

9 DRAINAGE

9.1 General

Design-Build Contractor shall design and construct the drainage Work in accordance with the applicable requirements in the PPA Documents, including Project Standards, this Section 9 and its Attachment 9-1 (Unique Special Provisions: Drainage), Attachment 9-2 (Recurring Special Provision Storm Water Management), and Attachment 9-3 (Pipe Ratings); Governmental Approvals; and applicable laws.

9.2 Culverts

9.2.1 Replacement Determination

Replace or line existing culverts based on the structural capacity determination from Attachment 9-3 (Pipe Ratings) and the criteria below. Requirements for culverts (with the exception of Des. No. 1006741, Pipe Liner 2.64 miles north of SR 10) are as follows:

1. Unlined Culverts
 - a. Overall Condition Rating less than or equal to 5, culvert shall be replaced
 - b. Overall Condition Rating greater than 5 and less than 8, culvert may be lined provided that the lined culvert meets hydraulic requirements. If lining the culvert does not meet hydraulic requirements, the culvert shall be replaced or other improvements to meet hydraulic requirements shall be implemented.
 - c. Overall Condition Rating greater than or equal to 8, culvert may remain in place if the culvert and any required extension meet hydraulic requirements. If the culvert does not meet hydraulic requirements, the culvert shall be replaced or other improvements to meet hydraulic requirements shall be implemented.
2. Lined Culverts
 - a. Overall Condition Rating less than or equal to 5, culvert shall be replaced
 - b. Overall Condition Rating greater than 5, culvert may remain in place

9.2.2 Culvert Lining

Line all culverts that are larger than or equal to 36-inch diameter (or hydraulic equivalent) and less than 48-inch diameter (or hydraulic equivalent) and culvert in Des. No. 1006741.

9.2.3 Hydraulic Capacity Evaluation

Evaluate hydraulic capacity for all culverts within Segments B and C and for any culverts modified by the Work within Segment A. Evaluate all lined culverts for both the pre-lined and lined conditions. Proposed hydraulic capacity shall be in accordance with Indiana Design Manual In-Kind Replacement or Pipe Lining design requirements. Submit hydraulic capacity evaluation report for all culverts and storm sewers to INDOT for approval. Obtain approval from INDOT prior to construction.

The minimum waterway opening for all culverts shall be equivalent to a 36-inch diameter pipe even if a smaller pipe satisfies hydraulic requirements. Replace existing culverts with a

waterway opening diameter less than 36 inches with a minimum 36-inch diameter culvert or equivalent.

9.3 Technical Requirements

1. New storm sewer drain shall discharge a minimum of 6 inches above the ditch flowline elevation.
2. Underdrains shall be designed and installed along all roadways. All underdrains shall outlet a minimum of 6 inches above the ditch flowline.
3. Existing field tile drainage shall be maintained at all times.
4. All existing drainage structures that will not be used in the final drainage system shall either (a) be removed and backfilled with structure backfill, Type 5 or (b) be filled with structure backfill, Type 5.
5. Inlet spacing, storm drain capacity, and slotted drain computations shall be performed by the Design-Build Contractor. Slotted drain is required on high side, superelevated shoulder that is sloped toward the travel lanes where guardrail, barrier or rail is present. Submit for INDOT approval a storm sewer report documenting that the Project meets the requirements.
6. Median ditches, median inlet spacing, and median drain capacity computations shall be performed by the Design-Build Contractor for the one percent annual EP storm. The hydraulic grade line shall not encroach onto the travel lanes. All existing median drain pipes shall be replaced or lined. Additional median drain pipes and inlets shall be added as required to meet capacity and encroachment requirements.
7. No stormwater detention storage is allowed in median ditches.
8. For cast-in-place pipe lining, follow the requirements of Attachment 9-1 (Unique Special Provisions: Drainage).
9. Water quantity control shall be designed by the Design-Build Contractor so that wherever additional stormwater is leaving the project site, due to increased impervious area, runoff quantity from the post-project one-percent exceedance probability storm event is equal to or less than runoff quantity from the pre-project 10-percent exceedance probability storm event. Submit for INDOT approval a detention evaluation report documenting that the Project meets the requirements.
10. The Design-Build Contractor shall notify the Lake County surveyor of any Work impacting legal drains in Lake County prior to commencement of any construction activity.

9.4 Deliverables

Deliverables, a non-exhaustive list of which is set forth in the table below, shall be submitted in both hardcopy and 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	Submittal Schedule	TP Section
CIPP field-cured sample report	Within 7 days of receipt	Attachment 9-1
Hydraulic capacity evaluation report	Prior to construction	9.2.3

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Deliverable	Submittal Schedule	TP Section
Detention evaluation report	Prior to construction	9.3
Storm sewer report	Prior to construction	9.3