



Drainage Strategy

Land on Brendon Avenue, Moston, M40 9DN MD
M Kenny Properties Ltd

January 2023

Project Information

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1. Executive Summary

- 1.1 Aval Consulting Group Limited has been commissioned by HAD & Co Property Consultants Ltd on behalf of M Kenny Properties Ltd ('the client') to provide a Drainage Strategy in relation to a planning application for the demolition of the existing development and the construction of 6no. new semi-detached C3 residential dwellings.
- 1.2 The total area of the site is 0.1089ha and is in Flood Zone 1. As the site is less than 1 hectare in size and in a very low risk flood zone a full Flood Risk Assessment is not required.
- 1.3 The site is at low risk of fluvial and pluvial flooding from the neighbouring watercourses. The site is located in an area with less than 0.1% risk of fluvial flooding (Flood Zone 1) and based on NPPF 2021 the development proposal is wholly suitable in terms of flood risk as it is a more vulnerable development.
- 1.4 The existing site is brownfield, including a dilapidated hall with trees and shrubs surrounding it which will be cleared and ground will be reprofiled. Attenuation and SuDS are to be provided within the site infrastructure to ensure that the impact of the site on the existing surface water network is minimised.
- 1.5 A topographical survey and GPR survey was provided by Survey Hub Ltd to help inform the report. No ground-based investigation report was available to aid the Drainage Strategy.
- 1.6 The proposed surface water drainage discharge for the site is to be restricted to a maximum rate of 1.0 l/s which is subject to approval by Manchester City Council LLFA. This is proposed to discharge into the existing combined water sewer network.
- 1.7 The proposed drainage is sustainable and will reduce the flow rate from the site. This will reduce the risk of off-site flooding for other properties and the attenuation tank will contribute to the overall network performance in the area. The proposed surface water will be discharged into the existing United Utilities combined water sewer network located South of the site on Brendon Avenue.
- 1.8 The proposed foul water will be discharged into the proposed private combined water system which connects into the existing United Utilities combined water sewer network located South of the site on Brendon Avenue.

2. Introduction

Overview

- 2.1 AVAL Consulting Group Limited (ACL) has been commissioned by the client to produce a Drainage Strategy for the proposed development at the Land on Brendon Avenue, Moston, M40 9DN.
- 2.2 The application is for the demolition of the existing development and the construction of 6no. new semi-detached C3 residential dwellings.
- 2.3 The proposal includes a surface water drainage plan including a dedicated surface water drainage system to drain the surface water from the site.
- 2.4 The existing site plan is presented in Appendix A. The proposed site plan is presented in Appendix B.
- 2.5 A flood exceedance plan has been included as part of the proposal.

Objective

- 2.6 The purpose of this report is to demonstrate to Manchester City Council and the Lead Local Flood Authority that the proposed development is subject to an acceptable level of flood risk and should not increase the likelihood of flooding elsewhere. It should also demonstrate that the site can be drained both safely and sustainably for the lifetime of the development.
- 2.7 The report has been prepared in accordance with the guidance set out in the National Planning Policy Framework (NPPF) Technical Guidance (Department of Communities and Local Government – July 2021). The report also considers the Manchester City Council's Strategic Flood Risk Assessment.
- 2.8 In addition, the report includes an appraisal of the relevance of the various sustainable drainage systems (SuDS) with respect to their potential inclusion within the surface-water drainage for this development and puts forward a drainage statement. The drainage statement will cover issues such as the control of surface water flows generated by the site and the use of SuDS features.

Site Location and Details

- 2.9 Figure 2.1 shows the proposed site location. The surroundings of the proposed development site are largely residential. The site is bounded by a church to the North, Brendon Avenue to the south and residential units to the east and west.



Figure 2.1: Proposed Site Location (Source: Google Maps)

3. Relevant Standards and Policies

- 3.1 This section summarises all legislation, policy, statutory and non-statutory guidelines relevant to the proposed development. That also includes all the latest regional and local planning policy guidance specifically applicable to the proposed development.

The National Planning Policy Framework (NPPF)

- 3.2 The latest National Planning Policy framework (NPPF) was published on 20th July 2021. The NPPF is supported by technical guidance set out within the Planning Practice Guidance for Flood Risk and Drainage, including the classification of the site vulnerability and the requirement to do an Exception Test in relation to the Flood Zone and Vulnerability Classification.
- 3.3 One of the key aims of the NPPF is to ensure that flood risk is taken into account at all stages of the planning process to avoid inappropriate development in areas at risk of flooding and to direct development away from areas of highest risk.
- 3.4 It advises that where new development is necessary in areas of higher risk, this should be safe, without increasing flood risk elsewhere, and where possible should reduce flood risk overall.
- 3.5 It advises that where new development is necessary in areas of higher risk, flood mitigation resilience and resistance measures should be incorporated which can include but not limited to a higher finished floor level, installing flood boards and moving electrical points above. The developments upstream of the proposed development should also be taken into the consideration of flood risk.
- 3.6 The NPPF's flood risk advice is all set out in Chapter 14 of the Framework document, meeting the challenge of climate change, flooding and coastal change.

Flood and Water Management Act 2010

- 3.7 The Flood and Water Management Act 2010 received Royal Assent on 8th April 2010. This Act provides duties on the Environment Agency, Local Authorities, Developers and other bodies to manage flood risks. The Act has significant planning and design implications for Developers.
- 3.8 It should be noted that these standards and procedures are being reviewed by the respective regulatory bodies and third parties against the requirements imposed by the Flood and Water Management Act 2010. The advice and recommendations provided may change when associated regulations have been issued in order to implement the full scope of the Act.

Regional and Local Policy Guidance

3.1 Manchester City Council Core Strategy Development Plan

The Manchester City Council's Core Strategy Development Plan document (adopted on 11th July 2012) includes the main policy regarding Flood Risk.

Policy EN 14: Flood Risk states the following:

"In line with the risk-based sequential approach contained within PPS25, development should be directed away from sites at the greatest risk of flooding, and towards sites with little or no risk of flooding; this should take account of all sources of flooding identified in the Manchester-Salford-Trafford Strategic Flood Risk Assessment (SFRA).

In addition to the requirements for site-specific Flood Risk Assessments (FRAs) set out in PPS25, an appropriate FRA will also be required for all development proposals including changes of use, on sites greater than 0.5ha within Critical Drainage Areas (CDAs) and Canal Hazard Zones identified in the SFRA.

All new development should minimise surface water run-off, including through Sustainable Drainage Systems (SUDS) and the appropriate use of Green Infrastructure Developers should have regard to the surface water run-off rates in the SFRA User Guide. In CDAs, evidence to justify the surface water run-off approach / rates will be required.

The City of Manchester contains many sections of rivers which are culverted or 'hidden' where these are indicated in the SFRA beneath the proposed development site, further investigation will be required and the development proposal should take this into account; where feasible and appropriate development should seek to open up culverted/hidden rivers to reduce the associated flood risk and danger of collapse, taking advantage of opportunities to enhance biodiversity and Green Infrastructure."

3.2 Manchester City Council Strategic Flood Risk Assessment

The Manchester City Council's Strategic Flood Risk Assessment provides maps of flood zones, flood extents and other relevant maps and highlights the requirement and procedures for the Sequential and where necessary the Exception Tests. This will be used in order to progress through this report.

4. Physical Setting

Site Details

Site Name and Address		Land on Brendon Avenue, Moston, M40 9DN
National Grid Reference		SD 87257 01396
Site Shape and Development Details		The site is rectangular in shape and occupies an area of 0.11ha.
General Topography		The site slopes from the north east of the site towards the low point located south west of the site.
Existing Surfacing		The existing site is a brownfield site which consists of commercial units and associated pathways.
Above Ground Structures		Commercial units and hall.
Sub-Surface Structures and Services		There are existing surface and foul water lines servicing the site but are to be made redundant.
Watercourses		Data shows that there are no water networks within 250m of the site.
Site History		In 1891, the site consisted of open field with a village a short distance to the north-east. The site then remains open field as mostly residential buildings take up a large majority of land east of the site in the 1900's. A hall is erected on-site in the early 1930's, with a second one being built between 1950-1955. Residential buildings continue to be built around the site in all directions up until the turn of the century. In 2003, one of the halls on-site was demolished and in 2022, it currently sits empty and surrounded by residential estates.
Boundaries	North	Lightbowne Evangelical Church,
	East	Residential units,
	South	Brendon Avenue,
	West	Residential units,
Access	Vehicular	There is vehicular access south of the site off Brendon Avenue.
	Pedestrian	Brendon Avenue
Summary of Walkover Features		A walkover was not undertaken.

5. Existing Site Characteristics

Existing Public Sewers

- 5.1 There is evidence of an existing 300mm diameter United Utilities combined water sewer located south of the proposed site boundary, on Brendon Avenue. The sewer flows east along Brendon Avenue.
- 5.2 The United Utilities Asset Search is attached in Appendix E.

Existing Private Drainage

- 5.3 The existing site has a combined water system which connects to the public sewers located along Brendon Avenue.

Local Topography and Geology

- 5.4 The site is located at an average height of 87.0m AOD.
- 5.5 The topographical drawing can be found in Appendix A.
- 5.6 The Soilscape maps indicate the underlying deposits are slowly permeable seasonally wet acid loamy and clayey soils, with an impeded drainage to the ground.
- 5.7 There are no boreholes within the site.

Watercourses, Land Drainage and other Waterbodies

- 5.8 The nearest watercourse to the site is mentioned below:
- The River Irk is located approximately 1750m west from the site boundary.

Existing Flood Defences and Other Structures

- 5.9 There are no flood defences recorded on any maps within close proximity to the proposed development site. The existing site has no flood walls or other defences.

Historical Land Use

- 5.10 The site consisted of open field with a village a short distance to the north-east. The site then remains open field as mostly residential buildings take up a large majority of land east of the site in the 1900's. A hall is erected on-site in the early 1930's, with a second one being built between 1950-1955. Residential buildings continue to be built around the site in all directions up until the turn of the century.

6. Management of Flood Risk

- 6.1 This section will explain how the proposed development will reduce the flood risk within the site and within the surrounding areas of the site.

Residual Risk

- 6.2 The primary residual risk that would remain at the site would be the drainage of surface water. Flood Mitigation and Management details will be given in Section 7. However, other residual risks remain such as a breach of a raised flood defence, blockage of a surface water conveyance system, overtopping of an upstream storage area, or failure of a pumped drainage system; failure of a reservoir; or a severe flood event that exceeds a flood management design standard, such as a flood that overtops a raised flood defence, or an intense rainfall event which the drainage system cannot cope with.
- 6.3 In order to further reduce the risk of surface water flooding within the proposed development, Sustainable Urban Drainage Systems would need to be installed to either safely discharge the surface water or to temporarily store the surface water for future use or discharge. This can be in the form but are not limited to, permeable paving, green roofs or rainwater harvesting.

Exception Test

- 6.4 The National Planning Policy Framework sets out the different conditions in terms of the vulnerability of the development and the flood zone and accordingly sets out the requirements to do an Exception Test. The table below describes the conditions required for an Exception Test.

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	✗	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	✗	✗	✗

Key: ✓ Development is appropriate.
✗ Development should not be permitted.

The proposed development would fall onto the 'More Vulnerable' classification. With the proposed development site being located within a Flood Zone 1, an Exception Test is not required, and the proposed development is appropriate.

7. Flood Mitigation/Management Measures and Evacuation Plan

- 7.1** As stated in Section 6.3, SuDS can help in reducing the effect of flooding within the site and also upstream of the development site. Storage of surface water for future use or a controlled discharge of surface water are implemented in the reduction of flooding upstream of the proposed development.
- 7.2** Although outside of the Flood Alert area, it is highly recommended for the users of the proposed development to sign up to the Environment Agency's Flood Alert service in order to receive alerts and information regarding any future flood alerts.
- 7.3** All residents would need to be aware of the Flood Alert System and sign up for the alerts upon using the proposed development. If the most severe warning appears, residents would have to call 999 if in immediate danger.
- 7.4** Users of the commercial unit would need to move upstairs to a higher level in the event that any flooding does occur at the site. The residents of the houses can stay within the flats until rescue services arrive.

8. Surface Water Management

8.1 National Planning Policy Framework

- 8.2 The National Planning Policy Framework 2021 (NPPF) and accompanying Planning Practice Guidance indicate surface water run-off should be controlled as near to its source as possible through a sustainable drainage approach to surface water management.
- 8.3 Consideration should therefore firstly be given to using sustainable urban drainage (SuDS) techniques including soakaways, infiltration trenches, permeable pavements, grassed swales, ponds and wetlands to reduce flood risk by attenuating the rate and quantity of surface water run-off from a site. This approach can also offer other benefits in terms of promoting groundwater recharge, water quality improvement and amenity enhancements. Approved document Part H of the Building Regulations (2010) sets out a hierarchy for the disposal of surface water which encourages a SuDS approach, as detailed above.

Climate Change

- 8.4 There are indications that the climate in the UK is changing significantly and it is widely believed that the nature of climate change will vary greatly by region. Current expert opinion indicates the likelihood that future climate change would produce more frequent short duration and high-intensity rainfall events with the addition of more frequent periods of long duration rainfall.
- 8.5 The Environment Agency has highlighted the climate change allowance for all proposed developments which will need to be used for all future surface water runoff calculations.

Small and Urban Catchment Climate Change Growth

- 8.6 The table below highlights the potential climate change expected in the future.

Applies across all of England	Total potential change anticipated for the '2020s' (2015 to 2039)	Total potential change anticipated for the '2050s' (2040 to 2069)	Total potential change anticipated for the '2080s' (2070 to 2115)
Upper end	10%	20%	40%
Central	5%	10%	20%

As this development is for residential use, **a climate change growth factor of 40% is proposed** to be used for the surface water runoff calculations to consider worst-case scenarios for surface water flooding.

Methods of Surface Water Management

8.7 As set out in Part H of the Building Regulations and the NPPF, there are four methods that have been reviewed for the management and discharge of surface water for the site which are detailed below; these may be applied individually or collectively to form a complete strategy. They should be applied in the order of priority as listed:

- Discharge via infiltration;
- Discharge via watercourse;
- Discharge via public surface water sewer; and
- Discharge via a combined sewer.

Discharge via Infiltration

8.8 Any impermeable areas that can drain to a soakaway or an alternative method of infiltration would significantly improve the sustainability of any surface water systems.

8.9 SOIL mapping for the site suggests that the soils beneath the site may not be able to infiltrate. In line with United Utilities standard practice, the drainage will be required to discharge via soakaways. In the absence of permeability information for the site, the drainage assumption is to provide a piped system with limited discharge to the sewer, if following permeability tests, in line with BRE digest 365, the use of soakaways is found to be appropriate, the design will be reconsidered accordingly.

8.10 As per standard practice, United Utilities will require evidence that testing has been undertaken to demonstrate the suitability of soakaways.

Discharge via Watercourse

8.11 The next consideration for the disposal of surface water is via a watercourse. There are no nearby watercourses and therefore it is not possible to discharge via a watercourse.

Discharge via Public Surface Water sewer

8.12 The next discharge method of surface water is via a public surface water. There are no public surface water sewers within close vicinity and therefore, a discharge to a public surface water sewer is not possible.

Discharge via Public Combined Water sewer

8.13 The next discharge method of surface water is via a public combined water sewer. There is a United Utilities combined water sewer to the south of the site along Brendon Avenue. This can be used to help discharge surface water from the site.

Therefore, a discharge via a public combined water sewer is the best method possible.

Proposed Surface Water Discharge Strategy

8.14 As stated in Section 8.12, the preferred method of discharging surface water is via a direct connection to the existing combined water United Utilities combined water sewer located along Brendon Avenue.

- 8.15 The general principle of the surface water drainage strategy for this site is to collect the runoff from the roof run-off and associated footpaths, and convey this to storage attenuation, of a tank feature within the yard area. From there the water, through a flow control hydrobrake, will be discharged into the existing surface water sewer network.
- 8.16 The proposed restricted discharge rate and calculated post-development runoff rates generate a storage requirement during periods of intense rainfall. This storage volume will need to store water which will not be able to discharge through to the existing sewer.
- 8.17 The Causeway Flow 'Quick Storage Estimate' module has been used to estimate the storage volume required for both a 1 in 30 year and 1 in 100 year storm event plus a 40% allowance for climate change.
- 8.18 As the site is brownfield, the aim was to improve the existing surface water discharge by providing betterment under all conditions including the 1 in 100 year flood event with 40% Climate Change. The existing site brownfield flow rate was calculated to be 58.1l/s at a 1 in 100 flood event. To suit the LLFA requirements we designed our system to consider a greenfield discharge rate at 1l/s.
- 8.19 In order to achieve the discharge rate of 1.0 l/s, attenuation storage has been modelled and calculated within the design. A flow control (Hydrobrake) is also included at the last surface water manhole prior to joining the surface water sewer.
- 8.20 The required storage for the development is calculated using attenuation storage crates.
- 8.21 If storage crates are used, and assuming a 95% void ratio, the required volume of crates is a minimum of **28.158m³**. The proposed storage solution is 9.5m x 6.0m x 0.52m deep, with a min 0.5m cover below the yard levels.
- 8.22 The proposed site discharge has been estimated at greenfield discharge rate of 1 litres per second which we will propose to Manchester City Council LLFA.
- 8.23 Appendix E includes the drawings and calculations of the surface water discharge and flood exceedance plan.

9. Foul Water Drainage Proposal

- 9.1 Based on the 4000 l/dwelling/day (0.05 l/s/dwelling), the foul water will be discharged at a peak flow rate of 0.3 l/s.
- 9.2 The foul water will be discharged into the existing private combined system located within the site and connects downstream to the United Utilities Combined Water sewer along Brendon Avenue.

10. SuDS Appraisal and Proposed SuDS for Development

SuDS- General

- 10.1 Appropriately designed, constructed and maintained, SuDS are more sustainable than conventional drainage systems. Their benefits in general terms are summarised below.

SuDS can:

- Reduce run-off surface water flow-rates and/or volumes and hence reduce the risk of flooding;
- Encourage natural groundwater re-charge;
- Reduce pollutant concentrations in storm water;
- Provide habitats for wildlife.

SuDS Appraisal

- 10.2 There are many site-specific factors which will influence the choice of any single or combination of SuDS device used within a development. The primary factors are:

- Whether the development is domestic, commercial or industrial;
- Whether the underlying ground is contaminated. If so, infiltration systems (soakaways) will most probably not be permitted;
- Whether the underlying ground is permeable enough for infiltration systems (soakaways) to be considered;
- Whether the groundwater levels are deep enough for infiltration systems (soakaways) to be considered;
- Whether the site is steeply sloping and its general topography;
- The availability of space inside the development for each potential SuDS facility;

Health and Safety aspects should the development be likely to be inhabited or used by children.

Types of SuDS with Respect to Proposed Development

- 10.3 As part of the design for this development, SuDS have been incorporated wherever practicably feasible. Based on local and regional policy, where there is a net increase in impermeable area, at least one 'at source' SuDS measure is to be provided to assist with reducing the volume of run-off.

The primary SuDS element proposed for this development is outlined below:

Flow Control Devices

- 10.4 Hydrobrakes can be used to restrict the discharge rate of surface water as it allows for a controlled discharge of surface water whilst not causing any potential flooding within the site and elsewhere (alongside storage).
- 10.5 The site includes an Hydrobrake to discharge the surface water at a maximum rate of 1.0 l/s.

Attenuation Storage

- 10.6 Attenuation storage crates have been included within the Drainage Design in order to temporarily store surface water from the impermeable areas of the site (i.e. the roof of the proposed development).
- 10.7 A total volumetric storage of 28.158m³ has been provided as part of the design.

11. Maintenance

- 11.1 The maintenance of the drainage system within the proposed development site will be managed by the owner of the proposed development. All maintenance operations should be carried out in accordance with the manufacturer's recommendations and maintenance guidances.

Surface Water Drains

Maintenance Activity	Remedial Action	Inspection Frequency
Conducting checks on the structure of drains and clearing of dirt and slit within the drains.	Removing the dirt/silt as required and if required to restructure/replace the drains to optimise operation.	Take action as required

System Inlets

Maintenance Activity	Remedial Action	Inspection Frequency
Conducting checks on drainage rainwater pipes inlets, inspection chambers, filter pipe and catchpit for dirt/silt and blockages	Removing the dirt/silt/blockages as required to ensure continued operation and to prevent dirt/silt/blockages from entering the drains.	Minimum every 6 months

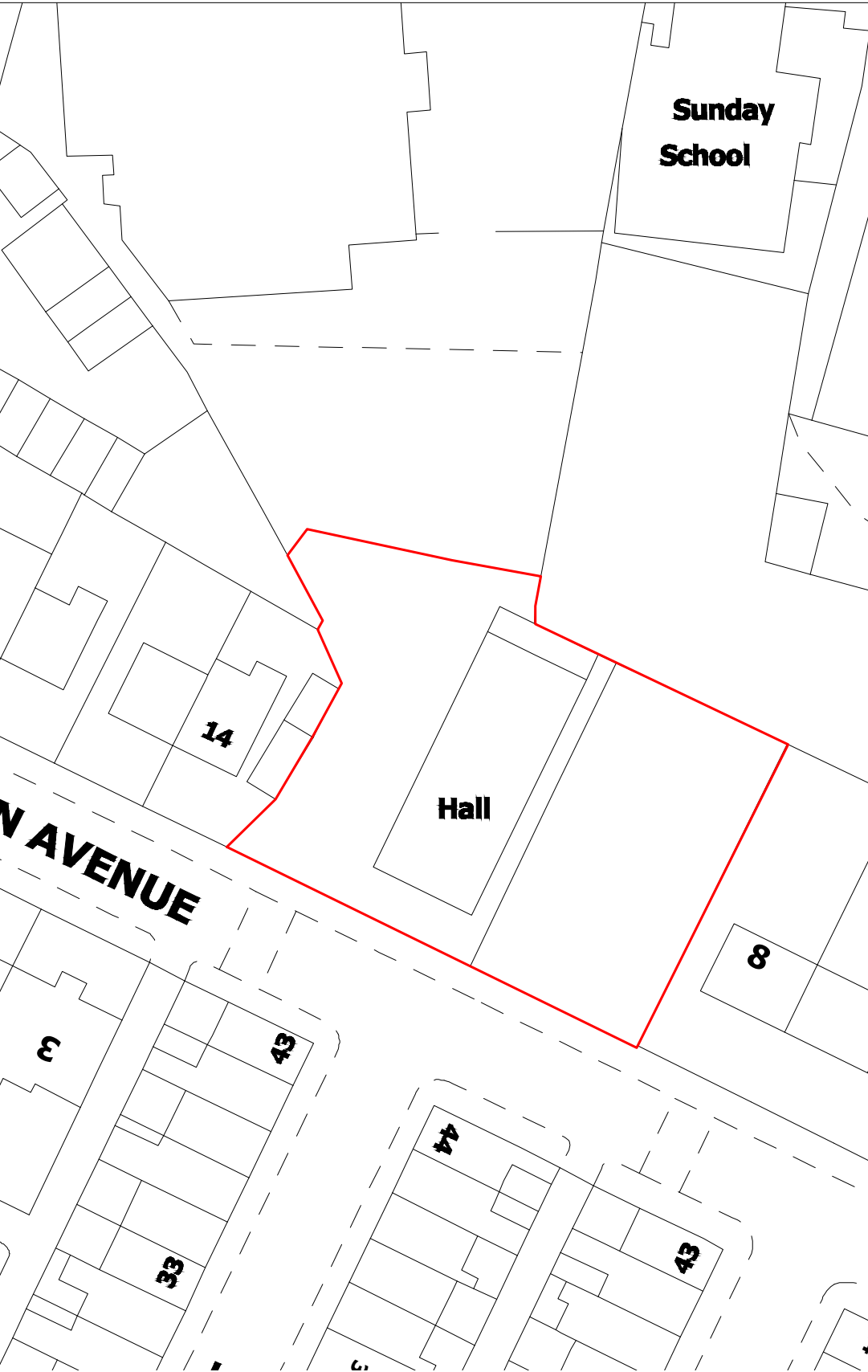
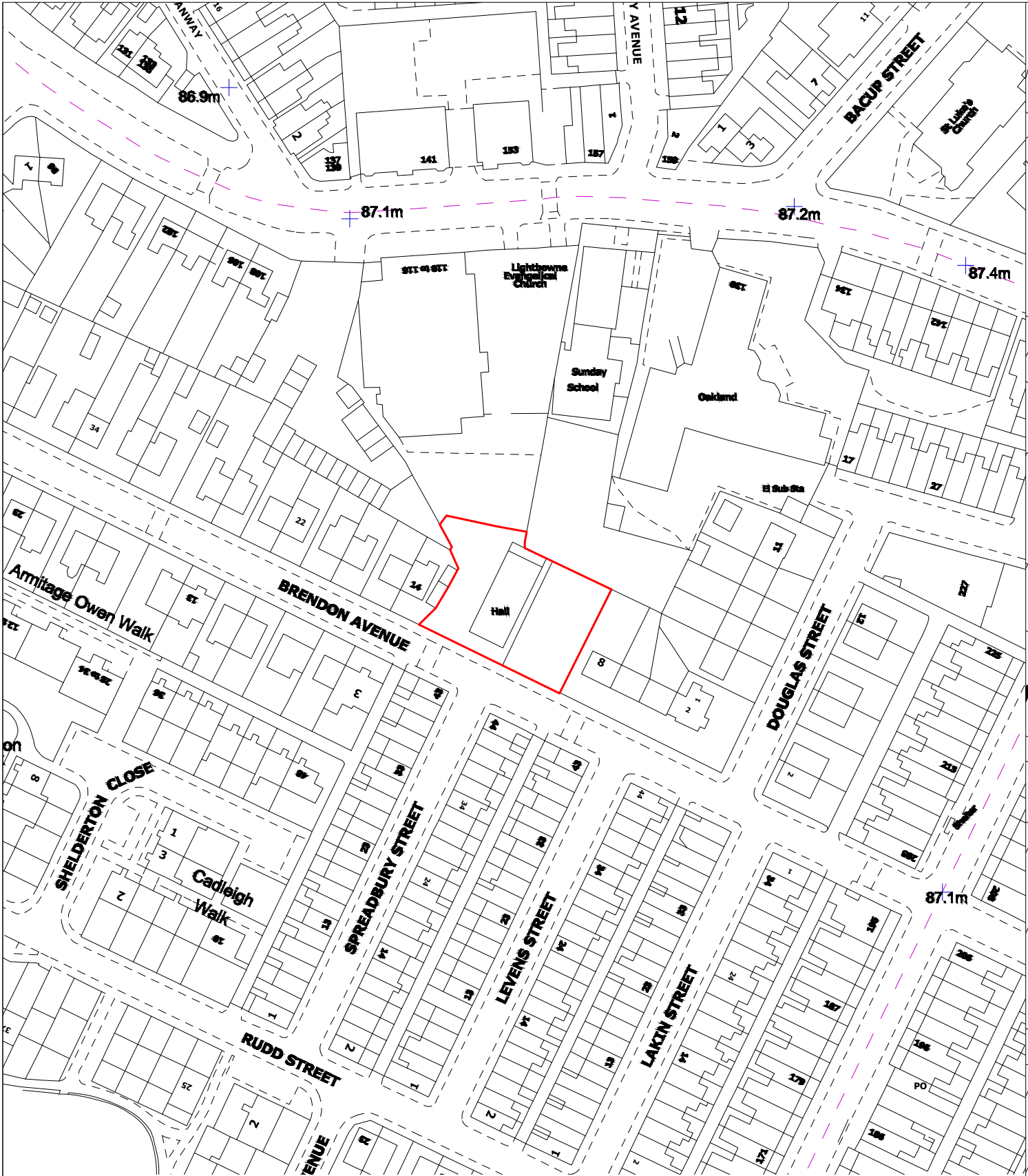
Other SuDS Features

Maintenance Activity	Remedial Action	Inspection Frequency
Conducting checks on attenuation storage for dirt/silt/blockages	Removing the dirt/silt/blockages as storage units if required	Minimum every 6 months unless action required

12. Summary

- 12.1 The proposed development site is located within Flood Zone 1, with a very low risk of river/sea flooding and a low risk of surface water flooding.
- 12.2 As per the SFRA, the proposed development site is suitable for development and an Exception test was not required as per the NPPF due to the development being within Flood Zone 1.
- 12.3 The proposed development will discharge the surface water into the United Utilities surface water sewer along Brendon Avenue. The maximum proposed discharge rate was calculated to be 1.0 l/s under all flood events upto and including the 1 in 100 year flood event with 40% Climate Change.
- 12.4 The primary option for surface water disposal is via an indirect connection to the existing combined water system located within the site and connects downstream to the United Utilities combined water sewer along Brendon Avenue.
- 12.5 The peak foul flow was calculated to be 0.3 l/s which will be discharged into the existing private combined system located within the site and connects downstream to the United Utilities Combined Water sewer along Brendon Avenue.
- 12.6 The proposed development will also include SuDS (attenuation storage) to store and discharge surface water at a restricted rate.
- 12.7 It can therefore be concluded that the proposed development meets the local and national policy.

Appendix A: Existing Site Plan



Notes:
All work is to be carried out to the latest current British Standards Codes of Practice and recognised working practices.
All work and materials should comply with Health and Safety legislation.
All dimensions are in millimetres unless where explicitly shown otherwise.
The contractor should check and certify all dimensions as work proceeds and notify the agent of any discrepancies.
Do not scale off the drawings, if in doubt ask.
HAD & Co. are not liable for any work undertaken prior to Full Planning Consent and/ or Building Regulations Approval.
CDM REGULATIONS 2015
The client must abide by the Construction Design and Management Regulations 2015. The client must appoint a contractor, if more than one contractor is to be involved, the client will need to appoint (in writing) a principal designer (to plan, manage and coordinate the planning and design work) and a principal contractor (to plan, manage and coordinate the construction and ensure there are arrangements in place for managing and organising the project).
Domestic clients
The domestic client is to appoint a principal designer and a principal contractor when there is more than one contractor. If not your duties will automatically transferred to the contractor or principal contractor.
The designer can take on the duties, provided there is a written agreement between you and the designer to do so.
The Health and Safety Executive is to be notified as soon as possible before construction work starts if the works:
(a) Last longer than 30 working days and has more than 20 workers working simultaneously at any point in the project.
Or:
(b) Exceeds 500 person days.
THERMAL BRIDGING
Care shall be taken to limit the occurrence of thermal bridging in the insulation layers caused by gaps within the thermal element, (i.e. around windows and door openings). Reasonable provision shall also be made to ensure the extension is constructed to minimise unwanted air leakage through the new building fabric.
MATERIALS AND WORKMANSHIP
All works are to be carried out in a workmanlike manner. All materials and workmanship must comply with Regulation 7 of the Building Regulations, all relevant British Standards, European Standards, Agreement Certificates, Product Certification of Schemes (Kite Marks) etc. Products conforming to a European technical standard or harmonised European product should have a CE marking.

Revisions List:

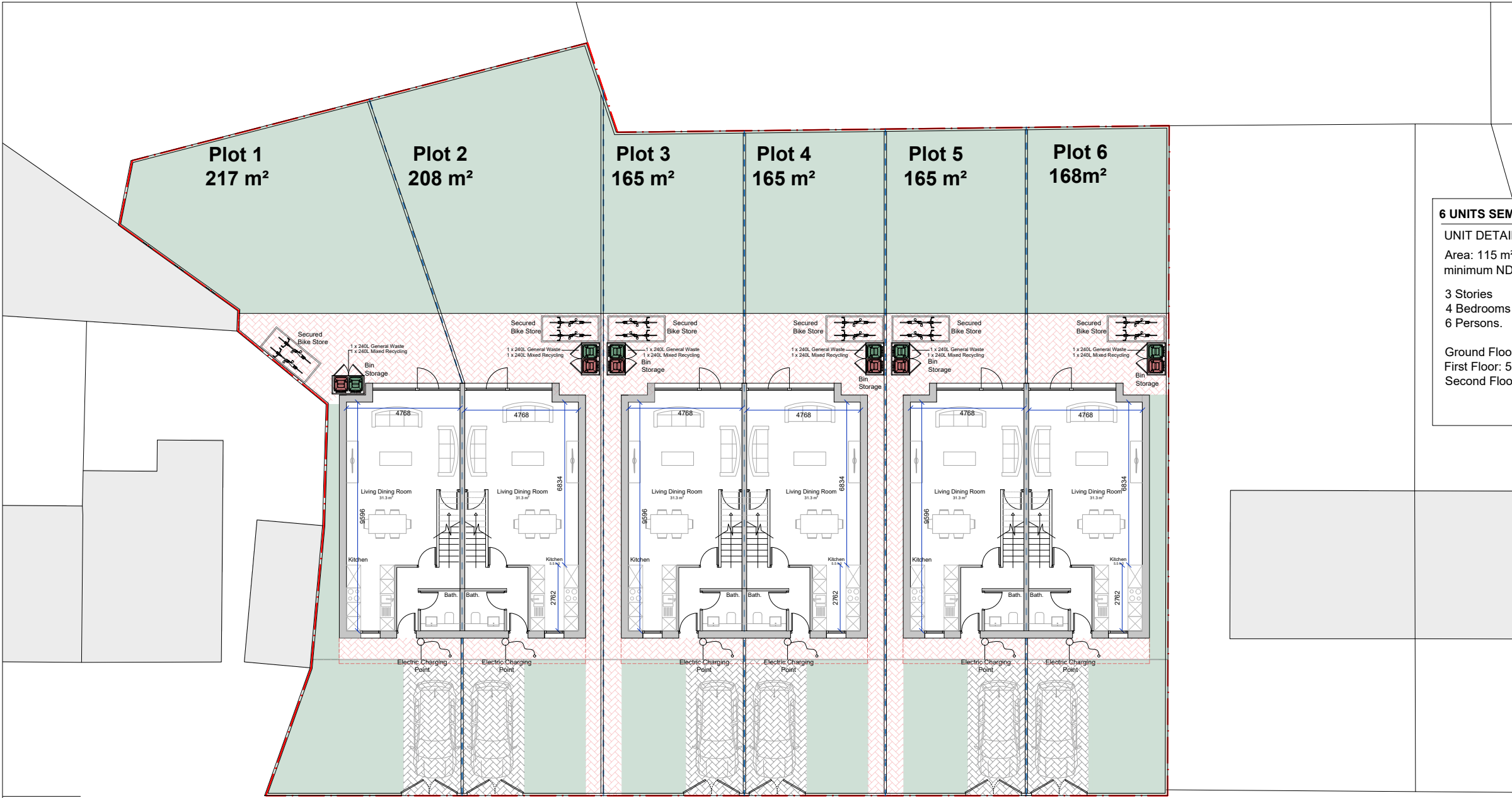


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Address: Brendon Avenue
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Title: Location and Site Plan	Drawn: HA
Client: Oseni Musa	Checked: SH
Date: 13-04-2022	Paper: A3
Drawing No: HAD3412-01	Scale: 1:200
Revision:	

Appendix B: Proposed Site Plan



6 UNITS SEMI DETACHED

UNIT DETAIL:

Area: 115 m², Comply with minimum NDSS 112 m²

3 Stories
4 Bedrooms
6 Persons.

Ground Floor: 45m²
First Floor: 50m²
Second Floor: 20m²

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Or:
(b) Exceeds 500 person days.

THERMAL BRIDGING
Care shall be taken to limit the occurrence of thermal bridging in the insulation layers caused by gaps within the thermal element, (i.e. around windows and door openings). Reasonable provision shall also be made to ensure the extension is constructed to minimise unwanted air leakage through the new building fabric.

MATERIALS AND WORKMANSHIP
All works are to be carried out in a workmanlike manner. All materials and workmanship must comply with Regulation 7 of the Building Regulations, all relevant British Standards, European Standards, Agreement Certificates, Product Certification of Schemes (Kite Marks) etc. Products conforming to a European technical standard or harmonised European product should have a CE marking.

Drawings not yet checked internally or by building control, external consultants input required including a structural engineer, all drawings are subject to change and must not be relied upon at this stage.

Revisions List:

a- Dimensions and areas have been added, the dwellings are comply with NDSS.

b- Updated plans with the rear bin storage and bike store.



HAD & Co.
www.hussainarchitecture.co.uk
01282 451428

Address: Brendon Avenue
Moston
M40 9DN

Title: Proposed Ground Floor Plan	Drawn: HA
Client: Oseni Musa	Checked: SH
Date: 4-10-2022	Paper: A3
Drawing No: HAD3412-02	Scale: 1:200
Revision:	a b



6 UNITS SEMI DETACHED

UNIT DETAIL:

Area: 115 m², Comply with minimum NDSS 112 m²

3 Stories
4 Bedrooms
6 Persons.

Ground Floor: 45m²
First Floor: 50m²
Second Floor: 20m²

Notes:
All work is to be carried out to the latest current British Standards Codes of Practice and recognised working practices.

All work and materials should comply with Health and Safety legislation.

All dimensions are in millimetres unless where explicitly shown otherwise.

The contractor should check and certify all dimensions as work proceeds and notify the agent of any discrepancies.

Do not scale off the drawings, if in doubt ask.

HAD & Co. are not liable for any work undertaken prior to Full Planning Consent and/ or Building Regulations Approval.

CDM REGULATIONS 2015
The client must abide by the Construction Design and Management Regulations 2015. The client must appoint a contractor, if more than one contractor is to be involved, the client will need to appoint (in writing) a principal designer (to plan, manage and coordinate the planning and design work) and a principal contractor (to plan, manage and coordinate the construction and ensure there are arrangements in place for managing and organising the project).

Domestic clients
The domestic client is to appoint a principal designer and a principal contractor when there is more than one contractor. If not your duties will automatically transferred to the contractor or principal contractor. The designer can take on the duties, provided there is a written agreement between you and the designer to do so.

The Health and Safety Executive is to be notified as soon as possible before construction work starts if the works:
(a) Last longer than 30 working days and has more than 20 workers working simultaneously at any point in the project.
Or:
(b) Exceeds 500 person days.

THERMAL BRIDGING
Care shall be taken to limit the occurrence of thermal bridging in the insulation layers caused by gaps within the thermal element, (i.e. around windows and door openings). Reasonable provision shall also be made to ensure the extension is constructed to minimise unwanted air leakage through the new building fabric.

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Revisions List:

a- Dimensions and areas have been added, the dwellings are comply with NDSS.

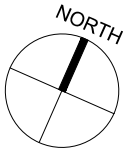


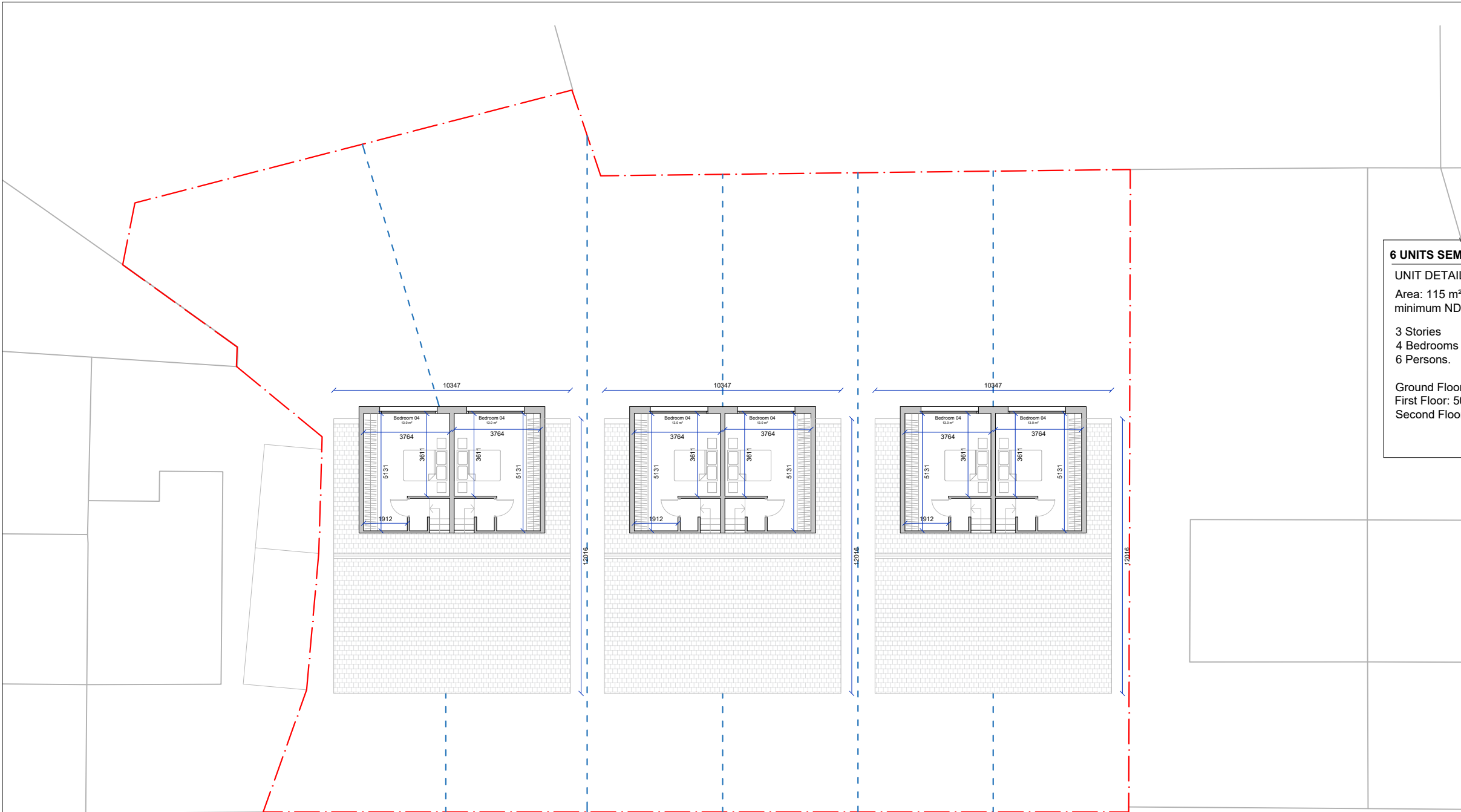
HAD & Co.
www.hussainarchitecture.co.uk
01282 451428

Address: Brendon Avenue
Moston
M40 9DN

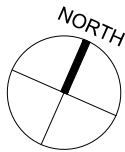
Title: Proposed First Floor Plan		Drawn: HA	
Client: Oseni Musa		Checked: SH	
Date: 12-09-2022		Paper: A3	
Drawing No: HAD3412-03		Scale: 1:200	
Revision:	a		

Proposed First Floor





Proposed Second Floor



6 UNITS SEMI DETACHED

UNIT DETAIL:

Area: 115 m², Comply with minimum NDSS 112 m²

3 Stories

4 Bedrooms

6 Persons.

Ground Floor: 45m²

First Floor: 50m²

Second Floor: 20m²

Notes:
All work is to be carried out to the latest current British Standards Codes of Practice and recognised working practices.

All work and materials should comply with Health and Safety legislation.

All dimensions are in millimetres unless where explicitly shown otherwise.

The contractor should check and certify all dimensions as work proceeds and notify the agent of any discrepancies.

Do not scale off the drawings, if in doubt ask.

HAD & Co. are not liable for any work undertaken prior to Full Planning Consent and/ or Building Regulations Approval.

CDM REGULATIONS 2015
The client must abide by the Construction Design and Management Regulations 2015. The client must appoint a contractor, if more than one contractor is to be involved, the client will need to appoint (in writing) a principal designer (to plan, manage and coordinate the planning and design work) and a principal contractor (to plan, manage and coordinate the construction and ensure there are arrangements in place for managing and organising the project).

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The Health and Safety Executive is to be notified as soon as possible before construction work starts if the works:
(a) Last longer than 30 working days and has more than 20 workers working simultaneously at any point in the project.
Or:
(b) Exceeds 500 person days.

THERMAL BRIDGING
Care shall be taken to limit the occurrence of thermal bridging in the insulation layers caused by gaps within the thermal element, (i.e. around windows and door openings). Reasonable provision shall also be made to ensure the extension is constructed to minimise unwanted air leakage through the new building fabric.

MATERIALS AND WORKMANSHIP
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Drawings not yet checked internally or by building control, external consultants input required including a structural engineer, all drawings are subject to change and must not be relied upon at this stage.

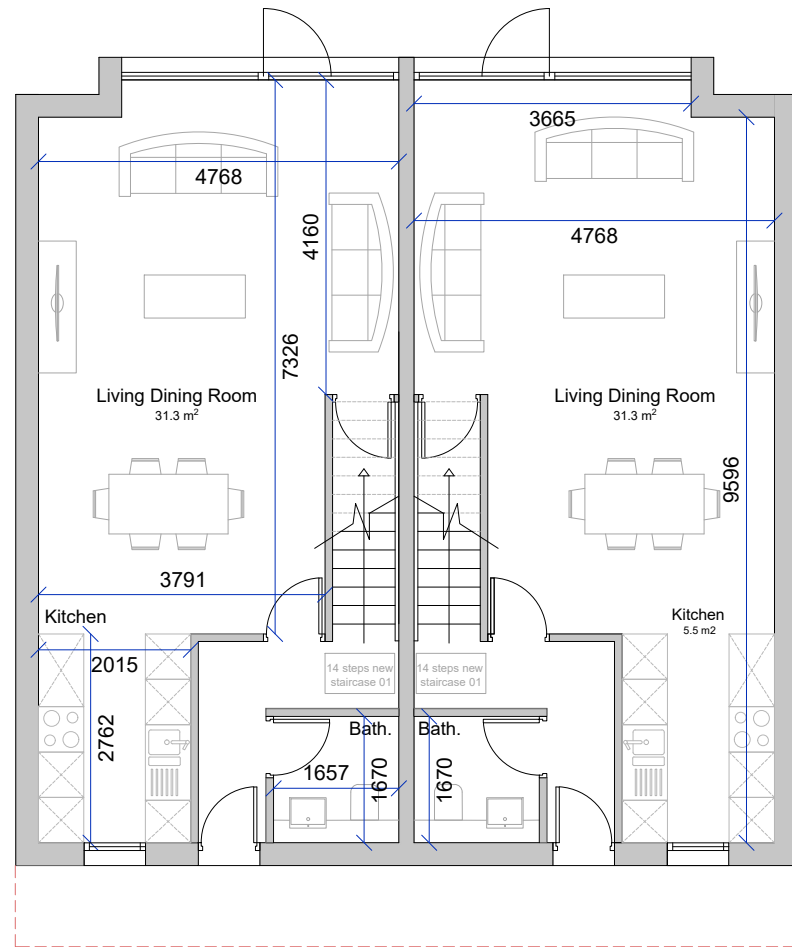
Revisions List:

a- Dimensions and areas have been added, the dwellings are comply with NDSS.

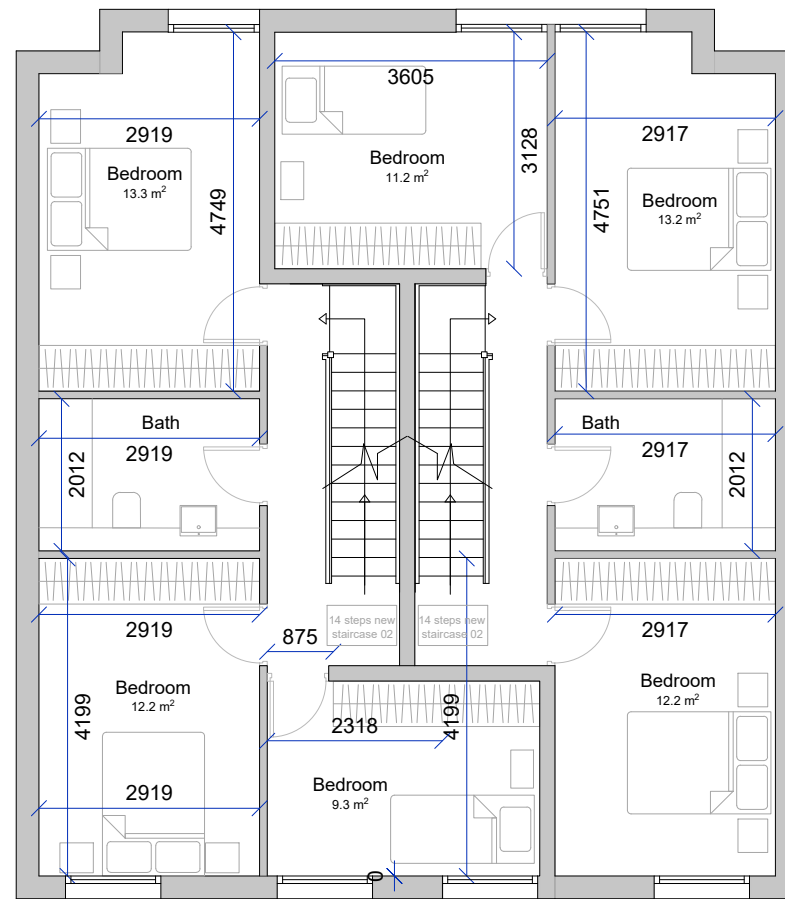


HAD & Co.
www.hussainarchitecture.co.uk
01282 451428

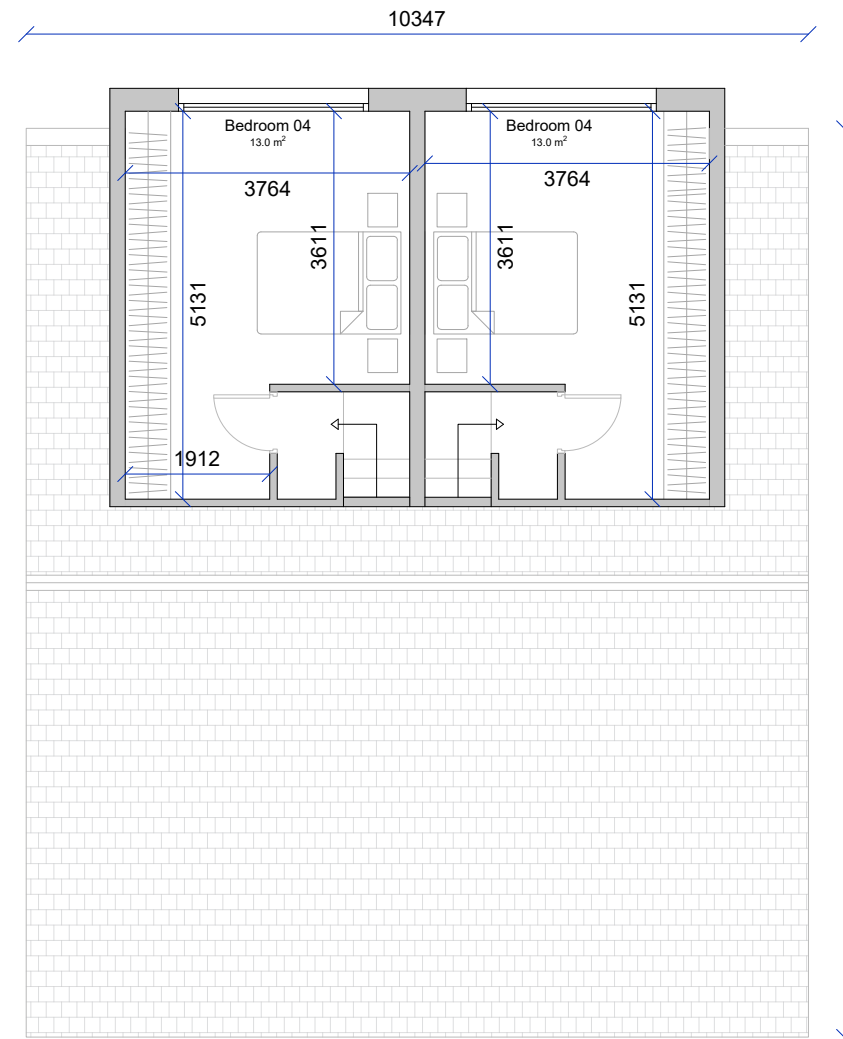
Address: Brendon Avenue Moston M40 9DN	
Title: Proposed Second Floor Plans	Drawn: HA
Client: Oseni Musa	Checked: SH
Date: 12-09-2022	Paper: A3
Drawing No: HAD3412-04	Scale: 1:200
Revision:	a



Proposed Ground Floor



Proposed First Floor



Proposed Second Floor

6 UNITS SEMI DETACHED

UNIT DETAIL:

Area: 115 m², Comply with minimum NDSS 112 m²

3 Stories
4 Bedrooms
6 Persons.

Ground Floor: 45m²
First Floor: 50m²
Second Floor: 20m²

Notes:
All work is to be carried out to the latest current British Standards Codes of Practice and recognised working practices.

All work and materials should comply with Health and Safety legislation.

All dimensions are in millimetres unless where explicitly shown otherwise.

The contractor should check and certify all dimensions as work proceeds and notify the agent of any discrepancies.

Do not scale off the drawings, if in doubt ask.

HAD & Co. are not liable for any work undertaken prior to Full Planning Consent and/or Building Regulations Approval.

CDM REGULATIONS 2015

The client must abide by the Construction Design and Management Regulations 2015. The client must appoint a contractor, if more than one contractor is to be involved, the client will need to appoint (in writing) a principal designer (to plan, manage and coordinate the planning and design work) and a principal contractor (to plan, manage and coordinate the construction and ensure there are arrangements in place for managing and organising the project).

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The domestic client is to appoint a principal designer and a principal contractor when there is more than one contractor. If not your duties will automatically transferred to the contractor or principal contractor.

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The Health and Safety Executive is to be notified as soon as possible before construction work starts if the works:

(a) Last longer than 30 working days and has more than 20 workers working simultaneously at any point in the project.

Or:
(b) Exceeds 500 person days.

THERMAL BRIDGING

Care shall be taken to limit the occurrence of thermal bridging in the insulation layers caused by gaps within the thermal element, (i.e. around windows and door openings). Reasonable provision shall also be made to ensure the extension is constructed to minimise unwanted air leakage through the new building fabric.

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All works are to be carried out in a workmanlike manner. All materials and workmanship must comply with Regulation 7 of the Building Regulations, all relevant British Standards, European Standards, Agreement Certificates, Product Certification of Schemes (Kite Marks) etc. Products conforming to a European technical standard or harmonised European product should have a CE marking.

Drawings not yet checked internally or by building control, external consultants input required including a structural engineer, all drawings are subject to change and must not be relied upon at this stage.

Revisions List:

a- Dimensions and areas have been added, the dwellings are comply with NDSS.



HAD & Co.

www.hussainarchitecture.co.uk
01282 451428

Address: Brendon Avenue
Moston
M40 9DN

Title: Proposed Semi Detached House Plans

Drawn: HA

Client: Oseni Musa

Checked: SH

Date: 12-09-2022

Paper: A3

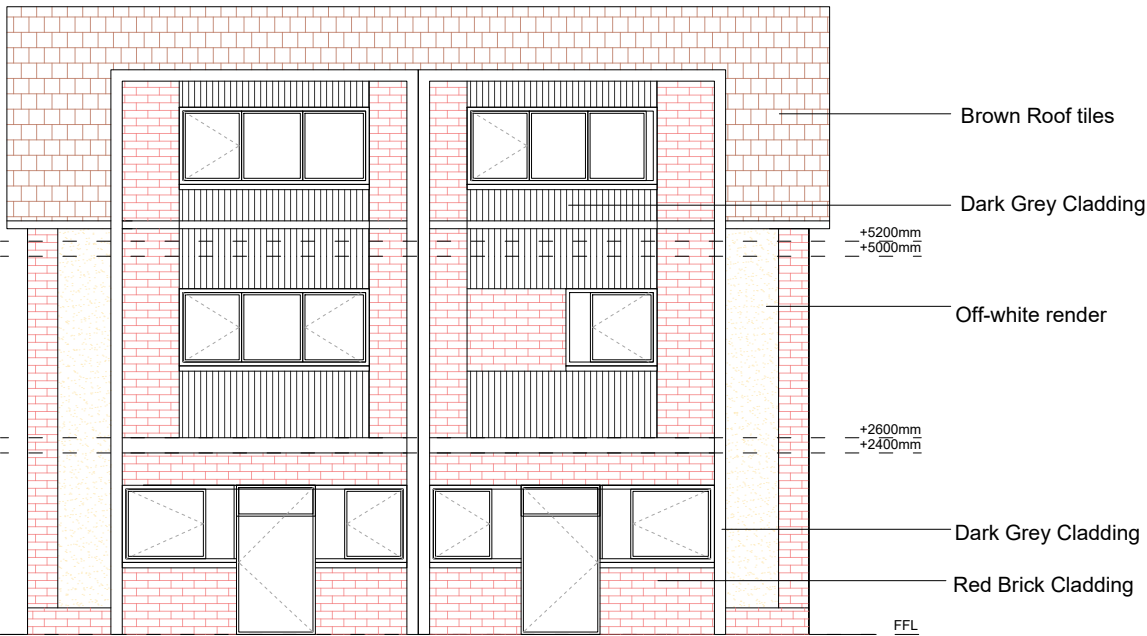
Drawing No: HAD3412-05

Scale: 1:100

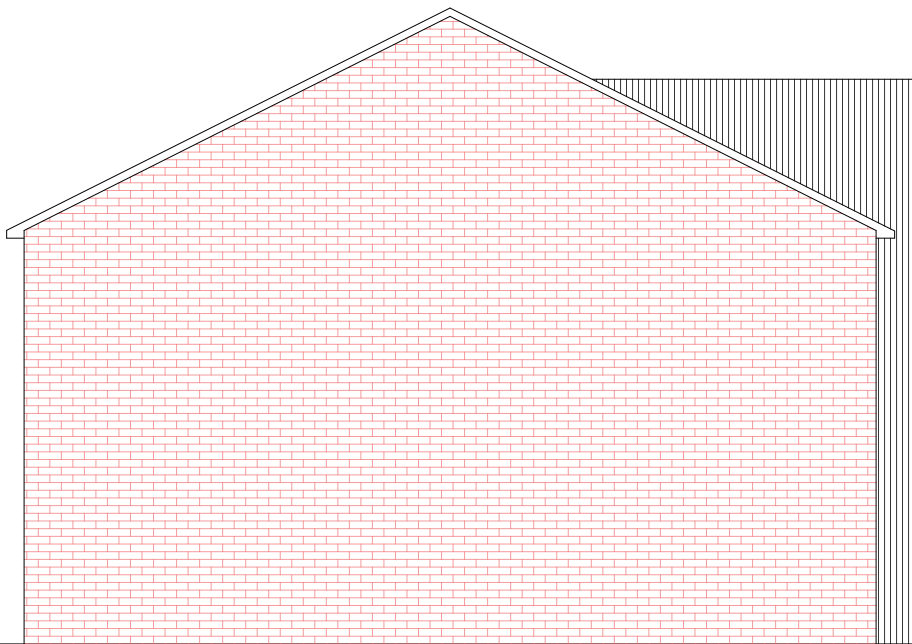
Revision:	a						
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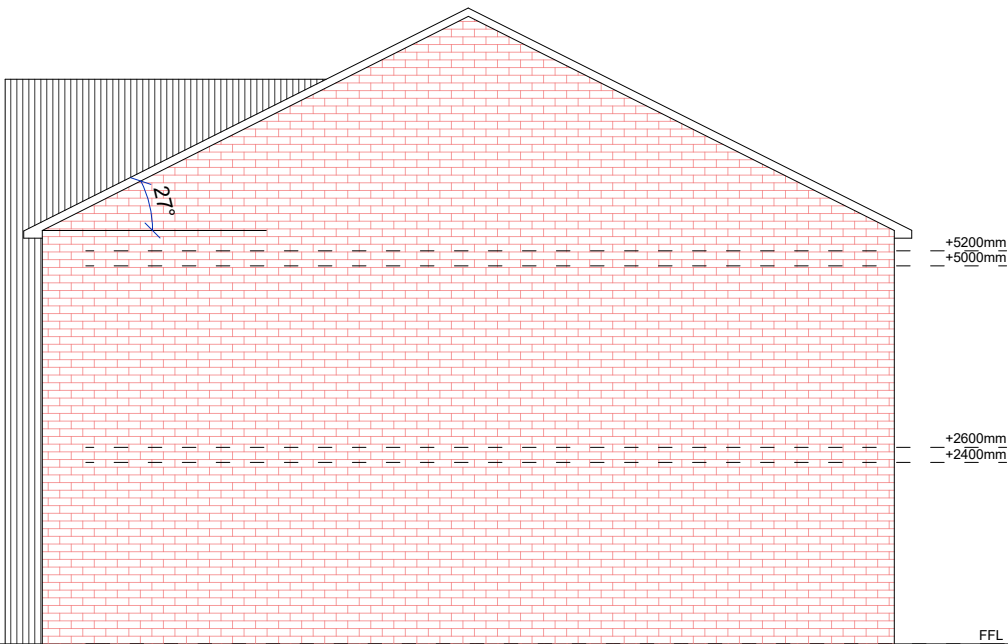
Proposed Front Elevation 1:100 @ A3
Option 01



Proposed Rear Elevation 1:100 @ A3
Option 01



Proposed Side Elevation 1:100 @ A3



Proposed Side Elevation 1:100 @ A3

Notes:
All work is to be carried out to the latest current British Standards Codes of Practice and recognised working practices.
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All dimensions are in millimetres unless where explicitly shown otherwise.
The contractor should check and certify all dimensions as work proceeds and notify the agent of any discrepancies.
Do not scale off the drawings, if in doubt ask.
HAD & Co. are not liable for any work undertaken prior to Full Planning Consent and/ or Building Regulations Approval.
CDM REGULATIONS 2015
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Or:
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Drawings not yet checked internally or by building control, external consultants input required including a structural engineer, all drawings are subject to change and must not be relied upon at this stage.

Revisions List:



HAD & Co.

www.hussainarchitecture.co.uk
01282 451428

Address: Brendon Avenue
Moston
M40 9DN

Title: Proposed Elevations

Drawn: HA

Client: Oseni Musa

Checked: SH

Date: 13-04-2022

Paper: A3

Drawing No: HAD3412-06

Scale: 1:100

Revision:

--	--	--	--	--	--	--	--



Proposed Street Scene Elevations

Notes:
All work is to be carried out to the latest current British Standards Codes of Practice and recognised working practices.

All work and materials should comply with Health and Safety legislation.

All dimensions are in millimetres unless where explicitly shown otherwise.

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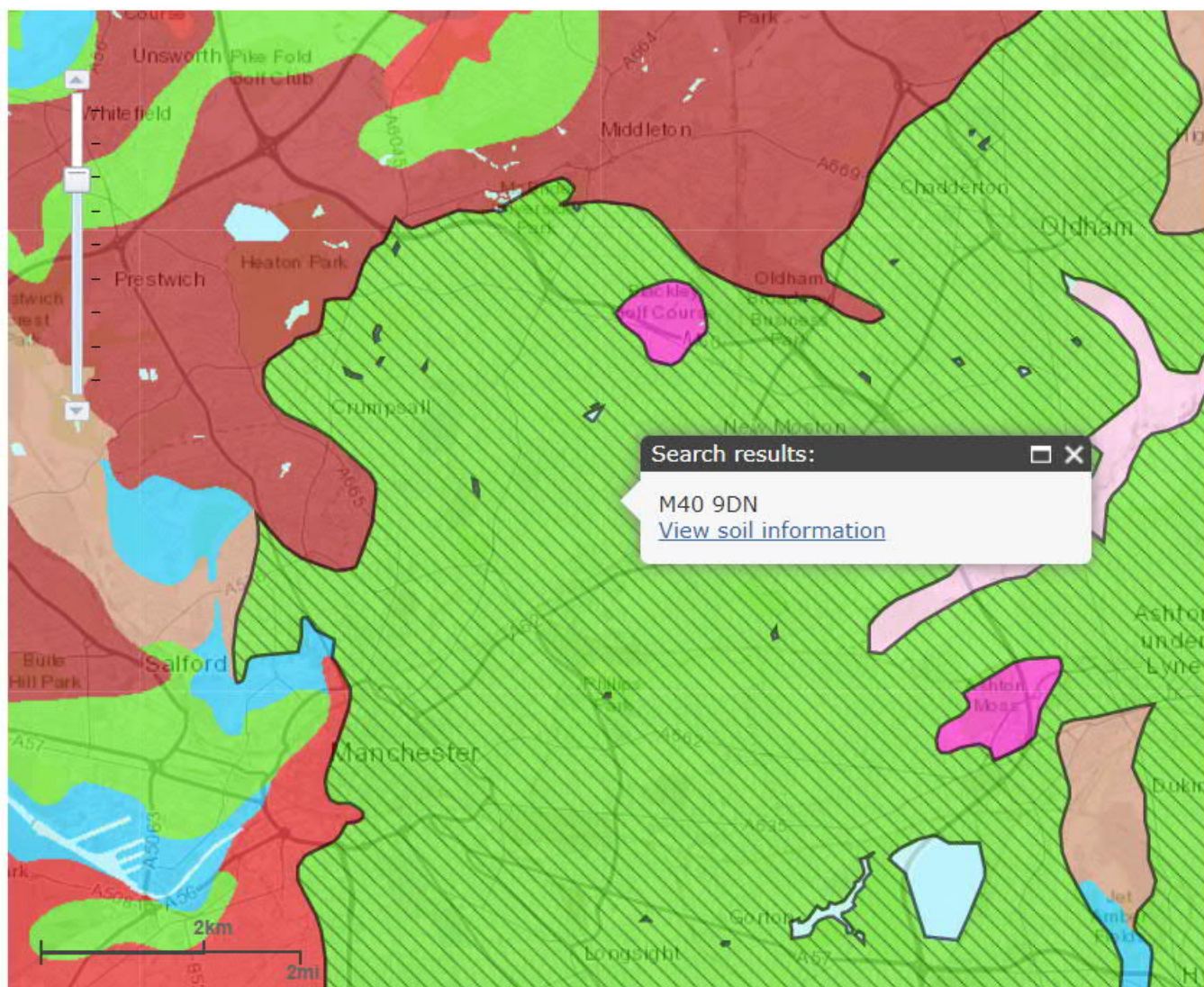
Revisions List:



HAD & Co.
www.hussainarchitecture.co.uk
01282 451428

Address: Brendon Avenue Moston M40 9DN	
Title: Street Scene Elevations	Drawn: HA
Client: Oseni Musa	Checked: SH
Date: 13-04-2022	Paper: A3
Drawing No: HAD3412-07	Scale: 1:200
Revision:	

Appendix C: Existing Site Drainage Review



Adjust transparency

Legend

Search

Soil information

Soilscape 17:

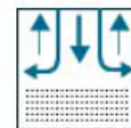
Slowly permeable seasonally wet acid loamy and clayey soils

Texture:

Loamy and clayey

Coverage:England: 7% Wales: 15.1%
England & Wales: 8.2%**Selected area:**230km²**Drainage:**

Impeded drainage

**Fertility:**

Low

**Habitats:**

Seasonally wet pastures and woodlands

Landcover:

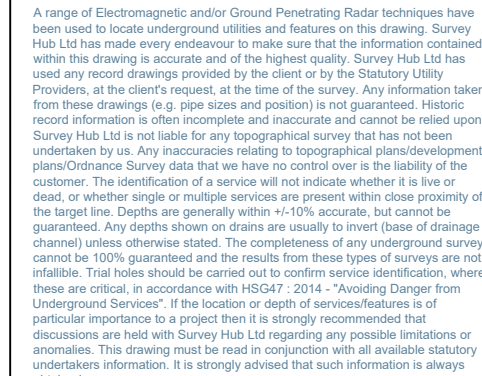
Grassland with some arable and forestry

Carbon:

Medium

Drains to:

Stream network

[illegible]

KEY	
DL	DL PIPE(S)
FUEL	FUEL PIPE(S)
SC	SCHEMATIC
BT	TRAF SIGNAL
BT	OVERHEAD BT CABLE(S)
COMM	COMMUNICATIONS CABLE(S)
COMM	OVERHEAD COMMUNICATIONS CABLE(S)
CTV	CABLE TV CABLE(S)
EL	ELECTRIC CABLE(S)
ED	OVERHEAD ELECTRIC CABLE(S)
FO	FIBROPTIC CABLE(S)
GS	GAS MAIN
GS	GAS SERVICE
GRF	GROUND PENETRATING RADAR (GPR) TRACE
GRF	PIPE
LC	LIGHTING CIRCUIT
LC	SECURITY CABLEING
MT	UNIDENTIFIED TRACE
MT	WATER MAIN
MT	WATER SERVICE
MT	FIRE ALARM CABLE(S)
MT	EMPTY DUCTING
MT	COMBINED SEWER
MT	FLOOD SEWER
MT	RISING MAIN
MT	SURFACE WATER SEWER
MT	CHAMBER (APPROX. POSITION)
MT	INVESTIGATION EXTENTS
MT	SEWER AIRWAY ROUTE
MT	SERVICE TAKEN FROM RECORDS
MT	DEPTH TO SERVICE
MT	END OF TRACE

Survey Coordinates and Grid
Please note that the grid shown on this drawing is as follows;

- ☐ Arbitrary
- ☐ Arbitrary but approx. related to North
- ☐ Best fit to an Ordnance Survey Digital Sheet
- ☒ Related to the Ordnance Survey National GPS Network

Levels
Please note that the levels shown on this drawing are as follows:

- ☐ Arbitrary
☐ Related to an Ordnance Survey Bench Mark
☒ Related to the Ordnance Survey National GPS Network



Title Manchester, M40 9DN
Underground Utility Survey

Station	Easting (m)	Northing (m)	Level (m)

NOTES:

All critical measurements should be checked on site prior to design.
No liability will be taken for this plan if passed on to 3rd parties.
Some services/data may be omitted in areas of parked vehicles and vegetation

THIS SURVEY HAS BEEN ORIENTATED TO THE ORDINANCE SURVEY (O.S.) NATIONAL GRID (OSGRID) VIA A GLOBAL POSITION SYSTEM (GPS) AND THE O.S. ACTIVE NETWORK (OS AN). A TRUE OSGRID COORDINATE HAS BEEN ESTABLISHED NEAR TO THE SITE CENTRE VIA A TRANSFORMATION USING THE OSTN02 AND OSGB06 TRANSFORMATION MODELS. THE SURVEY HAS BEEN CORRELATED TO THIS POINT AND A FURTHER ONE OR MORE OSGB06 POINTS ESTABLISHED TO CREATE A TRUE O.S. BEARING FOR ANGLE ORIENTATION. NO SCALE FACTOR HAS BEEN APPLIED TO THE SURVEY THEREFORE THE COORDINATES SHOWN ARE ARBITRARY & NOT TRUE O.S. COORDINATES WHICH HAVE A SCALE FACTOR APPLIED. PLEASE REFER TO SURVEY STATION TABLE TO ENABLE ESTABLISHMENT OF THE ON-SITE GRID.

Appendix D: Existing and Proposed Catchment Areas Review



Scale 1:100 @ A1 - 1:200 @ A3

NOTES

1) ALL DIMENSIONS ARE IN METERS UNLESS STATED OTHERWISE

KEY

- SITE BOUNDARY
- TOTAL SITE AREA: 1089m²
- PROPOSED IMPERMEABLE AREA 653m²
- PROPOSED PERMEABLE AREA 436m²

REVISIONS

REV	DESCRIPTION	DATE	BY
-	FIRST ISSUE	20/12/22	WR

Aval Consulting Group
Transportation Planning : Environmental Consultants
www.aval-group.co.uk, Email: contact@aval-group.co.uk
Company Number: 11922939

Client Name:
EQT EXETER

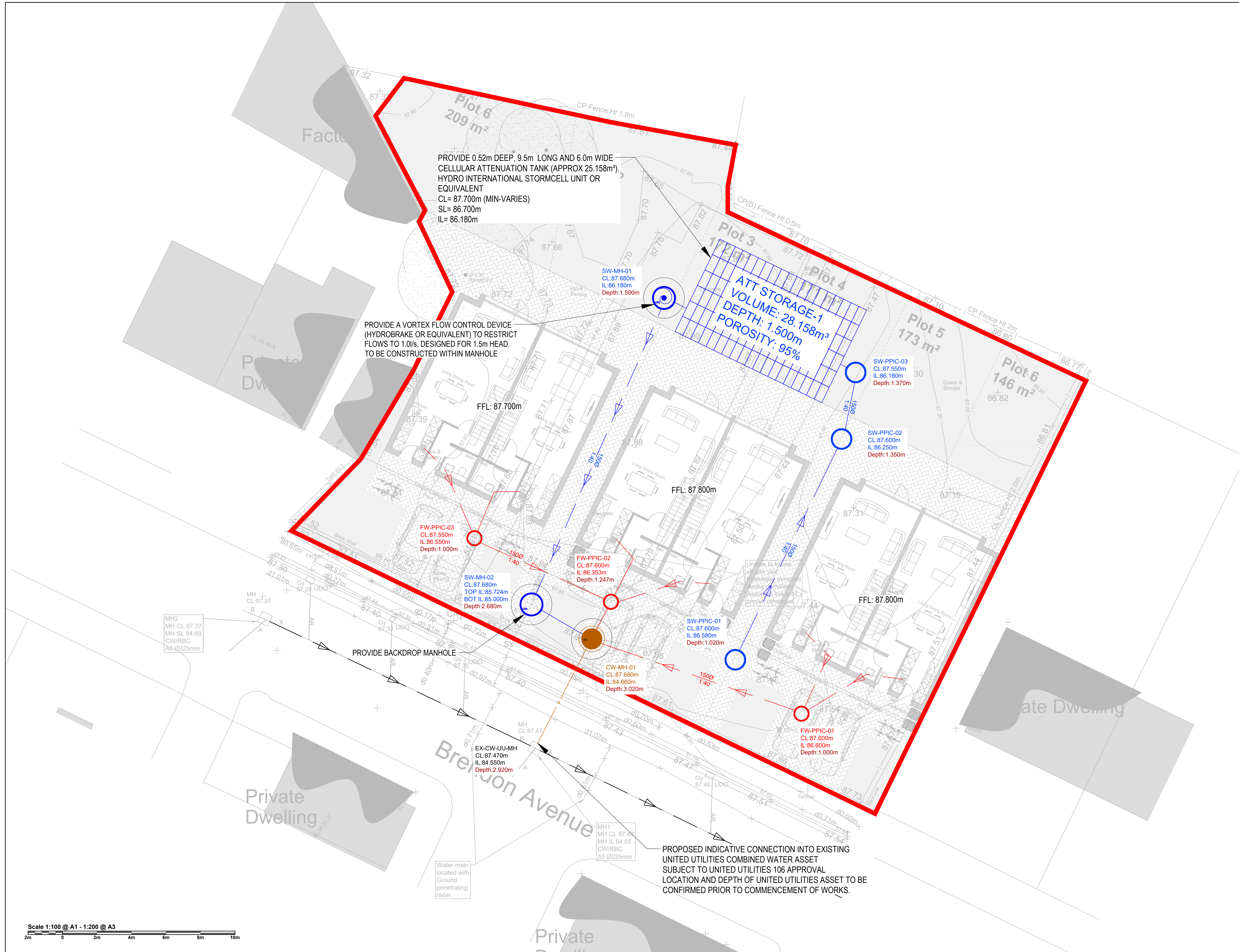
Project Title:
LAND ON BRENDON AVENUE,
MOSTON, M40 9DN

Drawing Title:
PROPOSED CATCHMENT AREAS PLAN

Date:	20.12.2022	Drawn By:	WR
Scale:	1:100 @ A1 1:200 @ A3	Checked:	WR
Status:	DRAFT	Approved:	AC

Drawing No:	AVAL/92071B/500/02	Rev:	-
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Appendix E: Proposed Drainage Strategy



NOTES

- 1) ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE
- 1) THE DEVELOPER HAS SELF VETTED THE DESIGN CRITERIA, MATERIAL STANDARDS AND WORKMANSHIP SPECIFICATION FOR THE PROPOSED ADAPTABLE SEWERS IN ACCORDANCE WITH SEWERS FOR ADOPTION 7TH EDITION AND THE REQUIREMENTS OF CDWW AS THE STATUTORY UNDERTAKER.
- 2) ALL PRIVATE DRAINAGE WORKS TO BE CONSTRUCTED IN ACCORDANCE WITH PART H OF THE CURRENT BUILDING REGULATIONS AND OR NHBC GUIDANCE.
- 3) THE POSITION AND DEPTH OF EXISTING STATUTORY UNDERTAKERS EQUIPMENT AFFECTED BY THE PROPOSED WORKS ARE TO BE CHECKED FOR ACCURACY ON SITE PRIOR TO COMMENCEMENT OF ANY OTHER WORKS.
- 4) ALL WORKS TO BE CONSTRUCTED MUST COMPLY WITH THE CURRENT HEALTH & SAFETY AT WORK ACT.
- 5) THE INVERT LEVELS OF EXISTING MANHOLES AND SEWER SPUR PIPES INTENDED FOR FUTURE CONNECTION BY THE PROPOSED DEVELOPMENT ARE TO BE CHECKED FOR ACCURACY ON SITE BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF ANY OTHER WORKS.
- 6) POSITION OF SOIL PIPE & BACK INLET GULLY CONNECTION POINTS TO BE CHECKED AGAINST ARCHITECTS HOUSE TYPE PLANS PRIOR TO COMMENCEMENT OF WORKS.
- 7) THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERING, ARCHITECTS AND LANDSCAPING DRAWINGS. ANY DISCREPANCIES IS TO BE REPORTED TO THE ENGINEER IMMEDIATELY TO SEEK CLARIFICATION.
- 8) ALL PRIVATE SURFACE WATER AND FOUL WATER SEWERS TO BE 100mm DIA UNLESS OTHERWISE SHOWN.
- 9) ALL LATERAL CONNECTIONS INTO ADAPTABLE MANHOLES TO BE 150mm DIA, UNLESS OTHERWISE SHOWN.
- 10) AVAL ACCEPTS NO RESPONSIBILITY FOR THE DESIGN AND SPECIFICATION OF THE RAINWATER HARVESTING SYSTEM. THE CLIENT SHOULD VERIFY THE ACCURACY AND COMPLETENESS OF THE DESIGN, INCLUDING COMPATIBILITY WITH THE M&E DESIGN.
- 11) ALL PIPES TO BE EITHER STRENGTH V.C. TO BS 65 OR PVC TO BS 4660 OR BS 5481 'UPONOR ULTRARIB' OR CONCRETE CLASS 120 TO BS 5911.
- 12) CONCRETE BED AND SURROUND IS REQUIRED TO ALL GULLY LEADS AND TO ALL PIPES IN HIGHWAYS/HARDSTANDING WHERE COVER TO PIPE <1200MM.

KEY

- SITE BOUNDARY
- PROPOSED SURFACE WATER SEWER
- PROPOSED FOUL WATER SEWER
- PROPOSED COMBINED WATER SEWER
- EXISTING UNITED UTILITIES COMBINED WATER
- PROPOSED SURFACE WATER PPIC
- PROPOSED FOUL WATER PPIC
- PROPOSED COMBINED WATER MANHOLE
- PROPOSED HYDROBRAKE

REVISIONS

REV	DESCRIPTION	DATE	BY
—	FIRST ISSUE	21/12/22	WR

Aval Consulting Group
Transportation Planning : Environmental Consultants
www.aval-group.co.uk, Email: contact@aval-group.co.uk
Company Number: 11522039

Client Name:
EQT EXETER

Project Title:
LAND ON BRENDON AVENUE,
MOSTON, M40 9DN

Drawing Title:
PROPOSED DRAINAGE STRATEGY

Date:	21.12.2022	Drawn By:	WR
Scale:	1:100 @ A1 1:200 @ A3	Checked:	WR
Status:	DRAFT	Approved:	AC

Drawing No:	AVAL/92071B/500/01	Rev:	—
-------------	--------------------	------	---



NOTES

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIALIST DETAILS AND SPECIFICATIONS.
2. ALL DIMENSIONS ARE IN METERS UNLESS STATED OTHERWISE.

KEY

- SITE BOUNDARY
- PROPOSED EXCEEDANCE FLOW ROUTE

REVISIONS

REV	DESCRIPTION	DATE	BY
-	FIRST ISSUE PLANNING	04/01/22	WR

Aval Consulting Group
Transportation Planning : Environmental Consultants
www.aval-group.co.uk, Email: contact@aval-group.co.uk
Company Number: 11622039

Client Name:

EQT EXETER

Project Title:

LAND ON BRENDON AVENUE,
MOSTON, M40 9DN

Drawing Title:

PROPOSED EXCEEDANCE FLOW ROUTE

Date: 13.07.2022 Drawn By: PR

Scale: 1:100 @ A1 Checked: WR

Status: PLANNING Approved: AC

Drawing No: AVAL/92071B/500/03 Rev: -

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	17.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.840	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
Storage	0.070	5.00	87.700	1500	1.520
MH-01			86.680	1500	1.680

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	Storage	MH-01	18.000	0.600	86.180	85.000	1.180	15.3	100	5.15	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.988	15.6	10.6	1.420	1.580	0.070	0.0	61	2.136

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	18.000	15.3	100	Circular	87.700	86.180	1.420	86.680	85.000	1.580

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	Storage	1500	Manhole	Adoptable	MH-01	1500	Manhole	Adoptable

Manhole Schedule

Node	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Storage	87.700	1.520	1500				
				0	1.000	86.180	100
MH-01	86.680	1.680	1500		1	1.000	85.000
							100

Aval Consulting Group	AVAL Consulting Group Ltd	File: Storage requirements.pfd	Page 2
	Newhaven Enterprise Centre	Network: Storm Network	92071 Land on Brendon Avn
	Denton Island	Pratheek Ramesh	Proposed Discharge Rate
	Newhaven BN9 9BA	05/01/2023	Calculation

Simulation Settings

Rainfall Methodology	FSR	Drain Down Time (mins)	240
FSR Region	England and Wales	Additional Storage (m³/ha)	0.0
M5-60 (mm)	17.000	Check Discharge Rate(s)	✓
Ratio-R	0.400	1 year (l/s)	5.1
Summer CV	0.750	30 year (l/s)	11.8
Winter CV	0.840	100 year (l/s)	14.8
Analysis Speed	Normal	Check Discharge Volume	✓
Skip Steady State	x	100 year 360 minute (m³)	15

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	40	0	0

Pre-development Discharge Rate

Site Makeup	Brownfield	Time of Concentration (mins)	4.00
Brownfield Method	MRM	Betterment (%)	50
Contributing Area (ha)	0.109	Q 1 year (l/s)	5.1
PIMP (%)	60	Q 30 year (l/s)	11.8
CV	0.840	Q 100 year (l/s)	14.8

Pre-development Discharge Volume

Site Makeup	Brownfield	CV	0.840	Betterment (%)	50
Brownfield Method	MRM	Return Period (years)	100	PR	0.504
Contributing Area (ha)	0.109	Climate Change (%)	0	Runoff Volume (m³)	15
PIMP (%)	60	Storm Duration (mins)	360		

Node MH-01 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	85.000	Product Number	CTL-SHE-0042-1000-1500-1000
Design Depth (m)	1.500	Min Outlet Diameter (m)	0.075
Design Flow (l/s)	1.0	Min Node Diameter (mm)	1200

Node Storage Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	86.180
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	196

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	56.6	0.0	0.520	56.6	0.0	0.521	0.0	0.0

Aval Consulting Group	AVAL Consulting Group Ltd Newhaven Enterprise Centre Denton Island Newhaven BN9 9BA	File: Storage requirements.pfd Network: Storm Network Pratheek Ramesh 05/01/2023	Page 3 92071 Land on Brendon Avn Proposed Discharge Rate Calculation
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Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	92.521	26.180
1 year 15 minute winter	64.927	26.180
1 year 30 minute summer	60.022	16.984
1 year 30 minute winter	42.121	16.984
1 year 60 minute summer	40.398	10.676
1 year 60 minute winter	26.839	10.676
1 year 120 minute summer	24.980	6.602
1 year 120 minute winter	16.596	6.602
1 year 180 minute summer	19.271	4.959
1 year 180 minute winter	12.527	4.959
1 year 240 minute summer	15.301	4.043
1 year 240 minute winter	10.165	4.043
1 year 360 minute summer	11.775	3.030
1 year 360 minute winter	7.654	3.030
1 year 480 minute summer	9.342	2.469
1 year 480 minute winter	6.207	2.469
1 year 600 minute summer	7.682	2.101
1 year 600 minute winter	5.249	2.101
1 year 720 minute summer	6.859	1.838
1 year 720 minute winter	4.609	1.838
1 year 960 minute summer	5.653	1.489
1 year 960 minute winter	3.745	1.489
1 year 1440 minute summer	4.127	1.106
1 year 1440 minute winter	2.773	1.106
1 year 2160 minute summer	2.975	0.822
1 year 2160 minute winter	2.050	0.822
1 year 2880 minute summer	2.487	0.666
1 year 2880 minute winter	1.671	0.666
1 year 4320 minute summer	1.898	0.496
1 year 4320 minute winter	1.250	0.496
1 year 5760 minute summer	1.570	0.402
1 year 5760 minute winter	1.016	0.402
1 year 7200 minute summer	1.338	0.341
1 year 7200 minute winter	0.864	0.341
1 year 8640 minute summer	1.171	0.299
1 year 8640 minute winter	0.756	0.299
1 year 10080 minute summer	1.047	0.267
1 year 10080 minute winter	0.676	0.267
30 year 15 minute summer	226.195	64.005
30 year 15 minute winter	158.733	64.005
30 year 30 minute summer	147.452	41.724
30 year 30 minute winter	103.475	41.724
30 year 60 minute summer	98.615	26.061
30 year 60 minute winter	65.517	26.061
30 year 120 minute summer	59.946	15.842
30 year 120 minute winter	39.827	15.842
30 year 180 minute summer	45.598	11.734
30 year 180 minute winter	29.640	11.734
30 year 240 minute summer	35.759	9.450
30 year 240 minute winter	23.758	9.450
30 year 360 minute summer	26.939	6.932
30 year 360 minute winter	17.511	6.932

Aval Consulting Group.	AVAL Consulting Group Ltd Newhaven Enterprise Centre Denton Island Newhaven BN9 9BA	File: Storage requirements.pfd Network: Storm Network Pratheek Ramesh 05/01/2023	Page 4 92071 Land on Brendon Avn Proposed Discharge Rate Calculation
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Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year 480 minute summer	20.981	5.545
30 year 480 minute winter	13.940	5.545
30 year 600 minute summer	17.039	4.661
30 year 600 minute winter	11.642	4.661
30 year 720 minute summer	15.093	4.045
30 year 720 minute winter	10.143	4.045
30 year 960 minute summer	12.278	3.233
30 year 960 minute winter	8.133	3.233
30 year 1440 minute summer	8.788	2.355
30 year 1440 minute winter	5.906	2.355
30 year 2160 minute summer	6.201	1.714
30 year 2160 minute winter	4.273	1.714
30 year 2880 minute summer	5.100	1.367
30 year 2880 minute winter	3.428	1.367
30 year 4320 minute summer	3.798	0.993
30 year 4320 minute winter	2.501	0.993
30 year 5760 minute summer	3.090	0.791
30 year 5760 minute winter	2.000	0.791
30 year 7200 minute summer	2.598	0.663
30 year 7200 minute winter	1.677	0.663
30 year 8640 minute summer	2.248	0.574
30 year 8640 minute winter	1.451	0.574
30 year 10080 minute summer	1.989	0.507
30 year 10080 minute winter	1.284	0.507
100 year +40% CC 15 minute summer	408.473	115.584
100 year +40% CC 15 minute winter	286.647	115.584
100 year +40% CC 30 minute summer	268.775	76.054
100 year +40% CC 30 minute winter	188.614	76.054
100 year +40% CC 60 minute summer	180.954	47.821
100 year +40% CC 60 minute winter	120.222	47.821
100 year +40% CC 120 minute summer	110.370	29.168
100 year +40% CC 120 minute winter	73.327	29.168
100 year +40% CC 180 minute summer	83.953	21.604
100 year +40% CC 180 minute winter	54.572	21.604
100 year +40% CC 240 minute summer	65.765	17.380
100 year +40% CC 240 minute winter	43.693	17.380
100 year +40% CC 360 minute summer	49.370	12.705
100 year +40% CC 360 minute winter	32.092	12.705
100 year +40% CC 480 minute summer	38.291	10.119
100 year +40% CC 480 minute winter	25.439	10.119
100 year +40% CC 600 minute summer	30.992	8.477
100 year +40% CC 600 minute winter	21.176	8.477
100 year +40% CC 720 minute summer	27.387	7.340
100 year +40% CC 720 minute winter	18.406	7.340
100 year +40% CC 960 minute summer	22.191	5.844
100 year +40% CC 960 minute winter	14.700	5.844
100 year +40% CC 1440 minute summer	15.789	4.232
100 year +40% CC 1440 minute winter	10.611	4.232
100 year +40% CC 2160 minute summer	11.070	3.059
100 year +40% CC 2160 minute winter	7.628	3.059
100 year +40% CC 2880 minute summer	9.060	2.428
100 year +40% CC 2880 minute winter	6.089	2.428

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +40% CC 4320 minute summer	6.697	1.751
100 year +40% CC 4320 minute winter	4.410	1.751
100 year +40% CC 5760 minute summer	5.418	1.387
100 year +40% CC 5760 minute winter	3.507	1.387
100 year +40% CC 7200 minute summer	4.536	1.157
100 year +40% CC 7200 minute winter	2.928	1.157
100 year +40% CC 8640 minute summer	3.910	0.998
100 year +40% CC 8640 minute winter	2.524	0.998
100 year +40% CC 10080 minute summer	3.448	0.880
100 year +40% CC 10080 minute winter	2.226	0.880

Results for 1 year Critical Storm Duration. Lowest mass balance: 97.68%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	Storage	13	86.218	0.038	8.3	2.1270	0.0000	OK
60 minute winter	MH-01	50	86.207	1.207	3.7	2.1333	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)
15 minute winter	Storage	1.000	MH-01	4.8	0.937	0.309	0.0952	
60 minute winter	MH-01	Hydro-Brake®		0.9				6.2

Results for 30 year Critical Storm Duration. Lowest mass balance: 97.68%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute winter	Storage	116	86.368	0.188	6.4	10.4156	0.0000	SURCHARGED
120 minute winter	MH-01	116	86.362	1.362	3.9	2.4071	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)
120 minute winter	Storage	1.000	MH-01	3.9	0.648	0.252	0.1408	
120 minute winter	MH-01	Hydro-Brake®		1.0				17.8

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 97.68%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	Storage	176	86.642	0.462	8.8	25.6644	0.0000	SURCHARGED
180 minute winter	MH-01	176	86.636	1.636	2.9	2.8905	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)
180 minute winter	Storage	1.000	MH-01	2.9	0.652	0.186	0.1408	
180 minute winter	MH-01	Hydro-Brake®		1.0				23.3

Technical Specification

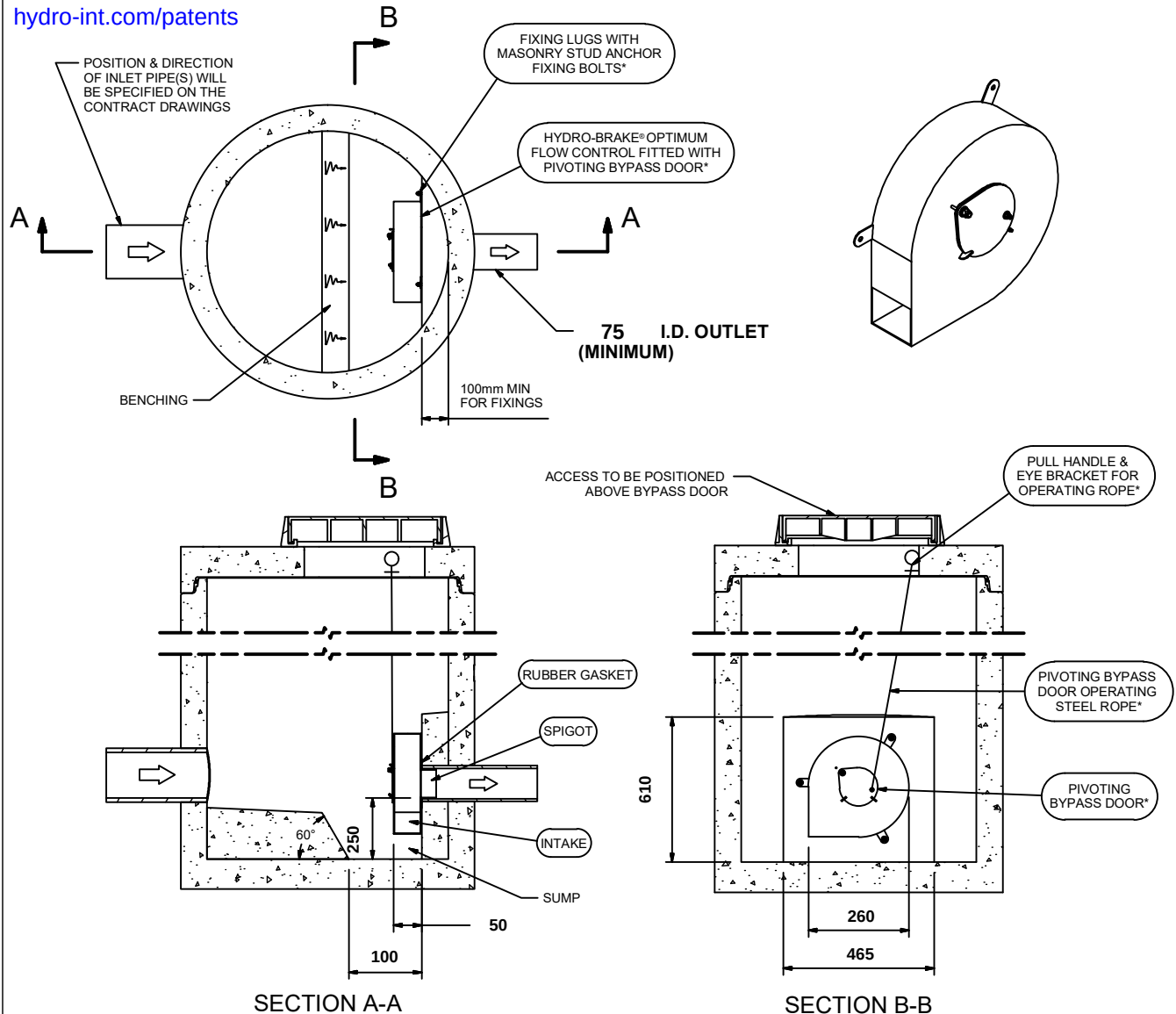
Control Point	Head (m)	Flow (l/s)
Primary Design	1.500	1.000
Flush-Flo™	0.186	0.656
Kick-Flo®	0.378	0.546
Mean Flow		0.741

Hydro-Brake® Optimum Flow Control including:

- 3 mm grade 304L stainless steel
- Integral stainless steel pivoting by-pass door allowing clear line of sight through to outlet, c/w stainless steel operating rope
- Beed blasted finish to maximise corrosion resistance
- Stainless steel fixings
- Rubber gasket to seal outlet
- Indicative Weight: 4 kg



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IMPORTANT: ○ LIMIT OF HYDRO INTERNATIONAL SUPPLY
 THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
 FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
 ALL CIVIL AND INSTALLATION WORK BY OTHERS
 * WHERE SUPPLIED
 HYDRO-BRAKE® FLOW CONTROL & HYDRO-BRAKE® OPTIMUM FLOW CONTROL ARE REGISTERED TRADEMARKS FOR FLOW
 CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE



The head/flow characteristics of this SHE-0042-1000-1500-1000 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro
International®

DATE 05/01/2023 18:36

SITE Land on Brendon Avenue

DESIGNER Pratheek Ramesh

REF 92071

SHE-0042-1000-1500-1000

Hydro-Brake® Optimum

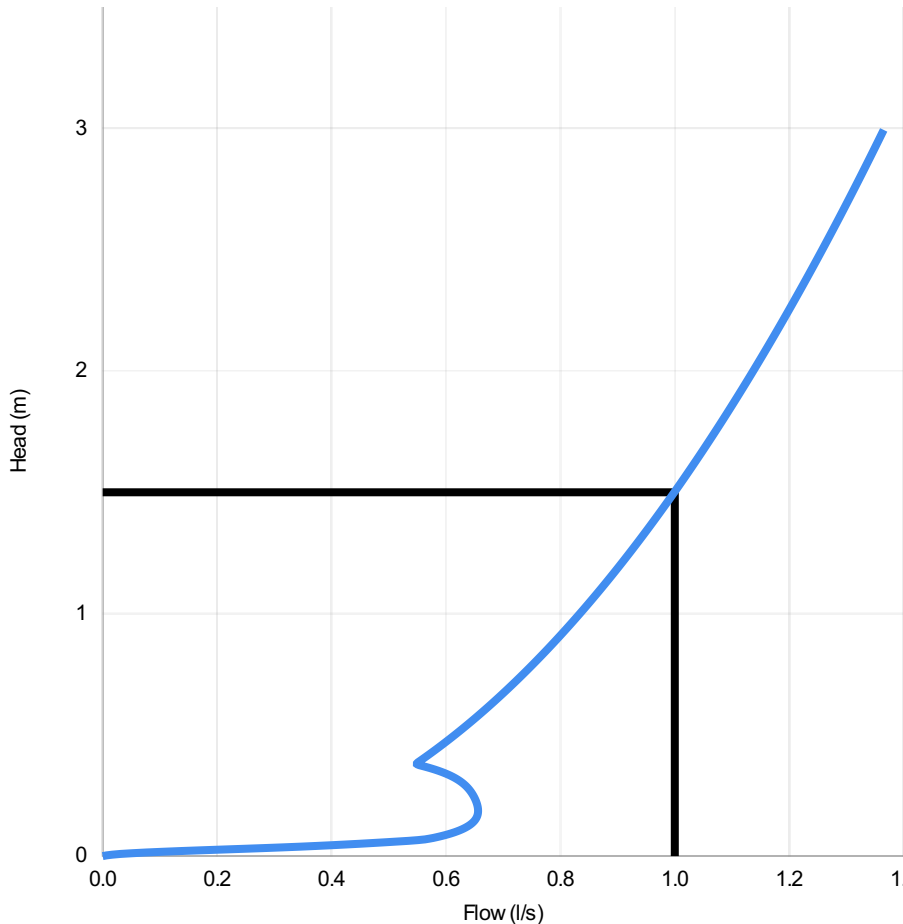
Technical Specification

Control Point	Head (m)	Flow (l/s)
Primary Design	1.500	1.000
Flush-Flo	0.186	0.656
Kick-Flo®	0.378	0.546
Mean Flow		0.741



PT/329/0412

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Head (m)	Flow (l/s)
0.000	0.000
0.052	0.455
0.103	0.621
0.155	0.653
0.207	0.655
0.259	0.646
0.310	0.624
0.362	0.573
0.414	0.567
0.466	0.597
0.517	0.625
0.569	0.651
0.621	0.676
0.672	0.700
0.724	0.724
0.776	0.746
0.828	0.767
0.879	0.788
0.931	0.808
0.983	0.828
1.034	0.847
1.086	0.865
1.138	0.883
1.190	0.901
1.241	0.918
1.293	0.935
1.345	0.952
1.397	0.968
1.448	0.984
1.500	0.999

DESIGN ADVICE



The head/flow characteristics of this SHE-0042-1000-1500-1000 Hydro-Brake Optimum® Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.

The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro
International

DATE	05/01/2023 18:36
Site	Land on Brendon Avenue
DESIGNER	Pratheek Ramesh
Ref	92071

SHE-0042-1000-1500-1000
Hydro-Brake Optimum®

Stormcell® Storage System

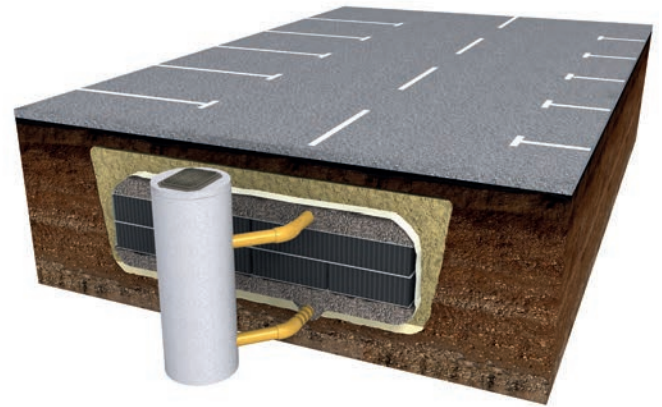


Store and infiltrate surface water and stormwater even on difficult or irregular sites

Stormcell® is a high-capacity, low-maintenance modular stormwater and surface water storage system that can be customised to suit shallow, deep or irregular sites.

Its flexible modular structure is light but strong, making it ideal for use beneath areas such as roads, car parks and industrial areas.

With a design that ensures that solids are washed through the pipework rather than into the storage area, the system requires very little maintenance.



Applications

- Sustainable Drainage (SuDS) schemes.
- Retrofit SuDS schemes.
- Attenuation schemes.
- Highways and Infrastructure projects.
- Car parks and Park & Ride schemes.
- Housing developments.
- Commercial Developments.
- Schools and Public / Civil schemes.
- Aquifer re-charge.

Physical Properties

- Void Ratio: 95%
- Block Dimensions: 2.4 m x 1.2 m x 0.52 m
- Block Weight: 63 kg
- Short Term Vertical Characteristic Strength (at Yield): 400 kN/m².
- Long Term Vertical Characteristic Strength (at Yield): 40 kN/m².
- Lateral Loading of 20 kN/m² can be accommodated.

Benefits

Design storage for even the most difficult of sites

With standard and shallow sizes, a choice of durable and more lightweight variants and the ability to cut blocks on site, Stormcell® provides designers with the flexibility to customise storage to meet the requirements of shallow, deep or irregular sites.

Reduce your stormwater maintenance

The Stormcell® system is designed to prevent silting and other build-up of solids and debris typically carried in surface water and stormwater, meaning that the system requires virtually no maintenance.

Install quickly and easily

Stormcell® requires no assembly or connectors, so installation on site is quick and easy.

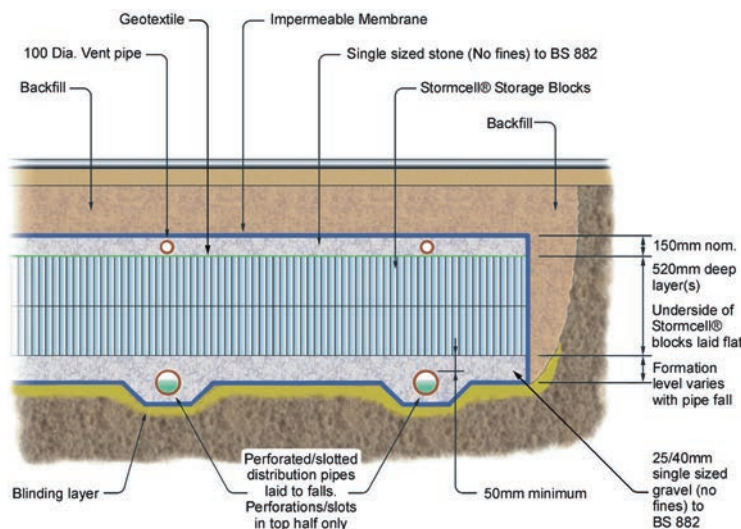
Recycling Information:

Stormcell® is a polypropylene product manufactured from approved recycled polypropylene. Due to the intended long life and minor maintenance requirements, there is a reduced need for recycling during its life span. At the end of the life cycle, Stormcell® can be recycled safely at minimal risk to the environment.

Main Elements of the Stormcell® storage system

The typical Stormcell® Storage System is composed of:

1. 2.4 m x 1.2 m x 0.52 m blocks of Stormcell® (120 mm deep shallow blocks also available).
2. An impermeable membrane wrapped around the Stormcell® blocks which prevents stormwater from escaping into the surrounding ground.
3. Large single size stone as a support base for Stormcell® blocks which also aids even distribution of stormwater throughout the plan area of the blocks and allows drain down through the outlet.
4. Perforated pipes to further facilitate the stormwater distribution when filling and collection and delivery to the outlet when emptying and to avoid unwanted back pressure to the upstream sewer or drain.
5. Geotextile on top of the Stormcell® blocks to prevent the migration of fines from above into the vertical voids.
6. Granular backfill to the top of the tank to assist structural loading distribution and the movement of air during filling and emptying.



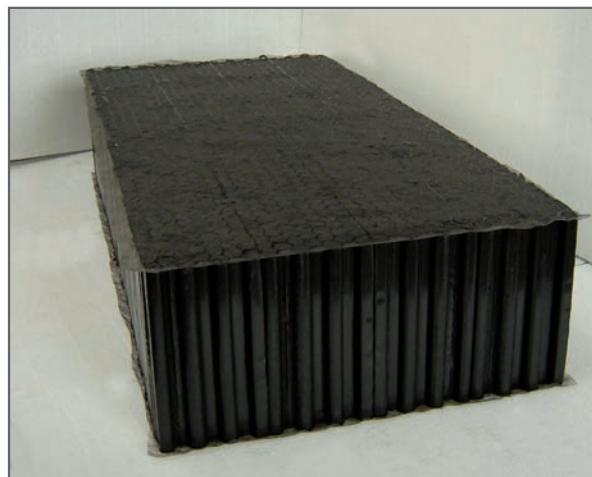
Stormcell® Lite

A lightweight version ideal for installation beneath landscaped areas.

Stormcell® Lite is a lightweight storage system ideally suited towards installation beneath landscaped, non-trafficked areas.

Advantages

- Modular and flexible.
- Lightweight.
- High structural integrity.
- Silt prevention system.
- Woven geotextile on the top and bottom of each block prevents intrusion of fines.
- Simple and quick to install - no assembly or connectors required.
- Shallow 120 mm deep blocks available.



Learn more

To learn more about how Stormcell® can help you to make better water management decisions, visit hydro-int.com, search **Stormcell** online or contact us:

United Kingdom

+44 (0)1275 878371

enquiries@hydro-int.com

hydro-int.com/contact

C/1117

Appendix F: Sewers Records Map

survey hub Ltd

34
Regent street,
nottingham, nottinghamshire
NG15BT

FAO:

How to contact us:

**United Utilities Water Limited
Property Searches
Haweswater House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP**

Telephone: 0370 7510101

E-mail: propertysearches@uuplc.co.uk

**Your Ref: 5731 Moston
Our Ref: UUPS-ORD-448746
Date: 23/11/2022**

Dear Sirs

Location: 86 KENYON LANE, MANCHESTER, M40 9DH

I acknowledge with thanks your request dated 22/11/2022 for information on the location of our services.

Please find enclosed plans showing the approximate position of United Utilities' apparatus known to be in the vicinity of this site.

The enclosed plans are being provided to you subject to the United Utilities terms and conditions for both the wastewater and water distribution plans which are shown attached.

If you are planning works anywhere in the North West, please read United Utilities' access statement before you start work to check how it will affect our network. <http://www.unitedutilities.com/work-near-asset.aspx>.

I trust the above meets with your requirements and look forward to hearing from you should you need anything further.

If you have any queries regarding this matter please [contact us](#).

Yours Faithfully,



Karen McCormack
Property Searches Manager

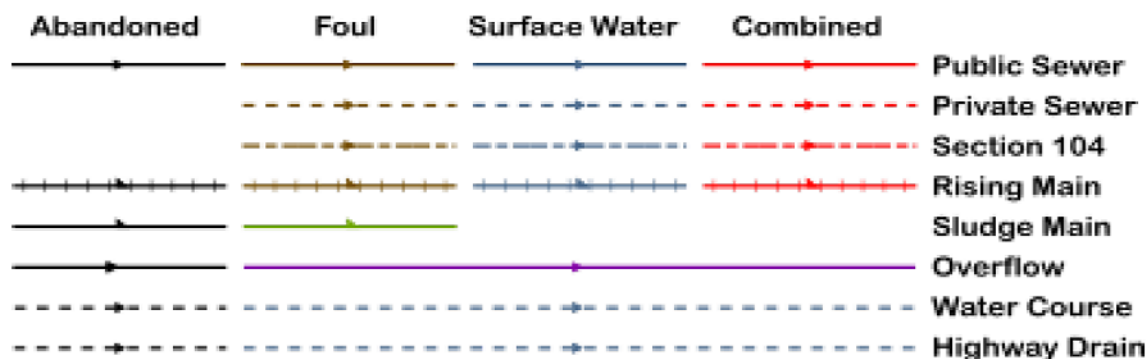
TERMS AND CONDITIONS - WASTEWATER AND WATER DISTRIBUTION PLANS

These provisions apply to the public sewerage, water distribution and telemetry systems (including sewers which are the subject of an agreement under Section 104 of the Water Industry Act 1991 and mains installed in accordance with the agreement for the self construction of water mains) (UUWL apparatus) of United Utilities Water Limited "(UUWL)".

TERMS AND CONDITIONS:

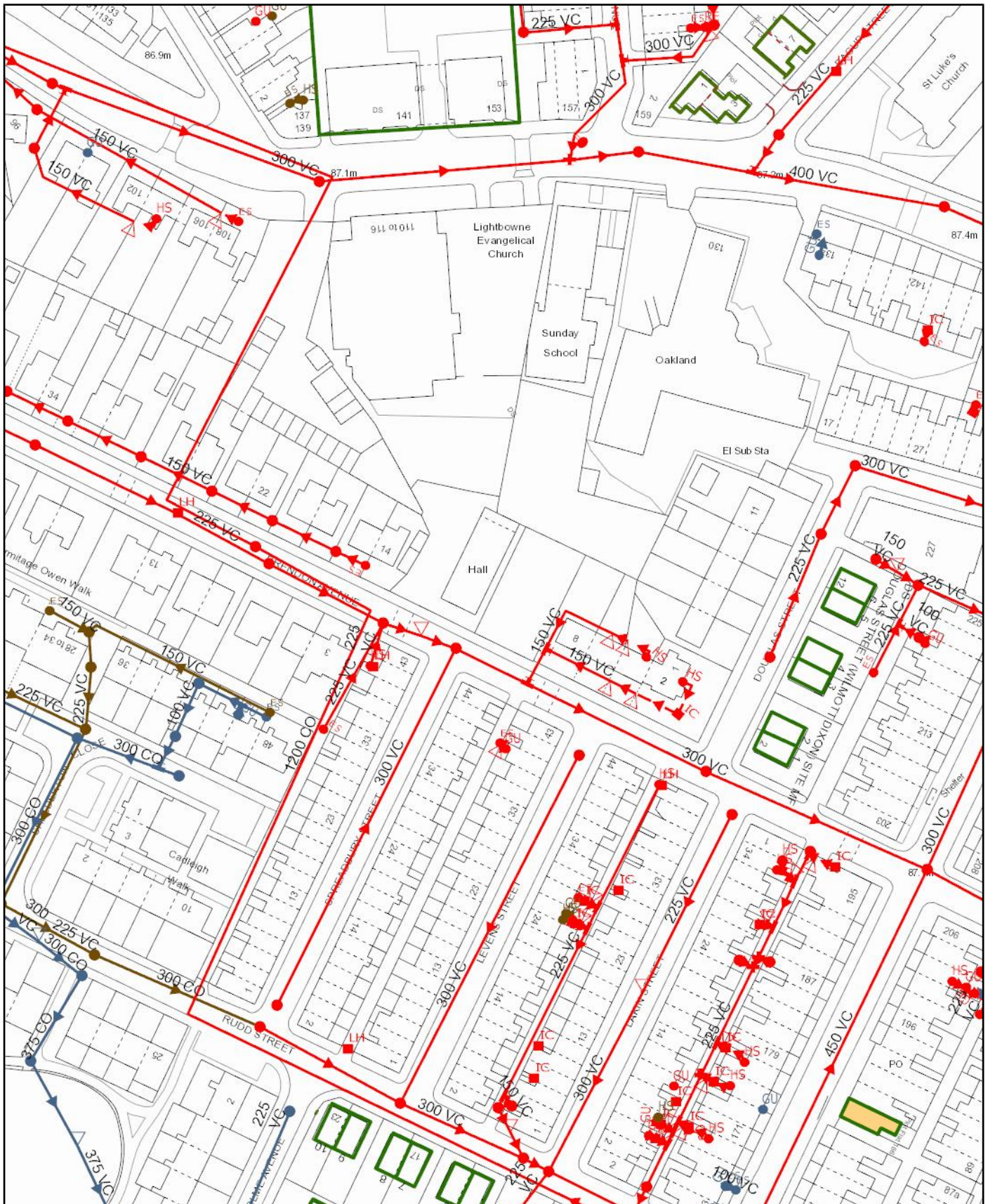
- This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
- This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
- In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
- The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
- The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
- This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
- No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
- If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
- This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

Wastewater Symbolology



All point assets follow the standard colour convention: **red** – combined **brown** - foul
blue – surface water **purple** - overflow

Manhole	Side Entry Manhole
Head of System	Outfall
Extent of Survey	Screen Chamber
Rodding Eye	Inspection Chamber
Inlet	Bifurcation Chamber
Discharge Point	Lamp Hole
Vortex	T Junction / Saddle
Penstock	Catchpit
Washout Chamber	Valve Chamber
Valve	Vent Column
Air Valve	Vortex Chamber
Non Return Valve	Penstock Chamber
Soakaway	Network Storage Tank
Gully	Sewer Overflow
Cascade	Ww Treatment Works
Flow Meter	Ww Pumping Station
Hatch Box	Septic Tank
Oil Interceptor	Control Kiosk
Summit	
Drop Shaft	Change of Characteristic
Orifice Plate	



Scale: 1:1250
Date: 23/11/2022

SEWER RECORDS



Water for the North West

Address or Site Reference: 86 KENYON LANE, MANCHESTER, M40 9DH

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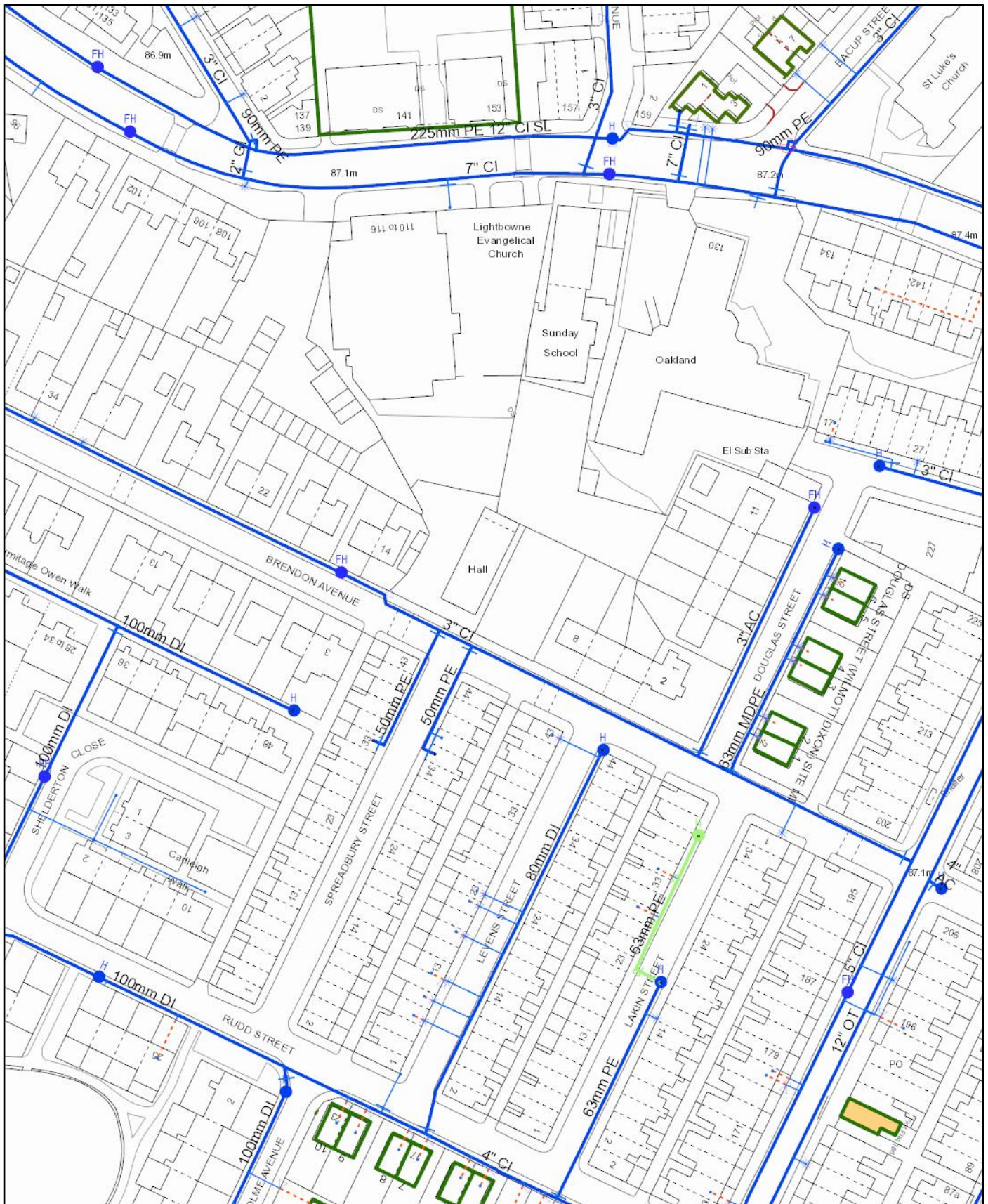
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Clean Water Symbolology

Proposed	Abandoned	Live	
			Distribution Main
			Trunk Main
			Comms Pipe
			Private Pipe
			Concessionary Service
			Raw Water
			LDTM Raw Water
			LDTM Treated Water
			Air Valve
			AC Valve, open
			AC Valve, closed
			CC Valve, open
			CC Valve, closed
			Non Return Valve
			Pressure Management Valve
			OMS Valve
			Stop Tap
			Flow Meter
			Domestic Meter
			Commercial Meter
			Pump
			Hydrant
			Fire Hydrant
			Anode
			Chlorination Point
			De-chlorination Point
			Strainer Point
			Access Point
			Hatch Box
			IP Point
			Sampling Station
			Logger Box
			Bore Hole
			Inlet Point
			Bulk Supply Point
			End Cap
			Site Termination
			Change of Characteristic
			Condition Report
			<u>Property Types</u>
			Water Tower
			Valve House
			Booster Pumping Station
			Intake Pumping Station
			Water Treatment Works
			Supply Reservoir
			Service Reservoir
			Impounding Reservoir
			Pipe Bridge

Symbology for proposed assets is the same as above, but shown in **green**
 Symbology for abandoned assets is the same as above, but shown in **black**



Scale: 1:1250
Date: 23/11/2022

WATER MAINS RECORDS

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