

Memorandum

Rolls Royce Solutions America, Inc. Facility Upgrade

ISG

To: Cory Bienfang, City of Mankato

From: Bryan Petzel

Date: January 27, 2026

Subject: Rolls Royce Solutions America, Inc. Facility Upgrade – Stormwater Management

STORMWATER MANAGEMENT

This stormwater management memo was prepared in response to engineering plan review comments provided by you on December 11, 2025 for the proposed Rolls Royce Solutions America, Inc. Facility Upgrade project located at 1711 Energy Drive in Mankato, Minnesota.

Existing Conditions

The existing 4.06-acre site includes a 6,400 square foot building and paved parking and yard areas. The existing impervious coverage on site totals 0.90 acres. The site also includes a drainage ditch within an easement that has been confirmed to be a bioswale stormwater treatment system. Stormwater from the site drains to the bioswale via overland flow and on-site storm sewer infrastructure.

Proposed Conditions

Proposed site improvements include a new driveway and paved parking and yard expansions. A portion of the bioswale that is no longer used for stormwater conveyance will need to be filled to facilitate the proposed improvements. Filling that portion of the bioswale and vacating that portion of the easement was approved by the City in 2013. The proposed project will result in a total impervious coverage on site of 1.57 acres, including 0.81 acres of new and fully reconstructed impervious surfaces.

Upon completion of the project, stormwater from the site will continue to drain to the bioswale via overland flow or on-site storm sewer infrastructure.

Bioswale Expansion

As a condition of the 2013 approval to fill in a portion of the bioswale, stormwater capacity that will be lost as a result of the filling is required to be replaced by expansion of the bioswale elsewhere on the property. The City also requires the bioswale expansion to provide an additional treatment volume of 1.1" for the new and fully reconstructed impervious areas. The tabulation below demonstrates the proposed bioswale expansion on the northern end of the property satisfies these requirements.

- New and fully reconstructed impervious area = 35,437 sf
- Additional treatment volume required (1.1") = 120 cy
- Volume lost filling a portion of the bioswale = 2438 cy
- **Required bioswale expansion volume = 2558 cy**
- **Provided bioswale expansion volume = 2648 cy**

Hydraulic Modeling

The existing bioswale was designed using a precipitation depth of 6.1 inches for the 100-year, 24-hour design storm. Current NOAA Atlas 14 data for Mankato lists a precipitation depth of 7.2 inches for the same storm. The original HydroCAD model for the bioswale provided by the City has been updated to model the new 100-year design storm. The updated model was then revised to reflect the proposed bioswale modifications. The original model was created to model fully developed conditions, so the composite curve number of 91 for the watershed was left unchanged for all models. Modeling results are summarized in the table below:

Precipitation Event	Original 6.1" Rainfall	Updated 7.2" Rainfall	Proposed 7.2" Rainfall	Difference between Updated and Proposed
Peak Flow (cfs)				
100-Year, 24-hour	152	165	165	0.00
Peak Elevation (ft)				
100-Year, 24-hour	1001.22	1002.20	1002.19	-0.01

As expected, the design storm update resulted in peak flow and peak elevation increases. According to the design plans provided by the City, the lowest top bank elevation of the bioswale is approximately 1004.5. This provides a freeboard of 2.3 ft for the 100-year storm. This meets the City of Mankato Grading Manual part 3.2.4.3 minimum freeboard requirement of 2 feet.

As compared to the updated original model, filling a portion of the bioswale combined with the bioswale expansion has negligible impacts on the modeling results.

Summary

The proposed project has been designed to meet the stormwater requirements prescribed in the engineering plan review comments provided on December 11, 2025.