Client

Stephen G Dalton & Son

Project

Mixed-use Residential Development, Salamander Street.

Title

Surface Water Management Plan

Date
November 2023

Issue
P00

ETIVE

CONSULTING ENGINEERS

Revision	Description	Issued by	Date	Checked
P00	Planning	JPC	13/11/2023	MNU

Report Reference: 23042-ETV-52-XX-C-RP-0001

CERTIFICATE A1 – SELF CERTICATION (DESIGNER)

1 We certify that reasonable professional skill and care has been used in the preparation and checking of the Surface Water Management Plan / Flood Risk Assessment (*delete as appropriate*) for the development at Salamander Street with a view to securing that:-

i It has been designed and checked in accordance with the most recent City of Edinburgh Council Flood Prevention Requirements.

ii It has been checked for compliance with the relevant Standards in i.

iii details of the ground investigation and the attached interpretative report demonstrating that any soakaways provided are compliant provided *(delete as appropriate)*

iv It has been accurately translated into drawings and documents submitted alongside the planning application (all of which have been checked). The unique numbers and revisions of these drawings are:-

23042-ETV-XX-C-RP-0001 Surface Water Management Plan

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2 Signed [redacted].....

Name Marta Navarro .....

DESIGN TEAM LEADER

3 Signed [redacted].....

Name John Chapman .....

Professional Qualifications CEng MICE .....

Position Held Director .....

PRINCIPAL OF ORGANISATION RESPONSIBLE FOR DESIGN

Name of Organisation ETIVE CONSULTING ENGINEERS .....

Date 13/11/23 .....

4 Is an independent check required? (Refer to Section 7) (*Delete as appropriate*) Yes/~~No~~

5

This certificate is accepted by the City of Edinburgh Council

Version: February 2017 **SURFACE WATER MANAGEMENT CHECKLIST**

Application reference: _____/_____/_____

	Item	Provided? (Y/N)	Submission Section Reference	If N comment reason
1	Location Plan.	Y	Section 3.1 & Appendix A	
2	Pre development overland flow path arrows for site **and surrounding land**.	Y	Section 6.2.1	
3	Area of impermeable surface in proposed development.	Y	Section 6.2	
4	Greenfield runoff calculations for impermeable area.	Y	Section 6.2.1 & Appendix C	
5	Confirmation that attenuation is provided to allow 200yr+40CC discharge at the lesser of *: • 1:2 year greenfield runoff rate; • 4.5 l/s/ha of **impermeable area.** *Subject to minimum 75mmØ flow control (3l/s)	Y	Section 6.2.2 & Appendix C	
6	Volume of attenuation required to allow discharge at greenfield rate (m^3). Volume of attenuation provided within the proposed drainage layout (m^3).	Y	Section 6.2.2 & Appendix C	
7	• Hand calculations or • Hydraulic modelling outputs with pipes included[1] and 30year+CC and 200year +40CC outputs. (1000year+CC for civil infrastructure[2]).	Y	Appendix C	
8	Drainage drawing with manhole numbers that cross reference with the hydraulic modelling outputs.	Y	Appendix D	
9	Confirmation that 30year +CC event remains below ground and that 200year +40CC remains attenuated on site safely[3].	Y	Section 6.2.2	
10	Post development flow paths for site and surrounding area (on separate plan to pre development)[4].	Y	Section 6.2.2	
11	Confirmation of who will adopt and maintain the surface water system including SuDS.	Y	Section 6.3	
12	Confirmation where the surface water ultimately discharges.	Y	Section 6.2.1	
13	Confirmation that appropriate water quality measures (SuDS treatment) is included in the design in line with relevant guidance.	Y	Section 6.2.1	
14	If discharging surface water to public sewer - confirmation that Scottish Water agree in principal to proposed connection.	Y	Section 2.2 & appendix B	DIA underway.
15	Does the proposed design take cognisance of Section 3.7 Water Environment (Edinburgh Design Guidance) and Policies Des 5 City Local Plan, E44 Rural West Local Plan and Des 8 Edinburgh Local Development Plan?	Y	Section 2.2	

[1] Pipe network only required for FUL and AMC applications. Where part of a larger strategy attenuation network then this must all be represented. For PPP applications minimum requirements are total storage volume and subsequent to-scale representation and location shown on plan layout.
[2] Refer to SPP for definition of civil infrastructure.
[3] All property FFLs are 600mm above this 200-year water level.
[4] For PPP applications where the site layout has not been finalised, an indication of the general intention for overland water flow paths should be presented.

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Table of Contents

1.0 Introduction

1.1 Purpose of Report

This Surface Water Management Plan (SWMP) is prepared on behalf of Stephen G Dalton & Son ('the Applicant') who is seeking detailed planning permission for the following description of development: "D*emolition of the existing building, and the erection of mixed use development including: residential development (build to rent) and purpose-built student accommodation development with commercial/retail floorspace (Class 1A) at street level with associated amenity space, landscaping and cycle parking at 52-66 Salamander Street, Leith, Edinburgh EH6 7LA* ('the Application').

This Flood Risk Assessment is part of a suite of documents submitted with the Application, as outlined below. These supporting documents are in addition to the formal application documents comprising the accompanying plans, sections, and elevations.

- Planning Statement
- Pre-application Consultation Report
- Design and Access Statement (Inc. Waste Management Plan, Building Adaptability and Amenity Breakdown)
- Landscape Statement
- Noise Impact Assessment
- Air Quality Impact Assessment
- Transport Statement
- Flood Risk Assessment
- **Surface Water Management Plan**
- Geo-environmental Report
- Sunlight and Daylight Assessment
- Ecological Assessment
- Statement of Energy
- Archaeological Assessment

The purpose of this this report is to inform the client and statutory reviewers of key foul, surface water drainage, including sustainable drainage system (SuDS), issues and constraints, which may influence the development process, and provide integrated drainage solutions for the proposed development, ensuring compliance with all current design guidance and best management practice.

The assessment has been based on a study of relevant historic information and informed by consultation with the City of Edinburgh Council Flood Prevention team, Scottish Environment Protection Agency (SEPA) and Scottish Water.

This report has been carried out to:

- Determine the drainage requirements for the site and identify any potential constraints.
- Establish an estimation of the pre-and post-development surface water flows.
- Identify appropriate SuDS technique which could be implemented on-site and its impact.
- Establish an appropriate means of foul water disposal form the site.

1.2 Reference documents

The report has been prepared referencing the following statutory literature and guidance documentation:

- CIRIA (2004). Interim Code of Practice for Sustainable Drainage Systems, National SUDS Working Group
- CIRIA (2015). C753 The SuDS Manual, CIRIA, Department for Environment, Food & Rural Affairs
- City of Edinburgh Council (2019), Guidance on Flood Risk Assessment and Surface Water Management Plans
- Vision for Water Management in the City of Edinburgh (CEC, 2020)
- City of Edinburgh Council Sustainable Rainwater Management Guidance (CEC, 2021)
- City of Edinburgh Council (April 2023). Development Control – Flood Risk and Surface Water Management Plan Requirements
- National Planning Framework 4 (NPF4) February 2023.
- Scottish Water (2018) Sewers for Scotland 4th Edition
- Scottish Water (2017), *Standard Advice note and process guidance: Surface Water Policy.*

2.0 Data Acquisition

Drainage information was collected from the following sources:

- Scottish Environment Protection Agency (SEPA)
- City of Edinburgh Council
- Scottish Water
- Desktop Search.

2.1 Scottish Environment Protection Agency

SEPA is the flood warning authority in Scotland responsible for monitoring river levels, rainfall, tidal predictions, and weather forecasts across the country to predict the likelihood and timing of likely flooding events. SEPA also has a strategic role in managing flood risk and has a duty to provide flood risk advice to Planning Authorities when consulted in relation to applications for development where the Planning Authority considers there may be a risk of flooding.

A review of information available via SEPA online maps at http://map.sepa.org.uk/floodmap/map.htm was carried out. Mapping of groundwater, fluvial, coastal, and pluvial flood risk as well as potentially vulnerable areas was examined.

For flood risk refer to Etive Consulting document 23042-ETV-52-XX-C-RP-0002.

2.2 City of Edinburgh Council

Under the terms of the Flood Prevention (Scotland) Act 1961, the Flood Prevention, Land Drainage (Scotland) Act 1997, the Flood Risk Management (Scotland) Act 2009 and the City of Edinburgh Council, as designated Flood Prevention Authority, have specific responsibilities, powers, and duties in relation to flood prevention matters. This includes the role of implementing controls to ensure development proposals have adequate surface water runoff controls and flood prevention controls.

The proposed surface management plan for the Salamander Street development has been evaluated to take cognisance of Section 3.8 of the Edinburgh Design Guidance concerning the water environment.

We believe the following requirements for the preliminary drainage design for the site have been met:

- Ensure that properties are not at risk from flooding from watercourses (above or below ground) or from sea.
- Design developments, including the floor level of buildings, to ensure that properties are not at risk of surface water flooding.
- Provide surface water attenuation on site to reduce flooding, due to the development, on surrounding areas.
- Integrate Sustainable urban Drainage Systems (SuDS) into development so that their visual, landscape and biodiversity potential is maximised.

The current drainage strategy for the site, explained later in the report, is expected to manage all events of surface water runoff from the development area without adversely affecting on-site building or properties and infrastructure in the vicinity of the site.

2.3 Scottish Water

Scottish Water asset plans for the site and its surroundings were obtained from the Scottish Water GIS database, a copy of which is provided in Appendix B.

A pre-development enquiry (PDE) application has been submitted to Scottish Water (SW) via the online portal to confirm the available capacity within the existing combined sewer network to receive foul and surface water flows from the development.

We await a response from Scottish Water on our PDE application.

2.4 Desktop Search

A desktop internet search was undertaken to gain any background knowledge of the site.

No records of flooding or drainage failure were found to have been reported in or around the area of the proposed development.

3.0 Regulatory Frameworks

3.1 Scottish Planning Policy (superseded)

Prior to adoption of National Planning Framework 4 (NPF4) in February 2023, Scottish Government planning policy on flooding and drainage was provided by Scottish Planning Policy (SPP) paragraphs 254–268 (Scottish Government, 2014). This policy was based on the following principles:

- Developers and planning authorities must consider the possibility of flooding from all sources.
- New development should be free from significant flood risk from any sources.
- In areas characterised as “medium to high” flood risk for watercourses and coastal flooding new development should be focused on built up areas and all development must be safeguarded from the risk of flooding.
- The storage capacity of functional flood plains should be safeguarded from further development.
- The functional flood plains comprise areas generally subject to an annual probability of flooding greater than 0.5% (1 in 200 year).
- Drainage is a material consideration and the means of draining a development should be assessed. Any drainage measures proposed should have a neutral or better effect on the risk of flooding both on and off the site.
- Sustainable Drainage Systems (SuDS) are required to avoid increased surface water flooding.

With respect to surface water flood risk, SPP specified that infrastructure and buildings should generally be designed to be free from surface water flooding in rainfall events when the annual probability of occurrence is greater than 0.5% (1:200 years). Furthermore, surface water drainage measures should provide a neutral or better effect on the risk of flooding both on and off site, accounting for both rain falling on the site as well as run-off from adjacent areas.

3.2 National Planning Framework 4 (NPF4)

NPF4 was adopted by Scottish Ministers on 13 February 2023, replacing SPP (2014). In relation to flood risk and water management, the intent of NPF4 is:

"To strengthen resilience to flood risk by promoting avoidance as a first principle and reducing the vulnerability of existing and future development to flooding."

Where development cannot avoid areas of flood risk, proposals will only be supported if they are for:

i. essential infrastructure where the location is required for operational reasons.

ii. water compatible uses.

iii. redevelopment of an existing building or site for an equal or less vulnerable use; or.

iv. redevelopment of previously used sites in built up areas where the Local Development

Plan (LDP) has identified a need to bring these into positive use and where proposals demonstrate that long-term safety and resilience can be secured in accordance with relevant SEPA advice.

In relation to surface water flood risk, development proposals will:

i. not increase the risk of surface water flooding to others, or itself be at risk.

ii. manage all rain and surface water through sustainable 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.

iii. seek to minimise the area of impermeable surface.

For planning purposes, "at risk of flooding" and "in a flood risk area" means land or built form with an annual probability of being flooded of greater than 0.5% which must include an appropriate allowance for future climate change.

SEPA and local authority guidance is yet to be updated to reflect interpretation and application of NPF4 at the date of issue of this FRA, with all existing guidance therefore being based upon SPP (2014).

The FRA will seek to be compliant with NPF4 in relation to defining the site surface water management strategy and with existing Scottish Water and local authority guidance in all other aspects.

4.0 Site Context

4.1 Location and Description of Site

The site is in the Leith area of Edinburgh, approximately centred on Ordnance Survey National Grid Reference NT 276 762 and covers an area of approximately 0.49-hectares.

The existing brownfield site comprises of an active scrap yard, with a building to the south-east corner. The site is bounded by Salamander Street to the north, by Salamander Place to the west and by commercial and residential buildings to the south and east respectively. A location plan is provided in Figure 1.0.

The site is located within the Edinburgh Waterfront allocation for regeneration. The Edinburgh Local Development Plan (ELDP 2016) sets out a key aim and strategy is to direct growth to this area as one of the key strategic development areas. The ELDP sets out opportunity for mixed use regeneration on the largest scale. More specifically the site is covered by allocation EW 1c for Housing-led regeneration on former industrial land.

The emerging City Plan 2030 further sets out the intent for significant development at the Edinburgh Waterfront. One of its key Aims sets out how development should be directed to brownfield land to deliver new communities at the Waterfront. The site is specifically identified as one for redevelopment. It is recognised that City Plan 2030 is yet to be found sound and adopted."

Figure 1.0: Site Location plan Ordnance Survey,2023)

4.2 Topography

A topographical survey of the site and surrounding areas was undertaken by GL Surveys in September 2023. A full copy of provided in Appendix A.

The survey depicts the levels of the site to generally fall in a north to south direction from 4.30m AOD in the south to 4.15m AOD to the North. The carriageway of Salamander Street, which follows the northern boundary of the site, falls in the west to east direction from 4.04m AOD to 3.88m AOD.

4.3 Existing Drainage

Public sewer records have been procured from the Scottish Water GIS database. These records show that the site and surrounding development is predominantly services by a combined sewer network, the exception being the dwellings of Sailmaker Road which have dedicated surface and foul water sewers. However, there ultimately discharge into the combined sewer system below Salamander Place.

A 600mm diameter concrete combined sewer is located below Salamander Street, this sewer flows in a westerly direction along Salamander Street towards Baltic Street. A 480mm brick build sewer flows in a northerly direction below Salamander Place, to the immediate west of the site, and into the main 600mm sewer, noted above, running below Salamander Place.

In addition to a search of public sewer records, and review of the City of Edinburgh Council archives has been undertaken. Drainage records for the current scrap yard on the site have been obtained. These records note that the existing buildings and hardstandings of the scrap yard are services by two dedicated combined (collecting both foul and surface water) sewers. Site buildings and gullies collecting runoff form the entrance and parking area of the site are collected and conveyed to the public combed sewer below Salamander Street, through a disconnecting manhole located within the entrance road bellmouth into the site.

A second combined sewer line services the main are of the site used to store scrap. This area collecting runoff from the scrap area as well as an existing vehicle wash facilities. Flows from these areas and passed through a petrol interceptor prior to discharge off site through a 150mm diameter pipe connection into the local sewer network.

A copy of the Scottish Water records and archive drainage records are provided in Appendix B.

4.4 Water Courses and Water Features

The Leith Docks are located 270m to the north of the site with the Firth for 870m north of the site.

The Waters of Leith are located 640m west of the site.

4.5 Geology and Ground Conditions

Johnson Poole & Bloomer (JPB) have undertaken a Stage 1 Geoenvironmental Investigation Report for the site (document reference XG240-02\MAK).

Based on their assessment of the available geological information, made ground is anticipated across the site associated with the former developments and iron works on the site. The underlying superficial deposits are noted to comprise marine deposits, clays, sands, and gravels. These are considered to the underlain by silts and clays or marine origin.

JPB consider the underlying rock strata to being to the Gullane Formation, typically comprising of mainly interbedded sandstones with siltstones and mudstones.

The report examines historical records for mining and mine entries and no evidence of underground mining within the vicinity of the site was noted.

4.6 Development Proposals

The proposed development is for the erection of mixed-use development including residential development (build to rent) and purpose-built student accommodation development with commercial/retail floorspace (ClassA1) at street level with associated amenity space, landscaping and cycle parking at 52-66 Salamander Street, Leith, Edinburgh.

A full copy of the proposed site layout is provided in Appendix A.

Figure 2.0: Proposed Site Layout Plan (Rankin Fraser, 2023)

Proposed site levels have been shared by the Landscape Architects which depict a ground flood level of 4.20m AOD. The ground floor consisting of bike and bin stores in addition to amenity space and allowance for commercial/ retail space.

Residential space for the development has been proposed at 1st flood building level with a finished floor level of 5.40m AOD.

5.0 Drainage Assessment

This report includes a high-level indication of the total site storage requirements for surface water and likely foul drainage volumes based on the numbers at the time of writing.

The following section presents the conceptual drainage strategy and surface water management plan specific to the proposed development.

5.1 Drainage Strategy Overview

The Drainage Assessment should deal with potential flood risk from surface water falling on the site, ensuring that runoff from the development will not increase the risk of flooding on site or elsewhere.

To comply with the National Planning Framework (NPF4, 2023) and the City of Edinburgh Council guidelines (2022), the surface water runoff from the site should be attenuated on-site prior to discharge off site.

Surface water should be attenuated to suitable discharge rate, required by the City of Edinburgh Council to be the equivalent 2-year greenfield runoff rate or 4.5 litres/second/hectare, whichever is the lowest figure. The surface water should be attenuated up to the 1 in 200-year (0.5% AEP) rainfall event, including a 40% allowance for climate change.

Where the lowest figure calculated from the City of Edinburgh guideline falls below 3 l/s, a default minimum 3 l/s discharge rate can be used as it is appreciated that surface water flow rates below this level can lead to inefficiencies and potential blockages in the proposed system.

An appropriate point of discharge for surface water discharge should be explored and considered.

In addition to surface water attenuation, an appropriate method of surface water treatment should be implemented on the site to follow the best practice requirements of Sustainable Drainage Systems (SuDS) to prevent negative impacts on receiving water quality.

The recommended method of assessing appropriate SuDS techniques for water quality is to follow the Simple Index Approach (SIA) as detailed in SEPA Regulatory Method WAT-RM-08 and CIRCA C753 The SuDS Manual.

The proposed foul and surface water networks should be designed as separate systems in accordance with Building Regulations and Sewers for Scotland 4th Edition and modelled using suitable hydraulic modelling software.

5.2 Foul Water Management

Foul flows generated from the proposed development buildings will be collected and conveyed off site through a traditional gravity pipe system to the 225mm diameter combined drainage network running below Salamander Street.

Proposals are to reuse the existing disconnecting manhole located on site where possible, to limit the off-site works required to tie into the local sewer network. The foul sewer network on-site will be kept separate from the surface water network and independent foul networks will service the PBSA and BTR element so the scheme.

An assessment of pre- and post-development foul flows generated on site has been undertaken, using the flow data presented in the Flows and Loads 4 – sizing criteria and Scottish Water guidance.

Table 5.1 presents a summary of the pre- and post-development flow rates.

Application	Average Flow (l/s)	Peak Flow (l/s)
Pre-development flows – Onsite office/welfare Estimated staff numbers = 8.	0.006	0.014
Post development flows. 279 bed PBSA scheme 216 bed BTR scheme	0.430	1.07

Table 5.1: Pre & Post-development Foul Flows

A comparison of pre and post development foul flows indicates that in the post-development state the average foul flows would increase by 0.424 l/s due to the change of site use. This flow comparison has been submitted to Scottish Water for review as part of the pre-development enquiry (PDE) assessment.

In accordance with design standards, the post-development foul water network should be designed to provide a self-cleansing regime with a minimum flow velocity of 0.75m/s at one-third design flow. Gradients should be restricted to no steeper than 1:10 to comply with safety standards.

The foul water design will be developed to an adoptable standard, where practicable, referring to the design parameter guidance in Sewers for Scotland 4th Edition, 2018 and current building design standards.

A copy of the conceptual foul water layout for the development is provided in Appendix E.

5.3 Surface Water Management Plan

A surface water management plan should deal with potential flood risk from surface water falling on the site, ensuring that runoff from the development will not increase the risk of flooding on site or elsewhere.

5.4 Pre-Development Assessment

5.4.1 Overland flow routing

A layout plan noting the overland flow routing in the pre-development state is provided in Appendix D. this has been based upon the topographical survey for the site and illustrates overland flow would be in a south to north direction towards Salamander Street.

5.4.2 Existing discharge rates Greenfield Runoff Rate

The total site covers an overall area of 0.48-hectares. Following the percentage runoff equations to WALLINGFORD PROCEDURE Volume 4 'The Modified Rational Method' surface water runoff in the existing brownfield state has been calculated to be 57.1 litres per second (l/s) for the 2-year return period, as shown in the below table.

Table 5.2 - Pre-Development Flow Rates

Storm Event					Coefficient C		Rainfall intensity i		Impermeable Area Ai
2 year	Qp	=	2.78	x	0.975	x	43.9	x	0.48
	Qp	**=**	**57.1**	**l/s**					
30 year	Qp	=	2.78	x	0.975	x	94.3	x	0.48
	Qp	**=**	**122.8**	**l/s**					
100 year	Qp	=	2.78	x	0.975	x	121.9	x	0.48
	Qp	**=**	**158.6**	**l/s**					
200 year plus % CC	Qp	=	2.78	x	0.975	x	126.5	x	0.48
	Qp	**=**	**164.5**	**l/s**					

5.4.3 Greenfield Runoff Rate

Calculations were carried out using the Institute of Hydrology IH124 method, to determine the equivalent greenfield runoff rate for the site.

The total re-development site covers an overall area of 0.48ha. Table 5.3 below shows the greenfield runoff rate for a 2-year return period as 2.2 l/s.

Table 5.3 - Greenfield Runoff Rates

Region	QBAR Rural (L/s)	QBAR Urban (L/s)	Q 2 (years) (L/s)	Q 1 (years) (L/s)	Q 30 (years) (L/s)	Q 100 (years) (L/s)
Region 2	2.4	2.4	2.2	2.1	4.6	6.4

The equivalent Greenfield runoff rate, using city of Edinburgh Council requirements of 4.5l/s/hectare would equate to 2.16 l/s.

In accordance with the requirements the lower figure shall be considered as the surface water discharge rate.

5.5 Post-Development Assessment

5.5.1 Surface Water Discharge

An appropriate point of discharge for surface water has been considered in accordance with Scottish Water's surface water management policy (Scottish Water *Standard Advice note and process guidance: Surface Water Policy* document SWSWP1/01/17).

Five potential sources for surface water disposal from the development have been identified and investigated using the hierarchical method noted in the Scottish Water policy document.

There suitability has been assessed based upon practicality and known entities at the time of writing. A summary of each potential source is presented below:

- **Rainwater harvesting:**

The implementation of the reuse of rainwater (Grey Water harvesting) for a development of this nature is not a viable solution for managing surface water. Moreover, even where rainwater re-use is considered appropriate for a portion of flows, a suitable connection to the public network will still be required.

- **Infiltration drainage:**

The site is located within a brownfield urbanised area of land, constrained on all sides, with the majority of the site being proposed for building structures making available space for on-site soakaway with the requisite 5m distance from building structures not viable for the scheme.

Based on site investigation report of the available geological information, made ground is anticipated across the site associated with the former developments and iron works on the site. The underlying superficial deposits are noted to comprise marine deposits, clays, sands, and gravels. These are considered to the underlain by silts and clays or marine origin.

The anticipated soil strata are considered unsuitable for surface water infiltration techniques due to the present of clay. However, partial infiltration SuDS would be possible on the site and should be considered within the scheme.

- **Discharge to a watercourse:**

The Waters of Leith are located 640m west of the site with a densely populated urban setting between the site and the river. On this basis discharge to a watercourse is not considered viable for this site.

- **Surface water sewer:**

Scottish Water records have been reviewed. A surface water sewer network is present to the south of the site, below Sailmaker Road. A trace of this sewers indicates its final discharge point to be into the combined sewer system below Salamander Place, therefore discharging to this sewer would not be a practical solution for the site.

- **Public combined sewer:**

The site currently drains to the Public Combined sewer unattenuated at two separate connection points into the large diameter sewer below Salamander Street. With the lack of alternative suitable discharge points for site surface water, the combined sewer system is deemed the only viable option for surface water discharge.

In discharging post development flows to this sewer, the development drainage strategy should include betterment to the overall flow rate and surface water volume existing the site, when compared to the pre-development scenario.

The implementation of soft landscape, attenuation features and SuDS techniques will assist in reducing the peak runoff and volume of surface water entering the existing combined sewer system.

5.5.2 Surface Water treatment

City of Edinburgh Council guidance requires surface water to be treated prior to entering the combined sewer network. Proposed land uses within the site are classified as building roof areas, pedestrian areas and low traffic access (service) roads. Therefore, in accordance with the CIRIA C753 Manual, the attributed pollution 'hazard' levels associated with building roof and pedestrian areas is typically 'very low; to 'low', with low traffic access roads also categorised as 'low'.

Each proposed land use has been numerically categorised based on the susceptibility of producing a pollution risk to receiving surface waters (following discharge of surface water run off). To deliver adequate treatment, the selected SuDS components should have a total pollution mitigation index (for each contaminant type) that equals or exceeds the pollution hazard index (for each pollution type). Where the mitigation index of an individual component is insufficient, two components (or more) in series will be required. In this case, the Total SuDS Pollution Mitigation Index can be calculated by the following equation.

$$\text{Total SuDs Mitigation Index} = \text{mitigation index}_1 + 0.5\ \text{mitigation index}^2$$

Where: mitigation index$_n$ = mitigation index for component

The Simple Index Assessment (SIA) approach has been used to assess appropriate surface water treatment options for the proposed site. Table 5.4 & 5.5 contain the SIA output results for the proposed development, associated hazard levels, SuDS components and mitigation.

Table 5.4: SIA Site Classification

Proposed Land Use	Pollution hazard level	Total Suspended Solids	Metals	Hydrocarbons
Low Traffic Access Roads	Low	0.5	0.4	0.4
Pedestrian areas and Residential Roofs	Very Low	0.2	0.2	0.05
Residential Roofs	Low	0.3	0.2	0.05

Table 5.5: SIA SuDS Selection

Proposed Land Use	Level of treatment	Proposed SuDS Component	Total Suspended Solids	Metals	Hydrocarbons
Access Roads	1	Filter Trench	0.5	0.4	0.4
	Min SuDS Pollution Mitigation index		**0.4**	**0.4**	**0.4**
Pedestrian areas	1	Bioretention	0.8	0.8	0.8
	Min SuDS Pollution Mitigation index		**0.8**	**0.8**	**0.8**
Residential Roofs	1	Filter Trench (or)	0.4	0.4	0.4
		Blue/ Green Roofs	0.8	0.8	0.8
	Min SuDS Pollution Mitigation index		**0.4**	**0.4**	**0.4**

The SIA assessment has confirmed that the selected SuDS components are satisfactory for the site in terms of water quality treatment, with proposed SuDS elements providing a satisfactory level of treatment to collected surface water.

5.5.3 Surface water discharge and Attenuation

The surface water discharge rate for this site has been calculated to be a total of 2.16l/s, in accordance with the City of Edinburgh guidance. Where the lowest figure calculated from the City of Edinburgh guideline falls below 3 l/s, a default minimum 3 l/s discharge rate can be used as it is appreciated that surface water flow rates below this level can lead to inefficiencies and potential blockages in the proposed system.

Surface water attenuation are that on-site attenuation should be sufficient to ensure that rainfall events up to and including the 1 in 200-year plus 39% climate change (CC) are retained on site, whist maintaining the restricted discharge rate from the site, 3.0l/s. Formal below and above ground attenuation will be provided for the 1 in 200- years and 39% climate change, with exceedance flows, over the 1 in 200-years plus 39% climate change, contained within the surface SuDS features and road areas of the site.

A preliminary surface water network model for the site been developed and simulations undertaken to ascertain the overall volume of surface water attenuation required to be incorporated into the development.

The total volume of surface water attenuation required for the site, based on a respective contributing areas, has been calculated to be in the order of 363m^3.

A copy of the Network Simulation calculations is provided in Appendix D.

5.5.4 Surface water proposals

Based upon the current site layout and urbanised nature of the site, there is limited space to provide extensive surface water attenuation storage at surface level in the form of a basin or pond.

Having reviewed appropriate SuDS measures and minimum attenuation requirements, it is proposed that the surface water drainage strategy for the site incorporates.

- Blue/Green roofs will be introduced on the proposed flat roofs amenity deck and podium deck of the BTR and PBSA buildings, covering an approximately area of 1,020m^2. The preliminary storage depth of these blue/green roofs will be 100mm providing attenuation storage of approximately 81.6m^3.

- Raingardens and bioretention areas will be strategically located around the development site at localised low points to collect and treat runoff from the proposed courtyard and external hardstanding areas.

- Additional attenuation storage, primarily for surface water storage of runoff from roads and footpaths, will be provided by a below ground oversized pipework in addition to available storage within the bioretention, filter trenches and raingarden features.

All proposed surface water pipes will be designed with a minimum velocity of 1m/s at pipe full flow and with a roughness of 0.6mm. The pipe should provide enough capacity to convey all the surface runoff flows to attenuation and treatment facilities. Indicative drainage proposals are provided in Appendix D

5.5.5 Post-Development Overland Flow Routing

Exceedance flows may occur when intense rainfall events exceed the infiltration capacity of the ground or capacity of the receiving drainage system. In instances where this may occur, it is important that overland flow routing is guided away from development buildings.

The finished ground levels for the from the site have been designed in such a way that exceedance flows will be routed away from the buildings and access points and towards softlandscaping and SuDS areas.

Drawings contained in Appendix D depict the key overland flow routing for the post development confirming runoff will be contained within the site and fall away from development buildings.

6.0 Maintenance

The drainage network within the redline boundary of the site will remain private and maintenance and inspection of the network should be through a factored agreement.

For these elements of the drainage a private maintenance and inspection regime should be compiled for the site in line with best practice guidance.

During the first year of operation, inspections should ideally be carried out after every significant storm event to ensure proper functioning.

Recommended maintenance requirements and frequencies of SuDS features are given with CIRIA (C753) the SuDS Manual, however specific maintenance requirements should be monitored and adjusted to suit site-specific conditions.

A regular SuDS and drainage inspection and maintenance regime will:

- help determine future maintenance activities.
- confirm hydraulic, water quality, amenity, and ecological performance.
- allow identification of potential system failures e.g., blockage, poor infiltration, poor water quality etc.

Specific maintenance and inspection of the proposed/blue green roofs within the development should be in accordance with the selected manufacturers guidance and literature.

7.0 Conclusions

The implementation of SuDS will attenuate flows from the proposed development and reduce peak discharge and volume of surface water offsite to the public sewer. Thus, providing betterment to the existing surface water regime for the site and meeting the requirement of Scottish Water policy and City of Edinburgh Council standards.

For surface water flows discharging to the public combined sewer system, proposals are to attenuate surface water discharge from the site to 3.0 l/s in line with the requirements of the City of Edinburgh Council. This restriction provides a 54.1 l/s reduction from the pre-development discharge rate from the site.

The surface water network will incorporate blue roofs, oversized pipe network, filter trenches and raingarden/bioretention areas to provide 363m^3 storage with a vortex flow control installed at the downstream of the networks.

Foul flows from the proposed redevelopment will be collected and conveyed off site through a traditional gravity pipe to the public combined sewer flowing below Salamander Street.

A Pre-development enquiry based upon the calculated flows has been sent to Scottish Water for approval and we await a response from them.

APPENDIX A – Topographical Survey & Site Plan

NOTES

1)

All survey levels and co-ordinates
are related to OS Datum and Grid
(National GPS Network).

2)

Whilst G.L.Surveys has made every effort to locate all
topographical and building features we cannot accept
responsibility for any features which may be omitted if
they are obscured from view for any fixed or temporary
reason at the time of the survey taking place.

LEGEND

AV - Air Valve
BH - Borehole
B - Bollard
BT - British Telecom Cover
C - Cover(unknown service)
CC - Concrete Cover(unknown service)
CL - Cill Level
COL - Column
CT - Cable Television Cover
D - Drain
DK - Drop Kerb
EC - Electricity Cover
EL - Eaves Level
EP - Electricity Pole
ER - Earthing Rod
FL - Floor Level
G - Gully
GAS - Gas Cover
GPO - Post Office Box
GT - Gas Toby
IC - Inspection Cover
IL - Invert Level
KL - Kerep Left Bollard
LB - Lighting Bollard
LL - Lintel Level
LP - Lamp Post
LT - Lighting Tower
MC - Mercury Cover
MH - Manhole
MKR - Marker
MP - Mooring Post
MR - Mooring Ring
OBM - O.S. Benchmark
OHW - Overhead Wires
OTP - O.S. Trig Point
P - Post
PM - Parking Meter
PYLN -Elec. Pylon
RE - Retaining Wall
RL - Ridge Level
RS - Road Sign
SP - Sign Post
SV - Stop Valve
T - Toby
TPIT - Trial Pit
TL - Traffic Lights
TP - Telegraph Pole
TV - Cable T.V. Cover
VP - Vent Pipe
WC - Water Cover
WH - Wall Head Level
WL - Water Level
WM - Water Meter
WT - Water Toby

GLS

G.L.SURVEYS
87 COMELY BANK AVENUE
EDINBURGH EH4 1EU
0131 315 2012
edinburgh@glsurveys.com

CLIENT

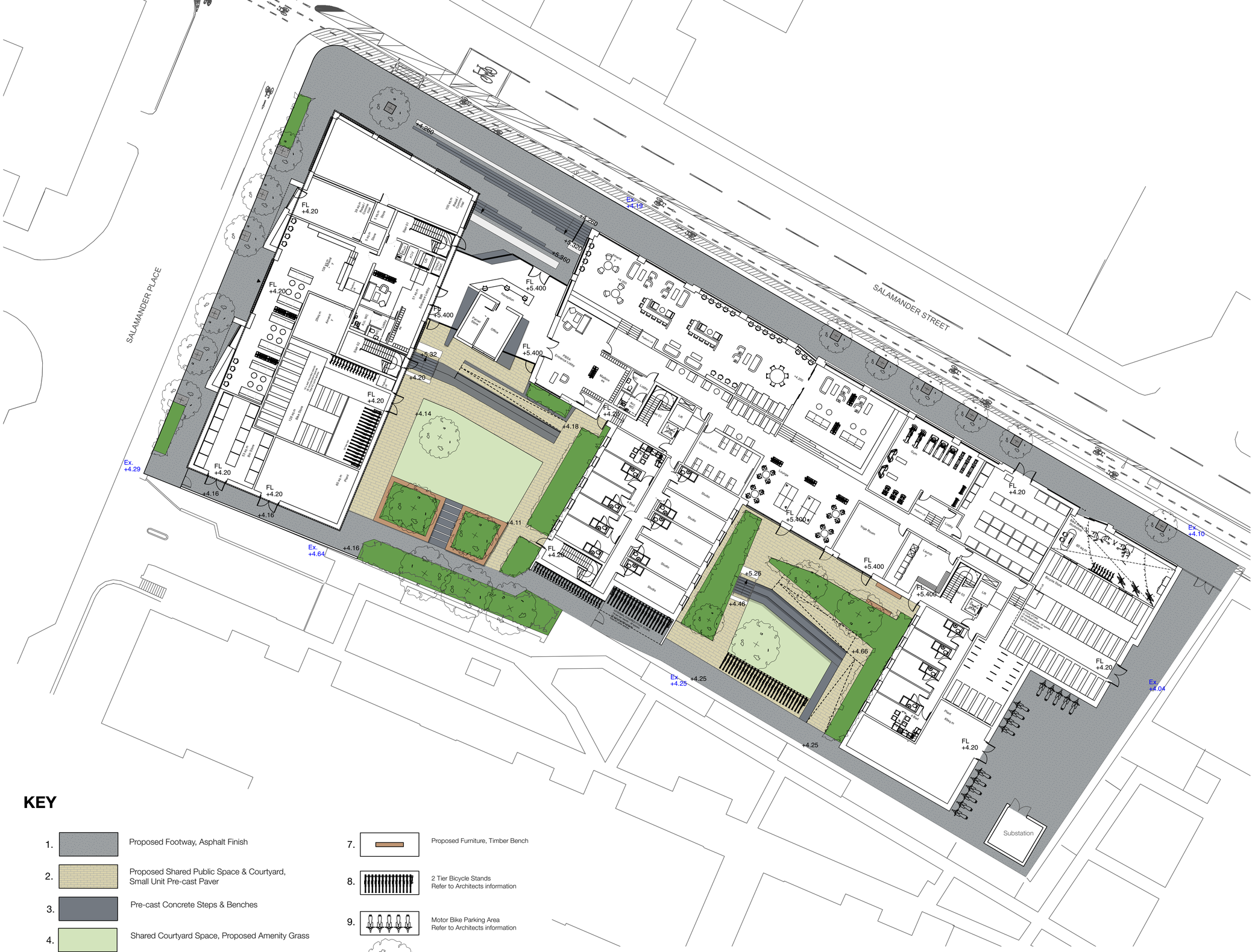
JOB TITLE
SALAMANDER STREET
EDINBURGH

DRAWING TITLE
SITE SURVEY (2D)
(PRELIMINARY)

DATE		SCALE
28.09.2023		1:200@A0
SURVEYED BY: EL	EDITED BY: EL	CHECKED BY: SL
JOB NUMBER: 23-07-03		DRAWING NUMBER: 01

Note:
Work to written dimensions only,
All dimensions to be checked on site,
Do not scale from drawing,
Any drawing errors or inconsistencies should be brought to the attention of rankinfraser landscape architecture as soon as they become apparent.

Refer to Planting Plan OOO-RFL-XX-XX-DR-L-0001



KEY

1. Proposed Footway, Asphalt Finish
2. Proposed Shared Public Space & Courtyard, Small Unit Pre-cast Paver
3. Pre-cast Concrete Steps & Benches
4. Shared Courtyard Space, Proposed Amenity Grass
5. Proposed Planting Area
6. Tactile Paving
7. Proposed Furniture, Timber Bench
8. 2 Tier Bicycle Stands
   Refer to Architects information
9. Motor Bike Parking Area
   Refer to Architects information
10. Proposed Trees
11. Metal Tree Grille

N

0 5 15 20m

P01 30/10/2023
rev date revision notes

rankinfraser
landscape architecture

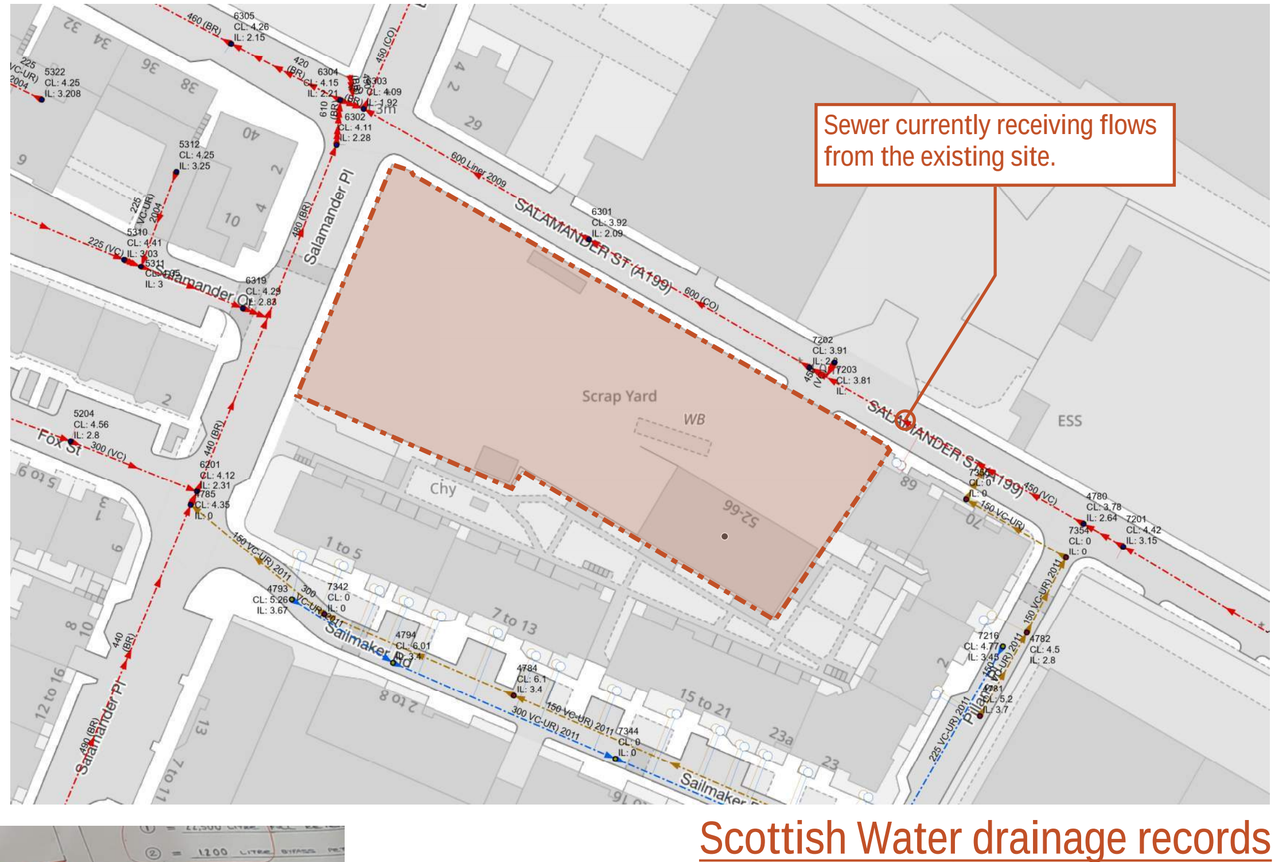
project **project nr** 2315
52-66 Salamander Street
client
Dalton Metal Recycling Ltd
drawing title
Landscape Layout Plan
drawing nr
OOO-RFL-XX-XX-DR-L-0001

date	**rev**	**scale**
30/10/2023	P01	1:200 @ A1

issue
information
billing
tender
construction
final construction

PLANNING

8 Darnaway Street Edinburgh EH3 6BG
0131 226 7071
mail@rankinfraser.com www.rankinfraser.com

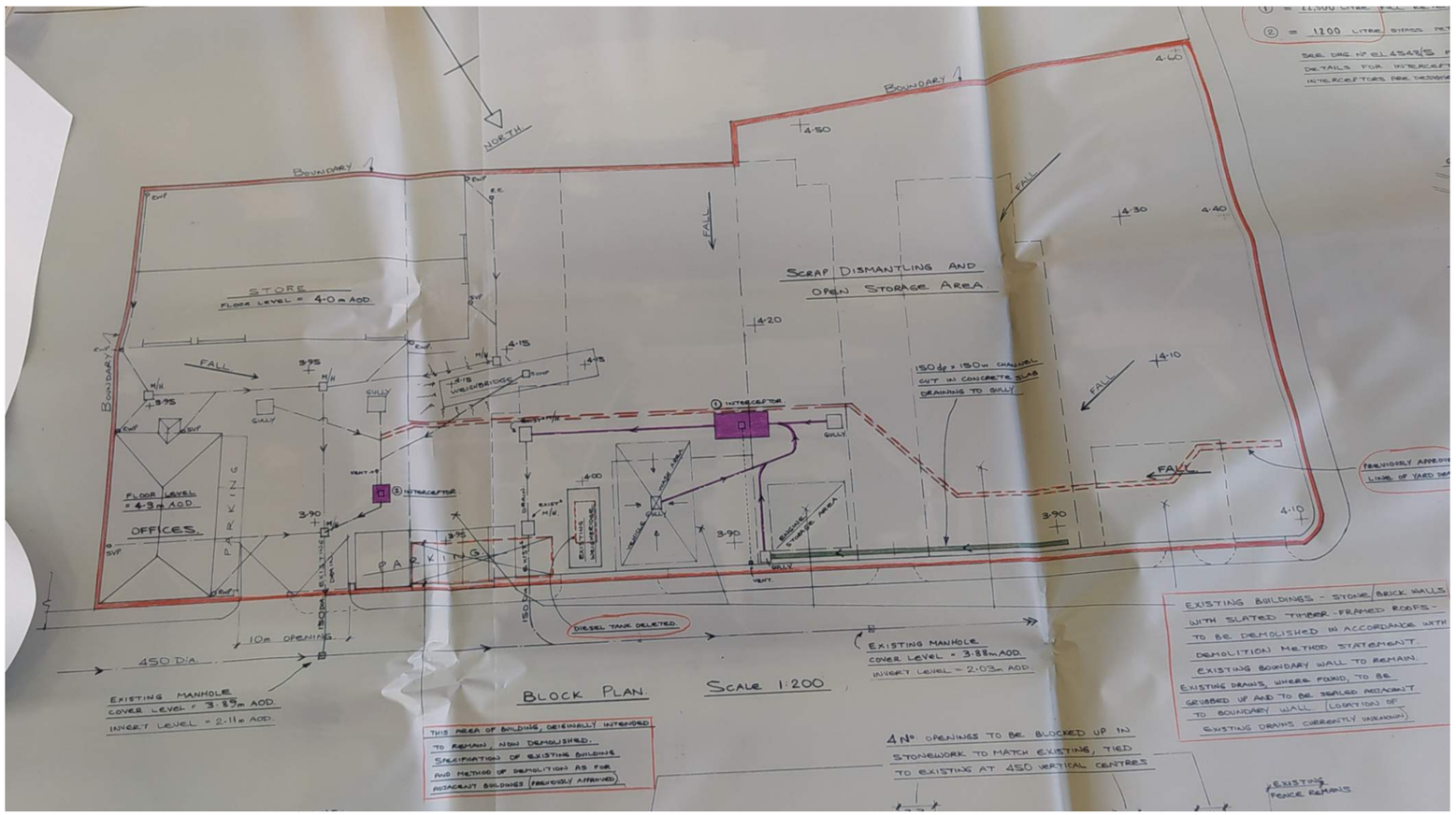


Scottish Water drainage records

(Scottish Water GIS, September 2023)

Scottish Water drawings for the site and surround were procured (see above).
The wastewater plans show that a 600mm concrete combined sewer flowing east to west along Salamander Street to the north of the site. This eventually discharges into a 930 x 580mm combined sewer runs along Baltic Street, north west of the site.

Historic drainage drawings of the site have been procured and note the site currently drains both foul and surface water into the above-mentioned 600mm concrete combined sewer.



Existing site drainage records

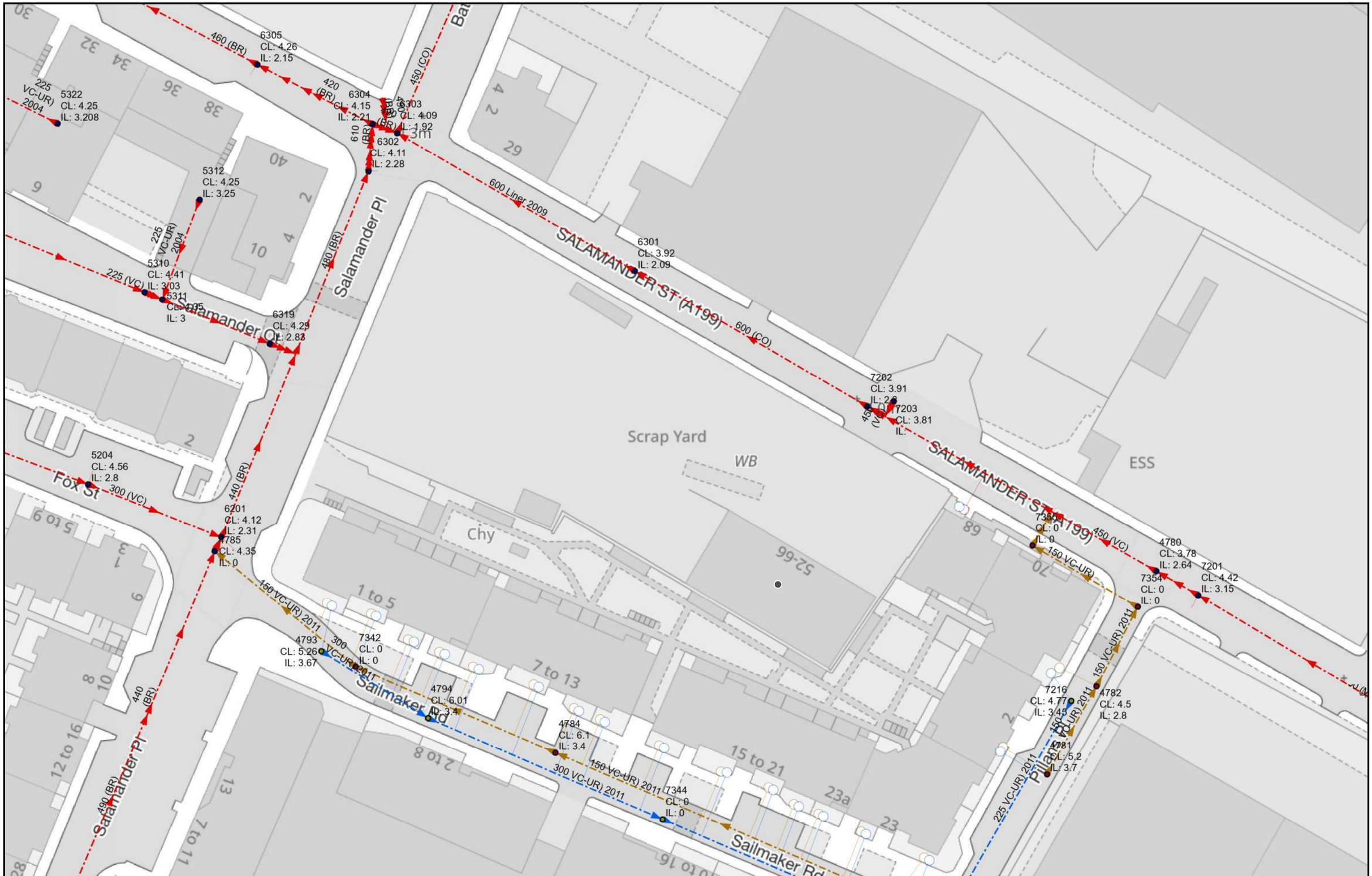
(CEC plan store, July 2023)

ETIVE
CONSULTING ENGINEERS

Etive Consulting Engineers Ltd.
22 Rutland Street
Edinburgh
EH1 2AN

T 0131 226 6746
W etiveconsulting.co.uk
E info@etiveconsulting.co.uk

APPENDIX B – Scottish Water Records



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 08000 778 778 WELL IN ADVANCE OF THE WORKS

Plotted By: john@etiveconsulting.co.uk

N

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.

Date: 30/08/2023

EH6 7LA - Wastewater

0 3.25 6.5 13 Meters

SCALE: 1:661

Scottish Water
Trusted to serve Scotland
The Bridge
6 Buchanan Gate
Stepps
Glasgow
G33 6FB
Tel No: 08000 778 778

APPENDIX C – Calculations

Foul Flow and Sewerage Treatment Plant Sizing Spreadsheet

Loading data from British Water Code Of Practice - Flows and Loads 4
Sizing Criteria, Treatment Capacity of Sewerage Treatment Plants

Project No. 17045
Project Name: Village Hotels - Elstree
Author: J. Chapman
Date: 10.03.2018

ETIVE
CONSULTING ENGINEERS

Pre-Development Flows. **Scrap Metal Yard**

Application	No. People/ meals/ users	Flow per Person (l/day)	Total Flow (l/day)	Organic Load Per Person (gBOD5/day)	Total Organic Load (gBOD5/day)	Ammonia Load per Person (gNH4-N/day)	Total Ammonia Load (gNH4-N/day)
Industrial							
Office/Factory without canteen		50	0	25	0	5	0
Office/Factory with Canteen		100	0	38	0	5	0
Open industrial site e.g. Quarry, construction without canteen	8	60	480	25	200	5	40
Day Staff		90	0	38	0	5	0
Part time Staff (4hr shift)		45	0	25	0	3	0

Loading Summary		
Total Daily Flow	**480**	l/day
total Daily Organic Load	**200**	gBOD5/day
Total Daily Ammonia Load	**40**	gNH4-N/day
Average Flow	**0.006**	l/s
Peak Flow	**0.014**	l/s

Foul Flow and Sewerage Treatment Plant Sizing Spreadsheet

Loading data from British Water Code Of Practice - Flows and Loads 4
Sizing Criteria, Treatment Capacity of Sewerage Treatment Plants

Post-development Flows - BTR & PBSA Site

Project No. 17045
Project Name: Village Hotels - Elstree
Author: J. Chapman
Date: 10.03.2018

ETIVE
CONSULTING ENGINEERS

Application	No. People/ meals/ users	Flow per Person (l/day)	Total Flow (l/day)	Organic Load Per Person (gBOD5/day)	Total Organic Load (gBOD5/day)	Ammonia Load per Person (gNH4-N/day)	Total Ammonia Load (gNH4-N/day)
Domestic dwellings							
House- large		150	0	60	0	8	0
Apartment or House - 1 Bedroom	26	150	3900	60	1560	8	208
Apartment or House - 2 Bedroom	21	150	3150	60	1260	8	168
Apartment or House - 3 Bedroom	15	150	2250	60	900	8	120
Apartment or House - 4 Bedroom		150	0	60	0	8	0
Apartment or House - 5 Bedroom		150	0	60	0	8	0
Apartment or House - 6 Bedroom		150	0	60	0	8	0
Mobile home/ caravan with full services		150	0	60	0	8	0
Students (Accommodation only)	279	100	27900	56	15624	5	1395

Loading Summary		
Total Daily Flow	**37200**	l/day
total Daily Organic Load	**19344**	gBOD5/day
Total Daily Ammonia Load	**1891**	gNH4-N/day
Average Flow	**0.431**	l/s
Peak Flow	**1.076**	l/s

Project:	Date:		
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023		
	Designed by:	Checked by:	Approved By:
	MNU	JC	JC
Report Details: Type: Inflows Storm Phase: SW NETWORK	Company Address: Etive Consulting 22 Rutland Street Edinburgh EH1 2AN		

Blue/Green Roof 01

Type : Catchment Area

Area (m²)	1445.447744

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Blue/Green Roof 02

Type : Catchment Area

Area (m²)	582.410988

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Blue/Green Roof 03

Type : Catchment Area

Area (m²)	814.363911

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project:	Date:		
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023		
	Designed by: MNU	Checked by: JC	Approved By: JC
Report Details: Type: Inflows Storm Phase: SW NETWORK	Company Address: Etive Consulting 22 Rutland Street Edinburgh EH1 2AN		

HARD 01

Type : Catchment Area

Area (m²)	533.00

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

HARD 02

Type : Catchment Area

Area (m²)	909.00

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Project:	Date:		
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023		
	Designed by:	Checked by:	Approved By:
	MNU	JC	JC
Report Details: Type: Junctions Storm Phase: SW NETWORK	Company Address: Etive Consulting 22 Rutland Street Edinburgh EH1 2AN		

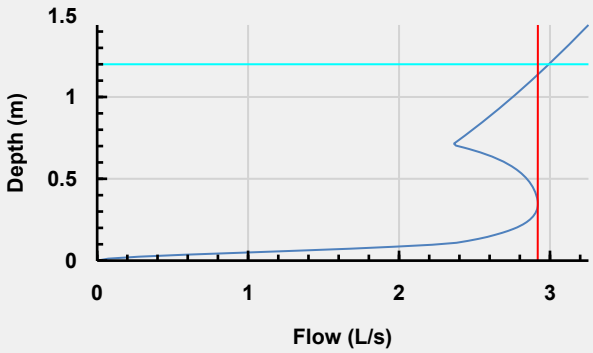
Inlets

Junction	Inlet Name	Incoming Item(s)	Bypass Destination	Capacity Type
S10	Inlet	2.006	(None)	No Restriction
	Inlet (1)	2.005	(None)	No Restriction
S11	Inlet	2.007	(None)	No Restriction
	Inlet (1)	2.004a	(None)	No Restriction
	Inlet (2)	Pipe (1)	(None)	No Restriction
S12 (dc)	Inlet	2.008	(None)	No Restriction
S01	Inlet	Blue/Green Roof 01	(None)	No Restriction
S02	Inlet	2.000 Pipe	(None)	No Restriction
S03	Inlet	2.001	(None)	No Restriction
S04	Inlet	2.002	(None)	No Restriction
S05	Inlet	Pipe - (21)	(None)	No Restriction
S06	Inlet	2.003	(None)	No Restriction
S07	Inlet	2.004	(None)	No Restriction
S08	Inlet	Blue/Green Roof 02	(None)	No Restriction
S09	Inlet	Blue/Green Roof 03	(None)	No Restriction
Simple Junction	Inlet	2.009	(None)	No Restriction

Outlets

Junction	Outlet Name	Outgoing Connection	Outlet Type
S10	Outlet	2.007	Free Discharge
S11	Outlet	2.008	Free Discharge
S12 (dc)	Outlet	2.009	Hydro-Brake®

Invert Level (m)	2.157
Design Depth (m)	1.200
Design Flow (L/s)	3.0
Objective	Minimise Upstream Storage Requirements
Application	Surface Water Only
Sump Available	☑
Unit Reference	SHE-0079-3000-1200-3000



S01	Outlet	2.000	Free Discharge
S02	Outlet	2.001	Free Discharge
S03	Outlet	2.002	Free Discharge
S04	Outlet	Pipe - (21)	Free Discharge
S05	Outlet	2.003	Free Discharge
S06	Outlet	2.004	Free Discharge
S07	Outlet	2.004a	Free Discharge
S08	Outlet	2.006	Free Discharge
S09	Outlet	2.005	Free Discharge

Project:	Date:		
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023		
	Designed by:	Checked by:	Approved By:
	MNU	JC	JC
Report Details: Type: Stormwater Controls Storm Phase: SW NETWORK	Company Address: Etive Consulting 22 Rutland Street Edinburgh EH1 2AN		

Bioretention 01

Type : Bioretention

Ponding Area

Exceedance Level (m)	4.200
Depth (m)	0.600
Base Level (m)	3.600
Top Area (m²)	189.56
Side Slope (1:X)	4.00
Base Area (m²)	105.00
Freeboard (mm)	300
Porosity (%)	100
Length (m)	17.617
Long. Slope (1:X)	200.00
Filtration Rate (m/hr)	0.1
Friction Scheme	Colebrook-White Roughness
Roughness (mm)	0.6
Total Volume (m³)	59.892

Filter Area

Base Level (m)	3.000

Filtration Layers

Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☑	Soil	300	40	0.1	Soil Type
	Storage	300	30	0.1	

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	HARD 02
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe (1)
Outlet Type	Free Discharge

Advanced

Ponding Area

Base Perimeter (m)	47.154
Top Perimeter (m)	56.754

Bioretention 02

Type : Bioretention

Ponding Area

Exceedance Level (m)	4.200
Depth (m)	0.600
Base Level (m)	3.600
Top Area (m²)	533.00
Side Slope (1:X)	4.00
Base Area (m²)	412.89
Freeboard (mm)	300
Porosity (%)	100
Length (m)	25.023
Long. Slope (1:X)	0.00
Filtration Rate (m/hr)	0.1
Friction Scheme	Colebrook-White Roughness
Roughness (mm)	0.6
Total Volume (m³)	219.583

Filter Area

Base Level (m)	3.000

Filtration Layers

Use	Name	Filtration Layer Depth (mm)	Porosity (%)	Conductivity (m/hr)	Soil Type
☑	Soil	300	40	0.1	Soil Type
	Storage	300	30	0.1	

Inlets

Inlet (1)

Inlet Type	Point Inflow
Incoming Item(s)	HARD 01
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe
Outlet Type	Free Discharge

Advanced

Ponding Area

Base Perimeter (m)	83.047
Top Perimeter (m)	92.647

Project:	Date:			
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023			
	Designed by:	Checked by:	Approved By:	ETIVE
	MNU	JC	JC	
Report Details: Type: Manhole Schedule Storm Phase: SW NETWORK	Company Address: Etive Consulting 22 Rutland Street Edinburgh EH1 2AN			

Name	Cover Level (m) Invert Level (m)	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)		Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
S10	4.200 2.871	Diameter / Length: 1.200	{1} 2.006	Pipe	2.871	Diam/Width:150	Manhole
E:327653.115 N:676292.252	1.329		{2} 2.005	Pipe	2.871	Diam/Width:150	
			{a} 2.007	Pipe	2.871	Diam/Width:150	Not Applicable
S11	4.200 2.388	Diameter / Length: 1.200	{1} 2.007	Pipe	2.388	Diam/Width:150	Manhole
E:327646.161 N:676275.290	1.812		{2} 2.004a	Pipe	2.388	Diam/Width:150	
			{3} Pipe (1)	Pipe	2.388	Diam/Width:100	
			{a} 2.008	Pipe	2.388	Diam/Width:150	Not Applicable
S12 (dc)	4.200 2.157	Diameter / Length: 1.200	{1} 2.008	Pipe	2.157	Diam/Width:150	Manhole
E:327628.978 N:676282.089	2.043		{a} 2.009	Pipe	2.157	Diam/Width:150	Not Applicable
S01	4.200 3.600	Diameter / Length: 1.200					Manhole
E:327701.087 N:676262.775	0.600		{a} 2.000	Pipe	3.600	Diam/Width:150	Not Applicable

Project:	Date:			
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023			
	Designed by:	Checked by:	Approved By:	ETIVE
	MNU	JC	JC	
Report Details: Type: Manhole Schedule Storm Phase: SW NETWORK	Company Address: Etive Consulting 22 Rutland Street Edinburgh EH1 2AN			

Name	Cover Level (m) Invert Level (m)	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)		Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
S02	4.200 3.499	Diameter / Length: 1.200	{1} 2.000	Pipe	3.499	Diam/Width:150	Manhole
E:327697.322	0.701		{2} Pipe	Pipe	3.499	Diam/Width:100	
N:676255.665			{a} 2.001	Pipe	3.499	Diam/Width:150	Not Applicable
S03	4.200 3.058	Diameter / Length: 1.200	{1} 2.001	Pipe	3.458	Diam/Width:150	Manhole
E:327694.033	1.142						
N:676255.293			{a} 2.002	Pipe	3.058	Diam/Width:150	Not Applicable
S04	4.200 2.774	Diameter / Length: 1.200	{1} 2.002	Pipe	2.774	Diam/Width:150	Manhole
E:327674.432	1.426						
N:676266.794			{a} Pipe - (21)	Pipe	2.774	Diam/Width:150	Not Applicable
S05	4.200 2.654	Diameter / Length: 1.200	{1} Pipe - (21)	Pipe	2.654	Diam/Width:150	Manhole
E:327666.096	1.546						
N:676271.465			{a} 2.003	Pipe	2.654	Diam/Width:150	Not Applicable
S06	4.200 2.605	Diameter / Length: 1.200	{1} 2.003	Pipe	2.605	Diam/Width:150	Manhole
E:327662.218	1.595						
N:676271.080			{a} 2.004	Pipe	2.605	Diam/Width:150	Not Applicable

Project:	Date:		
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023		
	Designed by:	Checked by:	Approved By:
	MNU	JC	JC
Report Details: Type: Manhole Schedule Storm Phase: SW NETWORK	Company Address: Etive Consulting 22 Rutland Street Edinburgh EH1 2AN		

Name	Cover Level (m) Invert Level (m)	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)		Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
S07	4.200 2.431	Diameter / Length: 1.200	{1} 2.004	Pipe	2.431	Diam/Width:150	Manhole
E:327649.386 N:676276.479	1.769		{a} 2.004a	Pipe	2.431	Diam/Width:150	Not Applicable
S08	4.200 3.200	Diameter / Length: 1.200					Manhole
E:327668.486 N:676284.829	1.000		{a} 2.006	Pipe	3.200	Diam/Width:150	Not Applicable
S09	4.200 3.200	Diameter / Length: 1.200					Manhole
E:327664.041 N:676316.227	1.000		{a} 2.005	Pipe	3.200	Diam/Width:150	Not Applicable
Simple Junction		Diameter / Length: 1.200	{1} 2.009	Pipe	2.310	Diam/Width:150	Simple Junction
E:327614.993 N:676287.565							Not Applicable

Project:	Date:			
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023			
	Designed by:	Checked by:	Approved By:	
	MNU	JC	JC	
Report Details: Type: Network Design Criteria Storm Phase: SW NETWORK	Company Address: Etive Consulting 22 Rutland Street Edinburgh EH1 2AN			

Flow Options

Peak Flow Calculation	(UK) Modified Rational Method
Min. Time of Entry (mins)	5
Max. Travel Time (mins)	30

Pipe Options

Lock Slope Options	None
Design Options	Minimise Excavation
Design Level	Level Soffits
Min. Cover Depth (m)	1.200
Min. Slope (1:X)	500.00
Max. Slope (1:X)	40.00
Min. Velocity (m/s)	1.0
Max. Velocity (m/s)	3.0
Use Flow Restriction	☐
Reduce Channel Depths	☐

Pipe Size Library

Default

Add. Increment (mm)	75
Max. Diameter (mm)	0

Diameter (mm)	Min. Slope (1:X)	Max. Slope (1:X)
100	0.00	0.00
150	0.00	0.00

Project:	Date:		
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023		
	Designed by:	Checked by:	Approved By:
	MNU	JC	JC
Report Details: Type: Network Design Criteria Storm Phase: SW NETWORK	Company Address: Etive Consulting 22 Rutland Street Edinburgh EH1 2AN		

Manhole Options

Apply Offset	☐

Manhole Size Library

Default

Diameter / Width

Connection (mm)	Diameter / Length (m)	Width (m)
0	1.200	0.000
375	1.350	0.000
500	1.500	0.000
750	1.800	0.000

Additional Sizing

Connection (mm)	900
Diameter / Length (m)	0.900
Width (m)	0.000

Depth

Depth (m)	Diameter / Length (m)	Width (m)
0.000	1.050	0.000
1.500	1.200	0.000

Access

Depth (m)	Ladder Protrusion (mm)
0.000	130
3.000	230

Benching Requirements

Landing Width (mm)	500
Benching Width (mm)	225

Project:	Date:		
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023		
	Designed by:	Checked by:	Approved By:
	MNU	JC	JC
Report Details: Type: Outfall Details Storm Phase: SW NETWORK	Company Address: Etive Consulting 22 Rutland Street Edinburgh EH1 2AN		

Outfalls

Outfall	Outfall Type	Fixed Surcharged Level (m)	Level Curve
Simple Junction	Free Discharge		

Project:	Date:		
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023		
	Designed by:	Checked by:	Approved By:
	MNU	JC	JC
Report Title:	Company Address:		
Rainfall Analysis Criteria	Etive Consulting 22 Rutland Street Edinburgh EH1 2AN		

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	0
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

FEH

Type: FEH

Site Location	GB 325505 676602 NT 25505 76602
Rainfall Version	2022
Summer	☑
Winter	☑

Return Period

Return Period (years)	Increase Rainfall (%)
2.0	0.000
30.0	40.000
200.0	40.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

Project:	Date:		
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023		
	Designed by:	Checked by:	Approved By:
	MNU	JC	JC
Report Details: Type: Inflows Summary Storm Phase: SW NETWORK	Company Address: Etive Consulting 22 Rutland Street Edinburgh EH1 2AN		

FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (m^2)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Blue/Green Roof 01	FEH: 2 years: +0 %: 15 mins: Summer	1445.45	1.0	1.647
Blue/Green Roof 02	FEH: 2 years: +0 %: 15 mins: Summer	582.41	1.0	1.647
Blue/Green Roof 03	FEH: 2 years: +0 %: 15 mins: Summer	814.36	1.0	1.647
HARD 01	FEH: 2 years: +0 %: 15 mins: Winter	533.00	6.3	2.907
HARD 02	FEH: 2 years: +0 %: 15 mins: Winter	909.00	10.7	4.951

Project:	Date:		
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023		
	Designed by: MNU	Checked by: JC	Approved By: JC
Report Details: Type: Inflows Summary Storm Phase: SW NETWORK	Company Address: Etive Consulting 22 Rutland Street Edinburgh EH1 2AN		

FEH: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (m^2)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Blue/Green Roof 01	FEH: 30 years: +40 %: 15 mins: Summer	1445.45	1.0	1.647
Blue/Green Roof 02	FEH: 30 years: +40 %: 15 mins: Summer	582.41	1.0	1.647
Blue/Green Roof 03	FEH: 30 years: +40 %: 15 mins: Summer	814.36	1.0	1.647
HARD 01	FEH: 30 years: +40 %: 15 mins: Winter	533.00	19.8	9.217
HARD 02	FEH: 30 years: +40 %: 15 mins: Winter	909.00	33.8	15.721

Project:	Date:		
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023		
	Designed by: MNU	Checked by: JC	Approved By: JC
Report Details: Type: Inflows Summary Storm Phase: SW NETWORK	Company Address: Etive Consulting 22 Rutland Street Edinburgh EH1 2AN		

FEH: 200 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (m^2)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
Blue/Green Roof 01	FEH: 200 years: +40 %: 360 mins: Winter	1445.45	6.6	58.484
Blue/Green Roof 02	FEH: 200 years: +40 %: 15 mins: Summer	582.41	1.0	1.647
Blue/Green Roof 03	FEH: 200 years: +40 %: 15 mins: Summer	814.36	1.0	1.647
HARD 01	FEH: 200 years: +40 %: 15 mins: Winter	533.00	29.0	13.466
HARD 02	FEH: 200 years: +40 %: 15 mins: Winter	909.00	49.4	22.971

Project:	Date:		
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023		
	Designed by:	Checked by:	Approved By:
	MNU	JC	JC
Report Details:	Company Address:		
Type: Junctions Summary Storm Phase: SW NETWORK	Etive Consulting 22 Rutland Street Edinburgh EH1 2AN		

FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
S10	FEH: 2 years: +0 %: 15 mins: Summer	4.200	2.871	2.897	0.027	2.0	0.030	0.000	2.0	3.114	OK
S11	FEH: 2 years: +0 %: 240 mins: Winter	4.200	2.388	2.571	0.183	2.8	0.206	0.000	2.8	45.085	Surcharged
S12 (dc)	FEH: 2 years: +0 %: 240 mins: Winter	4.200	2.157	2.565	0.408	2.8	0.461	0.000	2.8	44.663	Surcharged
S01	FEH: 2 years: +0 %: 60 mins: Summer	4.200	3.600	3.625	0.025	1.0	0.028	0.000	1.0	7.011	OK
S02	FEH: 2 years: +0 %: 15 mins: Summer	4.200	3.499	3.516	0.017	1.0	0.019	0.000	0.5	1.585	OK
S03	FEH: 2 years: +0 %: 15 mins: Summer	4.200	3.058	3.073	0.015	0.5	0.017	0.000	0.4	0.596	OK
S04	FEH: 2 years: +0 %: 15 mins: Summer	4.200	2.774	2.789	0.016	0.4	0.018	0.000	0.4	0.566	OK
S05	FEH: 2 years: +0 %: 15 mins: Summer	4.200	2.654	2.670	0.016	0.4	0.018	0.000	0.5	0.543	OK
S06	FEH: 2 years: +0 %: 15 mins: Summer	4.200	2.605	2.621	0.016	0.5	0.018	0.000	0.5	0.521	OK
S07	FEH: 2 years: +0 %: 240 mins: Winter	4.200	2.431	2.571	0.140	0.5	0.158	0.000	0.6	9.513	OK
S08	FEH: 2 years: +0 %: 15 mins: Summer	4.200	3.200	3.221	0.021	1.0	0.023	0.000	1.0	1.611	OK
S09	FEH: 2 years: +0 %: 120 mins: Winter	4.200	3.200	3.224	0.024	1.0	0.027	0.000	1.0	13.918	OK
Simple Junction	FEH: 2 years: +0 %: 240 mins: Winter		2.310	2.350	0.040	2.8			2.8	44.468	OK

Project:	Date:		
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023		
	Designed by:	Checked by:	Approved By:
	MNU	JC	JC
Report Details:	Company Address:		
Type: Junctions Summary Storm Phase: SW NETWORK	Etive Consulting 22 Rutland Street Edinburgh EH1 2AN		

FEH: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
S10	FEH: 30 years: +40 %: 15 mins: Summer	4.200	2.871	2.897	0.027	2.0	0.030	0.000	2.0	3.114	OK
S11	FEH: 30 years: +40 %: 960 mins: Winter	4.200	2.388	2.584	0.196	2.8	0.222	0.000	2.8	190.953	Surcharged
S12 (dc)	FEH: 30 years: +40 %: 960 mins: Winter	4.200	2.157	2.578	0.421	2.8	0.476	0.000	2.8	190.516	Surcharged
S01	FEH: 30 years: +40 %: 60 mins: Summer	4.200	3.600	3.625	0.025	1.0	0.028	0.000	1.0	7.011	OK
S02	FEH: 30 years: +40 %: 15 mins: Summer	4.200	3.499	3.516	0.017	1.0	0.019	0.000	0.5	1.585	OK
S03	FEH: 30 years: +40 %: 15 mins: Summer	4.200	3.058	3.073	0.015	0.5	0.017	0.000	0.4	0.596	OK
S04	FEH: 30 years: +40 %: 15 mins: Summer	4.200	2.774	2.789	0.016	0.4	0.018	0.000	0.4	0.566	OK
S05	FEH: 30 years: +40 %: 15 mins: Summer	4.200	2.654	2.670	0.016	0.4	0.018	0.000	0.5	0.543	OK
S06	FEH: 30 years: +40 %: 15 mins: Summer	4.200	2.605	2.621	0.016	0.5	0.018	0.000	0.5	0.521	OK
S07	FEH: 30 years: +40 %: 960 mins: Winter	4.200	2.431	2.584	0.153	0.5	0.173	0.000	0.6	36.537	Surcharged
S08	FEH: 30 years: +40 %: 15 mins: Summer	4.200	3.200	3.221	0.021	1.0	0.023	0.000	1.0	1.611	OK
S09	FEH: 30 years: +40 %: 480 mins: Summer	4.200	3.200	3.224	0.024	1.0	0.027	0.000	1.0	45.910	OK
Simple Junction	FEH: 30 years: +40 %: 960 mins: Winter		2.310	2.350	0.040	2.8			2.8	190.317	OK

Project:	Date:		
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023		
	Designed by:	Checked by:	Approved By:
	MNU	JC	JC
Report Details:	Company Address:		
Type: Junctions Summary Storm Phase: SW NETWORK	Etive Consulting 22 Rutland Street Edinburgh EH1 2AN		

FEH: 200 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
S10	FEH: 200 years: +40 %: 960 mins: Winter	4.200	2.871	3.302	0.431	2.0	0.488	0.000	2.0	154.490	Surcharged
S11	FEH: 200 years: +40 %: 960 mins: Winter	4.200	2.388	3.300	0.912	3.4	1.031	0.000	3.1	246.480	Surcharged
S12 (dc)	FEH: 200 years: +40 %: 960 mins: Winter	4.200	2.157	3.295	1.138	3.1	1.287	0.000	2.9	245.964	Surcharged
S01	FEH: 200 years: +40 %: 360 mins: Winter	4.200	3.600	3.664	0.064	6.6	0.072	0.000	6.5	58.449	OK
S02	FEH: 200 years: +40 %: 360 mins: Winter	4.200	3.499	3.536	0.037	6.5	0.041	0.000	2.2	58.423	OK
S03	FEH: 200 years: +40 %: 960 mins: Winter	4.200	3.058	3.300	0.242	1.5	0.274	0.000	1.6	45.325	Surcharged
S04	FEH: 200 years: +40 %: 960 mins: Winter	4.200	2.774	3.299	0.526	1.6	0.595	0.000	1.6	45.301	Surcharged
S05	FEH: 200 years: +40 %: 960 mins: Winter	4.200	2.654	3.300	0.646	1.6	0.730	0.000	1.6	45.278	Surcharged
S06	FEH: 200 years: +40 %: 960 mins: Winter	4.200	2.605	3.300	0.695	1.6	0.786	0.000	1.2	45.255	Surcharged
S07	FEH: 200 years: +40 %: 960 mins: Winter	4.200	2.431	3.300	0.869	1.2	0.982	0.000	1.1	45.232	Surcharged
S08	FEH: 200 years: +40 %: 960 mins: Winter	4.200	3.200	3.303	0.103	1.0	0.117	0.000	1.0	64.912	OK
S09	FEH: 200 years: +40 %: 960 mins: Winter	4.200	3.200	3.304	0.104	1.0	0.117	0.000	1.1	89.578	OK
Simple Junction	FEH: 200 years: +40 %: 480 mins: Winter		2.310	2.351	0.041	2.9			2.9	149.460	OK

Project:	Date:		
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023		
	Designed by: MNU	Checked by: JC	Approved By: JC
Report Details: Type: Stormwater Controls Summary Storm Phase: SW NETWORK	Company Address: Etive Consulting 22 Rutland Street Edinburgh EH1 2AN		

FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Bioretention 01	FEH: 2 years: +0 %: 1440 mins: Winter	3.691	3.677	0.603	0.677	0.9	22.021	0.000	0.000	0.5	18.150	63.232	OK
Bioretention 02	FEH: 2 years: +0 %: 1440 mins: Winter	3.603	3.605	0.603	0.605	1.2	75.574	0.000	0.000	0.0	0.000	65.583	OK

Project:	Date:		
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023		
	Designed by: MNU	Checked by: JC	Approved By: JC
Report Details: Type: Stormwater Controls Summary Storm Phase: SW NETWORK	Company Address: Etive Consulting 22 Rutland Street Edinburgh EH1 2AN		

FEH: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Bioretention 01	FEH: 30 years: +40 %: 1440 mins: Winter	3.936	3.936	0.848	0.936	2.2	54.138	0.000	0.000	0.5	61.782	9.608	Flood Risk
Bioretention 02	FEH: 30 years: +40 %: 1440 mins: Winter	3.741	3.741	0.741	0.741	1.9	146.976	0.000	0.000	0.0	0.000	33.066	OK

Project:	Date:		
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023		
	Designed by: MNU	Checked by: JC	Approved By: JC
Report Details: Type: Stormwater Controls Summary Storm Phase: SW NETWORK	Company Address: Etive Consulting 22 Rutland Street Edinburgh EH1 2AN		

FEH: 200 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Resident Volume

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Bioretention 01	FEH: 200 years: +40 %: 1440 mins: Winter	4.127	4.127	1.039	1.127	3.2	87.091	0.000	0.000	1.1	73.030	-45.413	Flood Risk
Bioretention 02	FEH: 200 years: +40 %: 1440 mins: Winter	3.867	3.867	0.867	0.867	3.2	203.583	0.000	0.000	0.0	0.000	7.287	OK

Project:	Date:		
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023		
	Designed by:	Checked by:	Approved By:
	MNU	JC	JC
Report Details:	Company Address:		
Type: Connections Summary Storm Phase: SW NETWORK	Etive Consulting 22 Rutland Street Edinburgh EH1 2AN		

FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
2.007	FEH: 2 years: +0 %: 240 mins: Winter	Pipe	S10	S11	4.200	2.897	0.104	30.908	0.8	0.07	2.0	OK
2.008	FEH: 2 years: +0 %: 240 mins: Winter	Pipe	S11	S12 (dc)	4.200	2.571	0.150	45.085	0.6	0.14	2.8	Surcharged
2.009	FEH: 2 years: +0 %: 240 mins: Winter	Pipe	S12 (dc)	Simple Junction	4.200	2.565	0.119	0.000	0.2	0.21	2.8	Surcharged
2.000	FEH: 2 years: +0 %: 120 mins: Summer	Pipe	S01	S02	4.200	3.625	0.020	14.212	0.8	0.05	1.0	OK
2.001	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	S02	S03	4.200	3.516	0.016	0.621	0.5	0.02	0.5	OK
2.002	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	S03	S04	4.200	3.073	0.016	0.596	0.5	0.02	0.4	OK
Pipe - (21)	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	S04	S05	4.200	2.789	0.016	0.566	0.4	0.02	0.4	OK
2.003	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	S05	S06	4.200	2.670	0.016	0.543	0.4	0.02	0.5	OK
2.004	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	S06	S07	4.200	2.621	0.021	0.521	0.5	0.02	0.5	OK
2.004a	FEH: 2 years: +0 %: 120 mins: Winter	Pipe	S07	S11	4.200	2.569	0.150	4.681	0.3	0.03	0.6	OK
2.006	FEH: 2 years: +0 %: 240 mins: Winter	Pipe	S08	S10	4.200	3.221	0.024	13.377	0.6	0.04	1.0	OK
2.005	FEH: 2 years: +0 %: 120 mins: Summer	Pipe	S09	S10	4.200	3.224	0.025	12.744	0.7	0.05	1.0	OK
Pipe	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	Bioretention 02	S02	4.200	3.602	0.023	0.965	0.0	0	0.0	Surcharged
Pipe (1)	FEH: 2 years: +0 %: 120 mins: Winter	Pipe	Bioretention 01	S11	4.288	3.644	0.098	3.813	0.2	0.04	0.5	Surcharged

Project:	Date:			
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023			ETIVE
	Designed by:	Checked by:	Approved By:	
	MNU	JC	JC	
Report Details: Type: Connections Summary Storm Phase: SW NETWORK	Company Address: Etive Consulting 22 Rutland Street Edinburgh EH1 2AN			

FEH: 30 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Flow

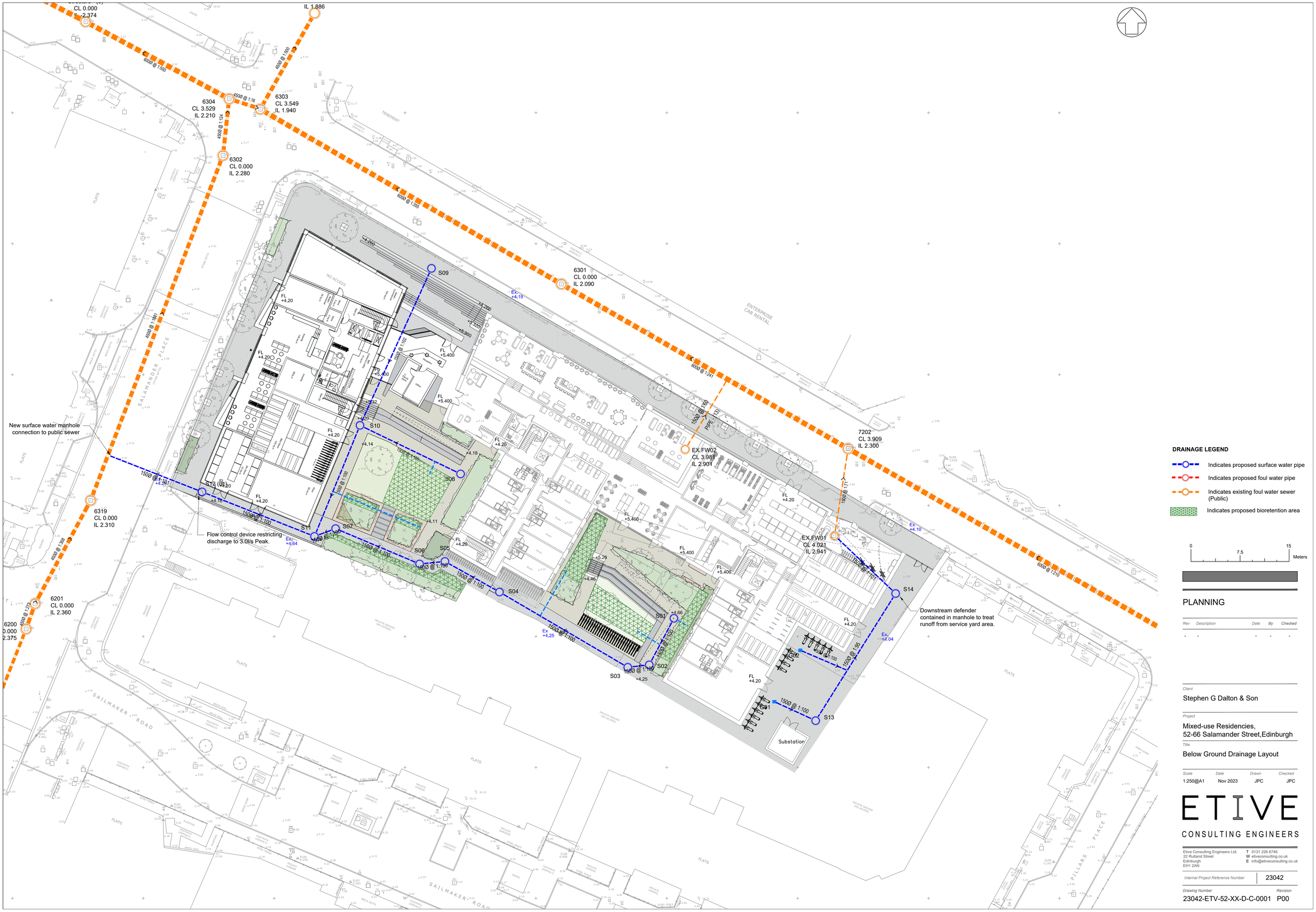
Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
2.007	FEH: 30 years: +40 %: 480 mins: Winter	Pipe	S10	S11	4.200	2.897	0.111	88.439	0.8	0.07	2.0	OK
2.008	FEH: 30 years: +40 %: 960 mins: Winter	Pipe	S11	S12 (dc)	4.200	2.584	0.150	190.953	0.6	0.14	2.8	Surcharged
2.009	FEH: 30 years: +40 %: 960 mins: Winter	Pipe	S12 (dc)	Simple Junction	4.200	2.578	0.119	0.000	0.2	0.21	2.8	Surcharged
2.000	FEH: 30 years: +40 %: 120 mins: Summer	Pipe	S01	S02	4.200	3.625	0.020	14.212	0.8	0.05	1.0	OK
2.001	FEH: 30 years: +40 %: 15 mins: Summer	Pipe	S02	S03	4.200	3.516	0.016	0.621	0.5	0.02	0.5	OK
2.002	FEH: 30 years: +40 %: 15 mins: Summer	Pipe	S03	S04	4.200	3.073	0.016	0.596	0.5	0.02	0.4	OK
Pipe - (21)	FEH: 30 years: +40 %: 15 mins: Summer	Pipe	S04	S05	4.200	2.789	0.016	0.566	0.4	0.02	0.4	OK
2.003	FEH: 30 years: +40 %: 15 mins: Summer	Pipe	S05	S06	4.200	2.670	0.016	0.543	0.4	0.02	0.5	OK
2.004	FEH: 30 years: +40 %: 15 mins: Summer	Pipe	S06	S07	4.200	2.621	0.021	0.521	0.5	0.02	0.5	OK
2.004a	FEH: 30 years: +40 %: 240 mins: Summer	Pipe	S07	S11	4.200	2.584	0.150	9.385	0.2	0.03	0.6	Surcharged
2.006	FEH: 30 years: +40 %: 480 mins: Winter	Pipe	S08	S10	4.200	3.221	0.024	37.371	0.6	0.04	1.0	OK
2.005	FEH: 30 years: +40 %: 480 mins: Summer	Pipe	S09	S10	4.200	3.224	0.025	45.910	0.7	0.05	1.0	OK
Pipe	FEH: 30 years: +40 %: 15 mins: Summer	Pipe	Bioretention 02	S02	4.200	3.611	0.023	0.965	0.0	0	0.0	Surcharged
Pipe (1)	FEH: 30 years: +40 %: 360 mins: Summer	Pipe	Bioretention 01	S11	4.288	3.817	0.100	16.664	0.5	0.05	0.5	Surcharged

Project:	Date:		
52-66 Salamander Street, Edinburgh. Surface Water Network Model	13/11/2023		
	Designed by:	Checked by:	Approved By:
	MNU	JC	JC
Report Details: Type: Connections Summary Storm Phase: SW NETWORK	Company Address: Etive Consulting 22 Rutland Street Edinburgh EH1 2AN		

FEH: 200 years: Increase Rainfall (%): +40: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
2.007	FEH: 200 years: +40 %: 480 mins: Summer	Pipe	S10	S11	4.200	2.897	0.150	105.246	0.8	0.07	2.0	OK
2.008	FEH: 200 years: +40 %: 480 mins: Winter	Pipe	S11	S12 (dc)	4.200	3.299	0.150	151.135	0.6	0.16	3.2	Surcharged
2.009	FEH: 200 years: +40 %: 480 mins: Winter	Pipe	S12 (dc)	Simple Junction	4.200	3.295	0.120	0.000	0.2	0.22	2.9	Surcharged
2.000	FEH: 200 years: +40 %: 360 mins: Winter	Pipe	S01	S02	4.200	3.664	0.050	58.449	1.3	0.33	6.5	OK
2.001	FEH: 200 years: +40 %: 360 mins: Winter	Pipe	S02	S03	4.200	3.536	0.035	19.739	0.7	0.11	2.2	OK
2.002	FEH: 200 years: +40 %: 480 mins: Winter	Pipe	S03	S04	4.200	3.299	0.150	25.449	0.7	0.11	2.2	Surcharged
Pipe - (21)	FEH: 200 years: +40 %: 480 mins: Winter	Pipe	S04	S05	4.200	3.299	0.150	24.580	0.7	0.11	2.2	Surcharged
2.003	FEH: 200 years: +40 %: 360 mins: Winter	Pipe	S05	S06	4.200	3.299	0.150	17.475	0.6	0.1	1.9	Surcharged
2.004	FEH: 200 years: +40 %: 480 mins: Winter	Pipe	S06	S07	4.200	3.299	0.150	22.985	0.5	0.08	1.6	Surcharged
2.004a	FEH: 200 years: +40 %: 480 mins: Winter	Pipe	S07	S11	4.200	3.299	0.150	21.892	0.2	0.06	1.1	Surcharged
2.006	FEH: 200 years: +40 %: 480 mins: Winter	Pipe	S08	S10	4.200	3.303	0.150	53.301	0.6	0.04	1.0	OK
2.005	FEH: 200 years: +40 %: 1440 mins: Winter	Pipe	S09	S10	4.200	3.303	0.150	99.832	0.7	0.05	1.1	OK
Pipe	FEH: 200 years: +40 %: 15 mins: Summer	Pipe	Bioretention 02	S02	4.200	3.619	0.023	0.965	0.0	0	0.0	Surcharged
Pipe (1)	FEH: 200 years: +40 %: 480 mins: Winter	Pipe	Bioretention 01	S11	4.288	4.022	0.100	21.054	0.1	0.1	1.1	Flood Risk

APPENDIX D – Drainage Drawing



DRAINAGE LEGEND

- Indicates proposed surface water pipe
- Indicates proposed foul water pipe
- Indicates existing foul water sewer (Public)
- Indicates proposed bioretention area

0 7.5 15 Meters

PLANNING

Rev	Description	Date	By	Checked
-	-	-	-	-

Client
Stephen G Dalton & Son

Project
Mixed-use Residencies,
52-66 Salamander Street,Edinburgh

Title
Below Ground Drainage Layout

Scale	Date	Drawn	Checked
1:250@A1	Nov 2023	JPC	JPC

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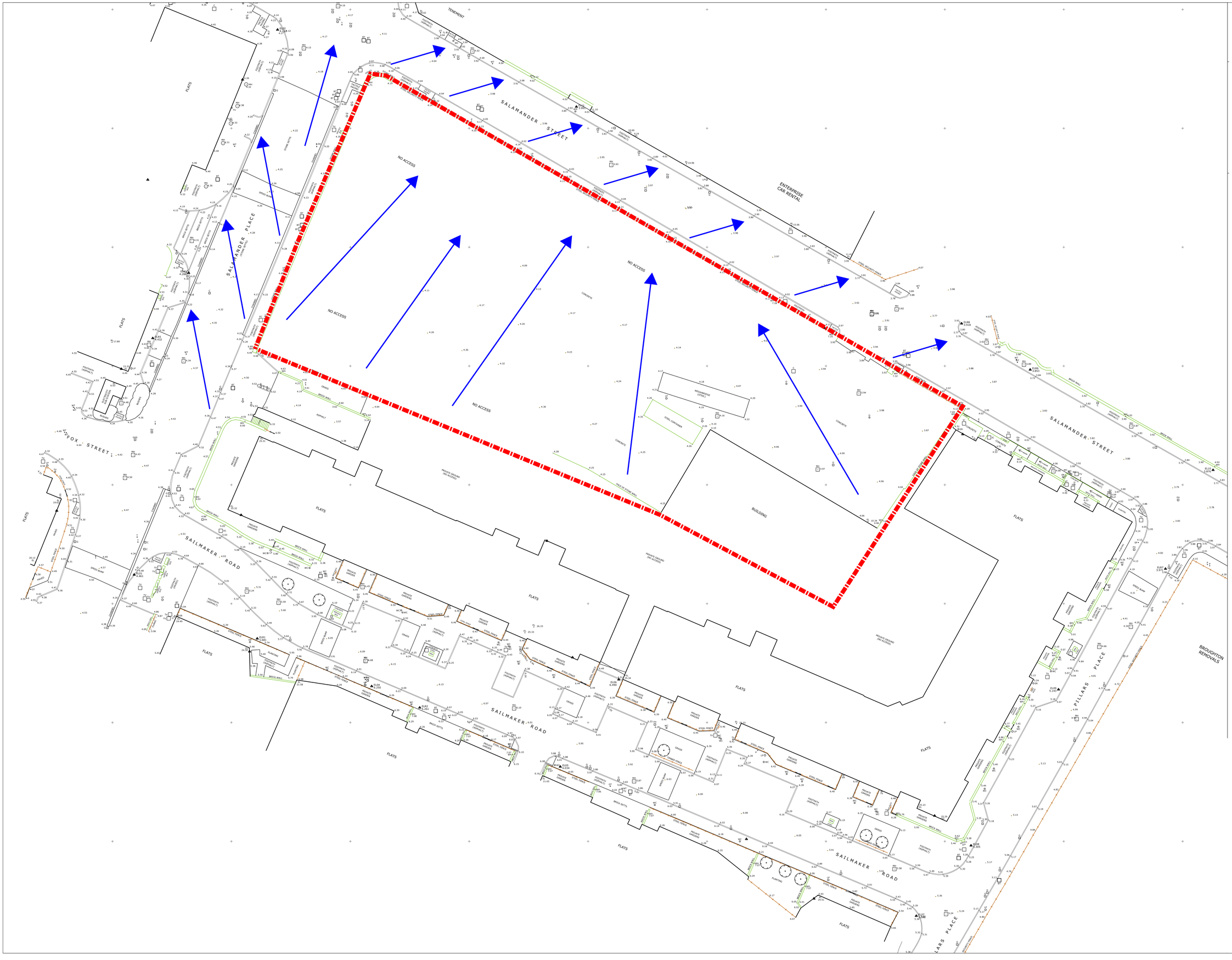
Drawing Number 23042-ETV-52-XX-D-C-0001 *Revision* P00


SALAMANDER STREET
SALAMANDER PLACE
FOX STREET
SAILMAKER ROAD
SAILMAKER PLACE
TENEMENT
ENTERPRISE CAR RENTAL
BUILDING
FLATS
NO ACCESS
BROUGHTON REMOVALS
Pre-Development
Overland Flow Routing
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0 7.5 15 Meters

PLANNING

Rev	Description	Date	By	Checked
-	-	-	-	-

Client
Stephen G Dalton & Son

Project
Mixed-use Residencies,
52-66 Salamander Street,Edinburgh

Title
Post-Development Overland Flow Routing

Scale	Date	Drawn	Checked
1:250@A1	Nov 2023	JPC	JPC

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