

13 STRUCTURES

13.1 General

Design-Build Contractor shall design and construct the structures Work in accordance with the applicable requirements in the PPA Documents, including Project Standards, this Section 13 and its Attachment 13-1 (Unique Special Provisions); Governmental Approvals; and applicable laws.

13.2 Bridge Structure Requirements

1. All rehabilitated structures shall be designed for HS20-44 loading in accordance with the 2002 AASHTO Standard Specifications for Highway Bridges, 17th Edition, and subsequent interim specifications.
2. All replacement structures shall be designed for HL-93 loading in accordance with 2014 AASHTO LRFD Bridge Design Specifications, 7th Edition, and subsequent interim specifications. Superstructure designs shall not include side-by-side box beams.
3. New and replacement bridges shall be composite and continuous over interior supports.
4. Steel bridges shall utilize grade 50 or 70 painted or weathering steel. If weathering steel is utilized, details shall be provided to minimize staining of MSE walls, abutments and/or piers. Hinges or pin and hanger type connections are not allowed. Fracture critical elements and fatigue prone details (AASHTO Category “E” or “F”) are not permissible.
5. Concrete bridge railing shall be used on all bridge structures. Concrete bridge railing shall be TL-5 for all structures carrying I-65. Barrier warrants shall satisfy IDM Chapter 49.
6. Concrete bridge railing transitions shall be placed at each bridge corner and guardrail transitions shall be placed where guardrail is warranted.
7. New Work shall match the geometry of existing bridges to be modified. Replacement bridges shall meet design requirements for geometry.
8. The location of construction joints between existing and proposed concrete bridge decks shall be staggered from the location of overlay construction joints by at least one foot.
9. New approach slab and bridge concrete shall be surface sealed in accordance with the Indiana Design Manual. Existing bridge railings and copings to remain shall also be surface sealed.
10. New approach slabs shall be connected to new and existing pavement ledges using horizontal tie bars. New approach slabs shall be detailed and constructed such that they may not be poured concurrently with the bridge deck. Type 1A joints shall be placed as required. New pavement ledges shall be no less than 9 inches wide.
11. Control joints shall be placed in all new approach slabs at lane lines, spaced no greater than 15 feet apart laterally. Control joints shall be similar to type 1A joints.
12. Place sacrificial embedded galvanic anodes per Attachment 13-1 (USP, Embedded Galvanic Anodes) along all interfaces where cleaned and straightened steel reinforcing bars are cast in new concrete.
13. Load Rating shall be performed by Design-Build Contractor. Work shall comply with the INDOT Bridge Inspection Manual, Part 3 Bridge Load Rating. The Load Rating summary for each bridge shall be submitted to the INDOT Central Office Load Rating Engineer for review and approval prior to construction.

14. The structures shall be constructed in phases to accommodate the MOT Plans and the maintenance of traffic requirements. Level One Design Criteria shall be met unless an approved Design Exception is obtained.
15. Drainage features shall be designed to eliminate or minimize the need for bridge deck drains. Wherever possible, existing bridge deck drains should be preserved and bridge drainage shall be directed to riprap drainage turnouts. New bridge deck drains shall be located in accordance with IDM Chapter 203. If riprap turnouts are installed at the end of a barrier transitions, construct modified concrete curb turnouts to direct water to the turnout.
16. At all bridge water crossings, a scour report with scour countermeasure recommendations shall be developed and submitted to INDOT for review and approval. Design and construct scour countermeasures as required.
17. Hydraulic analysis for superstructure or bridge replacements shall be performed by Design-Build Contractor and shall be submitted to INDOT for review and approval. Recommended and provided bridge waterway openings shall meet or exceed the requirements developed by hydraulic analysis.
18. Foundation design shall be in accordance with the Geotechnical Design Report.
19. If driven pile foundations are used, the number of dynamic pile load tests required and locations where dynamic pile load tests are to be performed shall be in accordance with the recommendations in the geotechnical design reports.
20. Any concrete placement with a minimum dimension of 5.0 feet or more shall be considered mass pour concrete and shall be placed in accordance with Attachment 13-1 (USP, Structural Mass Pour Concrete). Drilled shaft concrete shall not be considered mass pour concrete.
21. Design and construct foundations and structures to meet the following performance criteria:
 - a. Post-construction settlement of bridge piers and abutments: Less than 1.0-inch total settlement and less than 0.5-inch differential between adjacent piers or abutments.
 - b. Lateral deflection at top of foundations for non-seismic loading: As required for serviceability of Design-Build Contractor's design, but not to exceed 1.0-inch.
22. Seismic design of the structure shall be based on the soil profile type as recommended in the Geotechnical Design Report.
23. Patch piers, crash walls, and undersides of decks as required to repair all concrete delamination and spalling.
24. For modified existing bridges, existing beams shall not be overstressed by more than 5 percent. This allowance does not apply to Load Rating.
25. For all bridges carrying I-65, install ITS conduits in new bridge railings or on the outside face of existing bridge railings not requiring replacement. Connect the bridge conduits to buried conduits with expansion connections.
26. For all existing structures, clean end bent and gutter drain pipes and their inlet and outlet structures. Replace outlet protection, install revetment riprap, and install a delineator at the outlets.
27. Provide 16.0 feet minimum vertical clearance at bridges over I-65.
28. Requirements for structures to be widened:

- a. The cross-section of the bridges shall be widened to carry the full traveled way width. The outside shoulder width shall match the existing shoulder width.
 - b. Mill the existing bridge deck and perform hydrodemolition to remove unsound concrete. Perform full depth bridge deck patching as needed. Prior to milling, remove existing overlay if present. Milling depth may be a maximum of ½ inch, but no less than ¼ inch, to maintain HS-20 Load Rating.
 - c. Remove a portion of the existing concrete bridge deck coping sufficient to connect the widened deck and to remove unsound concrete.
 - d. Widen the concrete bridge deck, matching the milled existing bridge deck thickness, profile, and cross slope.
 - e. Place a variable depth (1¾ inch minimum) latex-modified concrete overlay on existing and widened bridge deck surface. Minimum cross-slope shall be 1.5 percent.
 - f. Widen the superstructure and piers in kind.
 - g. Replace existing bridge rails, bridge rail transitions and approach slabs for structures carrying I-65.
 - h. Place riprap drainage turnouts at ends of bridge rail transitions, on shoulders that receive drainage. Construct modified concrete curb turnouts to direct water to the turnout. Drainage shall not be turned out above the envelope of structure backfill if MSE walls are present.
 - i. End bents shall be semi-integral or integral.
 - j. Blast clean and prime the ends of steel beams at end bents where concrete is to be poured permanently against steel.
 - k. New structural steel shall be painted to match the color of existing structural steel.
 - l. Extend riprap spillslopes entirely across median.
 - m. Slopewalls and riprap spillslopes shall be widened to 2 feet outside the bridge deck, underneath structure.
29. Requirements for structures to be widened and to receive deck replacement:
- a. The cross-section of the bridges shall be widened to carry the full traveled way width. The outside shoulder width shall match the existing shoulder width.
 - b. Remove concrete deck, bridge rails, bridge rail transitions, approach slabs and guardrail at outside bridge corners.
 - c. Remove mudwalls down to bridge seat.
 - d. Place new 8 inch minimum thick concrete deck, bridge rails, bridge rail transitions and approach slabs, and tie new guardrail into existing guardrail at outside.
 - e. Widen the superstructure and piers in kind.
 - f. Place riprap drainage turnouts at ends of bridge rail transitions, on shoulders that receive drainage. Construct modified concrete curb turnouts to direct water to the turnout. Drainage shall not be turned out above the envelope of structure backfill if MSE walls are present.
 - g. End bents shall be poured semi-integral.

- h. Blast clean and prime the ends of steel beams at end bents where concrete is to be poured permanently against steel.
 - i. New structural steel shall be painted to match the color of existing structural steel.
 - j. Extend concrete slopewalls entirely across median.
 - k. Slopewalls and riprap spillslopes shall be widened to 2 feet outside the bridge deck, underneath structure.
30. Requirements for structures to be widened and to receive superstructure replacement:
- a. The cross-section of the bridges shall be widened to carry the full traveled way width.
 - b. Remove superstructure including concrete bridge slab, bridge rails, bridge rail transitions, approach slabs and guardrail at outside bridge corners. Remove portions of substructure as needed. Place new widened superstructure, bridge rails, bridge rail transitions, and approach slabs, and tie new guardrail into existing guardrail at outside shoulder.
 - c. End bents shall be poured semi-integral or integral.
 - d. Place riprap drainage turnouts at ends of railing transitions on shoulders that receive drainage. Construct modified concrete curb turnouts to direct water to the turnout. Drainage shall not be turned out above the envelope of structure backfill if MSE walls are present.
 - e. Extend riprap spillslopes entirely across median.
 - f. Slopewalls and riprap spillslopes shall be widened to 2 feet outside the bridge deck, underneath structure.
 - g. Piers shall be widened in-kind, matching existing piers.
31. No Work is required on the following structure:
Structure No. I65-258-04902 (101st Avenue over I-65)

13.3 Specific Bridge Requirements

13.3.1 *Bridge No. 1: 93rd Avenue over I-65*

File Structure No. I65-259-08308 A

The existing structure shall be rehabilitated in accordance with Section 13.2 except as modified herein:

- 1. Place a polymeric concrete bridge deck overlay on the bridge deck and approach slabs in accordance with the RSPs.
- 2. Mill and resurface 15 feet of the approach roadway pavement at each approach.
- 3. On the north side of the bridge, replace the first panel of concrete sidewalk on the approach roadway, approximately 5 feet long each. Place compression joint material between the existing bridge sidewalk on the approach slab and new sidewalk.
- 4. Pedestrian traffic shall be maintained across the bridge during all stages of construction.

13.3.2 Bridge No. 2: 101st Avenue over I-65

File Structure No. I65-258-04902

No Work shall be done to the existing structure.

13.3.3 Bridge Structure No. 3 & 4: I-65 NB & SB over Beaver Dam Ditch

File Structure No. I65-257-04901 DNBL and I65-257-04901 JDSBL

The existing structures shall be rehabilitated in accordance with Section 13.2 except as modified herein:

1. Place a polymeric concrete bridge deck overlay on the bridge deck and approach slabs in accordance with the RSPs.
2. In the southwest quadrant, fill the existing erosion hole located at the overhead light foundation.

13.3.4 Bridge No. 5 & 6: I-65 NB & SB over 109th Avenue

File Structure No. I65-257-04900 BNBL and I65-257-04900 BSBL

The existing structures shall be rehabilitated in accordance with Section 13.2 except as modified herein:

1. Place a polymeric concrete bridge deck overlay on the bridge deck and approach slabs in accordance with the RSPs.
2. Replace HMA portion of terminal joints. Widen terminal joints to match the bridge clear roadway width.

13.3.5 Bridge No. 7: 113th Avenue over I-65

File Structure No. I65-256-04899 B

The existing structure shall be rehabilitated in accordance with Section 13.2 except as modified herein:

Replace existing expansion joints with expansion joint sealing system.

13.3.6 Bridge No. 8 & 9: I-65 NB & SB over US 231

File Structure No. I65-255-02320 JCNB and I65-255-02320 CSBL

The existing structures shall be rehabilitated and widened with a deck replacement in accordance with Section 13.2 except as modified herein:

1. Replace all existing steel bearing assemblies with elastomeric bearing pad assemblies.
2. Tighten all bolts on bolted diaphragms between the original beams and the previous outside widening beams. Replace damaged or heavily-corroded bolts, nuts and hardware.

13.3.7 Bridge No. 10: 137th Avenue over I-65

File Structure No. I65-254-04898 B

The existing structure shall be rehabilitated in accordance with Section 13.2 except as modified herein:

1. Mill the existing bridge deck ½ inch depth, perform hydrodemolition to remove unsound concrete, and perform full depth patching as needed.
2. Place a variable depth (1¾ inch minimum) latex-modified concrete overlay on entire bridge deck surface. Minimum cross-slope shall be 1.5 percent.
3. Replace existing reinforced concrete approach slabs.
4. Fill voids at the top of the east and west slopewalls.
5. Patch concrete beam spalls in Span A.
6. Replace the rubber strip-seal gasket in existing S-S expansion joints.

13.3.8 Bridge No. 11 & 12: I-65 NB & SB over Wirtz Ditch (Stony Run)

File Structure No. I65-253-05119 CNBL and I65-253-05119 CSBL

The existing structures shall be rehabilitated and widened in accordance with Section 13.2 except as modified herein:

1. Remove mudwalls down to the bridge seat and a minimum of 5.0 feet of the bridge deck at end bents. Reconstruct existing end bents as semi-integral.
2. Mill and resurface 30 feet of the approach roadway pavement at each end.

13.3.9 Bridge No. 13: 153rd Avenue over I-65

File Structure No. I65-252-04897 B

The existing structure shall be rehabilitated in accordance with Section 13.2 except as modified herein:

1. Remove existing concrete overlay, mill the existing bridge deck ½ inch depth and perform hydrodemolition to remove unsound concrete. Perform full depth patching as needed.
2. Place a variable depth (2¼ inch minimum to match existing profile) latex-modified concrete overlay on entire deck surface. Minimum cross slope shall be 1.5 percent.
3. Place surface seal on existing reinforced concrete approach slabs.
4. Perform pier patching and wrap the I-65 outside shoulder piers with a fiber wrap concrete encasement system. The fiber wrap shall extend vertically from 6 inch below ground to the bottom of the hammerhead pier cap and shall encase the traffic face and both edges of the pier.
5. Patch concrete beam spalls in Span A.
6. Replace expansion joints with precompressed foam joints per Attachment 13-1 (USP, Precompressed Foam Joints).

7. Construct riprap turnouts at the bridge ends.

13.3.10 Bridge No. 14 & 15: I-65 NB & SB over SR 2

File Structure No. I65-249-04896 CNBL and I65-249-04896 CSBL

The existing structures shall be rehabilitated and widened in accordance with Section 13.2 except as modified herein:

Do not disturb existing highway lighting and conduit attached to the existing bridge components.

13.3.11 Bridge No. 16 & 17: I-65 NB & SB over Kankakee River

Existing File Structure No. I65-244-04891 CNBL and I65-244-04891 CSBL

Proposed File Structure No. I65-234-09807 NBL and I65-234-09807 SBL

The existing structures shall be replaced and widened in accordance with Section 13.2 and as follows:

1. Remove the existing superstructure including structural steel, concrete bridge slab, bridge rails, bridge rail transitions, approach slabs and guardrails. Remove the existing substructure as needed to construct the new bridge and appurtenances.
2. The cross-section of the replacement bridges shall carry the full traveled way width. Construct the new widened replacement bridges, including superstructure, bridge rails, bridge rail transitions, approach slabs, guardrails and substructure.
3. End bents shall be designed and poured semi-integral or integral.
4. Place riprap drainage turnouts at ends of railing transitions on shoulders that receive drainage. Construct modified concrete curb turnouts to direct water to the turnout. Drainage shall not be turned out above the envelope of structure backfill if MSE walls are present.
5. Extend slopewalls or riprap entirely across median.
6. Slopewalls or riprap shall extend 2 feet outside the bridge deck, underneath structure.
7. The replacement bridges shall be sized to provide sufficient space under the bridge for future construction of an access road along the south bank of the Kankakee River. The window for the access road will be 12 feet wide and 12 feet high below the bridge. The access road shall be located no less than 12 feet horizontally from the Kankakee River ordinary high water mark and shall be graded flat horizontally.
8. The existing access road along the north bank of the Kankakee River shall not be disturbed. If disturbed, the access road shall be regraded to original condition and location. If disturbed, the existing width and vertical clearance shall be no less than the existing.

13.4 Retaining Wall Structures

1. All walls shall be designed in accordance with the applicable Project Standards.

2. Retaining wall types shall not include modular block, bin walls, gabion walls, or prefabricated modular walls. Extensible ground reinforcement shall not be used. Wall types shall be subject to approval by INDOT.
3. Proposed MSE walls shall be in accordance with the applicable Project Standards. Material specifications for wall types other than MSE walls shall be in accordance with the applicable Project Standards. All retaining wall components shall be designed in accordance with the applicable Project Standards.
4. Where exposed heights of retaining walls adjacent to a sidewalk are unprotected by railing, appropriate permanent fall hazard protection shall be installed on retaining wall structures.

13.5 Noise Barriers

Noise barriers, if required, shall be in accordance with the RSPs, with the exception that they shall be designed in accordance with 6th Edition AASHTO LRFD Bridge Design Specifications and subsequent interim specifications.

1. The geotechnical evaluation required to design and construct the noise barrier shall be the responsibility of Design-Build Contractor.
2. Signing details for the noise barriers shall be the responsibility of Design-Build Contractor.
3. Provide fire hydrant access doors in accordance with Attachment 13-1 (USP, Noise Barrier Fire Hydrant Access Door Features) wherever fire hydrants are located within 400 feet of the edge of the I-65 shoulder.

13.6 Deliverables

Deliverables, a non-exhaustive list of which is set forth in the table below, shall be submitted in electronic format in accordance with the schedule set forth below. Acceptable electronic formats include PDF and current versions of Microsoft Word and Microsoft Excel, unless otherwise indicated.

Deliverable	Schedule	TP Section
Foundation Review Form	With Stage 3 and Released for Construction Documents	NA
Level 1 Checklist	With Stage 1, Stage 3, and Released for Construction Documents	NA
Asbestos Certification	With Released for Construction Documents	NA
Bridge Search Data Form	With Released for Construction Documents	NA
Load Rating summary for widened bridges	With Released for Construction Documents and approved prior to superstructure shop drawings submission	13.2
Load Rating summary for bridges with a new overlay	With Released for Construction Documents and approved at least 30 days prior to construction	13.2
Scour report	Minimum 30 days prior to Stage 1	13.2
Hydraulic analysis	Minimum 30 days prior to Stage 1	13.2