



CORNBROOK RESIDENTIAL, MANCHESTER

DRAINAGE STRATEGY

Project No: 2306-18

January 2024

Rev: P03

CBR-REN -XX-XX-RP-C-00002

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Date **15.12.2023**

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Date **15.12.2023**

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1.0 INTRODUCTION

1.1 Purpose of this Report

This Outline Surface Water Drainage Strategy has been prepared to support the planning application for the proposed Cornbrook residential development.

The assessment includes: a summary of the site, an estimate of the existing and proposed surface water discharge rates, infiltration assessment, SuDS assessment, and outline drainage proposals and performance criteria.

This report should be read in conjunction with the Flood Risk Assessment, renaissance, December 2023 and the completed North-West SuDS Pro-Forma in Appendix K

The proposals within this report are intended to demonstrate the feasibility of the overarching drainage strategy to support the planning proposal.

2.0 THE SITE

2.1 Site Location

The proposed development site is located off Cornbrook Road. Manchester.

The site location is described below:

- Post Code M15 4YG
- OS Reference 382421 , 397060
- National Grid Reference SJ824970



Figure 2.1: Site Location

2.2 Site Description

The site is circa 0.230 Ha and lies within a developed area, bounded by Dinton Street to the northwest, Cornbrook Road and Bridgewater Way to the south and the Vox residential development to the east. An active tram line and tram stop are present to the northwest of the site.

The site was developed with terraced housing and two public houses during the 1840s before being demolished and replaced by industrial buildings in the early 1980s which remained until recently. All buildings have now been demolished and the site is unoccupied.

The topographical survey (Appendix A) indicates the site to be relatively flat with sitewide levels approximately between 27.55 m AOD and 30.78m AOD.

2.3 Existing Site Drainage

The existing site is 57% impermeable and it is assumed that the previous developments positively drained into the sewer network surrounding the site.

United Utilities sewer records (Appendix B) indicate a 375x510mm diameter Combined Sewer to the northwest of the site within Dinton Street flowing to the southwest before connecting into a 300mm diameter combined sewer within Cornbrook Road to the south of the site.

A 400mm diameter Combined Sewer is indicated beneath the historic Runcorn Street in the central portion of the site flowing from north to south.

A 300x400mm diameter combined sewer is indicated beneath the historic Westminster Street. It is assumed that this sewer was abandoned as part of the works for the adjacent site development.

Based on a review of the planning application of the adjacent site, a surface water sewer is indicated to have been constructed within Dinton Street as part of the works for the Vox Residential development to the east of the site. The sewer is assumed to connect into the Cornbrook Culvert to the southwest of the site. A CCTV survey has been commissioned to confirm its extent and connectivity. Refer to Appendix C

2.4 Geology

Historic SI records indicate there to be between 0.50m and 3.60m of made ground beneath the site, typically consisting of sands and gravels with varying cobble and boulder contents, underlain by between 0.35 and 2.10m of fluvio-glacial deposits consisting of very gravelly sand with variable cobble contents. This is indicated to continue into glacial till consisting of generally firm to stiff slightly gravelly clay down to 9.00mbgl. This is underlain by weathered sandstone bedrock which becomes competent to core at circa 13.00mbgl. The ground conditions on site are to be verified by further site investigations.

2.4.1 Made Ground

BGS mapping does not display any made ground deposits on site, however based on the historical mapping and the development that has taken place, made ground deposits are highly likely to be present.

2.4.2 Superficial Deposits

The majority of the site is indicated to be underlain by Glaciofluvial Sheet Deposits, typically comprising sand and gravel. The far western corner of the site and the land to the west is underlain by glacial Till, which typically comprises clay with small quantities of silt, sand and gravel.

2.4.3 Solid Geology

The deeper solid geology is indicated to be part of the Chester Formation which typically comprises sandstone.

No faults are shown on or within an influencing distance of the site.

2.5 Hydrogeology & Hydrology

The nearest watercourse and surface water feature is the Cornbrook Culvert to the south of the site which runs approximately south-east to north-west.

The table below indicates the aquifer designation of the solid geology within the site.

Stratum	Coverage	Aquifer Designation
Glacial Till, Devensian	Full Site	Secondary Aquifer (Undifferentiated). The classification is assigned where it is not possible to attribute either category A or B to the aquifer
Chester Pebble Bed formation	Full Site	Principal Aquifer. This is the Geology of high intergranular and/or fracture permeability, usually providing a high level

		of water storage and may support water supply/river base flow on a strategic level.
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Table 2.1 –Environment agency aquifer designations of site geology

A summary of the pertinent hydrogeological features within the Phase 1 Desk Study are provided below:

Description	Distance (m) & Direction	Details
Nearest Active Groundwater Abstraction	890m, southwest	-
Nearest Active Potable Groundwater Abstraction	250m, southwest	-
Source Protection Zones	-	Site lies within Zone 2 (Outer Catchment) of a Source Protection Zone and a Zone 1 (Inner Catchment) is located c.50m southwest of the site. Source Protection Zones are associated with the 'Nearest Active Ground Water Abstraction'

Table 2.2 –Summary of Hydrogeological features

2.6 Proposed Development

Erection of a 24-storey mixed use building incorporating 224 residential apartments (Use Class C3), 87 apart-hotel studios (Use Class C1), amenity space, flexible commercial space (Use Class E), and café (Use Class E(b)), together with infrastructure, landscaping, and other associated works

Refer to Appendix d for Proposed Development plans

3.0 EXISTING & PROPOSED SURFACE WATER DISCHARGE RATES

3.1 Pre-Development Surface Water Run-Off Rates

The development is considered 57% impermeable consisting of the existing hardstanding from previously developments. The remaining 43% is considered permeable and consists of vegetation. Refer to topographical survey in Appendix A and Existing Impermeable Areas drawing CBR-REN-00-FN-DR-C-00050-P01 in Appendix E.

Existing Brownfield Run-Off Rates

An estimate of the pre-development surface water discharge into the public sewer has been calculated using the Modified Rational Method.

Modified Rational Method: $Q = 2.78 C i_{(peak)} A$

$$Q = 2.78 \times 1 \times 50 \times 0.23$$

$$Q = 31.97 \text{ l/s}$$

Existing Greenfield Run-Off Rates

The greenfield run-off for the total site area has been considered, this has been calculated using Microdrainage ICP SuDS method (Appendix F). The rates presented below are what would be typical of a site with an equivalent surface area which remains undeveloped / covered in grass or vegetation. A partly urbanised catchment ratio of 0.75, Q_{bar} has a return period of 2.3 years.

The equivalent greenfield run-off rate is tabled below: -

RETURN PERIOD	$Q_{GREENFIELD}$ (l/s)
1 in 1 year	2.8
1 in 2 year	3.3
1 in 30 year	4.6
1 in 100 year	5.0
$Q_{bar (URBAN)}$	3.2

Table 3.2 – Greenfield Run-off Rates

3.2 Proposed Surface Water Discharge Rates

As set out within the Strategic Flood Risk Assessment (SFRA) developments which have been previously developed (brownfield), should aim for a minimum reduction in surface water runoff rates of 50%, with an aim of reducing runoff to Greenfield rates up to a 1 in 100 year storm event, considering climate change.

As required by the North West SuDS Pro-Forma the discharge from the development is to be restricted to Q_{bar} , 3.2 l/s, to control the flow and volume of runoff from the site.

A Pre-development enquiry has been submitted to United Utilities and they have provisionally accepted a maximum discharge rated of 5.0 l/s. Refer to Appendix G

4.0 SURFACE WATER DISCHARGE & SUDS ASSESSMENT

4.1 Surface Water Discharge Assessment

In accordance with NPPF, the following hierarchy of surface water drainage options has been considered:

- Discharge into the ground (infiltration);
- Discharge to a surface water body;
- Discharge to a surface water sewer, highway drain, or another drainage system;
- Discharge to a combined sewer.

The Phase 1 desktop study identifies the site has been developed historically and as such made ground has been proven to circa 3.6m below ground. This could potentially pose risks to the mobilisation of contaminants should infiltration be utilised. For this reason infiltration has been discounted.

Opportunities for discharge to watercourse have been considered. The closest watercourse is the Cornbrook culvert and it is understood that as part of the Phase 1 of the wider development a surface water sewer was constructed within Dinton Street and a connection made to the Cornbrook Culvert. The design of this surface water sewer included an allowance for this phase and as such a stub connection was constructed. Therefore it is proposed that this phase utilises this connection in order to discharge surface water run-off to the Cornbrook culvert.

Connection to the public sewer will be subject to a S106 application with United Utilities under the water industry act.

4.2 Sustainable Urban Drainage

Table 4.1 below provides a summary of typical SuDS techniques outlined within CIRIA guide 753 SuDS manual. Based on a review of the suitability of the SuDS techniques it is proposed that the Salford Youth Zone development may incorporate the following:

SUDS TECHNIQUE	DESCRIPTION	SUITABILITY FOR DEVELOPMENT SITE	
Rainwater Harvesting	Collection of rainwater run-off for use	Large impermeable area and limited usage deems this unsuitable	✗
Soft Landscaping	Grassed areas that allow direct infiltration of rainwater	Soft landscaping will be utilised to limit the impermeable area	✓
Filter Drains	Granular filled Linear drains / soakaway with either granular fill and perforated pipe, or dense vegetation that treat runoff from adjacent impermeable areas	Not suitable due to known ground conditions	✗
Swales	Shallow landscape channel that can infiltrate or convey runoff.	Existing trees and limited soft landscaping deem this unsuitable	✗
Infiltration Basins	Depressions in the ground designed to store and infiltration runoff to the ground. Can be landscaped to provide amenity value.	Not suitable due to known ground conditions and limited space	✗
Wet Ponds	Basins with permanent pool of water providing water quality treatment, wildlife, and amenity benefit. Designed to provide temporary storage for additional runoff.	Not suitable due to limited space and poses a health and safety risk to the end users.	✗

Extended Detention Basins	Dry basins that are designed to temporarily store runoff providing water quality treatment.	Not suitable due to limited space and poses a health and safety risk to the end users.	✗
Constructed Wetland	Ponds and shallow wetland areas with vegetation to improve pollution removal and enhance wildlife habitat.	Not suitable due to limited space and poses a health and safety risk to the end users.	✗
Porous Paving	Granular build-up beneath permeable paving systems that can be used to either store runoff (lined system) and increase time of concentration or allow percolation into the ground.	Potential use with the proposed car park – however site levels and proposed drainage depths deem it not suitable.	✗
Trees Pits	Managed permeable paving systems around tree pits that can be used to either store runoff (lined system) and increase time of concentration or allow percolation into the ground.	Not suitable due to site conditions and site layout	✗
Soakaways	Infiltration device to temporarily store runoff and allow it to percolate into the ground.	Not suitable due to known ground conditions	✗
Green Roof	Vegetated roof area that reduces runoff and increases time of concentration.	Not suitable due to roof geometry and structural implications	✗
Blue Roof	Roof area designed to store and reduce peak runoff rates during intense storms.	Not suitable due to roof geometry and structural implications	✗
Underground Storage	Attenuation structures installed below ground to provide runoff storage.	Suitable beneath the car park.	✓

✗ Not suitable

? Potentially suitable subject to further investigation

✓ Suitable

Table 4.1 – SuDS Techniques & Suitability for Development Site

4.3 Water Quality Assessment

To assess the water quality, consideration will be given to the guidance with the National Standard for Sustainable Urban Drainage (NSSUD) and CIRIA Guide C753. The pollution hazard levels for difference land uses are presented in table 4.2 and are based on the definitions in the NSSUD and C753.

POLLUTION HAZARD LEVEL	LAND USE
Very Low	Residential roofs
Low	Individual property driveways, non-residential roofs, residential car parks, low traffic roads, non-residential car parking with infrequent change (e.g. Schools, offices)
Medium	Commercial yards and delivery areas, non-residential car parking with frequent change (e.g. hospital, retail), minor roads
High	Site with heavy pollution (e.g. Haulage yards, lorry parks, waste sites, sites with chemical and fuels are delivered, handled, stored etc.)

Table 4.2 – Pollution Hazard Levels

The pollution hazard level is considered to be low based on Table 4.2 with the primary consideration given to removal of gross solids and sediment.

The Simple Index Approach, as set out in Section 26.2 of the CIRIA SuDS Manual, has been applied to ensure there is adequate water quality treatment prior to discharging from site. The approach states that the Total SuDS Mitigation Index must be more than or equal to the Pollution

Hazard Index for each contaminant type. Tables 4.5 shows how the Simple Index Approach method has been applied for the Pollution hazard levels detailed in Table 4.2 above.

Pollution Hazard Index (External hard standing areas)				
Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Individual property driveways, non-residential roofs, residential car parks, low traffic roads, non-residential car parking with infrequent change (e.g. Schools, offices)	Low	0.5	0.4	0.4
SuDS Mitigation Index				
Hydro International Downstream Defender		0.5	0.4	0.8
Total SuDS Mitigation Index¹		0.5 ✓	0.4 ✓	0.8 ✓

¹Where two components (or more) in series are required the Total SuDS mitigation index = mitigation index₁ + 0.5 (mitigation index₂)

Table 4.5 – Simple Index Approach - External hard standing areas

4.4 SuDS Management Plan

The Sustainable Urban Drainage systems are to be maintained by the property owner and/or a maintenance company on their behalf. They will be required to maintain the SuDS features in line with the following recommendations and suppliers' requirements of the various features.

The following operation and maintenance requirements for the SuDS features incorporated into the development are to be adopted by the Building Management Company. These requirements are general and have been extracted from the CIRA Guide C753.

- Table 21.3 - Operation and maintenance requirement for Attenuation storage tanks

Proprietary Treatments systems are to be maintained inline the supplier recommendations.

The Contractor delivering the development is to update the general requirements to reflect the product specific requirements of the as installed proprietary SuDS and incorporate these into the Operation & Maintenance manual for the development.

TABLE 21.3 Operation and maintenance requirements for attenuation storage tanks

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

Maintenance at a Glance

Activity	Frequency
Inspection	<ul style="list-style-type: none"> - Regularly during first year of installation - Every 6 months after the first year of installation
Oil and Floatables Removal	<ul style="list-style-type: none"> - Once per year, with sediment removal - Following a spill in the drainage area
Sediment Removal	<ul style="list-style-type: none"> - Once per year or as needed - Following a spill in the drainage area
<p>NOTE: For most cleanouts it is not necessary to remove the entire volume of liquid in the vessel. Only removing the first few inches of oils/floatables and the sediment storage volume is required.</p>	

Figure 4.6 – Downstream Defender Maintenance Schedule

5.0 DRAINAGE STRATEGY

Refer to Appendix H for the Below Ground Drainage Plan

5.1 Surface Water System

The development will have a dedicated surface water network that is to collect the rainwater from the proposed building roofs, car park, and impermeable external areas. The system will then discharge under gravity public surface water sewer that is located within Dinton Street, subject to a S106 agreement under the water industry act. The drainage survey has indicated an existing stub connection to the public sewer which will be reused.

The surface water discharge from the site is to be limited to the rate detailed within Section 3.2 of this report using a flow control device within the final manhole on site prior to discharge into the public sewer. Proposed discharge rate is to be confirmed with the Lead Local Flood Authority and United Utilities as part of the detailed design. United Utilities have confirmed via the predevelopment enquiry that a pass forward rate of upto 5 l/s is acceptable to the public sewer.

Attenuation will be provided by a geocellular storage tank beneath the car park.

The surface water discharging from the site will be from the building roof, car park and external hard landscaping. As the run-off is to discharge into a surface water sewer which connects into a water course, treatment is required to improve water quality prior to entering the public sewer. The main source of treatment is to be provided by a vortex separator which has been assessed using the Simple Index Approach. The drainage system is to also include catchpit manholes and silt buckets within channel sumps to assist in removing sediment.

The surface water drainage network is to be designed in accordance with Building Regulation Part H, BS EN 752 and Code for Adoption. In addition, the following requirements will also be adopted in accordance with the Non-Statutory Technical Standards for Sustainable Drainage: Practice Guidance and Salford City Council SuDS requirements for new developments:

- The below ground drainage system will be designed to ensure flooding does not occur on site for the 1 in 30 year and no internal flooding for the 1 in 100-year rainfall events
- The surface water system is to be designed to accommodate the 1, 2, 30 and 100 year return events with 40% and 45% climate change allowances for the 30 and 100 year events respectively. The system will be designed for a maximum storm duration of 6 hours.

Micro Drainage calculations for the proposed surface water system are available in Appendix J.

The North-West SuDS Proforma has been completed to support this application, refer to Appendix K.

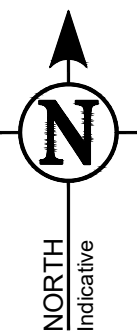
5.2 Foul Water System

The site will have a dedicated foul water network that will collect the foul water associated with the development that will discharge to the public combined sewer adjacent to Dinton Street. A pre-development enquiry with United Utilities has confirmed that foul water will be able to discharge at an unrestricted rate.

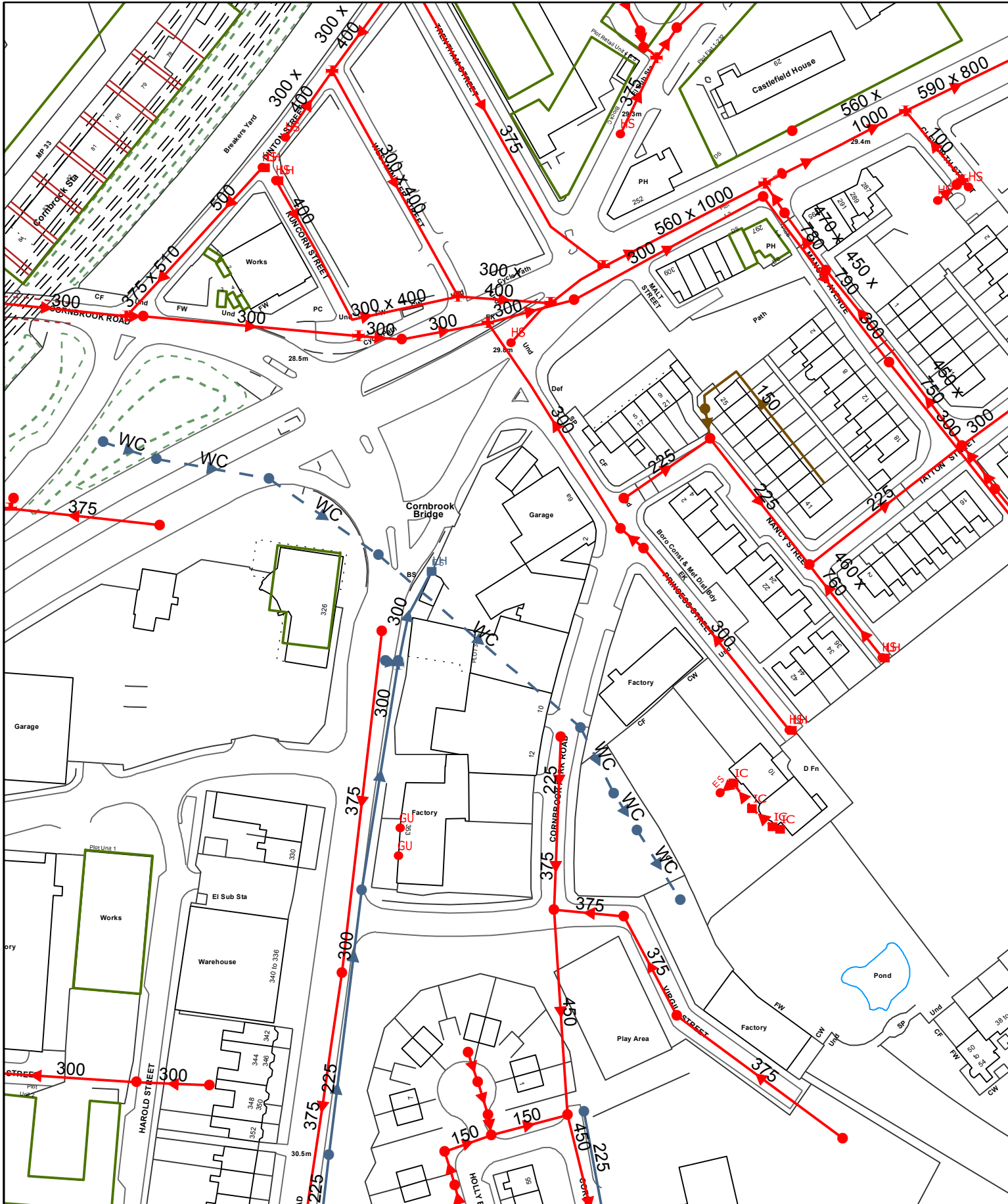
The new foul water drainage connection will be subject to separate section 106 application with United Utilities.

The drainage system is to be designed in accordance with Building Regulations Part H, BS EN 752 and Codes for Adoption.

APPENDIX A
TOPOGRAPHICAL SURVEY



APPENDIX B
UNITED UTILITIES SEWER MAP



Date: 20/12/2016

Extract from Map of Public Sewers

Printed By:
Property Searches

Around Cornbrook Park Road Stretford Manchester M15 4EE



The position of this underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available. The actual positions may be different from those shown on the plan private service pipes may be shown by a broken blue line. United Utilities will not accept any liability for any damage caused by the actual positions being different from those shown

United Utilities Water Limited 2014 The plan is based on the Ordnance Survey Map with the sanction of Controller of H.M. Stationery Office. Crown and Utilities copyrights are reserved. Unauthorised reproduction will infringe these copyrights.

APPENDIX C

DRAINAGE SURVEY

CCTV Report



Project

Cornbrook Road.
Manchester.

Survey Date

23/10/2023

Client

Artal

Surveyor

TH

Job Number

61807CCTV-01

Issue Date

07/11/2023

Checked by

DR

Revision - Issue Date

00/00/00

High Pressure Jetting & Resurvey

Maintenance Visits

Following the initial investigations completed on site we would recommend a quarterly re-survey of the drainage network in order to monitor the ongoing pipework condition.

System Maintenance Survey:

Quarterly Assessment of Existing Defects Due – 23/02/2024

Annual Full System Re-survey Due – 23/11/2024

High Pressure Jetting Required:

(5% - 30%) – MH1-A, MH2-A, MH3 X, MH4-X, MH7-B, MH7-X, MH9-X, MH15-A

(35 % - 60%) –

(65% - 95%) –

Project-information

 Project name:
Cornbrook Road

 Contract number:
61807

 Contact:
Tom Hogan

 Date:
26/10/2023

Client **Artal**
 Contact: **Tom Hogan**
 Position: **Associate Director**
 Road **Jordan Street**
 Town **Knott Mill**
 County
 Telephone: **07545 599568**
 Fax:
 Mobile: **07545 599568**
 E-Mail: **Tom@artal.uk.com**

Site **Cornbrook Road**
 Contact:
 Position:
 Road **Cornbrook Road**
 Town **Manchester**
 County
 Telephone:
 Fax:
 Mobile:
 E-Mail:

Contractor **Survey Solutions**
 Contact: **Thomas Houghton**
 Position: **Surveyor**
 Road **Riverside Business Park, Bollin Walk**
 Town **Wilmslow**
 County **Cheshire**
 Telephone: **01625 533444**
 Fax:
 Mobile:
 E-Mail: **manchester@survey-solutions.co.uk**

Defect Grade Description

 Project name:
Cornbrook Road

 Contract number:
61807

 Contact:
Tom Hogan

 Date:
26/10/2023
1:
 Brick: No Structural Defects
Pipe: No Structural Defects

Acceptable Structural Condition
2:
 Brick: Minor cracking, Surface mortar loss, Spalling slight, wear slight
Pipe: Circumfrential crack, Moderate joint defects, Spalling slight, Wear slight

Minor collapse risk in short term but potential for further deterioration
3:
 Brick: Total mortarloss without other defects, single brick displaced, Deformation up to 5%, Spalling medium, Wear medium
Pipe: Fractures with deformation up tp 5%, Longitudinal cracking or mulitlpe cracking, Minor loss of level, More severe joint defects, Spalling medium, Wear medium

! Collapse unlikely in near future but future deterioration likely !
4:
 Brick: Total mortarloss with deformation greater than 10%, Deformation up to 10% and fractured, Displaced/hanging brickwork, Small number of missing bricks
Pipe: Broken, Deformation up to 10% and broken,, Fractured with deformation 5 - 10%, Multiple fractures, Serious loss of level, spalling large, wear large

!! Collapse likely in foreseeable future !!
5:
 Brick: Already Collapsed, Missing invert, Deformation over 10% and fractured, Displaced/hanging brickwork and deformation over 10%, Extensive missing bricks
Pipe: Already collapsed, Deformation over 10% and broken, Extensive areas of fabric missing, Fractured with deformation over 10%

!!! Collapsed or collapse imminent !!!

Inspection report

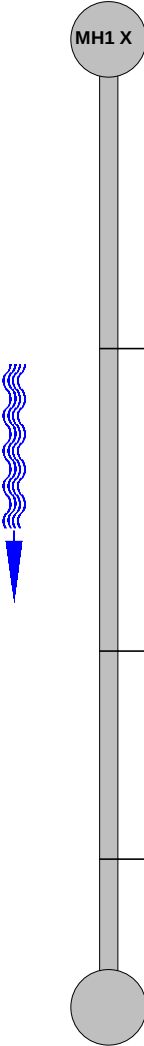
Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 1	PLR: MH1 X X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH1 X
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 28.8 m

Purpose:	Shape/Size: Circular dia 300 mm
Use: Surface water	Material: Concrete Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:225	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH1 X	00:00:00		(Constr) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	9.20	GP	General Condition photograph	00:00:00	3_3a	(Misc) 0
	18.20	GP	General Condition photograph	00:00:00	4_4a	(Misc) 0
	24.40	GP	General Condition photograph	00:00:00	5_5a	(Misc) 0
	28.80	FH	Finish Survey, Remark: Unable to survey beyond this point due to restricted leverage.	00:00:00		(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 1	PLR: MH1 X X
---------------------------------	--------------------------------	----------------------------	-----------------------------	------------------------



Photo: 3_3a, 00:00:00
9.2m, General Condition photograph



Photo: 4_4a, 00:00:00
18.2m, General Condition photograph

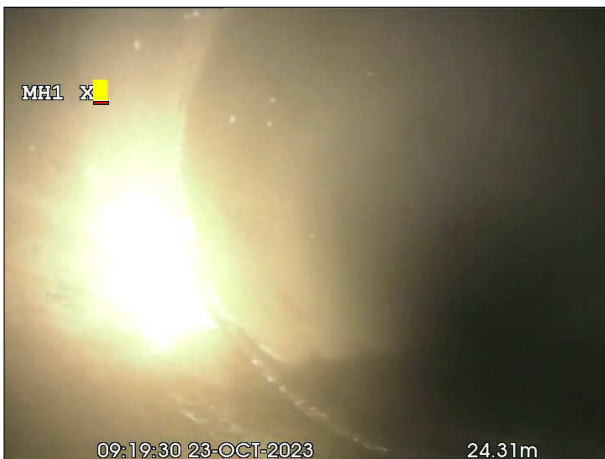


Photo: 5_5a, 00:00:00
24.4m, General Condition photograph

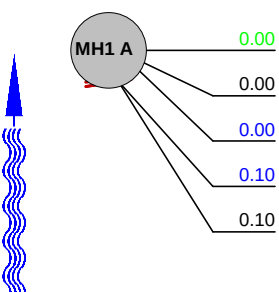
Inspection report

Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 2	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH1 A
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 0.1 m

Purpose:	Shape/Size: Circular dia 225 mm
Use: Surface water	Material: Concrete Pipe length:
Catchment:	Lining:
	Category:

Comment:
Location details:

1:25	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH1 A	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	0.10	DE	Debris, 20 % cross-sectional area loss	00:00:00	10_4a, b	(Serv) 1
	0.10	SA	Survey abandoned, Remark: Unable to survey beyond blockage.	00:00:00		(Misc) 0

Structural Defects	Constructional Features
Service Defects	Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 2	PLR: X
---------------------------------	--------------------------------	----------------------------	-----------------------------	------------------



Photo: 10_4a, 00:00:00
 0.1m, Debris, 20 % cross-sectional area loss



Photo: 10_4b, 00:00:00
 0.1m, Debris, 20 % cross-sectional area loss

Inspection report

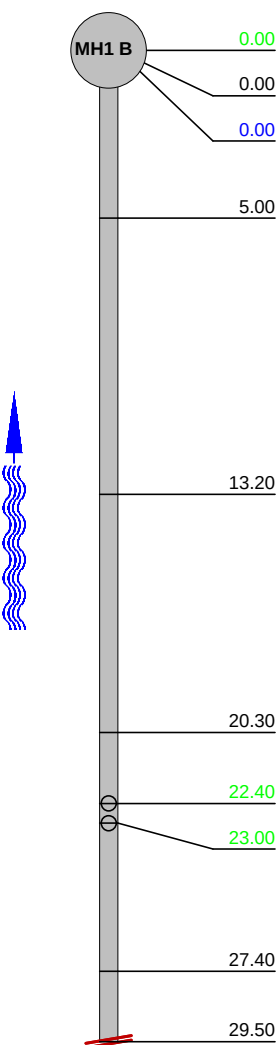
Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 3	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH1 B
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 29.5 m

Purpose:	Shape/Size: Circular dia 300 mm
Use: Surface water	Material: Concrete Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:225	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH1 B	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 5 % height/diameter	00:00:00		(Serv) 0
	5.00	GP	General Condition photograph	00:00:00	16_4a	(Misc) 0
	13.20	GP	General Condition photograph	00:00:00	17_5a	(Misc) 0
	20.30	GP	General Condition photograph	00:00:00	18_6a	(Misc) 0
	22.40	JN	Junction at 11 o'clock, dia 150 mm	00:00:00	19_7a	(Constr) 0
	23.00	JN	Junction at 01 o'clock, dia 150 mm	00:00:00	20_8a	(Constr) 0
	27.40	GP	General Condition photograph	00:00:00	21_9a	(Misc) 0
	29.50	SA	Survey abandoned, Remark: Unable to survey beyond this point due to restricted leverage.	00:00:00		(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 3	PLR: X
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Photo: 16_4a, 00:00:00
5m, General Condition photograph



Photo: 17_5a, 00:00:00
13.2m, General Condition photograph



Photo: 18_6a, 00:00:00
20.3m, General Condition photograph



Photo: 19_7a, 00:00:00
22.4m, Junction at 11 o'clock, dia 150 mm

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 3	PLR: X
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Photo: 20_8a, 00:00:00
23m, Junction at 01 o'clock, dia 150 mm



Photo: 21_9a, 00:00:00
27.4m, General Condition photograph

Inspection report

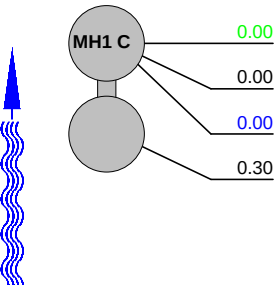
Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 4	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH1 C
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 0.3 m

Purpose:	Shape/Size: Circular dia 225 mm
Use: Surface water	Material: Concrete Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:25	position	code	observation	counter	photo	grade
						
	0.00	MH	Manhole Remark: MH1C	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	0.30	FH	Finish Survey, Remark: Line capped.	00:00:00	26_4a	(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 4	PLR: X
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Photo: 26_4a, 00:00:00
0.3m, Finish Survey, Remark: Line capped.

Inspection report

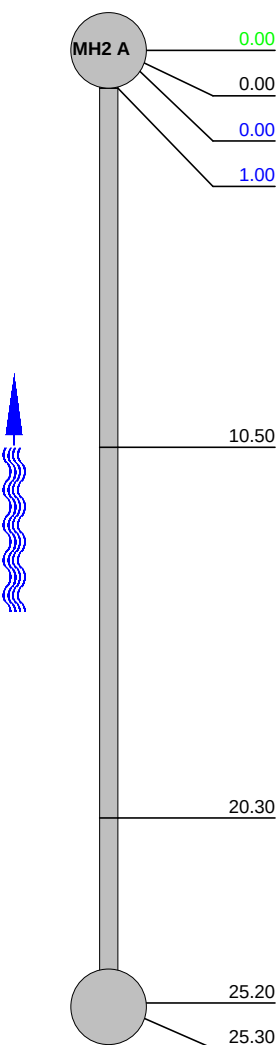
Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 5	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH2 A
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 25.3 m

Purpose:	Shape/Size: Circular dia 300 mm
Use: Surface water	Material: Concrete Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:200	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH2 A	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 5 % height/diameter	00:00:00		(Serv) 0
	1.00	DE	Debris, 20 % cross-sectional area loss	00:00:00	30_4a	(Serv) 1
	10.50	GP	General Condition photograph	00:00:00	31_5a	(Misc) 0
	20.30	GP	General Condition photograph	00:00:00	32_6a	(Misc) 0
	25.20	GP	General Condition photograph	00:00:00		(Misc) 0
	25.30	FH	Finish Survey, Remark: Point reached from previous survey of MH1 X	00:00:00		(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 5	PLR: X
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Photo: 30_4a, 00:00:00
1m, Debris, 20 % cross-sectional area loss



Photo: 31_5a, 00:00:00
10.5m, General Condition photograph



Photo: 32_6a, 00:00:00
20.3m, General Condition photograph

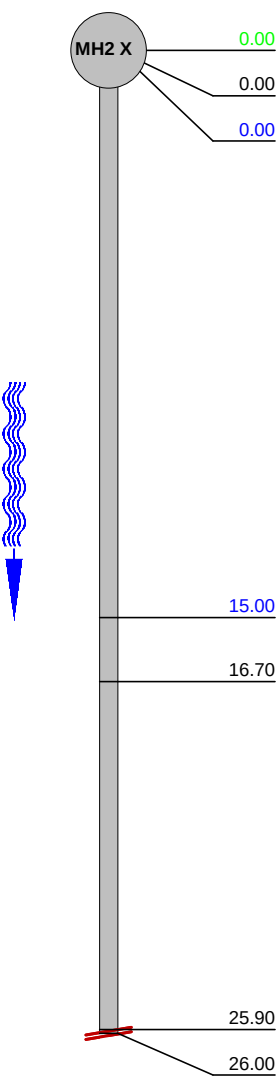
Inspection report

Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 6	PLR: MH2 X X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH2 X
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 26 m

Purpose:	Shape/Size: Circular dia 300 mm
Use: Surface water	Material: Concrete Pipe length:
Catchment:	Lining:
	Category:

Comment:
Location details:

1:200	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH2 X	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 10 % height/diameter	00:00:00	37_3a	(Serv) 0
	15.00	WL	Water level, 20 % height/diameter	00:00:00		(Serv) 0
	16.70	S1 CU	Camera Underwater, Start, Remark: Loss of vision.	00:00:00		(Misc) 0
	25.90	F1 CU	Camera Underwater, Finish, Remark: Loss of vision.	00:00:00		(Misc) 0
	26.00	SA	Survey abandoned, Remark: Unable to survey beyond this point due to assumed blockage, loss of vision.	00:00:00		(Misc) 0

Structural Defects	Constructional Features
Service Defects	Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 6	PLR: MH2 X X
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Photo: 37_3a, 00:00:00
0m, Water level, 10 % height/diameter

Inspection report

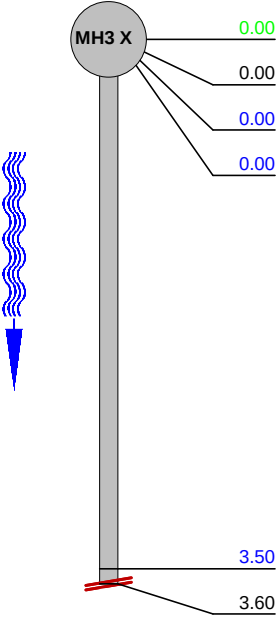
Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 7	PLR: MH3 X X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH3 X
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 3.6 m

Purpose:	Shape/Size: Circular dia 300 mm
Use: Combined	Material: Concrete Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:50	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH3 X	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 5 % height/diameter	00:00:00		(Serv) 0
	0.00	S1 DES	Debris silt, 10 % cross-sectional area loss, Start	00:00:00	45_4a	(Serv) 1
	3.50	F1 DES	Debris silt, 10 % cross-sectional area loss, Finish	00:00:00		(Serv) 1
	3.60	SA	Survey abandoned, Remark: Unable to survey beyond debris.	00:00:00		(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 7	PLR: MH3 X X
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Photo: 45_4a, 00:00:00
0m, Debris silt, 10 % cross-sectional area loss, Start

Inspection report

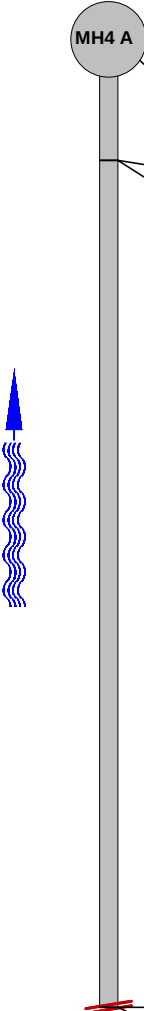
Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 8	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH4 A
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 9.6 m

Purpose:	Shape/Size: Circular dia 100 mm
Use: Surface water	Material: Vitrified clay Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:75	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH4 A	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	1.20	WL	Water level, 30 % height/diameter	00:00:00		(Serv) 0
	1.20	S1 CU	Camera Underwater, Start, Remark: Loss of vision.	00:00:00		(Misc) 0
	9.60	F1 CU	Camera Underwater, Finish, Remark: Loss of vision.	00:00:00		(Misc) 0
	9.60	SA	Survey abandoned, Remark: Unable to survey beyond assumed blockage.	00:00:00		(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Inspection report

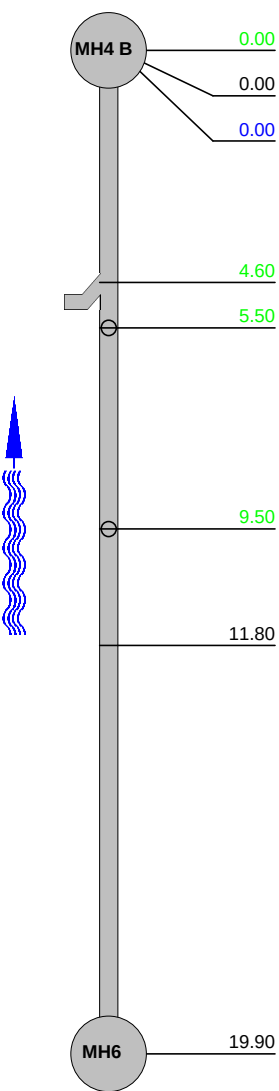
Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 9	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH4 B
Place: Cornbrook Road	District:	end MH: MH6
Location:	Tape No.:	Total length: 19.9 m

Purpose:	Shape/Size: Circular dia 225 mm
Use: Surface water	Material: Polyvinyl chloride Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:150	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH4 B	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	4.60	JN	Junction at 02 o'clock, dia 100 mm	00:00:00	58_4a	(Constr) 0
	5.50	JN	Junction at 11 o'clock, dia 100 mm	00:00:00	59_5a	(Constr) 0
	9.50	JN	Junction at 12 o'clock, dia 100 mm	00:00:00	60_6a	(Constr) 0
	11.80	GP	General Condition photograph	00:00:00	61_7a	(Misc) 0
	19.90	FH	Finish Survey, Remark: MH6 reached.	00:00:00		(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 9	PLR: X
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Photo: 58_4a, 00:00:00
4.6m, Junction at 02 o'clock, dia 100 mm



Photo: 59_5a, 00:00:00
5.5m, Junction at 11 o'clock, dia 100 mm



Photo: 60_6a, 00:00:00
9.5m, Junction at 12 o'clock, dia 100 mm

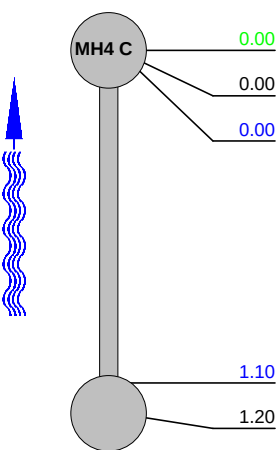


Photo: 61_7a, 00:00:00
11.8m, General Condition photograph

Inspection report

Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 10	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH4 C
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 1.2 m
Purpose:	Shape/Size: Circular dia 150 mm	
Use: Surface water	Material: Polyvinyl chloride	Pipe length:
Catchment:	Lining:	
	Category:	
Comment:		
Location details:		

1:25	position	code	observation	counter	photo	grade
		MH	Manhole Remark: MH4 C	00:00:00		(Constr) 0
		ST	Start of Survey	00:00:00		(Misc) 0
		WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
		LU	Line of Sewer deviates up	00:00:00		(Serv) 0
		FH	Finish Survey, Remark: Rest bend reached.	00:00:00		(Misc) 0
Structural Defects			Constructional Features			
Service Defects			Miscellaneous Features			

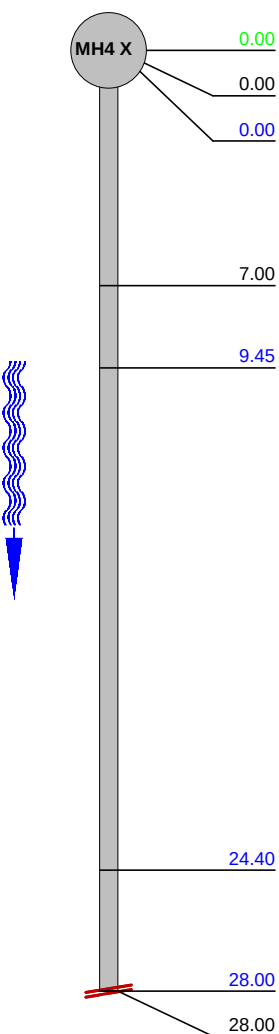
Inspection report

Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 11	PLR: MH4 X X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH4 X
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 28 m

Purpose:	Shape/Size: Circular dia 225 mm
Use: Surface water	Material: Polyvinyl chloride Pipe length:
Catchment:	Lining:
	Category:

Comment:
Location details:

1:225	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH4 X	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	7.00	GP	General Condition photograph	00:00:00	11_4a	(Misc) 0
	9.45	WL	Water level, 10 % height/diameter	00:00:00		(Serv) 0
	24.40	S1 DES	Debris silt, 10 % cross-sectional area loss, Start	00:00:00	74_6a	(Serv) 1
	28.00	F1 DES	Debris silt, 10 % cross-sectional area loss, Finish	00:00:00		(Serv) 1
	28.00	SA	Survey abandoned, Remark: Unable to survey beyond this point due to blockage	00:00:00		(Misc) 0

Structural Defects	Constructional Features
Service Defects	Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 11	PLR: MH4 X X
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Photo: 11_4a, 00:00:00
7m, General Condition photograph

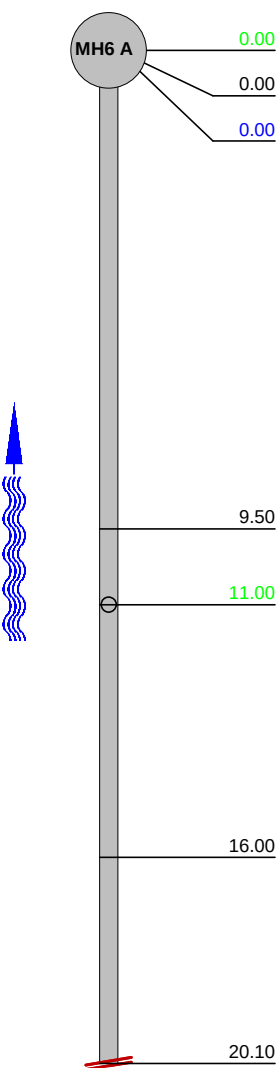


Photo: 74_6a, 00:00:00
24.4m, Debris silt, 10 % cross-sectional area loss, Start

Inspection report

Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 12	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH6 A
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 20.1 m
Purpose:	Shape/Size: Circular dia 225 mm	
Use: Surface water	Material: Polyvinyl chloride	Pipe length:
Catchment:	Lining:	
	Category:	
Comment:		
Location details:		

1:150	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH6 A	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	9.50	GP	General Condition photograph	00:00:00	79_4a	(Misc) 0
	11.00	JN	Junction at 12 o'clock, dia 150 mm	00:00:00	80_5a	(Constr) 0
	16.00	GP	General Condition photograph	00:00:00	81_6a	(Misc) 0
	20.10	SA	Survey abandoned, Remark: Unable to survey beyond this point due to restrict	00:00:00		(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 12	PLR: X
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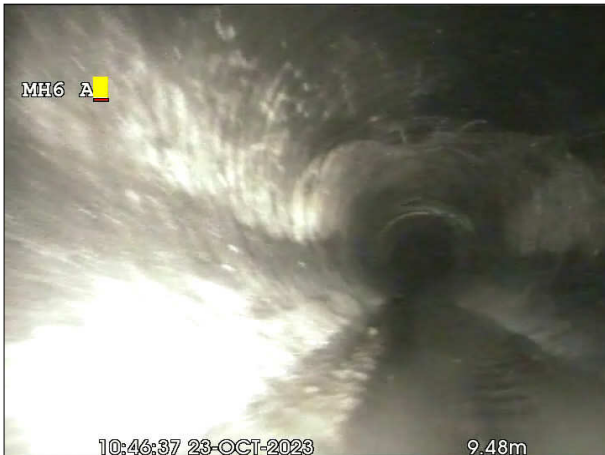


Photo: 79_4a, 00:00:00
9.5m, General Condition photograph



Photo: 80_5a, 00:00:00
11m, Junction at 12 o'clock, dia 150 mm

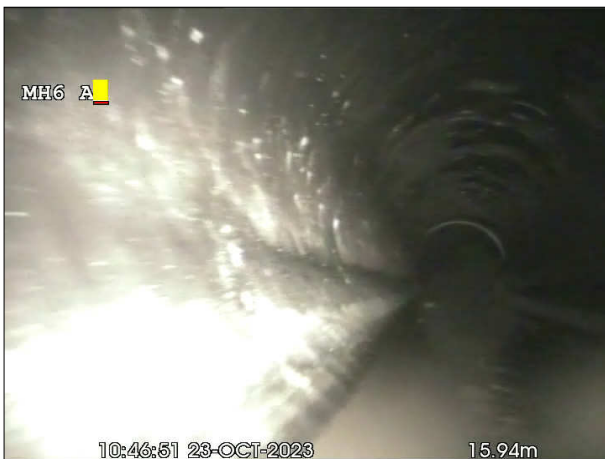


Photo: 81_6a, 00:00:00
16m, General Condition photograph

Inspection report

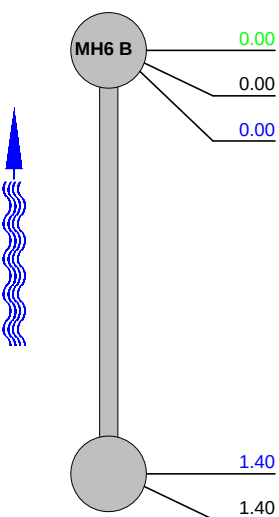
Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 13	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH6 B
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 1.4 m

Purpose:	Shape/Size: Circular dia 150 mm
Use: Surface water	Material: Polyvinyl chloride Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:25	position	code	observation	counter	photo	grade
		MH	Manhole Remark: MH6 B	00:00:00		(Constr) 0
		ST	Start of Survey	00:00:00		(Misc) 0
		WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
		LU	Line of Sewer deviates up	00:00:00		(Serv) 0
		FH	Finish Survey, Remark: Rest bend reached.	00:00:00		(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

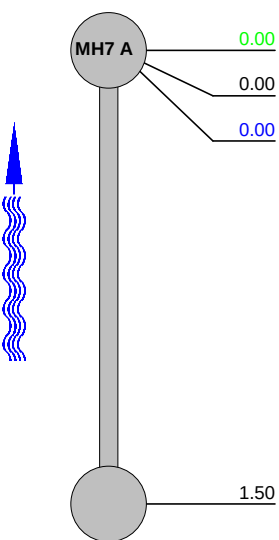
Inspection report

Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 14	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH7 A
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 1.5 m

Purpose:	Shape/Size: Circular dia 150 mm
Use: Surface water	Material: Polyvinyl chloride Pipe length:
Catchment:	Lining:
	Category:

Comment:
Location details:

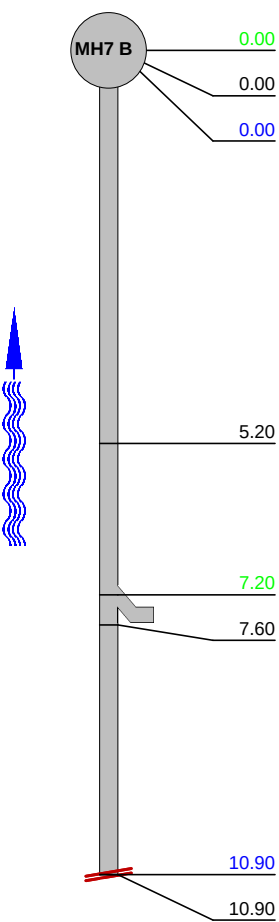
1:25	position	code	observation	counter	photo	grade
		MH	Manhole Remark: MH7 A	00:00:00		(Constr) 0
		ST	Start of Survey	00:00:00		(Misc) 0
		WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
		FH	Finish Survey, Remark: Gully reached.	00:00:00		(Misc) 0

Structural Defects	Constructional Features
Service Defects	Miscellaneous Features

Inspection report

Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 15	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH7 B
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 10.9 m
Purpose:	Shape/Size: Circular dia 150 mm	
Use: Surface water	Material: Polyvinyl chloride	Pipe length:
Catchment:	Lining:	
	Category:	
Comment:		
Location details:		

1:100	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH7 B	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	5.20	GO	General Observation, Remark: Poor vision.	00:00:00	95_4a	(Misc) 0
	7.20	JN	Junction at 09 o'clock, dia 150 mm	00:00:00	96_5a	(Constr) 0
	7.60	DC	Dimension of sewer changes, new dimension dia 100 mm	00:00:00	97_6a	(Misc) 0
	10.90	DE	Debris, 30 % cross-sectional area loss	00:00:00	98_7a	(Serv) 1
	10.90	SA	Survey abandoned, Remark: Unable to survey beyond blockage.	00:00:00		(Misc) 0
Structural Defects			Constructional Features			
Service Defects			Miscellaneous Features			

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 15	PLR: X
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Photo: 95_4a, 00:00:00
 5.2m, General Observation, Remark: Poor vision.



Photo: 96_5a, 00:00:00
 7.2m, Junction at 09 o'clock, dia 150 mm



Photo: 97_6a, 00:00:00
 7.6m, Dimension of sewer changes, new dimension dia 100 mm



Photo: 98_7a, 00:00:00
 10.9m, Debris, 30 % cross-sectional area loss

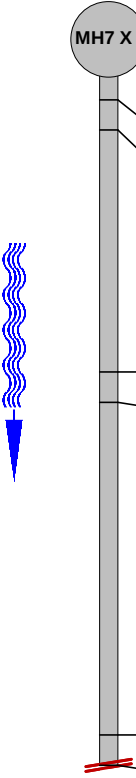
Inspection report

Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 16	PLR: MH7 X X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH7 X
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 2.4 m

Purpose:	Shape/Size: Circular dia 150 mm
Use: Surface water	Material: Polyvinyl chloride Pipe length:
Catchment:	Lining:
	Category:

Comment:
Location details:

1:25	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH7 X	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	0.20	JDM	Joint displaced. Medium	00:00:00	103_4a	(Struct) 1
	0.30	S1 DES	Debris silt, 10 % cross-sectional area loss, Start	00:00:00	104_5a	(Serv) 1
	1.10	LD	Line of Sewer deviates down	00:00:00		(Serv) 0
	1.20	F1 DES	Debris silt, 10 % cross-sectional area loss, Finish	00:00:00		(Serv) 1
	2.30	DE	Debris, 20 % cross-sectional area loss	00:00:00	16_9a	(Serv) 1
	2.40	SA	Survey abandoned, Remark: Unable to survey beyond blockage.	00:00:00		(Misc) 0

Structural Defects	Constructional Features
Service Defects	Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 16	PLR: MH7 X X
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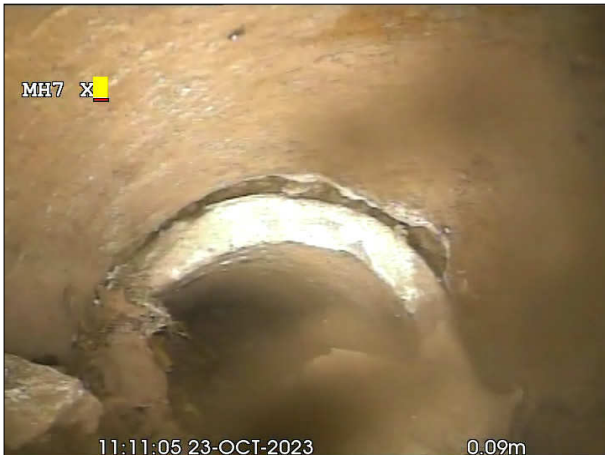


Photo: 103_4a, 00:00:00
0.2m, Joint displaced. Medium



Photo: 104_5a, 00:00:00
0.3m, Debris silt, 10 % cross-sectional area loss, Start



Photo: 16_9a, 00:00:00
2.3m, Debris, 20 % cross-sectional area loss

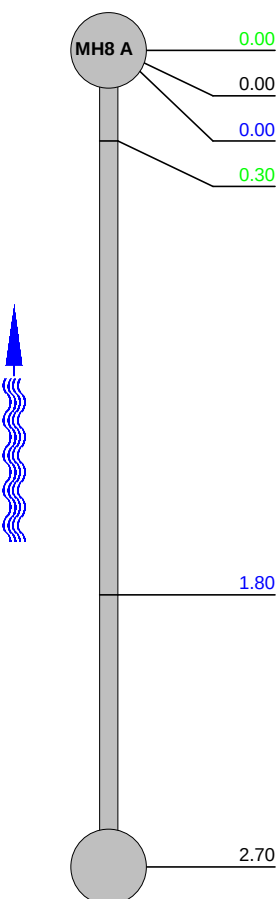
Inspection report

Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 17	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH8 A
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 2.7 m

Purpose:	Shape/Size: Circular dia 150 mm
Use: Surface water	Material: Polyvinyl chloride Pipe length:
Catchment:	Lining:
	Category:

Comment:
Location details:

1:25	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH8 A	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	0.30	JN	Junction at 06 o'clock, dia 150 mm, Remark: Back drop	00:00:00	17_4a	(Constr) 0
	1.80	LU	Line of Sewer deviates up	00:00:00		(Serv) 0
	2.70	FH	Finish Survey, Remark: Rest bend reached.	00:00:00		(Misc) 0

Structural Defects	Constructional Features
Service Defects	Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 17	PLR: X
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Photo: 17_4a, 00:00:00
0.3m, Junction at 06 o'clock, dia 150 mm, Remark: Back drop

Inspection report

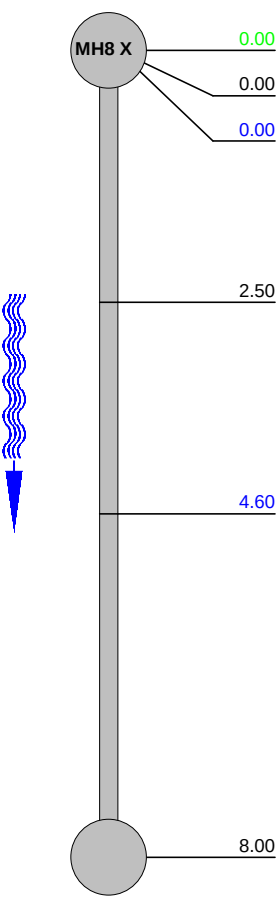
Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 18	PLR: MH8 X X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH8 X
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 8 m

Purpose:	Shape/Size: Circular dia 150 mm
Use: Surface water	Material: Polyvinyl chloride Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:75	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH8 X	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	2.50	GP	General Condition photograph	00:00:00	118_4a	(Misc) 0
	4.60	LL	Line of Sewer deviates left	00:00:00		(Serv) 0
	8.00	FH	Finish Survey, Remark: Drops into sewer line.	00:00:00		(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 18	PLR: MH8 X X
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Photo: 118_4a, 00:00:00
2.5m, General Condition photograph

Inspection report

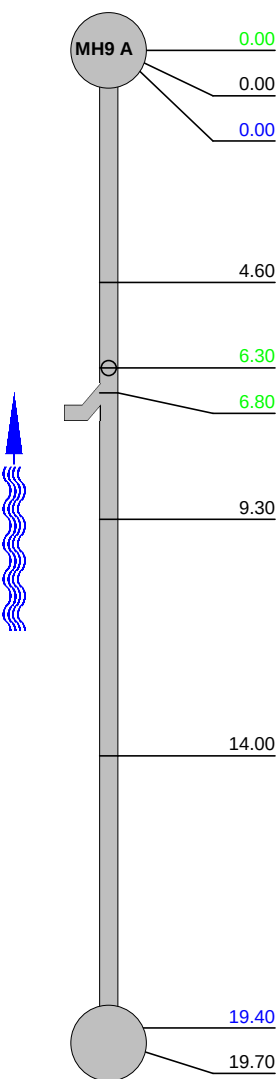
Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 19	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH9 A
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 19.7 m

Purpose:	Shape/Size: Circular dia 150 mm
Use: Surface water	Material: Polyvinyl chloride Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:150	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH9 A	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	4.60	GP	General Condition photograph	00:00:00	124_4a	(Misc) 0
	6.30	JN	Junction at 11 o'clock, dia 150 mm	00:00:00	125_5a	(Constr) 0
	6.80	JN	Junction at 03 o'clock, dia 150 mm	00:00:00	126_6a	(Constr) 0
	9.30	GP	General Condition photograph	00:00:00	127_7a	(Misc) 0
	14.00	GP	General Condition photograph	00:00:00	128_8a	(Misc) 0
	19.40	LL	Line of Sewer deviates left	00:00:00		(Serv) 0
	19.70	FH	Finish Survey, Remark: Rest bend reached.	00:00:00		(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 19	PLR: X
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Photo: 124_4a, 00:00:00
4.6m, General Condition photograph

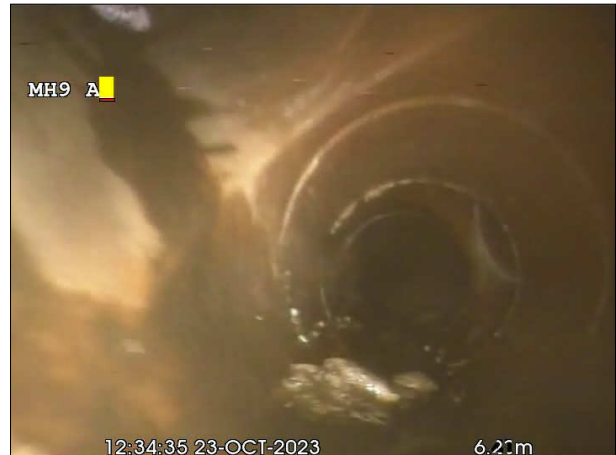


Photo: 125_5a, 00:00:00
6.3m, Junction at 11 o'clock, dia 150 mm

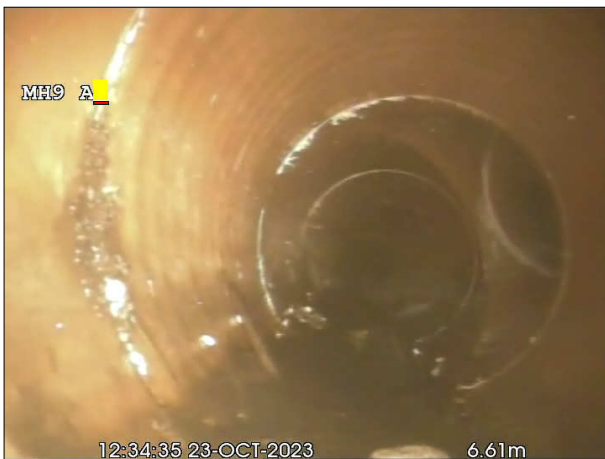


Photo: 126_6a, 00:00:00
6.8m, Junction at 03 o'clock, dia 150 mm



Photo: 127_7a, 00:00:00
9.3m, General Condition photograph

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 19	PLR: X
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Photo: 128_8a, 00:00:00
14m, General Condition photograph

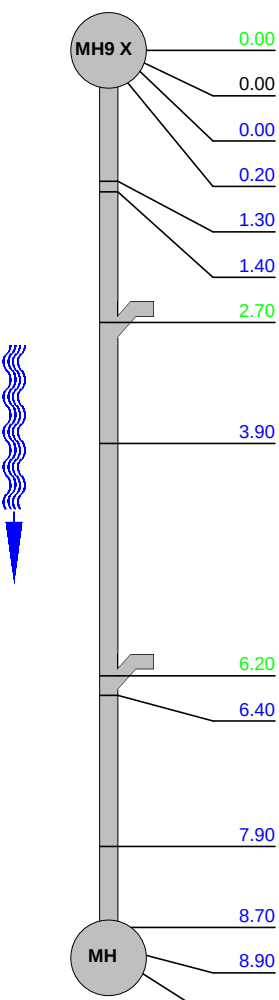
Inspection report

Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 20	PLR: MH9 X X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH9 X
Place: Cornbrook Road	District:	end MH: MH
Location:	Tape No.:	Total length: 9 m

Purpose:	Shape/Size: Circular dia 150 mm
Use: Surface water	Material: Polyvinyl chloride Pipe length:
Catchment:	Lining:
	Category:

Comment:
Location details:

1:75	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH9 X	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	0.20	S1	DES Debris silt, 10 % cross-sectional area loss, Start	00:00:00	134_4a	(Serv) 1
	1.30	F1	DES Debris silt, 10 % cross-sectional area loss, Finish	00:00:00		(Serv) 1
	1.40	LL	Line of Sewer deviates left	00:00:00		(Serv) 0
	2.70	JN	Junction at 09 o'clock, dia 150 mm	00:00:00	137_7a	(Constr) 0
	3.90	S2	DES Debris silt, 5 % cross-sectional area loss, Start	00:00:00	138_8a	(Serv) 1
	6.20	JN	Junction at 09 o'clock, dia 150 mm	00:00:00	139_9a	(Constr) 0
	6.40	F2	DES Debris silt, 5 % cross-sectional area loss, Finish	00:00:00		(Serv) 1
	7.90	S3	DES Debris silt, 5 % cross-sectional area loss, Start	00:00:00	141_11a	(Serv) 1
	8.70	LR	Line of Sewer deviates right	00:00:00		(Serv) 0
	8.90	F3	DES Debris silt, 5 % cross-sectional area loss, Finish	00:00:00		(Serv) 1
	9.00	FH	Finish Survey, Remark: MH reached.	00:00:00		(Misc) 0

Structural Defects	Constructional Features
Service Defects	Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 20	PLR: MH9 X X
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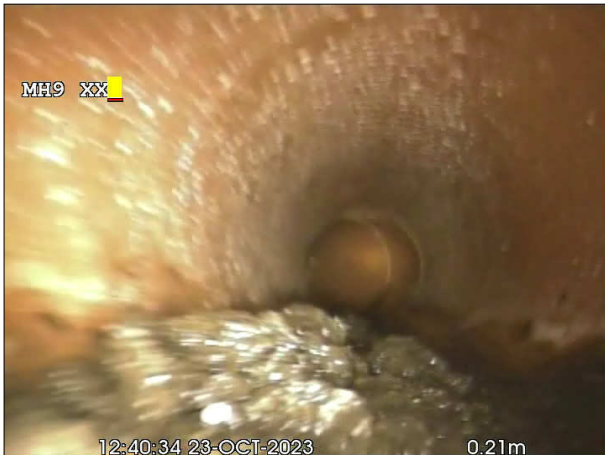


Photo: 134_4a, 00:00:00
0.2m, Debris silt, 10 % cross-sectional area loss, Start

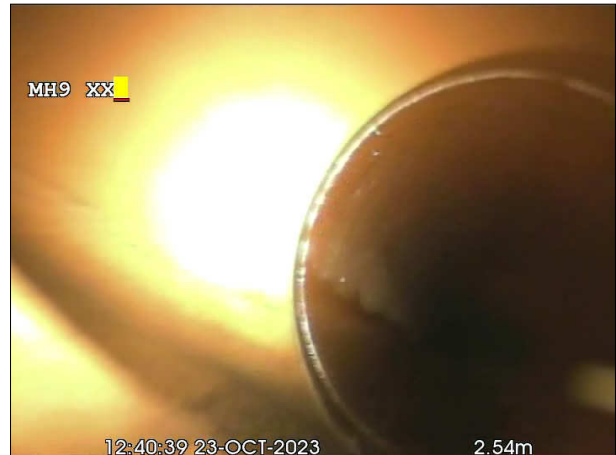


Photo: 137_7a, 00:00:00
2.7m, Junction at 09 o'clock, dia 150 mm

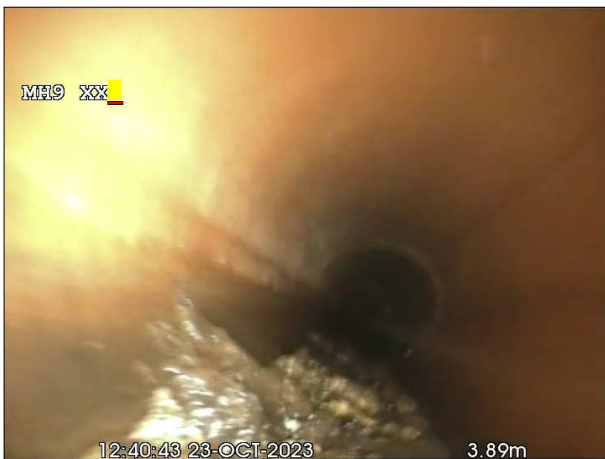


Photo: 138_8a, 00:00:00
3.9m, Debris silt, 5 % cross-sectional area loss, Start

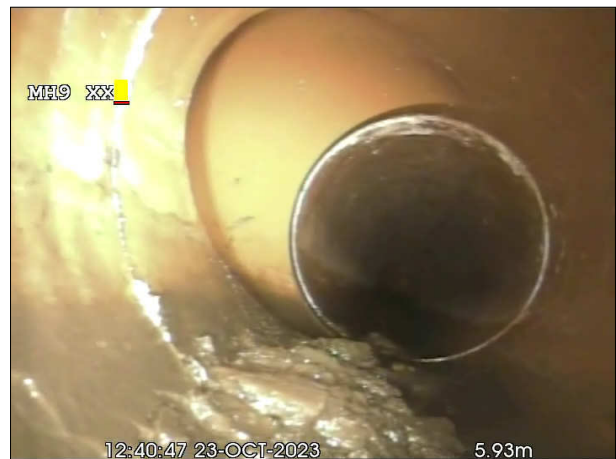


Photo: 139_9a, 00:00:00
6.2m, Junction at 09 o'clock, dia 150 mm

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 20	PLR: MH9 X X
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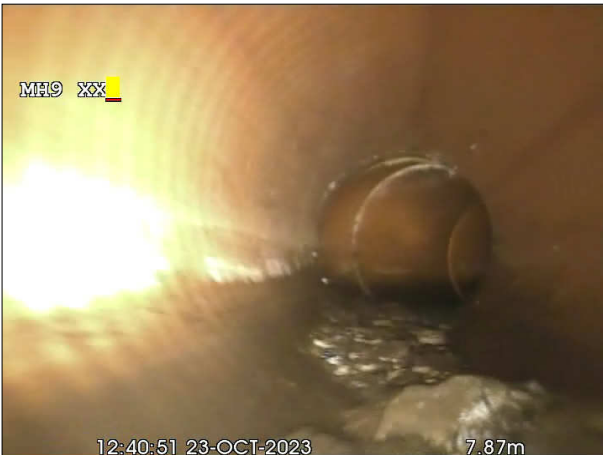


Photo: 141_11a, 00:00:00
7.9m, Debris silt, 5 % cross-sectional area loss, Start

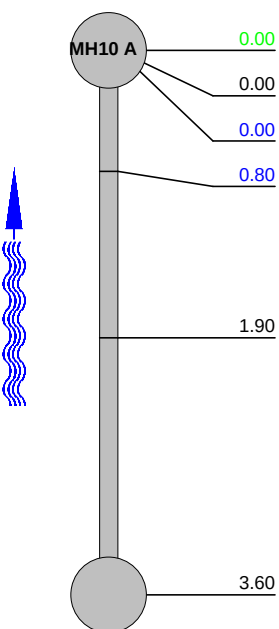
Inspection report

Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 21	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH10 A
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 3.6 m

Purpose:	Shape/Size: Circular dia 150 mm
Use: Surface water	Material: Polyvinyl chloride Pipe length:
Catchment:	Lining:
	Category:

Comment:
Location details:

1:50	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH10 A	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	0.80	LU	Line of Sewer deviates up	00:00:00		(Serv) 0
	1.90	GP	General Condition photograph	00:00:00	149_5a	(Misc) 0
	3.60	FH	Finish Survey, Remark: Gully reached.	00:00:00		(Misc) 0

Structural Defects	Constructional Features
Service Defects	Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 21	PLR: X
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Photo: 149_5a, 00:00:00
1.9m, General Condition photograph

Inspection report

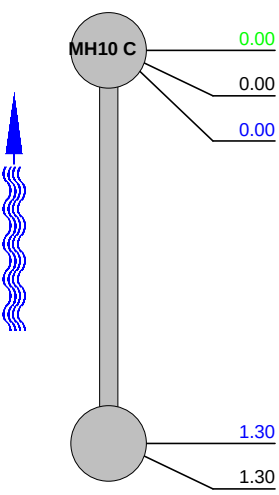
Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 22	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH10 C
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 1.3 m

Purpose:	Shape/Size: Circular dia 150 mm
Use: Surface water	Material: Vitrified clay Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:25	position	code	observation	counter	photo	grade
		MH	Manhole Remark: MH10 C	00:00:00		(Constr) 0
		ST	Start of Survey	00:00:00		(Misc) 0
		WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
		LU	Line of Sewer deviates up	00:00:00		(Serv) 0
		FH	Finish Survey, Remark: Rest bend reached.	00:00:00		(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Inspection report

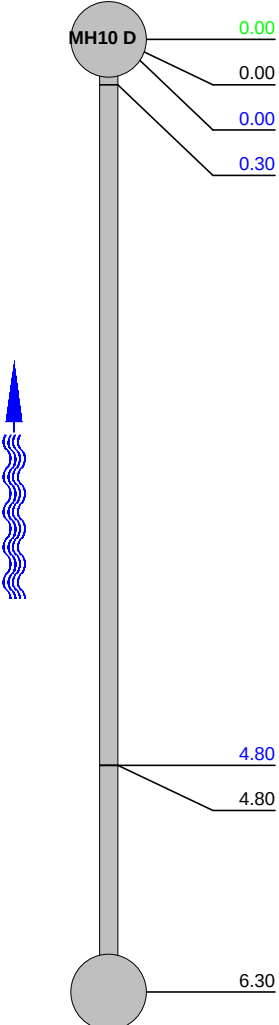
Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 23	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH10 D
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 6.3 m

Purpose:	Shape/Size: Circular dia 150 mm
Use: Surface water	Material: Vitrified clay Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:50	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH10 D	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	0.30	LR	Line of Sewer deviates right	00:00:00		(Serv) 0
	4.80	LL	Line of Sewer deviates left	00:00:00		(Serv) 0
	4.80	GP	General Condition photograph	00:00:00	161_6a	(Misc) 0
	6.30	FH	Finish Survey, Remark: Gully reached	00:00:00		(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 23	PLR: X
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Photo: 161_6a, 00:00:00
4.8m, General Condition photograph

Inspection report

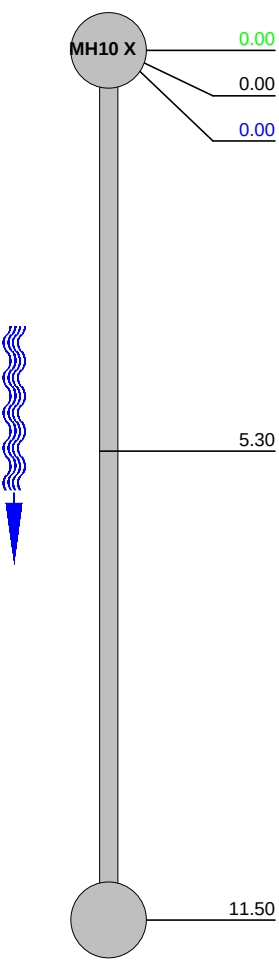
Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 24	PLR: MH10 X X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH10 X
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 11.5 m

Purpose:	Shape/Size: Circular dia 300 mm
Use: Surface water	Material: Vitrified clay Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:100	position	code	observation	counter	photo	grade
		MH	Manhole Remark: MH10 X	00:00:00		(Constr) 0
		ST	Start of Survey	00:00:00		(Misc) 0
		WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
		GP	General Condition photograph	00:00:00	166_4a	(Misc) 0
		FH	Finish Survey, Remark: Point reached from previous survey of MH1 B	00:00:00		(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 24	PLR: MH10 X X
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Photo: 166_4a, 00:00:00
5.3m, General Condition photograph

Inspection report

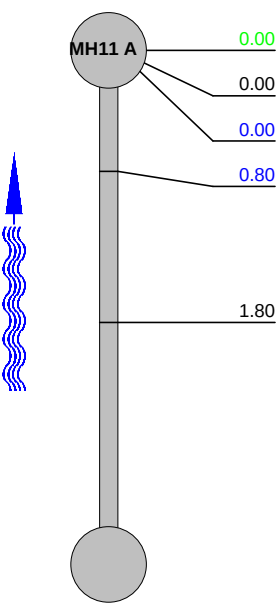
Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 25	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH11 A
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 3.4 m

Purpose:	Shape/Size: Circular dia 150 mm
Use: Surface water	Material: Polyvinyl chloride Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:50	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH11 A	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	0.80	LU	Line of Sewer deviates up	00:00:00		(Serv) 0
	1.80	GP	General Condition photograph	00:00:00	173_5a	(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 25	PLR: X
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Photo: 173_5a, 00:00:00
1.8m, General Condition photograph

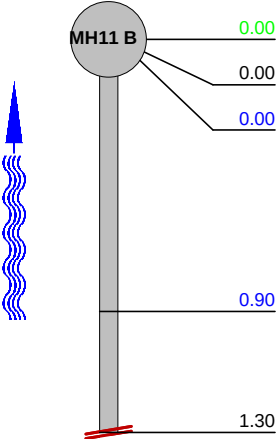
Inspection report

Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 26	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH11 B
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 1.3 m

Purpose:	Shape/Size: Circular dia 150 mm
Use: Surface water	Material: Polyvinyl chloride Pipe length:
Catchment:	Lining:
	Category:

Comment:
Location details:

1:25	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH11 B	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	0.90	LR	Line of Sewer deviates right	00:00:00		(Serv) 0
	1.30	SA	Survey abandoned, Remark: Unable to survey beyond deviation.	00:00:00		(Misc) 0

Structural Defects	Constructional Features
Service Defects	Miscellaneous Features

Inspection report

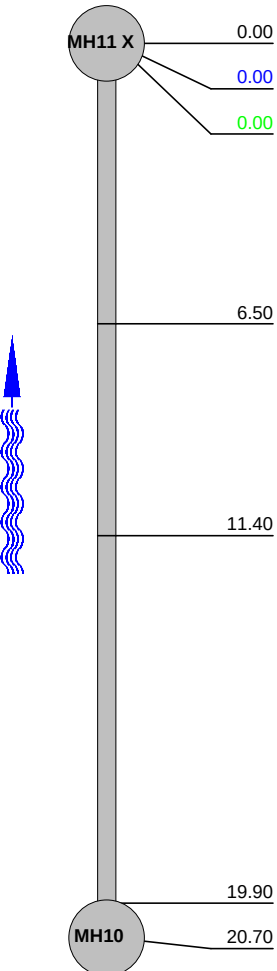
Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 27	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH11 X
Place: Cornbrook Road	District:	end MH: MH10
Location:	Tape No.:	Total length: 20.7 m

Purpose:	Shape/Size: Circular dia 150 mm
Use: Surface water	Material: Polyvinyl chloride Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:175	position	code	observation	counter	photo	grade
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	0.00	MH	Manhole Remark: MH11 X	00:00:00		(Constr) 0
	6.50	GP	General Condition photograph	00:00:00	27_-9503a	(Misc) 0
	11.40	GP	General Condition photograph	00:00:00	27_-9502a	(Misc) 0
	19.90	GP	General Condition photograph	00:00:00	27_-9501a	(Misc) 0
	20.70	FH	Finish Survey, Remark: MH10 reached.	00:00:00		(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 27	PLR: X
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Photo: 27_-9503a, 00:00:00
6.5m, General Condition photograph



Photo: 27_-9502a, 00:00:00
11.4m, General Condition photograph



Photo: 27_-9501a, 00:00:00
19.9m, General Condition photograph

Inspection report

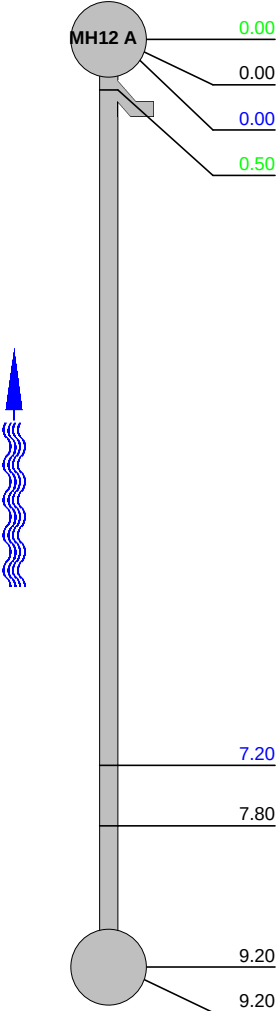
Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 28	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH12 A
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 9.2 m

Purpose:	Shape/Size: Circular dia 300 mm
Use: Surface water	Material: Concrete Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:75	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH12 A	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	0.50	JN	Junction at 09 o'clock, dia 150 mm	00:00:00	189_4a, b	(Constr) 0
	7.20	WL	Water level, 20 % height/diameter	00:00:00		(Serv) 0
	7.80	S1 CU	Camera Underwater, Start, Remark: Loss of vision.	00:00:00		(Misc) 0
	9.20	F1 CU	Camera Underwater, Finish, Remark: Loss of vision.	00:00:00		(Misc) 0
	9.20	FH	Finish Survey, Remark: MH reached.	00:00:00		(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 28	PLR: X
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Photo: 189_4a, 00:00:00
0.5m, Junction at 09 o'clock, dia 150 mm



Photo: 189_4b, 00:00:00
0.5m, Junction at 09 o'clock, dia 150 mm

Inspection report

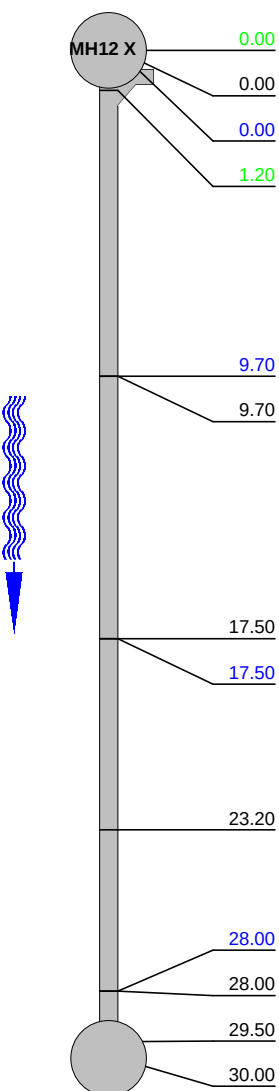
Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 29	PLR: MH12 X X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH12 X
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 30 m

Purpose:	Shape/Size: Egg shaped dia 300 mm
Use: Surface water	Material: Concrete Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:225	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH12 X	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	1.20	JN	Junction at 09 o'clock, dia 150 mm	00:00:00	197_4a	(Constr) 0
	9.70	WL	Water level, 20 % height/diameter	00:00:00		(Serv) 0
	9.70	S1	CU Camera Underwater, Start, Remark: Loss of vision.	00:00:00		(Misc) 0
	17.50	F1	CU Camera Underwater, Finish, Remark: Loss of vision.	00:00:00		(Misc) 0
	17.50	WL	Water level, 5 % height/diameter	00:00:00		(Serv) 0
	23.20	GP	General Condition photograph	00:00:00	202_9a	(Misc) 0
	28.00	WL	Water level, 30 % height/diameter	00:00:00		(Serv) 0
	28.00	S1	CU Camera Underwater, Start, Remark: Loss of vision.	00:00:00		(Misc) 0
	29.50	F1	CU Camera Underwater, Finish, Remark: Loss of vision.	00:00:00		(Misc) 0
	30.00	FH	Finish Survey, Remark: Unable to survey beyond this this point due restricted leverage.	00:00:00		(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 29	PLR: MH12 X X
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Photo: 197_4a, 00:00:00
 1.2m, Junction at 09 o'clock, dia 150 mm



Photo: 202_9a, 00:00:00
 23.2m, General Condition photograph

Inspection report

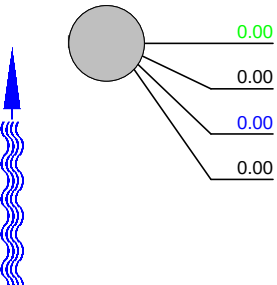
Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 30	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH13 A
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 0 m

Purpose:	Shape/Size: Egg shaped dia 150 mm
Use: Surface water	Material: Vitrified clay Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:25	position	code	observation	counter	photo	grade
		MH	Manhole Remark: MH13 A	00:00:00		(Constr) 0
		ST	Start of Survey	00:00:00		(Misc) 0
		WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
		FH	Finish Survey, Remark: Gully reached.			(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

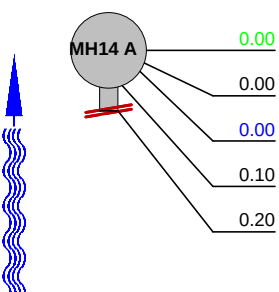
Inspection report

Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 31	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH14 A
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 0.2 m

Purpose:	Shape/Size: Egg shaped dia 300 mm
Use: Surface water	Material: Concrete Pipe length:
Catchment:	Lining:
	Category:

Comment:
Location details:

1:25	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH14 A	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	0.10	GO	General Observation, Remark: Sewer reappear	00:00:00	214_4a	(Misc) 0
	0.20	SA	Survey abandoned, Remark: Unable to survey beyond repair.	00:00:00		(Misc) 0

Structural Defects	Constructional Features
Service Defects	Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 31	PLR: X
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Photo: 214_4a, 00:00:00
0.1m, General Observation, Remark: Sewer reappear

Inspection report

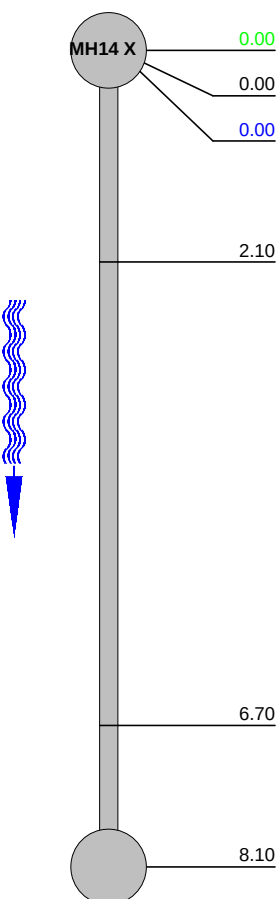
Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 32	PLR: MH14 X X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH14 X
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 8.1 m

Purpose:	Shape/Size: Egg shaped dia 300 mm
Use: Surface water	Material: Concrete Pipe length:
Catchment:	Lining:
	Category:

Comment:

Location details:

1:75	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH14 X	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	2.10	GP	General Condition photograph	00:00:00	219_4a	(Misc) 0
	6.70	GP	General Condition photograph	00:00:00	220_5a	(Misc) 0
	8.10	FH	Finish Survey, Remark: Drops into sewer line.	00:00:00		(Misc) 0

Structural Defects

Constructional Features

Service Defects

Miscellaneous Features

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 32	PLR: MH14 X X
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Photo: 219_4a, 00:00:00
2.1m, General Condition photograph

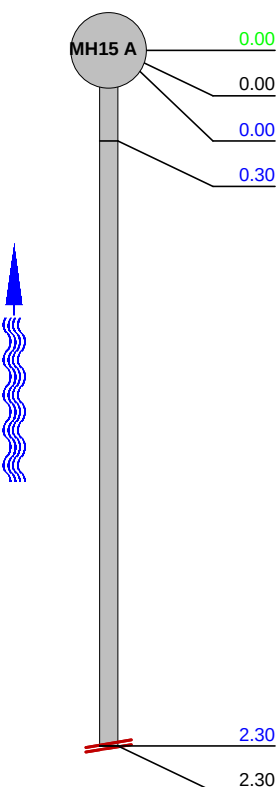


Photo: 220_5a, 00:00:00
6.7m, General Condition photograph

Inspection report

Date: 26/10/2023	Job N°: 61807	Weather: Dry	Operator: TH	section number: 33	PLR: X
Present:	Vehicle:	Camera: Solo Pro	Preset:	Cleaned: No	Grade:

Road: Cornbrook Road	Division:	start MH: MH15 A
Place: Cornbrook Road	District:	end MH:
Location:	Tape No.:	Total length: 2.3 m
Purpose:	Shape/Size: Egg shaped dia 150 mm	
Use: Surface water	Material: Polyvinyl chloride	Pipe length:
Catchment:	Lining:	
	Category:	
Comment:		
Location details:		

1:25	position	code	observation	counter	photo	grade
	0.00	MH	Manhole Remark: MH15 A	00:00:00		(Constr) 0
	0.00	ST	Start of Survey	00:00:00		(Misc) 0
	0.00	WL	Water level, 0 % height/diameter	00:00:00		(Serv) 0
	0.30	S1 DES	Debris silt, 10 % cross-sectional area loss, Start	00:00:00	225_4a	(Serv) 1
	2.30	F1 DES	Debris silt, 10 % cross-sectional area loss, Finish	00:00:00		(Serv) 1
	2.30	SA	Survey abandoned, Remark: Unable to survey beyond blockage.	00:00:00		(Misc) 0
Structural Defects				Constructional Features		
Service Defects				Miscellaneous Features		

Inspection photos

Place: Cornbrook Road	Road: Cornbrook Road	Date: 26/10/2023	section number: 33	PLR: X
---------------------------------	--------------------------------	----------------------------	------------------------------	------------------

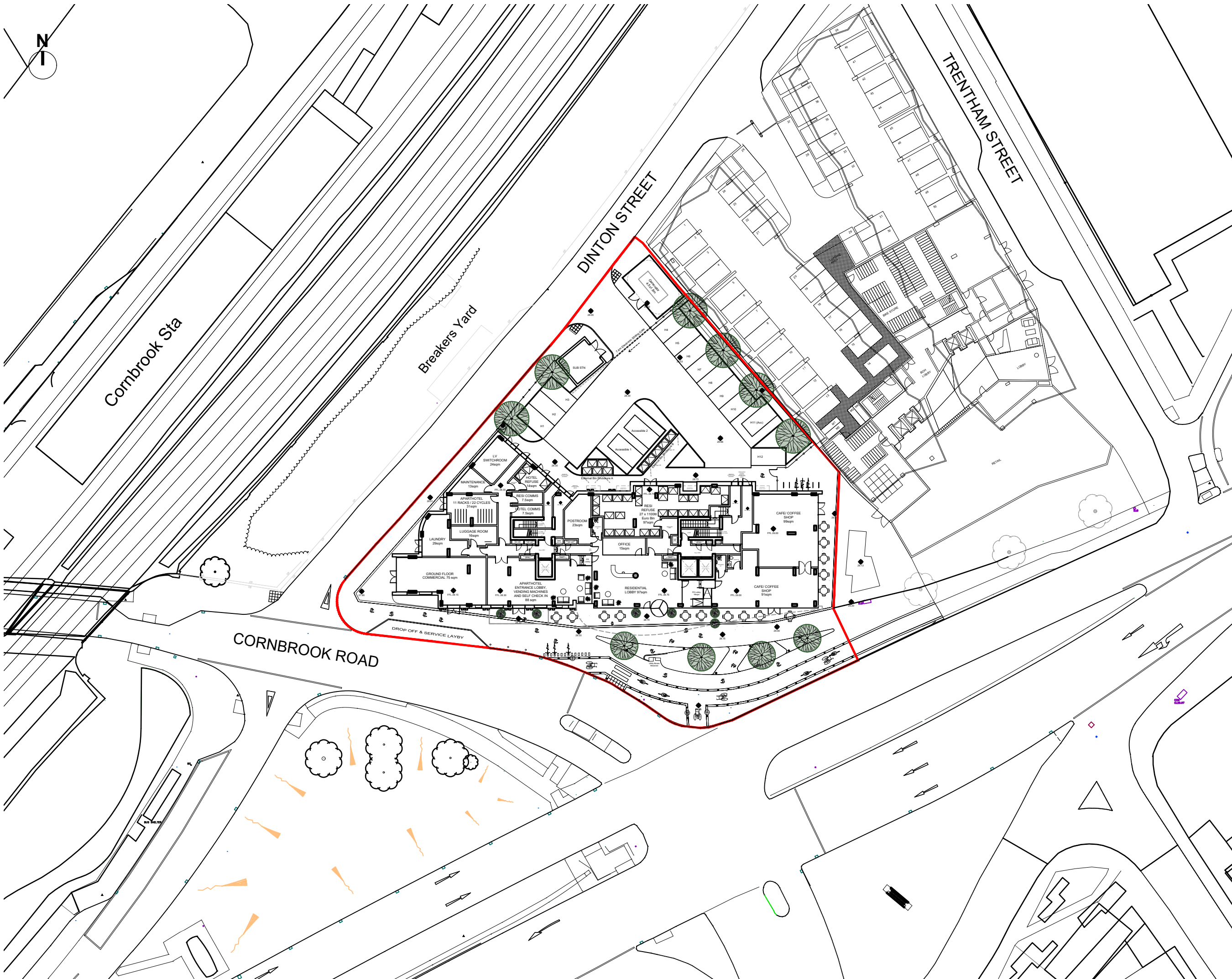


Photo: 225_4a, 00:00:00

0.3m, Debris silt, 10 % cross-sectional area loss, Start

APPENDIX D

PROPOSED DEVELOPMENT PLANS



GENERAL NOTES:

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P08	LANDSCAPING UPDATED	JDC	C.JG	25.01.24
P07	BOUNDARY FENCE AROUND PARKING ADDED	JDC	C.JG	17.01.24
P06	PLANNING APPLICATION BOUNDARY ADDED	JDC	C.JG	15.12.23
P05	BREAKERS YARD EXISTING LAYOUT SHOWN	JDC	C.JG	13.12.23
P04	UPDATED LAYOUT	EB	C.JG	09.11.23
P03	UPDATED LAYOUT	EB	C.JG	26.10.23
P02	UPDATED LAYOUT	EB	DL	18.10.23
P01	FIRST ISSUED	DL	DL	29.03.23
REV	DESCRIPTION	DATE	BY	DATE

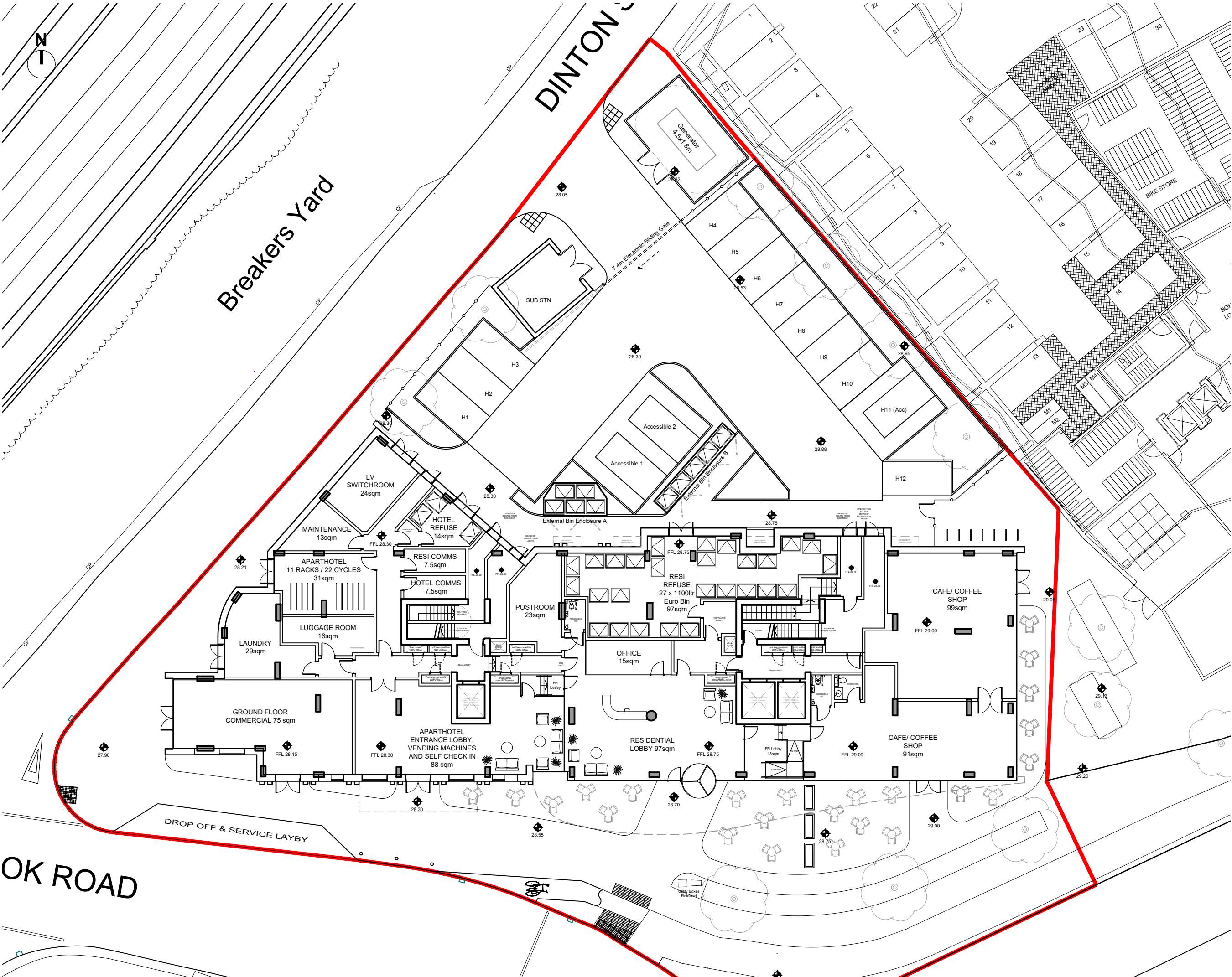
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CLIENT	FORSHAW GROUP
PROJECT	CORNBROOK RESIDENTIAL
DOCUMENT NAME	8353-LRW-ZZ-ZZ-DR-A-00-100
DESCRIPTION	PROPOSED SITE PLAN
REVISION	P08
SCALE	1:500@ A3
LRW PROJECT No.	8353
DATE CREATED	29.03.23
CREATED BY	EB
AUTHORISED BY	DL



GENERAL NOTES:

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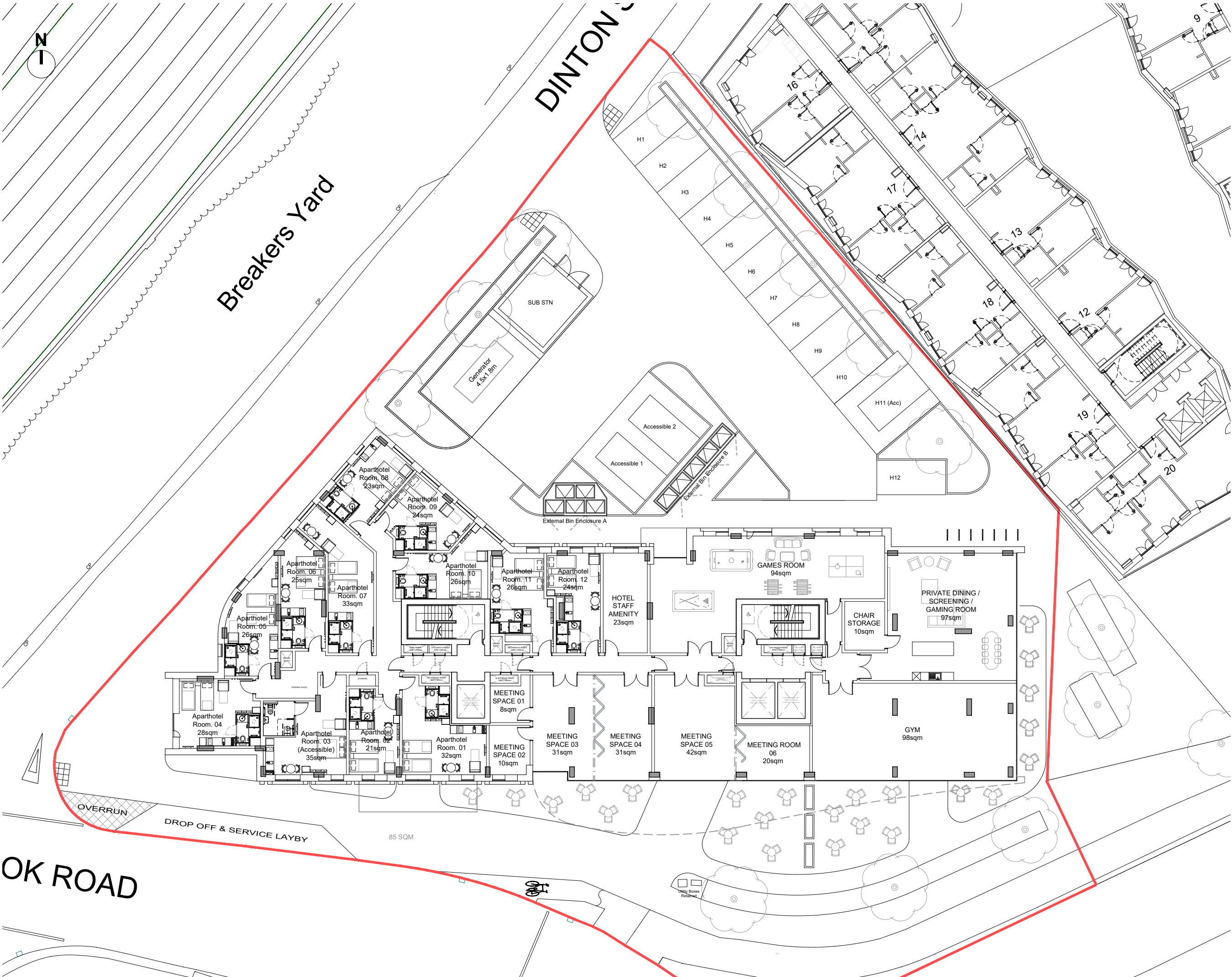
P09	GENERATOR & SUBSTATION POSITIONS AMENDED. PARKING ADJUSTED.	JDC	C/JG	19.01.24
P08	BOUNDARY FENCE ADDED TO PARKING AREA.	JDC	C/JG	17.01.24
P07	COMMERCIAL UNIT ADDED & ENTRANCE LOBBIES/ BOH RECONFIGURED.	JDC	C/JG	09.01.24
P06	RED LINE UPDATED. ISSUED FOR PLANNING.	JDC	C/JG	19.12.23
P05	BREAKERS YARD SHOWN AS EXISTING.	JDC	C/JG	13.12.23
P04	CYCLES & BOH LAYOUT AMENDED. EXTERNAL & FFL LEVELS ADDED.	JDC	C/JG	05.12.23
P03	UPDATED STRUCTURE & LAYOUT.	EB	C/JG	10.11.23
P02	CYCLE STORE AMENDMENT.	EB	C/JG	02.11.23
P01	FIRST ISSUED.	EB	C/JG	26.10.23
REV	description	drawn	check	date

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CLIENT	FORSHAW GROUP
PROJECT	CORNBROOK RESIDENTIAL
DOCUMENT NAME	8353-LRW-ZZ-00-DR-A-00-178
DESCRIPTION	PROPOSED GROUND FLOOR PLAN
REVISION	P09
SCALE	1:250@ A3
LRW PROJECT No.	8353
DATE CREATED	26.10.23
CREATED BY	EB
AUTHORISED BY	DL



GENERAL NOTES:

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P07	ADDITIONAL APARTHOTEL UNITS ADDED	JDC	C/J	09.01.24
P06	RED LINE UPDATED. ISSUED FOR PLANNING	JDC	C/J	19.12.23
P05	SMOKE SHAFT ADDED TO CORE.	JDC	C/J	05.12.23
P04	UPDATED AMENITY SPACES	AW	C/J	24.11.23
P03	UPDATED STRUCTURE & LAYOUT	EB	C/J	10.11.23
P02	CYCLE STORE AMENDMENT	EB	C/J	02.11.23
P01	FIRST ISSUED	EB	C/J	26.10.23
REV	description	drawn	auth	date

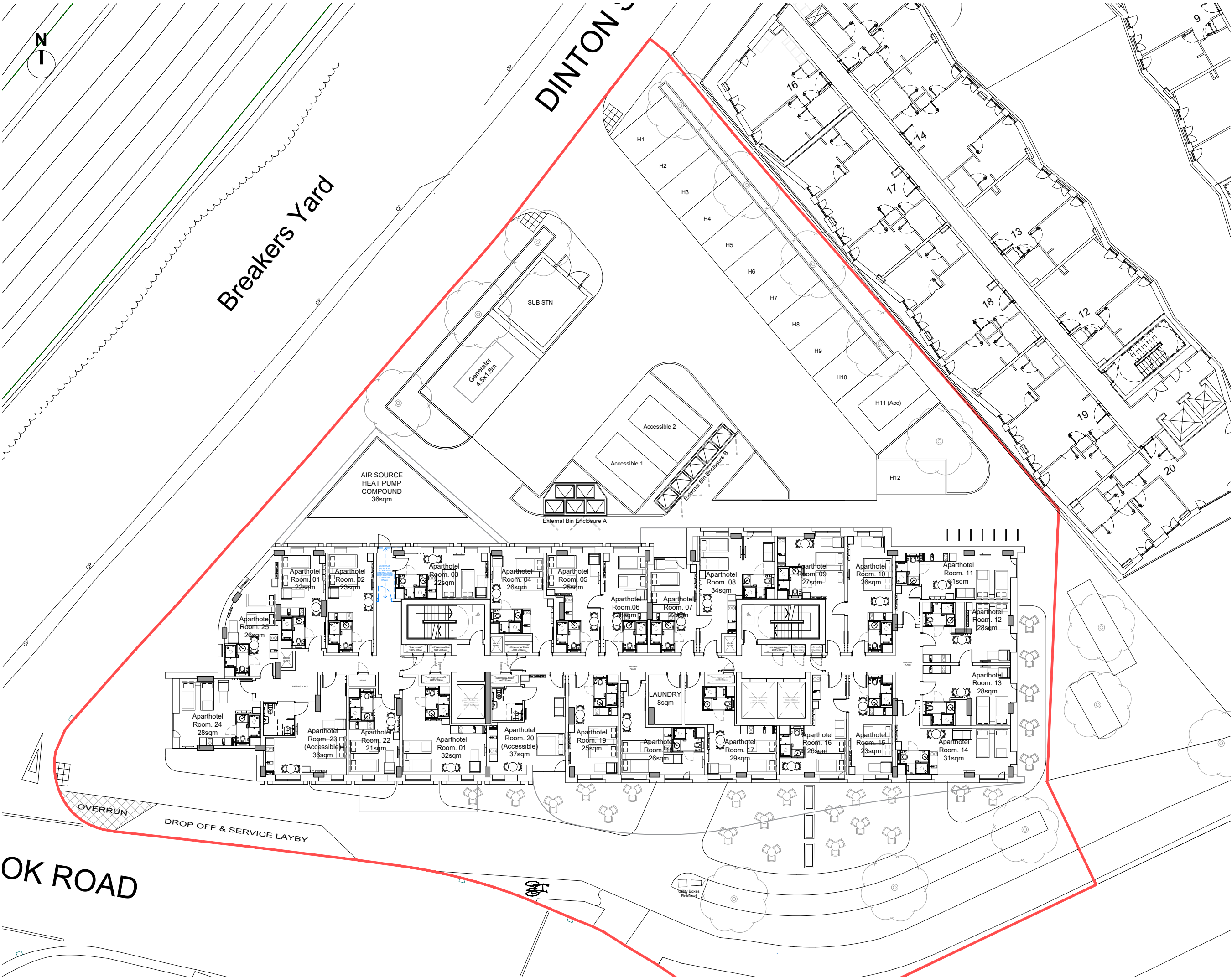
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client	FORSHAW GROUP
project	CORNBROOK RESIDENTIAL
document name	8353-LRW-ZZ-01-DR-A-00-179
LRW project no	8353
rev	P07
description	PROPOSED FIRST FLOOR PLAN OPTION 2
scale	1:250 @ A3
date drawn	26.10.23
drawn by	EB
authorised by	DL
purpose of issue	planning ☐ building regs ☐ tender ☐ comment ☒ approval ☐ construction ☐



GENERAL NOTES:

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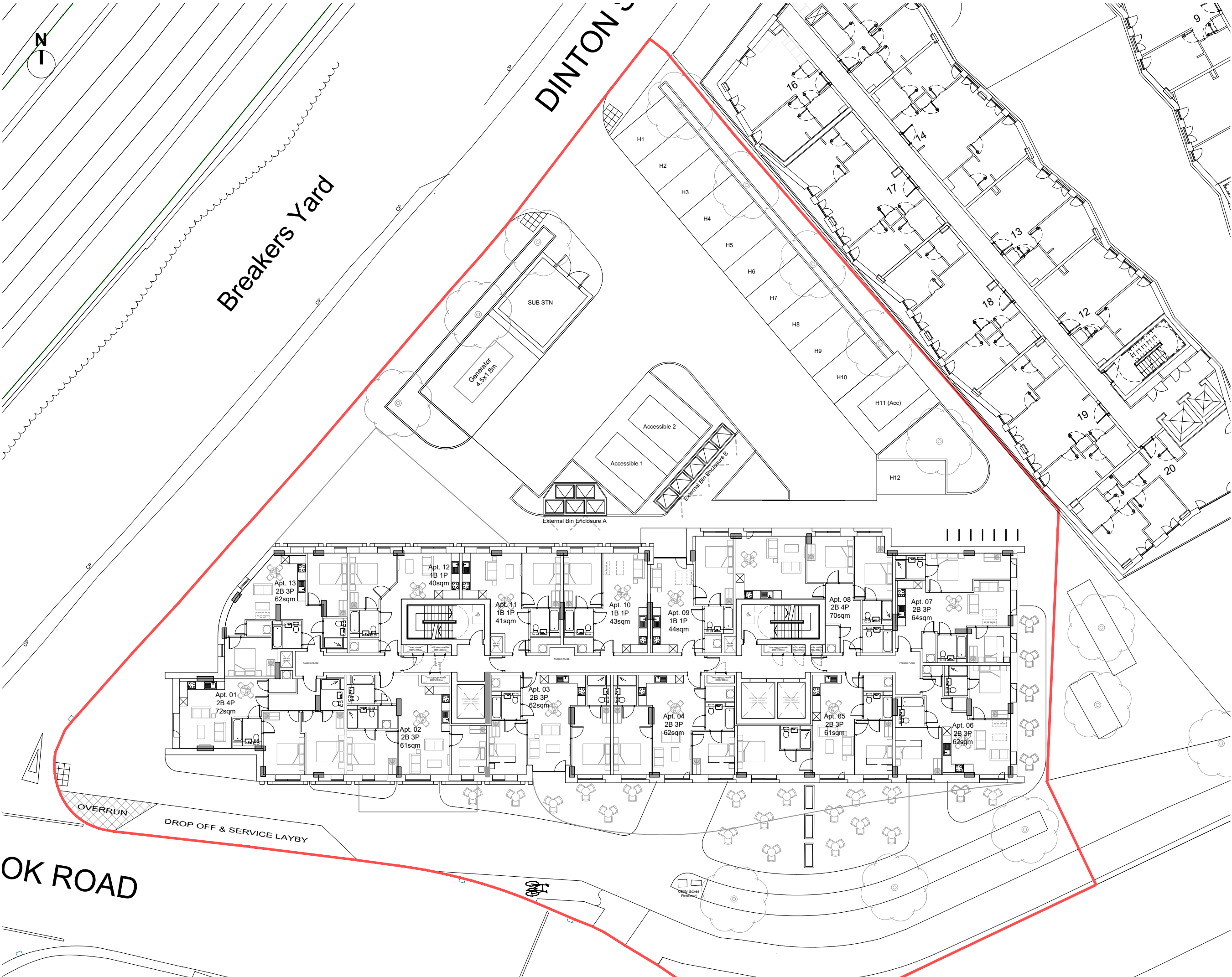
P08	RED LINE UPDATED. ISSUED FOR PLANNING	JDC	CJG	19.12.23
P07	SMOKE SHAFT OMITTED	JDC	CJG	08.12.23
P06	SVP APARTMENT STACKING ADDED	AW	CJG	24.11.23
P05	UPDATED STRUCTURE & LAYOUT	EB	CJG	10.11.23
P04	FURNITURE OMITTED	EB	CJG	02.11.23
P03	FURNITURE OMITTED	EB	CJG	02.11.23
P02	UPDATED LAYOUT	EB	CJG	02.11.23
P01	FIRST ISSUE	EB	CJG	26.10.23
REV	description	drawn	auth	date

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client	FORSHAW GROUP
project	CORNBROOK RESIDENTIAL
document name	8353-LRW-ZZ-DR-A-00-180
LRW project no	8353
rev	P08
description	PROPOSED 2ND TO 5TH FLOOR PLAN OPTION 2
scale	1:250@ A3
date drawn	26.10.23
drawn by	EB
authorised by	DL
purpose of issue	planning building regs tender comment approval construction



GENERAL NOTES:

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P05	RED LINE UPDATED. ISSUED FOR PLANNING	JDC	C/JG	19.12.23
P04	SMOKE SHAFT OMITTED	JDC	C/JG	08.12.23
P03	UPDATED STRUCTURE & LAYOUT	EB	C/JG	10.11.23
P02	UPDATED LAYOUT	EB	C/JG	02.11.23
P01	FIRST ISSUED	EB	C/JG	26.09.23
REV	description	drawn	auth	date

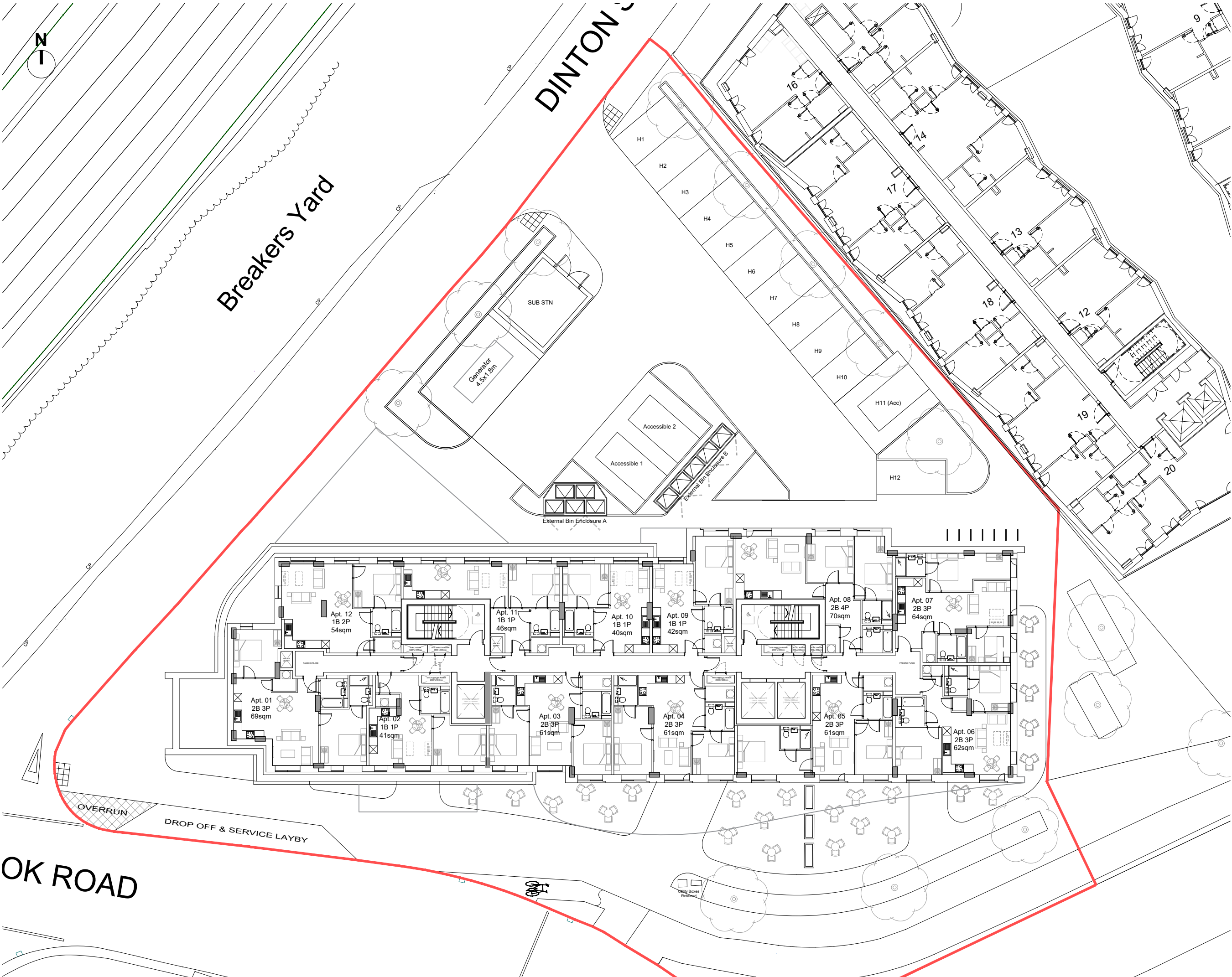
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client	FORSHAW GROUP		
project	CORNBROOK RESIDENTIAL		
document name	8353-LRW-ZZ-DR-A-00-181		
LRW project no	8353	rev	P05
description - PROPOSED 6TH TO 19TH FLOOR PLAN OPTION 2			
scale	1:250@ A3	date drawn	26.10.23
drawn by	EB	authorised by	C/JG
purpose of issue			
planning ☒ building regs ☐ tender ☐ comment ☐ approval ☐ construction ☐			



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ALL WORKS ARE TO COMPLY WITH CURRENT HEALTH AND SAFETY LEGISLATION, H.S.E. RECOMMENDATIONS/GUIDANCE AND THE CURRENT C.D.M. REGULATIONS.

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH LEACH RHODES WALKER ARCHITECTS GENERAL ARRANGEMENT (L CODE) DRAWINGS, TOGETHER WITH RELEVANT DETAILED (A CODE) DRAWINGS AND SPECIFICATIONS.

FOR ALL STRUCTURAL WORKS REFER TO THE STRUCTURAL ENGINEERS INFORMATION.

FOR ALL MECHANICAL AND ELECTRICAL WORKS REFER TO THE MECHANICAL AND ELECTRICAL ENGINEERS INFORMATION.

FOR ALL ABOVE GROUND DRAINAGE WORKS REFER TO THE PUBLIC HEALTH ENGINEERS INFORMATION.

ALL PRODUCTS SPECIFIED ARE TO BE INSTALLED STRICTLY IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS, SPECIFICATION AND DETAILS.

P05	RED LINE UPDATED. ISSUED FOR PLANNING	JDC	C/JG	19.12.23
P04	SMOKE SHAFT OMITTED	JDC	C/JG	08.12.23
P03	UPDATED STRUCTURE & LAYOUT	EB	C/JG	10.11.23
P02	UPDATED LAYOUT	EB	C/JG	02.11.23
P01	FIRST ISSUE	EB	C/JG	26.10.23
REV	description	drawn	with	date

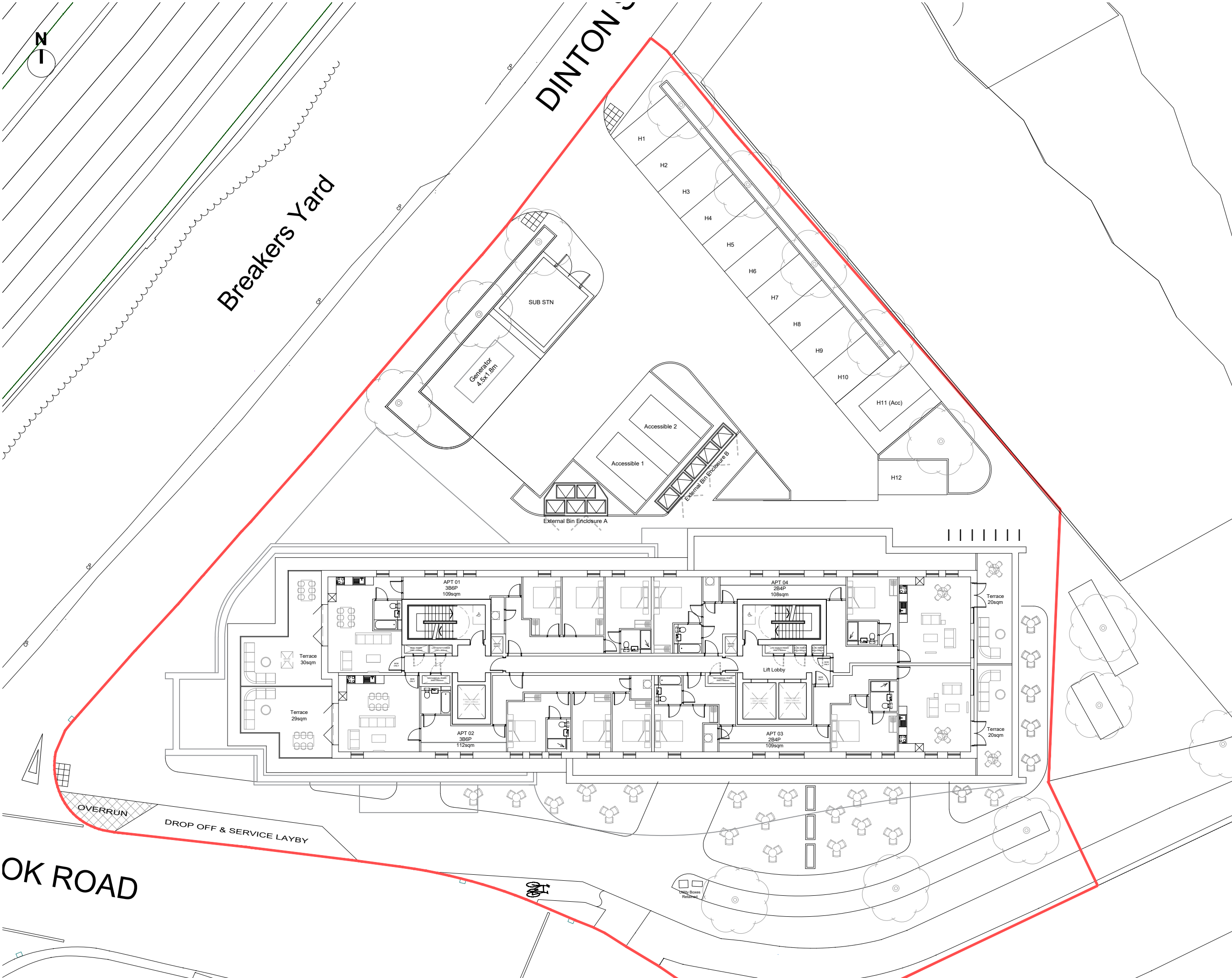
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client	FORSHAW GROUP
project	CORNBROOK RESIDENTIAL
document name	8353-LRW-ZZ-DR-A-00-182
LRW project no	8353
rev	P05
description	PROPOSED 20TH - 21ST FLOOR PLAN OPTION 2
scale	1:250@ A3
date drawn	26.10.23
drawn by	EB
authorised by	DL
purpose of issue	planning ● building regs ○ tender ○ comment ○ approval ○ construction ○



GENERAL NOTES:

ALL DIMENSIONS ARE TO BE CHECKED ON SITE WITH ANY DISCREPANCIES REPORTED TO THE ARCHITECT PRIOR TO THE WORKS BEING CARRIED OUT.

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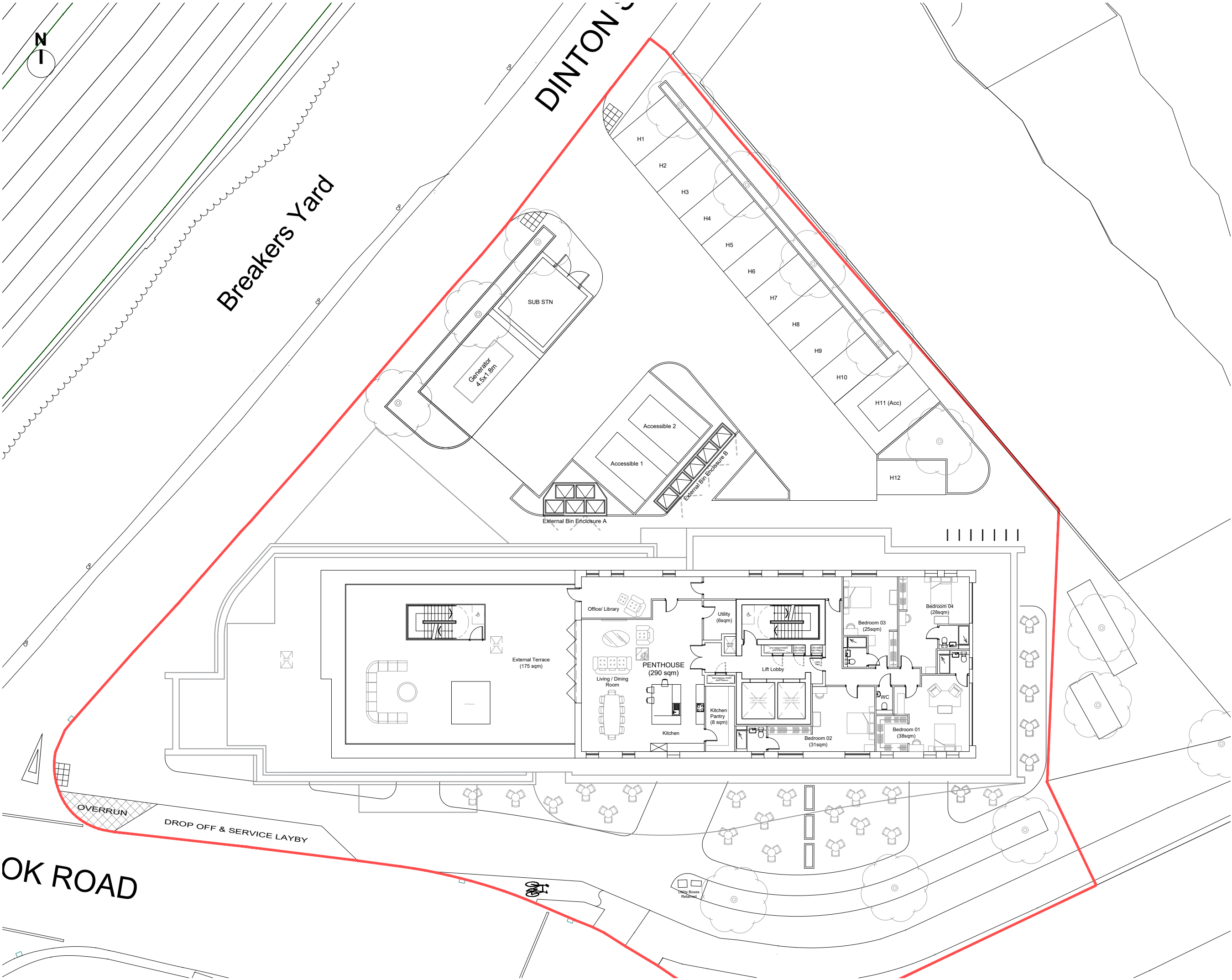
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P04	SMOKE SHAFT OMITTED	JDC	C/JG	08.12.23
P03	UPDATED STRUCTURE & LAYOUT	EB	C/JG	10.11.23
P02	UPDATED LAYOUT	EB	C/JG	02.11.23
P01	FIRST ISSUE	EB	C/JG	26.10.23
REV	description	drawn	with	date

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client	FORSHAW GROUP
project	CORNBROOK RESIDENTIAL
document name	8353-LRW-ZZ-22-DR-A-00-183
LRW project no	8353
rev	P05
description	PROPOSED 22ND FLOOR PLAN OPTION 2
scale	1:250@ A3
date drawn	26.10.23
drawn by	EB
authorised by	DL
purpose of issue	planning building regs tender comment approval construction



GENERAL NOTES:

ALL DIMENSIONS ARE TO BE CHECKED ON SITE WITH ANY DISCREPANCIES REPORTED TO THE ARCHITECT PRIOR TO THE WORKS BEING CARRIED OUT.

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P04	SMOKE SHAFT OMITTED	JDC	CJG	08.12.23
P03	UPDATED STRUCTURE & LAYOUT	EB	CJG	10.11.23
P02	UPDATED LAYOUT	EB	CJG	02.11.23
P01	FIRST ISSUE	EB	CJG	26.10.23
rev	description	drawn	auth	date

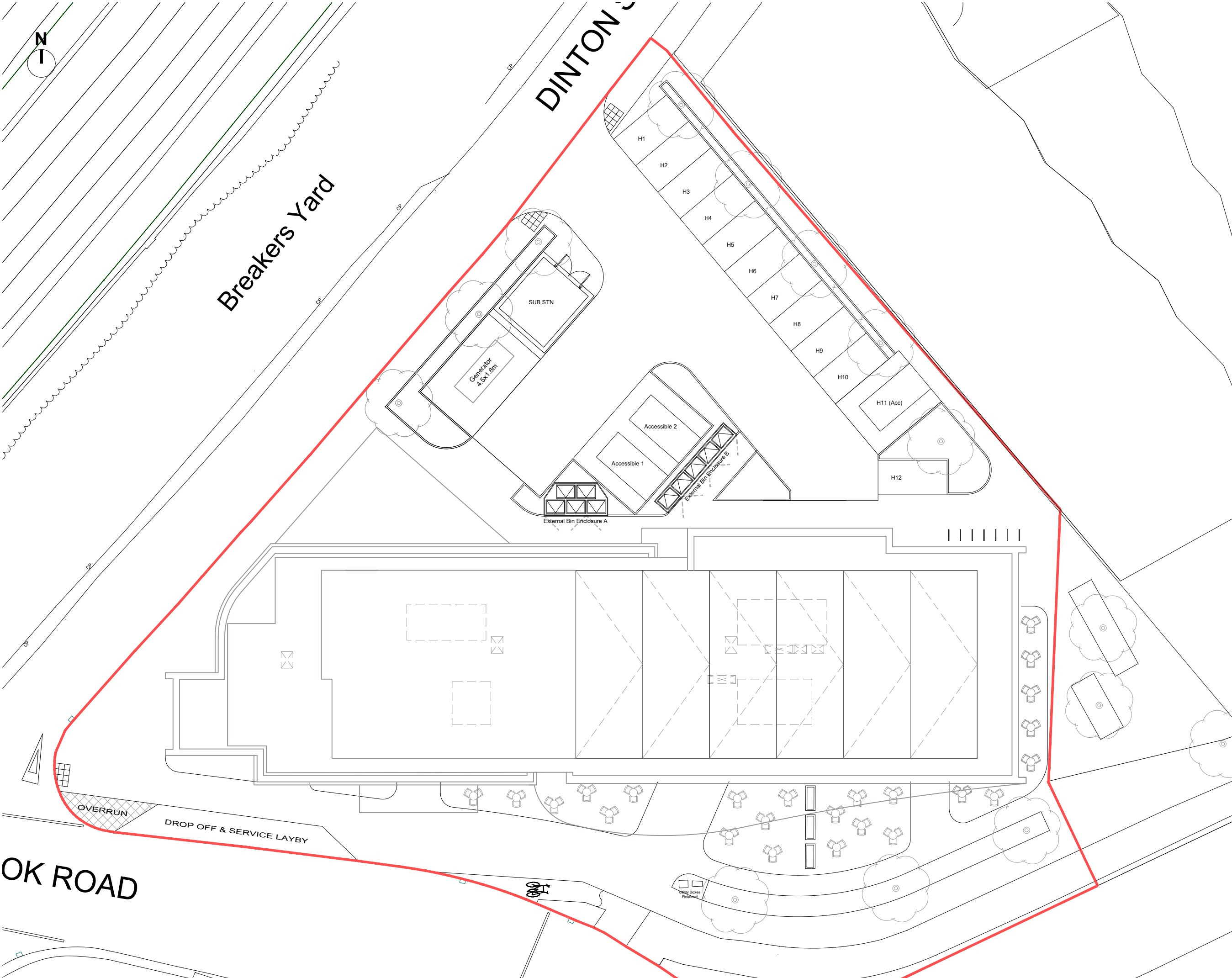
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client	FORSHAW GROUP		
project	CORNBROOK RESIDENTIAL		
document name	8353-LRW-ZZ-23-DR-A-00-184		
LRW project no	8353	rev	P05
description	PROPOSED 23RD FLOOR PLAN OPTION 2		
scale	1:250@ A3	date drawn	26.10.23
		drawn by	EB
		authorised by	DL
purpose of issue			
planning ☒ building regs ☐ tender ☐ comment ☐ approval ☐ construction ☐			



GENERAL NOTES:

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P04	RED LINE UPDATED. ISSUED FOR PLANNING	JDC	CJG	10.12.23
P03	SMOKE SHAFT OMITTED	JDC	CJG	08.12.23
P02	UPDATED STRUCTURE & LAYOUT	EB	CJG	10.11.23
P01	FIRST ISSUE	EB	CJG	02.11.23
REV	description	drawn	with	date

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client	FORSHAW GROUP		
project	CORNBROOK RESIDENTIAL		
document name	8353-LRW-ZZ-RF-DR-A-00-185		
LRW project no	8353	rev	P04
description -			
PROPOSED ROOF PLAN OPTION 2			
scale	1:250@ A3	date drawn	30.10.23
		drawn by	EB
		authorised by	DL
purpose of issue			
planning	building regs	tender	comment
approval	construction		

APPENDIX E
EXISTING DRAINED AREAS PLAN



NOTES:

1. THIS DRAWING IS INTENDED TO INDICATE THE EXISTING DRAINED AREAS FROM THE CORNBROOK SITE. IT IS BASED UPON A REVIEW OF THE TOPOGRAPHICAL SURVEY AND AERIAL IMAGES OF THE SITE.

KEY

PLANNING BOUNDARY

SITE BOUNDARY
TOTAL AREA: 2254 m² (0.23 ha)

SOFT LANDSCAPED AREAS
AREA: 969.34 m² (0.097 ha)

HARD PAVED AREAS
AREA: 1287.51 m² (0.130ha)

P02	UPDATED FOR LATEST ARCHITECT PLANS	19.01.24	JB	PC
P01	FIRST ISSUE	15.12.23	SA	PC
Rev:	Description:	Date:	By:	Chkd:



renaissance

Renaissance Associates Ltd
Carvers Warehouse
77 Dale Street
Manchester
M1 2HG

Project:

**CORNBROOK RESIDENTIAL,
MANCHESTER**

Drawing Title:

**EXISTING DRAINED AREAS
PLAN**

Status:

PLANNING

Size:	Date:	Drawn by:	Designed by:	Checked by:
A1	DEC 23	SA	SA	PC
Scale:	1:125	Project No:	2306-18	

Project	Originator	Volume	Level	Type	Role	Number	Revision
CBR-REN-00-FN-DR-C-00050							P02

APPENDIX F

GREENFIELD RUN-OFF RATES

Renaissance Assoc.		Page 1
Carvers Warehouse 77 Dale Street Manchester M1 2HG	Cornbrook Greenfield Run -Off	
Date 15/12/2023 10:36 File	Designed by JB Checked by PC	
Innovyze		Source Control 2020.1.3
<p align="center"><u>ICP SUDS Mean Annual Flood</u></p> <p align="center">Input</p> <p> Return Period (years) 2 SAAR (mm) 872 Urban 0.750 Area (ha) 0.225 Soil 0.450 Region Number Region 10 </p> <p align="center">Results 1/s</p> <p> QBAR Rural 1.3 QBAR Urban 3.2 </p> <p align="center">Q2 years 3.3</p> <p align="center"> Q1 year 2.8 Q30 years 4.6 Q100 years 5.0 </p>		
©1982-2020 Innovyze		

APPENDIX G
UNITED UTILITIES CORRESPONDENCE

From: seweradoptions@uuplc.co.uk
Sent: 06 October 2023 13:36
To: Henry Wilkinson
Subject: RE: PDE CA28. Cornbrook Residential - 04740820

Good afternoon Henry

Pre Development Enquiry for: Cornbrook Road, M15 4YG UU Reference Number : 04740820

We have carried out an assessment of your application which is based on the information provided. This pre-development advice on your drainage strategy will be valid for 12 months. Your drainage strategy will need to be reviewed by other competent authorities as part of the planning process, and we advise that you carry out the necessary site investigations to confirm the viability of your proposals.

If your investigations require access to our public sewer network, we ask that you contact our network engineers with a request for an access certificate via our main contact telephone number 0345 6723 723 or refer to the link below:

<https://www.unitedutilities.com/builders-developers/working-near-our-assets/>

Foul Water

Foul flow from this site will be allowed to drain into the public foul water/combined sewer system.

Our preferred point of discharge would be to the 300 x 400mm diameter public combined sewer within Dinton Street located to the south of your proposed development at an unrestricted rate.

In accordance with our infrastructure plans we may ask you to change your point of connection. Therefore please contact us when you are ready to formalise your drainage proposals, we would suggest before you submit for Full Planning.

Please be advised both proposed points of discharge are combined sewers, UU would not object to the same sewer being used for both connection points

Surface Water

All surface water flow from the proposed development should drain in-line with the drainage hierarchy, as outlined in Paragraph 80, (Reference ID: 7-080-20150323), of the National Planning Practice Guidance. We also recommend you prioritise the use of multi-functional sustainable drainage systems for the management of surface water in accordance with national planning policy.

Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.

This is outlined as follows, in order of priority:

- 1. into the ground (infiltration);**
- 2. to a surface waterbody;**
- 3. to a surface water sewer or highway drain;**
- 4. to a combined sewer.**

For guidance, The [North West SuDS Pro-Forma](#) provides information on the appropriate evidence required at each stage of the hierarchy, to demonstrate how each level has been discounted.

The Lead Local Flood Authority has responsibility for all surface water drainage concerns and their input to your proposal is critical. You should also consider whether it is necessary to discuss your proposal with the Environment Agency, or Internal Drainage Board (if operating in your area).

The Local Planning Authority are the determining authority for any application for planning permission and the appropriate authority for determining cost viability of a proposed drainage scheme, such assessments are outside of the jurisdiction of United Utilities.

Infiltration

Surface water runoff generated from this development should discharge to the ground via infiltration system where feasible.

A detailed evidence based feasibility assessment must be carried out in line with Chapter 25 of the CIRIA SuDS Manual 2015 to determine whether infiltration is a suitable method of surface water disposal.

Particular attention must be paid to Ground Water Source Protection Zones to ensure that the risk of pollution to these valuable resources is not compromised. Details can be obtained from the government website:

<https://www.gov.uk/guidance/groundwater-source-protection-zones-spzs#find-groundwater-spzs>

If your site is in a Groundwater Source Protection Zone, you should have regard to the Environment Agency's approach to Groundwater Protection. Information on this is available via the link below:

<https://www.gov.uk/government/publications/groundwater-protection-position-statements>

Please note that such a location could have implications for the principle of your development and the need for additional mitigating measures to protect the groundwater environment and public water supply in the detailed design of your site.

Highway Drainage

If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you investigate the possibility of draining surface water to the highway drain where this ultimately discharges to a watercourse, by contacting the relevant Highway Authority.

Public Sewer

In accordance with the hierarchy of drainage options within the National Planning Practice Guidance, both discharge to ground via infiltration and discharge to a waterbody should be discounted prior to consideration of discharging surface water to the public sewer system. Evidence should be provided to demonstrate how these have been discounted, as outlined in the North West SuDS pro-forma.

Once evidence is provided as outlined above, United Utilities will consider a connection to the 375 x 510mm diameter public combined sewer within Dinton Street located to the north of your proposed development at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities request that any agreed rate does not exceed 5 l/s.

As a Water Company, we have no obligation to accept highway drainage into our public sewer network. However, should your proposals include runoff from highways, we would request that consideration is given to SuDS components that deliver source control are incorporated within the design of the scheme to reduce the volume and frequency of discharges of these flows to the public sewer.

Please be advised both proposed points of discharge are combined sewers, UU would not object to the same sewer being used for both connection points

Levels

For low-lying sites, (where the ground level of the site or the level of a basement is below the ground level at the point where the drainage connects to the public sewer), care should be taken to ensure that the property is not at increased risk of flooding. If these circumstances exist, we recommend that you contact us to discuss further. It could affect the detailed design of your site and result in the need to incorporate appropriate mitigating measures in your drainage scheme.

Land drainage / Overland flows / track drainage

United Utilities have no obligation, and furthermore we do not accept land drainage, overland flows or track drainage into the public sewerage network under any circumstances

Existing Wastewater Assets Crossing the Site

We have reviewed our records and can confirm that there does not appear to be any charted public sewers located within the boundary of proposed development. However, due to the accuracy of the records and the public sewer transfer legislation in 2011, not all public sewers are shown on our records so we would ask that you proceed with caution and carry out your own site investigation works. If any uncharted sewers are identified while carrying out your works we would ask that you contact United Utilities at the earliest opportunity so that we can offer guidance and update our records

Existing Water Assets Crossing the Site

It is the developer responsibility to identify utilities on-site. Where clean water assets are shown on our records, we recommend that you contact our Water Pre-Development Team, via the following email address:

DeveloperServicesWater@uuplc.co.uk. Further information for this service can be found on our website via the link below:

<https://www.unitedutilities.com/builders-developers/larger-developments/pre-development/water-pre-dev/>

Connection Application

Although we may discuss and agree discharge points and rates in principle, please be aware that you will have to apply for a formal sewer connection. This is so that we can assess the method of construction, Health & Safety requirements and to ultimately inspect the connection when it is made. Details of the application process and the form itself can be obtained from our website by following the link below:

<https://www.unitedutilities.com/builders-developers/wastewater-services/sewer-connections/sewer-connection/>

We recommend that the detailed design should confirm the locations of all utilities in the area and ensure that any proposed drainage solution considers routing and clash checks where required.

If we can be of any further assistance please don't hesitate to contact us further.

Kind Regards



Lewis Barr

Assistant Developer Engineer
Developer Services & Metering
Customer Services
07827286541
unitedutilities.com

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----- Original Message -----

From: seweradoptions@uuplc.co.uk [seweradoptions@uuplc.co.uk]

Sent: 06/10/2023 09:24

To: henrywilkinson@renaissance-ltd.com

Subject: PDE CA28. Cornbrook Residential - 04740820

Good Morning,

PRE DEVELOPMENT APPLICATION AT Cornbrook Residential: – UU Ref 04740820

Please accept this email as receipt of your application received on 05/10/2023 for the above development. This has now been logged on our system and the job reference is 04740820 we would ask that you quote this reference in all future correspondence.

I have reviewed your application (and attachments) and can confirm this is suitable to be passed to Ashleigh for technical assessment. You will receive their response within 8 working days.

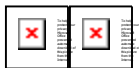
Kind regards,



Katie Houghton

Customer Advisor Advanced
Developer Services & Metering
Customer Services

Tel: 0345 072 6067 (option 4)
unitedutilities.com

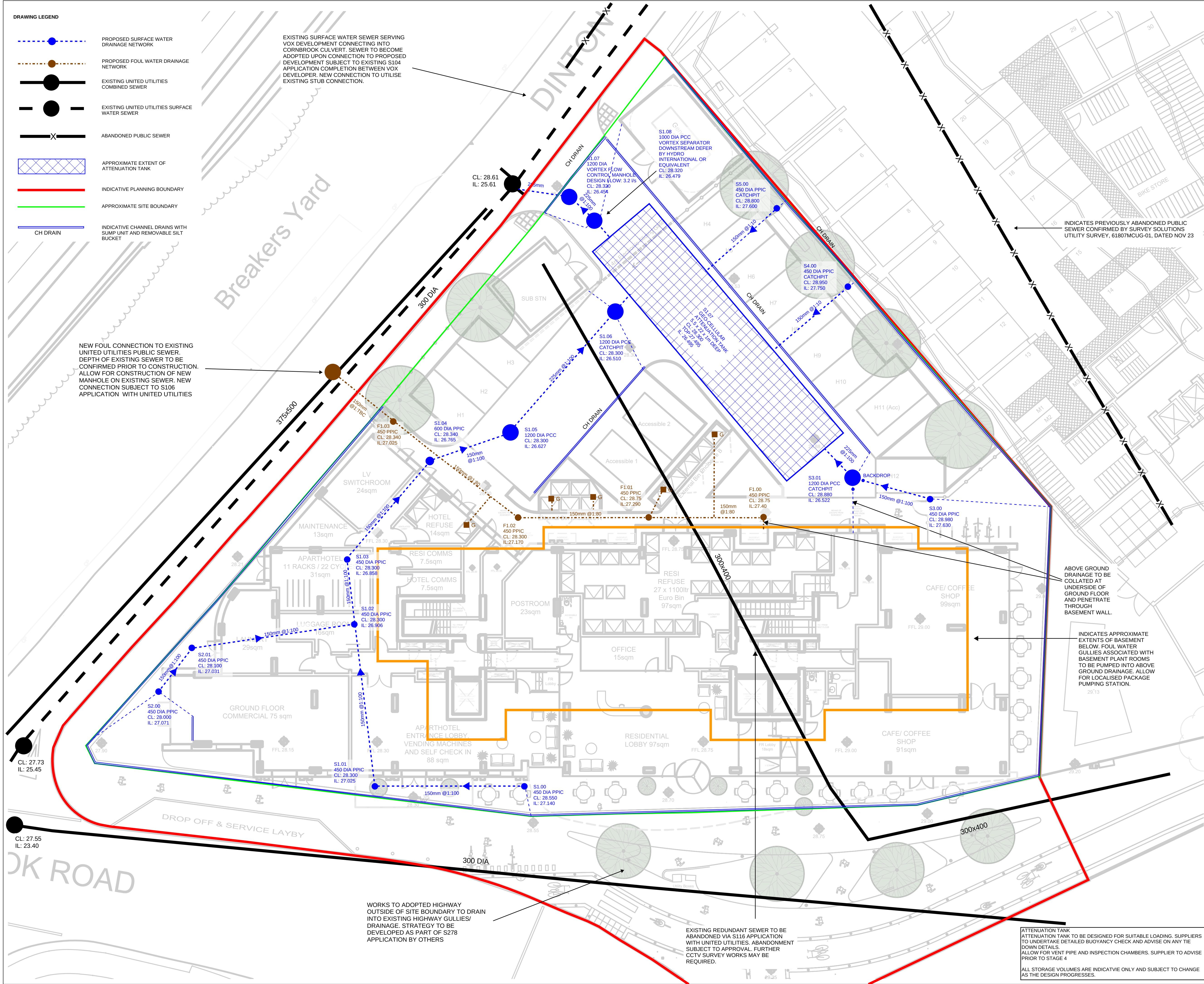


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Business Park, Lingley Green Avenue, Great Sankey,
Warrington, WA5 3LP
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www.unitedutilities.com/subsidiaries

APPENDIX H BELOW GROUND DRAINAGE PLAN



- NOTES:
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RENAISSANCE, ARCHITECTS, LANDSCAPE ARCHITECTS AND BUILDING SERVICES ENGINEERS DRAWINGS.
 - FOR ALL ABOVE GROUND DRAINAGE REFER TO BUILDING SERVICES AND ARCHITECT'S DRAWINGS
 - ALL BELOW GROUND DRAINAGE WORKS TO BE IN ACCORDANCE WITH RELEVANT BUILDING REGULATIONS AND SEWER SECTOR GUIDANCE APPENDIX C- DESIGN AND CONSTRUCTION GUIDANCE. IF DISCREPANCIES ARE NOTED BETWEEN SSS AND DRAWINGS THESE SHOULD BE BROUGHT TO THE ATTENTION OF RENAISSANCE FOR REVIEW.
 - RWPs, SVPS, SSS AND FLOOR GULLEYS ARE TO HAVE RODDABLE ACCESS POINTS ABOVE GROUND FLOOR TO BUILDING SERVICES DETAILS. ALL FLOOR GULLEYS AND RWPS ARE TO BE TRAPPED.
 - ALL GULLY AND CHANNEL DRAIN LOCATIONS INDICATIVE REFER TO ARCHITECT AND LANDSCAPE ARCHITECT DRAWINGS FOR SETTING OUT AND SPECIFICATION.
 - THE ATTENUATION TANK AND FLOW CONTROL ARE TO BE TO SUPPLIERS DESIGN AND DETAILS. INSTALLATION IS TO BE IN ACCORDANCE WITH THE SUPPLIERS REQUIREMENTS.
 - SEWERS TO BE LAID IN CLASS S BEDDING (150mm GRANULAR BED AND SURROUND), WHERE DEPTH OF COVER TO TOP OF THE SEWER IS LESS THAN: 1.2m IN HIGHWAYS OR VERGES, OR LESS THAN 0.9m IN PEDESTRIAN AREAS, THEN A 150mm CONCRETE SLAB SHOULD BE PROVIDED ABOVE THE GRANULAR BED AND SURROUND. REFER TO DETAILS SHEETS.
 - THE CONTRACTOR IS TO UNDERTAKE A FULL CCTV SURVEY AT COMPLETION OF THE WORKS TO DEMONSTRATE THAT THE DRAINAGE IS CLEAN. ANY DEFECTS ARE TO BE CORRECTED BY THE CONTRACTOR PRIOR TO HANDOVER OF THE SYSTEM TO THE CLIENT.
 - THE CONTRACTOR IS TO KEEP A RECORD SET OF THE AS INSTALLED DRAINAGE ON SITE AND PROVIDE THIS TO RENAISSANCE UPON COMPLETION OF THE WORKS TO ALLOW FOR PRODUCTION OF A 'FINAL CONSTRUCTION' ISSUE DRAWING.
 - DURING THE WORKS ALTERATIONS TO THE DRAINAGE LAYOUT ARE TO BE MARKED UP BY THE CONTRACTOR AND AGREED WITH RENAISSANCE IN WRITING.
 - THE CHAMBER SIZE OF PCC MANHOLES WITH MORE THAN ONE CONNECTION IN THEM MAY NEED TO BE INCREASED AN INCREMENT TO ACCOMMODATE THE CONNECTIONS AND BENDS.
 - MANHOLE COVERS ARE TO BE ACCORDANCE WITH BS EN 124 FOR THE RATING INDICATED IN THE MANHOLE SCHEDULE. THE CONTRACTOR IS TO SUBMIT DETAILS FOR THE PROPOSED MANHOLE COVERS TO THE ENGINEER AND LANDSCAPE ARCHITECT FOR REVIEW PRIOR TO INSTALLATION.
 - COVER SLABS MUST CARRY THE BSI KITEMARK. WHERE THE CLEAR OPENING OF THE KITEMARKED PRODUCT IS DIFFERENT TO THAT OF THE COVER AND FRAME, A LOAD BEARING REDUCING SLAB SHOULD BE FITTED ABOVE THE COVER SLAB TO BRING THE SIZE DOWN TO REQUIRED SIZE.
 - MINIMUM COVER TO DRAINAGE CROWN LEVEL:
LANDSCAPED AREAS- 0.35m
TRAFFICKED AREAS- 0.90m
ADOPTED HIGHWAYS- 1.20m
 - ALL SEWERS TO BE BSI KITEMARK (CERTIFIED TO WIS 4-35-01)
 - ALL CONCRETE PIPES TO BE TO ES EN 1916 CLASS 120 (54kN/m).
 - BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENTS OF THE WATER INDUSTRY SPECIFICATION 4-08092 (TABLE A2).
 - IF PLASTIC PIPES ARE TO BE USED THEN THE FOLLOWING MUST APPLY:
A. BSI KITEMARK (CERTIFIED TO BS EN 13476-1 AND WIS 4-35-01)
B. PIPES LESS THAN OR EQUAL TO 500mm DIA.
C. BEDDING AND BACKFILL MATERIAL TO CONFORM TO THE REQUIREMENTS OF THE WATER INDUSTRY SPECIFICATION 4-08092 (TABLE A2)
 - THE MINIMUM CRUSHING STRENGTH FOR CLAY PIPES SHOULD BE AS FOLLOWS: 100mm DIA. 40kN/m, 150mm DIA. 40kN/m, 225mm DIA. 45kN/m AND 300mm DIA. 72kN/m.
 - THE MINIMUM CRUSHING STRENGTH FOR CONCRETE PIPES SHOULD BE - (CLASS 120 TO EN 1916/BS5911-1: 2002). PLASTIC PIPES SHOULD CONFORM TO WIS 4-35-01 AND BS EN13476.
 - SULPHATE RESISTANT CEMENT (C20-DC2) AND PRECAST CONCRETE PRODUCTS MUST BE USED OR A LABORATORY REPORT PROVIDED PROVING THAT SUCH PRECAUTIONS ARE NOT NECESSARY.
20. SEWER PIPES TO BE LAID IN MAXIMUM 3 METER LENGTHS UNLESS THERE IS A SPECIFIC OPERATIONAL NEED TO LAY LONGER PIPES, AND

DISCHARGE RATES & SEWER CONNECTIONS
ALL PROPOSED DISCHARGE RATES ARE SUBJECT TO APPROVAL BY THE LEAD LOCAL FLOOD AUTHORITY AND UNITED UTILITIES. ALL CONNECTIONS TO EXISTING PUBLIC SEWERS ARE SUBJECT TO APPROVAL BY UNITED UTILITIES VIA A S106 APPLICATION.

RIBA STAGE 2
THIS DRAWING INTENDS TO COMMUNICATE THE CONCEPT DESIGN FOR THE BELOW GROUND DRAINAGE NETWORK FOR THE PROPOSED BUILDING AND IS APPROPRIATE FOR RIBA STAGE 2 (CONCEPT DESIGN). ALL SIZES ARE INDICATIVE ONLY AND ARE TO ASSIST WITH HIGH LEVEL COSTING BY THE PROJECT QUANTITY SURVEYOR AND CONTRACTOR. ALL LAYOUT AND CONNECTION PRINCIPLES ARE INDICATIVE AND ARE SUBJECT TO CHANGE THROUGH RIBA STAGE 3 (SPATIAL CO-ORDINATION) AND STAGE 4 (TECHNICAL DESIGN) FOLLOWING INPUT AND FEEDBACK FROM THE RELEVANT AUTHORITIES.
A DESIGN CONTINGENCY OF 15-20% IS RECOMMENDED TO ALLOW FOR DESIGN DEVELOPMENT DURING RIBA STAGE 2, 3 AND STAGE 4 (TECHNICAL DESIGN) AND TO REFLECT INPUT FROM CONTRACTOR DESIGNED PACKAGES.

P03	UPDATED TO SUIT LATEST ARCHITECT PLANS	26.01.24	JB	PC
P02	UPDATED TO SUIT LATEST ARCHITECT PLANS	19.01.24	JB	PC
P01	FIRST ISSUE	15.12.23	SA	PC
Rev:	Description:	Date:	By:	Chkd:

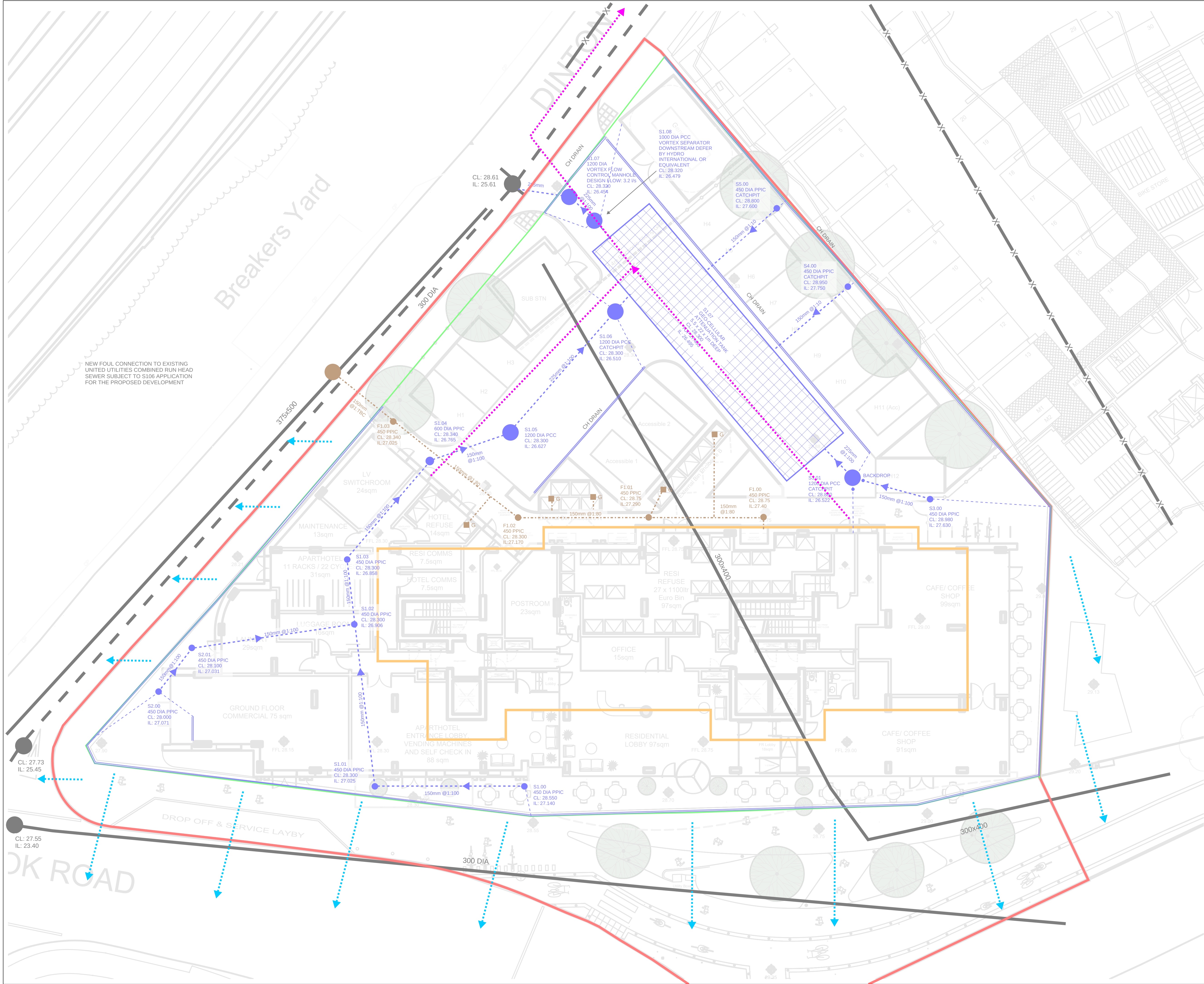


Project: CORNBROOK RESIDENTIAL, MANCHESTER

Drawing Title: **BELOW GROUND DRAINAGE GENERAL ARRANGEMENT**

Status: **PLANNING**

BELOW GROUND DRAINAGE GENERAL ARRANGEMENT							
Status:							
PLANNING							
Size:	Date:		Drawn by:	Designed by:	Checked by:		
A1	DEC 23		SA	SA	PC		
Scale:	1:125		Project No:		2306-18		
Project	Originator	Volume	Level	Type	Role	Number:	Revision:



- NOTES:
1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RENAISSANCE, ARCHITECTS, LANDSCAPE ARCHITECTS AND BUILDING SERVICES ENGINEERS DRAWINGS.
 2. THE DRAINAGE SYSTEM HAS BEEN DESIGNED TO ACCOMMODATE RAINFALL EVENTS UPTO 1 IN 100 YEAR + 45% CLIMATE CHANGE AND AS SUCH THIS DRAWING INDICATES THE OVERLAND FLOW ROUTES FOR AN EXCEEDANCE EVENT OF THE DRAINAGE SYSTEM.
 3. THE DRAWING ALSO INDICATES THE SAFE EGRESS ROUTE OFF SITE IN AN EXCEEDANCE EVENT

- DRAWING LEGEND
- SITE BOUNDARY
 - PLANNING BOUNDARY
 - EXCEEDANCE FLOOD FLOW ROUTES
 - SAFE EGRESS ROUTES

P01	ISSUED FOR PLANNING	26.01.24	SA	PC			
Rev:	Description:	Date:	By:	Chkd:			
		<div>Renaissance Associates Ltd Carvers Warehouse 77 Dale Street Manchester M1 2HG</div>					
Project:							
CORNBROOK RESIDENTIAL, MANCHESTER							
Drawing Title:							
OVERLAND EXCEEDANCE FLOOD FLOW ROUTES							
Status:							
PLANNING							
Size:	Date:	Drawn by:	Designed by:	Checked by:			
A1	JAN 24	SA	SA	PC			
Scale:	1:125	Project No:	2306-18				
Project - Originator - Volume - Level - Type - Role - Number:				Revision:			
CBR-REN-ZZ-XX-DR-C-00080				P01			

APPENDIX J

MICRODRAINAGE CALCULATIONS

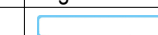
Renaissance Assoc.		Page 1
Carvers Warehouse 77 Dale Street Manchester M1 2HG	Cornbrook Attenuation Tank Calcs	
Date 15/12/2023 11:02 File	Designed by JB Checked by PC	
Innovyze	Source Control 2020.1.3	

Summary of Results for 100 year Return Period (+45%)

Half Drain Time : 309 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (1/s)	Max Control (1/s)	Max Σ Outflow (1/s)	Max Volume (m³)	Status
15 min Summer	26.914	0.419	0.0	3.2	3.2	48.1	O K
30 min Summer	27.050	0.555	0.0	3.2	3.2	63.8	O K
60 min Summer	27.180	0.685	0.0	3.2	3.2	78.7	O K
120 min Summer	27.282	0.787	0.0	3.2	3.2	90.4	O K
180 min Summer	27.313	0.818	0.0	3.2	3.2	94.0	O K
240 min Summer	27.315	0.820	0.0	3.2	3.2	94.3	O K
360 min Summer	27.290	0.795	0.0	3.2	3.2	91.4	O K
480 min Summer	27.266	0.771	0.0	3.2	3.2	88.6	O K
600 min Summer	27.240	0.745	0.0	3.2	3.2	85.7	O K
720 min Summer	27.215	0.720	0.0	3.2	3.2	82.8	O K
960 min Summer	27.164	0.669	0.0	3.2	3.2	76.9	O K
1440 min Summer	27.058	0.563	0.0	3.2	3.2	64.8	O K
2160 min Summer	26.884	0.389	0.0	3.2	3.2	44.7	O K
2880 min Summer	26.761	0.266	0.0	3.2	3.2	30.6	O K
4320 min Summer	26.624	0.129	0.0	3.1	3.1	14.8	O K
5760 min Summer	26.569	0.074	0.0	2.9	2.9	8.5	O K
7200 min Summer	26.550	0.055	0.0	2.5	2.5	6.3	O K
8640 min Summer	26.537	0.042	0.0	2.2	2.2	4.8	O K
10080 min Summer	26.528	0.033	0.0	1.9	1.9	3.8	O K
15 min Winter	26.968	0.473	0.0	3.2	3.2	54.4	O K
30 min Winter	27.123	0.628	0.0	3.2	3.2	72.2	O K
60 min Winter	27.272	0.777	0.0	3.2	3.2	89.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	123.207	0.0	51.9	25
30 min Summer	82.373	0.0	69.5	40
60 min Summer	52.627	0.0	88.7	68
120 min Summer	32.545	0.0	109.8	126
180 min Summer	24.251	0.0	122.7	182
240 min Summer	19.566	0.0	132.0	240
360 min Summer	14.331	0.0	145.1	302
480 min Summer	11.497	0.0	155.2	366
600 min Summer	9.684	0.0	163.3	432
720 min Summer	8.412	0.0	170.3	502
960 min Summer	6.731	0.0	181.6	644
1440 min Summer	4.907	0.0	198.7	922
2160 min Summer	3.570	0.0	216.8	1280
2880 min Summer	2.846	0.0	230.4	1620
4320 min Summer	2.064	0.0	250.7	2292
5760 min Summer	1.641	0.0	265.8	2944
7200 min Summer	1.373	0.0	278.0	3672
8640 min Summer	1.186	0.0	288.1	4408
10080 min Summer	1.048	0.0	297.0	5136
15 min Winter	123.207	0.0	58.1	25
30 min Winter	82.373	0.0	77.8	39
60 min Winter	52.627	0.0	99.4	68

Renaissance Assoc.		Page 2
Carvers Warehouse 77 Dale Street Manchester M1 2HG	Cornbrook Attenuation Tank Calcs	
Date 15/12/2023 11:02 File	Designed by JB Checked by PC	
Innovyze	Source Control 2020.1.3	

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
120 min Winter	27.395	0.900	0.0	3.2	3.2	103.4	O K
180 min Winter	27.439	0.944	0.0	3.2	3.2	108.5	O K
240 min Winter	27.448	0.953	0.0	3.2	3.2	109.6	O K
360 min Winter	27.422	0.927	0.0	3.2	3.2	106.6	O K
480 min Winter	27.389	0.894	0.0	3.2	3.2	102.8	O K
600 min Winter	27.356	0.861	0.0	3.2	3.2	98.9	O K
720 min Winter	27.320	0.825	0.0	3.2	3.2	94.8	O K
960 min Winter	27.244	0.749	0.0	3.2	3.2	86.1	O K
1440 min Winter	27.084	0.589	0.0	3.2	3.2	67.8	O K
2160 min Winter	26.816	0.321	0.0	3.2	3.2	36.9	O K
2880 min Winter	26.663	0.168	0.0	3.2	3.2	19.3	O K
4320 min Winter	26.560	0.065	0.0	2.7	2.7	7.5	O K
5760 min Winter	26.537	0.042	0.0	2.2	2.2	4.8	O K
7200 min Winter	26.525	0.030	0.0	1.8	1.8	3.4	O K
8640 min Winter	26.517	0.022	0.0	1.6	1.6	2.5	O K
10080 min Winter	26.512	0.017	0.0	1.4	1.4	2.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
120 min Winter	32.545	0.0	122.9	124
180 min Winter	24.251	0.0	137.5	180
240 min Winter	19.566	0.0	147.9	236
360 min Winter	14.331	0.0	162.5	338
480 min Winter	11.497	0.0	173.8	384
600 min Winter	9.684	0.0	182.9	462
720 min Winter	8.412	0.0	190.7	540
960 min Winter	6.731	0.0	203.5	694
1440 min Winter	4.907	0.0	222.5	1000
2160 min Winter	3.570	0.0	242.9	1340
2880 min Winter	2.846	0.0	258.1	1644
4320 min Winter	2.064	0.0	280.8	2248
5760 min Winter	1.641	0.0	297.7	2944
7200 min Winter	1.373	0.0	311.3	3672
8640 min Winter	1.186	0.0	322.8	4376
10080 min Winter	1.048	0.0	332.6	5128

Renaissance Assoc.		Page 3																																										
Carvers Warehouse 77 Dale Street Manchester M1 2HG	Cornbrook Attenuation Tank Calcs																																											
Date 15/12/2023 11:02 File	Designed by JB Checked by PC																																											
Innovyze	Source Control 2020.1.3																																											
<p style="text-align: center;"><u>Rainfall Details</u></p> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Return Period (years)</td> <td>100</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>18.000</td> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Ratio R</td> <td>0.363</td> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> <td>Climate Change %</td> <td>+45</td> </tr> </table> <p style="text-align: center;"><u>Time Area Diagram</u></p> <p style="text-align: center;">Total Area (ha) 0.225</p> <table> <thead> <tr> <th>Time (mins)</th> <th>Area</th> <th>Time (mins)</th> <th>Area</th> <th>Time (mins)</th> <th>Area</th> </tr> <tr> <th>From:</th> <th>To:</th> <th>From:</th> <th>To:</th> <th>From:</th> <th>To:</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>4 0.075</td> <td>4</td> <td>8 0.075</td> <td>8</td> <td>12 0.075</td> </tr> </tbody> </table>			Rainfall Model	FSR	Winter Storms	Yes	Return Period (years)	100	Cv (Summer)	0.750	Region	England and Wales	Cv (Winter)	0.840	M5-60 (mm)	18.000	Shortest Storm (mins)	15	Ratio R	0.363	Longest Storm (mins)	10080	Summer Storms	Yes	Climate Change %	+45	Time (mins)	Area	Time (mins)	Area	Time (mins)	Area	From:	To:	From:	To:	From:	To:	0	4 0.075	4	8 0.075	8	12 0.075
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<div>Model Details</div> <div>Storage is Online Cover Level (m) 28.300</div> <div>Cellular Storage Structure</div> <div>Invert Level (m) 26.495 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000</div> <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>121.0</td><td>0.0</td><td>1.001</td><td>0.0</td><td>0.0</td></tr><tr><td>1.000</td><td>121.0</td><td>0.0</td><td></td><td></td><td></td></tr></table> <div>Hydro-Brake® Optimum Outflow Control</div> <div>Unit Reference MD-SCL-0080-3200-1041-3200 Design Head (m) 1.041 Design Flow (l/s) 3.2 Flush-Flo™ Calculated Objective Minimise blockage risk Application Surface Sump Available Yes Diameter (mm) 80 Invert Level (m) 26.454 Minimum Outlet Pipe Diameter (mm) 100 Suggested Manhole Diameter (mm) 1200</div> <table><tr><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th><th>Control Points</th><th>Head (m)</th><th>Flow (l/s)</th></tr><tr><td>Design Point (Calculated)</td><td>1.041</td><td>3.2</td><td>Kick-Flo®</td><td>0.585</td><td>2.5</td></tr><tr><td>Flush-Flo™</td><td>0.254</td><td>3.2</td><td>Mean Flow over Head Range</td><td>-</td><td>2.8</td></tr></table> <div>The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated</div> <table><tr><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th><th>Depth (m)</th><th>Flow (l/s)</th></tr><tr><td>0.100</td><td>2.6</td><td>1.200</td><td>3.4</td><td>3.000</td><td>5.2</td><td>7.000</td><td>7.7</td></tr><tr><td>0.200</td><td>3.2</td><td>1.400</td><td>3.7</td><td>3.500</td><td>5.6</td><td>7.500</td><td>8.0</td></tr><tr><td>0.300</td><td>3.2</td><td>1.600</td><td>3.9</td><td>4.000</td><td>6.0</td><td>8.000</td><td>8.2</td></tr><tr><td>0.400</td><td>3.1</td><td>1.800</td><td>4.1</td><td>4.500</td><td>6.3</td><td>8.500</td><td>8.5</td></tr><tr><td>0.500</td><td>2.9</td><td>2.000</td><td>4.3</td><td>5.000</td><td>6.6</td><td>9.000</td><td>8.7</td></tr><tr><td>0.600</td><td>2.5</td><td>2.200</td><td>4.5</td><td>5.500</td><td>6.9</td><td>9.500</td><td>8.9</td></tr><tr><td>0.800</td><td>2.8</td><td>2.400</td><td>4.7</td><td>6.000</td><td>7.2</td><td></td><td></td></tr><tr><td>1.000</td><td>3.1</td><td>2.600</td><td>4.9</td><td>6.500</td><td>7.5</td><td></td><td></td></tr></table>			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	121.0	0.0	1.001	0.0	0.0	1.000	121.0	0.0				Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	1.041	3.2	Kick-Flo®	0.585	2.5	Flush-Flo™	0.254	3.2	Mean Flow over Head Range	-	2.8	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	2.6	1.200	3.4	3.000	5.2	7.000	7.7	0.200	3.2	1.400	3.7	3.500	5.6	7.500	8.0	0.300	3.2	1.600	3.9	4.000	6.0	8.000	8.2	0.400	3.1	1.800	4.1	4.500	6.3	8.500	8.5	0.500	2.9	2.000	4.3	5.000	6.6	9.000	8.7	0.600	2.5	2.200	4.5	5.500	6.9	9.500	8.9	0.800	2.8	2.400	4.7	6.000	7.2			1.000	3.1	2.600	4.9	6.500	7.5		
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APPENDIX K
NORTHWEST SUDS PRO-FORMA

NORTH WEST SuDS PRO-FORMA

This pro-forma is a requirement for any planning application for major development¹.

It supports applicants in summarising and confirming how surface water from a development will be managed sustainably under current and future conditions.

Your sustainable drainage system should be designed in accordance with [CIRIA The SuDS Manual C753](#) and any necessary adoption standards.

HOW TO COMPLETE

Blue Box	Instruction/ Question
Orange Box	Evidence Required
White Box	To be completed by Developer / Consultant

1. Complete ALL white boxes
2. Submit this pro-forma to the Local Planning Authority, along with:
 - Sustainable Drainage Strategy
 - Site Specific Flood Risk Assessment (if required)
 - Minimum supporting evidence, as indicated in orange boxes of this pro-forma.

GUIDANCE TO SUPPORT YOU

The pro-forma should be completed in conjunction with ‘Completing your SuDS Pro Forma Guide.’

The pro-forma can be completed using freely available tools such as [Tools for Sustainable Drainage Systems](#) or appropriate industry standard surface water management design software.

¹ as defined in Section 2 of [Statutory Instrument 2015 No. 595](#) or on sites in Critical Drainage Areas.

SECTION 1. APPLICATION & DEVELOPMENT DETAILS

Planning Application Reference <i>(if available)</i>		
State type of planning application <i>i.e. Pre-application, Outline, Full, Hybrid, Reserved Matters*</i> *Information only required if drainage is to be considered as part of reserved matters application		FULL PLANNING
Developer(s) Name:		FORSHAW GROUP
Consultant(s) Name:		RENAISSANCE ASSOCIATES LTD
Development Address <i>(including postcode)</i>		Land off Cornbrook Road M15 4YG
Development Grid Reference <i>(Eastings/Northings)</i>		382421, 397060
Total Development Site Area (Ha)		0.225
Drained Area (Ha)* of Development		0.225
Please indicate the flood zone that your development is in. Tick all that apply. <i>Based on the Environment Agency Flood Map for Planning and the relevant Local Authority Strategic Flood Risk Assessment (to identify Flood Zones 3a/3b).</i>		Flood Zone 1 ☒ Flood Zone 2 ☐ Flood Zone 3a ☐ Flood Zone 3b ☐
What is the surface water risk of the site? Tick all that apply. <i>Based on the Environment Agency Surface Water Flood Map.</i>		High ☐ Medium ☐ Low ☒
Have you submitted a Site Specific Flood Risk Assessment (FRA)? <i>See separate guidance notes for clarification on when a FRA is required</i>		Yes ☒ No ☐
Have you submitted a Sustainable Drainage Strategy?		Yes ☒ No ☐
Does your drainage proposal provide multi-functional benefits via SuDS?		Yes ☐ No ☒
Expected Lifetime of Development <i>(years)</i> <i>Refer to Planning Practice Guidance "Flood Risk and Coastal Change" Paragraph 026</i>		100 YEARS
Development Type:		State Proposed Number of Units
Greenfield Site <ul style="list-style-type: none"> Site is wholly undeveloped, and a new drainage system will be installed 		☒
Previously Developed/ Brownfield Site <ul style="list-style-type: none"> Site is already developed, and the <u>entirety</u> of the existing surface water drainage system will be used to serve the new development (evidence must be provided to prove existing surface water drainage system is reusable); <u>OR</u> Where records of the previously developed system are not available so that the hydraulic characteristics of the system cannot be determined or where the drainage system is not in reasonable working order i.e. broken, blocked or no longer operational for other reasons. 		☐
Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 1.		CBR-REN-XX-XX-RP-C-00001 CBR-REN-XX-XX-RP-C-00002

SECTION 2: IMPERMEABLE AREA AND EXISTING DRAINAGE

	Existing (E)	Proposed (P)	Change (P – E)
State Impermeable Area (Ha)	0.130	0.225	0.095
Evidence Required: Plans showing development layout of site with existing and proposed impermeable areas.			

<p>Are there existing sewers, watercourses, water bodies, highway drains, soakaways or filter drains on the site?</p>	<p>Yes ☒ No ☐ Don't Know ☐</p>
<p>Evidence Required: Plan(s) showing existing layout to include all:</p> <ul style="list-style-type: none"> • Watercourses, open and culverted • Water bodies – ponds, swales etc. • Sewers, including manholes • Highway drains, include manholes, gullies etc. • Infiltration features - soakaways, filter drains etc. 	<p>☒</p>

Drainage Design <i>Outline planning applications should be able to demonstrate that a suitable drainage system is achievable.</i> <i>All other type of planning application should provide full details or reference to previous planning application where drainage details have been submitted or approved.</i>	
<p>Select which design approach you are taking to manage water quantity (<i>refer to Section 3.3 SuDS Manual</i>)</p> <p>Approach 1 – Volume control / Long Term Storage (Technical Standards S2/3, S4/5)</p> <ul style="list-style-type: none"> The attenuated runoff volume for the 1 in 100 year 6 hour event (<i>plus climate change allowance</i>) is limited to the greenfield runoff volume for the 1 in 100 year 6 hour event, with any additional runoff volume utilising long term storage and either infiltrated or released at 2 l/s/ha The discharge rate for the critical duration 1 in 1 year event is restricted to the 1 in 1 year greenfield runoff rate The discharge rate for the critical duration 1 in 100 year event (<i>plus climate change allowance</i>) is restricted to the 1 in 100 year greenfield runoff rate <p>Approach 2 – Qbar (Technical Standards S6)</p> <ul style="list-style-type: none"> Justification has been provided that the provision of volume control/long term storage is not appropriate and an attenuation only approach is proposed. All events up to the critical duration 1 in 100 year event (<i>plus climate change allowance</i>) are limited to Qbar (1 in 2 year greenfield rate) or 2 l/s/ha, whichever is greater. 	☐ ☒
<p>Evidence Required: Plans showing:</p> <ul style="list-style-type: none"> Existing flow routes and flood risks Modified flow routes Contributing and impermeable areas Current (if any) and proposed ‘source control’ and ‘management train’ locations of sustainable drainage components (C753 Chapter 7) Details of drainage ownership Details of exceedance routes (Technical Standards S9) Topographic survey Locations and number of existing and proposed discharge points 	☒

Note consideration should be given to manage surface water from both impermeable and permeable surfaces (including gardens and verges) likely to enter the drainage system.

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 2.

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SECTION 3: PEAK RUNOFF RATES – TECHNICAL STANDARDS S2, S3 AND S6 (UNLESS S1 APPLIES)

Rainfall Event	Existing Rate (l/s)	Greenfield Rate (l/s)	Proposed Rate (l/s) <i>Previously developed sites - In line with S3 should be equivalent to Greenfield runoff rates – discuss with LLFA if this is not achievable pre-application</i>
Qbar (Approach 2)	31.97	3.2	3.2
1 in 1 Year Event (Approach 1)			
1 in 30 Year Event			
1 in 100 Year Event* (Approach 1)			
<p>* Total discharge at the 1 in 100 year rate should be restricted to the greenfield runoff volume for the 1 in 100 Year 6 hour event with additional volumes (long-term storage volume) released at a rate no greater than 2 l/s/ha where infiltration is not possible. The climate change allowance should only be applied to the proposed rate and not the existing or greenfield rate.</p>			
Evidence Required: Methodology used to calculate peak runoff rate clearly stated and justified. Impermeable areas plan, supported by topographical survey confirming positive drainage. Hydraulic calculations and details of software used.			☒ ☒ ☒

State the hydraulic method used in your calculations
(Refer to Table 24.1 of The SuDS Manual)

FEH ReFH2 - Microdrainage

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 3.

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SECTION 4: DISCHARGE VOLUME – TECHNICAL STANDARDS S4, S5 AND S6 (UNLESS S1 APPLIES)

Rainfall Event	Existing Volume (m ³)	Greenfield Volume (m ³)	Proposed Volume (m ³)
1 in 100 Year 6 Hour Event <i>(Approach 1)</i>			
Does the below statement apply to your development proposal? Long term storage is not achievable on this site and, in accordance with S6 of the Non Statutory Technical Standards for SuDS, the surface water discharge rates for events up to and including the 1 in 100 year critical event are limited to Qbar (Approach 2)			Yes ☒ No ☐
Evidence Required: Approach to managing the quantity of surface water leaving the site clearly stated and justified Methodology used to calculate discharge volume clearly stated and justified. Hydraulic calculations and details of software used.			☒ ☒ ☒

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 4.	CBR-REN-XX-XX-RP-C-00001 CBR-REN-XX-XX-RP-C-00002
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SECTION 5: STORAGE – TECHNICAL STANDARDS S7 AND S8

State climate change allowance used (%)	1 in 30 YEAR: 40% 1 in 100 YEAR: 45%
State housing density (houses per ha)	N/A
State urban creep allowance used (%)	0% - NOT SUITABLE DUE TO TYPE OF DEVELOPMENT
Evidence Required: State / used in appropriate industry standard surface water management design software.	☒

State storage volume required (m³) (excluding non-void spaces) <i>Must include an allowance for climate change and urban creep</i>	125.4
Have you incorporated interception into your design? <i>(Refer to Chapter 24 of The SuDS Manual C753)</i> <i>Where possible, infiltration or other techniques are to be used to try and achieve zero discharge to receiving waters for rainfall depths up to 5mm.</i>	Yes ☐ No ☒
Evidence Required: Drainage plans showing location of attenuation and all flow control devices and supporting calculations.	☒

Summarise how storage will be provided for 1 in 30 year event on site. <i>Storage must be designed to ensure that at no flooding occurs onsite in a 1 in 30 year event except in designed areas and no flooding occurs offsite in a 1 in 100 year (plus climate change allowance) event.</i>	ALL ATTENUATION IT TO BE PROVIDED BELOW GROUND IN A GEO-CELLULAR ATTENUATION TANK
Summarise how storage will be provided for 1 in 100 year (plus climate change) event on site. <i>Where storage above the 1 in 30 year rainfall event is provided in designated areas designed to accommodate excess surface water volumes, plans showing storage locations and surface water depths and supported by calculations used in appropriate industry standard surface water management design software. It is important to run a range of duration events to ensure the worst case condition is found for each drainage element on the site</i>	AS ABOVE
Evidence Required: Plans showing size and location of storage and supporting calculations. Where there is controlled flooding, extents and depths must be indicated.	☒

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 5.	CBR-REN-XX-XX-RP-C-00001 CBR-REN-XX-XX-RP-C-00002
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SECTION 6: WATER QUALITY PROTECTION

Contaminated surface water run-off can have negative impacts on the quality of receiving water bodies. The potential level of contamination will influence final the design of an appropriate treatment train as part of your sustainable drainage system.

Is the proposal site known to be or potentially contaminated?	Yes ☐	No ☒
<ul style="list-style-type: none"> If the site is contaminated, it should be demonstrated that the sustainable drainage system will not increase the risk of pollution to controlled waters through the mobilisation of contaminants and/or creation of new pollution pathways. 		

Confirm the Pollution Hazard Level of the proposed development - Tick <u>ALL</u> that apply <i>Refer to Pollution Hazard Indices for different Land Use Classifications in Table 26.2 of The SuDS Manual C753 for further guidance.</i>		
Pollution Hazard Level <i>Tick <u>ALL</u> that apply</i>		Surface water run-off from the proposed development will drain from:
VERY LOW	☐	<ul style="list-style-type: none"> Residential roofs
LOW	☒	<ul style="list-style-type: none"> Other roofs (typically commercial/industrial roofs) Individual property driveways, residential car parks, low traffic roads (e.g. cul de sacs, home-zones and general access roads) Non-residential car parking with infrequent change (e.g. schools, offices) i.e. < 300 traffic movements/day
MEDIUM	☐	<ul style="list-style-type: none"> Commercial yard and delivery areas Non-residential car parking with frequent change (e.g. hospitals, retail) All roads except low traffic roads and trunk roads/motorways²
HIGH	☐	<ul style="list-style-type: none"> Sites with heavy pollution (e.g. haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites) Sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured Industrial sites Trunk roads and motorways¹

If the development's Pollution Hazard Level is 'Very Low' or 'Low', has the sustainable drainage design been risk assessed and appropriate mitigation measures included?	Yes ☒	No ☐
<ul style="list-style-type: none"> If the proposed development has a very low or low polluting potential, you should design your sustainable drainage system to include an appropriate treatment train in accordance with The SuDS Manual (C753). 		

If the development's Pollution Hazard Level is 'Medium' or 'High', is the application supported by a detailed water quality risk assessment?	Yes ☐	No ☐
<ul style="list-style-type: none"> If the proposed development has a high polluting potential, a detailed risk assessment <u>will</u> be required to identify an appropriate SuDS treatment train and ensure compliance with Paragraph 170 of the National Planning Policy Framework. If the proposed development has a medium polluting potential, a detailed risk assessment <u>may</u> be required depending on the nature, scale and location of the development. 		

Has pre-application advice on water quality been obtained from the Environment Agency?	Yes ☐	No ☒
If YES, provide details:		

² Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009).

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 6.

SECTION 7: DETAILS OF YOUR SUSTAINABLE DRAINAGE SYSTEM

a) Function of your Sustainable Drainage System

Do your proposals store rainwater for later use (as a resource)?	Yes ☐ No ☒
Evidence Required: Please provide a brief sentence in the adjacent white box to describe how this function has been achieved.	

Do your proposals promote source control to manage rainfall close to where it falls? (e.g. promoting natural losses through soakage, infiltration and evapotranspiration)	Yes ☐ No ☒
Evidence Required: Please provide a brief sentence in the adjacent white box to describe how this function has been achieved.	

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 7a.	CBR-REN-XX-XX-RP-C-00001 CBR-REN-XX-XX-RP-C-00002
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b) Hierarchy of Drainage Options – Planning Practice Guidance

The proposed method of discharge are set out within order of priority. Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable.

Proposed method of surface water discharge		Is this proposed?	
Hierarchy Level 1: Into the ground (via infiltration)		Yes ☐ No ☒	
If YES - Evidence Required		If NO – Evidence Required Tick ALL that apply	
☐	A. Completed Infiltration Checklist from The SuDS Manual (C753) Appendix B <i>An editable version of this form is available on SusDrain website.</i>	☒	A. Site investigation to demonstrate that the ground is not free draining. Test results to be provided in accordance with: <ul style="list-style-type: none"> The methodology within BRE 365 (2016), OR Falling head permeability tests BS EN ISO 22282-2: 2012
☐	B. British Geological Survey (BGS) Infiltration SuDS Map	☐	B. NOTE: where an applicant is unable to access a site to undertake testing, e.g. where unable to access a site for an outline application, they can submit a SuDS GeoReport or similar.
☐	C. Infiltration testing to BRE 365 (2016) or falling head permeability tests to BS EN ISO 22282-2: 2012 (optional for outline)	☒	C. Evidence to confirm that infiltration to ground would result in a risk of deterioration to ground water quality.
☐	'Plan B' sustainable drainage plan and statement of approach with an alternative discharge method, in case infiltration proposals are proven not feasible upon	☒	D. Geotechnical advice from a competent person* which determines that infiltration of water to ground would pose an unacceptable risk of geohazards to the site and/or local area.

	further site specific ground investigation e.g. to consider seasonal variations to groundwater.		<i>*Note: Competent person may include a Chartered Engineer, Chartered Geologists, Registered Ground Engineering Professionals (RoGEP).</i>
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Proposed method of surface water discharge		Is this proposed?	
Hierarchy Level 2: To a surface water body <i>(select type)</i> NOTE: Consent from LLFA or Permit from Environment Agency may be required – refer to guidance		Yes ☒ No ☐ N/A ☒	
		☐ Main river ☐ Ordinary watercourse	☐ Canal ☐ Other water body
If YES - Evidence Required		If NO – Evidence Required Tick ALL that apply	
☐ Surface water body / watercourse survey and report	☐ Plan showing nearby watercourses and waterbodies AND ☒ Statement providing justification in your Sustainable Drainage Strategy <i>Note: Where discharge of any element in the hierarchy is discounted, an applicant should provide justification. If the reasoning for discounting a discharge of surface water to watercourse relates to issues associated with third party land or the securing of any other required consent, it may be necessary for the applicant to provide evidence to the local planning authority to support their proposed approach.</i>		

Proposed method of surface water discharge		Is this proposed?	
Hierarchy Level 3: To a surface water sewer or highway drain <i>(select type)</i>		Yes ☒ No ☐ N/A ☐	
		☒ Surface water sewer	☐ Highway drain
If YES - Evidence Required		If NO – Evidence Required Tick ALL that apply	
☐ Written correspondence from Water and Sewerage Company/ Highway Authority regarding proposed connection.	☒ Plan showing nearby sewers and highway drains AND ☒ Statement providing justification in your Sustainable Drainage Strategy		

Proposed method of surface water discharge		Is this proposed?	
Hierarchy Level 4: To combined sewer		Yes ☐ No ☒ N/A ☒	
If YES - Evidence Required		If NO – Evidence Required	
☐ Written correspondence from Water and Sewerage Company	N/A		

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 7b.	CBR-REN-XX-XX-RP-C-00001 CBR-REN-XX-XX-RP-C-00002
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c) Proposed SuDS Component Types

	Tick ALL that apply				
Within property boundary	☐ Rainwater harvesting	☐ Green/ blue roofs	☐ Pervious pavements [Type: A ☐ B ☐ C ☐	☐ Soakaway	☐ Bio retention systems

	Tick ALL that apply				
Within development site boundary (not property)	☐ Infiltration system [Type: ☐ Surface level ☐ Below ground]		☐ Filter strips	☐ Filter drains	☐ Swales
	☐ Bio retention system	☐ Detention basins	☐ Ponds and wetlands	☒ Attenuation tanks/ Oversized pipes	☐ Other (state below)
	If 'Other' please state:				

Off site (not within the boundary of the proposed development)	Please state:
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I confirm that the above selected components have been designed in accordance with The SuDS Manual (C753).	I confirm ☒
I confirm that the management of flows resulting from rainfall in excess of a 1 in 100 year plus climate change rainfall event, and their exceedance route(s), has been fully considered in order to minimise the risks to people, property (new and existing) and infrastructure.	I confirm ☒

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 7c.	CBR-REN-XX-XX-RP-C-00001 CBR-REN-XX-XX-RP-C-00002
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The applicant is responsible to ensure that ALL components selected in Section 7 can be maintained for the design life of the development. This information is required so the Local Planning Authority can ensure the maintenance and management of the sustainable drainage system. The Local Planning Authority will discuss how this will be secured (e.g. via planning condition or planning obligation).

[illegible]

Information Provided?	
Maintenance Schedule	Yes ☒ No ☐
Evidence Required: A copy of the maintenance schedule including: <ol style="list-style-type: none"> Proactive and preventative maintenance Detailing regular, occasional and remedial maintenance activities including recommendations for inspection and monitoring. This should include recommended frequencies, advice on plant/ machinery required and an explanation of the objectives for the maintenance proposed and potential implications of not meeting them. Reactive and corrective maintenance (e.g. product repair and replacement). Including advice on excavations, or similar works, in locations that could affect the SuDS components/ adjacent structures. 	☒

		Information Provided?
Maintenance and Management Arrangements		Yes ☒ No ☐
<p>Evidence Required:</p> <p>Evidence of formal agreement with the party responsible for undertaking maintenance.</p> <p>Please select any of the adopting bodies that you will be offering your sustainable drainage components for adoption. Tick all that apply.</p> <p>☐ Water and Sewerage Company <i>Section 104 agreement (Water Industry Act 1991)</i></p> <p>☐ Highway Authority <i>Section 278/38 agreement (Highways Act 1980)</i></p> <p>☐ Local Authority Public Open Space <i>[Refer to Local Authority Policy]</i></p> <p>Please select the arrangement(s) for all non-adopted sustainable drainage components. Tick all that apply.</p> <p>☒ Management Company</p> <p>☐ Property Owner <i>(for SuDS components within property boundary only)</i></p> <p>☐ Other (please state)</p> <div style="border: 1px solid black; height: 20px; width: 100%;"></div>		☐

Please list any relevant document and or drawing numbers (including revision reference) to support your answers to Section 8.

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DECLARATION AND SUBMISSION

This pro-forma has been completed using evidence from information which has been submitted with the planning application.

The information submitted in the Sustainable Drainage Strategy and site-specific Flood Risk Assessment (FRA), where submitted, is proportionate to the site conditions, flood risks and magnitude of development and I agree that this information can be used as evidence to this sustainable drainage approach.

Submitter Details			
Completed by	JOE BULLOUGH	Email Address	joebullough@renaissance-ltd.com
		Telephone Number(s)	0161 393 6509
Signed off by	PATRICK CLAYTON	Accreditation(s) and/or Qualification(s) of Signatory	CEng MIStructE
Date (dd/mm/yyyy)	15.12.2023	Company	RENAISSANCE ASSOCIATES LTD

Client Details			
Name	-	Company	FORSHAW GROUP