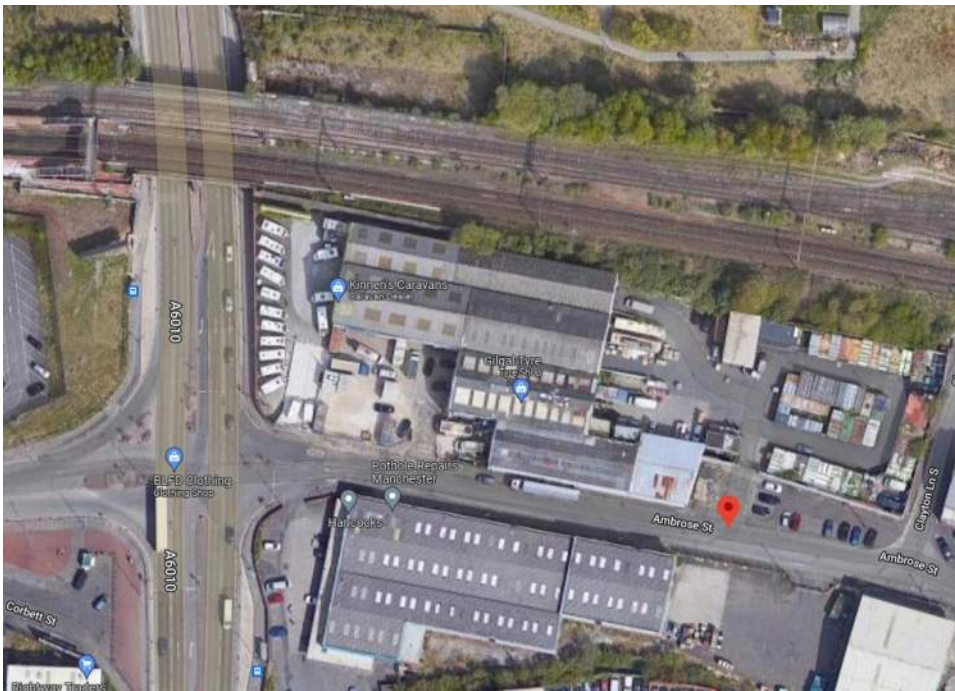


FLOOD RISK ASSESSMENT & OUTLINE DRAINAGE STRATEGY

at

Land off Ambrose Street
Manchester
M12 5DD



PF Investments Ltd
97 Alderley Road
Wilmslow
England
SK9 1PT

Contract No: 11325
Dated: 13 October 2022
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Issue	Description	Date	Originator	Approved
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6	Updated to connect into combined sewer	28/07/2025	PG	CH

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THOMASONS

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EXECUTIVE SUMMARY

The proposal is for the demolition of a group of existing commercial buildings and the construction of a storage building with external parking and access road. The overall site is approximately 0.52Ha in plan footprint.

According to the Environment Agency (EA) Indicative flood maps for planning, the majority of the development holds a Flood Zone 1 classification, i.e. land assessed as having less than a 1 in 1000 annual probability of fluvial flooding (<0.1%) in any year. However, there is a small area of Flood Zone 2, i.e. land assessed as having greater than a 1 in 1000 (>0.1%) but less than a 1 in 100 (<1.0%) annual probability of fluvial flooding in any year. The finished floor level of the new building will be set a minimum of 600mm above the peak 1000-year flood level from the adjacent culverted watercourse.

The development target has been assessed against the NPPF 'Sequential Test'. Taking into consideration that the application is for a commercial development predominantly in Flood Zone 1, Tables 1, 2 & 3 of the NPPF have been appraised to confirm that development is appropriate, the sequential test is passed, and the exception tests is not required. This Flood Risk Assessment has considered all other forms of flooding and overall, has found that the site is at low risk of flooding from all sources.

The surface drainage strategy as outlined below is to restrict the proposed flow rate to ensure that the flood risk to the site and surrounding catchment is not increased by development. The drainage hierarchy has been considered in the drainage strategy discussed in Section 6. The surface water runoff will be collected from the impermeable areas and directed to the combined public sewer via an existing connection in the southwest corner of the site. The runoff rates will be restricted to 5l/s which is considered the minimum flow rate to prevent blockage. This is significantly below the existing unrestricted flow rates to the combined public sewer. The SuDS hierarchical approach will be considered a flow control and offline geocellular crates incorporated. A drainage layout with outline hydraulic calculations have been prepared to support this approach and can be found in the Appendices. Ideally connection would have been made to the culverted watercourse. However, investigations undertaken by the applicant have found that this is heavily blocked with silt with the water levels higher than the connection level. As such there is considered to be a severe flood risk to the development. The blockage is within 3rd party land to which the client has no control over.

There is no residual flood risk from the development site to the surrounding district due to the restriction in storm water flow rates. The development does not therefore increase the risk of flooding to other adjacent neighbourhoods. Out of chamber or gully flooding for the extreme 100 year plus climate change event may occur within the development site and is classed as exceedance flows. Flood water from this event will be contained within the development site and directed away from the building to the external yards and hard landscaped areas.

Foul water generated by the development will continue to discharge to the existing combined sewer in Ambrose Street via an existing connection. The foul discharge does not present an increased flood risk to the surrounding district.

1.0 INTRODUCTION

Thomasons has been appointed by PF Investments Ltd to prepare this Flood Risk Assessment (FRA) to support a planning application for the demolition of an existing group of buildings and construction of a new storage unit with external parking on land off Ambrose Street, Manchester, M12 5DD. The assessment has been undertaken in line with Section 10 of the 'National Planning Policy Framework' plus the accompanying Technical Guidance on Flood Risk.

This Report has been commissioned by PF Investments Ltd and is specific to their interests in the commercial development as described by the Architectural plan enclosed in Appendix A. This report may not be assigned.

The report has been commissioned to identify likely flooding issues associated with the proposed development, any likely constraints that could be imposed and to advise on the technical feasibility of providing drainage for the development proposals. Post planning and as the detailed design progresses, the information and details within this report may have to be refined, modified and updated to suit requirements and obligations of the Environment Agency, Manchester City Council as Lead Local Flood Authority (LLFA), United Utilities and other statutory authorities. The Flood Risk Assessment will include the following scope of works:

- Identify available data relating to flood risk at the site.
- Determine whether the site is at risk from flooding, including from breach or overtopping of any existing flood defences, surface water flooding and/or ground water flooding.
- Identify available data relating to drainage at the existing site, including historical discharges.
- Discuss, if required, Sustainable Drainage Systems (SuDS) as an option for reducing surface water flood risk. Determine any potential increase in surface water runoff as a result of the proposed development.
- Devise an appropriate outline foul and surface water drainage strategy to deal with any increase in surface water runoff and include for climate change.
- Consider the recommendations of the Level 1 and Level 2 Manchester City Council Strategic Flood Risk Assessments (SFRA).
- Prepare the Flood Risk Assessment report.
- Assess mitigation measures & off-site impacts and define any residual risks.

2.0 DEVELOPMENT DESCRIPTION AND LOCATION

2.1 Site Location

The site is referenced in Table 1, and a site location map is provided in Figure 1.

Table 1: Site Referencing Information

Item	Brief Description
Site name	Storage World
Site address and location	Land off Ambrose Street, Manchester, M12 5DD.
Council Area	Manchester City Council
Approximate Grid Reference	OS: N: 387259, E: 397214
General Locality	The site is located in the Gorton area of Manchester, some 2km to the west of Manchester City Centre.

2.2 Existing Site Description

The development site (Red Line Boundary) is roughly rectangular in plan shape and situated in a commercial and industrial led area with some residential dwellings beyond to the north and south. The site currently encompasses a group of warehouse buildings with parking areas.

Pottery Lane is located along the western boundary with a railway line as a flyover to the north, beyond that are fields belonging to Bridge college. Ambrose Street and access to the site is located to the south with further commercial and industrial developments located to the east, south and west of the site

Figure 1 overleaf identifies the overall site location details. Further details of the existing layout can be seen on the Red Line Plans in Appendix A and the Topographical survey in Appendix B.

The development site can be classed as Brownfield for drainage purposes.

Figure 1 – Location Plan



2.3 Local Hydrology

The closest identified watercourse to the development boundary is the corn Brook, located approximately 60m to the south of the site flowing westerly in both open channel and culvert. The Ashton Canal some 800m to the north of the site.

2.4 Proposed Development

This report has been prepared to support a full planning application for the demolition of an existing group of buildings and construction of a new storage unit with external parking and access on land off Ambrose Street.

The current outline Architectural site Master Plan in Appendix A provides an indication of the proposed development intent.

3.0 PLANNING POLICY AND CONSULTATION

3.1 Planning Policy Requirement

The flood maps for planning provided by the Environment Agency (EA) locate the majority of the site in low-risk Flood Zone 1, i.e. land assessed as having less than a 1 in 1000 (0.1%) annual probability of fluvial flooding in any year. However, there is a small area of Flood Zone 2 set down from the main building in the southeast corner, i.e. land assessed as having greater than a 1 in 1000 (>0.1%) but less than a 1 in 100 (<1.0%) annual probability of fluvial flooding in any year. As a requirement of the new NPPF (2023), Paragraph 162, the proposed development should satisfy the requirements of the Sequential Test and where applicable the Exception Test.

Sequential Test:

Under the NPPF (2023), Flood Zone 1 is defined as low probability flood risk. The proposal is for a commercial development, which in line with Table 2 is classified as 'less Vulnerable'.

Placing both these criteria into Table 3 (Flood Risk Vulnerability and Flood Zone 'Compatibility'), Less Vulnerable development in Flood Zone 2 determines that the Sequential test is passed, and Exception test is not required.

3.2 Strategic Flood Risk Assessment (SFRA)

SFRA's assess the risk associated with all types of flooding and provide the information required to identify the amount of development permitted in an area, how drainage systems in the area should function and also how risks in vulnerable areas can be reduced and/or mitigated. The NPPF states that regional planning bodies (RPB's) or Local Planning Authorities should prepare SFRA's in consultation with the EA.

The building sits within the coverage of Manchester City Council Level 2 Hybrid SFRA Final Report March 2011: a combined study undertaken by the local authorities forming the AGMA body. The published SFRA identifies current and future broad scale flood related issues in Trafford. The JBA Consulting 'final report' is dated March 2011 and remains current at the time of this assessment. The purpose of the SFRA is to assess and map all known sources of flood risk including fluvial, surface water, sewer, groundwater and all impounded water bodies, taking into account future climate change predictions.

A summary of the main elements from the SFRA associated with the district is detailed below. The full report can be obtained from the Manchester City Council website.

- SFRA provides a detailed understanding of flood risks across all areas from all sources.

- SFRA maps indicate the site to be at low risk of fluvial flooding (FZ1). However, these have now been superseded by the recently completed hydraulic modelling of the Corn Brook Culvert by the EA.
- Full sequential and exception tests to be carried out (where applicable).
- Flood resilient construction to be used where applicable.
- Safe dry access and egress to be assured.
- Surface Water drainage should be designed so that there is no flooding to the development in a 1 in 30-year event and so that there is no building flooding in a 1 in 100 year plus climate change event. Where possible sustainable drainage should be incorporated.

3.3 Statutory Authority Correspondence

Thomasons have consulted with the EA to obtain the modelled flood levels from the Corn Brook Culvert. Full details can be found in Appendix D.

United Utilities have also been consulted via a pre development enquiry and also via direct correspondence with MCC in July 2025 confirming acceptance of the connections into the combined sewer system. Evidence of correspondence with UU is contained within Appendix F.

4.0 DEFINITION OF FLOOD HAZARD

4.1 Sources of information

The NPPF requires the developer to consider the impact of runoff generated by the proposed development onto the downstream catchment, and to assess the risk of runoff from the surrounding district impacting on the development's footprint. Further, the report is to consider flood risk from all other sources. This section defines the flood risk receptors and anticipated flood risk. Section 5 then discusses in further the probability of flooding from defined sources and the likely impacts.

Table 2 summarises the main sources of information used in the identification of flood risk.

Table 2: Sources of information used in the identification of flood risk.

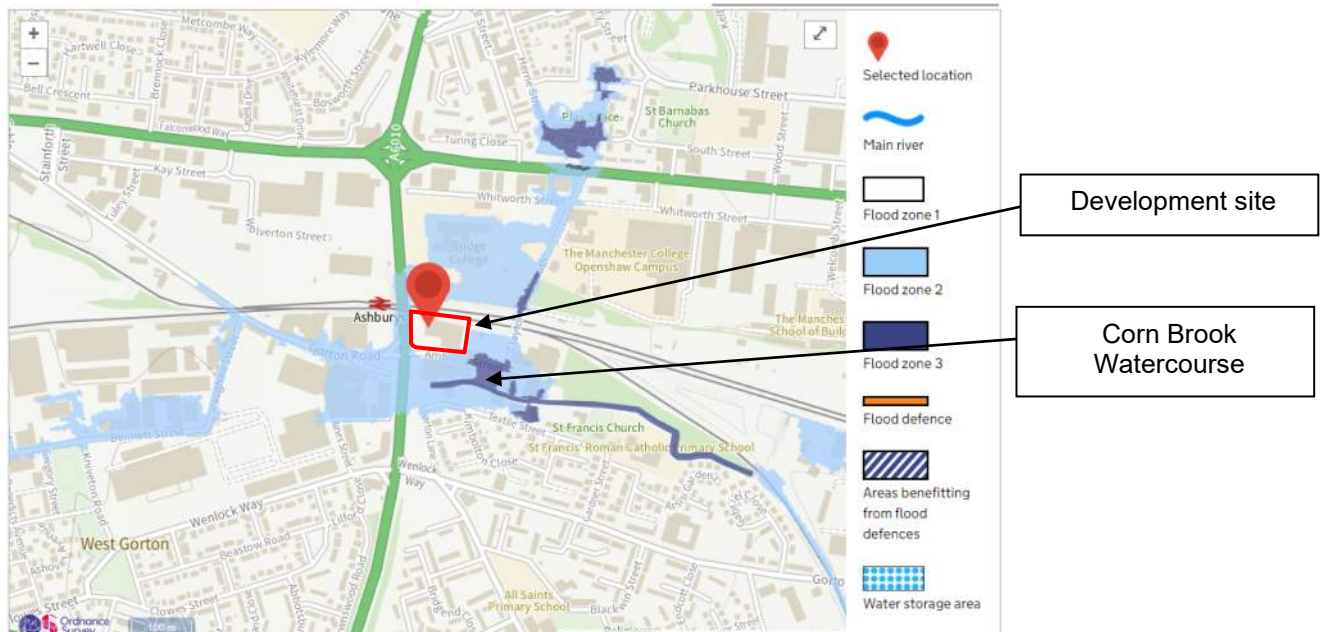
Source of Information	Details
Environment Agency Flood Map	From EA website and formal Written Response
United Utility Sewer Records	Various Maps
Historic Maps	From various websites
Local SFRA	Report & Various Maps

4.2 Flooding from Sea (Tidal) and Rivers & Watercourses (Fluvial)

As mentioned in earlier sections, the closest identified watercourse to the development boundary is the Corn Brook, located 60m south of the site within 3rd party land.

Figure 2 below indicates that the flood maps for planning provided by the Environment Agency (EA) locate the majority of the site in low-risk Flood Zone 1, i.e. land assessed as having less than a 1 in 1000 (0.1%) annual probability of fluvial flooding in any year. However, there is a small area of Flood Zone 2 set down from the main building in the southeast corner, i.e. land assessed as having greater than a 1 in 1000 (>0.1%) but less than a 1 in 100 (<1.0%) annual probability of fluvial flooding in any year. Refer to Section 5 for full details of this associated with the development intent.

Figure 2 – The Environment Agency’s Indicative 100-year Flood Plain Map



4.3 Sewers and Private Drainage

The United Utilities (UU) sewer records have been reviewed as part of this assessment. There is shown to be a 970x910mm brick combined sewer at circa 5m depth in Ambrose Street flowing west. There is also a 300mm combined sewer emanating from the development site into Ambrose Street, again flowing east. No surface water sewers have been identified in close proximity.

A CCTV of the existing private drainage has confirmed that the current roof and external areas connect to the existing combined drainage network in the site with unrestricted outflow to the combined public sewer. Figure 3 below is an extract of the United Utility sewer records for the area from 2006.

The UU adopted sewers and private drainage networks serving the surrounding district ensures that the development footprint is protected from the impact of both upstream and downstream runoff. It is speculated that complete protection may well exist beyond a storm event equivalent to the 30-year statistical event. Beyond this projection, there may be a small degree of peripheral ‘Exceedance’ flooding in the highways associated with the surface water sewer, which is set much lower than the proposed building. In light of this the risk of flooding from sewer / drainage can be considered to be low.

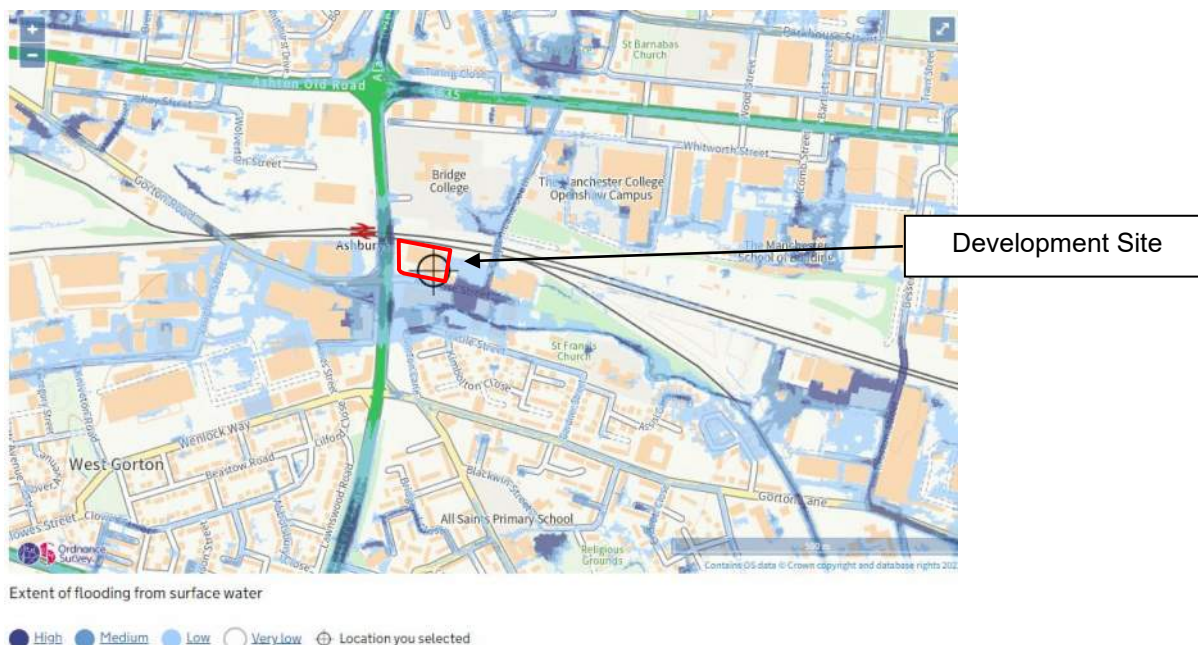
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The Environment Agency's surface water flood maps (refer to Figure 4) show the site area at very low risk of surface flooding. There is a small area to the east side at low risk, associated with the low-lying levels. Any areas shown as at medium/high risk are contained within Ambrose Street, with these areas being a sufficient distance away from the site to have no implications for flood risk or access and egress.

There are no existing surface water flow routes through the site that would need to be maintained.

As part of the proposed development the levels across the development will ensure that all low points are located away from buildings, thus posing a low risk. The new surface water drainage will also be designed and installed in accordance with the latest guidance and climate change allowances to ensure no surface water ponding will occur.

Figure 4 – The Environment Agency's Indicative Surfaced Water Flood Map



4.6 Artificial Sources

No other artificial sources such as canals, reservoirs or other waterbodies have been identified in the vicinity of the site to pose a flood risk.

4.7 Summary

Table 3 below considers each of the sources and defines in tabular format the probability of flood risk associated to each and the likely impacts.

Table 3: Flood Risk Summary

Source	Flood Risk	Impact	Remarks
Tidal	Low	Low	The site is not at risk of Tidal flooding
Fluvial (Watercourse)	Low-Medium	Low	Site located predominantly in Low Risk Flood Zone 1 from Fluvial Flooding according to the EA indicative flood maps. Small area located in medium risk Flood Zone 2. Further assessment is identified Section 5 on this risk.
Surface (Overland Flood Flow)	Low	Low	Site and surrounding area has a nominal fall to the south west. SFRA and EA maps indicate site to be at very low risk from surface water flooding. Post development mitigation measures such as raised FFL to mitigate risk.
Sewers & Drainage	Low	Low	Large diameter existing UU sewer located in adjoining highways to serve the local area.
Groundwater	Low	Low	No indication through SFRA that site at risk of groundwater flooding.
Artificial Sources	Low	Low	No Artificial sources in close proximity.

5.0 ASSESSMENT OF FLOOD RISK ON PROPOSED DEVELOPMENT

5.1 Summary

As discussed in Section 3, the development site has been categorised in accordance with the SFRA only as being partly located within a potential Medium Flood Risk Area from fluvial flooding. This is related to flood risk from the Corn Brook. As such further assessment is required.

Other flood risk sources such as watercourse, groundwater, sewer and overland flows have been considered and have been found not to be a flood risk generator to the site.

5.2 Flooding from the Fluvial Influenced Corn Brook

The EA have been consulted to provide the modelled flood data from the Corn Brook via a Product 4 request. A response was received on the 14th October with the detailed flood levels.

Based on a review of the EA flood data, Table 4 below outlines the peak flood levels.

Table 4: Peak Flood Level – Corn Brook

Node Ref:	1 in 100 year (1% AEP)	1 in 100 year (1% AEP)	1 in 1000 year (0.1% AEP)
4	50.02m AOD	50.73m AOD	52.00m AOD

The proposed finished floor level (FFL) of the new building is to be set at approximately 52.65m AOD. This level is 0.65m higher than the 1 in 1000-year flood event and significantly above all other flood levels.

In light of this, this data has confirmed that the development building is located outside of the impact of fluvial based flood waters and can be classed as located in low-risk Flood Zone 1. There may be some minor flooding in the adjacent Ambrose Street highway outside of the site boundary that is set down from the FFL of the building.

6.0 SUSTAINABLE DRAINAGE SYSTEM (SuDS) ASSESSMENT

6.1 Consultation

Thomasons have consulted with United Utilities via a predevelopment enquiry. In response, they have confirmed that evidence should be provided that the SuDS Hierarchy has been assessed. Should this assessment confirm that the only viable surface water outfall is to drain to a combined sewer then they would allow connect at a peak rate not exceeding 21l/s. Full details can be found in Appendix F.

6.2 Existing Surface Water Runoff

The existing brownfield flow rates from the site have been defined in Table 5 below based on the modified rational method for the various storm events of the existing site area currently draining to the combined water sewer via the existing connections. These are considered to be on the high side and very much dictated by the size of the existing piped network.

Table 5: Existing Brownfield Runoff Rates

	Site Area (ha)	1 Year (30mm/hr)	30 Year (65mm/hr)	100 year (95mm/hr)
Development Site	0.52	43 l/s	94 l/s	137 l/s

To satisfy MCC guidance & policy, the existing Greenfield rates have also been defined in Table 6 below.

Table 6: Existing Greenfield Runoff Rates

Area (ha)	1 year (l/s)	Qbar (l/s)	30 year (l/s)	100 year (l/s)
0.52	2.5	2.9	4.9	6.0

To prevent blockage, the flow control will be set to a peak rate of 5l/s.

6.3 Geology

A detailed Phase 2 site investigation has been undertaken at the site. This has identified Made Ground encompassing silty clay to a maximum depth of 2.7m over gravelly sandy silty clay to depth. In light of these findings, infiltration-based SuDS devices are deemed to be unsuitable for use on the site.

6.4 Hydrological Assessment

The closest identified feature is a 1.1m diameter culverted watercourse, located some 60m beyond the eastern boundary that flows south beneath Ambrose Street and outflows to the Corn brook Watercourse.

Investigations undertaken by the applicant have found that both the 1.1m diameter culvert and downstream Corn Brook watercourse are heavily blocked such that no water appears to be flowing as it is continually surcharged. The culvert is located in 3rd party land and the applicant has no control over when this could be cleared. Should a connection be made to the culverted section, there is too much of a risk of the site flooding due to the restricted outflow. Therefore this option has been discounted. Refer to Appendix G for details of the investigation.

6.5 Existing Sewer Records

The United Utilities (UU) sewer records have been reviewed and there are a number of combined sewers within Ambrose Street to the south of the site.

6.6 Sustainable Drainage Systems

SuDS Objectives:

Sustainable drainage developed in line with the ideals of sustainable development is collectively referred to as Sustainable Drainage Systems (SuDS). At a particular site, these systems are designed both to manage the environmental risks resulting from the urban runoff and to contribute wherever possible to environmental enhancement. SuDS objectives are therefore to minimise the impacts from the development on the quantity and quality of the runoff and maximise amenity and biodiversity opportunities (CIRIA C753, 2015).

The SuDS Management Train

The 'Management Train Approach' should be central to the surface water drainage strategy of the proposed site. The main objective is treatment and control of runoff as near to the source as possible protecting downstream habitats and further enhancing the amenity value of the site. This concept uses a hierarchy of drainage techniques to incrementally reduce pollution, flow rates and volumes of storm water discharge from the site, and is as follows:

1. **Prevention** – The use of good site design and housekeeping measures to prevent runoff and pollution and includes the use of rainwater reuse / harvesting.
2. **Source Controls** – Control of runoff at source or as close to source as possible (e.g. soakaways, green roofs, pervious pavements).
3. **Site Control** – Management of water in a local area and can include below ground storage / attenuation, detention basins, large infiltration devices.
4. **Regional Control** – Management of water from a site or various sites and can include wetlands and balancing ponds.

SuDS Site Constraints

SuDS techniques are suitable for all sites in some form; therefore, an assessment of the existing site is required so that SuDS limitations can be determined.

- Land Use Characteristics: The type of development plot reduces the range of prevention options, though site control SuDS devices can be considered below ground.
- Site Characteristics: Based on an assessment of the historic site investigation, shallow infiltration SuDS devices would not be suitable for use on the site.
- Catchment Characteristics: In terms of runoff characteristics the site is considered to be 'Brownfield'.
- Environmental and Amenity Performance: The inclusion of SuDS within the overall development is a key driver in providing both amenity and habitat creation. Most 'Green' type SuDS options cannot be considered for this site due to the type of development. Maintenance plans will be prepared for all SuDS devices that are included.

SuDS Methods

Tables 7 and 8, below, provide an assessment of various above and below ground SuDS methods that can provide water quality treatment and management of flows to reduce runoff rates and volumes and whether they can be suitably incorporated at this development site. The purpose of this assessment is to set out options to be considered at the planning stage with consideration to time constraints, viability and lifetime maintenance of the storage and distribution development.

Table 7: Surface SuDS Methods

Method	Comment	Suitability for development
Green Roofs	Can be used on suitable low-rise buildings to provide retention, attenuation and treatment of rainwater, and promotes evaporation and local biodiversity.	<u>Not suitable:</u> Architectural proposals for the development involve a pitched roof arrangement which are not suitable for green roofs.
Water Butts	Plastic tanks placed at the base of rainwater down pipes to collect rainwater runoff from the roof areas.	<u>Not Suitable</u> Not appropriate for developments like these.
Rainwater Harvesting	Rainwater harvesting reduces the total runoff volume from the developed site and reduces treated water consumption.	<u>Not suitable:</u> - Additional costs of installation would have severe effect on viability of the development. - Running and maintenance costs would not be acceptable to our client. - The ability to restrict peak flow rates and short-term peak volumes is non-existent where a critical storm event occurs.
Infiltration	Reduces total run off volume from the development.	<u>Not suitable:</u> Underlying cohesive ground is unsuitable for infiltration-based SuDS options.
Permeable Surfacing (Infiltration)	- Reduces total run off volume from the development. - Can be used to enhance water quality.	<u>Not suitable:</u> Underlying cohesive ground is unsuitable for infiltration-based SuDS options.

Method	Comment	Suitability for development
Permeable Surfacing (Standard)	• Can be used to enhance quality of runoff water. • Sub-base provides 'source' storage and reduces the volume of storage downstream. • The storage can be created with selection of the stone fill or use of plastic box stems. • Impermeable membrane at base of construction to prevent impact on pavement stability.	<u>Not suitable:</u> • Underlying cohesive ground is unsuitable for infiltration-based SuDS options.
Swales, basins and ponds	• Provide areas for above ground surface runoff storage. • Swales also allow filtering of particulate matter, improving water quality	<u>Not suitable:</u> • Space constraints on site do not permit large above ground areas for storage. • No scope to reduce car parking numbers due to site viability.

Table 8: Sub-Surface SuDS Methods

Method	Comment	Suitability for Development
Geocellular Storage	• Suitable for sites with insufficient space for basins etc. • Suitable for sites where topography prevents the use of open basins etc. • Can be very effective infiltration devices subject to ground conditions.	<u>Suitable:</u> • Subject to details design and drainage layout.
Large Diameter Pipes, Culverts or Tanks	• Suitable for sites with insufficient space for basins etc. • Provide a volume of below ground storage with a high void ratio and good man entry provision to allow for future maintenance and cleaning. • Generally suitable for adoption by the statutory water company (e.g. United Utilities).	Not Suitable: • More suited to large housing developments.

SuDS Hierarchal Approach

Based on the SuDS assessment in Tables 7 and 8, plus an assessment of the local site conditions, the SuDS hierarchal approach for discharge of surface water at the development site is considered in greater detail below:

Table 9: SuDS Hierarchal Approach

Method	Suitability	Suitability for Development
Infiltration to Ground	No	Underlying cohesive ground is unsuitable for infiltration-based SuDS options.
Connection to Watercourse	No	Culvert and watercourse are heavily blocked with no mechanism for them to be cleaned. Furthermore the connection would be lower than the identified water levels. Therefore this option has been discounted.
Connection to Surface Water Sewer	No	No surface water sewer in close proximity
Connection to a Combined Sewer	Yes	Reuse existing connection to the combined sewer at restricted rates.

SuDS Design Philosophy

The SuDS assessment and hierarchal approach discussed in Tables 7, 8 & 9 above has defined the overall SuDS strategy. Thus the SuDS philosophy for the development site is the promotion of Site Control techniques with discharge to the combined sewer at restricted rates to reduce the flooding impact and downstream flooding.

The following design philosophy is proposed:

- Surface water treatment using the 'Management Train' approach to remove and isolate contamination at all SuDS facilities prior to connection.
- Site Control by the inclusion of a geocellular attenuation tank beneath the car park.
- Aim to limit where possible the impermeable fraction of development.

Due to the limited external area, there are no other options for 'Green' based SuDS.

7.0 OUTLINE DRAINAGE STRATEGY

7.1 Surface Water Drainage

The general principle of the surface water drainage strategy is to collect the runoff from the new building & parking area, and direct to a below ground surface water drainage network within the car parking area. This will outfall to the combined sewer at the southwest corner via the existing connection. A flow restricting device will be placed on the network with the peak flows restricted to 5l/s as described in Section 6.2 and an online geocellular tank will retain the peak flows.

The proposed private drainage layout for the new development site will be designed in accordance with BS EN 752: 2008 and Building Regulations part H guidance, i.e. up to the 30-year storm return period criterion.

Flooding can occur on a local scale beyond the 30-year criterion due to runoff exceeding the capacity of the minor system during extreme events and it can only be addressed on a site-specific basis. Design and Construction Guidance (DCG) states that properties should be protected against flooding from extreme events (1 in 30 year) and that flood pathways are identified when the drainage system is exceeded.

In the case of this development, exceedance flows will be all those over and above the 30-year design criterion set by Building Regulations guidance. Using storage within the external parking areas would be achievable and would direct flood water away from the proposed building, with flows directed back into the surface water drainage network as water levels in the drainage network receded. The 20m³ of flooding for the 1 in 100 plus 45% climate change allowance is shown in the corner of the parking area of the drainage GA.

In May 2022, the Environment Agency released updated climate change allowances for peak rainfall intensities which should be applied to new developments. Rather than nationwide allowances, each area will have its own peak rainfall allowances. In the case of the Manchester area, this is the Irwell Management Catchment peak rainfall allowances.

Based on the nature of the development, a lifespan of 75 years is anticipated. Therefore, the potential climate change allowance for the 2070's ranges between 30% for the central allowance and 45% for the upper end allowance. As such, an allowance of 45% for climate change on peak rainfall intensity will be included in calculations.

Runoff from roofs is generally considered to be clean and will be discharged directly into the surface water network. As the number of car parking spaces will be limited, a petrol interceptor is not to be considered. Silt will be prevented from entering the drainage system by the use of trapped gullies, silt boxes and separators.

Although it is envisaged that Prevention and Source Controls measures could be included in the final scheme, this strategy will assume for outline calculations purposes that only Site Control methods are incorporated. A full detailed hydraulic surface water network has been simulated in the Causeway Flow Design Software. This takes into account the peak discharge rate of 5l/s and assumes no prevention & source control measures are incorporated and no infiltration to ground is possible. It is noted that these rates and volumes are preliminary for this outline assessment and are likely to alter at detailed design stage when more site-specific information is made available.

Drawing 11325-025 in Appendix C indicates the Drainage Strategy based on the Architect's masterplan intent, with the hydraulic calculations in Appendix D.

7.2 Management & Maintenance

The long-term maintenance of the new drainage infrastructure will be with the owner / occupier of the proposed commercial units in line with best practice guidance. Annual inspections will need to be carried out and clearing of drainage channels, gullies, catchpits and petrol interceptors undertaken. Typically the maintenance regime will be in line with Table 10 below.

Table 10: Outline Management and Maintenance Strategy

<u>Future Maintenance of the Drainage System</u>			
Responsibility	Feature	Maintenance	Frequency
Owner / Occupier / Management Company	Drainage Channel.	Regular maintenance / removal of blockages and silts.	Ad-hoc flushing / jetting and emptying of silt traps required.
	Rainwater gutters, downpipes and above ground drainage.	Regular maintenance and inspections.	Ad-hoc sweeping and emptying of silt and debris required. Annual visual inspections to check for damage/leaks.
	Flow control chambers.	Regular maintenance / removal of blockages and debris.	Annual inspection and following significant rainfall events.
	Geocellular Attenuation / Tanks	Regular maintenance / removal of blockages and debris.	Annual inspection and following significant rainfall events.
	Pipes, sewers, manholes, outfall headwall.	Regular maintenance / removal of blockages and debris.	Annual inspection and removal of silts if required.

7.3 Foul Drainage

Foul water flows generated from the site will discharge unrestricted to the existing foul water drain connecting to the combined sewer within Ambrose Street.

The proposed private drainage layout for the new development site will be designed in accordance with BS EN 752: 2008 and Building Regulations Part H guidance.

8.0 MANAGEMENT MEASURES, OFF SITE IMPACTS AND RESIDUAL RISK

8.1 Flood Risk Management Measures

The surface water drainage strategy for the new development site will be to drain into the combined sewer system via the existing connection. The new surface water networks will be designed in line with current British Standard guidance up to the 100-year storm return period including an allowance for climate change. Beyond the 30-year criterion out of chamber flooding may occur with flood water directed away from the building to the parking areas where it will then be directed back into the drainage network as the pipe water levels recede.

The use of a flow restricting device and SuDS in the form of Site Control measures will help to minimise the flood risk impact to the surrounding sewers.

There will be a site management health and safety document prepared in respect of the final development. This will include the required maintenance regime for the on-site drains and drainage facilities such as the channels, gullies, pipes, manholes and all SuDS facilities.

The owner will be responsible for site cleanliness, gully emptying and drain cleansing to ensure that the surface water drainage system will always operate at its maximum efficiency.

8.2 Off Site Impacts

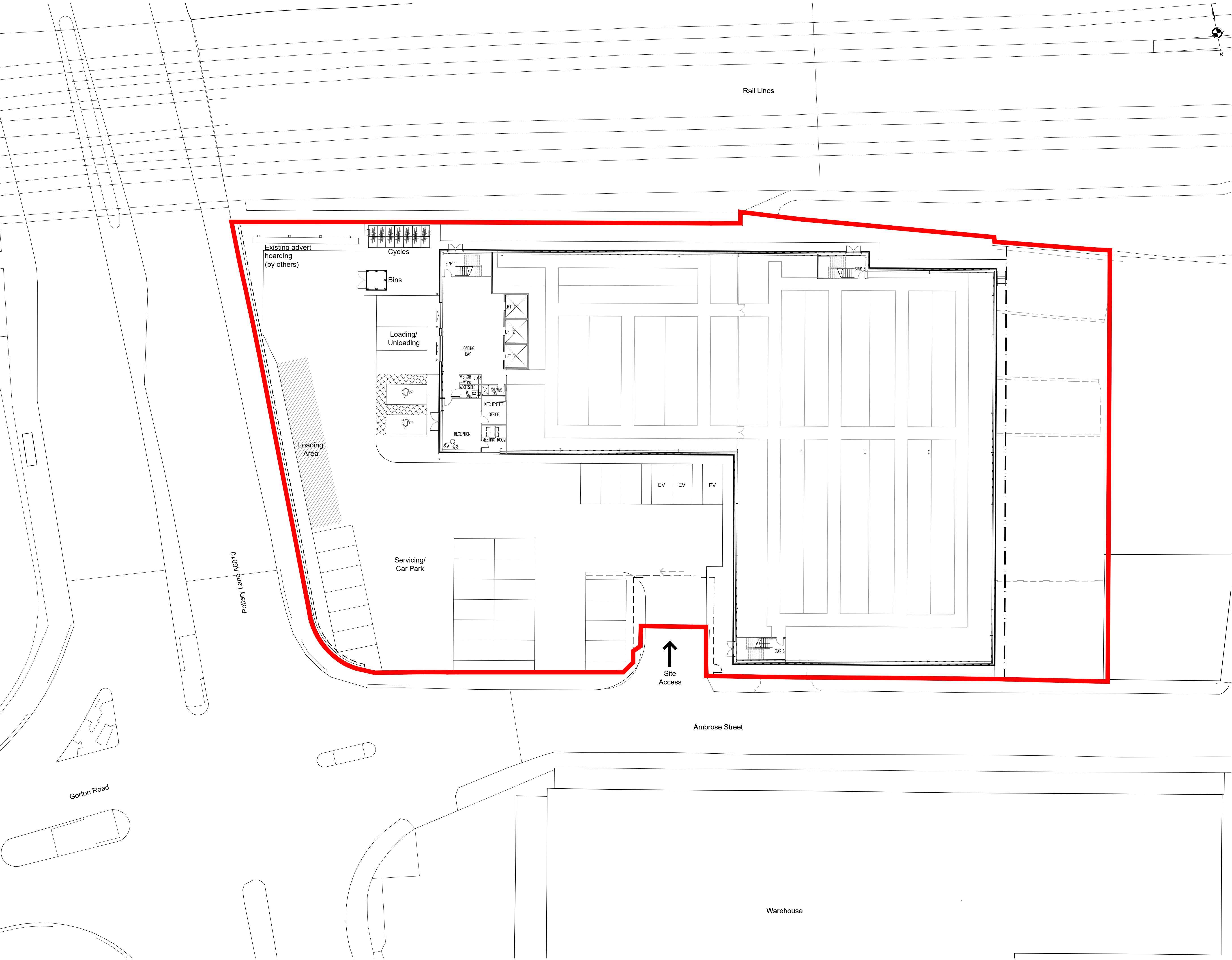
Surface water runoff will mimic the pre-development scenario as there is no change to the impermeable areas or the drainage networks, therefore not increasing the flood risk to the downstream catchment.

8.3 Residual Risk

With careful design of the drainage elements as described above there will be no residual flood-related risks that will remain after the development has been completed.

Flood risk to people and property can be managed but it can never be completely removed; a residual risk remains after flood management or mitigation measures have been put in place. The only known flood related residual risk that will remain after flood management or mitigation measures have been put in place will be the risk of flooding from the drainage networks beyond the extreme event. By raising the building levels the risk is mitigated.

Appendix A – Architect Layout Plan



SCHEDULE OF ACCOMMODATION:		
SITE AREA	1.27 Acres	
	0.52 Hectares	
LINE OF 2400MM HIGH PALADIN FENCING AND GATES		
LINE OF 2400MM PALADIN FENCE ON RETAINING WALL		
GROSS INTERNAL FLOOR AREA		
GROUND FLOOR	2,225sqm	/ 23,955sqft
FIRST FLOOR	2,225sqm	/ 23,955sqft
SECOND FLOOR	2,225sqm	/ 23,955sqft
THIRD FLOOR	2,225sqm	/ 23,955sqft
FOURTH FLOOR	2,225sqm	/ 23,955sqft
TOTAL FLOOR AREA -	11,125sqm	/ 119,775sqft
GROSS EXTERNAL FLOOR AREA		
GROUND FLOOR	2,300sqm	/ 24,756sqft
FIRST FLOOR	2,300sqm	/ 24,756sqft
SECOND FLOOR	2,300sqm	/ 24,756sqft
THIRD FLOOR	2,300sqm	/ 24,756sqft
FOURTH FLOOR	2,300sqm	/ 24,756sqft
TOTAL FLOOR AREA -	11,500sqm	/ 123,780sqft
PARKING SPACES		
25no. STANDARD SPACES		
3no. LOADING SPACES		
2no. DDA SPACES		
3no. EV SPACES		
14no. CYCLE SPACES		

G	UPDATED NORTH ELEVATION OF PLAN	06.03.24	LT	GB
F	UPDATED NORTH EAST CORNER	06.09.23	LT	GB
E	RECEPTION/OFFICE/MEETING ROOM/ AMENITIES UPDATED. STORE NOW SHOWER	15.05.23	PS	GB
D	PATH BY EV SPACES, PAVEMENT FILLED	21.04.23	PS	GB
C	DOORS RECESSED	26.10.22	DC	GB
B	STAIR AMENDED, BINSTORE ADDED	10.10.22	PS	GB
A	PLAN AMENDED	03.10.22	PS	GB
Rev	Description	Date	By	CHK

Status		Purpose for Issue	
Planning	☒ Tender	☐	
Construction	☐ As Built	☐	PLANNING

Client
STORAGE WORLD

Contract
PROPOSED WORKS
STORAGE WORLD, AMBROSE STREET,
MANCHESTER

Drawing
PROPOSED SITE PLAN

bateandtaylor
architects

www.bate-taylor.co.uk

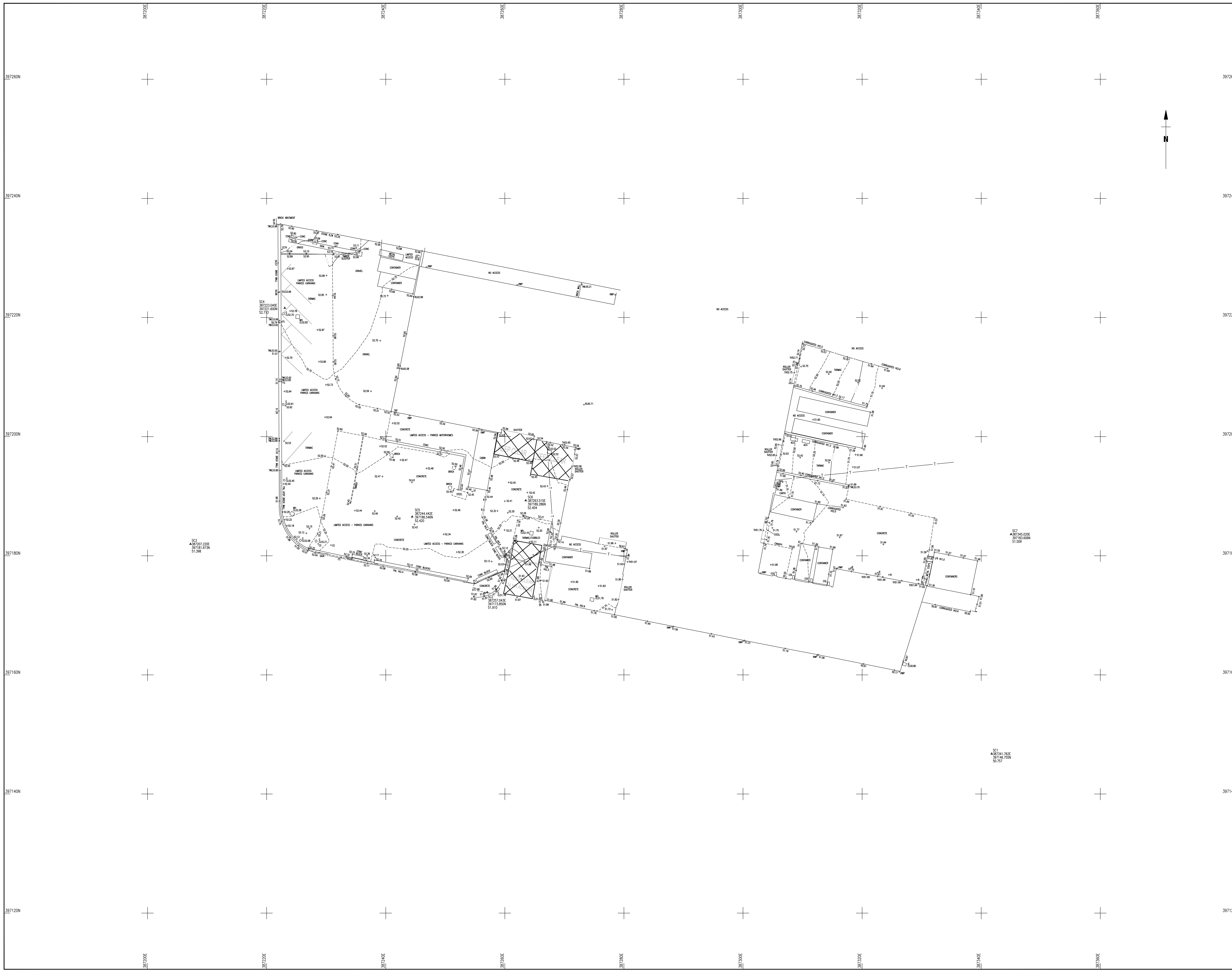
macintosh house
4a cambridge street
manchester m1 5gg

tel: 0161 236 0999
fax: 0161 236 0404
mail@bate-taylor.co.uk

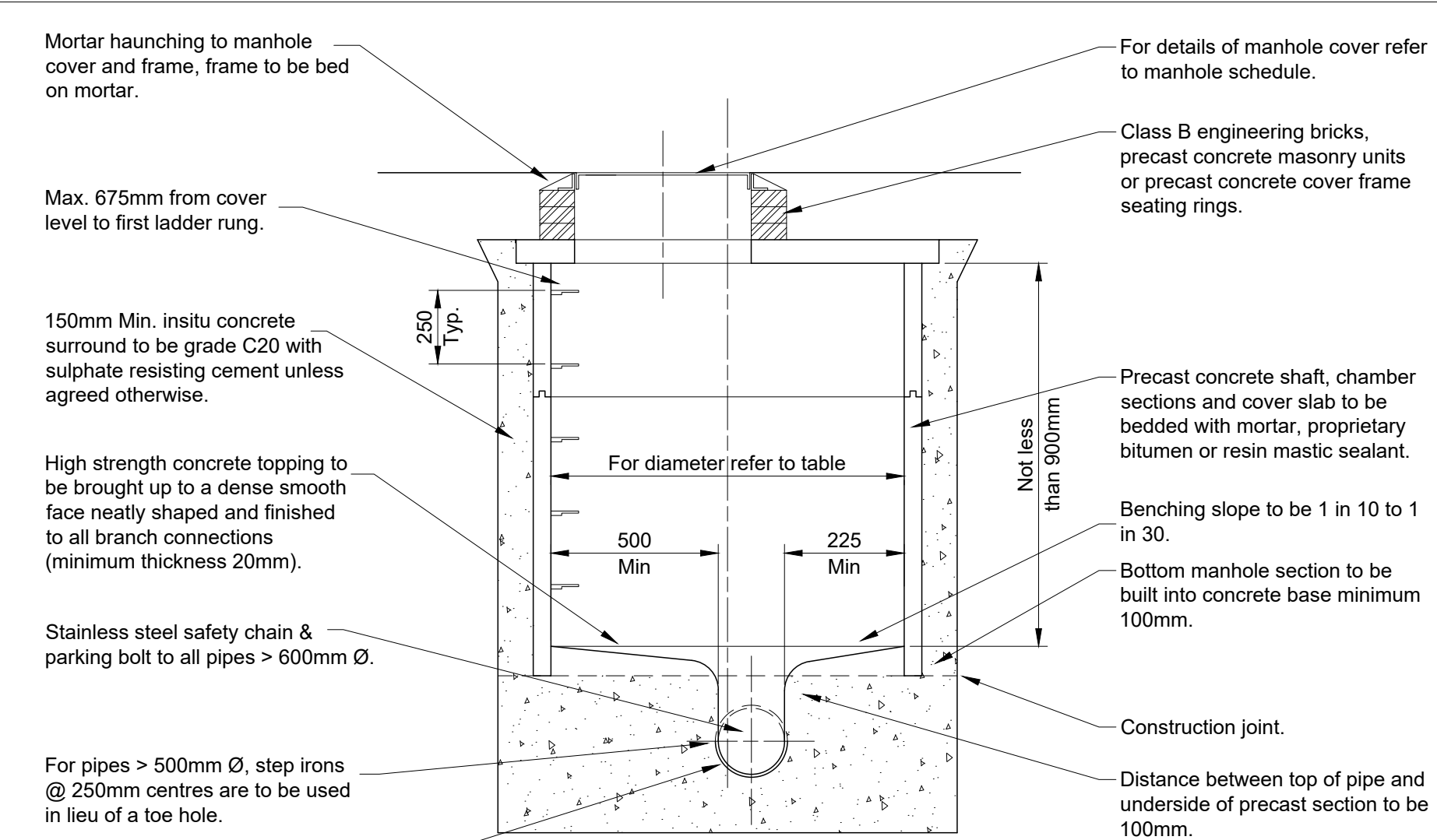
Drawing No.	MH1314-07	Revision	G
Scales	1:200@A1	Date	SEPT '22
Drawn	PS	Checked	GB

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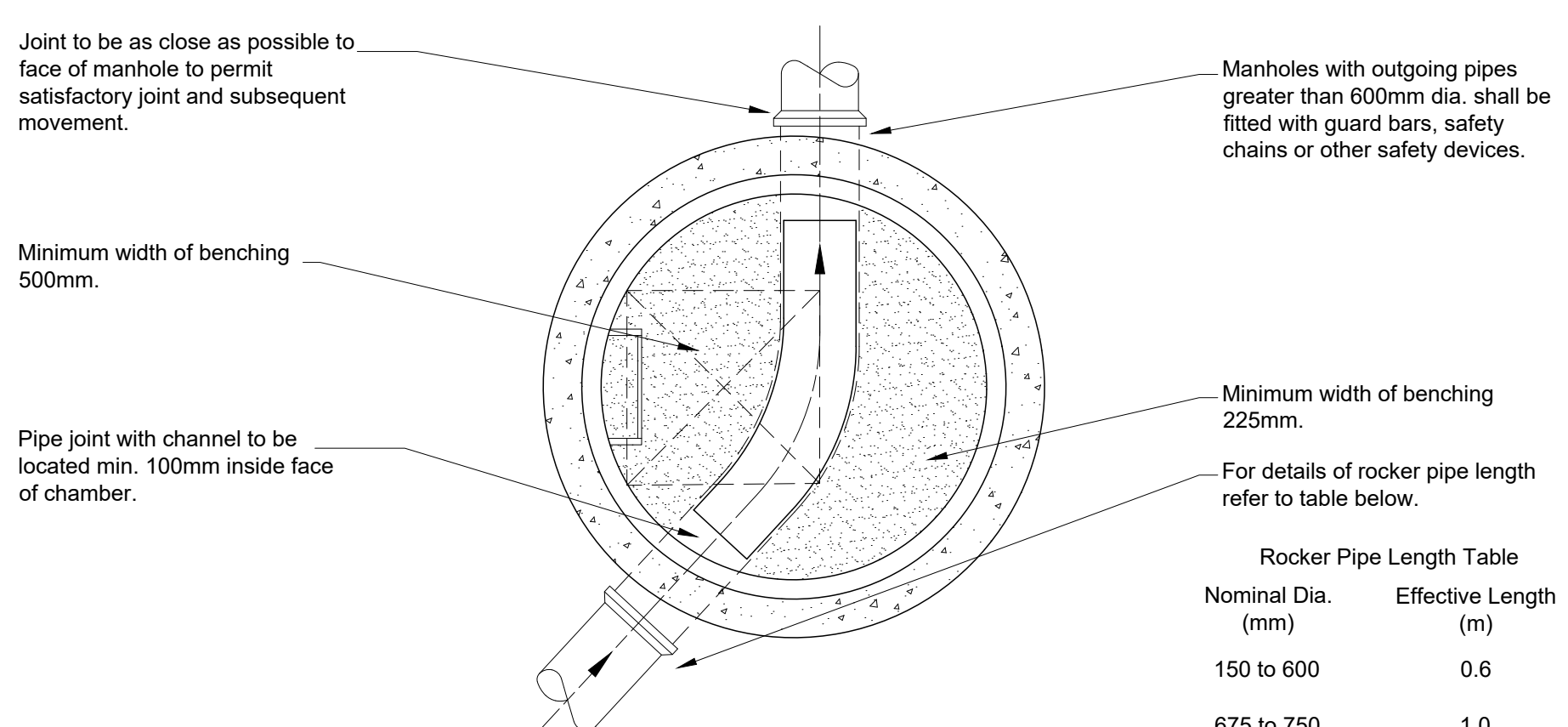
Appendix B – Topographical Survey

[illegible]

Appendix C – Thomasons Drawings



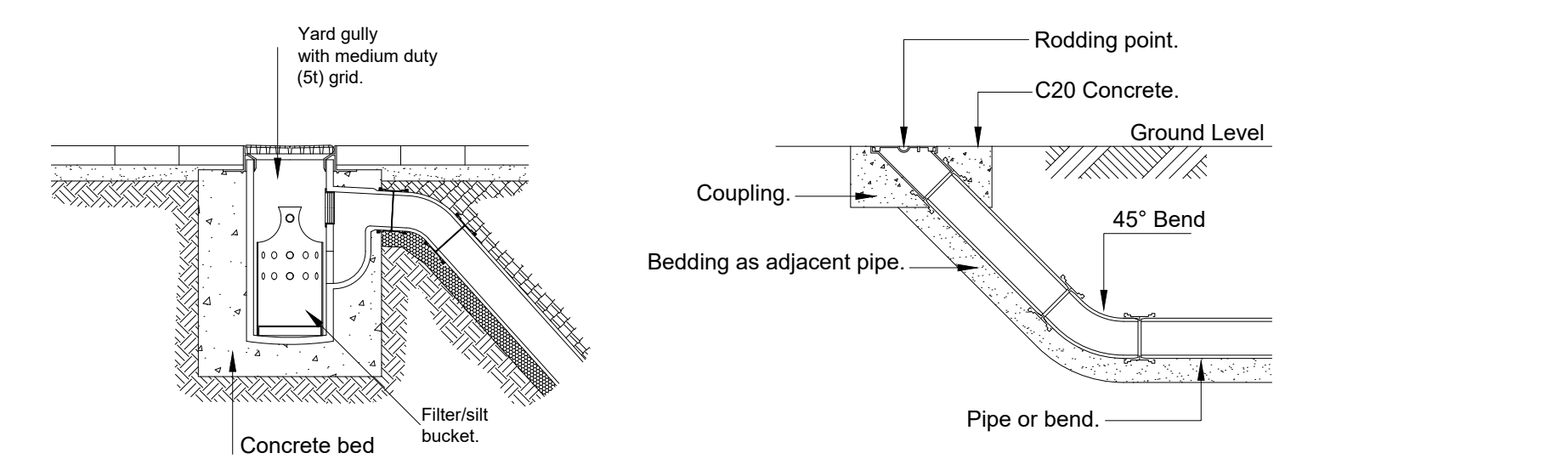
Manhole Diameter Table	
Diameter of largest pipe in manhole (mm)	Internal diameter of manhole (mm)
Less than 375	1200 *
500 - 700	1500
750 - 900	1800
975 - 1050	2100



Typical Manhole Detail - Type B
Scale 1:20

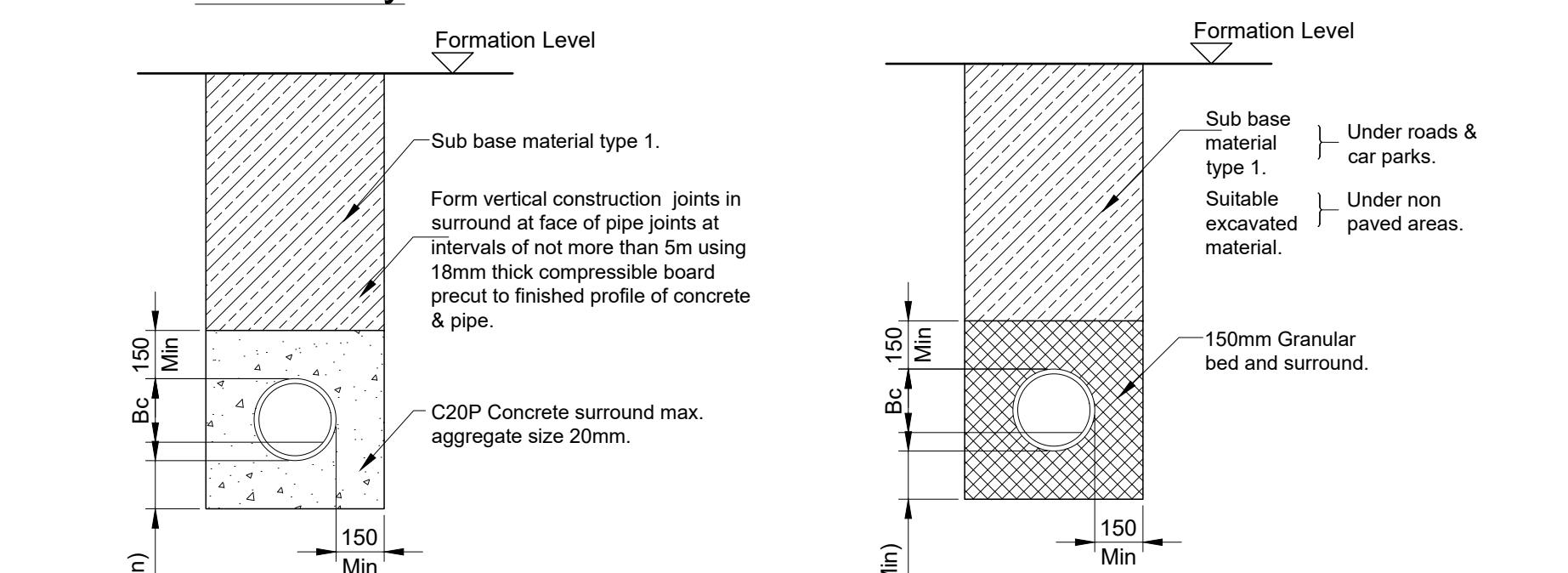
Max. Depth from cover level to pipe soffit 1.5m to 3.0m

Single inlet & outlet pipe is for illustrate purposes only, refer to drainage layout for no. of pipes and direction.



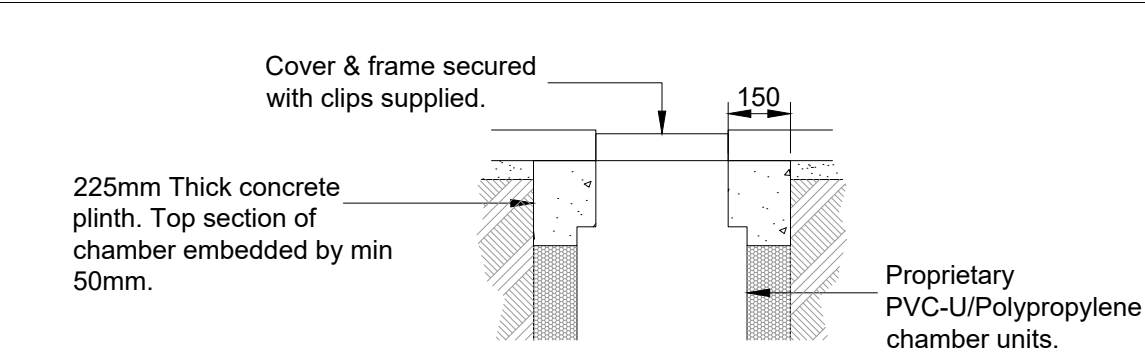
Yard Gully

RODDING POINT

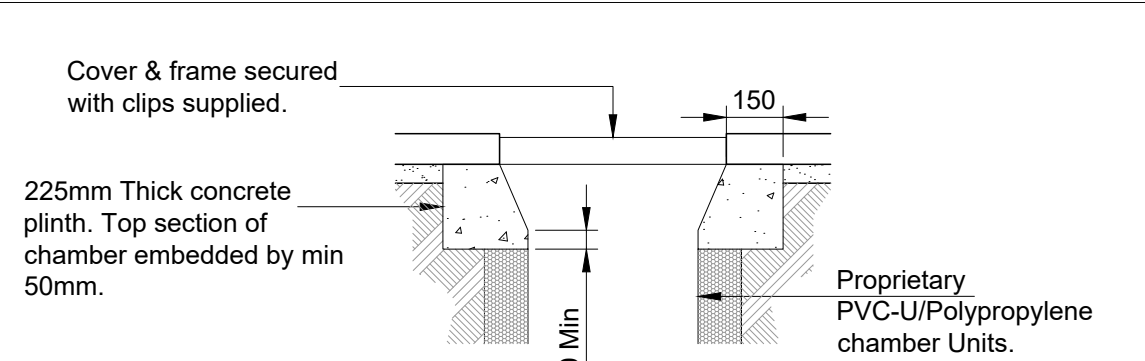


Pipe Bedding - Type Z

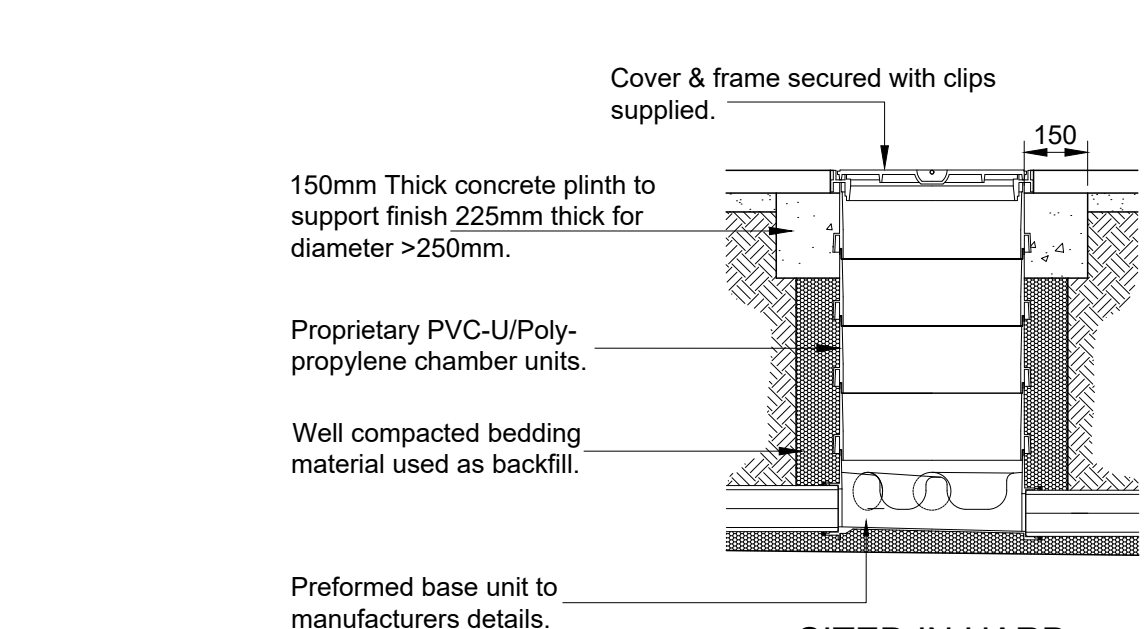
Pipe Bedding - Type S



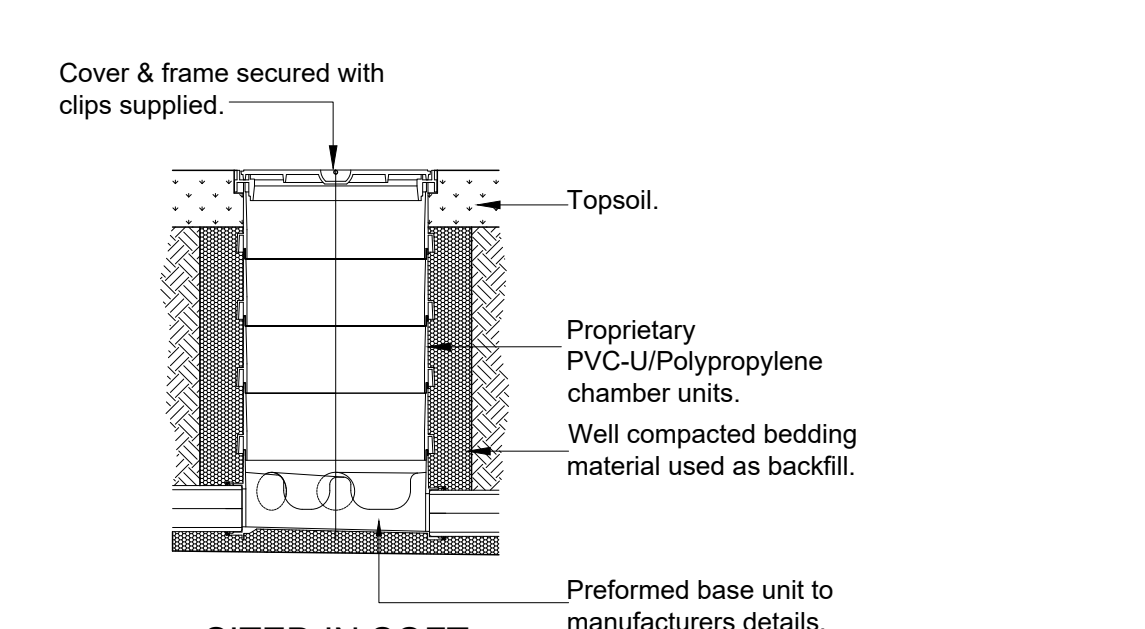
COVER SMALLER THAN CHAMBER.



COVER LARGER THAN CHAMBER.



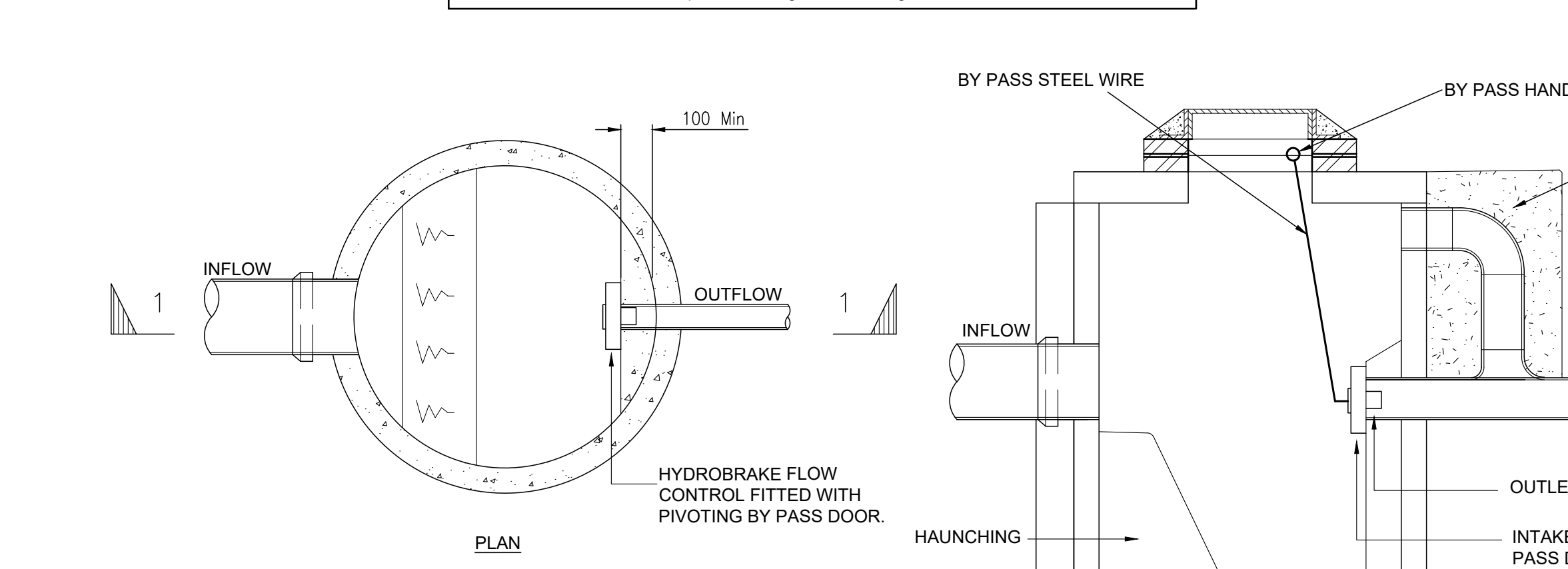
SITED IN HARD LANDSCAPED AREAS.



SITED IN SOFT LANDSCAPED AREAS.

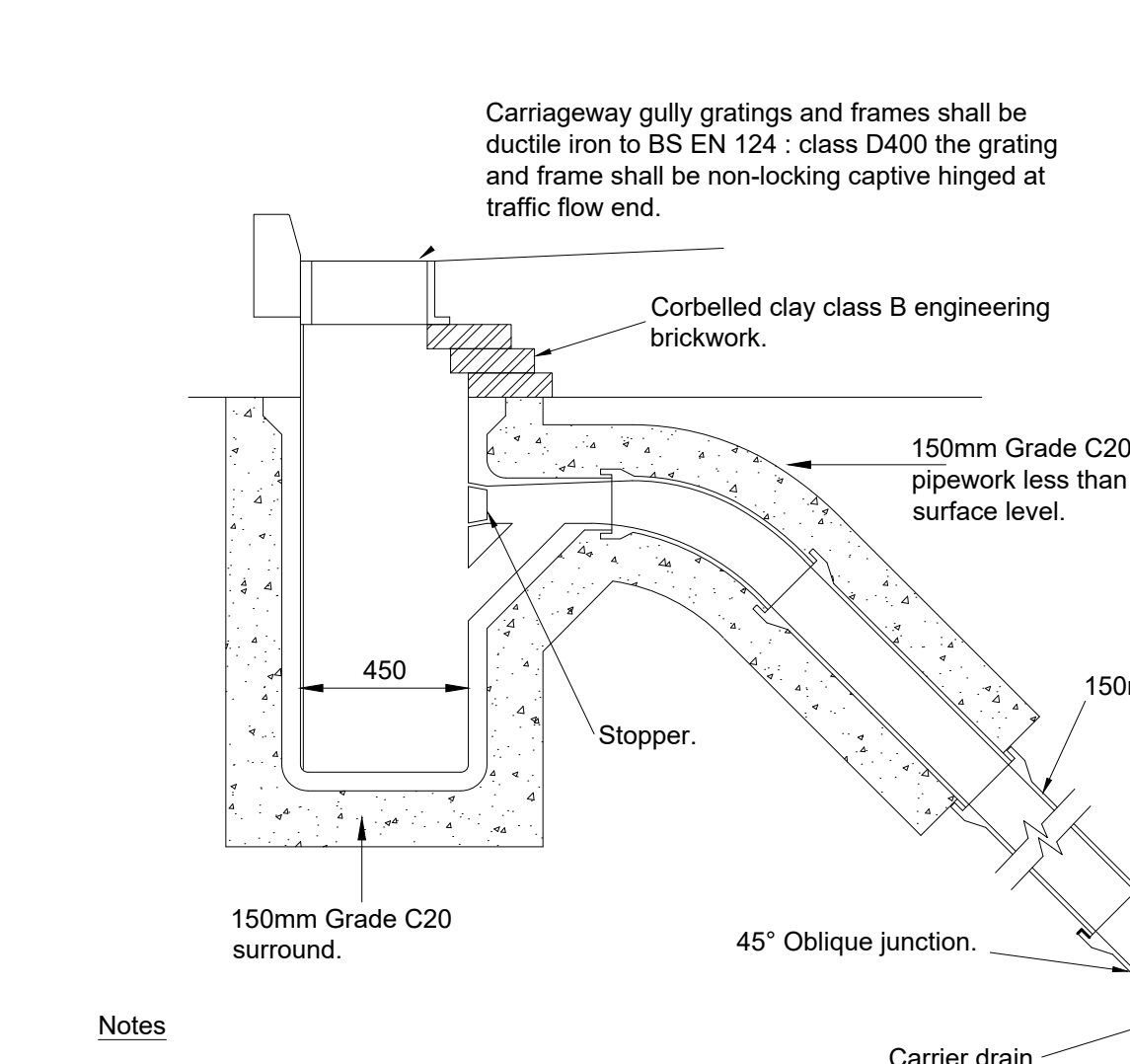
PVC-U/POLYPROPYLENE INSPECTION CHAMBER DETAIL IN GARDENS OR LIGHT PAVED AREAS - TYPE 2.

Where chamber is in road, replace bedding backfill with grade 20 Concrete 150mm min thick.



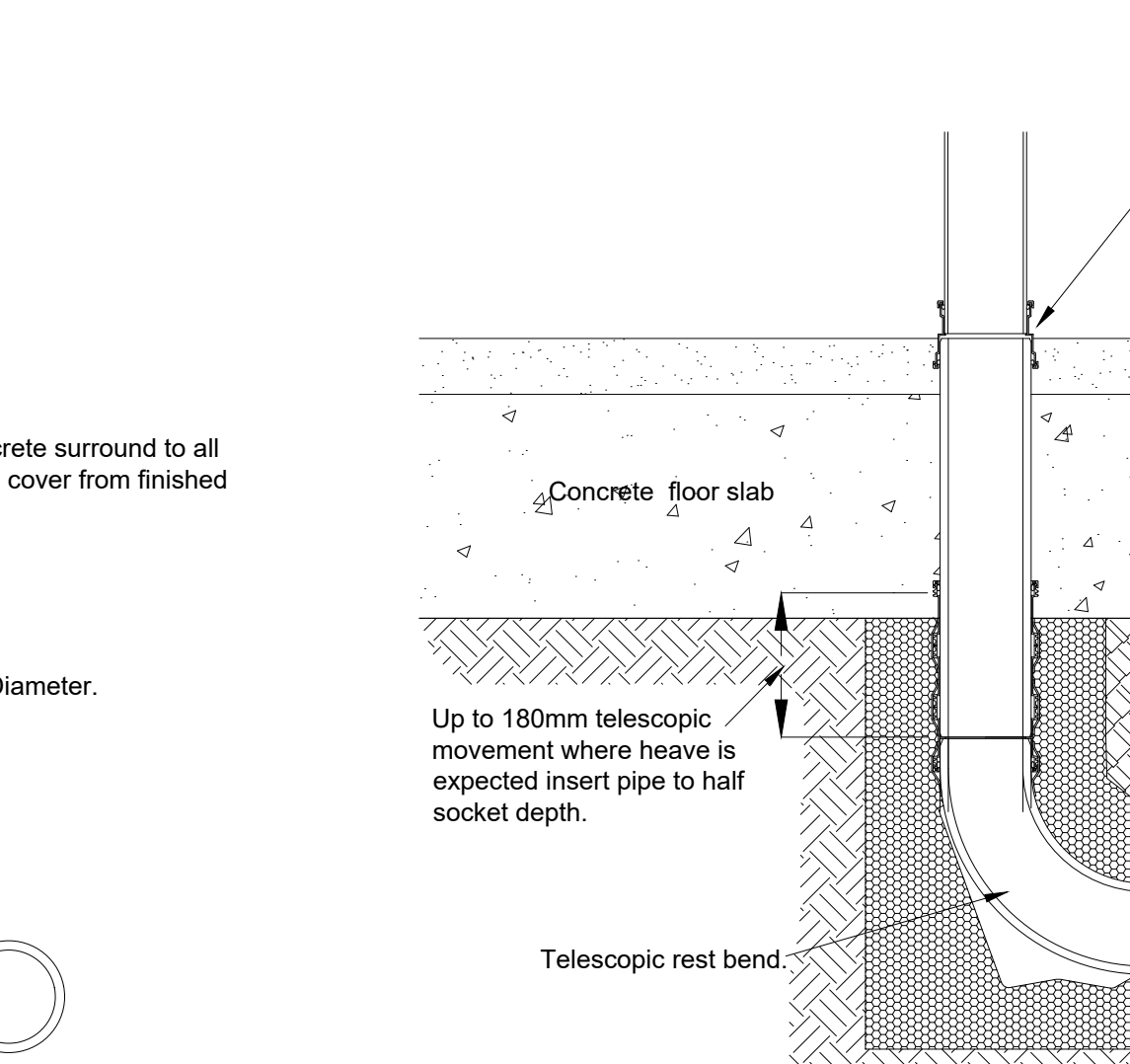
NOTE :
THIS DETAIL IS INDICATIVE ONLY.
SEE MANUFACTURERS DRAWINGS
AND SPECIFICATION FOR
CONSTRUCTION DETAILS.

VORTEX CONTROL CHAMBER



- Notes
- Gully pot to be of 100 litres capacity.
 - Maximum trench width for 150mm gully lead is 600mm.
 - Number of bends may vary due to site differences, see drainage schedule.
 - Concrete surround to pipes shall always finish at a joint.

Gully Detail



STANDARD TELESCOPIC REST BEND CONNECTION DETAIL

DRAINAGE NOTES

- ALL FOUL AND SURFACE WATER PIPES TO BE VITRIFIED CLAY PIPES AND PIPELINE FITTINGS AND SHALL COMPLY WITH THE RELEVANT PARTS OF BS EN295:1991 PART 1 OR BS65 WITH FLEXIBLE MECHANICAL JOINTS.
- GRANULAR MATERIAL USED FOR BEDDING PIPES SHOULD COMPLY WITH THE REQUIREMENTS FOR NOMINAL SINGLE SIZED AGGREGATE TO TABLE 4 OF BS882:1983.
- ALL PIPE TO PIPE CONNECTIONS ARE TO BE CONSTRUCTED AT INVERT LEVELS.
- INSITU CONCRETE SURROUND TO BE GRADE C20 WITH A MINIMUM CEMENT CONTENT OF 280kg/m³ (O.P.C.) AND A MAXIMUM FREE WATER/CEMENT RATIO OF 0.55 BY WEIGHT.
- BLINDING CONCRETE TO BE GRADE C7.5 OMIT IF CASTING BASE IMMEDIATELY AFTER EXCAVATION.
- MOVEMENT JOINTS TO BE FORMED IN CONCRETE SURROUND TO PIPES AT EACH PIPE SOCKET OR SLEEVE JOINT FACE WITH COMPRESSIBLE BOARD MADE FROM BITUMEN IMPREGNATED INSULATING BOARD COMPLYING WITH BS1142, PART 3 OR OTHER EQUALLY COMPRESSIBLE FILLER MATERIAL SUCH AS FIBREBOARD OR POLYSTYRENE..
- ALL DRAINAGE WORK SHOWN ON THIS DRAWING IS TO BE CARRIED OUT IN ACCORDANCE WITH THE DRAINAGE SPECIFICATION.
- WHERE DRAINAGE RUNS ARE LAID IN WATERLOGGED GROUND OR OUTSIDE THE AREAS OF STONED SUB-BASE THE PIPE BEDDING AND SURROUND IS TO BE WRAPPED IN GEOTEXTILE FABRIC IE. TERRAM.
- SELECTED FILL MATERIAL TO BE READILY COMPACTIBLE AND EXCLUDING STONES RETAINED ON A 40mm SEIVE, HARD LUMPS OF CLAY RETAINED ON A 100mm SEIVE, TIMBER, FROZEN MATERIAL AND VEGETABLE AND FOREIGN MATERIAL.

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- ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
- DO NOT SCALE FROM THE DRAWINGS OR THE COMPUTER DIGITAL DATA, ONLY FIGURED DIMENSIONS ARE TO BE USED.
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- THE STEEL FRAME SUB-CONTRACTOR SHALL SUBMIT ALL SPECIFICATIONS, DRAWINGS, DETAILS AND CALCULATIONS TO THE DESIGN TEAM FOR REVIEW A MINIMUM 2 WEEKS PRIOR TO COMMENCING FABRICATION. FABRICATION SHALL NOT COMMENCE UNTIL ALL COMMENTS HAVE BEEN RESOLVED.

CDM DESIGNER'S RISK ASSESSMENT

THOMASONS ASSUME THAT THE CONTRACTOR IS COMPETENT IN MATTERS OF HEALTH & SAFETY AND IS AWARE OF ALL THE NORMAL RISKS ASSOCIATED WITH CONSTRUCTION OF THE TYPE SHOWN ON THIS DRAWING. REMAINING UNUSUAL RISKS ARE :-

	CHK'D.
--	--------

CONSTRUCTION	
1. Potential asbestos containing materials in ground.	CH
2. High water table. Allow for pumping of excavations.	
3. Working adjacent to live railway.	
4. Working adjacent to existing structures to be retained, care to be taken to not undermine / damage these during the works.	

MAINTENANCE / CLEANING

1. No unusual risks	CH
---------------------	----

DECOMMISSIONING / DEMOLITION

1. No unusual risks	CH
---------------------	----

T2	TENDER ISSUE	MT	28.07.25	CH
T1	TENDER ISSUE	MT	11.02.25	CH
Rev	Description	By	Date	Chkd



**STORAGE WORLD
AMBROSE STREET**

DRAINAGE DETAILS

Status	TENDER			
Drawing No.	11325 - 026			Revision
Scale	Size	Drawn	Date	Passed (Tender)
1:20	A1	MT	JAN 25	CH
				Passed (Construction)
				T2



1. ALL FOUL AND SURFACE WATER PIPES TO BE VITRIFIED CLAY PIPES AND PIPELINE FITTINGS AND SHALL COMPLY WITH THE RELEVANT PARTS OF BS EN295:1991 PART 1 OR BS655 WITH FLEXIBLE MECHANICAL JOINTS.
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3. ALL PIPE TO PIPE CONNECTIONS ARE TO BE CONSTRUCTED AT INVERT LEVELS.
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5. BLINDING CONCRETE TO BE GRADE C7.5 OMIT IF CASTING BASE IMMEDIATELY AFTER EXCAVATION.
6. MOVEMENT JOINTS TO BE FORMED IN CONCRETE SURROUND TO PIPES AT EACH PIPE SOCKET OR SLEEVE JOINT FACE WITH COMPRESSIBLE BITUMEN BASED FROM BITUMEN IMPREGNATED INSULATING BOARD COMPLYING WITH BS1142, PART 3 OR OTHER EQUALLY COMPRESSIBLE FILLER MATERIAL SUCH AS FIBREBOARD OR POLYSTYRENE..
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8. WHERE DRAINAGE RUNS ARE LAID IN WATERLOGGED GROUND OR OUTSIDE THE AREAS OF STONED SUB-BASE THE PIPE BEDDING AND SURROUND IS TO BE WRAPPED IN GEOTEXTILE FABRIC IE. TERRAM.
9. SELECTED FILL MATERIAL TO BE READILY COMPACTABLE 5% BY EXCLUSION STONES RETAINED ON A 40mm SEIVE, HARD LUMPS OF CLAY RETAINED ON A 100mm SEIVE, TIMBER, FROZEN MATERIAL AND VEGETABLE AND FOREIGN MATERIAL.

INLET/OUTLET PIPES MUST BE SUPPORTED WITH CONCRETE TO PROTECT IT DURING BACKFILLING

THE CONTRACTOR SHALL PROHIBIT THE MOVEMENT OF CONSTRUCTION PLANT ACROSS THE STORAGE TANK AND WHERE NECESSARY PROVIDE ADDITIONAL SUPPORT AND PROTECTION TO THE STRUCTURE. PARTICULARLY POST CONSTRUCTION. TEMPORARY FENCING CAN BE USED TO PROHIBIT TRADE STOCKS, PILLING MATERIALS, HEAVY PLANTS ETC..

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	CHK'D
CONSTRUCTION	
1. Potential asbestos containing materials in ground.	CH
2. High water table. Allow for pumping of excavations.	
3. Working adjacent to live railway.	
4. Working adjacent to existing structures to be retained, care to be taken to not undermine / damage these during the works.	
MAINTENANCE / CLEANING	
1. No unusual risks	CH
DECOMMISSIONING / DEMOLITION	
1. No unusual risks	CH

T2	LEVELS UPDATED	MT	28.07.25	CH
T1	TENDER ISSUE	MT	11.02.25	CH
Rev	Description	By	Date	Chkd



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Manchester M3 7BB | Tel : 0161 839 3993

STORAGE WORLD
AMBROSE STREET

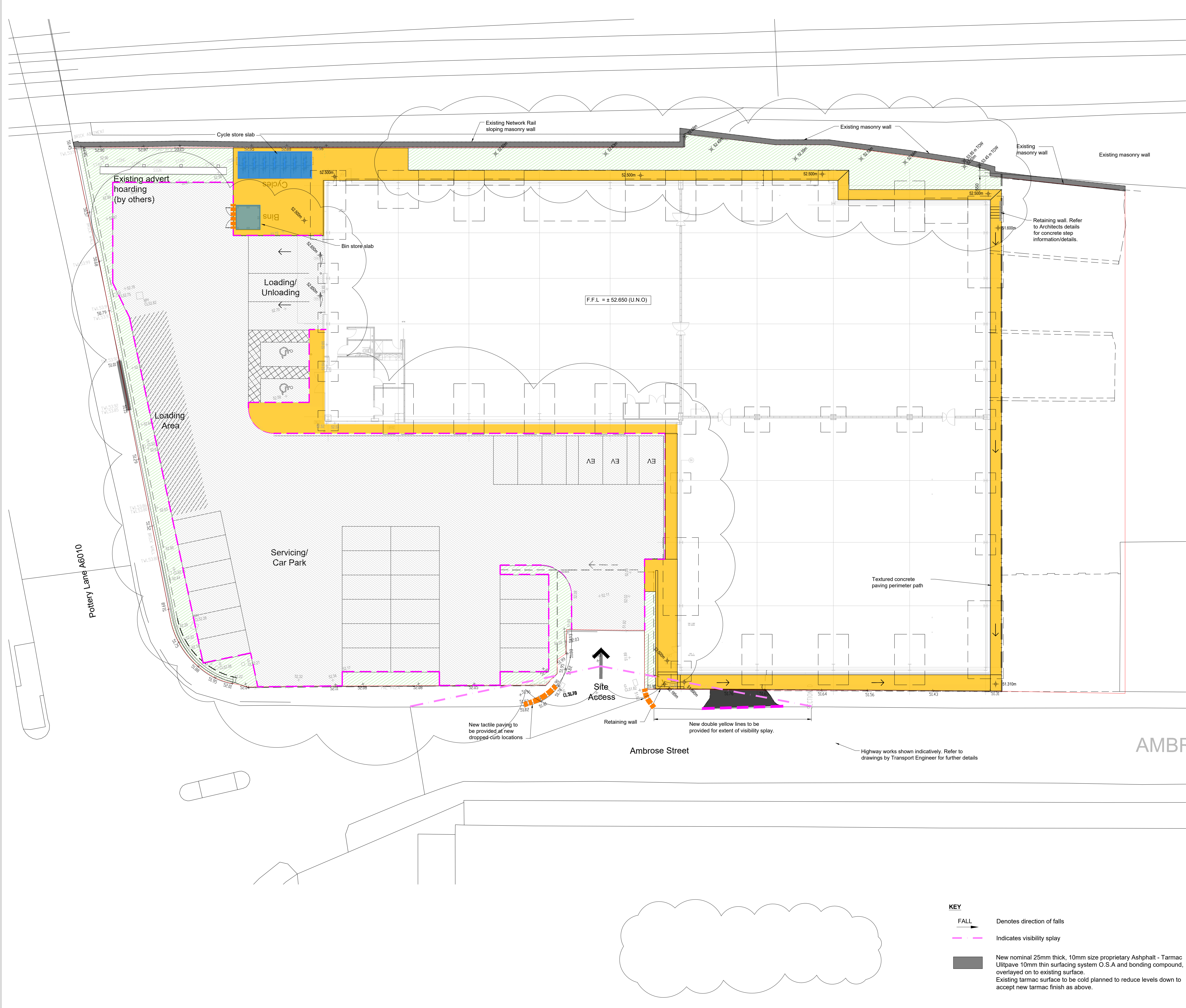
DRAINAGE DETAILS

TYP ATTENUATION TANK

Status:

TENDER

Drawing No.				Revision	
11325 - 027				T2	
Scale	Size	Drawn	Date	Passed (Tender)	Passed (Construction)
1:20	A1	MT	JAN 25	CH	



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MAINTENANCE / CLEANING	
1. No unusual risks	CH
DECOMMISSIONING / DEMOLITION	
1. No unusual risks	CH

- KEY:**
- CONDENSER/BICYCLE STORE SLAB**
- 150mm Insitu concrete slab using RC40XF mix, reinforced with 2 layers A393 mesh (1 TOP, 1 BTM, 40 cover) with brushed finish laid to falls away from building, plus trowelled and rounded edges and restrained movement joints as shown on plan laid on 1200g polyethylene membrane.
150mm DoT TYPE 1 Sub-base on existing rolled strata or if required additional 6F2 rolled and compacted in min 150mm layers down to formation level (MIN 5% CBR)
all slabs to receive 300 x 300 edge thickening uno.
- HEAVY DUTY ACCESS ROAD/YARD**
- 40mm 10mm Size SMA wearing course
60mm dense macadam binder course
150mm dense macadam base course
150mm DoT Type 1 sub-base on existing rolled strata or if required additional 6F2 rolled and compacted in min 150mm layers down to formation level (MIN 5% CBR)
- LIGHT DUTY PAVING**
- 600X600 Paving and sand blinding to architect's details
150mm DoT Type 1 Sub-base on existing rolled strata or if required additional 6F2 rolled and compacted in min 150mm layers down to formation level (Min 5% CBR)
- Denotes new landscaping
- Denotes galvanized steel crash protection bollards
- Indicates kerb
- Indicates dropped kerb

T5	BUILD UP ADJUSTED	MT	16.01.25	CH
T4	TENDER ISSUE UPDATED TO SUIT COMMENTS	MT	13.06.24	CH
T3	TENDER ISSUE UPDATED	MT	16.05.24	CH
P1	PLANNING ISSUE	MT	27.03.24	CH
T2	VISIBILITY SPLAY AND KERBS ADDED	MT	15.05.23	CH
Rev	Description	By	Date	Chkd



**STORAGE WORLD
AMBROSE STREET**

EXTERNAL WORKS LAYOUT

Status					
TENDER					
Drawing No.				Revision	
11325 - 050				T5	
Scale	Size	Drawn	Date	Passed (Tender)	Passed (Construction)
1:150	A1	MT	MAR 23	CH	-

Appendix D – Outline Calculations

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	18.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.358	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	4.00	Enforce best practice design rules	x

1 STANDARD Manhole Type

Max Width (mm)	Diameter (mm)	Max Width (mm)	Diameter (mm)
374	1200	749	1500
499	1350	900	1800

>900 Link+900 mm

Max Depth (m)	Diameter (mm)	Max Depth (m)	Diameter (mm)
1.500	1050	99.999	1350

1 STANDARD Link Type

Shape	Circular	Auto Increment (mm)	75
Barrels	1	Follow Ground	x

Available Diameters (mm)

100 | 150

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Depth (m)
SW01	0.083	4.00	52.500	1200	1.425
RG	0.047	4.00	52.000	200	0.800
SW02	0.103	4.00	52.500	1350	1.525
SW03	0.097	4.00	52.450	1200	1.425
TANK	0.030	4.00	52.400	100	1.800
SW04	0.050	4.00	52.400	1500	1.825
2				1200	
EX MH			52.280	1350	1.735

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.001	SW01	SW02	19.000	0.600	51.075	50.975	0.100	190.0	225	4.34	50.0
2.000	RG	SW02	22.000	0.600	51.200	51.050	0.150	146.7	150	4.44	50.0
1.002	SW02	TANK	10.000	0.600	50.975	50.775	0.200	50.0	225	4.53	50.0
3.000	SW03	TANK	23.000	0.600	51.025	50.825	0.200	115.0	225	4.31	50.0
1.003	TANK	SW04	4.000	0.600	50.600	50.575	0.025	160.0	225	4.60	50.0
1.004	SW04	EX MH	3.000	0.600	50.575	50.545	0.030	100.0	150	4.65	50.0

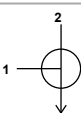
Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.001	0.945	37.6	11.2	1.200	1.300	0.083	0.0	84	0.826
2.000	0.827	14.6	6.4	0.650	1.300	0.047	0.0	69	0.800
1.002	1.854	73.7	31.6	1.300	1.400	0.233	0.0	102	1.781
3.000	1.218	48.4	13.1	1.200	1.350	0.097	0.0	80	1.037
1.003	1.031	41.0	48.8	1.575	1.600	0.360	0.0	225	1.050
1.004	1.005	17.8	55.6	1.675	1.585	0.410	0.0	150	1.023

Pipeline Schedule

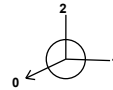
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.001	19.000	190.0	225	1 STANDARD	52.500	51.075	1.200	52.500	50.975	1.300
2.000	22.000	146.7	150	1 STANDARD	52.000	51.200	0.650	52.500	51.050	1.300
1.002	10.000	50.0	225	1 STANDARD	52.500	50.975	1.300	52.400	50.775	1.400
3.000	23.000	115.0	225	1 STANDARD	52.450	51.025	1.200	52.400	50.825	1.350
1.003	4.000	160.0	225	1 STANDARD	52.400	50.600	1.575	52.400	50.575	1.600
1.004	3.000	100.0	150	1 STANDARD	52.400	50.575	1.675	52.280	50.545	1.585

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.001	SW01	1200	Manhole	1 STANDARD	SW02	1350	Manhole	1 STANDARD
2.000	RG	200	Manhole	1 STANDARD	SW02	1350	Manhole	1 STANDARD
1.002	SW02	1350	Manhole	1 STANDARD	TANK	100	Manhole	1 STANDARD
3.000	SW03	1200	Manhole	1 STANDARD	TANK	100	Manhole	1 STANDARD
1.003	TANK	100	Manhole	1 STANDARD	SW04	1500	Manhole	1 STANDARD
1.004	SW04	1500	Manhole	1 STANDARD	EX MH	1350	Manhole	1 STANDARD

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW01	242.750	238.250	52.500	1.425	1200				
						0	1.001	51.075	225
RG	267.750	260.250	52.000	0.800	200				
						0	2.000	51.200	150
SW02	267.750	238.250	52.500	1.525	1350		1	1.001	50.975
						2	2.000	51.050	150
						0	1.002	50.975	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW03	285.405	228.115	52.450	1.425	1200				
						0	3.000	51.025	225
TANK	267.732	228.694	52.400	1.800	100		1	3.000	50.825
						2	1.002	50.775	225
						0	1.003	50.600	225
SW04	252.513	221.424	52.400	1.825	1500		1	1.003	50.575
						0	1.004	50.575	150
2	268.233	229.223			1200				
EX MH	243.194	209.011	52.280	1.735	1350		1	1.004	50.545

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	18.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.358	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	45	0	0

Node SW04 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	50.575	Product Number	CTL-SHE-0098-5000-1500-5000
Design Depth (m)	1.500	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	5.0	Min Node Diameter (mm)	1200

Node TANK Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	50.600
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	160.0	0.0	1.200	160.0	0.0	1.201	0.0	0.0

Approval Settings

Node Size	✓	Minimum Full Bore Velocity (m/s)	
Node Losses	✓	Maximum Full Bore Velocity (m/s)	3.000
Link Size	✓	Proportional Velocity	✓
Minimum Diameter (mm)	150	Return Period (years)	
Link Length	✓	Minimum Proportional Velocity (m/s)	0.750
Maximum Length (m)	100.000	Maximum Proportional Velocity (m/s)	3.000
Coordinates	✓	Surcharged Depth	✓
Accuracy (m)	1.000	Return Period (years)	
Crossings	✓	Maximum Surcharged Depth (m)	0.100
Cover Depth	✓	Flooding	✓
Minimum Cover Depth (m)		Return Period (years)	30
Maximum Cover Depth (m)	3.000	Time to Half Empty	x
Backdrops	✓	Discharge Rates	✓
Minimum Backdrop Height (m)		Discharge Volume	✓
Maximum Backdrop Height (m)	1.500	100 year 360 minute (m ³)	
Full Bore Velocity	✓		

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
1 year 15 minute summer	94.631	26.777	30 year 60 minute winter	69.521	27.653
1 year 15 minute winter	66.408	26.777	30 year 120 minute summer	64.725	17.105
1 year 30 minute summer	62.502	17.686	30 year 120 minute winter	43.002	17.105
1 year 30 minute winter	43.861	17.686	30 year 180 minute summer	49.672	12.782
1 year 60 minute summer	43.047	11.376	30 year 180 minute winter	32.288	12.782
1 year 60 minute winter	28.599	11.376	30 year 240 minute summer	39.164	10.350
1 year 120 minute summer	27.239	7.198	30 year 240 minute winter	26.020	10.350
1 year 120 minute winter	18.097	7.198	30 year 360 minute summer	29.696	7.642
1 year 180 minute summer	21.313	5.485	30 year 360 minute winter	19.303	7.642
1 year 180 minute winter	13.854	5.485	30 year 480 minute summer	23.318	6.162
1 year 240 minute summer	17.098	4.519	30 year 480 minute winter	15.492	6.162
1 year 240 minute winter	11.360	4.519	30 year 600 minute summer	19.053	5.212
1 year 360 minute summer	13.347	3.435	30 year 600 minute winter	13.018	5.212
1 year 360 minute winter	8.676	3.435	30 year 720 minute summer	16.951	4.543
1 year 480 minute summer	10.629	2.809	30 year 720 minute winter	11.392	4.543
1 year 480 minute winter	7.062	2.809	30 year 960 minute summer	13.883	3.656
1 year 600 minute summer	8.786	2.403	30 year 960 minute winter	9.197	3.656
1 year 600 minute winter	6.003	2.403	30 year 1440 minute summer	10.030	2.688
1 year 720 minute summer	7.894	2.116	30 year 1440 minute winter	6.741	2.688
1 year 720 minute winter	5.305	2.116	100 year +45% CC 15 minute summer	433.303	122.610
1 year 960 minute summer	6.572	1.731	100 year +45% CC 15 minute winter	304.072	122.610
1 year 960 minute winter	4.354	1.731	100 year +45% CC 30 minute summer	290.377	82.167
1 year 1440 minute summer	4.868	1.305	100 year +45% CC 30 minute winter	203.773	82.167
1 year 1440 minute winter	3.272	1.305	100 year +45% CC 60 minute summer	199.139	52.627
30 year 15 minute summer	231.479	65.500	100 year +45% CC 60 minute winter	132.303	52.627
30 year 15 minute winter	162.441	65.500	100 year +45% CC 120 minute summer	123.447	32.623
30 year 30 minute summer	153.602	43.464	100 year +45% CC 120 minute winter	82.015	32.623
30 year 30 minute winter	107.791	43.464	100 year +45% CC 180 minute summer	94.580	24.339
30 year 60 minute summer	104.640	27.653	100 year +45% CC 180 minute winter	61.480	24.339

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +45% CC 240 minute summer	74.355	19.650	100 year +45% CC 600 minute winter	24.358	9.751
100 year +45% CC 240 minute winter	49.400	19.650	100 year +45% CC 720 minute summer	31.621	8.475
100 year +45% CC 360 minute summer	55.995	14.410	100 year +45% CC 720 minute winter	21.251	8.475
100 year +45% CC 360 minute winter	36.399	14.410	100 year +45% CC 960 minute summer	25.771	6.786
100 year +45% CC 480 minute summer	43.781	11.570	100 year +45% CC 960 minute winter	17.071	6.786
100 year +45% CC 480 minute winter	29.087	11.570	100 year +45% CC 1440 minute summer	18.479	4.953
100 year +45% CC 600 minute summer	35.650	9.751	100 year +45% CC 1440 minute winter	12.419	4.953

Results for 1 year Critical Storm Duration. Lowest mass balance: 99.86%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW01	10	51.157	0.082	10.7	0.1878	0.0000	OK
15 minute winter	RG	10	51.269	0.069	6.1	0.0835	0.0000	OK
15 minute winter	SW02	10	51.086	0.111	30.1	0.3084	0.0000	OK
15 minute winter	SW03	10	51.105	0.080	12.5	0.2002	0.0000	OK
180 minute winter	TANK	132	50.818	0.218	11.6	33.2222	0.0000	OK
180 minute winter	SW04	132	50.818	0.243	4.4	0.5617	0.0000	SURCHARGED
	2							
180 minute winter	EX MH	132	50.596	0.051	4.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	SW01	1.001	SW02	10.7	0.662	0.286	0.3086	
15 minute winter	RG	2.000	SW02	6.1	0.780	0.415	0.1712	
15 minute winter	SW02	1.002	TANK	30.0	1.652	0.407	0.1817	
15 minute winter	SW03	3.000	TANK	12.5	1.007	0.258	0.2848	
180 minute winter	TANK	1.003	SW04	4.0	0.129	0.099	0.1583	
180 minute winter	SW04	1.004	EX MH	4.4	0.776	0.246	0.0169	53.7

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.86%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	SW01	10	51.250	0.175	26.2	0.4019	0.0000	OK
15 minute winter	RG	11	51.359	0.159	14.8	0.1922	0.0000	SURCHARGED
15 minute winter	SW02	10	51.215	0.240	71.0	0.6663	0.0000	SURCHARGED
180 minute winter	SW03	168	51.194	0.169	7.3	0.4212	0.0000	OK
180 minute winter	TANK	168	51.194	0.594	27.1	90.4832	0.0000	SURCHARGED
180 minute winter	SW04	168	51.193	0.618	5.2	1.4316	0.0000	SURCHARGED
	2							
60 minute summer	EX MH	56	50.599	0.054	4.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	SW01	1.001	SW02	24.5	0.736	0.652	0.6928	
15 minute winter	RG	2.000	SW02	14.0	0.884	0.959	0.3873	
15 minute winter	SW02	1.002	TANK	68.5	1.917	0.929	0.3593	
180 minute winter	SW03	3.000	TANK	7.3	0.848	0.150	0.8254	
180 minute winter	TANK	1.003	SW04	4.8	0.121	0.118	0.1591	
180 minute winter	SW04	1.004	EX MH	4.9	0.799	0.275	0.0184	105.0

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.86%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute winter	SW01	172	52.065	0.990	9.6	2.2740	0.0000	SURCHARGED
360 minute winter	RG	248	52.000	0.800	9.7	0.9648	20.0595	FLOOD
240 minute winter	SW02	172	52.067	1.092	26.0	3.0372	0.0000	SURCHARGED
240 minute winter	SW03	172	52.065	1.040	11.2	2.5924	0.0000	SURCHARGED
240 minute winter	TANK	172	52.067	1.467	39.9	182.9763	0.0000	SURCHARGED
240 minute winter	SW04	172	52.068	1.493	10.9	3.4553	0.0000	SURCHARGED
	2							
240 minute winter	EX MH	172	50.599	0.054	4.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute winter	SW01	1.001	SW02	9.0	0.652	0.240	0.7557	
360 minute winter	RG	2.000	SW02	-8.0	0.668	-0.548	0.3873	
240 minute winter	SW02	1.002	TANK	25.3	1.307	0.343	0.3977	
240 minute winter	SW03	3.000	TANK	10.6	0.832	0.218	0.9147	
240 minute winter	TANK	1.003	SW04	8.6	0.218	0.211	0.1591	
240 minute winter	SW04	1.004	EX MH	4.9	0.799	0.276	0.0184	114.6

11325 AMBROSE STREET
CALCULATION FOR ATTENUATION TANK TO HALF EMPTY

Flow+ - Storage World Surface Water Network Mar 25.pfd

File Help



 Sketch

 Simulation Settings

 Storm

 Design Settings

 Nodes

 Links

 Manhole Schedule

 Hydrographs

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 Storage

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Backdrops

Full Bore Velocity

Proportional Velocity

Surcharged Depth

Flooding

Time to Half Empty

Discharge Rate

Discharge Volume

No infiltrating structures failed to half empty in 1440 minutes during the 100 year return period

Appendix E – Environment Agency Flood Data

Flood risk assessment data

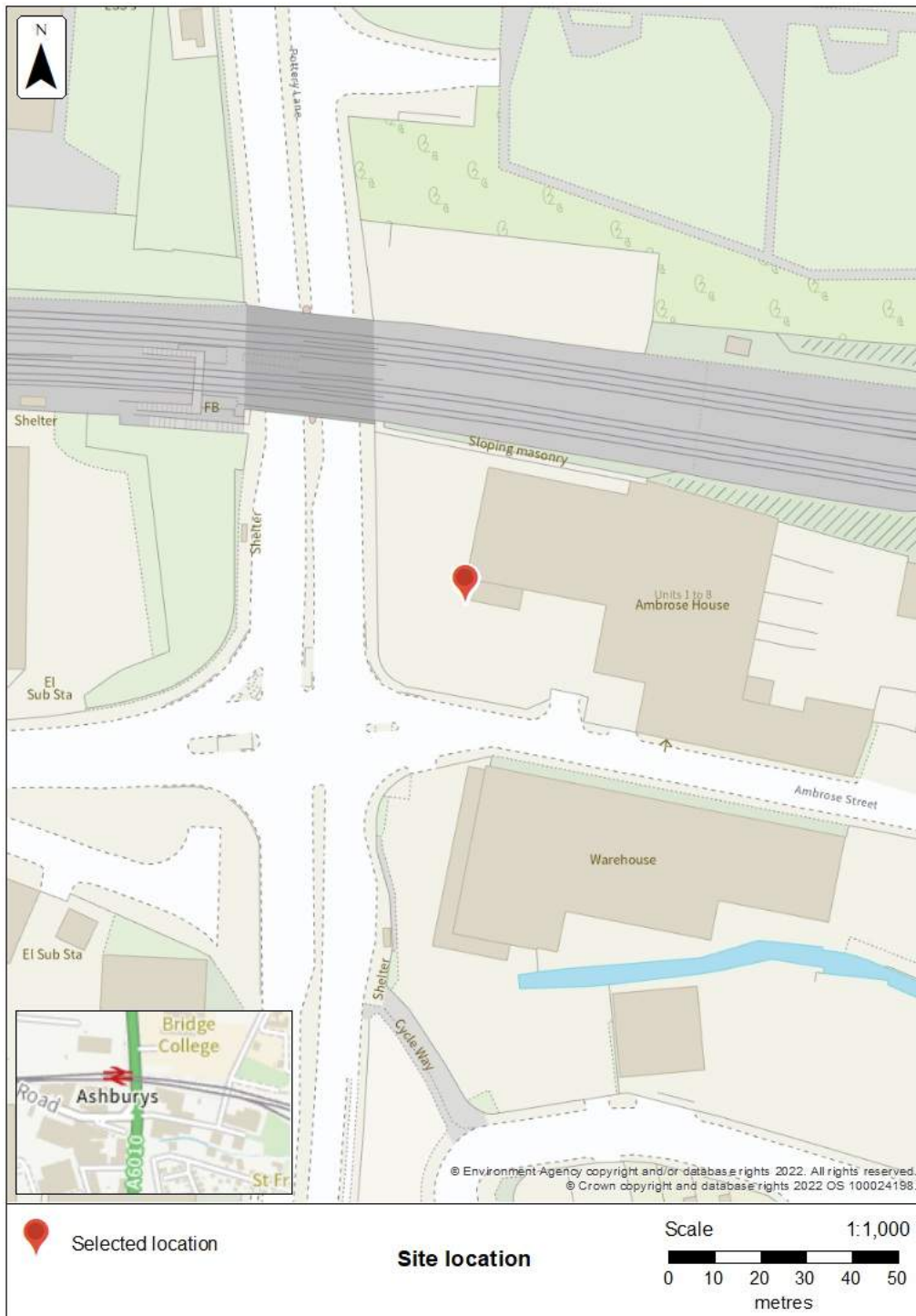
Location of site: 387241 / 397198 (shown as easting and northing coordinates)

Document created on: 20 September 2022

This information was previously known as a product 4.

Customer reference number: DC6G832AYB1M

Map showing the location that flood risk assessment data has been requested for.



How to use this information

You can use this information as part of a flood risk assessment for a planning application. To do this, you should include it in the appendix of your flood risk assessment.

We recommend that you work with a flood risk consultant to get your flood risk assessment.

Included in this document

In this document you'll find:

- how to find information about surface water and other sources of flooding
- information on the models used
- definitions for the terminology used throughout
- flood map for planning (rivers and the sea)
- modelled data
- climate change modelled data
- information about strategic flood risk assessments
- information about this data
- information about flood risk activity permits
- help and advice

Information that's unavailable

This document **does not** contain:

- historic flooding
- flood defences and attributes

We do not have historic flooding data for this location.

Please note that:

- flooding may have occurred that we do not have records for
- flooding can come from a range of different sources
- we can only supply flood risk data relating to flooding from rivers or the sea

You can contact your Lead Local Flood Authority or Internal Drainage Board to see if they have other relevant local flood information. Please note that some areas do not have an Internal Drainage Board.

We aren't able to display flood defence locations and attributes as there are no formal flood defences in the area of interest.

Surface water and other sources of flooding

Use the [long term flood risk service](#) to find out about the risk of flooding from:

- surface water
- ordinary watercourses
- reservoirs

For information about sewer flooding, contact the relevant water company for the area.

About the models used

Model name: Corn Brook 2017

Scenario(s): No defences exist fluvial, no defences exist climate change fluvial

Date: 31 December 2017

This model contains the most relevant data for your area of interest.

Terminology used

Annual exceedance probability (AEP)

This refers to the probability of a flood event occurring in any year. The probability is expressed as a percentage. For example, a large flood which is calculated to have a 1% chance of occurring in any one year, is described as 1% AEP.

Metres above ordnance datum (mAOD)

All flood levels are given in metres above ordnance datum which is defined as the mean sea level at Newlyn, Cornwall.

Flood map for planning (rivers and the sea)

Your selected location is in flood zone 1.

Flood zone 3 shows the area at risk of flooding for an undefended flood event with a:

- 0.5% or greater probability of occurring in any year for flooding from the sea
- 1% or greater probability of occurring in any year for fluvial (river) flooding

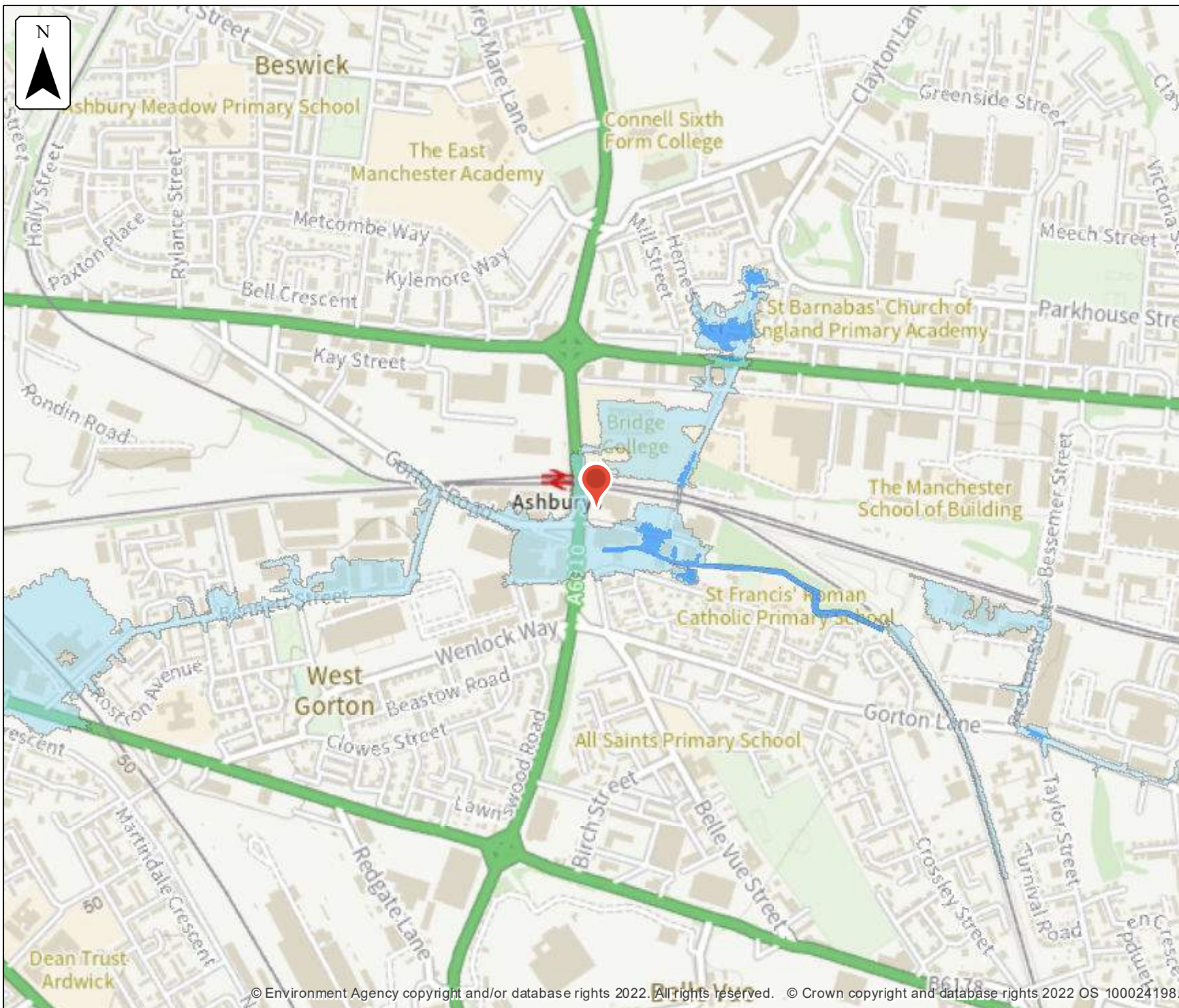
Flood zone 2 shows the area at risk of flooding for an undefended flood event with:

- between a 0.1% and 0.5% probability of occurring in any year for flooding from the sea
- between a 0.1% and 1% probability of occurring in any year for fluvial (river) flooding

It's important to remember that the flood zones on this map:

- refer to the land at risk of flooding and do not refer to individual properties
- refer to the probability of river and sea flooding, ignoring the presence of defences
- do not take into account potential impacts of climate change

This data is updated on a quarterly basis as better data becomes available.



Flood map for planning

Location (easting/northing)
387241/397198

Scale
1:10,000

Created
20 Sep 2022



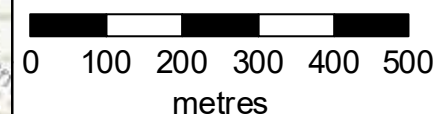
Selected location



Flood zone 3



Flood zone 2



Modelled data

This section provides details of different scenarios we have modelled and includes the following (where available):

- outline maps showing the area at risk from flooding in different modelled scenarios
- modelled node point map(s) showing the points used to get the data to model the scenarios and table(s) providing details of the flood risk for different return periods
- map(s) showing the approximate water levels for the return period with the largest flood extent for a scenario and table(s) of sample points providing details of the flood risk for different return periods

Climate change

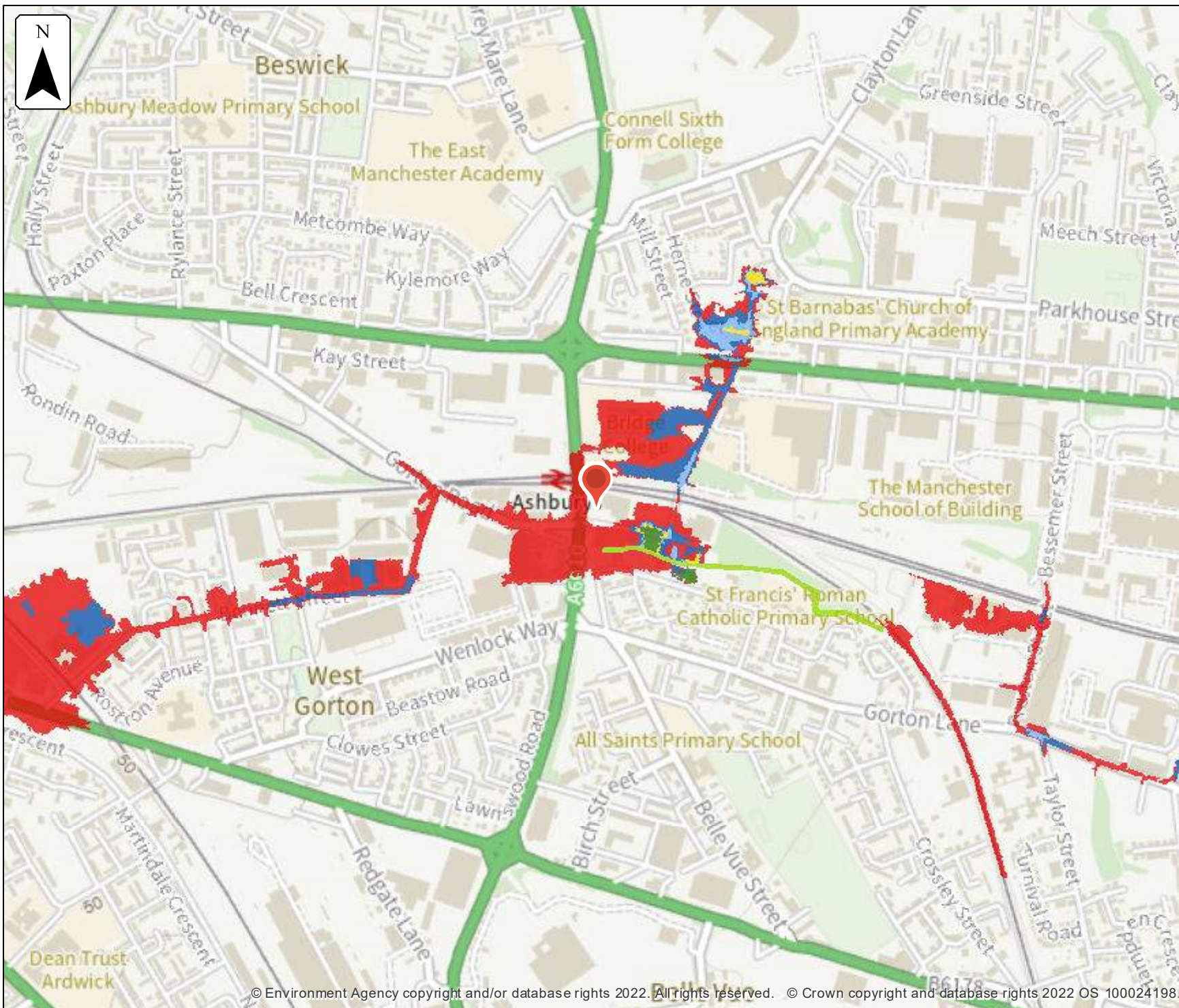
The climate change data included in the models may not include the latest [flood risk assessment climate change allowances](#). Where the new allowances are not available you will need to consider this data and factor in the new allowances to demonstrate the development will be safe from flooding.

The Environment Agency will incorporate the new allowances into future modelling studies. For now, it's your responsibility to demonstrate that new developments will be safe in flood risk terms for their lifetime.

Modelled scenarios

The following scenarios are included:

- No defences exist modelled fluvial: risk of flooding from rivers where there are no flood defences
- No defences exist climate change modelled fluvial: risk of flooding from rivers where there are no flood defences, including estimated impact of climate change



No defences exist modelled fluvial extent

Location (easting/northing)
387241/397198

Scale Created
1:10,000 20 Sep 2022

Model name
Corn Brook 2017

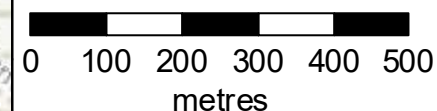


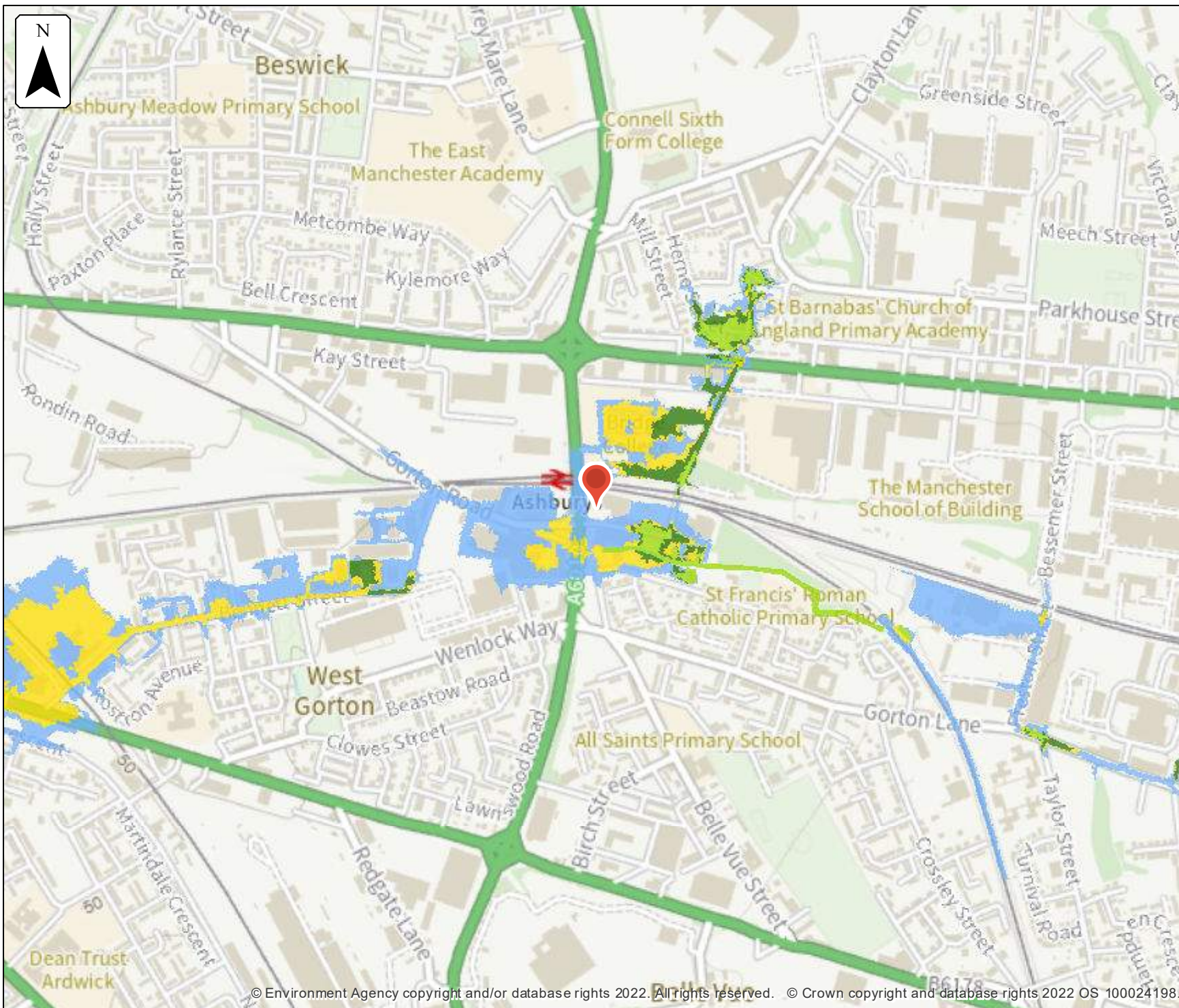
Selected location

Modelled flood extent

- 5% AEP
- 2% AEP
- 1.33% AEP
- 1% AEP
- 0.5% AEP
- 0.1% AEP

Flood extents may not be
visible where they overlap
other return periods





No defences exist climate change modelled fluvial extent

Location (easting/northing)
387241/397198

Scale Created
1:10,000 20 Sep 2022

Model name
Corn Brook 2017

 Selected location

 Main river

Modelled flood extent

 1.0% AEP (+30%)

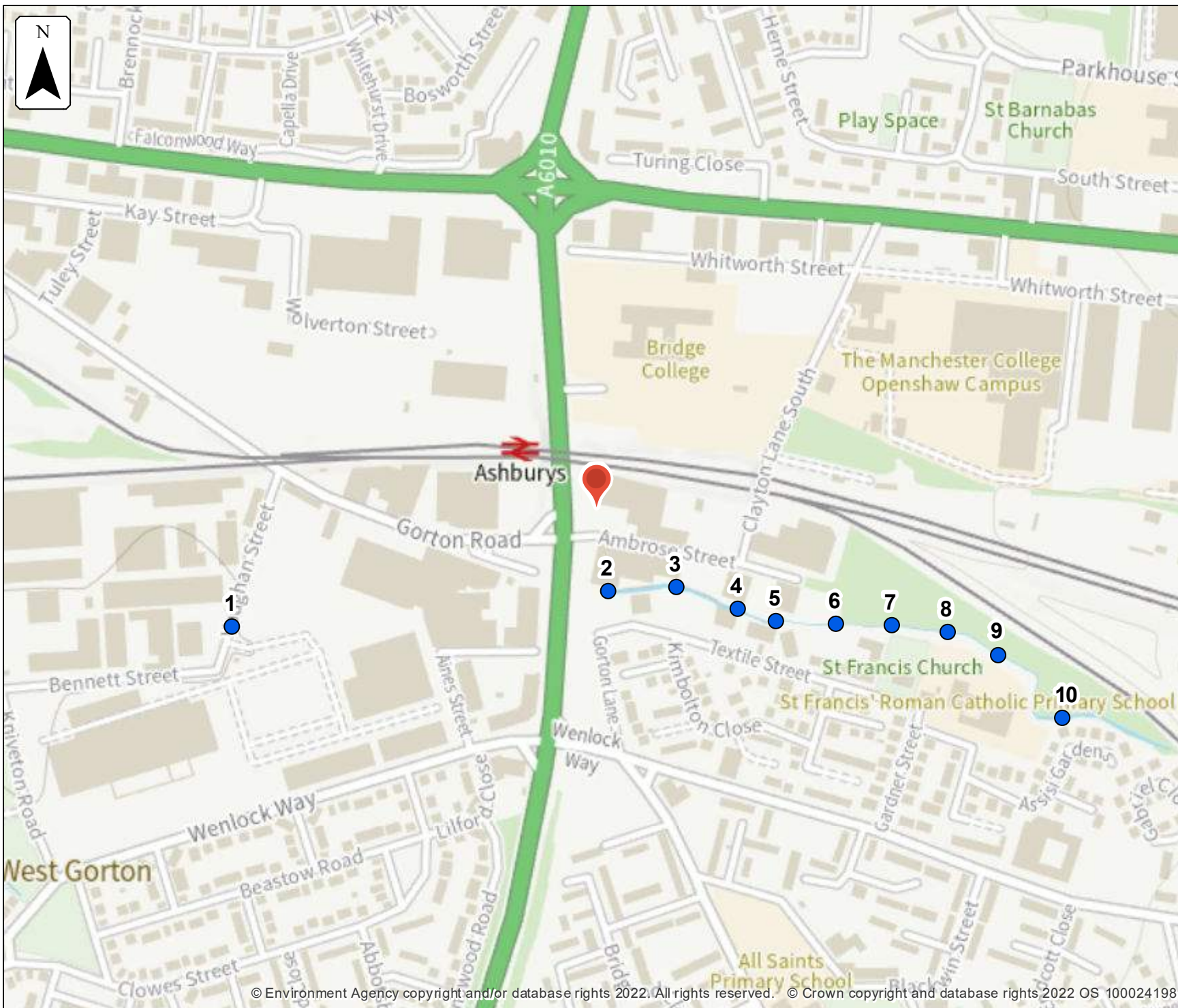
 1.0% AEP (+35%)

 1.0% AEP (+70%)

 0.1% AEP (+30%)

Flood extents may not be
visible where they overlap
other return periods


0 100 200 300 400 500
metres



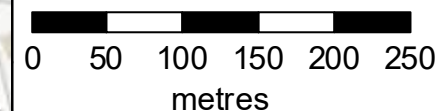
No defences exist modelled fluvial node locations

Location (easting/northing)
387241/397198

Scale Created
1:5,000 20 Sep 2022

Model name
Corn Brook 2017

-  Selected location
-  Modelled location



Modelled node locations data

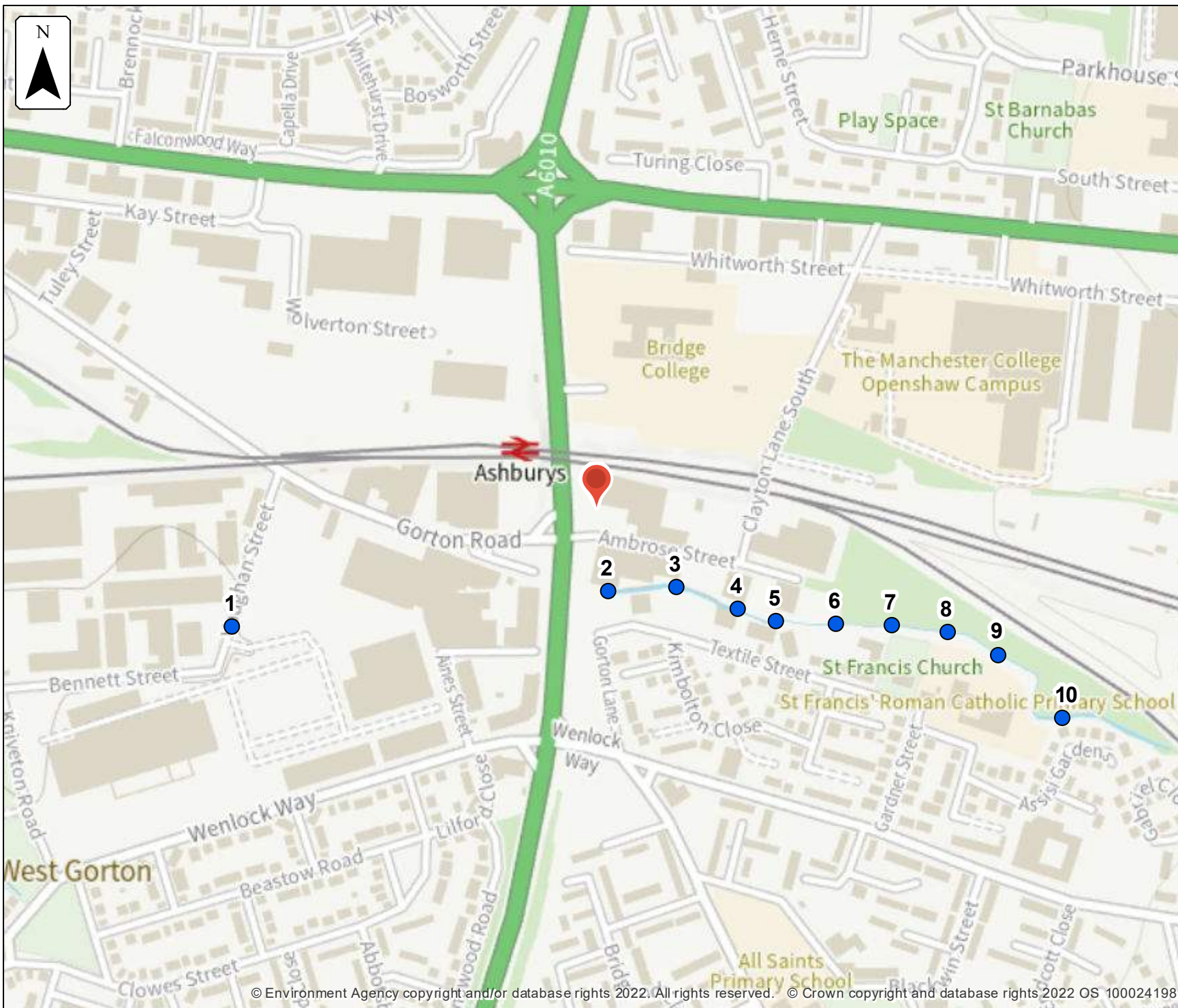
No defences exist

Label	Modelled location ID	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	952459	386888	397082	46.25	0.66	46.57	1.24	46.80	1.55	47.95	1.81	49.66	2.54	50.23	5.15
2	952461	387253	397116	49.31	2.68	49.66	4.52	49.84	5.58	49.93	6.10	50.82	8.26		
3	952460	387319	397120	49.39	2.68	49.69	4.52	49.87	5.58	49.95	6.10	50.84	9.79		
4	952445	387378	397099	49.85	1.47	49.93	2.26	49.98	2.59	50.02	2.83	50.84	4.15	52.0	10.80
5	952450	387416	397088	51.35	1.49	51.49	2.36	51.55	2.60	51.61	3.29	51.76	5.12	52.0	7.21
6	952455	387474	397085	51.74	1.44	51.90	2.42	51.96	2.96	52.01	3.40	52.17	5.08	52.49	10.36
7	952466	387528	397084	52.04	1.43	52.21	2.38	52.28	2.93	52.34	3.38	52.51	4.90	52.95	10.12
8	952442	387582	397077	52.36	1.43	52.52	2.37	52.59	2.92	52.65	3.38	52.81	4.89	53.25	10.11
9	952463	387631	397055	52.65	1.43	52.79	2.37	52.85	2.92	52.90	3.38	53.05	4.88	53.48	10.14
10	952454	387693	396994	53.31	1.43	53.44	2.37	53.50	2.92	53.55	3.38	53.68	4.89	53.97	10.34

Data in this table comes from the Corn Brook 2017 model.

Level values are shown in mAOD, and flow values are shown in cubic metres per second.

Any blank cells show where a particular scenario has not been modelled for this location.



**No defences exist
climate change
modelled fluvial
node locations**

Location (easting/northing)
387241/397198

Scale Created
1:5,000 20 Sep 2022

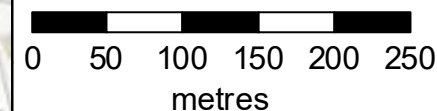
Model name
Corn Brook 2017



Selected location



Modelled location



Modelled node locations data

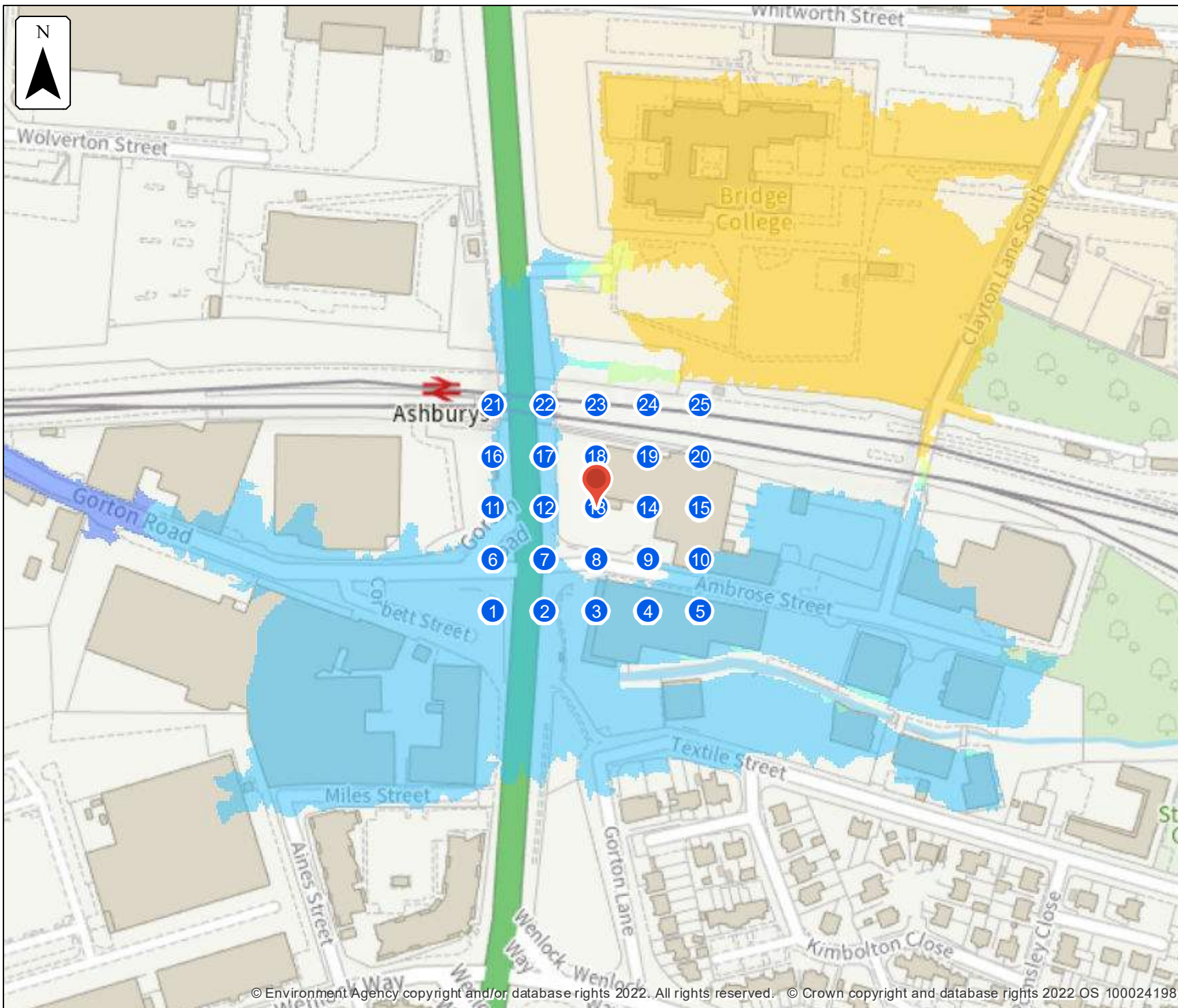
No defences exist climate change

Label	Modelled location ID	Easting	Northing	1.0% AEP (+30%)		1.0% AEP (+35%)		1.0% AEP (+70%)		0.1% AEP (+30%)	
				Level	Flow	Level	Flow	Level	Flow	Level	Flow
1	952459	386888	397082	49.54	2.35	49.61	2.44	49.89	3.08	50.43	6.69
2	952461	387253	397116	50.57	7.77	50.70	8.03				
3	952460	387319	397120	50.58	8.07	50.73	8.78				
4	952445	387378	397099	50.60	3.92	50.73	4.11	51.46	7.15	52.10	13.13
5	952450	387416	397088	51.74	4.76	51.75	4.93	51.79	5.14	52.16	8.49
6	952455	387474	397085	52.14	4.66	52.15	4.85	52.32	6.64	52.57	12.56
7	952466	387528	397084	52.47	4.50	52.49	4.68	52.68	6.51	53.03	12.37
8	952442	387582	397077	52.77	4.49	52.79	4.68	52.95	6.52	53.35	12.29
9	952463	387631	397055	53.01	4.49	53.03	4.67	53.21	6.49	53.59	12.20
10	952454	387693	396994	53.64	4.49	53.66	4.67	53.80	6.55	54.04	12.61

Data in this table comes from the Corn Brook 2017 model.

Level values are shown in mAOD, and flow values are shown in cubic metres per second.

Any blank cells show where a particular scenario has not been modelled for this location.



No defences exist modelled fluvial extent and height

Location (easting/northing)
387241/397198

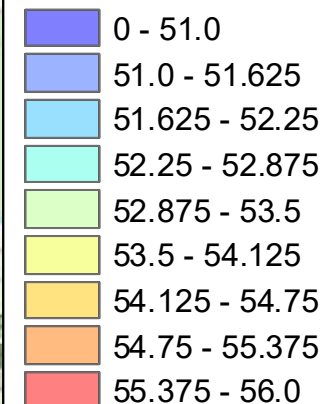
Scale Created
1:2,500 20 Sep 2022

Model name
Corn Brook 2017

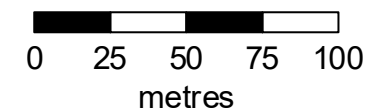
 Selected location

 Main river

Modelled 2D grid
Water level in mAOD



This map shows the
0.1% AEP height data



Sample point data

No defences exist

Label	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height
1	387191	397148	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.81	51.76
2	387216	397148	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.66	51.77
3	387241	397148	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.51	51.78
4	387266	397148	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.43	51.78
5	387291	397148	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.22	51.78
6	387191	397173	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.82	51.77
7	387216	397173	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.31	51.77
8	387241	397173	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
9	387266	397173	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
10	387291	397173	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.10	51.81
11	387191	397198	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.42	51.77
12	387216	397198	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.57	51.77
13	387241	397198	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
14	387266	397198	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
15	387291	397198	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
16	387191	397223	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	0.23	51.78

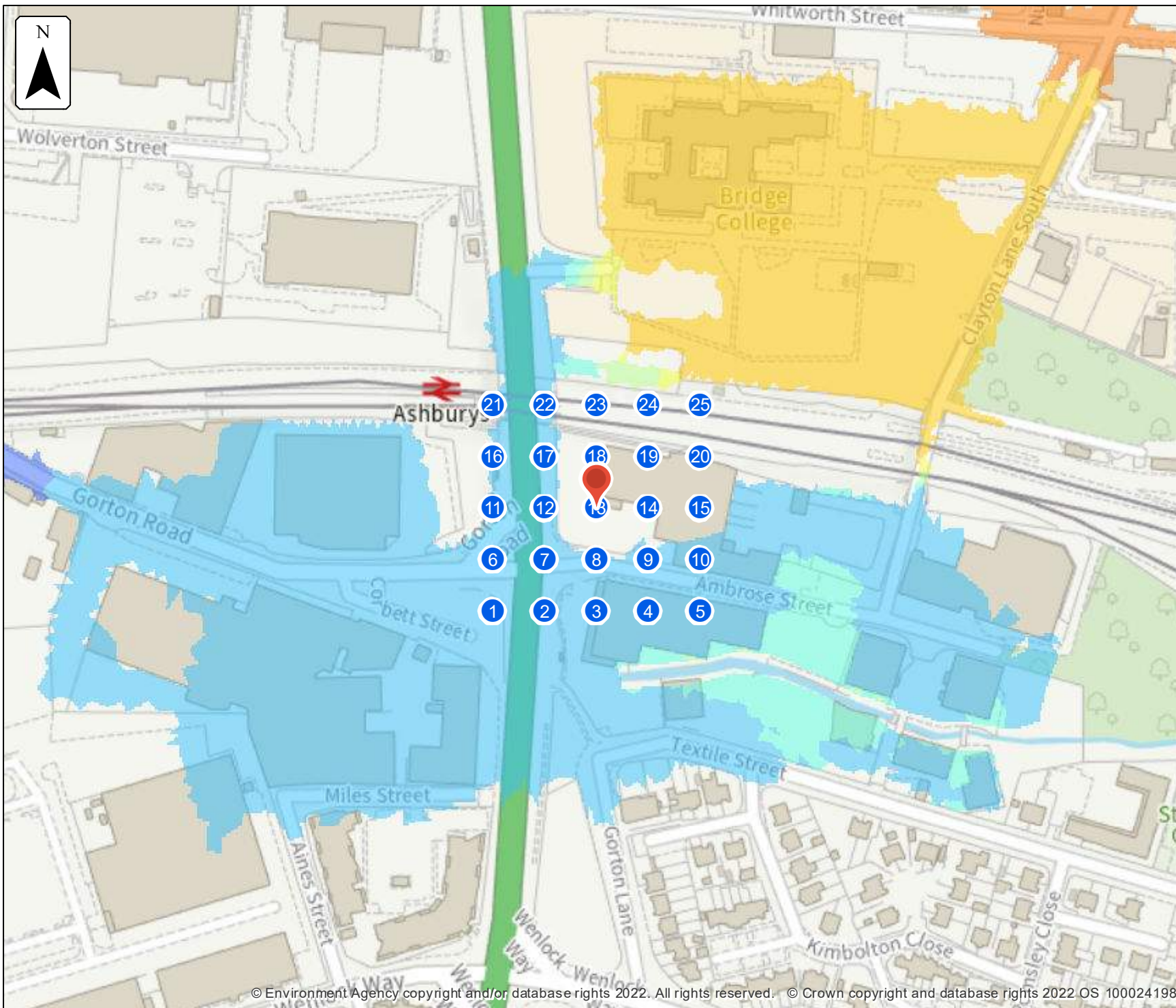
Label	Easting	Northing	5% AEP		2% AEP		1.33% AEP		1% AEP		0.5% AEP		0.1% AEP	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height	Depth	Height
17	387216	397223	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	1.23	51.78
18	387241	397223	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
19	387266	397223	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
20	387291	397223	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
21	387191	397248	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	387216	397248	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	1.47	51.78
23	387241	397248	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	387266	397248	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
25	387291	397248	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Data in this table comes from the Corn Brook 2017 model.

Height values are shown in mAOD, and depth values are shown in metres.

Any blank cells show where a particular scenario has not been modelled for this location.

Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.



No defences exist climate change modelled fluvial extent and height

Location (easting/northing)
387241/397198

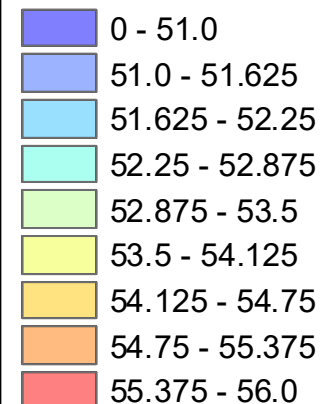
Scale Created
1:2,500 20 Sep 2022

Model name
Corn Brook 2017

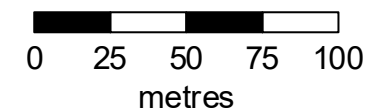
 Selected location

 Main river

Modelled 2D grid
Water level in mAOD



This map shows the
0.1% AEP +30% height data



Sample point data

No defences exist climate change

Label	Easting	Northing	1% AEP (+30%)		1% AEP (+35%)		1% AEP (+70%)		0.1% AEP (+30%)	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height
1	387191	397148	NoData	NoData	NoData	NoData	NoData	NoData	1.08	52.03
2	387216	397148	NoData	NoData	NoData	NoData	NoData	NoData	0.86	52.03
3	387241	397148	NoData	NoData	NoData	NoData	NoData	NoData	0.79	52.05
4	387266	397148	NoData	NoData	NoData	NoData	NoData	NoData	0.70	52.05
5	387291	397148	NoData	NoData	NoData	NoData	NoData	NoData	0.50	52.05
6	387191	397173	NoData	NoData	NoData	NoData	NoData	NoData	1.08	52.03
7	387216	397173	NoData	NoData	NoData	NoData	NoData	NoData	0.58	52.03
8	387241	397173	NoData	NoData	NoData	NoData	NoData	NoData	0.18	52.04
9	387266	397173	NoData	NoData	NoData	NoData	NoData	NoData	0.21	52.09
10	387291	397173	NoData	NoData	NoData	NoData	NoData	NoData	0.35	52.06
11	387191	397198	NoData	NoData	NoData	NoData	NoData	NoData	1.05	52.03
12	387216	397198	NoData	NoData	NoData	NoData	NoData	NoData	0.83	52.04
13	387241	397198	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
14	387266	397198	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
15	387291	397198	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
16	387191	397223	NoData	NoData	NoData	NoData	NoData	NoData	1.28	52.04

Label	Easting	Northing	1% AEP (+30%)		1% AEP (+35%)		1% AEP (+70%)		0.1% AEP (+30%)	
			Depth	Height	Depth	Height	Depth	Height	Depth	Height
17	387216	397223	NoData	NoData	NoData	NoData	NoData	NoData	1.49	52.04
18	387241	397223	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
19	387266	397223	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
20	387291	397223	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
21	387191	397248	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
22	387216	397248	NoData	NoData	NoData	NoData	NoData	NoData	1.73	52.04
23	387241	397248	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
24	387266	397248	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData
25	387291	397248	NoData	NoData	NoData	NoData	NoData	NoData	NoData	NoData

Data in this table comes from the Corn Brook 2017 model.

Height values are shown in mAOD, and depth values are shown in metres.

Any blank cells show where a particular scenario has not been modelled for this location.

Cells which contain text 'NoData' for a scenario show that return period has been modelled but there is no flood risk for that return period for that location.

Strategic flood risk assessments

We recommend that you check the relevant local authority's strategic flood risk assessment (SFRA) as part of your work to prepare a site specific flood risk assessment.

This should give you information about:

- the potential impacts of climate change in this catchment
- areas defined as functional floodplain
- flooding from other sources, such as surface water, ground water and reservoirs

About this data

This data has been generated by strategic scale flood models and is not intended for use at the individual property scale. If you're intending to use this data as part of a flood risk assessment, please include an appropriate modelling tolerance as part of your assessment. The Environment Agency regularly updates its modelling. We recommend that you check the data provided is the most recent, before submitting your flood risk assessment.

Flood risk activity permits

Under the Environmental Permitting (England and Wales) Regulations 2016 some developments may require an environmental permit for flood risk activities from the Environment Agency. This includes any permanent or temporary works that are in, over, under, or nearby a designated main river or flood defence structure.

[Find out more about flood risk activity permits](#)

Help and advice

Contact the Greater Manchester Merseyside and Cheshire Environment Agency team at inforequests.gmmc@environment-agency.gov.uk for:

- [more information about getting a product 5, 6, 7 or 8](#)
- general help and advice about the site you're requesting data for

Appendix F – United Utilities Pre-Development Enquiry Response

Paul Graveney

From: wastewaterdeveloperservices@uuplc.co.uk
Sent: 27 October 2022 11:40
To: Paul Graveney
Subject: PDE for: Ambrose Street UU Ref. 02951448

Good morning Paul,

Pre Development Enquiry for: Ambrose Street UU Reference Number : 02951448

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 910*970mm public combined sewer within Ambrose Street located to the South of your proposed development at an unrestricted rate.

If you are able to identify an alternative, more suitable point of discharge, we request that you contact us at your earliest convenience so that we can assess suitability.

Please ensure all proposed manhole chambers cover levels and finished floor levels are higher than the receiving public sewer.

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.

Waterbody

If an evidence based assessment has been carried out and confirms that infiltration is not feasible, we recommend that you contact the Lead Local Flood Authority and/or Environment Agency to discuss a point of discharge to the 1100mm culverted watercourse located 30m East of the proposed site (the depth according to our records is 2.67m, also the WC outfall is very close and doesn't look very deep).

We would encourage you to identify and engage with any third party landowner and riparian owner to agree access and discharge rights to the water body if this is not in your ownership.

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 900*1000mm public combined sewer within Pottery Lane located Southwest of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority. United Utilities request that any agreed rate does not exceed 21l/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.

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.

Many thanks and kind regards,



Mohammed Aljafarawi (He/Him)
Developer Engineer
Developer Services & Metering
Customer Services
M [redacted]
unitedutilities.com

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Clare Hudson

From: Bill Davidson
Sent: 23 July 2025 09:25
To: Bill Davidson; Imogen Byrne-Mullan
Subject: FW: CDN/25/0241 - Land Off Ambrose Street Manchester [REDACTED]

BILL DAVIDSON BA (Hons) Dip TP Dip UD MRTPI

Managing Director



113 Timber Wharf, 40 Worsley Street
Castlefield, Manchester, M15 4LD

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From: Sue Wills
Sent: 22 July 2025 13:56
To: Alex Snow
Subject: Re: CDN/25/0241 - Land Off Ambrose Street Manchester [REDACTED]

Dear Alex,

Please see extract of correspondence received from United Utilities.

Further to our review of the submitted documents, Drawing 11325 - 025, Rev T6 - Dated 06.03.2025, United Utilities has no objection to condition 6 being discharged.

The applicant can discuss their drainage proposals with our Developer Services team by email at SewerAdoptions@uuplc.co.uk. Alternative ways to contact the team are detailed in the Appendix, Section 5.0 'Contacts'. When considering their drainage proposal, it is the applicant's responsibility to investigate the existence of any infrastructure that might impact their detailed design. This includes water,

wastewater, operational and/or abandoned pipelines. United Utilities will not routinely carry out this assessment when reviewing drainage proposals submitted within a planning application. Where infrastructure exists, the drainage design must comply with the relevant United Utilities guidelines and/or Building Regulations. Further information is available on our website: Working near our pipes - United Utilities. Failure to consider existing infrastructure when designing a drainage proposal may result in the applicant having to redesign proposals at a later date.

On this basis you may wish to reapply to discharge condition no.6.

Kind regards,
Sue Wills
Principal Planner
Development Management Areas
Planning
Growth and Development Directorate.
Manchester City Council
Floor 6 Town Hall Extension
Albert Square
P.O.BOX 532
M60 2LA
External Tel:
Internal extension
Mobile
Email: sue.wills@manchester.gov.uk
<http://www.manchester.gov.uk>

From: Alex Snow
Sent: 24 June 2025 12:00 PM
To: Sue Wills
Cc: Bill Davidson
Subject: RE: CDN/25/0241 - Land Off Ambrose Street Manchester [REDACTED]

ALERT This message originated outside of the Manchester City Council network. **BE CAUTIOUS** before clicking any links or opening any attachments. Please remember your Cyber Training and report anything suspicious.

Hi Sue,

Trust all is well.

Just following up on my email from Monday last week. It would be useful to understand if you have heard anything back from both parties. Conscious that we are looking to get this sorted as soon as possible, it would be very useful to get feedback.

Many thanks,

ALEX SNOW BA (Hons) MPlan MRTPI
Planner

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From: Alex Snow

Sent: 16 June 2025 10:29

To: Sue Wills

Subject: FW: CDN/25/0241 - Land Off Ambrose Street Manchester [REDACTED]

Hi Sue,

Further to our conversation earlier this week. Please could this message be forwarded to both United Utilities (UU) and the Lead Local Flood Authority (LLFA).

The Flood Risk Assessment (FRA) submitted in support of the discharge of condition 6 (application ref. CDN/25/0241) outlines that initial investigations into the culvert have confirmed a blockage around the inspection chamber cover on Ambrose Street. Additionally, the invert level of the drain at Ambrose Street is at the same level as the outfall into Corn Brook. Consequently, connecting new drains to the culvert poses a significant risk that the attenuation tank will not discharge effectively, thereby increasing the potential for on-site flooding during storm events. As a result, the FRA proposes a connection to the main combined sewer, rather than the culvert. Further technical detail on this assessment is provided in the attached FRA.

In response to this application, we received the attached consultee comments from UU dated 01.05.2025 recommending the condition not be discharged. The basis for this was that the culvert be fully investigated and the applicant seek it's cleaning/clearing by whoever is responsible for it. UU advised this matter should be fully explored prior to granting discharge to the combined sewer.

Since then, further efforts have been made to confirm the culvert is not a viable drainage solution:

1. 3 May – GK Construction conducted additional investigations confirming the inspection chamber on Ambrose Street remains blocked. No change in water levels at Corn Brook was observed.

2. 7 May – Following a review of title documents, we contacted the adjacent land occupier, Hancocks, to request clearance of the culvert under their land. On 13 May, they confirmed they are unable to assist as they are tenants of the Council and not the landowners.
3. 12 May – GK Construction carried out a further inspection, which again confirmed the blockage. Despite a prolonged period of dry weather, water levels in Corn Brook remain level with the outfall, and the outlet pipe is inaccessible without partially draining the brook and removing boundary structures that are outside our jurisdiction.
4. 11 June 2025 - Our drainage company attended on 11 June 2025 with a vacuum tanker with the aim of clearing the inspection chamber to inspect the branch pipe/culvert which leads into Corn Brook, and record accurate invert levels. The email attached records the findings and includes photographs – which are described below. The tanker removed a total of 9No. loads of sludge and water but was unable to clear any of the culvert to enable an inspection, as the pipe and chamber were continually filling, presumed to be from both from upstream and downstream, due to the blockages in the pipe and the water level in Corn Brook (photo 1 – chamber prior to commencement, photo 2 – a glimpse of the brick arch at the top of the branch pipe, photo 3 – chamber on completion after removal of 9No. tanker loads).
5. The drainage company verbally noted to us that they think there may be a hydro-break at the end of the branch pipe, where it discharges into brook, although details of this could not be seen or established.

From the results of this work, it is concluded that doing any more work on the culvert is well outside the applicant's remit. It is our understanding that the responsibility sits presumably with Highways and Hancocks – although please see attached the response received from Hancocks when we approached them previously.

An application was made to the LLFA to connect to the culvert on 15 May 2025. To clarify why this application was submitted despite knowledge that it was infeasible: since February 2023, the applicant and their drainage consultant have attempted to engage with the LLFA through pre-application discussions, during the original application and as part of condition discharge regarding the use of the culvert, to no avail. In the absence of formal feedback, and the contents of the attached UU consultee comment, the applicant proceeded with a formal application to prompt a definitive response from the LLFA on this matter.

Given the comprehensive investigations and outlined above conducted over the past 2+ years, we trust this information is sufficient for the LLFA to confirm that the culvert is not a viable drainage solution. As concluded in the submitted FRA, discharge into the UU combined sewer represents the most feasible and sustainable option within the drainage hierarchy.

With this information provided, we trust it is sufficient in allowing the LLFA to confirm that the culvert is not a viable drainage solution, and rather as set out in the submitted FRA, discharging into the UU drain is the highest feasible option on the drainage hierarchy. On this basis, we need UU to reconsider our application, or, the LLFA review these further details and confirm to us/UU that we are unable to use the culvert.

Should further discussion be required, the project manager and civil engineer remain available to engage directly with UU and the LLFA.

We appreciate your urgency on this matter, as it is essential for the progression of this matter.

Many thanks,

ALEX SNOW BA (Hons) MPlan MRTPI

Planner

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This footnote also confirms that this email message has been swept for the presence of computer viruses.

Appendix G – Culvert Investigation



Observation Dilapidation Survey #3: Surface Water investigation Manhole:EX.UU MH3100

Origin		Status	Initiated
Created By	David Ford (GK Construction & Project Management)	Date Created	28 Jan, 2025
Assignee	David Ford (GK Construction & Project Management)	Distribution	Vicky Jones (Beaumont Lord) Bradley Greenwood (GK Construction & Project Management) Patrick Allmark (GK Construction & Project Management) Adam Podmore (GK Construction & Project Management)
Notification Date	25 Feb, 2025	Priority	High
Location			
Due Date	28 Feb, 2025	Private	Yes
Spec Section			
Description	28/01/25 - investigation work on existing surface water drainage. Manhole reference EX.UUMH3100 cover level of 50.790 and Inver level of 48.090 - full with water around 49.674mm down from cover level. Investigation works stopped.		
Linked Drawings	08052024: United Utilities - Sewer Records Rev.0		



[08052024: United Utilities - Sewer Records Rev.0](#)

Attachments



[1738054962512.754883_templImage.jpeg](#)



[1738054962447.296143_templImage.jpeg](#)



[1738054962387.208008_templImage.jpeg](#)

Activity (3)

David Ford
07/02/2025 at 04:20 PM GMT

Comment: UU (ref: 07004101) have states that the maintenance of this is not with UU. It with who ever the land owner is above the run. Clare any alternative proposals? Or could this be used to utilise Manhole Ref EX. MH 09 that's linked to the foul line along Ambrose street?

David Ford
28/02/2025 at 12:58 PM GMT

Comment: Previous Drainage investigation survey attached - Man hole ref: 3100 - Taken 13/09/2022 also shows MH filled with water.

Attachments:



[Site Plan.pdf](#)



[Manhole Records.pdf](#)

David Ford
28/02/2025 at 12:57 PM GMT

Comment: 28/02/24 - Investigation works. Levels MH Ref EXUUMH3100 - 49.595 level of water within manhole Brook - 49.891 Water line level. No visible pipe from surface water to brook - currently under water level. Connection point from MH SW06 to existing assumed IL to be 49.114 (1:43 fall) - Currently under water.

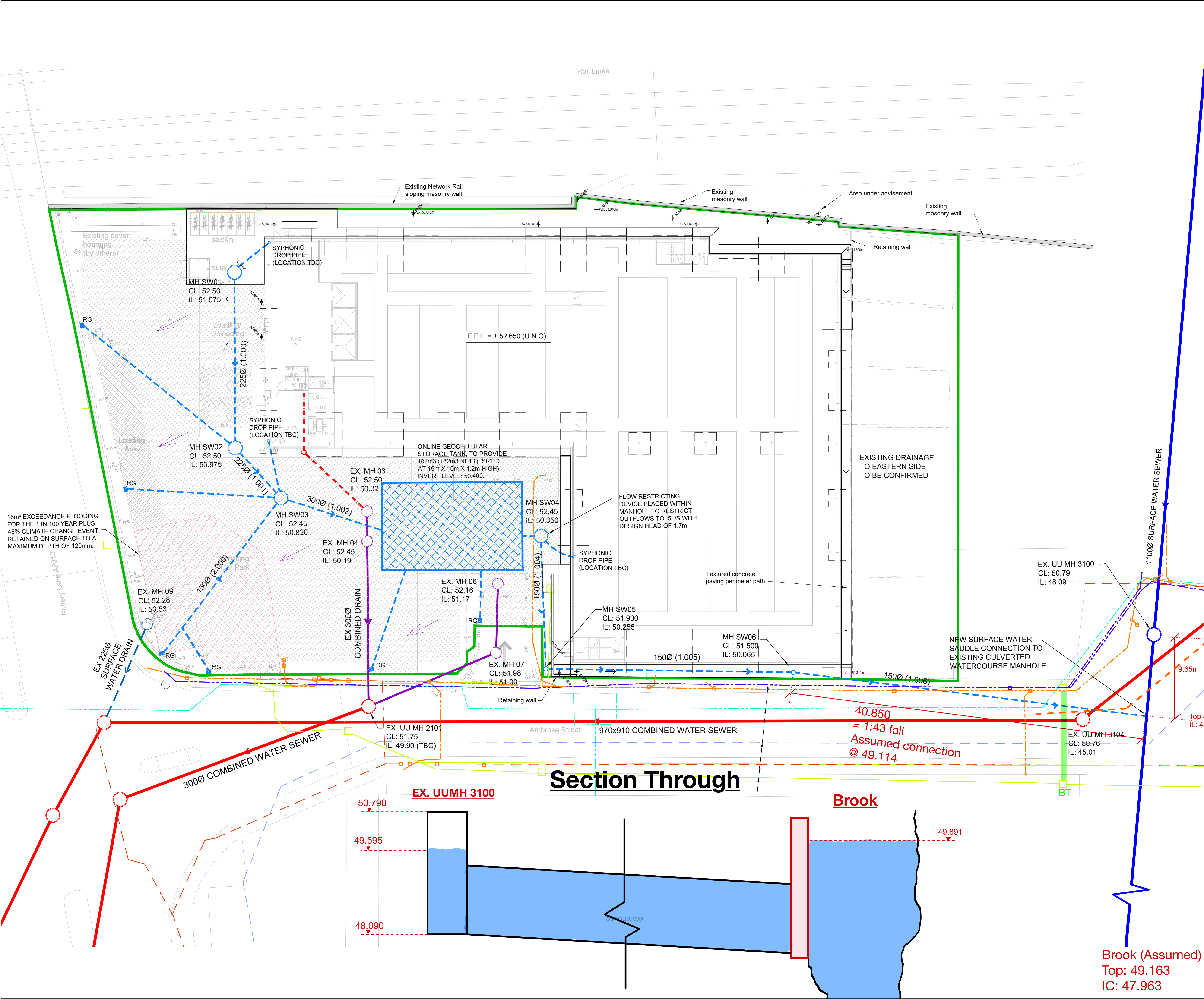
Attachments: [Covert investigation- 28.02.25.pdf](#)



[A7DA5E2B-9D89-4B3B-B4AB-E59DA1E2DDC1.jpeg](#)



[058787E2-05D2-47E0-9234-4D5AD45E9972.jpeg](#)



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5. IF THE CONTRACTOR CONSIDERS THAT HE DOES NOT HAVE SUFFICIENT INFORMATION TO SAFELY COMPLETE THE WORKS DETAILED ON THIS DRAWING, HE SHOULD CONTACT THE ENGINEER.	
CDM DESIGNER'S RISK ASSESSMENT	
THOMASONS ASSUME THAT THE CONTRACTOR IS COMPETENT IN MATTERS OF HEALTH & SAFETY AND IS AWARE OF ALL THE NORMAL RISKS ASSOCIATED WITH CONSTRUCTION OF THE TYPE SHOWN ON THIS DRAWING. REMAINING UNUSUAL RISKS ARE :-	
CONSTRUCTION	CHK'D
1. Potential asbestos containing materials in ground.	CH
2. High water table. Allow for pumping of excavations.	
3. Working adjacent to live railway.	
4. Working adjacent to existing structures to be retained, care to be taken to not undermine / damage these during the works.	
MAINTENANCE / CLEANING	
1. No unusual risks	CH
DECOMMISSIONING / DEMOLITION	
1. No unusual risks	CH

KEY	
	EXISTING COMBINED WATER SEWER
	EXISTING CULVERTED WATERCOURSE
	EXISTING COMBINED WATER DRAINAGE
	EXISTING SURFACE WATER DRAINAGE
	PROPOSED FOUL WATER DRAINAGE
	PROPOSED SURFACE WATER DRAINAGE
	SITE BOUNDARY
	OVERLAND FLOOD FLOWS

Surface water
@150mm
Not less than 1:150

@1200mm
No less that 1:400

Unknow service located.

Rev	Description	By	Date	Chkd
T4	DRAINAGE LAYOUT UPDATED	MT	11.02.25	CH
T3	DRAINAGE LAYOUT UPDATED	MT	21.01.25	CH
T3	SHEET PILING OMITTED	MT	13.06.24	CH
T2	BUILDING OUTLINE REVISED.	MT	23.05.24	CH
T1	TENDER ISSUE	BB	20.04.23	CH



STORAGE WORLD
AMBROSE STREET

DRAINAGE LAYOUT

Status					
TENDER					
Drawing No.				Revision	
11325 - 025				T5	
Scale	Size	Drawn	Date	Passed (Tender)	Passed (Construction)
1:200	A1	BB	APR 23	CH	-

Appendix H – Site Investigation Report



Client:

Storage World Self Storage & Workspace LLP
40 Ashton Old Rd
Manchester
M12 6LP

Consultant/Engineer:

Thomasons
3 Brewery Yard
Deva City Office Park
Trinity Way
Manchester
M3 7BB

Geotechnical Ground Investigation – Concrete Floor Slab

Storage World Ambrose Street, Manchester

Unit 4
Sheffield Street
Heaton Norris
Stockport
Cheshire
SK4 1RU

Jan 2023

Site Ref: 6101/VAJ-G

Telephone :
e-mail :

Storage World Ambrose Street, Manchester

Client:

Storage World Self Storage & Workspace LLP
40 Ashton Old Rd
Manchester
M12 6LP

Consultant:

Thomasons
3 Brewery Yard
Deva City Office Park
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Manchester
M3 7BB

Geotechnical Investigation – Concrete Floor Slab

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Appendices

- A1. Site Plan with Exploratory Hole Locations
- A2. Proposed Plan
- B1. Terminology used in Soil Descriptions
- B2. List of Abbreviations
- B3. Concrete in Aggressive Ground
- C1. Exploratory Hole Logs BH1 to BH6
- C2. Exploratory Hole Logs TP1 and TP2 including photographs
- D1. Laboratory Test Summary Sheet
- D2. Classification Test Summary Sheet
- D3. Sulphate and pH Test Summary Sheet

Client:

Storage World Self Storage & Workspace LLP
40 Ashton Old Rd
Manchester
M12 6LP

Consultant:

Thomasons
3 Brewery Yard
Deva City Office Park
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Manchester
M3 7BB

Geotechnical Investigation

1. Introduction

This report is an account of a ground investigation carried out by GeoAssist Limited at the request of Thomasons on behalf of Storage World Self Storage & Workspace LLP their Client and undertaken at the existing Storage World Ambrose Street, Manchester.

The object of this investigation was to obtain information into the ground conditions inside and around the existing unit which is to be demolished and where the proposed new unit is to be constructed.

The work was commissioned following the instructions to proceed issued on 3rd November 2022 by Thomasons on behalf of their Client Storage World Self Storage & Workspace LLP.

The location of the area under investigation is indicated on the site plan in Appendix A1 along with the exploratory hole locations.

2. Description of the Site

2.1 Present

The site is located to the northern side of Ambrose Street at the junction of Pottery Lane and is presently occupied by a large warehouse structure with associated exterior hardstanding areas. The building is subdivided into smaller commercial/light industrial and retail lettings. The site is roughly rectangular in shape and the general topography of the site is relatively level.

A railway line forms the northern boundary to the site. Commercial/industrial property is located along the eastern boundary of the site. The southern boundary to the site abuts Ambrose Street over which more commercial/industrial property is located. To the west the site abuts Pottery Lane across which more commercial /warehousing/light industrial units are located.

Where observed the condition of the concrete floor was not uniform or consistent.

2.2 Proposed Development

The proposed development comprises a new storage facility occupying a similar foot print to the existing unit with new concrete floor slabs and external hardstanding.

The proposed plan for the Site forms appendix A2 to this report.

3. Geology

The 1 in 10,560 scale geological map of the area SJ 89 NE published in 1976, shows the site to be located on Boulder Clay (Glacial Till) Drift deposits. The depth of the drift is not readily discernible from the plans. The underlying solid geology is shown as being Westphalian C Undifferentiated red strata, mainly Mudstone of the Carboniferous Period.

No faults in the solid geology pass directly beneath the site, however, a fault is shown as roughly 150m east of the site in a roughly north-south direction.

4. Intrusive Investigation

The ground investigation was carried out in accordance with BS 5930:1999/2015 where relevant.

All fieldwork was supervised by suitably qualified GeoAssist Limited Geotechnical Engineers.

Geotechnical in situ testing, sampling and laboratory testing was carried out within the GeoAssist Laboratory.

The exploratory holes were located at positions that were accessible for the equipment used and as indicated by Thomasons Engineer.

4.1 Exploratory Hole Programme

Exploratory holes BH1 to BH6 were undertaken using windowless sampling and dynamic probing techniques.

The internal concrete floor was pre-cored to allow the in-situ testing beneath.

Two trial pits referenced TP1 and TP2 were excavated immediately adjacent to the existing retaining wall running along the north side of the site in order to establish, if possible, the nature and depth of the existing foundations of the retaining wall.

The locations of all the exploratory holes are shown on the site plan attached to this report in Appendix A.

The exploratory holes were completed between the 14th and 16th November 2022.

4.2 Field Sampling and Testing

Representative samples were taken of all the strata encountered in the exploratory holes.

In Situ Dynamic Penetration tests using the Standard SPT drop weight and drop height were carried out in the exploratory holes. All samples were stored in airtight containers and returned to the laboratory for subsequent examination and testing.

In situ TRL DCP tests were undertaken at shallow depth in selected exploratory holes in order that CBR values for the subsoils could be assessed.

Observations of groundwater conditions were made throughout the fieldwork operations.

Exploratory holes BH1, BH3 and BH6 were converted to gas/groundwater monitoring standpipes.

On completion to depth the remaining exploratory holes were backfilled and reinstated.

4.3 Field Results

Full details of the subsoil conditions in the exploratory holes are given in the exploratory hole log sheets, which form Appendix C1 to this report.

The details of the strata in the exploratory holes were recorded by a suitably qualified Professional Engineer. The results of interpreted CBR values are recorded on the exploratory hole logs.

5. Laboratory Investigation

5.1 Geotechnical Testing

The following geotechnical tests were performed in GeoAssist's laboratory on samples recovered from the exploratory holes.

Table 5.1 Geotechnical Testing

TEST	PURPOSE
Shear Strength from Hand Vane/Hand Penetrometer test	Assessment of in-situ shear strength of cohesive deposits
Natural Moisture Content and Classification test	Assessment of in-situ subsoil conditions and compressibility/shrinkage of cohesive deposits
Sulphate and pH test	Assessment of potential aggressive ground conditions with respect to subsurface concrete

5.2 Test Results

The geotechnical test results are given in the laboratory test results summary sheets, which form Appendices D1 to D3 to this report.

6. Subsurface Stratigraphy

The subsoil profile obtained from the exploratory holes consists of made ground to depths between 0.40m and 2.70m over gravelly sandy silty Clay with sand inclusions. The upper made ground consists of concrete/hard standing over sandy gravels with brick fragments. A lower silty clay with cinders and ash was encountered in BH2, BH3 and BH6.

Further details of the subsurface stratigraphy can be found in the exploratory hole log sheets which form Appendix C1 to this report.

Table 6.0 Subsoil Profile Summary

Strata	Depth of Strata (m) below ground level	
	Top	Base
Made Ground – MG1 Concrete/Hard standing over variable mixed granular	Ground Level	0.30 to 1.40
Made Ground – MG2 Silty Clay with ash and cinders in parts	0.20 to 1.90 BH2, BH3 and BH6	2.00 to 2.70 BH2, BH3 and BH6
Glacial Till – GT Gravelly sandy silty Clay	0.40 to 2.70	>6.00

7. Groundwater

Groundwater was encountered at depths of 1.90m and 1.00m in BH1 and BH6 respectively during the course of the fieldwork. The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to

the record being taken.

Groundwater levels associated with the groundwater monitoring in BH1 and BH6 standpipes installed on this site indicate that over the monitoring period 09/12/2022 to 16/01/2023, ground water has been recorded as being present at highest depths of 1.90m and 0.80m respectively with a corresponding highest level around 51.0 mAOD. Water ingress was noted at a higher level of 52.3mAOD in the Trial Pits.

Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.

8. Geotechnical Properties

The following sections summarise the geotechnical properties for the main strata encountered on this site and are based on physical description, measured and empirical values.

8.1 Upper Made Ground – MG1

Made ground has been identified on the entire site as being mainly granular consisting of sandy gravel with brick fragments and cinders in varying proportions.

Table 8.1 Summary of Geotechnical Properties – Upper Made Ground

Property	Number of Tests	Range of Results	Derived Value Weighted Mean
Sulphate 2:1 Water:Soil Extract	1	520 mg/l	520 mg/l
Sulphate Total from contamination tests	4	0.018 to 2.14%	2.14 % See note on concrete attack

8.2 Lower Made Ground – MG2

Made ground has been identified in BH2, Bh3 and BH6 as being mainly cohesive consisting of silty clay with cinders in varying proportions.

Table 8.2 Summary of Geotechnical Properties – Lower Made Ground

Property	Number of Tests	Range of Results	Derived Value Weighted Mean
Sulphate 2:1 Water:Soil Extract	3	400 to 510 mg/l	520 mg/l see above
Sulphate Total from contamination tests	4	0.019 to 1.2%	1.2%

8.3 Glacial Till – GT

Gravelly sandy silty Clay, medium to very high strength increasing with depth and intermediate to high in plasticity

Table 8.3 Summary of Geotechnical Properties – Glacial Till

Property	Number of Tests	Range of Results	Derived Value Weighted Mean
Sulphate 2:1 Water:Soil Extract	2	400 to 470 mg/l	520 mg/l see above
Plasticity Index	2	25% to 34%	31%
Shear Strength From Hand Vane tests within influencing depth	6	109 to 170 kN/m ²	100 kN/m ² Reduced to alleviate adverse settlements
Assessed CBR value for TRLDGP probe tests	3	5% to 13%	5% Drained with water 0.60m lower than formation

9. Geotechnical Assessment

9.1 Design Criteria

The following typical design criteria have been assumed for the proposed development.

1. Structural loads of up to 20kN/m² on slab foundations at shallow depth.
2. Structural loads of up to 120kN/m² on pad foundations up to 2.00m square at depth of around 1.00m.

9.2 Foundation Design Considerations

Made ground is present across the site. Deeper pad/strip foundations located in the natural clay present at depths between 1.00m and 2.70m may be considered.

9.3 Shallow to Moderate Depth Footings

Reinforced concrete foundations located on the stiff natural gravelly sandy silty clay can be designed to the bearing capacities given below with the likely associated settlements as indicated.

Depth m	Material	Foundation Type	Maximum Foundation Size m	Allowable bearing capacity kN/m ²	Long term Settlement mm
1.00 to 2.70	Stiff gravelly sandy silty Clay	Pad	Up to 2.00 square	200	<25

Concreting of foundations should take place as soon as formation level is exposed in order to prevent weakening of the subsoil due to the ingress of surface/seepage groundwater.

9.4 Excavations

Ancillary shallow depth excavations (<1.20m) in the made ground will require nominal support with at least pumping from sumps to control surface water ingress. There is a high perched groundwater on site apparently fed by seepage water emanating from beneath the adjacent retaining wall and railway embankment. Suitable interception of this seepage water should be installed as part of the enabling works during demolition of the existing buildings.

10. Vehicle Pavement Foundations

The results of classification tests indicate a CBR value of 5% could be anticipated in the very silty clays present across the site.

The pavement design and construction will be dependent on the service requirements of the intended vehicular paved area and consequently is outside the scope of this report.

The very silty clay in this area is susceptible to softening in the presence of surface/ground water when exposed and it is recommended that the Engineer takes a conservative approach to the design in respect of CBR value likely to be obtained during construction. In situ CBR tests should be undertaken to confirm that the design for the external outside paved areas has been achieved during/after the enabling works after demolition has been completed.

Adequate drainage should be installed to ensure that the groundwater is at least 600mm below the sub-base of the pavement foundations.

11. Subsurface Concrete Attack

The results of the soluble sulphate and pH tests carried out on samples of subsoil obtained from this site in general indicate that according to Building Research Establishments Special Digest 1 (2005) no particular precautions for concrete foundations will be required.

Generally, the use of concrete mix design sulphate class DS-2 and according to ACEC Class AC-2 of Table C1 conditions can be used for subsurface concrete mix design in contact with the natural clay.

It should be noted a high total sulphate content was encountered within the fill materials in BH2 and BH5 and the Design Engineer should ensure suitable precautions should be undertaken to remove the made ground deposits off site or to segregate concrete foundations from the potentially aggressive made ground materials.

Matthew Benson BSc
Geotechnical/Environmental Engineer

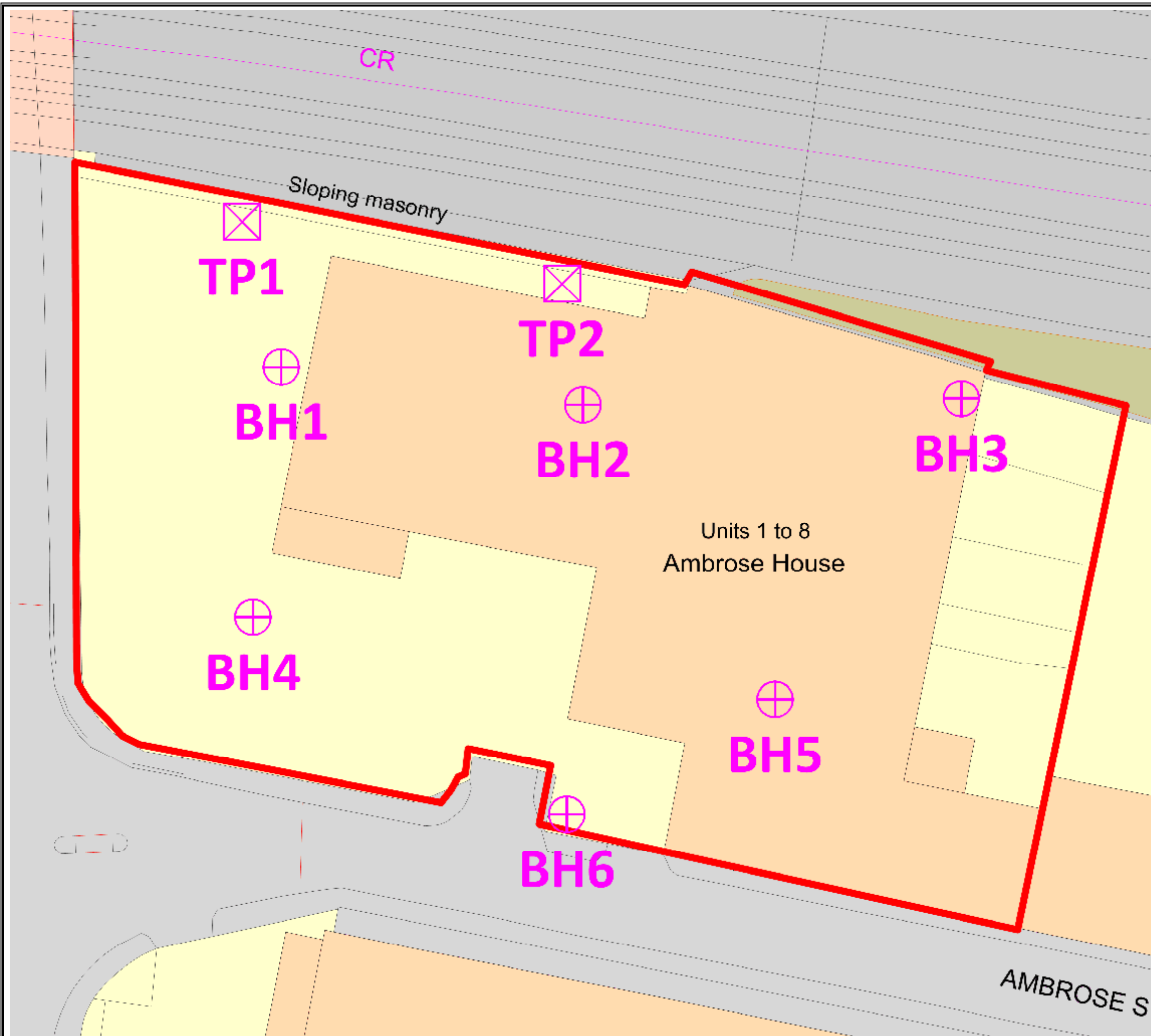
Mark Richardson MSc CEng MICE
Technical Director

Field investigations have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions are, and can be, variable and have only been tested at isolated locations across the site. Therefore, the potential exists for ground conditions to be encountered which are different to those considered in this report.

This report has been prepared by GeoAssist Limited with all reasonable professional skill, care and diligence within the terms of the contract with Storage World Self Storage & Workspace LLP. The report is confidential to Thomasons and Storage World Self Storage & Workspace LLP and GeoAssist Limited accepts no responsibility of whatever nature to third parties to whom this report may be divulged. GeoAssist Limited owns the copyright in this report. All rights are reserved, and unauthorised use is prohibited. Thomasons and Storage World Self Storage & Workspace LLP may use the report for their/her/his own purposes.

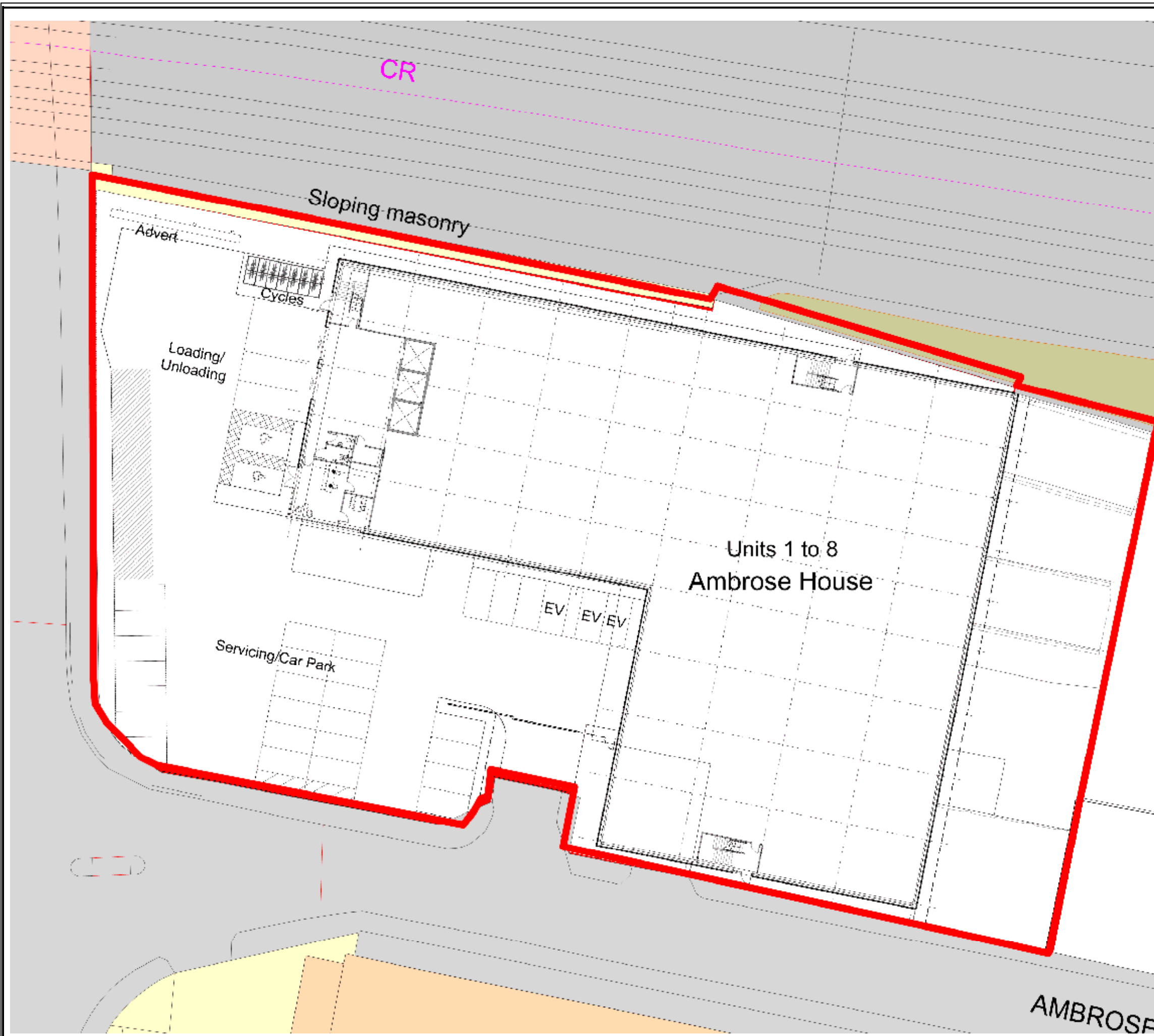
Appendix A

- A1 Site Plan with Exploratory Hole Locations
- A2 Proposed Site Plan



A1. Site Plan

Site Name	Seaton House Stockport
Location	
GeoAssist Ref	6101/VAJ
Client	Storage World Self Storage & Workspace LLP
Planning Consultant	Thomasons
NGR (centre of site)	387260, 397200
Production Date	Jan 2023
Survey Method	
Surveyor	Others
Status	Final v1.00
Base Survey	OSGB36



A2. Proposed Plan

Site Name	Seaton House Stockport
Location	
GeoAssist Ref	6101/VAJ
Client	Storage World Self Storage & Workspace LLP
Planning Consultant	Thomasons
NGR (centre of site)	387260, 397200
Production Date	Jan 2023
Survey Method	
Surveyor	Others
Status	Final v1.00
Base Survey	OSGB36

Appendix B

- B1 Terminology used in Soil Descriptions
- B2 List of Abbreviations
- B3 Concrete in Aggressive Ground

Terminology used in Soil Descriptions

The procedure and principles given in BS EN ISO 14688-1:2002 Part 1: 'Identification and description' have been adopted in producing the soil descriptions contained within this report.

The general identification and description of soils is based on a flexible system for immediate (field) use by experienced persons, covering both material and mass characteristics by visual and manual techniques.

Details are given of the individual characteristics for identifying soils and the descriptive terms in regular use, including those related to the results of tests from the field.

This part of ISO 14688 is applicable to natural soils *in situ*, similar man-made materials *in situ* and soils redeposited by man.

Particular sections of BS EN ISO 14688-1:2002 Part 1 are reproduced here in order to clarify the production of the soil descriptions contained within this report.

Identification of soil

General

Soil characteristics that generally permit soil to be identified with adequate accuracy for general (or preliminary) characterization are outlined below. A more accurate identification and classification based on grading, plasticity or organic content can be achieved by laboratory tests. In addition to identifying soils, the condition in which a soil is encountered, any particular secondary constituents, other features of a soil, such as carbonate content, particle shape, surface roughness of particles, odour, any common names and the geological classification are indicated.

The identification and description of soils generally follows the flow chart in Figure B1.1 attached.

Particle size

Particle size is the fundamental basis for designating mineral soils using particle fractions to distinguish the soil mechanical behaviour.

Table B1 shows the terms to be used for each soil fraction and its sub-fractions, together with the corresponding chosen range of particle sizes.

Basic soils are soils with uniform grading (i.e. they consist of particles of only one size range as specified in Table B1.1

Table B1.1 Particle Size Fractions

Soil fractions	Sub-fractions	Symbols	Particle sizes mm
Very coarse soil	Large boulder	LBo	> 630
	Boulder	Bo	> 200 to 630
	Cobble	Co	> 63 to 200
Coarse soil	Gravel	Gr	> 2,0 to 63
	Coarse gravel	CGr	> 20 to 63
	Medium gravel	MGr	> 6,3 to 20
	Fine gravel	FGr	> 2,0 to 6,3
	Sand	Sa	> 0,063 to 2,0
	Coarse sand	CSa	> 0,63 to 2,0
	Medium sand	MSa	> 0,2 to 0,63
	Fine sand	FSa	> 0,063 to 0,2
Fine soil	Silt	Si	> 0,002 to 0,063
	Coarse silt	CSi	> 0,02 to 0,063
	Medium silt	MSi	> 0,006 3 to 0,02
	Fine silt	FSi	> 0,002 to 0,006 3
	Clay	Cl	≤ 0,002

APPENDIX B1

Form No.: QF029AEN

Composite soils

General

Most soils are composite and consist of principal and secondary fractions. They are designated by a noun (main term) describing the principal fraction and by one or more adjectives (qualifying terms) describing the secondary fractions (e.g. sandy gravel saGr, gravelly clay grCl).

Principal fraction

The principal fraction in terms of mass determines the engineering properties of the soil and is given in capital letters for clarity.

In the case of very coarse soils, the principal fraction is the relevant very coarse soil fraction predominating in terms of mass. The very coarse fraction should be separated from the sample before identifying the fine and coarse fractions.

In the case of coarse soils, the principal fraction is the relevant coarse soil fraction predominating in terms of mass.

Composite coarse soils include a fines fraction (silt and/or clay) that does not determine the engineering properties of the soil.

In the case of fine soils, the principal fraction is the relevant fine soil type determining the engineering properties of the soil.

In the case of composite fine soils, the fines fraction determines the engineering properties of the soil. The fines fraction is regarded as determining the characteristics of a composite soil if this is of at least medium dry strength or exhibits a certain degree of plasticity.

In both cases, the soil is termed either "clay" or "silt", depending on the plasticity of the fines fraction and not on the grading.

Secondary fractions

Secondary and further fractions do not determine but will affect the engineering properties of the soil. The secondary fractions as adjectives are placed with the term describing the principal fraction in the order of their relevance.

If coarse secondary fractions are present in a particularly small or particularly large proportion, the term "slightly" or "very" shall precede the qualifying term.

If it is a fine soil, the properties of which are determined by fines fractions, a soil can be identified as "silt" or "clay" by checking for the presence of fine secondary constituents on the basis of its plasticity properties.

If, in the case of coarse soils, two soil fractions are present in approximately equal proportions, an oblique shall be placed between the relevant terms, e.g. gravel/sand (Gr/Sa) or fine/medium sand (FSa/MSa).

Plasticity

Assessment of the plasticity and identification of a soil as either silt or clay permits the soil to be qualified as being of low plasticity or high plasticity.

An exact determination can only be made by establishing the liquid limit and the plastic limit in laboratory tests.

Organic content

Small quantities of dispersed organic matter in a soil can produce a distinctive odour and colour. The intensity of odour and colour indicates the proportion of organic matter and should be described.

Determination of consistency

The consistency of a cohesive soil shall be determined in a manual test, permitting the following identification and description:

- a) a soil is to be identified as **very soft** if it exudes between the fingers when squeezed in the hand;
- b) a soil is to be identified as **soft** if it can be moulded by light finger pressure;
- c) a soil is to be identified as **firm** if it cannot be moulded by the fingers, but rolled in the hand to thick threads without breaking or crumbling;
- d) a soil is to be identified as **stiff** if it crumbles and breaks when rolled to thick threads but is still sufficiently moist to be moulded to a lump again;
- e) a soil is to be identified as **very stiff** if it has dried out and is mostly light coloured. It can no longer be moulded but crumbles under pressure. It can be indented by the thumbnail.

Preliminary descriptions are based on visual and manual identification only.

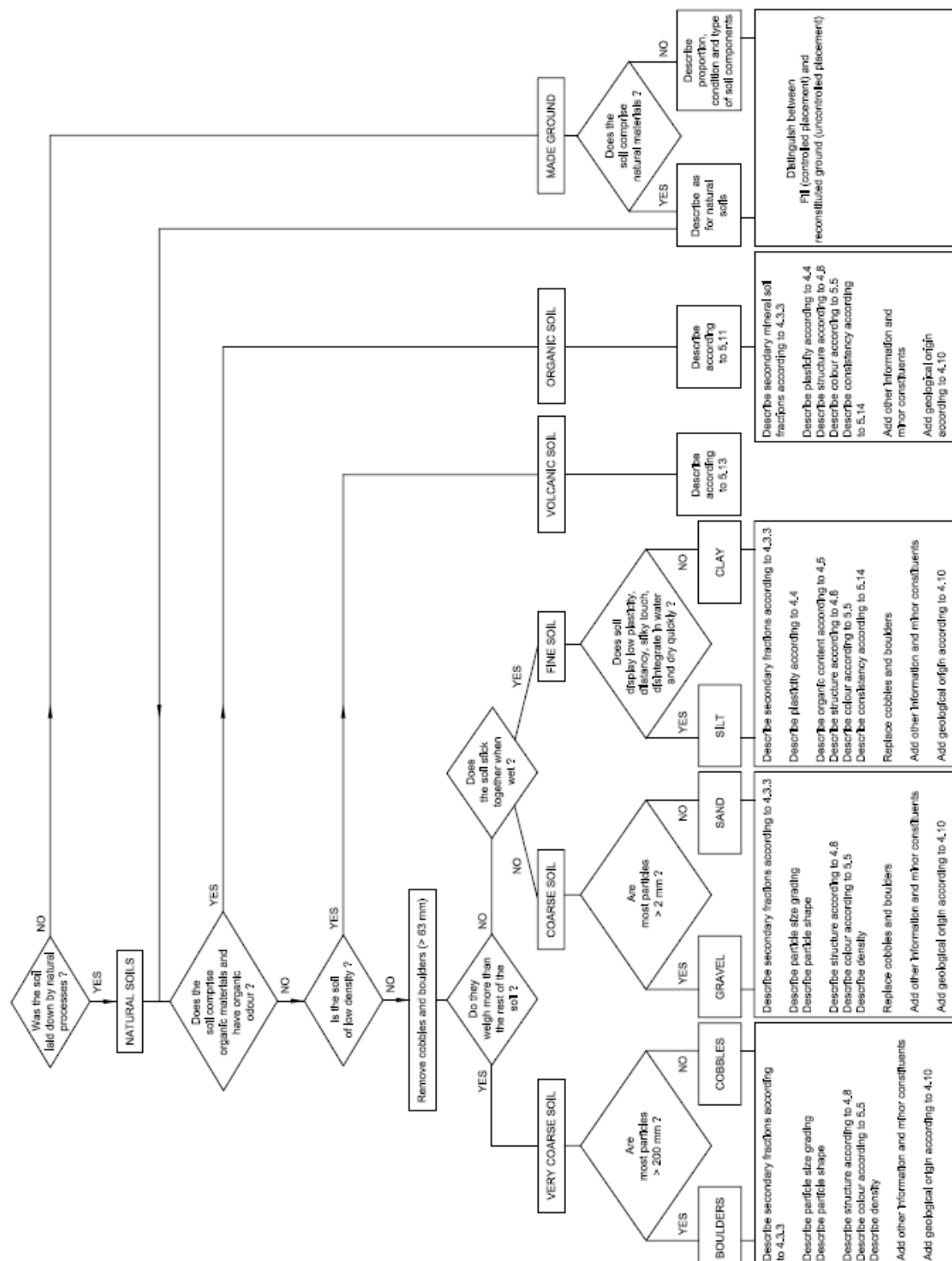


Figure B1.1 Flow chart for the identification and description of soils

Terminology used in Soil Classification

The procedure and principles given in BS EN ISO 14688-2:2004 Part 2: 'Principles for a classification' have been adopted in producing the soil descriptions contained within this report where laboratory or in situ field tests have been carried out.

The classification principles established in this part of ISO 14688 permit soils to be grouped into classes of similar composition and geotechnical properties and, with respect to their suitability for geotechnical engineering purposes.

This part of ISO 14688 is applicable to natural soil and similar man-made material *in situ* and redeposited, but it is not a classification of soil by itself.

Particular sections of BS EN ISO 14688-1:2002 Part 2 are reproduced here in order to clarify the production of the soil descriptions contained within this report.

Principles of soil classifications

General

Soils shall be classified into soil groups on the basis of their nature, which is the composition only, irrespective of their water content or compactness, taking into account the particle size distribution (grading), plasticity, organic content, genesis as appropriate.

The most common approach to classification is to divide the soils on the basis of particle size grading and plasticity. The division is made on the relative size fractions present for the coarser soil fractions, determined on the whole sample, and on the plasticity of the finer fractions (Table B1.2).

Table B1.2 Principles of a classification of soils

Criterion	Soil group	Quantification	Denomination into groups of similiar properties			Further subdivision as appropriate by
Wet soil does not stick together	very coarse	most particles > 200 mm	Bo	xBo		Requires special consideration
				boCo	coBo	
	most particles > 63 mm	Co	saCo, grCo	sagrCo		
	coarse	most particles > 2 mm	Gr	coGr	cosaGr	Particle size (grading) Shape of grading curve Relative density Permeability
			saGr, grSa	sasiGr, grsiSa		
		most particles > 0,063 mm	Sa	siGr, clGr orSa	siSa, clSa, saclGr	(Mineralogy) (Particle shape)
Wet soils sticks together	fine	low plasticity dilatant	Si	saSi	sagrSi saclSi	Plasticity Water content Strength, sensitivity Compressibility, stiffness (Clay mineralogy)
				clSi, siCl		
		plastic non-dilatant	Cl	orSi, orCl	sagrCl	
Dark colour, low density	organic		Or	saOr, siOr	clOr	Requires special consideration
Not naturally	Made ground	deposited	Mg	xMg	Man-made material	Requires special consideration
					Relaid natural materials	As for natural soils
Key to symbols						Cases requiring special consideration should be classified according to national or project requirements
Soil	Principal	Secondary or tertiary component				
Boulders	Bo	bo	Gr(gr) and Sa(sa) can be subdivided into fine F(f), medium M(m) or coarse C(c)			
Cobbles	Co	co				
Gravel	Gr	gr				
Sand	Sa	sa				
Silt	Si	si				
Clay	Cl	cl	any combination of components			
Organic	Or	or				
Made ground	Mg	—				
		x				

APPENDIX B1

Form No.: QF029AEN

Fractions

Soil is a mixture of materials of different particle size, which are grouped into fractions as specified in BS EN ISO 14688-1.

Classification of coarse and very coarse soils is to be based on the particle size distribution alone (see Table B1.3)

Table B1.3 Classification of very coarse soils

Fraction	Percent by mass	Term
Boulders	< 5	low boulder content
	5 to 20	medium boulder content
	> 20	high boulder content
Cobbles	< 10	low cobble content
	10 to 20	medium cobble content
	> 20	high cobble content

In the case of soils composed of both fine and coarse material, classification is to be based on both plasticity and particle size distribution.

Particle size distribution (grading)

The particle sizes and their distribution in a soil are determined by mechanical analysis carried out by the separation of the coarser fractions by sieving on a series of standard sieves and the determination of the finer fractions by sedimentation.

The results of the sieving and sedimentation process are plotted as a grading curve.

Plasticity

The fine fractions of soil, represented by clay and silt and containing clay minerals (see also BS EN ISO 14688-1), both alone or in mixtures with coarser material, are usually classified according to their plasticity characteristics. This is carried out on the basis of laboratory tests to determine the liquid limit w_L and plastic limit w_P .

Organic content

When soils with organic constituents are classified according to their organic content (Table B1.4), a distinction is to be made between organic soils and mineral soils with an organic content.

Table B1.4 Classification of soils with organic constituents

Soil	Organic content (≤ 2 mm) % of dry mass
Low-organic	2 to 6
Medium-organic	6 to 20
High-organic	> 20

Classification of coarse and composite organic soils accumulated *in situ* is based on the type of organic matter and that of organic soils, on the genetic origin and the degree of decomposition of the organic constituents.

APPENDIX B1

Form No.: QF029AEN

Undrained shear strength of fine soils

The terms to be used for the designation of the undrained shear strength according to the results of laboratory and field tests are given in Table B1.5.

Table B1.5 Undrained shear strength of fine soils

Undrained shear strength of clays	Undrained shear strength c_u kPa
Extremely low	< 10
Very low	10 to 20
Low	20 to 40
Medium	40 to 75
High	75 to 150
Very high	150 to 300
Extremely high ^a	> 300
^a Materials with shear strength greater than 300 kPa may behave as weak rocks and should be described as rocks according to ISO 14689-1.	

Table B1.6 Guiding values for the division of mineral soils on a basis of the contents of various fractions

Fraction	Content of fraction in wt % of material ≤ 63 mm	Content of fraction in wt % of material ≤ 0,063 mm	Name of soil	
			Modifying term	Main term
Gravel	20 to 40 > 40		gravelly	gravel
Sand	20 to 40 > 40		sandy	sand
Silt + clay (fine soil)	5 to 15	< 20	slightly silty	silt silt clay clay
		≥ 20	slightly clayey	
	15 to 40	< 20	silty	
		≥ 20	clayey	
	> 40	< 10		
		10 to 20	clayey	
		20 to 40	silty	
		> 40		

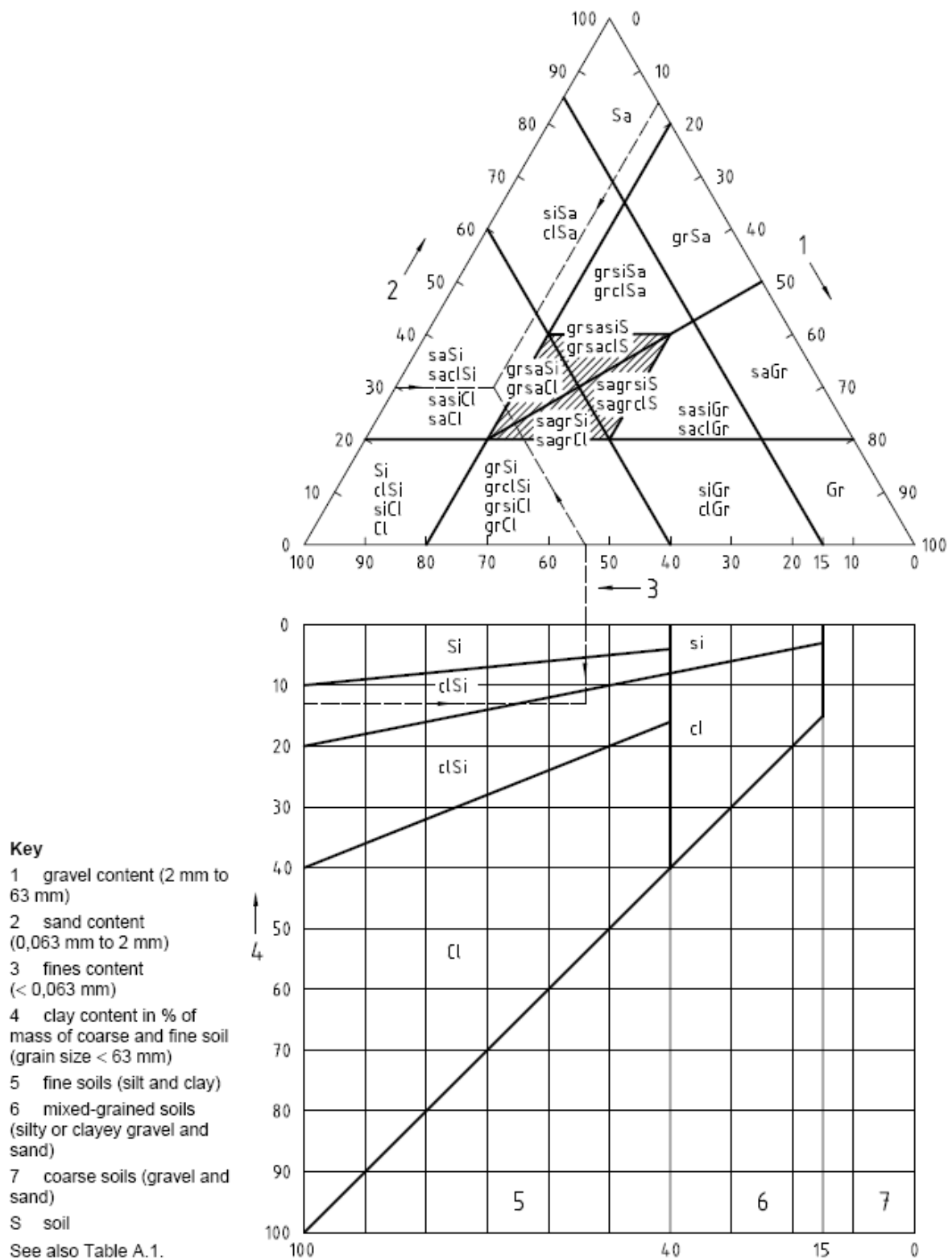


Figure B1.2 Classification of soils, based on grading alone

References

BS EN ISO 14688-1: 2002

Geotechnical investigation and testing — Identification and classification of soil — Part 1: Identification and description

BS EN ISO 14688-2: 2004

Geotechnical investigation and testing — Identification and classification of soil — Part 2: Principles for a classification

Abbreviations

Exploratory Hole log

Sample Type

AGS Code	Sample Type	AGS Code	Sample Type
B	Bulk Disturbed sample	SPT	Penetration Test – split spoon
CBR	CBR sample	U	Undisturbed sample – open drive
CPT	Penetration Test – cone	UF	Undisturbed sample failed recovery
D	Small disturbed sample	W	Water sample
PU	Piston sample	C - ES	Environmental sample

SPT and CPT – Standard Penetration Test

Blow Count (N) – If full penetration of 450mm then the total number of blows for the last 300mm is given.

If limited penetration following 150mm seating blows then the number of blows for the stated penetration is given.

If limited penetration then the total number of blows for the stated penetration is given.

The N values are actual blows recorded and uncorrected.

U - Undisturbed Sample

Blow Count – total number of blows for recovered length

Legend – As per British Standard – if blank then CAVITY/OPEN HOLE

Core Rec.:

T - Total Core Recovery as a percentage of the cored run

S – Solid Core Recovery as a percentage of the cored run

RQD – Rock Quality Designation as a percentage of the cored run

FI – Fracture index as number of fractures per metre

l_f – Fracture spacing as the average length of solid core pieces between natural fractures over core length of reasonable uniform characteristics

APPENDIX B2

Form No.: QF033AEN

Laboratory Test Summary Sheet

Tests on Soils

AGS Code	Test Name	AGS Code	Test Name
ASB	Asbestos	IDEN	In Situ Density
BDEN	Bulk Density	IGNIS	Loss on Ignition
CBR	California Bearing Ratio	IVAN	In Situ Vane
CD	Consolidated drained (single stage)	LS	Linear shrinkage
CDM	Consolidated drained (multi stage)	MCVG	Moisture Condition Value
CLSS	Atterberg Limits	NMC	Natural Moisture content
CMPG	Compaction	OMS	Organic Matter
CNMT	Contaminant and Chemical	PD	Particle density
CONG	Consolidation	PHS	pH
CU	Consolidated undrained with pwp measurement (single stage)	PTST	Laboratory permeability
CUM	Consolidated undrained with pwp measurement (multi stage)	RELD	Relative Density
DDEN	Dry Density	SHBG	Shear box
FRST	Frost Susceptibility	SLIM	Shrinkage Limit
GRAD HY	Particle Size (Hydrometer)	SULWS	Sulphate on 2:1 Water:Soil Extract
GRAD WS	Particle size (wet Sieve)	TNPC	Ten Per Cent Fines
HVP	Hand vane – peak	UU	Unconsolidated quick undrained (single stage)
ICBR	In situ CBR	UUM	Unconsolidated quick undrained (multi stage)

Tests on rocks and Aggregates

AGS Code	Test Name	AGS Code	Test Name
ACV	Aggregate crushing value	SHOR	Shore hardness
BRAZ	Tensile Strength by Brazilian method	SOUN	Aggregate Soundness Test
LOSA	Aggregate Los Angeles Abrasion	UCS	Uniaxial Compressive Strength
PLSI	Point Load Index – size corrected	WTAB	Aggregate Water Absorption

4. Reference AGS Format Edition 3

Concrete in Aggressive Ground

1. Assessing the Aggressive Chemical Environment

In order to assess the levels of sulphate in the ground or groundwater, which may have a deleterious effect on concrete, the sulphate content of soil and groundwater may be determined in accordance with BS 1377 (2001) Test 3:5. The sulphate contents determined are grouped into Aggressive Chemical Environment for Concrete (ACEC) site classifications in Building Research Establishment Special Digest 1 – Part 1 (2005) Tables C1 and C2 as reproduced below.

Based on this classification BRE Special Digest 1 gives recommendations for the design of suitable concrete mixes to resist chemical attack for each ACEC classification. Care should be taken in the interpretation of results over the site area, if classification is based solely on groundwater analysis, it should be based on the highest sulphate concentration recorded. Where a large number of results from soil analysis are available it should be based on the average of the highest 20 per cent of the results. If a varied set of results are recorded from a limited sampling programme it is important to carry out further analyses before a detailed classification is given.

2. References

BS 1377: 2001: 'Methods of Test for Soils for Civil Engineering Purposes': British Standards Institution.

BRE Special Digest 1: 2005: 'Concrete in Aggressive Ground': Building Research Establishment.

Table C1 Aggressive Chemical Environment for Concrete (ACEC) classification for natural ground locations ^a						
Sulfate Design Sulfate Class for location	2:1 water/soil extract ^b	Groundwater	Total potential sulfate ^c	Groundwater Static water	Mobile water	ACEC Class for location
1	2 (SO ₄ mg/l)	3 (SO ₄ mg/l)	4 (SO ₄ %)	5 (pH)	6 (pH)	7
DS-1	< 500	< 400	< 0.24	≥ 2.5	> 5.5 ^d 2.5–5.5	AC-1s AC-1 ^e AC-2z
DS-2	500–1500	400–1400	0.24–0.6	> 3.5 2.5–3.5	> 5.5 2.5–5.5	AC-1s AC-2 AC-2s AC-3z
DS-3	1600–3000	1500–3000	0.7–1.2	> 3.5 2.5–3.5	> 5.5 2.5–5.5	AC-2s AC-3 AC-3s AC-4
DS-4	3100–6000	3100–6000	1.3–2.4	> 3.5 2.5–3.5	> 5.5 2.5–5.5	AC-3s AC-4 AC-4s AC-5
DS-5	> 6000	> 6000	> 2.4	> 3.5 2.5–3.5	≥ 2.5	AC-4s AC-5

Notes

- Applies to locations on sites that comprise either undisturbed ground that is in its natural state (ie is not brownfield – Table C2) or clean fill derived from such ground.
- The limits of Design Sulfate Classes based on 2:1 water/soil extracts have been lowered relative to previous Digests (Box C7).
- Applies only to locations where concrete will be exposed to sulfate ions (SO₄) which may result from the oxidation of sulfides (eg pyrite) following ground disturbance (Appendix A1 and Box C8).
- For flowing water that is potentially aggressive to concrete owing to high purity or an aggressive carbon dioxide level greater than 15 mg/l (Section C2.2.3), increase the ACEC Class to AC-2z.

Table C2 Aggressive Chemical Environment for Concrete (ACEC) classification for brownfield locations ^a								
Sulfate and magnesium						Groundwater		ACEC
Design Sulfate Class for location	2:1 water/soil extract ^b		Groundwater		Total potential sulfate ^c	Static water	Mobile water	Class for location
1	2	3	4	5	6	7	8	9
	(SO ₄ mg/l)	(Mg mg/l)	(SO ₄ mg/l)	(Mg mg/l)	(SO ₄ %)	(pH) ^d	(pH) ^d	
DS-1	< 500		< 400		< 0.24	≥ 2.5	> 6.5 ^d 5.5–6.5 4.5–5.5 2.5–4.5	AC-1s AC-1 AC-2z AC-3z AC-4z
DS-2	500–1500		400–1400		0.24–0.6	> 5.5 2.5–5.5	> 6.5 5.5–6.5 4.5–5.5 2.5–5.5	AC-1s AC-2 AC-2s AC-3z AC-4z AC-5z
DS-3	1600–3000		1500–3000		0.7–1.2	> 5.5 2.5–5.5	> 6.5 5.5–6.5 2.5–5.5	AC-2s AC-3 AC-3s AC-4 AC-5
DS-4	3100–6000	≤ 1200	3100–6000	≤ 1000	1.3–2.4	> 5.5 2.5–5.5	> 6.5 2.5–6.5	AC-3s AC-4 AC-4s AC-5
DS-4m	3100–6000	> 1200 ^e	3100–6000	> 1000 ^e	1.3–2.4	> 5.5 2.5–5.5	> 6.5 2.5–6.5	AC-3s AC-4m AC-4ms AC-5m
DS-5	> 6000	≤ 1200	> 6000	≤ 1000	> 2.4	> 5.5 2.5–5.5	> 2.5	AC-4s AC-5
DS-5m	> 6000	> 1200 ^e	> 6000	> 1000 ^e	> 2.4	> 5.5 2.5–5.5	≥ 2.5	AC-4ms AC-5m

Notes

- a Brownfield locations are those sites, or parts of sites, that might contain chemical residues produced by or associated with industrial production (Section C5.1.3).
- b The limits of Design Sulfate Classes based on 2:1 water/soil extracts have been lowered from previous Digests (Box C7).
- c Applies only to locations where concrete will be exposed to sulfate ions (SO₄²⁻), which may result from the oxidation of sulfides such as pyrite, following ground disturbance (Appendix A1 and Box C8).
- d An additional account is taken of hydrochloric and nitric acids by adjustment to sulfate content (Section C5.1.3).
- e The limit on water-soluble magnesium does not apply to brackish groundwater (chloride content between 12 000 mg/l and 17 000 mg/l). This allows it to be omitted from the relevant ACEC classification. Seawater (chloride content about 18 000 mg/l) and stronger brines are not covered by this table.

Appendix C

- C1 Exploratory Hole Logs BH1 to BH6
- C2 Exploratory Hole Logs TP1 and TP2 including photograph

GeoAssist Limited Consultant: Thomasons Client: Storage World Self Storage & Workspace LLP	Exploratory Hole Record Sheet Project: Storage World Ambrose Street Location: Manchester		Ref: BH1 Sheet: 1					
	Equipment: Archway Dart Rig		Ground Level: 52.75 m.AOD Co-ordinates: Easting: 387241.3(m) Northing: 397217.2(m) Dates: 16/11/2022 to 16/11/2022					
Drilling Foreman: M Walton STRATUM DESCRIPTION Engineer/Geologist: M Benson		Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests Depth (m) from to	Sample Type/No	Blow Count N/(U)	Field Records

0	Grey/brown sandy gravel, brick and concrete fragments - MADE GROUND	(0.40) 0.40	52.35		0.30	C1		
	Stiff to very stiff brown with light grey gravelly sandy silty CLAY	(0.60) 1.00	51.75		0.80 1.00 1.20	D1 CP1 D2	9	TRLDGP Test CBR at 0.40m- 13%
1	Stiff to very stiff brown high to very high strength gravelly slightly sandy silty CLAY							Hand penetrometer at 1.20m - 164kPa
2					2.00	CP2	13	Hand penetrometer at 1.80m - >250kPa
3		(3.60)			3.00	CP3	13	Hand penetrometer at 2.50m - 220kPa
4		4.60	48.15		4.00	CP4	7	Hand penetrometer at 3.50m - 182kPa
5	Very stiff brown/grey very high strength gravelly sandy silty CLAY with occasional sand inclusions	(0.40) 5.00	47.75		4.90	CP5	9	Hand penetrometer at 4.50m - 144kPa Hand penetrometer at 4.80m - 219kPa
6	Exploratory Hole complete at 5.00m							16/11/2022: On completion of exploratory hole at 5.00m. Casing at 2.00m. Standing water level Nil with casing. On withdrawal of casing groundwater/gas monitoring standpipe installed to 4.00m with response zone from 1.00m to 4.00m.
7								
8								
9								
10								

Remarks: 16/11/2022: Inspection pit excavated to 1.00m depth to avoid services The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.	Logged: M Benson Date: 21/11/2022 Checked: M Richardson Date: 25/11/2022 Site Ref: 6101/VAJ Scale 1:50
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Soil Description		Depth (m)	Soil Profile	Depth (m)	Soil Type	Depth (m)	Notes
0.00	CONCRETE	0.10		0.40	C1	9	Hand penetrometer at 2.20m - 209kPa
0.10	Brown sandy gravel with brick and sandstone fragments - MADE GROUND	0.20		0.50	CP1	9	
0.20	Very soft to firm grey with black very low to medium strength inclusions very silty clay - MADE GROUND	(1.80)		0.90	D1	1	
1.80		2.00		1.00	CP2	1	
2.00				1.50	CP3	4	
2.00	Firm to stiff brown medium to high strength gravelly sandy silty CLAY with cobbles from 3.00 to 4.00m depth			2.00	CP4	10	Hand penetrometer at 3.50m - >250kPa
				2.20	D2	10	
		(3.00)		3.00	CP5	15	
				4.00	CP6	13	Hand penetrometer at 4.50m - 170kPa
		5.00		4.90	CP7	26	
5.00	Exploratory Hole complete at 5.00m						14/11/2022: On completion of exploratory hole at 5.00m. Casing at 2.00m. Standing water level Nil with casing. On withdrawal of casing exploratory hole backfilled and reinstated.
6.00							
7.00							
8.00							
9.00							
10.00							

Remarks: 14/11/2022: Concrete slab precored The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.	Logged: M Benson Date: 21/11/2022 Checked: M Richardson Date: 25/11/2022 Site Ref: 6101/VAJ Scale 1:50
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GeoAssist Limited		Exploratory Hole Record Sheet					Ref: BH3	
		Project: Storage World Ambrose Street Location: Manchester					Sheet: 1	
Consultant: Thomasons		Equipment: Archway Dart Rig					Ground Level: NR m.AOD	
Client: Storage World Self Storage & Workspace LLP							Co-ordinates: Easting: NR(m) Northing: NR(m)	
							Dates: 14/11/2022 to 14/11/2022	
Drilling Foreman: M Walton STRATUM DESCRIPTION		Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests			Field Records
Engineer/Geologist: M Benson					Depth (m) from to	Sample Type/No	Blow Count N/(U)	

Depth (m)	Description	Soil Type / Material	Penetration Test Results (kPa)	Notes
0.00 - 0.10	CONCRETE	Concrete	-	
0.10 - 0.30	Light grey concrete fragments - MADE GROUND	Concrete fragments	-	
0.30 - 0.50	Orange/brown brick fragments - MADE GROUND	Brick fragments	-	
0.50 - 2.70	Very soft to soft grey with black silty clay, ash and cinders - MADE GROUND	Made ground	(2.20)	
2.70 - 6.00	Stiff to very stiff brown/grey high to very high strength gravelly sandy silty CLAY	Gravelly sandy silty clay	(3.30)	
6.00 - 6.00	Exploratory Hole complete at 6.00m			

Remarks: 14/11/2022: Concrete slab precored The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.	Logged: M Benson Date: 21/11/2022 Checked: M Richardson Date: 25/11/2022 Site Ref: 6101/VAJ Scale 1:50
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	0.12	52.34						
CONCRETE Stiff to very stiff brown with light grey high to very high strength gravelly sandy silty CLAY with occasional sand inclusions								
-1					0.30	C1		TRLDCP Test CBR at 0.30m- 5%
					0.80	D1		
					1.00	CP1	10	Hand penetrometer at 1.20m - 229kPa
					1.20	D2		
-2								Hand penetrometer at 1.80m - 224kPa
					2.00	CP2	11	Hand penetrometer at 2.50m - 167kPa
	(4.88)							
-3					3.00	CP3	12	Hand penetrometer at 3.50m - 220kPa
-4					4.00	CP4	8	Hand penetrometer at 4.50m - 172kPa
-5	5.00	47.46			4.90	CP5	9	16/11/2022: On completion of exploratory hole at 5.00m. Casing at 2.00m. Standing water level Nil with casing. On withdrawal of casing exploratory hole backfilled and reinstated.
Exploratory Hole complete at 5.00m								
-6								
-7								
-8								
-9								
-10								

Remarks: 16/11/2022: Inspection pit excavated to 1.00m depth to avoid services The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.	Logged: M Benson Date: 21/11/2022 Checked: M Richardson Date: 25/11/2022 Site Ref: 6101/VAJ Scale 1:50
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GeoAssist Limited	Exploratory Hole Record Sheet						Ref: BH5		
	Project: Storage World Ambrose Street		Location: Manchester				Sheet: 1		
	Consultant: Thomasons		Equipment: Archway Dart Rig				Ground Level: NR m.AOD		
Client: Storage World Self Storage & Workspace LLP						Co-ordinates: Easting: NR(m) Northing: NR(m)		Dates: 14/11/2022 to 14/11/2022	
Drilling Foreman: M Walton		STRATUM DESCRIPTION	Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests			Field Records
Engineer/Geologist: M Benson						Depth (m) from to	Sample Type/No	Blow Count N/(U)	

0	CONCRETE	0.30						
	Dark grey/brown sandy gravel with cinders, brick and timber fragments - MADE GROUND				0.50	CP1	15	
-1		(1.10)			0.50	C1		
					1.00	CP2	3	
		1.40			1.00	D1		
	Firm to stiff brown medium to high strength gravelly sandy silty CLAY				1.50	CP3	7	Hand penetrometer at 1.60m - 160kPa
-2		(0.60)			1.60	D2		
	Very stiff brown very high strength gravelly sandy silty CLAY	2.00			2.00	CP4	10	Hand penetrometer at 2.50m - 187kPa
-3								
					3.00	CP5	9	Hand penetrometer at 3.50m - 162kPa
-4		(3.00)						
					4.00	CP6	8	Hand penetrometer at 4.50m - 170kPa
-5		5.00			4.90	CP7	16	14/11/2022: On completion of exploratory hole at 5.00m. Casing at 2.00m. Standing water level Nil with casing. On withdrawal of casing exploratory hole backfilled and reinstated.
-6	Exploratory Hole complete at 5.00m							
-7								
-8								
-9								
-10								

Remarks: 14/11/2022: Concrete slab precored The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.	Logged: M Benson Date: 21/11/2022 Checked: M Richardson Date: 25/11/2022 Site Ref: 6101/VAJ Scale 1:50
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GeoAssist Limited	Exploratory Hole Record Sheet						Ref:	BH6
	Project:		Storage World Ambrose Street				Sheet:	1
	Location:		Manchester					
Consultant: Thomasons	Equipment: Archway Dart Rig					Ground Level: 51.86 m.AOD		
Client: Storage World Self Storage & Workspace LLP						Co-ordinates: Easting: 387268.8(m) Northing: 397174(m)		
						Dates: 15/11/2022 to 15/11/2022		
Drilling Foreman:	M Walton	Depth (Thick) {m}	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests			Field Records
STRATUM DESCRIPTION					Depth (m) from to	Sample Type/No	Blow Count N/(U)	
Engineer/Geologist:	M Benson							

Depth (m)	Soil Description	Soil Type	Moisture (%)	Unit Weight (kN/m³)	Penetration (mm)	Soil Profile	Soil Test Results
0	CONCRETE		0.10	51.76			
0.30	Brown sand, gravel and brick fragments - MADE GROUND		0.30	51.56			
0.70	Soft to firm brown/grey gravelly sandy silty clay - MADE GROUND		(0.70)				
1.00			1.00	50.86			
1.40	Very soft brown with grey gravelly sandy silty clay - MADE GROUND		(0.90)				
1.90			1.90	49.96			
2.00	Stiff brown high strength gravelly sandy silty CLAY		(1.10)				
3.00			3.00	48.86			
3.20	Brown silty fine to medium SAND		3.20	48.66			
4.00	Stiff brown high strength gravelly sandy silty CLAY		(0.80)				
4.80			4.80	47.06			
5.00	Medium dense brown with occasional black silty fine to medium SAND		(0.80)				
5.00	Brown/grey gravelly sandy silty CLAY		5.00	46.86			
5.00	Exploratory Hole complete at 5.00m						
6.00							
7.00							
8.00							
9.00							
10.00							

Remarks: 15/11/2022: Inspection pit excavated to 1.00m depth to avoid services The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.	Logged: M Benson Date: 21/11/2022 Checked: M Richardson Date: 25/11/2022 Site Ref: 6101/VAJ Scale 1:50
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GeoAssist Limited Consultant: Thomasons Client: Storage World Self Storage & Workspace LLP	Exploratory Hole Record Sheet Project: Storage World Ambrose Street Location: Manchester		Ref: TP1 Sheet: 1
	Equipment: Hand Excavation Methods		Ground Level: 53.04 m.AOD Co-ordinates: Easting: 387237.5(m) Northing: 397231.2(m) Dates: 16/11/2022 to 16/11/2022

Drilling Foreman: M Walton STRATUM DESCRIPTION Engineer/Geologist: M Benson	Depth (Thick) (m) Reduced Level (mAOD) Strata Legend/Standpipe Backfill	Samples/Tests Depth (m) from to Sample Type/No Blow Count N/(U)	Field Records
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0 Dark brown sandy gravel, brick fragments and sandstone cobbles - MADE GROUND Brown with light grey gravelly sandy silty CLAY Base of Masonry Wall at 0.70m depth Exploratory Hole complete at 0.80m	(0.50) 0.50 0.80	52.54 52.24		0.30	C1	Water ingress from 0.70m depth 16/11/2022: On completion of trial pit at 0.80m. Hole backfilled and reinstated
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Remarks: The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.	Logged: M Benson Date: 21/11/2022 Checked: M Richardson Date: 25/11/2022 Site Ref: 6101/VAJ Scale 1:25
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GeoAssist Limited Consultant: Thomasons Client: Storage World Self Storage & Workspace LLP	Exploratory Hole Record Sheet Project: Storage World Ambrose Street Location: Manchester		Ref: TP2 Sheet: 1
	Equipment: Hand Excavation Methods		Ground Level: 53.04 m.AOD Co-ordinates: Easting: 387268.4(m) Northing: 397225.2(m) Dates: 16/11/2022 to 16/11/2022

Drilling Foreman: M Walton		Depth (Thick) (m)	Reduced Level (mAOD)	Strata Legend/ Standpipe Backfill	Samples/Tests			Field Records
STRATUM DESCRIPTION					Depth (m) from to	Sample Type/No	Blow Count N/(U)	
Engineer/Geologist: M Benson								

0	CONCRETE	0.30	52.74		0.60	C1	Water ingress from 0.70m depth 16/11/2022: On completion of trial pit at 0.90m. Hole backfilled and reinstated
	Brown with light grey gravelly sandy silty CLAY	(0.60)					
	Base of Masonry Wall at 0.80m depth	0.90	52.14				
1	Exploratory Hole complete at 0.90m Note that datum level is where concrete meets wall						



Remarks: The groundwater conditions entered on the exploratory hole logs are those observed at the time of the drilling operations and the water level may not have reached equilibrium with the surrounding water level prior to the record being taken. Standing groundwater levels will be subject to seasonal variation or changes in local drainage conditions and could be higher at certain times of the year particularly after periods of heavy rainfall.	Logged: M Benson Date: 21/11/2022 Checked: M Richardson Date: 25/11/2022 Site Ref: 6101/VAJ Scale 1:25
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Appendix D

- D1 Laboratory Test Summary Sheet
- D2 Classification Test Summary Sheet
- D3 Sulphate and pH Test Summary Sheet

GeoAssist Limited SOIL LABORATORY SUMMARY SHEET	Project: Storage World Ambrose Street Location: Manchester Client: Storage World Self Storage & Workspace LLP Consultant : Thomasons	Site Ref: 6101/VAJ Project Code :
		Hole Ref BH1 to BH6

Sample Ref.	Depth m	Sample Description	Classification					Triaxial Compression					Chemical		Test Code
			LL %	PL %	PI %	% passing 425 m	Moist Cont. %	Bulk Density Mg/m ³	Sample Diameter mm	Lateral Pressure kN/m ²	Deviator Stress kN/m ²	Shear Cohesion kN/m ²	So ₄ 2:1 extract Soil:Water mg/l	pH	
BH1 D1	0.80	Brown with light grey gravelly sandy silty CLAY					-						470	7.9	SULWS PHS
BH1 D2	1.20	Brown gravelly slightly sandy silty CLAY	46	21	25	100	19								NMC CLSS
BH2 D1	0.90	Grey with black very silty clay - MADE GROUND					-						400	7.1	SULWS PHS
BH2 D2	2.20	Brown gravelly sandy silty CLAY	53	22	31	99	20								NMC CLSS
BH3 D1	0.90	Grey with black silty clay, ash and cinders - MADE GROUND					-						410	7.5	SULWS PHS
BH3 D2	3.20	Brown/grey gravelly sandy silty CLAY	54	23	31	100	20								NMC CLSS
BH4 D1	0.80	Brown with light grey gravelly sandy silty CLAY with occasional sand inclusions					-						400	7.8	SULWS PHS
BH4 D2	1.20	Brown with light grey gravelly sandy silty CLAY with occasional sand inclusions	45	20	25	99	17								NMC CLSS
BH5 D1	1.00	Dark grey/brown sandy gravel with cinders, brick and timber fragments - MADE GROUND					-						520	7.6	SULWS PHS
BH5 D2	1.60	Brown gravelly sandy silty CLAY	56	22	34	98	22								NMC CLSS
BH6 D1	0.80	Brown/grey gravelly sandy silty clay - MADE GROUND					-						510	7.7	SULWS PHS
BH6 D2	1.40	Brown with grey gravelly sandy silty clay - MADE GROUND	51	21	30	97	24								NMC CLSS

Site Reference:			6101 VAJ					
Project Site:			Storage World Ambrose Street					
Project Location:			Manchester					
Client:			Storage World Self Storage & Workspace LLP					
Consultant:			Thomasons					
CLASSIFICATION TEST								
Borehole Reference	Sample	Depth	Liquid Limit	Plastic Limit	Plasticity Index	% passing 425 micro	Natural Moisture Content	Material Code
BH1	D2	1.20	46	21	25	100	19	CI
BH2	D2	2.20	53	22	31	99	20	CH
BH3	D2	3.20	54	23	31	100	20	CH
BH4	D2	1.20	45	20	25	99	17	CI
BH5	D2	1.60	56	22	34	98	22	CH
BH6	D2	1.40	51	21	30	97	24	CH
		Mean	51	22	29	99	20	
		Maximum	56	23	34	100	24	
CLAY		Minimum	45	20	25	97	17	
	Standard Deviation		4	1	4	1	2	
	Count		6	6	6	6	6	

Site Reference:			6101	VAJ		
Project Site:			Storage World Ambrose Street			
Project Location:			Manchester			
Client:			Storage World Self Storage & Workspace LLP			
Consultant:			Thomasons			
	GEOTECHNICAL SULPHATE AND PH TEST					
Borehole Reference	Sample	Depth	SO4 2:1 Water:Soil extract mg/l	pH	SO4 Water mg/l	
BH1	D1	0.80	470	7.9		
BH2	D1	0.90	400	7.1		
BH3	D1	0.90	410	7.5		
BH4	D1	0.80	400	7.8		
BH5	D1	1.00	520	7.6		
BH6	D1	0.80	510	7.7		