



Engineering Design Report

Preliminary Stormwater Design Report – Lefevre East Substation

EC.40327 – ANI 275kV Relocation Project

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1 General

1.1 Document Purpose

This purpose of this Stormwater Design Report is to advise on the concept methodology for the bulk earthworks, stormwater drainage system and stormwater disposal for the Lefevre and Lefevre East substations during the facility operation, which will be based on the following design elements:

- Major flooding considerations
- Detention storage sizing and drainage

1.2 The Site

The Lefevre East Substation site (The Site) is located approximately 18km north-west of Adelaide in the suburb of Osborne, South Australia. The existing infrastructure surrounding The Site has recently been acquired by the Australian Naval Infrastructure (ANI) as part of the submarine building program. Access to the existing Lefevre Substation currently occurs via Mersey Road North, and access to the proposed Lefevre East Substation is proposed via an existing unsealed access track which runs parallel to the southern fence line. The Site is currently vacant land within close proximity to the Port River to the east.



Figure 1 - Lefevre East Substation Site (MetroMap 18/01/2026)

1.3 Codes and Standards

Unless noted otherwise, the codes and design guidelines listed below were used for the civil design, as applicable. If project requirements require guidance/resources that are not listed below, those additional requirements/resources shall be identified prior to design commencement:

AS ISO 1000	The international system of units (SI system) and its application
AS 1597	Precast Reinforced Concrete Box Culverts (all parts)
AS 2566	Buried flexible pipelines (all parts)
AS 3725	Design for installation of buried concrete pipes
AS 3996	Access covers and grates
AS 4058	Precast Concrete pipes
AS/NZS 3500.3	Plumbing and drainage – Stormwater drainage
ARR 2019	Australian Rainfall and Runoff Guidelines
AGRD05-25	Austrroads: Guide to Road Design Part 5: Drainage
08327-ECS-004	Engineering Contract Specification: Section 3.4 – Substation Infrastructure
1-11-ADM-15	Substation Earthworks and Stormwater Drainage Asset Design Manual
1-11-FR-15	Substation Earthworks and Stormwater Drainage Functional Requirements

2 Design Criteria

The stormwater drainage network, detention storage and flooding considerations shall incorporate the following design criteria:

Table 1 - Design parameters

Design Parameter	Adopted Criteria	Reference
Minimum Surface Drain Grade	1:200 (0.50%) Min / 1:100 (1.00%) Ideal	1-11-FR-15
Internal Roads, Pavements & Hardstand Areas	5% AEP	1-11-FR-15
Works Bench	0.5% AEP + 300mm Freeboard or, Probable Maximum Flood (whichever is the lesser)	1-11-FR-15
Minimum Runoff Coefficients	Roofed: 1.0 Paved: 0.9 Gravel: 0.5 Pervious: 0.1	AS 3500.3 and Industry Practice
Concrete Channel Grade	0.5% (min)	AS 3500.3
Peak Flow Rates	Post-development ≤ Pre-development	1-11-FR-15

2.1 Annual Exceedance Probability

The following minimum Annual Exceedance Probability (AEP) applies to the drainage design:

Table 2 - Design AEPs

Component	Design Standard (AEP)
Longitudinal and Minor Network Stormwater (Road Drainage)	5%
Scour Protection in Channel	5%

2.2 Project Specific Requirements

In accordance with Engineering Contract Specification: Section 3.4 – Substation Infrastructure (ECS) the following is required to be considered for incorporation into the design:

Lefevre East Substation:

- The Contractor is responsible for the design of the stormwater drainage system to ensure that the site peripheral and internal drainage design meets the terms of the DA and local council requirements;
- The Contractor must design the site drainage system that all stormwater generated within the substation is conveyed to a single collection point and discharged into the existing pond located on western side of the new substation; and
- The Contractor is responsible for providing the adequate control measures to manage surface runoff and erosion during construction.

Lefevre Substation:

- a) No significant modifications to the existing drainage system are anticipated at this site. However, the Contractor shall ensure that the drainage associated with the proposed platform extension is fully integrated with the existing system to maintain effective stormwater management;
- b) Any damage to the existing site drainage system caused by the Contractor, must be fixed by the Contractor at their expense in accordance with document 1-11-FR-15 Substation Earthworks and Stormwater Drainage Clause 4.3.3; and
- c) The Contractor must ensure there is no water pooling issues within the bench due to any modification/integration work carried out to accommodate all new equipment, cable trenches and other foundations.

Stormwater Pond (Existing at Lefevre Substation):

- a) Undertake a condition assessment of the existing pond, identify defects, and propose/implement repair measures to ensure the pond is fit-for-purpose for holding clean stormwater from the substation;
- b) Block the existing outlet discharging from the pond to the environment;
- c) Provide a new outlet connecting the pond to the nearby stormwater mains managed by the Local Council or relevant stakeholders. The outlet shall be located at the base of the pond to enable continuous drainage of stormwater runoff;
- d) Install an isolation (shut-off) valve at the new outlet, positioned upstream of the discharge point to the stormwater mains. The valve shall be accessible for safe operation, particularly during emergency scenarios such as a reactor fire at the Lefevre East substation;
- e) Undertake an assessment of the downstream stormwater mains to confirm hydraulic capacity and suitability;

3 Existing Site Conditions

The Site is currently vacant land and is located in the suburb of Osborne in the Adelaide Metropolitan Area. Pedestrian and vehicle access to The Site is currently via an existing unsealed access track to the south which intersects with Mersey Road North to the west. The Port River is approximately 100m to the east of The Site.

A site inspection by at The Site was carried out by Enerven on 19/02/2026 to support the concept drainage solution outlined in this report.

During the site inspection, the presence of ponding water within The Site vicinity was identified. No rainfall had occurred over The Site in the week prior to the site inspection based on Bureau of Meteorology (BOM) data. Based on geotechnical investigation reports in the general area the presence of ponding water may be attributed to high groundwater (to be confirmed with the Lefevre East Substation Geotechnical Investigation) and is a consideration for any below ground earthworks or drainage infrastructure to be installed.



Figure 2 - Ponding water within The Site vicinity (1)



Figure 3 - Ponding water within The Site vicinity (2)

The existing Lefevre Substation retention pond was also inspected during the site inspection on 19/02/2026. The existing retention pond was observed as unlined at the base and sides, with the retention pond sides heavily vegetated at the time of the inspection.



Figure 4 - Existing retention pond

A Reinforced Concrete Box Culvert (RCBC) located at the top of the retention pond had been installed to act as an overflow channel for the retention pond. The overflow spillway at the retention pond nominated on the Lefevre Substation As-Built civil drawings could not be identified and appeared to be obstructed by a fallen tree at the time of the inspection.



Figure 5 - Existing retention pond overflow RCBC (1)



Figure 6 - Figure 5 - Existing retention pond overflow RCBC (2)

A PVC pipe was also identified at the existing retention pond overflow location, which was not specified in the Lefevre Substation civil drawings. The purpose of this PVC pipe could not be determined during the site inspection. Scouring to the existing retention pond base was present during the inspection which may indicate that external stormwater flows are possibly entering the retention pond via the PVC pipe.



Figure 7 - Existing PVC pipe at retention pond overflow RCBC location

The existing stormwater drainage 450mm diameter Reinforced Concrete Pipe (RCP) inlet pipe to the retention pond was found during the site inspection. The RCP appeared to be in reasonable condition for future use, and no immediate repairs to the existing RCP were identified. Visible scouring and subsidence to the base of the retention pond at the inlet pipe location was identified during the site inspection. The existing inlet pipe to the retention pond from the Lefevre Substation oil/water separator catch tank was unable to be located at the time of the inspection.



Figure 8 - Existing retention pond 450mm RCP stormwater inlet pipe

Side Entry Pits (SEP's) were identified at intervals along the northern side of the existing access track during the site inspection which are assumed to connect to an existing underground pipe network discharging stormwater to the Port River (based on available online information). Available data on the existing underground pipe network has revealed that the pipe network invert levels may be below the high tide sea level. At the time of the inspection the existing pipe network outlet (assumed to be discharging to the Port River) was unable to be visibly identified at the location obtained from available online sources. This is most likely due to high tidal conditions at the time of the site inspection.



Figure 9 - Existing SEP - northern side of existing access track



Figure 10 - Existing SEP at eastern end of existing access track



Figure 11 - Port River tidal conditions 19/02/2026

4 Drainage Solution Overview

The Lefevre/Lefevre East Substation preliminary concept drainage solution is presented in Appendix B of this report.

The concept drainage solution is based on available online information at the time of this report, the information obtained during the site inspection by Enerven on 19/02/2026, and the information provided by the client at the time of this report.

The existing site conditions have identified that the existing retention pond is not suitable for use in order to comply with the ECS. Preliminary stormwater models using DRAINS software have determined the capacity of the existing retention pond is insufficient for detention usage (by installing a new outlet at the base in accordance with the ECS) for servicing the existing Lefevre Substation and the proposed Lefevre East Substation, due to the increase in impervious area from the proposed Lefevre East Substation.

The ECS has proposed the existing retention pond shall have an isolation (shut-off) valve installed at the new pond outlet to cater for emergency scenarios such as a reactor fire. The existing retention pond has also been determined as unsuitable for this function in its existing form due to the sides and base of the existing pond being unlined, which could result in contamination to the below soil profile/groundwater.

Coordination with the overhead transmission lines engineers has revealed that new monopoles will likely be required between the existing Lefevre Substation and proposed Lefevre East Substation which may encroach on the existing retention pond location and limit the available area for construction of a new stormwater detention pond.

A new underground On-Site Detention basin (OSD) is proposed in the concept drainage solution (in lieu of a pond) due to the required detention capacity (to service Lefevre Substation and Lefevre East Substation), the available area between the proposed overhead line structure foundations, and to allow adequate area for ongoing maintenance of the OSD, shut-off valve, and overhead lines. A 525mm RCP outlet shall be installed at the base of the OSD which connects to a junction pit where a penstock isolation valve shall be installed. The outlet pipe from the junction pit shall then discharge/connect to the existing stormwater main to the south which is owned and maintained by the Australian Naval Infrastructure (ANI).

The ECS specifies the existing outlet (overflow) from the existing retention pond which currently discharges to the environment is to be blocked. This would occur upon decommissioning of the existing retention pond, however Grated Inlet Pits (GIP's) shall be installed at the inlet(s) to the OSD which would be designed to bubble up and overflow to the north in the event of a blockage to the downstream stormwater main, to protect the Lefevre Substation and Lefevre East Substation from inundation of stormwater during such an event. The GIP's would also act as an overflow for the OSD for a storm event that exceeds the OSD design capacity. A hydraulic assessment and consideration of tailwater conditions shall be included as part of the detailed design works upon completion of site investigation works.

Available Hydrology Report's within the vicinity of The Site (completed by Southfront in 2018) have suggested The Site is not in a flood prone area, however due to The Site's close proximity to the Port River the finished levels for the Lefevre East Substation bench will likely be dictated by sea level rise and climate change factors (to be confirmed with the Lefevre East Substation Hydrology Report). Information provided by the City of Port Adelaide Enfield Council who previously owned and maintained the surrounding infrastructure (prior to the acquisition by ANI) has suggested finished bench levels should be between 3.10m (AHD) and 3.35m (AHD) to comply with the SA Planning and Design Code. Based on the information provided, the finished bench levels would be approximately between 1.50m – 2.00m above the current existing ground surface levels for The Site. To minimise the extent of bulk earthworks and underground drainage pipe network, underground detention storage required for the new OSD between the Lefevre Substation and Lefevre East Substation a ridge line at a location central to the Lefevre East Substation bench (highest point of the bench) is proposed, and the bench grading split from the ridge line

east and west. Drainage pits would then be installed at the east and west ends of The Site to collect stormwater runoff and discharge via an underground pipe network. A proposed pipe network to the west would discharge stormwater to the new OSD (between Lefevre Substation and Lefevre East Substation), and a proposed pipe network to the east would discharge to a new stormwater detention pond with a minimum storage capacity of 160m³. The outlet from the new detention pond to the east would be via a 375mm RCP at the base of the pond which would then discharge/connect to the existing stormwater main via the existing SEP at the east end of the existing access track.

Based on available information at the time of this report, it is highly likely the finished levels for the Lefevre East Substation may be 1.00m – 2.00m above the existing access track levels where vehicle access points to the Lefevre East Substation are directly adjacent to. Coordination with the asset owner (ANI) should be undertaken as a priority to confirm if the existing access track levels can be raised/modified to suit the Lefevre East Substation development. Raising the existing access track levels would likely impact the existing overland flow path between Mersey Road North and the Port River, it is anticipated that additional drainage works would also be required to the existing access track to accommodate the Lefevre East Substation development.

In accordance with 1-11-FR-15 - Substation Earthworks and Stormwater Drainage Functional Requirements post-development peak flows must match pre-development peak flows in accordance with the requirements of the local authority. At the time of this report, public infrastructure surrounding The Site had been recently acquired by the Australian Naval Infrastructure (ANI) and the stormwater detention requirements from ANI were not available. To meet the above 1-11-FR-15 requirement Enerven is proposing to limit post-development flow rates to the pre-development flow rates for the Minor 10% AEP critical storm and major 1% AEP critical storm in accordance with AGRD05-23 - Austroads: Guide to Road Design Part 5A: Drainage.

4.1 Water Quality Treatment

The proposed Lefevre East Substation development would result in additional pollutant runoff when compared to existing conditions. In accordance with the 1-11-FR-15 the stormwater drainage infrastructure must be designed to consider current best industry practice WSUD techniques, where practical. Water quality treatment for The Site post development may be via filter inserts/litter baskets to drainage pits (Ocean Guard by Ocean Protect or similar), cartridge filters installed to the underground OSD (Storm Filter by Ocean Protect or similar), and/or the proposed new detention pond to the east being designed to capture silts and sediment below the outlet RCP. A minimum 80% sediment load reduction should be achieved in accordance with 1-11-FR-15.

All oily water generated by the proposed reactor at Lefevre East Substation is to be connected into the existing oil/water separator tank at Lefevre Substation in accordance with the ECS. The new reactor bund shall be designed in accordance with the ECS to prevent contamination of downstream stormwater catchments.

Water quality treatment details are to be provided at detailed design once all design input parameters are established. Where required by the local authority or downstream infrastructure asset owner, water quality modelling shall be undertaken to predict the expected water quality improvement prior to discharge.

4.2 Pre-Development Flow Rates

The existing Lefevre Substation internal areas are to remain largely unmodified, with the only modification to the existing stormwater drainage system to occur at the existing retention pond location. A runoff coefficient of 0.75 (75% impervious area) to reflect the existing conditions.

The Lefevre East Substation site is currently undeveloped vacant land, which has been the case for 20+ years based on historical imagery from Google Earth (dating back to January 2004). As the existing infrastructure was previously owned and maintained by the City of Port Adelaide Enfield Council prior to the recent acquisition, the pre-development flow rate for the Lefevre East Substation Site shall be calculated in accordance with The City of Port Adelaide Enfield Development Guide for Engineering Siteworks Plans which specifies runoff calculations for all methods should be based on a coefficient of 0.35.

The Pre-Development flow rates for the 10% AEP Minor Storm and 1% AEP Major Storm have been calculated using the Rational Method based on the below parameters:

$$Q = FCIA$$

Lefevre Substation:

The pre-development flow rate for the Lefevre Substation has been based on the best practice assumption with the existing retention pond being 35% full. The design capacity of the existing retention pond from the Lefevre Substation civil drawings (310 510/790-001) has been calculated at 192m³, which results in Minor Storms (10% AEP) up to 9 minutes, and Major Storms up to 4 minutes being retained in the existing pond. The time of concentration for the Minor Storm (10% AEP) peak flow rate shall be 10 minutes, and the time of concentration for the Major Storm (1% AEP) shall be 5 minutes.

Table 3 - Lefevre Substation Pre-Development Flow Rates

Conversion Factor (F)	Runoff Coefficient (C)	Area (A) (ha)	Rainfall Intensity (I) (Minor) 10 Minute (mm/hr)	Rainfall Intensity (I) (Major) 10 Minute (mm/hr)	Flow Rate (Q) (Minor) (m ³ /s)	Flow Rate (Q) (Major) (m ³ /s)
2.78 x 10 ⁻³	0.75	1.4665	74.0	188.0	0.226	0.575

Lefevre East Substation:

The Pre-development time of concentration for the Lefevre East Substation has been determined as 10 minutes for both Minor and Major Storms to allow for overland flow based on a runoff coefficient of 0.35.

Table 4 - Lefevre East Substation Pre-Development Flow Rates

Conversion Factor (F)	Runoff Coefficient (C)	Area (A) (ha)	Rainfall Intensity (I) (Minor) 10 Minute (mm/hr)	Rainfall Intensity (I) (Major) 10 Minute (mm/hr)	Flow Rate (Q) (Minor) (m ³ /s)	Flow Rate (Q) (Major) (m ³ /s)
2.78 x 10 ⁻³	0.35	1.6727	74.0	135.0	0.120	0.220

Total Allowable Outflow Rates in Post Development Scenario:

Table 5 - Total Allowable Outflow Rates in Post Development Scenario

Q (Minor) (m³/s)	Q (Major) (m³/s)
0.346	0.795

Post-Development Modelling Method

The ILSAX hydrological modelling method for drainage design was utilised in DRAINS to analyse the stormwater system.

The catchment runoff parameters that were selected are:

- Impervious area depression storage: 1mm
- Pervious area depression storage: 5mm
- Sub-catchment areas runoff coefficient 0.75 (75% Impervious)

All storm events up to 24-hour durations were modelled to determine the critical minor and major storms. The model outputs are provided in Appendix B of this report.

The proposed detention storages for input into the model have been summarised below based on the Drainage Overview Solution.

Table 6 - Proposed Stormwater Detention Storages

	Stormwater Detention Storage Volume (m³)
New Underground OSD (Between Lefevre Substation and Lefevre East Substation)	360
New Stormwater Detention Pond (East of Lefevre East Substation)	160

4.3 Minor Storm Results 10% AEP

DRAINS modelling has identified the critical minor storm time of concentration for the 10% AEP at the proposed underground OSD (between Lefevre Substation and Lefevre East Substation) occurs at 1 hour, and at the proposed detention pond to the east of Lefevre East Substation the critical time of concentration occurs at 15 minutes. The critical time of concentration for both detention storages combined for the maximum peak outflow to the stormwater main occurs at 25 minutes. The detention storages were not breached during the critical minor storm with all stormwater discharging via the outlets. The total maximum outflow rate from The Site post-development did not exceed the total maximum allowable outflow rate specified in section 4.1 of this report.

The DRAINS model arrangement details and results are shown in Appendix B.2 - Minor Storm 10% AEP Model Output.

4.3.1 Design Outflows 10% AEP

The design outflows for the 10% AEP storm events are shown in Table 9.

Table 7 - Design Outflow 10% AEP Storm Critical Storm Event

	Time of Concentration (minutes)	Peak Outflow (m³/s)
New Underground OSD Post-development Outflow	60	0.206
New Eastern Detention Pond Post Development Outflow	15	0.096
Total Combined Maximum for Minor Storm 10% AEP	25	0.300

4.4 Major Storm Results 1% AEP

DRAINS modelling has identified the critical minor storm time of concentration for the 1% AEP at the proposed underground OSD (between Lefevre Substation and Lefevre East Substation) occurs at 25 minutes, and at the proposed detention pond to the east of Lefevre East Substation the critical time of concentration occurs at 20 minutes. The critical time of concentration for both detention storages combined for the maximum peak outflow to the stormwater main occurs at 25 minutes. The detention storages were not breached during the critical major storm with all stormwater discharging via the outlets. The total maximum outflow rate from The Site post-development did not exceed the total maximum allowable outflow rate specified in section 4.1 of this report.

The DRAINS model arrangement details and results are shown in Appendix B.2 - Major Storm 1% AEP Model Output.

4.4.1 Design Outflows 1% AEP

The design outflows for the 1% AEP storm events are shown in Table 9.

Table 8 - Design Outflow 1% AEP Storm Critical Storm Event

	Time of Concentration (minutes)	Peak Outflow (m³/s)
New Underground OSD Post-development Outflow	25	0.434
New Eastern Detention Pond Post Development Outflow	20	0.149
Total Combined Maximum for Major Storm 1% AEP	25	0.584

5 Summary

An assessment of the proposed stormwater drainage methodology outlined in section 4 of this report has been undertaken and confirmed with DRAINS modelling based on available information at the time of this report.

All storm events up to and including the 1% AEP are expected to be contained within the stormwater detention storages with no overflow occurring. Safe overland flow is a consideration for detailed design and is to be documented in the final drainage design report for storm events which exceed the stormwater detention storage design capacity, and in the event of a blockage to the downstream stormwater infrastructure/main.

DRAINS modelling has confirmed the post-development flow rates from The Site during the minor and major storms should not exceed the pre-development flow rates based on the proposed drainage solution. The critical major storm post-development total maximum outflow rate from the detention storages for the Lefevre Substation and Lefevre East Substation Site has been determined at $0.584\text{m}^3/\text{s}$, and the pre-development outflow rate from the existing Lefevre Substation Site only has been calculated at $0.575\text{m}^3/\text{s}$ which indicates there would likely be very minimal impact to the surrounding stormwater infrastructure during a major storm as a result of the Lefevre East Substation development. The critical minor storm would result in increased stormwater flows to the surrounding infrastructure, however the calculated pre-development flow rates were not exceeded based on the existing conditions at the Lefevre Substation, and the City of Port Adelaide Enfield (previous infrastructure asset owners) design parameters for new developments which have been utilised to calculate the pre-development flow rate for the Lefevre East Substation. The time of concentration for the critical minor and major storm post-development has been determined at 25 minutes resulting in a delay to peak stormwater outflow peak flow when compared to pre-development conditions which was determined at 10 minutes for Lefevre East Substation based on the existing retention pond initially being 35% full. The asset owner should review this data against existing data for the downstream stormwater main to confirm there would be no impacts to the stormwater drainage system upstream due to the delay in peak flow from The Site.

A site inspection at The Site focusing on the existing Lefevre Substation retention pond was carried out by Enerven on 19/02/2026 and the recommendations outlined in this report have determined the existing retention pond is likely not suitable for future use with the Lefevre East Substation development. Upgrading of the existing retention pond to suit the proposed Lefevre East Substation development is not recommended due to the available area constraints with the required stormwater detention storage capacity, proposed overhead lines structure locations and to allow for a safe working area for maintenance of the isolation (shut-off) valve, and the overhead lines.

The drainage solution for The Site has confirmed that allowances have been made for incorporation of water quality treatment devices in accordance with 1-11-FR-15. Water quality modelling shall be completed as part of the detailed design if required with the pollutant reduction targets, or other required design criteria specified in the conditions of approval. All oily water generated by the new reactor at the proposed Lefevre East Substation shall be connected to the existing oil/water catchment tank at Lefevre Substation.

6 Limitations

This preliminary stormwater design report has been prepared for the client to outline the bulk earthworks and stormwater drainage design methodology based on the information available at the time of this report. Surface elevation data utilised in this report has been obtained from ELVIS online information and may be subject to errors. Geotechnical information and Hydrology information utilised in this report has been obtained from previously completed investigations within the vicinity of The Site. The design concept outlined in this report shall be confirmed at detailed design with completed site investigation works for Topographic and Feature Survey, Hydrology Investigation Report, and a Geotechnical Investigation Report for The Site. The detention storage volumes and bulk earthworks methodology/site grading outlined in this report may be subject to changes once site investigation works have been completed.

Sub-catchment pervious/impervious areas for the post-development scenario have not been determined in detail as part of this report. This report and concept design has utilised a weighted runoff coefficient (Cw) of 0.75 for The Site based on previous experience with substation and similar infrastructure projects. Post-development runoff coefficients are to be determined as part of the detailed design for the individual sub-catchment areas to The Site.

Information outlining the tailwater conditions for the downstream stormwater main, and sea level rise with allowance for climate change were not available at the time of this report, and as a result a hydraulic assessment of the downstream stormwater mains to confirm the hydraulic capacity and suitability was unable to be completed as part of this report. The detention storage volumes outlined in this report may be subject to increase once tailwater conditions have been incorporated into the design models.

Overhead transmission line structure locations were under development at the time of this report and have been shown for preliminary information purposes only in the concept drainage plan. Discrepancies with the geospatial information provided to Enerven have resulted in further review of the overhead line structures, and the exact overhead line structure locations shown on the concept drainage plan are not to be relied upon. The stormwater detention storage concept may be subject to change based on final overhead transmission line structure locations.

At the time of this report rainfall storage within the stormwater detention system (between Lefevre Substation and Lefevre East Substation) was under review with the client. Rainfall storage within the stormwater detention system has not been allowed for in the concept drainage design. The stormwater detention storages shall be reviewed at detailed design with the instruction provided by the client for rainfall storage during an emergency.

Appendix A – DRAINS Model Results

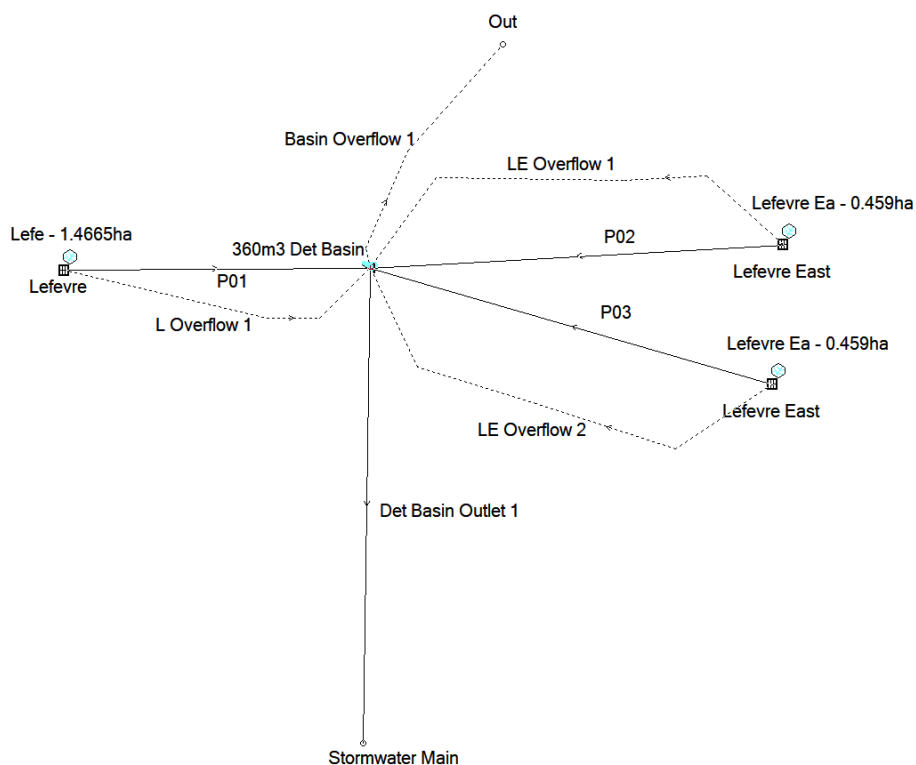


Figure 12 - DRAINS Model Arrangement Lefevre Substation and Western Portion of Lefevre East Substation

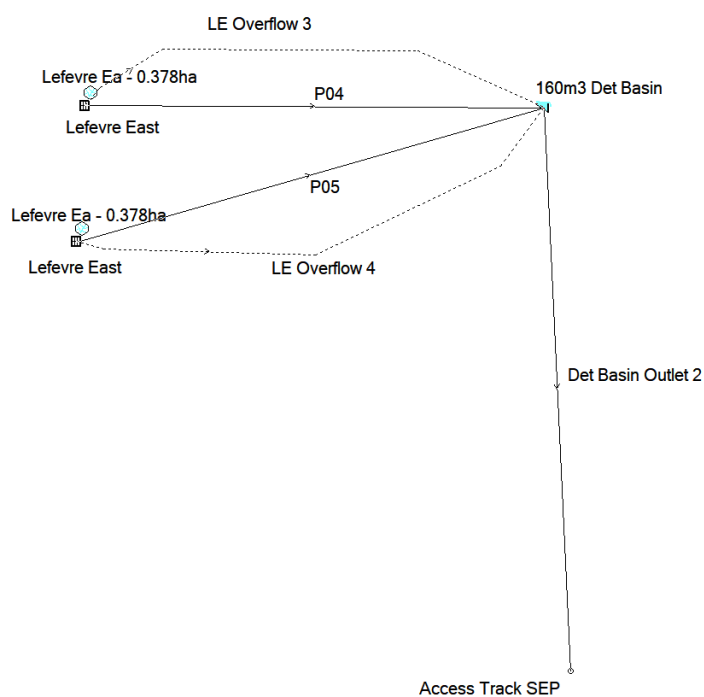


Figure 13 - DRAINS Model Arrangement Eastern Portion of Lefevre East Substation

A.1 Minor Storm 5% AEP Model Output

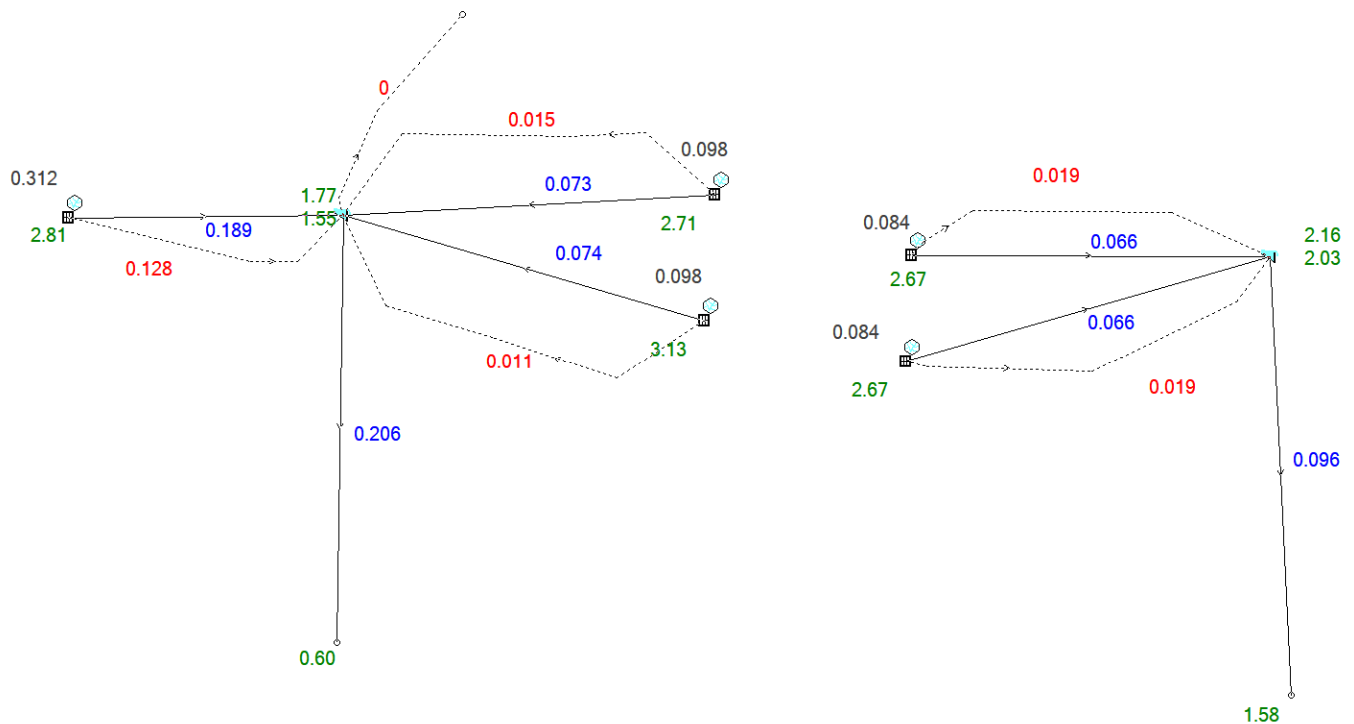


Figure 14 - DRAINS 10% AEP Model Output

A.2 Major Storm 1% AEP Model Output

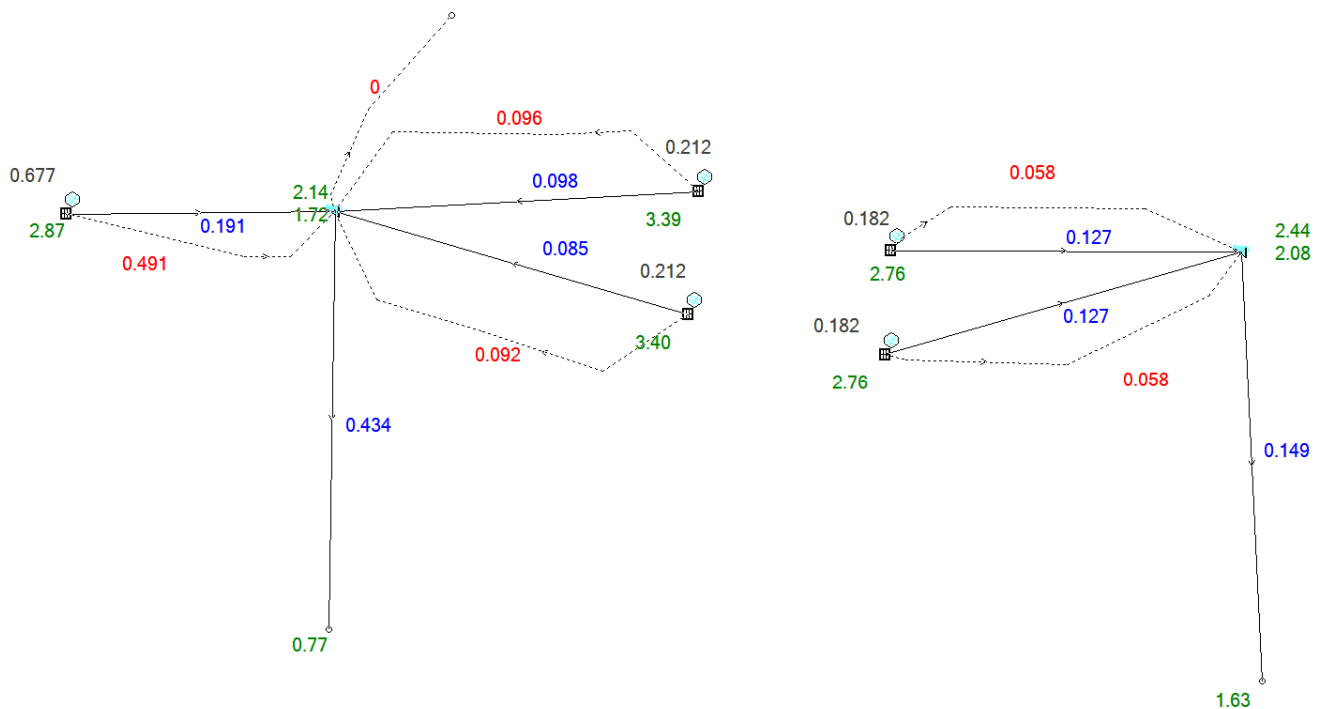


Figure 15 - DRAINS 1% AEP Model Output

Appendix B – Concept Drainage Plan

B.1 Concept Drainage Plan Lefevre Substation / Lefevre East Substation

