September 18, 2024

TxDOT Design Exception Request for Interstate Highways SOP Statewide Webinar

TxDOT Design Division

Agenda

1 | Introduction

2 | Background and Purpose

3 | Design Exception Request for Interstate Highways SOP Overview

4 | Design Exception Development Process

5 | Request for Interstate Design Exception Template

6 | Request for Interstate Design Exception Submittal and Approval Process

7 | Design Exception Guidance

8 | Design Exception Resources

9 | Final Thoughts / Questions

Help End the Streak

Objective of the Webinar

- **To Inform Participants about…**

  FHWA Delegation of Interstate Design Exception Requests

  Design Exception Request for Interstate Highways SOP, Template and Checklist

- **To Explain How to use …**

  Template and Crash Analysis Tool

- **To Address Questions**

Background and Purpose

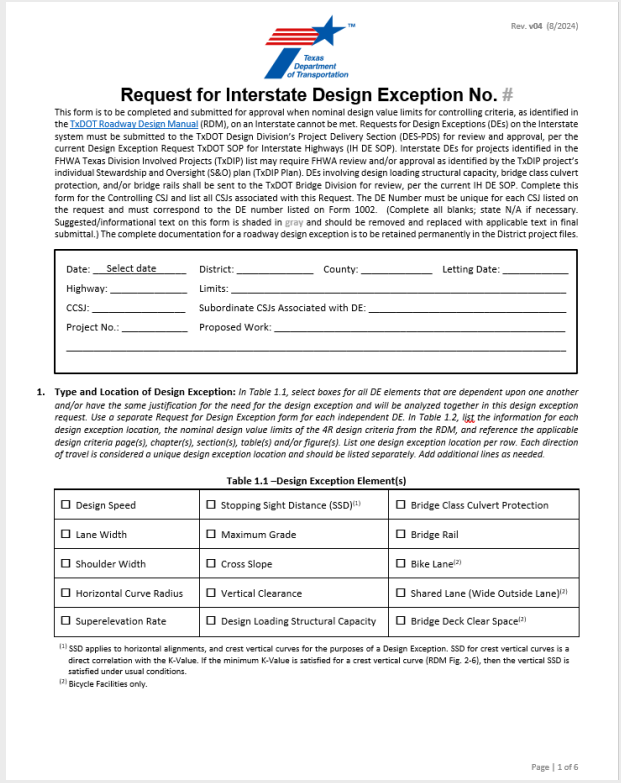
- **Background**
  - Lack of Statewide SOP
  - Current Practice
  - FHWA-TxDOT Stewardship and Oversight (S&O) Agreement
- **Purpose**
  - Consistent and Uniform Direction
  - Improve Quality and Project Delivery

Interstate Design Exception SOP Overview

Design Exception Request
For Interstate Highways
TxDOT Standard Operating Procedures

Texas Department of Transportation
Design Division

August 2024



Rev. v04 (8/2024)

Request for Interstate Design Exception No.

This form is to be completed and submitted for approval when nominal design value limits for controlling criteria, as identified in the TxDOT Roadway Design Manual (RDM), on an Interstate cannot be met. Requests for Design Exceptions (DEs) on the Interstate system must be submitted to the TxDOT Design Division's Project Delivery Section (DES-PDS) for review and approval, per the current Design Exception Request TxDOT SOP for Interstate Highways (IH DE SOP). Interstate DEs for projects identified in the FHWA Texas Division Involved Projects (TxDIP) list may require FHWA review and/or approval as identified by the TxDIP project's individual Stewardship and Oversight (S&O) plan (TxDIP Plan). DEs involving design loading structural capacity, bridge class culvert protection, and/or bridge rails shall be sent to the TxDOT Bridge Division for review, per the current IH DE SOP. Complete this form for the Controlling CSJ and list all CSJs associated with this Request. The DE Number must be unique for each CSJ listed on the request and must correspond to the DE number listed on Form 1002. (Complete all blanks; state N/A if necessary. Suggested/informational text on this form is shaded in gray and should be removed and replaced with applicable text in final submittal.) The complete documentation for a roadway design exception is to be retained permanently in the District project files.

Date: Select date District: _____ County: _____ Letting Date: _____
Highway: _____ Limits: _____
CCSJ: _____ Subordinate CSJs Associated with DE: _____
Project No.: _____ Proposed Work: _____

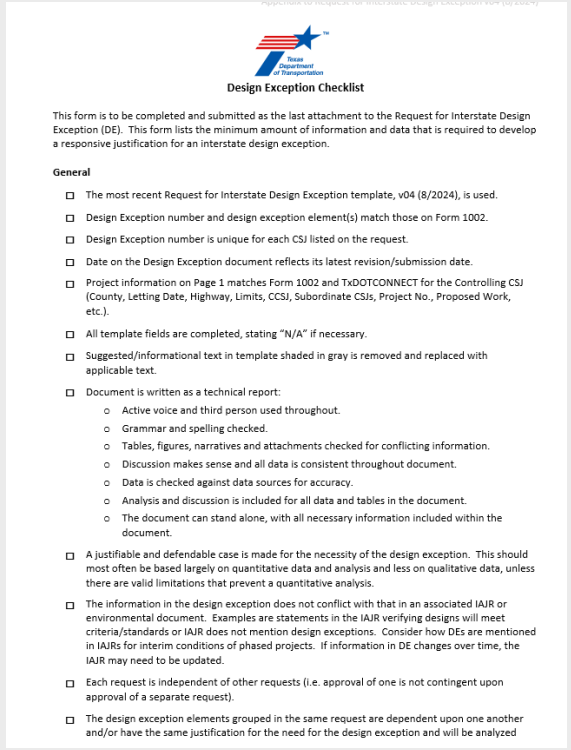
1. **Type and Location of Design Exception:** *In Table 1.1, select boxes for all DE elements that are dependent upon one another and/or have the same justification for the need for the design exception and will be analyzed together in this design exception request. Use a separate Request for Design Exception form for each independent DE. In Table 1.2, list the information for each design exception location, the nominal design value limits of the 4R design criteria from the RDM, and reference the applicable design criteria page(s), chapter(s), section(s), table(s) and/or figure(s). List one design exception location per row. Each direction of travel is considered a unique design exception location and should be listed separately. Add additional lines as needed.*

Table 1.1 –Design Exception Element(s)

☐ Design Speed	☐ Stopping Sight Distance (SSD)[1]	☐ Bridge Class Culvert Protection
☐ Lane Width	☐ Maximum Grade	☐ Bridge Rail
☐ Shoulder Width	☐ Cross Slope	☐ Bike Lane[2]
☐ Horizontal Curve Radius	☐ Vertical Clearance	☐ Shared Lane (Wide Outside Lane)[2]
☐ Superelevation Rate	☐ Design Loading Structural Capacity	☐ Bridge Deck Clear Space[2]

[1] SSD applies to horizontal alignments, and crest vertical curves for the purposes of a Design Exception. SSD for crest vertical curves is a direct correlation with the K-Value. If the minimum K-Value is satisfied for a crest vertical curve (RDM Fig. 2-6), then the vertical SSD is satisfied under usual conditions.
[2] Bicycle Facilities only.

Page | 1 of 6



Design Exception Checklist

This form is to be completed and submitted as the last attachment to the Request for Interstate Design Exception (DE). This form lists the minimum amount of information and data that is required to develop a responsive justification for an interstate design exception.

General

- ☐ The most recent Request for Interstate Design Exception template, v04 (8/2024), is used.
- ☐ Design Exception number and design exception element(s) match those on Form 1002.
- ☐ Design Exception number is unique for each CSJ listed on the request.
- ☐ Date on the Design Exception document reflects its latest revision/submission date.
- ☐ Project information on Page 1 matches Form 1002 and TxDOTCONNECT for the Controlling CSJ (County, Letting Date, Highway, Limits, CCSJ, Subordinate CSJs, Project No., Proposed Work, etc.).
- ☐ All template fields are completed, stating "N/A" if necessary.
- ☐ Suggested/informational text in template shaded in gray is removed and replaced with applicable text.
- ☐ Document is written as a technical report:
  - Active voice and third person used throughout.
  - Grammar and spelling checked.
  - Tables, figures, narratives and attachments checked for conflicting information.
  - Discussion makes sense and all data is consistent throughout document.
  - Data is checked against data sources for accuracy.
  - Analysis and discussion is included for all data and tables in the document.
  - The document can stand alone, with all necessary information included within the document.
- ☐ A justifiable and defendable case is made for the necessity of the design exception. This should most often be based largely on quantitative data and analysis and less on qualitative data, unless there are valid limitations that prevent a quantitative analysis.
- ☐ The information in the design exception does not conflict with that in an associated IAJR or environmental document. Examples are statements in the IAJR verifying designs will meet criteria/standards or IAJR does not mention design exceptions. Consider how DEs are mentioned in IAJRs for interim conditions of phased projects. If information in DE changes over time, the IAJR may need to be updated.
- ☐ Each request is independent of other requests (i.e. approval of one is not contingent upon approval of a separate request).
- ☐ The design exception elements grouped in the same request are dependent upon one another and/or have the same justification for the need for the design exception and will be analyzed

Interstate Design Exception SOP Overview

- Purpose
- Methodology
- Need
- Study Limits
- Traffic Analysis
- Safety Analysis
  - Crash Data Analysis
  - Predictive Analysis
- Alternative Analysis
- Mitigation Measures
- Review and Approval Process
- Design Exception Form
- Review Checklist

What is a Design Exception?

A Design Exception refers to the formal documentation of roadway design elements that do not meet minimum nominal controlling criteria, as set forth by AASHTO and TxDOT standards, policies, and standard specifications.

A Design Exception analyzes the impacts and risks of including design elements into a project that do not meet minimum nominal controlling criteria, so as to justify their implementation into that project.

Why are Design Exceptions Needed?

Range of Reasons:

- Environmental Impacts
- ROW Impacts
- Context Sensitivity
- Construction Cost

Design Exceptions are needed:

- By law, per 23 CFR 625.3(f).
- To critically analyze, evaluate risk, and justify unconforming and unconventional designs (partly based in Performance-Based Practical Design (PBPD)).
- For permanent documentation for future reference.

Why are Design Exceptions Needed?

US Code of Federal Regulations – Title 23 Chapter 1 Subchapter G – Engineering and Traffic Operations, Part 625 – Design Standards for Highways

- **Per 23 CFR 625.3(f) – Application. Exceptions**

(1) Project exception.

(i) Approval within the delegated authority provided by FHWA Order M1100.1A may be given on a project basis to designs on the NHS which do not conform to the minimum criteria as set forth in the standards, policies, and standard specifications for:

(A) Experimental features on projects; and

(B) Projects where conditions warrant that exceptions be made.

(ii)The determination to approve a project design that does not conform to the minimum criteria is to be made **only after due consideration is given to all project conditions** such as maximum service and safety benefits for the dollar invested, compatibility with adjacent sections of roadway and the probable time before reconstruction of the section due to increased traffic demands or changed conditions.

Why are Design Exceptions Needed?

Safety Consideration

Nominal vs Substantive Safety

Nominal Safety

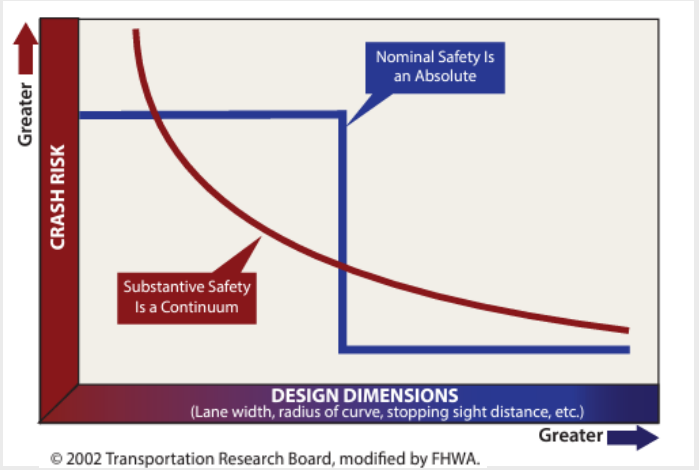
Adherence to applicable design criteria and standards

i.e., manual, tables, figures

Substantive Safety

Predicted, or expected, safety performance of a highway or proposed design

i.e., analysis, models, etc.

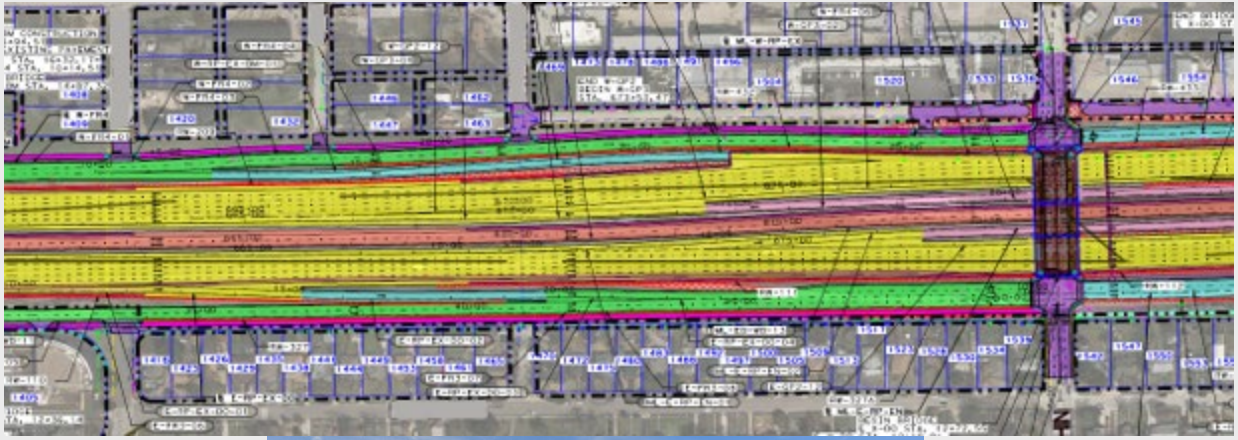


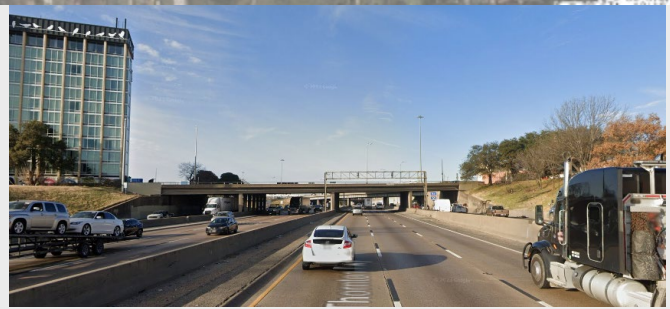
When is a Design Exception Needed?

Nominal controlling criteria met?

NO

Design Exception





When is a Design Exception Needed?

- **Per TxDOT's Roadway Design Manual, Chapter 1, Section 2 (v. 12/2022):**

  A design exception is required whenever the controlling criteria specified for different categories of construction projects (i.e., 4R, 3R, 2R, Special Facilities, Off-System Bridge Replacement and Rehabilitation projects, Historically Significant Bridge Projects, On-System Park Road Projects, and on-street Bicycle Facilities) are not met.

- Design Exceptions are not perpetual and require reevaluation/documentation for **each new project**.

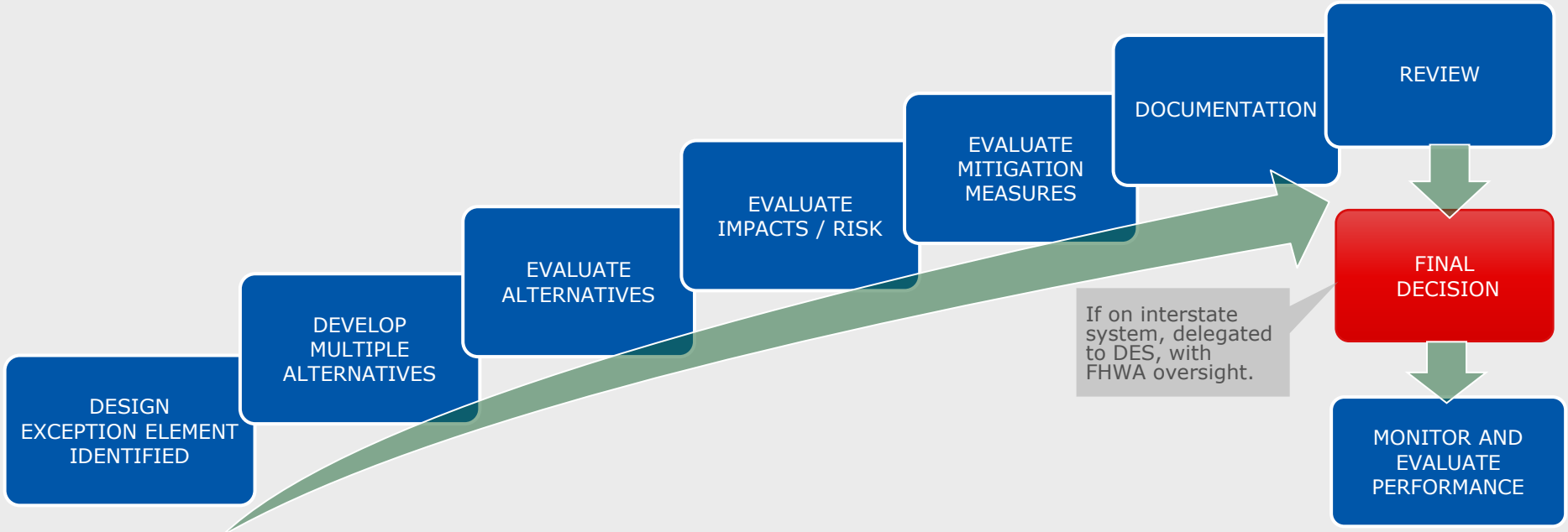
- A design exception is **not** required when values exceed the minimum guidelines for the controlling criteria.

When is an Interstate Design Exception Needed?

Controlling Criteria for Interstates

- Design Speed
- Lane Width
- Shoulder Width
- Horizontal Curve Radius
- Superelevation Rate
- Stopping Sight Distance (SSD)
- Maximum Grade
- Cross Slope
- Vertical Clearance
- Design Loading Structural Capacity
- Bridge Class Culvert Protection
- Bridge Rail
- Bike Lane
- Shared Lane (Wide Outside Lane)
- Bridge Deck Clear Space

What is the Design Exception Development Process?



How are Design Exceptions Documented, Analyzed and Justified?

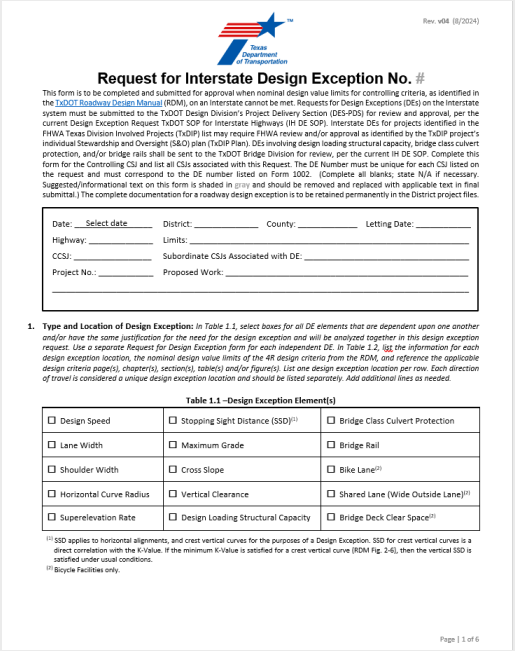
Per 23 CFR 625.3(f)(2): *The determination to approve a project design that does not conform to the minimum criteria is to be made* ***only after due consideration is given to all project conditions*** *such as maximum service and safety benefits for the dollar invested, compatibility with adjacent sections of roadway and the probable time before reconstruction of the section due to increased traffic demands or changed conditions.*

MINIMUM COMPONENTS OF DOCUMENTATION *		
Specific controlling criteria that will not be met	Future plans to meet minimum criteria	Alternatives considered and their analyses
Brief description of project and purpose; existing roadway characteristics	Compatibility with adjacent sections of roadway	Other anticipated impacts
Constraints preventing meeting minimum criteria	Existing and anticipated safety and operational performance	Proposed mitigation measures
*** The level of analysis should reflect the complexity of the project.**		

Request for Design Exception Document

Request for Interstate Design Exception Template Document

- **Section 1:** Type and Location of Design Exception
- **Section 2:** Brief Project Description
- **Section 3:** Why Nominal Design Value Limit(s) Cannot Be Met
- **Section 4:** Future Projects Programmed to Remove Design Exception
- **Section 5:** Compatibility of Proposed Design with Adjacent Sections of Roadway
- **Section 6:** Design Exception Condition Traffic and Safety Analysis
- **Section 7:** Comparison of Design Alternatives Considered
- **Section 8:** Proposed Practical Mitigation Measures, Their Costs and Impacts to Safety



Rev. v04 (8/2024)

Texas Department of Transportation

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Date: Select date District: _____ County: _____ Letting Date: _____
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[1] SSD applies to horizontal alignments, and crest vertical curves for the purposes of a Design Exception. SSD for crest vertical curves is a direct correlation with the K-Value. If the minimum K-Value is satisfied for a crest vertical curve (RDM Fig. 2-6), then the vertical SSD is satisfied under usual conditions.
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Request for Interstate Design Exception Template Document

General Project Information

- For recordkeeping and future reference
- Design Exception number

- Include:
  - Date of document
  - District, County
  - Letting Date
  - Highway, Limits
  - CCSJ
  - Subordinate / Associated CSJs
  - Project No.
  - Proposed Work

Section 1 – Type and Location of Design Exception

- Each Design Exception Request is a stand-alone document and is independent of other requests.
- Determine if multiple design exception locations should be combined within the same document for analysis purposes.
- Identify specific controlling criteria that cannot be met.

Table 1.1 –Design Exception Element(s)

❑ Design Speed(3)	❑ Stopping Sight Distance (SSD)(1)	❑ Bridge Class Culvert Protection
❑ Lane Width	❑ Maximum Grade	❑ Bridge Rail
❑ Shoulder Width	❑ Cross Slope	❑ Bike Lane (2) (3)
❑ Horizontal Curve Radius	❑ Vertical Clearance	❑ Shared Lane (Wide Outside Lane)(2) (3)
❑ Superelevation Rate	❑ Design Loading Structural Capacity(3)	❑ Bridge Deck Clear Space(2) (3)

(1) SSD applies to horizontal alignments, and crest vertical curves for the purposes of a Design Exception. SSD for crest vertical curves is a direct correlation with the K-Value. If the minimum K-Value is satisfied for a crest vertical curve (Fig. 2-6), then the vertical SSD is satisfied under usual conditions.
(2) Bicycle Facilities only.
(3) Rarely used.

Section 1 – Type and Location of Design Exception

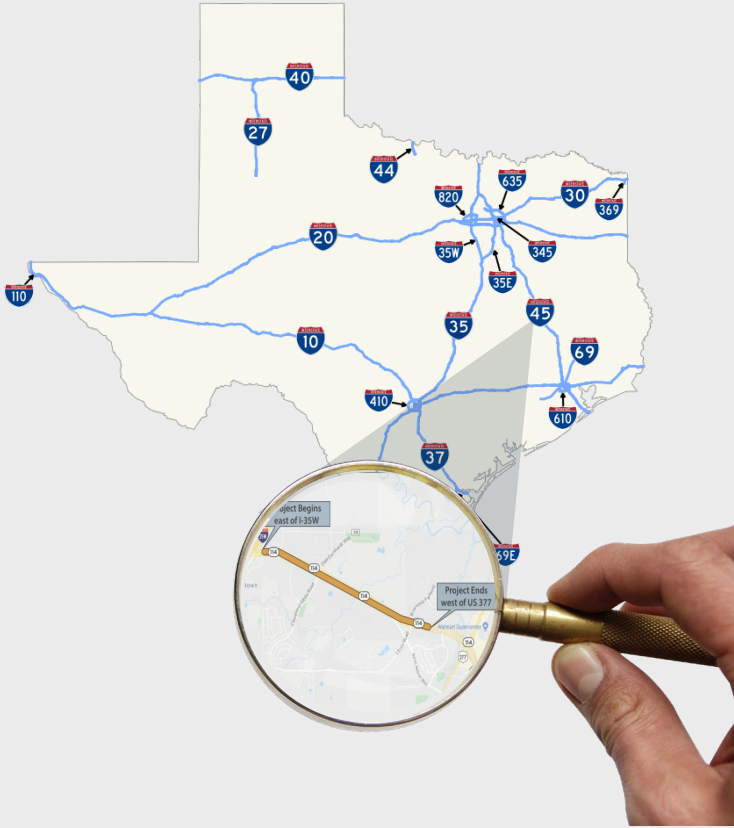
- Document the impacted facility, controlling criteria, location and limits of the design exception, and existing and proposed condition.

Table 1.2 - Design Exception Element Location and Values

Interstate No., Direction of Travel, Rd Part	Design Exception Element	Location(s) (DFO/MP and Station)		Nominal Design Value Limit	Proposed Value	Existing Value	Design Value Reference(s)
		Begin DFO/MP, Sta.	End DFO/MP, Sta.				
I-XXX EB GPL	Lane Width	x.xxx, xxx+xx	x.xxx, xxx+xx	12 ft.	11.5 ft.	12 ft.	RDM Ch.3, Sec 6, Tbl 3-18
I-XX NB Exit Ramp	SSD	x.xxx, xxx+xx	x.xxx, xxx+xx	425 ft.	385 ft.	385 ft.	RDM Ch.2, Sec 4, Tbl 2-1

Section 2 – Brief Project Description

- Project, project purpose, existing conditions
- Proposed improvements
- Regional vicinity map
- Project location map (Identifying the project limits and design exception locations)
- Existing and proposed typical sections and plan views for ALL locations shown in Table 1.2
- Existing and proposed profiles and cross sections as applicable



Section 3 – Why Nominal Design Value Limits Cannot Be Met

- Why is the Design Exception needed?
- Describe true constraints.
- Explain why nominal controlling criteria values for each design exception element and location cannot be met.

Section 4 – Future Projects Programmed to Remove Design Exception

- Describe future projects programmed to remove the design exception condition.
- Describe commitments made that planned projects will be completed in the next few years.
- Describe the length of time the design exception is anticipated to be in place.
- Indicate if the design exception will be permanent.

Section 5 – Compatibility of Proposed Design with Adjacent Sections of Roadway

- Describe adjacent roadway sections and the corridor and whether or not they are compatible/consistent with the proposed design exception condition.
- Describe how the corridor and proposed design exception condition relate to driver expectancy.
- If adjacent roadway sections are not compatible/consistent with the corridor and the proposed design exception condition

→ Mitigation measures at a minimum should be taken and described in Section 8.

Section 6 – Design Exception Condition Traffic and Safety Analysis

a) Crash History

- Determine and describe the limits of the design exception study area/area of influence. Describe how they were determined and the approach taken for the analysis of the historical crash data.
- Summarize **and analyze** the crash history within the limits of the design exception location and the design exception's area of influence.
- The analysis approach and analysis tools should be similar to the analysis for the overall project and match the complexity of the project.
- Perform the historical crash data analysis for **at least the three** most recent years of available data.
- Use figures and diagrams to support discussion.

Section 6 – Design Exception Condition Traffic and Safety Analysis

- Summarize and analyze the number of crashes by **severity**
- Collect crash data history from TxDOT's Crash Records Information System (CRIS)

Table 6.1 - Crashes by Severity

Hwy / Limits: [Interstate No.], from [Begin STA] to [End STA] ([Begin DFO] to [End DFO])							
Year	Non-Injury or Property Damage Only (PDO)	Possible Injury (C)	Suspected Minor Injury (B)	Suspected Serious Injury (A)	Fatal Injury (k)	Unknown	Total
N-3							
N-2							
N-1							
N							
Total							
% of Total							
Statewide Crashes By Severity for Similar Interstate Type- Choose an item							
N-3							
N-2							
N-1							
N							
Total							
% of Total							

Choose Similar Interstate Type.
Urban Interstate
Rural Interstate

Section 6 – Design Exception Condition Traffic and Safety Analysis

- Summarize and analyze the number of crashes by **Manner of Collision**

Table 6.2 - Crashes by Manner of Collision

Hwy / Limits: [Interstate No.], from [Begin STA] to [End STA] ([Begin DFO] to [End DFO])									
Year	One Motor Vehicle	Angle	Rear End	Sideswipe	Vehicles in Same Direction	Head On	Vehicles in Opposite Direction	Other	Total
N-3									
N-2									
N-1									
N									
Total									
% of Total									

Section 6 – Design Exception Condition Traffic and Safety Analysis

- Summarize and analyze the **Crash Rates**

Table 6.3 – Crash Rate

Hwy / Limits: [Interstate No.], from [Begin STA] to [End STA] ([Begin DFO] to [End DFO])				Roadway Segment Length (mi.): #.###
Year	Crashes	AADT	Crash Rate (HMVMT)	Average Statewide Crash Rate (HMVMT) for Similar Interstate Type - Choose an item.
N-3				
N-2				
N-1				
N				

Choose Similar Interstate Type.
Urban Interstate
Rural Interstate

R = Crash rate for the road segment expressed as crashes per 100 million vehicle-miles of travel (HMVMT).

C = Total number of crashes in the study period.

N = Number of years of data.

V = Number of vehicles per day (both directions).

L = Length of roadway segment in miles.

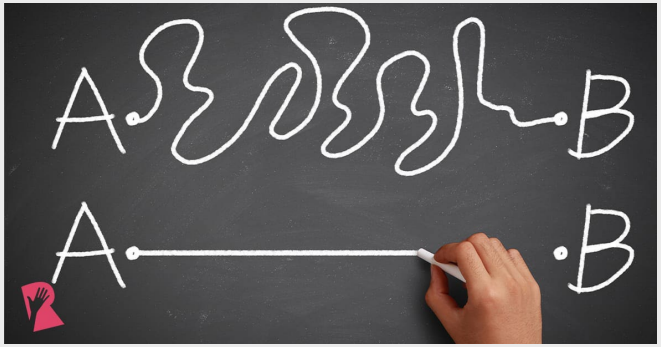
Formula: $R = 10^8 \times C / (365 \times N \times V \times L)$

Section 6 – Design Exception Condition Traffic and Safety Analysis

COMING SOON

Crash Diagnostic Tool

- Analysis based on Historical Crashes
- Requirement: Crash Data
- Time involved
- Streamlined Process
- Validation and consistency
- Reduction of Review Time
- Design Exception Tool



Section 6 – Design Exception Condition Traffic and Safety Analysis

Crash Diagnostic Tool

- Inputs:
  - CSJ
  - Limits
  - County
  - Range of Crash Year Data
  - Highway
  - Beginning and Ending DFO

Preliminary Roadway Characteristics Required – Design Exception Request

1. **Project CSJ**: 0015-13-000
2. **Project Limits**:
   a. From: E. Cesar Chavez St.
   b. To: E. 15th St.
3. **County**: Travis
   a. County or counties where the design exception is located
4. **Crash Year**: 2018 - 2022
   a. Crash year or range of years of historical analysis desired (i.e., typical historical crash analysis includes the latest full 5-year crash timeframe; example: from 2019 to 2023 under current calendar year 2024)
5. **Highway**: IH0035
   a. Roadway identification name represented as 7-digit value
      i. Example: Interstate Highway 35 West is represented as "IH" for Interstate Highway, "0035" for 35, and "W" for West (IH0035W). NOTE: roadway number is represented with 4 digits, while succeeding letter may be left out if there is no distinctive explicit direction to roadway.
6. **Crash DFO (ID)**: Between "233.559" AND "235.088"
   a. Destination-from-Origin value of beginning and ending location of **area of interest (AOI)** in ascending order
      i. Value of DFO is represented with 6 digits (3-digits to the left of the period, and 3-digits to the right of the period). DFOs are represented in **Miles**, therefore, DFOs are accurate to the hundreds & thousandths of a mile.
      ii. See Guidance on "How To DFO" to find respective DFOs.

Section 6 – Design Exception Condition Traffic and Safety Analysis

Crash Diagnostic Tool

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Crash	Highway	Crash DFO	Crash Latitude	Crash Longi	Crash Ass	Displacem	Crash Mi	TxDOT D	County	City	Crash Con	Reported Intersecti	Vehicle Direc
2	16182700	IH0035	234.622	30.27205833	-97.7322927	0235	'+0.079	18.154	Austin	Travis	AUSTIN	0015-13	12TH	SOUTH
3	16186070	IH0035	234.03	30.2638785	-97.7353061	0234	'+0.496	17.569	Austin	Travis	AUSTIN	0015-13	4TH	UNKNOWN
4	16186115	IH0035	234.164	30.26572778	-97.7346263	0235	'-0.379	17.702	Austin	Travis	AUSTIN	0015-13	IH 35	SOUTH
5	16188502	IH0035	234.297	30.26757574	-97.7339345	0235	'-0.246	17.834	Austin	Travis	AUSTIN	0015-13	IH 35 SVRD	SOUTH
6	16194263	IH0035	234.03	30.2638785	-97.7353061	0234	'+0.496	17.569	Austin	Travis	AUSTIN	0015-13	4TH ST	SOUTH
7	16201255	IH0035	235.002	30.27734324	-97.7304526	0235	'+0.459	18.53	Austin	Travis	AUSTIN	0015-13	15TH ST	NORTH
8	16201380	IH0035	234.254	30.26697612	-97.7341591	0235	'-0.289	17.791	Austin	Travis	AUSTIN	0015-13	E 11TH ST	NORTH

Instructions | Source_B | Tables-DE

INPUT INSTRUCTIONS

Orange-Neutral Boxes --> Type input information into box	
NOTE: STARS volume data can be obtained at the following website:	https://www.txd

INPUTS:

General Info		Average Annual Daily Traffic		
CSJ:		Year	AADT	STARS Location ID (s)
Highway:		0		
From:		1		
To:		2		
Beg. DFO:		3		
End DFO:		4		
Urban/ Rural:				
Hwy Syst Type:				

INPUT INSTRUCTIONS

Orange-Neutral Boxes --> Type input information into box	
NOTE: STARS volume data can be obtained at the following website:	https://www.txd

INPUTS:

General Info		Average Annual Daily Traffic		
CSJ:	0015-13-000	Year	AADT	STARS Location ID (s)
Highway:	I-35	2018	158,343	2227H115A
From:	E. Cesar Chavez St.	2019	161,510	2277H115A
To:	E. 15th St.	2020	143,744	2277H115A
Beg. DFO:	233.559	2021	154,795	227H3502
End DFO:	235.088	2022	172,635	227H3503
Urban/ Rural:	URBAN			
Hwy Syst Type:	Interstate Highways			

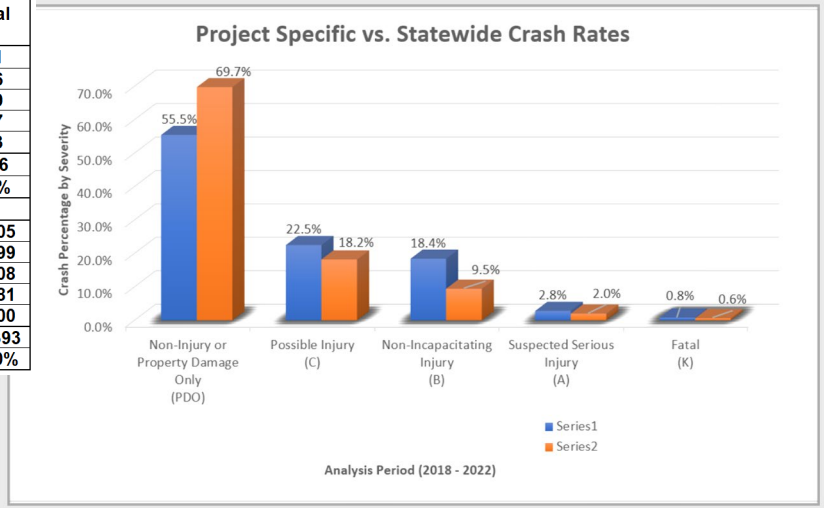
Section 6 – Design Exception Condition Traffic and Safety Analysis

Crash Diagnostic Tool

- Outputs – Crashes by Severity

Hwy/ Limits: I-35 From: E. Cesar Chavez St. To: E. 15th St.

Year	Non-Injury or Property Damage Only (PDO)	Possible Injury (C)	Non-Incapacitating Injury (B)	Suspected Serious Injury (A)	Fatal (K)	Total
2018	207	82	55	13	4	**361**
2019	206	107	72	7	4	**396**
2020	163	61	59	6	0	**289**
2021	149	51	63	12	2	**277**
2022	160	58	45	7	3	**273**
Total	**885**	**359**	**294**	**45**	**13**	**1596**
% of Total	**55.5%**	**22.5%**	**18.4%**	**2.8%**	**0.8%**	**100%**
Statewide Crashes by Severity for Similar Facility Type : URBAN - Interstate Highways						
2018	56,552	16,080	7,392	1,429	452	**81,905**
2019	59,104	16,947	7,447	1,548	453	**85,499**
2020	51,389	13,460	6,571	1,544	444	**73,408**
2021	59,746	14,480	8,388	1,875	592	**85,081**
2022	57,333	13,117	8,703	1,784	563	**81,500**
Total	**284,124**	**74,084**	**38,501**	**8,180**	**2,504**	**407,393**
% of Total	**69.7%**	**18.2%**	**9.5%**	**2.0%**	**0.6%**	**100.0%**



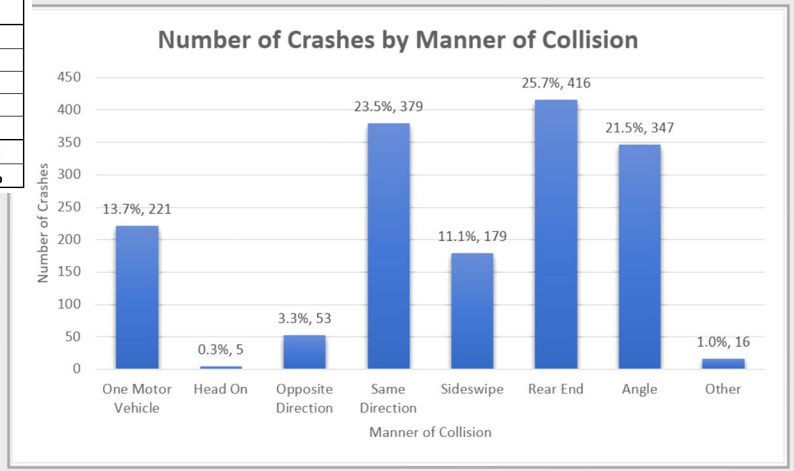
Section 6 – Design Exception Condition Traffic and Safety Analysis

Crash Diagnostic Tool

- Outputs – Crashes by Manner of Collision

Hwy/ Limits: I-35 From: E. Cesar (To: E. 15th St.

Year	One Motor Vehicle	Head On	Opposite Direction	Same Direction	Sideswipe	Rear End	Angle	Other	Total
2018	45	0	12	98	41	101	63	4	**364**
2019	58	3	12	93	44	121	66	2	**399**
2020	40	0	9	67	38	63	74	1	**292**
2021	46	1	5	62	27	63	79	4	**287**
2022	32	1	15	59	29	68	65	5	**274**
Total	**221**	**5**	**53**	**379**	**179**	**416**	**347**	**16**	**1616**
% of Total	**13.7%**	**0.3%**	**3.3%**	**23.5%**	**11.1%**	**25.7%**	**21.5%**	**1.0%**	**100%**



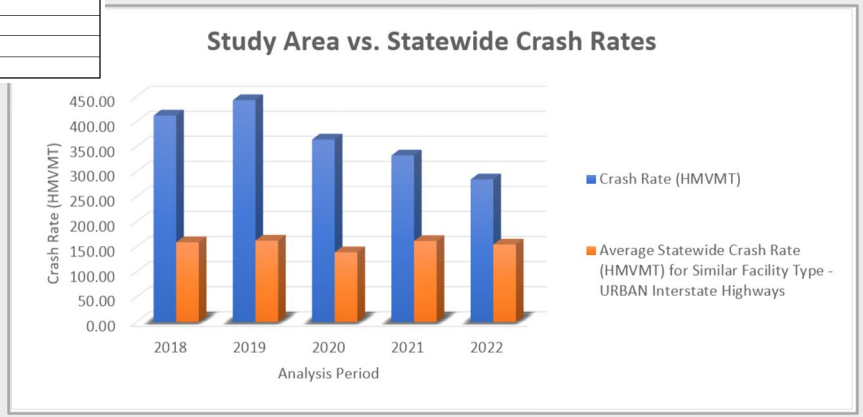
Section 6 – Design Exception Condition Traffic and Safety Analysis

Crash Diagnostic Tool

- Outputs – Crash Rates

Hwy/ Limits: I-35 | From: E. Cesar Chavez St. | To: E. 15th St.
Roadway Segment Length (Mi.): 1.529

Year	Crashes	AADT	Crash Rate (HMVMT)	Average Statewide Crash Rate (HMVMT) for Similar Facility Type - URBAN Interstate Highways
2018	364	158,343	411.91	158.77
2019	399	161,510	442.66	162.14
2020	292	143,744	363.99	138.83
2021	287	154,795	332.22	161.35
2022	274	172,635	284.39	154.56



Section 6 – Design Exception Condition Traffic and Safety Analysis

b) Anticipated Changes to Crashes with the Proposed Design Exception

- Discuss and analyze the predicted safety outcomes of the proposed design exception condition and how they compare to predicted safety outcomes of existing conditions.
- Describe the limits and approach taken for the predictive safety analysis.
- The limits of the predictive safety analysis should be identical to those used for the historical crash analysis.
- The analysis approach and analysis tools used should be similar to those used for the overall project and match the complexity of the project.
- Describe the anticipated changes to crashes for the No-Build and the Build condition (with the design exception) **for both the opening and design years.**
- Utilize HSM-based predictive safety analysis methods, if applicable, to quantify the anticipated changes in crashes due to the proposed design.
- In instances where the crash history does not adequately address the issue (e.g., new alignment, substantial changes are made, etc.), use relevant Crash Modification Factors (CMFs) and/or a qualitative analysis.

Section 6 – Design Exception Condition Traffic and Safety Analysis

- Summarize and analyze the **Predicted Total Number of Crashes** for existing conditions compared to the design exception condition

Table 6.4 – YYYYY Opening Year and ZZZZ Design Year Predicted Crashes

Hwy / Limits: [Interstate No.], from [Begin STA] to [End STA]				
Year	Condition	Predicted Crashes	Change in Crashes Compared to No-Build Conditions	Percent Change in Crashes Compared to No-Build Conditions
YYYY	No-Build			%
YYYY	Build			
ZZZZ	No-Build			%
ZZZZ	Build			

Break for Questions

Section 7 – Comparison of Design Alternatives Considered

a) Description of Alternatives, and Alternative Quantitative Analysis

- Describe and analyze the quantitative elements of the design alternatives considered (preferably in a table) showing which variables change from base conditions and costs associated with each alternative.
- Explain why each alternative was eliminated and why the proposed design was preferred over each alternative.
- At a minimum, an alternative for a No-Build alternative and an alternative for a Build alternative with no design exception should be included as part of the analysis.

Section 7 – Comparison of Design Alternatives Considered

- Summarize the Design Alternatives in Table 7.1.
- Describe and discuss each alternative considered and why it was not selected.

Table 7.1 - Design Alternatives

Hwy / Limits: [Interstate No.], from [Begin STA] to [End STA]					
Element of Comparison	Existing Conditions	Design Exception Condition	Alternative 1 No Build	Alternative 2 Brief Description	Alternative 3 Ex.-Widen to meet criteria
[IH No.] EB Lane Width	12 ft.	11 ft.	12 ft.	12 ft.	11.5 ft.
[IH No.] EB Inside Shoulder Width	10 ft.	10 ft.	10 ft.	12 ft.	4 ft.
[IH No.] EB Stopping Sight Distance	700 ft.	690 ft.	700 ft.	730 ft.	640 ft.
Total Predicted Crashes YYYY-ZZZZ					
Reduction in Total Crashes compared to Existing Conditions			0		
Percent Change in Total Predicted Crashes Compared to Existing Conditions		%	%	%	%
Design Alternative Cost		$	$	$	$

Section 7 – Comparison of Design Alternatives Considered

b) Additional Discussion on the Proposed Design Exception's Impact to Project to Justify Not Selecting an Alternative Design

- Provide additional justification for the proposed design's impact as it relates to such factors as:
  - Project schedule
  - Operations
  - Constructability
  - Traffic control
  - Right-of-way
  - The community
  - The environment
  - Cost
  - Usability by all modes of transportation
  - Incident management
  - Storm drainage, and/or
  - Other considerations

- Describe factors not yet discussed or easily quantifiable that will justify this design exception or were used to eliminate the other design alternatives in Section 7a.

Section 8 – Proposed Practical Mitigation Measures, Their Costs and Impacts to Safety

- Describe and discuss practical mitigation measures (e.g., delineation, milled rumble strips, signing, lighting, etc.) proposed for this project to mitigate the design exception condition and the costs associated with each.
- Provide crash reduction factors (CRFs)/ crash modification factors (CMFs) such as those found in the *Crash Modification Factors Clearinghouse* or other reference material.
- Discuss how the proposed mitigation measures are anticipated to reduce crashes.
- If no mitigations measures are to be implemented, provide justification.

Attachments

- Attach all additional exhibits (diagrams, tables, figures, analyses, reports, etc.). Label each attached document and reference each appendix in the text. At a minimum, the following should be included as appendices for most DEs:
  - **Appendix A** – Maps (e.g., Regional Vicinity Map and Project Location Map/Title Sheet (showing DFO and station limits of project limits and general design exception locations))
  - **Appendix B** – Existing and Proposed Typical Sections (to include all design exception locations and study limits, with station limits and DE elements labeled)
  - **Appendix C** – Plan Views (of specific design exception locations and study limits, showing DFO/stations of limits and design values of the design exception elements)
  - **Appendix D** – Existing and Proposed Profiles (as applicable)
  - **Appendix E** – Existing and Proposed Cross Sections (as applicable)
  - **Appendix F** – Historical Crash Data (used for the historical crash analysis)
  - **Appendix G** – Native (Electronic) Predictive Safety Analysis Files (used to generate predictive crash results)
  - **Appendix H** – Predictive Safety Analysis Summary Sheets (showing predictive crash results; e.g., ISATe / IHSDM outputs)
  - **Appendix I** – CRF / CMF Summary (pdf copy, as applicable)
  - **Appendix J** – Design Alternative Cost Estimate Details (used to determine the alternative costs)
  - **Appendix K** – Completed Design Exception Checklist (used for QC / QA)

Request for Interstate Design Exception Checklist

Design Exception Checklist

This form is to be completed and submitted as the last attachment to the Request for Interstate Design Exception (DE). This form lists the minimum amount of information and data that is required to develop a responsive justification for an interstate design exception.

General

- ☐ The most recent Request for Interstate Design Exception template, v04 (8/2024), is used.
- ☐ Design Exception number and design exception element(s) match those on Form 1002.
- ☐ Design Exception number is unique for each CSJ listed on the request.
- ☐ Date on the Design Exception document reflects its latest revision/submission date.
- ☐ Project information on Page 1 matches Form 1002 and TxDOTCONNECT for the Controlling CSJ (County, Letting Date, Highway, Limits, CCSJ, Subordinate CSJs, Project No., Proposed Work, etc.).
- ☐ All template fields are completed, stating "N/A" if necessary.
- ☐ Suggested/informational text in template shaded in gray is removed and replaced with applicable text.
- ☐ Document is written as a technical report:
  - ○ Active voice and third person used throughout.
  - ○ Grammar and spelling checked.
  - ○ Tables, figures, narratives and attachments checked for conflicting information.
  - ○ Discussion makes sense and all data is consistent throughout document.
  - ○ Data is checked against data sources for accuracy.
  - ○ Analysis and discussion is included for all data and tables in the document.
  - ○ The document can stand alone, with all necessary information included within the document.
- ☐ A justifiable and defendable case is made for the necessity of the design exception. This should most often be based largely on quantitative data and analysis and less on qualitative data, unless there are valid limitations that prevent a quantitative analysis.
- ☐ The information in the design exception does not conflict with that in an associated IAJR or environmental document. Examples are statements in the IAJR verifying designs will meet criteria/standards or IAJR does not mention design exceptions. Consider how DEs are mentioned in IAJRs for interim conditions of phased projects. If information in DE changes over time, the IAJR may need to be updated.
- ☐ Each request is independent of other requests (i.e. approval of one is not contingent upon approval of a separate request).
- ☐ The design exception elements grouped in the same request are dependent upon one another and/or have the same justification for the need for the design exception and will be analyzed

together in the same design exception request. Typically, cross-sectional elements can be analyzed independently of vertical elements. Also, cross-sectional elements within the same roadway segment typically can be grouped within the same request.

- ☐ All design exception elements for the project have been identified, documented and analyzed in a Request for Interstate Design Exception.
- ☐ If improvements are proposed for any elements in the same roadway segment as an existing design exception, the existing design exceptions currently in place have been re-evaluated and included in a new Design Exception Request and submitted for approval.
- ☐ Requests for Design Exceptions involving design loading structural capacity, bridge class culvert protection, and/or bridge rails have been submitted to the Bridge Division for review.
- ☐ Requests for Design Exceptions on the interstate system are reviewed and approved by DES or FHWA, as applicable, per the latest TxDOT DE SOP.
- ☐ The complete documentation for a design exception is retained permanently in the District project files.

Section 1. Type and Location of Design Exception

- ☐ Table 1.1 Completed:
  - ○ All design exception elements applicable to the request are identified in Table 1.1.
- ☐ Table 1.2 Completed:
  - ○ Location(s) for each design exception element identified in Table 1.1 are described in detail in Table 1.2.
  - ○ Each unique design exception element and location are listed in a separate row.
  - ○ Table 1.2 and document clearly identify location of design exception element (which facility (road), in which direction of travel, which lanes/shoulders, beginning and ending points for reference, etc.).
  - ○ Each design exception location is listed with the following information:
    - *Facility Type – Hwy (e.g. I-35); Direction of Travel (NB, SB, EB, WB); Road Part (GPL (General Purpose Lane), ML (Managed Lane), Ramp, FR (Frontage Road), etc.).*
    - *One design exception location per row.*
    - *Each direction of travel listed separately.*
    - *All Design Exception Elements selected (from Table 1.1) included.*
    - *Location, Begin and End –Distance from Origin (DFO) / Milepoint, and Station identified.*
    - *Nominal 4R Design Criteria Value Limit from the RDM, identified.*
    - *Proposed Value identified.*
    - *Existing Value identified. "N/A" is shown if there is no existing value.*
    - *Design Value Reference (applicable source, design criteria page(s), chapter(s), section(s), table(s) and/or figure(s)) identified.*
  - ○ The controlling criteria specified in Table 1.2 of the Request for Design Exception form falls under the Project Design Criteria specified on Form 1002.
  - ○ The controlling criteria specified in Table 1.2 of the Request for Design Exception Form is correct and applicable.

  - ○ The need for a design exception is verified using the 4R Design Criteria, the design exception element(s) identified in Table 1.1 and the controlling criteria specified in Table 1.2 against the requirements for a design exception described in RDM, Ch. 1, Section 2.

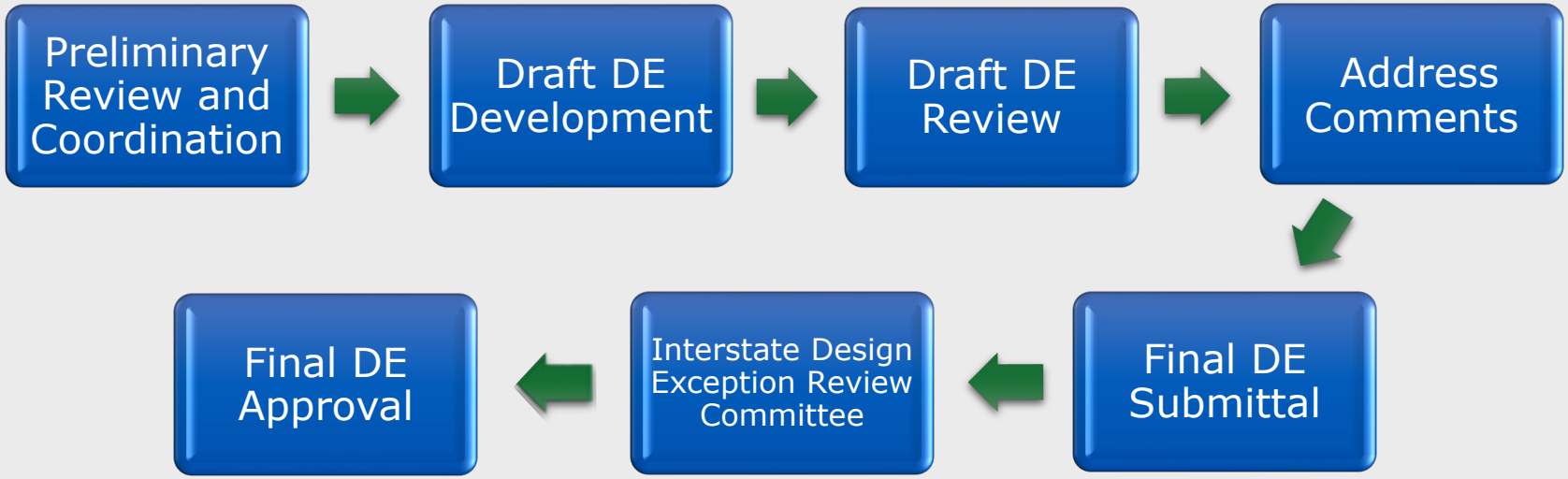
Section 2. Brief Project Description

- ☐ Purpose of Project - The project description describes the purpose of the project and clearly explains the project, its improvements and general and specific locations. Information provided agrees with the project information on Page 1 of the template and as shown in TxDOTCONNECT.
- ☐ Regional Vicinity Map included as Attachment
  - ○ *The regional view is at an appropriate scale to easily find the project location with respect to the state/county/city.*
  - ○ *The general location of the design exception relative to the project limits is clearly labeled.*
- ☐ Project Location Map included as Attachment
  - ○ *All elements are readable / legible.*
  - ○ *Project limits / CSJ Nos. clearly identified.*
  - ○ *Overall proposed work of the project clearly shown.*
  - ○ *Design Exception locations with milepoint/DFO **and** stationing identified.*
  - ○ *Design Exception elements and values identified.*
- ☐ Existing Typical Sections included as Attachment - *for ALL locations shown in Table 1.2, with stations and design exception locations labeled.*
- ☐ Proposed Typical Sections included as Attachment - *for ALL locations shown in Table 1.2, with stations and design exception locations labeled.*
- ☐ Plan Views included as Attachment - *for ALL locations shown in Table 1.2 and adjacent areas of influence, with stations, DFOs (Distances from Origin)/MPs (milepoints), design exception locations, elements and limits, and constraints labeled.*
- ☐ Cross-Sections (existing and proposed) included as Attachment, if the request includes cross-section modifications.
- ☐ Profiles (existing and proposed) included as Attachment, if the request includes profile modifications.

Section 3. Why Nominal Design Value Limit(s) Cannot Be Met

- ☐ Field limits and constraints listed for each location shown in Table 1.2.
- ☐ The description references the nominal design criteria value not attained and why they cannot be met for each element and location.
- ☐ The explanation identifies valid and true constraints for not meeting nominal 4R controlling criteria value(s).
- ☐ The controlling criteria and values included in the description(s) agree with the information shown in Tables 1.1 and 1.2 of the Request for Design Exception Form and on the criteria specified on Page 3 of Form 1002.

Interstate Design Exception Review and Approval Process



Design Exception Submittals: DES_PDSS-DesignExceptions-THFNDeviations@txdot.gov

Interstate Design Exception Review and Approval Process

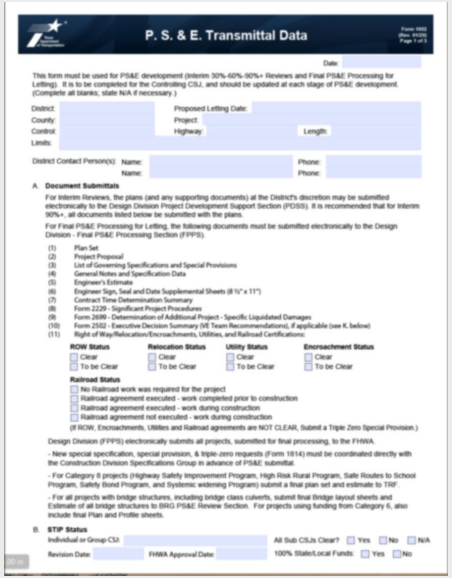
FINAL DECISION

- Alternatives, impacts and risks are adequately evaluated.
- Design will accomplish the project's purpose and goals.
- Design Exception clearly documents a defendable case that the selected design is the preferred alternative.
- Approved **only after due consideration is given to all project conditions** such as maximum service and safety benefits for the dollar invested, compatibility with adjacent sections of roadway and the probable time before reconstruction of the section due to increased traffic demands or changed conditions. [23 CFR 625.3(f)(2)]

Interstate Design Exception Review and Approval Process

DESIGN EXCEPTION RECORD OF DECISION

- **Form 1002** is the official place to document a project's design criteria and list all design exceptions associated with a project. Form 1002 will document each Design Exception's Final Record of Decision (approval/non-approval).
- Design Exceptions are numbered sequentially per project.
- Districts permanently retain all Design Exception records.



P. S. & E. Transmittal Data

Date:

This form must be used for PS&E development (interim 30%-60%-90%+ Reviews and Final PS&E Processing for Letting). It is to be completed for the Controlling CSJ, and should be updated at each stage of PS&E development. (Complete all blanks, state N/A if necessary.)

District:
County:
Control:
Limits:
Proposed Letting Date:
Project:
Highway:
Length:

District Contact Person(s): Name: Phone:
Name: Phone:

A. **Document Submittals**

For Interim Reviews, the plans (and any supporting documents) at the District's discretion may be submitted electronically to the Design Division Project Development Support Section (PDSS). It is recommended that for interim 90%+, all documents listed below be submitted with the plans.

For Final PS&E Processing for Letting, the following documents must be submitted electronically to the Design Division - Final PS&E Processing Section (FPPS).

(1) Plan Set
(2) Project Proposal
(3) List of Governing Specifications and Special Provisions
(4) General Notes and Specification Data
(5) Engineer's Estimate
(6) Engineer Sign, Seal and Date Supplemental Sheets (8 ½" x 11")
(7) Contract Time Determination Summary
(8) Form 2229 - Significant Project Procedures
(9) Form 2699 - Determination of Additional Project - Specific Liquidated Damages
(10) Form 2502 - Executive Decision Summary (VE Team Recommendations), if applicable (see K. below)
(11) Right of Way/Relocation/Encroachments, Utilities, and Railroad Certifications:

ROW Status: Clear / To be Clear
Relocation Status: Clear / To be Clear
Utility Status: Clear / To be Clear
Encroachment Status: Clear / To be Clear

Railroad Status
No Railroad work was required for the project
Railroad agreement executed - work completed prior to construction
Railroad agreement executed - work during construction
Railroad agreement not executed - work during construction
(If ROW, Encroachments, Utilities and Railroad agreements are NOT CLEAR, Submit a Triple Zero Special Provision.)

Design Division (FPPS) electronically submits all projects, submitted for final processing, to the FHWA.

- New special specification, special provision, & triple-zero requests (Form 1814) must be coordinated directly with the Construction Division Specifications Group in advance of PS&E submittal.

- For Category 8 projects (Highway Safety Improvement Program, High Risk Rural Program, Safe Routes to School Program, Safety Bond Program, and Systemic widening Program) submit a final plan set and estimate to TRF.

- For all projects with bridge structures, including bridge class culverts, submit final Bridge layout sheets and Estimate of all bridge structures to BRG PS&E Review Section. For projects using funding from Category 6, also include final Plan and Profile sheets.

B. **STIP Status**

Individual or Group CSJ: All Sub CSJs Clear? Yes No N/A
Revision Date: FHWA Approval Date: 100% State/Local Funds: Yes No

Interstate Design Exception Guidance

Interstate Design Exception SOP and Guidance, including the Request for Interstate Design Exception template and checklist, are posted on txdot.gov (Design Tools and Training) and on the Design Division's Project Delivery Section Highway Safety & Operations intranet site.

Look for upcoming Crash Diagnostic Tool to assist in data reporting of CRIS historical crash data.

Form 1002 will be updated to reflect new process.

Design Exception Resources

- https://www.txdot.gov/business/resources/design-tools-training.html
- TxDOT Roadway Design Manual
- TxDOT Traffic and Safety Analysis Procedures (TSAP) Manual
- TxDOT Bridge Railing Manual
- TxDOT Bridge Inspection Manual
- TxDOT Project Development Process Manual
- Code of Federal Regulations: 23 CFR 625.3(f)
- FHWA's Design Decision Documentation and Mitigation Strategies for Design Exceptions, March 2024

DES_PDSS-DesignExceptions-THFNDeviations@txdot.gov

Final Thoughts / Questions?

Jennifer Book, P.E.
Lead Engineer, Highway Safety & Operations
Design Division | PDS
Jennifer.Book@txdot.gov
(512) 416-2615

Eddie Espinoza, P.E.
Transp. Engineer, Highway Safety & Operations
Design Division | PDS
Eddie.Espinoza@txdot.gov
(512) 865-8300

Khalid Jamil, P.E.
Supervisor, Highway Safety & Operations
Design Division | PDS
Khalid.Jamil@txdot.gov
(512) 486-5171