



# Road & Bridge Design Publications

## Monthly Update – September 2012

Revisions for the month of **September** are listed and displayed below. The special detail index for **August** will remain in effect. Please contact Wayne Pikka ([pikkaw@michigan.gov](mailto:pikkaw@michigan.gov)) for questions related to the road changes or Vladimir Zokvic ([zokvicv@michigan.gov](mailto:zokvicv@michigan.gov)) for questions related to the bridge changes.

### Road Design Manual

2.05.05: Turf Establishment & 14.48: Request for Turf Establishment Recommendations: These sections were revised to eliminate Form 257 which is now obsolete.

9.03.01E: Light Standard Details: This is a new section.

5.10: ROW at Railroad Crossings, 12.11: Railroad Crossings, 12.12: Bicycle Facilities, 14.22: Railroad Coordination, 14.36: The Plan Review, 14.41: Participation Agreements: The former “Governmental and Railroad Coordination Unit” has recently split into two independent entities. The participation agreements function is now referred to as the “Governmental Coordination Unit-Development Services Division”. References to the railroad coordination function are now referred to as the “Railroad Coordination Unit – Office of Rail”.

### Bridge Design Manual

7.01.16(LFD & LRFD): Added a requirement for the approval of non-redundant or fracture critical designs by the Engineer of Bridge Design.

Updates to MDOT Cell Library, Bridge Auto Draw Program, etc., may be required in tandem with some of this month's updates. Until such updates to automated tools can be made, it is the designer's/detailer's responsibility to manually incorporate any necessary revisions to notes and plan details to reflect these revisions.

## MICHIGAN DESIGN MANUAL ROAD DESIGN

### 2.05.04 (continued)

#### Showing SESC Measures on Plans

- Use an SESC block on plan sheets to call out specific pay items.
- Include plan notes to indicate required sequence of placement of SESC measures to maximize their effectiveness.
- Include an adequate quantity of the pay item Erosion Control, Maintenance, Sediment Removal.
- Use special provisions for non-standard SESC measures when necessary and show these measures on the plans.
- Clearly identify sensitive areas such as lakes, streams, or wetlands, and include Vegetated Buffer at Watercourse (E&S-22);
- Delineate areas that are not to be used for materials or equipment storage and call for these areas to be clearly identified in the field.
- Clearly identify critical areas such as highly erosive soils or slopes.
- Show key numbers for E&S Details that do not have pay items associated with them such as Slope Roughening and Scarification (E&S-32), when these measures are critical for successful control of erosion and sediment control.

### 2.05.05 (revised 9-17-2012)

#### Turf Establishment

For all projects requiring turf establishment contact the Roadside Development Unit of the Design Division for procedures and materials recommendations four weeks before they are needed.

## MICHIGAN DESIGN MANUAL ROAD DESIGN

### 5.10 (revised 9-17-2012)

#### R.O.W. AT RAILROAD CROSSINGS

When determining the clear vision R.O.W. requirements of an at-grade trunkline crossing with a railroad, a plan sheet of the area in question should be submitted by the Design Engineer to the **Railroad Coordination Unit – Office of Rail**. This should be done as early as possible, so that the needed R.O.W. may be shown on the preliminary and final R.O.W. plans. **See Section 5.24, Figure 5.24.03.**

### 5.11 (revised 9-20-2010)

#### CONSENT TO GRADE

In cases where minor grading extends a short distance beyond the existing R.O.W., a consent to grade may be required. When it is anticipated that more than 500 cyd of earth excavation is to be removed from a grading consent area, the R.O.W. plans should show the location and estimated quantities. Drainage structures, culverts, and ditches should not be placed within areas with a grading consent, but require fee R.O.W. or easements. Consents to Grade shall be dimensioned from the proposed or existing R.O.W. lines. **See Section 5.24, Figure 5.24.04.**

### 5.12

#### POTENTIALLY CONTAMINATED SITES

The identification of potentially contaminated sites is important on all projects, whether proposed R.O.W. is required or the project will be built within existing R.O.W. The Design Engineer should refer to the procedure outlined in [Chapter 14](#).

### 5.13

#### TEMPORARY FENCE

It may be necessary to provide temporary fencing in stock grazing land where extra R.O.W. for grading and disposal of muck is required. A miscellaneous quantity of woven wire fence (for temporary fencing) should be shown on the note sheet.

### 5.14

#### PRESERVING R.O.W. LOCATION

Knowledge of the physical location of the R.O.W. is important to the Department when future improvements or expansions are planned. It is immediately important to owners of remainder properties abutting our fee ownership. Unless monuments are placed to mark the original alignment on which the R.O.W. was purchased, confusion may result over the location of the R.O.W. In urban trunklines and rural expressway projects, where use of alignment monuments by surveyors would be so dangerous as to be impractical, the R.O.W. lines are monumented. In both cases, state law requires that all Government Corners used in the design survey or affected by construction activities be preserved and a record filed with the Register of Deeds.

**MICHIGAN DESIGN MANUAL  
ROAD DESIGN**

**CHAPTER 9**

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  - C. Water Main Relocation Studies
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# MICHIGAN DESIGN MANUAL

## ROAD DESIGN

### 9.03

#### DESIGN GUIDES

##### 9.03.01 (revised 9-17-2012)

#### Utility Poles and Light Standards

Guidelines have been developed for the location of utility poles and light standards on free access roadway construction projects. These guidelines, which follow, reflect the most recent fix-object crash research and is the Department's latest effort to provide for the safety of the motoring public. Where reconstruction of a roadway is included in the project, every effort should be pursued to ensure that adjacent poles meet the recommended location criteria. However if the project does not impact the location of existing poles, a specific pole relocation is to be dependent on a concentrating of crashes or clear potential for crashes for the pole to be relocated.

#### Guidelines for Placement of Light Standards and Utility Poles on Free Access Roadways

When placed within public roadway right-of-way, light standards and utility poles should be located to provide a safe recovery area for motorists. To ensure maximum safety, this guideline is established to assist appropriate representatives in selecting the most practical and safe utilization of public rights-of-way. This guideline applies to all highway, utility, and roadway lighting construction projects on free access roadways.

#### A. General Considerations

It should be recognized that this is a guideline and that individual cases may arise which require special treatment such as: traffic signal installations; locations demonstrating fixed-object accident patterns; and locations with unique design problems, sight distance restrictions, high pedestrian activity, or unique environmental conditions. Departmental review procedures will take these factors into account.

### 9.03.01A (continued)

Certain highway geometrics warrant special consideration for placement of light standards and utility poles. Target positions to traffic flow should be avoided if possible. Such locations are: opposite T-intersections, outside of curves, beyond lane drops, and those locations that are not conducive to safe traffic operation. Where guardrails or barriers are in place specifically for shielding other roadside obstacles, light standards and utility poles should be placed behind the guardrail or barrier. The number of light standards and utility poles should be kept to a practical minimum. Consideration should be given to utilizing joint-use construction where possible.

#### B. Authorization

1. Any variances from this guideline will be resolved by the concerned parties. Concerned parties could include MDOT, FHWA, Local Governmental Units, the utility, the business community, citizen groups, and so forth.
2. The Development Services Division handles applications for a permit to place light standards or utility poles will be made on forms furnished by the Michigan Department of Transportation and shall be accompanied by a sketch showing the proposed locations in relation to the pavement edge or curb face and right-of-way, and should also include the posted speed limits and the widths and locations of any sidewalks.

#### C. Clarifications of Terms Used in Guideline

1. The placement of light standards and utility poles referred to in this guideline includes all related appurtenances.
2. All lateral distances are measured from traffic side of utility pole or light standard to pavement edge or curb face.

# MICHIGAN DESIGN MANUAL ROAD DESIGN

## 9.03.01 (continued)

### Utility Poles and Light Standards

#### D. Lateral Offset Guideline

Light standards and utility poles should always be placed as far from the roadway as feasible.

1. Where posted speeds are less than 35 mph:
  - a) In areas with curb types F & C (as specified on Standard Plan R-30-Series) or their equivalent, light standards and utility poles should be a minimum of 6' back of face of curb.
  - b) In areas with curb types B & D or their equivalent, light standards and utility poles should be a minimum of 15' from edge of pavement.
  - c) In Central Business District (CBD) areas with curb types F & C or equivalent and continuous sidewalk between the curb and buildings, light standards and utility poles may be placed 2' back of face of curb.
2. Where the speed limit is 35 mph or greater on tangent roadways with flat side slopes, light standards and utility poles should be placed according to the following table, regardless of the presence or absence of barrier curb.

SPEED LIMIT mph	LATERAL OFFSET feet
35	18
45	20
50	25
55	30

These lateral offsets should be increased for steeper slopes and for horizontal curves. Any variances from this guideline will be resolved by the concerned parties.

## 9.03.01D (continued)

Light standards on roadways with a speed limit of 35 mph or greater that cannot be placed equal to or greater than the prescribed distances shall be equipped with a "Frangible Device." The device shall meet NCHRP 350 criteria and be certified by FHWA (as proven by a letter of acceptance from FHWA).

### E. Light Standard Details

All light standards must be detailed on the design plans. MDOT details for light standards (non-frangible base), frangible base, and square aluminum light standards are available by contacting the Design- Municipal Utilities Unit. Shop drawings and design calculations for all light standards are to be submitted to the Design-Municipal Utilities Unit and the MDOT Structural Fabrication Unit – Operations Field Services Division for review and subsequent approval by the project manager. This applies to all light standards and more importantly to details other than those developed and provided by MDOT.

## 9.03.02 (revised 12-22-2011)

### Municipal Utility Alterations and Notification of Utility Design Units

Municipal Utility alterations are most often designed by the Utilities, Drainage, and Roadside Section of the Design Division. The most common alterations are designed by the Municipal Utility (water main and sanitary sewers), Hydraulics (drainage and storm sewer cost participation), and the Electrical (freeway lighting) Design Units. Close coordination between the Road or Bridge Design Unit and the Utility Design Units is needed.

The designer must inform the Utilities, Drainage, and Roadside Section of possible involvement early in the project design. After a scope verification meeting is held and plans are developed sufficiently to identify possible utility involvement, a set of prints should be sent to the appropriate Utilities, Drainage and Roadside Section Design Unit. This informs that particular design unit of their possible involvement and establishes a contact that should continue as the project progresses.

# MICHIGAN DESIGN MANUAL

## ROAD DESIGN

### 12.11

#### RAILROAD CROSSINGS

##### 12.11.01

###### References

- A. Standard Plan R-121-Series, "Track Crossings"
- B. Standard Plan R-122-Series, "Railroad Crossing Signals"
- C. Department Policy and Procedures 4110.02, "Coordination With Railroads"
- D. Michigan Manual of Uniform Traffic Control Devices, Part VIII
- E. American Railway Engineering Association, Manual for Railway Engineering
- F. Association of American Railroads, Signal Manual

##### 12.11.02 (revised 9-17-2012)

###### General

By law, highway crossings of a railroad are the railroad's responsibility. If a highway improvement requires the elevation of the tracks to be raised more than 1", the highway agency must assume the cost of the track adjustment. If a highway is widened, necessitating lengthening of the crossing, cost of the additional crossing may be borne by the railroad. Changes in, or additions to, railroad signals are funded equally between the railroad and the Department. Existing agreements may dictate the cost responsibilities at particular crossings. Certain safety improvements at railroad crossings may be funded with federal or state grade crossing account funds. Also federal funds may be used for crossing improvements required in connection with road improvement projects. The **Railroad Coordination Unit – Office of Rail** should be consulted about laws, agreements and funding.

##### 12.11.03 (revised 9-17-2012)

###### Railroad Contacts

When a railroad is involved on a Department project, the contact and negotiations with the railroad company are made by the **Railroad Coordination Unit – Office of Rail**. The designer should contact this unit very early in the design stage to alert the Railroad Coordination Engineer that a crossing is involved and to afford the opportunity for early project input. The **Railroad Coordination Unit – Office of Rail** may participate in the field reviews and may even request the railroad to attend.

The field review party should make observations regarding crossing condition and compatibility with the proposed project, but it is the responsibility of the **Railroad Coordination Unit – Office of Rail** to determine the actual work required at the crossing.

When railroad crossing improvements are federally funded, but the road work is with Michigan funds, the cost of detour traffic signing for the railroad crossing improvement should be included in the federally funded project.

Any changes in the railroad facilities, including rail elevations, superelevation, or relocation, should be discussed with the Railroad Coordination Engineer and must have railroad approval.

The **Railroad Coordination Unit – Office of Rail** will request prints from the designer, as necessary, to obtain approvals and agreements with the railroad.

## MICHIGAN DESIGN MANUAL ROAD DESIGN

### 12.11.04 (revised 9-17-2012)

#### Design of At-Grade Crossings

##### A. Track Elevations on Plans

The existing track profile(s) should be shown on the road plans extending 1000' each side from the crossing, if possible. Occasionally track profiles are not available. If track adjustments in excess of 1" are required, track elevations should be requested.

##### B. Track Raises

Existing track elevations usually must be met at grade. Studying the top of rail profile will frequently disclose that a raise in track elevations may be as beneficial to the railroad as to the highway. Small raises in track elevation can be made at no large expense, but this is not true when tracks are lowered. Railroads almost never lower their tracks, but are usually cooperative when a small raise is considered.

On those projects involving a track raise of any consequence (in excess of 1"), both the existing track profile and the new track profile through the crossing should be shown. In the case of new grade crossings, the existing track profile should be shown whether a track raise is required or not. This information is usually required by the various railroads for review when determining the need for adjusting the track profiles with respect to their own requirements.

##### C. Establishing Grade

The highway grade should be established to pass through the plane of the rails and at an elevation that is equal to the highest elevation of the two rails. See the details on Standard Plan R-121-Series, when establishing the highway grade to meet an at grade railroad crossing.

### 12.11.04C (continued)

A very good study can be made of the crossing by plotting profiles and cross sections to a scale of 1:125 horizontal and 1:12.5 vertical. A profile should be plotted for the centerline and each edge of a 2-lane pavement and in addition, along each joint line or lane line for pavements more than 2 lanes in width. The location, top of rail elevations, and cross surface should be carefully shown on each profile. Show adjusted profiles to meet the edge of crossing by means of irregular or French curves. Distances of approximately 100' should be used on both sides of the crossing to warp the grade from the edge of crossing surface to the grade established through the top of rail plane. Avoid "humping" the grade any more than necessary. After profiles have been established, plot cross sections at frequent intervals so that the amount of warp and maximum crown may be visually assessed for the entire irregular section. After the sections are plotted, an adjustment in the profiles, other than the centerline profile, will usually have to be made to avoid an excessively tilted pavement.

If the proposed pavement is only 2 lanes in width, it is necessary to warp out the crown at the outer edges of the pavement, which is easily accomplished. The crown on multiple-lane pavements vary from 4" to 6", and unless the warping transition is of considerable length, the riding qualities of the outer lanes will not be good at high speeds. One point that is not always given sufficient consideration in discussing the riding qualities of a railroad crossing is that of speed. Crossings that ride well at slow speed to moderate speeds may ride badly at high speeds and vice versa. Crossings of multi-lane highways, especially if relatively long due to a skew, should be designed so that a minimum longitudinal grade is called for on the rails. Drainage is an important consideration in selection of grades because it directly affects crossing stability. Runoff should be intercepted where possible to prevent drainage into the crossing area.

# MICHIGAN DESIGN MANUAL

## ROAD DESIGN

### 12.11.04 (continued)

#### Design of At-Grade Crossings

##### D. Superelevation

Where crossings are complicated by inclined grades on both the railroad and highway, by skew crossings, by multiple tracks, and/or by railroad superelevation in a plane opposite to that of the highway grade, a difficult problem results that usually cannot be completely and satisfactorily resolved.

In establishing preliminary grades to eliminate or reduce existing track superelevation, the grade should always be laid to meet the high edge of the crossing, knowing that it will be necessary to request a raise in elevation. The **Railroad Coordination Unit – Office of Rail** can explore superelevation changes with the railroad. Main line track superelevation normally must be maintained, but the superelevation on switch tracks and side tracks can sometimes be reduced or eliminated entirely.

Where the plane of superelevation of the tracks is counter to that of the highway grade, it is necessary to establish a short grade tangent to the top of both rails. At the intersections of this short tangent with the longer approaching grades, short vertical curves are used. If this treatment results in an undesirable "hump" it can be minimized somewhat by careful adjustment of the tangent intersections and the skillful choice of vertical curves. Sometimes the use of vertical curves with unequal tangents will make a much smoother crossing (i.e. detail grades).

### 12.11.04 (continued)

#### E. Types of Crossings

Three principal types of crossings are now used: hot mix asphalt with guard log or three rail, the prefabricated sectional treated timber crossing and the proprietary crossing surfaces. The proprietary crossing surfaces are generally considered to be superior, but their price is also greater. The selection of the type of crossing material will be as agreed upon between the **Railroad Coordination Unit – Office of Rail** and the Railroad.

#### F. Railroad Owned Materials

Occasionally the plans will call for the contractor to remove railroad owned materials, principally rails, fittings, and ties, during the progress of the work. In most cases the railroad company wants these materials salvaged for its future use.

Ordinarily the disposition of such material will be covered in an agreement or by letter communication with the Department. The proposed disposition of such material should be indicated on the plans so the contractor will not assume that the salvaged material is to become the contractor's property.

When the disposal becomes the responsibility of the contractor, railroad ballast, railroad ties, treated wooden piles and treated wood posts disposition shall be as follows:

##### 1. Railroad Ballast

Design should request the Region/TSC Resource Specialist to make a preliminary field inspection of the crossing. Then, unless there is obvious contamination or reason to suspect a problem, the project should proceed as if the material were clean. If, on construction, contamination is encountered, the cleanup will be done by force account.

# MICHIGAN DESIGN MANUAL

## ROAD DESIGN

### 12.11.04F (continued)

#### Design of At-Grade Crossings

##### 2. Railroad Ties or other Treated Wood

Railroad ties and other treated wood that are in good condition may be separated from the junk and may be used for landscaping purposes, retaining walls, etc. The contractor should not be allowed to dump the ties (or piles, posts, etc.) in a pile for future sorting since this could be considered improper disposal of contaminated waste material.

##### 3. Disposal

Licensed Type II landfills are the appropriate disposal areas for railroad ties, treated wood piles, treated wooden guardrail post, etc. The appropriate disposal area for contaminated ballast will be determined after the contaminants are identified.

Designers should use the following General Plan Note:

#### **Railroad Ties and Other Treated Wood**

Railroad ties and other treated wood that are in good condition may be separated from the junk and may be used for landscaping purposes, retaining walls, etc. The contractor will not be allowed to dump the ties (or piles, posts, etc.) in a pile for future sorting since this could be considered improper disposal of contaminated waste material. Licensed Type II landfills are the appropriate disposal areas for railroad ties, treated wood piles, treated wooden guardrail post, etc.

### 12.11.04 (continued)

#### G. Traffic Control Devices (Railroad Signals and Gates)

The **Railroad Coordination Unit – Office of Rail** will locate the traffic control devices with respect to the road and tracks. These signal locations should be shown on the plans to assist in determining conflicts with utilities, drainage, driveways, etc.

Standard railroad pavement markings and signing should be included in the design of the crossing.

### 12.11.05

#### Railroad Grade Separations

On limited access highways, all at-grade Railroad-Highway crossings are to be eliminated per federal guidelines. Grade separations must be constructed at these locations unless the railroad can relocate or abandon their tracks.

On free access roads, grade separations must be economically justified by a benefit/cost ratio of 1.0 or more. Benefit/cost ratios will be calculated by the Economic Analysis Unit, Program Planning Division, Bureau of Transportation Planning. Ratios will divide the value of highway-user delay, operating cost and accident savings, by the Department's life-cycle cost, discounting to present value, over a period of 20 years.

For highway bridges over railroads a vertical clearance of 23' is required. When laying a preliminary road grade over a separated railroad, the designer should assume the road grade to be 28' above the top of rail elevation. This is generally adequate for a skew crossing of perhaps two sets of tracks. For a 90 degree crossing of a single track an allowance on the order of 27' will be close.

For railroad side clearances, see Bridge Design Guides 5.24.03 and 5.24.04.

See also [Chapter 13](#) of the Bridge Design Manual.

# MICHIGAN DESIGN MANUAL

## ROAD DESIGN

### 12.12

#### BICYCLE FACILITIES

##### 12.12.01 (revised 3-17-2009)

###### Legislation

Section 10k of Act 327, P.A. of 1972 amended the basic Act 51, by providing that 1/2 of 1% of the gas and weight tax returns made to the Department, counties, cities, and villages be spent for non-motorized transportation. Act 444, P.A. of 1978, further amended Act 51 by increasing the percentage to 1%.

##### 12.12.02 (revised 3-17-2009)

###### Attorney General Opinions

Various Attorney General's Opinions have stated the following:

- A. The term "highway" includes facilities for non-motorized transportation; thus, the right of eminent domain applies. (November 1, 1973)
- B. Participating cities must participate in the cost of a non-motorized path as if it were a highway. (April 29, 1974)
- C. The Department must pay the entire cost of a railroad crossing required for a new bicycle path. (July 24, 1975)
- D. A non-motorized facility must adjoin, be in close proximity to, or cross over roads, streets, or bridges in order to be considered a "reasonable appurtenance" to roads, streets, or bridges. (June 19, 1980)
- E. A trail separated somewhat from its highway which demonstrably accommodates non-motorized traffic which would otherwise use the highway should satisfy the close proximity requirement. (Sept 3, 1992)

### 12.12.03

#### References

- A. Act 51, P.A. of 1951 as amended, Section 247.660k
- B. "Guide for Development of New Bicycle Facilities, 1991," AASHTO
- C. ***Standard Specifications for Construction*** – Current Edition
- D. Planning, Design, and Maintenance of Pedestrian Facilities, F.H.W.A. 1P-88-079.

##### 12.12.04 (revised 12-15-97)

#### Non-motorized Transportation Project Review

For projects that do not have to go through the project development process, the project initiator must consider the feasibility of conveyances for non-motorized vehicles. Normally all projects with a length of approximately 1 mile or more, including resurfacing projects, should be considered for these facilities.

The merits of a path are considered on the basis of its location, connection to other facilities, and potential for use. Those projects meriting a positive consideration, which includes a recommendation as to type, location, and width of the path, are referred to the Department Bicycle/Pedestrian Coordinator, Bureau of Transportation Planning.

## MICHIGAN DESIGN MANUAL ROAD DESIGN

### 12.12.04 (continued)

#### Non-motorized Transportation Project Review

The Bicycle/Pedestrian Coordinator investigates the project in detail, soliciting input from local governmental units and user groups. Also considered is the availability of funds and the accumulated total of funds previously committed.

### 12.12.05

#### Department "Policy"

The Department will not construct, with State trunkline funds, independent bike paths (i.e., back of curb or beyond the shoulder) unless a local governmental agency accepts the responsibility for maintenance of the facility on completion of construction.

See [Section 12.03.06](#) for Department "policy" for constructing bicycle facilities on turnbacks.

### 12.12.06 (revised 12-15-97)

#### Urban Projects

On urban-type projects with curb and gutter, but without sidewalk, the bicycle path will likely occupy the space normally reserved for future sidewalk. Since most municipalities insist on concrete for sidewalks, the bicycle path should be constructed of 4" concrete if it is evident that sidewalks will be eventually built anyway. In essentially rural areas, even with curb and gutter, the path will normally be hot mix asphalt if it appears that there is little probability of sidewalk ever being needed.

Generally, it is poor practice to attempt to utilize portions of existing sidewalk in front of homes for a bike path. If it is proposed to build a bicycle path in front of homes, the

### 12.12.06 (continued)

Bicycle/Pedestrian Coordinator, the Region/TSC, and Design should coordinate the proposal with local officials. If favored locally, the local officials should contact affected property owners to discuss the bike path and land requirements with them, and include those results in a response to MDOT.

This information will be used to determine if an MDOT public hearing is required prior to initiating R.O.W. acquisition by MDOT.

### 12.12.07 (revised 9-17-2012)

#### Agreements

Whenever it is proposed that an independent bicycle path be constructed, it will be necessary to obtain from the local unit of government, a commitment that it will not enact any ordinances prohibiting cyclists from using bicycle paths constructed by the Department. In addition, the local unit of government must agree to repeal any such existing ordinances that might apply to the path in question.

The designer should provide the Local Agencies Unit with a description of the facility being constructed, including a print of the title sheet (if available) so that the necessary documents may be secured from the involved local unit of government. These documents should also include agreements with the municipalities relative to maintenance of bicycle paths. This description of the facility should be forwarded early in the design stage to ensure that the local governmental agency will have sufficient time to act prior to our scheduled advertising date. Local rejection of such an agreement will have the effect of immediately terminating the bike path project.

To adhere to FHWA guidelines and Michigan law (MMVC 750.419), it is suggested that all state/local agreements for projects with [separate] bikeways contain a prohibition against use of the path by motorized vehicles, except maintenance vehicles.

# MICHIGAN DESIGN MANUAL

## ROAD DESIGN

### 12.12.07 (continued)

#### Agreements

Act 51 participation (cities over 25,000 population) is required for bicycle facilities, the same as for any other highway construction project. Separate agreements are used for funding, maintenance, and operations. The maintenance and operation agreement should be secured from the local unit prior to the design of the facility. Participation agreements are usually secured at a later date and are included with the major project.

If the bike path crosses a railroad, either by grade separation or at grade, the **Governmental Coordination Unit – Developmental Services Division** should be informed as soon as possible so that the proper arrangements and agreements can be made.

### 12.12.08 (revised 3-17-2009)

#### Types of Bicycle Facilities

Most of the bicycle facilities built in Michigan are of two types: a widened paved shoulder or a shared use path.

A shared use path is a bikeway or pedestrian walkway physically separated from motorized vehicular traffic by an open space or barrier - either within a highway right-of-way or within an independent right-of-way. Shared use paths may also be used by pedestrians, skaters, wheelchair users, joggers, and other non-motorized users.

Shared use paths may be one-way, consisting of paths on each side of the road, or two-way, located on one side.

Adding bicycle lanes 4' or wider or, on curbed roadways, widening curb lanes to approximately 14' are design options in urban areas.

### 12.12.09 (revised 9-17-2012)

#### Design Features of Bicycle Paths

The basis for the design of bicycle facilities is the AASHTO design criteria of the "Guide for the Development of Bicycle Facilities, Aug. 1991.

##### A. Design Speed

The desirable design speed for bicycle paths should be 20 mph. Where descending grades are over 4%, the design speed should be increased to 30 mph. On paths where a mix of non-motorized users is anticipated (bikers, walkers, roller bladers, etc.), lower design speeds should be used.

##### B. Grades

Grades, in general, should follow the lay of the land. Except for short distances, grades greater than 5%, either ascending or descending, are undesirable.

##### C. Horizontal Alignment

A meandering alignment using compound curves, "eye-balled" in the field, is preferable to simple circular curves. Tight, short-radius curves should be avoided, if possible. For a design speed of 20 mph, a minimum radius on the order of 100' is recommended.

##### D. Crown and Superelevation

For drainage, a minimum of 2% cross-slope should be used, with the high point at one edge of the path for ease of construction. This equates to a 2% superelevation, so the direction of cross-slope should be switched as necessary to match the direction of curvature. Greater amounts of superelevation up to a maximum of about 5% may be considered for sharper curves.

## MICHIGAN DESIGN MANUAL ROAD DESIGN

### 12.12.09 (continued)

#### Design Features of Bicycle Paths

##### E. Width

The minimum paved width of a two-way path should be 10'. This width may be reduced to 8' for short distances to avoid inordinate cost, such as would occur when widening a vehicular bridge. Where large numbers of cyclists can be expected, e.g., adjacent to a college campus, 12' or 14' widths may be justified. Widths should be uniform for ease of construction.

A one-way path should have a minimum 5' width, although narrower widths can be accepted for short distances where obstacles and other restrictions occur.

Part-width paved shoulders that are intended for bicycle use should desirably be 5' wide. The minimum width for shoulder ribbons intended for bicycle use is 4'.

Paths separate from a pavement or shoulder are difficult to pave with a HMA paver when they are less than 8' wide. This is not to say that paths of narrower widths cannot be constructed of HMA, but the quality of the path will likely be somewhat diminished.

##### F. Clearances

Lateral clearance from the edge of path to adjacent obstructions should desirably be 3' (2' min.). Usually, this clearance cannot be obtained at bridges or in tight R.O.W. that is fenced. In these cases the side obstruction should be made as "snag proof" as possible.

Vertical ground clearance should be 8' minimum.

### 12.12.09 (continued)

#### G. Grading

If the subgrade contains vegetative cover or root mat, all such material should be removed to a depth of at least 4" and the subgrade smoothed and compacted and a soil sterilant applied. A minimum of 4" of "Coarse Aggregate 6A (LM)," paid for by the cubic yard, should be used to provide an adequate base.

When available space permits, a minimum 2' width of graded area should be provided adjacent to the path. The paved surface should be close to the same elevation as the adjacent ground, consistent with good drainage.

When a path is located between the top of backslope (or the toe of fill slope) and the R.O.W. line, at least 15' is required to construct an 8' path to allow rounding of the slope intersections.

#### H. Surface Type

Modern road bicycles trend toward narrow, high-pressure tires and lightweight frames. A smooth path is considered paramount. To achieve the required smoothness of a HMA surfaced path, machine spreading should be specified. Most agencies opt for the HMA surfacing because it lacks joints and generally is more economical to construct.

If concrete is used, it is built much like sidewalk, except that sawing of joints should be specified to eliminate the depression that is characteristic of a jointing tool. A joint down the center of the path should be avoided.

Curb cuts for bicycle paths are essentially the same as for sidewalk ramps (See Standard Plan R-28-Series). The section through the curb cut should be a smooth curve and *not* the 1" lip that was sometimes used at driveway openings.

## MICHIGAN DESIGN MANUAL ROAD DESIGN

### 12.12.09 (continued)

#### Design Features of Bicycle Paths

##### I. Drainage and Structures

Occasional temporary flooding of the path, if duration does not exceed perhaps one day, is acceptable provided it is not frequent and that no objectionable deposits are left on the path. Drainage courses should be accommodated by culverts and bridges. These structures need not be elaborate; e.g., end treatments may often be omitted on culverts. For ease of maintenance, culverts should be used rather than bridges. Where small bridges are required, the Roadside Development Unit of Design Division should be consulted. Use of prefabricated structures should be considered.

When a typical timber structure for bicycle paths over small streams is called for, the designer should inform the Region/TSC Soils and Materials Engineer. The Soils and Materials Engineer will then conduct an investigation to determine if the assumed soil capacity is adequate. This investigation may range from a site inspection and review of previously made culvert borings to borings made with a continuous flight auger. In those rare cases where a complete foundation investigation is required, it will be requested by the Region/TSC Soils and Materials Engineer.

The minimum information for timber bicycle structures to be included in the plans consists of:

1. Complete alignment ties
2. Plan and profile
3. Design loading
4. Foundation design, including soil information and footing pressures.

Ditch crossings, if not via embankment and culvert, should be on a flat angle across the ditch.

### 12.12.09 (continued)

#### J. Railings and Retaining Walls

Railings or fencing should be considered to protect cyclists from hazards such as steep side slopes. Any railing or fencing should be a minimum of 2' from the edge of the path with a minimum height of 4.5'. A smooth rub rail should be provided at a height of 3.5'.

The Roadside Development Unit of the Design Division should be consulted for appropriate railing and fence treatments and for the design and materials of retaining wall used along bicycle paths.

#### K. Bicycle Facility Railroad Crossings

Bike paths should cross as close as possible to a 90° angle to the tracks. The **Railroad Coordination Unit – Office of Rail** should be contacted for design details of the crossing, including crossing material, flange filler, and appropriate signing and warning devices.

## MICHIGAN DESIGN MANUAL ROAD DESIGN

**14.21.03** (revised 3-26-2012)

### **Bridge Loading and Under clearance Review**

It is essential that the Department maintain accurate and detailed records and control of the added deadload on bridges and of the under clearance at underpasses. Occasionally these considerations will mean that deck surfacing material must be removed before a resurfacing can be undertaken or that surfacing under a bridge must be removed so that a new surface can be maintained at or near the existing elevation. On some H-15 bridges, 2" of surfacing may reduce the operating load capacity by 10,000 lbs.

After scope verification, a memo should be sent to the Bridge Management Unit listing structures within the limits of the project, proposed treatments, proposed plan completion and letting dates requesting recommendations. The Bridge Management Unit will contact the Operations Field Services Division to determine if periodic maintenance inspections have disclosed the need for remedial measures. Detailed recommendations will then be sent to the Project Manager.

**14.21.04**

### **Special Structures/Footing Design**

On occasion there may be situations where the scope of work includes disciplines beyond the expertise of the Project Manager and/or the unit assigned the project. Frequently, items such as sound walls, retaining walls, unique culverts and footings are assigned a bridge unit for design assistance. In these instances the Project Manager should request assistance from the Special Assignment Structures Unit in Bridge Design. The request should be by memo with copies to the Supervising Engineer-Bridge, and Engineer of Bridge Design. These requests should be made as soon as the need is known to allow the bridge unit(s) as much lead time as possible to accommodate the project's schedule while meeting their own schedules.

**14.22** (revised 9-17-2012)

### **RAILROAD COORDINATION (PPMS Task Description 3650)**

A contact by the Department with the railroad company is required any time a highway alteration occurs within the railroad right of way.

For at-grade crossings and grade separations, the contact is made by the **Railroad Coordination Unit – Office of Rail.**

In the case of at-grade crossings:

1. Submit one (1) set of prints of the title sheet, typical cross section, and plan and profile sheets for the affected railroad crossing with a memorandum to the **Railroad Coordination Unit – Office of Rail** indicating the proposed improvements to be made. This unit will advise the Design Unit as to what preliminary additions and alterations are desirable in order to satisfy the particular railroad company involved. Even if little or no impact on the railroad is expected, the railroad will usually be notified, and a coordination clause may be required.
2. Always show track elevations and profiles on the plans. If sufficient survey is not available, write a note to this effect on the plans. If track adjustments in excess of 1" are required, a request for pick-up survey is needed to obtain the required information.
3. After the plan notes have been completed to the satisfaction of the **Railroad Coordination Unit – Office of Rail**, submit three (3) sets of prints to the **Railroad Coordination Unit – Office of Rail** for their use in contacting the railroad. Any required Special Provisions will be supplied to the Design Unit by the **Railroad Coordination Unit – Office of Rail.**

## MICHIGAN DESIGN MANUAL ROAD DESIGN

### 14.22 (continued)

#### RAILROAD COORDINATION

4. While the general design of the railroad crossing should be set after THE Plan Review, it should be noted that railroad negotiations will take a minimum of six months to complete. If an agreement is required, it will take a minimum of one year. The Design Unit must take this into account by timely submittal of the initial prints to the **Railroad Coordination Unit – Office of Rail**.

Note that THE Plan Review does not attempt to determine whether a crossing is adequate, should be extended, or if a complete new crossing is warranted. An observation may be made regarding the condition of the crossing and compatibility with the proposed project, but it is the responsibility of the **Railroad Coordination Unit – Office of Rail** to determine the actual work required at the crossing. This may require scheduling of a diagnostic team review and ultimately, lead to the issuance of a regulatory order by the Department.

It is particularly important that both existing and proposed utility crossings under and over the railroad be shown. Details of those crossings must also be included and approved by that particular railroad company.

See also [Section 12.11.03](#) of the Road Design Manual and Chapter 13 of the Bridge Design Manual.

### 14.23

#### REQUEST FOR TRAFFIC VOLUMES (PPMS Task Description #2120)

Existing traffic volumes (ADT, DHV) for 3R projects should be requested from the Data Collection Section in the Bureau of Transportation Planning. Volumes from the latest available year should be included in the plans (Title Sheet).

Increased Capacity/New Routes (4R) projects require projected traffic volumes, usually 20 years in advance of the projected year of construction. Ordinarily these volumes have already been determined during the Project Development stage (see [Section 14.05](#)). However, if a significant period of time has elapsed, these volumes should be revised. Revisions are requested from the Project Planning Section in the Bureau of Transportation Planning. This request should be made as soon as the need becomes evident.

If the amount of traffic data is large (i.e. entrance & exit ramps at several interchanges), it may be desirable to show the information on a separate plan sheet.

## MICHIGAN DESIGN MANUAL ROAD DESIGN

### 14.36.02 (revised 9-17-2012)

#### Procedure

1. When the Project Manager or Consultant determines the plans meet the requirements for THE Plan Review, a Plan Review Material Submittal (Form 2913) is completed to verify that supporting documents, proposal materials and plans are ready to submit. The materials are entered into ProjectWise under the following file names;
  - Job Number-Supporting Documents
  - Job Number-Proposal Material
  - Job Number-Plans (flatten file prior to posting)
2. The Project Manager fills out a Plan Review Meeting (Form 0200). Include E-mail addresses for invitees outside of MDOT, Include dates that key personnel and conference rooms are available. They should be at least 3 weeks (preferably 4-5 weeks) from the submittal date.
3. The Project Manager will verify that ProjectWise (folder 3) is current with the following format;
  - 3 – Plan Review
    - Meeting Request and Minutes
    - Review Comments

If the format is not correct contact the ProjectWise administrator to apply the proper template.
4. When the project is ready for final review, form 0200 is placed in the ProjectWise subfolder "Meeting Requests and Minutes" using the file name *Job Number-form 200* and the state is advanced to "Request for Meeting" to initiate submittal to Quality Assurance for review. The ProjectWise state on the three files containing plans, proposal material and supporting documents in the "Plan Review" folder are also advanced once to "Submitted for Review".

### 14.36.02 (continued)

5. The plans will be reviewed by Quality Assurance for completeness and a meeting date scheduled 4-5 weeks from the time of submittal. Instances where projects require a compressed schedule or scheduling without plans should be kept to a minimum. The 4-5 week period is needed to assure all participants are given ample time to review the plans prior to the meeting. This is essential to making THE Plan Review as useful and productive as possible.
6. Plans and other material are made accessible in ProjectWise by the Project Manager. Quality Assurance distributes the same to non-ProjectWise users in an alternate deliverable and usable format. The reviewers include the following:
  - Operations Field Services Division
  - Region System Manager
  - TSC Manager
  - Region/TSC Resident/Delivery Engineer
  - TSC Development Engineer
  - Region/TSC Operations Engineer
  - Region/TSC Soils/Materials Engineer
  - Region/TSC Traffic and Safety Engineer
  - Region/TSC Maintenance Engineer
  - Region/TSC Utilities/Permits Engineer
  - Region/TSC Real Estate Agent
  - Region Resource Specialist
  - Region Bridge Engineer  
(Bridge Jobs Only)
  - Region Bridge Inspection Engineer  
(Bridge Jobs Only)
  - Environmental Section-BTP
  - FHWA Oversight
  - Design Utilities Section
  - Railroad Coordination Unit – Office of Rail  
(if applicable)
  - Geometrics Section- Design
  - Utilities/Permits Development Services Division
  - City or Village (if applicable)
  - County Drain Commissioner  
(if applicable)
  - County Road Commission
  - Department of Management and Budget (MIR Program)
  - Others identified by the Project Manager

## MICHIGAN DESIGN MANUAL ROAD DESIGN

14.41 (revised 9-17-2012)

### PARTICIPATION AGREEMENTS (PPMS Task Description 3630)

#### 14.41.01

##### General

Any questions with respect to the necessity of an agreement, cost participation, cost splits, or negotiation of terms in an agreement should be coordinated with the **Governmental Coordination Unit - Development Services Division**. Agreements for State trunkline highway projects are prepared by the Governmental and Railroad Coordination Unit in the following categories:

- Memos of Understanding (for activities performed by local agencies-PE, CE, ROW acquisition, etc.)
- Trunkline enhancement projects
- Statutory-Act 51 Participation
- Extra Width Construction and Resurfacing
- Non-trunkline Work
- Municipal Utility (betterment or relocation)
- Turn back
- Parking
- Maintenance and Operation (bike path, sound walls, pedestrian bridges, etc.)
- Michigan Institutional Roads
- Joint Storm Sewers
- Detour Route Improvements

The **Governmental Coordination Unit - Development Services Division** is responsible for the negotiation of terms and preparation of agreements. Contact should be made as early as possible in the plan development process to allow adequate time for the proper coordination to process an agreement.

#### 14.41.01 (continued)

Any correspondence with a local unit of government that involves participation, whether statutory or special, should be originated by or cleared through the **Governmental Coordination Unit - Development Services Division**. Particular care should be used when citing cost estimates and federal participation since the agreement cost estimate figures may include higher contingency percentage and lower federal-aid participation ratios.

Information on work to be included in a contract at 100% local expense should be submitted to the **Governmental Coordination Unit - Development Services Division** upon request for the additional work from the local agency.

Requests for agreements should be submitted prior to scheduling an OEC Meeting or sooner, if possible. The following information should be submitted for an agreement preparation:

- Project Agreement Checklist-with any special conditions included in the project.
- Engineer's Estimate-with proper agency splits (proposal level in TRNS•PORT).

Plans should include the following:

1. Corporate limits and itemized quantity splits to be participated in by the city for Act 51 work.
2. Itemized quantity splits for any 100% local work (work not participated in with MDOT funds).

Other agreements such as, non-contract traffic signal (**Operational Services**), right-of-way (**Development Services Division**) and general road and bridge maintenance (**Maintenance Services**) are processed by other areas **within MDOT**.

## MICHIGAN DESIGN MANUAL ROAD DESIGN

### 14.41.02 (revised 9-17-2012)

#### Estimates

The estimate provided to the **Governmental Coordination Unit - Development Services Division** for agreement purposes should NOT include contingencies since a contingency factor will be added to the construction cost for agreement purposes. The estimate should be refined to such a degree that it will be within 25% of the final engineer's estimate. Anything in excess of 25% should be called to the attention of the **Governmental Coordination Unit - Development Services Division**. The estimate must be split along corporate limits for projects with city participation. Any modifications to the scope should be incorporated in a revised or amended agreement.

Upon receipt of the request for involvement, the **Governmental Coordination Unit - Development Services Division** will contact the Design Unit to request any additional information required and will coordinate the agreement processing procedure.

### 14.41.03 (revised 9-17-2012)

#### Act 51 Participation

Act 51 Public Acts of 1951, as amended (1982), provides that cities having a population of 25,000 or more will participate with the Department in the cost of opening, widening and improving, including construction and reconstruction, of State trunkline highways within said cities. Cities required to participate, based on the 2010 census, are:

### 14.41.03 (continued)

<b>OVER 50,000 12.5 % Participation</b>	
Ann Arbor	Pontiac
Battle Creek	Rochester Hills
Dearborn	Royal Oak
Dearborn Heights	Saginaw
Detroit	St. Clair Shores
Farmington Hills	Southfield
Flint	Sterling Heights
Grand Rapids	Taylor
Kalamazoo	Troy
Lansing	Warren
Livonia	Westland
Novi *	Wyoming
<b>40,000 to 50,000 11.25 % Participation</b>	
East Lansing	Portage
Kentwood	Roseville
Midland	
<b>25,000 to 40,000 8.75 % Participation</b>	
Allen Park	Lincoln Park *
Bay City	Madison Heights
Burton	Mount Pleasant
Eastpointe	Muskegon *
Garden City	Oak Park
Holland	Port Huron
Inkster	Southgate
Jackson	Wyandotte

\* City has changed participation range.

## MICHIGAN DESIGN MANUAL ROAD DESIGN

### 14.41.03 (continued)

#### Act 51 Participation

In order to facilitate the administration of this portion of Act 51, P.A. 1951, as amended, the **Governmental Coordination Unit - Development Services Division** should be contacted to determine whether an agreement is required for a project and to determine the items requiring participation if the project lies within or partially within the corporate limits of any of the previously noted cities.

### 14.41.04 (revised 9-17-2012)

#### Maintenance

Maintenance work is excluded from statutory participation. The distinction between maintenance and construction items in a contract is sometimes hard to determine. The **Governmental Coordination Unit - Development Services Division** will make the final determination. Generally the following items are considered as non-participating, even though they may be in a construction contract:

- Replacing aggregate in a thickness of less than 3" on an existing gravel or stone surface where the original material has been lost or bladed off.
- The installation of traffic signs, delineators, or pavement markings other than those required for the maintenance of traffic during construction.
- Installation of freeway lighting for traffic safety.
- Nominal repair or painting of structures.
- Replacement of pavement joints unless performed in conjunction with a project to prepare the roadway for resurfacing.
- At existing railroad crossings, the installation of railroad crossing warning devices and the reconstruction or replacement of crossing materials, including maintaining traffic, detours and minor roadway approach work.

### 14.41.04 (continued)

- Seal coating, patching and repairing of roadway surfaces.
- Snow and ice removal.
- Cleaning of road and street surfaces.
- County drain assessments.
- The trunkline share of traffic signals unless specifically included as part of the agreement with the participating city or village.
- Brushing and tree trimming other than in connection with a roadway improvement.
- Reconditioning of hot mix asphalt surfaces of any length by scarifying and remixing in place, or resurfacing without scarifying when the new material added increases the existing HMA surface less than 1½".
- Application of dust control layers, sprinkling and flushing.
- Outdoor advertising sign removals without widening or relocating the roadway.
- All work programmed as Capital Preventive Maintenance (CPM).
- Upgrading of existing sidewalk ramps or construction of new sidewalk ramps in order to comply with federal requirements under the Americans with Disabilities Act (ADA), ONLY when required ADA compliance is a direct result of CPM work.

## MICHIGAN DESIGN MANUAL ROAD DESIGN

### 14.41.05 (revised 9-17-2012)

#### Extra Width Construction or Resurfacing

Act 51 is specific as to the width of pavement for which the Department is responsible. An agreement is necessary whenever the proposed work covers a width greater than the Department can justify.

In any city or village, the width of a State trunkline highway will be the width required to serve expected future traffic needs for a 20 year period, as determined by a Department transportation survey. This width, except as noted below, will not be less than (1)the currently accepted standards for a 4-lane highway, (2)such width as may be built on the same trunkline route immediately beyond and adjacent to either legal boundary of the city or village, or (3)on trunklines eligible for federal highway funds, such width as may be prescribed by the federal government, whichever is greater. The Department and the governing body of a city or village by mutual agreement may determine that the width of a State trunkline highway will be less than the width prescribed above. If any city or village desires to widen a State trunkline highway for local purposes beyond the width prescribed above, the entire cost of the extra width must be borne by the city or village.

Resurfacing of any width greater than 47'-3" (64'-0" if parking is prohibited and marking is for 5 lane operation) or of any lane or bay on which parking is permitted should be reviewed with the **Governmental Coordination Unit - Development Services Division**.

The Department will pay the costs for any construction on a trunkline highway where parking is permitted when the width is 47'-3" or less. If the resurfacing of the parking lanes is done at project cost, an agreement will be written that states that the Department may use the additional width for trunkline purposes, when and if, necessary.

### 14.41.05 (continued)

The **Governmental Coordination Unit - Development Services Division** should be notified if there is a possibility of extra width construction or resurfacing. If so, it will conduct negotiations, make a final determination, and prepare an agreement if necessary.

### 14.41.06 (revised 9-17-2012)

#### 100% Betterment for Local Party (non-trunkline work)

A local party, whether governmental or private, may request betterments to their local facilities, to be constructed in conjunction with a state trunkline project. Any such work requires a participation agreement. Regardless of the Division contacted, the **Governmental Coordination Unit - Development Services Division** should be notified so that negotiations on the cost agreement can be started.

Betterments may be either improvement of utilities or any construction not required because of the trunkline project. Generally this includes any construction beyond the spring points of the intersection on the local legs or the trunkline right-of-way lines extended (whichever is smaller), other than the minimum work to transition either in width or grade back to the existing road.

## MICHIGAN DESIGN MANUAL ROAD DESIGN

### 14.41.07 (revised 9-17-2012)

#### Municipal Utilities

General relocation of municipally owned utilities within their corporate limits is done at project expense, except for water main relocation (See [Section 9.02.01B](#)). If the relocation is part of the Department's contract, no agreement is necessary; however, local notification is secured through the procedure outlined in [Chapter 9 "Utilities."](#) If the relocation is to be done by the owner, or if the utility is located outside the corporate limits of the owner, an agreement is required. The [Governmental Coordination Unit - Development Services Division](#) and the Municipal Utilities Unit will make the determination. For more information see [Section 9.02](#).

### 14.41.08 (revised 9-17-2012)

#### Bicycle Paths

An agreement is necessary with the local government agency for the construction of independent bike paths within the limits of that agency. The Department will construct the path, including the initial signing, provided that the governmental agency agrees to certain conditions, principally a willingness to assume all maintenance responsibility. The agreement should be requested from the [Governmental Coordination Unit - Development Services Division](#) at the beginning of the design phase. No agreement is required for shoulders designated as bike paths other than for reasons listed in other categories of agreements. For more information see [Section 12.12](#).

### 14.41.09

#### Turnbacks

Turn back work will require an agreement. Cities with a population over 25,000 participate by statute. Special items or betterments are treated the same as regular trunkline work. Under some circumstances an agreement will be obtained only to outline the procedure for design, construction and transferring jurisdiction. Care in meeting these provisions must be exercised in the design process. Any work done in advance of or in anticipation of turn back may require an agreement to protect the Department's interest. The Turn back Law also contains provisions for making a lump sum payment to the local agency in lieu of a rehabilitation project. For more information see [Section 12.03](#).

### 14.41.10

#### Parking

The Design Division should notify the Traffic and Safety Division of the possibility that a parking restriction agreement is required. The Traffic and Safety Division will investigate the situation and formally request an agreement, if required. Any section of roadway being widened within the corporate limits of a city or village should be referred to and reviewed by the Traffic and Safety Division. Resurfacing of any roadway in any city or village where parking is not prohibited should be reviewed.

## MICHIGAN DESIGN MANUAL ROAD DESIGN

### 14.41.11 (revised 9-17-2012)

#### Special Maintenance and Operational Obligations

When special conditions for either maintenance or operational obligations exist (bike paths, sound walls, pedestrian bridges, etc.), contact the **Governmental Coordination Unit - Development Services Division**, as these must be covered by an agreement.

### 14.41.12 (revised 9-17-2012)

#### Michigan Institutional Roads (MIR Program)

Work done with MIR funds does not require an agreement since these are budgeted MDOT funds. Work is confined to roads open to the public. Institutions may request work on private roads, parking lots, or other items of benefit to them such as drainage or lighting. These items are not eligible for MIR funds and must be funded with a special account number. An agreement must be secured with the Department of Management and Budget by the **Governmental Coordination Unit - Development Services Division**.

### 14.42

#### SPECIAL USE PERMITS

Special Use Permits (SUPs) are issued by local governmental agencies. Currently, except in a few instances, the Contractor is responsible for obtaining Special Use Permits. However, on occasion, construction delays can be caused if certain SUPs are required. Therefore, the Project Manager needs to address SUPs during the plan development process.

All SUPs are not required to be obtained during the design phase, only those that have the potential to delay construction. To determine which SUPs could impact construction schedules, the Project Manager should list any possible SUPs on the title sheet prior to submittal for THE Plan Review. These can be discussed separately at THE Plan Review and a determination made as to which, if any, are required to be obtained prior to advertising. The minutes from THE Plan Review will indicate any SUPs that are required. The Project Manager will coordinate the work with the appropriate individual(s) to obtain the SUPs prior to the distribution of the plan/proposal package for the OEC Meeting. Any required SUPs should be included in the plan/proposal package submitted to the Specifications and Estimates Unit.

A partial list of Special Use Permits is given below:

- Mining (wetland)
- Night work
- Noise
- Tree cutting/replacement
- Burning
- Water system connections
- Public utility
- Concrete plants of crushers
- Pavement breakers
- County drain
- Dust control
- Storm sewer connection
- City/Township ordinance
- Other

## MICHIGAN DESIGN MANUAL ROAD DESIGN

### 14.47.02

#### Improvements Requiring ROW Acquisition

On existing facilities requiring ROW, monuments should be placed so as to define the boundary of any newly acquired parcel (total or partial take). Those extending through platted areas should monument any new plat corner locations. These locations should be coordinated with the project control and shown on the construction and ROW plans labeled with their Station and Coordinate values. The actual numbering of monuments should be coordinated with the Lansing Design Survey Unit. The scope of services for such a contract should be prepared by the Lansing Survey consultant management staff or the Regional Surveyor (if not included in the construction contract). Funding must be identified for any such work.

### 14.47.03

#### Improvements Not Requiring Row Acquisition

Existing Rights-of-Way typically have sufficient evidence or occupation (i.e.: fences, existing monumentation, etc.) to indicate the location of the boundary. Monumentation in these situations is not recommended. Any dispute involving the location of any ROW boundary should be resolved by formal survey on a case by case basis.

### 14.47.04

#### Coordination

Currently, MDOT rarely provides funding for monumentation. Project Managers for projects requiring ROW acquisition should contact the Lansing Design Survey Unit for direction in what, if any, monumentation information should be included in the plans.

### 14.48 (revised 9-17-2012)

#### REQUEST FOR TURF ESTABLISHMENT RECOMMENDATIONS

Once the limits of earthwork are known and the construction schedule has been determined, the Project Manager should contact the Roadside Development Unit in the Design Division for any turf establishment procedures and materials recommendations.

## **MICHIGAN DESIGN MANUAL BRIDGE DESIGN - CHAPTER 7: LRFD**

### **7.01.15**

#### **Shoulder Widths for Work Zone Safety and Mobility (8-20-2009)**

For projects beginning with fiscal year 2013 the freeway and interstate standard bridge shoulder widths shall be 14'-10". The requirement is valid for 2 lane freeway new bridge construction and reconstruction (superstructure replacement and deck replacement). This will provide increased safety and mobility for future maintenance of traffic. The cross section will provide part width bridge construction with traffic being maintained on two 11 ft. lanes with 1 ft. shy distance on each side.

For projects scheduled prior to 2013 the 14'-10" shoulder width shall be implemented on a case by case basis. An MDOT internal design exception will be required for 4R projects scheduled for fiscal year 2013 and beyond when the new shoulder width is not met. For projects scheduled prior to 2013 see Bridge Design Guide 6.05.01 and projects in 2013 and beyond see Guide 6.05.01A. The Region Systems Manager shall determine the required shoulder width at the scoping of the projects.

Designers should layout beam spacing to accommodate future part width reconstruction. In most cases beams at centerline of structure should be avoided. Side by side box beam structures should have beams on either side of structure centerline. (11-28-2011)

Bridge approach guardrail and bridge approach curb and gutter will be affected as a result of the widened shoulders and must be addressed in the design of the approaches. If the increased shoulder width is deemed necessary on reconstruction projects substructure widening may become necessary.

### **7.01.16**

#### **Redundancy (8-20-2009) (9-17-2012)**

Consideration should be given to providing redundancy in bridge designs. Avoid nonredundant schemes if possible. All non-redundant or fracture critical designs shall be approved by the Engineer of Bridge Design.

### **7.01.17**

#### **Part Width Construction (11-28-2011)**

For existing bridges used to maintain traffic, the structural performance of the in-service portion of the structure shall be evaluated with respect to stage demolition and adjacent construction.

To the extent possible, plans shall show location of existing spread footings with respect to proposed construction.

Unbraced excavations for new substructures shall not extend below the bearing elevation of adjacent spread footing foundations.

Drilled excavations adjacent to in-service spread footing foundations shall be cased to prevent undermining.

## MICHIGAN DESIGN MANUAL BRIDGE DESIGN

### 7.01.15

#### **Shoulder Widths for Work Zone Safety and Mobility (11-28-2011)**

For projects beginning with fiscal year 2013 the freeway and interstate standard bridge shoulder widths shall be 14'-10". The requirement is valid for 2 lane freeway new bridge construction and reconstruction (superstructure replacement and deck replacement). This will provide increased safety and mobility for future maintenance of traffic. The cross section will provide part width bridge construction with traffic being maintained on two 11 ft. lanes with 1 ft. shy distance on each side.

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