336-003-RP02

Drainage Impact Assessment

Proposed BESS – Spittal, Scotland

DOCUMENT STATUS	DATE	BY	CHECKED	APPROVED
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Contents

1 Introduction

Haydn Evans Consulting Ltd (HEC) has been commissioned by Field (hereafter referred to as the Client) to carry out a Drainage Impact Assessment to support a planning application for the construction and operation of a 300 megawatts (MW) battery energy storage system (BESS) with associated infrastructure, access and ancillary works on land adjacent to Spittal Converter Station.

1.1 Site Proposal

The proposed development has a total development footprint of approximately 9.51 hectares (ha) across the 48.6 ha site.

The Proposed Development principally comprises a battery energy storage system (BESS) with a capacity of up to 300 megawatts (MW) which will charge and discharge electricity from the adjacent Spittal 275 kV substation. It includes:

- Battery storage units arranged into rows;
- Medium-voltage (MV) skids and ancillary low-voltage (LV) equipment;
- High-voltage (HV) grid transformers;
- Air insulated switchgear;
- A substation building comprising welfare facilities, a switch room and control room;
- An underground 275 kV grid connection cable;
- Site-wide supporting infrastructure including cabling, access tracks, fencing and an attenuation basin; and
- Landscaping measures including earth bunds and biodiversity enhancements.

Whilst the exact specifications are subject to detailed design, the principal components described form the basis of the planning application to allow environmental assessments and mitigation to be appropriately scoped.

2 Location and Existing Conditions

2.1 Site Location

The site is located approximately 273 metres (m) to the north-west of the entrance into Spittal, centred on approximate Ordnance Survey (OS) grid reference 315694,955029 (see red line on Figure 1).

Figure 1: Site location map

The site is generally surrounded by greenfield land. The A9, Halkirk Road bounds the site to the east and The Burn of Achanarras bounds the site to the west, flowing in a northerly direction. Spittal Substation is located in the north of the proposed site boundary.

The existing site entrance is off the A9, approximately 672m south-east of the main site area.

2.2 Existing Topography

A topographical survey has been produced for the site (see Appendix A). The survey shows ground levels to generally fall from the east, towards the north-west. Ground levels in the east (adjacent to the A9) are circa 113 metres Above Ordnance Datum (mAOD), falling to circa 85 metres (mAOD) in the north-west.

The survey shows vegetation on the western perimeter of the site.

2.3 Existing Sewer Assets

Scottish Water (SW) sewer records for the site have been obtained (see Appendix B). The records show no foul or surface water sewers in the vicinity of the site.

2.4 Existing Drainage Regime

There is a 2 inch PVC potable water pipe running under the Electricity Distribution Site from east to west shown on the SW asset plans. There are no drainage assets recorded within the boundary or in close proximity to the site. Surface water will flow overland or soak into the underlying soils. There are however several ditches/depressions (shown on the topographic survey) along the western boundary and throughout the site running from east to west. This allows for the surface water to convey into/towards The Burn of Achanarras.

2.5 Ground Conditions

British Geological Survey (BGS) mapping confirms the site to have a bedrock geology of Spittal Flagstone Formation (Slitstone, mudstone, and sandstone) (see Figure 2). Superficial deposits of Till, Devensian (Diamiction) are shown to be present across the most-part of the site, with Alluvium (Clay, slit, sand, and gravel) located along the western boundary (see Figure 3).

Online mapping shows the site to be in an area with a 'low' groundwater vulnerability.

The Phase 2 Ground Investigation states that: "Details on the hydrogeological classification of the Devensian Till are not given by SEPA mapping. The Spittal Flagstone Formation is characterised as a moderately productive aquifer, locally yielding small amounts of groundwater."

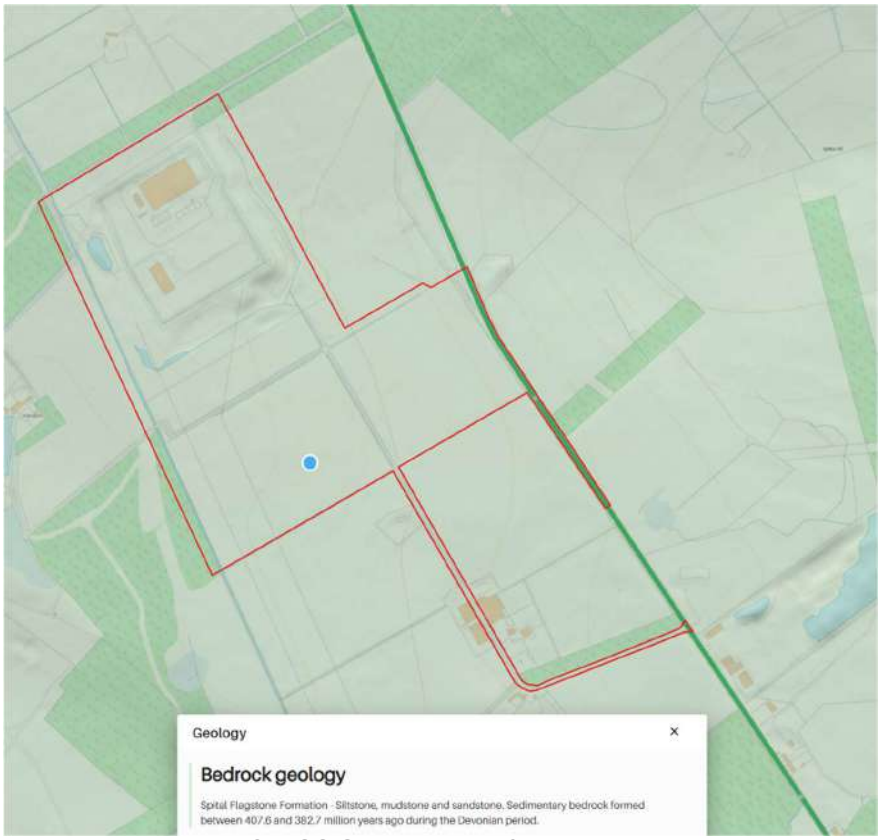


Figure 2: BGS Geology Map of Bedrock geology

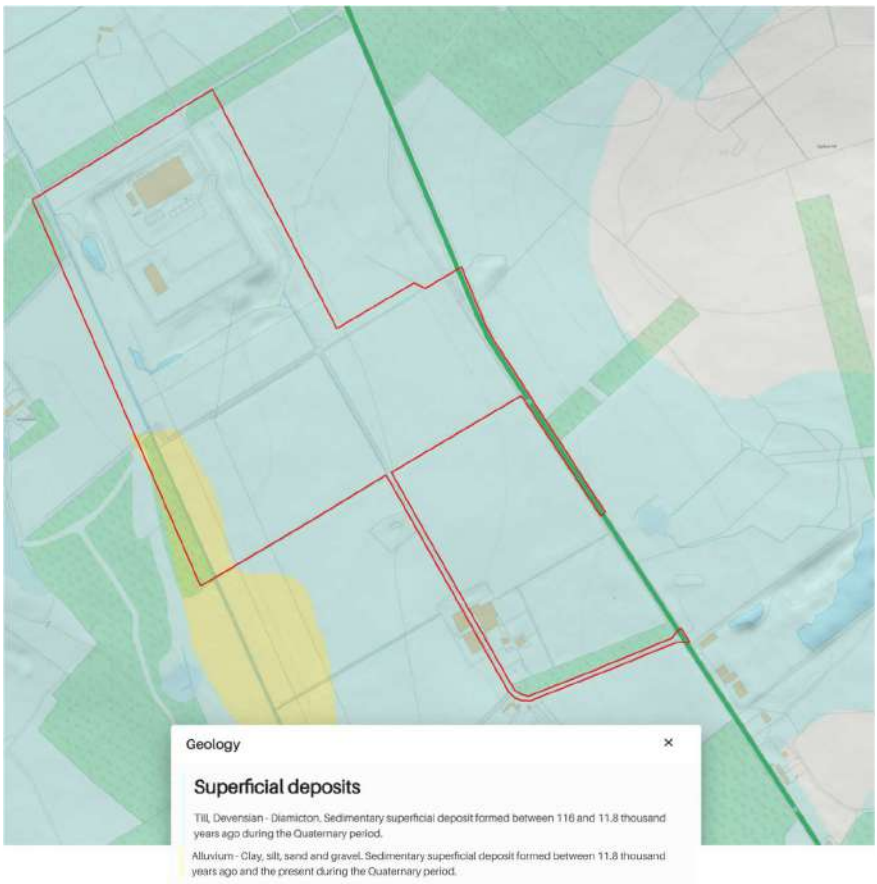


Figure 3: BGS Geology Map of Superficial Deposits

3 Planning Policy Context

3.1 National Planning Framework 4 (NPF4 Adopted 2023)

The National Planning Framework 4 (NPF4, 2023) includes government policy for developments and meeting the challenges of climate change and flood risk. Policy 22 states that development proposals should

- not increase the risk of surface water flooding to others, or itself be at risk.
- manage all rain and surface water through sustainable urban drainage systems (SUDS), which should form part of and integrate with proposed and existing blue-green infrastructure. All proposals should presume no surface water connection to the combined sewer;
- seek to minimise the area of impermeable surface.

3.2 Highland-wide Local Development Plan (HwLDP, Adopted 2012)

On 5 April 2012 the Highland-wide Local Development Plan was adopted by the Council and was constituted as the local development plan in law. The Plan sets out a vision statement and spatial strategy for the area, taking on board the outcomes of consultation undertaken during preparation of the plan. Policy 66 is relevant to this assessment and reads as follows:

Policy 66 Surface Water Drainage

All proposed development must be drained by Sustainable Drainage Systems (SuDS) designed in accordance with The SuDS Manual (CIRIA C697) and, where appropriate, the Sewers for Scotland Manual 2nd Edition. Planning applications should be submitted with information in accordance with Planning Advice Note 69: Planning and Building Standards Advice on Flooding paragraphs 23 and 24. Each drainage scheme design must be accompanied by particulars of proposals for ensuring long-term maintenance of the scheme.

4 Surface Water Drainage

The surface water drainage strategy has been designed based on the requirements of CIRIA 753 (C753) dated March 2015 and the Water Assessment and Drainage Assessment Guide produced by the Sustainable Urban Drainage Scottish Working Party (SUDSWP).

4.1 SuDS Hierarchy

Surface water drainage should be managed in a way that replicates the natural drainage processes for the site as closely as possible. The proposals should follow the hierarchy outlined in C753 and should be disposed of to a receptor in the order of preference described below:

1. Into the ground;
2. To a surface water body e.g. watercourse;
3. To a surface water, highway drain, or another drainage system;
4. To a combined sewer.

4.1.1 SuDS Selection

Into the ground

Infiltration testing, in accordance with BRE365, was undertaken at the site as part of the Phase 2 Ground Investigation prepared by Curtins (ref: 085447-CUR-XX-XX-T-GE-00002 December 2024). A single test was undertaken at one location (SA01). The soakaway test was unsuccessful due to the 75% and 25% drop in water levels not being achieved. The poor infiltration is likely a result of the cohesive nature of the Devensian Till and impermeable nature of the bedrock.

Infiltration drainage is therefore not feasible at this site and is not discussed further in this report.

To a surface water body

It is proposed to discharge surface water run-off from the site to the adjacent ditch which ultimately discharges to Achanarras Burn. This mimics the existing drainage regime for the site.

4.2 Greenfield run-off rates

The greenfield run-off discharge rates have been calculated using the HR Wallingford IH124 method and are based on the proposed impermeable area of the site (3.9ha). The greenfield rates for the site are summarised in Table 1 below (see Greenfield Calculations in Appendix B).

Rainfall event	Greenfield discharge rate (l/s)
1:1 year	22.79
Qbar	26.82
1:30 year	52.29
1:200 year	76.16

Table 1: Greenfield run-off calculations

4.3 Surface water drainage strategy – BESS Compound

The proposed development infrastructure is located in a single compound. Surface water generated by the infrastructure is intercepted by a filter drain positioned along the low side of the site compound (western boundary). Surface water is conveyed, via a pipe, to the attenuation basin which discharges the surface water at a restricted rate to the Burn of Achanarras. The surface water drainage drawing and supporting calculations are provided in Appendix B.

Filter drains have been provided along the other boundaries and at the foot of the cut slope, to intercept surface water generated by the earthworks. These direct surface water around the site and into the surrounding ditch network, mimicking the existing surface water drainage regime.

Discharge rate

The discharge of surface water run-off from the site will be restricted to the 1:1 year greenfield rate (22.79 l/s) in line with the guidance provided by SUDSWP. Discharge from the attenuation basin is restricted by a flow control device.

Attenuation

Attenuation is provided in the form on an open attenuation basin and has been designed using FEH data and Causeway Flow software to accommodate the temporary run-off for rainfall events up to and including the 1:200-year rainfall event. The basin has been designed to have 300 mm of freeboard. The volume of storage required for the 200-year event is 2,215.m^3

4.4 Pollution Mitigation

The above proposal ensures that surface water is managed 'at source'. All surface water from the proposed development area will pass through a filter drain and the attenuation basin. This type of development has 'Low' pollution hazard level, as shown in table 26.2 of C753. The relevant land use is tabled below, with the SuDS pollution indices tabled (as per table 26.3 of C753).

Pollution Hazard indices for different land use classifications				
Land Use	**Pollution Hazard Level**	**Total suspended solids pollution index**	**Metals**	**Hydrocarbons (HC)**
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, home zones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie., 300 traffic movements/day	Low	0.5	0.4	0.4
Indicative SuDS mitigation indices for discharges to surface waters				
Filter Drain		0.4	0.4	0.4
Detention Basin (secondary indices halved)		0.5 (0.25)	0.5 (0.25)	0.6 (0.3)

Total	0.65	0.65	0.7

Table 2: SuDS Pollution Assessment

The totals above show that the appropriate mitigation measures are provided for the potential pollution hazards likely from this type of development.

In addition a penstock valve is provided to prevent any contaminated water from entering the wider environment. It is proposed that this will be manually operated in the event of a pollution / contamination event on site.

4.5 Management and Maintenance

The surface water drainage system should be maintained to ensure the system operates at its maximum capacity for the lifetime of development. A management and maintenance plan is provided in Appendix B.

4.6 Cumulative Impact

A review of cumulative impacts has been undertaken considering sites identified as lying within the locality of the proposed Spittal BESS. The cumulative impact of surface water drainage is considered to be negligible as the site proposals include attenuation and controlled discharge of surface water at a reduced rate in line with SEPA requirements.

4.7 Surface water drainage strategy – Access of A9

A new access is proposed off the A9 for construction and permanent use. The access road is proposed to be unbound, except for the first xxxm forming the bell-mouth entrance off the A9. As the access will not be bound surface water will be able to follow the existing drainage regime, either infiltration through the unbound material or running off in more significant events at greenfield rates.

As there is a risk of particulate pollution from an unbound surface it is proposed to provide a grass filter strip between the access road and the adjacent unnamed watercourse. Any surface water that flows off the road will pass over the filter strip before entering the watercourse.

5 Summary and Conclusion

5.1 Summary

HEC has been commissioned by the Client to carry out a Drainage Impact Assessment to support a planning application for the construction and operation of a 300MW Battery Energy Storage System (BESS) with associated infrastructure, access and ancillary works on land adjacent to Spittal Converter Station.

Infiltration drainage is not feasible at the site. It is therefore proposed to discharge surface water to Burn of Achanarras at a restricted rate to match the 1:1-year greenfield run-off rate. Attenuation has been provided for the 1 in 200-year event.

The use of filter drains and an attenuation basin provides the appropriate mitigation for the pollutants likely for the Proposed Development.

The surface water drainage system should be maintained to ensure the system operates at its maximum capacity for the lifetime of development.

5.2 Conclusion

The drainage strategy complies with the requirements of CIRIA 753; surface water generated by the proposed development can be attenuated on site in the extreme event and discharged to a watercourse mimicking greenfield run-off rates.

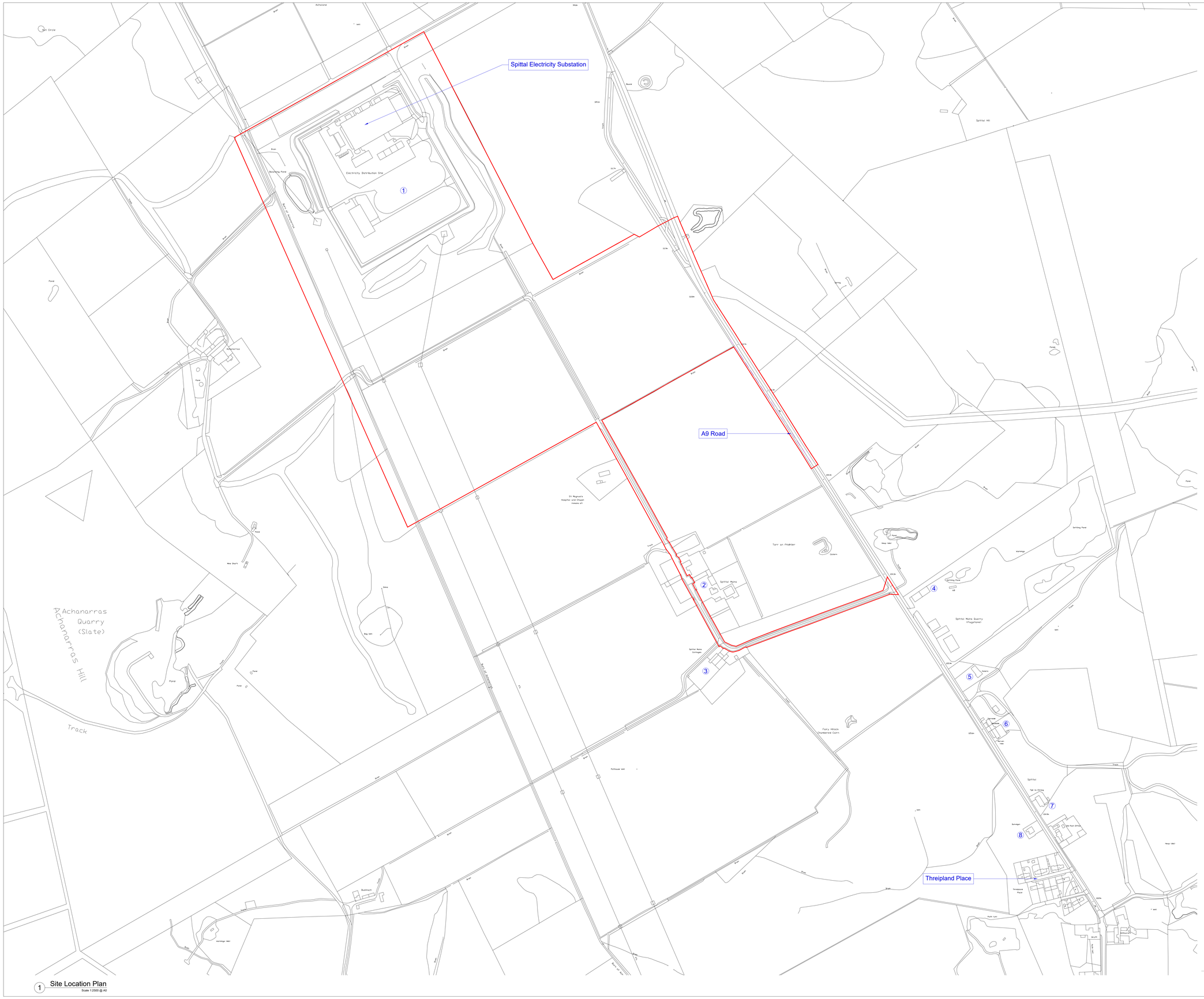
The Proposed Development does not increase on or off-site flood risk and is therefore considered to be acceptable.

Appendix A - Existing & Proposed Site

Field drawing BTGBSPI01-002.1 – Site Location

Highland Surveyors Ltd drawing 23067_01-05 - Topographical Survey

Field drawing BTGBSPI01 – Proposed Site Plan



Drawing Notes:

1. All dimensions are shown in metres unless noted otherwise.
2. Do not scale from this drawing.
3. Planning boundary area = 48.583ha

List of Addresses	
1	Spittal Converter Substation, Halkirk, KW12 6XA
2	Spittal Mains, Spittal, Wick, KW1 5XR
3	St. Magnus Cottage, Spittal, Wick, KW1 5XR
4	A&D Sutherland Ltd. Spittal Mains Quarry, Spittal, Wick, KW1 5XR
5	Kakers, Roadside, Spittal, Wick, KW1 5XR
6	[3 Addresses] a) Cairnside; b) Roadside Cottage; c) Morven View, Spittal, Wick, KW1 5XR
7	Tigh Na Chreag, Spittal Wick, KW1 5XR
8	Edgemoor Filling Station, Spittal, Wick, KW1 5XR

Legend

Planning Boundary

1:100	1m	2m	3m	4m	5m	6m	7m	8m	9m	10m
1:200	5m	10m	15m	20m
1:250	5m	10m	15m	20m	25m
1:500	10m	20m	30m	40m	50m
1:1000	10m	20m	30m	40m	50m	60m	70m	80m	90m	100m
1:2000	50m	100m	150m	200m
1:2500	50m	100m	150m	200m	250m
1:5000	100m	200m	300m	400m	500m

REV	DATE	DESCRIPTION	BY	CHK'D
6	21.10.2024	Planning boundary amended	JH	AP
5	19.04.2024	Planning boundary adjusted	EW	AP
4	19.04.2024	Option site & wider LO boundaries removed, additional scaling added	EW	AP
3	04.04.2024	Boundaries & option site extents adjusted	EW	JH
2	02.02.2024	Planning boundary amended	JH	AP
1	25.01.2024	Details added to site location plan	JH	AP
0	18.01.2024	Site Location Plan - Original	JH	AP

Field
Fora - Montacute Yards
186 Shoreditch High Street
London
E1 6HU

PROJECT
Spittal

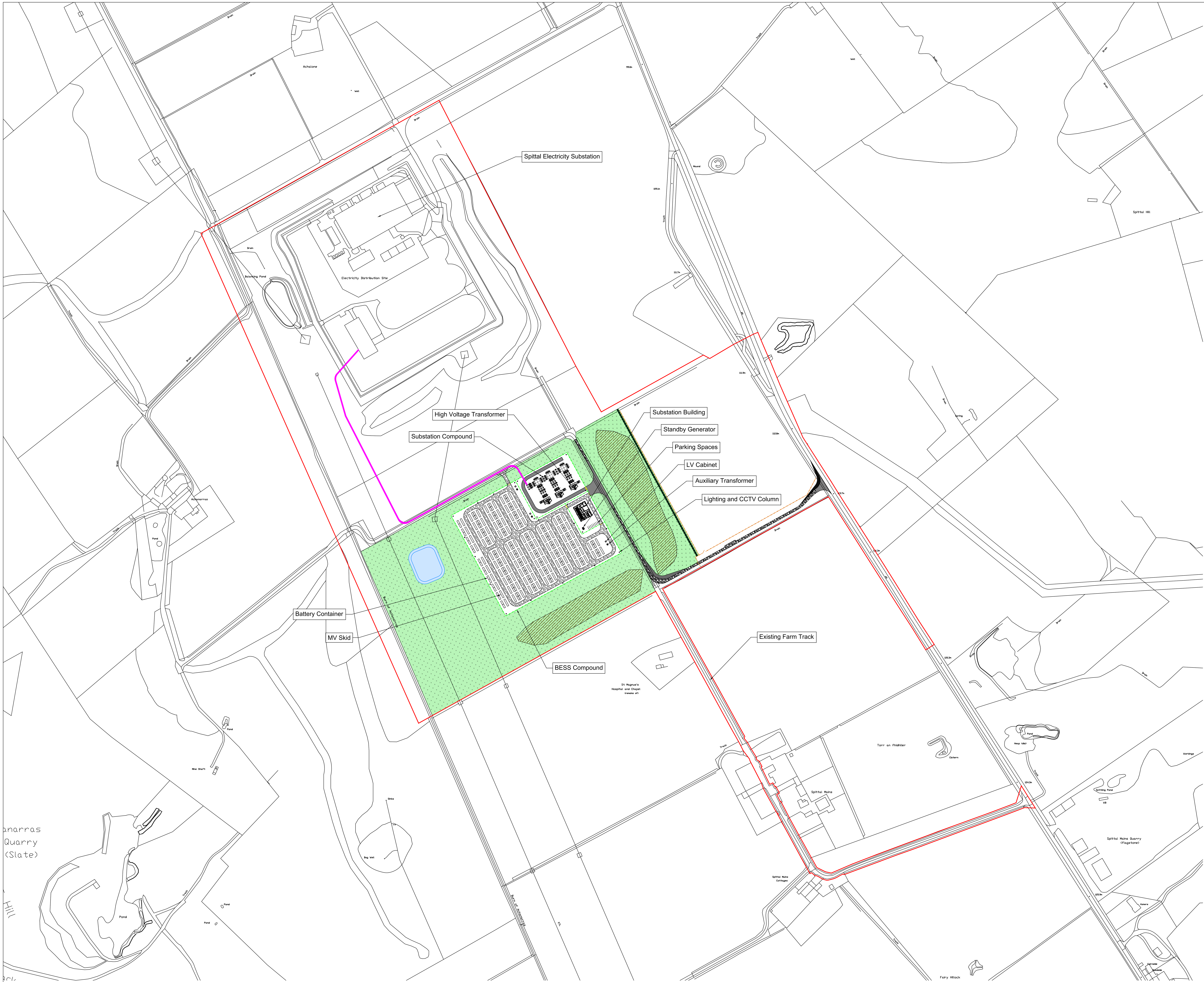
TITLE
Site Location Plan

DISCIPLINE
PLANNING

DRAWING STATUS
FOR PLANNING

SCALE	DATE	DRAWN BY	CHECKED BY	APPROVED BY
1:2500 @ A0	18.01.2024	JH	AP	RS

PROJECT NO.	DRAWING NO.	REV.
BTGBSPI01	002.1	6



1 Indicative Site Layout Plan
Scale 1:2000 @ A0

Drawing Notes:

1. All dimensions are shown in metres unless noted otherwise.
2. Do not scale from this drawing.
3. Planning boundary area = 48.583ha.

Legend

- Planning Boundary
- Indicative Underground Grid Connection Cable
- Landscaping Area
- Native Hedgerow
- Attenuation Basin
- 2.4m Palisade Fence with 0.6m Electric Topper
- Stock Proof Fencing
- Access Track - Unbound Finish
- Access Track - Asphalt Finish
- AIL Run-over Area - Unbound Finish
- Landscaping Bund

REV	DATE	DESCRIPTION	BY	CHK'D
11	17.12.2024	Landscaping notation amended	EW	JH
10	12.11.2024	Bund shape & aux transformer detail adjusted	EW	AP
9	21.10.2024	Access road, drainage and planning boundary amended. Stock proof fencing added.	JH	AP
8	10.09.2024	Bunds amended	EW	JH
7	30.08.2024	Site layout amended	JH	RS
6	10.06.2024	Planning boundary adjusted	EW	AP
5	07.06.2024	HV compound detail, attenuation pond detail & indicative cable route updated. Fenced channel for farm access between field gates added to western edge.	EW	JH
4	09.04.2024	BESS duration and layout adjusted	EW	JH
3	04.04.2024	Now showing Envision system, TO sub station detail updated with PSUK drgs, layout adjusted. Capacity & duration amended. Option site boundary adjusted. Site grading details added.	EW	JH
2	02.02.2024	Planning boundary amended	JH	AP
1	25.01.2024	Site layout amended	JH	AP
0	31.08.2023	Site layout plan - for information	WL	RS

Field
Fora - Montacute Yards
186 Shoreditch High Street
London
E1 6HU

PROJECT
Spittal

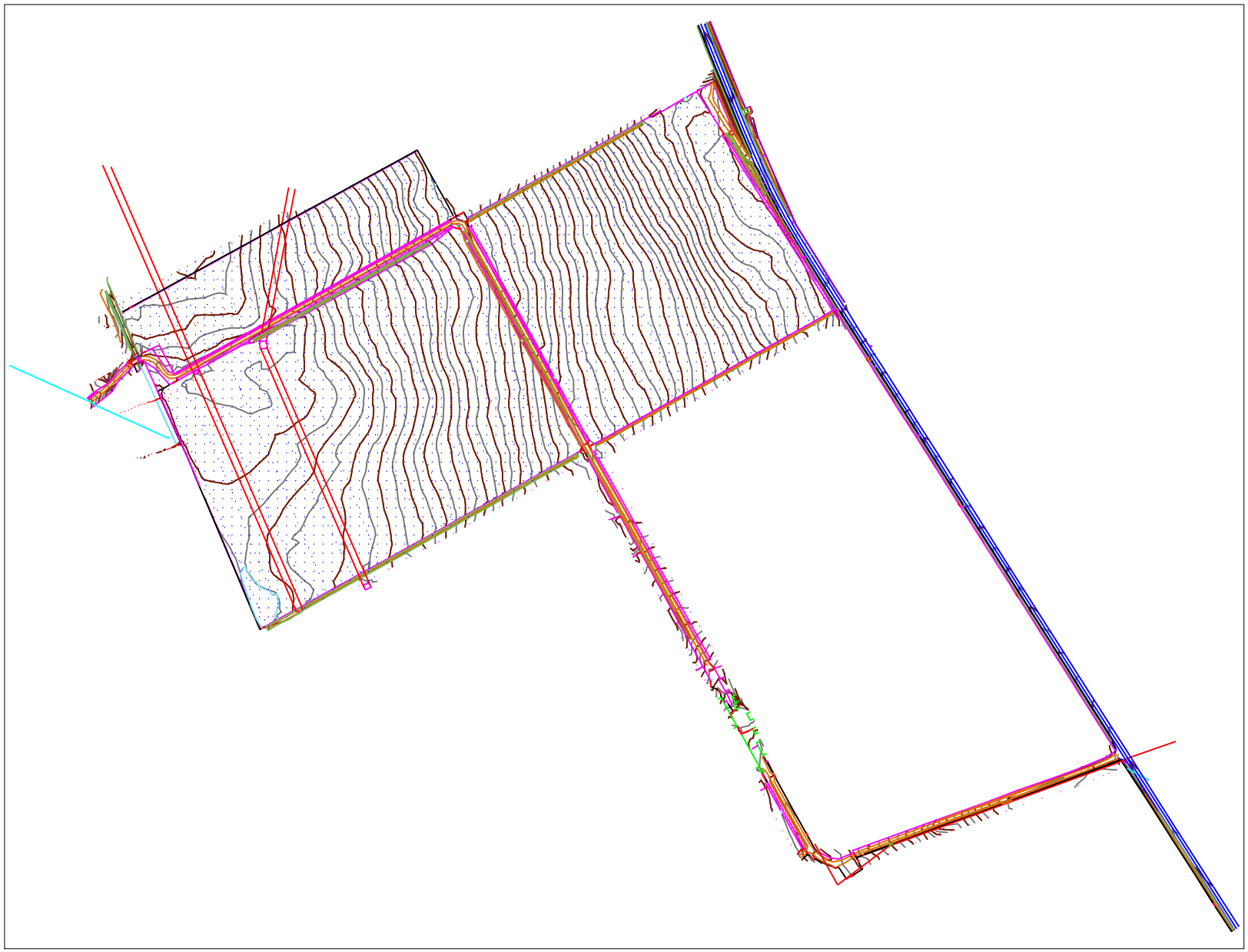
TITLE
Indicative Site Layout Plan

DISCIPLINE
PLANNING

DRAWING STATUS
FOR PLANNING

SCALE	DATE	DRAWN BY	CHECKED BY	APPROVED BY
1:2000 @ A0	31.08.2023	WL	RS	RS

PROJECT NO.	DRAWING NO.	REV.
BTGBSPI01	001.1	11



Appendix B - Surface Water Drainage

Haydn Evans calculations 336-003-CA1-P01 – Greenfield Calculations

Haydn Evans calculations 336-003-CA2 – Attenuation

Haydn Evans drawing 336-003-D001 – Site Access GA & Longitudinal Section

Haydn Evans drawing 336-003-D010 – Surface Water Drainage Strategy

Haydn Evans document 336-003-RP3 – SuDS Management & Maintenance Plan

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Tayler Evans
Site name:	Spittal
Site location:	Spittal

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	58.47734° N
Longitude:	3.44851° W
Reference:	3588513345
Date:	Oct 07 2024 15:37

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 3.9

Methodology

Q_{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Soil characteristics

	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics

	Default	Edited
SAAR (mm):	947	947
Hydrological region:	1	1
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	1.95	1.95
Growth curve factor 100 years:	2.48	2.48
Growth curve factor 200 years:	2.84	2.84

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

	Default	Edited

Q_{BAR} (l/s):	26.82	26.82
1 in 1 year (l/s):	22.79	22.79
1 in 30 years (l/s):	52.29	52.29
1 in 100 year (l/s):	66.5	66.5
1 in 200 years (l/s):	76.16	76.16

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	3.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	x
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
basin	3.900	3.00	87.400	1800	315445.363	955003.517	1.300
flow control	0.000		87.400	1800	315445.363	955003.517	1.300

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Additional Storage (m³/ha)	20.0
Summer CV	0.750	Skip Steady State	x	Check Discharge Rate(s)	x
Winter CV	0.840	Drain Down Time (mins)	240	Check Discharge Volume	x

Storm Durations

15	60	180	360	600	960	2160
30	120	240	480	720	1440	2880

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
200	0	0	0

Node flow control Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	86.100	Product Number	CTL-SHE-0206-2280-1300-2280
Design Depth (m)	1.300	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	22.8	Min Node Diameter (mm)	1500

Node basin Depth/Area Storage Structure

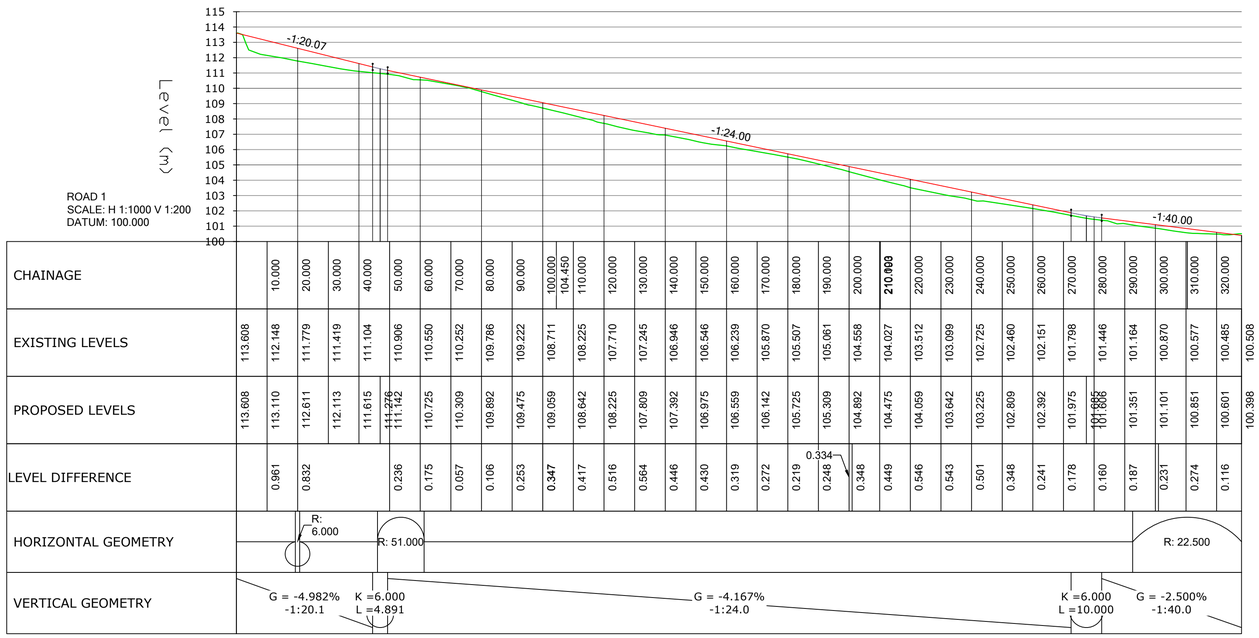
Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	86.100
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	1896.0	0.0	1.300	2573.0	0.0

Results for 200 year Critical Storm Duration. Lowest mass balance: 99.93%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute winter	basin	472	87.098	0.998	233.1	2215.1650	0.0000	SURCHARGED
480 minute winter	flow control	472	87.098	0.998	23.1	2.5411	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
480 minute winter	basin	basin 01	flow control	23.1	0.220	0.052	2.2006	
480 minute winter	flow control	Hydro-Brake®		22.7				732.2



LONGITUDINAL SECTION
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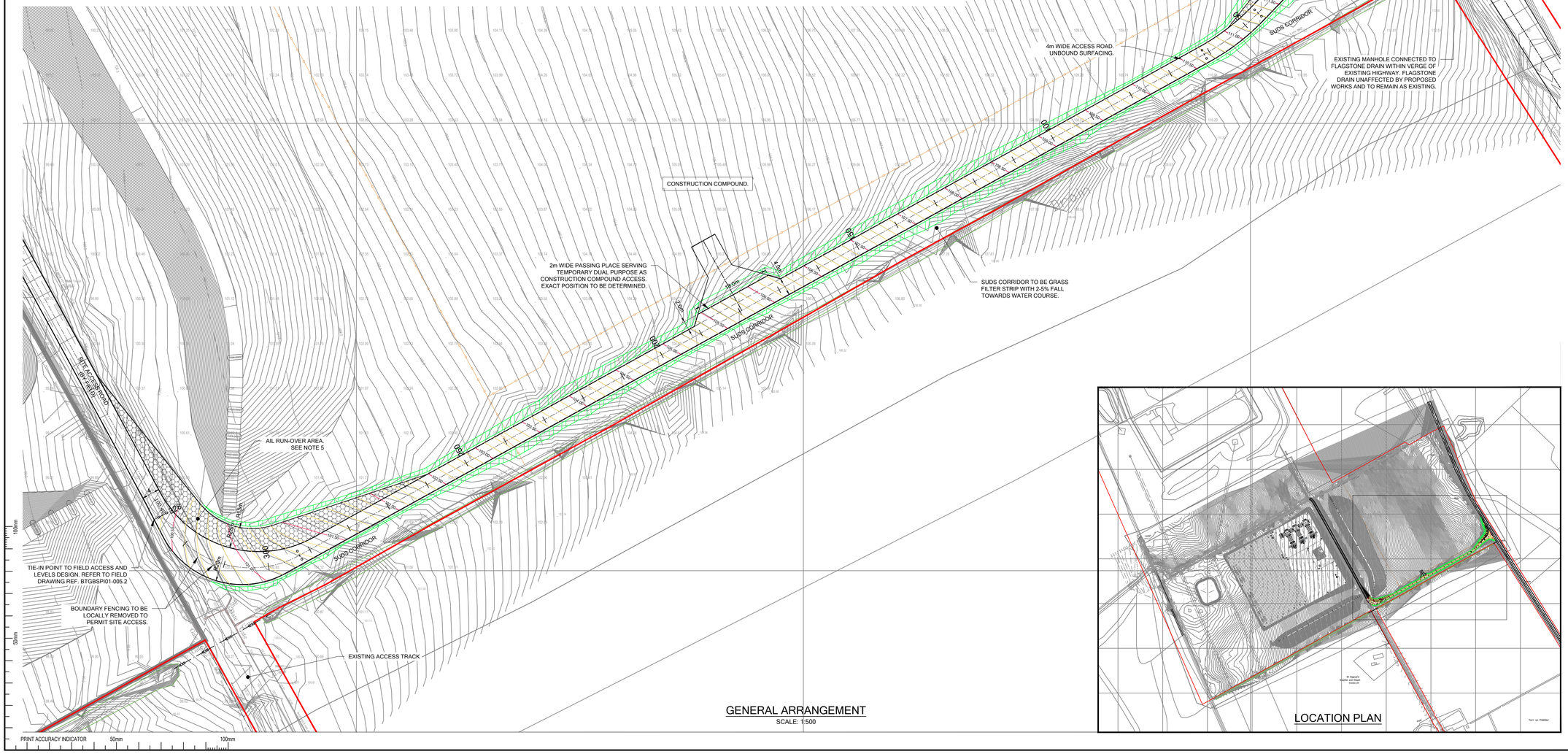

GENERAL ARRANGEMENT
SCALE: 1:500

LOCATION PLAN

NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.
2. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY. WRITTEN PERMISSION MUST BE OBTAINED FROM HAYDN EVANS PRIOR TO SCALING ELECTRONICALLY OR USING THIS ELECTRONIC FILE.
3. SITE LAYOUT BASED ON FIELD INDICATIVE SITE LAYOUT PLAN, DRAWING REF. BTGBSPI01 - SPITTAL SITE PLAN, DATED 21st OCTOBER 2024 .
4. SITE ACCESS LEVELS AND ALIGNMENT BASED ON TOPOGRAPHICAL SURVEY BY HIGHLAND SURVEYORS, DRAWING REF. 23067, UNDERTAKEN NOVEMBER 2023.
5. AIL OVER-RUN EXTENTS BASED ON TURNING CIRCLE OF WORST CASE VEHICLE OF THE THREE OPTIONS PROVIDED BY WYNNS INDEPENDENT TRANSPORT ENGINEERS RECEIVED APRIL 2024. WORST CASE VEHICLE FOR TURNING IS THE 5 AXLE BED 5 AXLE DRAW BAR TRAILER. INFORMATION TAKEN FORM DRAWING REF. 24-1235.TC02. SWEPT PATH ANALYSIS NOT UNDERTAKEN. WYNNS TO CONFIRM SUITABILITY OF OVER-RUN EXTENTS PROPOSED.

KEY

- EXTENT OF EXISTING HIGHWAY (A9)
- EXTENT OF EXISTING FLAGSTONE DRAIN
- EXTENT OF PROPOSED ASPHALTIC CONSTRUCTION
- EXTENT OF PROPOSED UNBOUND SURFACING
- EXTENT OF AIL RUN-OVER AREA
- PROPOSED SUDS CORRIDOR
- TIE-IN GRADING EXTENTS
- EXISTING SURFACE WATER DRAIN
- xx.xxx(Ex) EXISTING LEVEL
- xx.xxx PROPOSED LEVEL
- PROPOSED MINOR CONTOUR (0.1m)
- PROPOSED MAJOR CONTOUR (0.5m)
- PLANNING BOUNDARY

DRAWING FOR APPROVAL
NOT FOR CONSTRUCTION

Rev'n	Date	Description	Drawn	Chk'd	App'd
P07	19/12/2024	UPDATED TO SUIT LATEST LAYOUT	JC	BP	JC
P06	22/10/2024	UPDATED TO SUIT LATEST SITE LAYOUT	TE	BP	JC
P05	16/10/2024	BELLMOUTH ENTRANCE AMENDED	TW	BP	JC
P04	09/10/2024	UPDATED LAYOUT	TE	BP	JC
P03	24/05/2024	UPDATED TO ADDRESS CLIENT COMMENTS	BP	JC	JC
P02	22/05/2024	DRAFT REVISION	BP	-	-
P01	31/01/2024	PRELIMINARY ISSUE	ME	JC	JC

Status: PLANNING

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www.haydnevans.co.uk
mail@haydnevans.co.uk

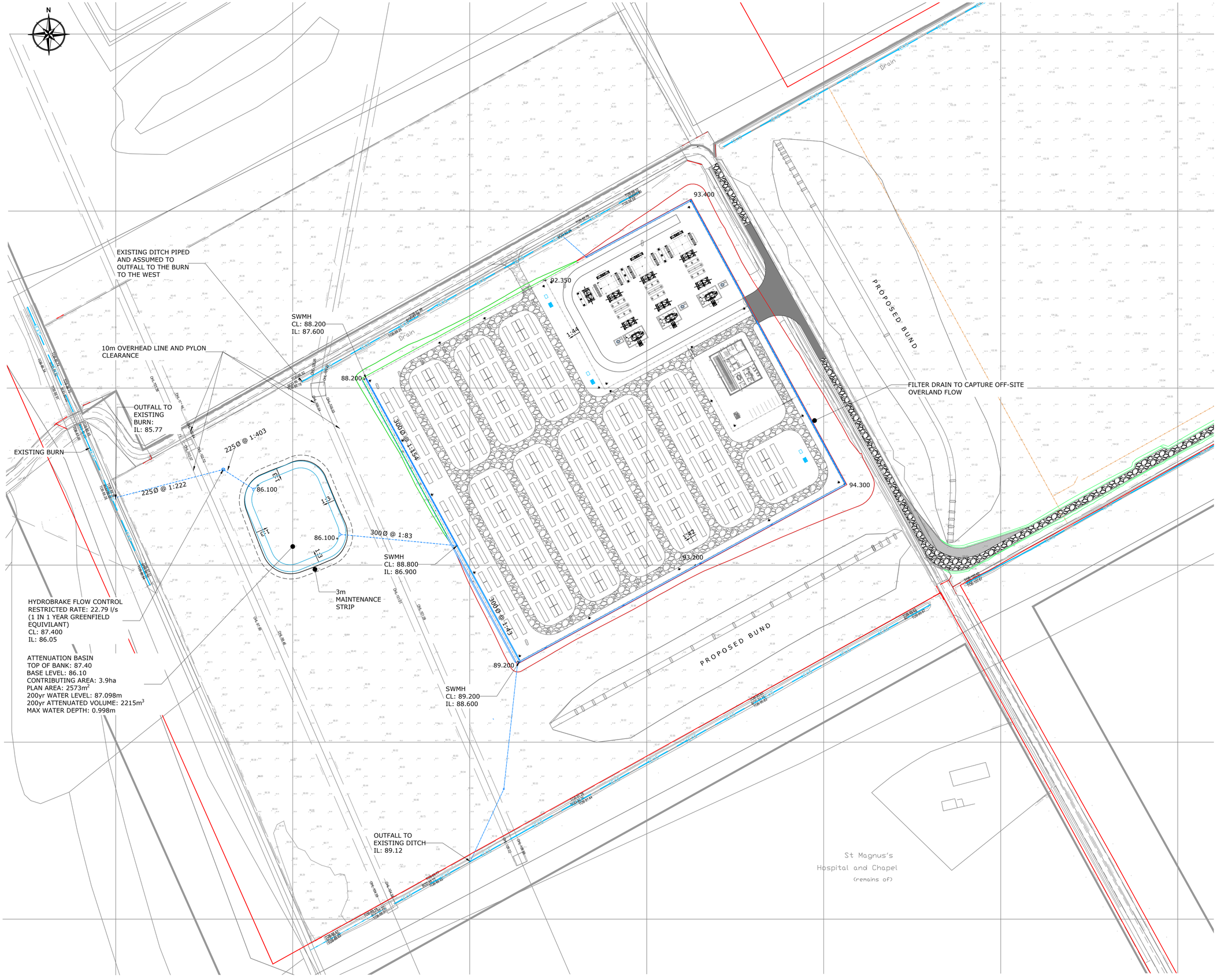
Client: FIELD

Project: SPITTAL BESS

Drawing title: SITE ACCESS GA & LONGITUDINAL SECTION

Scale	Drawn	Checked	Approved	Date
NOTED @ A1	ME	JC	JC	JAN 2024

Drawing no.: 336-003-D001
Revision: P07



NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ENGINEERS, ARCHITECTS AND SPECIALISTS DRAWINGS AND THE SPECIFICATION.
2. DO NOT SCALE FROM THIS DRAWING MANUALLY OR ELECTRONICALLY. WRITTEN PERMISSION MUST BE OBTAINED FROM HAYDN EVANS PRIOR TO SCALING ELECTRONICALLY OR USING THIS ELECTRONIC FILE.
3. SITE LAYOUT BASED ON FIELD INDICATIVE SITE LAYOUT PLAN, DRAWING REF. BTGBSPI01 - SPITTAL SITE PLAN , DATED 21st OCTOBER 2024 .
4. SITE ACCESS LEVELS AND ALIGNMENT BASED ON TOPOGRAPHICAL SURVEY BY HIGHLAND SURVEYORS, DRAWING REF. 23067, UNDERTAKEN NOVEMBER 2023.

KEY

- OWNERSHIP BOUNDARY
- RED LINE BOUNDARY
- xx.xx (Ex) + 65.66 — EXISTING LEVEL
- xx.xxx — PROPOSED LEVEL
- 1:xx — PROPOSED GRADIENT
- SITE COMPOUND TOTAL AREA: 3.9 HA
- INDICATIVE SITE GRADING- FILL
- INDICATIVE SITE GRADING- CUT
- EXS — EXISTING DRAINS, DITCHES AND BURN
- PROPOSED ATTENUATION BASIN
- 150Ø @ 1:150 — SURFACE WATER DRAIN
- SURFACE WATER MANHOLE - 1200/1500mmØ
- SURFACE WATER PPIC - 6000mmØ
- SURFACE WATER HEADWALL
- FILTER DRAIN

LEVEL ABBREVIATIONS:

OHL	OVERHEAD LINE (EXISITNG)
TOB	TOP OF BANK (EXISTING)
BOD	BOTTOM OF DITCH (EXISTING)

Rev'n	Date	Description	Drawn	Chk'd	App'd
P05	19.12.2024	UPDATED TO SUIT LATEST LAYOUT	JC	BP	JC
P04	22.10.2024	UPDATED TO SUIT LATEST SITE LAYOUT	TE	BH	JC
P03	14.10.2024	NEW SITE LAYOUT	TE	BH	JC
P02	24.06.2024	NEW SITE LAYOUT	TE	BP	JC
P01	25.04.2024	PRELIMINARY ISSUE	ME	BH	JC

Status: PLANNING

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Client: FIELD

Project: SPITTAL

Drawing title: SURFACE WATER DRAINAGE STRATEGY

Scale	Drawn	Checked	Approved	Date
1:1000 @ A1	ME	BH	JC	APR/2024

Drawing no.: 336-003-D010

Revision: P05

Proposed Battery Energy Storage System - Spittal, Scottland
SuDS Management & Maintenance Plan

1 Introduction

Sustainable Drainage Systems (SuDS) features are utilised to manage rainfall and use landscape features to deal with surface water. SuDS control the flow rate and volume of water leaving the development area and reduce pollution by intercepting silt and cleaning run-off from hard surfaces.

Like all aspects of drainage systems, SuDS components should be regularly inspected and maintained. This ensures efficient operation and reduces the likelihood of failure. The level of inspection and maintenance will vary depending on the type of SuDS component. Further information on maintenance can be found in The SuDS Manual (CIRIA publication C753).

The SuDS and drainage features for the development are to be maintained by the site owner/occupant.

2 Managing SuDS

The SuDS features have been designed for easy maintenance to comprise:

- Regular day to day care – litter collection and checking the inlets and outlets where water enters or leaves the SuDS feature.
- Occasional tasks – removing any silt that builds up, cutting back and clearing excessive vegetation growth, inspection of outlets, manholes and flow controls.
- Remedial work – repairing damage where necessary.

3 Contact

In the event of concern over any matter to do with the SuDS, please contact the site owner/occupant.

4 SuDS Maintenance

The surface water drainage system includes filter drains, an attenuation basin, a flow control, pipes and manholes.

Surface water is collected by filter drains and directed to the attenuation basin or existing ditch network via an underground piped system. Surface water is then directed to the outfall via a flow control device.

Table 1 below provides a breakdown of general maintenance requirements to be undertaken, appropriate to the types of SuDS and surface water drainage systems proposed at this site.

Regular Maintenance		Frequency
1	**Litter Management** Check for and pick up litter around the entire site.	Monthly or as required
2	**Inlets and Outlets** Remove silt and debris from inlets and outlets.	Quarterly or as required
3	**Respond to reported blockages, etc.**	As required
Occasional Maintenance		**Frequency**
4	**Inspection of Control Chamber** Inspection of chambers for silt build up and visually check pipes appear clear and free flowing. Remove silt as required. Jetting as required.	Annually
5	**Inspection of Attenuation** Check for blockages within the connecting pipes.	Quarterly and following heavy storms
Remedial Work		**Frequency**
6	**Inspect SuDS systems to check for damage or failure** Undertake remedial work as required.	Annually
7	**Silt control and removal** Wash or replace filter medium when required.	As required

Table 1: SuDS General Maintenance Requirements

Tables 2 to 5 below provides a breakdown of typical maintenance requirements appropriate to the types of SuDS proposed at this site.

Operation and Maintenance Requirements for Detention Basins		
Responsible for Maintenance	**Site Owner/Occupier**	
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular maintenance	Remove litter and debris.	Monthly
	Cut grass - for spillways and access routes.	Monthly (during growing season), or as required.
	Cut grass - meadow grass in and around basin.	Half yearly (spring – before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants.	Monthly (at start), then as required
	Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage.	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Monthly (for first year), then annually or as required
	Check any penstocks and other mechanical devices.	Annually
	Tidy all dead growth before start of growing season.	Annually
	Remove sediment from inlets, outlets and forebay.	Annually, or as required
	Manage wetland plants in outlet pool, where provided.	Annually
Occasional maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
	Remove sediment from inlets, outlets, forebay and main basin when required	Every 5 years, or as required (likely to be minimal requirements where effective upstream source control is provided)
Remedial actions	Repair erosion or other damage by reseeding or re-turfing.	As required
	Realignment of rip-rap.	As required
	Repair/rehabilitation of inlets, outlets and overflows.	As required
	Relevel uneven surfaces and reinstate design levels.	As required

Table 2: Site specific maintenance requirements – Detention Basin

Operation and Maintenance Requirements for Pipes, Manholes and Gullies		
Responsible for Maintenance	**Site Owner/Occupier**	
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular inspections	Remove cover and inspect, ensuring that water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt.	Annually and after leaf fall in autumn
	Jetting pipes or poor performance to assess requirements for CCTV survey and potential replacement pipes.	Annually or as required
Remedial action	Repair physical damage if necessary.	As required

Table 3: Site specific maintenance requirements – Pipes, manholes and gullies

Operation and Maintenance Requirements for a Flow Control		
Responsible for Maintenance	**Site Owner/Occupier**	
Maintenance Schedule	**Required Action**	**Typical Frequency**
Routine maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation	Six monthly
	Remove sediment, oil, grease and floatables	As necessary – indicated by system inspections or immediately following significant spill
Remedial actions	Replace malfunctioning parts or structures	As required
Monitoring	Inspect for evidence of poor operation	Six monthly
	Inspect sediment accumulation rates and establish appropriate removal frequencies	Monthly during first half year of operation, then every six months

Table 4: Site specific maintenance requirements – Flow control

Operation and Maintenance Requirements for Filter Drains		
Responsible for Maintenance	**Developer/Household**	
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices	Monthly, or as required
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Six monthly
	Remove sediment from pre-treatment	Six monthly, or as required
Occasional maintenance	Remove or control tree roots where they are encroaching the sides of the filter drain, using recommended methods (eg NJUG, 2007 or BS 3998:2010)	As required
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlying filter medium	Five yearly, or as required
	Clear perforated pipework of blockages	As required

Table 5: Site specific maintenance requirements – Filter drain

Appendix C – Scottish Water

Cornerstone Projects Ltd - Utilities Search Report - Water and Sewer - Page 49-56

WATER & SEWER

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Tel. 0151 632 5142
enquiries@cornerstoneprojects.co.uk
www.cornerstoneprojects.co.uk
VAT Reg. No. 851 4941 19
Company No. 5132353

Drain
Drain
Achalone
Well
Drain
A9
355mm HPPE 2000
99.0m
A9
A9
Mound
2in PVC 1975
109.1m
Track
355mm HPPE 2000
2in PVC 1975
111.7m
Drain
Balancing Pond
Electricity Distribution Site
2in PVC 1975
Burn of Achanarras
2in PVC 1975
Track
Drain
Drain
Drain
Pond
Drain
Drain
Achanarras
Track
Pond
Pond
St Magnus's
Hospital and Chapel
(remains of)
Pond
Mine Shaft
Sinks
Bog Well
Track
Pond
Pond
Burn of Achanarras
ETL

Warning! Damaging a large diameter trunk main (12"/300mm and above) can result in loss of life and major water supply and water quality problems.
If you're planning any extension work in the vicinity of any large diameter mains shown on our maps, you must contact Scottish Water to arrange a site visit (0800 778 778. WELL IN ADVANCE OF THE WORKS.

N

Spittal - Water Only

SCALE: 1:1,323

Plotted By: duncan@cornerstoneprojects.co.uk
Date Plotted: 21/03/2024

The representation of physical assets and the boundaries of areas in which Scottish Water and others have an interest does not necessarily imply their true positions. For further details contact the appropriate District office.

Scottish Water
Trusted to serve Scotland

The Bridge
6 Buchanan Gate
Stepps
Glasgow
G33 6FB

Tel No: 08000 778 778

Well
Drain
Drain
Drain
Spittal Hill
A9
350mm HPPE 2000
9in CI 1956
Mound
2in PVC 1975
109.1m
Track
111.7m
111.9m
Drain
Spring
113.7m
Ponds
Drain
116.3m
Drain
120.3m
Drain
Drain
Pond
Heap (dis)
Torr an fhidhlich
1 1/2in AC 1960
Cistern
Workings
Settling Pond
WB
Track
124.3m
Spittal Mains Quarry
(flagstone)
Ponds
Well
Spittal Mains
Spittal Mains
Cottages
Track
125.9m
Kakers
Fairy Hillock
Chambered Cairn
125.6m

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N

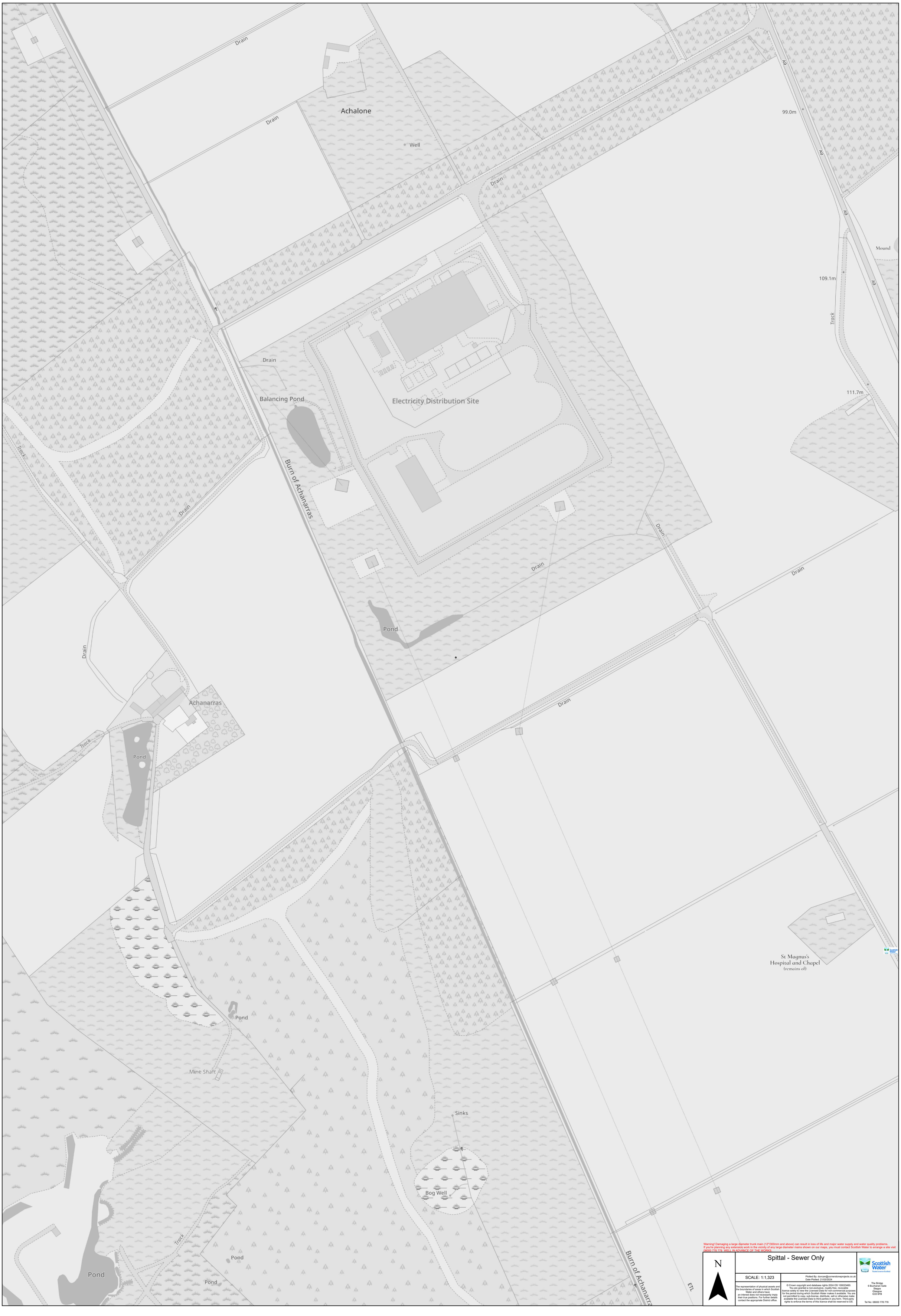
Spittal - Water.2 Only

SCALE: 1:1,323

Plotted By: duncan@cornerstoneprojects.co.uk
Date Plotted: 21/03/2024

The Bridge
6 Buchanan Gate
Stepps
Glasgow
G33 6FB

Tel No: 08000 778 778



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Scottish Water
Trusted to serve Scotland

The Bridge
6 Buchanan Gate
Stepps
Glasgow
G33 6FB

Tel No: 08000 778 778


Well
Drain
Drain
Drain
A9
A9
A9
A9
A9
A9
A9
A9
A9
A9
A9
A9
Mound
109.1m
Track
111.7m
111.9m
112.8m
113.7m
116.3m
120.3m
124.3m
125.9m
125.6m
Spittal Hill
Spring
Drain
Drain
Drain
Drain
Drain
Drain
Drain
Ponds
Pond
Heap (dis)
Settling Pond
Workings
Settling Pond
WB
Track
Track
Track
Spittal Mains Quarry
(flagstone)
Ponds
Well
Kakers
Torr an fhidhlier
Cistern
Spittal Mains
Spittal Mains
Cottages
Fairy Hillock
Chambered Cairn
Warning! Damaging a large diameter trunk main (12"/300mm and above) can result in loss of life and major water supply and water quality problems.
If you're planning any excavation work in the vicinity of any large diameter mains shown on our maps, you must contact Scottish Water to arrange a site visit
08000 778 778 WELL IN ADVANCE OF THE WORKS.
N
Spittal - Sewer.2 Only
SCALE: 1:1,323
Plotted By: duncan@cornerstoneprojects.co.uk
Date Plotted: 21/03/2024
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Scottish Water
The Bridge
6 Buchanan Gate
Stepps
Glasgow
G33 6FB
Tel No: 08000 778 778

Scottish Water Asset Data

Water Network

Fittings

Valve

- Valve - Abandoned
- Valve

Pressure Management Valve

- Abandoned
- Adopted
- Isolated
- Pressure Reducing
- Pressure Relief
- Pressure Sustaining
- Proposed
- Removed
- Unknown

Hydrant

- Abandoned
- Adopted
- Ball
- Fire
- Isolated
- Proposed
- Removed
- Shipping
- Unknown
- Washout

Stop Cock

- Abandoned
- Adopted
- In Use
- Isolated
- Proposed
- Removed
- Unknown

Boundary Box

End Cap

- Abandoned
- Adopted
- In Use
- Isolated
- Proposed
- Removed
- Unknown

Air Shaft

- Abandoned
- Adopted
- Isolated
- Pipe
- Proposed
- Removed
- Shaft
- Unknown

Air Valve

- AV
- Abandoned
- Adopted
- Air Cock
- DAV
- HAV
- Isolated
- Proposed
- Removed
- SAV
- TAV
- Unknown

Blank Tee

- Abandoned
- Adopted
- Flanged Plate
- Isolated
- Other
- Other_
- Proposed
- Removed
- Unknown

Chamber Box

- Abandoned
- Access Chamber
- Adopted
- Danelaw Box
- General
- Isolated
- Lucy Box
- Other
- Proposed
- Removed
- Swabbing
- Unknown

Collecting Chamber

Discharge Point

- Buchan Trap
- Isolated
- New Subtype
- Other
- Proposed
- Proudfoot Box
- Removed
- Undefined Scour Point
- Unknown
- Unknown End

Pressure Monitoring Point

Swab Chamber

- Abandoned
- Adopted
- Hatch Box
- Isolated
- Joint
- Proposed
- Removed
- T and Blank Plate
- Unknown

Wet Chamber

Pipes

Main - Water Distribution Public

- Abandoned, Public
- Adopted, Public
- Bypass, Public
- Distribution, Public
- Drain, Public
- Fire, Public
- Isolated, Public
- Overflow, Public
- Proposed, Public
- Removed, Public
- Sludge, Public
- Trunk, Public
- Washout, Public
- Main - Water Distribution

Main - Water Distribution Private

- Abandoned, Private
- Abandoned, Private (Operated by Scottish Water)
- Adopted, Private
- Bypass, Private
- Distribution, Private
- Distribution, Private (Operated by Scottish Water)
- Drain, Private
- Fire, Private
- Fire, Private (Operated by Scottish Water)
- Isolated, Private
- Overflow, Private
- Overflow, Private (Operated by Scottish Water)
- Proposed, Private
- Proposed, Private (Operated by Scottish Water)
- Removed, Private
- Sludge, Private
- Sludge, Private (Operated by Scottish Water)
- Trunk, Private
- Washout, Private
- Washout, Private (Operated by Scottish Water)

Service Pipe

- Abandoned
- Communication
- Communication - Fire Connection
- Isolated
- Proposed
- Removed
- Service
- Supply - Common
- Supply - Fire Main
- Supply - Single
- Service Pipe General

Main - Raw Water

- Abandoned
- Isolated
- Overflow
- Proposed
- Raw Supply
- Removed
- Syphon
- Washout
- Main - Raw Water General

Aqueduct

- Abandoned
- Aqueduct
- Tunnel - Aqueduct
- Viaduct
- Aquaduct General

Scottish Water Asset

Waste Water Network

Fittings

Access (Lateral)
- Abandoned
- Combined (C)
- Foul (F)
- Proposed
- Surface Water (S)

Chamber
- Abandoned
- CSO
- Combined
- Foul
- Dual Manhole - Foul
- Dual Manhole - Surface
- Isolated
- Natural Water
- Not Applicable
- Other
- Planned
- Proposed
- Surface Water
- Trade Effluent
- Treated Effluent
- Unknown
- Unknown_

Combined Sewer Overflow
- CSO-COMB SEW O/FL

Balancing Pond

Basin

Bifurcation Chamber
- Abandoned
- Combined (C)
- Foul (F)
- Isolated
- Planned
- Proposed
- Surface Water (S)
- Unknown

Sewerage Air Valve
- Combined (C)
- Isolated
- Abandoned
- CSO (O)
- Foul (F)
- Other
- Proposed
- Surface Water (S)
- Trade Effluent (T)
- Treated Effluent (E)
- Unknown

Buchan Trap
- Abandoned
- CSO (O)
- Combined (C)
- Foul (F)
- Isolated
- Natural Water (W)
- Other
- Proposed
- Surface Water (S)
- Treated Effluent (E)
- Unknown(Z)

Capped End
- Abandoned
- Accepted
- Adopted
- In Use
- Isolated
- Not Applicable
- Planned
- Proposed
- Removed
- Unknown

Hatchbox
- Abandoned
- CSO (O)
- Combined (C)
- Foul (F)
- Isolated
- Natural Water (W)
- Other
- Proposed
- Surface Water (S)
- Trade Effluent (T)
- Treated Effluent (E)
- Unknown

Hydraulic Control Chamber
- Abandoned
- CSO (O)
- Combined (C)
- Foul (F)
- Natural Water (W)
- Planned
- Proposed
- Surface Water (S)
- Trade Effluent (T)
- Treated Effluent (E)
- Unknown

Inlet
- Abandoned
- CSO (O)
- Combined (C)
- Foul (F)
- Natural Water (W)
- Other
- Proposed
- Surface Water (S)
- Treated Effluent (E)
- Unknown

Rodding Eye
- Abandoned
- CSO (O)
- Combined (C)
- Foul (F)
- Isolated
- Natural Water (W)
- Other
- Proposed
- Surface Water (S)
- Trade Effluent (T)
- Treated Effluent (E)
- Unknown
- Unknown(Z)

Non-return Valve
- Abandoned
- CSO (O)
- Combined (C)
- Foul (F)
- Natural Water (W)
- Proposed
- Surface Water (S)
- Treated Effluent (E)
- Unknown

Lamphole
- Abandoned
- CSO (O)
- Combined (C)
- Foul (F)
- Natural Water (W)
- Proposed
- Surface Water (S)
- Treated Effluent (E)
- Unknown

Outfall
- Planned
- Abandoned
- CSO (O)
- Combined (C)
- Foul (F)
- Isolated
- Natural Water (W)
- Proposed
- Surface Water (S)
- Trade Effluent (T)
- Treated Effluent (E)
- Unknown
- Unknown_

Pond

Trench

Sluice Valve
- Abandoned
- CSO (O)
- Combined (C)
- Foul (F)
- Isolated
- Natural Water (W)
- Other
- Proposed
- Surface Water (S)
- Trade Effluent (T)
- Treated Effluent (E)

Unknown End
- Abandoned
- Unknown End

Washout
- Abandoned
- CSO (O)
- Combined (C)
- Foul (F)
- Natural Water (W)
- Other
- Proposed
- Surface Water (S)
- Trade Effluent (T)
- Treated Effluent (E)
- Unknown

Wetland

Vent Column

Pipes

Gravity Pipe
- Abandoned
- CSO (O)
- Combined (C)
- Foul (F)
- Natural Water (W)
- Proposed
- Surface Water (S)
- Trade Effluent (T)
- Treated Effluent (E)
- Gravity Pipe General

Gravity Pipe
- Abandoned
- CSO (O)
- Combined (C)
- Foul (F)
- Natural Water (W)
- Proposed
- Surface Water (S)
- Trade Effluent (T)
- Treated Effluent (E)
- Gravity Pipe General

Connection (Lateral)
- Abandoned
- Combined (C)
- Foul (F)
- Proposed
- Surface Water (S)
- Trade Effluent (T)
- Treated Effluent (E)
- Connection (Lateral) General

Rising Main
- Abandoned
- CSO (O)
- Combined (C)
- Foul (F)
- Proposed
- Surface Water (S)
- Trade Effluent (T)
- Treated Effluent (E)
- Rising Main General

Rising Main
- Abandoned
- CSO (O)
- Combined (C)
- Foul (F)
- Proposed
- Surface Water (S)
- Trade Effluent (T)
- Treated Effluent (E)
- Rising Main General

Syphon
- Abandoned
- CSO (O)
- Combined (C)
- Foul (F)
- Natural Water (W)
- Surface Water (S)
- Treated Effluent (E)

Please note the plans provided by Scottish Water Horizons (SWH) or Scottish Water (SW) are subject to the following conditions:

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b) SWH/SW will not accept any liability due to any loss, damage, injury or any other occurrence arising from the Customer or End User's use of the Utility Search Report.

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