Project Memo

H-158040-MEM-WP-001

March 15, 2017

Procor Joffre Facility Expansion

Drainage Assessment

1. Introduction

This memo presents a summary of the assessment has been completed by Hatch to evaluate the drainage requirements of Joffre Facility Expansion project proposed by Procor as illustrated in H-158040-DWG-RI-001 Procor Joffre IFC Rack and Grading Drawing Package. The site is located just over a kilometre west of Joffre, Alberta, Figure 1-1.

Figure 1-1 – Site Location

According to the Procor's website, the Joffre Service Centre's primary roles include light mechanical repairs for tank and freight cars, and minor interior coating repairs for covered hopper cars. The facility deal with empty car trains and the services are provided in a contained and controlled area. Therefore, no contamination or accidental contamination of the stormwater is expected. Figure 1-2 shows the existing layout of the facility. The expansion project involves addition of several tracks to the facility.

Figure 1-2 – Joffre Site (Procor website)

2. Methodology

Several key guidelines outlined in the Water Act that were considered in this evaluation are listed below:

- Minimize flooding and erosion.
- Minimize effects to the aquatic environment.
- Maintain the natural stream and wetlands through the property.
- Develop above the 1 in 100 year flood level.
- Minimize impact on groundwater, erosion and sediment transport to the receiving water body.
- Provide runoff control to ensure a maximum release rate equal to pre-development flow unless an adequate outlet exists and the increased rate of release will not cause any adverse effects.

As mentioned the industrial activities at the site are contained in a controlled environment and no accidental contamination is expected from those activities. The site is not adjacent to any major tributary of the Red Deer River and being above 1 in 100 year flood line is not expected to be a concern.

3. Site Hydrology

Intensity duration curves are available for the Red Deer Airport (Figure 3-1) and the Lacombe area (Figure 3-2). Both locations are within 30 km of the site and suitable to be used for the project. Red Deer Airport information covers a longer period of records and hence was chosen to be used for this project.

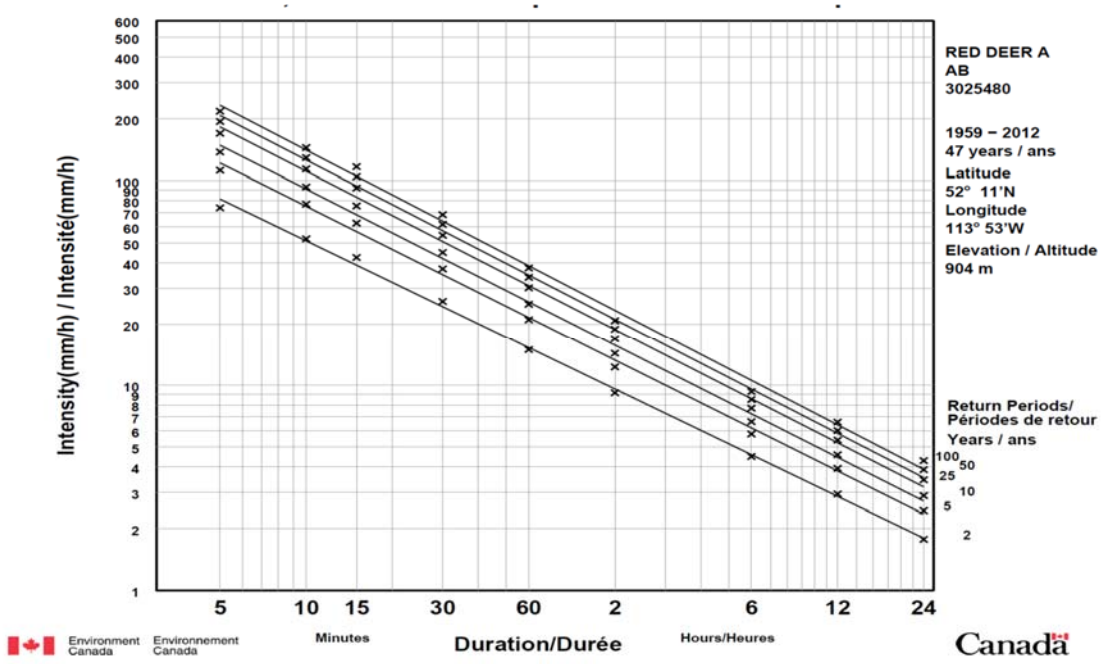

Figure 3-1 – Rainfall IDF for Red Deer Airport (Environment Canada)

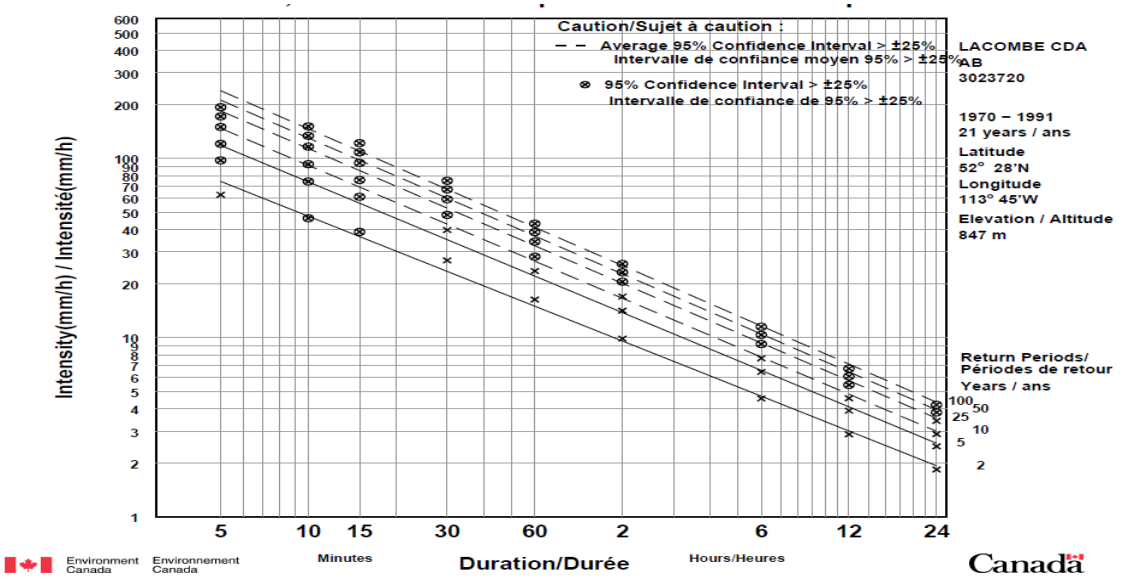

Figure 3-2 – Rainfall IDF for Lacombe (Environment Canada)

4. Sub catchment area

Figure 4-1 shows the sub-catchment areas for this project.

Figure 4-1 – Sub-catchment areas

5. Runoff coefficient

The area currently is covered with the existing facility, cultivated area, and low cut and maintained grass area. The recommended runoff coefficient values for railroad yard area is about 0.4 which is similar to the current condition of the cultivated area based on the satellite imagery. The grass area coefficient is assumed to be 0.2. Figure 5-1 shows the satellite imagery of the cultivated area during time. As can be observed the land lacks sufficient vegetation majority of the time.

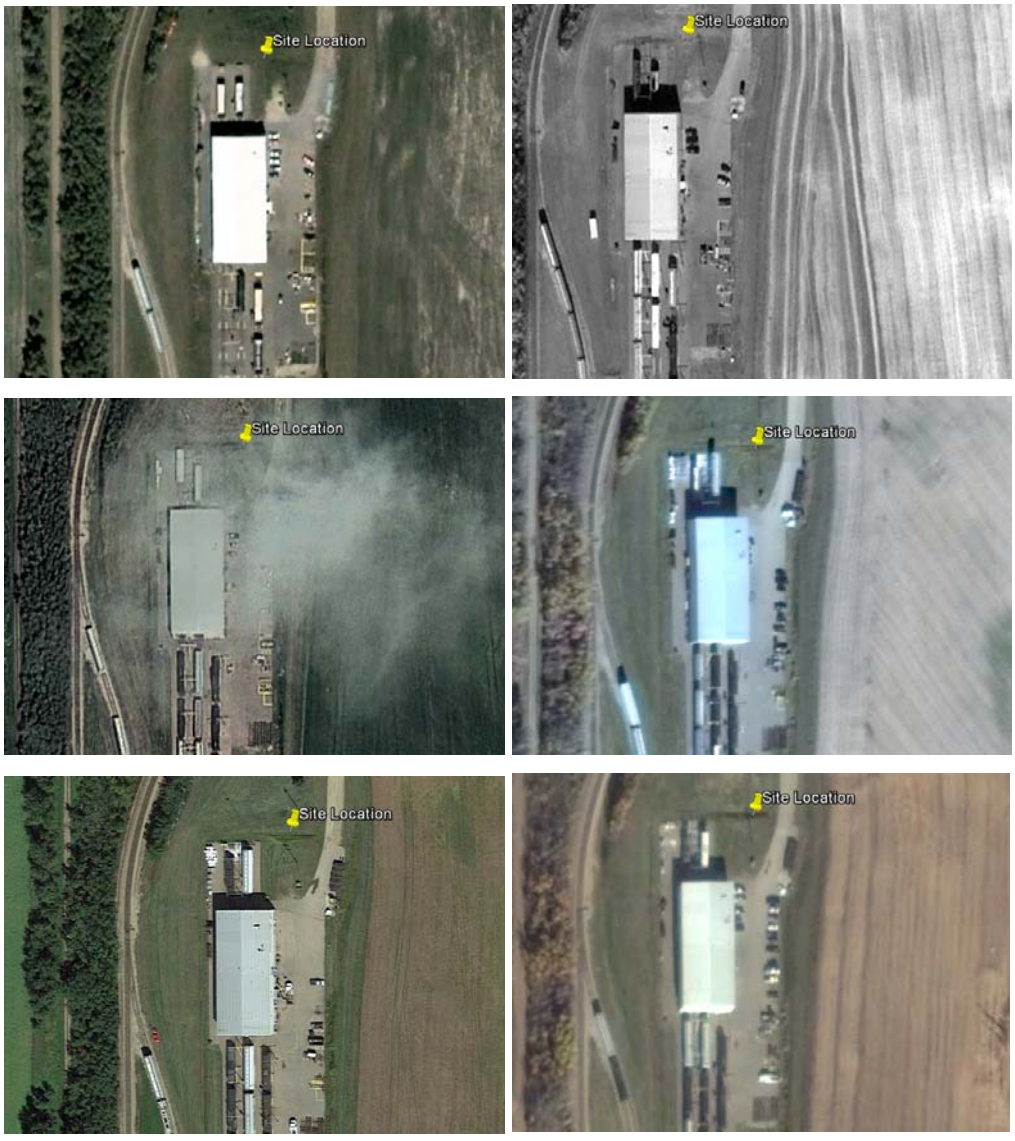

Figure 5-1 – Satellite imagery of the cultivated area

6. Site Drainage Assessment

Based on the information provided the maximum expected change in the flow is less than 20% based on the existing configuration of the area. This change is based on the worst case in 1 in 100 year storm event is estimated to be 0.14 m^3/s.

This is considered to be negligible since the receiving waterbody has a large marshland area just downstream of the site which will attenuate the flow in larger storms (Figure 6-1). The surface area of this low land is about 35,000 m^2 and the expected change in the water level due to this increase in flow is expected to be unnoticeable.

Figure 6-1 – Marshland area along the creek

7. Design

The conveyance system for this project is designed for 1 in 100 year rainfall events. All the ditches are sized to keep the water level below the subgrade during the design event.

8. Summary, Conclusions and Recommendations

In summary, the proposed development will have negligible local impacts to local drainage. Surface roughness is not expected to significantly affect basin response rates and the changes to the overall area due to the new surface grading result in negligible flow changes of both magnitude and direction. A large marshland area downstream of the project area naturally provides attenuation for the catchment area reducing impact to the downstream area.

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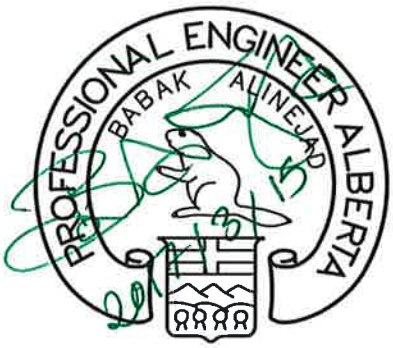

B. Alinejad	Mar 15, 2017
	Date