



MINNESOTA DEPARTMENT OF TRANSPORTATION
Engineering Services Division
Technical Memorandum No. 15-03-TS-01
March 25, 2015

To: Electronic Distribution Recipients

From: Nancy T. Daubenberger, P.E. *Nancy Daubenberger*
Division Director, Engineering Services

Subject: Design Guidelines for Locating Wet Ponds with Permanent Water Depths along Freeways and High Speed Highways

Expiration

This Technical Memorandum supersedes Technical Memorandum 14-05-TS-01 and will expire on March 25, 2020, unless superseded prior to this date or placed into the MnDOT Road Design manual or Drainage manual.

Implementation

The guidelines contained in this Technical Memorandum are effective immediately for projects in the preliminary design phase where new wet ponds are required or where existing wet ponds are being modified as part of the project.

Introduction

In 2004 a Technical Memorandum was issued to address the concern that there was an increased probability that an errant vehicle could travel through the ramp/loop clear zone, and enter deep ponds in these instances (see attached examples). Guidance was provided on locating deep wet ponds with the goal of either eliminating these permanent deep wet ponds from exit ramp gore areas or, if not practical, properly shielding or otherwise mitigating them. This Technical Memorandum is being issued to clarify and expand on previous guidance.

Purpose

The purpose of this Technical Memorandum is to clarify our guidelines for locating wet ponds with a permanent water depth of 2 ft. or more to insure that they are not located within exit gore areas of interchanges and are not located outside of high-speed curves without mitigation.

Guidelines

Exit gore areas of interchanges have a higher potential for errant vehicles to run-off-the-road. Therefore, when locating wet ponds with a permanent depth of 2 ft. or more in the aforementioned areas, the clear zone should not be the only controlling design criteria. This Technical Memorandum does not supersede but is in addition to the clear zone design criteria in the MnDOT Road design Manual or in the AASHTO Roadside Design Guide.

Wet ponds with a permanent depth of 2 feet or more located outside of high speed curves should have mitigation. High speed curves for purposes of this Technical Memorandum are defined as 3 degree curves or sharper with a design speed of 50 MPH or greater.

A wet pond has a permanent water elevation that is sometimes referred to as the Normal Water Level (NWL). The permanent water elevation or NWL does not include the temporary water surface bounce associated with a specific design event.

This Technical Memorandum does not apply to infiltration basins, filtration basins or other Best Management Practices (BMP's) that are not designed to have a permanent water depth of 2 feet or more.

Following are a few alternatives in order of preference to consider when locating these types of wet ponds regardless of whether they are located inside or outside the clear zone:

1. Remove or relocate wet ponds from the areas mentioned above.
2. Mitigate these wet ponds by:
 - A. Use Best Management Practices (BMP's) other than permanent deep ponds if permit requirements allow and the practice meets permit design criteria. Best Management Practices include but are not limited to: infiltration basins or trenches, filtration basins or trenches, enhanced swales or dry storage ponds with underdrains.
 - B. Modify wet pond design by:
 - a. Flattening roadway and pond inslopes (1V: 4H or flatter) and extending benches on the traffic side of the pond. Benches at these locations are 20-50 ft. wide, with slopes of 1:10 or flatter having less than 2 ft. of permanent water over the benches at the NWL (see attachments), or
 - b. Considering other design alternatives as recommended by the District Hydraulic Engineer.
 - C. Install barrier protection, if no other feasible alternative is available.

Questions

Any questions regarding the technical provisions of this Technical Memorandum can be addressed to either of the following:

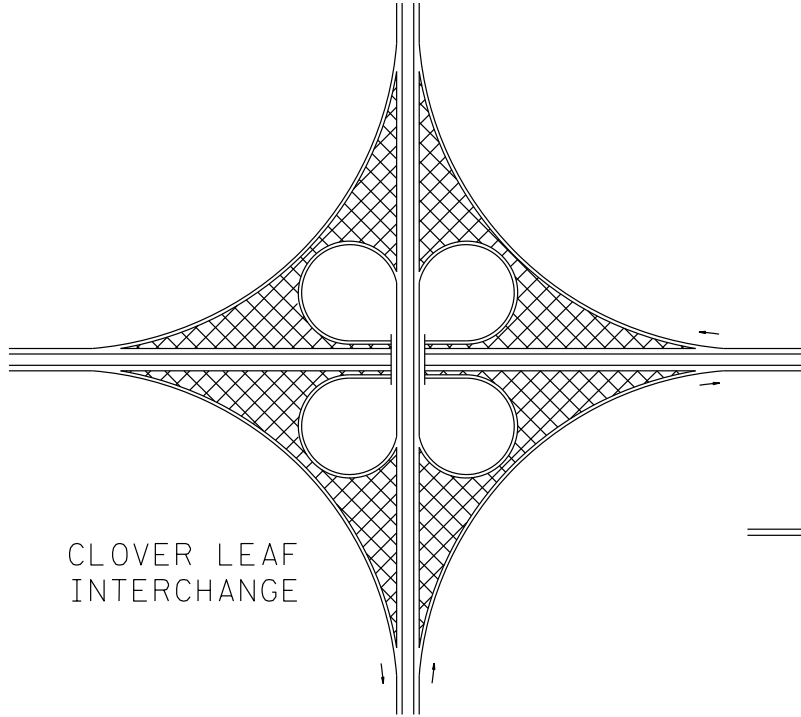
- **Andrea Hendrickson**, State Hydraulic Engineer at **(651) 366-4466**
- **Mike Elle**, Design Standards Engineer at **(651) 366-4622**
- **Darwin Yasis**, State Geometrics Engineer **(651) 366-4623**

Any questions regarding publication of this Technical Memorandum should be referred to the Design Standards Unit, DesignStandards.DOT@state.mn.us. A link to all active and historical Technical Memoranda can be found at <http://techmemos.dot.state.mn.us/techmemo.aspx>.

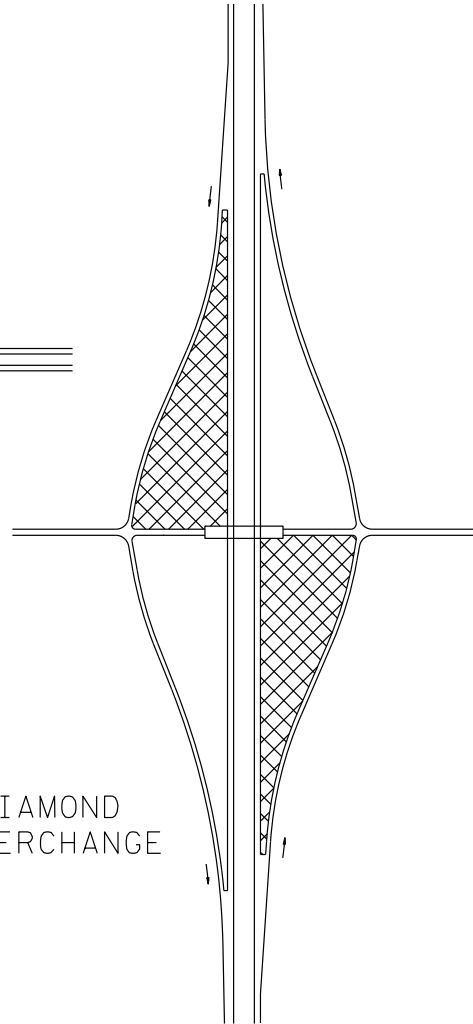
To add, remove, or change your name on the Technical Memoranda mailing list, please visit the web page <http://techmemos.dot.state.mn.us/subscribe.aspx>

Attachments:

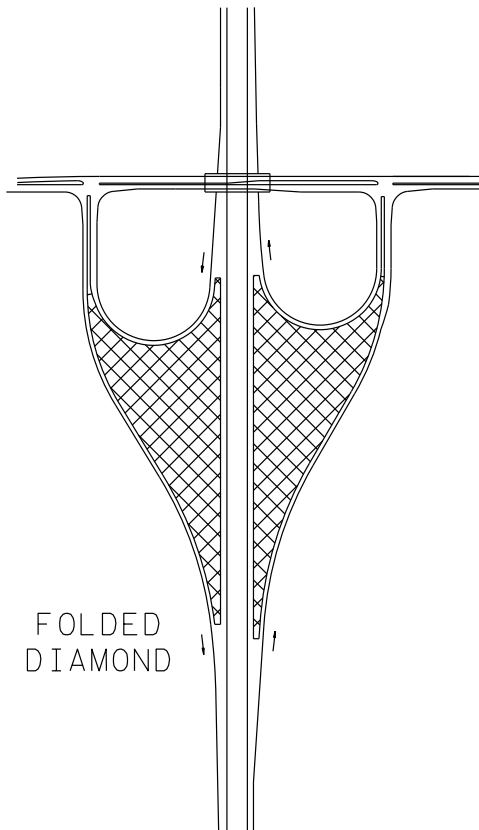
- Attachment A – Deep Pond Mitigation (Plan)
- Attachment B – Deep Pond Mitigation (Cross Section)



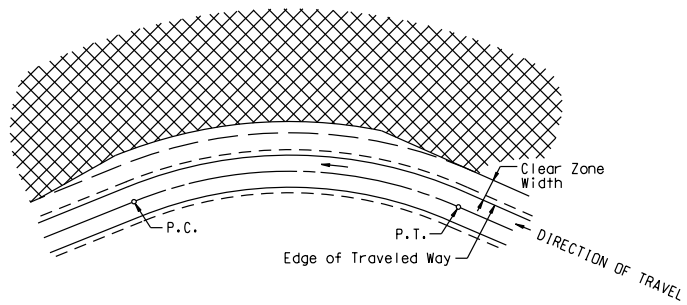
CLOVER LEAF
INTERCHANGE



DIAMOND
INTERCHANGE



FOLDED
DIAMOND



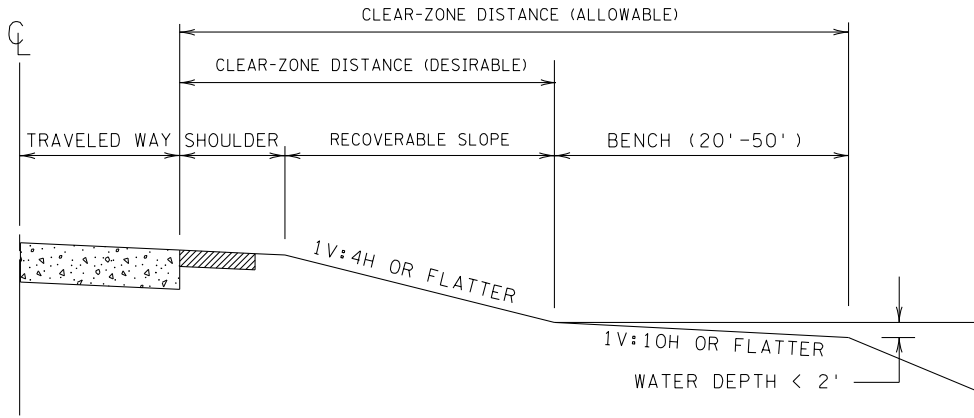
SHARP CURVE (MAINLINE)



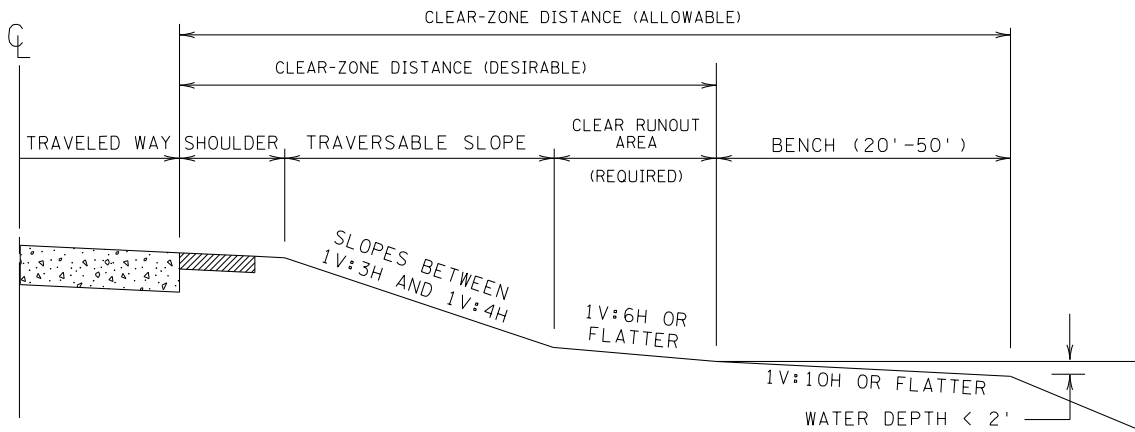
MITIGATE PONDS 2 FT. OR MORE IN
DEPTH IN THESE AREAS.

(AREAS THAT HAVE AN INCREASED
PROBABILITY OF AN ERRANT VEHICLE
TRAVELING THROUGH THE CLEAR ZONE
AND ENTERING THE DEEP PONDS)

Technical Memorandum No. 15-03-TS-01
Attachment B – Deep Pond Mitigation (Cross Section)



RECOVERABLE SLOPE



TRAVERSABLE SLOPE