I N T E R O F F I C E M E M O

TECHNICAL SERVICES
Bridge Engineering Section
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DATE: April 7, 2014

TO: Craig Shike
Bridge Operations & Standards Managing Engineer

FROM: Albert Nako Phone#: 503-986-3333
Seismic Bridge Standards Engineer
ODOT – Bridge Section

SUBJECT: Proposed Revision to Bridge Design & Drafting Manual

RE: BDDM Section A2.7.3

Problem Statement:

The review process of the bridge plans over the past few years has revealed a severe inconsistency of General Notes pertaining to seismic design. Furthermore, the current General Notes fail to provide one of the most important information regarding the seismic design; Seismic Design Category (SDC) for the bridge site.

The proposed modification intends to establish an environment where maintaining consistency on seismic related General Notes would become such an easy task by filling in the same Seismic Data Table.

Proposal:

Modify/Add Section A2.7.3 as follows

A2.7.3 PLAN AND ELEVATION

[New Seismic Designs ----- Multi-Span Bridges]:
Seismic design is performed by the multi-mode (single-mode) analysis in accordance with the ~~"AASHTO LRFD Bridge Design Specifications" (~~"AASHTO Guide Specifications for LRFD Seismic Bridge Design"~~)~~ ("AASHTO LRFD Bridge Design Specifications") as modified by the "ODOT Bridge Design & Drafting Manual". The 2002 USGS Seismic Hazard Maps (Site-Specific Ground Motion Response Analysis) have been used to collect the Seismic Hazard Values for the bridge site with Latitude 00.0000N~~_____~~ and Longitude 000.0000W~~_____~~:

~~1000 Year Return Period ("No Collapse" criteria)~~

~~Horizontal Peak Ground Acceleration Coefficient, PGA=_____g~~
~~Horizontal Response Spectral Acceleration Coefficients: S_S=____g, S_1=____g~~

~~500 Year Return Period ("Serviceable" criteria)~~
~~Horizontal Peak Ground Acceleration Coefficient, PGA=_____g~~
~~Horizontal Response Spectral Acceleration Coefficients: S_S=____g, S_1=____g~~

~~The bridge site is defined as a Site Class __ with Site Factors of: *Fpga*=___, *Fa* =___, and *Fv*=___.~~

Seismic Performance Criteria	Earthquake Return Period (yrs.)	Mapped Hazard Values			Site Class	Design Hazard Values			Seismic Design Category
		PGA	S_s	S_1		A_s	S_{DS}	S_{D1}	
Life Safety	1000	0.000	0.000	0.000	X	0.000	0.000	0.000	X
Operational	500	0.000	0.000	0.000	X	0.000	0.000	0.000	X

The Response Modification factors used are: R=___ for column moments, R= 0.8 for abutment connections, and R= 1.0 for other components.

[New Seismic Designs -----Single-Span Bridges]:
Seismic design is performed in accordance with the "AASHTO LRFD Bridge Design Specifications" ("AASHTO Guide Specifications for LRFD Seismic Bridge Design") as modified by the "ODOT Bridge Design & Drafting Manual" for 500- and 1000-year criteria. The Horizontal Peak Ground Acceleration Coefficients (PGA) for the 500 year (Serviceable) and 1000 year (No Collapse) return periods are ___g and ___g respectively, based on 2002 USGS Seismic Hazard Maps. The bridge site is defined as a Site Class __ with Site Factor (*Fpga*) of ___.

[Widenings which do not carry the existing structure]:
Seismic design for widening is performed by the single-mode (multi-mode) analysis, with Response Modification Factors, in accordance with the "AASHTO LRFD Bridge Design Specifications" as modified by the "ODOT Bridge Design & Drafting Manual". Seismic design is based on __ ft of superstructure width and is not designed to carry the seismic load of the existing structure. The 2002 USGS Seismic Hazard Maps have been used to collect the Seismic Hazard Values for the bridge site with Latitude 00.0000N_____ and Longitude 000.0000W_____:

[Insert the Seismic Data Table here]~~1000 Year Return Period ("No Collapse" criteria)~~
~~Horizontal Peak Ground Acceleration Coefficient, PGA=_____g~~
~~Horizontal Response Spectral Acceleration Coefficients: S_S=____g, S_1=____g~~

~~500 Year Return Period ("Serviceable" criteria)~~
~~Horizontal Peak Ground Acceleration Coefficient, PGA=_____g~~
~~Horizontal Response Spectral Acceleration Coefficients: S_S=____g, S_1=____g~~

~~The bridge site is defined as a Site Class __ with Site Factors of: *Fpga*=___, *Fa* =___, and *Fv*=___.~~

[Widenings which do carry the existing structure]:
Seismic design for widening is performed by the single-mode (multi-mode) analysis, with Response Modification Factors, in accordance with the "AASHTO LRFD Bridge Design Specifications" as modified by the "ODOT Bridge Design & Drafting Manual". The widened structure is designed to resist the full seismic load including the existing structure. The 2002 USGS Seismic Hazard Maps have been used to collect the Seismic Hazard Values for the bridge site with Latitude 00.0000N_____ and Longitude 000.0000W_____:

[Insert the Seismic Data Table here]~~1000 Year Return Period ("No Collapse" criteria)~~
~~Horizontal Peak Ground Acceleration Coefficient, PGA=_____g~~

~~Horizontal Response Spectral Acceleration Coefficients: S_S=____g, S_1=____g~~

~~500 Year Return Period ("Serviceable" criteria)~~
~~Horizontal Peak Ground Acceleration Coefficient, PGA=_____g~~
~~Horizontal Response Spectral Acceleration Coefficients: S_S=____g, S_1=____g~~

~~The bridge site is defined as a Site Class __ with Site Factors of: *Fpga*=___, *Fa* =___, and *Fv*=___.~~

Analysis / Research / Other Supporting Data:

☒ None
☐ Attached:
- [name of attachment]
- [name of attachment]

Bridge Engineering Section Response:

☐ Accepted for consideration as submitted ☐ Accepted for consideration as noted ☐ Proposal tabled, see Remarks ☐ Proposal not accepted, see Remarks		
Remarks:		
[name of reviewer] Bridge Design Standards Reviewer		Date
Craig Shike Bridge Operations & Standards Managing Engineer		Date

Cc: file