Road & Bridge Design Publications

Monthly Update – November 2012

Revisions for the month of **November** are listed and displayed below. New special details are to be included in projects submitted for the **February** letting as is stated on the special detail index sheets. Please contact Wayne Pikka (pikkaw@michigan.gov) for questions related to the road changes. Contact Vladimir Zokvic (zokvicv@michigan.gov) for questions related to the bridge changes.

Road Design Manual

9.02.01C: Water Main Relocation Studies: A statement was added requiring all documentation in regards to Water Main Relocation Studies to be saved in the Utilities, Drainage and Roadside subfolder of ProjectWise.

9.03.01E: Light Standard Details: A statement was added requiring the inspection of light standards or foundations by the MDOT Structural Fabrication Unit when they are considered for salvage or reuse.

9.04.06: Gas Main Relocation Policy under Pavement Widening and Reconstruction: A statement was added requiring all documentation in regards to the disposition of gas mains to be saved in the Utilities, Drainage, and Roadside subfolder of ProjectWise.

Bridge Design Manual

7.02.18 C.5 (LFD & LRFD): Added use criteria for steel diaphragms.

8.09.04 W (LFD & LRFD): Included sealant application around beam stiffeners.

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.

CHAPTER 9

UTILITIES

9.01 (revised 2-27-2012)

REFERENCES

A. ***Utility Coordination Manual***
Development Services Division

B. Guidance Document 10087
Distribution of Cost
Municipally Owned Utilities

C. Guidance Document 10086
Relocation of Municipally Owned Utilities

D. Standard Plan R-1-Series
Drainage Structures

E. Standard Plan R-18-Series
Cover Q

F. Standard Plan R-83-Series
Utility Trenches

9.02

MUNICIPAL AND PRIVATE UTILITY RELOCATION POLICIES AND PROCEDURES

9.02.01 (revised 11-26-2012)

Municipal Utility Relocation Policy

A. General Information Applying to All Municipal Utilities

The Highway Steering Committee at its meeting on March 26, 1992 approved the Design Division's Municipal Utility Relocation Policy. A municipal utility is a utility or service owned, operated, and maintained by a recognized governmental entity within its corporation or jurisdictional boundaries. Such utilities or services are water, waste water, storm water, and public

9.02.01A (continued)

lighting. The facilities operated by these municipal utilities are water mains, sanitary sewers, storm sewers, power lines, poles, and street lights.

Public Act 51 of 1951 requires MDOT to bear the cost of removal and replacement of street lights impacted by a trunkline highway project. As a general rule, municipalities provide street lighting as a public service through agreements with electric utilities. MDOT typically coordinates street light reimbursement with the electric utility provider rather than the municipality.

The current policy allows an evaluation of the existing utility's condition and age to estimate its potential effects on the life cycle of the proposed pavement.

Relocations of facilities, not including betterments, at project costs (defined in Guidance Document 10087) only apply when the municipal utility is operating within the corporate boundaries of the municipality. Costs of relocations outside the corporate boundaries shall be the responsibility of the municipality with the following exceptions:

1. If it is conclusively determined that the utility serves only customers within its corporate boundaries the costs shall be at project cost.

2. Storm sewer costs will be shared, based on the contributing flow (Q) of each agency. (State and Local) These costs are shared based on each run of the storm sewer. Refer to ***MDOT Drainage Manual*** Section 2.5.4 and Guidance Document 10087.

3. If the utility is not located on public right-of-way but on other easements or right-of-way secured by that body or utility.

9.02.01A (continued)

Municipal Utility Relocation Policy

The Department will relocate sanitary sewers, storm sewers, power lines, power poles, street lights, communications lines, etc. at project costs, not including betterments, only when they are in direct conflict with the proposed construction.

B. Water Main Relocation Costs and Betterments

Water mains are considered a potential threat to the roadway. The current policy requires an evaluation of the existing water main's condition and age to estimate its potential effects on the life cycle of the proposed pavement.

Projects constructed using Federal Funds, will include a water main relocation study according to the process as described in Section 9.02.01C.

Distribution of Costs - If it is determined that water main relocation will be included with the project, the municipality shall be required to participate in 50% of the non-federal costs of the installed price of the main and appurtenances. An agreement must be initiated with the municipality through the Governmental Coordination Engineer. Water main betterments shall be in accordance with Guidance Document 10087. If it is determined that water main relocation will not be included with the project, water main relocations which are required due to direct construction conflicts, i.e., physically being displaced, significantly reducing the cover over the mains or placing structures atop of the main, will be performed at the project costs.

9.02.01 (continued)

C. Water Main Relocation Studies

Relocation Studies at Department costs will consist of input and recommendations from the TSC Utility Coordinators and from the Design Division's Municipal Utilities Unit. Studies will be conducted as follows, except that such a study will not be performed for projects constructed without the use of Federal Funds:

1. **No Conflicts** - A water main located under an existing pavement that is not going to be removed (such as a resurfacing project).

2. **Conflicts -** A water main located;

   a) under and existing pavement which will be removed.
   b) outside the existing pavement but under a proposed pavement widening.
   c) under new roadways.

   A water main relocation study will be performed.

All documentation pertaining to the Water Main Relocation study must be saved in ProjectWise in the Utilities, Drainage and Roadside subfolder.

9.03

DESIGN GUIDES

9.03.01 (revised 11-26-2012)

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.

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.

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.

Any light standard foundation(s), light standard(s), or portions thereof being considered for salvage and reuse, must first be inspected by the MDOT Structural Fabrication Unit – Operations Field Services Division during the planning or design stage of the project. Contact the MDOT Structural Fabrication Engineer to arrange for inspection.

9.04.06 (revised 11-26-2012)

Gas Main Relocation Policy under Pavement Widening and Reconstruction

The following is policy for the relocation of gas mains under pavement widening and reconstruction projects.

1. All gas mains (distribution or transmission) may remain under proposed widening areas unless the main has a history of frequent repairs or is cast iron, 6" or less in diameter. The maintenance records furnished by the gas companies will be reviewed by the TSC Utility Coordinator, and if the report indicates there have been no repairs in the five preceding years, the gas main may remain. If, however, there have been repairs during this period of time, it will be reviewed with the Michigan Public Service Commission as to the necessity for removing the gas main.

2. No main shall be required to be relocated:

    a) When the construction project is less than ½ mile in length.

    b) Where relocation would require extensive private easement.

While extenuating circumstances may exist to modify the above procedure, only extreme conditions will warrant deviation from these requirements. Contact the Development Services Division, Utilities Coordination & Permits Section Manager.

All documentation pertaining to the disposition of gas mains must be saved in ProjectWise in the Utilities, Drainage and Roadside subfolder.

9.04.07 (revised 12-22-2011)

Sanitary Sewers and Water Mains

Existing sanitary sewers should not be disturbed unless they would be in conflict with a proposed construction project. Existing combined sanitary and storm sewers should not be used for drainage purposes on a new roadway or improvement project. A permit from the Water Division of the Michigan Department of Environmental Quality (MDEQ) will be required, when an existing sanitary sewer is adjusted or moved. All sanitary sewer designs must be coordinated with the Design Engineer - Municipal Utilities. On certain projects, previous agreements may have been made between the MDOT and the city or village as to the disposition of sewers. Designers should check with the Governmental Coordination Engineer regarding agreements.

The Design Engineer – Municipal Utilities, must be contacted in all cases where sanitary sewers, water mains, and other municipal utilities are encountered or are in conflict. The Design Engineer - Municipal Utilities will then contact and coordinate with the affected municipality.

City of Detroit - The Design Engineer - Municipal Utilities will contact the City of Detroit when a City of Detroit sewer system is a part of a Department project or when the Department constructs a sewer system that will be maintained by the City of Detroit. This includes catch basins located in service roads, existing streets, and easements. Also included is the last connecting sewer run that drains from a catch basin or manhole of a ramp or turning roadway to the City of Detroit sewer system.

7.02.18 (continued)

Prestressed Concrete Design

C. Prestressed Concrete I-Beam Design

1. Bearing Pads

   For single-span structures 40'-0" or less in length, use dependant backwalls with 1" elastomeric pads under the beams and joint filler under the backwall.

   For single- and multiple-span structures with spans over 40'-0", allowance for expansion is required in designing the bearing pads.

2. Sole Plates

   Sole plates are to be cast in the beams and shall be tilted as required when the calculated bevel exceeds 1%.

3. Skew Bridges

   On skewed structures, the ends of the I-beams shall be made square regardless of the angle of skew. The top corners may be blocked out in order to accommodate a straight expansion joint across the structure.

4. Concrete Diaphragms

   End diaphragms are to be set back 10" to 12" from the end of beam in order to permit the removal of the forms after the diaphragms are poured.

   The bottoms of all diaphragms are to bear on the bottom of the lower beam fillet.

   All diaphragms are to be cast separately from slab except with continuous for live load structures (optional construction joint). (5-6-99)

7.02.18 (continued)

5. Steel Diaphragms

   Use steel diaphragms on structures where mobility analysis defines the project as significant and mitigation measures to minimize travel delay are needed (See Work Zone Safety and Mobility Policy).

   Use details from Bridge Design Guide 6.60.12 A. & B. and include Special Provision in proposal. (11-26-2012)

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8.09.04 (continued)

Maintenance Painting Notes

M. Substructure Horizontal Surface Sealer shall be applied to the top of Abutment ___ (and __) (and the front face of the independent backwall). Vertical surfaces accidentally coated shall be cleaned at contractor's expense. [Use when there is a superstructure transverse joint directly above or the unit is adjacent to a pavement.] (12-5-2005)

N. Substructure Horizontal Surface Sealer shall be applied to the top of (all) Pier(s) (___ & ___). Vertical surfaces accidentally coated shall be cleaned at contractor's expense. [Use only when superstructure transverse joints are directly above the pier.] (12-5-2005)

O. Shear locks shall be removed by methods approved by Engineer before structure is blast cleaned. (Included in the bid item "Steel Structure, Cleaning, Type 4 (Structure No.)".) (12-5-2005)

P. The sign(s) over (description of location) shall be removed for cleaning and coating of the fascia beam(s). Sign(s) shall be reinstalled using new connection hardware according to Subsection 919.02 of the Standard Specifications. (Included in the bid items for cleaning and coating existing steel structures.) [Use where it has been determined that signs must be removed to allow cleaning and coating of fascia beams.] (9-18-98)

Q. Sealant shall be applied around the perimeter of bearing plate to concrete contact surfaces after cutting away any protruding portion of lead plate. [Use when superstructure transverse joints are directly above pier or abutment.](9-18-98)

R. Sealant shall be applied around the perimeter of bolted end diaphragm connection plates and angles. [Use when end diaphragms are under an open transverse deck joint.] (9-18-98)

8.09.04 (continued)

S. Sealant shall be applied around the perimeter of all riveted girder plates and angles. [Use at riveted plate girders.] (9-18-98)

T. Sealant shall be applied around the perimeter of all beam ends where encased in the backwalls. (9-18-98)

U. Sealant shall be applied to the perimeter of all riveted (bolted) girder plate and angle contact surfaces at the outside face of the fascia beams for the entire length and at each girder end, below deck joints, for a total length of 5'-0" [Use at riveted or bolted plate girders on outside of fascia only.] (9-18-98)

V. Blast clean and prime faying surfaces prior to erecting (diaphragms) (bent plates). This work is included in the pay items for cleaning and coating existing structural steel. [Use where project includes field coating and steel members will be added or replaced.] (9-18-98)

W. Sealant shall be applied around the perimeter of riveted pin plates and stiffeners. (9-18-98) (11-26-2012)

X. Sealant shall be applied around the connection of new structural steel member to existing structural steel member. (9-18-98)

Y. The color of the urethane protective coat shall be light gray. Federal Standard 595C color number 16440. [Use with shop or field coating. Check with Roadside Development Unit if other color is desired.] (5-1-2000) (11-28-2011)

Z. The contractor shall take necessary measures to avoid overspray on adjacent substructure and superstructure concrete surfaces and on signs attached to the structure. (Included in the bid item "Steel Structure, Coating, Type 4 (Structure No.)"). (12-5-2005)

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