Scottish & Southern Electricity Networks

Fanellan Hub 400 kV Substation and Converter Station Environmental Impact Assessment Report Volume 4 | Technical Appendices

Appendix 13.2 – Drainage Strategy Report

February 2025

Fanellan

400kV Switching Station and HVDC Converter Station

Drainage Strategy Report
LT459-SWE-XX-XX-T-C-0501

SWECO

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1 Introduction

This report details the outline drainage strategy to inform the drainage design proposals as part of the Fanellan 400kV Switching Station and HVDC Convertor Station, on behalf of Scottish and Southern Energy Networks (SSEN) Transmission. The information contained in this report will support the planning application for the Fanellan development. The report describes the proposed drainage design methodology taking into account relevant information from the ground investigation works and Flood Risk Assessment (FRA).

1.1 Site Location

The proposed Fanellan development lies approximately 5km south west of Beauly within the Highland Council local authority. The OS Grid northings and eastings of the site are approximately 248404, 843094 (to the middle of the proposed development site). Access to the site can be taken from the A831 via the A862 and C1106 road from the Black Bridge. Refer to site layout drawing LT459-SWE-XX-XX-D-X-0002 and LT459-SWE-XX-XX-D-X-0003 in Appendix A for details and Figure 1.1.

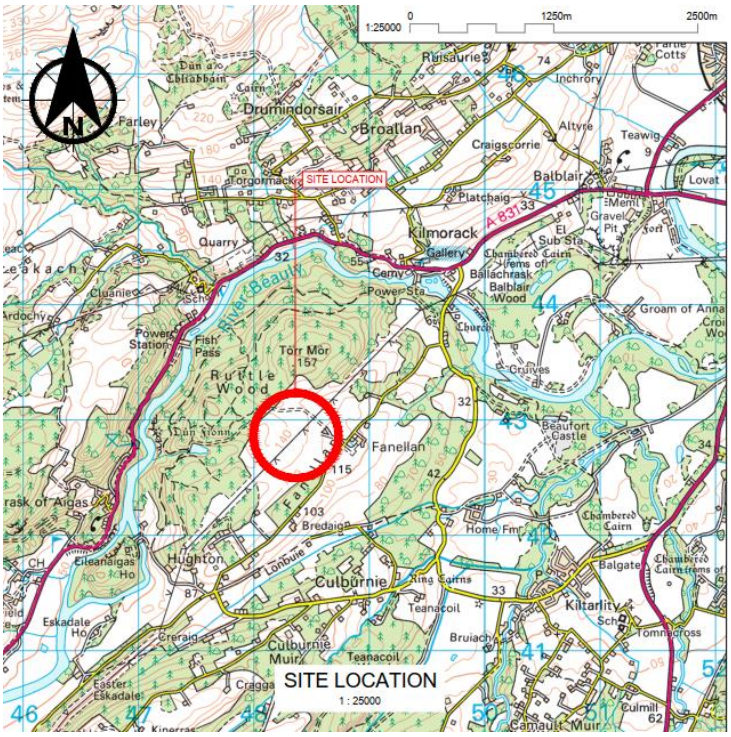


Figure 1.1 Site location to the south of the River Beauly

1.2 Purpose of this Report

This report has been prepared to detail the methodology of detailing with the surface water run-off and foul water from the proposed site. The report will detail the overall drainage strategy and the corresponding impact on the scheme. The report has been prepared taking into account the requirements and recommendations of the following documents

- SEPA Water Assessment and Drainage Assessment Guide
- The Highland Council Flood Risk and Drainage Impact
- CIRIA SuDS Manual C753
- SSEN Earthworks Specification SP-NET-CIV-501

- SSEN Drainage Specification SP-NET-CIV-502
- SSEN Pavements and Roadways Specification SP-NET-CIV-503
- SSE – HVDC Standardisation – Pre Riba-3 (PMI) Works (31st August 2023)
- Scottish Water Record Drawings

As well as the above noted sources of information, the drainage strategy report also relies on information detailed with the Cyber Hawk DTM Survey and the Preliminary Site Layout designs. The drainage report should be read in conjunction with the preliminary design drainage drawings noted in Appendix B.

2 Consultations

There will be a number of consultations required through the development of the drainage design. These will focus on both regulatory approval and SSENs own internal design and maintenance stakeholders. The known consultees are noted below:

- Scottish Environmental Protection Agency (SEPA)
- The Highland Council
- SSEN Operational and Maintenance Teams

3 Existing Site Description

3.1 Current Site Description

The proposed Fanellan development is located on a mixture of arable land and grassland for agricultural use. The site is bordered to the north and west by mature trees of varying species and to the south and east by the existing C1106 council adopted road. The topography of the site generally falls from west to east towards the road, however, there is a number of undulations or 'knowes' and localised 'gully' type features to the north and south west of the site. Within the proposed site boundary, there are existing dwelling cottages and farm building as wells as unbound access tracks providing access to various points around the site.

3.2 Site Topography

A drone survey was carried out of the site by Cyber Hawk in June 2023 proving which provided a DTM point cloud survey. The highest point of the proposed site is approximately 147m AOD, at the mid-point of the site, falling to the lowest point approximately at 90m AOD at the north east corner.

There are several drainage features located within the proposed site boundary in the form of land ditches or natural gullies which remove both surface water run-off and the ground water table.

3.3 Ground Conditions

Geotechnical Investigation (GI) was undertaken in August and September 2023 and the formal Factual Report was issued in January 2024. The proposed development site consists of shallow superficial materials consisting of sand and cemented glacial till. A localised area of peat was encountered at one trial pit location. Rock was encountered beneath the proposed development site at a level range of 92.5m AOD to 146m AOD.

Over the course of the GI undertaken, groundwater was struck at 21 locations within the proposed development site. The groundwater was encountered at its highest level (125m – 130m AOD) towards the west of the site. The proposed platform level is 127m AOD, therefore, groundwater needs to be managed and drained from the platform. Manual groundwater monitoring was undertaken at 18 locations and results noted within the Ground Investigation Report (GIR) along with description of groundwater conditions encountered. The highest groundwater level was recorded at 141.0m AOD. Three data loggers (Divers) were installed in three boreholes BH11, BH13 and BH21.

Groundwater was encountered both in the superficial Glacial Till and within fractured conglomerate bedrock. Due to the depth of the cuttings required for construction of Fanellan, and the potential inflow from fractured bedrock, this will require to be mitigated through the drainage strategy as described in Section 6.

3.4 Watercourses and Existing Drainage Features

3.4.1 Watercourses

The River Beauly passes the proposed development to the north and west, as it makes its way into the Beauly Firth, but is located approximately 725m beyond the proposed site boundary at its closed point.

There are a number of minor un-named watercourses / drainage ditches which are in close proximity to the site, all of which are culverted under Fanellan Road running parallel to the eastern side of the site.

The first watercourse / drainage ditch is culverted under the road at Easting 248389 and Northing 842226 and flows in an easterly direction eventually discharging into the Lonbuie Burn. The watercourse / drainage ditch appears to drain a naturally low lying area of the site.

The second watercourse / drainage ditch is again culverted under the existing public road and flows in a northerly direction towards the River Beauly. The approximate Easting and Northing are 249077 and 843114 where it passes under the road. The watercourse / drainage ditch receives a number of ditches which drain the road and surround land.

A third un-named watercourse / drainage ditch is located at approximately Easting 248590 and Northing 842442 and is culverted under the existing public road. The watercourse flows in an easterly direction and eventually discharges to the Lonbuie Burn.

None of the watercourse / drainage ditches are monitored on the SEPA flood maps noted in Figure 3.1 but are shown. Reference should be made to drawings drainage drawings LT459-SWE-XX-XX-D-X-0501 and LT459-SWE-XX-XX-D-X-0502 which show the locations of the drainage watercourses / drainage ditches.

3.4.2 Drainage Features

There are a number of existing drainage features which comprise of land ditches used to cut-off the overland flows coming off the existing fields. There are also cut-off ditches along the existing road, however, many sections of these have no formal outfall and appear to empty via infiltration. The ditches are typically cut with near vertical side slopes.

To the south west of the site, there is an existing small lochan which is located at Easting 247522 and Northing 842738 which part of the existing catchment of the site drains into. The lochan is topped up by the natural catchment draining into it and is a habitat of fish. The lochan is noted on the SEPA flood map shown in Figure 3.1. Refer to drawing LT459-SWE-XX-XX-D-X-0002 and LT459-SWE-XX-XX-D-X-0003, Appendix B, for the locations of the features.

The is an existing well and issues noted to the north west of the Upper Fanellan Cottages. Both appear to be a result of the high water table locally exceeding existing ground level at a localised low point in the topography.

3.5 Flood Risk

A review of available information relating to flood risk of the site has been undertaken with the SEPA Flood Maps, Figure 3.1, confirming no river flooding present within the scheme extents. Some surface water flooding is noted in the map; however, this is considered minor in nature and is not located where the main substation is proposed to be located.

A Flood Risk Assessment (FRA) and Drainage Impact Assessment has been undertaken for the scheme.

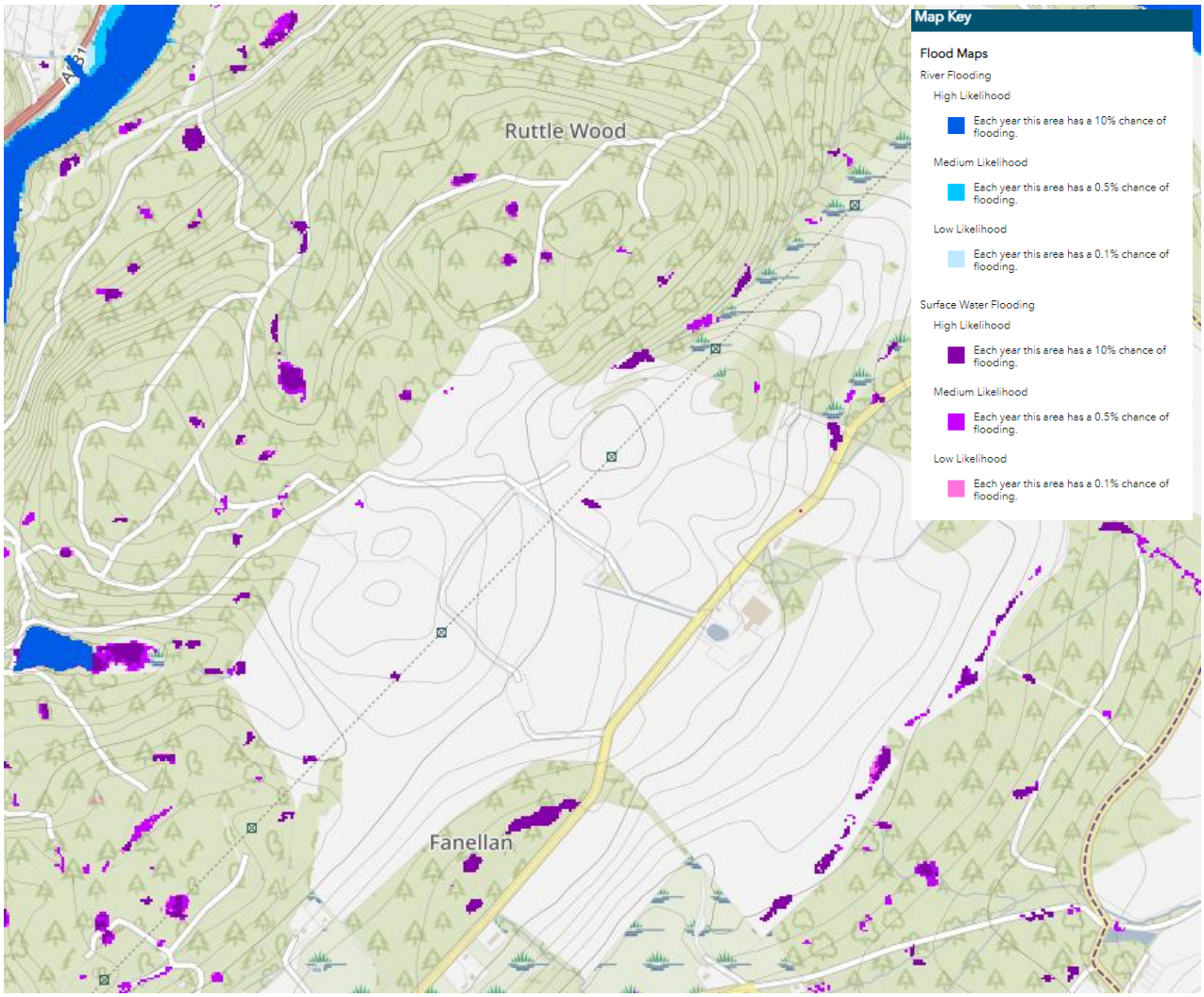


Figure 3.1 SEPA flooding mapping showing river and surface water flooding

3.6 Utilities and Private Water Supplies

There is an existing Scottish Water supply main which is located in the verge of the existing public road. This is predominately located in the eastern verge; however it locally moves onto the western verge as it passes the existing SSEN stores site compound located immediately opposite the entrance to the Upper Fanellan Cottages access. A supply main services the Upper Fanellan Cottages, however, it is not shown on the Scottish Water asset drawings.

There are no foul sewers located in the vicinity of the scheme. It is assumed that the Upper Fanellan Cottages discharge foul drainage via a septic tank system. The location of the tank is not currently known and this will need to be investigated.

4 Proposed Development

The proposed Fanellan development shown in Figure 4.1 and layout drawings included in Appendix A consists of a 240,000m^2 platform area with associated 400kV substation and associated building constructed on top. The earthworks platform sits at a level of 127m AOD and incorporates a number of land forms (earthworks screening features) which shield the buildings and associated substation infrastructure from view.

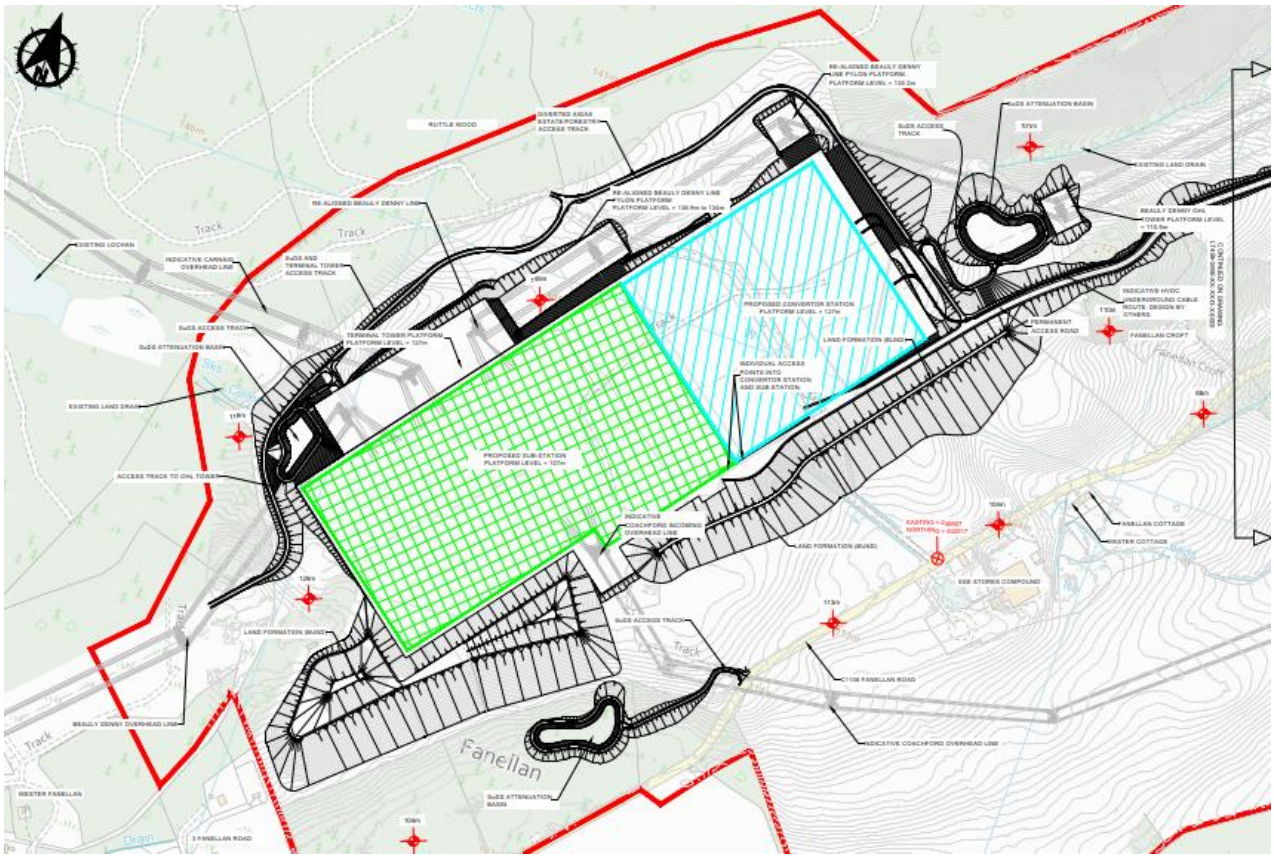


Figure 4.1 Fanellan Site Layout

Access to the substation will be via a 5m , minimum, wide asphalt access road and there will be a series of internal asphalt bound access roads within the perimeter of the substation. The sub-station area of the platform will be formed of a build-up of a minimum of 1m crushed rock and will be predominately free draining material. The convertor station area of the substation will consist of a number of buildings and hardstand areas which will be impermeable. There will be welfare buildings included within the development which will be supplied with drinking water and there will also be a foul water system included.

The substation will be surrounded by a security perimeter fence and there will also be associated unbound access tracks providing maintenance access to overhead line towers and existing rights of access.

5 Proposed Drainage: Surface Water

5.1 Design Philosophy

The drainage strategy follows the overarching requirements of the SuDS Manual C753 noted in Table 5.1 below.

Table 5.1 SuDS Manual hierarchy

Prevention	Prevent run-off of water with particular focus on polluted water.
Control at Source	Control the run-off where it occurs (tanks or pipes)
Control at Site	Control the run-off within the development boundary (swales basins, ponds)

Control in Region	Control the run-off from several sites within the vicinity of the developments (large wetlands, reservoirs)

Further principles for the design philosophy are noted below to ensure the safe operation of the final development:

- Removal of surface water from the access roads and hardstand areas as quickly as possible to provide safety and minimum nuisance to the travelling public. ·
- Provision of effective sub-surface drainage to maximise longevity of hardstand areas and associated earthworks. ·
- Minimisation of the impact of the runoff on the receiving environment in terms of flood risk and water quality.
- Roofs, earthworks, access roads and other associated features are effectively drained. ·
- Consideration is given to future maintenance and operation of the systems. ·
- Climate change and possible changes in impermeable area is accounted for. ·
- The generation of waste during construction and operation is minimised.

5.2 Design Parameters

The overarching requirements of SSEN Drainage Specification, document number SP-NET-CIV-502, are as follows:

- 1 in 200 year rainfall return period protection for operations areas;
- 1 in 1000 year rainfall return period protection for critical equipment check (critical equipment can be sited in raised platforms if required);
- 1 in 200 year rainfall return period protection for off-site flooding.

For the purposes of the Fanellan development, it is classed as critical equipment, therefore at the 1 in 1000 year return period the maximum depth of water above the finished level of the platform shall be less than 100mm.

Climate change will be added to the drainage modelling to ensure a robust system is put in place. The SEPA climate change allowances for flood risk assessment in land use planning, version 3, Table 2 recommends for the North highland river basin region a 42% uplift should be applied to all modelling to ensure the system is fit for future increased rainfall events.

Pipe networks and attenuation features shall be analysed using FEH 13 rainfall data for storm durations between 15 minutes to 10080 minutes. Due to the scale of the site, numerous FEH 13 points have been obtained and used in the modelling to ensure the most accurate results possible are obtained.

The drainage design parameters follow the guidance set out in SuDS Manual and SSEN specific guidance and are summarised in Table 5.2, below:

Table 5.2 Drainage Design Parameters

Parameter	Value
Pipe networks will not surcharge above manhole covers	200 year + 42% climate change
No flooding above 100mm on platform finished level	1000 year + 42% climate change
No flooding of cut-off ditches and earthworks ditches	200 year + 42% climate change
No flooding of attenuation features	200 year + 42% climate change
Minimum pipe velocity from paved areas	0.75 metre/second
Minimum vegetated SuDs system velocity	0.3 metre/second

Parameter	Value
Roughness value (k_s) for carrier drains	0.6mm
Roughness value (k_s) for combined drains	1.5mm
Global Time of Entry	5 min
Manning's (n) for new ditches	0.045
Manning's (n) for new wet swales	0.100
Minimum freeboard to open attenuation features	300mm

5.3 Drainage Outfall Options

The options for outfalling surface water based on the SuDS Manual C753 hierarchy are noted in Table 5.3 below.

Table 5.3 Outfall Hierarchy

Method of Outfalling Drainage Network	Suitability	Comment on Suitability
Infiltrate run-off back into the ground	The BRE soakaway test undertaken during the Geotechnical Investigation completed in September 2023 confirmed infiltration rates were visually confirmed as being poor on site.	Not feasible to use this method of outfall due to poor infiltration results.
Discharge run-off to surface watercourse	There are a number unnamed watercourses located at the extremities of the site. Based on the proposed development levels, outfalls can be achieved to these watercourses.	This is feasible and allows for a number of outfalls if it is preferred to split up the development catchment.
Discharge run-off to surface or combined sewers	There are no Scottish Water sewers in the vicinity of the scheme.	Not feasible to do this.
Discharge run-off into existing water features such as ponds	There are existing pond features in close proximity to the site which currently control run-off. These are located in private land and would need legal agreement to discharge into them.	Not feasible due to the ownership issues associated with this.

5.4 Attenuation

The outline drainage network and attenuation system are designed in accordance with the SuDS Manual and The Highland Council specific flooding guidance where applicable. All SuDS attenuation features shall store surface water run-off to the 1 in 200 year return period rainfall event + 42% climate change. Further checks will be undertaken to the 1000 year return period to consider any adverse impacts on the surrounding area and identify exceedance routes.

Due to the scale of the platform, it is proposed to separate the sub-station and convertor station areas into separate catchments for attenuation purposes. This ensures that the catchments try to match the pre-development discharges and ensure there is no increased downstream flood risk to the receiving watercourses. Due to the position of the site, broadly at the high point of the surrounding land, the watercourses are small in nature and not sized to accept large discharges of run-off.

5.4.1 Sub-Station Platform Area

The sub-station area of the platform is approximately 15ha (granular platform area) not including engineered slopes and natural catchments. It is proposed to split this area into two catchments for attenuation purposes and try to match the existing catchment area as much as possible.

The pre-development greenfield run-off rate has been calculated, shown in Table 5.4, for a number of return periods including and allowance of 42% climate change. Analysis has been carried out via a number of existing and historical methods of calculating pre-development greenfield run-off. The discharge rate for any SuDS feature shall be limited to this using a means of flow control (vortex control or orifice plate). Analysis shall be undertaken to ensure any exceedance events from the attenuation features to not cause in detriment above the 1 in 200 year return period including 42% climate change. It is proposed to use the 1m granular make-up of the platform to help attenuate rainfall over the platform area due to its size. It has been considered the granular platform make-up will have a voids ratio of 30% which will be suitable for storing run-off in the short term. The proposed areas for the attenuation within the platform are shown in drainage drawings. The rates noted in the table below shall be updated as the design progresses based on the actual impermeable area draining to each SuDS feature.

Table 5.4 Switching Station Catchment Discharge Rates

Impermeable Catchment Area (ha	IH 124 Discharge Rate Return Period (litres / second)	ReFH 2 Discharge Rates (litres / second)	FEH Discharge Rates (litres / second)	Design Discharge Rate (litres / second)
Switching Station East Catchment = 9.682	Q_{bar} = 22.8	Q_{med} = 17.4	Q_{med} = 23.1	ReFH 2 Q_{med}
Switching Station West Catchment = 10.679	Q_{bar} = 26.0	Q_{med} = 39.6	Q_{med} = 35.9	IH124 Q_{bar}

Table 5.4 shows a number of methods of calculating the greenfield run-off rate have been used with the most conservative value taken forward into the design. There are a number of sensitive receptors out with the site which could be susceptible to flooding. The discharge rates will require to be developed as the scheme design progresses due to the changing nature of the development size.

Maintenance access shall be provided to the attenuation features in the form of unbound granular access tracks which, as a minimum, will provide access to all inlet and outlet headwalls with sufficient parking and turning areas for a van and trailer.

5.4.2 Convertor Station Platform Area

The pre-development area where the platform is located greenfield run-off has been calculated as shown in Table 5.5 with an allowance of 42% climate change. It is proposed to attenuate run-off via a basin before outfalling into the nearby watercourse. The discharge rate for any the feature shall be limited to this using a means of flow control (vortex control or orifice plate). Analysis shall be undertaken to ensure any exceedance events from the attenuation features to not cause in detriment above the 1 in 200 year return period including 42% climate change. The rates noted in the table below shall be updated as the design progresses based on the actual impermeable area draining to each SuDS feature.

Table 5.5 Convertor Station Discharge Rates

Impermeable Catchment Area (ha)	IH 124 Discharge Rate Return Period (litres / second)	ReFH 2 Discharge Rates (litres / second)	FEH Discharge Rates (litres / second)	Design Discharge Rate (litres / second)
HVDC Convertor Station = 7.898	Q_{bar} = 56.2	Q_{med} = 34.5	Q_{med} = 27.6	FEH Q_{med}

5.4.3 Permanent Access Road

A 1.5km access road is provided to the development off Fanellan Road close to the junction with the U1604 Kiltarlity Roaf. Once completed the road will have an asphalt surface of varying width which will generate run-off. It is proposed to treat and attenuate the run-off in basins at two location along the length of the track. The drainage of the access road is split to minimise the volumes of water being stored at each attenuation feature.

Table 5.6 Access Road Discharge Rates

Impermeable Catchment Area (ha)	IH 124 Discharge Rate Return Period (litres / second)	ReFH 2 Discharge Rates (litres / second)	FEH Discharge Rates (litres / second)	Design Discharge Rate (litres / second)
Permanent Access Road Network AR-1 =1.100	Q_{bar} = 7.8	Q_{med} = 4.3	Q_{med} = 5.1	ReFH 2 Q_{med}
Permanent Access Road Network AR-2 = 0.500	Q_{bar} = 3.2	Q_{med} = 2.1	Q_{med} = 2.6	ReFH 2 Q_{med}

Table 5.6 shows a number of methods of calculating the greenfield run-off rate have been used with the most conservative value taken forward into the design.

6 Drainage Strategy: Ground Water

Groundwater level monitoring and observations made during the ground investigation indicate that groundwater is shallow, and present in both the superficial Glacial Till (within granular sands and gravels) and the underlying bedrock conglomerate. Groundwater flow within the bedrock is expected to be predominantly within weathered rock and through fractures, evident within the conglomerate. The rate of flow of groundwater will therefore vary depending on the degree of fracturing. Deep cuttings into the bedrock for construction of the substation platform, will intercept groundwater during construction works. Calculations have been made on the likely groundwater inflows to current design cutting faces, using site specific information available and taking into account the likely permeability range, in the absence of in situ or site-specific data. Resulting inflows are as follows:

- Average 5L/s ranging from 0.2L/s to 17L/s in AC (W) noted pipes (LT459-SWE-XX-XX-D-G-0001)
- Average 8L/s ranging from 0.3L/s to 27L/s into DC (W) noted pipes (LT459-SWE-XX-XX-D-G-0003)

There is expected to be ongoing seepage of groundwater from the exposed cutting faces which will have implications for permanent design and will be managed accordingly. It is proposed to attenuate the ground water, where the flow rates allow, as it will be intercepted by the pipe network and distributed into the nearby surface water courses at much shorter durations than currently happens. In some instances it will not be possible to attenuate ground water due to the flow rates being greater than the attenuation discharge rates. In this case, groundwater will be managed in the same manor as earthworks drainage. It is expected that the rates above will be refined as more monitoring data becomes available from the boreholes drilled onsite.

7 Drainage Strategy: Temporary Drainage

Temporary drainage is required to manage run-off during the construction works to adequately distribute water back into the natural catchment. The design incorporates numerous cut-off and pre-earthworks drainage ditches and pipes which shall be incorporated into the permanent drainage network which reduces the amount of temporary drains required.

- Cut-off and pre-earthworks ditches: temporary drainage will predominately be provided in the form of open cut ditches. These will provide capture and conveyance to distribute the run-off the nearby watercourse. Where high levels of sediment or other pollutants are anticipated within the run-off, ditches shall be grassed or hessian lined to help capture contaminates.
- Filter drains: where the use of ditches is not practicable due to site levels, filter drains shall be used to treat and convey water.
- Sedimentation lagoons: Prior to discharging back into the water environment, any conveyance pipes or ditches shall pass through a sedimentation lagoon which shall store the run-off and allow any sediments to settle. The discharge rate into the downstream watercourse shall be controlled so not to increase downstream flood risk.

8 Drainage Strategy – Oily Water

The Fanellan site will contain a number of components which use or store oil-based products. Internally on the site, locations where oil is stored will have an earthworks bunds surrounding it to prevent leakage or discharge of the pollutant. A system will be in place which notifies the sub-station maintainer, via an alarm system, that an oil leak has occurred and a pumping system will begin to operate to discharge the contaminated water, firstly, to an above ground oily water mitigation system. Any oil leaked for an asset on the site shall be stored and removed offsite to an appropriate treatment facility.

Where oil based products are deposited onto the access or internal roads, the water pass into the surface water drainage system via either filtration through filter media or into an open vegetated SuDS system such as a swale. The water will then undergo further treatment and attenuation in a SuDS basin which will further trap and remaining oil pollutants. The final protection of the downstream watercourse will be an oil trap chamber shown in drawing LT459-SWE-XX-XX-D-X-0503 which will prevent the floatable oil from discharging into the downstream water feature. If any oil reaches this chamber, the internal chamber can be inspected, and any pollutants removed via a vacuum unit and disposed of safely. Typically, two levels of treatment are provided to surface water run-off from access roads and hardstand areas in line with SEPAs Simple Index Approach.

9 Drainage Strategy: Foul Water

Foul water will be generated from the proposed development from toilets and washing facilities provided in the welfare buildings. There is no Scottish Water foul or combined sewers within the vicinity of the scheme, therefore, it is proposed to treat and discharge foul water via a packaged treatment plant. The design proposals for this shall adhere to British Water Flows and Loads – 4 code of practice for industrial sites and SEPA WAT-RM-03 regulations. It is considered at this stage; usage will be low. The final sizing shall be agreed with SSEN and authorised by SEPA.

10 Operation and Maintenance

A key consideration of the drainage system installed is the operation and maintenance of the infrastructure to ensure it is robust and can be safely maintained over its design life. The following chapters provide details of the maintenance regime which is anticipated to be implemented as a minimum. Suitable offsets will be provided to allow maintenance access to all drainage features.

10.1 Filter Drains

Table 9.1 demonstrations the minimum maintenance regime which should be undertaken for filter drains.

Table 10.1 Filter drain maintenance requirements

• **Maintenance schedule**	• **Required Action**	• **Frequency**
• Regular Maintenance	• Litter and debris removal.	• Monthly
	• Manage other vegetation and remove nuisance plants	• Monthly at start then as required
• Occasional Maintenance	• Check for areas of poor infiltration due to sediment	• Annually
	• Re-seed areas of poor vegetation growth. Alter plant types to better suit conditions if required.	• Annually
• Remedial Actions	• Repair erosion or other damage by re-turfing or re-seeding.	• As required
	• Re-level uneven surfaces and reinstate design levels.	• As required
	• Remove and dispose of oils or petrol residues using safe standard practices.	• As required
• Monitoring	• Inspect drain surface for areas of vehicle overrun or where stone scatter has occurred	• Half yearly

10.2 Septic Tanks (Treatment Plants)

Septic tanks should be registered with SEPA prior to their commissioning. The tank should be emptied at typically 12 month intervals or at the interval period specified by the tank manufacturer. The tank should be emptied using a vacuum unit where the foul waste can safely be removed to be treated off site.

The location of the septic tanks for the scheme are shown in drawing 65209642-SWE-XX-XX-D-X-0503 where maintenance access is also shown.

10.3 Swales / Ditches

Details of the operational and maintenance requirements of the drainage swales are noted in Table 9.2, below.

Table 10.2 Swale and Ditch maintenance requirements

Maintenance schedule	Required Action	Frequency
Regular Maintenance	Litter and debris removal.	Monthly
	Grass cutting.	Monthly during growing season
	Manage other vegetation and remove nuisance plants	Monthly at start then as required
Occasional Maintenance	Check for areas of poor vegetation growth due to lack of sunlight or dropping of leaf litter and cut back adjacent vegetation where possible.	Annually
	Re-seed areas of poor vegetation growth. Alter plant types to better suit conditions if required.	Annually
Remedial Actions	Repair erosion or other damage by re-turfing or re-seeding.	As required
	Re-level uneven surfaces and reinstate design levels.	As required
	Remove and dispose of oils or petrol residues using safe standard practices.	As required
Monitoring	Inspect drain surface for areas of vehicle overrun or where the topsoil has become compacted.	Half yearly

10.4 Detention Basins

Details of the operational and maintenance requirements of the detention basins are noted in Table 9.3, below.

Table 10.3 Detention basin maintenance requirements

Maintenance Schedule	Required Action	Frequency
Regular Maintenance	Litter and debris removal	Monthly.
	Grass cutting - for spillways and access routes.	Monthly (during growing season), or as required.
	Grass cutting - meadow grass in and around basin.	Half yearly (spring - before nesting season, and autumn).

Maintenance Schedule	Required Action	Frequency
	Manage other vegetation and remove nuisance plants.	Monthly (at start, then as required).
	Tidy all dead growth before start of growing season.	Annually.
	Remove sediment from inlets, outlet and forebay.	Annually (or as required).
	Manage wetland plants in outlet pool - where provided.	Annually.
Occasional Maintenance	Re-seed areas of poor vegetation growth.	Annually (or as required).
	Prune and trim trees and remove cuttings.	2 Years (or as required).
	Remove sediment from forebay, when 50% full and from micropools if volume reduced by > 25%.	3-10 Years (or as required).
Remedial Actions	Repair of erosion or other damage by re-seeding or re-turfing.	As required.
	Realignment of rip-rap.	As required.
	Repair / rehabilitation of inlets, outlets and overflows.	As required.
	Re-level uneven surfaces and reinstate design levels.	As required.
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly / After large storms
	Inspect banksides, structures, pipework etc for evidence of physical damage.	Monthly / After large storms
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Half yearly
	Check penstocks and other mechanical devices.	Half yearly

11 Conclusion

The drainage strategy report details the methodology behind the selection of the drainage infrastructure to be installed as part of the scheme and demonstrates these have been integrated into the proposed development layout. The report also demonstrates the design parameters used to model the new drainage networks and highlights how the designer has taken into consideration all impacts of the new system.

This report will be used as the basis for ongoing consultation with relevant stakeholders. It will set the baseline for the design strategy and parameters to be used to develop the drainage design. This report will be

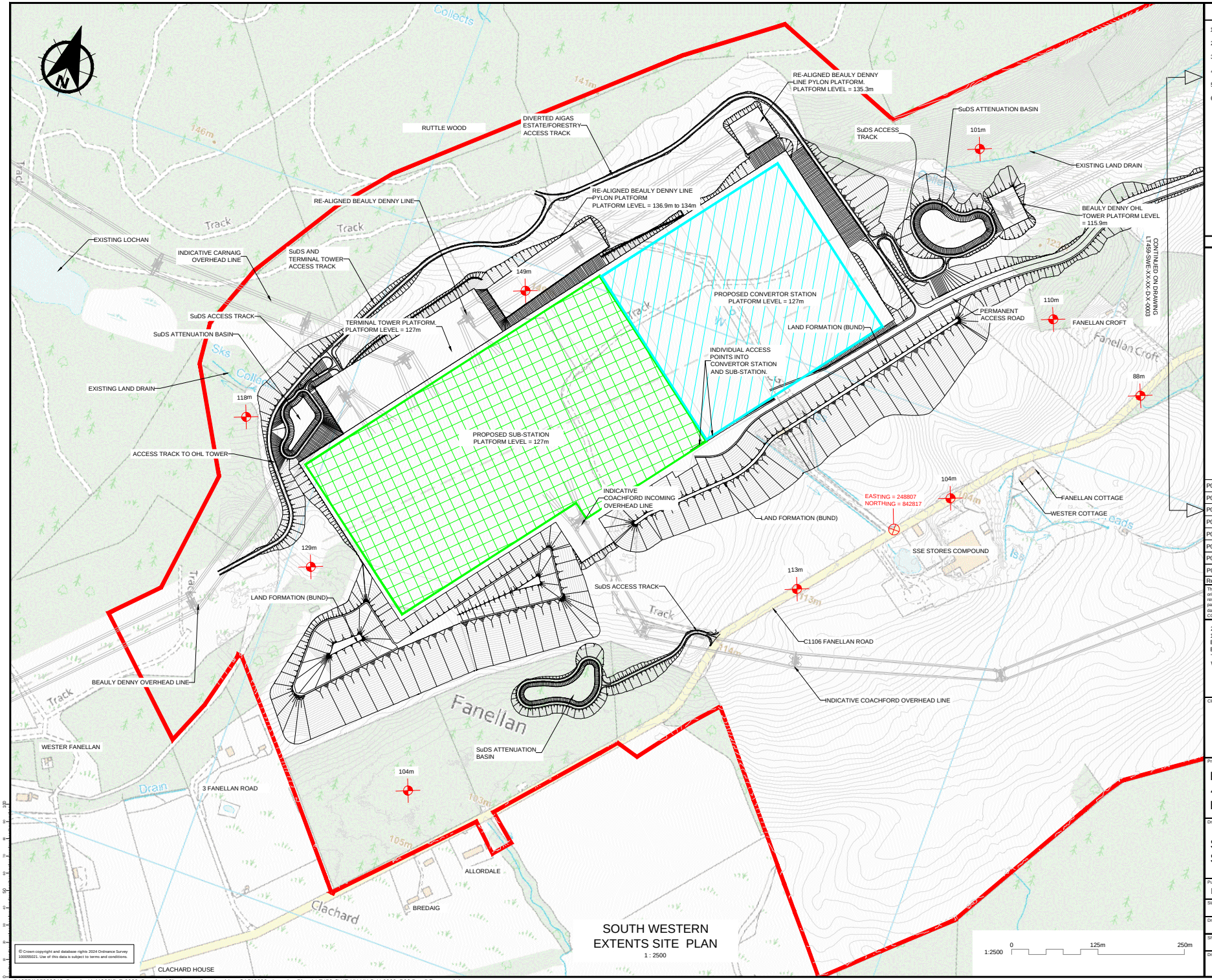
continually developed as the design becomes more developed and stakeholder and consultee requirements are added.

Appendix A

Fanellan Development Site Layout

LT459-SWE-XX-XX-D-X-0002

LT459-SWE-XX-XX-D-X-0003



NOTES

1. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT PROJECT INFORMATION.
3. ALL DATUM LEVELS ARE IN METRES AND DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
4. REFER TO DRAWING LT459-SWE-XX-XX-D-X-0001 FOR DETAILS OF THE SITE LOCATION.
5. REFER TO DRAWING LT459-SWE-XX-XX-D-X-0003 FOR DETAILS OF THE NORTH EASTERN EXTENTS OF THE SITE.
6. PROPOSED AND EXISTING TOPOGRAPHY CONTOURS ARE SHOWN AT 1m INTERVALS OF HEIGHT DIFFERENCE.

KEY TO DRAWING

- PLANNING BOUNDARY AREA = 223 Ha
- 100m EXISTING TOPOGRAPHY SPOT LEVEL
- CONVERTOR STATION AREA
- SUB-STATION AREA

Rev	Date	Amendment Details	Dr'n	Chk'	App'
P08	28/01/2025	ROAD ALIGNMENTS UPDATED	RL	NG	CB
P07	28/11/2024	CONTOURS ADDED	RL	NG	CB
P06	20/08/2024	FINAL LAYOUT	RL	NG	CB
P05	14/06/2024	COMMENTS ADDRESSED	RL	NG	CB
P04	18/04/2024	DESIGN FIX 2C	RL	NG	CB
P03	29/02/2024	DESIGN FIX 2B	RL	NG	CB
P02	15/12/2023	DESIGN FIX A	MA	RL	CB
P01	10/10/2023	FOR COMMENT	MA	RL	CB

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SWECO

Client: Scottish & Southern Electricity Networks TRANSMISSION

Project Title: FANELLAN 400kV SWITCHING STATION AND HVDC CONVERTOR STATION

Drawing Title: SITE PLAN SHEET 1 OF 2

Purpose Of Issue: PRELIMINARY

Status	Status Description
S5	FOR REVIEW AND ACCEPTANCE

Drawn	Designed	Checked	Approved
NG	NG		

Sheet Size	Scale	Sweco Ref	Revision
A1	1:2500	65209842	P08

Drawing Number: LT459-SWE-XX-XX-D-X-0002

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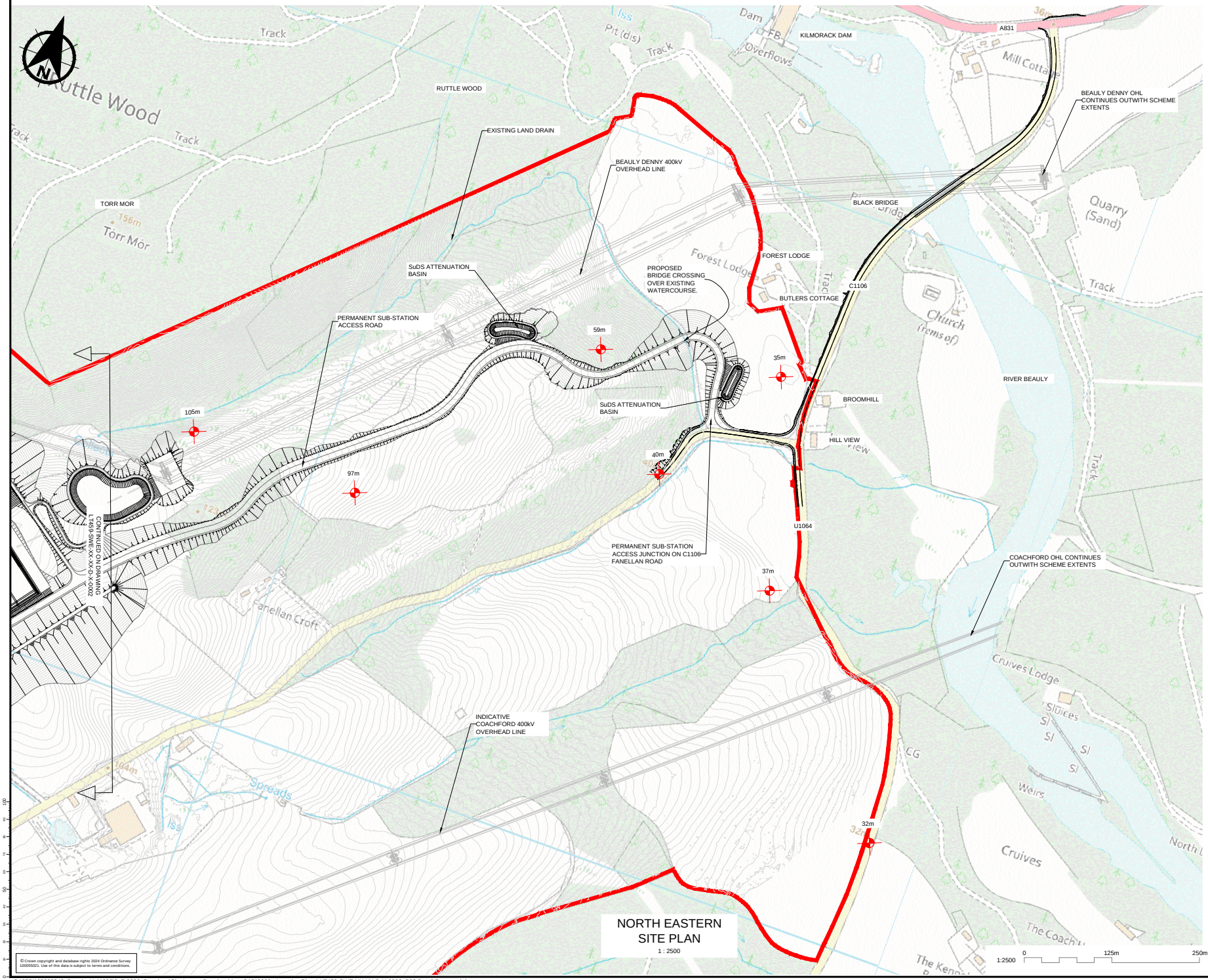

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NOTES

1. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT PROJECT INFORMATION.
3. ALL DATUM LEVELS ARE IN METRES AND DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
4. REFER TO DRAWING LT459-SWE-XX-XX-D-X-0001 FOR DETAILS OF THE SITE LOCATION.
5. REFER TO DRAWING LT459-SWE-XX-XX-D-X-0002 FOR DETAILS OF THE SOUTH WESTERN EXTENTS OF THE SITE.
6. PROPOSED AND EXISTING TOPOGRAPHY CONTOURS ARE SHOWN AT 1m INTERVALS OF HEIGHT DIFFERENCE.

KEY TO DRAWING

PLANNING BOUNDARY AREA = 223 Ha

100m EXISTING TOPOGRAPHY SPOT LEVEL

Rev	Date	Amendment Details	Dr'n	Chk'	App'
P08	10/02/2025	ACCESS ROAD AMENDED	RL	NG	CB
P07	28/11/2024	CONTOURS ADDED	RL	NG	CB
P06	20/08/2024	FINAL LAYOUT	RL	NG	CB
P05	14/06/2024	COMMENTS ADDRESSED	RL	NG	CB
P04	18/04/2024	DESIGN FIX 2C	RL	NG	CB
P03	29/02/2024	DESIGN FIX 2B	RL	NG	CB
P02	15/12/2023	DESIGN FIX A	MA	RL	CB
P01	10/10/2023	FOR COMMENT	MA	RL	CB

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SWECO

Client: Scottish & Southern Electricity Networks TRANSMISSION

Project Title: FANELLAN 400kV SWITCHING STATION AND HVDC CONVERTOR STATION

Drawing Title: SITE LAYOUT SHEET 2 OF 2

Purpose Of Issue: PRELIMINARY

Status	Status Description
S5	FOR REVIEW AND ACCEPTANCE

Drawn	Designed	Checked	Approved
RL	NG	NG	CB

Sheet Size	Scale	Sweco Ref	Revision
A1	1:2500	65209842	P08

Drawing Number: LT459-SWE-XX-XX-D-X-0003

Appendix B

Preliminary Drainage Drawings

LT459-SWE-XX-XX-D-X-0501

LT459-SWE-XX-XX-D-X-0502

LT459-SWE-XX-XX-D-X-0503

LT459-SWE-XX-XX-D-X-0504

LT459-SWE-XX-XX-D-X-0505

LT459-SWE-XX-XX-D-X-0506

LT459-SWE-XX-XX-D-X-0507

LT459-SWE-XX-XX-D-X-0508

LT459-SWE-XX-XX-D-X-0509

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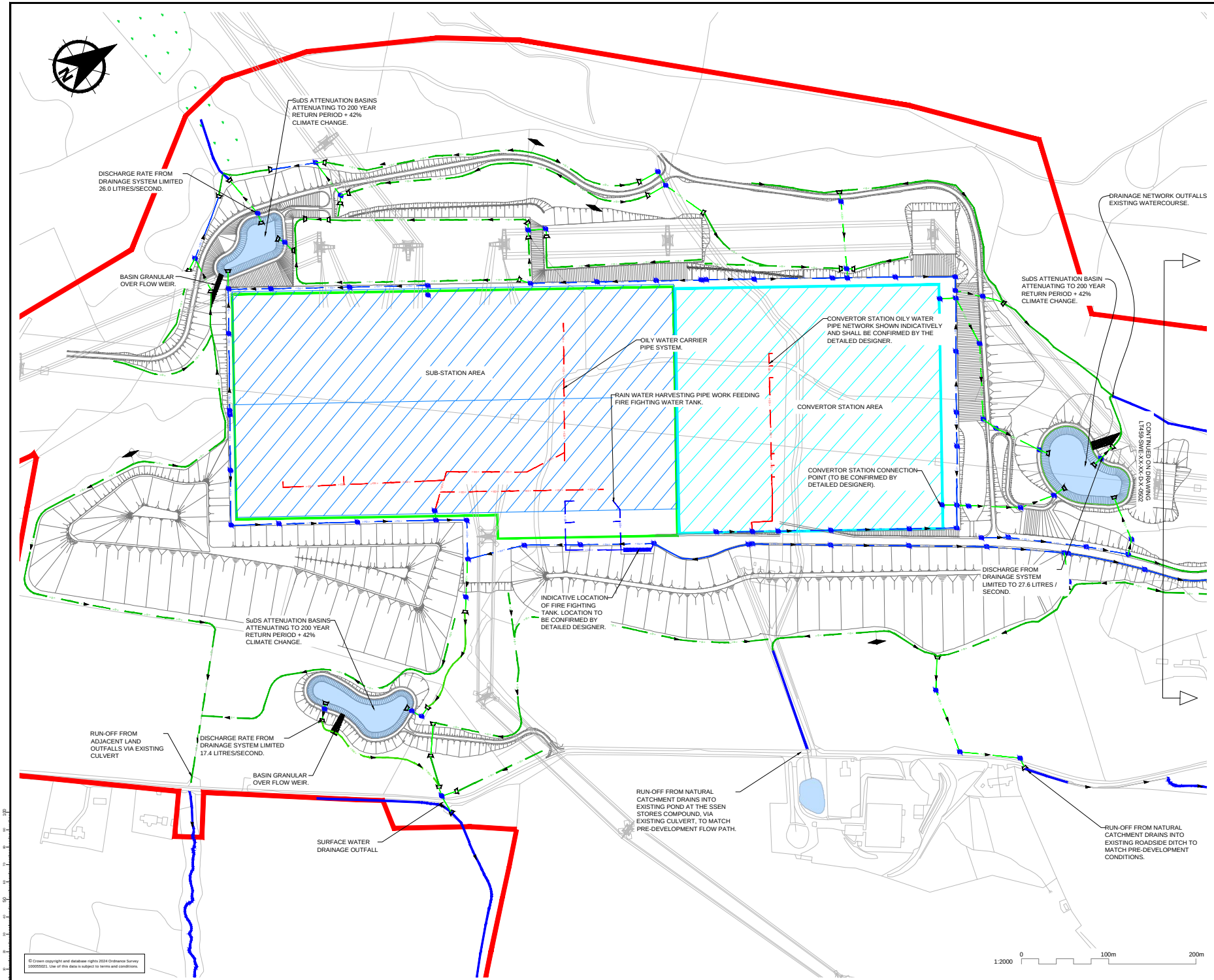
LT459-SWE-XX-XX-D-X-0512



NOTES

1. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT PROJECT INFORMATION.
3. ALL DATUM LEVELS ARE IN METRES AND DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
4. REFER TO DRAWING LT459-SWE-XX-XX-D-X-0502 FOR DETAILS OF THE NORTH EASTERN EXTENTS OF THE SITE.
5. FOR THE DETAILED LAYOUT OF THE DRAINAGE NETWORKS, REFER TO DRAWINGS LT459-SWE-XX-XX-D-X-0507, LT459-SWE-XX-XX-D-X-0508, LT459-SWE-XX-XX-D-X-0509 AND LT459-SWE-XX-XX-D-X-0510.
6. FOR THE TYPICAL DRAINAGE DETAILS PROPOSED, REFER TO DRAWING LT459-SWE-XX-XX-D-X-0503.
7. THE OILY WATER STRATEGY FOR THE CONVERTOR STATION SHALL BE CONFIRMED BY THE DETAILS DESIGNER.
8. ALL SUDS BASINS INCORPORATE LIFE BUOY RINGS AT EACH INLET HEADWALL.

KEY TO DRAWING

- SITE RED LINE BOUNDARY
- FILTER DRAIN
- CARRIER DRAIN
- DRAINAGE SWALE
- CUT-OFF DITCH
- ROUTE OF EXISTING DRAINAGE FEATURE
- OILY WATER CARRIER DRAIN
- RAINWATER HARVESTING WATER CARRIER DRAIN
- DRAINAGE CHAMBER
- HEADWALL
- TRAPPED GULLY
- FLOW DIRECTION ARROW
- GRANULAR PLATFORM AREA USED FOR ATTENUATION
- BREAK POINT IN DRAINAGE NETWORK
- CONVERTOR STATION AREA
- SUB-STATION AREA

Rev	Date	Amendment Details	Dr'n	Chk'	App'
P07	28/01/2025	TOWER ACCESS TRACK ADDED	RL	SG	CB
P06	20/08/2024	LAYOUT UPDATED	RL	SG	CB
P05	20/06/2024	LAYOUT UPDATES	RL	SG	CB
P04	18/04/2024	DESIGN FIX 2C	RL	SG	CB
P03	18/03/2024	HVAC (W) MINOR LAYOUT CHANGE	RL	SG	CB
P02	06/03/2024	DESIGN FIX 2B	RL	SG	CB
P01	15/12/2023	DESIGN FIX A	RL	SG	CB

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Project Title: FANELLAN 400kV SWITCHING STATION AND HVDC CONVERTOR STATION

Drawing Title: SURFACE WATER DRAINAGE OVERVIEW SHEET 1 OF 2

Purpose Of Issue: PRELIMINARY

Status	Status Description
S5	FOR REVIEW AND ACCEPTANCE

Drawn	Designed	Checked	Approved
RL	RL	SG	CB

Sheet Size	Scale	Sweco Ref	Revision
A1	1:2000	65209842	P07

Drawing Number: LT459-SWE-XX-XX-D-X-0501

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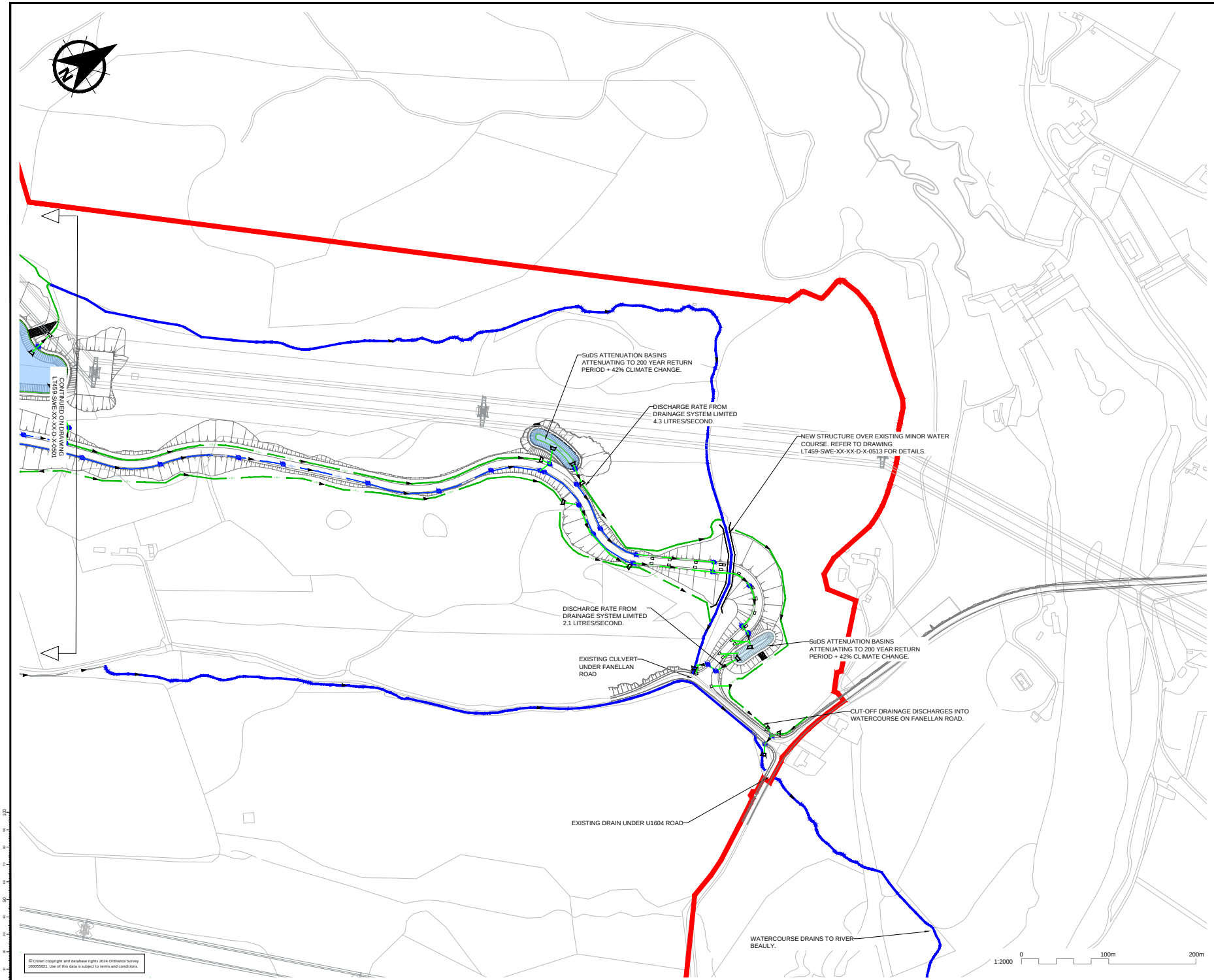

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3. ALL DATUM LEVELS ARE IN METRES AND DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
4. REFER TO DRAWING LT459-SWE-XX-XX-D-X-0501 FOR DETAILS OF THE SOUTH WESTERN EXTENTS OF THE SITE.
4. FOR THE DETAILED LAYOUT OF THE DRAINAGE NETWORKS, REFER TO DRAWINGS LT459-SWE-XX-XX-D-X-0507, LT459-SWE-XX-XX-D-X-0508, LT459-SWE-XX-XX-D-X-0509 AND LT459-SWE-XX-XX-D-X-0510.
5. FOR THE TYPICAL DRAINAGE DETAILS PROPOSED, REFER TO DRAWING LT459-SWE-XX-XX-D-X-0503.

KEY TO DRAWING

- SITE RED LINE BOUNDARY
- FILTER DRAIN
- CARRIER DRAIN
- DRAINAGE SWALE
- CUT-OFF DITCH
- ROUTE OF EXISTING DRAINAGE FEATURE
- DRAINAGE CHAMBER
- HEADWALL
- TRAPPED GULLY
- FLOW DIRECTION ARROW
- GRANULAR PLATFORM AREA USED FOR ATTENUATION
- BREAK POINT IN DRAINAGE NETWORK

Rev	Date	Amendment Details	Dr'n	Chk'	App'
P05	28/01/2025	ACCESS ROAD UPDATED	RL	SG	CB
P04	20/08/2024	LAYOUT UPDATED	RL	SG	CB
P03	18/04/2024	DESIGN FIX 2C	RL	SG	CB
P02	06/03/2024	DESIGN FIX 2B	RL	SG	CB
P01	15/12/2023	DESIGN FIX A	RL	SG	CB

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Client

Scottish & Southern Electricity Networks TRANSMISSION

Project Title

FANELLAN
400kV SWITCHING STATION AND HVDC CONVERTOR STATION

Drawing Title

SURFACE WATER DRAINAGE OVERVIEW
SHEET 2 OF 2

Purpose Of Issue: PRELIMINARY

Status	Status Description
S5	FOR REVIEW AND ACCEPTANCE

Drawn	Designed	Checked	Approved
RL	RL	SG	CB

Sheet Size	Scale	Sweco Ref	Revision
A1	1:2000	65209842	P05

Drawing Number: LT459-SWE-XX-XX-D-X-0502

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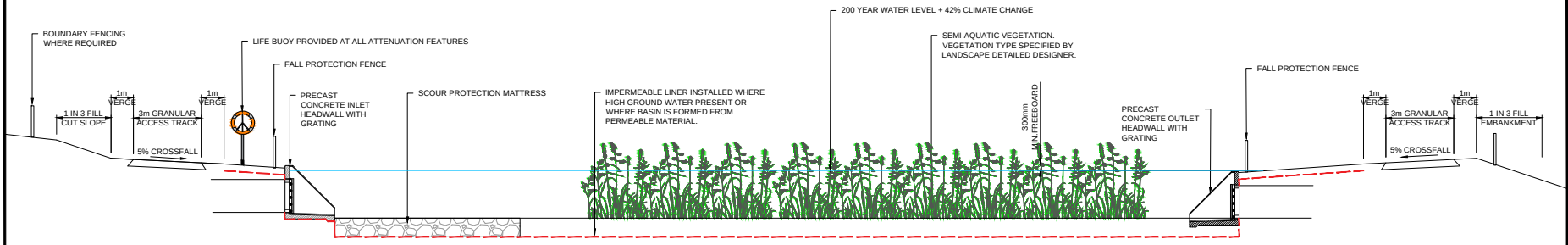
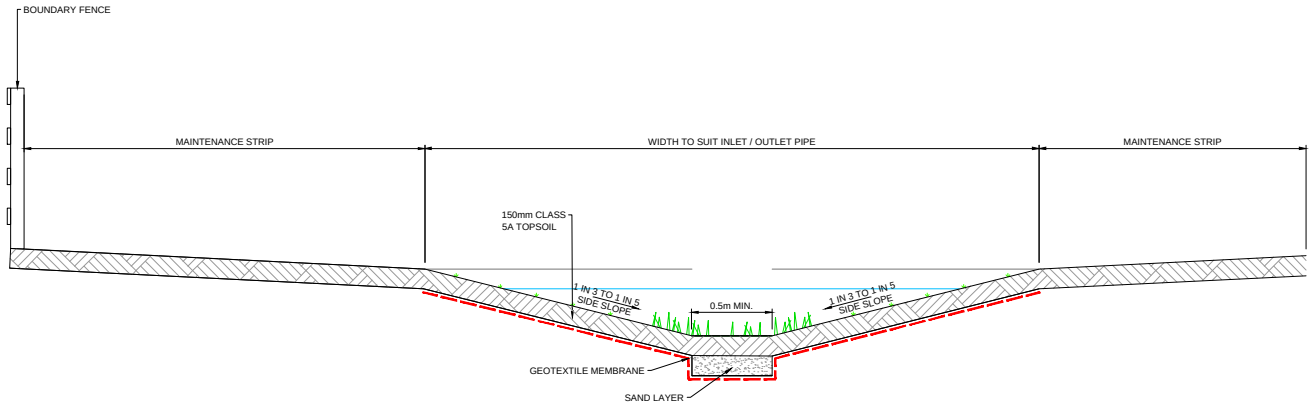
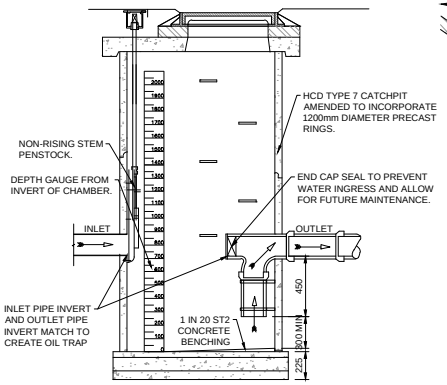


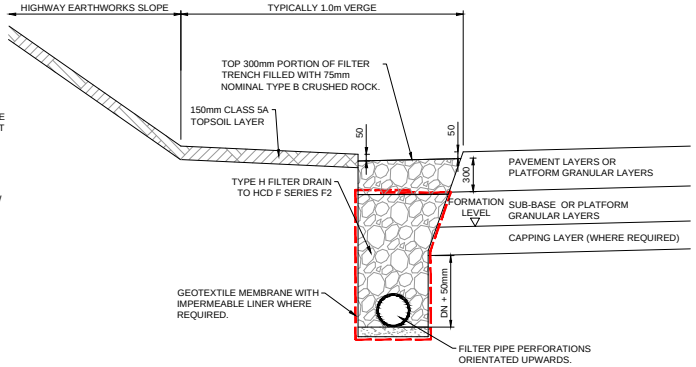
TYPICAL SuDS ATTENUATION AND TREATMENT BASIN
SCALE 1:100



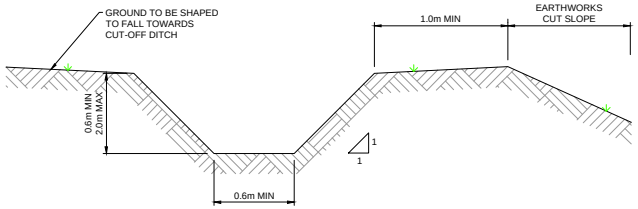
TYPICAL WET SWALE
SCALE 1:20m



TYPICAL POLLUTION CONTROL CHAMBER
SCALE 1:20



TYPICAL FILTER DRAIN
SCALE 1:20



TYPICAL CUT-OFF/PRE-EARTHWORKS DITCH
SCALE 1:20m

NOTES

1. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT PROJECT INFORMATION.
3. ALL DATUM LEVELS ARE IN METRES AND DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
4. ALL SLOPES AND EMBANKMENTS SHOWN ON THIS DRAWING FALL OR RISE AT 1 IN 3 UNLESS OTHERWISE NOTED ON THE SPECIFIC DETAIL.
5. REFER TO DRAWINGS LT459-SWE-XX-XX-D-X-0501 AND LT459-SWE-XX-XX-D-X-0502 FOR THE DRAINAGE LAYOUT.

KEY TO DRAWING

Rev	Date	Amendment Details	Dr'n	Chk'	App'
P04	20/08/2024	FINAL ISSUE	RL	SG	CB
P03	18/04/2024	DESIGN FIX 2C	RL	SG	CB
P02	05/03/2024	DESIGN FIX 2B	RL	SG	CB
P01	15/12/2023	DESIGN FIX A	RL	SG	CB

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SWECO

Client: Scottish & Southern Electricity Networks TRANSMISSION

Project Title: FANELLAN 400kV SWITCHING STATION AND HVDC CONVERTOR STATION

Drawing Title: TYPICAL DRAINAGE DETAILS SHEET 1 OF 1

Purpose Of Issue: PRELIMINARY

Status	Status Description
S5	FOR REVIEW AND ACCEPTANCE

Drawn	Designed	Checked	Approved
RL	RL	SG	CB

Sheet Size	Scale	Sweco Ref	Revision
A1	AS SHOWN	65209842	P04

Drawing Number: LT459-SWE-XX-XX-D-X-0503

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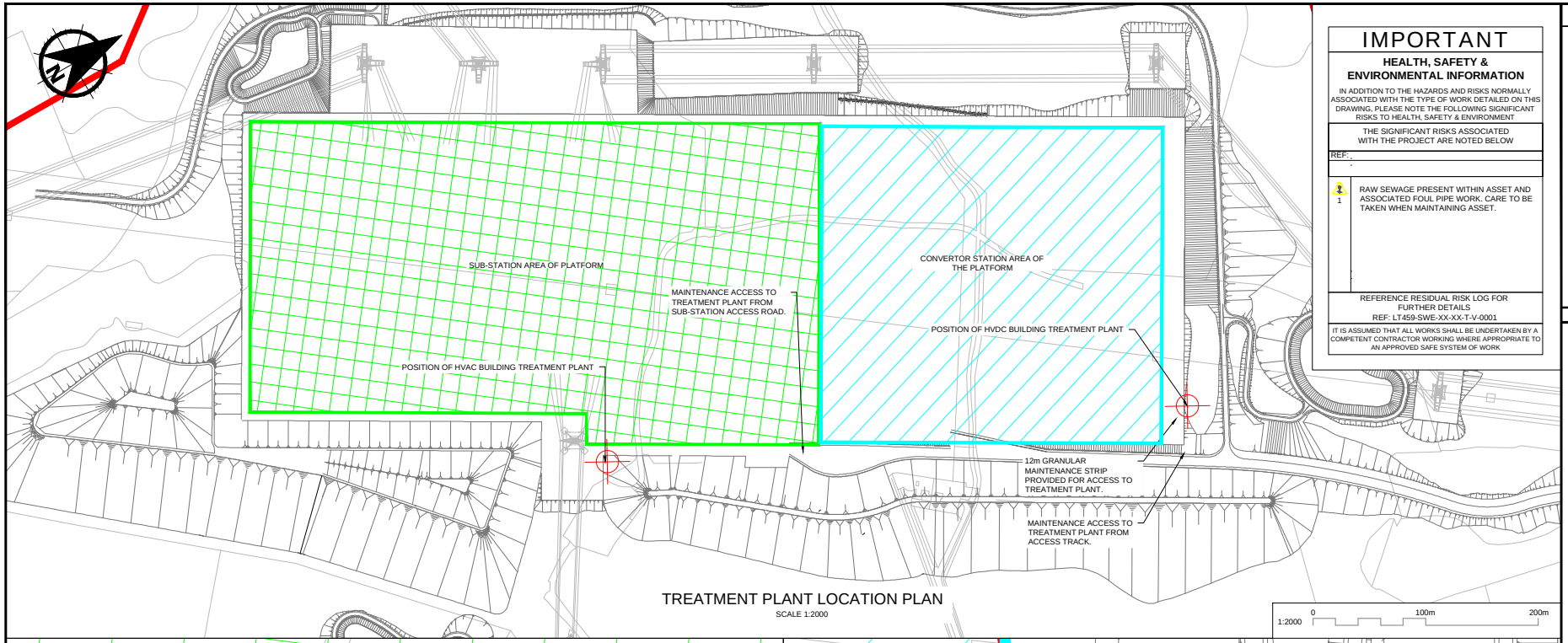


TREATMENT PLANT LOCATION PLAN
SCALE 1:2000

1:2000 0 100m 200m

IMPORTANT

HEALTH, SAFETY & ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS AND RISKS NORMALLY ASSOCIATED WITH THE TYPE OF WORK DETAILED ON THIS DRAWING, PLEASE NOTE THE FOLLOWING SIGNIFICANT RISKS TO HEALTH, SAFETY & ENVIRONMENT

THE SIGNIFICANT RISKS ASSOCIATED WITH THE PROJECT ARE NOTED BELOW

REF:

1 RAW SEWAGE PRESENT WITHIN ASSET AND ASSOCIATED FOUL PIPE WORK. CARE TO BE TAKEN WHEN MAINTAINING ASSET.

REFERENCE RESIDUAL RISK LOG FOR FURTHER DETAILS
REF: LT459-SWE-XX-XX-T-V-0001

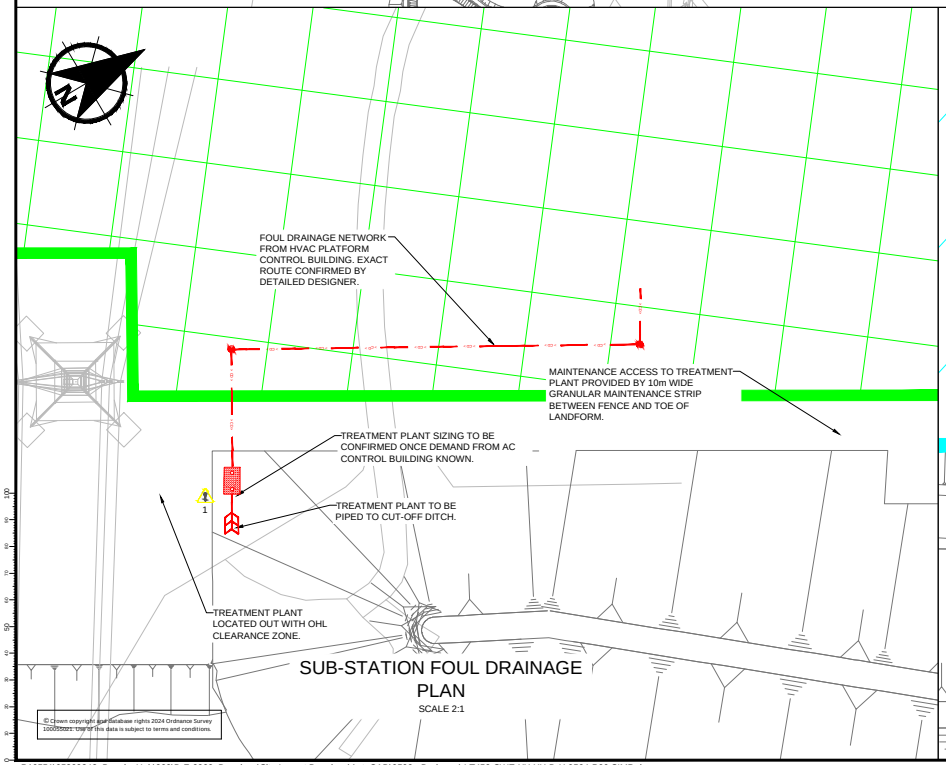
IT IS ASSUMED THAT ALL WORKS SHALL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING WHERE APPROPRIATE TO AN APPROVED SAFE SYSTEM OF WORK

NOTES

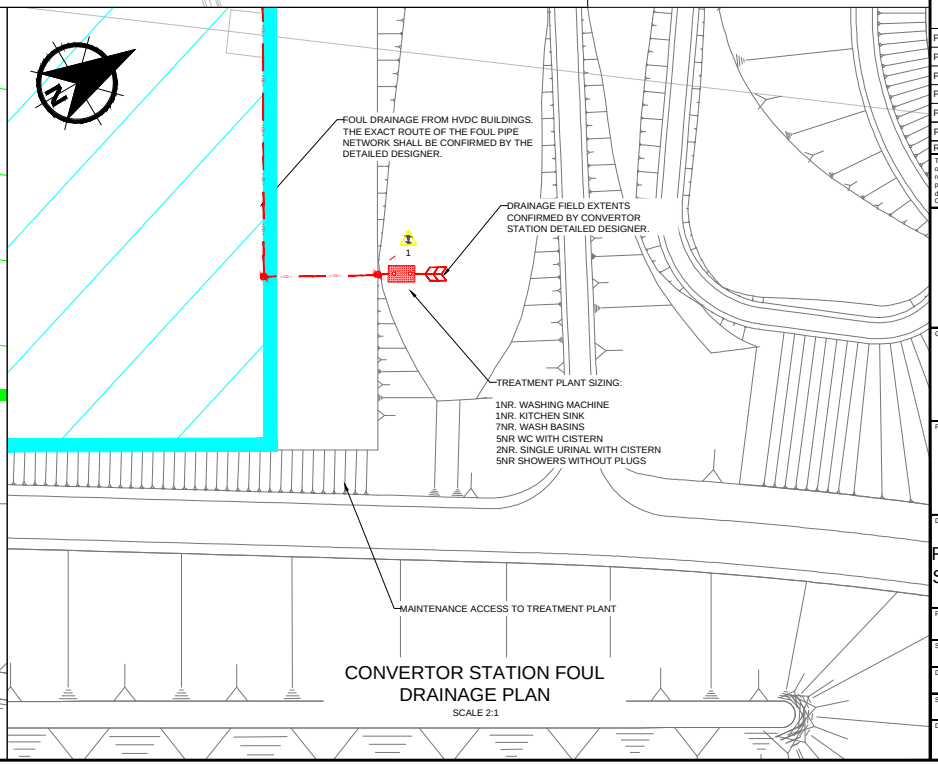
1. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT PROJECT INFORMATION.
3. ALL DATUM LEVELS ARE IN METRES AND DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
4. ALL TREATMENT PLANTS ARE LOCATED A MINIMUM OF 7M FROM ANY BUILDINGS.
4. FOR DETAILS OF THE DRINKING WATER SUPPLY, REFER TO DRAWING LT459-SWE-XX-XX-D-X-0505.
5. ALL TREATMENT PLATS SHALL DISCHARGE VIA AN APPROPRIATELY SIZED HERRINGBONE DRAINAGE FIELD.
6. THE LOCATIONS OF THE PACKAGE TREATMENT PLANTS ARE SHOWN INDICATIVELY AND SUBJECT TO DEVELOPMENT DURING THE DETAILED DESIGN PHASE.

KEY TO DRAWING

- SITE RED LINE BOUNDARY
- TREATMENT PLANT LOCATION
- FOUL CARRIER DRAIN
- FOUL MANHOLE
- TREATMENT PLANT AND HERRINGBONE DRAINAGE FIELD
- CONVERTOR STATION AREA
- SUB-STATION AREA



SUB-STATION FOUL DRAINAGE PLAN
SCALE 2:1



CONVERTOR STATION FOUL DRAINAGE PLAN
SCALE 2:1

Rev	Date	Amendment Details	Dr'n	Chk'	App'
P06	28/01/2025	ACCESS ROADS UPDATED	RL	SG	CB
P05	20/08/2024	FINAL ISSUE	RL	SG	CB
P04	18/06/2024	LAYOUT UPDATED	RL	SG	CB
P03	19/04/2024	DESIGN FIX 2C	RL	SG	CB
P02	05/03/2024	DESIGN FIX 2B	RL	SG	CB
P01	15/12/2023	DESIGN FIX A	RL	SG	CB

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SWECO

Client: Scottish & Southern Electricity Networks TRANSMISSION

Project Title
FANELLAN
400kV SWITCHING STATION AND HVDC CONVERTOR STATION

Drawing Title
FOUL WATER DRAINAGE LAYOUT
SHEET 1 OF 1

Purpose Of Issue: PRELIMINARY

Status	Status Description
S5	FOR REVIEW AND ACCEPTANCE

Drawn	Designed	Checked	Approved
RL	RL	SG	CB

Sheet Size	Scale	Sweco Ref	Revision
A1	As Shown	65209842	P06

Drawing Number: LT459-SWE-XX-XX-D-X-0504

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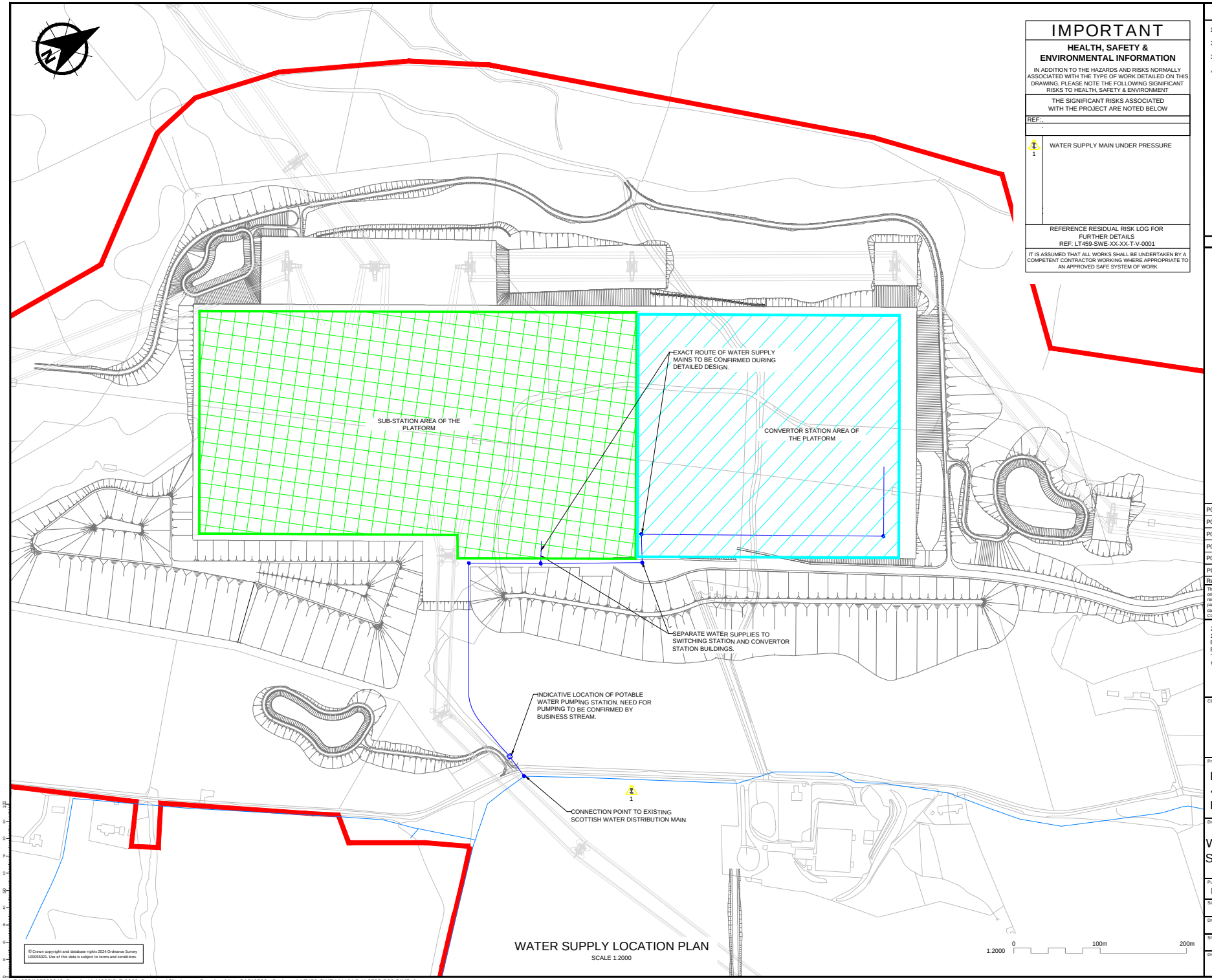

IMPORTANT

HEALTH, SAFETY & ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS AND RISKS NORMALLY ASSOCIATED WITH THE TYPE OF WORK DETAILED ON THIS DRAWING, PLEASE NOTE THE FOLLOWING SIGNIFICANT RISKS TO HEALTH, SAFETY & ENVIRONMENT

THE SIGNIFICANT RISKS ASSOCIATED WITH THE PROJECT ARE NOTED BELOW

REF:-

1 WATER SUPPLY MAIN UNDER PRESSURE

REFERENCE RESIDUAL RISK LOG FOR FURTHER DETAILS
REF: LT459-SWE-XX-XX-T-V-0001

IT IS ASSUMED THAT ALL WORKS SHALL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING WHERE APPROPRIATE TO AN APPROVED SAFE SYSTEM OF WORK

NOTES

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4. FOR DETAILS OF THE FOUL WATER, REFER TO DRAWING LT459-SWE-XX-XX-D-X-0504.

KEY TO DRAWING

- SITE RED LINE BOUNDARY
- NEW SCOTTISH WATER SUPPLY MAIN
- EXISTING SCOTTISH WATER DISTRIBUTION MAIN
- CONNECTION POINT / CHAMBER
- INDICATIVE PUMPING STATION
- CONVERTOR STATION AREA
- SUB-STATION AREA

Rev	Date	Amendment Details	Dr'n	Chk'	App'
P06	28/01/2025	ACCESS ROADS UPDATED	RL	SG	CB
P05	20/08/2024	FINAL ISSUE	RL	SG	CB
P04	18/06/2024	LAYOUT UPDATED	RL	SG	CB
P03	19/04/2024	DESIGN FIX 2C	RL	SG	CB
P02	05/03/2024	DESIGN FIX 2B	RL	SG	CB
P01	15/12/2023	DESIGN FIX A	RL	SG	CB

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Web: www.sweco.co.uk

SWECO

Client: Scottish & Southern Electricity Networks TRANSMISSION

Project Title: FANELLAN 400kV SWITCHING STATION AND HVDC CONVERTOR STATION

Drawing Title: WATER SUPPLY LAYOUT SHEET 1 OF 1

Purpose Of Issue: PRELIMINARY

Status	Status Description
S5	FOR REVIEW AND ACCEPTANCE

Drawn	Designed	Checked	Approved
RL	RL	SG	CB

Sheet Size	Scale	Sweco Ref	Revision
A1	1:2000	65209842	P06

Drawing Number: LT459-SWE-XX-XX-D-X-0505

WATER SUPPLY LOCATION PLAN
SCALE 1:2000

1:2000 0 100m 200m

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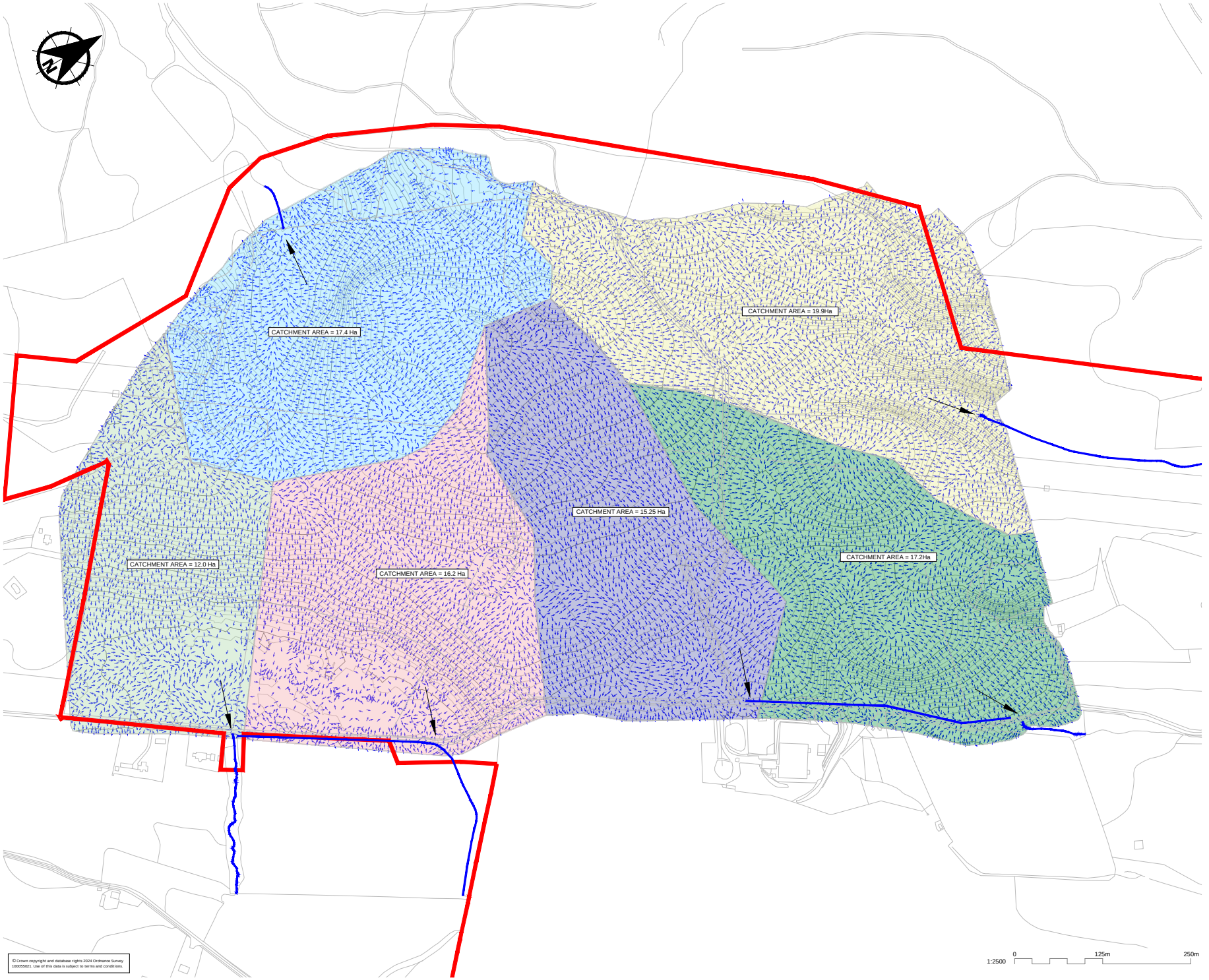

NOTES

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2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT PROJECT INFORMATION.
3. ALL DATUM LEVELS ARE IN METRES AND DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.

KEY TO DRAWING

- SITE RED LINE BOUNDARY
- EXISTING DRAINAGE FEATURE OR WATERCOURSE
- CATCHMENT DRAIN POINT

Rev	Date	Amendment Details	Dr'n	Chk'	App'
P03	20/08/2024	FINAL ISSUE	RL	SG	CB
P02	19/04/2024	DESIGN FIX 2C	MA	RL	CB
P01	15/12/2023	DESIGN FIX A	MA	RL	CB

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SWECO

Client: Scottish & Southern Electricity Networks TRANSMISSION

Project Title: FANELLAN 400kV SWITCHING STATION AND HVDC CONVERTOR STATION

Drawing Title: EXISTING SURFACE WATER CATCHMENT SHEET 1 OF 1

Purpose Of Issue: PRELIMINARY

Status	Status Description
S5	FOR REVIEW AND ACCEPTANCE

Drawn	Designed	Checked	Approved
MA	RL	RL	CB

Sheet Size	Scale	Sweco Ref	Revision
A1	1:2500	65209842	P03

Drawing Number: LT459-SWE-XX-XX-D-X-0506

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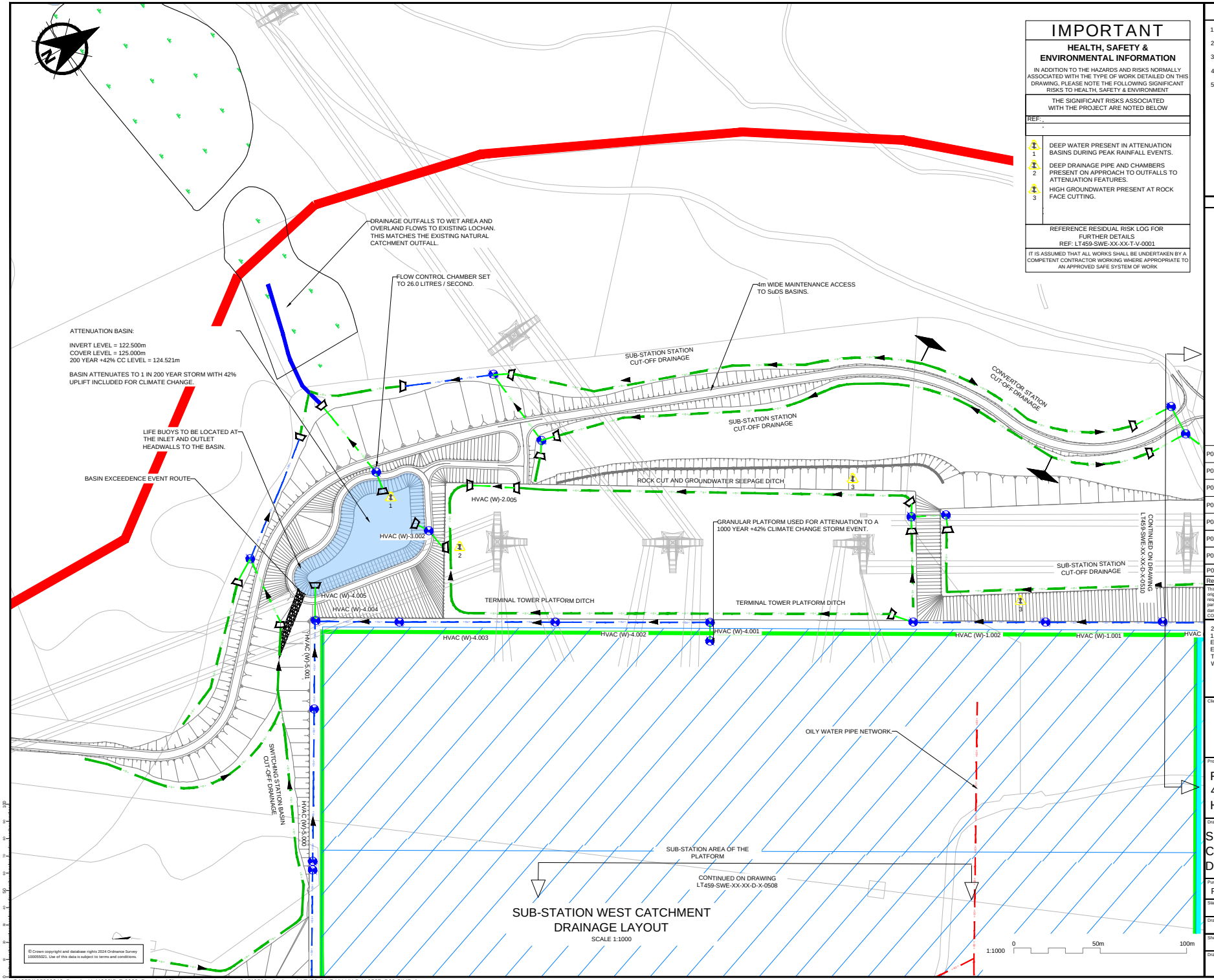

IMPORTANT

HEALTH, SAFETY & ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS AND RISKS NORMALLY ASSOCIATED WITH THE TYPE OF WORK DETAILED ON THIS DRAWING, PLEASE NOTE THE FOLLOWING SIGNIFICANT RISKS TO HEALTH, SAFETY & ENVIRONMENT

THE SIGNIFICANT RISKS ASSOCIATED WITH THE PROJECT ARE NOTED BELOW

REF: -

1. DEEP WATER PRESENT IN ATTENUATION BASINS DURING PEAK RAINFALL EVENTS.
2. DEEP DRAINAGE PIPE AND CHAMBERS PRESENT ON APPROACH TO OUTFALLS TO ATTENUATION FEATURES.
3. HIGH GROUNDWATER PRESENT AT ROCK FACE CUTTING.

REFERENCE RESIDUAL RISK LOG FOR FURTHER DETAILS
REF: LT459-SWE-XX-XX-T-V-0001

IT IS ASSUMED THAT ALL WORKS SHALL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING WHERE APPROPRIATE TO AN APPROVED SAFE SYSTEM OF WORK

NOTES

1. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT PROJECT INFORMATION.
3. ALL DATUM LEVELS ARE IN METRES AND DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
4. NOT ALL PIPE REFERENCES ARE SHOWN ON THE LAYOUT PLAN FOR CLARITY.
5. REFER TO DRAWINGS LT459-SWE-XX-XX-D-X-0508, LT459-SWE-XX-XX-D-X-0509 AND LT459-SWE-XX-XX-D-X-0510 FOR THE DRAINAGE LAYOUT OF THE OTHER AREAS OF THE SUB-STATION AND SURROUNDING LAND.

KEY TO DRAWING

- SITE RED LINE BOUNDARY
- FILTER DRAIN
- CARRIER DRAIN
- DRAINAGE SWALE
- CUT-OFF DITCH
- ROUTE OF EXISTING DRAINAGE FEATURE
- OILY WATER CARRIER DRAIN
- RAINWATER HARVESTING WATER CARRIER DRAIN
- DRAINAGE CHAMBER
- HEADWALL
- TRAPPED GULLY
- FLOW DIRECTION ARROW
- GRANULAR PLATFORM AREA USED FOR ATTENUATION
- HVAC (W) - 1.000 SUB-STATION WEST CATCHMENT PIPE REFERENCE
- BREAK POINT IN DRAINAGE NETWORK
- ATTENUATION EXCEEDANCE ROUTE
- CONVERTOR STATION AREA
- SUB-STATION AREA

Rev	Date	Amendment Details	Dr'n	Chk'	App'
P08	28/01/2025	ACCESS TRACK ADDED	RL	SG	CB
P07	15/08/2024	FINAL LAYOUT	RL	SG	CB
P06	18/06/2024	LAYOUT UPDATED	RL	SG	CB
P05	19/04/2024	DESIGN FIX 2C	RL	SG	CB
P04	18/03/2024	OUTFALL RATE AMENDED	RL	SG	CB
P03	06/03/2024	DESIGN FIX 2B	RL	SG	CB
P02	29/01/2023	EXCEEDANCE ROUTES ADDED & OUTFALL UPDATED	RL	SG	CB
P01	15/12/2023	DESIGN FIX A	RL	SG	CB

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SWECO

Client: Scottish & Southern Electricity Networks TRANSMISSION

Project Title: FANELLAN 400kV SWITCHING STATION AND HVDC CONVERTOR STATION

Drawing Title: SUB-STATION WESTERN CATCHMENT SURFACE WATER DRAINAGE LAYOUT

Purpose Of Issue: PRELIMINARY

Status	Status Description
S5	FOR REVIEW AND ACCEPTANCE

Drawn	Designed	Checked	Approved
RL	RL	SG	CB

Sheet Size	Scale	Sweco Ref	Revision
A1	1:1000	65209842	P08

Drawing Number: LT459-SWE-XX-XX-D-X-0507

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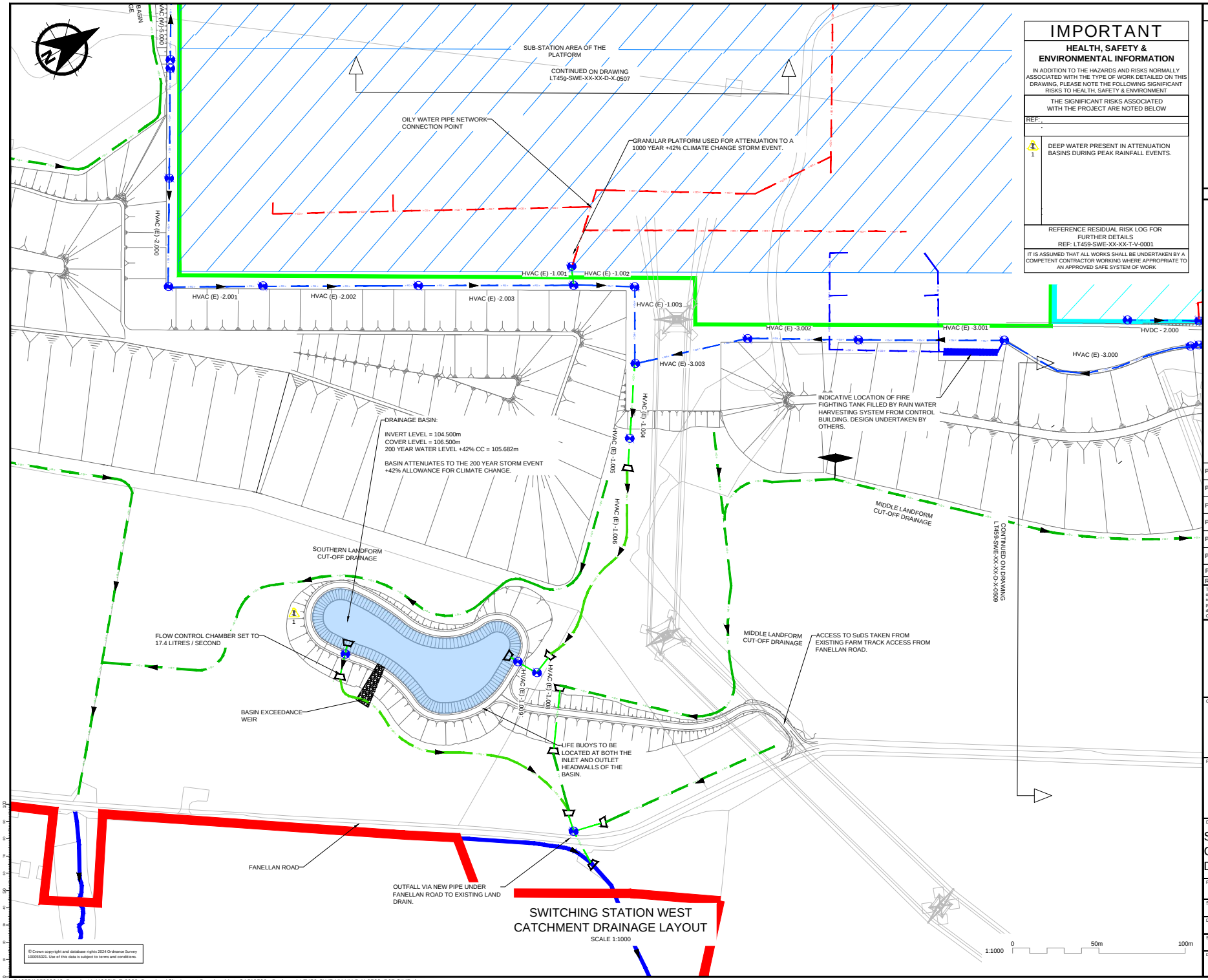

IMPORTANT

HEALTH, SAFETY & ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS AND RISKS NORMALLY ASSOCIATED WITH THE TYPE OF WORK DETAILED ON THIS DRAWING, PLEASE NOTE THE FOLLOWING SIGNIFICANT RISKS TO HEALTH, SAFETY & ENVIRONMENT

THE SIGNIFICANT RISKS ASSOCIATED WITH THE PROJECT ARE NOTED BELOW

REF:

1. DEEP WATER PRESENT IN ATTENUATION BASINS DURING PEAK RAINFALL EVENTS.

REFERENCE RESIDUAL RISK LOG FOR FURTHER DETAILS
REF: LT459-SWE-XX-XX-T-V-0001

IT IS ASSUMED THAT ALL WORKS SHALL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING WHERE APPROPRIATE TO AN APPROVED SAFE SYSTEM OF WORK

NOTES

1. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT PROJECT INFORMATION.
3. ALL DATUM LEVELS ARE IN METRES AND DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
4. NOT ALL PIPE REFERENCES ARE SHOWN ON THE LAYOUT PLAN FOR CLARITY.
5. REFER TO DRAWINGS LT459-SWE-XX-XX-D-X-0507, LT459-SWE-XX-XX-D-X-0509 AND LT459-SWE-XX-XX-D-X-0510 FOR THE DRAINAGE LAYOUT OF THE OTHER AREAS OF THE SUB-STATION AND SURROUNDING LAND.

KEY TO DRAWING

- SITE RED LINE BOUNDARY
- FILTER DRAIN
- CARRIER DRAIN
- DRAINAGE SWALE
- CUT-OFF DITCH
- ROUTE OF EXISTING DRAINAGE FEATURE
- OILY WATER CARRIER DRAIN
- RAINWATER HARVESTING WATER CARRIER DRAIN
- DRAINAGE CHAMBER
- HEADWALL
- TRAPPED GULLY
- FLOW DIRECTION ARROW
- GRANULAR PLATFORM AREA USED FOR ATTENUATION
- HVAC (E) - 1.000 — SUB-STATION WEST CATCHMENT PIPE REFERENCE
- BREAK POINT IN DRAINAGE NETWORK
- ATTENUATION EXCEEDANCE ROUTE
- CONVERTOR STATION AREA
- SUB-STATION AREA

Rev	Date	Amendment Details	Dr'n	Chk'	App'
P07	10/02/2025	TOWER PLATFORM REMOVED	RL	SG	CB
P06	15/08/2024	FINAL LAYOUT	RL	SG	CB
P05	18/06/2024	LAYOUT UPDATED	RL	SG	CB
P04	19/04/2024	DESIGN FIX 2C	RL	SG	CB
P03	06/03/2024	DESIGN FIX 2B	RL	SG	CB
P02	29/01/2023	EXCEEDANCE ROUTES ADDED	RL	SG	CB
P01	15/12/2023	DESIGN FIX A	RL	SG	CB

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SWECO

Client: Scottish & Southern Electricity Networks TRANSMISSION

Project Title: FANELLAN 400kV SWITCHING STATION AND HVDC CONVERTOR STATION

Drawing Title: SUB-STATION EASTERN CATCHMENT SURFACE WATER DRAINAGE LAYOUT

Purpose Of Issue: PRELIMINARY

Status	Status Description
S5	FOR REVIEW AND ACCEPTANCE

Drawn	Designed	Checked	Approved
RL	RL	SG	CB

Sheet Size	Scale	Sweco Ref	Revision
A1	1:1000	65209842	P07

Drawing Number: LT459-SWE-XX-XX-D-X-0508

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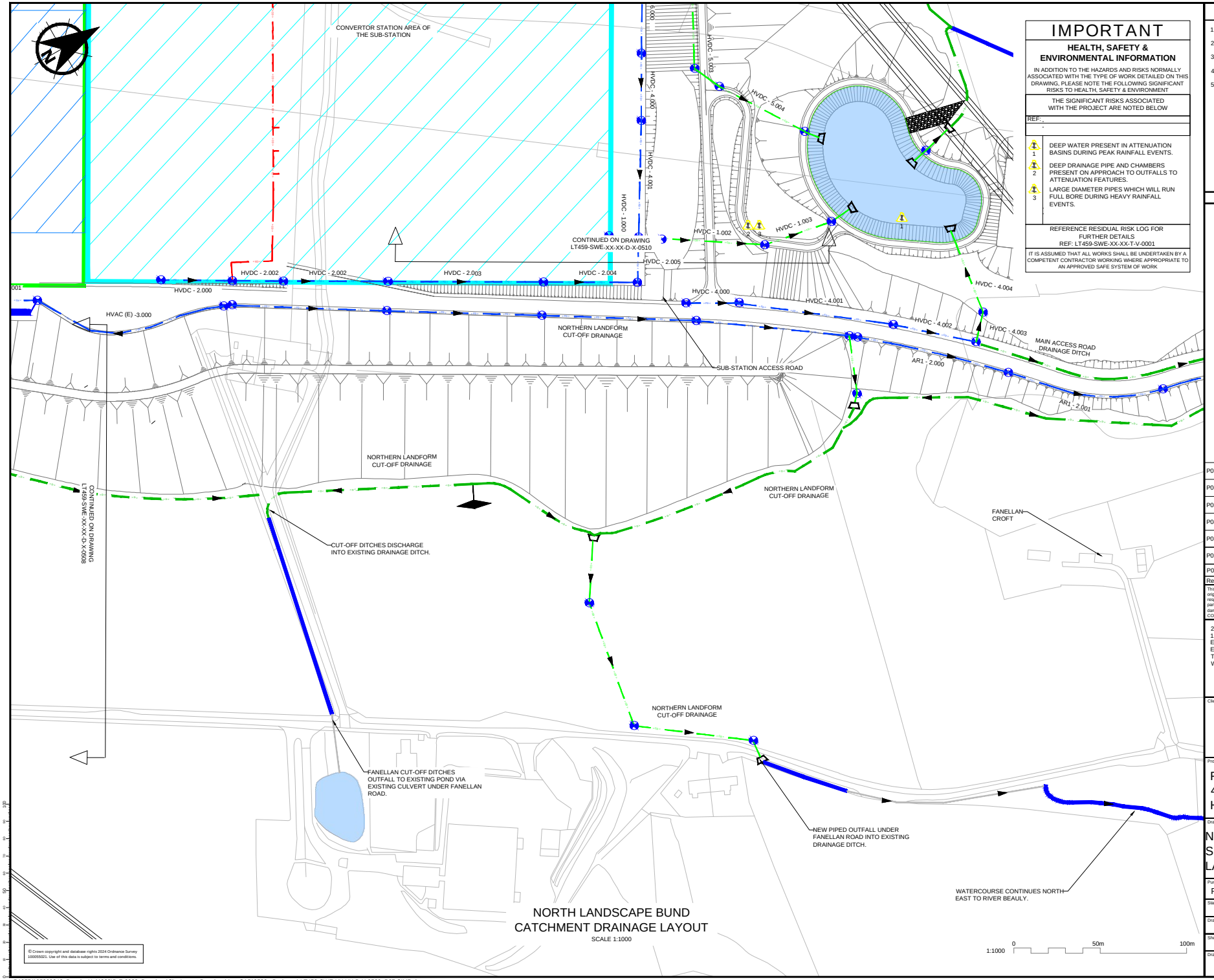

IMPORTANT

HEALTH, SAFETY & ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS AND RISKS NORMALLY ASSOCIATED WITH THE TYPE OF WORK DETAILED ON THIS DRAWING, PLEASE NOTE THE FOLLOWING SIGNIFICANT RISKS TO HEALTH, SAFETY & ENVIRONMENT

THE SIGNIFICANT RISKS ASSOCIATED WITH THE PROJECT ARE NOTED BELOW

REF:

1. DEEP WATER PRESENT IN ATTENUATION BASINS DURING PEAK RAINFALL EVENTS.
2. DEEP DRAINAGE PIPE AND CHAMBERS PRESENT ON APPROACH TO OUTFALLS TO ATTENUATION FEATURES.
3. LARGE DIAMETER PIPES WHICH WILL RUN FULL BORE DURING HEAVY RAINFALL EVENTS.

REFERENCE RESIDUAL RISK LOG FOR FURTHER DETAILS
REF: LT459-SWE-XX-XX-T-V-0001

IT IS ASSUMED THAT ALL WORKS SHALL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING WHERE APPROPRIATE TO AN APPROVED SAFE SYSTEM OF WORK

NOTES

1. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT PROJECT INFORMATION.
3. ALL DATUM LEVELS ARE IN METRES AND DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
4. NOT ALL PIPE REFERENCES ARE SHOWN ON THE LAYOUT PLAN FOR CLARITY.
5. REFER TO DRAWINGS LT459-SWE-XX-XX-D-X-0507, LT459-SWE-XX-XX-D-X-0508 AND LT459-SWE-XX-XX-D-X-0510 FOR THE DRAINAGE LAYOUT OF THE OTHER AREAS OF THE SUB-STATION AND SURROUNDING LAND.

KEY TO DRAWING

- SITE RED LINE BOUNDARY
- FILTER DRAIN
- CARRIER DRAIN
- DRAINAGE SWALE
- CUT-OFF DITCH
- ROUTE OF EXISTING DRAINAGE FEATURE
- OILY WATER CARRIER DRAIN
- RAINWATER HARVESTING WATER CARRIER DRAIN
- DRAINAGE CHAMBER
- HEADWALL
- TRAPPED GULLY
- FLOW DIRECTION ARROW
- GRANULAR PLATFORM AREA USED FOR ATTENUATION
- AR - 1.000 — ACCESS ROAD CATCHMENT PIPE REFERENCE
- HVDC - 1.000 — CONVERTOR STATION CATCHMENT PIPE REFERENCE
- BREAK POINT IN DRAINAGE NETWORK
- ATTENUATION EXCEEDANCE ROUTE
- CONVERTOR STATION AREA
- SUB-STATION AREA

Rev	Date	Amendment Details	Dr'n	Chk'	App'
P07	28/01/2025	ACCESS ROAD UPDATD	RL	SG	CB
P06	20/08/2024	FINAL LAYOUT	RL	SG	CB
P05	18/06/2024	LAYOUT UPDATED	RL	SG	CB
P04	19/04/2024	DESIGN FIX 2C	RL	SG	CB
P03	06/03/2024	DESIGN FIX 2B	RL	SG	CB
P02	29/01/2023	EXCEEDANCE ROUTES ADDED	RL	SG	CB
P01	15/12/2023	DESIGN FIX A	RL	SG	CB

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SWECO

Client: Scottish & Southern Electricity Networks TRANSMISSION

Project Title: FANELLAN 400kV SWITCHING STATION AND HVDC CONVERTOR STATION

Drawing Title: NORTH LANDSCAPE BUND SURFACE WATER DRAINAGE LAYOUT

Purpose Of Issue: PRELIMINARY

Status	Status Description
S5	FOR REVIEW AND ACCEPTANCE

Drawn	Designed	Checked	Approved
RL	RL	SG	CB

Sheet Size	Scale	Sweco Ref	Revision
A1	1:1000	65209842	P07

Drawing Number: LT459-SWE-XX-XX-D-X-0509

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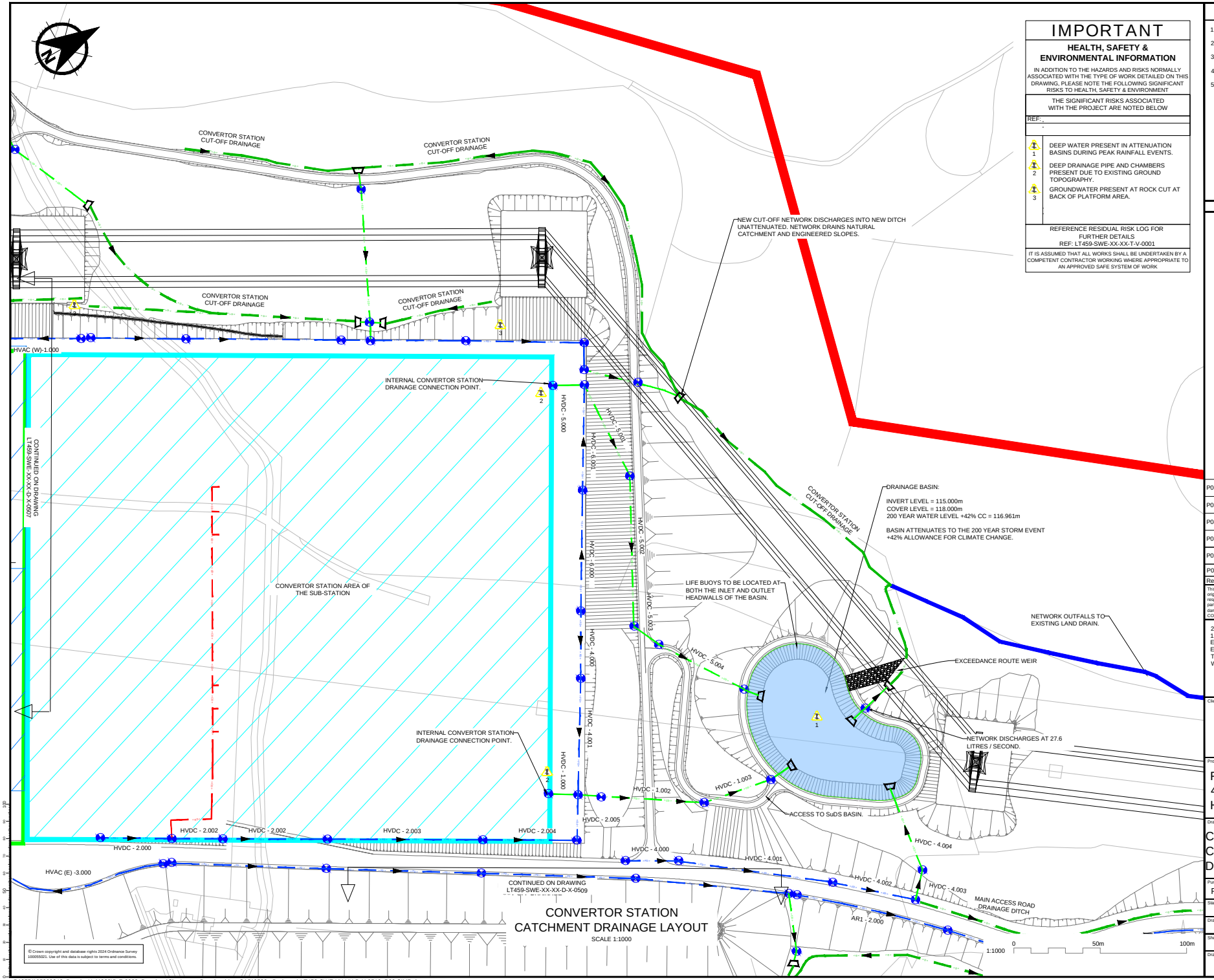

IMPORTANT

HEALTH, SAFETY & ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS AND RISKS NORMALLY ASSOCIATED WITH THE TYPE OF WORK DETAILED ON THIS DRAWING, PLEASE NOTE THE FOLLOWING SIGNIFICANT RISKS TO HEALTH, SAFETY & ENVIRONMENT

THE SIGNIFICANT RISKS ASSOCIATED WITH THE PROJECT ARE NOTED BELOW

REF: -

1. DEEP WATER PRESENT IN ATTENUATION BASINS DURING PEAK RAINFALL EVENTS.
2. DEEP DRAINAGE PIPE AND CHAMBERS PRESENT DUE TO EXISTING GROUND TOPOGRAPHY.
3. GROUNDWATER PRESENT AT ROCK CUT AT BACK OF PLATFORM AREA.

REFERENCE RESIDUAL RISK LOG FOR FURTHER DETAILS
REF: LT459-SWE-XX-XX-T-V-0001

IT IS ASSUMED THAT ALL WORKS SHALL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING WHERE APPROPRIATE TO AN APPROVED SAFE SYSTEM OF WORK

NOTES

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4. NOT ALL PIPE REFERENCES ARE SHOWN ON THE LAYOUT PLAN FOR CLARITY.
5. REFER TO DRAWINGS LT459-SWE-XX-XX-D-X-0507, LT459-SWE-XX-XX-D-X-0508 AND LT459-SWE-XX-XX-D-X-0509 FOR THE DRAINAGE LAYOUT OF THE OTHER AREAS OF THE SUB-STATION AND SURROUNDING LAND.

KEY TO DRAWING

- SITE RED LINE BOUNDARY
- FILTER DRAIN
- CARRIER DRAIN
- DRAINAGE SWALE
- CUT-OFF DITCH
- ROUTE OF EXISTING DRAINAGE FEATURE
- OILY WATER CARRIER DRAIN
- RAINWATER HARVESTING WATER CARRIER DRAIN
- DRAINAGE CHAMBER
- HEADWALL
- TRAPPED GULLY
- FLOW DIRECTION ARROW
- GRANULAR PLATFORM AREA USED FOR ATTENUATION
- HVDC - 1.000 CONVERTOR STATION CATCHMENT PIPE REFERENCE
- BREAK POINT IN DRAINAGE NETWORK
- ATTENUATION EXCEEDANCE ROUTE
- CONVERTOR STATION AREA
- SUB-STATION AREA

Rev	Date	Amendment Details	Dr'n	Chk'	App'
P06	28/01/2025	ACCESS ROAD UPDATED	RL	SG	CB
P05	20/08/2024	FINAL LAYOUT	RL	SG	CB
P04	19/04/2024	DESIGN FIX 2C	RL	SG	CB
P03	06/03/2024	DESIGN FIX 2B	RL	SG	CB
P02	29/01/2023	EXCEEDANCE ROUTES ADDED	RL	SG	CB
P01	15/12/2023	DESIGN FIX A	RL	SG	CB

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SWECO

Client: Scottish & Southern Electricity Networks TRANSMISSION

Project Title: FANELLAN 400kV SWITCHING STATION AND HVDC CONVERTOR STATION

Drawing Title: CONVERTOR STATION CATCHMENT SURFACE WATER DRAINAGE LAYOUT

Purpose Of Issue: PRELIMINARY

Status	Status Description
S5	FOR REVIEW AND ACCEPTANCE

Drawn	Designed	Checked	Approved
RL	RL	SG	CB

Sheet Size	Scale	Sweco Ref	Revision
A1	1:1000	65209842	P06

Drawing Number: LT459-SWE-XX-XX-D-X-0510

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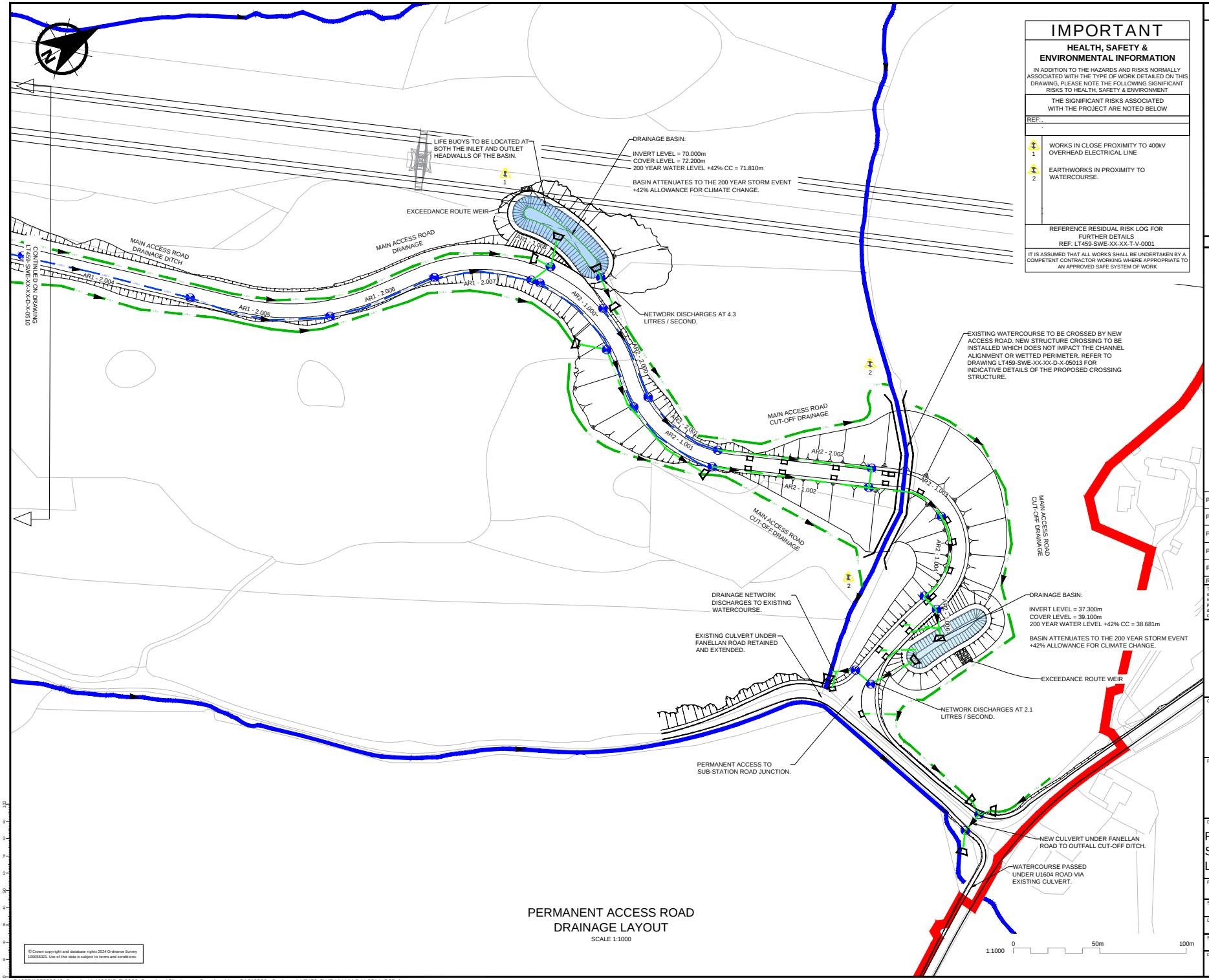

PERMANENT ACCESS ROAD
DRAINAGE LAYOUT
SCALE 1:1000

IMPORTANT

HEALTH, SAFETY & ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS AND RISKS NORMALLY ASSOCIATED WITH THE TYPE OF WORK DETAILED ON THIS DRAWING, PLEASE NOTE THE FOLLOWING SIGNIFICANT RISKS TO HEALTH, SAFETY & ENVIRONMENT

THE SIGNIFICANT RISKS ASSOCIATED WITH THE PROJECT ARE NOTED BELOW

REF:-

1. WORKS IN CLOSE PROXIMITY TO 400kV OVERHEAD ELECTRICAL LINE
2. EARTHWORKS IN PROXIMITY TO WATERCOURSE.

REFERENCE RESIDUAL RISK LOG FOR FURTHER DETAILS
REF: LT459-SWE-XX-XX-T-V-0001

IT IS ASSUMED THAT ALL WORKS SHALL BE UNDERTAKEN BY A COMPETENT CONTRACTOR WORKING WHERE APPROPRIATE TO AN APPROVED SAFE SYSTEM OF WORK

NOTES

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4. NOT ALL PIPE REFERENCES ARE SHOWN ON THE LAYOUT PLAN FOR CLARITY.
5. REFER TO DRAWINGS LT459-SWE-XX-XX-D-X-0507, LT459-SWE-XX-XX-D-X-0508, LT459-SWE-XX-XX-D-X-0509 AND LT459-SWE-XX-XX-D-X-0510 FOR THE DRAINAGE LAYOUT OF THE OTHER AREAS OF THE SUB-STATION AND SURROUNDING LAND.

KEY TO DRAWING

- SITE RED LINE BOUNDARY
- FILTER DRAIN
- CARRIER DRAIN
- DRAINAGE SWALE
- CUT-OFF DITCH
- ROUTE OF EXISTING DRAINAGE FEATURE
- DRAINAGE CHAMBER
- HEADWALL
- TRAPPED GULLY
- FLOW DIRECTION ARROW
- GRANULAR PLATFORM AREA USED FOR ATTENUATION
- BREAK POINT IN DRAINAGE NETWORK
- ATTENUATION EXCEEDANCE ROUTE

Rev	Date	Amendment Details	Dr'n	Chk'	App'
P05	28/01/2025	ACCESS ROAD UPDATED	RL	SG	CB
P04	20/08/2024	FINAL LAYOUT	RL	SG	CB
P03	18/06/2024	LAYOUT UPDATED	RL	SG	CB
P02	19/04/2024	DESIGN FIX 2C	RL	SG	CB
P01	06/03/2024	DESIGN FIX 2B	RL	SG	CB

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SWECO

Client: Scottish & Southern Electricity Networks TRANSMISSION

Project Title
FANELLAN
400kV SWITCHING STATION AND HVDC CONVERTOR STATION

Drawing Title
PERMANENT ACCESS ROAD SURFACE WATER DRAINAGE LAYOUT

Purpose Of Issue			
PRELIMINARY			
Status: S5	Status Description: FOR REVIEW AND ACCEPTANCE		
Drawn: RL	Designed: RL	Checked: SG	Approved: CB
Sheet Size: A1	Scale: 1:1000	Sweco Ref: 65209842	Revision: P05

Drawing Number
LT459-SWE-XX-XX-D-X-0511

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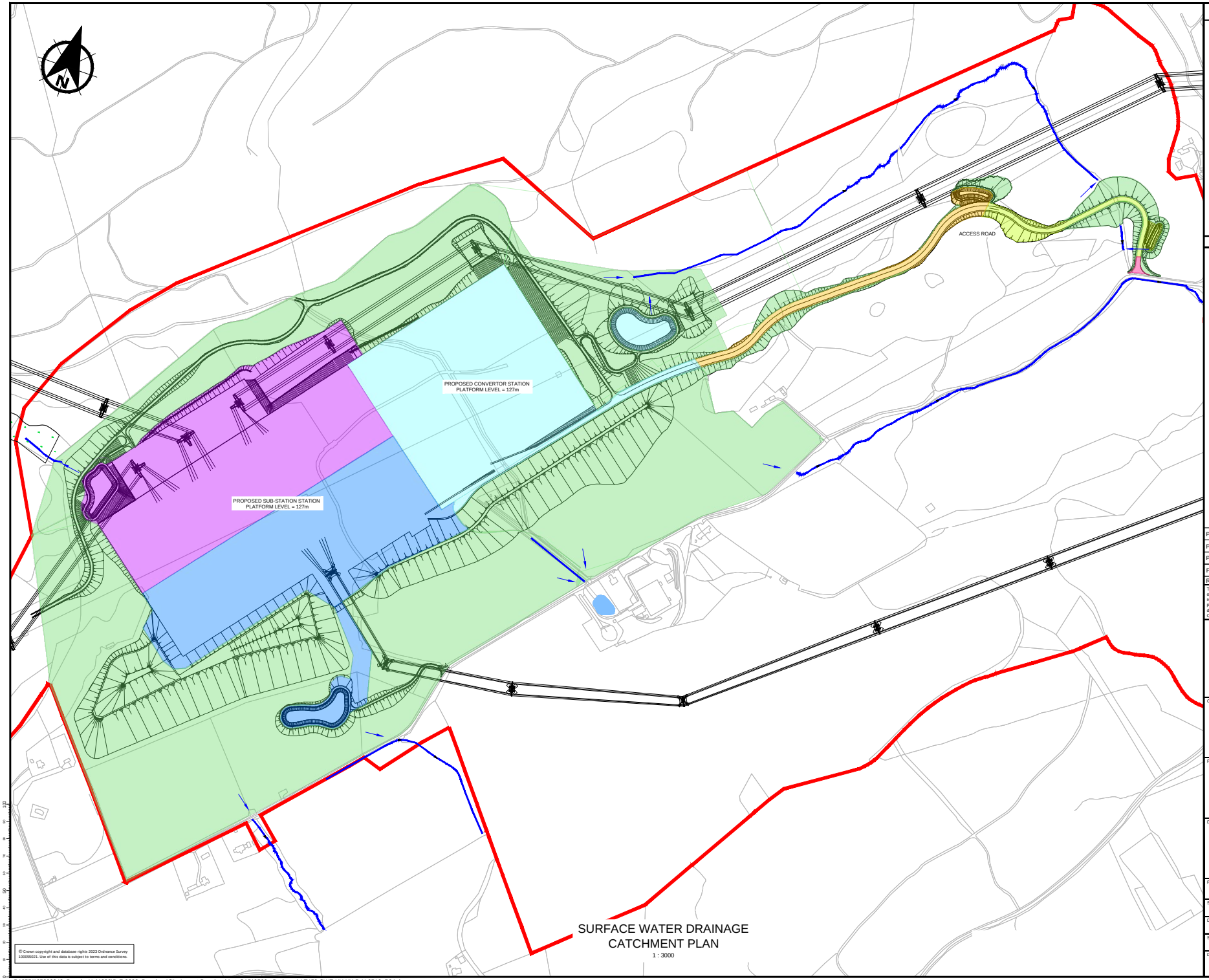

SURFACE WATER DRAINAGE
CATCHMENT PLAN
1 : 3000

NOTES

1. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT PROJECT INFORMATION.
3. ALL DATUM LEVELS ARE IN METRES AND DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.

KEY TO DRAWING

- PLANNING BOUNDARY AREA = 223 Ha
- HVAC WEST CATCHMENT AREA = 10.679 Ha
- HVAC EAST CATCHMENT AREA = 9.682 Ha
- HVDC CATCHMENT AREA = 7.898 Ha
- MAIN ACCESS ROAD CATCHMENT AREA = 1.100 Ha
- MAIN ACCESS ROAD JUNCTION CATCHMENT AREA = 0.500 Ha
- IMPERMEABLE UNATTENUATED CATCHMNET AREA = 0.032HA
- GREENFIELD AND PERMEABLE CATCHMENT
- SURFACE WATERCOURSE
- DRAINAGE OUTFALL

Rev	Date	Amendment Details	Dr'n	Chk'	App'
P04	28/01/2025	CATCHMENTS AMENDED	RL	SG	CB
P03	20/08/2024	FINAL LAYOUT	RL	SG	CB
P02	18/06/2024	LAYOUT UPDATED	RL	RL	CB
P01	22/05/2024	FOR COMMENT	RL	RL	CB

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SWECO

Client: Scottish & Southern Electricity Networks TRANSMISSION

Project Title
FANELLAN
400kV SWITCHING STATION AND
HVDC CONVERTOR STATION

Drawing Title
PROPOSED SURFACE WATER
CATCHMENT PLAN
SHEET 1 OF 1

Purpose Of Issue: PRELIMINARY

Status	Status Description
S5	FOR REVIEW AND ACCEPTANCE

Drawn	Designed	Checked	Approved
MA	RL	RL	CB

Sheet Size	Scale	Sweco Ref	Revision
A1	1:3000	65209842	P04

Drawing Number: LT459-SWE-XX-XX-D-X-0512

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