2018 Preconstruction Conference

Design Exceptions

Lesly Tribelhorn – Highways Engineer
Ryan Dahlke – Consultant Design Engineer
Welcome!

Question #1
Are you in the right class? Is this information intended for you?

Answer
Yes!

No matter if you’re in Environmental, Geotech, Hydraulics, Road Design, Construction, a Consultant, or any other Functional Area, for that matter.

Knowing what goes into design exception decisions will most certainly help you in your job, finding the best solution for the overall project.
What discipline do you currently work in? Consultants, pick the area you most often work in.

A. Project Management  47%
B. Road Design  13%
C. Construction  4%
D. Environmental  9%
E. Geotechnical  2%
F. Hydraulics  2%
G. Bridge  0%
H. Traffic and Safety  11%
I. Checking/QA/QC  11%
J. Right-of-Way/Utilities  0%
Outline of Today’s Discussion

1. Summary of last year’s content
2. New developments
3. Exceptions in a round-about way
4. Case examples
5. Q & A
Summary of last year’s content

1. Changes to design features requiring exceptions
   Revised controlling criteria in Road Design Manual
2. New design exception template and content
   Comprehensive and robust
3. Case examples
4. Valid reasons for a design exception
New developments

1. Change to Route Segment Plan Map
2. Summary of project types and required exceptions
   a) Matrix in Guidelines for Nomination and Development of Pavement Projects
3. New Short Form for Design Exceptions
   a) Can be stand alone or embedded in PFR/SOW report
Updated concurrently with the new 3R guidelines (Guidelines for Nomination and Development of Pavement Projects)
Consider lane and shoulder widths on NHS, Primary and Secondary systems in accordance with the following and other sections of this Agreement on all projects that include a crash analysis.
Review the Route Segment Plan map for uniform application of shoulder widths.
See MDT Geometric Design Standards for lane and shoulder width standards.
Review the crash analysis for Road Departure LOSS, pattern recognition, trends and recommendations relative to roadway width.
See further guidance for each system project type above. Schedule the Roadway Width and Rumble Strip Committee to evaluate and determine roadway widths as prescribed in other sections of this Agreement. Provide the committee members with the PFR report and crash analysis for consideration. The PFR report, crash analysis and Route Segment Plan map will be considered by the committee to establish lane and shoulder widths, along with information from the AASHTO Highway Safety Manual. Widths determined by the committee may require design exceptions as noted for the project types characterized in this Agreement.
Non-NHS routes use same criteria
Following this table, but using 20-year projections for AADT
Note route consistency and intention for flexibility
Design Exception Requirements

1. Table and details in new 3R Guidelines
2. Many design exceptions are included in FHWA agreement
3. Minor Rehab and lower may use short format DER

Guidelines for Nomination and Development of Pavement Projects (a.k.a. 3R Guidelines)
12/14/2017 Joint Agreement MDT, Commission, FHWA
Design exceptions for lower level preservation is “Programmatically” excepted by the agreement – document in milestone report
Mid-level pavement project exceptions – document and justify in short format design exception report
Major work falls under full design exception report
Open document

Table 1 shows the MDT standards that require a design exception by treatment category

Yes = Design Exception required

Yes* = Design Exception required; short version is acceptable

No = Formal documentation of exception not required. This agreement with FHWA allows this exception with documentation in SOW report.

No* = Consider addressing the design deficiency with this project. Otherwise, document the exception in SOW report.

Pick a couple of examples to talk through
Have you used the new Design Exception report template?

A. Yes
B. No
If you have, what do you think of it?

A. Contains the appropriate amount of information
B. Needs more guidance on what should be included in each section
C. Needs to be longer – I like writing a lot
D. #$@&!
Short Format DER

1. Pavement Preservation
2. Minor Rehabilitation
3. Include in PFR/SOW report or standalone document
4. Remove rows for non-applicable criteria

For those of you who selected c and d: we have a new, shorter version!
The short format is appropriate for minor pavement work
Can be used as a standalone report or combined with PFR/SOW

If using PFR/SOW, insert design exception section
Standalone report includes much of the same information as SOW report
Short Format DER

1. Existing condition
2. Standard
3. Standard reference
4. Proposed criteria
5. Location
6. Justification
This is the new short form template, with the signature page removed.

Includes some core information that will be included in any milestone report (so generally will be copy & paste)

The meat of this short form template is the “Proposed Design Criteria” Table. This can also be included in the PFR/SOW or SOW report.
<table>
<thead>
<tr>
<th>Controlling Element</th>
<th>Existing Condition</th>
<th>Standard Reference</th>
<th>Proposed Criteria</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lane Width</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Justification:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shoulder Width</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Justification:</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Existing condition
2. Standard
3. Standard reference
4. Proposed criteria
5. Location
6. Justification
Not sure which treatment category your project falls under?

Table available with the report templates
Work type, work description, pavement treatment category, template format required
What do you use as a reference to determine if a design exception is required?

A. Co-worker
B. Checker
C. Boss
D. The Dynamic Duo (Ryan or Lesly)
E. Road Design Manual
F. Guidelines for Nomination and Development of Pavement Projects
G. A dartboard
H. All of the above

The point of this one is that there is a wealth of resources for design exception input.
Roundabouts are a completely different beast when it comes to design exceptions. For goodness sake, the whole *intent* of a roundabout is to install elements that cause people to slow down. Inherently, that means we’re going to be putting in non-standard elements in the roadway. Because of that, we need to approach roundabouts a little differently.

Unfortunately, we’re still in the world of figuring this out. And without clear guidance, we’re stuck addressing these case-by-case. The simple answer...... if you’re modifying or adding something to a roundabout that isn’t clearly industry practice, it likely needs a design exception.
Is a design exception required for the horizontal curves within the splitter islands of a roundabout?

A. Yes
B. No

**ANSWER & EXPLANATION**

No, but a bit of a trick question. Horizontal curvature within the splitter islands is considered independent of the alignments outside the splitter islands, just as the circle of the roundabout itself is.

Base design on industry best-practices.

Formal design exception criteria/guidance for roundabouts is forthcoming.
What requires a design exception for landscaping features within the center island of a roundabout?

A. All vegetation  
B. Any non-traversable slope  
C. Any non-breakaway object greater than 4” tall  
D. Any feature not included in MDT’s standard roundabout landscaping plan  
E. B and C  
F. All of the above

**ANSWER & EXPLANATION**

B & C. This falls under the “Roadside Clear Zones” category of items that require design exceptions (Chapter 2 of the Road Design Manual).

Long and short of it....... If you’re putting something in that you really don’t want to hit with your vehicle, it needs a design exception.

**WILL IT GET APPROVED?**

It depends. Roy Peterson is finalizing a document that will give guidance on objects in the center island. Roundabout Committee decision.

In example, a city sign in an urban, low-speed setting will likely be approved. An 8-ton, 6-foot high sculpture on a high-speed facility in a rural setting won’t be.

**Another element we get asked a lot about** is slopes behind the outside curb. I’ll answer that one by saying that standard industry practice is not to automatically install v-ditches everywhere just to reduce R/W impacts. So you guessed it...... design exception time. We hope to get out some formal guidance soon......
If guardrail is installed for some other reason (i.e. bridge approach rail or for a large culvert end), do I need a design exception to steepen slopes behind this guardrail that’s going in anyway?

A. Yes
B. No

**ANSWER & EXPLANATION**
Yes. This falls under the “Side Slopes” category of items that require design exceptions.

Guardrail is the *mitigation* measure to protect the slope, not a justification to not do a design exception.

**WILL IT GET APPROVED?**
In all likelihood, yes.

*Warning:* This is really applicable for the guardrail that’s *needed for the bridge end*. If you extend that rail to cover a steepened slope, it will be scrutinized, and additional justification will be needed.
There is a utility pole at the end of the project within the clear zone. Relocation would require moving several poles. Is a design exception needed to leave the pole in place?

A. Yes
B. No
C. It depends on the cost to relocate the necessary poles

ANSWER & EXPLANATION
Yes. This falls under the “Roadside Clear Zones” category of items that require design exceptions. Consider evaluating the risk of it being hit. Is it directly behind the curb, or is it at the edge of the clear zone? Provide specific and detailed cost implications. An additional $45,000 to relocate a few poles may be well worth it to get everything outside the clear zone.

WILL IT GET APPROVED?
It depends. Cost, risk of it being hit, offset distance, and dominant travel speeds are all going to be big players in this decision.
Right-of-Way negotiations resulted in a short section of steepened slopes. Is a design exception needed if guardrail is added at this location to protect the slope?

A. Yes  
B. No  
C. Only if the steepened slope is greater than 100’ in length

**ANSWER & EXPLANATION**
Yes. This falls under the “Roadside Clear Zones” category of items that require design exceptions. It doesn’t matter how long the steepened section is.

Of course, guardrail should only be added if you can’t get the clear zone with the revised slope.

**WILL IT GET APPROVED?**
Ahhh, yes....... Here it is. Can we use difficult landowners as justification? If ever there was an appropriate answer of “it depends”, it’s here.

Every effort needs to be made to buy the necessary R/W. And you need to document these efforts. Not wanting to talk to a landowner that expressed opposition to the project or to MDT in general is not sufficient effort. We need to make every effort to get it done.
Is a design exception needed for leaving non-compliant rail in place on a major rehab project on a primary route in September of an even year?

A. Yes  
B. No  
C. Depends on the phase of the moon

**ANSWER & EXPLANATION**
C – it depends!! In reality, this is a bit of a trick question. It depends on the rail (w-beam, bridge rail, cable rail, etc.), and when this comes up. The MDT-FHWA partnership agreement, along with the recent MASH guidance that just came out needs to be referenced in this case. The answer to this question is going to be different in 2019 than it is now. And different yet in 2020. And different again in 2021.

**WILL IT GET APPROVED??**
Probably not. We are extremely sensitive regarding MASH guardrail on Federal-aid projects in particular.
How do you decide if a design exception is needed for a minor rehabilitation project?

A. Ask Lesly
B. Refer to Guidelines for Nomination and Development of Pavement Projects
C. Punt

ANSWER & EXPLANATION
B – Refer to the Guidelines for Nomination and Development of Pavement Projects. The answer.....lies there. It depends on the design element. It’s on our website.
Is it appropriate to use the posted speed as a justification for horizontal curvature design exceptions?

A. Yes
B. No
C. Kind of?
D. Transportation Commission decision

**ANSWER & EXPLANATION**

C – Kind of!! Posted speed is a critical consideration in design exceptions, but more importantly, what is the dominant travel speed?

Regardless, speed cannot be the **only** justification.

**WILL IT GET APPROVED?**

If the only justification provided is the posted speed, nope – it won’t be. If it’s used in combination with other justifications, then it might be.
Bridge approach guardrail is proposed on a project. The standard slope given the fill height is a 4:1. In order to transition to the bridge end riprap that built to a 2:1, adjacent slopes are steepened to 2:1. Is a design exception required for the 2:1 fill slope transition?

A. Yes
B. No
C. It depends
D. I don’t like the question

**ANSWER & EXPLANATION**
D – I don’t like this question either. Unfortunately, the answer is really Yes. And until there is some sort of formal policy to change this, it will stay that way.

**WILL IT GET APPROVED?**
Yep. The slope will clearly be covered by bridge approach rail that is needed anyway.
According to MDT Standard Specifications, how far out does Clearing & Grubbing extend?

A. To the R/W limits
B. To the construction limits

ANSWER & EXPLANATION

B – To the Construction limits.

This is critical to remember, particularly in forested areas. Obstacles (trees, boulders, etc.) will **not** be automatically removed beyond the construction limits unless a special provision directs the Contractor to do so.

This is very important if you’re counting on a flat area at the bottom of your fill slope for a landing area to satisfy your clear zone requirements. Be aware of this – you may have obstacles in the clear zone!
Did you learn anything today?

A. Yes
B. No
C. ZZZZZ.........
Questions & Answers
Links to Resources

• Design Exception Work Type
• Design Exception Shortform
• Design Exception Report - Full
• Design Exception Report - FHWA PoDI
• Guidelines for Nomination and Development of Pavement Projects
• Complete Road Design Manual
• Geometric Design Standards
• Route Segment Plan Map