







Great Northern Warehouse

Flood Risk Assessment and Detailed Drainage Strategy

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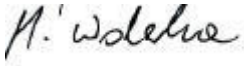
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1.0 Introduction

1.1 Project Background

1.1.1 Curtins was appointed by GNW Developments Limited to provide a Flood Risk Assessment (FRA) and Detailed Drainage Strategy (DDS) for the proposed redevelopment of land and buildings at the Great Northern Warehouse and Deansgate Terrace, situated at 223-253 Deansgate, Manchester. The nearest postcode to the site is M3 4EN, and the site is centred around National Grid Reference 383555, 397867.

1.1.2 The report provides information on the nature of flood risk at the site and follows Government guidance with regards to development and flood risk.

1.1.3 The report is based on currently available information and preliminary discussions.

1.1.4 Proposals contained or forming part of this report represent the design intent and may be subject to alteration or adjustment in completing the detailed design for this project. Where such adjustments are undertaken as part of the detailed design and are deemed a material deviation from the intent contained in this document, prior approval shall be obtained from the relevant authority in advance of commencing such works.

1.1.5 Where the proposed works to which this report refers are undertaken more than twelve months following the issue of this report, Curtins shall reserve the right to re-validate the findings and conclusions by undertaking appropriate further investigations at no cost to Curtins.

1.2 Scope of Assessment

1.2.1 The assessment is to be undertaken in accordance with the standing advice and requirements of the Environment Agency (EA) for Flood Risk Assessments as outlined in the Communities and Local Governments Planning Policy Guidance to the National Planning Policy Framework (NPPF).

1.2.2 In April 2015, the Government made changes to the National Planning Policy Framework which made Sustainable Urban Drainage Systems (SuDS) a material consideration in the determination of planning applications for ‘major’ developments.

1.2.3 A Detailed Drainage Strategy will therefore be required as part of the Full Planning Application for the development, as the site is considered to be ‘major’ development by the Town and Country Planning Order 2015.

1.2.4 The assessment will:

- Investigate all potential risks of flooding to the site;
- Consider the impact the development may have elsewhere with regards to flooding;
- Consider proposals to mitigate any potential risk of flooding determined to be present; and

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- Consider design proposals for foul and surface water drainage at the site.

1.2.5 The assessment reviews the following information:

- Environment Agency flood maps for rivers and sea flooding.
- UK Government Flood Warning Information Service maps for surface water flooding and reservoir flooding.
- Manchester City, Salford City and Trafford Councils Level 1 Hybrid Strategic Flood Risk Assessment (SFRA) published in March 2010.
- Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA, User Guide, Final, dated May 2010.
- Manchester City, Salford City and Trafford Councils Level 2 Hybrid Strategic Flood Risk Assessment (SFRA) published in March 2011.
- Preliminary Flood Risk Assessment (PFRA) for Manchester County Council dated May 2011.
- Manchester City Council SuDS Requirements for New Developments.
- Topographical Survey by S.E.P, dated March 2017
- Utility Surveys by S.E.P, dated January 2016 & June 2017.
- CCTV Survey by S.E.P dated June 2017
- CCTV Survey by Layer Surveys dated June 2022
- Utilities Search Report carried out by Groundwise, dated April 2017
- 064582-CUR-00-XX-RP-GE-001 Phase 1 Preliminary Site Assessment carried out by Curtins, dated June 2022

1.3 Proposed Development

1.3.1 The proposals include the re-use and sensitive adaptation of the Great Northern Warehouse and Deansgate Terraces, alongside the re-design of Great Northern Square.

Great Northern Square

1.3.2 The sunken amphitheatre is to be demolished and a single storey basement constructed in it place. Within the basement there is to be a plant room containing water storage and sprinkler tanks. The basement also has space available for community use or storage.

Great Northern Warehouse

1.3.3 The ground and first floors are to be retained as commercial with the change of use for levels 02 to 04 to be made from car park to office use.

Level 01 is to be re-configured to create a Co-working / events space within the Warehouse which requires the incorporation of a new mezzanine floor.

A central section of Levels 03 & 04 is to be 'opened-up' and the roof covering replaced with glazing to create a three-storey high central atrium.

New plant and communal terraces are introduced at roof level, requiring the local removal of existing roof trusses and new structure to provide the required support.

The existing glazed 'high line' structure link to the leisure box is to be demolished and level 01 is to be converted into a roof garden / public terrace. Elements of the existing floor structure are to be removed to provide a visual link to the lower level. The existing primary structural beams and columns are to be retained.

A new mezzanine floor is to be constructed between ground and level 01 to provide bicycle store for the office units.

At ground level plant rooms and commercial units are to be provided.

1.3.4 An external new lift structure is required to service the warehouse floors. A new link bridge provides access between the Warehouse and Terrace office units at level 01.

Deansgate Terraces

1.3.5 The proposals are to create a new north-south pedestrianised street to the rear of Deansgate Terraces.

1.3.6 A new two / three storey extension is proposed to the rear of the northern extent of the Deansgate Terraces with retail units at ground floor and office units over.

1.3.7 The proposed site layout and floor plans for the site are included in *Appendix A*.

Leisure Box

1.3.8 The proposals for the Leisure Box are subject to a separate planning application, with the drainage proposals for this works undertaken by others.

1.3.9 The Drainage Strategy for the Leisure (Ref 775-02) has been prepared by Civic Engineering.

2.0 Existing Site Details

2.1 History and Current Use

2.1.1 The site is located in Manchester City Centre, approximately 220m south-west of Manchester Town Hall. The site is bounded by Peter Street to the north, Watson Street to the east, Deansgate to the west, and the Great Northern NCP Car Park to the south which serves the existing site. There are also further existing commercial and retail buildings directly to the south of the site (see Figure 1).

Figure 1: Aerial Photograph (© Google 2017)



2.1.2 The area proposed for development is considered to be entirely brownfield, with an area of landscaping in the northern part of the existing site. Historic mapping shows that between 1909 and 1956 the site was used primarily as a railway goods station. By 1972 the railway appears to have been abandoned and post-1999 a new building is shown adjoining the south side of the former railway goods station, which aligns with the site observed today.

2.1.3 The proposals relate to a Site that comprises of four components: the Great Northern Square, Great Northern Warehouse and the Atrium Connection Building, part of the Leisure Box and of the Deansgate Terrace. To the northern area of the Site is the Great Northern Square, amphitheatre space and pavilion bar, which is located along Peter Street. The bar is not included within the red line boundary for the proposals and will remain in its current form.

2.1.4 Adjoining the Square to the south is the Grade II* Great Northern Warehouse building (the former Great Northern Railway Company's Goods Warehouse), which currently accommodates a number of

established retail, restaurant and leisure uses, including a bowling alley and casino, together with circulation space and public car parking.

2.1.5 To the south of the Great Northern Warehouse is the modern Atrium Connection Building, which acts as a connecting structure to provide pedestrian access between the Great Northern Warehouse and the Leisure Box, as well as a bridge that connects into a pedestrian route to Deansgate-Castlefield Metrolink Station.

2.1.6 The Leisure Box building is located within the southernmost extent of the Site and includes a number of leisure uses including a cinema, gym and a further multi-storey car park. This application relates to part of the Leisure Box where temporary works are required to facilitate continued access.

2.1.7 In total, 1,240 car parking spaces are provided across the site, with 519 bays in the Great Northern Warehouse and 721 bays in the Leisure Box and access is provided from Watson Street leading to a car park ramp. The space between the Great Northern Warehouse and Deansgate Terrace is currently occupied by a mixture of access and servicing arrangements, including the car park ramps providing vehicular access to the upper levels of Great Northern Warehouse.

2.1.8 The Grade II Listed Deansgate Terraces are located along the western boundary of the Site, fronting Deansgate and ranging from 2 to 4 storeys in height. At lower levels, there are 29 retail unit frontages, some of which have been merged into larger self-contained units, accommodating a mix of uses including cafes, shops, restaurants and estate agents. The upper levels of Deansgate Terrace provide some office space and storage for the units at lower level, as well as the Great Northern Management Suite.

2.1.9 The wider area consists of mainly retail and commercial buildings associated with the city centre of Manchester to the north, east, and south; to the west there is an area of residential buildings west of Deansgate, followed by commercial and industrial buildings beyond which is the River Irwell.

2.2 Existing Watercourses and Other Waterbodies

2.2.1 No above ground watercourses have been identified within the proposed site or in the immediate vicinity of the site.

2.2.2 The River Medlock (which is a ‘main river’) is located approximately 320m south-west of the site from which point it is canalised as the Bridgewater Canal (non-Canal and River Trust). Upstream, the River Medlock passes through a number of culverts underneath Manchester City Centre.

2.2.3 The River Irwell is located approximately 450m north-west of the site at its closest point, and it flows in a south-westerly direction towards the town of Runcorn. The downstream section of the River Irwell is known as the ‘Manchester Ship Canal’ and is privately maintained, whilst upstream the River Irwell is a ‘main river’.

2.2.4 The Rochdale Canal (Canal & River Trust) begins approximately 460m south-west of the site, and runs to the east / north-east through Manchester City Centre.

2.2.5 The Ashton Canal (Canal and River Trust) begins approximately 1.19km east of the site, running in an approximately easterly direction away from Manchester City Centre.

2.3 'Lost' Watercourses

2.3.1 A hidden (or 'lost') watercourse is identified within the vicinity of the site in the Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA. It is difficult to locate the specific routes of lost watercourses since they are culverted underneath the urban areas around Manchester, however the lost watercourse in the vicinity of the site appears to flow adjacent to the southern boundary of the site underneath Watson Street towards Camp Street and with a connection to the River Irwell approximately 500m northwest of the site.

2.3.2 A survey of the lost watercourse was carried out by SEP and it has been confirmed that this lost watercourse forms part of the abandoned Manchester and Salford Junction of the Bridgewater Canal. Further information has been obtained from Manchester City Council (enclosed in *Appendix D*) which also confirms the approximate route of the former canal structure.

2.3.3 As described in the Curtins Preliminary Site Investigation Report, the canal officially closed in 1922 with the section east of Watson Street being infilled and the western section used with reduced capacity until 1936 when it was officially abandoned. During WW2, the canal was drained, reinforced and used as an air raid shelter. The canal is now scheduled as a Grade II listed building.

2.4 Existing Drainage

2.4.1 The public sewer records have been obtained for the development site and are enclosed in *Appendix B*.

2.4.2 The records indicate that there is a 500mm public combined sewer running across the northern part of the site. The records show that the head of the system is located near to the north-east site boundary, potentially within the highway.

2.4.3 Following a review of the CCTV and Utility surveys, plus historical and existing building records. It was concluded that this section of sewers must have been removed when the existing site was constructed (1994-1996).

2.4.4 Discussions have taken place, and United Utilities have confirmed that they consider the sewer to be removed. A copy of the correspondence is available in Appendix D

2.4.5 There are no further public sewers recorded within the site.

2.4.6 The public sewer records indicate that the following public sewers are located within the vicinity of the site:

- A 375mm public combined sewer flows adjacent to the north of the site within Peter Street, flowing towards manhole 5903 at the junction of Peter Street with Deansgate. From manhole 5903, a 2400mm public combined sewer flows in a southerly direction within Deansgate adjacent to the western site boundary. A number of public combined sewer connections are located along this 2400mm combined sewer, from the existing frontages of the buildings along the western boundary of the site.
- Adjacent to the east of the site, a 450mm public combined sewer flows within Watson Street before joining with a 450mm public combined sewer within Peter Street adjacent to the north-east of the site. The public combined sewer then flows west within Peter Street via a 500 x 400mm public combined sewer adjacent to the northern site boundary.

2.4.7 A Utilities and CCTV survey was completed in Jun 2017 and is enclosed in *Appendix B*. The survey identified a number of private surface and foul water drainage features within the existing site. Generally, the existing private drainage is routed as follows:

- Surface water from the eastern part of the former railway goods depot discharges into the 450mm public combined sewer to the east of the site in Watson Street. The remainder of the building discharges to the north, south and western elevations, prior to connecting to the on-site combined private sewers. The network then outfalls via the under-croft area to the north-west of the site and into the 2400mm combined brick sewer in Deansgate.
- It is anticipated that surface water from the existing terraced buildings along Deansgate drains to the property frontage where it discharges into the public sewer within Deansgate.
- The surface water from the amphitheatre discharges into the private combined network on-site, prior to discharge to the north-west corner into the 2400mm combined brick sewer in Deansgate.
- Foul water from the former railway goods depot is discharges externally to the northern and western elevations of the building. The network then outfalls via the under-croft area to the north-west of the site and into the 2400mm combined brick sewer in Deansgate.
- Foul water from the terraces along Deansgate discharge externally to the eastern elevations of the building. The network then outfalls via the under-croft area to the north-west of the site and into the 2400mm combined brick sewer in Deansgate.
- A number of combined sewer connections exist along the front of the Deansgate terraces. This would indicate that there is existing foul drainage from the from the buildings to the front of the properties.
- The foul water from the amphitheatre discharges into the private combined network on-site, prior to discharge to the north-west corner into the 2400mm combined brick sewer in Deansgate.

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2.5 Topography

2.5.1 A topographical survey has been carried out for the proposed site and is enclosed in *Appendix C*.

2.5.2 Adjacent to the northern site boundary, the footway along Peter Street falls from approximately 36.35m AOD near to the north-east corner of the site, down to approximately 34.68m AOD near to the north-west corner of the site.

2.5.3 Adjacent to the western site boundary, the footway along Deansgate falls from approximately 35.35m AOD near to the south-west corner of the site down to approximately 34.68m AOD near to the north-west corner of the site.

2.5.4 Adjacent to the eastern site boundary, the footway along Watson Street rises from approximately 37.14m AOD adjacent to the south-east corner of the existing former railway goods depot building up to approximately 37.49m AOD near to the middle of the eastern site boundary, before falling to approximately 36.35m AOD near to the north-east corner of the site.

2.5.5 Within the northern part of the site, the northern building line of the former railway goods depot lies between approximately 35.86m AOD in the west to approximately 37.42m AOD in the east. The external areas then generally fall in a north-westerly direction, with a number of steps in the north-west corner of the site. Within the centre of the northern part of the site, a circular amphitheatre steps down from approximately 36.39m AOD at external ground level to approximately 33.58m AOD at the grassed area in the bottom of the amphitheatre. Adjacent to the north of this bottom level, there is a further stepped drop down to approximately 32.29m AOD where a paved area allows staff access to the basement of the bar located adjacent to the northern site boundary.

2.5.6 The internal areas of the former railway goods depot have not been surveyed, however just to the south of the building is the vehicle access to the car park, off Watson Street, which lies at approximately 36.65m AOD near to the car park entrance and slopes down to approximately 35.73m AOD at the bottom of the car park 'up' ramps. The internal areas of the lower level car park have not been surveyed.

2.6 Geology

2.6.1 The Curtins Phase Site Assessment identifies the following geological succession underlying the site:

- Made Ground – Likely to be present across the site
- Superficial deposits – None recorded for the majority of the site, with Glaciofluvial Sheet Deposits (Devensian) located in the north-west part of the site.
- Bedrock – Chester Pebble Beds Formation (Sandstone) across the majority of the site, with Manchester Maris Formation in the north-eastern portion of the site.

2.6.2 A BGS borehole (SJ89NW66) adjacent to the west of the site at the junction of Deansgate with Camp Street recorded Made Ground to a depth of 2.13m, and Sandstone to a depth of 13.41m.

2.6.3 The site is not located within a groundwater source protection zone.

3.0 Development and Flood Risk

3.1 National Planning Policy Framework (NPPF) and Planning Practice Guidance

3.1.1 In March 2012, the Department of Communities and Local Government published the National Planning Policy Framework document (NPPF) and the Planning Practice Guidance was published in March 2014 which provides guidance on how flood risk should be assessed during the planning and development process.

Table 1: (Extract from Planning Practice Guidance) Flood Zone Classifications

These Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences. They are shown on the Environment Agency's Flood Map for Planning (Rivers and Sea), available on the Environment Agency's website, as indicated in the table below

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map – all land outside Zones 2 and 3)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (Land shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	**This zone comprises land where water has to flow or be stored in times of flood.** Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

Table 2: (Extract from Planning Practice Guidance) Flood Risk Vulnerability Classification

Essential Infrastructure

- Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk.
- Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood.
- Wind turbines.

Highly Vulnerable

- Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding.
- Emergency dispersal points.
- Basement dwellings.
- Caravans, mobile homes and park homes intended for permanent residential use.
- Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or waterside locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'Essential Infrastructure'.)

More Vulnerable

- Hospitals.
- Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels.
- Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels.
- Non-residential uses for health services, nurseries and educational establishments.
- Landfill and sites used for waste management facilities for hazardous waste.
- Sites used for holiday or short let caravans and camping, subject to a specific warning and evacuation plan.

Less Vulnerable • Police, ambulance and fire stations which are **not** required to be operational during flooding. • Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'More Vulnerable' class; and assembly and leisure. • Land and buildings used for agriculture and forestry. • Waste treatment (except landfill* and hazardous waste facilities). • Minerals working and processing (except for sand and gravel working). • Water treatment works which do not need to remain operational during times of flood. • Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.
Water-Compatible Development • Flood control infrastructure. • Water transmission infrastructure and pumping stations. • Sewage transmission infrastructure and pumping stations. • Sand and gravel working. • Docks, marinas and wharves. • Navigation facilities. • Ministry of Defence defence installations. • Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. • Water-based recreation (excluding sleeping accommodation). • Lifeguard and coastguard stations. • Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. • Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

Table 3: (Extract from Planning Practice Guidance) Flood Risk Vulnerability and Flood Zone Compatibility

Flood Zone	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	✗	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	✗	✗	✗	✓

Key:

✓ Development is appropriate

✗ Development should not be permitted.

Notes to Table 3:

- This table does not show the application of the Sequential Test which should be applied first to guide development to Flood Zone 1, then Zone 2, and then Zone 3; nor does it reflect the need to avoid flood risk from sources other than rivers and the sea.
- The Sequential and Exception Tests do not need to be applied to minor developments and changes of use, except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site.
- Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

† In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

* In Flood Zone 3b (functional floodplain) essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows and not increase flood risk elsewhere.

3.2 Site Specific NPPF Flood Risk Categorisation

3.2.1 To assess the NPPF flood risk classification for the site, the first step was to inspect the UK Government web based 'Flood Map for Planning' which is used to inform planning of a site's Flood Zone(s) and the probability of flooding from rivers or sea (not taking into account the presence of flood defences or climate change). However, the web based 'Long Term Flood Risk Assessment for Locations in England' should also be used to identify the long-term flood risks from rivers and seas, surface water and reservoirs.

3.2.2 The Flood Map for Planning is shown below in Figure 2, and it can be seen that the pre-development site is located within an area classified as Flood Zone 1 (low probability of flooding from rivers or sea).

Figure 2: Flood Map for Planning (© Crown Copyright)



3.2.3 Further site-specific review of the flood risk to the site is provided in section 4.

3.3 Site Specific Flood Zone Compatibility

3.3.1 The proposals for the development site are likely to fall within the following categories:

- Buildings used for shops
- Restaurants, cafes and hot food takeaways

3.3.2 The development contains proposals classed as 'Less Vulnerable' development in the Flood Risk Vulnerability Classification (Table 2).

3.3.3 The site is located within Flood Zone 1, for which 'Less Vulnerable' development is deemed to be appropriate, and neither the sequential nor the exception test is required (refer to Table 3 for the Flood Zone compatibility table taken from NPPF technical guidance).

4.0 Hydrological Assessment

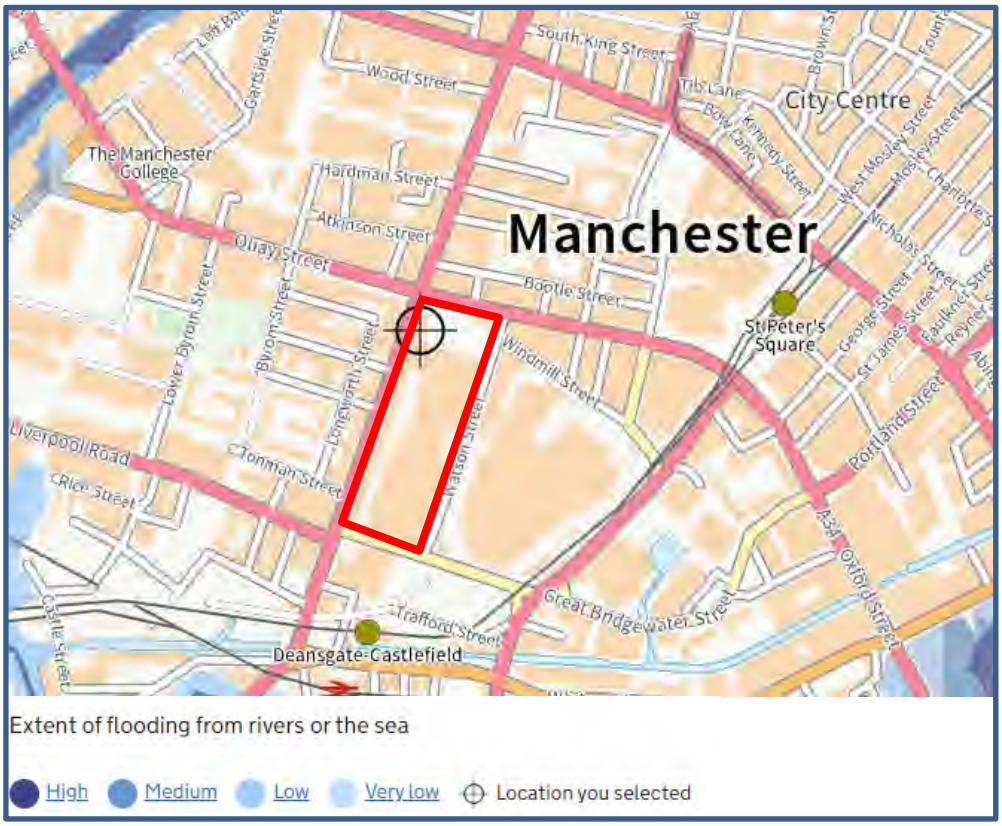
4.1 Sources of Flood Risk

4.1.1 This study assesses the risk from different types of flooding to the development and the risk of flooding from the development, taking into consideration climate change, as well as how flood risks should be managed. The approach to assessing flood risk at the development site was informed by the requirements of NPPF in conjunction with the client and Environment Agency requirements.

4.2 Fluvial Flooding (Rivers and Streams)

4.2.1 Flooding to the site from rivers and seas, taking into account flood defences, is indicated below in Figure 3, taken from the UK Government's Long Term Flood Risk Information.

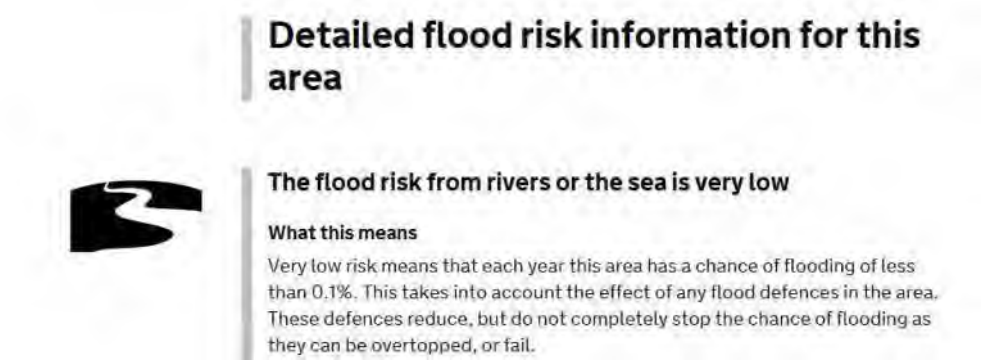
Figure 3: Long Term Flood Risk Assessment Map – Flood Risk from Rivers or Sea (© Crown Copyright)



4.2.2 The detailed flood risk information taken from the UK Government Long Term Flood Risk Assessment website (Figure 3) indicates that the area within the existing site is at 'Very Low' residual risk from fluvial flooding. Since the site is not shown to be in an area which benefits from flood defences, the fluvial flooding risk is directly linked to the Flood Zone 1 extents. The site has less than 0.1% chance of fluvial

flooding each year (see Figure 4). Therefore, the proposed site is considered to be at very low residual risk from fluvial flooding.

Figure 4: Long Term Flood Risk Assessment (Detailed Information) – Flood Risk from Rivers or Sea (© Crown Copyright)



4.3 Tidal Flooding (Coastal or Estuarine)

4.3.1 There is currently no flood risk identified on the flood risk maps for the site and it is therefore regarded to be at very low risk from tidal flooding.

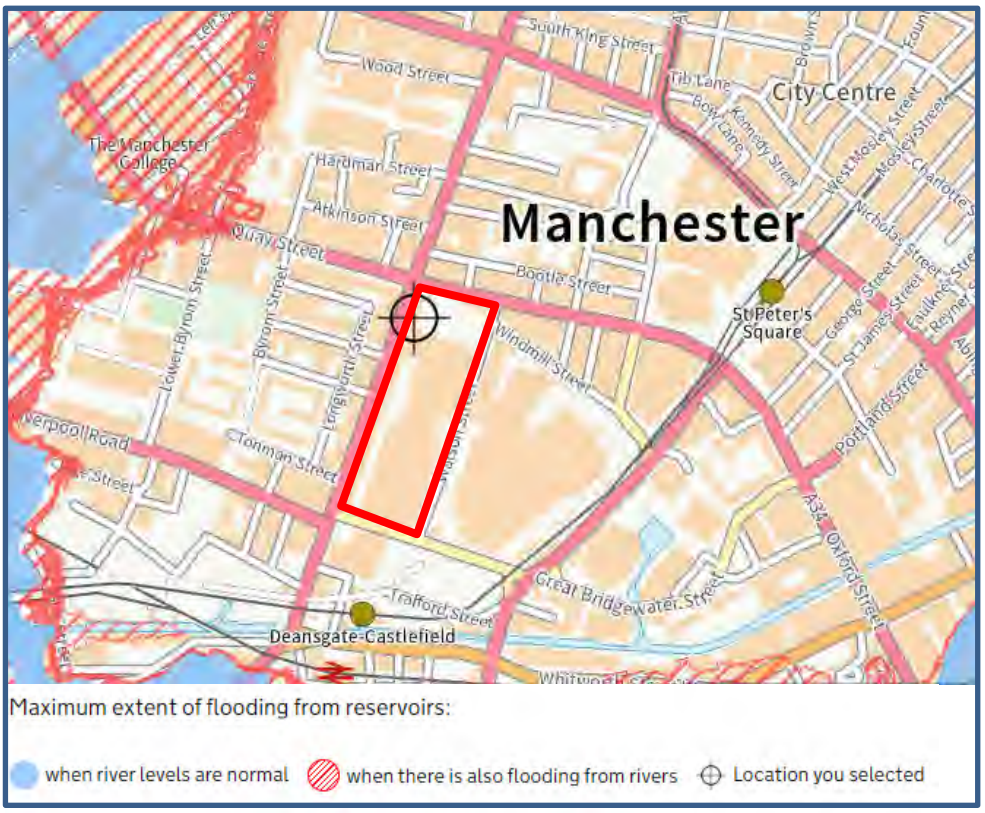
4.4 Reservoir Flooding

4.4.1 Reservoir flooding is extremely unlikely to happen and there has been no loss of life in the UK from reservoir flooding since 1925. The Environment Agency is the enforcement authority and ensures that reservoirs are inspected regularly and essential safety work is carried out.

4.4.2 The Long-Term Flood Risk Assessment (Flood Risk from Reservoirs) map shows the largest area that might be flooded if a reservoir were to fail and release the water it holds. Since this is a prediction of a worst-case scenario, it is very low risk that a reservoir flood would be this large.

4.4.3 The extents of flooding due to reservoir breach in the vicinity of the site is shown in Figure 5, and It can be seen that site does not lie within the maximum extents of flooding due to reservoir breach. Therefore, the site is considered to be at very low risk from reservoir flooding.

Figure 5: Risk of Flooding from Reservoirs – Extent of Flooding (© Crown Copyright)



4.5 Canal Flooding

4.5.1 The Manchester Ship Canal (which is privately owned and maintained) is located approximately 450m north-west of the site at its nearest point, and runs in a south-westerly direction downstream of the River Irwell. The Bridgewater Canal (non-Canals and River Trust) begins approximately 320m south-west of the site, running approximately parallel to the Manchester Ship Canal. The Rochdale Canal begins approximately 460m south-west of the site, running east / north-east. The Ashton Canal begins approximately 1.19km east of the site.

4.5.2 There is a disused canal (part of the former Manchester and Salford Junction Canal) which is culverted adjacent to the southern boundary of the site. During the recent tunnel survey conducted by SEP, no water was identified within the canal tunnel, and as described in the Curtins Phase 1 Preliminary Site Assessment the canal section east of Watson Street was infilled post-1922 and the section west of Watson Street drained during WW2. Manchester City Council have confirmed that they hold no records of historic flooding within the site or the vicinity of the site, and therefore it is assumed that the risk of flooding from the disused canal branch is very low.

4.5.3 The SFRA identifies that the Manchester Ship Canal is a canalised watercourse, and hence its flooding mechanisms have more in common with a watercourse than a typical canal. Therefore, the risks

associated with flooding from the Manchester Ship Canal have been assessed as part of the Fluvial Flooding risk. The other canals are identified as 'broad canals'.

4.5.4 The broad canals are identified in the SFRA as not generally posing a direct flood risk as they are a controlled water body. Therefore, the residual risk of canal flooding is usually associated with lower probability events such as overtopping and/or the breaching of embankments.

4.5.5 A lack of information results in an inability to quantify the risk of canal breach or overtopping but the SFRA describes the areas at potential risk of flooding from all canal sources. The development site, and its vicinity, are not in a canal overtop hazard zone or a canal breach zone.

4.5.6 Given the above information, it is considered that there is very low risk of canal flooding to the site.

4.6 Groundwater Flooding

4.6.1 The Level 2 SFRA (Map 2.1) indicates that the site is not in an area at risk of groundwater flooding, groundwater rebound, or shallow groundwater.

4.6.2 The Curtins Preliminary Site Investigation Report identifies that there is limited potential for groundwater flooding to occur (based on BGS Groundwater Flooding Susceptibility information).

4.6.3 Although the existing site contains sub-ground level areas, site specific groundwater levels are not available; therefore, it is assumed that there could be a potential risk of groundwater flooding. Mitigation measures are therefore proposed in section 5.

4.7 Public Sewers or Highway Drainage Flooding (Infrastructure Failure)

4.7.1 The SFRA identifies that there have been sewer flooding incidents in Manchester City Centre, however the exact locations are not known.

4.7.2 There is no highway drainage recorded within the site.

4.7.1 There is a 500mm public combined sewer running across the northern part of the site within Great Northern Square. This has been confirmed as removed by United Utilities

4.7.2 There may be a risk of flooding due to limitations of the existing sewer network to take any extra flows which may be generated by additional development on the site. A Pre-Development Enquiry has been submitted to United Utilities and they have confirmed foul drain to the public sewers at an unrestricted rate and 50% reduction of existing surface water rates is required. This would indicate that the public sewers downstream of the site have ample capacity and would not pose a flood risk to the site. The United Utilities correspondence is enclosed in *Appendix D*.

4.7.3 The SFRA places the site within the Conurbation Core Critical Drainage Area (CDA). CDAs generally have local flooding problems associated with drainage, and are particularly sensitive to an increase in the rate of surface water runoff and/or volume from new development. Specific drainage requirements

are required in these areas to help reduce local flood risk. This is addressed as part of the surface water strategy in Section 6.

4.7.4 Providing United Utilities and Manchester City Council maintain their drainage assets in the vicinity of the site, the risk of flooding to the proposed redevelopment site from public sewers or highway drainage is considered as low.

4.8 Surface Water Flooding to the site

4.8.1 Surface water flooding can be caused when rainwater during extreme rainfall events does not drain away through the normal drainage system or soak into the ground with flooding occurring, principally from manholes and gullies. Surcharging sewers can result in overland flows which if originating at a higher elevation than a development site can potentially pose a flood risk.

4.8.2 From the UK Government's Long Term Flood Risk Assessment (Surface Water Extent map);

- Where a site is located in a dark blue shaded zone, this indicates that the site is at high risk of flooding, where flooding occurs as a result of rainfall with a greater than 1 in 30 (3.3%) chance in any given year.
- Where a site is located in a mid-blue shaded zone, this indicates that the site is at medium risk of flooding, where flooding occurs as a result of rainfall of between 1 in 100 (1%) and 1 in 30 (3.3%) chance in any given year.
- Where a site is located in a light blue shaded zone, this indicates that the site is at low risk of flooding, where flooding occurs as a result of rainfall of between 1 in 1000 (0.1%) and 1 in 100 (1%) chance in any given year.
- Where a site is located in a clear (unshaded) area; this indicates that the site is at very low risk of flooding, where flooding occurs as a result of rainfall with less than 1 in 1000 (0.1%) chance in any given year.

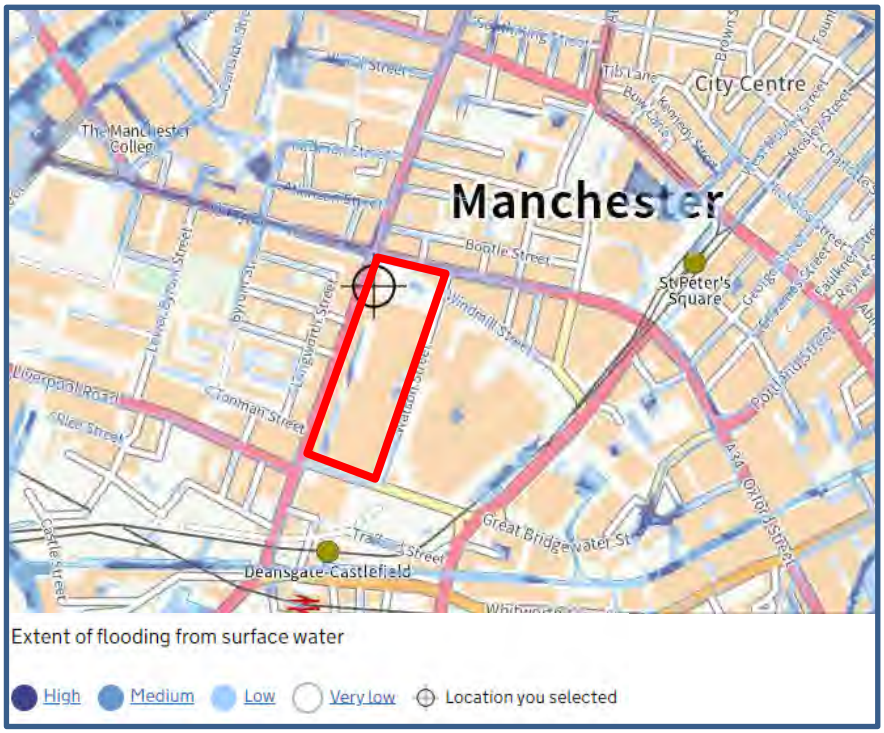
4.8.3 The extent of flooding to the site from surface water is indicated in Figure 6 and it can be seen that the majority of the site is located in an area classified as being at 'Very Low' risk of flooding from surface water.

4.8.4 The paved area at the bottom of the amphitheatre in the northern part of the site is classified as being at 'medium risk' of flooding from surface water, with the maximum flood depth being over 900mm. It is noted that this part of the site is currently at a much lower elevation than the adjacent ground.

4.8.5 Along the eastern boundary of the site, the existing car park entrance is at medium risk from surface water flooding. The maximum depth of flooding is between 300mm to 900mm.

4.8.6 Along the western site boundary, between the rear of the terraces and the former railway goods depot, there is a strip which is identified as being at medium to high risk from surface water flooding. This is likely caused by surface water ponding against the building line, with a maximum depth of 300-900mm.

Figure 6: Risk of Flooding from Surface Water - Extent of Flooding (© Crown Copyright)



4.8.7 Considering the above information, the general risk of surface water flooding to the site is considered very low. However, the existing site has localised areas which are at low, medium, and high risk from surface water flooding. Therefore mitigation measures are proposed in Section 5.

4.9 Surface Water Flooding from the site

4.9.1 Developers are responsible for ensuring that new development does not increase the flood risk elsewhere. This is so as not to cause damage to buildings, essential services or adjoining developments and services.

4.9.2 The proposed surface water drainage network shall be designed to not flood for the critical 1 in 30-year storm event and flood water generated up to the critical 1 in 100-year plus climate change storm event shall be constrained within areas on site so as not to cause damage to buildings, essential services or adjoining developments and services.

4.9.3 The development has the potential to increase flood risk where additional run-off from proposed roads, paved areas and building roofs are discharged freely into the downstream drainage network. It is

therefore encouraged to propose permeable areas, landscaping areas and incorporate sustainable drainage features utilising infiltration or attenuation where possible.

4.9.4 The SFRA places the site within the Manchester Conurbation Core Critical Drainage Area (CDA). CDAs generally have local flooding problems associated with drainage, and are particularly sensitive to an increase in the rate of surface water runoff and/or volume from new development. Specific drainage requirements are required in these areas to help reduce local flood risk. The LLFA usually require that surface water discharge from the site must meet a 50% betterment or more, and that this must be calculated from the existing impermeable area of the site / capacity of the existing outfall from the site.

4.9.5 The CDAs provided in the SFRA are identified as being "*extensive*" due to the lack of risk based information for the sewer network and surface water flow paths in the Conurbation Core CDA are largely linked to the natural floodplains of 'hidden' or 'lost' culverted watercourses that run through this area

4.9.6 A detailed assessment of the proposed surface flows is carried out within the drainage strategy within section 6 of this report.

4.10 Historical Flooding

4.10.1 Historical flood events are noted within the SFRA and there has been previous flooding in Manchester City Centre, although the exact locations are unknown. Historic flooding does not necessarily indicate that flooding will be a future risk.

4.10.2 Manchester City Council have been consulted and they have confirmed that although the area is susceptible to surface water flooding, they do not hold any record of any property flooding on the site or in the immediate vicinity of the site. A Pre-Development Enquiry has been submitted to United Utilities and they have confirmed that they have no records of hydraulic sewer flooding in the area.

4.11 Summary of Flood Risk

4.11.1 From the evidence collated and subsequent negotiations the main types of flooding that may apply to the proposed development site are as follows:

- Groundwater flooding (potential);
- Public sewer flooding (potential);
- Surface water flooding to the site; and
- Surface water flooding from the site.

5.0 Mitigation

5.1 Fluvial/Tidal Flood Mitigation

5.1.1 The development site lies entirely within Flood Zone 1 and therefore is at low risk of fluvial and tidal flooding. No specific measures are required at this location in order to mitigate against fluvial and tidal flooding.

5.2 Groundwater Flood Mitigation

5.2.1 Groundwater flooding tends to be more persistent than other sources of flooding, typically lasting for weeks or months rather than hours or days. Groundwater flooding does not generally pose a significant risk to life due to the slow rate at which the water level rises; however, it can cause significant risk to property.

5.2.2 The site is considered to be at potential risk of groundwater flooding, however based on the lack of site specific groundwater levels it is recommended that groundwater levels are monitored during ground investigation works. Typically, groundwater levels are recorded during gas monitoring over a 3-month period. Fluctuations in groundwater levels should be assessed during ground investigation works and floor levels proposed based on being above the maximum levels recorded.

5.2.3 Finished floor levels for the development should be set above the highest groundwater level.

5.2.4 The lowest existing ground level across the site is approximately 32.29m AOD and is situated within the amphitheatre adjacent to the existing bar in the northern portion of the site. Manchester City Council have confirmed that there are no historical records of property flooding within the site or within the vicinity of the site; therefore, it is unlikely that groundwater flooding would occur.

5.2.5 It is recommended that all basement wall construction is suitably sealed by a tanking protection system and land drainage associated with the retaining walls.

5.2.6 External ground levels across the site should fall away from the proposed buildings and ensure that the creation of low points is avoided (other than those used intentionally for drainage features) in order that in the unlikely event of groundwater flooding, the flood water is safely routed away from the buildings on site.

5.2.7 Providing the above mitigation measures were imposed, the risk from groundwater flooding would therefore be considered low post development.

5.3 Surface Water Flooding to the site Mitigation

5.3.1 The UK Government Long Term Flood Risk Assessment surface water flood maps indicate that the majority of the site is at very low risk of surface water flooding, with localised areas of low, medium, and

high risk within the site. However, the site topography is to be reprofiled as part of the development proposals, including building a structure within the existing amphitheatre. Therefore, measures outlined in this section are recommended in order to ensure that the risk of surface water flooding to the post-development site shall be classed as very low.

5.3.2 Existing footway levels along the outside perimeter of the site are determined by the highway authority. It is recommended that these levels should be maintained in order that surface water shall fall away from the site and into the highway gullies. It is assumed that the highway drainage will be subject to the local highway authority regular drainage maintenance schedule.

5.3.3 It is recommended that proposed external ground levels across the site should fall away from the proposed buildings in a manner which does not create low points where water might collect unintentionally. This will ensure that any surface water will not flow towards the proposed buildings. In addition, permeable finishes are proposed. The proposed surface water drainage network shall be designed to accommodate flows generated from within the site.

5.3.4 Providing the above measures are implemented the flooding risk to the development site from surface water is therefore considered low post development.

5.4 Surface Water Flooding from the site Mitigation

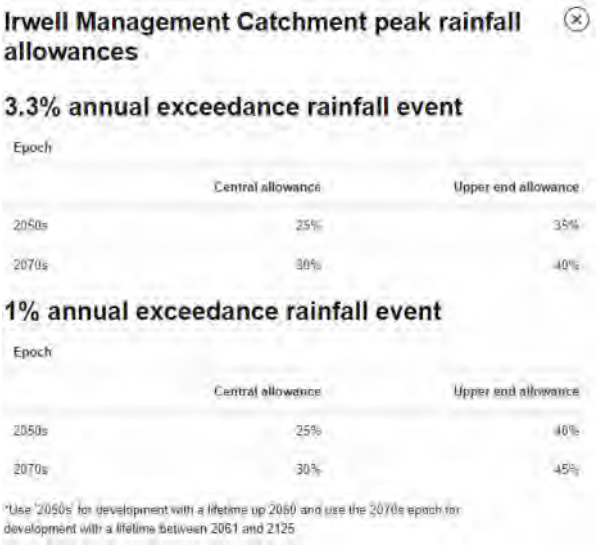
5.4.1 Any new development site drainage should be designed in accordance with current best practice to provide adequate capacity not to flood for the critical 1 in 30-year storm event and flood water generated from up to the critical 1 in 100-year plus climate change storm event shall be constrained within the areas on site so not to cause damage to buildings, essential services or adjoining developments & services.

5.4.2 For sites, which are located within a CDA, the following guidance is provided in the SFRA:

- Development should aim for a minimum reduction in surface water runoff rates of 50% for Brownfield sites, with an aim of reducing runoff to Greenfield rates up to a 1 in 100-year storm event, considering climate change.

5.4.3 In 2022, the Environment Agency released updated climate change allowances for peak rainfall intensities which should be applied to new developments. Figure 7 demonstrates the climate change allowances with central and upper end allowances being considered.

Figure 7. Climate change allowances Irwell Catchment



Irwell Management Catchment peak rainfall allowances

3.3% annual exceedance rainfall event

Epoch	Central allowance	Upper end allowance
2050s	25%	35%
2070s	30%	40%

1% annual exceedance rainfall event

Epoch	Central allowance	Upper end allowance
2050s	25%	40%
2070s	30%	45%

*Use '2050s' for development with a lifetime up 2060 and use the 2070s epoch for development with a lifetime between 2061 and 2125

5.4.4 Based on the nature of the development, a lifespan of 100 years is anticipated, and the LLFA has confirmed that a climate change allowance of 45% should be used for this scheme. A copy of the correspondence is available in Appendix D.

5.4.5 In following the standard hierarchy of drainage solutions, consideration should firstly be given to the discharge of surface water runoff by sustainable methods such as infiltration.

5.4.6 Section 6 describes the options for surface water discharge. The surface water is proposed to discharge into the public combined sewer adjacent to the west of the site within Deansgate at a restricted rate.

5.4.7 To minimise localised flooding within the site, the drainage design should ensure that gullies, drainage channels and drains are all suitably sized to accommodate peak storm flows. Also, all inlet features should have suitably sized sumps to catch silts and should be subject to a documented routine maintenance and cleansing regime.

5.4.8 Flood water exceedance routes should be identified, both on and off site.

5.4.9 For any sustainable drainage systems employed in the development, an appropriate management and maintenance plan for the sustainable drainage system for the lifetime of the development should be submitted which should include:

- Any arrangements for management and maintenance by a Residents' Management Company.
- Arrangements concerning appropriate funding mechanisms for its on-going maintenance of all elements of the sustainable drainage system (i.e. inspections, regular maintenance).
- Means of access for maintenance and easements where applicable.

5.4.10 Assuming that the proposed drainage system is designed to provide adequate capacity, and that the private will be maintained , it can be assumed risk of flooding is low.

The final design of the drainage networks shall be in accordance with the legislation set by the Environment Agency, Manchester City Council, and United Utilities.

6.0 Drainage Strategy

6.1 Existing Drainage

6.1.1 The records indicate that there is a 500mm public combined sewer running across the northern part of the site. The records show that the head of the system is located near to the north-east site boundary, potentially within the highway.

6.1.2 Following a review of the CCTV and Utility surveys, plus historical and existing building records. It was concluded that this section of sewers must have been removed when the existing site was constructed (1994-1996).

6.1.3 Discussions have taken place, and United Utilities have confirmed that they consider the sewer to be removed. A copy of the correspondence is available in Appendix D

6.1.4 The public sewer records indicate that the following public sewers are located within the vicinity of the site:

- A 375mm public combined sewer flows adjacent to the north of the site within Peter Street, flowing towards manhole 5903 at the junction of Peter Street with Deansgate. From manhole 5903, a 2400mm public combined sewer flows in a southerly direction within Deansgate adjacent to the western site boundary. A number of public combined sewer connections are located along this 2400mm combined sewer, from the existing frontages of the buildings along the western boundary of the site.
- Adjacent to the east of the site, a 450mm public combined sewer flows within Watson Street before joining with a 450mm public combined sewer within Peter Street adjacent to the north-east of the site. The public combined sewer then flows west within Peter Street via a 500 x 400mm public combined sewer adjacent to the northern site boundary.

6.1.5 The Utilities and CCTV surveys (enclosed in *Appendix B*) identified a number of private surface and foul water drainage features within the existing site. Generally, the existing private drainage is routed as follows:

- Surface water from the eastern part of the former railway goods depot discharges into the 450mm public combined sewer to the east of the site in Watson Street. The remainder of the building discharges to the north, south and western elevations, prior to connecting to the on-site combined private sewers. The network then outfalls via the under-croft area to the north-west of the site and into the 2400mm combined brick sewer in Deansgate.
- It is anticipated that surface water from the existing terraced buildings along Deansgate drains to the property frontage where it discharges into the public sewer within Deansgate.

- The surface water from the amphitheatre discharges into the private combined network on-site, prior to discharge to the north-west corner into the 2400mm combined brick sewer in Deansgate.
- Foul water from the former railway goods depot is discharges externally to the northern and western elevations of the building. The network then outfalls via the under-croft area to the north-west of the site and into the 2400mm combined brick sewer in Deansgate.
- Foul water from the terraces along Deansgate discharge externally to the eastern elevations of the building. The network then outfalls via the under-croft area to the north-west of the site and into the 2400mm combined brick sewer in Deansgate.
- A number of public combined sewer connections exist along the front of the Deansgate terraces. This would indicate that there is existing foul drainage from the from the buildings to the front of the properties.
- The foul water from the amphitheatre discharges into the private combined network on-site, prior to discharge to the north-west corner into the 2400mm combined brick sewer in Deansgate.

6.2 Proposed Foul Water Drainage

6.2.1 Separate foul and surface water systems are proposed.

Great Northern Warehouse

6.2.2 The existing foul drainage from within the Great Northern Warehouse is to be retained. There is a requirement for an additional 6.5 l/s, as per information received from the M&E designer.

6.2.3 A diversion to the existing combined drainage will be required to facilitate the proposed. The proposed diversion should be designed to provide sufficient capacity for the existing flows, and the additional foul flows from the Great Northern Warehouse, and Deansgate Terraces.

6.2.4 The combined drainage diversion will connect to the existing 300mm combined drain, which discharges to the existing 2400mm diameter combined sewer in Deansgate.

Great Northern Square

6.2.5 The existing 150mm private combined drain running underneath the existing amphitheatre area is to be maintained. It is anticipated that there will be some connections from floor gullies within the plant room area. However, it is considered that this will produce a negligible increase in flows.

Deansgate Terraces

6.2.6 Any existing internal foul drainage connections from the rear of the terraces along Deansgate are to be diverted to a new foul collector drain outside the building footprint to allow the construction of the extensions. Any existing foul drainage connections to the front of the building are to be retained and re-used where possible. These connections should be confirmed.

6.2.7 The foul drain connects to the proposed combined drainage diversion noted above.

6.2.8 The terraces have basement areas, which currently contain foul drainage. It has not been possible to confirm where these connections connect into the wider drainage network, as the units are still occupied, and above ground drainage is hidden behind boxing out, etc.

6.2.9 Given the lack of information regarding the basement drainage, it has been assumed that for the proposed scheme, any drainage at basement level will require pumping to the new foul drainage network.

6.2.10 The foul water peak flow rate: 13.7 l/s based on 383.7 discharge units, as per information received form the M&E. The foul drainage should be designed to accommodate these flows. The proposed combined diversion should be designed to accommodate the existing and proposed flows.

6.2.11 The peak foul flow rates should be confirmed at detailed design.

6.2.12 A Pre-Development Enquiry has been issued to United Utilities and they have confirmed that foul water will be allowed to drain to the public combined sewer network at an unrestricted rate. The connection to the public sewer can be at a convenient point(s).

6.2.13 Therefore, the proposed connection point is expected to be to the existing 300mm diameter combined drain within the site. This discharges to the 2400mm diameter public combined sewer within Deansgate.

6.2.14 An indirect connection to the public sewer will be subject to a Section 106 Agreement with United Utilities (Part 1 only).

6.2.15 The Proposed Drainage Strategy is enclosed in *Appendix F.*

6.3 Proposed Surface Water Drainage

6.3.1 Any new development site drainage should be designed in accordance with current best practice to provide adequate capacity not to flood for the critical 1 in 30-year storm event and flood water generated for up to the critical 1 in 100-year plus climate change storm event shall be constrained within the areas on site so not to cause damage to buildings, essential services or adjoining developments and services.

6.3.2 In following the standard hierarchy of drainage solutions, consideration should firstly be given to the discharge of surface water runoff by sustainable methods such as infiltration.

Infiltration

6.3.3 The Curtins Phase 1 Site Assessment identifies superficial deposits of Glaciofluvial Sheet Deposits (West & South) and Glacial Till (Eastern boundary). The Bedrock is recorded as Chester Pebble Beds Formation (Sandstone) across the majority of the site, with Manchester Maris Formation in the north-eastern portion of the site. Made ground deposits are also likely to be present, based on the historic use of the site; a nearby BGS borehole at the junction of Deansgate with Camp Street recorded Made Ground to a depth of 2.13m.

6.3.4 Given the proposed site layout and the limited space on site, infiltration is not considered to be a viable solution.

Watercourse

6.3.5 No above ground watercourses have been identified within the proposed site or in the immediate vicinity of the site. The nearest watercourse is the River Medlock (a 'Main River') which is located approximately 320m south-west of the site across numerous third party's land. Discharge to watercourse is not considered a viable option. The former Manchester and Salford Junction Canal adjacent to the southern boundary of the site has been drained and partially infilled, and is a Grade II Listed structure, therefore it is not considered as a viable option for discharging surface water from the site.

Surface Water Sewer

6.3.6 There are no dedicated surface water sewers in the vicinity of the site therefore connection to a surface water sewer is not a viable option.

Combined Water sewer

6.3.7 There are various combined sewers adjacent to the north, east, and west of the site within the adjacent public highway. United Utilities have confirmed that surface water will be allowed to drain to the public combined sewer at an unrestricted rate, and the connection to the public sewer can be at a convenient point(s). The 500mm public combined sewer identified on the public sewer records as crossing the northern part of the site has not been confirmed and is therefore not considered as a viable option.

6.3.8 Table 4 summarises the options for surface water disposal.

Table 4: Surface Water Disposal

Surface Water Disposal	Potential	Description
Infiltration	✗	It is assumed at this stage that the site will be unsuitable for infiltration SuDS due to the lack of space and the thickness of the made ground present within the site.
Watercourse	✗	The River Irwell is located approximately 320m south-west of the site across numerous third party land. A new connection to the river is not considered a viable option as it would have to pass through numerous third party land and would be prohibitively expensive. Additionally, the downstream River Irwell is privately owned and maintained as the Manchester Ship Canal.

Surface Water Public Sewer	✗	There are no public surface water sewers identified on the public sewer records within the vicinity of the site.
Combined Public Sewer	✓	There are a number of public combined sewers adjacent to the north, east, and west of the site.

6.3.9 Connection to the public combined sewers adjacent to the site is therefore the preferred method for dealing with surface water.

6.3.10 The existing site has previous industrial use and would be considered Brownfield. The existing surface water runoff discharges from the site via the following routes:

- Existing Area E1 encompasses the eastern side of the terraced buildings, the area to the south of the Great Northern Warehouse, and a portion of the Great Northern Square External Areas. These are served by surface water/ combined drains, and discharge to the UU sewer in Deansgate. This covers an area of 0.61 Ha and will be subject to reduced flows in the proposed development.
- Existing Area E2 encompasses the remaining external areas within Greta Northern Square. These are served by existing surface water/ combined drains, and discharges to the UU sewer in Deansgate. This covers an area of 0.16 Ha and will be subject to reduced flows in the proposed development.
- Existing Area E3 encompasses the eastern section of the Great Northern Warehouse roof, which discharges directly to the existing UU combined sewer in Watson Street. This covers an area of 0.26 Ha and is excluded from the drainage calculations, as the existing drainage is to be retained.
- Existing Area E4 encompasses the remaining area of the Great Northern Warehouse roof, which is served by existing surface water/ combined drains, and discharge to the UU sewer in Deansgate. This covers an area of 0.29 Ha and is excluded from the drainage calculations, as the existing drainage is to be retained.
- Existing Area E5 encompasses the western section of the Deansgate Terraces roofs, which discharge directly to the existing UU combined sewer in Deansgate. This covers an area of 0.19 Ha and is excluded from the drainage calculations, as the existing drainage is to be retained.

6.3.11 The Existing Impermeable Areas Drawing is enclosed within *Appendix E.*

6.3.12 The estimated 1 in 1, 30 and 100-year return periods have been simulated and the flow rates and volumes are shown in Table 5:

Table 5: Existing Surface Water Runoff, Peak Flow Rates and Volumes

CATCHMENT	IMPERMEABLE AREA (Ha)	DISCHARGE FLOW RATES (l/s)		
		1-YR EVENT	30-YR EVENT	100-YR EVENT*
AREA E1	0.610	65	128	149
AREA E2	0.160	17	38	45
AREA E3	0.256	AS EXISTING - EXCLUDED FROM CALCULATIONS		
AREA E4	0.291	AS EXISTING - EXCLUDED FROM CALCULATIONS		
AREA E5	0.191	AS EXISTING - EXCLUDED FROM CALCULATIONS		
TOTAL IMPERMEABLE AREA (E1+E2) FOR DISCHARGE RATE CALCULATIONS	**0.770**	**82**	**166**	**194**

6.3.13 The existing calculations are enclosed within *Appendix E.*

6.3.14 The existing warehouse and bar building roof drainage and the majority of the drainage systems serving them, will remain in place post development. Some diversion works will be required to the combined drainage to avoid the amended building footprint adjacent to the western boundary of the site.

6.3.15 The area of works subject to a reduced discharge (area P1) will be served by a new drainage system. This will connect to the proposed combined drainage diversion. From there, it will connect to the existing 300mm diameter combined drain on site. This the outfalls to outfalls to the existing 2400mm public combined sewer in Deansgate.

6.3.16 There are 2 further proposed areas of drainage:

- Area P2 (0.05 Ha), podium -proposed drainage model has taken this area into account.
- Area P3 (0.05 Ha), sit outside of the boundary for this scheme, but may require draining by the proposed network. The proposed network has also been checked, including this area.

6.3.17 Based on the above flow rates and to comply with Manchester City Council guidance, a 50% reduction should be applied to the remaining post development flow given in Table 6. Therefore, allowable discharge rates should be restricted to the following:

Table 6: Allowable Discharge Rates for Area P1

CATCHMENT	IMPERMEABLE AREA (Ha)	DISCHARGE FLOW RATES (l/s)		
		1-YR EVENT	30-YR EVENT	100-YR EVENT*
AREA P1+P2	**0.66**	**41**	**83**	**97**
*PROPOSED INCLUDES FOR 45% CLIMATE CHANGE ALLOWANCE				

6.3.18 During ongoing Discussions with United Utilities, they have stated that the maximum discharge for the Proposed Area should be **47 l/s**. Therefore, the drainage has been designed to give a maximum discharge rate of 41 l/s for all storm events.

6.3.19 Surface Water run-off to external areas will be collected either by linear drains, or by permeable filter drains situated in landscape areas. Any roof drainage will connect to the main drainage runs.

6.3.20 The proposals include for the inclusion of a permeable sub-base layer underneath the surfacing for all of the external areas. This will be used for attenuation storage throughout the site. The storage will be utilised in two main ways, dependent on the location of the drainage:

- Great Northern Square – There are a series of small diameter orifice plates located in the inspection chamber throughout the network. There chamber will have connections into the permeable sub-base via diffuser units. As water backs up, it will pass into the permeable sub-base, and then drain out once the storm has finished. Check dams within the sub-base will be located at these points, in order to retain the water in place.
- East of Densgate Terraces/ South of Great Northern Warehouse. – In these areas, the linear drainage channels will discharge water into the sub-base via diffuser units. The water will flow down to another check dam, which will have an outlet containing a small diameter orifice plate, before connection to the main drainage. This will hold back the flow within the sub-base.

6.3.21 A further flow control, in the form of a Hydrobrake vortex control, is located in manhole S18. This provides a final discharge control to pick up any roof drainage that has not been attenuated in the permeable sub-base.

6.3.22 In addition to the attenuation provided by the permeable sub-base, the pipework along the East of the terraces has been oversized (up to 450mm diameter), in order to provide additional storage.

6.3.23 A plan showing the indictive attenuation locations and volumes is enclosed within *Appendix F*

6.3.24 The roof over the old amphitheatre area will be paved with a permeable surfacing. The sub-base of this system will connect directly into the permeable sub-base within the main external areas. This is subject to detailed design of the interface at the edge of the ampitheatre.

6.3.25 An approximate model has been prepared in Flow modelling software; and this confirms that the permeable sub-base and the piped system can accommodate volumes up to the 1 in 100-year event, with a climate change allowance of 45%, satisfying the allowable discharge.

6.3.26 A separate model has been checked, including the additional area P3, this can be shown to work, although this requires some minor changes to the drainage design. (Pipe, manhole and orifice plate sizes). The drainage strategy shown is for the areas not including P3.

6.3.27 It is recommended that plant room, bin stores and the internal parking spaces are drained via foul gullies for wash-down purposes.

6.3.28 The Proposed Drainage Strategy and Proposed Calculations are enclosed within *Appendix F.*

6.3.29 The final design of the drainage networks shall be in accordance with the legislation set by the Environment Agency, Manchester City Council and United Utilities.

6.3.30 Surface water run-off from hard paved areas at risk of contamination should receive water quality treatment. Access roads are considered as a low hazard in terms of contamination. Figure 8 illustrates the pollution hazard indices for different land use classifications from The CIRIA SuDS Manual C753 (2015).

Figure 8: Pollution Hazard indices for land use classification (Table 26.2 the CIRIA SuDS manual 2015)

TABLE 26.2 Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways[1]	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways[1]	High	0.8[2]	0.8[2]	0.9[2]

6.3.31 Figure 9 illustrates the SuDS Component mitigation indices from The CIRIA SuDS Manual C753 (2015).

Figure 9: Indicative SuDS mitigation indices (Table 26.3 the CIRIA SuDS manual 2015)

TABLE 26.3 Indicative SuDS mitigation indices for discharges to surface waters

	Mitigation indices[1]		
Type of SuDS component	**TSS**	**Metals**	**Hydrocarbons**
Filter strip	0.4	0.4	0.5
Filter drain	0.4[2]	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.5
Pond[4]	0.7[3]	0.7	0.5
Wetland	0.8[3]	0.8	0.8
Proprietary treatment systems[5,6]	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area		

Notes

1 SuDS components only deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters.

2 Filter drains can remove coarse sediments, but their use for this purpose will have significant implications with respect to maintenance requirements, and this should be taken into account in the design and Maintenance Plan.

3 Ponds and wetlands can remove coarse sediments, but their use for this purpose will have significant implications with respect to the maintenance requirements and amenity value of the system. Sediment should normally be removed upstream, unless they are specifically designed to retain sediment in a separate part of the component, where it cannot easily migrate to the main body of water.

4 Where a wetland is not specifically designed to provide significantly enhanced treatment, it should be considered as having the same mitigation indices as a pond.

5 See Chapter 14 for approaches to demonstrate product performance. A British Water/Environment Agency assessment code of practice is currently under development that will allow manufacturers to complete an agreed test protocol for systems intended to treat contaminated surface water runoff. Full details can be found at: **http://tinyurl.com/qf7yuj7**

6 SEPA only considers proprietary treatment systems as appropriate in exceptional circumstances where other types of SuDS component are not practicable. Proprietary treatment systems may also be considered appropriate for existing sites that are causing pollution where there is a requirement to retrofit treatment. SEPA (2014) also provides a flowchart with a summary of checks on suitability of a proprietary system.

6.3.32 The selection of treatment should ensure that the SuDS mitigation component index (Figure 9) exceeds the pollution hazard index (Figure 8).

6.3.33 The proposals include permeable paving, permeable sub-base (under impermeable surfacing), and also filter drains to provide water quality treatment.

6.3.34 The final design of the drainage networks shall be in accordance with the legislation set by the Environment Agency, Manchester City Council and United Utilities.

7.0 Maintenance

7.1.1 A suitable maintenance strategy should be adopted to ensure the drainage network is cleaned regularly and the routine maintenance and cleansing regime should be documented.

7.1.2 It is recommended that the drainage system is inspected as a minimum twice a year, with the system also being inspected after any major storm event. Significant sediment deposition is likely in areas used for storage, so a post clean-up operation may be required including the removal of litter, vegetation, sewerage debris and larger objects.

7.1.3 A more detailed Drainage Maintenance Strategy should be provided at Detailed Design.

7.1.4 A management company may be required for maintenance of attenuation facilities.

Appendix A

Landscape Architect Site Plan

Proposed Architect's Layouts

KEY:

Residential (Use Class C3)

- Residential Entrance/ Shared Amenity
- Residential circulation/ Private Amenity
- One Bed Apartment
- Two Bed Apartment
- Three Bed Apartment

Office (Use Class E(c))

- Office
- Office Entrances
- Office Circulation/ Balconies & Terraces

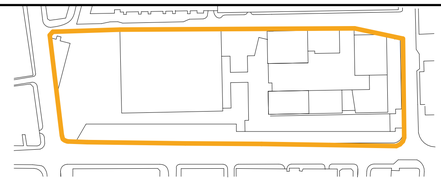
Commercial, Business & Service Community (Use Class Varies)

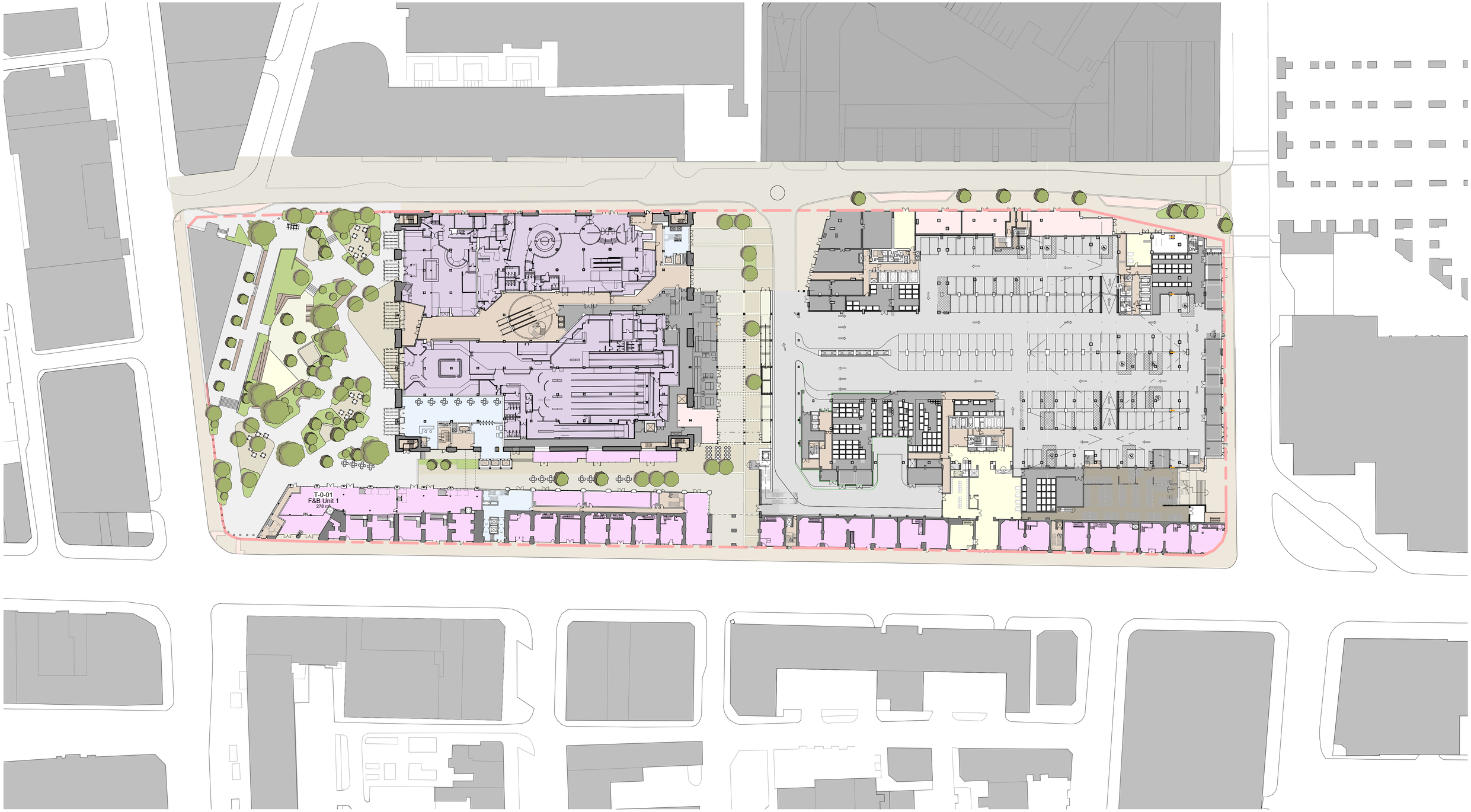
- Use Class E
- Use Class E or Sui Generis (Entertainment Venue)
- Use Class E or Sui Generis (Drinking Establishments or Hot Food Takeaway or Entertainment Venue)
- Use Class E or F2 (b)
- Entrances & Circulation

Other (Use Class Varies)

- Car Park (Sui Generis)
- Ancillary (Plant, Refuse Stores, Back of House, etc)
- Ancillary (Cycle Stores)
- Landscaping

KEY PLAN:





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Do not scale off dimensions.

All dimensions to be checked on site by contractor.

Contractor to report any dimensional discrepancies, errors or omissions prior to commencing on site.

NORTH

Rev	Date	Description
P01	2022-02-09	First Issue
P02	2022-03-09	Baseline Scheme Update
P03	2022-06-10	Interim Issue
P04	2022-07-25	Scheme Update
P05	2022-08-12	Developed Scheme Issue
P06	2022-08-16	Developed Scheme Issue
P07	2022-09-02	Stage 2 Issue
P08	2022-10-10	Planning Design Freeze

Project Title: Great Northern

Drawing Title: Proposed Site Plan
Warehouse Ground Floor Level

Project No: 10422

Scale: 1 : 500@ A1

Status: FOR INFORMATION

PROJ - ORIG - ZONE - MODL - LEVL - TYPE - LOC - SEQ

Revision: 10422-SHP-Z0-A-G100-PL-00-001 P08

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KEY:

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- Residential circulation/ Private Amenity
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- Two Bed Apartment
- Three Bed Apartment

Office (Use Class E(c))

- Office
- Office Entrances
- Office Circulation/ Balconies & Terraces

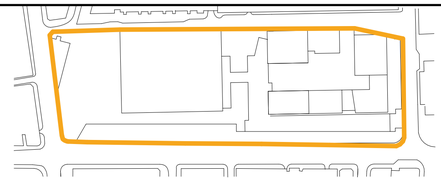
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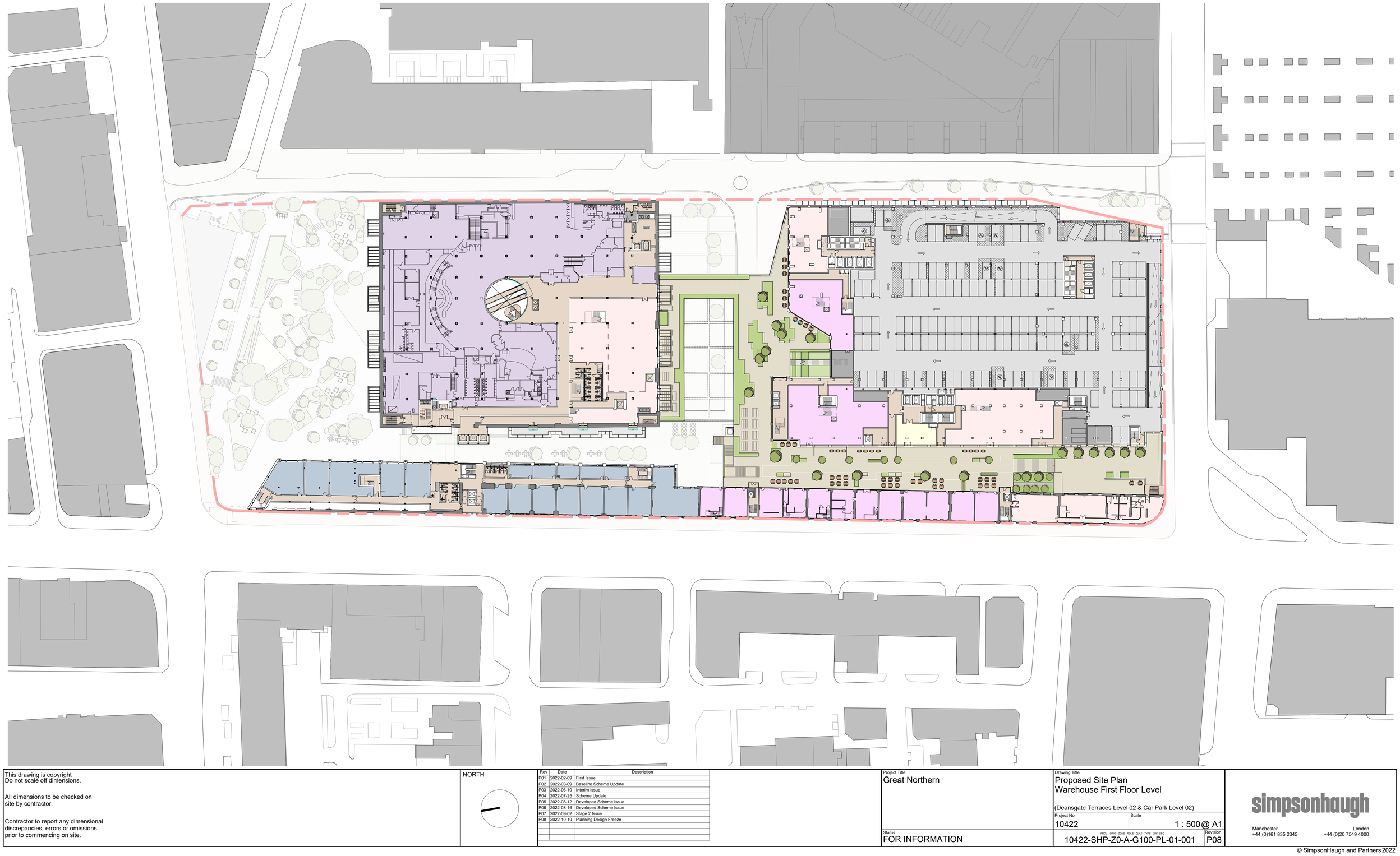
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- Entrances & Circulation

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- Ancillary (Plant, Refuse Stores, Back of House, etc)
- Ancillary (Cycle Stores)
- Landscaping

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P05	2022-08-12	Developed Scheme Issue
P06	2022-08-16	Developed Scheme Issue
P07	2022-09-02	Stage 2 Issue
P08	2022-10-10	Planning Design Freeze

Project Title
Great Northern

Status
FOR INFORMATION

Drawing Title
Proposed Site Plan
Warehouse First Floor Level

(Deansgate Terraces Level 02 & Car Park Level 02)

Project No
10422

Scale
1 : 500@ A1

PROJ - ORIG - ZONE - ROLE - CLAS - TYPE - LOC_SEQ
10422-SHP-Z0-A-G100-PL-01-001

Revision
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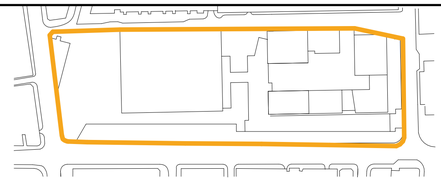
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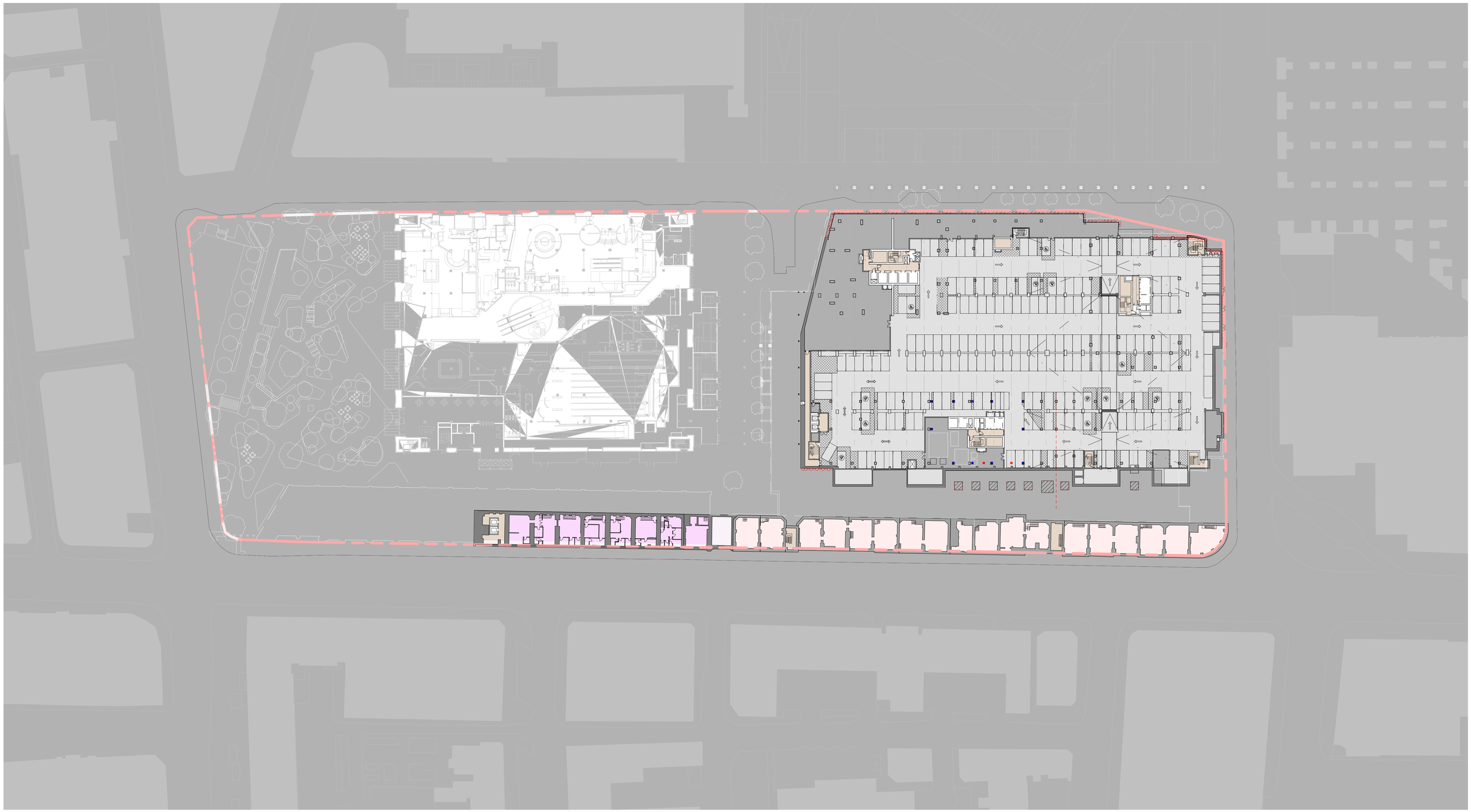
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- Entrances & Circulation

Other (Use Class Varies)

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- Landscaping

KEY PLAN:





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P01	2022-02-09	First Issue
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P05	2022-08-12	Developed Scheme Issue
P06	2022-08-16	Developed Scheme Issue
P07	2022-09-02	Stage 2 Issue
P08	2022-10-10	Planning Design Freeze

Project Title: Great Northern

Drawing Title: Proposed Site Plan
Basement Floor Plan

Project No: 10422

Scale: 1 : 500@ A1

Status: FOR INFORMATION

PROJ - ORIG - ZONE - ROLE - CLAS - TYPE - LOC - SEQ
10422-SHP-Z0-A-G100-PL-B1-001

Revision: P08

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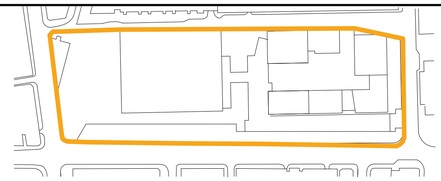
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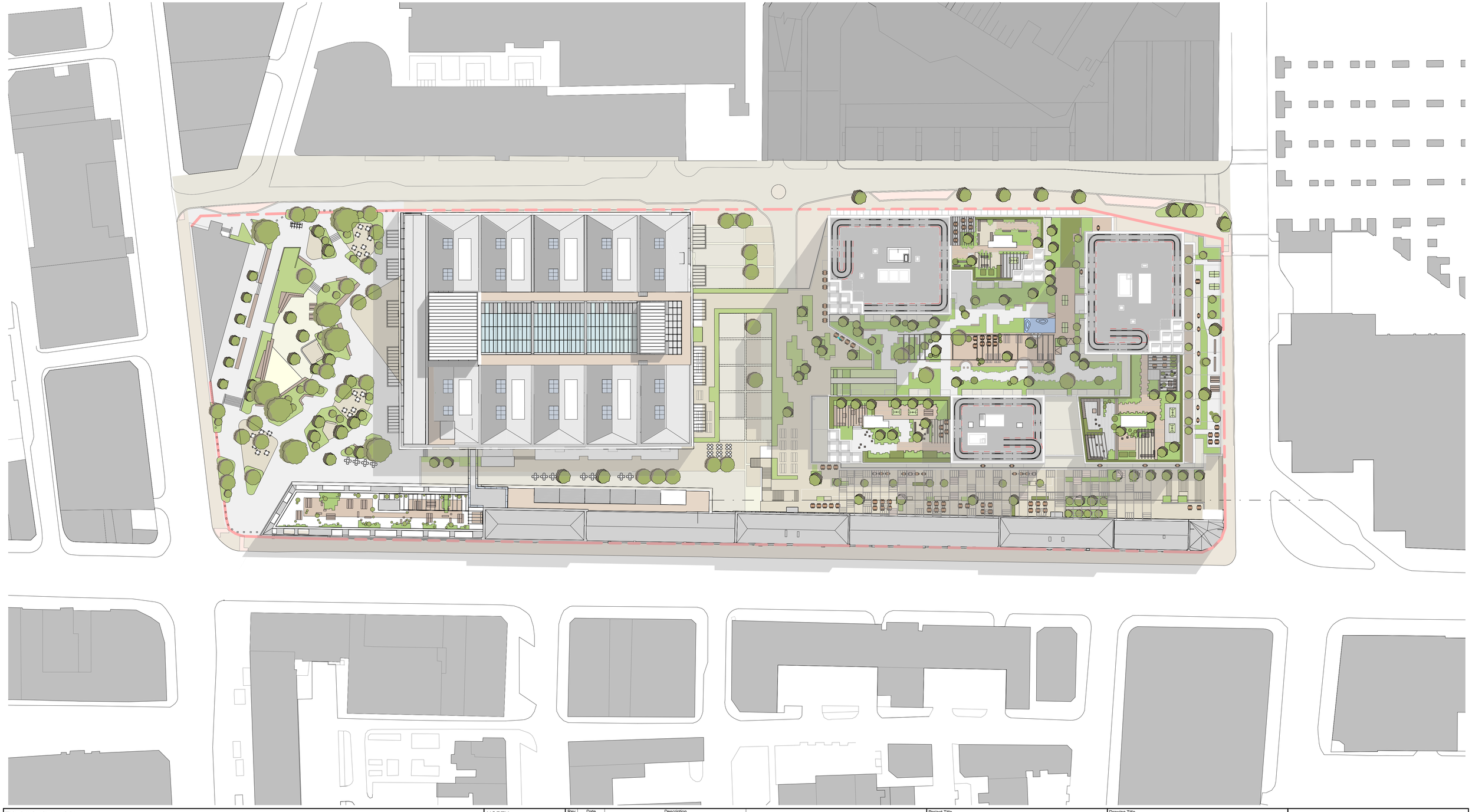
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- Car Park (Sui Generis)
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P07	2022-09-02	Stage 2 Issue
P08	2022-10-10	Planning Design Freeze

Project Title
Great Northern

Status
FOR INFORMATION

Drawing Title
Proposed Site Plan
Roof Level

Project No
10422

Scale
1 : 500@ A1

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10422-SHP-Z0-A-G100-PL-RF-001

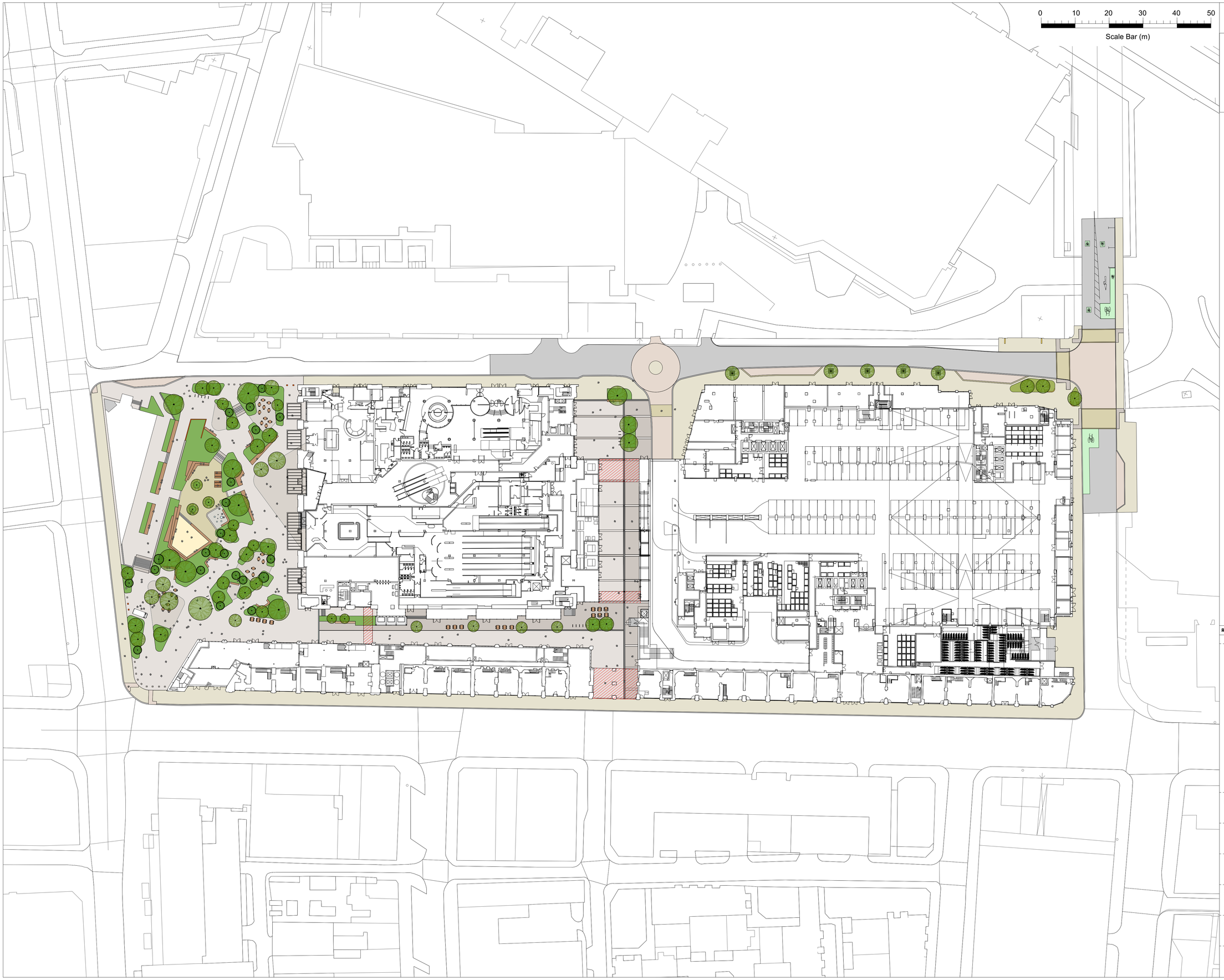
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5. The dimensions of all materials must be checked on site before being laid out.
6. This drawing must be read with the relevant specification clauses and detail drawings.
7. Order of construction and setting out to be agreed on site.

Revision	Date	Description	Drawn	Apprvd.
S3-P02	14-10-22	Review and comment	SAB	LH
S3-P01	28-08-22	Review and comment	SAB	LH

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Client Trilogy Real Estate LLP

Project Manchester

Drg Title Landscape Masterplan - Ground Floor

Created on	Created by	Approved by
28.08.22	SAB	LH

Scale	Size	Workstage
1:500	A1	Stage 2

Drg No.	Suitability	Revision
2891-PLA-XX-00-DR-L-0001	S3	P02

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Appendix B

Public Sewer Records

CCTV Drainage Survey

GPR Survey

Utilities Report

GROUNDWISE

Groundwise Searches Ltd

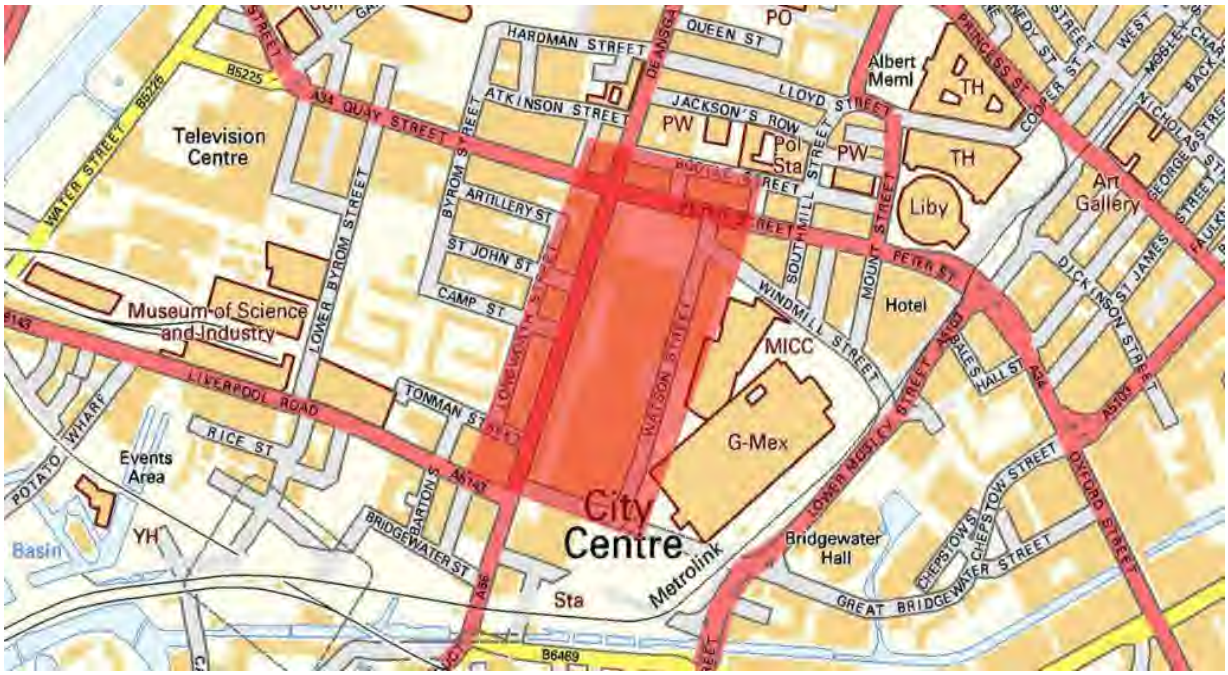


Groundwise Searches Limited
Suite 8, Chichester House
45 Chichester Road
Southend on Sea
Essex, SS1 2JU

Telephone 01702 615566
Fax 01702 460239
Email mail@groundwise.com
Website www.groundwise.com

Groundwise Searches Ltd

Groundwise Reference	URO5612.1DM
Site	Around Deansgate and Watson Street, Manchester, M3 4EJ
Client	Alistair Lambert
Company	WSP
Client Reference	Great Northern
Purchase Order	



Researcher	Debbie Miller dmiller@groundwise.com
Report Version	#1 - Thursday, 20 April 2017



Groundwise Searches Limited
Suite 8, Chichester House
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Fax 01702 460239
Email mail@groundwise.com
Website www.groundwise.com

Groundwise Searches Ltd

Groundwise Reference	URO5612.1DM
Site	Around Deansgate and Watson Street, Manchester, M3 4EJ

Click on a Data Supplier to view their response

Type	Data Supplier	Date Received	Date Sent	Assets in Area
Electricity	Energetics	20/04	20/04	
Electricity	Electricity North West Ltd	20/04	20/04	**X**
Gas	GTC	20/04	20/04	
Gas	National Grid	20/04	20/04	**X**
Gas	Fulcrum	20/04	20/04	**X**
Mobile Phone Masts	Mast Data	Awaiting	Awaiting	**X**
Telecom	BskyB Telecommunications Services Ltd	20/04	20/04	
Telecom	BT	20/04	20/04	**X**
Telecom	C.A. Telecom - Colt	20/04	20/04	
Telecom	CityFibre	20/04	20/04	**X**
Telecom	euNetworks	20/04	20/04	
Telecom	Instalcom Ltd	20/04	20/04	**X**
Telecom	Interoute Vtesse Ltd	Awaiting	Awaiting	
Telecom	McNicholas - KPN	Awaiting	Awaiting	
Telecom	McNicholas - TATA	Awaiting	Awaiting	
Telecom	Plancast	20/04	20/04	
Telecom	Telent	20/04	20/04	
Telecom	Trafficmaster	Awaiting	Awaiting	
Telecom	Verizon	20/04	20/04	
Telecom	Virgin Media	Awaiting	Awaiting	
Telecom	Vodafone	Awaiting	Awaiting	
Transport	Network Rail	20/04	20/04	
Various	LinesearchbeforeUdig - Gamma	20/04	20/04	
Various	LinesearchbeforeUdig - Zayo	20/04	20/04	
Various	SSE	20/04	20/04	
Water Mains	United Utilities	20/04	20/04	**X**
Water Sewers	United Utilities	20/04	20/04	**X**

Debbie Miller

From: Plant Enquiries <plantenquiries@energetics-uk.com>
Sent: 06 April 2017 14:40
To: Debbie Miller
Subject: RE: URO5612.1DM - Site : Around Deansgate and Watson Street, Manchester, M3 4EJ

Dear Sir/Madam,

Thank you for submitting your recent plant enquiry.

Based on the information provided, I can confirm that Energetics **does not** have any plant within the area(s) specified in your request.

Please be advised that it may take around 10 working days to process enquiries. In the unlikely event that you have been waiting longer than 10 working days, or require further assistance with outstanding enquiries, please call 01698 404945.

Please ensure all plant enquiries are sent to plantenquiries@energetics-uk.com

Regards

Plant Enquiries

E: plantenquiries@energetics-uk.com
W: www.energetics-uk.com

energetics

International House, Stanley Boulevard, Hamilton International Technology Park, Glasgo

From: Debbie Miller [mailto:DMiller@groundwise.com]
Sent: 06 April 2017 10:27
To: Plant Enquiries; osm.enquiries@atkinsglobal.com; plantenquiries@mcnicholas.co.uk; plantenquiries@instalcom.co.uk; osp-team@uk.verizonbusiness.com; interoute.enquiries@plancast.co.uk; telenttelia.plantenquiries@telent.com; NRSWA@bskyb.com; plantenquiries@catelecomuk.com; OPBuriedServicesEnquiries@networkrail.co.uk; plantenquiries@trafficmaster.co.uk; mbnl.plant.enquiries@turntown.com; plantenquiries@psgservices.co.uk; assetrecords@utilityassets.co.uk; Andrew.Charnock@tfgm.com
Subject: Ref: URO5612.1DM - Site : Around Deansgate and Watson Street, Manchester, M3 4EJ

Ref: URO5612.1DM
Site : Around Deansgate and Watson Street, Manchester, M3 4EJ
Grid reference: 383535,397841
Requests:

For your reference, we have provided a site plan. Please use both the grid reference/postcode & site plan when responding to our requests.

We are doing research on the above site for a client and would be grateful if you could confirm whether the above operators have any cabling or apparatus in the immediate vicinity. Should there be anything detected in the vicinity plus 50 meters around the site, I would appreciate a plan showing the location. The reason we need the information is so our client can avoid digging through your cables or can investigate the potential for connecting with your network.

I enclose location plans of the site for your convenience and look forward to hearing from you. We shall of course be providing a copy of your response to our client as part of a wider report on the site including reports from other utility companies or providers.

Should you have any problems in identifying the location of the sites or should you require further clarification of the details requested, please do not hesitate to contact me.

I look forward to receiving details from you and thank you in advance for your assistance in this matter.

Kind regards,

Debbie Miller
Production Researcher
Groundwise Searches Ltd

GROUNDWISE

dmiller@groundwise.com | *01702 615566* | *www.groundwise.com*
Suite 8 Chichester House, 45 Chichester Road, Southend-on-Sea, Essex SS1 2JU

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Company Registration Number 4130795
VAT number 769 0642 02

Electricity North West
Data Management,
Electricity North West
Linley House
Dickinson Street
Manchester, M1 4LF
Phone: 0800 195 4141
Email: planrequest@enwl.co.uk
Web: www.enwl.co.uk

Ms Rosie Munns
Groundwise Searches Ltd
Suite 8 Chichester House 45 Chichester Road
Southend on Sea Essex
SS1 2JU

Our Reference: 10218857

Your Reference: URO5612.1DM

Dear Ms Rosie Munns

Electricity Network Plans

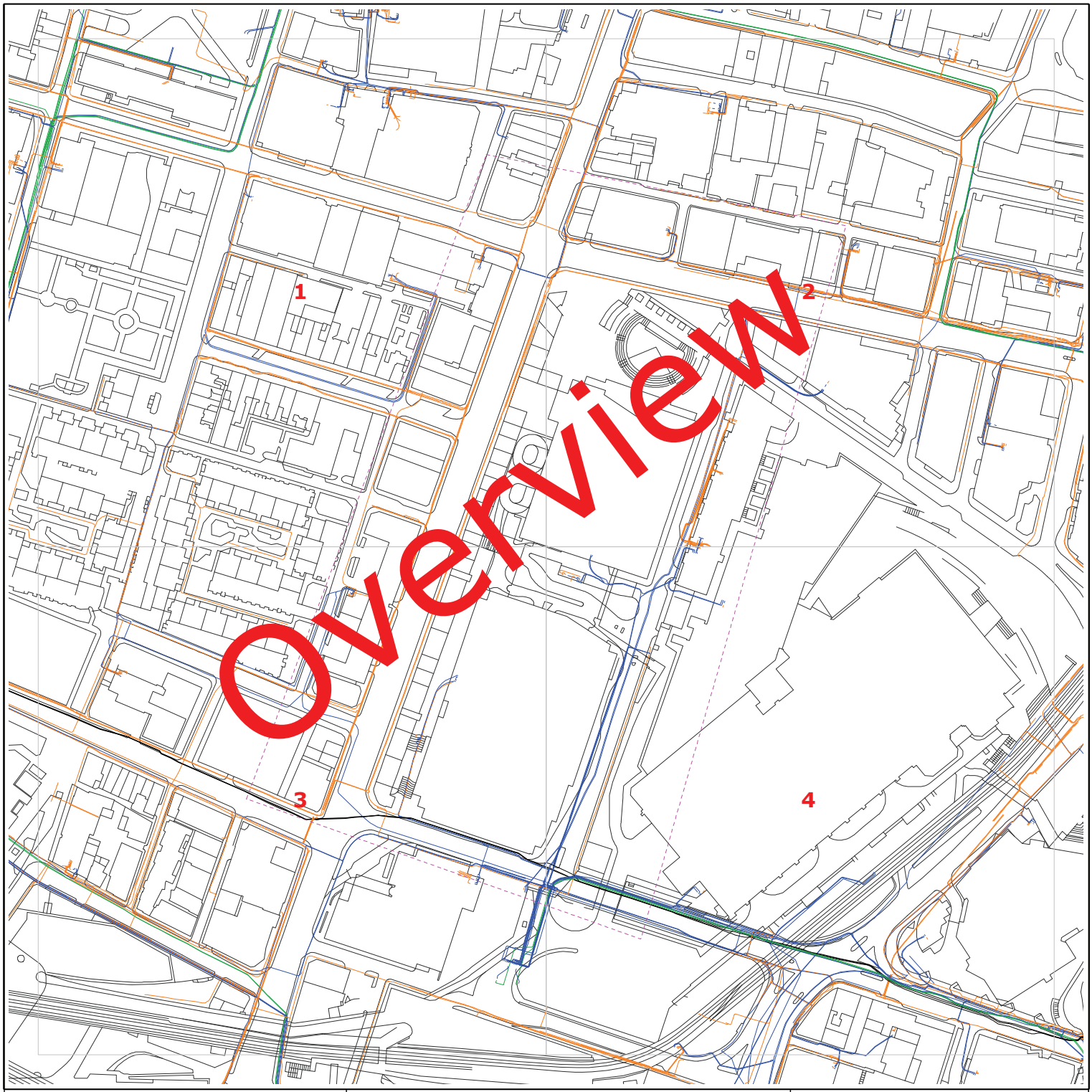
I acknowledge with thanks your request dated 10/04/2017 11:04:13 AM for information on the location of our services.

Please find enclosed plan(s) showing the approximate position of our apparatus known to be in the vicinity of this site.

I attach Conditions and information regarding electricity mains, which details contact numbers for additional services (i.e. new supplies, connections, diversion). In addition you should ensure they are made available to anyone carrying out any works which may affect our apparatus.

Yours sincerely,

Data Management



Requested by: Rosie Munns
Company: Groundwise Searches Ltd
Date Requested: 10/04/2017
Job Reference: 10218857
Your Scheme/Reference: URO5612.1DM

Dig Sites:

Area Line

Operating Voltage	Colour Code	Line Colour
132kV	Black	
33kV	Green	
22kV-25kV	Yellow	
11kV	Red	
6kV-6.6kV	Blue	
1kV-6kV	Violet	
LV	Orange	
Unknown Voltage	Brown	

Data Management
Electricity North West
Linley House
Dickinson Street
Manchester, M1 4LF
Phone: 0800 195 4141
Email: planrequest@enwl.co.uk

Scales on A4 paper:
1:1250 Area dig site
1:250 Line dig site

Unless otherwise indicated the depth of Electricity North West Limited cables are in accordance with NJUG (450mm for Low Voltage & 600mm for 11kV cables) 33kV and 132kV cables are laid at depths as marked. The depth and positions of Electricity North West Limited equipment was accurate as shown when the equipment was installed. However third parties may have altered the level & other reference data. Therefore Electricity North West Limited accept no responsibility for the position of Electricity North West Limited equipment being different from shown. No person, body or company, shall be relieved from liability for damage caused to Electricity North West Limited equipment by reason of being located differently to the indications on this drawing. Service cables are not necessarily shown but must be assumed to exist to all premises, streetlights and signs. There may be other Electricity North West Limited apparatus in the vicinity which is not indicated on the cable records. Other apparatus may also be present which is owned by a third party other than Electricity North West Limited.

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Reference should be made to HSE Guidance, HS(G)47 "Avoiding Danger from Underground Services" and GS6 "Avoidance of Danger from Overhead Power Lines".

Electricity North West Limited 304 Bridgewater Place, Birchwood Park, Warrington WA3 6XG. Registered in England and Wales. Registered No 02366949



Requested by: Rosie Munns
Company: Groundwise Searches Ltd
Date Requested: 10/04/2017
Job Reference: 10218857
Your Scheme/Reference: URO5612.1DM

Dig Sites:

Area Line

Operating Voltage	Colour Code	Line Colour
132kV	Black	
33kV	Green	
22kV-25kV	Yellow	
11kV	Red	
6kV-6.6kV	Blue	
1kV-6kV	Violet	
LV	Orange	
Unknown Voltage	Brown	

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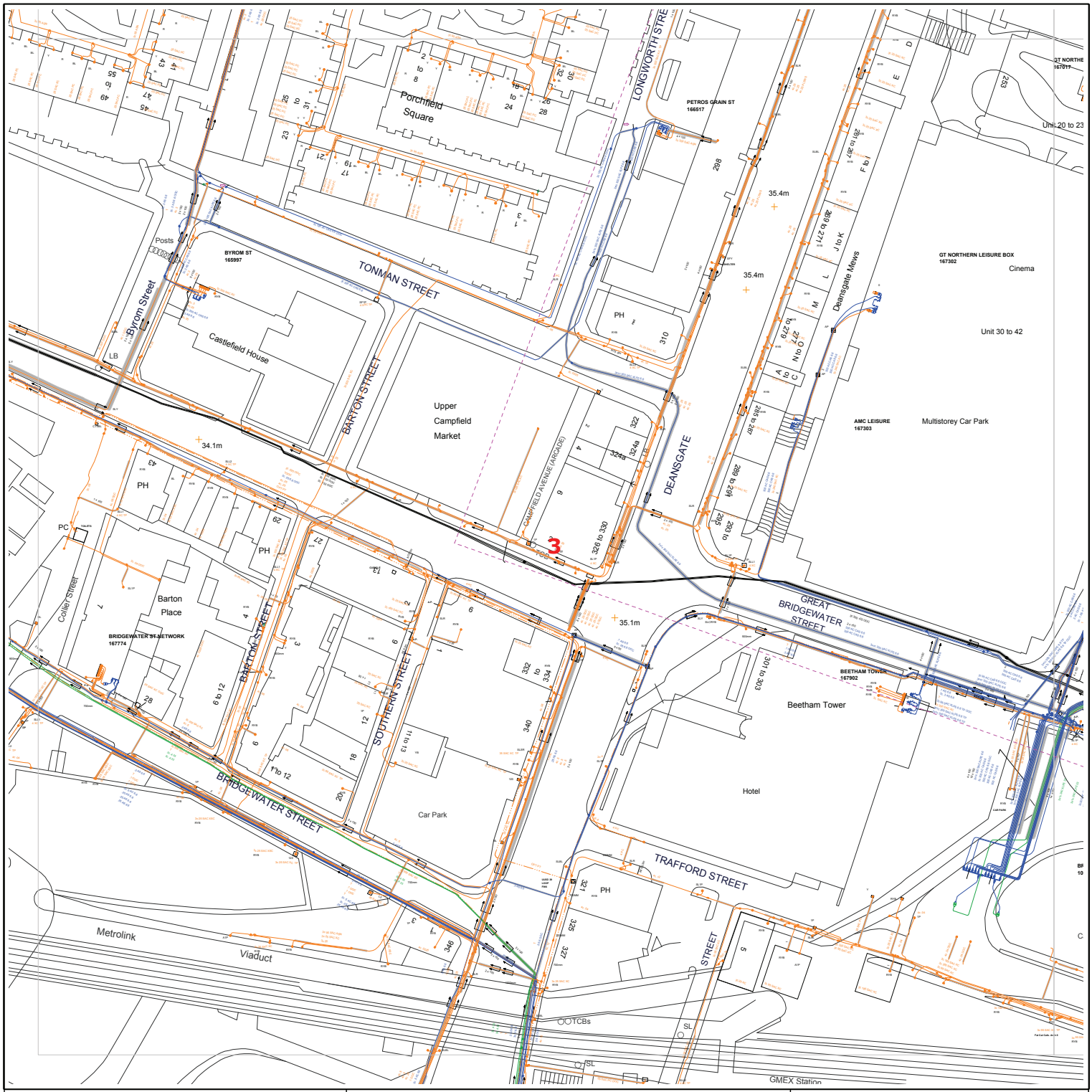
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electricity north west

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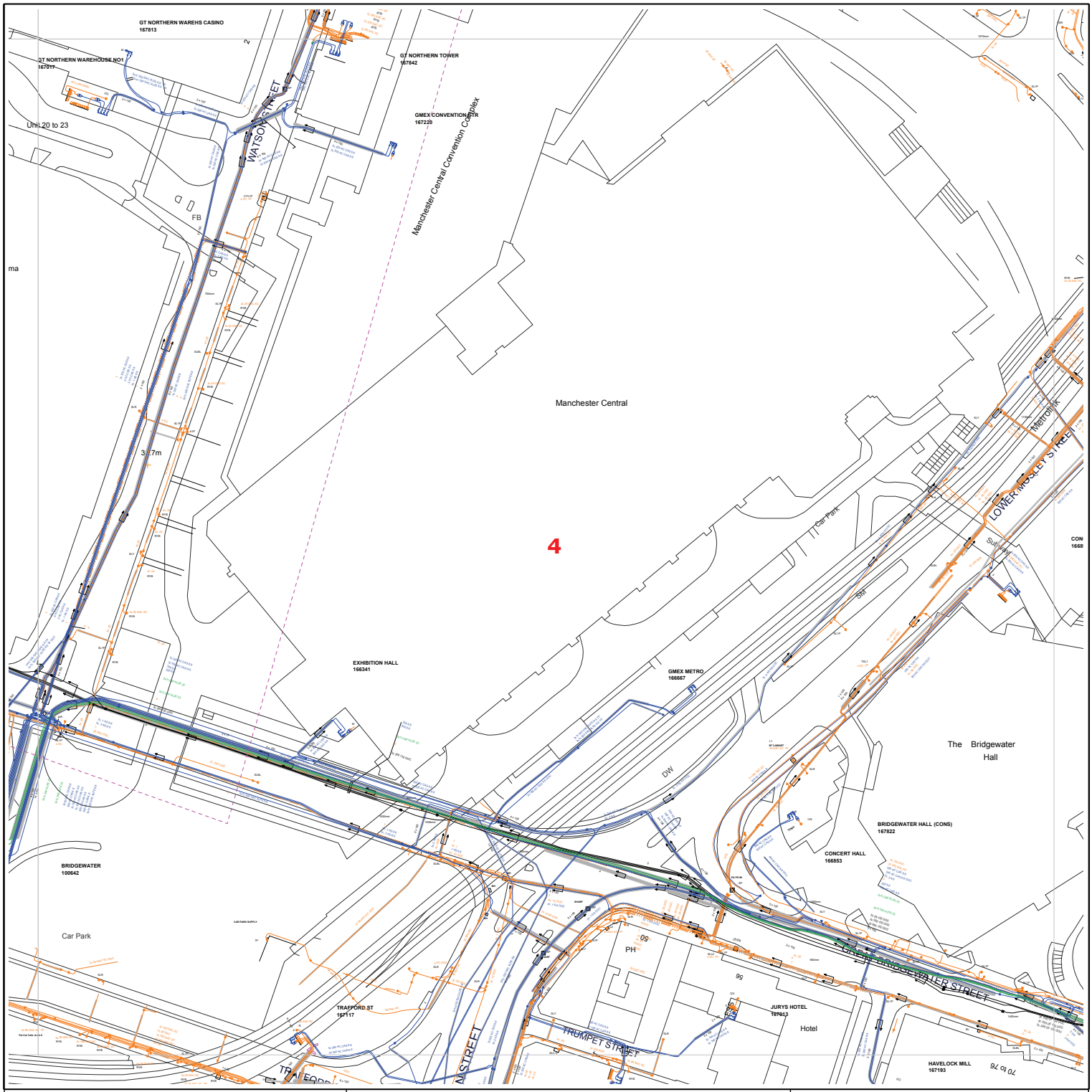
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Electricity North West Limited 304 Bridgewater Place, Birchwood Park, Warrington WA3 6XG. Registered in England and Wales. Registered No 02366949

Conditions and information regarding electricity mains

These general conditions and precautions apply to the electricity distribution system of Electricity North West Limited.

Please ensure that a copy of these conditions is passed to your representative and contractor on site.

1. There may be other Electricity North West Limited apparatus in the vicinity, which is not indicated on the cable records. Other apparatus may also be present which a third party owns other than Electricity North West Limited

2. Before any machines are used all of Electricity North West's underground apparatus should be located by manual excavation taking the appropriate safety precautions in accordance with the **Health and Safety Executive Guidance note HS(G)47 "Avoiding danger from underground services"**. This contains advice to site personnel when working near underground services.

   Underground services, particularly electricity and gas, can be dangerous. Damage to electricity cables can cause a dangerous flash, leading to severe burns or even death. Gas leaks can cause fire or explosion.

   Damage can result from excavation or penetration of the ground, e.g. by a road pin.

   Underground services may be found in roads, footpaths and on sites. Always assume that they are present. Treat any services found anywhere as live.

   Accidents have happened because people have mistaken one service for another, e.g. black plastic covered electricity cables look like black plastic water pipes and cast iron gas and water mains look alike. Check before you act.

3. Before starting work you must:

   - Make sure you have plans of the underground services in the area. This may not always be possible for emergency or unforeseen works. **Remember that service connection cables and pipes from the main to building or streetlight may not be shown**.
   - Use a cable and pipe locator to trace electricity cables and metal pipes.
   - Look for signs of service connection cables or pipes, e.g. a gas meter or service connection entry into a house or a streetlight.
   - Hand dig trial holes (as many as necessary) to confirm the position of services in close proximity to the area of work.

4. When you start work:

   - Hand dig near buried services whenever possible. Spades and shovels are safer than picks, pins or forks.
   - Remember that cables may be embedded in concrete. Electricity cables embedded in concrete **must** either be made dead before the concrete is broken out or another safe way of working agreed with the cable owner.
   - Watch out for signs of services as work continues.
   - Report damage to a cable, pipe or pipe coating however slight.
   - Do not use hand held power tools within 0.5m of he marked position of an electricity cable, unless this is impracticable and the line of the cable has been identified by plans and positively confirmed by a locator.
   - Do not use hand held power tools directly over the marked line of cable unless:

     a) You have already found the cable at that position by careful hand digging beneath the surface and it is at a safe depth (at least 300mm) below the bottom of the surface to be broken, or

     b) Physical means have been used to prevent the tool striking it.

   - If an excavator is used near an electricity cable keep everyone clear of the bucket while it is digging. Buckets should not be used near cable – hand dig.
   - Do not use exposed services as a convenient step or handhold.
   - Do not handle or attempt to alter the position of an exposed service.
   - Do not install plant close to an existing service.
   - Do not build existing services into a manhole or other structure or encase them in concrete.

Would you also ensure that all site operators have this information and if any electrical apparatus is damaged, they/you should contact Electricity North West Limited fault desk on **0800 195 4141 (option 1)**

5. Overhead lines are not necessarily shown on the Electricity North West Limited cable records but may be present. In the event of work being carried out adjacent to overhead lines (including access, storage etc.) please always ensure strict adherence to the requirements of the **Health and Safety Executive's Document GS6 "Avoidance of Danger from Overhead Electric Lines"**.

   Extreme personal danger can result from contact, or near contact, with live conductors or overhead lines.

   Treat all overhead lines and other electrical apparatus as live. If in doubt, get advice.

6. Electricity North West Limited must be consulted if work is to take place within 15 metres of overhead lines on steel towers or 9 metres of overhead lines on wood, concrete or steel pylons. (All distances should be measure at ground level from a position estimated by eye to be vertically under the outermost conductor at a tower or pole position) Any person involved in work in the vicinity of overhead lines should:

   - Understand and follow the instructions given on safe working areas and methods of work.
   - Make sure that warning notices are in the cabs of machines working in the vicinity of an overhead line.
   - Make sure that barriers and warning notices are erected as required.
   - Not tip soil or stack material underneath overhead lines as this may reduce the clearance to an unsafe distance.
   - Make sure when handling or using platforms, scaffold, poles, piping, ladders, hand tools etc., that they are kept at a safe distance from overhead lines.
   - Not steady a suspended load, skip, hoist wire, slings etc., unless satisfied that there isn't any danger from overhead lines.
   - Remember that when mobile plant, such as a crane or excavator, is operating near overhead lines , the raising or slewing of the jib may introduce danger.
   - Always keep overhead lines in view when manoeuvring mobile plant.
   - Never operate a machine unless carefully guided by an experienced banksman.
   - Not approach or touch any broken or fallen conductors or any plant in contact with an overhead line before Electricity North West Limited confirms that conditions are safe. Warn others to keep well clear.

   Machine operators should note that: if a machine comes into contact with an overhead line and cannot be disentangled by backing off, remain seated in the cab and warn others to keep clear of the machine until Electricity North West Limited confirms that conditions are safe. If it is essential to leave the machine while it is in contact with the overhead line, for example if it catches fire, jump well clear – and **do not** attempt to climb down in the normal way nor touch any part of the machine when on the ground.

7. Electricity North West Limited provides approximate locations of its electricity mains or apparatus according to its records but these records are not necessarily accurate or complete and do not always show the position of private cables from mains to properties. No person or company shall be relieved from liability for any damage caused by reason of the actual positions and/or depths being different from those indicated.

8. Care should be taken when excavating near cables. Known road crossings are highlighted on the enclosed plans. Should any cable, or Electricity North West Limited apparatus indicated on the attached plans, be affected by your proposals please contact us as follows:

   Data Management
   Linley House
   Dickinson St
   Manchester
   M1 4LF

   Telephone: **0800 195 4141 (option 2)**

   Details of diversion costs, if any, will be provided on request once your firm proposals have been submitted.

9. Please note that service cables may be affected by some of the works being carried out on site.

   If any services do require temporary disconnection please phone **0800 195 4141 (option 2)** for domestic and commercial disconnection, so that arrangement can be made to disconnect before work commences on site.

10. For information regarding supplies please contact us on **0800 195 4141 (option 2)**.

11. Please note that cable records supplied may not be up to date, or may be incomplete, if the area concerned is a new site.

12. For information regarding wayleave or easement agreements contact:

Manchester	**0161 604 1341**
Preston	**01772 848639**
Kendal	**01539 796082**

13. The latest cable records are always available for inspection during normal working hours and you should satisfy yourself that the information you have is up to date at the time you commence work. This service is consistent with the requirement of Regulation 36 of the Electricity Supply Regulations and paragraph 79 of the New Road and Street Works Act.

    Please contact Data Management on **0800 195 4141 (option 2)** to arrange an appointment to view the records.

electricity north west

304 Bridgewater Place
Birchwood Park
Warrington
WA3 6XG

www.enwl.co.uk

Registered in England and Wales
Registered Number 2366949

Rosie Munns

From: plantenquiryservice@gtc-uk.co.uk
Sent: 10 April 2017 12:05
To: Rosie Munns
Subject: GTC Plant Enquiry - Ref- 407620
Attachments: 407620.png

GTC Apparatus Not Found In Search Area

Our Plant Enquiry Service Ref: 407620
Your Enquiry Ref: URO5612.1DM

Dear Rosie,

Thank you for your enquiry concerning apparatus in the vicinity of your proposed work. GTC can confirm that we have no apparatus in the vicinity but please note that other asset owners may have and ensure all utility owners have been consulted. For your records, the search area is shown in the attached map.

Please note our assets now include those owned and operated by:

- GTC Pipelines Limited
- Independent Pipelines Limited
- Quadrant Pipelines Limited
- Electricity Network Company Limited
- Independent Power Networks Limited
- Independent Water Networks Limited
- Independent Fibre Networks Limited
- Independent Community Heating Limited

If you have any queries or require any further information please do not hesitate to contact us.

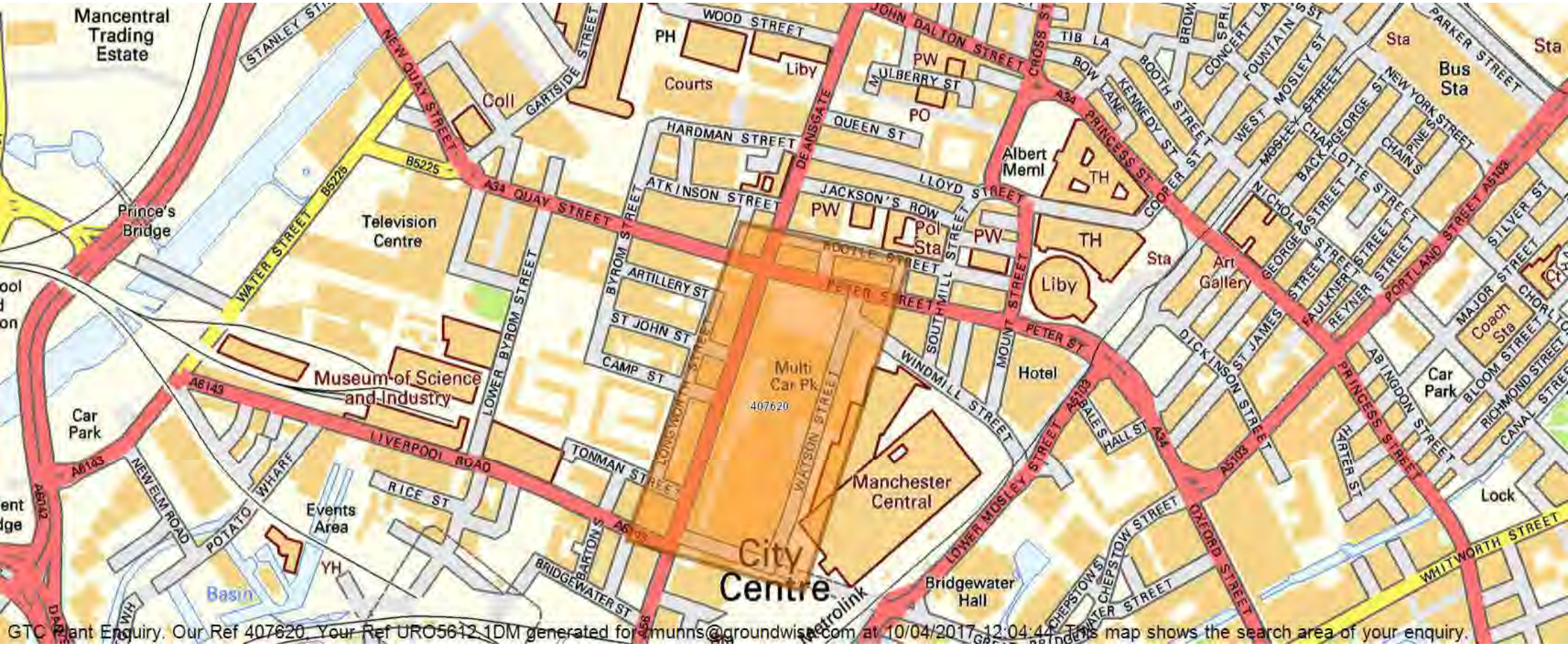
Your sincerely,

GTC Plant Enquiry Service.

GTC
Energy House
Woolpit Business Park
Woolpit
Bury St Edmunds
Suffolk, IP30 9UP
Tel: 01359 240363
plant.enquiries@gtc-uk.co.uk

NOTE:
This E-Mail originates from GTC, Energy House, Woolpit Business Park, Woolpit, Bury St Edmunds, Suffolk, IP30 9UP
VAT Number: GB688 8971 40. Registered No: 029431.

DISCLAIMER
The information in this E-Mail and in any attachments is confidential and may be privileged. If you are not the intended recipient, please destroy this message, delete any copies held on your system and notify the sender immediately. You should not retain, copy or use this E-Mail for any purpose, nor disclose all or any part of its content to any other person. Whilst we run antivirus software on Internet E-Mails, we are not liable for any loss or damage. The recipient is advised to run their own up to date antivirus software.
Thank you



GTC Plant Enquiry. Our Ref 407620, Your Ref URO5612.1DM generated for mmunns@groundwise.com at 10/04/2017 12:04:44. This map shows the search area of your enquiry.

Plant Protection
National Grid
Block 1; Floor 1
Brick Kiln Street
Hinckley
LE10 0NA
E-mail: plantprotection@nationalgrid.com
Telephone: +44 (0)800 688588

Rosie Munns
Groundwise Searches Ltd
Suite 8 Chichester House
45 Chichester Road
Southend on Sea
Essex
SS1 2JU

National Grid Electricity Emergency Number:
0800 40 40 90*

National Gas Emergency Number:
0800 111 999*
* Available 24 hours, 7 days/week.
Calls may be recorded and monitored.

www.nationalgrid.com

Date: 10/04/2017
Our Ref: NW_TW_Z1_3SWX_320855
Your Ref: URO5612.1DM
RE: Proposed Works, Around Deansgate and Waston Street

Thank you for your enquiry which was received on 10/04/2017.
Please note this response and any attached map(s) are valid for 28 days.

An assessment has been carried out with respect to National Grid Electricity Transmission plc's, National Grid Gas plc's and National Grid Gas Distribution Ltd's apparatus. Please note it does not cover the items listed in the section "Your Responsibilities and Obligations", including gas service pipes and related apparatus.
For details of National Grid's network areas please see the National Grid website (http://www.nationalgrid.com/uk/Gas/Safety/work/) or the enclosed documentation.

As your works are at a "proposed" stage, any maps and guidance provided are for information purposes only. This is not approval to commence work. You must submit a "Scheduled Works" enquiry at the earliest opportunity and failure to do this may lead to disruption to your plans and works. National Grid will endeavour to provide an initial assessment within 14 days of receipt of a Scheduled Works enquiry and dependent on the outcome of this, further consultation may be required.

In any event, for safety and legal reasons, works must not be carried out until a Scheduled Works enquiry has been completed and final response received.

National Grid is a trading name for:
National Grid Electricity Transmission plc
Registered Office: 1-3 Strand, London WC2N 5EH
Registered in England and Wales, No 2366977

National Grid is a trading name for:
National Grid Gas plc
Registered Office: 1-3 Strand, London WC2N 5EH
Registered in England and Wales, No 2006000

National Grid is a trading name for:
National Grid Gas Distribution Limited
Registered Office: 1-3 Strand, London WC2N 5EH
Registered in England and Wales, No 10080864

Your Responsibilities and Obligations

The "Assessment" Section below outlines the detailed requirements that must be followed when planning or undertaking your scheduled activities at this location.

It is your responsibility to ensure that the information you have submitted is accurate and that all relevant documents including links are provided to all persons (either direct labour or contractors) working for you near National Grid's apparatus, e.g. as contained within the Construction (Design and Management) Regulations.

This assessment solely relates to National Grid Electricity Transmission plc (NGET), National Grid Gas plc (NGG) and National Grid Gas Distribution Ltd (NGGD) apparatus. This assessment does **NOT** include:

- National Grid's legal interest (easements or wayleaves) in the land which restricts activity in proximity to National Grid's assets in private land. You must obtain details of any such restrictions from the landowner in the first instance and if in doubt contact National Grid.
- Gas service pipes and related apparatus
- Recently installed apparatus
- Apparatus owned by other organisations, e.g. other gas distribution operators, local electricity companies, other utilities, etc.

It is **YOUR** responsibility to take into account whether the items listed above may be present and if they could be affected by your proposed activities. Further "Essential Guidance" in respect of these items can be found on the National Grid Website (http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=8589934982).

This communication does not constitute any formal agreement or consent for any proposed development work; either generally or with regard to National Grid's easements or wayleaves nor any planning or building regulations applications.

NGG, NGET and NGGD or their agents, servants or contractors do not accept any liability for any losses arising under or in connection with this information. This limit on liability applies to all and any claims in contract, tort (including negligence), misrepresentation (excluding fraudulent misrepresentation), breach of statutory duty or otherwise. This limit on liability does not exclude or restrict liability where prohibited by the law nor does it supersede the express terms of any related agreements.

If you require further assistance please contact the National Grid Plant Protection team via e-mail (click here) or via the contact details at the top of this response.

Yours faithfully

National Grid Plant Protection Team

ASSESSMENT

Affected Apparatus
The National Grid apparatus that has been identified as being in the vicinity of your proposed works is:

- High or Intermediate pressure (above 2 bar) Gas Pipelines and associated equipment
- Low or Medium pressure (below 2 bar) gas pipes and associated equipment. (As a result it is highly likely that there are gas services and associated apparatus in the vicinity)

Requirements

BEFORE carrying out any work you must:

- Carefully read these requirements including the attached guidance documents and maps showing the location of National Grid apparatus.
- Contact the landowner and ensure any proposed works in private land do not infringe National Grid's legal rights (i.e. easements or wayleaves). If the works are in the road or footpath the relevant local authority should be contacted.
- Ensure that all persons, including direct labour and contractors, working for you on or near National Grid's apparatus follow the requirements of the HSE Guidance Notes HSG47 - 'Avoiding Danger from Underground Services' and GS6 – 'Avoidance of danger from overhead electric power lines'. This guidance can be downloaded free of charge at http://www.hse.gov.uk
- In line with the above guidance, verify and establish the actual position of mains, pipes, cables, services and other apparatus on site before any activities are undertaken.

GUIDANCE

High Pressure Gas Pipelines Guidance:
If working in the vicinity of a high pressure gas pipeline the following document must be followed: 'Specification for Safe Working in the Vicinity of National Grid High Pressure Gas Pipelines and Associated Installations - Requirements for Third Parties' (SSW22). This can be obtained from:
http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=33968

Dial Before You Dig Pipelines Guidance:
http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=33969

Excavating Safely - Avoiding injury when working near gas pipes:
http://www.nationalgrid.com/NR/rdonlyres/2D2EEA97-B213-459C-9A26-18361C6E0B0D/25249/Digsafe_leaflet3e2finalamends061207.pdf

Standard Guidance

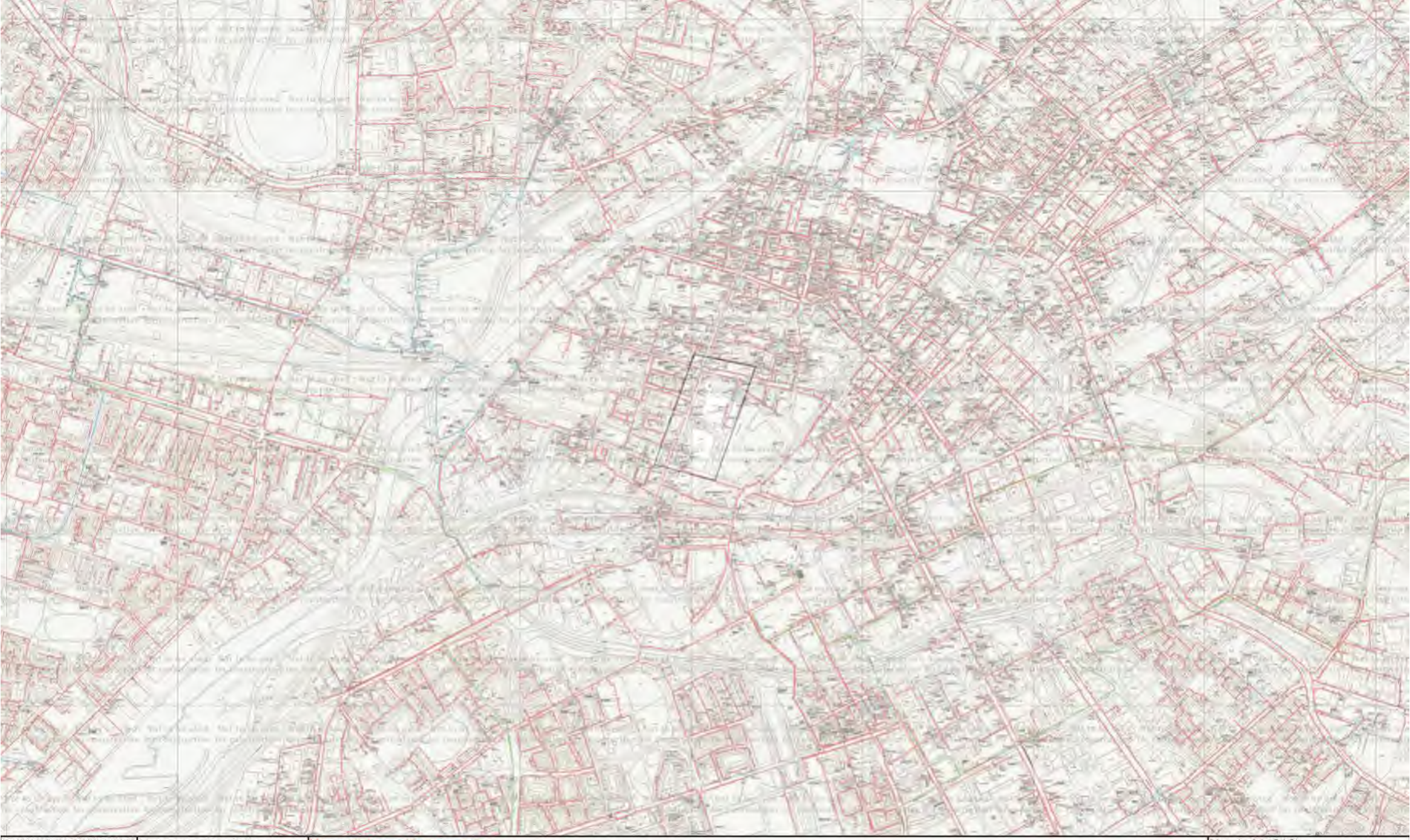
Essential Guidance document:
http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=8589934982

General Guidance document:
http://www2.nationalgrid.com/WorkArea/DownloadAsset.aspx?id=35103

Excavating Safely in the vicinity of gas pipes guidance (Credit card):
http://www.nationalgrid.com/NR/rdonlyres/A3D37677-6641-476C-9DDA-E89949052829/44257/ExcavatingSafelyCreditCard.pdf

Excavating Safely in the vicinity of electricity cables guidance (Credit card):
http://www.nationalgrid.com/NR/rdonlyres/35DDEC6D-D754-4BA5-AF3C-D607D05A25C2/44858/ExcavatingSafelyCreditCardelectricitycables.pdf

Copies of all the Guidance Documents can also be downloaded from the National Grid Website:
http://www.nationalgrid.com/uk/Gas/Safety/work/downloads/



ID: NW_TW_Z1_3SWX_320855

USER: RosieMunns

DATE: 10/04/2017

DATA DATE: 09/04/2017

REF: URO5612.1DM

MAP REF: SJ8397

CENTRE: 383541, 397840

View extent: 4120m, 2440m

LP MAINS

MP MAINS

IP MAINS

LHP MAINS

NHP MAINS

0m 200m

Approximate scale 1:10000
on A3 Colour Landscape

Some examples of Plant Items:

Valve | Depth of Cover | Syphon | Diameter Change | Material Change | Out of Standard Service

Map not to be used for construction

This plan shows those pipes owned by National Grid Gas plc in its role as a Licensed Gas Transporter (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regard to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy thereof cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc., are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by National Grid Gas plc or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with HS(G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue.

Map 1 of 1 (GAS)

MAPS Plot Server Version 1.9.0

nationalgrid

Requested by: Groundwise Searches Ltd

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ENQUIRY SUMMARY

Received Date
10/04/2017

Your Reference
URO5612.1DM

Location
Centre Point: 383540, 397840
X Extent: 300
Y Extent: 372
Location Description: Around Deansgate and Waston Street

Map Options
Paper Size: A3
Orientation: LANDSCAPE
Requested Scale: 2500
Actual Scale: 1:10000 (GAS)
Real World Extents: 4120m x 2440m (GAS)

Recipients
rmunns@groundwise.com

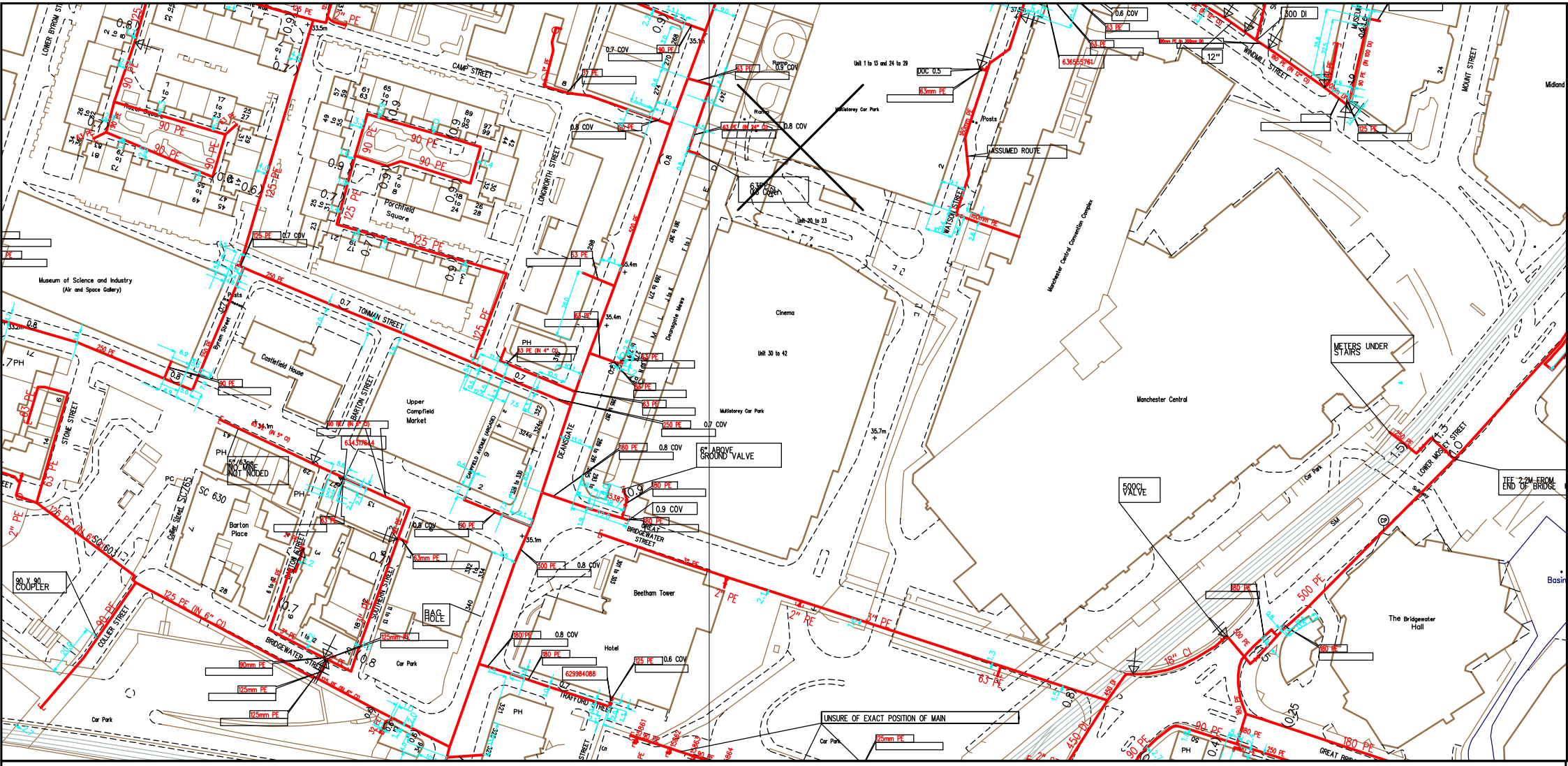
Enquirer Details
Organisation Name: Groundwise Searches Ltd
Contact Name: Rosie Munns
Email Address: rmunns@groundwise.com
Telephone: 01702 615566 (01702 615566)
Address: Suite 8 Chichester House, 45 Chichester Road, Southend on Sea, Essex, SS1 2JU

Description of Works
STUDY

Enquiry Type
Proposed Works

Activity Type
General Excavation

Work Types
Work Type: Plans Only



SCALE: Not to scale	LP MAINS
USER ID: rmunns	MP MAINS
DATE: 20/04/2017	IP MAINS
EXTRACT DATE: 06/12/2016	LHP MAINS
MAP REF: SJ8397	NHP MAINS
CENTRE: 383529, 397751	

Some examples of Plant Items

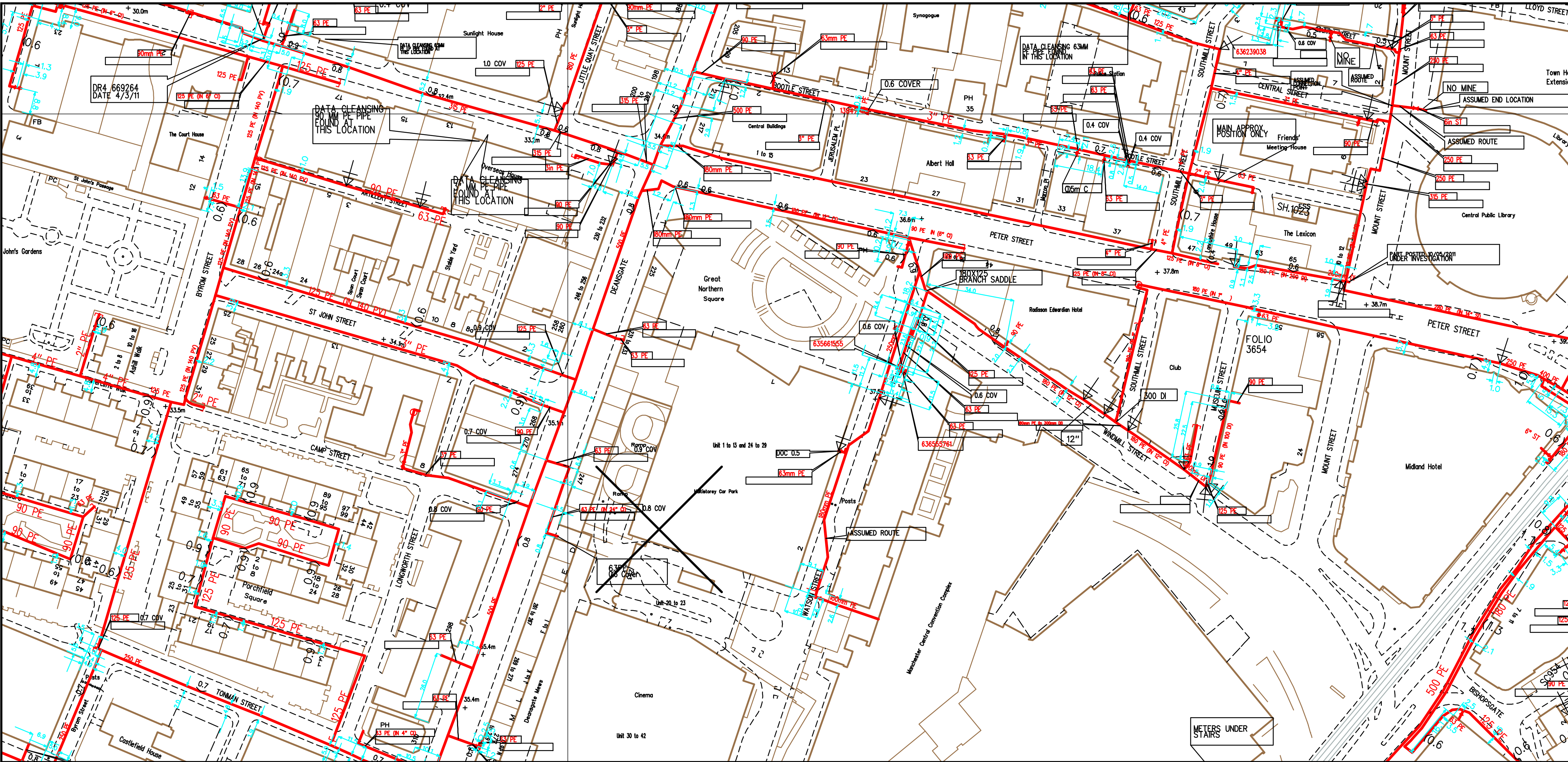


This plan shows those pipes owned by National Grid Gas plc in their role as a Licensed Gas Transporter (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regard to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy thereof cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc. are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by National Grid Gas plc or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with HS(G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue. Further information on all DR4s can be determined by calling the DR4 hotline on 01455 892426 (9am-5pm) A DR4 is where a potential error has been identified within the asset record and a process is currently underway to investigate and resolve the error as appropriate.

MAPS Viewer Version 5.7.0.0

Local Machine

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SCALE: Not to scale	LP MAINS
USER ID: rmunns	MP MAINS
DATE: 20/04/2017	IP MAINS
EXTRACT DATE: 06/12/2016	LHP MAINS
MAP REF: SJ8397	NHP MAINS
CENTRE: 383583, 397897	

Some examples of Plant items: Valve, Depth of Cover, Syphon, Diameter Change, Material Change, Out of Standard Service

This plan shows those pipes owned by National Grid Gas plc in their role as a Licensed Gas Transporter (GT). Gas pipes owned by other GTs, or otherwise privately owned, may be present in this area. Information with regard to such pipes should be obtained from the relevant owners. The information shown on this plan is given without warranty, the accuracy thereof cannot be guaranteed. Service pipes, valves, syphons, stub connections, etc. are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by National Grid Gas plc or their agents, servants or contractors for any error or omission. Safe digging practices, in accordance with HS(G)47, must be used to verify and establish the actual position of mains, pipes, services and other apparatus on site before any mechanical plant is used. It is your responsibility to ensure that this information is provided to all persons (either direct labour or contractors) working for you on or near gas apparatus. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue. Further information on all DR4s can be determined by calling the DR4 hotline on 01455 892426 (9am-5pm) A DR4 is where a potential error has been identified within the asset record and a process is currently underway to investigate and resolve the error as appropriate.

MAPS Viewer Version 5.7.0.0

Local Machine

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Ms Rosie Munns
Groundwise Searches Ltd
Suite 8 Chichester House 45 Chichester Road
Southend on Sea Essex
SS1 2JU

Tel: 03330 146 455

2 Europa View
Sheffield Business Park
Sheffield S9 1XH

Web: fulcrum.co.uk
Email: enquiries@fulcrum.co.uk

Date: 10/04/2017

Our Reference: 10218857
Your Reference: URO5612.1DM

Dear Ms Rosie Munns,

Asset Network Plans

Thank you for your request regarding the position of our pipelines received through the LinesearchbeforeUdig service.

We can confirm that Fulcrum Pipelines Limited currently has or is planning to have gas pipes in the vicinity of your proposed works. I have enclosed a copy of our drawings and site location to help you to locate them.

If you are proposing to carry out an excavation on or near a valve, please refer to the "Appendix 1 - Safe working practices in the vicinity of metallic valves" attached.

We will do everything we can to assist you in your safe working procedures, however, it's worth bearing in mind that we are not responsible for any incidents or accidents that may occur whilst working around our pipe network.

With this in mind, we'd recommend the following practices are adhered to maintain the integrity of the pipeline:-

- Trial Holes to find our pipes.
- Hand Digging to find our pipes and their vicinity once found.
- Adequate protection of the pipe if exposed and once your work is completed i.e. sand covering

It is essential to refer to the HSE document HSG47 for information regarding trial holes and safe digging practice when working near our pipes. A copy of this document can be downloaded from the following HSE website link - http://www.hse.gov.uk/pubns/books/hsg47.htm

Additional costs may be incurred if our plant has to be relocated due to your proposed works.

Please note that other gas transporters may have plant in the area which could be affected by your proposed works.

If you need any help or information simply contact Fulcrum on 03330 146 455.
In case of an emergency please phone 0800 111 999.

Yours Sincerely,

Fulcrum Pipelines Limited
03330 146 455
FPLPlant@fulcrum.co.uk

Disclaimer

Plans provided by Fulcrum Pipelines Limited only primarily show those pipes owned by Fulcrum Pipelines Limited in its role as a Licensed Independent Gas Transporter ("iGT"). The plan may show future pipework, plant or other assets or existing pipework, plant or other assets which may be removed or abandoned by Fulcrum Pipelines Limited from its gas network at any time in the future. Apparatus installed within the last 90 days and other apparatus including (but not limited to) service pipes, valves, siphons and stub connections may be present in the area but may not be shown on the plan, however, their presence should be anticipated. Gas pipes owned by any other Gas Transporters, or otherwise privately owned, may also be present in this area but may not be shown. Areas of operation or facilities operated by any other Gas Transporter may be shown on the plan, however, such information is based on information provided by such Gas Transporters. Information with regard to such third party pipes, operations or facilities should be obtained from the relevant owners.

The information shown on this plan is given without warranty or representation by Fulcrum Pipelines Limited as to its completeness, accuracy or as to its up to date representation of any geography or pipework or other assets. Save for any matter for which it is not permitted by law to exclude or limit its liability, neither Fulcrum Pipelines Limited nor its affiliates, nor any agents, servants or contractors of the same, shall have any liability arising out of or in connection with the information provided in the plan (whether present or future), whether in contract, tort, misrepresentation (excluding fraudulent misrepresentation), under statute or otherwise, howsoever caused including (without limitation) by negligence. The information included on this plan should not be referred to beyond a period of 28 days from the date of issue.

ALERT

Appendix 1

Safe working practices in the vicinity of metallic valves

All operatives are required to adhere to the following precautionary measures when working on or near metallic valves.

Where the valves are likely to be encountered?

In any location above or below ground, for example (please note this list is not exhaustive):

- Buried line valves
- Governor installations
- Meter installations
- ECVs / Construction valves
- Valve associated with outlet pipe work
- Metallic valves installed by other utilities (e.g. water)

REQUIRED ACTION

Below Ground

- DO NOT use hand held power tools or mechanical excavator within 0.5m (500mm) either side of the valve, or above the valve position.
- When excavating to expose a valve, dig down at the side of the marked position, and not directly above. Use an air lance, spades and shovels rather than grafts, forks or picks.
- DO NOT position yourself directly over or in front of the valve bonnet at any time, as should the valve fail catastrophically, parts of it and/or escaped gas and other materials could be ejected out. Should anything unusual become evident e.g. smell of gas, noise or ejection of material from the excavation – STOP, withdraw and contact National Gas Emergency Service on 0800 111 999
- DO NOT attempt to operate valve or remove any protective coatings.

In the Event of an Emergency

If there is a smell of gas you must take the following actions IMMEDIATELY:

- Stop work and get everyone away from the immediate vicinity of the escape
- Inform the National Gas Emergency Service on 0800 111 999
- DO NOT attempt to stop the escape by filling the excavation as gas may enter buildings

Issued by: Fulcrum Pipelines Limited
Date: June 2016
Version: 1.0

Design it well, Build it Correctly, Do it Safely

"VERY IMPORTANT - INFORMATION FOR CUSTOMER"

TRENCH DEPTH GUIDELINES

All trenches to be in accordance with N.J.U.G. guidelines

MINIMUM DEPTHS OF COVER –

NRWS: (a) Carriageway - 750mm (b) Other ground - 600mm

SERVICES: (a) <63mm - As above (b) >63mm - 450mm

*All pipes laid to a minimum bend - 1.1m

All ducts (if used) must conform to BS4607, Yellow in colour, coilable and perforated.

VERY IMPORTANT - INFORMATION FOR CUSTOMER

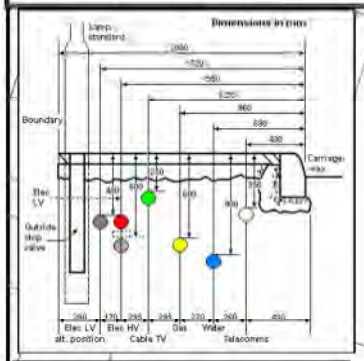
MINIMUM PROXIMITY DISTANCES

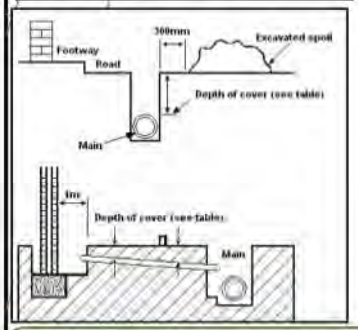
The permissable proximities to normally occupied buildings vary depending upon construction material and operating pressure show in the tables below.

STEEL MAINS

Operating Pressure	Minimum Proximity to Premises (m)
LP	0.25
MP	1
IP	3

PE MAINS	Material PE Grade	Maximum Operating Pressure <=75mbar (LP)	Maximum Operating Pressure >75mbar <=2Bar (MP)
		Minimum Proximity to Premises (m)	
<=160	PE80 SDR17.6	0.25	3
	PE80 SDR11	0.25	3
	PE100 SDR11	0.25	3
160 to 250	PE80 SDR17.6	1	3
	PE80 SDR11	1	3
	PE100 SDR11	1	3
315	PE80 SDR17.6	1	3
	PE80 SDR11	1	3
	PE100 SDR11	1	3





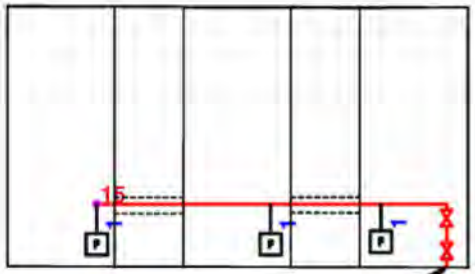
APPROVED

By Fulcrum Pipelines Ltd at 8:43 am, Aug 08, 2012

The location of the service termination is in accordance with IGE/ GM6 & 8, Meter room must be ventilated to a minimum 3% of total floor area.' Equally distributed at High and Lower level.

ALL SERVICES LAID ON THIS PROJECT COMPLY WITH THE LATEST EDITION OF IGE / TD / 4

ALL MAINS LAID ON THIS PROJECT COMPLY WITH THE LATEST EDITION OF IGE / TD / 3



In Accordance with IGE/G/5 table 5 adequate support will be given using walraven clips minimum unrestrained length from either end of rails at 0.5m using 1 clip per horizontal rail and 1 clip vertical for support.

WATSON STREET

Ex 180mm PE LP CTSN*0325642841

180mm PE pipe to be re-classified as a main please see email from NG

Connection Point E383595/N397816

Fulcrum Pipelines Limited
2 Europa View
Sheffield Business Park
Sheffield, S9 1XH

QUOTE REF: 9011248 Variation (4195731)

SITE ADDRESS:
Units 1 3 and 4
GREAT NORTHERN
MANCHESTER
M2 4EJ

DESCRIPTION OF WORKS:
Lay new 90mm PE LP main plus 3" ST manifold supplying three 2" ST services terminating with 2" ECV's to internal positions

DESIGNED BY: Clyde Bonnett
SCALE: 1:500 @ A3 DATE: 07/05/2012
DRAWING:

DRAWING KEY:
LP Main
MP Main
IP Main
Proposed Service
Proposed Meter Position
Pipes To Be Abandoned

Change Of Diameter		Governor	
Change Of Material		Valve	

GIRS ACCREDITED DESIGNER

DATE _____

SIGNATURE _____

UNIT	MPRN
Unit 1	7678616908
Unit 3	7678617001
Unit 4	7678617102

FPL CUSTOMER TO PROVIDE ADDITION AIRBRICK VENTILATION TO METER BAYS. AS DISCUSSED WITH CHRIS BURNETT FULCRUM FIELD OFFICER.

This project has been approved on the understanding that the ventilation requirements have been installed as per the approved design. A post completion audit must be carried out by Fulcrum's Operational personnel to confirm that this has been installed correctly. Fulcrum Pipelines need written confirmation from Fulcrum Infrastructure Services to confirm that the installed ventilation meets the approved specifications.

Unit 1 and 3 Hourly load: 325kwh per Unit - Annual load: 325000 per Unit
Unit 4 Hourly load: 270kwh per Unit - Annual load: 270000 per Unit

APPROVED
By FPL at 8:10 am, Jun 20, 12

"VERY IMPORTANT - INFORMATION FOR CUSTOMER"

TRENCH DEPTH GUIDELINES

All trenches to be in accordance with N.J.U.G. guidelines

MINIMUM DEPTHS OF COVER:-
MAINS: (a) Carriageway - 750mm (b) Other ground - 600mm
SERVICES: (a) <63mm - As above (b) >=63mm - 450mm
*All pipes laid in agricultural land - 1.1m

All ducts (if used) must conform to BS4962, Yellow in colour, convoluted and perforated.

VERY IMPORTANT - INFORMATION FOR CUSTOMER

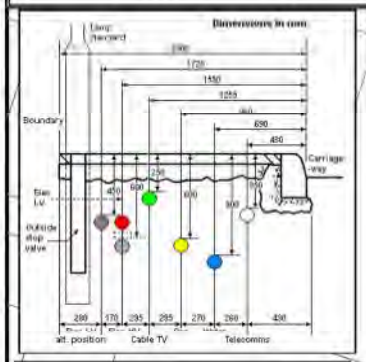
MINIMUM PROXIMITY DISTANCES

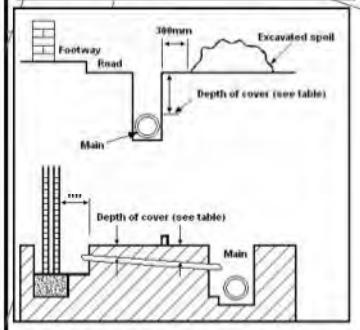
The permissible proximities to normally occupied buildings vary depending upon construction material and operating pressure show in the tables below.

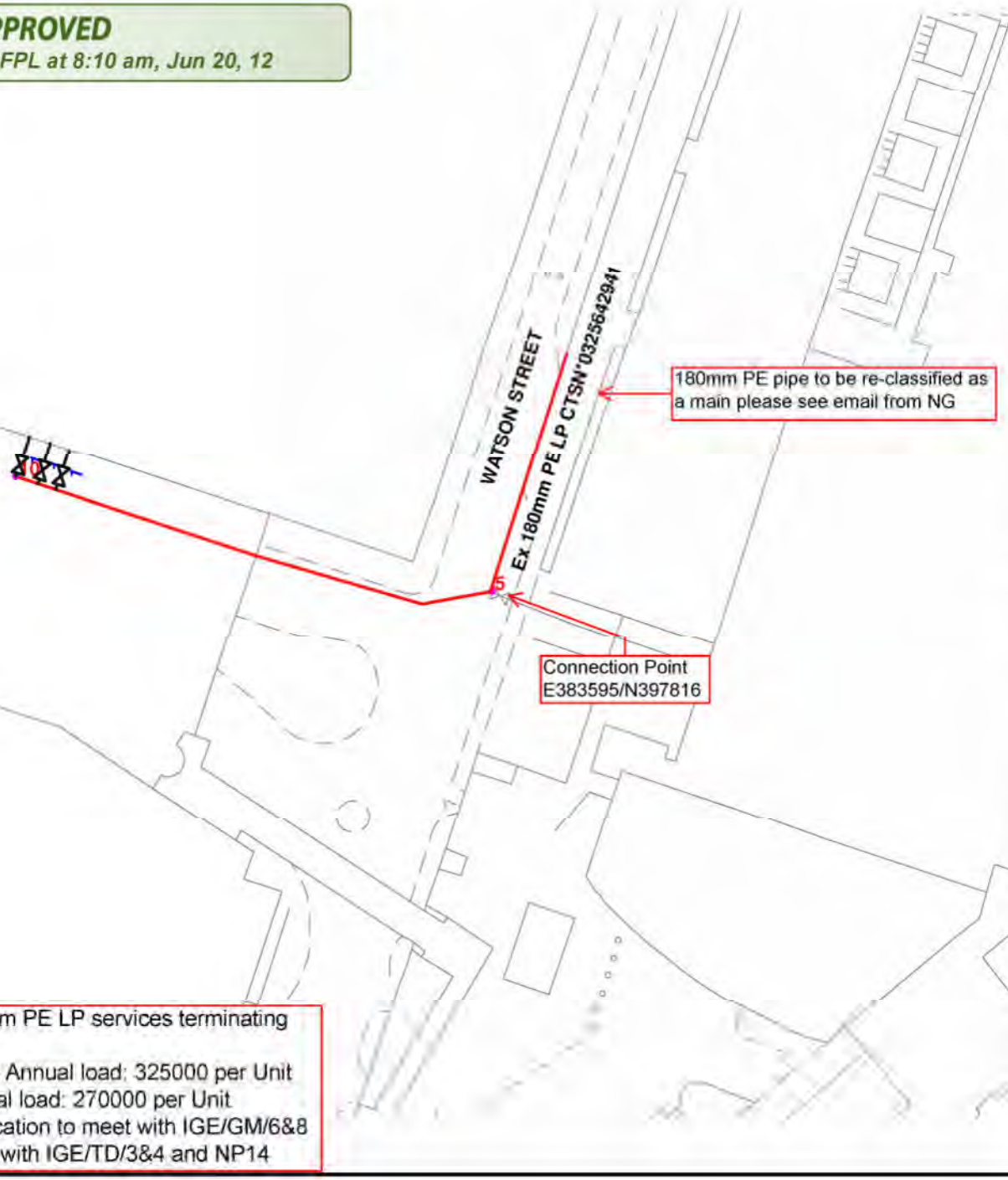
STEEL MAINS

Operating Pressure	Minimum Proximity to Premises (m)
LP	0.25
MP	1
IP	3

PE MAINS	Material PE Grade	Maximum Operating Pressure	
O.D (mm)		<=75mbar (LP)	>75mbar <=2Bar (MP)
		Minimum Proximity to Premises (m)	
<=Mac	PE80 SDR17.6	0.25	3
	PE80 SDR11*	0.25	3
	PE100 SDR11	0.25	3
180 to 250	PE80 SDR17.6	1	3
	PE80 SDR11	1	3
	PE100 SDR11	1	3
315	PE80 SDR17.6	1	3
	PE80 SDR11	1	3
	PE100 SDR11	1	3







Fulcrum Pipelines Limited
2 Europa View
Sheffield Business Park
Sheffield, S9 1XH

QUOTE REF: 9011248 (4195731)

SITE ADDRESS:
Units 1 3 and 4
GREAT NORTHERN
MANCHESTER
M2 4EJ

DESCRIPTION OF WORKS:
Lay new 90mm PE LP main and three 63mm PE LP services terminating with 2" ECV's to internal positions

DESIGNED BY: Clyde Bonnett
SCALE: 1:500 @ A3 **DATE:** 04/11/2012
DRAWING:

DRAWING KEY:
LP Main
MP Main
IP Main
Proposed Service
Proposed Meter Position
Pipes To Be Abandoned
Change Of Diameter
Change Of Material
Governor
Valve

GIRS ACCREDITED DESIGNER

DATE

SIGNATURE

Lay new 90mm PE LP main and three 63mm PE LP services terminating with 2" ECV's to internal positions.
Unit 1 and 3 Hourly load: 325kwh per Unit - Annual load: 325000 per Unit
Unit 4 Hourly load: 270kwh per Unit - Annual load: 270000 per Unit
Customer has provided ventilated meter location to meet with IGE/GM/6&8
Main and services designed in accordance with IGE/TD/3&4 and NP14

UNIT	MPRN
Unit 1	7678616908
Unit 3	7678617001
Unit 4	7678617102

AS LAID TEMPLATE

PROJECT REFERENCE: 4195731

DESIGNED BY: Clyde Bonnett

SITE ADDRESS:
Units 1 3 and 4
GREAT NORTHERN
MANCHESTER
M3 1EJ

SCALE: 1:500 @ A3

MAP/GRID REF: 383596 397818

COMMENTS: 57m - 90m LP PE
MAIN LAID TO 3" ST
MANIFOLD
3 x 2" ST SERVICES
CONNECTION
180 x 90 BRANCH SADDLE
MPRN'S
U1 7679616908
U3 7678617001
U4 7678617102

DRAWN BY: D. STOTT

COMPANY: EARTHON

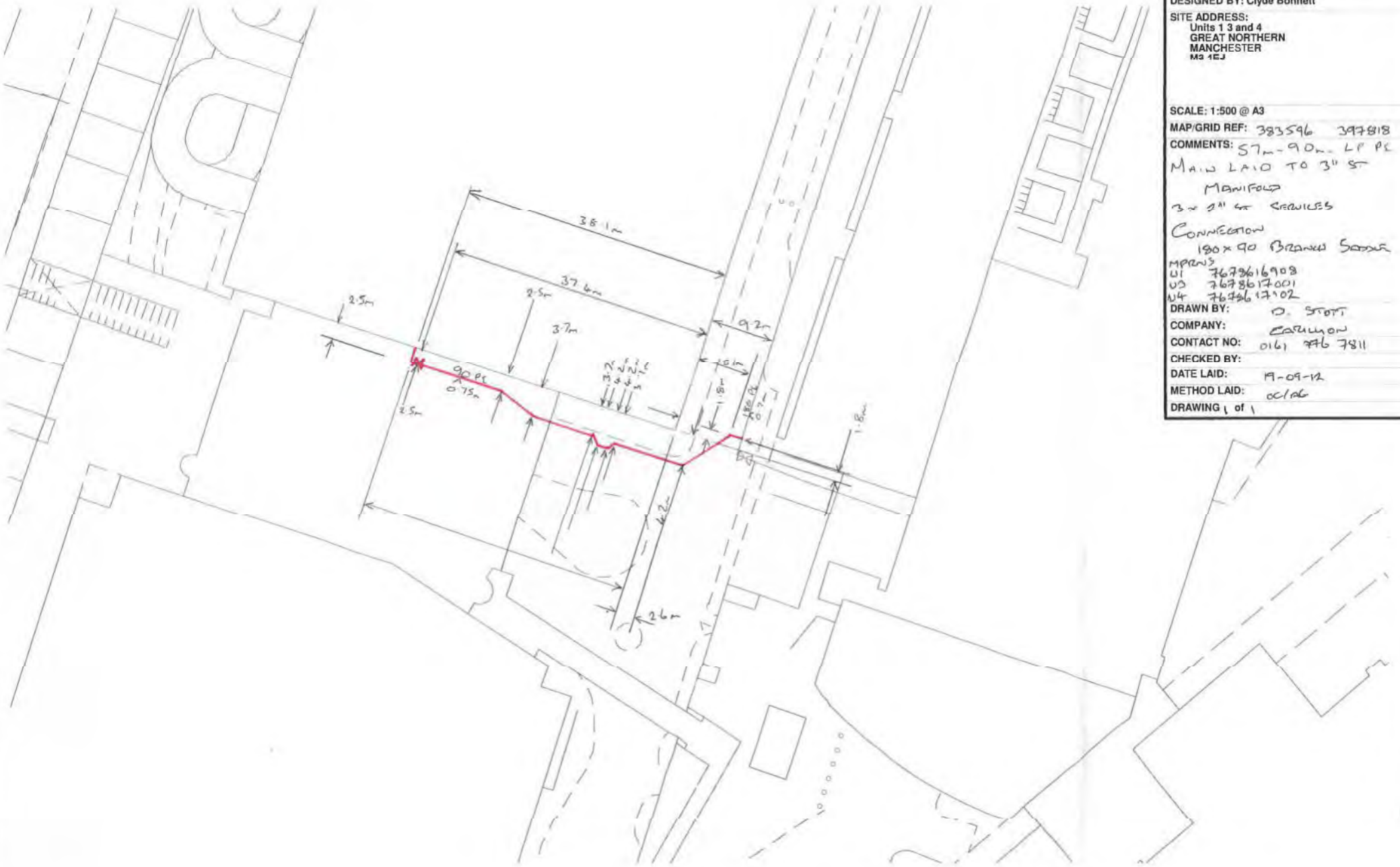
CONTACT NO: 0161 776 7811

CHECKED BY:

DATE LAID: 19-09-12

METHOD LAID: OC/PC

DRAWING 1 of 1



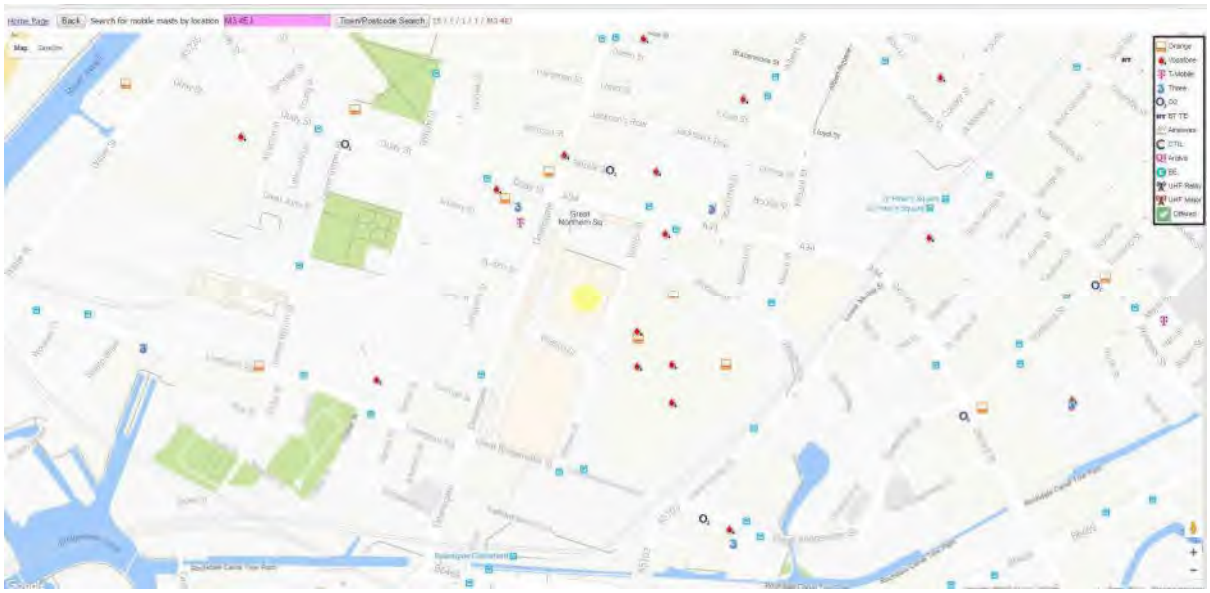
P:\Project Files\4000000\4195000\4195731\DesignRecords\4195731_crb05_1 - Approximate Scale 1 mm = 0.500 metres

AFFECTED

A search for the location and details of mobile phone masts around your site has been carried out using http://www.mastdata.com/

On this occasion there appears to be a number of masts within the vicinity of your site.

Please see the enclosed Mast Data map.



Further details can be found on the Mast Data website - http://www.mastdata.com/

Debbie Miller
Groundwise Searches Ltd
dmiller@groundwise.com

SKY Telecommunications Services Ltd
70 Buckingham Avenue
SLOUGH
SL1 4PN
Tel: 0207 0323 234/250
Fax: 020 70323252
email: nrswa@sky.uk

Date	Our Reference	Your Reference
07 April 2017	PEA-17-04-0091	URO5612.1DM

RE: Around Deansgate and Watson Street, Manchester, M3 4EJ
E383535,N397841

Further to your recent enquiry at the location above, the following SKY route(s) are affected:

Level 3 - Fibernet-MTMB-Manchester Ring

Although the above SKY route(s) are affected, Fibernet are responsible for the maintenance or diversion of the affected route as SKY only lease Fibre or Duct from them. For further information or detailed plans for this area, please contact their Enquiry Team.

You may be able to contact Fibernet (now owned by Global Crossing), by email: PlantEnquiries@instalcom.co.uk or Phone: 0208 731 4613. Please be aware that this information may no longer be valid and we do not have any further contact details for this company. Please visit their company website for more information.

Yours sincerely

NRSWA Department
Network Infrastructure
Sky Network Services

email: DBYD@openreach.co.uk
Phone: 0800 023 2023. Option 5

BT reference/date of issue: Refer to attached map(s)

Groundwise Reference: URO5612.1DM

Dear Customer,

NR & SW ACT 1991 – PROPOSED WORKS AT:

Prior to commencement of work: for free onsite guidance and accurate up to date location of BT plant please contact our Plant Protection Service by the following methods
Email Dial before you dig DBYD@openreach.co.uk
Visit the website www.dialbeforeyoudig.com

Thank you for your request of 10/04/2017 describing the above proposals.

Enclosed are copies of our drawing marked up to show the approximate locations of BT apparatus which is present in the immediate vicinity of your works. It is intended for general guidance only. No guarantee is given of its accuracy.

It should not be relied upon in the event of excavations or other works made near to British Telecommunications plc apparatus which may exist at various depths and may deviate from the marked route.

To avoid damage it is recommended that mechanical excavators or borers are not used within 600mm of British Telecommunications plc plant. If scaffolding is erected, please ensure that our equipment is not enclosed, blocked, covered or otherwise obstructed by the scaffolding.

In the event of BT apparatus being in the area of works we recommend that your plant/vehicle crossing is either resited, or apply for a budget estimate by submitting detailed plans to the above address, these will be forwarded to the appropriate department for their comments.

Please ensure you quote our reference on any future correspondence.

Yours faithfully,

Openreach Plant Maps Requested

NewSite Office (addresses can be located from here)

Dear Sir/Madam,

Thank you for your request to: www.openreach.co.uk/networkinfo/

You have downloaded copies of our drawings marked up to show the approximate location of Openreach apparatus, which is present in the immediate vicinity of your works. It is intended for general guidance only. No guarantee is given of its accuracy. It should not be relied upon in the event of excavations or other works made near to Openreach apparatus, which may, exist at various depths and may deviate, from the marked route.

To avoid damage it is recommended that mechanical excavators or borers are not used within 600mm of Openreach plant. Please ensure that our equipment is not enclosed, blocked, covered or otherwise obstructed by your plant. In the event of clearance not being adequate we anticipate that your plant is either resited, or an order is placed with Openreach for rearrangements of its plant. If there are any difficulties with the Map please email DBYD@openreach.co.uk

---

Please contact our Network Protection Service by Email on DBYD@openreach.co.uk giving seven days notice of your commencement date. This will provide you with on-site advice and a check of location for any Openreach apparatus.

Further to this, I hope the following points will assist you at the new development: -

Openreach has a licence obligation to provide service to any end customer requiring a connection. A Developer would not normally be charged for provision of service, our standard connection charges would apply to the end user when orders are placed with the communication provider of choice. However, should a Developer insist on an underground service in an area where Openreach plant is provided overhead, charges may be incurred.

When the Developer has obtained contract and planning permission Openreach would request a 'Clean', scaled Site Layout, Location Map and a covering letter be sent to the relevant newSite Office. We would particularly request that you give details of your programmed site start date and likely first occupancy date where possible. To obtain contact details of the newSite office covering the development area click on the URL below.

http://www.openreach.co.uk/orpg/networkinfo/developnetwork/regionalcontacts.do

Where a development affects existing Openreach apparatus in the public highway, the cost of any necessary protection or diversionary works must be borne by the Developer. In this case where a budget estimate is required a Site Plan, Location Map and a covering letter should be forwarded to the Repayments Project Office. Please visit http://www.openreach.co.uk/orpg/networkinfo/alternetwork/alterationcontacts.do for contact details of the Repayments Office covering the development area.

Yours faithfully,

Openreach newSites

Maps by email Plant Information Reply



IMPORTANT WARNING

Information regarding the location of BT apparatus is given for your assistance and is intended for general guidance only. No guarantee is given of its accuracy. It should not be relied upon in the event of excavations or other works being made near to BT apparatus which may exist at various depths and may deviate from the marked route.

openreach

CLICK BEFORE YOU DIG

FOR PROFESSIONAL FREE ON SITE ASSISTANCE PRIOR TO COMMENCEMENT OF EXCAVATION WORKS INCLUDING LOCATE AND MARKING SERVICE

email cbyd@openreach.co.uk

ADVANCE NOTICE REQUIRED
(Office hours: Monday - Friday 08.00 to 17.00)
www.openreach.co.uk/cbyd

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(C) Crown Copyright British Telecommunications plc 100028040

KEY TO BT SYMBOLS

DP	Pole
Planned DP	Planned Pole
PCP	Joint Box
Planned PCP	Change Of State
Built	Split Coupling
Planned	Duct Tee
Inferred	Planned Box
Building	Manhole
Kiosk	Planned Manhole
Hatchings	Cabinet
	Planned Cabinet

Other proposed plant is shown using dashed lines.
BT Symbols not listed above maybe disregarded.
Existing BT Plant may not be recorded.
Information valid at time of preparation

openreach
a BT Group business

BT Ref : APA12046Z
Map Reference : (centre) SJ8353597841
Easting/Northing : (centre) 383535,397
Issued : 10/04/2017 12:05:05

WARNING: IF PLANNED WORKS FALL INSIDE HATCHED AREA IT IS ESSENTIAL BEFORE PROCEEDING THAT YOU CONTACT THE NATIONAL NOTICE HANDLING CENTRE. PLEASE SEND E-MAIL TO: nnhc@openreach.co.uk

COLT PLANT ENQUIRIES

C.A TELECOM UK LIMITED
Dockers Field Farm
Pean Hill
Whitstable
Kent CT5 3BJ

Email: plantenquiries@catelecomuk.com
Tel: 01227 768427

Our Reference: P010982

OVERSEEING ORGANISATION AGENT ACHEME REFERENCE

O.O Agent – Groundwise Searches Ltd
Contact – Debbie Miller
Title – Deansgate and Watson Street, Manchester, M3 4EJ
Scheme Ref – URO5612.1DM

Date 12h April 2017

Dear Sir/Madam,

Thank you your enquiry for the above reference. We can confirm that Colt Technology Services do have apparatus near the above location within the scheme reference and enclose the relevant drawings showing the approximate location of Colt apparatus for purpose of initial plant enquiry. Detailed network location will be presented via Scheme Identification Study Process. All reasonable effort has been made to capture network however image may not reflect unprocessed new build track. Search is based on Overseeing Organisation Agent data supplied; we do not accept responsibility for O.O Agent inaccurate data.

If your proposed works are likely to affect or expose the Colt Technology Services apparatus in anyway please contact Colt Civils Team members below to discuss any plant protection/diversionary measures that may be required, as per the code of Practice Measures necessary where apparatus is affected under NRSWA 1991 Diversionary Works Scheme Identification & Preliminary C2 Enquires.

Clients request for C3 budget costs will trigger the onsite survey to ascertain the requirement's needed to ensure a safe area for the affected COLT network

Colt company policy negates any potentially detrimental effect on the network as well as protecting us from any potential costs and damages.

Please note as COLT moves to C3 status we will require as estimated start date for the project to allow for COLT policy lead-time's

Des.creighton@colt.net - London

John.Richardson@colt.net- UK outside London M25

Paul.terry@colt.net- escalations

We would remind you that mechanical excavators or borers should never be used within 1500mm of any COLT Technology Service apparatus.

If we can be of any further assistance please do not hesitate to contact us.

Yours sincerely,
Plant Enquiry Team



CONFIDENTIAL

PREPARED BY C.A. TELECOM UK LTD

12th April 2017

Our Ref: P010982

UTILITY UNDERTAKER

colt

Colt Technology Services
Beaufort House,
15 St Botolph Street,
London,EC3A 7QN

www.colt.net

PLANT ENQUIRY AGENT FOR Colt

C.A. TELECOM UK LTD
Dockers Field Farm
Pean Hill
Whitstable
Kent CT5 3BJ

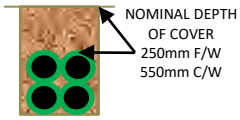
CONTACT Tel: 01227 768427
Fax: 01227 458884
email: plantenquiries@catelecomuk.com

MAP IMAGE PERMISSIONS

Centara supplied map
Promap

LEGEND

COLT DUCT



NRSWA 1991 Diversionary Works

SCHEME & PRELIMINARY INQUIRIES C2
Colt Technology Services External Infrastructure general location indicated only for purposes of initial plant enquiry, detailed network location will be presented via Scheme Identification Study process. All reasonable effort has been made to capture network however image may not reflect unprocessed new build track.

OVERSEEING ORGANISATION AGENT REFERENCE

O.O Agent – Groundwise Searches Ltd

Contact – Debbie Miller
Title – Deansgate and Watson Street, Manchester, M3 4EJ
Scheme Ref – URO5612.1DM



CityFibre

LEGEND

EXISTING PLANT

EXISTING PLANT

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Licence No. OS 0100031673

Select a bitmap

Head Office
CityFibre Holdings Ltd
15 Bedford Street,
London,
WC2E 9HE

Tel: 0845 293 0774
Web: www.cityfibre.com

Asset Office
CityFibre Holdings Ltd,
Rutherford House,
Birchwood,
Warrington,
WA3 6ZH

Email: asset.team@cityfibre.com

Disclaimer:

Information shown on this plan is for general guidance only. No warranty is made as to its accuracy.
This plan must not be solely relied upon in the event of excavation or other works being carried out in the vicinity of Cityfibre plant.
No liability of any kind is accepted by Cityfibre, its agents or servants for any error, omission, discrepancy or deviation. This information is valid for the date printed.

Project

Plant Enquiry

Drawing

Existing Plant

Drawn by:

smallworld

Date: 10/04/2017

Drawing No.

CFH_EP_000001

Revision

001

Scale: 1:1250

A4

0m 20m 40m 60m 80m 100m

N

Debbie Miller

From: Plant Enquiries <plantenquiries@psgservices.co.uk>
Sent: 07 April 2017 20:10
To: Debbie Miller
Subject: Ref: URO5612.1DM

To Whom It May Concern:

Thank you for your recent enquiry regarding your proposed work at the above location.

euNetworks Fiber UK Limited do not have plant in the vacinity of your proposed works and no strategic additions to our existing network are envisaged in the immediate future.

This information is only valid for a period of 3 months so, if your start date is 3 months or more from the date of this email, please re-apply for updated information at our generic email addre ss: plantenquiries@psgservices.co.uk.

Kind regards

ALL PLANT ENQUIRIES AND DIVERSIONARY REQUESTS SHOULD BE ADDRESSED BY EMAIL TO THE OPERATIONS TEAM AT plantenquiries@psgservices.co.uk **, WITH A PLAN AND FULL POSTAL ADDRESS OF YOUR ENQUIRY, THANK YOU**

For and on behalf of euNetwork Fiber UK Limited

Regards

Stuart Green

M 07796 696810 | **T** 01257 433166 | **E** plantenquiries@psgservices.co.uk

Telecommunications Survey, Planning, Engineering & GIS Services ----------

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==========

Debbie Miller

From: Plantenquiries <Plantenquiries@instalcom.co.uk>
Sent: 11 April 2017 14:04
To: Debbie Miller
Subject: RE: E04-17-1321 URO5612.1DM - Site : Around Deansgate and Watson Street, Manchester, M3 4EJ
Attachments: URO5612.1DM.pdf; Guide to Excavation.pdf

Dear Sir or Madam,

With reference to your enquiry regarding the above noted location, we enclose the drawings on behalf of Level 3 indicating the approximate position of services in this area.

We would draw your attention to the fact that while the position of the plant has been shown as accurately as possible, the information is intended as a general guide only and must not be relied upon in the event of any excavations or other work in the vicinity. **We would remind you that the onus remains on you to determine the exact position for example by a hand excavated trial hole.** Instalcom accepts no liability for claims arising from any inaccuracy, omissions or errors contained herein. If you would like to query the location further, please email us accordingly and we can arrange an in depth survey, which will be charged at a cost. Enclosed is a guide to excavation works around existing plant.

Instalcom responds to plant enquiries for LEVEL 3, GLOBAL CROSSING (UK) LTD, GLOBAL CROSSING PEC and FIBERNET UK LTD and FIBRESPAN LTD simultaneously and therefore you only need send one copy of a plant enquiry to cover all of these companies.

Please note that this response is only valid for 3 months. If your works do not commence within this time period, please resubmit your plant enquiry for assessment before any works commence.

If you require any further information, please do not hesitate to contact us.

Regards

Plant Enquiries Dept
Instalcom Limited
Borehamwood Ind. Park
Rowley Lane
Borehamwood
WD6 5PZ

Office: +44 (0)208 731 4613
Fax: +44 (0)208 731 4601
Email: plantenquiries@instalcom.co.uk
Web: http://www.instalcom.co.uk

From: Debbie Miller [mailto:DMiller@groundwise.com]
Sent: 06 April 2017 10:27
To: plantenquiries@energetics-uk.com; osm.enquiries@atkinsglobal.com; plantenquiries@mcnicholas.co.uk; Plantenquiries; osp-team@uk.verizonbusiness.com; interoute.enquiries@plancast.co.uk; telenttelia.plantenquiries@telent.com; NRSWA@bskyb.com; plantenquiries@catelecomuk.com; OPBuriedServicesEnquiries@networkrail.co.uk; plantenquiries@trafficmaster.co.uk; mbnl.plant.enquiries@turntown.com; plantenquiries@psgservices.co.uk; assetrecords@utilityassets.co.uk; Andrew.Charnock@tfgm.com
Subject: Ref: URO5612.1DM - Site : Around Deansgate and Watson Street, Manchester, M3 4EJ

Ref: URO5612.1DM
Site : Around Deansgate and Watson Street, Manchester, M3 4EJ
Grid reference: 383535,397841
Requests:

For your reference, we have provided a site plan. Please use both the grid reference/postcode & site plan when responding to our requests.

We are doing research on the above site for a client and would be grateful if you could confirm whether the above operators have any cabling or apparatus in the immediate vicinity. Should there be anything detected in the vicinity plus 50 meters around the site, I would appreciate a plan showing the location. The reason we need the information is so our client can avoid digging through your cables or can investigate the potential for connecting with your network.

I enclose location plans of the site for your convenience and look forward to hearing from you. We shall of course be providing a copy of your response to our client as part of a wider report on the site including reports from other utility companies or providers.

Should you have any problems in identifying the location of the sites or should you require further clarification of the details requested, please do not hesitate to contact me.

I look forward to receiving details from you and thank you in advance for your assistance in this matter.

Kind regards,

Debbie Miller
Production Researcher
Groundwise Searches Ltd

GROUNDWISE

dmiller@groundwise.com | 01702 615566 | www.groundwise.com
Suite 8 Chichester House, 45 Chichester Road, Southend-on-Sea, Essex SS1 2JU

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Business Address and Registered Office - Suite 8 Chichester House, 45 Chichester Road, Southend-on-Sea, Essex SS1 2JU
Company Registration Number 4130795
VAT number 769 0642 02

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SPECIAL REQUIREMENTS IN RELATION TO LEVEL 3 PLANT

1. In this special requirement, the following terms shall have the meanings assigned to it :-

   a. "Company" means Level 3.

   b. "Company Representative" means the staff of Level 3 or its Authorized Representatives and Agents.

   c. "Apparatus" means all surface or sub-surface equipment and plant including any associated cabling and/or ducting owned leased or rented by Level 3.

2. Before commencing any work or moving heavy plant or equipment over any portion of the site, the contractor shall confirm details of the Apparatus, owned, leased or rented by the Company, within the site with the Company Representative, who can be contacted at the following point: -

Instalcom Limited
Borehamwood Industrial Park
Rowley Lane
Borehamwood
Hertfordshire
WD6 5PZ
Tel: 0208 731 4600
Fax: 0208 731 4601
E-mail: plantenquiries@instalcom.co.uk

3. Where such details show that the works or the movement of plant or equipment may endanger the Apparatus of the Company the Contractor must give the Company Representative at least 7 days written notice of the date on which it is intended to commence such works of the movement of plant and equipment in order that the presence of any sub-surface apparatus can be indicated by markers to be supplied by the Company and placed by the Contractor under the supervision of a Company Representative. The Contractor shall ensure that all Company Apparatus, particularly surface running cabling is adequately protected from damage and such protective measures shall be approved by the Company Representative.

4. In the event of a Company marker being disturbed for any reason, it shall not be replaced other than in the exact position of its former depth unless the repositioning is carried out at the direction and under the supervision of a Company Representative.

5. The Contractor shall take particular care in relation to the protection of Company Apparatus, where such Apparatus includes the presence within the site of optical fibre cabling. The contractor should particularly note that the damage to such Apparatus is extremely disruptive to the Company network and costly to reinstate. The Contractor shall make every effort to avoid the disturbance of Company Apparatus more than is absolutely necessary for the completion of the works in accordance with the contract.

6. When excavating around, moving or backfilling around Company Apparatus, the Company Representative shall be given adequate notice, which shall not be less than 3 days, of the contractor's intentions in order that he may supervise the works. The Contractor should note that the normal depth of cover for Company Apparatus and ducts are as follows: -

   a. Carriageways 600mm

   b. Footways 350mm

   c. Verges 450mm

   These minimum depths of cover should be maintained wherever possible.

   Where the minimum depths of cover cannot be maintained, the Contractor shall carry out the instructions of the Company Representative for the protection of Company Apparatus.

   Where cables are not in duct and the required depth of cover cannot be maintained, such cables as are affected shall be enclosed and protected in UPVC duct or equivalent materials as supplied by the Company and by the method directed by the Company Representative.

   With regard to excavation in the vicinity of Company Apparatus the Contractor should have particular regard to the possibility of reduced cover and the encountering of such Company Apparatus at depths of cover less than that given at **a, b and c above**.

7. All excavation adjacent to Company Apparatus is to be carried out by hand until the exact extent and/or location of Company Apparatus is known. Mechanical borers and/or excavators shall not be used within 1.0m of Company Apparatus without the supervisory presence of a Company Representative, To prevent any movement of Company Apparatus during excavations, complete shuttering shall be used as directed by the Company Representative if:-

   a. Excavation is deeper than the depth of cover of adjacent Company Apparatus.

   b. Excavation is within 1.0m of Company Apparatus in stable ground.

   c. Excavation is within 5.0m of Company Apparatus in unstable ground.

   If for the completion of the works, the Contractor intends using any of the following: -

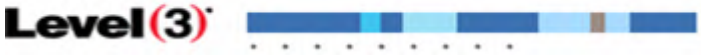
   a. Pile driving equipment within 10.0m of Company Apparatus.

   b. Explosives within 20.0m of Company Apparatus.

   c. Laser equipment within 10.0m of Company Apparatus.

   The Contractor shall advise the Company Representative, giving at least 7 working days written notice in order that any special protective measure for the Company Apparatus affected may be arranged.

8. All Company manhole, joint box and /or other access points and chambers within the site shall be kept clear and unobstructed. Access for vehicles, winches, cable drums and/or further equipment required by the Company for the maintenance of it's Apparatus, must be maintained at all reasonable times. The Contractor should particularly note that footway type jointing chambers are not specified for carriageway loadings and will need to be adequately protected and/or demolished and rebuilt under the supervision of a Company Representative where such chambers are likely to be placed at risk, either temporarily or permanently, from the movement of plant and/or equipment on the site.



9. The covers to Company chambers and/or Apparatus shall only be lifted by means of appropriate keys obtained from the Company Representative and under the direct supervision of the Company Representative. No employee of the Contractor or of any sub-contractor employed by the Contractor shall enter any chamber and/or Apparatus of the Company unless under the supervision of the Company Representative and in any case not before the mandatory gas check has been carried out in the presence of the Company Representative and such checks have shown it to be safe to enter the chamber and/or Apparatus of the Company.

   The Company Representatives shall be given reasonable access to all Company Apparatus and chambers when required.

10. In the event of any damage whatsoever to Company Apparatus, the Contractor shall immediately inform the Company Representative and report the occurrence immediately by contacting the Company as follows:-

Telephone:-

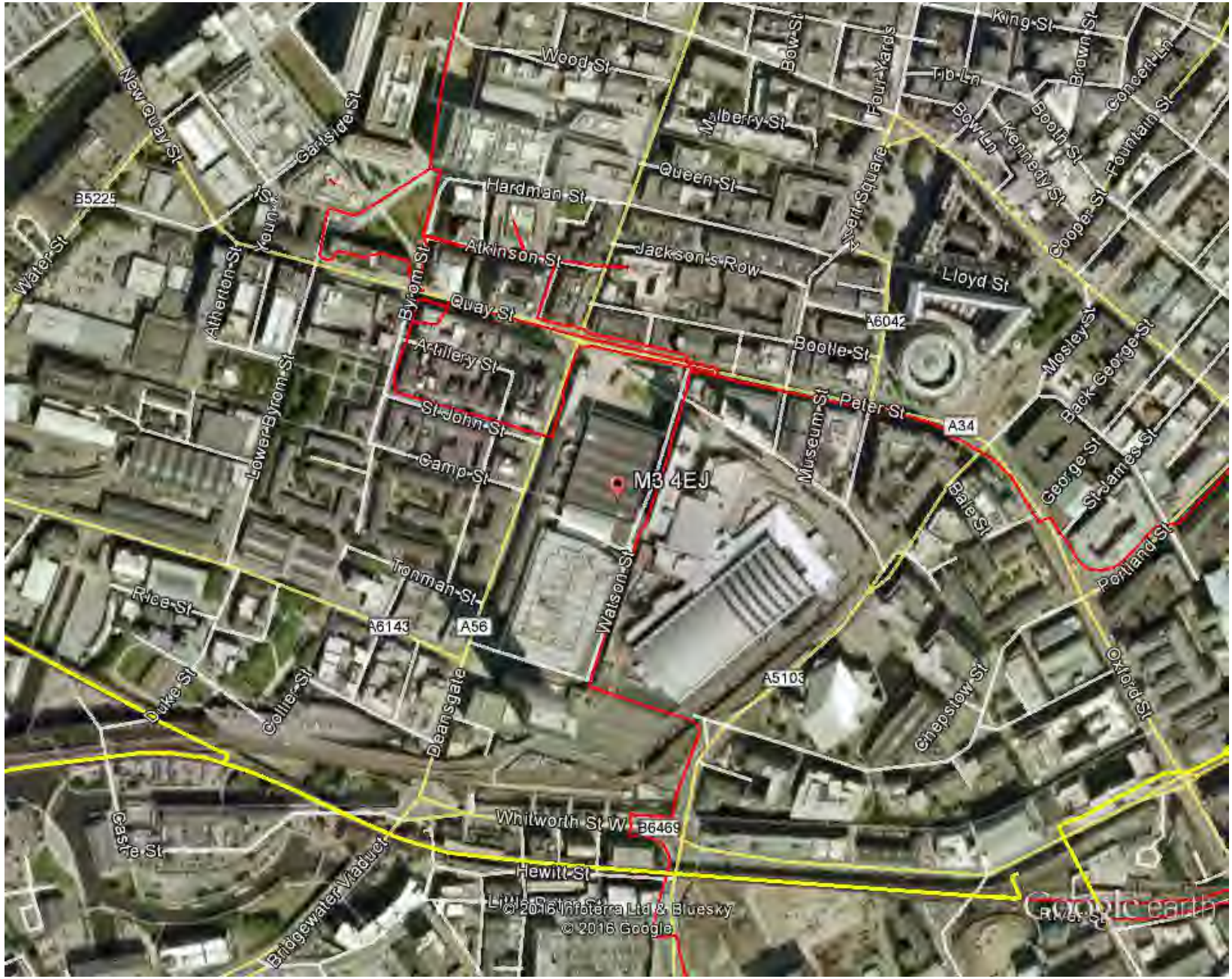
0208 731 4600
Mon-Fri Office Hours (Instalcom Head Office)

0208 510 3111/3101
Out of Office Hours (24Hr Level 3 Network Operations Centre)

11. The above requirements do not relieve the Contractor of any of his obligations under the Contract.

The accuracy of information on the plans cannot be guaranteed and no liability can be accepted for errors or omissions.

Damage to Communications Plant is Expensive – Please Take Care.


M3 4EJ
Wood St
Bow St
King St
Brown St
Concert Ln
Four Yards
Trb Ln
Bow Ln
Booth St
Kennedy St
Fountain St
Cooper St
Mulberry St
Queen St
Hardman St
Atkinson St
Jackson's Row
Lloyd St
Mosley St
Back George St
George St
St James St
Portland St
Oxford St
Chepstow St
Dale St
Museum St
Peter St
A34
A6042
Booth St
Quay St
Byron St
Artillery St
St John St
Camp St
Lower Byrom St
Atherton St
Water St
New Quay St
Garlside St
B5225
Tonman St
Rice St
A6143
A56
Watson St
A5103
Deansgate
Duke St
Collie St
Castle St
Whitworth St W
B6469
Hewitt St
Bridgewater Viaduct
© 2016 Infoterra Ltd & Bluesky
© 2016 Google
Google earth
feet
meters
2000
700

Debbie Miller

From: Interoute Enquiries <interoute.enquiries@plancast.co.uk>
Sent: 06 April 2017 11:50
To: Debbie Miller
Subject: RE: URO5612.1DM - Site : Around Deansgate and Watson Street, Manchester, M3 4EJ

This response does not include Vtesse or Easynet plant, please continue to use Vtesse or Easynet details for their enquiries

To whom it may concern

Thank you for your enquiry regarding the above proposals at the above location

We would advise that we are unaware of any Interoute plant or services in this Location as indicated in your enquiry.

We bring to your attention the fact that whilst we try to ensure the information we provide is accurate, the information is provided Without Prejudice and Interoute and its Agents accept no liability for claims arising from any inaccuracy, omissions or errors contained in this response.

All responses are only vaild for 28 days

Yours faithfully

PLANCAST Plant Enquiry Department

The Old Haybarn
Rosebery Mews, Mentmore
Bedfordshire LU7 0UE

T: 01296 662647
www.plancast.co.uk

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Registered office: 1st Floor, The Old Haybarn, Rosebery Mews, Mentmore LU7 0UE.
Registered in England and Wales with number 4455025 VAT No. 8567 195 80

From: Debbie Miller [mailto:DMiller@groundwise.com]
Sent: 06 April 2017 10:27
To: plantenquiries@energetics-uk.com; osm.enquiries@atkinsglobal.com; plantenquiries@mcnicholas.co.uk; plantenquiries@instalcom.co.uk; osp-team@uk.verizonbusiness.com; Interoute Enquiries

<interoute.enquiries@plancast.co.uk>; telenttelia.plantenquiries@telent.com; NRSWA@bskyb.com; plantenquiries@catelecomuk.com; OPBuriedServicesEnquiries@networkrail.co.uk; plantenquiries@trafficmaster.co.uk; mbnl.plant.enquiries@turntown.com; plantenquiries@psgservices.co.uk; assetrecords@utilityassets.co.uk; Andrew.Charnock@tfgm.com
Subject: Ref: URO5612.1DM - Site : Around Deansgate and Watson Street, Manchester, M3 4EJ

Ref: URO5612.1DM
Site : Around Deansgate and Watson Street, Manchester, M3 4EJ
Grid reference: 383535,397841
Requests:

For your reference, we have provided a site plan. Please use both the grid reference/postcode & site plan when responding to our requests.

We are doing research on the above site for a client and would be grateful if you could confirm whether the above operators have any cabling or apparatus in the immediate vicinity. Should there be anything detected in the vicinity plus 50 meters around the site, I would appreciate a plan showing the location. The reason we need the information is so our client can avoid digging through your cables or can investigate the potential for connecting with your network.

I enclose location plans of the site for your convenience and look forward to hearing from you. We shall of course be providing a copy of your response to our client as part of a wider report on the site including reports from other utility companies or providers.

Should you have any problems in identifying the location of the sites or should you require further clarification of the details requested, please do not hesitate to contact me.

I look forward to receiving details from you and thank you in advance for your assistance in this matter.

Kind regards,

Debbie Miller
Production Researcher
Groundwise Searches Ltd

GROUNDWISE

dmiller@groundwise.com | *01702 615566* | *www.groundwise.com*
Suite 8 Chichester House, 45 Chichester Road, Southend-on-Sea, Essex SS1 2JU

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Business Address and Registered Office - Suite 8 Chichester House, 45 Chichester Road, Southend-on-Sea, Essex SS1 2JU
Company Registration Number 4130795
VAT number 769 0642 02

telent
Mayne House
Fenton Way
Basildon
Essex
SS15 6TD
United Kingdom

Telephone: +44 (0)800 526 015

www.**telent**.com

Date 07/04/2017
Our Ref OSA170407

Dear Sir/Madam

Teliasonera Line Plant Enquiry.

Thank you for your correspondence enclosing details of your proposals. Our client's apparatus, Teliasonera, is not located within the vicinity of the above reference and we therefore have no further interest in this current location.

Please note that all enquiries relating to the Teliasonera line plant should be forwarded to:

By post – to, telent,

Teliasonera line plant enquiries,

Mayne House,

Fenton Way,

Basildon,

Essex

SS15 6TD

By email - to, telenttelia.plantenquiries@telent.com

By phone – to, 01268 412670

Yours faithfully

Telent CCO

Basildon

Debbie Miller

From: UK OSP-Team <osp-team@uk.verizon.com>
Sent: 06 April 2017 11:48
To: Debbie Miller
Cc: UK OSP-Team
Subject: RE: URO5612.1DM - Site : Around Deansgate and Watson Street, Manchester, M3 4EJ

Dear Sir/Madam

Verizon is a licensed Statutory Undertaker.

We have reviewed your plans and have determined that Verizon (Formally known as MCI WorldCom, MFS) has no apparatus in the areas concerned.

If you have any further queries please do not hesitate to get in touch.

Yours faithfully

Plant Protection Officer E.mail osp-team@uk.verizon.com

From: Debbie Miller [mailto:DMiller@groundwise.com]
Sent: 06 April 2017 10:27
To: plantenquiries@energetics-uk.com; osm.enquiries@atkinsglobal.com; plantenquiries@mcnicholas.co.uk; plantenquiries@instalcom.co.uk; UK OSP-Team; interoute.enquiries@plancast.co.uk; telenttelia.plantenquiries@telent.com; NRSWA@bskyb.com; plantenquiries@catelecomuk.com; OPBuriedServicesEnquiries@networkrail.co.uk; plantenquiries@trafficmaster.co.uk; mbnl.plant.enquiries@turntown.com; plantenquiries@psgservices.co.uk; assetrecords@utilityassets.co.uk; Andrew.Charnock@tfgm.com
Subject: Ref: URO5612.1DM - Site : Around Deansgate and Watson Street, Manchester, M3 4EJ

Ref: URO5612.1DM
Site : Around Deansgate and Watson Street, Manchester, M3 4EJ
Grid reference: 383535,397841
Requests:

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I enclose location plans of the site for your convenience and look forward to hearing from you. We shall of course be providing a copy of your response to our client as part of a wider report on the site including reports from other utility companies or providers.

Should you have any problems in identifying the location of the sites or should you require further clarification of the details requested, please do not hesitate to contact me.

Debbie Miller

From: Purser Richard <Richard.Purser@networkrail.co.uk> on behalf of OP Buried Services Enquiries <OPBuriedSE@networkrail.co.uk>
Sent: 06 April 2017 13:30
To: Debbie Miller
Subject: RE: URO5612.1DM - Site : Around Deansgate and Watson Street, Manchester, M3 4EJ

Dear Sir/Madam,

With regards to your enquiry, Network Rail does not believe there is any Network Rail owned apparatus or underground services within the area you have defined. As there is always the possibility that new works could be planned and undertaken in this area by Network Rail this information is valid as at today's date and is supplied for general guidance only.

Please be aware that this response is based on Network Rail's records and knowledge and no guarantee can be given regarding accuracy or completeness. CAT scans, safe digging practices (as contained in HSE publications) and other appropriate investigative techniques should always be carried out.

There may be other apparatus or underground services owned or operated by Utility Companies and accordingly you should contact individual utilities for information.

If, in connection with your investigations and/or work, you become aware of Network Rail apparatus or underground services within your area of work, please ensure these are notified to our Asset Protection team via the following link as a matter of urgency so that appropriate measures for avoidance of risk and damage can be put in place.

http://www.networkrail.co.uk/aspx/1758.aspx?cd=1

If you require any further clarification on any of the information please contact opburiedservicesenquiries@networkrail.co.uk.

Regards,

Richard Purser
Distribution Administrator (Underground Services), Asset Information Services

Asset Information Services: to inspire & enable through the power of data
National Records Group, Audax Road, Clifton Moor York YO30 4US

T: 01904 386 388
E: richard.purser@networkrail.co.uk

From: Debbie Miller [mailto:DMiller@groundwise.com]
Sent: 06 April 2017 10:27
To: plantenquiries@energetics-uk.com; osm.enquiries@atkinsglobal.com; plantenquiries@mcnicholas.co.uk; plantenquiries@instalcom.co.uk; osp-team@uk.verizonbusiness.com; interoute.enquiries@plancast.co.uk; telenttelia.plantenquiries@telent.com; NRSWA@bskyb.com; plantenquiries@catelecomuk.com; OP Buried Services Enquiries; plantenquiries@trafficmaster.co.uk; mbnl.plant.enquiries@turntown.com; plantenquiries@psgservices.co.uk; assetrecords@utilityassets.co.uk; Andrew.Charnock@tfgm.com
Subject: Ref: URO5612.1DM - Site : Around Deansgate and Watson Street, Manchester, M3 4EJ

Ref: URO5612.1DM
Site : Around Deansgate and Watson Street, Manchester, M3 4EJ
Grid reference: 383535,397841
Requests:

For your reference, we have provided a site plan. Please use both the grid reference/postcode & site plan when responding to our requests.

We are doing research on the above site for a client and would be grateful if you could confirm whether the above operators have any cabling or apparatus in the immediate vicinity. Should there be anything detected in the vicinity plus 50 meters around the site, I would appreciate a plan showing the location. The reason we need the information is so our client can avoid digging through your cables or can investigate the potential for connecting with your network.

I enclose location plans of the site for your convenience and look forward to hearing from you. We shall of course be providing a copy of your response to our client as part of a wider report on the site including reports from other utility companies or providers.

Should you have any problems in identifying the location of the sites or should you require further clarification of the details requested, please do not hesitate to contact me.

I look forward to receiving details from you and thank you in advance for your assistance in this matter.

Kind regards,

Debbie Miller
Production Researcher
Groundwise Searches Ltd

GROUNDWISE

dmiller@groundwise.com | 01702 615566 | www.groundwise.com
Suite 8 Chichester House, 45 Chichester Road, Southend-on-Sea, Essex SS1 2JU

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Business Address and Registered Office - Suite 8 Chichester House, 45 Chichester Road, Southend-on-Sea, Essex SS1 2JU
Company Registration Number 4130795
VAT number 769 0642 02

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Network Rail Infrastructure Limited registered in England and Wales No. 2904587, registered office Network Rail, 2nd Floor, One Eversholt Street, London, NW1 2DN

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Enquiry Summary Manual Print

You will receive formal confirmation of this enquiry by email. Subject always to our standard terms and conditions, this enquiry result is valid for 28 days only from the date of enquiry and is based on the confirmed information you entered. If the location of the work changes then a further enquiry must be made. Should the work not be undertaken within 28 days of the enquiry then a further enquiry must be made.

Where applicable listed below are those registered Asset Owners who have been notified, those to whom you need to send further information and those who have no apparatus within your search area. In addition your response will include other non-registered Asset Owners contact details who have NOT been notified, which may be of interest to you.

Please be aware that the lists below are not exhaustive and that not all Asset Owners are registered with this service. In particular please note that the LinesearchbeforeUdig system only contains information on National Grid's Gas above 2 bar asset and all National Grid Electricity Transmission asset. For National Grid Gas below 2 bar asset information please go to www.beforeudig.nationalgrid.com

If you are required to email additional info please note that we need the following:Site contact name and number, Location plan, Detailed plan (minimum scale 1:2500), Cross sectional drawings (if available), Work Specification.

Enquiry Lodging Details

LSBUD Ref	**10218857**
Job lodged on	10/04/2017 - 12:02:38 pm

Enquiry Details

Enquiry Type	Initial Enquiry
Work Category	Property Conveyance
Work Type	Commercial/industrial
Job Start Date	11/04/2017
Job End Date	11/07/2017
Scheme/Reference	URO5612.1DM
Preferred Plan Size	A3 - Landscape
Working on Behalf of	Other
Searched Location	XY= 383535, 397841 Easting/Northing
Confirmed Location	383542 397851
Search Type	Area

Thank you for your enquiry

Shortly you will receive an email confirming your enquiry and listing the Asset Owners who will contact you regarding the location of their assets.

It is **your responsibility** to identify the presence of any underground/aboveground assets in and around your proposed site. Please be aware that not all Asset Owners are registered with this service so it is **your responsibility** to identify and contact any Asset Owners not listed here as either Inside or Outside the Zone of Interest.

If you are required to email additional info please note that we need the following:
Site contact name and number, Location plan, Detailed plan (minimum scale 1:2500), Cross sectional drawings (if available), Work Specification.

List of affected LSBUD members

LSBUD Members who have assets registered on the LSBUD service within the vicinity of your search area:

Asset Owner	Phone/Email	Emergency Only	Status
Electricity North West Limited	08001954141	08001954141	Await response
Fulcrum Pipelines Limited	03330146455	0800111999	Await response
Gamma	01618703384	08452416000	Await response
Zayo Group UK Ltd c/o JSM Group Ltd	01992 655 919	0800 169 1646	Await response

List of not affected LSBUD members

LSBUD members who do not have assets registered on the LSBUD service within the vicinity of your search area. Please be aware that LSBUD members make regular changes to their assets.

Asset Owner	Asset Owner	Asset Owner
AWE Pipeline	Esso Petroleum Company Limited	Petroineos
BOC Limited (A Member of the Linde Group)	Gateshead Energy Company	Phillips 66
BP Midstream Pipelines	Gigaclear PLC	Premier Transmission Ltd (SNIP)
BPA	Humbly Grove Energy	Prysmian Cables & Systems Ltd (c/o Western Link)
Carrington Gas Pipeline	IGas Energy	Redundant Pipelines - LPDA
CATS Pipeline c/o Wood Group PSN	Ineos Enterprises Limited	RWEnpower (Little Barford and South Haven)
Cemex	INEOS Manufacturing (Scotland and TSEP)	SABIC UK Petrochemicals
Centrica Energy	Intergen (Coryton Energy or Spalding Energy)	Scottish Power Generation
Centrica Storage Ltd	Lark Energy	Seabank Power Ltd
CLH Pipeline System Ltd	Mainline Pipelines Limited	SGN
Concept Solutions People Ltd	Manchester Jetline Limited	Shell (St Fergus to Mossmorran)
ConocoPhillips (UK) Ltd	Manx Cable Company	Shell Pipelines
DIO (MOD Abandoned Pipelines)	Marchwood Power Ltd (Gas Pipeline)	Total (Finaline, Colnbrook & Colwick Pipelines)
Dong Energy (UK) Ltd	Melbourn Solar Limited	Transmission Capital
E.ON UK CHP Limited	National Grid Gas (Above 7 bar), National Grid Gas Distribution Limited (Above 2 bar) and National Grid Electricity Transmission	Uniper UK Ltd
EirGrid	Northumbrian Water Group	Vattenfall
ENI & Himor c/o Penspen Ltd	NPower CHP Pipelines	Veolia ES SELCHP Limited

Asset Owner	Asset Owner	Asset Owner
ESP Utilities Group	Oikos Storage Limited	Western Power Distribution
ESSAR	Perenco UK Limited (Purbeck Southampton Pipeline)	Wingas Storage UK Ltd

Non-LSBUD members (Asset owners not registered on LSBUD)

The following non-LSBUD members may have assets in your search area. It is YOUR RESPONSIBILITY to contact them before proceeding. Please be aware this list is not exhaustive and it is your responsibility to identify and contact all asset owners within your search area.

Asset Owner	Preferred Contact Method	Phone	Status
BT	https://www.swns.bt.com/pls/mbe/welcome.home	08009173993	Not Notified
CityFibre	asset.team@cityfibre.com	033 3150 7282	Not Notified
Colt	plantenquiries@catelecomuk.com	01227768427	Not Notified
Energetics Electricity	plantenquiries@energetics-uk.com	01698404646	Not Notified
ENGIE	nrswa@cofely-gdfsuez.com	01293 549944	Not Notified
GTC	https://pe.gtc-uk.co.uk/PlantEnqMembership	01359240363	Not Notified
GTT (formerly Hibernia Networks)	owen.maguire@gtt.net	01704 322 300	Not Notified
Instalcom	plantenquiries@instalcom.co.uk	02087314613	Not Notified
Interoute	interoute.enquiries@plancast.co.uk	02070259000	Not Notified
Manchester City Council	medc@manchester.gov.uk	01614552250	Not Notified
Mobile Broadband Network Limited	mbnl.plant.enquiries@turntown.com	01212 621 100	Not Notified
National Grid Gas Distribution (below 2 bar)	plantprotection@nationalgrid.com	0800688588	Not Notified
Network Rail	OPBuriedServicesEnquiries@networkrail.co.uk	01904523401	Not Notified
Sky UK Limited	nrswa@sky.uk	02070323234	Not Notified
Tata, KPN (c/- McNicholas)	plantenquiries@mcnicholas.co.uk	03300558469	Not Notified
Teliasonera	telenttelia.plantenquiries@telent.com	0800526015	Not Notified

Asset Owner	Preferred Contact Method	Phone	Status
United Utilities	property.searches@uuplc.co.uk	08707510101	Not Notified
Utilicom Limited	NRSWA@cofely-gdfsuez.com	01293549944	Not Notified
Utility assets Ltd	assetrecords@utilityassets.co.uk		Not Notified
Verizon Business	osp-team@uk.verizonbusiness.com	01293611736	Not Notified
Virgin Media	http://www.digdat.co.uk	08708883116	Not Notified
Vodafone	osm.enquiries@atkinsglobal.com	01454662881	Not Notified
Vtesse Networks	https://plant.interoute.com/plant-enquiries/	01992532100	Not Notified

Disclaimer

The results of this Enquiry have been provided for the sole use of the Enquirer and no other party. The asset information on which the Enquiry results are based has been provided by LinesearchbeforeUdig members, LinesearchbeforeUdig will provide no guarantee that such information is accurate or reliable nor does it monitor such asset information for accuracy and reliability going forward. There are also asset owners which do not participate in the enquiry service operated by LinesearchbeforeUdig, including but not exclusively those set out above. Therefore, LinesearchbeforeUdig cannot make any representation or give any guarantee or warranty as to the completeness of the information contained in the enquiry results. LinesearchbeforeUdig and its employees, agents and consultants accept no liability (except insofar as liability under any statute that cannot be excluded) arising in respect thereof or in any other way for errors or omissions including responsibility to any person by reason of negligence. Please refer to LinesearchbeforeUdig's Terms of Use for full terms of use available at www.linesearchbeforeudig.co.uk

Date: 10/04/2017

LSBUD reference. 10218857
Your Scheme/Reference: URO5612.1DM

Dear Plant Enquirer,

Having examined our records, I can confirm that Gamma has owned apparatus close to the area of your enquiry detailed in the reference/location provided.

I attach a plan showing the approximate location.

Gamma have no objection to any proposed Utility works - The Information provided via LSBUD are drawings showing the location of the Gamma Apparatus within your work area & can be used in your Stat pack for the Civils Contractor.

Safe Working Procedures should be Practiced.

Please ensure that the use of mechanical excavators within the vicinity of our plant is kept to a minimum. Gamma Ducts are normally Green & contain Fibre Optic Cables. Extreme care must be taken whilst working in the vicinity of these ducts & hand digging methods to be used to determine their precise location.

If you require our apparatus to be diverted then a meeting can be arranged & costing can be provided.

Should you require further details, please call me at your convenience.

Please note this email address is for LSBUD responses only.

Your Scheme/Reference is on the PDF drawing attached.

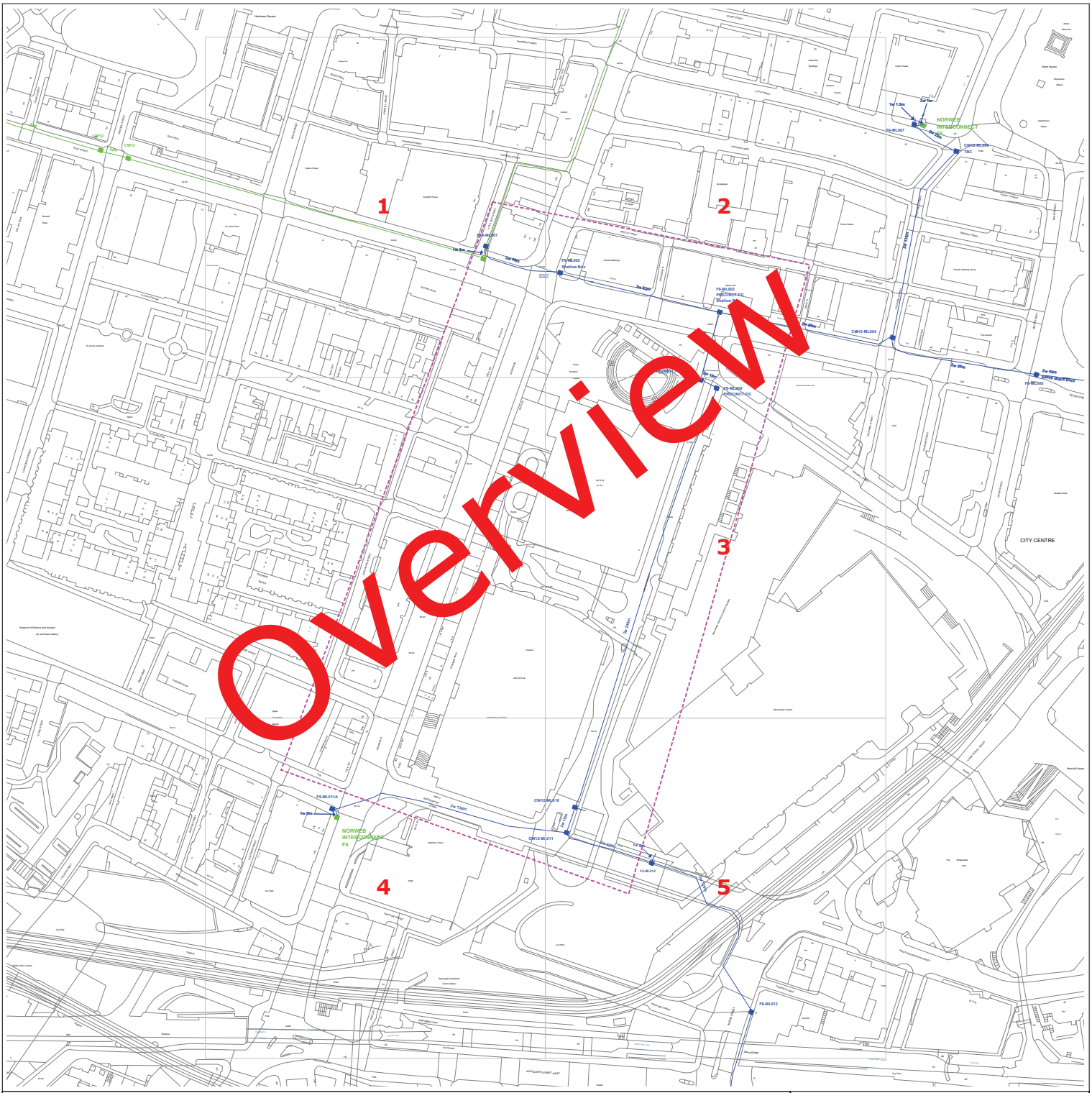
Regards

Gamma

Plant Records

Tel: 0161 870 3384

Fax: 0161 877 5704



Date Requested: 10/04/2017
Requested by: Rosie Munns
Job Reference: 10218857

Company: Groundwise Searches Ltd
Scheme/Reference: URO5612.1DM

2W — GAMMA FIBRE DUCT & No.
FW6 — GAMMA FIBRE CHAMBER & TYPE
GAMMA FIBRE OPTIC IN OLO DUCT
FW6 — GAMMA FIBRE OPTIC IN OLO CHAMBER
GAMMA POP SITE
GAMMA REGEN SITE
FW6 — GAMMA FIBRE OPTIC IN SHARED CHAMBER
GAMMA FIBRE OPTIC IN SHARED DUCT

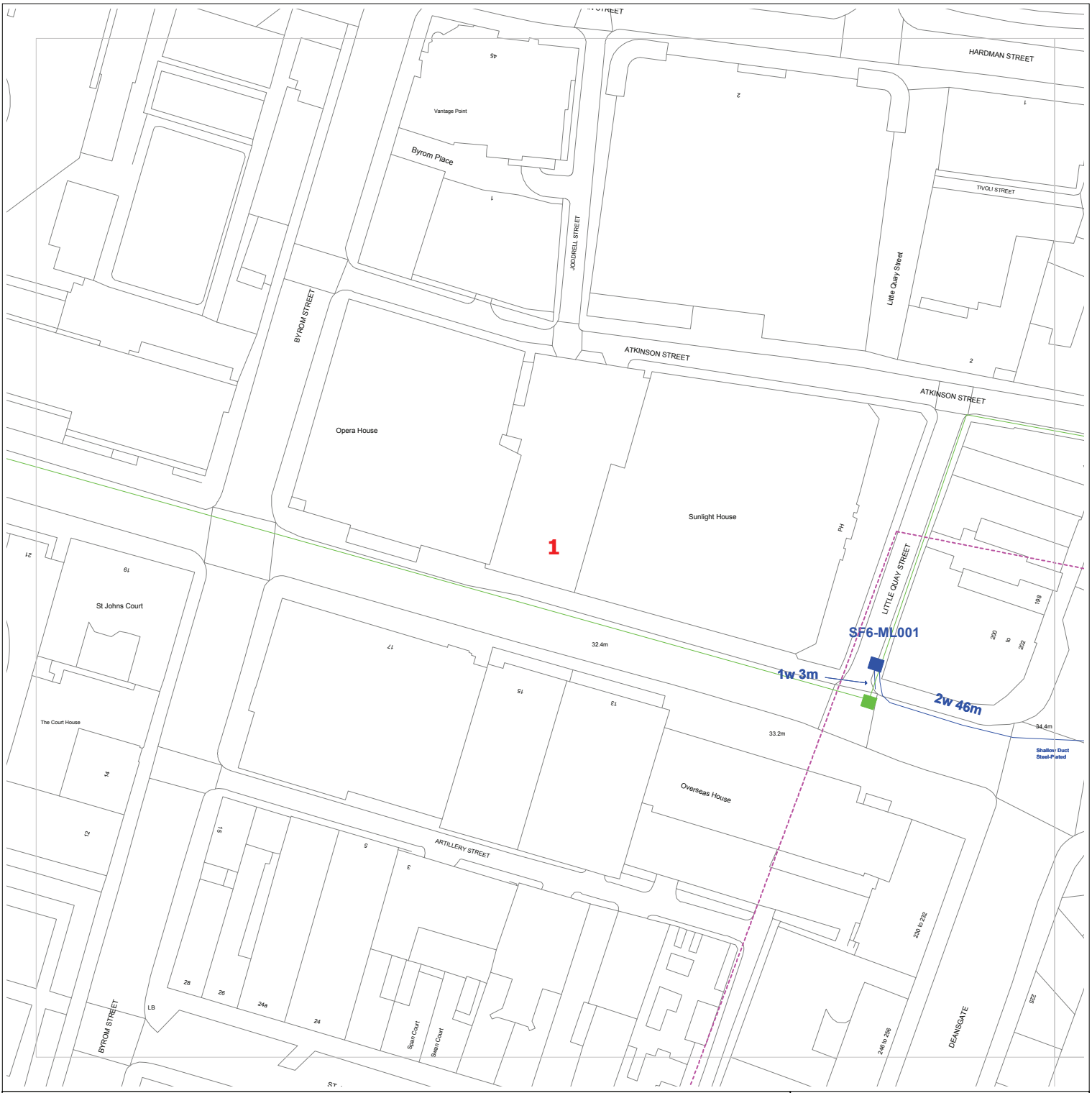
The Information shown on this map is given as a general guide only. The map is issued without obligation or warranty.
The accuracy cannot be guaranteed. The Exact position of the ducts should be verified prior to mechanical excavation.
The Nominal Depth of Duct Cover is:- Carriageway-600m Footway & Verge-350mm. The Fibre Optic cables will not be traceable by use of a "CAT"

NOTES :- Chamber Lids may be labelled as 'Atlantic'

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Gamma, Streetworks Team
Unit C, Focal Point, 2nd Avenue
Trafford Park
Manchester. M17 1FG
Phone: 0161 870 3384
Email: plantenquiries@gamma.co.uk

Dig Sites:
Area Line
Approx scale on A4 paper: 1:1000 (excluding Overview map)



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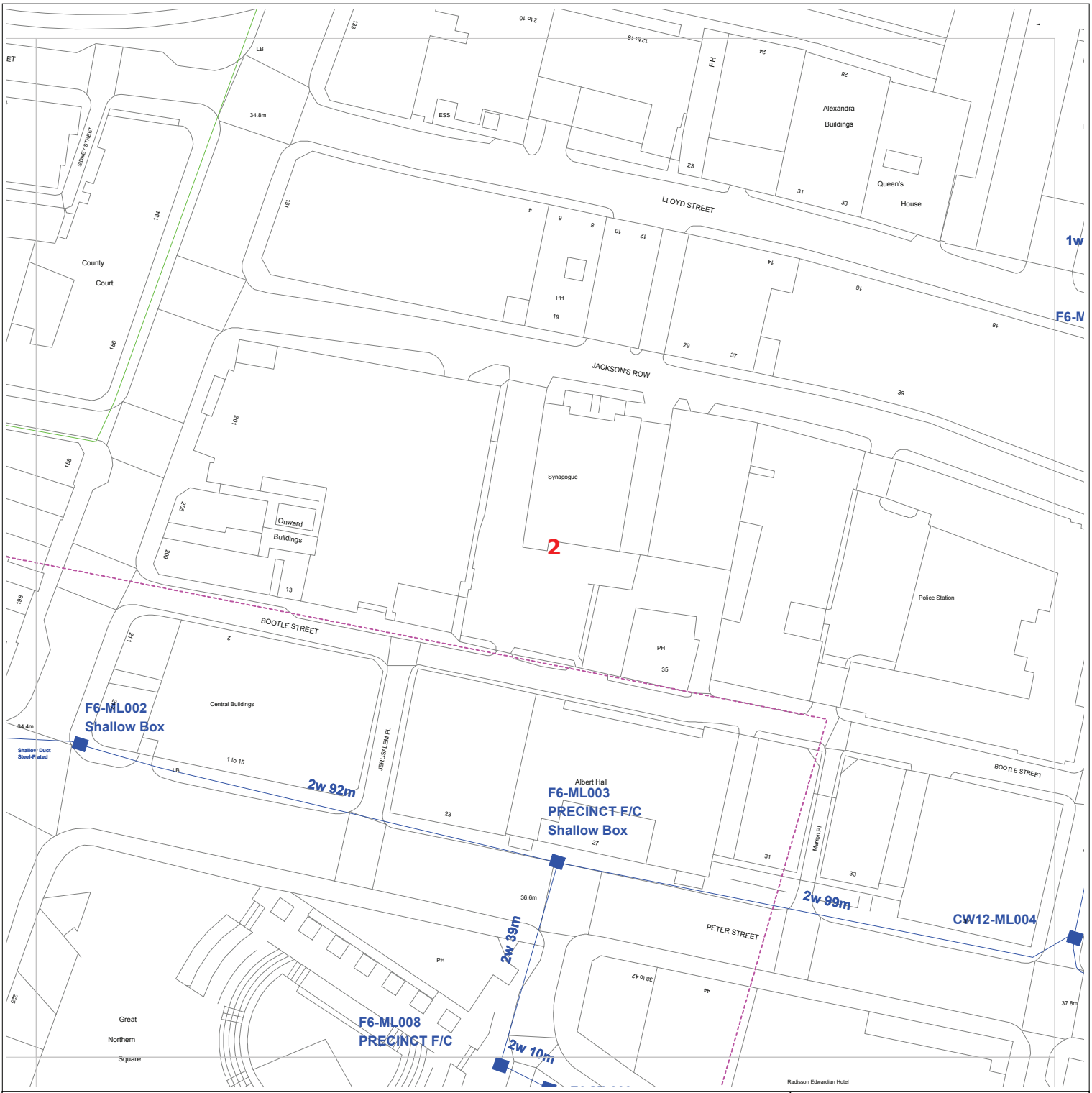
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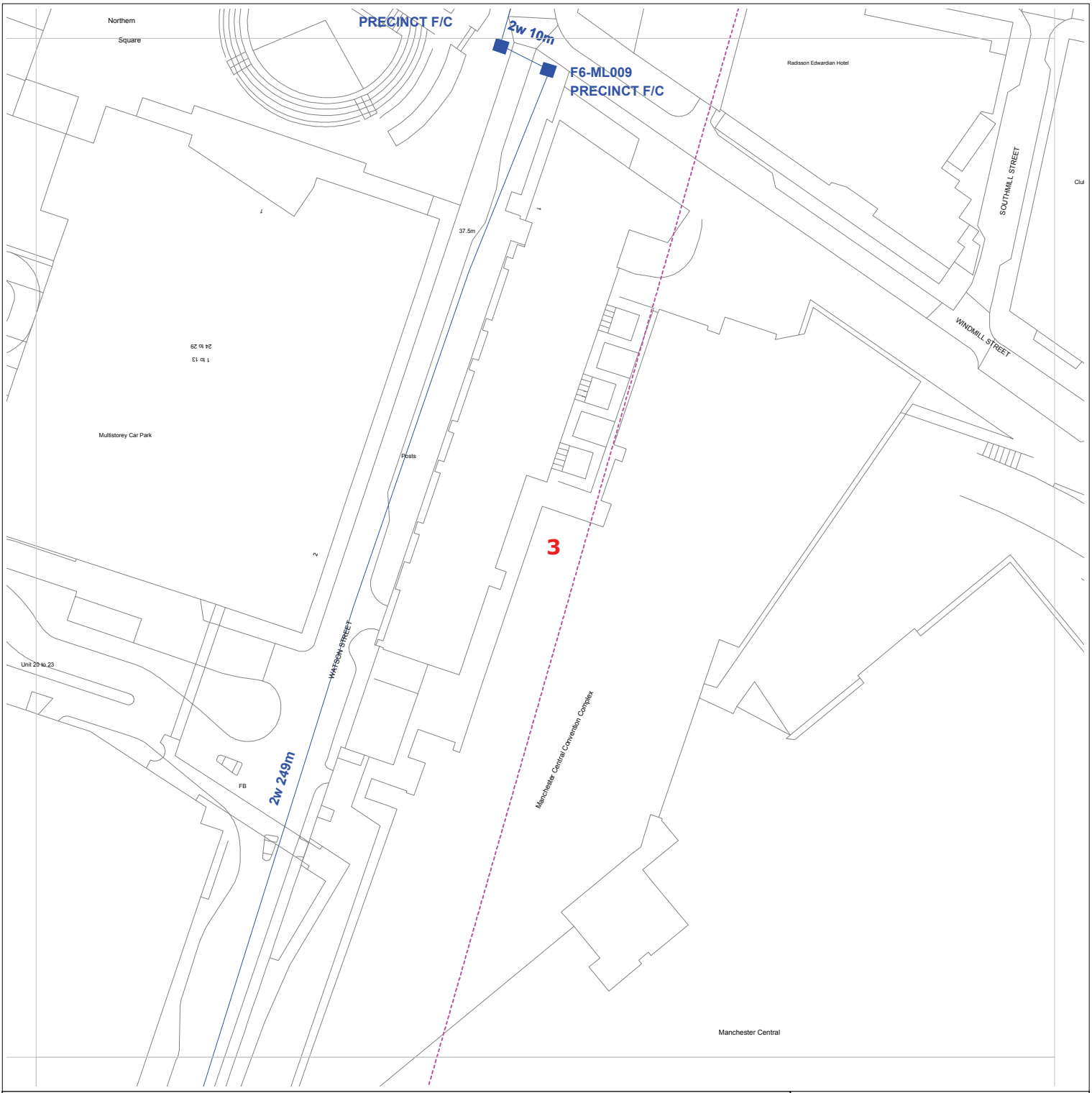
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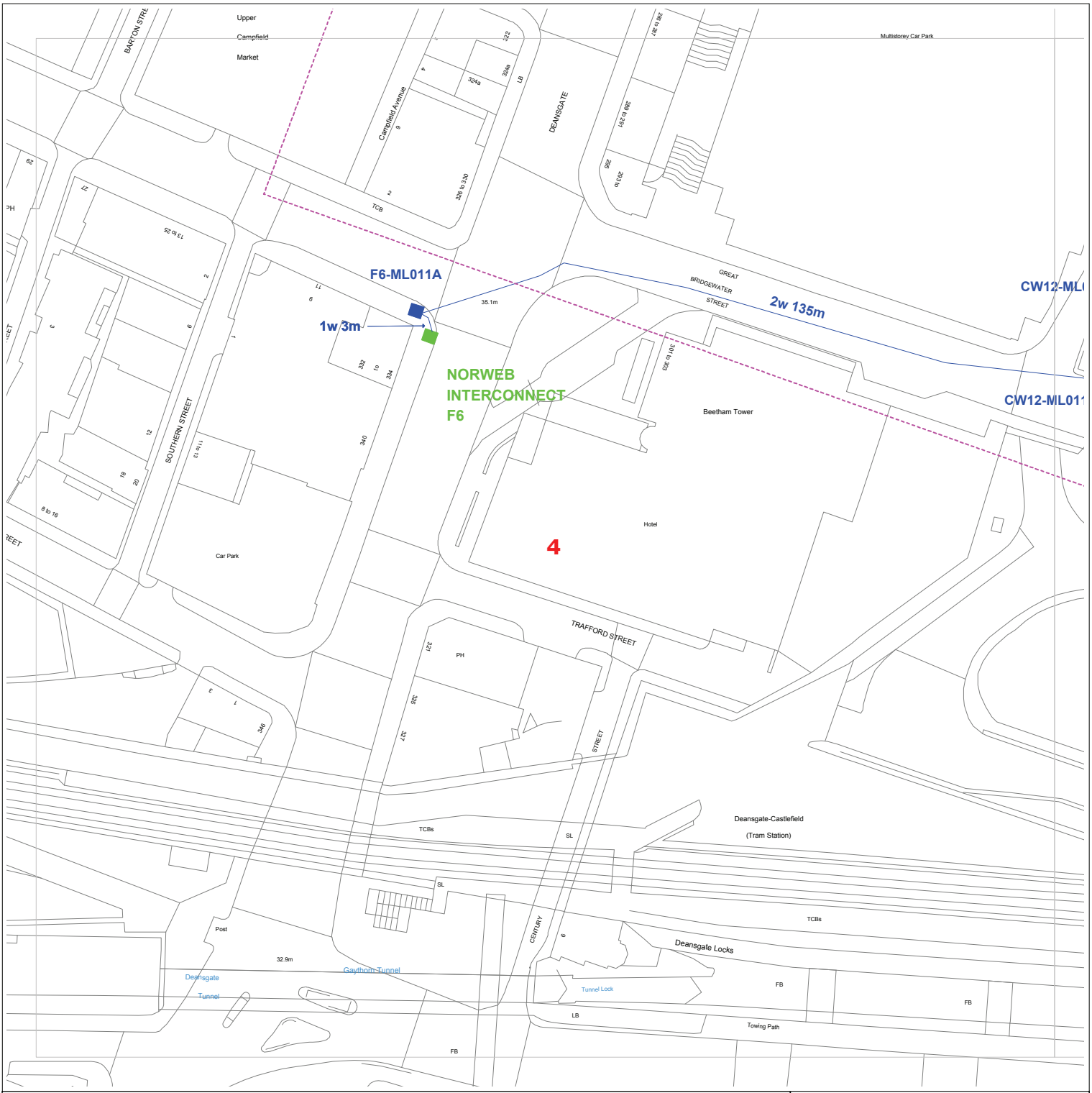
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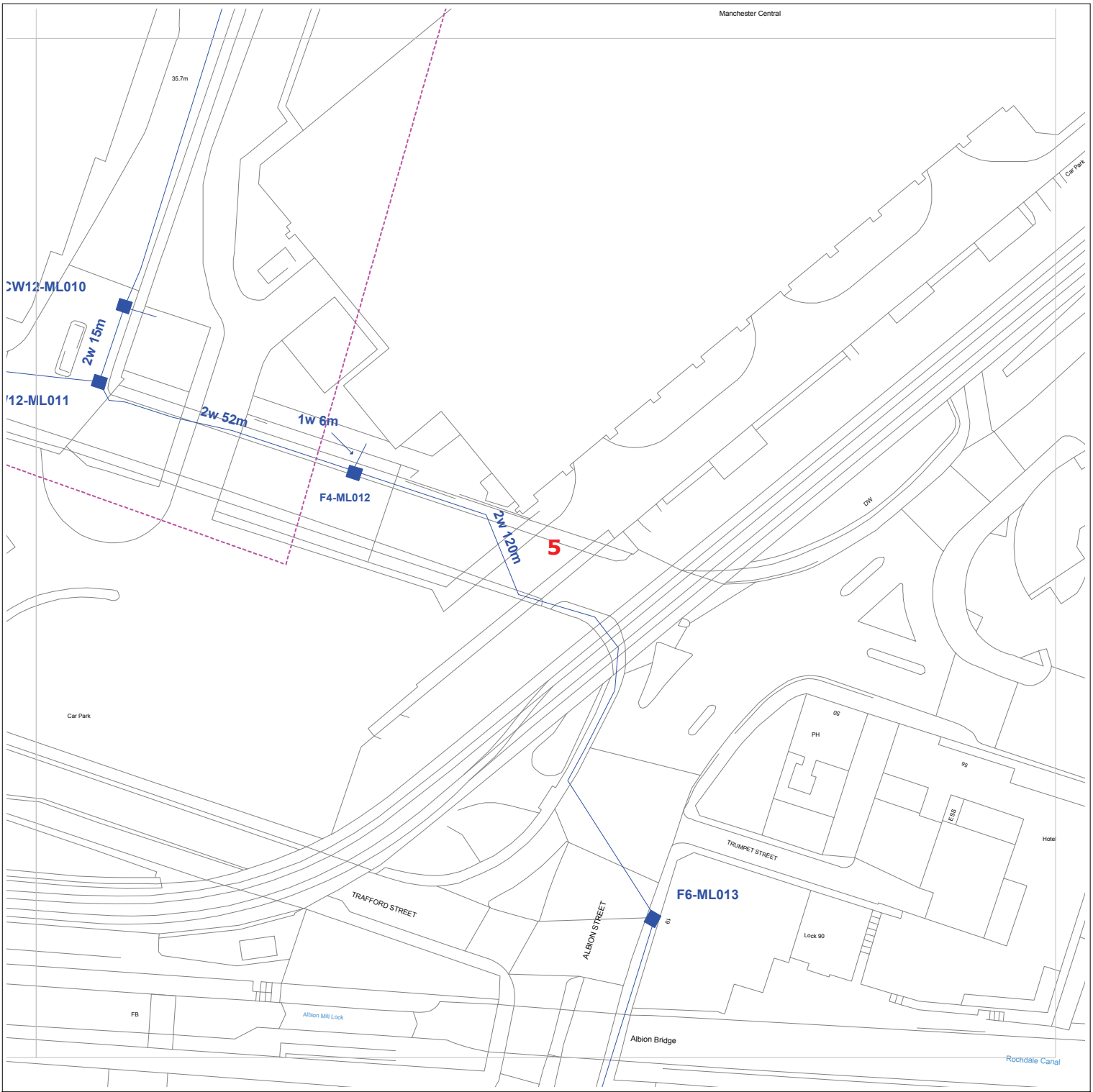
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Ms Rosie Munns
Groundwise Searches Ltd
Suite 8 Chichester House 45 Chichester Road
Southend on Sea Essex
SS1 2JU

Zayo Plant Protection Centre
c/o JSM Group Ltd
Plant Protection Department
Sterling House
Mutton Lane
Potters Bar
Herts, EN6 3AR

Date: 10/04/2017

Our Reference: 10218857
Your Reference: URO5612.1DM

Dear Ms Rosie Munns,

ZAYO GROUP UK LTD AFFECTED C2 PRELIMINARY PLANT ENQUIRY

We acknowledge with thanks your request dated 10/04/2017 11:04:15 AM for information on the location of our services.

Please find enclosed plan(s) showing the approximate position of our apparatus known to be in the vicinity of this site.

We confirm we have reviewed your proposed plan, and have enclosed maps of the area in which Zayo Group UK Ltd have apparatus.

Please note these maps indicate approximate location only and their accuracy cannot be guaranteed. To determine the exact location a trial hole must be dug using extreme caution and hand dig methods only. Please refer to the attached document "Guide to Excavation within the vicinity of Zayo Apparatus".

If you would like a Supervisor on site to mark the trench, or to supervise works around the apparatus, please call 5 days in advance to schedule a site meeting. Please note this maybe chargeable.

Please forward all C3 and C4 Diversionary Estimate requests for diversionary works under the New Roads and Street Works Act 1991 "Measures necessary where apparatus is affected by Major Works (Diversionary Works), A Code of Practice", to zayodiversions@jsmgroup.com.

Please do not hesitate to contact us for further assistance.

Regards,

Zayo Group UK Ltd c/o JSM Group Ltd
JSM Plant Protection Department
T: 01992 655 919
zayoplantenquiries@jsmgroup.com

GUIDE TO CONTRACTORS UNDERTAKING EXCAVATIONS IN THE VICINITY OF ZAYO PLANT

1. Prior to commencing any work or moving heavy plant or equipment over any portion of the site, the Contractor shall confirm details of the location of the Zayo apparatus by contacting and requesting utility drawings from LinesearchbeforeUdig

   All Enquirers should register free of charge for the Zayo plant enquiry service at LinesearchbeforeUdig http://www.linesearchbeforeudig.co.uk/

   Or follow the direct link to register at http://onecall.linesearchbeforeudig.co.uk/RegisterNewUser and start your search there.

   If you have any queries or wish to speak to a member of the JSM Plant Protection Team please call 01992 655 919.

   The accuracy of information on the plans cannot be guaranteed and no liability can be accepted for errors or omissions.

2. Where the utility drawings show that the works or the movement of plant or equipment may endanger the Zayo Apparatus the Contractor must mark out the location of the Zayo Apparatus and ensure the apparatus is adequately protected from damage.

3. The contractor should note that damage to Zayo's Fibre-optic network is extremely disruptive and costly to reinstate. The Contractor shall make every effort to avoid the disturbance of Zayo's apparatus for the completion of the work.

4. When excavating, moving or backfilling around Zayo's apparatus The Contractor should note that the normal depth of cover for Zayo ducts are as follows:

   - Carriageway 600mm
   - Footway 350mm
   - Verge 350mm

5. With regard to excavation in the vicinity of Zayo's apparatus the Contractor should be aware of the possibility of reduced cover and the possibility of encountering Zayo apparatus at depths of cover less than that given above.

6. All excavation adjacent to Zayo apparatus is to be carried out by hand until the exact extent and/or location of the Zayo apparatus is known. Use spades and shovels in preference to other tools.

7. Do NOT use Mechanical borers and/or excavators within 0.5m of Zayo Apparatus.

8. To prevent any movement of Zayo apparatus during excavations, complete shuttering shall be used if:

   - The excavation is deeper than the depth of cover of the adjacent Zayo apparatus.
   - The excavation is within 1.0m of Zayo apparatus in stable ground.
   - The excavation is within 5.0m of Zayo apparatus in unstable ground.

9. If for the completion of the works the Contractor intends using any of the following:

   - Pile driving equipment within 10.0m of Company Apparatus.
   - Explosives within 20.0m of Company Apparatus.

   Then the Contractor shall advise the Zayo Plant Protection Centre giving a minimum 10 working days written notice.

10. All Zayo manhole, joint box and /or other access points and chambers within the site shall be kept clear and unobstructed at all times to allow access by Zayo and /or their Contractor to carryout maintenance on the network. The Contractor should particularly note that footway type jointing chambers are not specified for carriageway loadings and will need to be adequately protected and/or demolished and rebuilt by Zayo where such chambers are likely to be placed at risk, either temporarily or permanently, from the movement of plant and/or equipment on the site.

11. The covers to Zayo chambers and/or apparatus shall only be lifted by means of appropriate manhole keys under the direct supervision of a Zayo Representative. No employee of the Contractor or of any sub-contractor employed by the Contractor shall enter any Zayo chamber and/or apparatus unless under the supervision of a Zayo Representative.

12. In the event of any damage whatsoever to Zayo apparatus, the Contractor shall immediately report the incidence to Zayo by contacting Zayo as follows:

    Telephone: 0800 169 1646 (Zayo 24Hr Network Operations Centre)

    Damage to Communications Plant is Expensive – Please Take Care

    Please note these basic safety details are explained in detail in the HSE booklet HS(G)47 – Avoiding Danger from Underground Services.



Date Requested: 10/04/2017

Requested by: Rosie Munns

Company: Groundwise Searches Ltd

Job Reference: 10218857

Your Scheme/Reference: URO5612.1DM

ZAYO DUCT

ZAYO CHAMBER

Dig Sites: Line Area

Scale on A4 paper: 1:1000

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Linesearch before dig

Protecting Lives, Cables & Pipes

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In Emergency Only and if Zayo Plant or Cables damaged call: 0800 169 1646

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4th Floor Harmsworth House
13-15 Bouverie Street
London EC4Y 8DP

JSM Group Ltd
Sterling House
Mutton Lane, Potters Bar
Hertfordshire, EN6 3AR
T: 01992 788 019
zayoplantenquiries@jsmgroup.com



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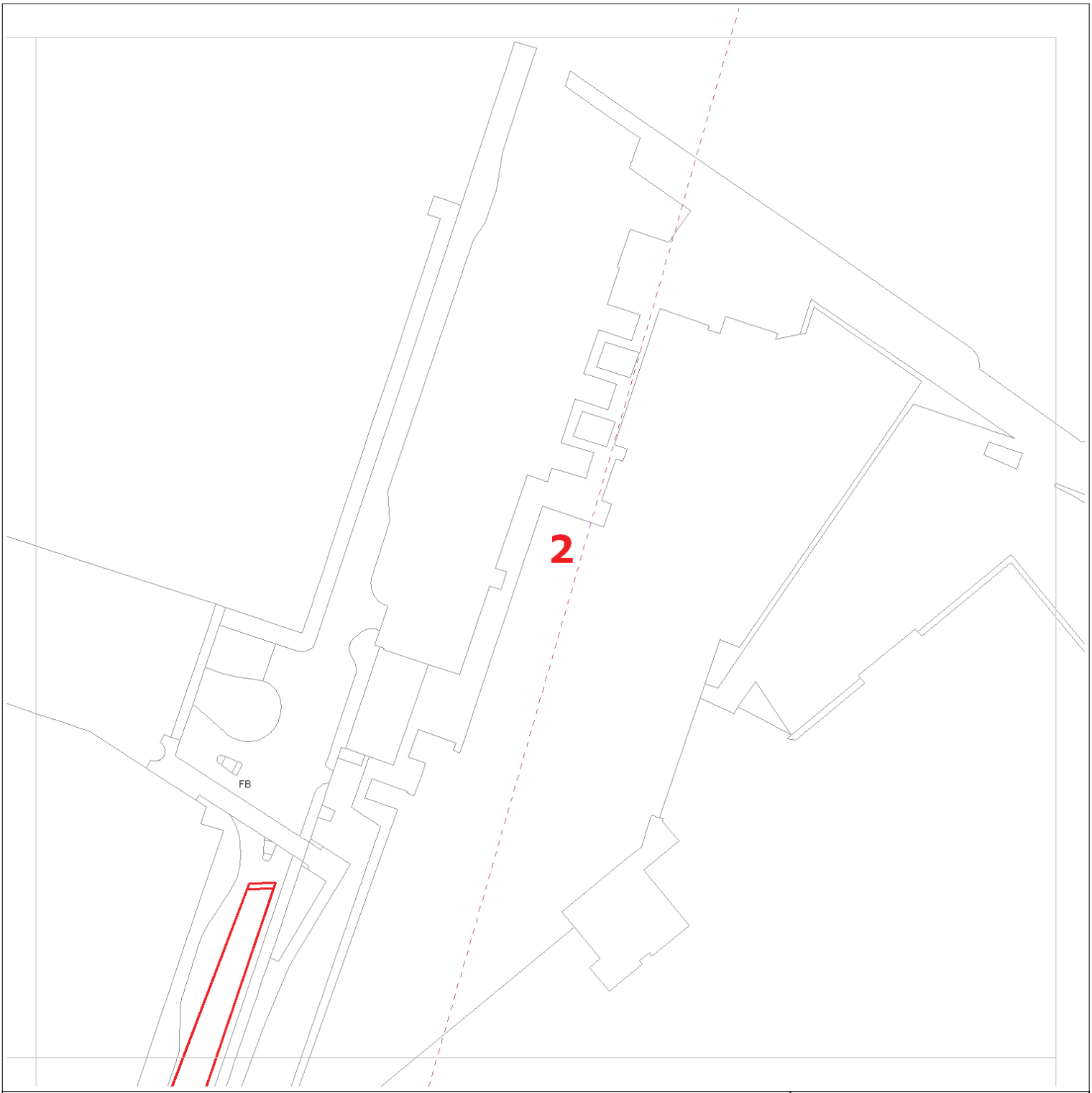
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Hertfordshire, EN6 3AR
T: 01992 788 019
zayoplantenquiries@jsmgroup.com

I look forward to receiving details from you and thank you in advance for your assistance in this matter.

Kind regards,

Debbie Miller
Production Researcher
Groundwise Searches Ltd

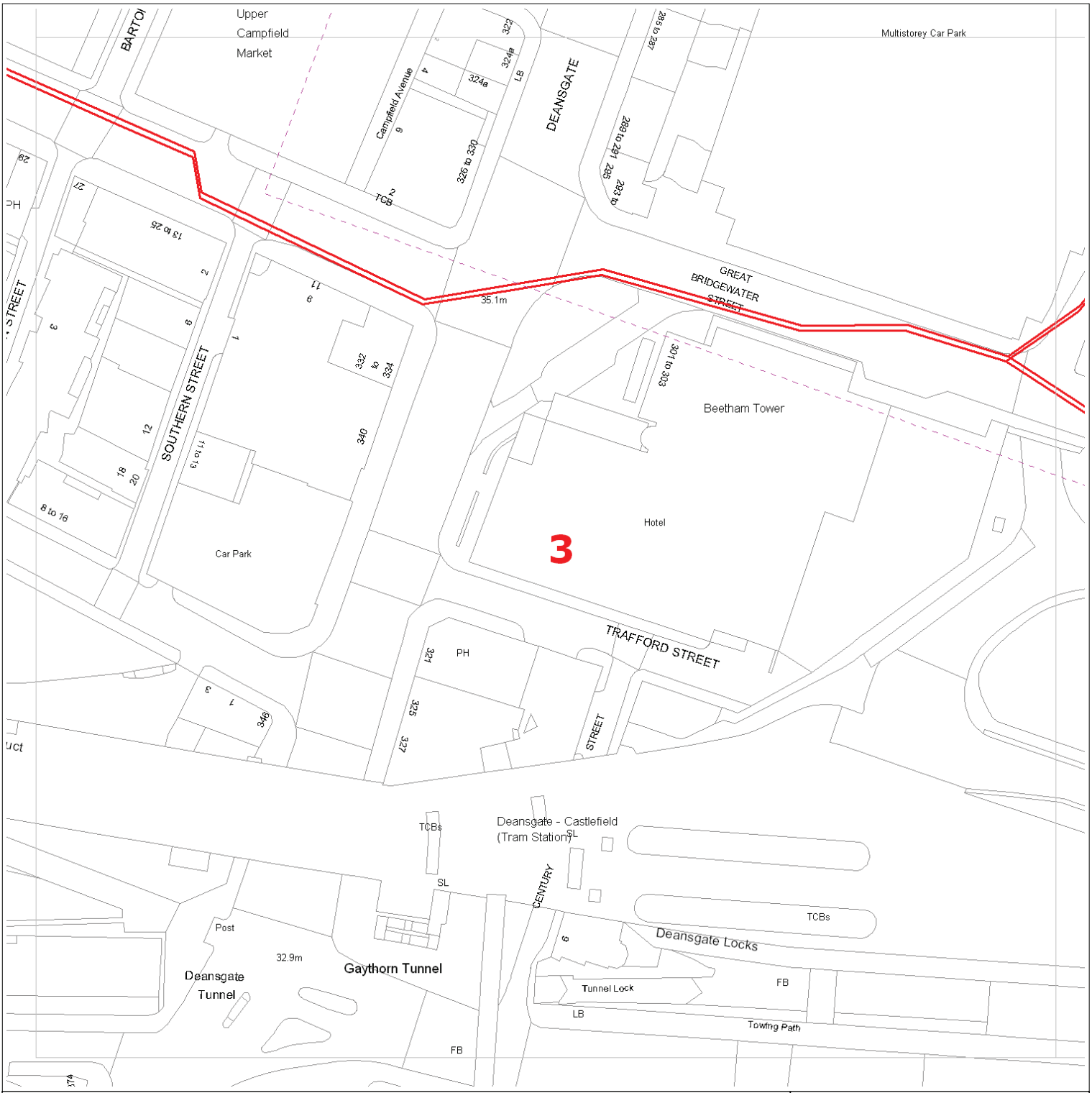
GROUNDWISE

dmiller@groundwise.com | *01702 615566* | *www.groundwise.com*
Suite 8 Chichester House, 45 Chichester Road, Southend-on-Sea, Essex SS1 2JU

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VAT number 769 0642 02

Verizon UK Limited - registered in England & Wales - registered number 2776038 - registered office at Reading International Business Park, Basingstoke Road, Reading, Berkshire, UK RG2 6DA - VAT number 823 8170 33



Date Requested: 10/04/2017

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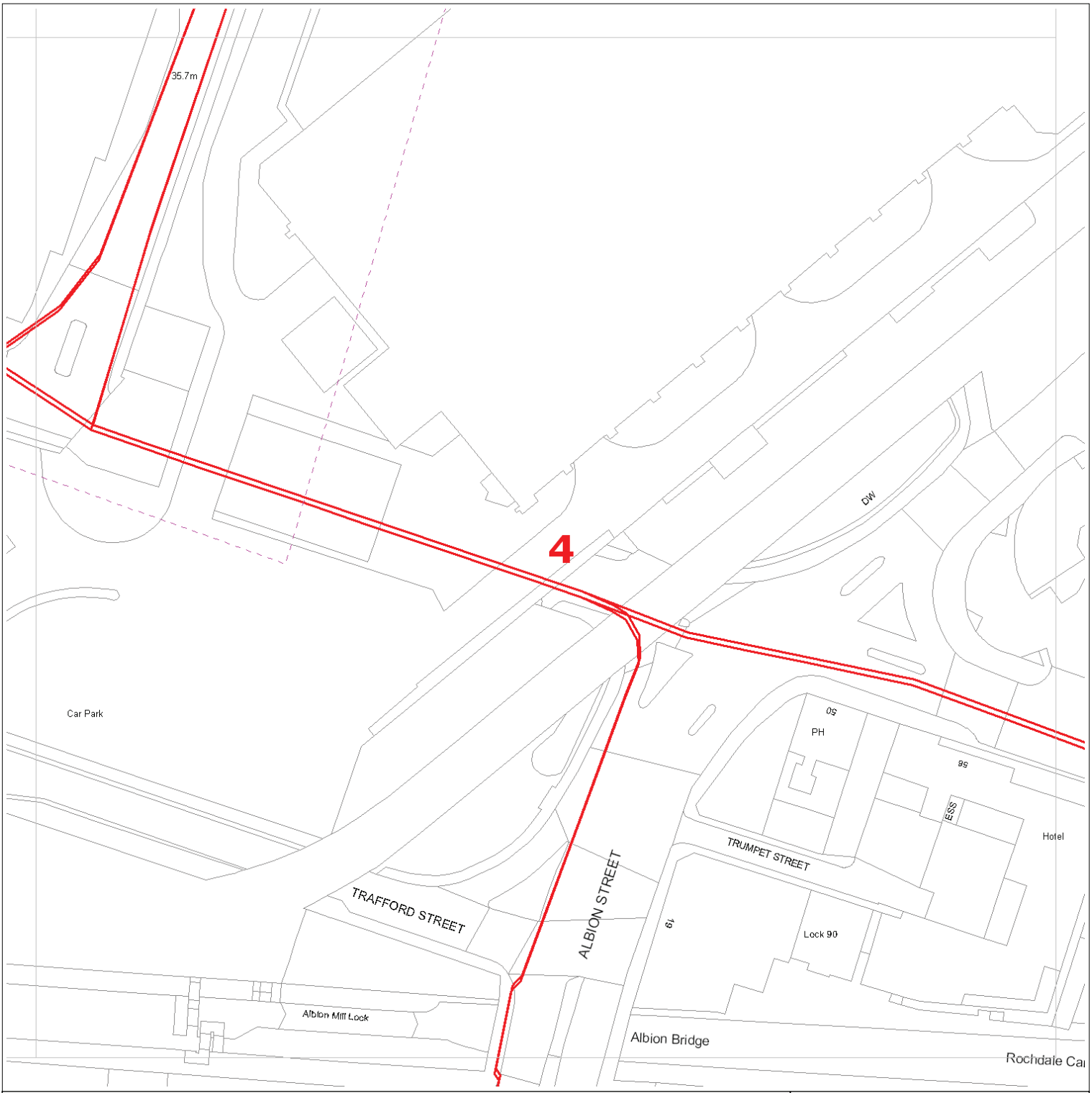
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Watch it!

Safety advice brought to you by
Scottish and Southern Electricity Networks

These notes are intended to help all those who have to work in the vicinity of electrical apparatus. Employers have a legal obligation to ensure that their operatives are fully instructed in the correct procedures.

The Electricity at Work Regulations 1989 impose health and safety requirements upon employers, employees and self-employed persons with respect to electricity at work. The regulations impose restrictions on persons being engaged in work activities on or near live conductors.

Regulation 14 requires that: "No person shall be engaged in any work activity on or near any live conductor (other than one suitably covered with insulating material so as to prevent danger) that danger may arise unless:

- it is **unreasonable** in all circumstances for it to be dead; and
- it is **reasonable** in all circumstances for him to be at work on or near it while it is live; and
- suitable precautions (including where necessary the provision of suitable protective equipment) are taken to prevent injury."

The purpose of the regulations is to require precautions to be taken against the risk of death or personal injury from electricity in work activities.

Publications

The Health and Safety Executive have produced a document entitled 'Avoiding Danger from Underground Services', and the Appendix 1 deals specifically with electric cables. Copies are available from the HSE's Accredited Agents and good booksellers, Ref. HS (G) 47.

Copies of Health and Safety Guidance note GS 6 relating to safe working in proximity to overhead lines, are available from the Health and Safety Executive's website - www.hse.gov.uk.

Note

In situations of emergency or danger, or where the advice contained in these notes cannot be followed, you must consult Scottish and Southern Electricity Networks immediately. Tel. 08457 708090 for southern England or 0800 300999 for Scotland.

Additional copies of these "Watch it!" leaflets can be obtained from our Asset Data Team office upon request. Tel. 01256 337294, or Fax 01256 337295.

You must read and accept the following safety notes as part of the contract to receive our network plans. You will have the option to print these and issue them to site staff.

Watch it! - Working in the vicinity of underground cables

Our plans show the positions and normal depths for the buried cables and pipes at the time when they were installed. However, alterations to road alignments surface levels and buildings may have occurred subsequently without our knowledge. If you discover plant or cables that are not marked or incorrectly marked, then you are required to contact us as soon as possible to give us the opportunity to amend our plans.

These plans show the equipment owned by Scottish and Southern Electricity Networks. There may be other privately owned plant in the area, which is outside of our control. You should always check with the Local Authority, National Grid Company, Department of the Environment, other Electricity Companies and other utilities before proceeding.

It is not intended that the issue of these plans will absolve either party from their obligation under any of the acts that control digging in the public highways.

Supplies To Properties, etc.

The location of cables supplying individual properties, street lighting, traffic signs, telephone kiosks etc. are not always shown on the plans. You should assume that each property, streetlight etc. will have its own supply cable.

Major Circuits

Where our plans indicate the presence of cables with a voltage exceeding 11,000 volts, you are advised to contact our local depot (telephone number is on the plans), before commencing any excavations within the vicinity of these cables. These major circuits form an extremely important link in Scottish and Southern Electricity Networks' networks, and damaging or modifying these circuits is a major and costly undertaking. Any development should therefore be designed to allow these circuits to remain undisturbed and accessible in their present location.

For your own and your workmates' safety, please follow the **do's** and **don'ts** listed below:

- ✓ **do** make sure you have plans of the underground cables in the area **before** any excavation work starts. Remember that some cables may not be shown on plans. If carrying out emergency work, excavate as though there are buried live cables in the vicinity.
- ✓ **do** use a cable locator to determine the position of existing cables in the work area. The positions should be marked and tests made as work proceeds. **If in doubt, get advice from your supervisor.**
- ✓ **do** ask for a cable to be made dead if it is buried in concrete.
- ✓ **do** watch for signs of cables as work progresses. Note any marker-tape or cable-cover, which may be exposed

- ✓ **do** backfill carefully, using stone-free soil around the cables, replacing marker-tapes and / or covers.
- ✓ **do** notify us immediately if you accidentally damage our cables. Arrange to keep people well clear of a cable that has been damaged until we have confirmed it has been made safe.
- ✓ **do** make sure before starting to demolish a building that all cables have been disconnected. We welcome prior notice of the intention to demolish buildings. This enables us to ensure that the site has been made safe electrically.
- ✓ **don't** operate a bulldozer, scraper, dragline or excavator; unless you are satisfied that there are no buried cables in the working area.
- ✓ **don't** use picks, pins, forks or pointed instruments in soft clay or soil when cables are present. Exercise extreme caution where such instruments are used to free lumps of stone, or break up firmly compacted ground. **Never** throw a fork or sharp instrument into the ground.
- ✓ **don't** dig trial holes over the indicated route of the cable. Excavate alongside instead.
- ✓ **don't** use exposed cables as a convenient step or handhold.
- ✓ **don't** handle or attempt to alter the position of any cable.

Remember that a damaged cable may cause extensive loss of supplies, make expensive repairs necessary and cause serious or even fatal injury.

If effective measures are not adopted to protect our equipment, we will take steps to recover the cost of any damage caused. Persons causing damage resulting in loss of supply to customers can be held legally responsible for any claims made by those customers. Promptness in reporting an incident will minimise costs.

In most cases it is not practicable to make cables dead without interrupting supplies to our customers. But given adequate notice, we will wherever possible, give advice regarding special precautions which may be necessary on any site where particular problems are likely to be encountered. The right is reserved to make a charge for this service.

Electricity cables can exist anywhere - under paths or roads, in gardens or driveways, on new housing or industrial development sites or even farmland.

Watch it! - Working in the vicinity of overhead lines

For your own and your workmates' safety, please follow the **do's** and **don'ts** listed below

- ✓ **do** carefully note the position of all overhead lines before commencing work.
- ✓ **do** co-operate with us during planning and sitework stages.
- ✓ **do** follow the advice given in HSE Guidance Note GS 6 when siting barriers, goal posts, bunting etc.
- ✓ **do** keep overhead lines in view when moving scaffolding or machinery and take special care when felling or lopping trees.
- ✓ **do** remember that the raising or slewing of a crane or excavator jib may cause danger when operating near an overhead line.
- ✓ **do** avoid any machinery that is in contact with an overhead line until we confirm that conditions are safe.
- ✓ **do** warn others to keep well clear.
- ✓ **don't** drive a high vehicle below an overhead line when an alternative route is available.
- ✓ **don't** raise the bed of a tipper lorry beneath an overhead line or drive under the line with the body of the vehicle raised.
- ✓ **don't** steady any suspended load until you are satisfied that there is no danger from overhead lines.
- ✓ **don't** handle or use scaffold platforms, poles, pipes or ladders unless they are at a safe distance from overhead lines.
- ✓ **don't** transport long objects beneath overhead lines, unless they are carried in a horizontal position.
- ✓ **don't** approach or touch any broken or fallen overhead lines.

Always remember that:

- Electricity can jump gaps.
- Contact or near contact with a crane jib, scaffold or ladder can cause a discharge of electricity with a risk of fatal or severe shock and burns to any person in the vicinity.

If effective measures are not adopted to protect our equipment, we will take steps to recover the cost of any damage caused. Persons causing damage resulting in loss of supply to customers can be held legally responsible for any claims made by those customers. Promptness in reporting an incident will minimise costs.

In most cases it is not practicable to make overhead lines dead without interrupting supplies to customers. However, provided adequate notice is given, then we will, whenever possible, give advice regarding special precautions which may be necessary on site where specific problems may be encountered. The right is reserved to make a charge for this service.

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NORMAL DEPTH TO THE TOP OF THE CABLE WHEN LAID				
	services	l.v.	h.v.	e.h.v.
FOOTPATH	0.40m	0.45m	0.60m	0.75m
ROAD CROSSING	0.60m	0.60m	0.75m	0.90m

l.v./services – up to 1000V.
h.v. – over 1000V. to 11,000V.
e.h.v. – 22,000V. to 132,000V.

WARNING

There may have been subsequent alterations to the surface levels. Trial holes must be taken to determine positions and depth of cables. HS (G) 47 Booklet from the Health and Safety Executive – Avoiding Danger from Buried Cables – should be consulted before commencing excavation work. (available from the HSE)

WHEN WORKING IN THE VICINITY OF OVERHEAD LINES THE HEALTH AND SAFETY GUIDANCE NOTE GS6 SHOULD BE CONSULTED. (AVAILABLE FROM THE HSE)

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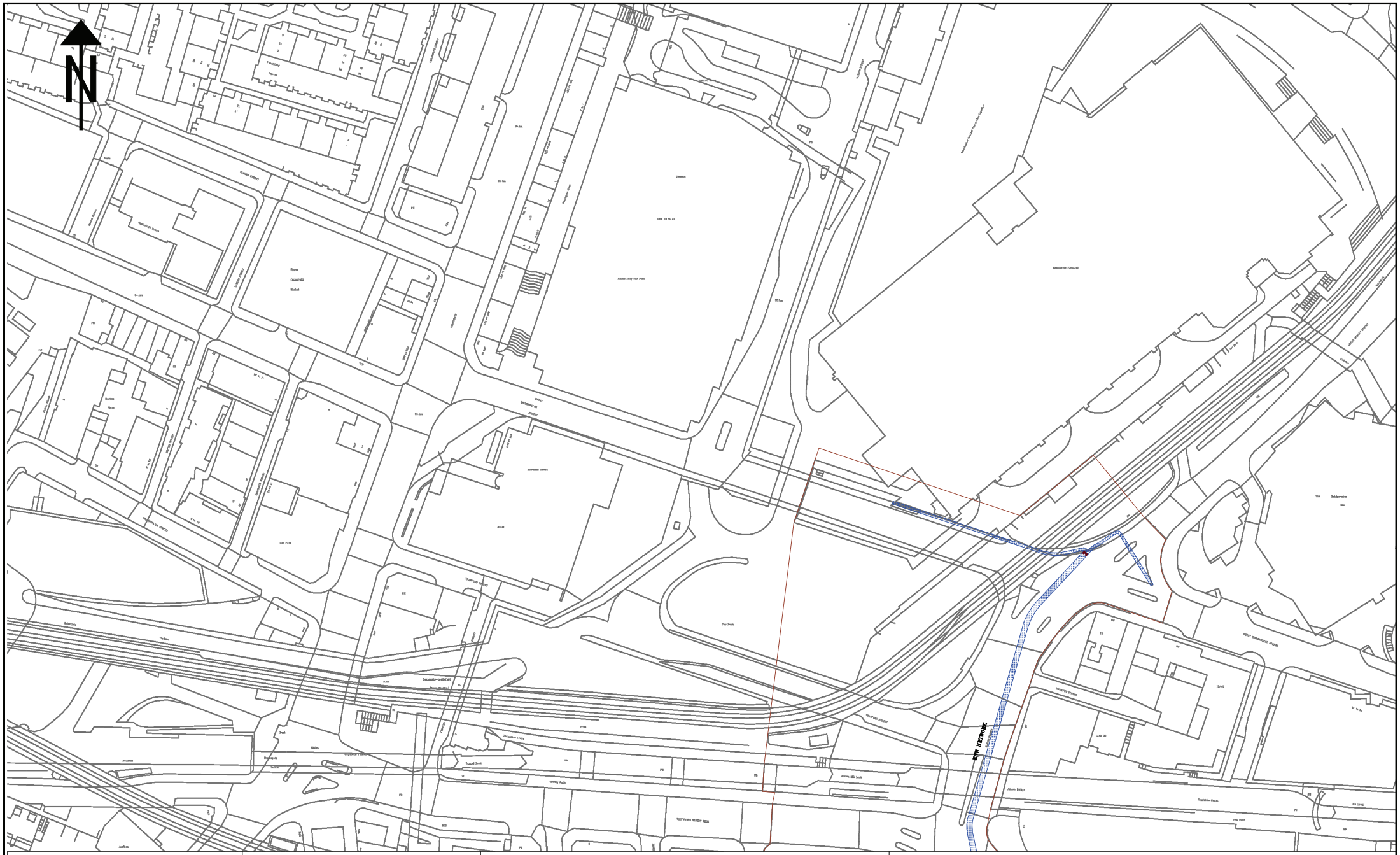
Mapping Services Unit
01256 337294

Grid Ref: sj83539784

Scale: 1:1250

Date: 11/04/2017

HV



NORMAL DEPTH TO THE TOP OF THE CABLE WHEN LAID				
	services	l.v.	h.v.	e.h.v.
FOOTPATH	0.40m	0.45m	0.60m	0.75m
ROAD CROSSING	0.60m	0.60m	0.75m	0.90m

l.v./services – up to 1000V.
h.v. – over 1000V. to 11,000V.
e.h.v. – 22,000V. to 132,000V.

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Grid Ref: sj83539768

Scale: 1:1250

Date: 11/04/2017

HV



NORMAL DEPTH TO THE TOP OF THE CABLE WHEN LAID				
	services	l.v.	h.v.	e.h.v.
FOOTPATH	0.40m	0.45m	0.60m	0.75m
ROAD CROSSING	0.60m	0.60m	0.75m	0.90m

l.v./services – up to 1000V.
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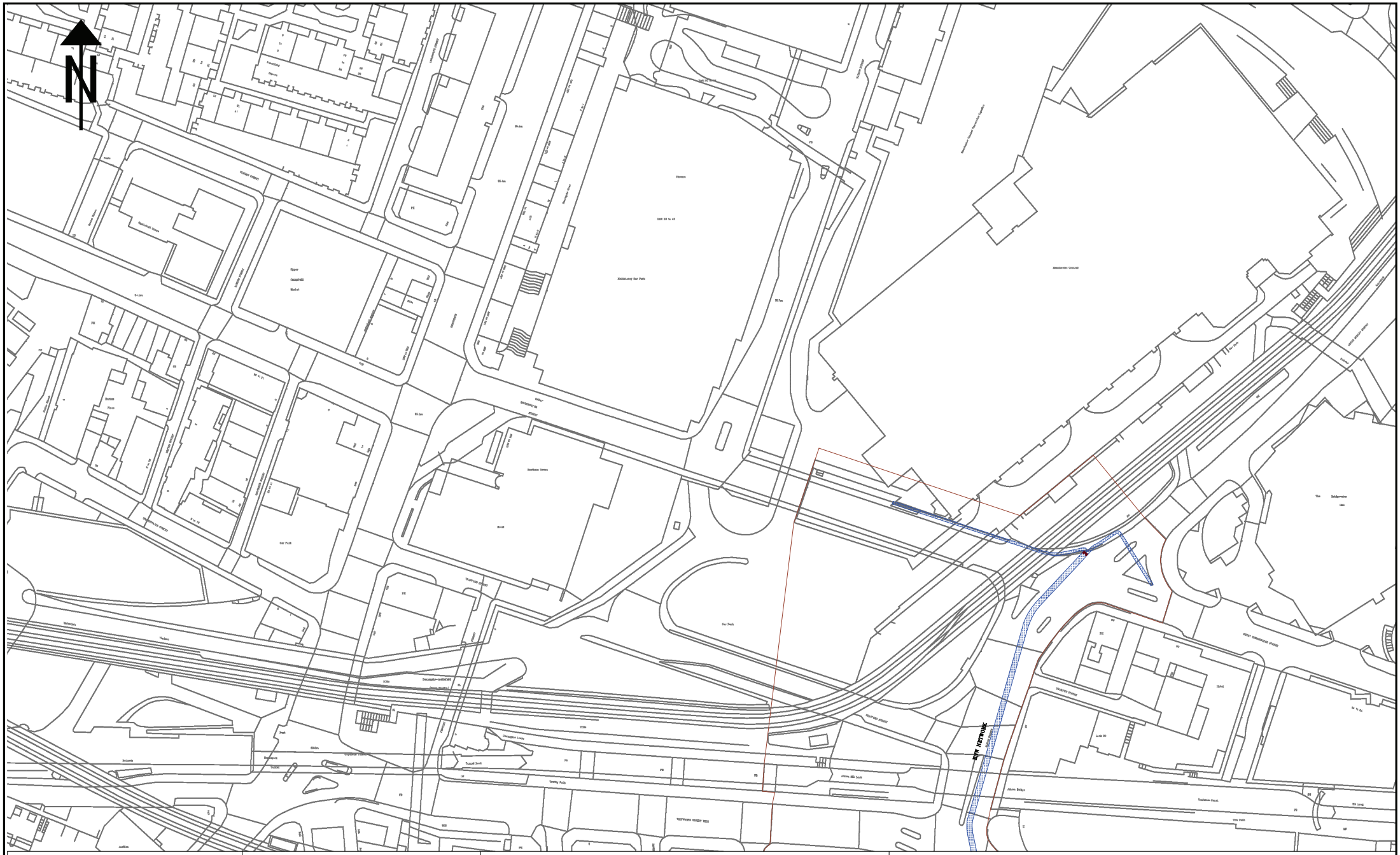
Mapping Services Unit
01256 337294

Grid Ref: sj83539784

Scale: 1:1250

Date: 11/04/2017

LV



NORMAL DEPTH TO THE TOP OF THE CABLE WHEN LAID				
	services	l.v.	h.v.	e.h.v.
FOOTPATH	0.40m	0.45m	0.60m	0.75m
ROAD CROSSING	0.60m	0.60m	0.75m	0.90m

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LV

United Utilites Water Limited
Property Searches
Ground Floor Grasmere House
Lingley Mere Business Park
Great Sankey
Warrington
WA5 3LP
DX 715568 Warrington
Telephone 0370 751 0101

Property.searches@uuplc.co.uk

Your Ref: 5612
Our Ref: 1283189
Date: 10/4/2017

Groundwise Searches Ltd
Suite 8 Chichester House
45 Chichester Road
Southend on Sea

SS1 2JU

FAO: Debbie Miller

Dear Sirs

Location: Around Deansgate and Watson Street Manchester M3 4EJ

I acknowledge with thanks your request dated 06/04/17 for information on the location of our services.

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

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

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

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

If you have any queries regarding this matter please telephone us on 0370 7510101.

Yours Faithfully,

Karen McCormack
Property Searches Manager

UUWaterLimited 2014

United Utilities Water Limited
Registered in England & Wales No. 2366678
Registered Office: Haweswater House,
Lingley Mere Business Park, Lingley Green Avenue,
Great Sankey, Warrington, WA5 3LP

TERMS AND CONDITIONS - WASTERWATER & WATER DISTRIBUTION PLANS

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

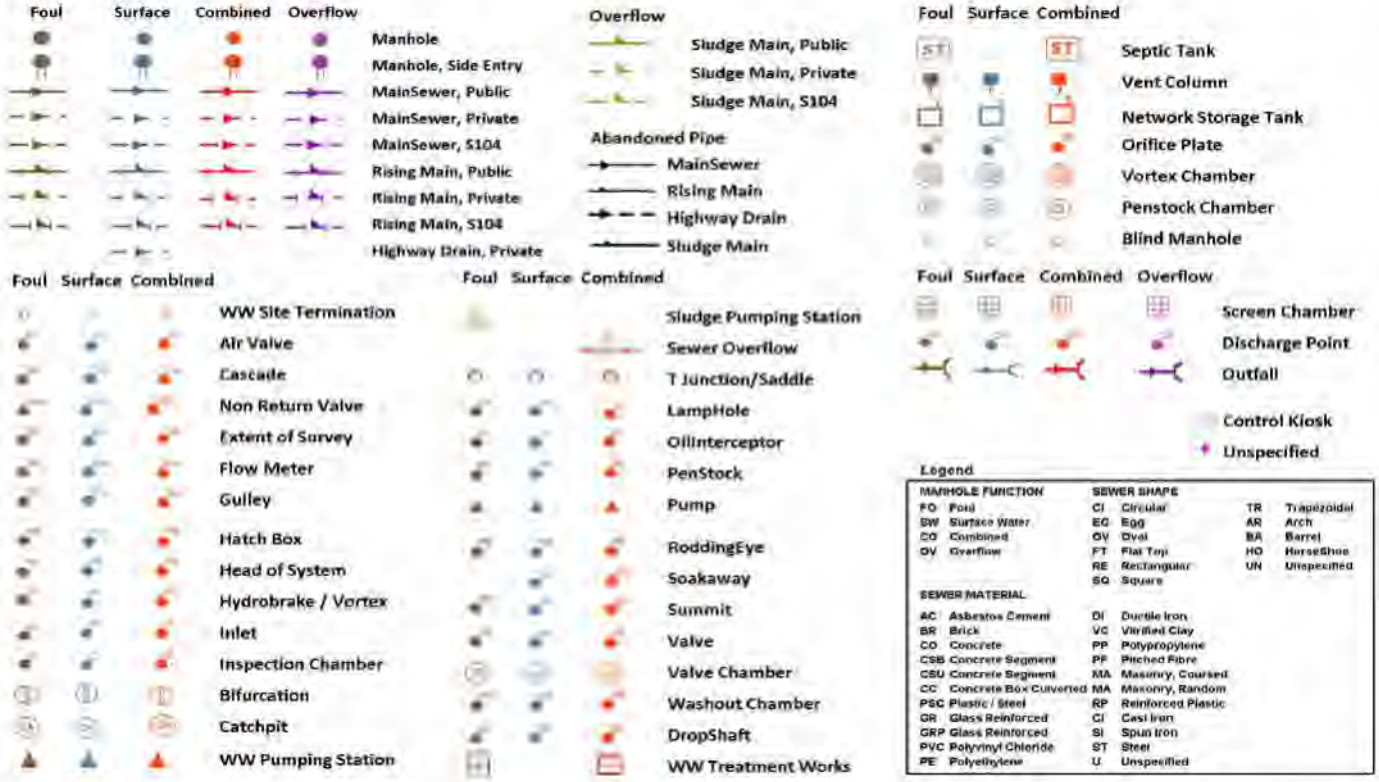
TERMS AND CONDITIONS:

1. This Map and any information supplied with it is issued subject to the provisions contained below, to the exclusion of all others and no party relies upon any representation, warranty, collateral contract or other assurance of any person (whether party to this agreement or not) that is not set out in this agreement or the documents referred to in it.
2. This Map and any information supplied with it is provided for general guidance only and no representation, undertaking or warranty as to its accuracy, completeness or being up to date is given or implied.
3. In particular, the position and depth of any UUWL apparatus shown on the Map are approximate only and given in accordance with the best information available. The nature of the relevant system and/or its actual position may be different from that shown on the plan and UUWL is not liable for any damage caused by incorrect information provided save as stated in section 199 of the Water Industry Act 1991. UUWL strongly recommends that a comprehensive survey is undertaken in addition to reviewing this Map to determine and ensure the precise location of any UUWL apparatus. The exact location, positions and depths should be obtained by excavation trial holes.
4. The location and position of private drains, private sewers and service pipes to properties are not normally shown on this Map but their presence must be anticipated and accounted for and you are strongly advised to carry out your own further enquiries and investigations in order to locate the same.
5. The position and depth of UUWL apparatus is subject to change and therefore this Map is issued subject to any removal or change in location of the same. The onus is entirely upon you to confirm whether any changes to the Map have been made subsequent to issue and prior to any works being carried out.
6. This Map and any information shown on it or provided with it must not be relied upon in the event of any development, construction or other works (including but not limited to any excavations) in the vicinity of UUWL apparatus or for the purpose of determining the suitability of a point of connection to the sewerage or other distribution systems.
7. No person or legal entity, including any company shall be relieved from any liability howsoever and whensoever arising for any damage caused to UUWL apparatus by reason of the actual position and/or depths of UUWL apparatus being different from those shown on the Map and any information supplied with it.
8. If any provision contained herein is or becomes legally invalid or unenforceable, it will be taken to be severed from the remaining provisions which shall be unaffected and continue in full force and affect.
9. This agreement shall be governed by English law and all parties submit to the exclusive jurisdiction of the English courts, save that nothing will prevent UUWL from bringing proceedings in any other competent jurisdiction, whether concurrently or otherwise.

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United Utilities

WASTE WATER SYMBOLOGY



Legend

MANHOLE FUNCTION		SEWER SHAPE			
FO	Foul	CI	Circular	TR	Trapezoidal
SW	Surface Water	EG	Egg	AR	Arch
CO	Combined	OV	Oval	BA	Barrel
OV	Overflow	FT	Flat Top	HO	HorseShoe
		RE	Rectangular	UN	Unspecified
		SQ	Square		

SEWER MATERIAL			
AC	Asbestos Cement	DI	Ductile Iron
BR	Brick	VC	Vitrified Clay
CO	Concrete	PP	Polypropylene
CSB	Concrete Segment	PF	Pitched Fibre
CSU	Concrete Segment	MA	Masonry, Coursed
CC	Concrete Box Culverted	MA	Masonry, Random
PSC	Plastic / Steel	RP	Reinforced Plastic
GR	Glass Reinforced	CI	Cast Iron
GRP	Glass Reinforced	SI	Spun Iron
PVC	Polyvinyl Chloride	ST	Steel
PE	Polyethylene	U	Unspecified

CLEAN WATER SYMBOLOGY

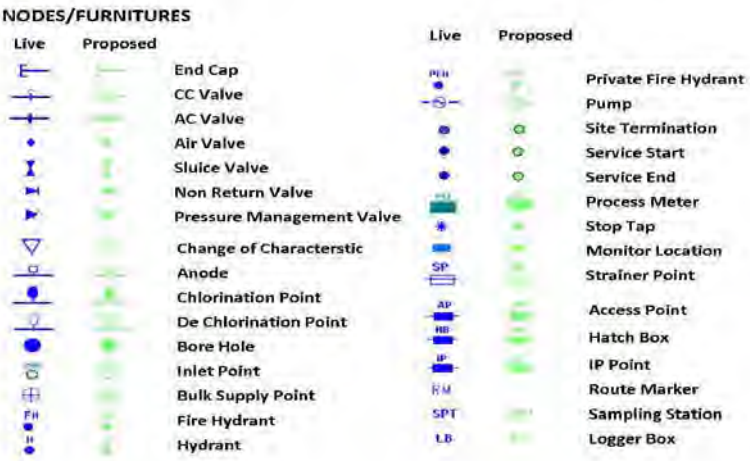
PIPE WORK



ABANDONED PIPE



NODES/FURNITURES



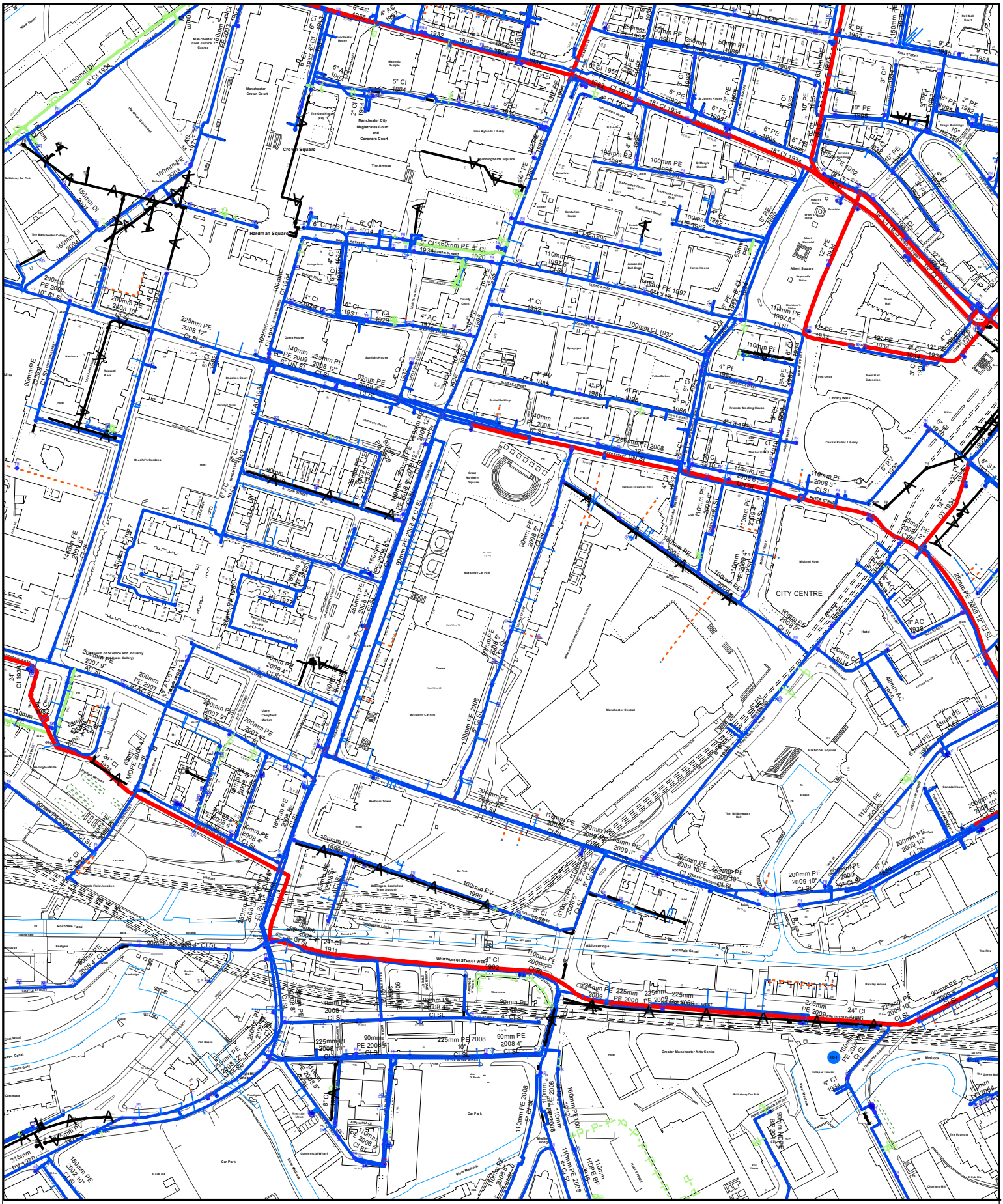
PROPERTY TYPES





Legend

MATERIAL TYPES		LINING TYPES	
AC	ASBESTOS CEMENT	CL	CEMENT LINING
CI	CAST IRON	TB	TAR OR BITUMEN
CU	COPPER	ERL	EPOXY RESIN
CO	CONCRETE		
DI	DUCTILE IRON	INSERTION TYPES	
GI	GALVANISED IRON		
GR	GREY IRON	DD	DIE DRAWN
OT	OTHERS	DR	DIRECTIONAL DRILLING
PB	LEAD	MO	MOLING
PV	uPVC	PI	PIPELINE
SI	SPUN IRON	SL	SLIP LINED
ST	STEEL		
UN	UNKONWN		
PE	POLYETHYLENE		



Date: 10/04/2017

Printed By:
Property Searches

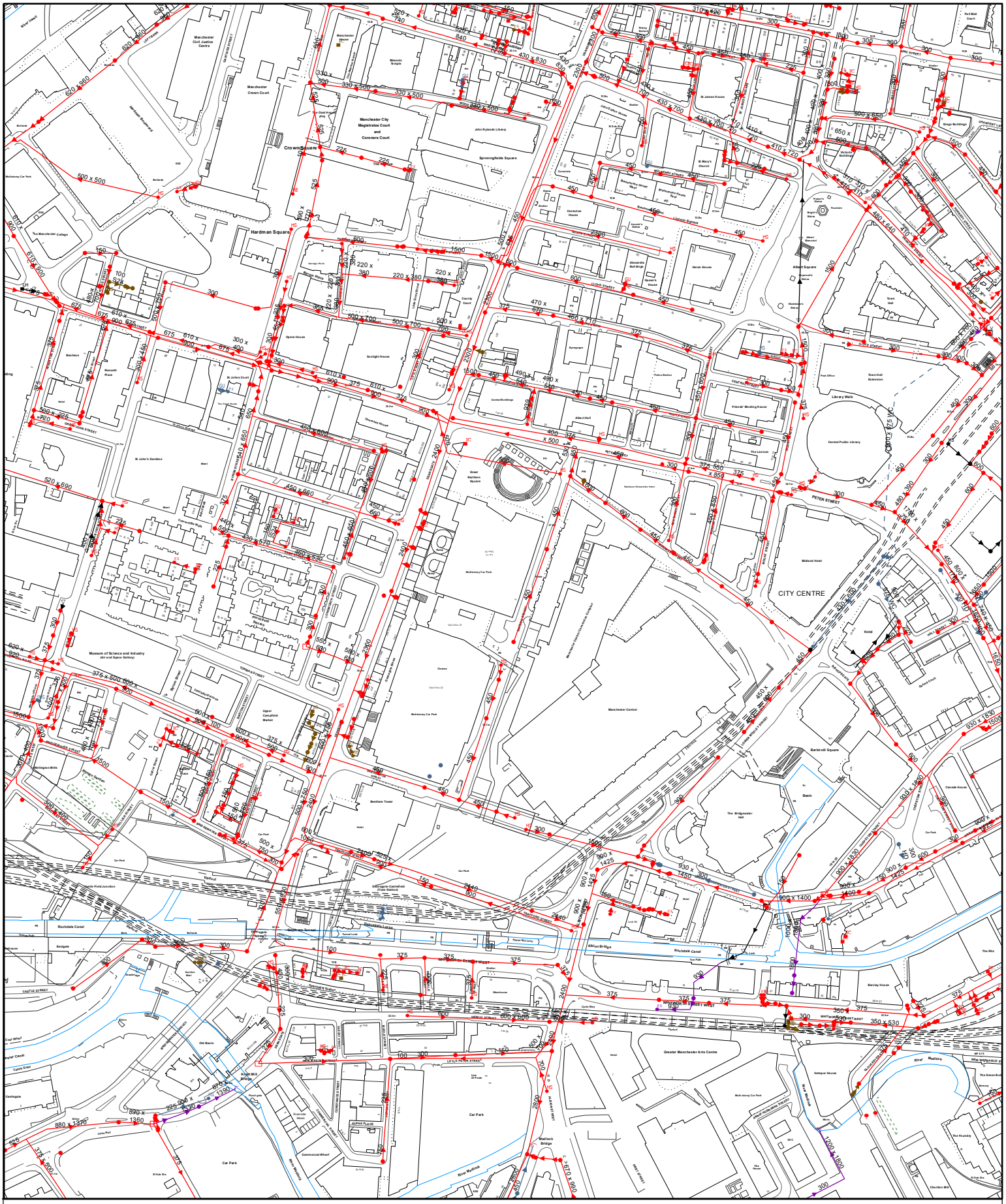
Extract from Map Of Water Mains

DEANSGATE AND WATSON STREET

United Utilities
helping life flow smoothly

The position of this underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available.The actual positions may be different from those shown on the plan, private service pipes may be shown where a known record is available. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown. Crown copyright and database rights [2016] Ordnance Survey 100022432.

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Date: 10/04/2017

Printed By:
Property Searches

Extract from Map of Public Sewers

DEANSGATE AND WATSON STREET

United Utilities
helping life flow smoothly

The position of this underground apparatus shown on this plan is approximate only and is given in accordance with the best information currently available.The actual positions may be different from those shown on the plan and private pipes, sewers or drains may not be recorded. United Utilities Water will not accept liability for any loss or damage caused by the actual position being different from those shown. Crown copyright and database rights [2016] Ordnance Survey 100022432.

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Debbie Miller

From: Victor Nwegbu <v.nwegbu@manchester.gov.uk>
Sent: 13 April 2017 09:31
To: Debbie Miller
Subject: Fwd: Fw: Ref: URO5612.1DM - Site : Around Deansgate and Watson Street, Manchester, M3 4EJ
Attachments: URO5612.1DM.png; Location.jpg

Hello Debbie Miller

I can confirm that there are no Manchester City Council owned and maintained highway structures within your works boundary.
All the structures shown within the boundary are privately owned - see attached file.

However, if your works involves excavating or building below the existing highways ground level that would require temporary or permanent support to the highways, then we need the works details and an AIP (Approval In Principle) before you proceed with the works.
A fee is charged for the check and approval.

Should you require any further details on the MCC owned structures, please do not hesitate to contact me.

Regards

Victor

Victor K. NWEGBU (Ph.D.)
Assistant Engineer

Postal Address:
HIGHWAYS
Manchester City Council
PO Box 532 Town Hall
Manchester
M60 2LA

Office location:
Level 6, Town Hall Extension
Lloyd Street
Manchester
M2 5HD (Sat Nav)

Telephone: 0161 219 6668
Internal: 801 36668
Mobile : 07742 227406
E-mail: v.nwegbu@manchester.gov.uk
Website: www.manchester.gov.uk

---------- Forwarded message ----------

----- Forwarded by Andrew Crompton/Housing/MCC on 12/04/2017 16:46 -----

contact@mancheste

r.gov.uk

To
11/04/2017 17:51 EngCP8/MCC@MCC,
cc

Please respond to contact@mancheste r.gov.uk

Subject
Fw: Ref: URO5612.1DM - Site : Around Deansgate and Watson Street, Manchester, M3 4EJ

Email sent by: Danielle McCluskey

----- Forwarded by SWCP-Contact on 11/04/2017 17:51 -----

Debbie Miller <DMiller@groundwise.com>

06/04/2017 10:32

To "communications@amey.co.uk" <communications@amey.co.uk>, "contact@manchester.gov.uk" <contact@manchester.gov.uk>

cc

Subject FW: Ref: URO5612.1DM - Site : Around Deansgate and Watson Street, Manchester, M3 4EJ

Request for plans & information showing the location of any council owned assets within the vicinity of the following site:

Street Lighting apparatus/cabling
CCTV apparatus/cabling
Traffic Signal apparatus/cabling

Ref: URO5612.1DM
Site : Around Deansgate and Watson Street, Manchester, M3 4EJ
Grid reference: 383535,397841
Requests:

For your reference, we have provided a site plan. Please use both the grid reference/postcode & site plan when responding to our requests.

We are doing research on the above site for a client and would be grateful if you could confirm whether the above operators have any cabling or apparatus in the immediate vicinity. Should there be anything detected in the vicinity plus 50 meters around the site, I would appreciate a plan showing the location. The reason we need the information is so our client can avoid digging through your cables or can investigate the potential for connecting with your network.

I enclose location plans of the site for your convenience and look forward to hearing from you. We shall of course be providing a copy of your response to our client as part of a wider report on the site including reports from other utility companies or providers.

Should you have any problems in identifying the location of the sites or should you require further clarification of the details requested, please do not hesitate to contact me.

I look forward to receiving details from you and thank you in advance for your assistance in this matter.

Kind regards,

Debbie Miller
Production Researcher
Groundwise Searches Ltd

GROUNDWISE

dmiller@groundwise.com | 01702 615566 | www.groundwise.com
Suite 8 Chichester House, 45 Chichester Road, Southend-on-Sea, Essex SS1 2JU

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that any e-mails or attachments are virus free, as Groundwise Searches Ltd

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permanently delete this message.

Business Address and Registered Office - Suite 8 Chichester House, 45

Chichester Road, Southend-on-Sea, Essex SS1 2JU
Company Registration Number 4130795VAT number 769 0642 02
(See attached file: URO5612.1DM.png)

****

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

Please contact internet.administrators@manchester.gov.uk with any queries.

****


★Quay Street Retaining Wall
★Quay Street Development Arups
et Tunnel (RIVER IRWELL)
★Camp Street Canal Tunnel (RIVER IRWELL)
★Deansgate Canal Tunnel (RIVER IRWELL)
★Watson Street Tunnel Bridge (RIVER IRWELL)
★Watson Street Footbridge
★Campfield Avenue Canopy Bridge
★Great Bridgewater Street Railway Bridge (demolished 1999)
★Barton Street Retaining Wall
★CENTRAL STATION ACCESS RAMP (DEMOLISHED 1999)
★Deansgate Bridge - North
★Central Station Bridge
Bridge (DISUSED)
★Metrolink Bow Bridge
Bridge No. 3
★Bridgewater Street Bridge

Groundwise Searches Ltd

Terms & Conditions

1. Definitions

"Client" means any company or other person or body placing an Order with Groundwise; "Equipment" means pipes wires cables and other plant or equipment;
"Fee" means in relation to a Site of an area not exceeding the Standard Maximum Area the fee for carrying out a Search identified either on Groundwise website (where an Order is placed through the website) or on the Order Form where an Order is placed using an Order Form plus Value Added Tax and in relation to a Site of an area exceeding the Standard Maximum Area shall be such sum as shall be agreed between Groundwise and a Client plus Value Added Tax;
"Groundwise" means Groundwise Searches Limited
"Order" means an order by a Client from Groundwise for the provision of a Search whether placed electronically through Groundwise's website or in paper form using an Order
Form;
"Order Form" means Groundwise's current standard Utility Searches Order Form for placing an order for a Search in hard copy;
"Report" means a written report in hard copy provided by Groundwise to a Client reflecting the results of Groundwise's enquiries of Utility Companies in response to an Order; "Search" means making enquiries of the Utility Companies likely to have utilised or operated Equipment on a Site, as to the location of any Equipment on that Site following acceptance by Groundwise of an Order, and providing the Client with a Report;
"Site" means a site identified on a plan submitted with an Order which in relation to any Order placed electronically shall not exceed the Standard Maximum Area;
"Standard Maximum Area" means an area no greater than 15 hectares or of a length no greater than one kilometre and a width no greater than two hundred metres;
"Terms of an Order" means in the case of an Order placed electronically the information requested from a Client relating to a Site, the provisions relating to the method of payment, the information contained in or accessed through the tabs appearing on an Order Summary and all other applicable information contained in Groundwise's website and in the case of an Order placed in hard copy means the provisions of a completed Order Form.

2. Agreement

2.1 The Terms of an Order together with these Terms and Conditions constitute the terms of a contract ("Contract") between Groundwise and a Client for the carrying out of a Search.
2.2 A Contract shall come into effect when Groundwise notifies a Client that it has accepted an Order. Where such notification is by email it shall be deemed to have occurred as soon as Groundwise has sent the email to the Client, where such notification is by letter, upon the posting of the letter to the Client, or where there is a verbal acceptance when Groundwise verbally confirms acceptance of an Order to the Client.

3. Payment and Refunds

3.1 Other than in the case of Clients who have set up an account with Groundwise, when placing an Order a Client shall provide Groundwise with credit card details sufficient to enable Groundwise to debit that credit card with the Fee and by such notification and subject to accepting the relevant Order Groundwise is authorised to debit that credit card with the Fee
3.2 In the case of Clients who have an account with Groundwise the Fee shall be paid within 28 days of the acceptance of an Order by Groundwise
3.3 Groundwise shall be entitled to terminate any account set up with it by a Client any time without notice and to require payment in accordance with paragraph 3.1
3.4 Where a Client cancels an Order :
3.4.1 within three hours of that Order being accepted by Groundwise, Groundwise shall promptly refund the Fee paid plus Value Added Tax in full, or where no fee has been paid no fee shall be payable;
3.4.2 within three days but after the elapse of three hours of an Order being accepted by Groundwise, Groundwise shall promptly refund 50% of the Fee paid plus Value Added Tax or where no fee has been paid 50% of the fee plus Value Added Tax shall be payable and in either such case following such reimbursement or where no payment has been made upon making any payment due the relevant Contract shall terminate without further liability on the part of Groundwise or of the Client.

4. Limitation of Liability

4.1 Groundwise shall use its reasonable endeavours to provide a Search within the period referred to in the Order and shall not be liable for any delay arising because of any act omission or delay of any Utility Company.
4.2 Without limiting the liability of Groundwise in the case of death or personal injury Groundwise shall have no liability to a Client:
4.2.1 for the information contained in a Report to the extent that any errors or omissions reflect the errors or omissions of a Utility Company in providing or omitting to provide information to Groundwise and to the extent that that Utility Company has no liability to Groundwise in relation to the provision of such information, or the omission to provide relevant information;
4.2.2 in relation to any Report for loss or damage arising in relation to loss of profits, loss of business, loss of use, or any special indirect consequential or pure economic loss, costs, damages, charges or expenses and subject as earlier provided Groundwise's total liability in contract, tort (including negligence or breach of statutory duty), misrepresentation restitution or otherwise in relation to the performance or contemplated performance of the Services shall be limited £2,000,000.00 and 4.2.3 to any third party for any errors or omissions contained in or omitted from a Report.

5. Copyright

5.1 The copyright in the Report is the property of Groundwise and the Report may not be copied or reproduced in whole or in part nor communicated or divulged to any third party without the prior written consent of Groundwise.

6. Data Protection

The Client acknowledges and agrees that details of the Client's name address and payment record may be submitted to a credit reference agency and personal data will be processed by and on behalf of Groundwise in connection with the Searches

7. Force Majeure

Groundwise will have no liability to the Client if it is prevented from or delayed in performing its obligations under a Contract by acts events omissions or accidents beyond its reasonable control, including strikes, lock-outs and other industrial disputes, failure of a utility service or transport network, act of God, war, riot, civil commotion, malicious damage, compliance with any law or governmental order rule regulation or direction, accident, breakdown of plant or machinery, fire, flood, storm or default of suppliers or sub-contractors.

8. Severance

8.1 If any provision or part of any provision in these terms and conditions or of any Contract is found by any court or administrative body of competent jurisdiction to be invalid, unenforceable or illegal, the other provisions will remain force.
8.2 If any invalid, unenforceable or illegal provision would be valid, enforceable or legal if some of it were deleted that provision will apply with whatever modification is necessary to make it valid, enforceable and legal.
8.3 The parties agree, in the circumstances referred to in paragraph 8.1 above to attempt to substitute for any invalid, unenforceable or illegal provision a valid, enforceable and legal provision which achieves to the greatest extent possible the same effect as would have been achieved by the invalid, unenforceable or illegal provision.

9. Status of Pre-Contractual Statements

Each of the parties acknowledges and agrees that in entering into a Contract it does not rely on any undertaking, promise, assurance, statement, representation, warranty or understanding (whether in writing or not) of any person (whether party to these terms and conditions or not) relating to the subject matter of a Contract.

10. Assignment

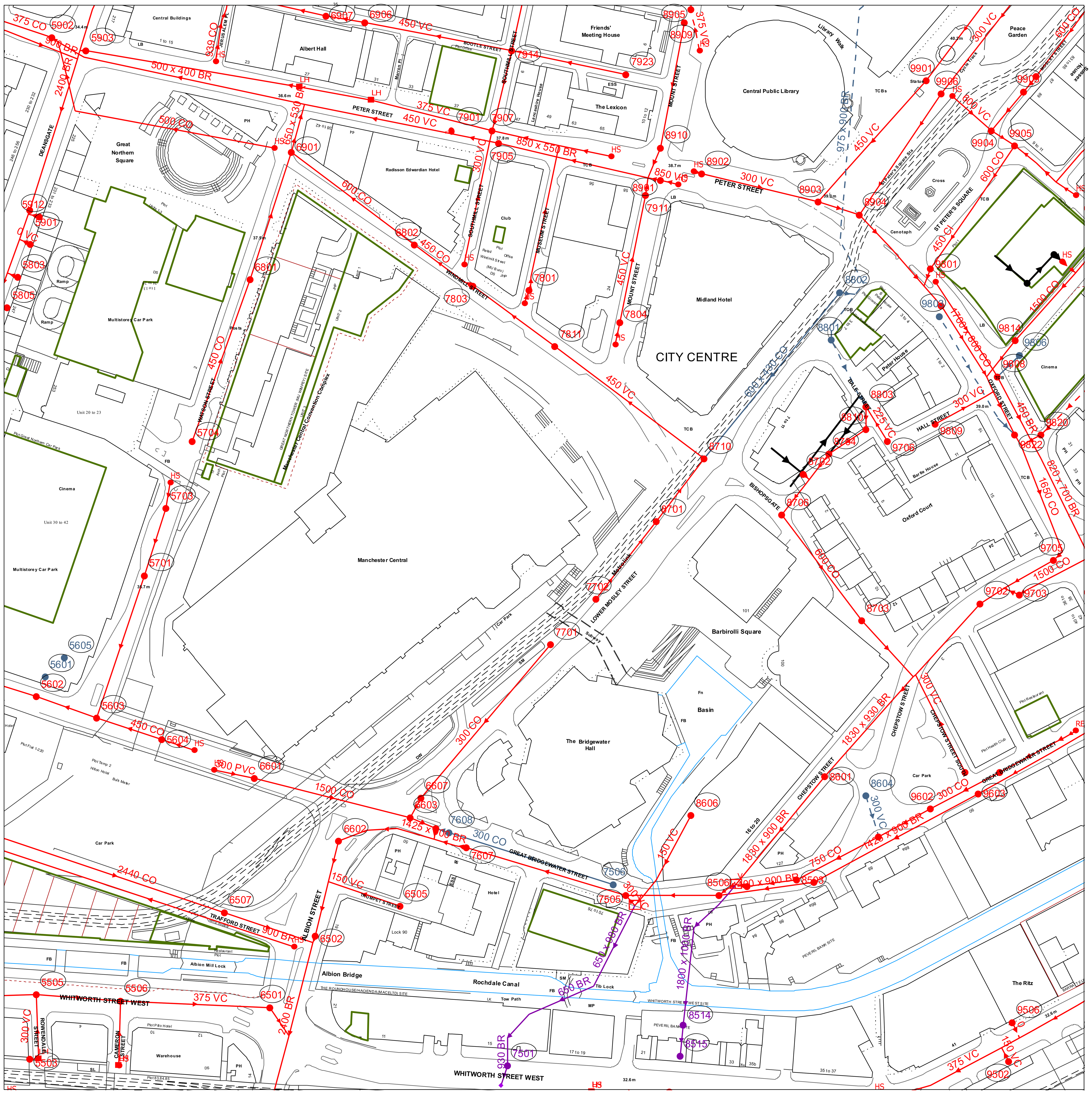
A Client shall not, without the prior written consent of Groundwise, assign transfer charge sub-contract or deal in any other matter with any of its rights under a Contract.

11. Third Party Rights

For the purposes of the Contracts (Rights of Third Parties) Act 1999 it is not intended that the rights of either of the parties shall be contractually enforceable by any third party.

12. Governing Law and Jurisdiction

These terms and conditions and any Contract are governing by and construed in accordance with the laws of England and Wales and the parties irrevocably agree that the courts of England and Wales shall have non-exclusive jurisdiction to settle any dispute or claim that arises out of or in connection with these terms and conditions or any Contract.



OS Sheet No: SJ8397NE

Printed By: Donna Camblin

Scale: 1: 1250 Date: 17/01/14

Refno	Cover	Func	Invert	Size.x	Size.y	Shape	Matl	Length	Grad
5503	33.4	CO	30.67	300		CI	VC	34.02	1
5505	33.83	CO							
5506	34.08	CO							
5601	36.03	SW							
5602	35.48	CO							
5603	35.59	CO							
5604	35.71	CO							
5605	35.76	SW							
5701	35.76	CO	32.7	450		CI	CO	69.57	2
5703	17.87	CO							
5704		CO	0	450		CI	CO	79.71	37
5801		CO		0		CI	VC	5.41	
5803		CO		0		CI	VC	5.16	
5805		CO		0		CI	VC	5.45	
5901	34.79	CO	21.81	2400		CI	BR	70.23	8
5902	34.19	CO	31.03	375		CI	CO	55.67	1
5903	34.5	CO							
5912		CO		0		CI	VC	4.98	
6501	34.91	CO							
6502	36.02	CO							
6505	35.94	CO		150		CI	VC	34.92	
6507	9.01	CO							
6601	35.88	CO							
6602	36.37	CO							
6603	37.02	CO	31.39	1500		CI	CO	13	0
6607	38.01	CO							
6801		CO	0	450		CI	CO	61.98	21
6802	18.46	CO							
6901	36.94	CO							
6906	18.09	CO	0	450		CI	VC	18.25	8
6907	27.13	CO							
7501	33.14	OV	27.68	1330	900	EG	BR	9.49	0
7505	37.28	CO							
7506	37.31	SW	34.55	300		CI	CO	79.7	2
7607	37.09	CO							
7608	37.09	SW							
7609	37.12	CO							
7701	39	CO	35.54	300		CI	CO	92.96	3
7702		CO	0	450		CI	CO	22.8	5
7801	39.53	CO							
7803	39.37	CO							
7804	39.52	CO	36.53	450		CI	VC	60.21	1
7811		CO	0	450		CI	VC	47.2	10
7901		CO							
7905	37.89	CO	34.47	300		CI	BR	25.5	0
7907	37.82	CO							
7911		CO							
7914	38.51	CO							
7923		CO	0	450		CI	VC	54.13	17
8502	36.36	CO	23.56	1400	900	EG	BR	44.41	4
8503	36.47	CO	31.55	750		CI	CO	23.19	0
8504	36.93	CO							
8506	36.98	CO							
8514		OV							
8515		OV							
8601	36.5	CO							
8604	35.93	SW	33.35	300		CI	VC	19.92	0
8606		CO	0	150		CI	VC	49.49	44
8701	39.37	CO	35.25	450		CI	VC	36.4	1
8702	37.28	CO	34.68	600		CI	CO	3.8	0
8703	36.76	CO							
8704	37.6	CO							
8706	37.42	CO	32.92	600		CI	CO	61.4	2
8710	39.43	CO							
8801	39.34	SW							
8802	39.51	SW	35.59	600	430	EG	CO	99.49	3
8803	37.76	CO							
8810	37.6	CO							
8901	38.88	CO							
8902	39.04	CO							
8903	39.45	CO							
8904	39.66	CO							
8905	39.82	CO	36.02	375		CI	VC	2	6
8909		CO	0	450		CI	VC	59.03	15
8910		CO							
9502		CO	0	150		CI	VC	7.37	4
9506		CO		0		CI		7.87	
9601	36.54	CO							
9602	36.14	CO							
9603	36.26	CO							
9604	36.45	CO	33.34	300		CI	CO	36.24	1
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9702	38.08	CO							
9703	38.33	CO	29.42	1500		CI	CO	7.62	0
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9706	37.71	CO	36.36	225		CI	VC	18.87	0
9801	39.33	CO	31	450		CI	CI	8.54	0
9802	39.35	CO							
9803	39.23	SW	35.83	300		CI	VC	54.2	
9806	39.32	SW	36.1	450		CI	VC	14.14	0
9808	39.09	CO							
9809	38.17	CO	30.88	300		CI	VC	30.89	1
9814		CO							
9820	39.27	CO							
9822	38.93	CO							
9901	39.86	CO							
9902	41.04	CO	36.63	600		CI	CO	9.22	0
9903	40.42	CO							
9904	40.27	CO							
9905	40.25	CO							
9906	39.99	CO							
5606		CO	0	450		CI	CO	15.81	5
5607		CO	0	300		CI	PVC	19.42	5
5610		CO	0	2440		CI	CO	106.57	14
5702		CO	0	450		CI	CO	12.17	3
5904		CO	0	939		CI	CO	14.14	9
5908		CO	0	500		CI	BR	32.98	6
5911		CO							
6503		CO	0	900		CI	BR	140.09	19
6904		CO							
6905		CO	0	540		CI	CO	6.08	2
6915		CO	0	500		CI	CO	93.56	21
7502		OV	0	930		CI	BR	27.87	5
7508		OV	0	650		CI	BR	32.7	4
7703		CO							
7802		CO							
7808		CO	0	300		CI	VC	63.35	8
7812		CO	0	800	470	FT	BR	6.32	1
7815		CO	0	450		CI	VC	10.2	3
7920		CO	0	375		CI	VC	24.52	5
8501		CO							
8511		OV							
8809		SW	0	970	920	UN	BR	3.16	0
8906		CO	0	850		CI	VC	8.25	2
8907		CO	0	300		CI	VC	4.12	0
8908		CO		375		CI	VC	19.42	
9501		CO							
9710		CO	0	1830	930	EG	BR	5.66	0
9804		CO							
9813		CO							
9815		CO							
9818		CO	0	450		CI	VC	52.7	9
9907		CO	0	600		CI	VC	24.08	6
9909		CO							
9912		CO	0	600	450	EG	BR	10.82	1
9914		CO							
9915		CO							
5502		CO							
5508		CO							
5609		CO							
5802		CO							
5804		CO							
5905		CO	0	500	500	SQ	BR	3.61	1
5906		CO	0	2400		CI	BR	97.42	7
5907		CO							
5910		CO							
5913		CO							
6504		CO							
6506		CO							
6508		CO							

Refno	Cover	Func	Invert	Size.x	Size.y	Shape	Matl	Length	Grad
6606		CO							
6902		CO							
6903		CO							
6911		CO							
6912		CO							
6913		CO	0	939		CI	CO	5.39	1
7611		CO							
7809		CO							
7813		CO	0	850	450	EG	BR	62.37	13
7921		CO							
7922		CO							
7930		CO							
8705		CO							
8804		SW							
8807		SW							
9503		CO	0	375		CI	VC	78.24	37
9504		CO							
9507		CO							
9612		CO							
9613		CO							
9615		CO							
9616		CO	0	1425	900	EG	BR	38.95	3
9617		CO							
9708		CO							
9709		CO							
9711		CO							
9712		CO	0	820	700	EG	BR	186.15	26
9807		CO							
9811		SW	0	300		CI	VC	11.31	1
9812		CO							
9817		CO							
9823		CO							
9825		CO							
9827		CO	0	550	475	EG	BR	8.49	4
9910		CO							
8707		SW							
8709		CO							
8811		CO							
9805		CO							
9810		CO							
9819		CO							
7504		CO	30.31	300		CI	VC	6.41	0
8507		CO							

WASTE WATER SYMBOLOGY



LEGEND

MANHOLE FUNCTION

FO Foul
SW Surface Water
CO Combined
OV Overflow

SEWER SHAPE

CI	Circular	TR	Trapezoidal
EG	Egg	AR	Arch
OV	Oval	BA	Barrel
FT	Flat Top	HO	HorseShoe
RE	Rectangular	UN	Unspecified
SQ	Square		

SEWER MATERIAL

AC	Asbestos Cement	DI	Ductile Iron
BR	Brick	PVC	Polyvinyl Chloride
PE	Polyethylene	CI	Cast Iron
RP	Reinforced Plastic Matrix	SI	Spun Iron
CO	Concrete	ST	Steel
CSB	Concrete Segment Bolted	VC	Vitrified Clay
CSU	Concrete Segment Unbolted	PP	Polypropylene
CC	Concrete Box Culverted	PF	Pitch Fibre
PSC	Plastic/Steel Composite	MAC	Masonry, Coursed
GRC	Glass Reinforced Concrete	MAR	Masonry, Random
GRP	Glass Reinforced Plastic	U	Unspecified

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OS Sheet No: SJ8397NE
Scale: 1: 1250 Date: 17/01/14
193 Nodes
Sheet 1 of 1

United Utilities

SEWER RECORDS

Appendix C

Topographical Surveys

Architect Existing Terraces Plans

Architect Existing Warehouse Plans

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PLAN GRID NORTH

File Name: S14423-CCTV.dwg

LEGEND

AV	AIR VALVE
BT	BT INSPECTION COVER
C	CATCHPIT / GULLY
CCTV	CCTV CAMERA POST
COM	COMMUNICATIONS COVER
CP	CONTROL POINT
DI	DRAINAGE CHANNEL
DC	DRAIN COVER
DR	DRAIN
ELE	ELECTRIC INSPECTION COVER
ELB	ELECTRIC BOX
ER	EARTH ROD
FL	FLOOD LIGHT POLE
FFL	FINISHED FLOOR LEVEL
FH	FIRE HYDRANT
G	GULLY
GL	GROUND LIGHT
GT	GAS TAP
GV	GAS VALVE
IC	INSPECTION COVER
K	KERB OUTLET
K.D.	KERB DROP
LP	LAMP POST
MKR	MARKER
MP	MANHOLE PIPE
PN	PYLON
PP	PETROL PUMP
SP	SIGN POST
PWP	PASSENGER PIPE
SOF	SUPPLY LEVEL
TC	TRIAL CHAMBER
TCB	TELEPHONE CALL BOX
TL	TRAFFIC LIGHT
TP	TELEPHONE JUNC BOX
TR	TELEGRAPH POLE
WC	WATER COVER
WO	WATER OUTLET
WT	WATER STOP TAP
WV	WATER STOP VALVE
EOT	END OF TRACE
OOA	OUT OF SURVEY AREA
UTL	UNABLE TO LIFT
UTR	UNABLE TO RODDE
UTT	UNABLE TO TRACE
S/L	SIGNAL LOSS
MH	MANHOLE
NFC	NO FURTHER OPR CONTACTS
NVP	NO VISIBLE PIPE
NVM	NO VISIBLE MH
↳	EOT SYMBOL

BT	BT
DUCT	DUCT
CCTV	CCTV
TELECOMS	TELECOMS
ELECTRIC	ELECTRIC
FUEL	FUEL
MAINS WATER	MAINS WATER
MAINS GAS	MAINS GAS
SEWER FW	SEWER FW
SEWER SW	SEWER SW
UNIDENTIFIED CABLE	UNID
UNIDENTIFIED TRACE	UNID
UNIDENTIFIED CABLE	UNID
UNIDENTIFIED TRACE	UNID
VEHICLE DETECTOR CABLE	VDC
SURVEY BOUNDARY	

FROM STATUTORY AUTHORITY PLANS

BT	
CABLE DUCT	
CATV	
CCTV	
TELECOMS	
ELECTRIC	
MAINS GAS	
MAINS WATER	
SEWER FW	
SEWER SW	
LAMP COLUMN	

NOTES

All levels relate to O.S (Newlyn) Datum. Established using network RTK. Survey plotted on a plane local grid, orientated to National Grid.

Services shown as 'From Statutory Authority Plans' line styles are taken from Statutory Records plans supplied by the relevant regional authority. These services were not located and are shown for indicative purposes only.

DISCLAIMER:

At SEP we use skilled and experienced staff, modern up to date techniques and top of the range electromagnetic and radar technology to locate and trace sub-surface utilities. However the performance of the equipment employed in non-invasive surveys can be adversely affected by factors outside the control of SEP. Therefore SEP cannot guarantee that all utilities present on site have been located. It is the responsibility of the Client to consult regional authority records and undertake trial digs where appropriate.

Where similar services run in close proximity it may be impossible to separately trace individual services as the trace signal can experience interference. In such cases, services will be shown as a single, annotated line. The displayed depth will refer to the shallowest detected utility.

Successful tracing of non-conductive materials may be limited. Drainage gulleys are dye tested where possible to prove connectivity but it is not always possible to introduce the sonde due to narrow pipe sizes and/or accumulated silt.

Depth information of underground services/features are generally accurate to within +/- 10% (i.e. a pipe at 2m deep may be accurate to +/-200mm) but this cannot be guaranteed. Depths shown usually refer to the top of the service. Gravity sewer and drain depths are usually to invert (base of drainage channel) unless otherwise stated.

Some above ground features may have been obscured at time of survey. It is not always possible to operate the Ground Penetrating Radar in areas including, but not limited to, dense vegetation, rubble, debris and/or rough/uneven ground.

Existing record information that was made available to SEP by the Client or by the statutory utility provider should be regarded only as an indication and cannot be guaranteed.

Excavation in the vicinity of services shown should be carried out with due diligence (Ref. HSG47).

SHEET LAYOUT

0 2m 4m 8m 12m 16m

SCALE BAR

REV	DATE	DESCRIPTION

SEP DRAINAGE SURVEYS

Client
Curtis Consulting Ltd
17-19 Whitworth Street West
Manchester
Greater Manchester

Project Title
Utility Survey of Land at:
Great Northern
Deansgate
Manchester
Greater Manchester

Surveyed	Drawn	Checked
M. Bullock	C. Gaudie	M. Bullock

Scale	Date	Drawing Ref.	No.	Size	Rev
1:200	Jun 17	S14423-CCTV	01	A0	--

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PLAN GRID NORTH

File Name: 1286SWV001.dwg

LEGEND

AV	AIR VALVE	BP	PETROL PUMP
BC	BOLLARD COVER	PC	PETROL COVER
CB	CONTROL BOX	RWP	RAINWATER PIPE
CCTV	CCTV CAMERA POST	SOF	SOFFIT LEVEL
COV	CABLE JUNCTIONS COVER	TC	TELEPHONE
CP	CABLE PROTECTION	TCB	TELEPHONE CALL BOX
DC	DRAINAGE CHANNEL	TL	TRAFFIC LIGHT
DP	DOWN PIPE	TLB	TRAFFIC LIGHT BOX
EC	ELEC. COVER	TP	TRAFFIC LIGHT POLE
EIG	ELEC. INSPECTION COVER	WM	WATER METER
EB	ELECTRIC BOX	WO	WATER OUTLET
ER	EARTH ROD	WSV	WATER STOP TAP
FH	FIRE HYDRANT	WV	WATER VALVE/VALVE
FL	FINISHED FLOOR LEVEL	EOT	END OF TRACE
FH	FIRE HYDRANT	OSA	OUT OF SURVEY AREA
GC	GAS COVER	UTO	UNABLE TO OPEN
GLT	GROUND LIGHT	UTS	UNABLE TO STAKE
GST	GAS TAP	UTT	UNABLE TO TRACE
GV	GAS VALVE	BL	BLOCKED
IC	INSPECTION COVER	BLK	BLOCKED
IL	INVERT LEVEL	NFW	NO FURTHER WORK
LC	LIGHTING COLUMN	NVP	NO VISIBLE PIPE
LP	LAMP POST	NVS	NO VISIBLE SVS
MH	MANHOLE	ToP	TOP OF PIPE
MW	MANWAY	ToS	TOP OF SILL
OP	OVERFALL PIPE		EOT/OTHER DIRECTION
PN	PYLON		GPR EOT SYMBOL

BT
CABLE DUCT
CABLE TV
CCTV
TELECOMS
EARTH ROD STRIP
ELECTRIC
FIBRE OPTICS
FUEL LINE
FUEL INJECTION LINE
MAINS GAS
MAINS WATER
SEWER FW
SEWER SW
TRAFFIC SIGNAL CABLE
UNIDENTIFIED TRACE
UNIDENTIFIED CABLE
UNIDENTIFIED PIPE
VEHICLE DETECTION CABLE
Rail

Linetypes With Suffixes (S) (A) (R) show Statutory Authority, Assumed and Recorded Underground Data

NOTES:

All levels relate to Existing Site Datum, orientated to Existing Site Grid.

Services shown as 'From Statutory Authority Plans' are styles as taken from Statutory Records plans supplied by the relevant regional authority. These services were not located and are shown for indicative purposes only.

Only manholes and services visible at time of survey shown.

Drainage information must be checked and verified with local authority records prior to work commencing.

Please note all drainage information and chamber position have be taken from CCTV condition survey.

Drainage information added to drawing supplied by client.

DISCLAIMER:

At Layer Surveys staff are skilled and experienced staff, modern up to date equipment and follow BSI 10500 Code of Practice and Standard methodology to locate and trace sub-surface utilities. However the performance of the equipment employed in non-invasive surveys can be adversely affected by factors outside the control of Layer Surveys. Therefore Layer Surveys cannot guarantee that all utilities present on site have been located. It is the responsibility of the Client to consult regional authority records and undertake trial digs where appropriate.

Where similar services run in close proximity it may be impossible to separately trace individual services as the trace signal can experience interference. In such cases, services will be shown as a single, generalised line. The displayed depth will refer to the shallowest detected utility.

Successful tracing of non-conductive materials may be limited. Drainage gulleys are dye tested where possible to prove connectivity but it is not always possible to introduce the smoke due to narrow pipe sizes and/or accumulated silt.

Depth information of underground services/features are generally accurate to within +/- 10% (i.e. a pipe at 2m deep may be accurate to +/-200mm) but this cannot be guaranteed. Depths shown usually refer to the top of the service. Gravity sewer and drain depths are usually to invert (base of drainage channel) unless otherwise stated.

Some above ground features may have been obscured at time of survey. It is not always possible to operate the Ground Penetrating Radar in areas including, but not limited to, dense vegetation, rubble, debris and/or rough/uneven ground.

Existing record information that was made available to Layer Surveys by the Client or by the statutory utility provider should be regarded only as an indication and cannot be guaranteed.

Excavation in the vicinity of services shown should be carried out with due diligence (Ref. HSG47).

0 20m 40m 80m 120m
SCALE BAR 1:200

REV	DATE	DESCRIPTION

Layer Surveys Ltd
See the Complete Picture

Client
Civic Engineers
Corvers Warehouse
77 Dale Street
Manchester.M1 2HG

Project Title
The Great Northern Warehouse
Management Suite
235 Deansgate
Manchester M3 4EN

Surveyed	Drawn	Checked
J.C.	I.T	Layer Surveys

Scale	Date	Drawing Ref.	No.	Size	Rev
1:200	June 22	1286	01	A1	

COVER BROKEN, UNSAFE TO LIFT
CHAMBER IS SIDE ENTRY FOR MAIN SEWER IN ROAD
REF MH30
REF MH31
JU CHAMBER 4805 LIFTED. CHAMBER IS 16m PLUS DEEP, WITH HEAVY FLOW. MAN ENTRY REQUIRED FOR FURTHER INVESTIGATION.
UNABLE TO COMPLETE CCTV SURVEY DUE TO CHAMBER/SEWER BEING BLOCKED WITH WASTE AND RUBBLE. CLEAN REQUIRED IN ORDER TO COMPLETE
REF MH32
REF MH11 DEPTH 0.99m
REF MH20 DEPTH 0.83m
CHAMBER/SEWER BLOCKED AT TIME OF SURVEY. CLEAN REQUIRED IN ORDER TO COMPLETE
REF MH27 DEPTH 0.89m
REF MH26 DEPTH 1.16m
CCTV ABANDONED AT 1.50m DUE TO DEPOSITS
UNABLE TO COMPLETE CCTV SURVEY DUE TO CHAMBER/SEWER BEING BLOCKED WITH WASTE AND RUBBLE. CLEAN REQUIRED IN ORDER TO COMPLETE
REF MH33
CCTV ABANDONED AT 1.60m DUE TO DEPOSITS
REF MH21 DEPTH 1.09m
CHAMBER/SEWER BLOCKED AT TIME OF SURVEY. CLEAN REQUIRED IN ORDER TO COMPLETE
REF MH13 DEPTH 1.06m
UNABLE TO COMPLETE CCTV SURVEY DUE TO CHAMBER/SEWER BEING BLOCKED WITH WASTE AND RUBBLE. CLEAN REQUIRED IN ORDER TO COMPLETE
REF MH34
REF MH22 DEPTH 1.20m
CHAMBER/SEWER BLOCKED AT TIME OF SURVEY. CLEAN REQUIRED IN ORDER TO COMPLETE
REF MH28
REF MH14 DEPTH 1.47m
UNABLE TO COMPLETE CCTV SURVEY DUE TO CHAMBER/SEWER BEING BLOCKED WITH WASTE AND RUBBLE. CLEAN REQUIRED IN ORDER TO COMPLETE
REF MH35
REF MH23 DEPTH 1.26m
CHAMBER/SEWER BLOCKED AT TIME OF SURVEY. CLEAN REQUIRED IN ORDER TO COMPLETE. POSSIBLE CLAY INTERCEPTOR
REF MH29
REF MH15 DEPTH 1.17m
UNABLE TO COMPLETE CCTV SURVEY DUE TO CHAMBER/SEWER BEING BLOCKED WITH WASTE AND RUBBLE. CLEAN REQUIRED IN ORDER TO COMPLETE
REF MH36
REF MH37
REF MH24
CCTV ABANDONED AT 6.76m DUE TO DEPOSITS
REF 50 DEPTH 1.30m
UNKNOWN USAGE. POSSIBLE REDUNDANT CHAMBER
REF MH10
UNABLE TO LIFT COVER AT TIME OF SURVEY DUE TO BEING UNABLE TO REMOVE BOLTS
REF MH50A
REF MH9 DEPTH 1.09m
REF MH50 DEPTH 0.95m
REF MH9 DEPTH 1.29m
CCTV ABANDONED AT 26.71m DUE TO DEBRIS
UNABLE TO LIFT COVER AT TIME OF SURVEY
REF MH8
REF MH48 DEPTH 0.95m
CCTV ABANDONED AT 6.53m DUE TO DEBRIS
CCTV ABANDONED AT 5.05m DUE TO SLUDGE
REF MH7 DEPTH 2.76m
REF 5703
REF MH6 DEPTH 2.07m
UNABLE TO LIFT COVER AT TIME OF SURVEY DUE TO BEING UNABLE TO REMOVE BOLTS
REF MH47
POSSIBLE ROUTE OF SEWER LINE IS UNKNOWN

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PLAN GRID NORTH

File Name: LY1555SV001284.dwg

LEGEND

AV	AIR VALVE	BP	PETROL PUMP
BC	BOUNDARY CHAMBER	PC	PEDESTAL CAP
CB	CONTROL BOX	PIP	RAINWATER PIPE
CCTV	CCTV CAMERA POST	SOF	SOFFIT LEVEL
COV	CHAMBER/MANHOLE COVER	TB	TELEPHONE BOX
CW	CABLE/ELECTRICITY POST	TCB	TELEPHONE CALL BOX
DC	DRAINAGE CHANNEL	TL	TRAFFIC LIGHT
DP	DOWN PIPE	TLB	TRAFFIC LIGHT BOX
EB	ELECTRIC BOX	TP	TELEGRAPH POLE
EIC	ELEC. INSPECTION COVER	WM	WATER METER
ELB	ELECTRIC BOX	WO	WATER OUTLET
EK	CLUTCH KOD	WSO	WATER STOP TAP
FB	FLOWER BOX	WSV	WATER STOP VALVE
FFL	FINISHED FLOOR LEVEL	X	END OF TRACE
FH	FIRE HYDRANT	QSA	OUT OF SURVEY AREA
GL	GAS LAMP	UTO	UNABLE TO OPEN
GLT	GROUND LIGHT	UTS	UNABLE TO STAKE
GST	GAS TAP	UTT	UNABLE TO TRACE
GV	GAS VALVE	VEG	VEGETATION
IC	INSPECTION COVER	BLK	BLOCKED
IL	INVERT LEVEL	NFH	NO FURTHER GPR CONTACTS
LC	LIGHTING COLUMN	NFP	NO FURTHER PIPES
LP	LAMP POST	NP	NO WORKS PIPE
MH	MANHOLE	TOP	TOP OF PIPE
MPR	MANHOLE	EOT	EOT/LOT/TOT
OP	OVERFLOW PIPE		EOT/LOT/TOT DIRECTION
PN	PYLON		GPR EOT SYMBOL

BT	
CABLE DUCT	
CABLE TV	
CCTV	
TELECOMS	
EARTH ROD STRIP	
ELECTRIC	
FIBRE OPTICS	
FUEL LINE	
FUEL INJECTION LINE	
MAINS GAS	
MAINS WATER	
SEWER ON	
SEWER FW	
SEWER RW	
TRAFFIC SIGNAL CABLE	
UNIDENTIFIED TRACE	
UNIDENTIFIED PIPE	
UNIDENTIFIED PIPE	
VEHICLE DETECTION CABLE	
Rail	

Linetypes With Suffixes (S) (A) (R) show Statutory Authority, Assumed and Recorded Underground Data.

NOTES:
All levels relate to Existing Site Datum, orientated to Existing Site Grid.

Services shown as 'From Statutory Authority Plans' line styles are taken from Statutory Records plans supplied by the relevant regional authority. These services were not located and are shown for indicative purposes only.

Only manholes and services visible at time of survey shown.

Drainage information must be checked and verified with local authority records prior to work commencing.

Please note all drainage information and chamber position have be taken from CCTV condition survey.

Drainage information added to drawing supplied by client.

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Excavation in the vicinity of services shown should be carried out with due diligence (Ref. HSG47).

SCALE BAR 1:200

REV	DATE	DESCRIPTION

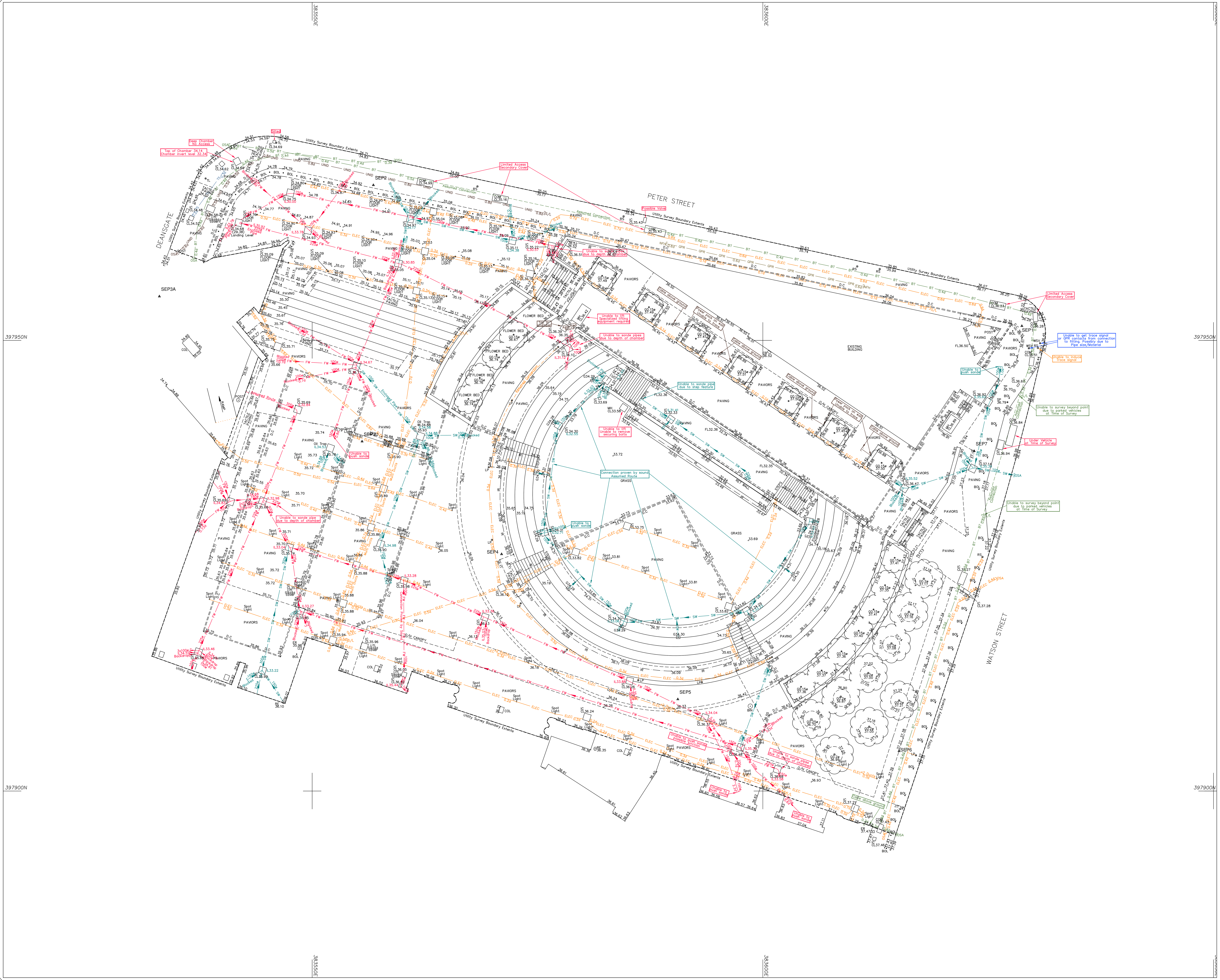
Layer Surveys Ltd
See the Complete Picture

Client
Civic Engineers
Corvers Warehouse
77 Dale Street
Manchester M1 2HG

Project Title
The Great Northern Warehouse
Management Suite
235 Deansgate
Manchester M3 4EN

Surveyed	Drawn	Checked
J.C	I.S	Layer Surveys

Scale	Date	Drawing Ref.	No.	Size	Rev
1:200	June 22	1284	02	A1	



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N

PLAN GRID NORTH

File Name: S12020-U-Deansgate.dwg

LEGEND

AV	AIR VALVE
BT	BT INSPECTION COVER
CB	CONTROL BOX
CCTV	CCTV CAMERA POST
COM	COMMUNICATIONS COVER
CTV	CABLE TV COVER
DC	DRAINAGE CHANNEL
DP	DOWN PIPE
DR	DRAIN
EIC	ELEC INSPECTION COVER
ELB	ELECTRIC BOX
ER	EARTH ROD
EP	ELECTRICITY POLE
FFL	FINISHED FLOOR LEVEL
FH	FIRE HYDRANT
G	GULLY
GLT	GROUND LIGHT
GST	GAS TAP
GSV	GAS VALVE
IC	INSPECTION COVER
IL	INVERT LEVEL
KO	KERB OUTLET
LP	LAMP POST
MH	MANHOLE
MKR	MARKER
OP	OUTFALL PIPE
PN	PYLON
PP	PETROL PUMP
RE	RODDING EYE
RWP	RAINWATER PIPE
SOF	SOFFIT LEVEL
SV	STOP VALVE
TCB	TELEPHONE CALL BOX
TL	TRAFFIC LIGHT
TLB	TRAFFIC LIGHT BOX
TP	TELEGRAPH POLE
WM	WATER METER
WO	WATER OUTLET
WST	WATER STOP TAP
WSV	WATER STOP VALVE
EOT	END OF TRACE
OSA	OUT OF SURVEY AREA
UTL	UNABLE TO LIFT
UTS	UNABLE TO SONDE
UTT	UNABLE TO TRACE
S/L	SIGNAL LOSS
BLK	BLOCKED
NFH	NO FURTHER GPR CONTACTS
BD	BACKDROP PIPE
⌴	EOT SYMBOL

Service	Line
BT	BT
CABLE DUCT	DUCT
CABLE TV	CATV
CCTV	CCTV
COMMUNICATION CABLE	COM
EARTH ROD STRIP	ER
ELECTRIC	ELEC
FIBRE OPTICS	F/O
FUEL LINE	FL
GPR	GPR
MAINS GAS	GAS
MAINS WATER	W
SEWER CW	CW
SEWER FW	FW
SEWER SW	SW
TRAFFIC SIGNAL CABLE	TS
UNIDENTIFIED TRACE	UNID
UNIDENTIFIED CABLE	UC
UNIDENTIFIED PIPE	UP
VEHICLE DETECTION CABLE	VDC
SURVEY BOUNDARY	

FROM STATUTORY AUTHORITY PLANS

Service	Line
COMMS	COMS STAT
BT	BT STAT
CABLE DUCT	DUCT STAT
CATV	CATV STAT
CCTV	CCTV STAT
ELECTRIC	ELEC STAT
MAINS GAS	GAS STAT
MAINS WATER	WTR STAT
SEWER CW	CW STAT
SEWER FW	FW STAT
SEWER SW	SW STAT

NOTES:

All levels relate to O.S (Newlyn) Datum, Established using network RTK. Survey plotted on a plane local grid, orientated to National Grid.

Services shown as "From Statutory Authority Plans" line styles are taken from Statutory Records plans supplied by the relevant regional authority. These services were not located and are shown for indicative purposes only.

SHEET LAYOUT

0 10m 20m 40m 60m 80m

SCALE BAR

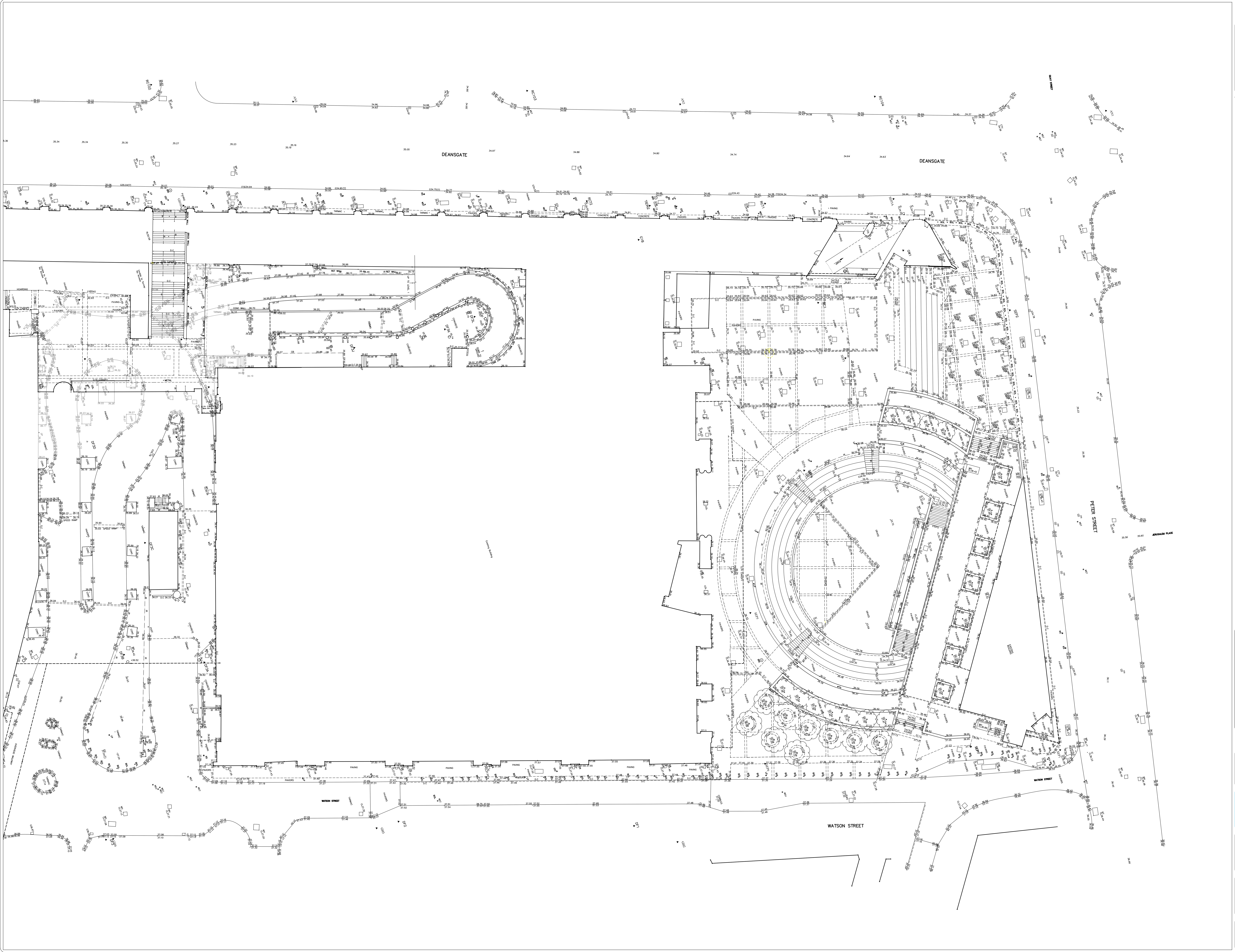
REV	DATE	DESCRIPTION

Client
2110 Consult
5 Parkway
Porters Wood
St Albans
Hertfordshire
AL3 6PA

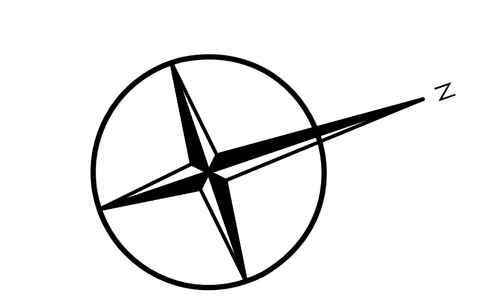
Project Title
Utility Survey of Land at:
Civic Square and Pavillion
The Great Northern
Deansgate
Manchester
M50 4EN

Surveyed	Drawn	Checked
M Law	R Webb	M Law

Scale	Date	Drawing Ref.	No.	Size	Rev
1:200	Jan 16	S12020-U	1	A1	--



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PLAN GRID NORTH

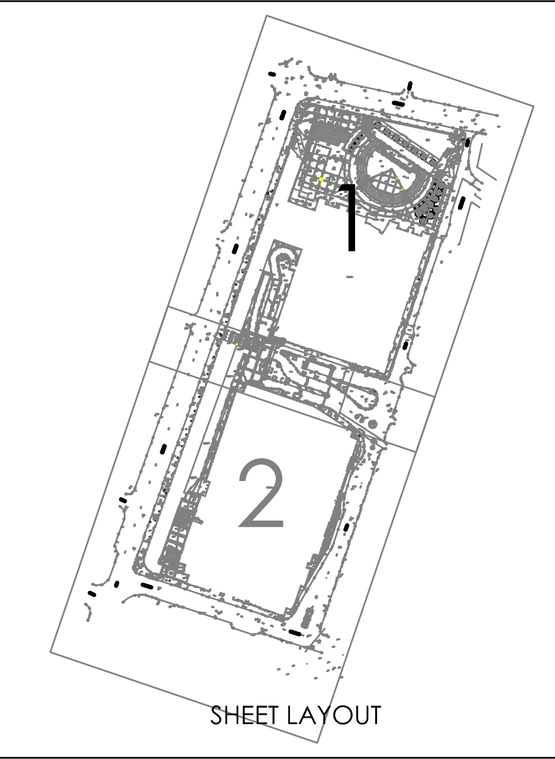
File Name: S13920-T.dwg

LEGEND

AV	AIR VALVE	LBY	LIFEBUOY
BOL	BOLLARD	MH	MANHOLE
BH	BORE HOLE	MKR	MARKER
BIN	BIN	MS	MILE STONE
BM	BENCH MARK	MP	MOORING POINT
BS	BUS STOP	MW	MONITORING WELL
BT	BT INSPECTION COVER	NP	NAME PLATE
CB	CONTROL BOX	OP	OUTFALL PIPE
CCTV	CCTV CAMERA POST	PB	POST OFFICE BOX
COL	COLUMN	PN	PYLON
COM	COMMUNICATIONS COVER	PP	PETROL PUMP
CTV	CABLE TV COVER	PT	POST
DC	DRAINAGE CHANNEL	RE	RODDING EYE
DP	DOWN PIPE	RL	RIDGE LEVEL
DR	DRAIN	RS	ROAD SIGN
EIC	ELEC INSPECTION COVER	RTW	RETAINING WALL
EL	EAVES LEVEL	RWP	RAINWATER PIPE
ELB	ELECTRIC BOX	SAP	SAPLING
ER	EARTH ROD	SP	SIGN POST
EP	ELECTRICITY POLE	SOF	SOFFIT LEVEL
FFL	FINISHED FLOOR LEVEL	SV	STOP VALVE
FH	FIRE HYDRANT	TB	TRAFFIC BOLLARD
FP	FLAG POLE	TCB	TELEPHONE CALL BOX
G	GULLY	TIE	TIE WIRE
GLT	GROUND LIGHT	TL	TRAFFIC LIGHT
GP	GATE POST	TLB	TRAFFIC LIGHT BOX
GST	GAS TAP	TM	TICKET MACHINE
GSV	GAS VALVE	TP	TELEGRAPH POLE
IC	INSPECTION COVER	VP	VENT PIPE
IL	INVERT LEVEL	WM	WATER METER
KO	KERB OUTLET	WO	WASH OUT
LAD	LADDER	WST	WATER STOP TAP
LD	LAND DRAIN	WSV	WATER STOP VALVE
LP	LAMP POST	G0.8ø	TREE GIRTH (Dia.)
		MG	TREE MULTI−GIRTH

PAL	PALISADE	DRIP LINE
W/M	WIRE MESH	WATER COURSE
B/W	BARBED WIRE	KERB
C/P	CONC PANEL	FENCE
P/W	POST AND WIRE	SURFACE CHANGE
P/R	POST AND RAIL	WALL
I/R	IRON RAIL	TOP BANK
C/B	CLOSE BOARDED	BOTTOM BANK
CH/L	CHAIN LINK	BUILDING
(99.99)	TOP OF FEATURE	BUILDING CANOPY
	GATE	OVER HEAD ELECTRICAL
	STATION	OVER HEAD TELECOM
	BOREHOLE	
	BATTER	HEDGE

NOTES:
All levels relate to O.S (Newlyn) Datum, Established using network RTK.
Survey plotted on a plane local grid, orientated to National Grid.



SHEET LAYOUT

0 2m 4m 8m 12m 16m
SCALE BAR

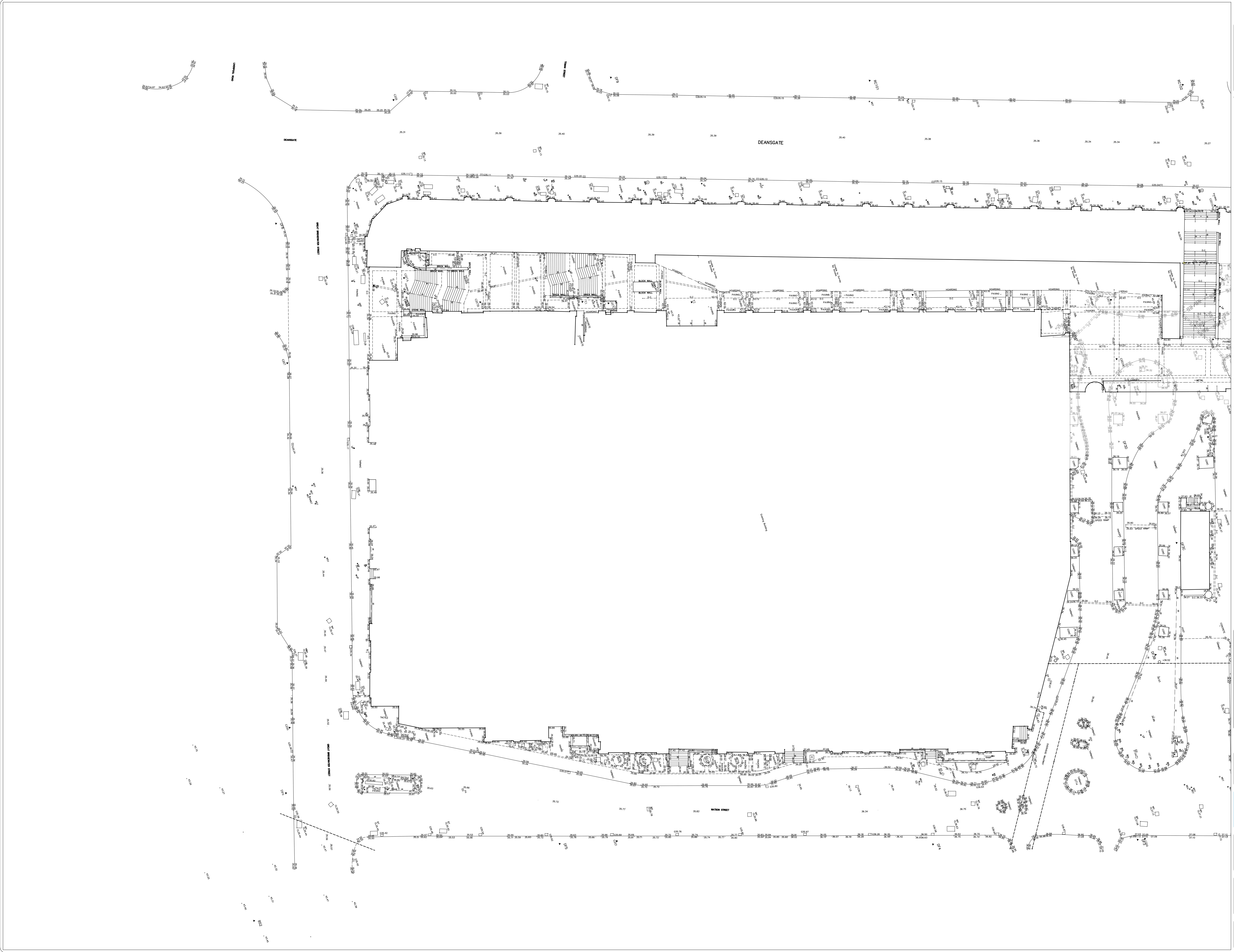
REV	DATE	DESCRIPTION

SURVEY & ENGINEERING PROJECTS

Client
2110 Consult
5 Parkway
Porters Wood
St Albans
Hertfordshire
AL3 6PA

Project Title
Topographical Survey of Land at:
The Great Northern
Deansgate
Manchester
M3 4EN

Surveyed		Drawn	Checked		
A.N/A.J/G.H		G.Birchall	R.Critchley		
Scale	Date	Drawing Ref.	No.	Size	Rev
1:200	Mar 17	S13920-T	01	A0	--



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PLAN GRID NORTH

File Name: S13920-T.dwg

LEGEND

AV	AIR VALVE	LBY	LIFEBUOY
BOL	BOLLARD	MH	MANHOLE
BH	BORE HOLE	MKR	MARKER
BIN	BIN	MS	MILE STONE
BM	BENCH MARK	MP	MOORING POINT
BS	BUS STOP	MW	MONITORING WELL
BT	BT INSPECTION COVER	NP	NAME PLATE
CB	CONTROL BOX	OP	OUTFALL PIPE
CCTV	CCTV CAMERA POST	PB	POST OFFICE BOX
COL	COLUMN	PY	PYLON
COM	COMMUNICATIONS COVER	PP	PETROL PUMP
CTV	CABLE TV COVER	PT	POST
DC	DRAINAGE CHANNEL	RE	RODDING EYE
DP	DOWN PIPE	RL	ROOF LEVEL
DR	DRAIN	RS	ROAD SIGN
EIC	ELEC INSPECTION COVER	RTW	RETAINING WALL
EL	EAVES LEVEL	RWP	RAINWATER PIPE
ELB	ELECTRIC BOX	SAP	SAPLING
ER	EARTH ROD	SP	SIGN POST
EP	ELECTRICITY POLE	SOF	SOFFIT LEVEL
FFL	FINISHED FLOOR LEVEL	SV	STOP VALVE
FH	FIRE HYDRANT	TB	TRAFFIC BOLLARD
FP	FLAG POLE	TCB	TELEPHONE CALL BOX
G	GULLY	TW	TIE WIRE
GLT	GROUND LIGHT	TL	TRAFFIC LIGHT
GP	GATE POST	TLB	TRAFFIC LIGHT BOX
GST	GAS TAP	TM	TICKET MACHINE
GV	GAS VALVE	TP	TELEGRAPH POLE
IC	INSPECTION COVER	VP	VENT PIPE
IL	INVERT LEVEL	WM	WATER METER
KO	KERB OUTLET	WO	WASH OUT
LAD	LADDER	WST	WATER STOP TAP
LD	LAND DRAIN	WSV	WATER STOP VALVE
LP	LAMP POST	GD.9	TREE GIRTH (Dia.)
		MG	TREE MULTI-GIRTH

PAL	PALISADE		DRIP LINE
W/M	WIRE MESH		WATER COURSE
B/W	BARBED WIRE		KERB
C/P	CONC. PANEL		FENCE
P/W	POST AND WIRE		SURFACE CHANGE
P/R	POST AND RAIL		WALL
I/R	IRON RAIL		TOP BANK
C/B	CLOSE BOARDED		BOTTOM BANK
CH/L	CHAIN LINK		BUILDING
(90.99)	TOP OF FEATURE		BUILDING CANOPY
	GATE		OVER HEAD ELECTRICAL
	STATION		OVER HEAD TELECOM
	BOREHOLE		HEDGE
	BATTER		

NOTES:
All levels relate to O.S (Newlyn) Datum. Established using network RTK.
Survey plotted on a plane local grid, orientated to National Grid.

SHEET LAYOUT

2

0 2m 4m 8m 12m 16m
SCALE BAR

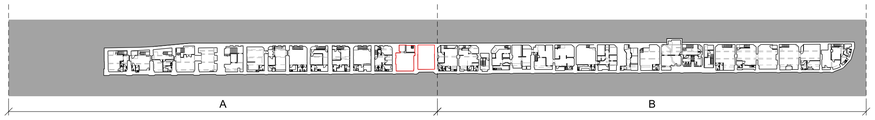
REV	DATE	DESCRIPTION

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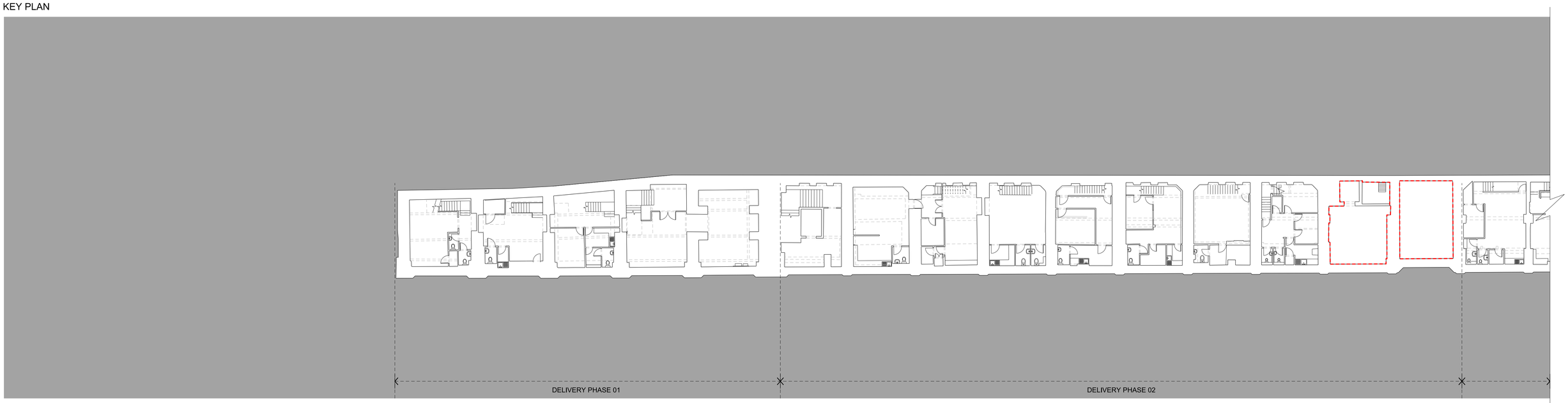
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Project Title
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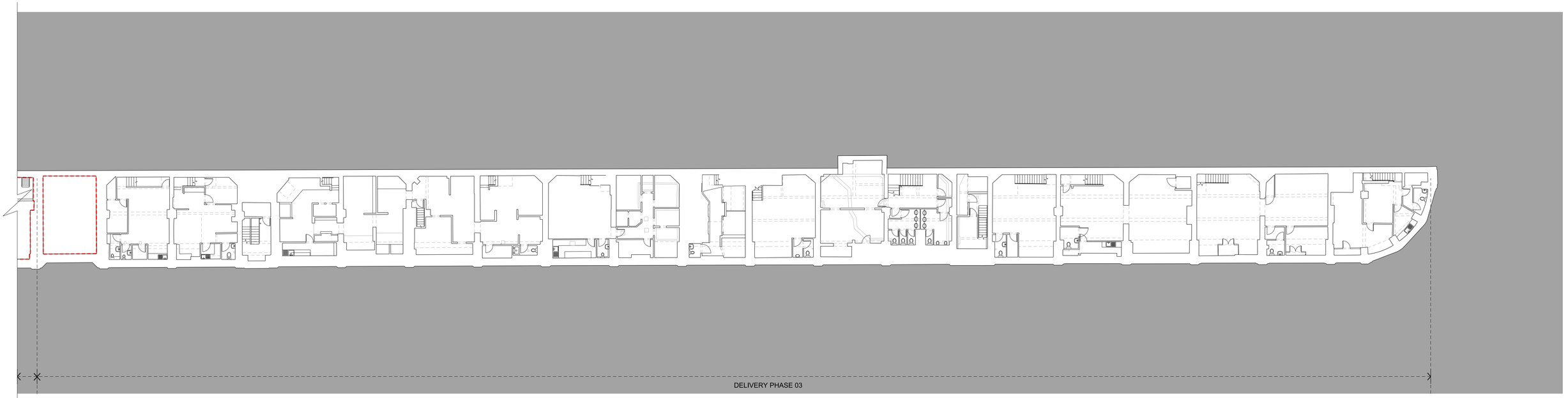
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A.N/A.J/G.H	G.Birchall		R.Critchley	
Scale	Date	Drawing Ref.	No.	Size	Rev
1:200	Mar 17	S13920-T	02	A0	–



KEY PLAN



A



B

Note:

Topographical survey received from 2110 consult on 21.07.2017, drawing number: S13920-T_Rev A
GNW survey received from SEP on 21.07.2017, drawing number: S13920-DG_Level 0_REV A

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Rev	Date	Description
-		

NORTH

Project Title: GREAT NORTHERN WAREHOUSE

Status: PRELIMINARY

Drawing Title: Deansgate Terraces - Existing Basement

Scale @A1: 1:200 @A1

Scale @A3: 1:400 @A3

Drawing No: 10161-Z3-A-G200-XP-B1-001

Job No: 10161

Date: July 2017

Revision: -

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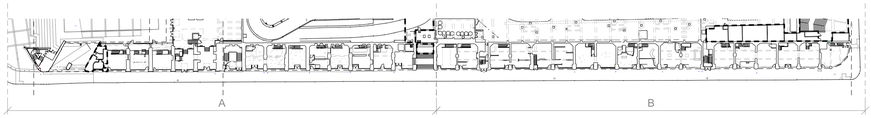
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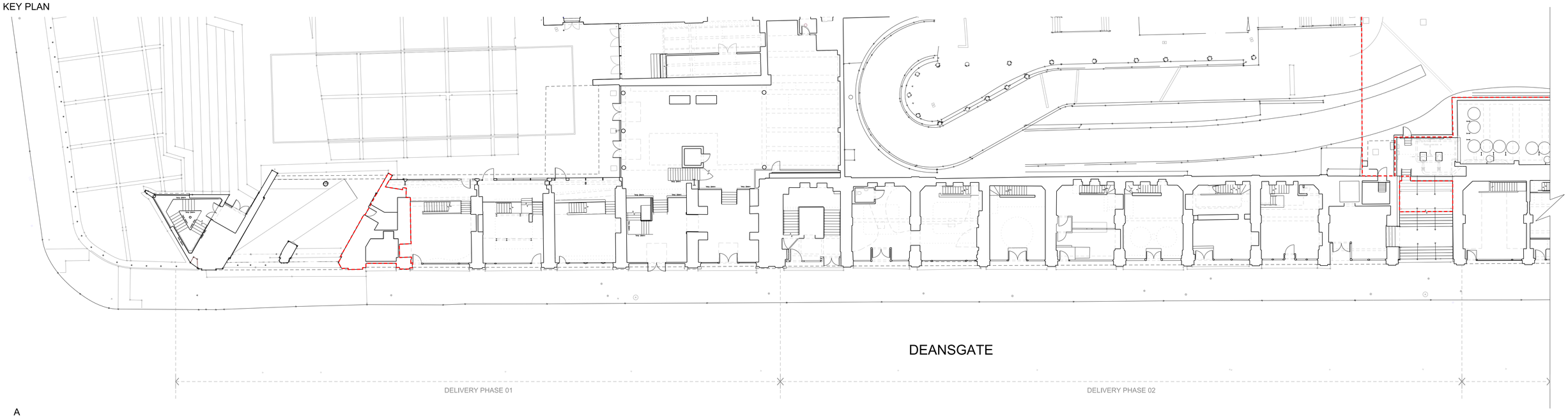
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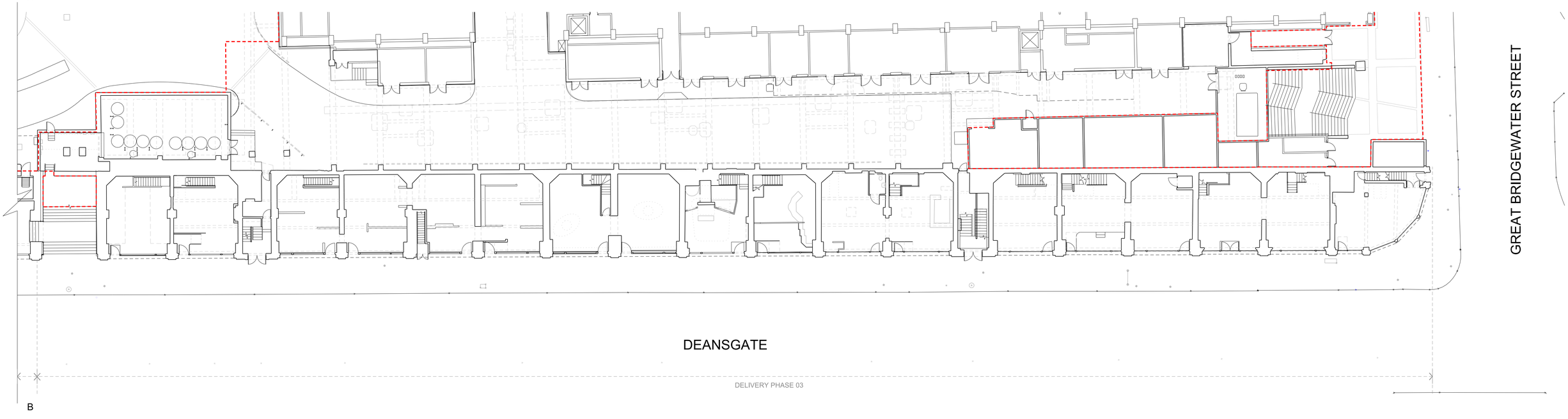
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KEY PLAN



A



B

Note:

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Rev	Date	Description
01	25.07.17	Updated to reflect latest SEP survey information received 21.07.17.

NORTH

Project Title: GREAT NORTHERN WAREHOUSE

Status: PRELIMINARY

Drawing Title: Deansgate Terraces - Existing Ground Floor

Scale @A1: 1:200 @A1

Scale @A3: 1:400 @A3

Drawing No: 10161-Z3-A-G200-XP-00-001

Job No: 10161

Date: July 2017

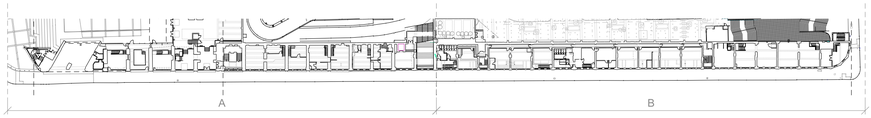
Revision: 01

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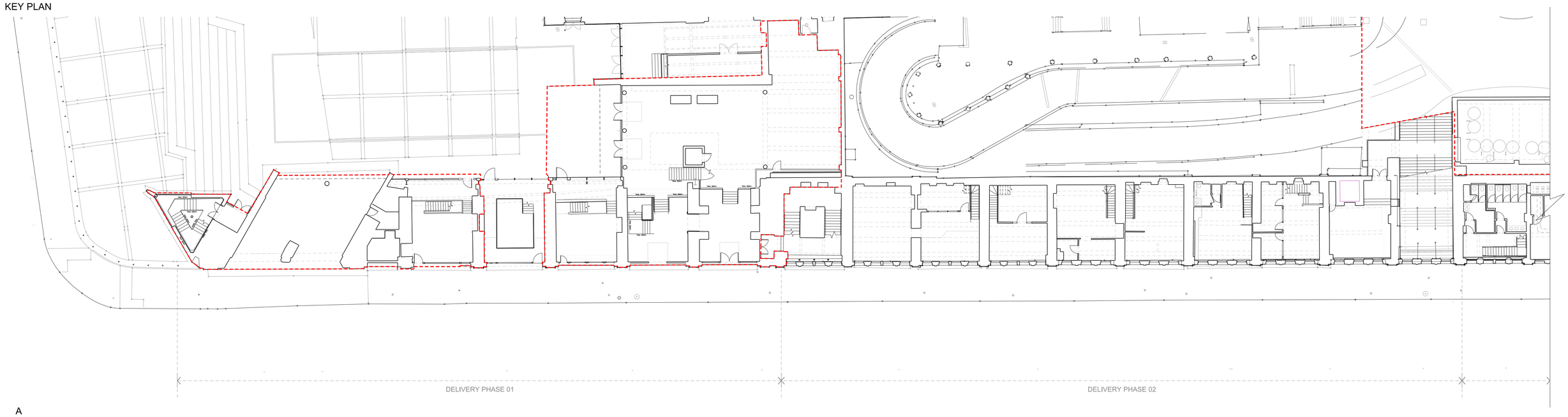
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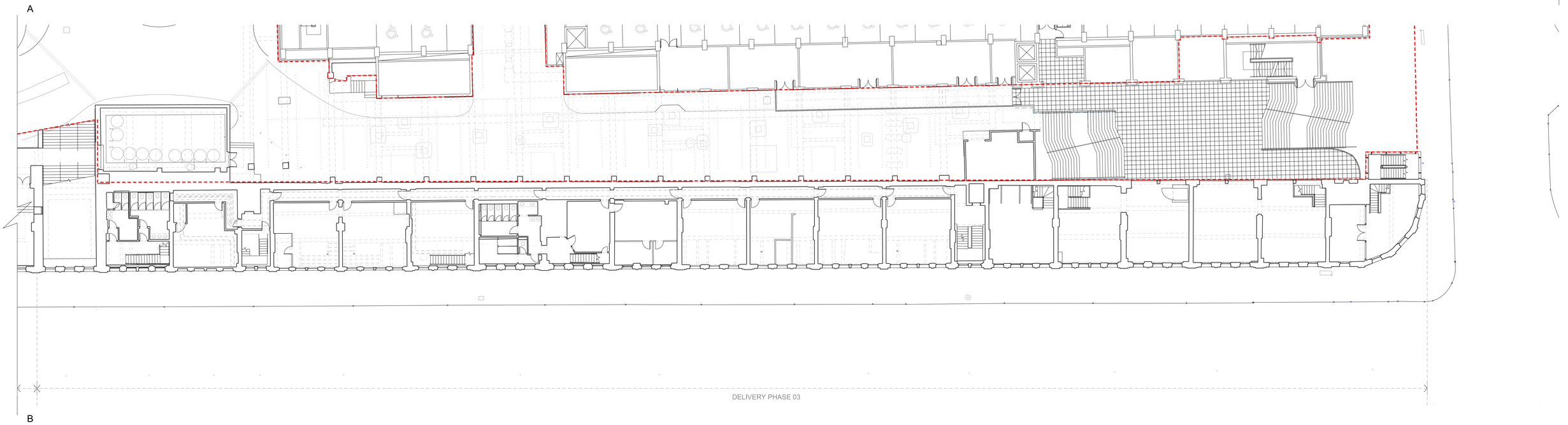
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KEY PLAN



A



B

Note:

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GNW survey received from SEP on 21.07.2017, drawing number: S13920-DG_Level 2_ REV A

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Rev	Date	Description
01	25.07.17	Updated to reflect latest SEP survey information received 21.07.17.

NORTH

Project Title: GREAT NORTHERN WAREHOUSE

Status: PRELIMINARY

Drawing Title: Deansgate Terraces - Existing Level 01

Scale @A1: 1:200 @A1

Scale @A3: 1:400 @A3

Drawing No: 10161-Z3-A-G200-XP-01-001

Job No: 10161

Date: July 2017

Revision: 01

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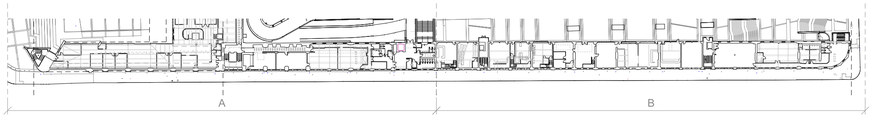
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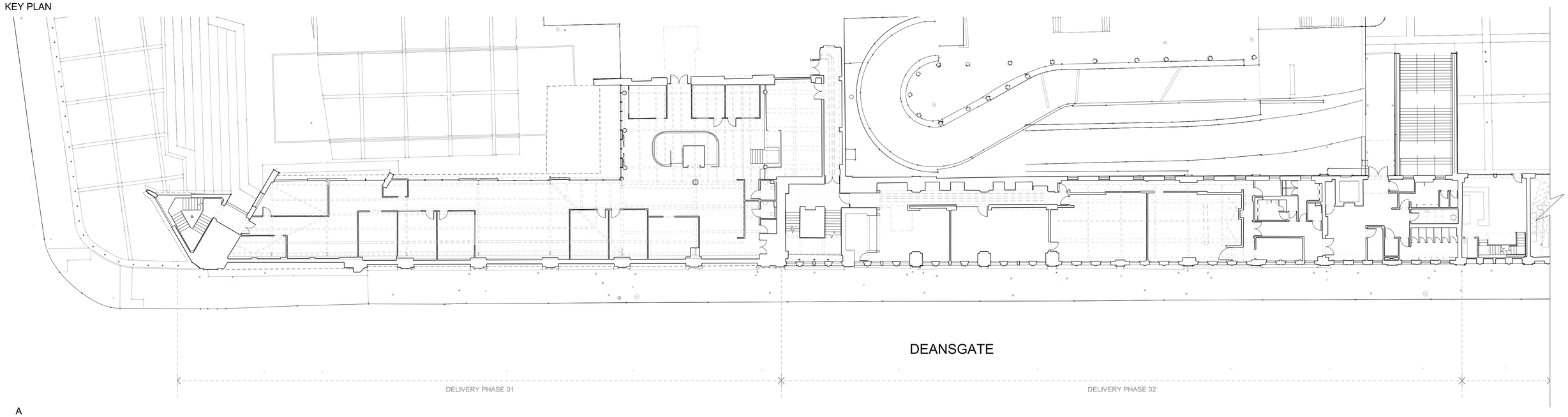
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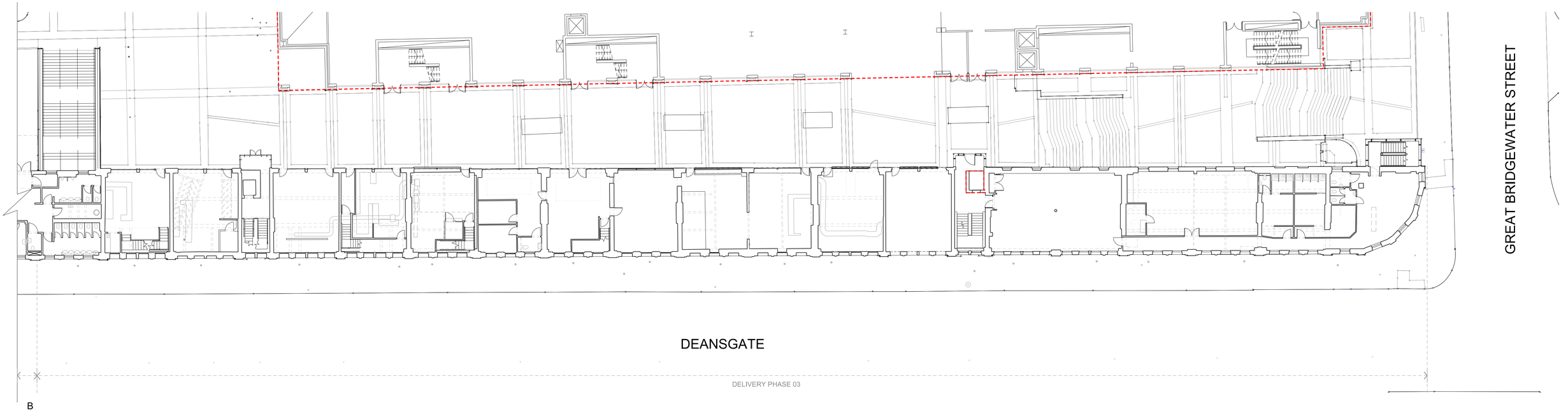
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KEY PLAN



A



B

Note:

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GNW survey received from SEP on 21.07.2017, drawing number: S13920-DG_Level 3_REV A

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Rev	Date	Description
01	25.07.17	Updated to reflect latest SEP survey information received 21.07.17.

NORTH

Project Title: GREAT NORTHERN WAREHOUSE

Status: PRELIMINARY

Drawing Title: Deansgate Terraces - Existing Level 02

Scale @A1: 1:200 @A1

Scale @A3: 1:400 @A3

Drawing No: 10161-Z3-A-G200-XP-02-001

Job No: 10161

Date: July 2017

Revision: 01

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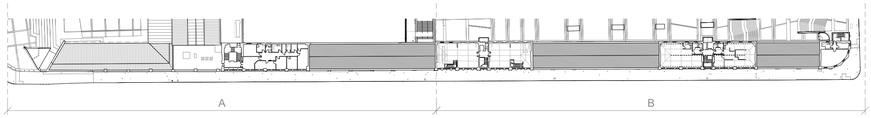
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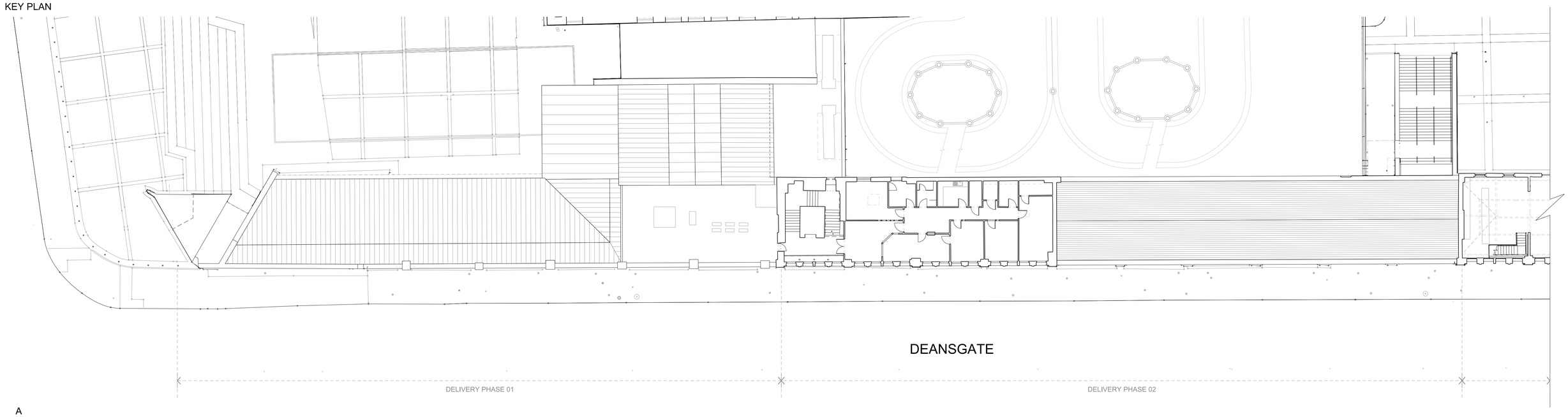
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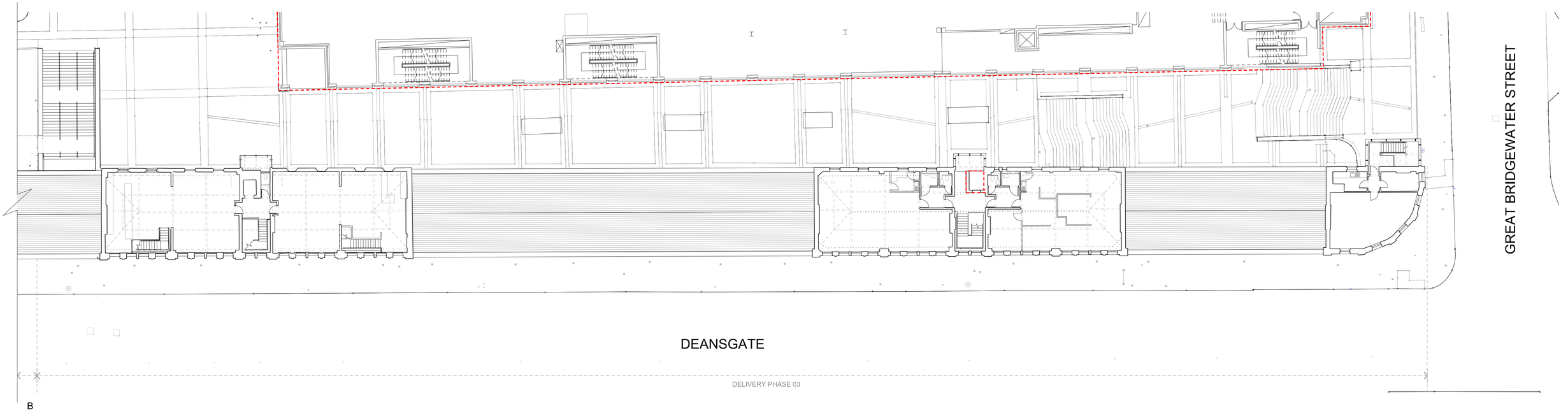
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KEY PLAN



A



B

Note:

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Rev	Date	Description
01	25.07.17	Updated to reflect latest SEP survey information received 21.07.17.

NORTH

Project Title: GREAT NORTHERN WAREHOUSE

Status: PRELIMINARY

Drawing Title: Deansgate Terraces - Existing Level 03

Scale @A1: 1:200 @A1

Scale @A3: 1:400 @A3

Drawing No: 10161-Z3-A-G200-XP-03-001

Job No: 10161

Date: July 2017

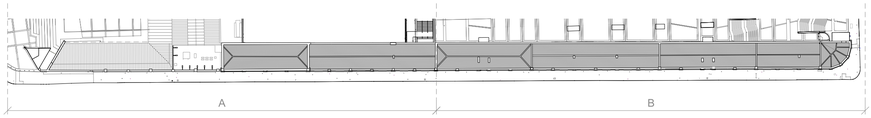
Revision: 01

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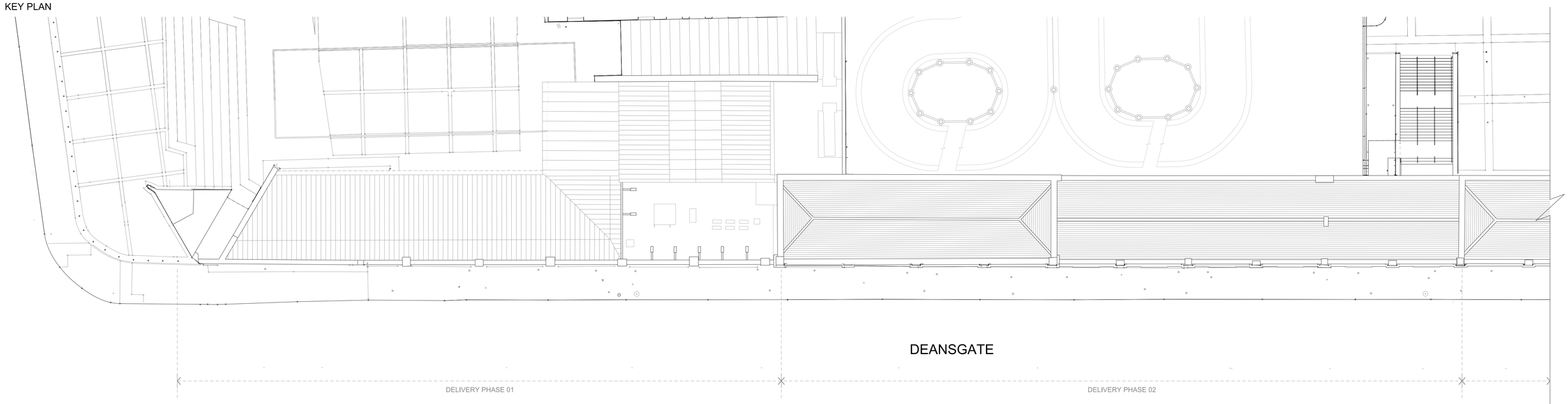
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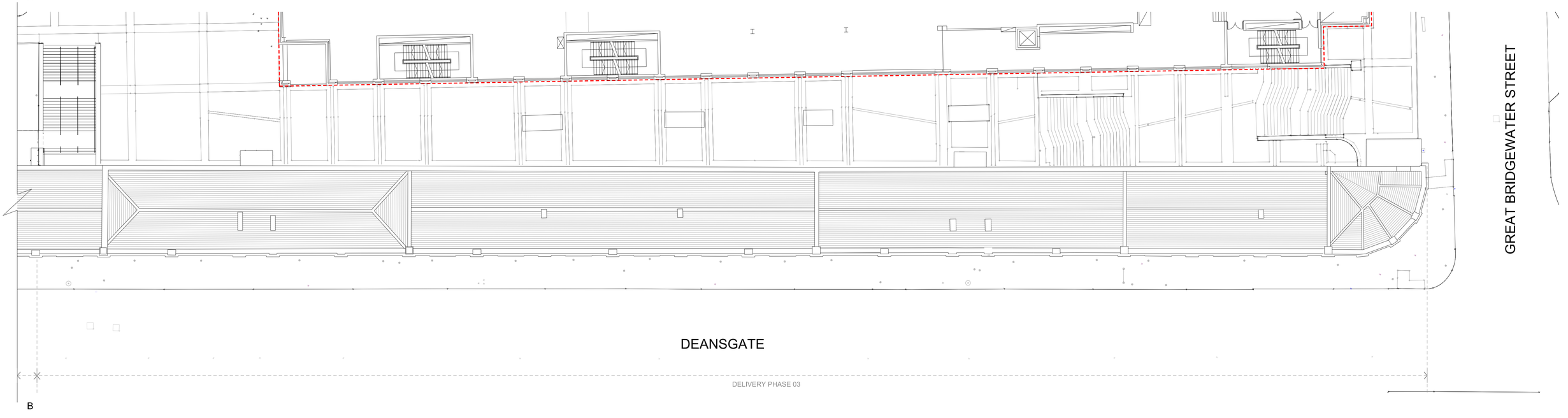
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KEY PLAN



A



B

Note:

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Rev	Date	Description
-		

NORTH

Project Title: GREAT NORTHERN WAREHOUSE

Status: PRELIMINARY

Drawing Title: Deansgate Terraces - Existing Roof Plan

Scale @A1: 1:200 @A1

Scale @A3: 1:400 @A3

Drawing No: 10161-Z3-A-G200-XP-RF-001

Job No: 10161

Date: August 2017

Revision: -

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Rev	Date	Description
01	25.07.17	Survey information shown, drawing number changed.

NORTH

Project Title: GREAT NORTHERN WAREHOUSE

Status: PRELIMINARY

Drawing Title: EXISTING PLAN- GROUND FLOOR

Scale @A1: 1:200 @A1

Scale @A3: 1:400 @A3

Drawing No: 10161-Z2-A-G200-XP-00-001

Job No: 10161

Date: MARCH 2017

Revision: 01

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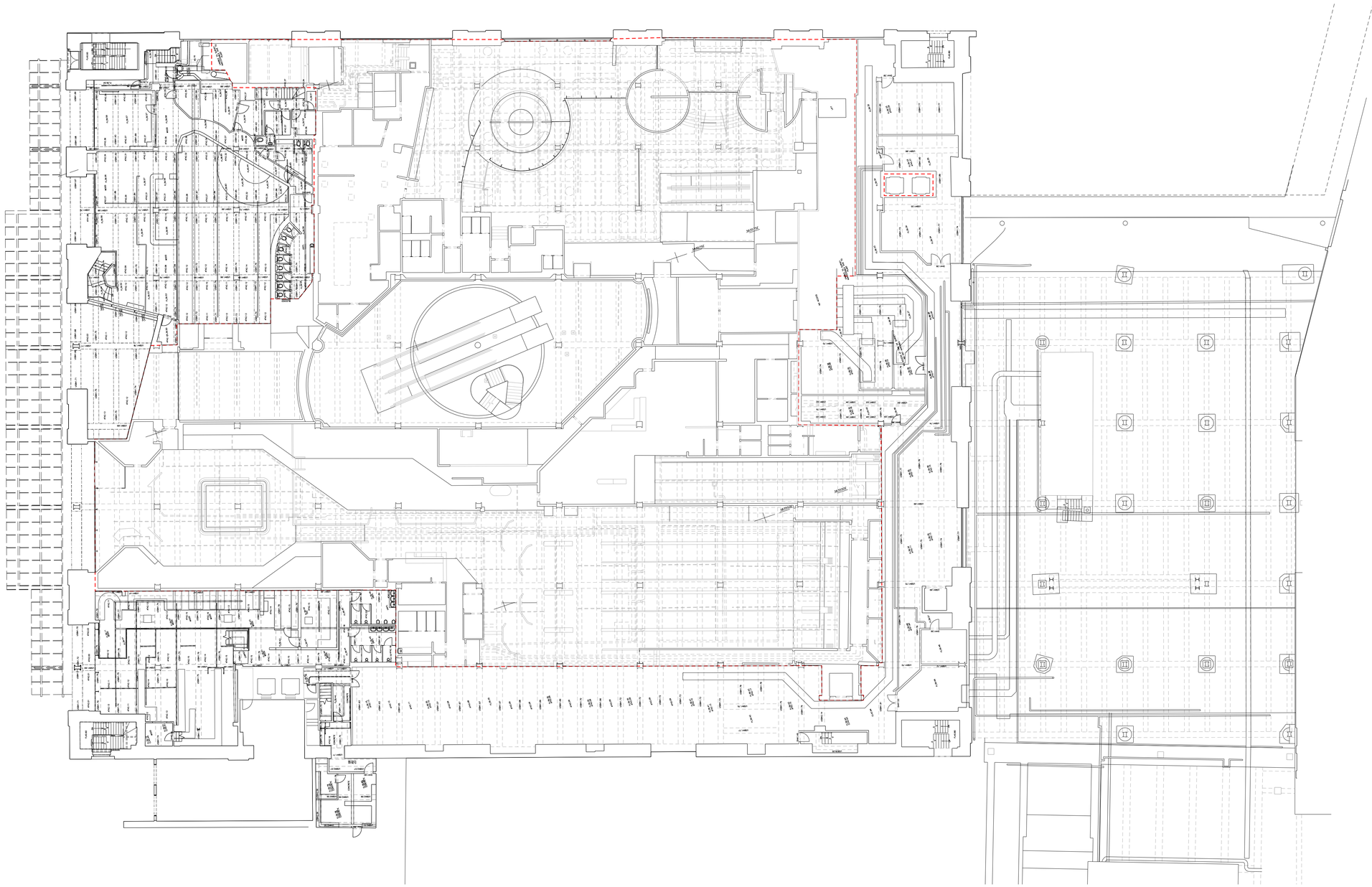
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S13920-WH_GF_REV A

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Rev	Date	Description
01	25.07.17	Survey information shown, drawing number changed.
02	04.08.17	Updated to revised survey

NORTH

Project Title: GREAT NORTHERN WAREHOUSE

Status: PRELIMINARY

Drawing Title: EXISTING PLAN - GROUND FLOOR MEZZANINE

Scale @A1: 1:200 @A1

Scale @A3: 1:400 @A3

Drawing No: 10161-Z2-A-G200-XP-00-MZ-001

Job No: 10161

Date: June 2017

Revision: 02

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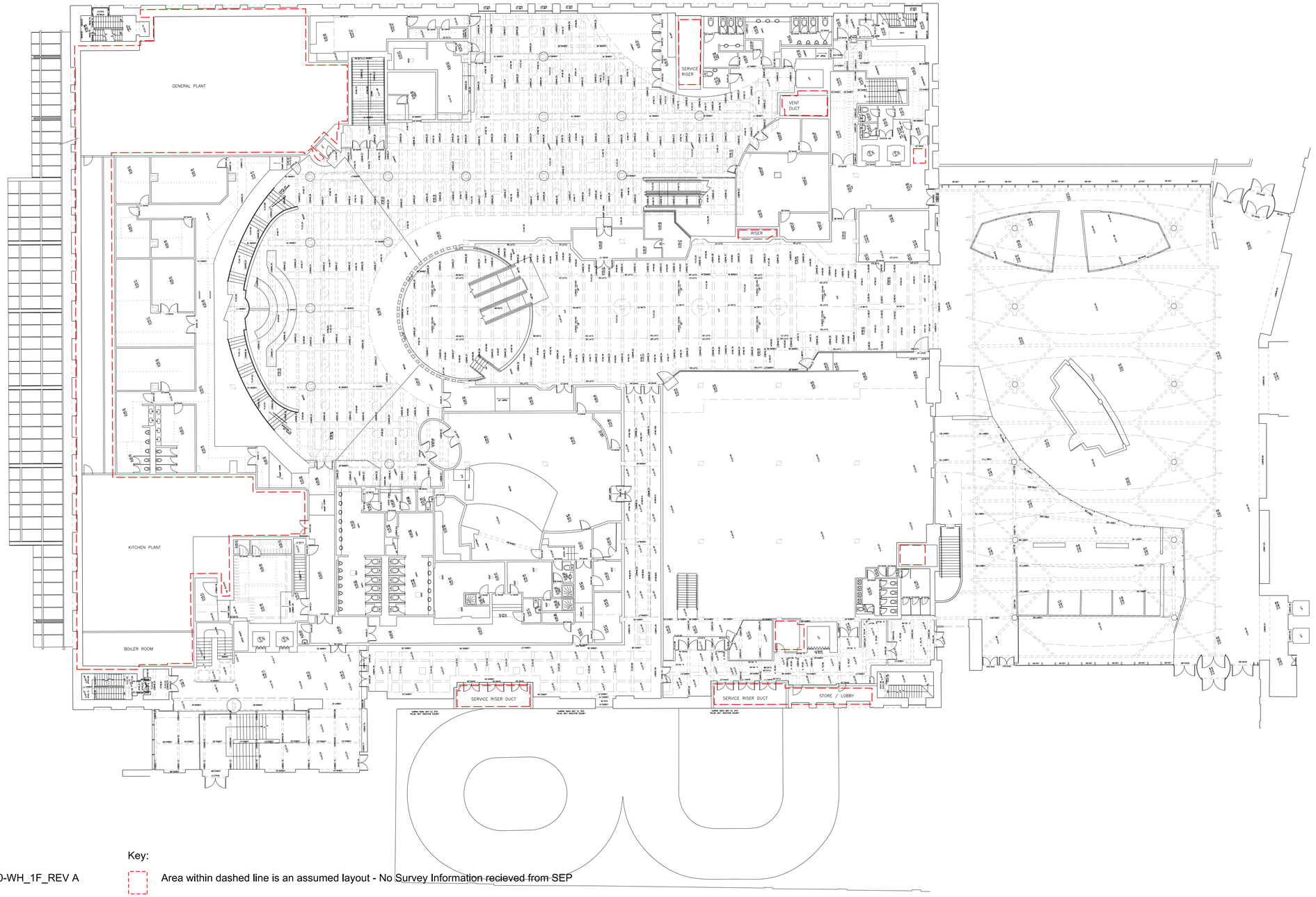
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Rev	Date	Description
01	25.07.17	Survey information shown, drawing number changed.

NORTH

Project Title: GREAT NORTHERN WAREHOUSE

Status: PRELIMINARY

Drawing Title: EXISTING PLAN- LEVEL 01

Scale @A1: 1:200 @A1

Scale @A3: 1:400 @A3

Drawing No: 10161-Z2-A-G200-XP-01-001

Job No: 10161

Date: MARCH 2017

Revision: 01

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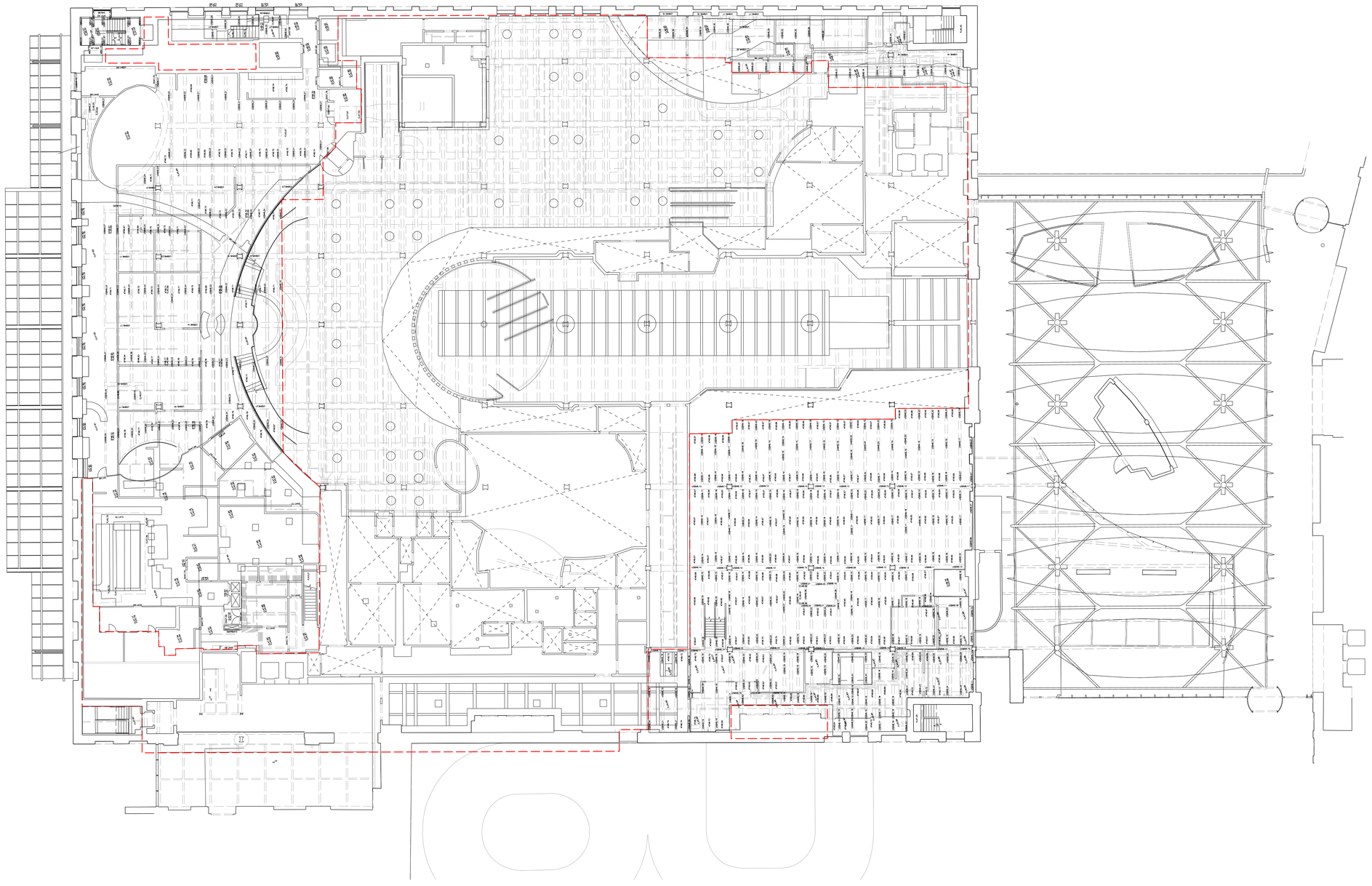
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Information is also subject to change following further design development and building tolerances, or events outside the architect's control. The architect accepts no responsibility for any resulting implications or decisions, commercial or otherwise, made on the basis of this information.

Rev	Date	Description
-		

NORTH

Project Title: GREAT NORTHERN WAREHOUSE

Status: PRELIMINARY

Drawing Title: EXISTING PLAN- LEVEL 01 MEZZANINE

Scale @A1: 1:200 @A1

Scale @A3: 1:400 @A3

Drawing No: 10161-Z2-A-G200-XP-01-MZ-001

Job No: 10161

Date: JULY 2017

Revision: -

simpsonhaugh

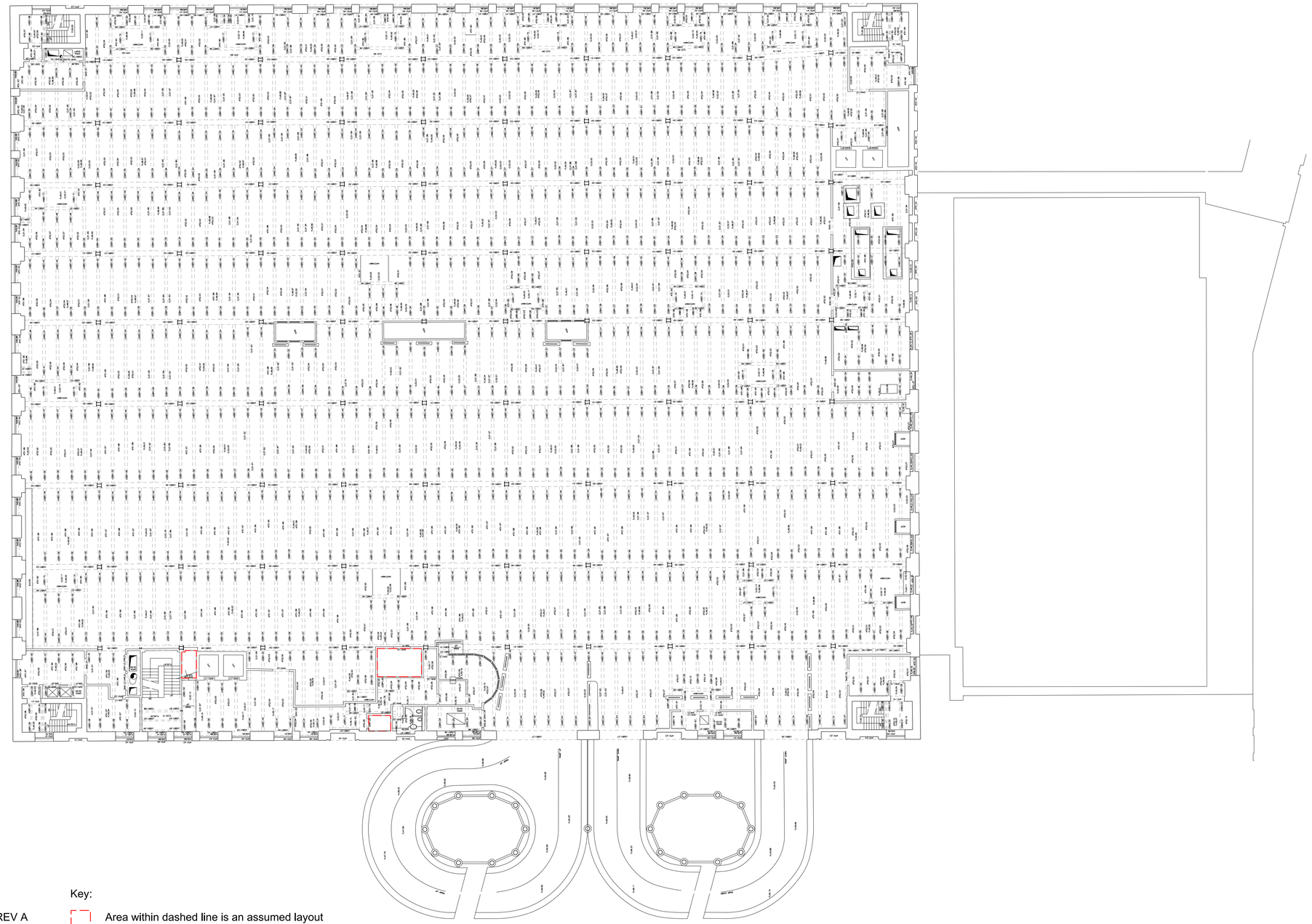
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Note:

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Key:

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Rev	Date	Description
01	25.07.17	Survey information shown, drawing number changed.

NORTH

Project Title: GREAT NORTHERN WAREHOUSE

Status: PRELIMINARY

Drawing Title: EXISTING PLAN- LEVEL 02

Scale @A1: 1:200 @A1

Scale @A3: 1:400 @A3

Drawing No: 10161-Z2-A-G200-XP-02-001

Job No: 10161

Date: MARCH 2017

Revision: 01

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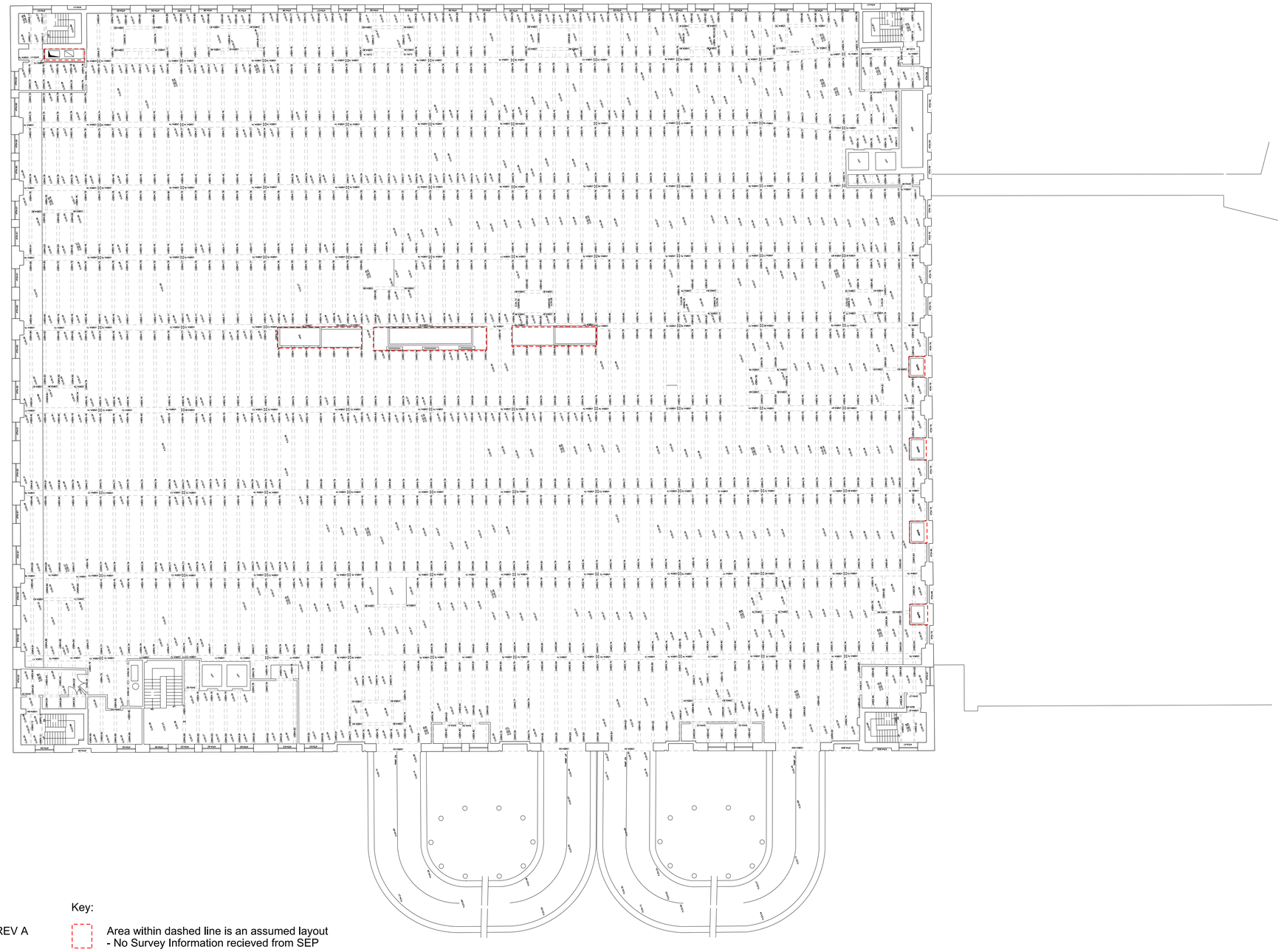
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Please note that all layouts and areas are indicative and may be subject to change in line with the coordination of structure, services, fire requirements, survey information and easements.

Information is also subject to change following further design development and building tolerances, or events outside the architect's control. The architect accepts no responsibility for any resulting implications or decisions, commercial or otherwise, made on the basis of this information.

Rev	Date	Description
01	25.07.17	Survey information shown, drawing number changed.

NORTH

Project Title: GREAT NORTHERN WAREHOUSE

Status: PRELIMINARY

Drawing Title: EXISTING PLAN- LEVEL 03

Scale @A1: 1:200 @A1

Scale @A3: 1:400 @A3

Drawing No: 10161-Z2-A-G200-XP-03-001

Job No: 10161

Date: MARCH 2017

Revision: 01

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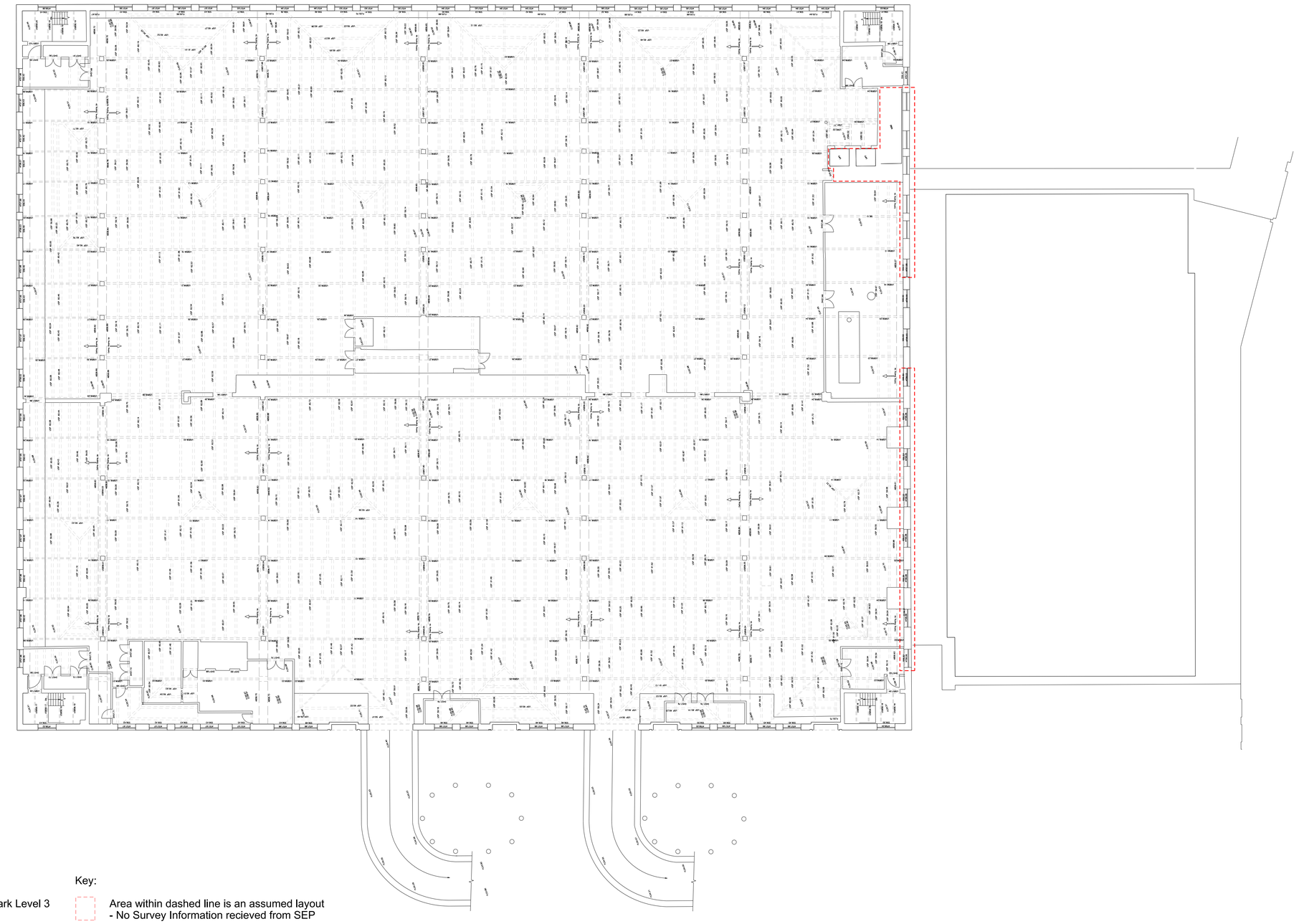
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Note:

GNW survey received from SEP on 04.08.2017, drawing number: S13920-WH_Carpark Level 3

Key:

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Please note that all layouts and areas are indicative and may be subject to change in line with the coordination of structure, services, fire requirements, survey information and easements.

Information is also subject to change following further design development and building tolerances, or events outside the architect's control. The architect accepts no responsibility for any resulting implications or decisions, commercial or otherwise, made on the basis of this information.

Rev	Date	Description
01	25.07.17	Survey information shown, drawing number changed.
02	11.08.17	Revised to updated survey information received on 04.08.17

NORTH

Project Title: GREAT NORTHERN WAREHOUSE

Status: PRELIMINARY

Drawing Title: EXISTING PLAN- LEVEL 04

Scale @A1: 1:200 @A1

Scale @A3: 1:400 @A3

Drawing No: 10161-Z2-A-G200-XP-04-001

Job No: 10161

Date: MARCH 2017

Revision: 02

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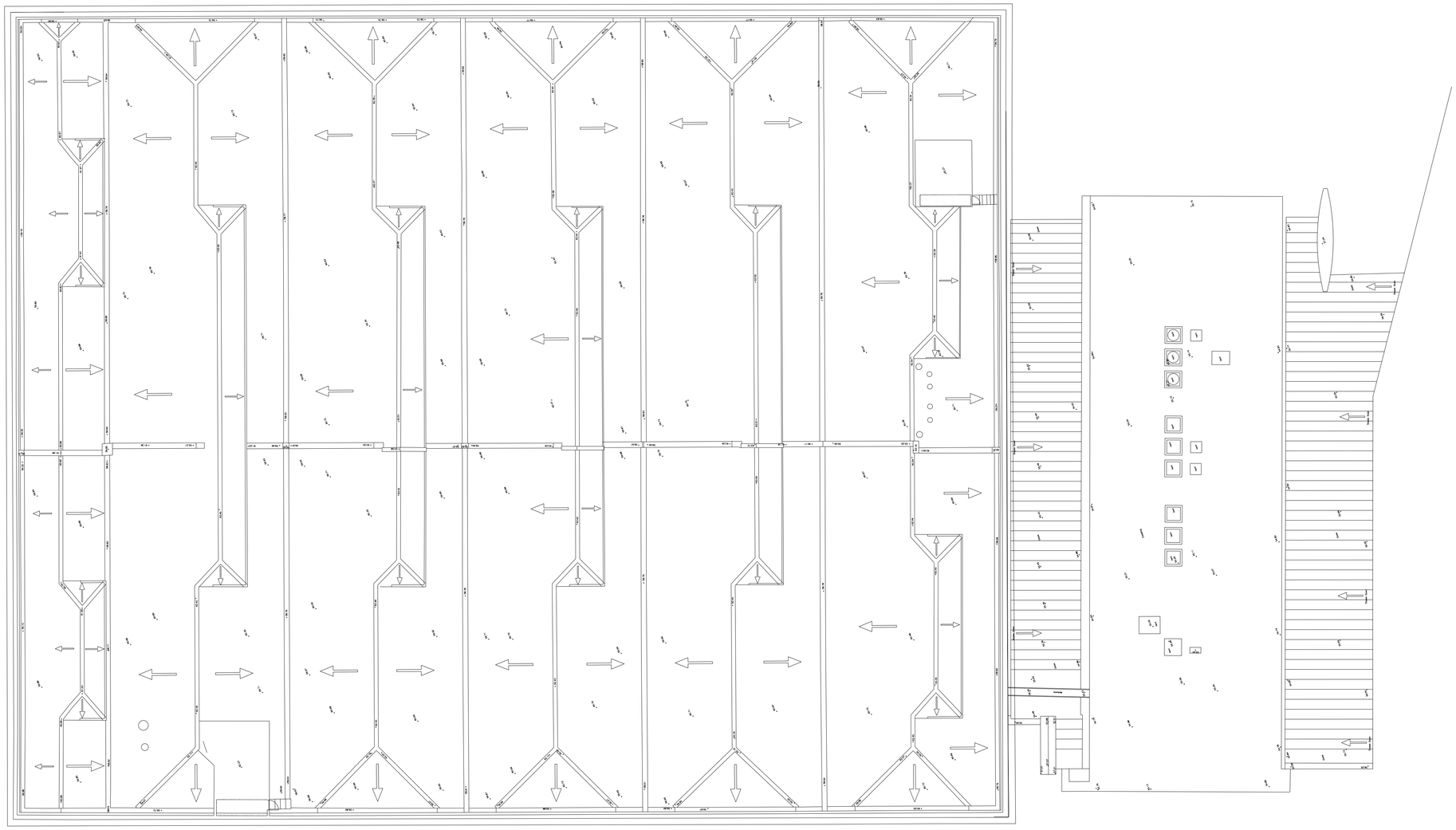
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Note:

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Information is also subject to change following further design development and building tolerances, or events outside the architect's control. The architect accepts no responsibility for any resulting implications or decisions, commercial or otherwise, made on the basis of this information.

Rev	Date	Description
01	25.07.17	Survey information shown, drawing number changed.
02	04.08.17	Information updated to latest survey information, atrium roof shown

NORTH

Project Title: GREAT NORTHERN WAREHOUSE

Status: PRELIMINARY

Drawing Title: EXISTING PLAN- ROOF

Scale @A1: 1:200 @A1

Scale @A3: 1:400 @A3

Drawing No: 10161-Z2-A-G200-XP-RF-001

Job No: 10161

Date: JUNE 2017

Revision: 02

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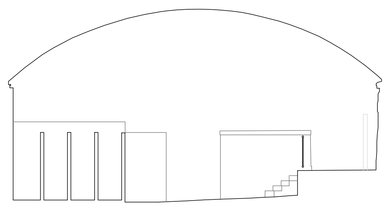
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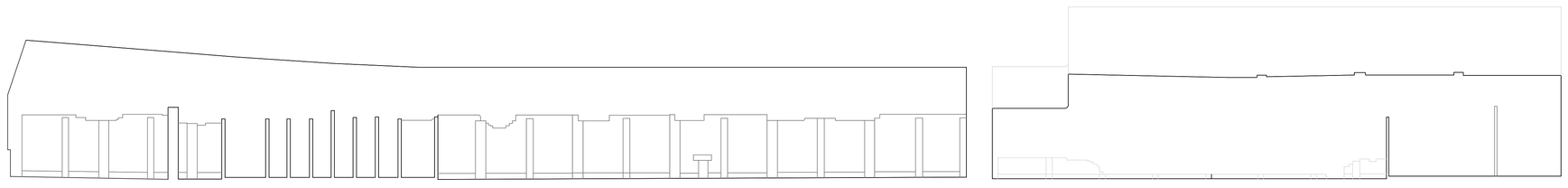
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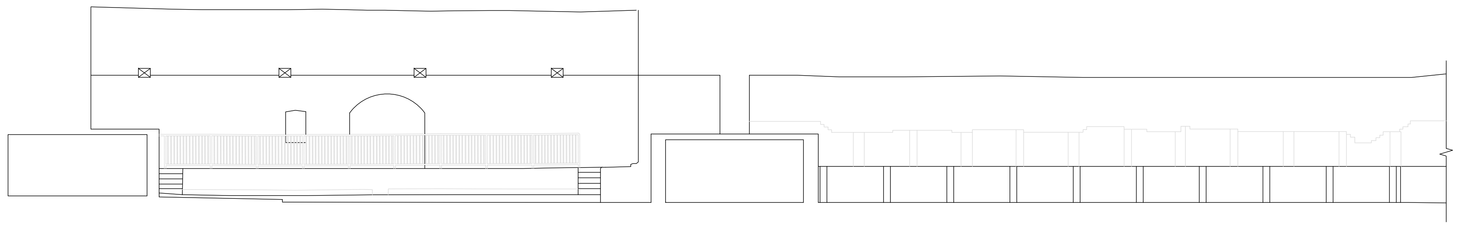
Datum 23.00m

ELEVATION 1



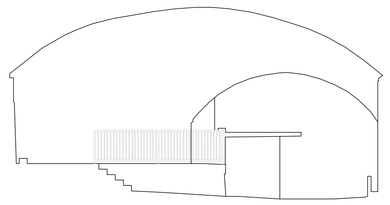
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ELEVATION 2



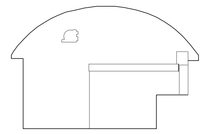
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ELEVATION 3



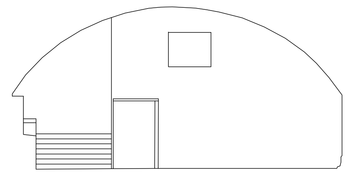
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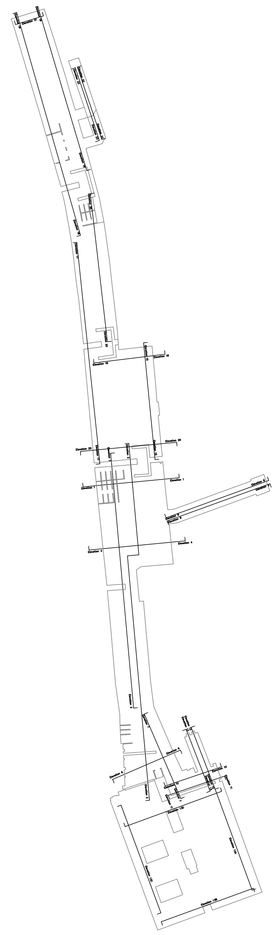
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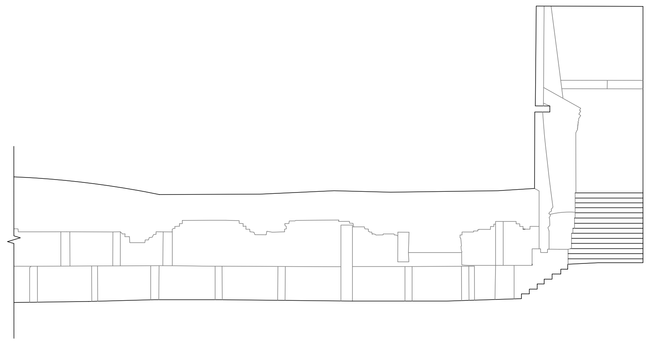


Datum 23.00m

ELEVATION 6

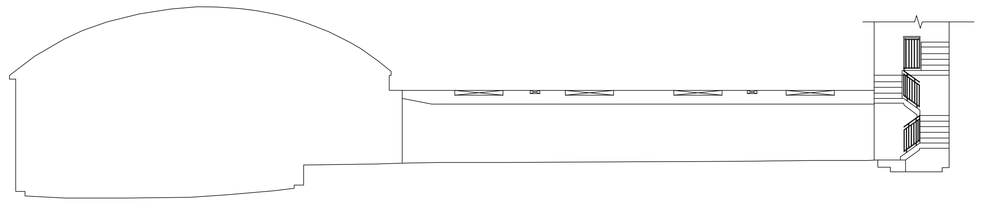


ELEVATION LOCATION PLAN



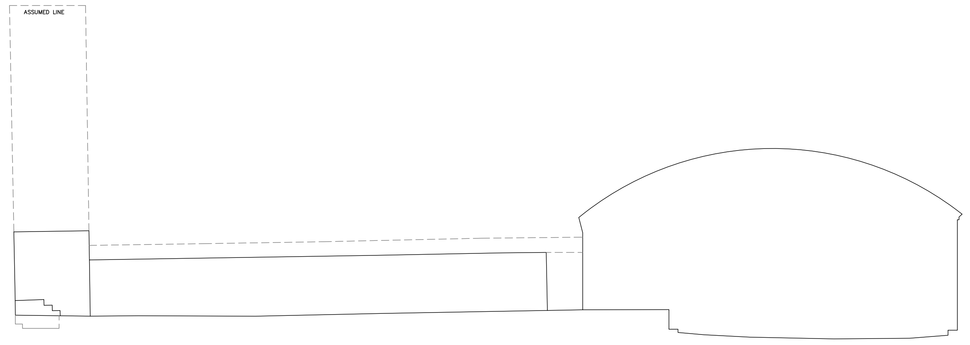
Datum 23.00m

ELEVATION 7



Datum 23.00m

ELEVATION 8



Datum 23.00m

ELEVATION 9

BUILDING SURVEY LEGEND

Level Prefix Descriptions

99.99	Spot Level
FL99.99	Floor Level
CL99.99	Ceiling Level
SU399.99	Suspended Ceiling Level
SB399.99	Suspended Beam
DH99.99	Door Height
SI99.99	Sill Level
LI99.99	Lintel Level
ATOP.99	Arch Top Level
ABOT.99	Arch Bottom Level

Symbol Descriptions

99.99 — Level Marker

99.99 — Level Marker

Stairs/Ramp Direction

Sloping Ceiling Direction

RADIATOR — Radiator

Break Line

Door Swing

Toilet

Urinal

Sink

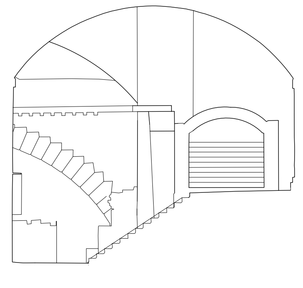
Kitchen Sink

Linetype Descriptions

Brg. Walls
Brg. Walls Partition
Building Complex
Cladding
Dimensions
Doors
Ducting
Electrical
Fences, Gates
Handrails
Hatch
Inspection Covers
Kitchen Furniture
Level
Lighting
Ob. Beams
Ob. Ceiling
Pipes
Radiators
Roof Lines
Services
Skylights
Steps/Risers
Surface Changes
Tanks
Vents
Walls
Wc Facilities
Windows
Hidden Detail

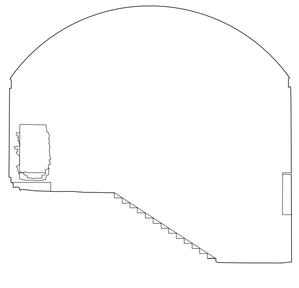
Deviation Diagram

Figures show deviations of building face away from a vertical plane passing through the building with axis defined at positions marked A1 and A2.



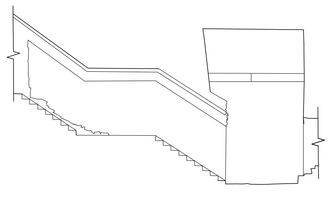
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ELEVATION 10



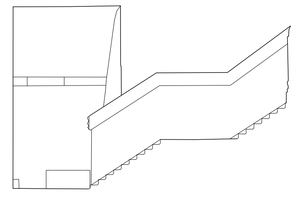
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ELEVATION 11



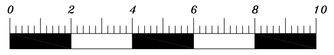
Datum 23.00m

ELEVATION 12



Datum 23.00m

ELEVATION 13



Scale Bar (m)

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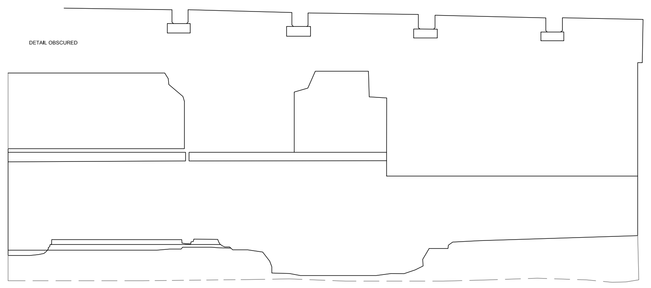
Client
2110 CONSULT
5 PARKWAY
PORTERS WOOD
ST ALBANS
HERTFORDSHIRE
AL3 6PA

Project Title
ELEVATIONS@
REDUNDANT UNDERGROUND CANALS
THE GREAT NORTHERN
DEANSGATE
MANCHESTER

Scale	Date	Job No
A0@100	DEC 13	08979-E-01
Surveyed	Drawn	Checked
TC	GB/CM/JB/DC	SEP

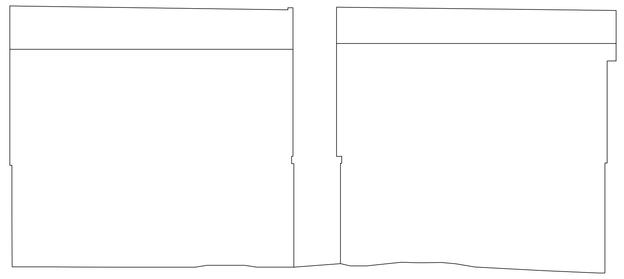
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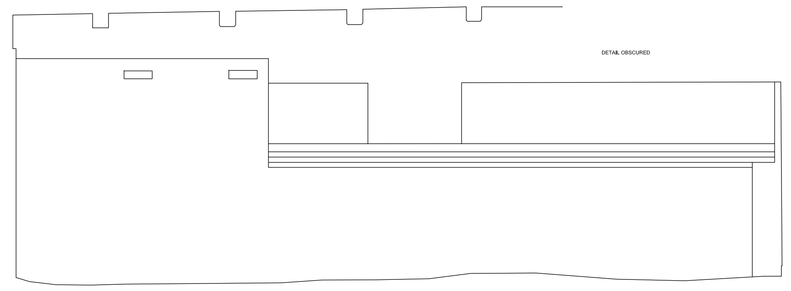
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Elevation 13A



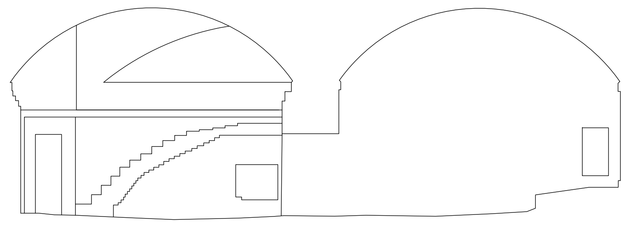
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ELEVATION 13B



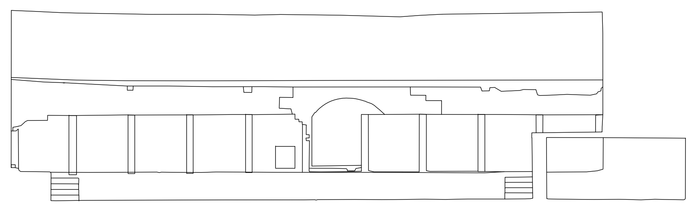
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ELEVATION 13C



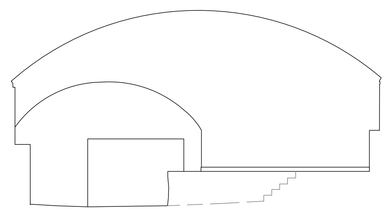
Datum 23.00m

ELEVATION 13D



Datum 23.00m

Elevation 15



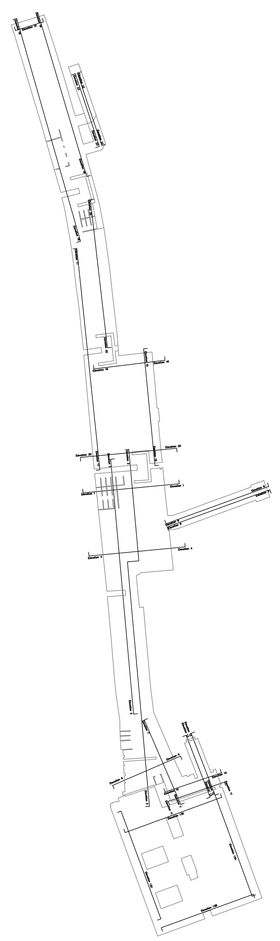
Datum 23.00m

Elevation 16

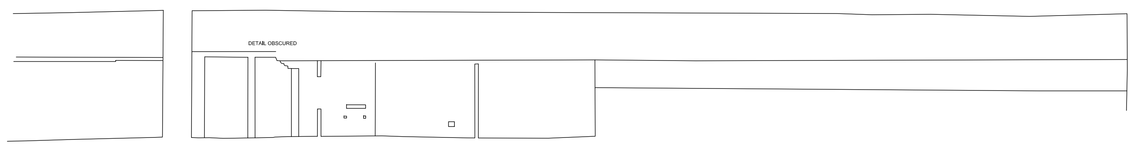


Datum 23.00m

Elevation 17

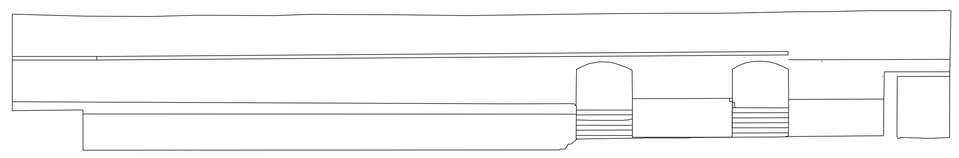


ELEVATION LOCATION PLAN



Datum 23.00m

ELEVATION 18



Datum 23.00m

ELEVATION 19

BUILDING SURVEY LEGEND

Level Prefix Descriptions

99.99	Spot Level
FL99.99	Floor Level
CL99.99	Ceiling Level
SC99.99	Suspended Ceiling Level
US099.99	Underside Of Beam
DH99.99	Door Height
SH99.99	Sill Height
LI99.99	Lintel Level
AT99.99	Arch Top Level
AB99.99	Arch Bottom Level

Symbol Descriptions

99.99 Level Marker

99.99 Level Marker

Stairs/Ramp Direction

Sloping Ceiling Direction

Radiator

Break Line

Door Swing Toilet Urinal

Sink Kitchen Sink

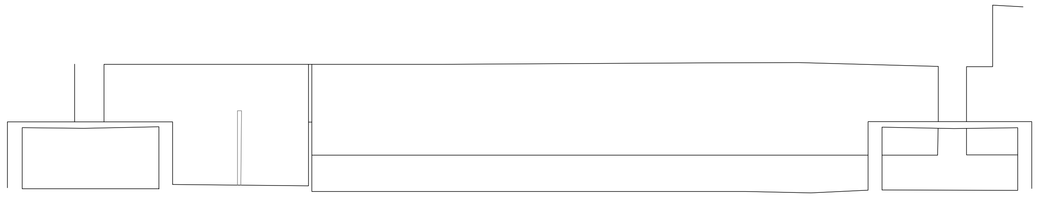
Deviation Diagram

Figures show deviations of building face away from vertical. Positive deviations shown lean into building with zero defined at positions marked B1 and B2.

Linetype Descriptions

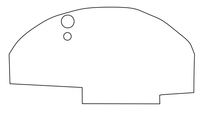
Big Walls
Big Walls Partition
Building Canopies
Centre Lines
Dimensions
Doors
Drainage
Elevations
Fences Gates
Footpaths
Hatch
Inspection Covers
Kitchen Furniture
Ladders
Lighting
Low Walls
Ob. Ceiling
Pipes
Radiators
Sections
Services
Skylights
Steps/Ramps
Surface Changes
Tanks
Vents
Walls
Wc Facilities
Windows

Hidden Detail



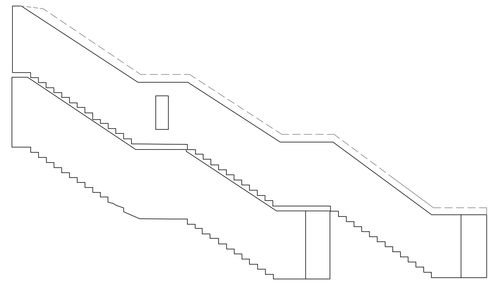
Datum 23.00m

ELEVATION 20



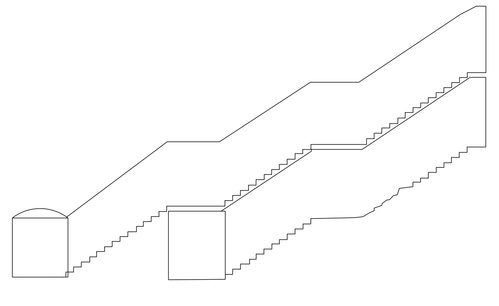
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ELEVATION 21



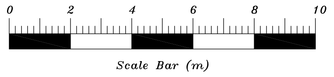
Datum 23.00m

ELEVATION 22



Datum 23.00m

ELEVATION 23



Scale Bar (m)

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PORTERS WOOD
ST ALBANS
HERTFORDSHIRE
AL3 6PA

Project Title
ELEVATIONS@
REDUNDANT UNDERGROUND CANALS
THE GREAT NORTHERN
DEANSGATE
MANCHESTER

Scale	Date	Job No
A0@100	DEC 13	08979-E-02
Surveyed	Drawn	Checked
TC	GB/CM/JB/DC	SEP

Survey & Engineering Projects, 33 Sandy Lane, Skelmersdale, Lancashire, WN8 8LA
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Project Title
PLANE
REDUNDANT UNDERGROUND CANALS
THE GREAT NORTHERN
DEANSGATE
MANCHESTER

Scale	Date	Job No
A0@100	DEC 13	0897 9-P-01
Surveyed	Drawn	Checked
TC	GB/JB	SEP

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t (09893) 729826 f (09893) 725666 W. www.spdl.co.uk E. info@spdl.co.uk

PLAN GRID NORTH

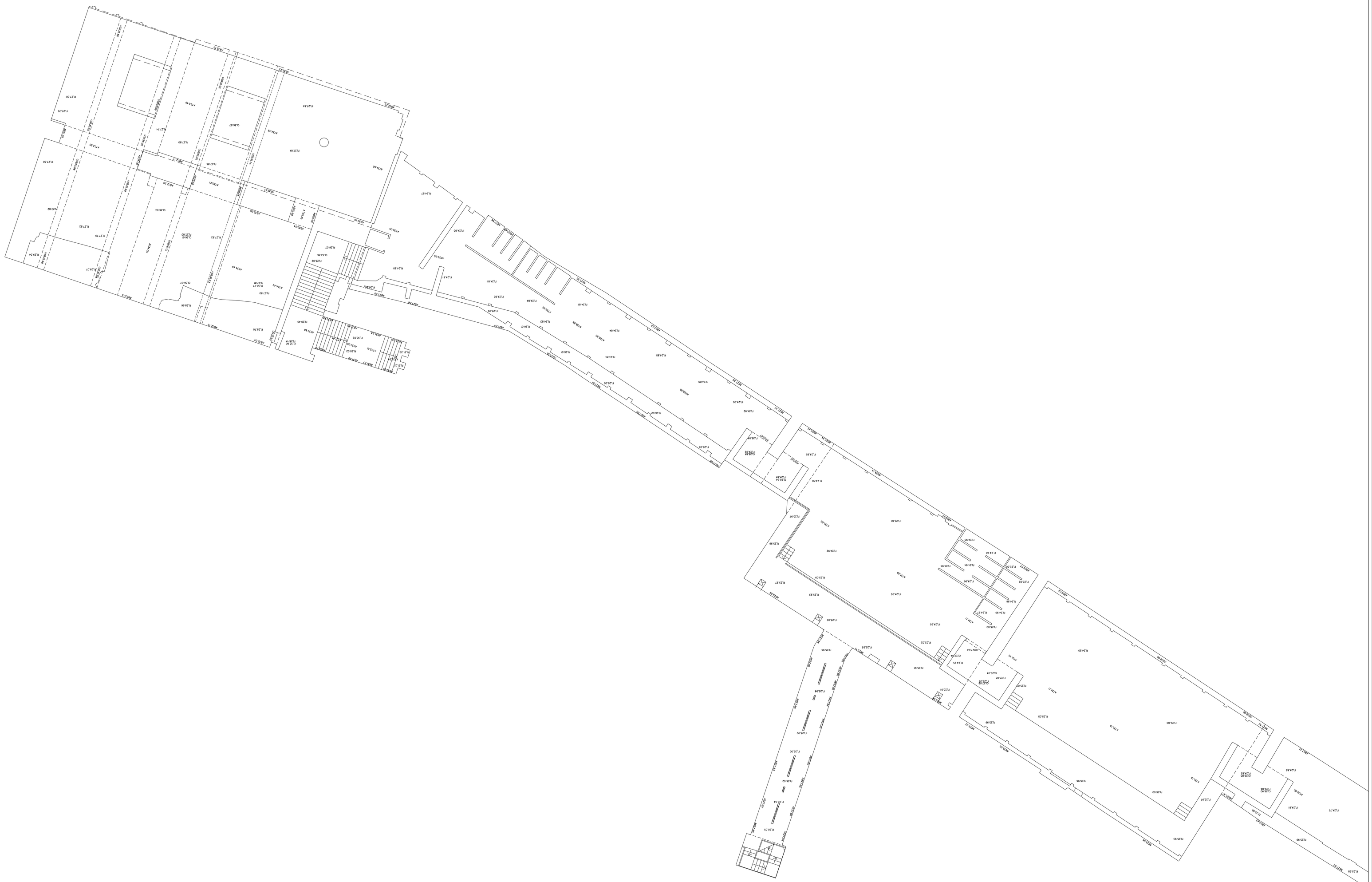
BUILDING SURVEY LEGEND

Level Prefix Descriptions
- 39.99 Add Level
- 2199.99 Floor Level
- 3299.99 Spot Height
- 3299.99 Underside Of Beam
- 3299.99 Existing Level
- 186.99 Level
- 186.99 Arch Top Level
- A899.99 Arch Bottom Level

Symbol Descriptions
- 39.99 Level Master
- 39.99 Level Master
- Stairs/Ramp Direction
- Sloping Ceiling Direction

Linetype Descriptions
- Sq Mets
- Boundary Perimeter
- Building Footprints
- Centrelines
- Chords
- Concentric Circles
- Elevation Lines
- Ellipses
- Hidden Lines
- Leaders
- Miscellaneous Functions
- Offsets
- Polylines
- Radial Lines
- Rectangles
- Revision Clouds
- Sloping Arrows
- Spirals
- Splines
- Tangents
- Text
- Traverse Lines
- Triangles
- Underlying Survey
- Utilities
- Vectors
- Walls
- Window

Hidden
Break Line
Door Swing
Toilet
Urinal
Kitchen Sink
Elevation Diagram
Figure box position or sizing has been made as accurate as existing conditions allow but can not be guaranteed. Existing dim may deviate at points marked
Kitchen Detail



PLAN GRID NORTH

N

BUILDING SURVEY LEGEND

Symbol Descriptions

Level Point	Symbol Descriptions
99.99 Main Level	99.99
75.89 Floor Level	Level Raiser
75.89 Ceiling Level	
0.000.89 Underside Of Beam	
0.000.89 Top Of Beam	
0.000.89 Floor Height	99.99
4766.89 Arch Top Level	Level Raiser
4766.89 Arch Level	
4899.99 Arch Bottom Level	Sloping/Ramp Direction

Sloping Ceiling Direction

Underlye Descriptions

Rubble	By Note
Brick	By Note Partition
Concrete	Cavity
Stone	Chimney
Timber	Cladding
Plaster	Concrete
Render Other	Flooring
Asphalt	Joists
Rubber/Lino Covering	Paving
Furniture	Roofing
Fittings	Tiles
Lighting	Trusses
Radiators	Vents
Pipes	Weathering
Roofing	Windows
Skylights	Wall Openings
Services	Window Openings
Tanks	Doors
Sanitary Ceramics	Walls
Sinks	Wall Partition
Windows	Roof
Rubber Detail	

Door Swing Hatch Level

Break Line

Window Sill Height

Manhole Size

Drain Size

Manhole

Invert Level

Pipe Direction

Drop Pipe

Gully

Soil Vent Pipe

Rainwater Pipe

Overflow Pipe

Gas Valve

Water Stop Valve

Electric Meter

Gas Meter

Oil Tank

Boundary Post

Bollard

Elevation Diagram

Elevation shall be taken at the point where the top surface of the loading arm passes over the centre line of the pivot.

Where this section is taken through two loading arms the loading arm nearest the platform edge shall be used.

Survey & Engineering Projects, 15 Derby Lane, Stanningley, Leeds, West Yorkshire, LS28 7AA
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Scale: A0@1:100	Date: DEC 13	Job No: 0879-P-02
Surveyed: TC	Drawn: GB/JB	Checked: SEP

Project Title:

PLAN@
REDUNDANT UNDERGROUND CANALS
THE GREAT NORTHERN
DEANSGATE
MANCHESTER

Client:

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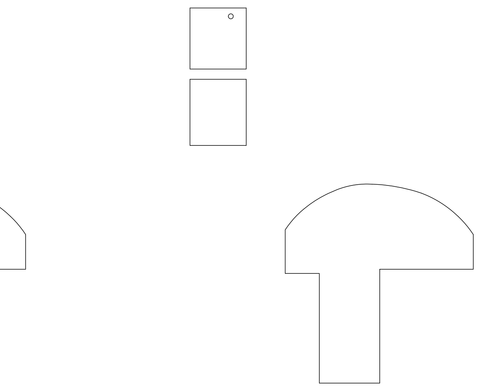
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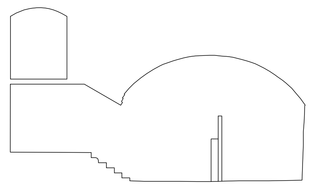
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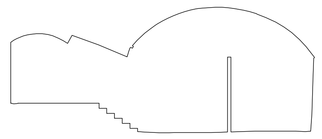


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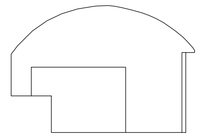
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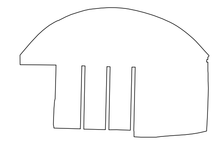
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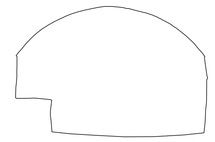
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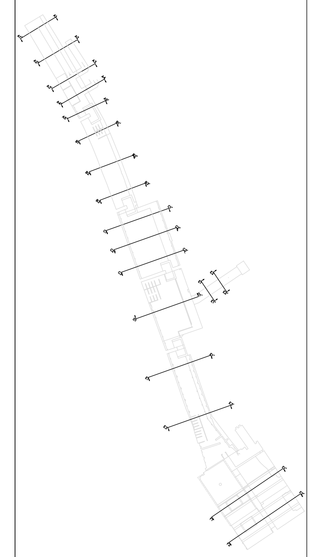
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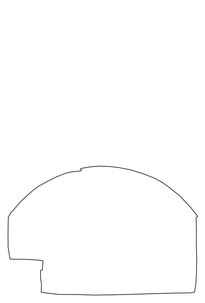
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SECTION B1–B1



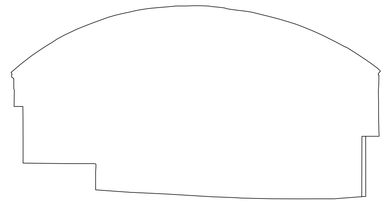
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SECTION B2–B2



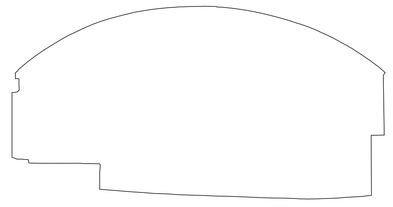
SECTION LOCATION PLAN



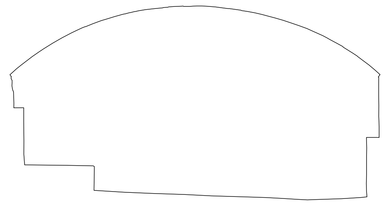
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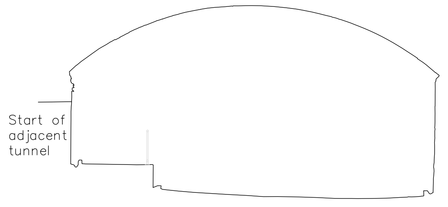
Datum 23.00m
SECTION C1–C1



Datum 23.00m
SECTION C2–C2



Datum 23.00m
SECTION C3–C3



Datum 23.00m
SECTION D1–D1

BUILDING SURVEY LEGEND

Level Prefix Descriptions

99.99	Spot Level
FL99.99	Floor Level
CL99.99	Ceiling Level
SL99.99	Suspended Ceiling Level
US99.99	Underside Of Beam
DH99.99	Door Height
SH99.99	Sill Height
LB9.99	Lintel Level
AT99.99	Arch Top Level
AB99.99	Arch Bottom Level

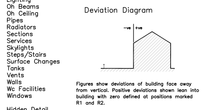
Symbol Descriptions

99.99	Level Marker
99.99	Level Marker
	Stairs/Ramp Direction
	Sloping Ceiling Direction
RADIATOR	Radiator
	Break Line
	Door Swing
	Toilet
	Urinal
	Sink
	Kitchen Sink

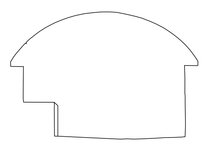
Linetype Descriptions

- By Walls
- By Walls Partition
- Building Canopies
- Centres
- Dimensions
- Doors
- Drawing
- Elevations
- Fences Gates
- Fittings
- Hatch
- Inspection Covers
- Kitchen Furniture
- Ladders
- Lighting
- Oil Tanking
- Overhead
- Pipes
- Radiators
- Sections
- Services
- Skylights
- Steps/Stairs
- Structural Charges
- Tanks
- Vents
- Walls
- Wc Facilities
- Windows
- Hidden Detail

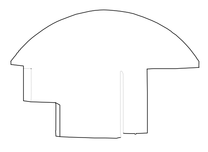
Deviation Diagram



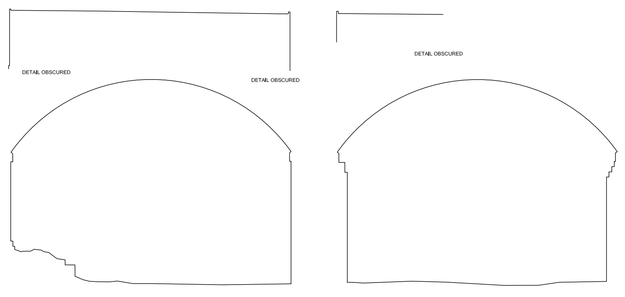
Figures show deviations of building face away from vertical. Positive deviations shown lean into building with zero defined at positions marked X1 and X2.



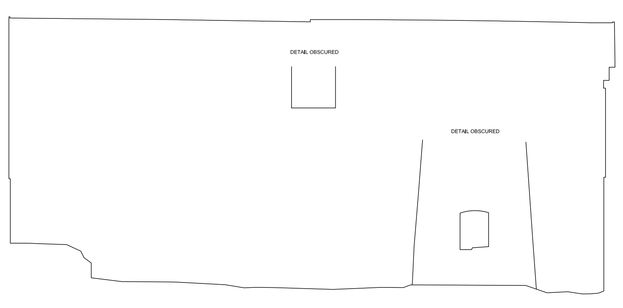
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SECTION E1–E1



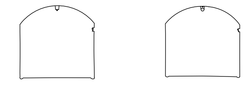
Datum 23.00m
SECTION E2–E2



Datum 23.00m
Section F1–F1'



Datum 23.00m
Section F2–F2'



Datum 23.00m
SECTION G1–G1

Datum 23.00m
SECTION G2–G2

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Project Title
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REDUNDANT UNDERGROUND CANALS
THE GREAT NORTHERN
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Appendix D

Manchester City Council Correspondence

United Utilities Correspondence

Andy Losty

From: Marta Wolska
Sent: 26 October 2022 13:07
To: Andy Losty
Subject: FW: Great Northen Warehouse flow rates climate change

Marta Wolska Senior Engineer
Curtins
T. 0161 236 2394 | marta.wolska@curtins.com

From: Marta Wolska
Sent: 01 September 2022 07:54
To: Andy Losty <Andy.Losty@curtins.com>
Cc: Chloé Grimsley <Chloe.Grimsley@curtins.com>
Subject: FW: Great Northen Warehouse flow rates climate change

Marta Wolska Senior Engineer
Curtins
T. 0161 236 2394 | marta.wolska@curtins.com

From: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Sent: 31 August 2022 15:53
To: Marta Wolska <marta.wolska@curtins.com>
Subject: RE: Great Northen Warehouse flow rates climate change

Hi Marta,

Hope you are well.

I would firstly mention that our records highlight that a historic canal tunnel is located directly beneath the site (between the two large existing buildings – North and South). Therefore, before anything can formally be agreed, we would expect to see evidence that an investigation has taken place to confirm the location of the tunnel in relation to the proposed development.

If the tunnel is found to be located within the site boundary, then we would expect this asset to be considered as part of the drainage hierarchy (as set out within Building Regulation Document H). We would class this asset as an ordinary watercourse and therefore request all new surface water connections be restricted to greenfield run-off rates. If it is evidenced that the canal tunnel no longer exists (or it is not appropriate to discharge surface water to this asset), then we would consider discharging surface water to the UU combined sewer acceptable. We would need to see an existing impermeable areas drawing and see the various rainfall intensities calculations for the site before agreeing to the proposed rates brownfield rates.

Regarding your second query, as the development has an anticipated lifespan of 60 years, we would expect to see areas which are drained by the new drainage structures to attenuate surface water flows up to and including the critical 1 in 100 year storm event plus 45% climate change.

I can also confirm that we have no records on our system of the site flooding.

Thanks,

Oliver

Oliver Timmins
Engineer (Flood Risk Management)
Mobile: 07814082200
Email: oliver.timmins@manchester.gov.uk

Lead Local Flood Authority
Highways
Growth & Development and Neighbourhoods Directorate
Manchester City Council
PO Box 532 Town Hall
Manchester
M60 2LA

Web: http://www.manchester.gov.uk

From: Marta Wolska <marta.wolska@curtins.com>
Sent: 23 August 2022 12:37
To: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Cc: Andy Losty <Andy.Losty@curtins.com>; Chloé Grimsley <Chloe.Grimsley@curtins.com>
Subject: Great Northen Warehouse flow rates climate change

Dear Sir/ Madam

The site is located at Great Northern Warehouse and Square, Peter Street/Deansgate Manchester.

The existing site comprises of the existing buildings with an external area.

The proposal is an internal refurbishment of the existing building, some extensions and new external area arrangements. I have marked up new areas on the proposed attached plan

It is proposed to retain the existing connections from existing buildings and **decrease 50% the surface water discharge rate from external areas and new extensions only(area 0.68 ha)**. Can you please let me know if that will be an acceptable approach?

In May 2022, the Environment Agency released updated climate change allowances by Irwell Management Catchment for peak rainfall intensities which should be applied to new developments. Demonstrates the climate change allowances with central and upper end allowances being considered.

Based on the nature of the development, a lifespan of 60 years is anticipated (as defined by the current requirement for commercial development). Therefore, the potential climate change allowance in the 2070s; 2061-2115 ranges between 30% for the central allowance and 45% for the upper-end allowance. As such, an allowance of 40% for climate change on peak rainfall intensity will be included in calculations and checked for the impact of 45%.

Could you please let me know if it is acceptable?

Irwell Management Catchment peak rainfall allowances

3.3% annual exceedance rainfall event

Epoch	Central allowance	Upper end allowance
2050s	25%	35%
2070s	30%	40%

1% annual exceedance rainfall event

Epoch	Central allowance	Upper end allowance
2050s	25%	40%
2070s	30%	45%

*Use '2050s' for development with a lifetime up 2060 and use the 2070s epoch for development with a lifetime between 2061 and 2125.

Do you have any records of historical flooding adjacent to the site?

Marta Wolska
Senior Engineer
T. 0161 236 2394
marta.wolska@curtins.com

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Manchester M1 5WG

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****

Andy Losty

From: Marta Wolska
Sent: 26 October 2022 13:06
To: Andy Losty
Subject: FW: Climate Change allowances

Marta Wolska Senior Engineer
Curtins
T. 0161 236 2394 | marta.wolska@curtins.com

From: Chloé Grimsley <Chloe.Grimsley@curtins.com>
Sent: 01 September 2022 13:44
To: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Cc: Marta Wolska <marta.wolska@curtins.com>; Andy Losty <Andy.Losty@curtins.com>; Charlie Smith <Charlie.Smith@curtins.com>
Subject: RE: Climate Change allowances

Thanks Oliver – we note this going forward working to the upper figures unless decommissioning can be confirmed.

Kind Regards,
Chloé

Chloé Grimsley Principal Engineer
Curtins
T. 0161 236 2394 | chloe.grimsley@curtins.com

From: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Sent: 01 September 2022 11:58
To: Chloé Grimsley <Chloe.Grimsley@curtins.com>
Cc: Marta Wolska <marta.wolska@curtins.com>; Andy Losty <Andy.Losty@curtins.com>; Charlie Smith <Charlie.Smith@curtins.com>
Subject: RE: Climate Change allowances

Hi Chloe,

Yes, the below guidance should be followed as a general guideline.

In general, we would consider all non-residential developments to have a design life of at least 75 years in accordance with https://www.gov.uk/guidance/flood-risk-and-coastal-change (unless we have written evidence to confirm decommissioning before the 75th year following completion of the development).

On this basis, we would consider that all new applications would generally have a minimum design life of 2097 which is 3 years before the 2100 threshold (assuming completion is this year 2022). Therefore, (unless we have written confirmation of decommissioning prior to 2097,) for non-residential developments we would expect the 45% climate change to be incorporated into the proposed drainage design, as generally most developments completed over the next few years will be within 2100 threshold.

Hope the above provides clarification regarding climate change allowances for peak rainfall intensities.

Thanks,

Oliver

Oliver Timmins
Engineer (Flood Risk Management)
Mobile: 07814082200
Email: oliver.timmins@manchester.gov.uk

Lead Local Flood Authority
Highways
Growth & Development and Neighbourhoods Directorate
Manchester City Council
PO Box 532 Town Hall
Manchester
M60 2LA

Web: http://www.manchester.gov.uk

From: Chloé Grimsley <Chloe.Grimsley@curtins.com>
Sent: 01 September 2022 11:08
To: Flood Risk Management <floodriskmanagement@manchester.gov.uk>
Cc: Marta Wolska <marta.wolska@curtins.com>; Andy Losty <Andy.Losty@curtins.com>; Charlie Smith <Charlie.Smith@curtins.com>
Subject: Climate Change allowances

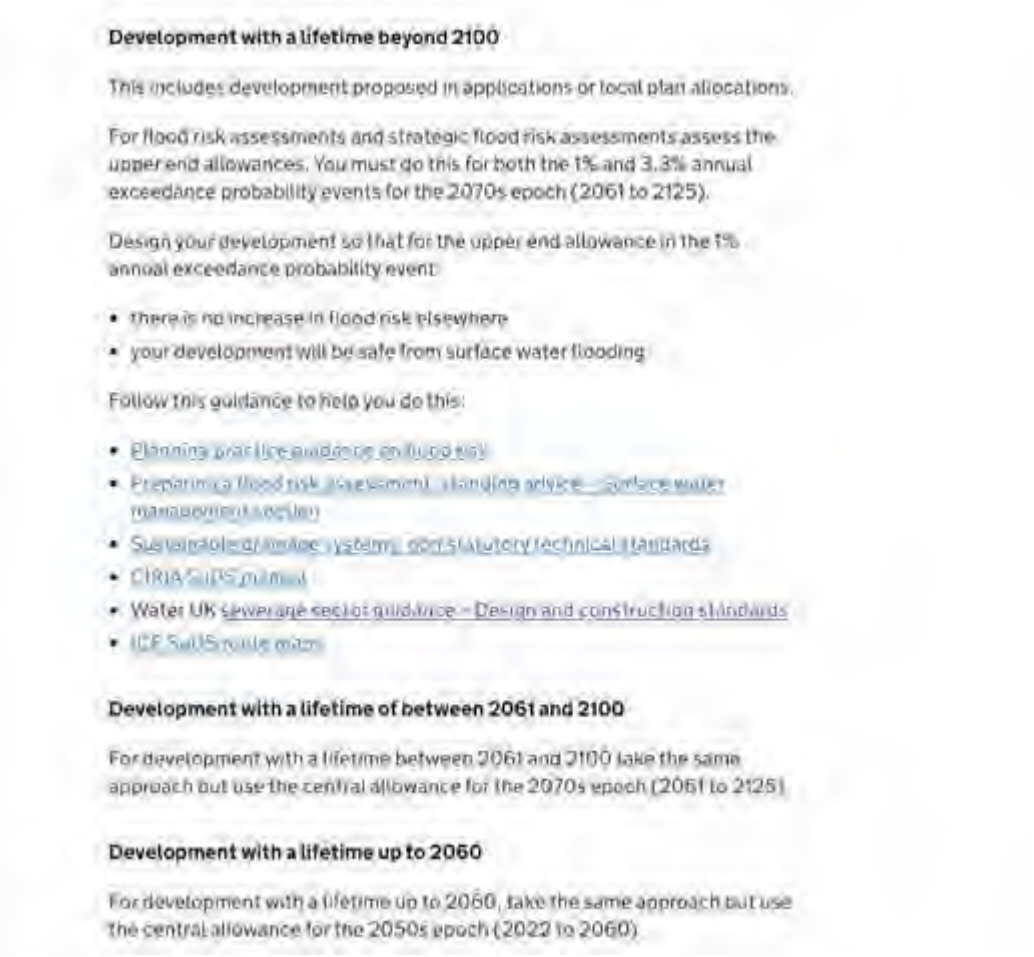
Good Morning Oliver/Laura,

I hope you are both well.

Just a general query we have for development climate change allowances as this has been raised on a few project consultations recently (Great Northern Warehouse and 3 Circle Square).

In our recent development planning submissions, we have applied the updated climate change allowances (May 2022) as defined on the government website and this advises that climate change application is based on development lifetime.
It advises that development up to 2100 should use the upper end allowances for the 2070's epoch but development between 2061 and 2100 should use the central allowance for the 2070's epoch.

See below:



Development with a lifetime beyond 2100

This includes development proposed in applications or local plan allocations.

For flood risk assessments and strategic flood risk assessments assess the upper end allowances. You must do this for both the 1% and 3.3% annual exceedance probability events for the 2070s epoch (2061 to 2125).

Design your development so that for the upper end allowance in the 1% annual exceedance probability event:

- there is no increase in flood risk elsewhere
- your development will be safe from surface water flooding

Follow this guidance to help you do this:

- Planning practice guidance on flood risk
- Preparing a flood risk assessment: standing advice - surface water management section
- Sustainable drainage systems: non-statutory technical standards
- CIRIA SuDS manual
- Water UK sewerage sector guidance - Design and construction standards
- ICE SuDS route maps

Development with a lifetime of between 2061 and 2100

For development with a lifetime between 2061 and 2100 take the same approach but use the central allowance for the 2070s epoch (2061 to 2125)

Development with a lifetime up to 2060

For development with a lifetime up to 2060, take the same approach but use the central allowance for the 2050s epoch (2022 to 2060)

Based on the above and designing for a general development lifespan of 60 years (which is what we would use for commercial development) we would apply the central allowance of 30% in the Irwell Catchment. For Residential, we would use 100 years and would apply the upper end allowance of 45%.

Please could you review the above and confirm if this is the approach we should be taking – in reference to the above projects: 3 Circle square was only a file note from the planning consultations that 45% would not be enforced as we have applied 40%, however we note that this is a commercial development.
On Great Northern Warehouse, we have been advised to apply 45% when it is a commercial development. I have attached this correspondence for reference.

Kind Regards,
Chloé

Chloé Grimsley
Principal Engineer
T. 0161 236 2394
chloe.grimsley@curtins.com

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17-19 Whitworth Street West
Manchester M1 5WG

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

Marta Wolska

From: wastewaterdeveloperservices@uuplc.co.uk
Sent: 20 September 2022 12:12
To: Marta Wolska
Cc: Andy Losty
Subject: RE: PDE for: Great Northern Warehouse UU Ref : 02644457

Good afternoon Marta,
Thanks for your emails.

Regarding the first email (the 500mm combined sewer crossing the site), I still can see the 500mm in UU records as a live sewer, I understand that you had a previous corresponded with my formal colleague Neil which confirm his acceptance to the provided evidence that the 500mm not exist anymore, and was removed during the basement construction.

It seems that a mistake in the updating process of our records occurred at that time. I will email the relevant team to update our records, once that is done I will confirm that with you.

Regarding the second email, I am aware of the Wallingford Procedure, we don't agree that Cv will equal 1 since we consider part of the surface water will go to the green area north of the site, to the main road and part will evaporate.

Furthermore, according to the CIRIA SuDs manual 2015 page 519 '' For paved area runoff, the two coefficients are usually incorporated into a single term with a value of between 0.8 and 1.0 - depending on how effectively the catchment is drained and the level of impermeability.''
Using the same equation with C=1, the rate after betterment will be 47 l/s.

If you want to challenge our calculation, and wish for a higher rate. Then we will expect a full on-site assessment and hydraulic calculations to be submitted to us, which will include CCTV of all drainage sewers on site, a topographical survey and Micro drainage modelling.

Kind regards,

United Utilities
Water for the North West

Mohammed Aljafarawi (He/Him)
Developer Engineer
Developer Services & Metering
Customer Services
M: 07950474499
unitedutilities.com

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---------- Original Message ----------
From: Marta Wolska [marta.wolska@curtins.com]
Sent: 12/09/2022 09:13
To: wastewaterdeveloperservices@uuplc.co.uk
Cc: andy.losty@curtins.com
Subject: RE: PDE for: Great Northern Warehouse UU Ref : 02644457

EXTERNAL EMAIL This email originated outside of the organisation. Do not click links or open attachments unless you recognise the sender and know the content is safe.

Dear Mohammed

Thank you for your e-mail. In your response, it was mentioned that there is a difference in estimated discharge rates. Please, see the reference to your response below.

*"However, we don't agree with the discharge rate estimation for the external areas and new extensions. Using the Wallingford Procedure Methodology Calculation = 2.78*CiA = 2.78*1*50*0.68= 94 l/s, after 50% betterment it became 47l/s.*

*And as such United Utilities request that any agreed rate does not exceed **47l/s** for the external areas and new extensions only (anticipated QBar rate from the site impermeable areas only)."*

You used coefficient C as1, whereas coefficients C= C_vCr= 1.3 based on The Wallingford Procedure, Volume 1 – Principles, Methods and Practice. Part 3 - Pg. 101-2 shown below.

We calculate the peak discharge flow (Q_p) as given in the Wallingford Procedure, Volume 4 – Modified Rational Method, which states the following[1]:

Q_p= 2.78*CiA

Where:

i – Rainfall intensity (mm/hr)

A – Catchment area (ha)

C – Coefficient = C_vC_r (i.e. – Qp = 2.78*C_vC_riA)

C_v – *"…Proportion of the rainfall on the catchment which appears as surface runoff in the storm drainage system…"*. Since we consider the entire catchment area to drain to the surface water network, we considered the value of Cv to be 1.

C_r – Routing coefficient. Recommended value of 1.3 by the Wallingford Procedure[1].

Therefore, using the other parameters for our site, the formula becomes:

Q_p=2.78*1*1.3*50*0.68=122.9 l/s => 50%Q_p=61.4 l/s.

Please confirm if 61.4 l/s will be acceptable.

- The Wallingford Procedure, Volume 4 – The Modified Rational Method. Chapter 4, Pg. 4-5.

I copied screenshots from the relevant text on The Wallingford Procedure for easy reference.

The Wallingford Procedure, Volume 1 – Principles, Methods and Practice. Part 3 - Pg. 101-2.

The Modified Rational Method gives a peak discharge from the equation:

$$Q_p = 2.78\, C_v C_R i A \qquad \text{.....13.1}$$

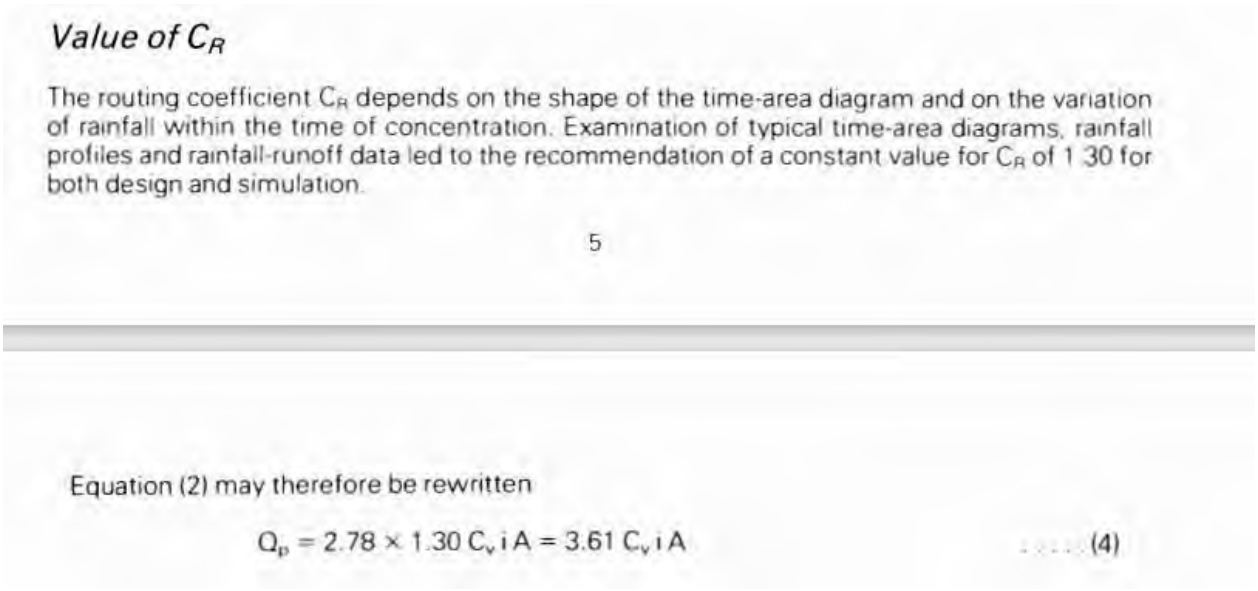
where Q_p is the peak discharge in l/s
C_v is the volumetric runoff coefficient

101

C_R is a dimensionless routing coefficient
i is a rainfall intensity in mm/hr
and A is the catchment area in ha.

The steps involved in the hand and computer versions are now described. A self-contained summary of the hand calculation is also available as Volume 4 of this report.

The Wallingford Procedure, Volume 4 – The Modified Rational Method. Pg. 5-6.



Value of C_R

The routing coefficient C_R depends on the shape of the time-area diagram and on the variation of rainfall within the time of concentration. Examination of typical time-area diagrams, rainfall profiles and rainfall-runoff data led to the recommendation of a constant value for C_R of 1.30 for both design and simulation.

5

Equation (2) may therefore be rewritten

$$Q_p = 2.78 \times 1.30\, C_v\, i\, A = 3.61\, C_v\, i\, A \quad \ldots\ldots (4)$$

Marta Wolska Senior Engineer
Curtins
T. 0161 236 2394 | marta.wolska@curtins.com

From: Marta Wolska
Sent: 06 September 2022 12:03
To: wastewaterdeveloperservices@uuplc.co.uk
Subject: RE: PDE for: Great Northern Warehouse UU Ref : 02644457

Dear Mohammed

You have advised in the below email that existing wastewater assets cross the site.

We contacted UU and we submitted S116 application with relevant drawings in 2018 ref 4200018141. The sewer were abandoned and confirmed by Neil O Brien on 06.12.2018 that sewer will be removed from records attached email.

Existing Wastewater Assets Crossing the Site

According to our public sewer records there are public sewers located within your site boundary. We will require unrestricted access to the sewer for maintenance purposes, we would ask that you maintain a minimum clearance of 6m which is measured 3m from the centre line of the pipe unless there happens to be a formal easement agreement in place, in which case the specified easement width would apply. If you cannot achieve this then you may wish to consider diverting and or abandoning the public sewer.

Could you please clarify why the sewer has not been removed from the record since 06.12.2018. Can you please advise if the sewer will be removed from the records?

Marta Wolska Senior Engineer
Curtins
T. 0161 236 2394 | marta.wolska@curtins.com

From: wastewaterdeveloperservices@uuplc.co.uk <wastewaterdeveloperservices@uuplc.co.uk>
Sent: 23 August 2022 11:18
To: Marta Wolska <marta.wolska@curtins.com>
Subject: PDE for: Great Northern Warehouse UU Ref : 02644457

Good morning Marta

Pre Development Enquiry for: Great Northern Warehouse UU Reference Number : 02644457

Thanks for your email, the provided site investigation link has been expired. However, 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/

I can confirm that we have no current record of sewer flooding on our DG5 register within the vicinity of the proposed development. The DG5 register is a register of properties that have flooded as a result of hydraulic inadequacy of the public sewer network.

Please note that United Utilities Water Limited (UUW) can only record and check flooding events which are reported to us and we have to comply with our Regulators instructions on the qualification of flooding events to place on the register.

Our response does not include:

1. any sewer flooding events caused by blockages or collapses which are the result of third party actions, natural events or other actions over which UUW has no control and not a facet of sewer capacity; or

1. any historical sewer flooding events that have been removed from the register as a result of investment in our infrastructure.

Foul Water

Foul flow from this site will be allowed to drain into the public foul water/combined sewer system at any convenient point and at an unrestricted rate. United Utilities would have no preference to the specific connection point in this instance.

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

United Utilities acknowledge that the nearest watercourse is a significant distance off-site.

Highway Drainage

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

Public Sewer

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

Once evidence is provided as outlined above, the surface water flows can be split into two connection points to limit the effect on capacity in the existing sewer network. To that end, our initial view on ideal connection points would be:

To the 450mm diameter public combined sewer within Watson Street located East of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority.
Or
To the 2400mm diameter public combined sewer within Deansgate Street located West of the proposed site at a pass forward flow to be agreed by the Lead Local Flood Authority.

We have noted that you have provided brownfield calculations. Surface water from the existing buildings will be allowed to drain to the public combined sewer network at an unrestricted rate (no building demolition, only refurbished work for the same building footprint).

However, we don't agree with the discharge rate estimation for the external areas and new extensions.
Using the Wallingford Procedure Methodology Calculation = 2.78*CiA = 2.78*1*50*0.68= 94 l/s, after 50% betterment it became 47l/s.
And as such United Utilities request that any agreed rate does not exceed **47l/s** for the external areas and new extensions only (anticipated QBar rate from the site impermeable areas only).

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 pubic sewerage network under any circumstances

Existing Wastewater Assets Crossing the Site

According to our public sewer records there are public sewers located within your site boundary. We will require unrestricted access to the sewer for maintenance purposes, we would ask that you maintain a minimum clearance of 6m which is measured 3m from the centre line of the pipe unless there happens to be a formal easement agreement in place, in which case the specified easement width would apply. If you cannot achieve this then you may wish to consider diverting and or abandoning the public sewer.

Please be aware that any proposed diversion may require modelling. This process may take up to 6 months in order to reach an acceptable design.

Please refer to the link below to obtain full details of the processes involved with sewer diversions:

https://www.unitedutilities.com/builders-developers/larger-developments/wastewater/sewer-diversions/

Please refer to the link below to obtain full details of the processes involved with sewer closure:

https://www.unitedutilities.com/builders-developers/wastewater-services/close-a-sewer/sewer-closures/

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: 07950474499
unitedutilities.com

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Marta Wolska

From: wastewaterdeveloperservices@uuplc.co.uk
Sent: 21 September 2022 12:18
To: Marta Wolska
Subject: PDE for: Great Northern Warehouse UU Ref : 02644457 - sewer records updated

Good afternoon Marta,

I confirm that the 500mm combined sewer was removed today (21/09/2022) from our records.

Kind regards,

Mohammed Aljafarawi (He/Him)
Developer Engineer
Developer Services & Metering
Customer Services
M: 07950474499
unitedutilities.com

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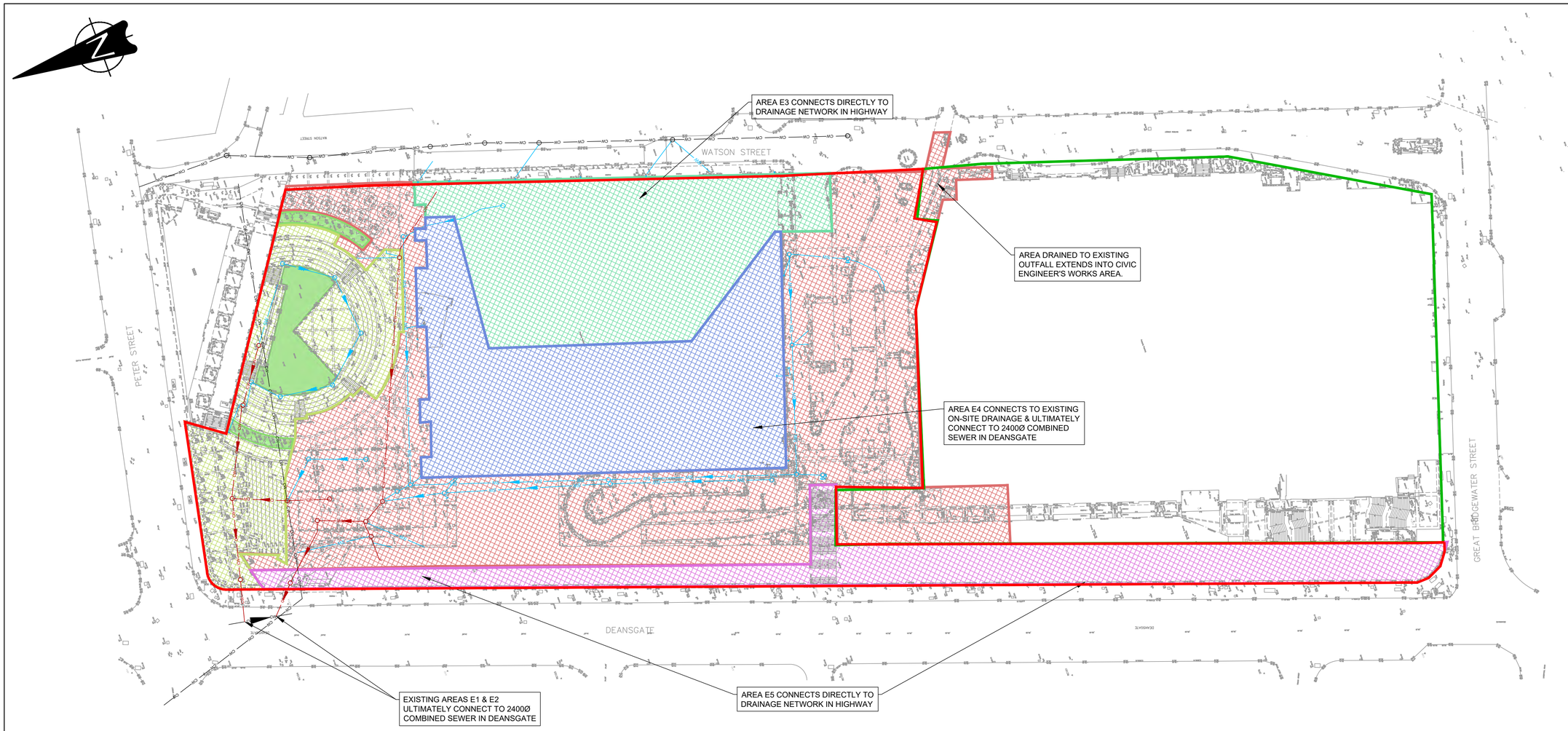
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Appendix E

Existing Areas Drawing

Existing Surface Water Drainage (1, 30, 100 Year)



GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
2. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
3. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
4. FOR GENERAL NOTES REFER TO DRAWING.

KEY:

- BOUNDARY OF CURTINS WORKS TAKEN FROM DRAWING 772-02-CIV-XX-00-SK-X-9001
- BOUNDARY OF CIVIC ENGINEERS WORKS TAKEN FROM DRAWING 772-02-CIV-XX-00-SK-X-9001
- EXISTING IMPERMEABLE AREA E1:
- EXISTING IMPERMEABLE AREA E2:
- EXISTING IMPERMEABLE AREA E3:
  THIS AREA CONSISTS OF EXISTING ROOF DRAINAGE THAT DRAINS DIRECTLY TO SEWERS IN WATSON STREET. CONNECTIONS ARE TO BE RETAINED, AND THEREFORE THIS AREA HAS BEEN EXCLUDED FROM DRAINAGE CALCULATIONS.
- EXISTING IMPERMEABLE AREA E4:
  THIS AREA CONSISTS OF EXISTING ROOF DRAINAGE THAT DRAINS VIA THE EXISTING DRAINAGE NETWORK ON THE SITE, AND OUTFALLS TO THE EXISTING PUBLIC SEWER IN DEANSGATE. CONNECTIONS ARE TO BE RETAINED, AND THEREFORE THIS AREA HAS BEEN EXCLUDED FROM DRAINAGE CALCULATIONS.
  THE EXISTING PRIVATE DRAINAGE WITHIN THE SITE WILL REQUIRE A DIVERSION.
- EXISTING IMPERMEABLE AREA E5:
  THIS AREA CONSISTS OF EXISTING ROOF DRAINAGE THAT DRAINS DIRECTLY TO SEWERS IN DEANSGATE. CONNECTIONS ARE TO BE RETAINED, AND THEREFORE THIS AREA HAS BEEN EXCLUDED FROM DRAINAGE CALCULATIONS.
- EXISTING PERMEABLE AREA: 0.04 Ha
  THIS AREA DOES NOT DRAIN TO THE EXISTING DRAINAGE NETWORK, AND HAS THEREFORE BEEN EXCLUDED FROM CALCULATIONS.
- CW —— EXISTING PUBLIC COMBINED SEWER
- CW —— EXISTING PRIVATE COMBINED DRAINAGE
- SW —— EXISTING PRIVATE SURFACE WATER DRAINAGE
- FW —— EXISTING PRIVATE FOUL DRAINAGE

TABLE 1: EXISTING AND PROPOSED DISCHARGE RATES

CATCHMENT	IMPERMEABLE AREA (Ha)	DISCHARGE FLOW RATES (l/s)		
		1-YR EVENT	30-YR EVENT	100-YR EVENT*
AREA E1	0.610	65	128	149
AREA E2	0.160	17	38	45
AREA E3	0.256	AS EXISTING - EXCLUDED FROM CALCULATIONS		
AREA E4	0.291	AS EXISTING - EXCLUDED FROM CALCULATIONS		
AREA E5	0.191	AS EXISTING - EXCLUDED FROM CALCULATIONS		
TOTAL IMPERMEABLE AREA (FOR DISCHARGE RATE CALCULATIONS)	**0.770**	**82**	**166**	**194**
		INCLUDES 50% REDUCTION IN ACCORDANCE WITH MCC REQUIREMENTS		
ALLOWABLE DISCHARGE		**41**	**83**	**97**
*PROPOSED INCLUDES FOR 45% CLIMATE CHANGE ALLOWANCE				

DRAWING BASED ON:

TOPOGRAPHICAL SURVEY
- S13920-T-01 & T02 BY SEP RECEIVED APRIL 2017

UTILITY SURVEY
- S12020-U BY SEP DATED JAN 2016

CCTV SURVEY
- S14423-CCTV BY SEP DATED JAN 2016
- 1286 BY LAYER SURVEY DATED JUNE 2022

UNITED UTILITIES PUBLIC SEWER RECORDS
- EXTRACT DATED NOVEMBER 2018.

DESIGN RESPONSIBILITY PLANS (CIVIC ENGINEERS)
- 772-02-CIV-XX-00-SK-X-9001 REV P02
- 772-02-CIV-XX-00-SK-X-9002 REV P02
- 772-02-CIV-XX-00-SK-X-9001 REV P02

Rev:	Description:	Date:	By:	Chkd:
P01	FIRST ISSUE	28/10/22	ATL	MW

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Status: PRELIMINARY

Project: GREAT NORTHERN WAREHOUSE, MANCHESTER

Drg Title: EXISTING DRAINAGE CATCHMENTS

Size:	Date:	Drawn By:	Designed By:	Checked By:
A1	28.10.22	ATL	ATL	MW
Scale: 1:500				

Project No:	Originator:	Zone:	Level:	Type:	Discipline:	Category / Number:	Rev:
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Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	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	0.360	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.122	5.00	36.420	1200	383562.863	397810.397	1.760
2	0.041	5.00	36.550	1200	383568.266	397822.409	2.080
3	0.027	5.00	36.470	1200	383548.957	397828.759	2.240
4	0.088	5.00	35.780	1200	383519.222	397832.273	1.900
5	0.000	5.00	35.950	1200	383521.388	397837.720	2.140
6	0.000	5.00	38.030	1200	383534.677	397877.813	4.500
7	0.013	5.00	36.680	1200	383601.612	397902.415	3.100
8			35.850	1200	383548.816	397919.934	2.600
9			35.800	1200	383548.432	397923.209	2.675
10	0.085	5.00	35.900	1200	383522.076	397843.401	1.510
11	0.079	5.00	38.030	1200	383533.655	397877.725	4.240
12			35.990	1200	383544.442	397913.421	2.800
13	0.027	5.00	36.480	1200	383597.498	397904.793	2.740
14			35.740	1200	383547.419	397927.104	2.740
15	0.012	5.00	35.890	1200	383540.917	397932.159	1.070
16	0.112	5.00	35.680	1200	383544.463	397932.157	2.730
17			35.690	1200	383548.414	397942.278	2.670
18			34.670	1200	383537.305	397952.783	2.460
18_OUT			34.500		383531.375	397958.309	3.300

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	1	2	13.171	0.600	34.660	34.470	0.190	69.3	150	5.18	46.1
1.001	2	3	20.327	0.600	34.470	34.230	0.240	84.7	150	5.49	45.0
1.002	3	5	28.988	0.600	34.230	33.810	0.420	69.0	150	5.89	43.6
2.000	4	5	5.862	0.600	33.880	33.810	0.070	83.7	150	5.09	46.5
1.003	5	6	42.238	0.600	33.810	33.530	0.280	150.9	225	6.55	41.5
1.004	6	8	44.431	0.600	33.530	33.250	0.280	158.7	225	7.27	39.5

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	1.209	21.4	15.2	1.610	1.930	0.122	0.0
1.001	1.093	19.3	19.9	1.930	2.090	0.163	0.0
1.002	1.212	21.4	22.5	2.090	1.990	0.190	0.0
2.000	1.099	19.4	11.1	1.750	1.990	0.088	0.0
1.003	1.062	42.2	31.3	1.915	4.275	0.278	0.0
1.004	1.035	41.2	29.8	4.275	2.375	0.278	0.0

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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)
3.000	7	8	55.627	0.600	33.580	33.250	0.330	168.6	225	5.92	43.5
1.005	8	9	3.297	0.600	33.250	33.125	0.125	26.4	225	7.29	39.4
1.006	9	14	4.025	0.600	33.125	33.000	0.125	32.2	300	7.31	39.4
4.000	10	11	36.225	0.600	34.390	33.790	0.600	60.4	225	5.36	45.4
4.001	11	12	37.290	0.600	33.790	33.190	0.600	62.2	225	5.73	44.1
4.002	12	14	14.003	0.600	33.190	33.000	0.190	73.7	225	5.89	43.6
5.000	13	14	54.823	0.600	33.740	33.025	0.715	76.7	150	5.80	43.9
1.007	14	16	5.855	0.600	33.000	32.950	0.050	117.1	300	7.38	39.2
6.000	15	16	3.547	0.600	34.820	33.025	1.795	2.0	150	5.01	46.8
1.008	16	17	10.865	0.600	32.950	33.020	-0.070	-155.2	300	7.56	38.8
1.009	17	18	15.289	0.600	33.020	32.210	0.810	18.9	300	7.63	38.6
1.010	18	18_OUT	8.106	0.600	32.210	31.200	1.010	8.0	300	7.66	38.5

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
3.000	1.004	39.9	1.5	2.875	2.375	0.013	0.0
1.005	2.557	101.7	31.1	2.375	2.450	0.291	0.0
1.006	2.780	196.5	31.1	2.375	2.440	0.291	0.0
4.000	1.686	67.0	10.5	1.285	4.015	0.085	0.0
4.001	1.661	66.1	19.6	4.015	2.575	0.164	0.0
4.002	1.525	60.6	19.4	2.575	2.515	0.164	0.0
5.000	1.149	20.3	3.2	2.590	2.565	0.027	0.0
1.007	1.452	102.6	51.2	2.440	2.430	0.482	0.0
6.000	7.225	127.7	1.5	0.920	2.505	0.012	0.0
1.008	1.000	70.7	63.7	2.430	2.370	0.606	0.0
1.009	3.635	256.9	63.4	2.370	2.160	0.606	0.0
1.010	5.582	394.5	63.2	2.160	3.000	0.606	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	13.171	69.3	150	1 STANDARD	36.420	34.660	1.610	36.550	34.470	1.930
1.001	20.327	84.7	150	1 STANDARD	36.550	34.470	1.930	36.470	34.230	2.090
1.002	28.988	69.0	150	1 STANDARD	36.470	34.230	2.090	35.950	33.810	1.990
2.000	5.862	83.7	150	1 STANDARD	35.780	33.880	1.750	35.950	33.810	1.990
1.003	42.238	150.9	225	1 STANDARD	35.950	33.810	1.915	38.030	33.530	4.275
1.004	44.431	158.7	225	1 STANDARD	38.030	33.530	4.275	35.850	33.250	2.375
3.000	55.627	168.6	225	1 STANDARD	36.680	33.580	2.875	35.850	33.250	2.375
1.005	3.297	26.4	225	1 STANDARD	35.850	33.250	2.375	35.800	33.125	2.450

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	1200	Manhole	1 STANDARD	2	1200	Manhole	1 STANDARD
1.001	2	1200	Manhole	1 STANDARD	3	1200	Manhole	1 STANDARD
1.002	3	1200	Manhole	1 STANDARD	5	1200	Manhole	1 STANDARD
2.000	4	1200	Manhole	1 STANDARD	5	1200	Manhole	1 STANDARD
1.003	5	1200	Manhole	1 STANDARD	6	1200	Manhole	1 STANDARD
1.004	6	1200	Manhole	1 STANDARD	8	1200	Manhole	1 STANDARD
3.000	7	1200	Manhole	1 STANDARD	8	1200	Manhole	1 STANDARD
1.005	8	1200	Manhole	1 STANDARD	9	1200	Manhole	1 STANDARD

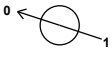
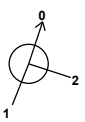
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Pipeline Schedule

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)
1.006	4.025	32.2	300	1 STANDARD	35.800	33.125	2.375	35.740	33.000	2.440
4.000	36.225	60.4	225	1 STANDARD	35.900	34.390	1.285	38.030	33.790	4.015
4.001	37.290	62.2	225	1 STANDARD	38.030	33.790	4.015	35.990	33.190	2.575
4.002	14.003	73.7	225	1 STANDARD	35.990	33.190	2.575	35.740	33.000	2.515
5.000	54.823	76.7	150	1 STANDARD	36.480	33.740	2.590	35.740	33.025	2.565
1.007	5.855	117.1	300	1 STANDARD	35.740	33.000	2.440	35.680	32.950	2.430
6.000	3.547	2.0	150	1 STANDARD	35.890	34.820	0.920	35.680	33.025	2.505
1.008	10.865	-155.2	300	1 STANDARD	35.680	32.950	2.430	35.690	33.020	2.370
1.009	15.289	18.9	300	1 STANDARD	35.690	33.020	2.370	34.670	32.210	2.160
1.010	8.106	8.0	300	1 STANDARD	34.670	32.210	2.160	34.500	31.200	3.000

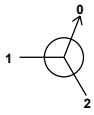
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.006	9	1200	Manhole	1 STANDARD	14	1200	Manhole	1 STANDARD
4.000	10	1200	Manhole	1 STANDARD	11	1200	Manhole	1 STANDARD
4.001	11	1200	Manhole	1 STANDARD	12	1200	Manhole	1 STANDARD
4.002	12	1200	Manhole	1 STANDARD	14	1200	Manhole	1 STANDARD
5.000	13	1200	Manhole	1 STANDARD	14	1200	Manhole	1 STANDARD
1.007	14	1200	Manhole	1 STANDARD	16	1200	Manhole	1 STANDARD
6.000	15	1200	Manhole	1 STANDARD	16	1200	Manhole	1 STANDARD
1.008	16	1200	Manhole	1 STANDARD	17	1200	Manhole	1 STANDARD
1.009	17	1200	Manhole	1 STANDARD	18	1200	Manhole	1 STANDARD
1.010	18	1200	Manhole	1 STANDARD	18_OUT		Manhole	1 STANDARD

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
1	383562.863	397810.397	36.420	1.760	1200		0	1.000	34.660	150
2	383568.266	397822.409	36.550	2.080	1200		1 0	1.000 1.001	34.470 34.470	150 150
3	383548.957	397828.759	36.470	2.240	1200		1 0	1.001 1.002	34.230 34.230	150 150
4	383519.222	397832.273	35.780	1.900	1200		0	2.000	33.880	150
5	383521.388	397837.720	35.950	2.140	1200		1 2 0	2.000 1.002 1.003	33.810 33.810 33.810	150 150 225
6	383534.677	397877.813	38.030	4.500	1200		1 0	1.003 1.004	33.530 33.530	225 225

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
7	383601.612	397902.415	36.680	3.100	1200		0	3.000	33.580	225
8	383548.816	397919.934	35.850	2.600	1200		1	3.000	33.250	225
							2	1.004	33.250	225
							0	1.005	33.250	225
9	383548.432	397923.209	35.800	2.675	1200		1	1.005	33.125	225
							0	1.006	33.125	300
10	383522.076	397843.401	35.900	1.510	1200		0	4.000	34.390	225
11	383533.655	397877.725	38.030	4.240	1200		1	4.000	33.790	225
							0	4.001	33.790	225
12	383544.442	397913.421	35.990	2.800	1200		1	4.001	33.190	225
							0	4.002	33.190	225
13	383597.498	397904.793	36.480	2.740	1200		0	5.000	33.740	150
14	383547.419	397927.104	35.740	2.740	1200		1	5.000	33.025	150
							2	4.002	33.000	225
							3	1.006	33.000	300
							0	1.007	33.000	300
15	383540.917	397932.159	35.890	1.070	1200		0	6.000	34.820	150
16	383544.463	397932.157	35.680	2.730	1200		1	6.000	33.025	150
							2	1.007	32.950	300
							0	1.008	32.950	300
17	383548.414	397942.278	35.690	2.670	1200		1	1.008	33.020	300
							0	1.009	33.020	300
18	383537.305	397952.783	34.670	2.460	1200		1	1.009	32.210	300
							0	1.010	32.210	300
18_OUT	383531.375	397958.309	34.500	3.300			1	1.010	31.200	300

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Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	18.000	Drain Down Time (mins)	240
Ratio-R	0.360	Additional Storage (m³/ha)	20.0
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	0	0	0

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Results for 1 year Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	10	34.758	0.098	14.9	0.2473	0.0000	OK
15 minute winter	2	11	34.608	0.138	19.7	0.2106	0.0000	OK
15 minute winter	3	12	34.393	0.163	22.4	0.2243	0.0000	SURCHARGED
15 minute winter	4	11	33.979	0.099	10.7	0.2035	0.0000	OK
15 minute winter	5	11	33.961	0.151	31.6	0.1706	0.0000	OK
15 minute winter	6	11	33.684	0.154	32.0	0.1740	0.0000	OK
15 minute winter	7	11	33.610	0.030	1.6	0.0360	0.0000	OK
15 minute winter	8	12	33.374	0.124	32.9	0.1406	0.0000	OK
15 minute winter	9	12	33.304	0.179	32.5	0.2019	0.0000	OK
15 minute winter	10	10	34.449	0.059	10.4	0.1334	0.0000	OK
15 minute winter	11	10	33.875	0.085	19.8	0.1277	0.0000	OK
15 minute winter	12	12	33.313	0.123	19.5	0.1390	0.0000	OK
15 minute winter	13	11	33.780	0.040	3.3	0.0531	0.0000	OK
15 minute winter	14	12	33.301	0.301	52.8	0.3402	0.0000	SURCHARGED
15 minute winter	15	10	34.831	0.011	1.5	0.0151	0.0000	OK
15 minute winter	16	12	33.275	0.325	65.8	0.6347	0.0000	SURCHARGED
15 minute winter	17	12	33.134	0.114	65.3	0.1285	0.0000	OK
15 minute winter	18	12	32.303	0.093	65.1	0.1050	0.0000	OK
15 minute winter	18_OUT	12	31.282	0.082	65.2	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	1	1.000	2	14.7	1.013	0.690	0.1892	
15 minute winter	2	1.001	3	19.3	1.167	0.999	0.3501	
15 minute winter	3	1.002	5	21.4	1.252	0.999	0.5085	
15 minute winter	4	2.000	5	10.3	0.730	0.531	0.0877	
15 minute winter	5	1.003	6	32.0	1.120	0.758	1.2083	
15 minute winter	6	1.004	8	31.4	1.256	0.763	1.1313	
15 minute winter	7	3.000	8	1.5	0.342	0.037	0.7067	
15 minute winter	8	1.005	9	32.5	1.708	0.320	0.0928	
15 minute winter	9	1.006	14	33.8	0.634	0.172	0.2296	
15 minute winter	10	4.000	11	10.2	0.935	0.152	0.3985	
15 minute winter	11	4.001	12	19.5	1.374	0.295	0.6402	
15 minute winter	12	4.002	14	17.6	0.568	0.291	0.4337	
15 minute winter	13	5.000	14	3.2	0.376	0.156	0.5858	
15 minute winter	14	1.007	16	52.9	0.751	0.515	0.4122	
15 minute winter	15	6.000	16	1.5	1.497	0.012	0.0323	
15 minute winter	16	1.008	17	65.3	1.182	0.923	0.5152	
15 minute winter	17	1.009	18	65.1	3.037	0.254	0.3284	
15 minute winter	18	1.010	18_OUT	65.2	3.829	0.165	0.1381	33.8

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	13	36.309	1.649	36.4	4.1496	0.0000	FLOOD RISK
15 minute winter	2	13	36.078	1.608	33.5	2.4518	0.0000	SURCHARGED
15 minute winter	3	13	35.503	1.273	34.0	1.7472	0.0000	SURCHARGED
15 minute winter	4	13	34.549	0.669	26.3	1.3752	0.0000	SURCHARGED
15 minute winter	5	13	34.473	0.663	48.5	0.7500	0.0000	SURCHARGED
15 minute winter	6	13	34.062	0.532	47.8	0.6014	0.0000	SURCHARGED
15 minute winter	7	13	33.637	0.057	3.9	0.0698	0.0000	OK
15 minute winter	8	12	33.637	0.387	51.6	0.4376	0.0000	SURCHARGED
15 minute winter	9	12	33.570	0.445	56.2	0.5031	0.0000	SURCHARGED
15 minute winter	10	10	34.485	0.095	25.4	0.2138	0.0000	OK
15 minute winter	11	11	33.950	0.160	48.7	0.2411	0.0000	OK
15 minute winter	12	12	33.682	0.492	45.6	0.5562	0.0000	SURCHARGED
15 minute winter	13	10	33.805	0.065	8.1	0.0860	0.0000	OK
15 minute winter	14	12	33.550	0.550	98.3	0.6218	0.0000	SURCHARGED
15 minute winter	15	10	34.837	0.017	3.6	0.0228	0.0000	OK
15 minute winter	16	12	33.451	0.501	127.5	0.9782	0.0000	SURCHARGED
15 minute winter	17	12	33.191	0.171	127.9	0.1938	0.0000	OK
15 minute winter	18	12	32.351	0.141	128.1	0.1591	0.0000	OK
15 minute winter	18_OUT	12	31.316	0.116	128.1	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	1	1.000	2	22.0	1.252	1.032	0.2319	
15 minute winter	2	1.001	3	27.2	1.547	1.410	0.3579	
15 minute winter	3	1.002	5	31.6	1.794	1.474	0.5103	
15 minute winter	4	2.000	5	21.7	1.232	1.117	0.1032	
15 minute winter	5	1.003	6	47.8	1.203	1.133	1.6799	
15 minute winter	6	1.004	8	48.3	1.317	1.173	1.7671	
15 minute winter	7	3.000	8	3.8	0.389	0.094	1.3281	
15 minute winter	8	1.005	9	56.2	1.784	0.553	0.1311	
15 minute winter	9	1.006	14	57.5	0.821	0.293	0.2834	
15 minute winter	10	4.000	11	25.1	1.184	0.374	0.8280	
15 minute winter	11	4.001	12	45.6	1.490	0.690	1.3058	
15 minute winter	12	4.002	14	43.8	1.102	0.723	0.5569	
15 minute winter	13	5.000	14	7.9	0.544	0.388	0.6820	
15 minute winter	14	1.007	16	99.0	1.407	0.965	0.4123	
15 minute winter	15	6.000	16	3.6	1.419	0.028	0.0331	
15 minute winter	16	1.008	17	127.9	2.034	1.810	0.6084	
15 minute winter	17	1.009	18	128.1	3.460	0.498	0.5658	
15 minute winter	18	1.010	18_OUT	128.1	4.444	0.325	0.2339	83.2

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Results for 100 year Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	1	11	36.420	1.760	47.0	4.4299	4.0705	FLOOD
15 minute winter	2	12	36.340	1.870	40.2	2.8521	0.0000	FLOOD RISK
15 minute winter	3	12	35.874	1.644	38.1	2.2554	0.0000	SURCHARGED
15 minute winter	4	12	34.990	1.110	33.9	2.2827	0.0000	SURCHARGED
15 minute winter	5	13	34.846	1.036	55.9	1.1720	0.0000	SURCHARGED
15 minute winter	6	13	34.335	0.805	54.5	0.9109	0.0000	SURCHARGED
15 minute winter	7	13	33.792	0.212	10.9	0.2579	0.0000	OK
15 minute winter	8	13	33.792	0.542	59.1	0.6128	0.0000	SURCHARGED
15 minute winter	9	13	33.694	0.569	65.4	0.6431	0.0000	SURCHARGED
15 minute winter	10	10	34.500	0.110	32.8	0.2473	0.0000	OK
15 minute winter	11	12	34.336	0.546	62.9	0.8214	0.0000	SURCHARGED
15 minute winter	12	12	33.868	0.678	54.5	0.7666	0.0000	SURCHARGED
15 minute winter	13	11	33.816	0.076	10.4	0.1007	0.0000	OK
15 minute winter	14	13	33.664	0.664	115.6	0.7505	0.0000	SURCHARGED
15 minute winter	15	10	34.839	0.019	4.6	0.0256	0.0000	OK
15 minute winter	16	12	33.535	0.585	148.8	1.1416	0.0000	SURCHARGED
15 minute winter	17	12	33.210	0.190	148.6	0.2148	0.0000	OK
15 minute winter	18	12	32.365	0.155	148.5	0.1757	0.0000	OK
15 minute winter	18_OUT	12	31.326	0.126	148.5	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	1	1.000	2	24.4	1.386	1.142	0.2319	
15 minute winter	2	1.001	3	27.7	1.573	1.434	0.3579	
15 minute winter	3	1.002	5	31.5	1.787	1.469	0.5103	
15 minute winter	4	2.000	5	24.9	1.416	1.284	0.1032	
15 minute winter	5	1.003	6	54.5	1.369	1.290	1.6799	
15 minute winter	6	1.004	8	53.6	1.348	1.302	1.7671	
15 minute winter	7	3.000	8	8.4	0.407	0.210	2.1866	
15 minute winter	8	1.005	9	65.4	1.783	0.643	0.1311	
15 minute winter	9	1.006	14	67.1	0.953	0.341	0.2834	
15 minute winter	10	4.000	11	32.4	1.207	0.483	1.0676	
15 minute winter	11	4.001	12	54.5	1.448	0.825	1.4831	
15 minute winter	12	4.002	14	54.3	1.366	0.896	0.5569	
15 minute winter	13	5.000	14	10.2	0.673	0.500	0.7273	
15 minute winter	14	1.007	16	117.5	1.669	1.145	0.4123	
15 minute winter	15	6.000	16	4.6	1.425	0.036	0.0335	
15 minute winter	16	1.008	17	148.6	2.291	2.102	0.6380	
15 minute winter	17	1.009	18	148.5	3.540	0.578	0.6409	
15 minute winter	18	1.010	18_OUT	148.5	4.574	0.376	0.2633	103.5

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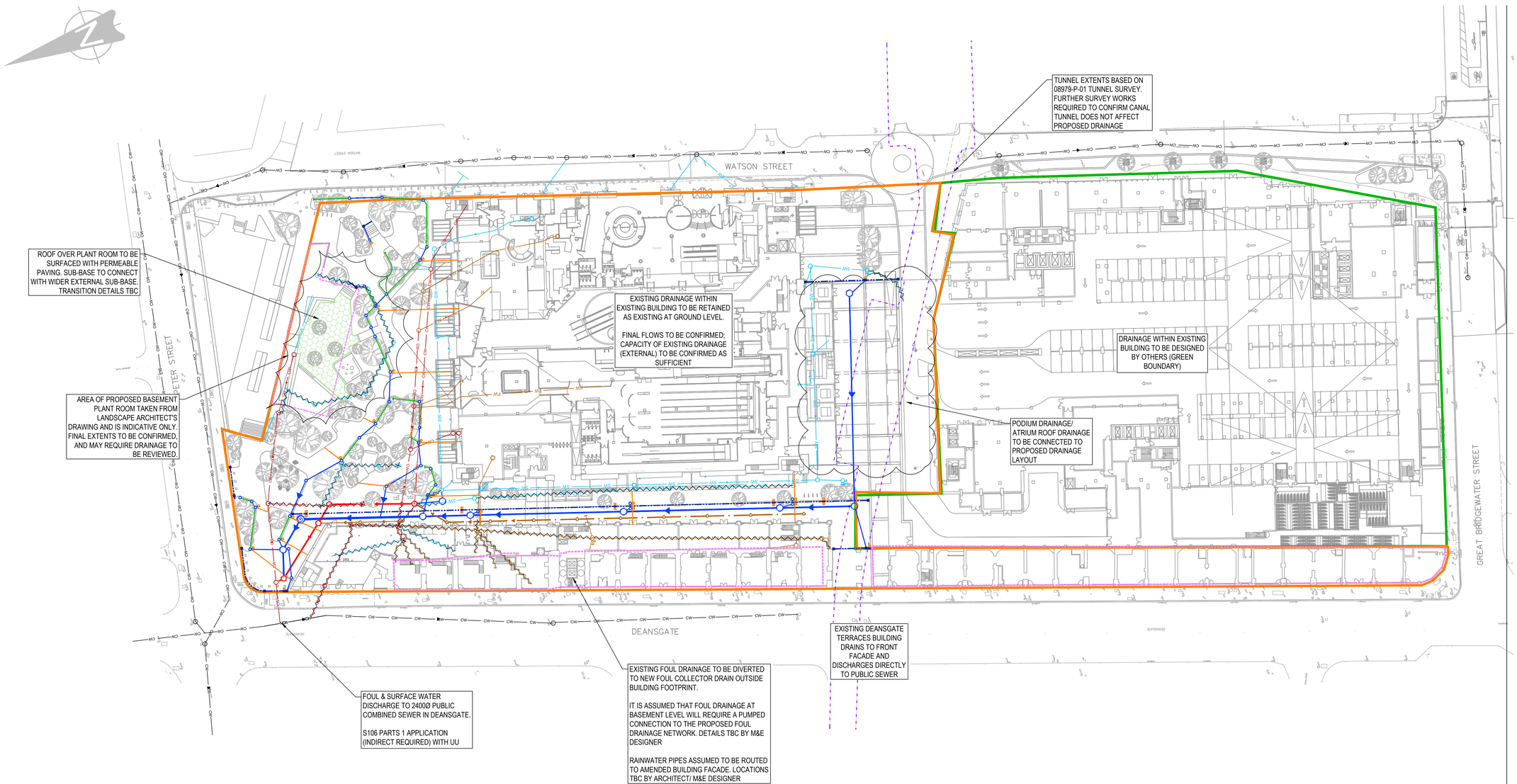
Appendix F

Proposed Drainage Strategy

Proposed Surface Water Drainage Calculations

Attenuation Areas & Volumes Plan

Proposed Drainage Strategy



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KEY

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EXISTING DRAINAGE

- EXISTING PUBLIC COMBINED SEWER
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- EXISTING PRIVATE FOUL DRAIN
- EXISTING PRIVATE SURFACE WATER DRAIN
- DRAINAGE TO BE ABANDONED & REMOVED

PROPOSED DRAINAGE

- PROPOSED COMBINED DRAINAGE
- PROPOSED FOUL DRAINAGE
- PROPOSED SURFACE WATER DRAINAGE
- PROPOSED PERFORATED SURFACE WATER DRAIN IN LANDSCAPED AREA
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- EXTENT OF PLANT ROOM AREA (INDICATIVE ONLY - EXACT EXTENTS TBC)
- EXTENT OF UNDERGROUND CANAL ROUTE (INDICATIVE)

SURFACE WATER DRAINAGE DESIGN PHILOSOPHY

OUTFALL LOCATIONS
THE SURFACE WATER FOR THE PROPOSED BUILDING & EXTENSIONS TO THE 2400Ø PUBLIC COMBINED SEWER IN DEANSGATE, AS PER ADVICE RECEIVED FROM UNITED UTILITIES.

IT IS NOT CONSIDERED THAT INFILTRATION WILL BE SUITABLE FOR THIS SCHEME. HOWEVER, FURTHER TESTING MAY BE REQUIRED TO DEMONSTRATE THIS TO THE LLFA & UNITED UTILITIES.

LEVELS INDICATE THAT PUMPING WILL NOT BE REQUIRED.

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UNITED UTILITIES HAVE STATED THE MAXIMUM DISCHARGE RATE FROM THE SITE IS 47 l/s. THEREFORE, THIS DISCHARGE RATE HAS BEEN SET FOR THE 30 & 100-YEAR STORMS.

THIS IS BASED ON A 50% REDUCTION OF BROWNFIELD FLOWS FOR THE PROPOSED AREA (0.77hA), USING THE MODIFIED RATIONAL METHOD.

THE MAXIMUM DISCHARGE RATE IS TO BE AGREED WITH THE LLFA.

THE DRAINAGE HAS BEEN DESIGNED TO INCLUDE A 45% ALLOWANCE FOR CLIMATE CHANGE, IN ACCORDANCE WITH LLFA REQUIREMENTS

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SuDS TREATMENT IS PROVIDED BY THE RAIN GARDENS AND FILTER DRAINS, AND ALSO BY PERMEABLE SUB-BASE, IF USED.

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FW PEAK FLOW RATE: 13.7 l/s BASED ON 383.7 DISCHARGE UNITS, AS PER M&E DESIGNER INFORMATION.

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FW PEAK FLOW RATE: 6.5 l/s BASED ON 87 DISCHARGE UNITS, AS PER M&E DESIGNER INFORMATION.
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BASEMENTS
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FURTHER SURVEY WORKS MAY BE REQUIRED IN ORDER TO CONFIRM IF THERE IS ANY EXISTING GRAVITY DRAINAGE FROM THIS AREA.

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CATCHMENT	IMPERMEABLE AREA (Ha)	DISCHARGE FLOW RATES (l/s)		
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		INCLUDES 50% REDUCTION IN ACCORDANCE WITH MCC REQUIREMENTS		
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*PROPOSED INCLUDES FOR 45% CLIMATE CHANGE ALLOWANCE				

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- 2891-PLA-XX-XX-SK-L-0004 DRAFT LEVEL MARK UP

SERVICES
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- CCTV SURVEY BY SEP DATED JUNE 2017
- 08979-P-01 TUNNEL SURVEY (WATERCOURSE) BY SEP DATED DEC 2013

SITE INVESTIGATION
- 064582-CUR-00-XX-RP-GE-001 REV P01 PHASE 1 PRELIMINARY RISK ASSESSMENT

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- S12020-U BY SEP DATED JAN 2016

CCTV SURVEY
- S14423-CCTV BY SEP DATED JAN 2016
- 1286 BY LAYER SURVEY DATED JUNE 2022

UNITED UTILITIES PUBLIC SEWER RECORDS
- EXTRACT DATED NOVEMBER 2018.

DESIGN RESPONSIBILITY PLANS (CIVIC ENGINEERS)
- 772-02-CIV-XX-00-SK-X-9001 REV P02
- 772-02-CIV-XX-00-SK-X-9002 REV P02
- 772-02-CIV-XX-00-SK-X-9001 REV P02

Rev:	Description:	Date:	By:	Chkd:
P02	PLANNING ISSUE	10.11.22	ATL	MW
P02	DRAFT PLANNING ISSUE	28.10.22	ATL	MW
P01	STAGE 2 ISSUE	31.08.22	ATL	MW

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Status: SUITABLE FOR INFORMATION — S2

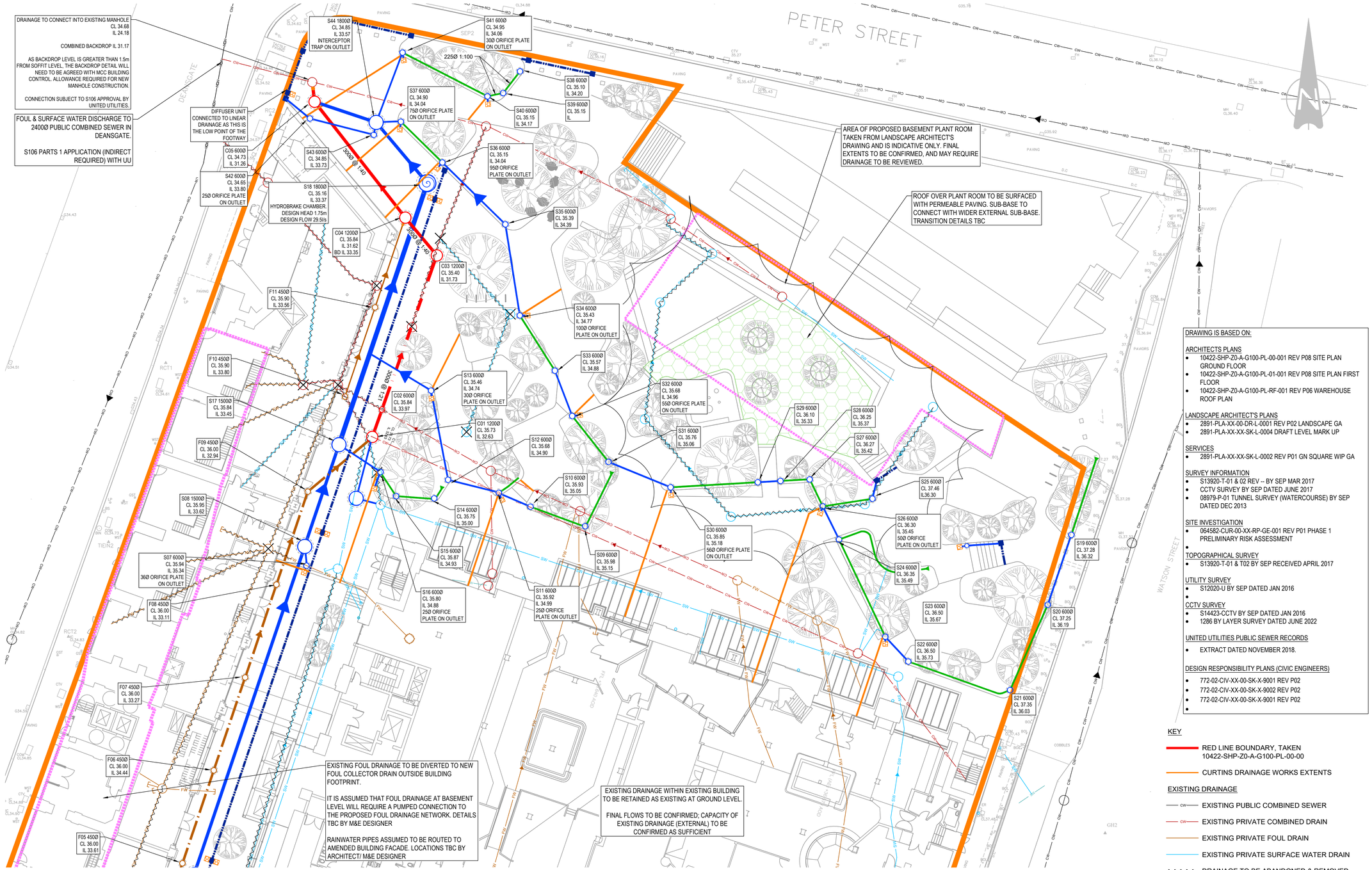
Project: GREAT NORTHERN WAREHOUSE

Drg Title: PROPOSED DRAINAGE STRATEGY OVERVIEW

Drawn By	Designed By	Checked By
ATL	ATL	CG
	Date: 31/08/22	Scales @ A1: 1:500

Project No - Originator - Function - Spatial - Form - Discipline - Number: 064582 - CUR - XX - XX - D - C - 92000
Revision: P03

\\mafs02\Projects\064001 - 065000\064582 Phase 1 & 2 Great Northern Warehouse\04S 4 Production\4B Models & Drawings_Civil C/4D/



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UNITED UTILITIES PUBLIC SEWER RECORDS
- EXTRACT DATED NOVEMBER 2018.

DESIGN RESPONSIBILITY PLANS (CIVIC ENGINEERS)
- 772-02-CIV-XX-00-SK-X-9001 REV P02
- 772-02-CIV-XX-00-SK-X-9002 REV P02
- 772-02-CIV-XX-00-SK-X-9001 REV P02
-

KEY
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P02	PLANNING ISSUE	10.11.22	ATL	MW
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www.curtins.com
Civils & Structures • Transport Planning • Environmental • Infrastructure • Geotechnical • Conservation & Heritage • Principal Designer
Birmingham • Bristol • Cambridge • Cardiff • Douglas • Dublin • Edinburgh • Glasgow • Kendal • Leeds • Liverpool • London • Manchester • Nottingham

Status: SUITABLE FOR INFORMATION — S2

Project: GREAT NORTHERN WAREHOUSE

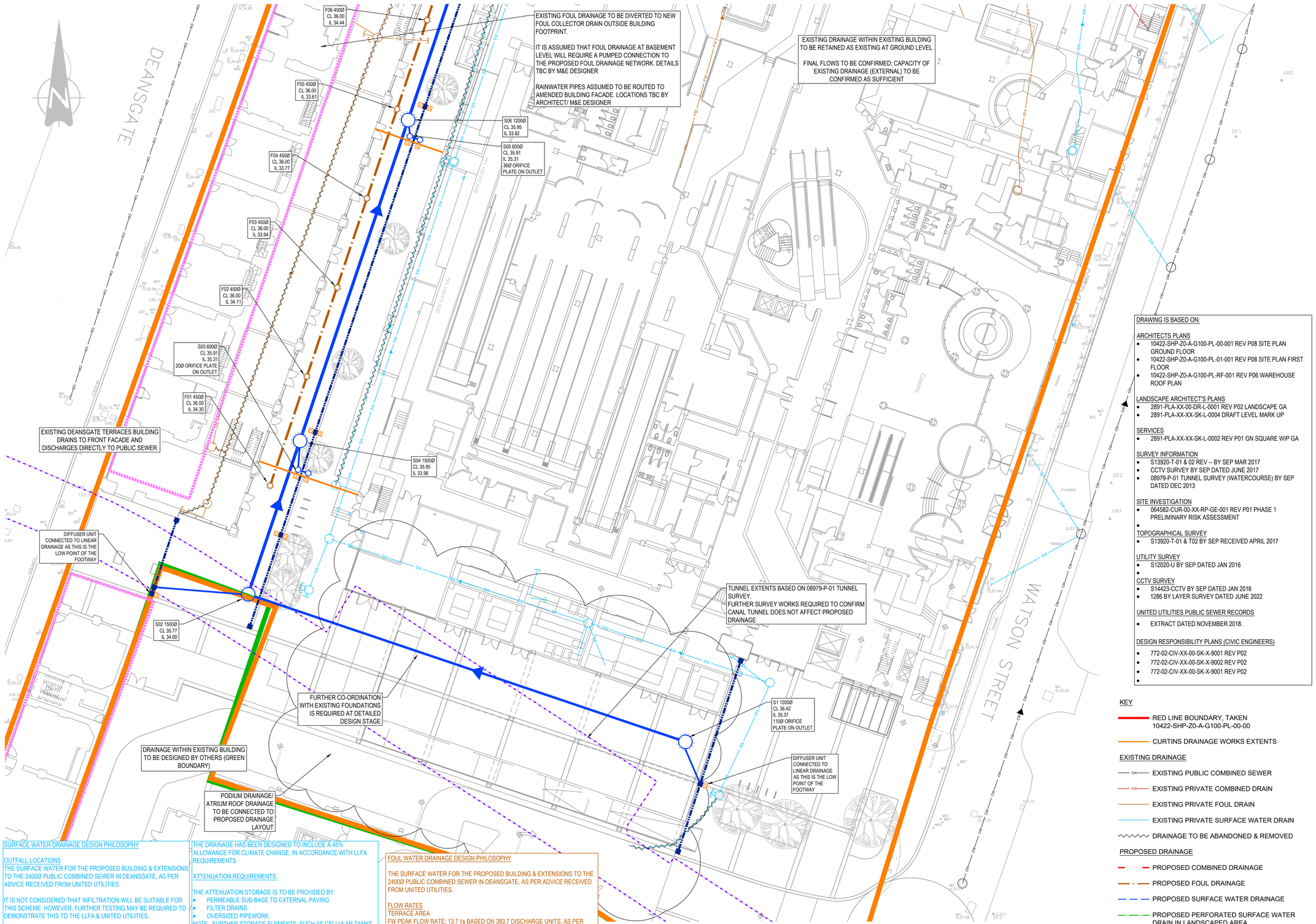
Drg Title: PROPOSED DRAINAGE STRATEGY SHEET 1

Drawn By	Designed By	Checked By
ATL	ATL	MW
	Date: 28/10/22	Scales @ A1: 1:200

Project No - Originator - Function - Spatial - Form - Discipline - Number: 064582 - CUR - XX - XX - D - C - 92001

Revision: P02

\\mafs02\Projects\064001 - 065000\064582 Phase 1 & 2 Great Northern Warehouse\04 Production\4B Models & Drawings_Civil-C\CAD\



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- DRAINAGE TO BE ABANDONED & REMOVED

PROPOSED DRAINAGE
- PROPOSED COMBINED DRAINAGE
- PROPOSED FOUL DRAINAGE
- PROPOSED SURFACE WATER DRAINAGE
- PROPOSED PERFORATED SURFACE WATER DRAIN IN LANDSCAPED AREA
- PROPOSED LINEAR DRAINAGE - GATIC CASTSLOT TREADSAFE OR SIMILAR APPROVED.
- PERMEABLE SURFACING ON PLANT ROOM ROOF.
- DIFFUSER UNIT IN PERMEABLE SUB-BASE.
- CHECK DAM IN PERMEABLE SUB-BASE.
- EXTENT OF PLANT ROOM AREA (INDICATIVE ONLY - EXACT EXTENTS TBC)
- EXTENT OF UNDERGROUND CANAL ROUTE (INDICATIVE)

SURFACE WATER DRAINAGE DESIGN PHILOSOPHY

OUTFALL LOCATIONS
THE SURFACE WATER FOR THE PROPOSED BUILDING & EXTENSIONS TO THE 2400Ø PUBLIC COMBINED SEWER IN DEANSGATE, AS PER ADVICE RECEIVED FROM UNITED UTILITIES.

IT IS NOT CONSIDERED THAT INFILTRATION WILL BE SUITABLE FOR THIS SCHEME. HOWEVER, FURTHER TESTING MAY BE REQUIRED TO DEMONSTRATE THIS TO THE LLFA & UNITED UTILITIES.

LEVELS INDICATE THAT PUMPING WILL NOT BE REQUIRED.

PROPOSED FLOW RATES:
EXISTING FLOWS AS SHOWN IN TABLE 1.

THE MAXIMUM DISCHARGE OR THE 1-YEAR STORM IS 41 l/s, BASED ON A REDUCTION OF 50% FROM EXISTING FLOWS.

UNITED UTILITIES HAVE STATED THE MAXIMUM DISCHARGE RATE FROM THE SITE IS 47 l/s. THEREFORE, THIS DISCHARGE RATE HAS BEEN SET FOR THE 30 & 100-YEAR STORMS.

THIS IS BASED ON A 50% REDUCTION OF BROWNFIELD FLOWS FOR THE PROPOSED AREA (0.77ha), USING THE MODIFIED RATIONAL METHOD.

THE MAXIMUM DISCHARGE RATE IS TO BE AGREED WITH THE LLFA.

THE DRAINAGE HAS BEEN DESIGNED TO INCLUDE A 45% ALLOWANCE FOR CLIMATE CHANGE, IN ACCORDANCE WITH LLFA REQUIREMENTS

ATTENUATION REQUIREMENTS:

THE ATTENUATION STORAGE IS TO BE PROVIDED BY:
- PERMEABLE SUB-BASE TO EXTERNAL PAVING
- FILTER DRAINS
- OVERSIZED PIPEWORK.

NOTE - FURTHER STORAGE ELEMENTS, SUCH AS CELLULAR TANKS, MAY BE REQUIRED IF THE PROPOSED STORAGE METHODS CAN NOT PROVIDE SUFFICIENT VOLUME.

SUSTAINABLE DRAINAGE:
SuDS TREATMENT IS PROVIDED BY THE RAIN GARDENS AND FILTER DRAINS, AND ALSO BY PERMEABLE SUB-BASE, IF USED.

FINAL SuDS PROPOSALS ARE SUBJECT TO FURTHER CO-ORDINATION AT DETAILED DESIGN STAGE.

A S106 (PART 1) APPLICATION WILL NEED TO BE SUBMITTED TO UNITED UTILITIES. A PART 2 APPLICATION WILL NOT BE REQUIRED.

FOUL WATER DRAINAGE DESIGN PHILOSOPHY

THE SURFACE WATER FOR THE PROPOSED BUILDING & EXTENSIONS TO THE 2400Ø PUBLIC COMBINED SEWER IN DEANSGATE, AS PER ADVICE RECEIVED FROM UNITED UTILITIES.

FLOW RATES
TERRACE AREA
FW PEAK FLOW RATE: 13.7 l/s BASED ON 383.7 DISCHARGE UNITS, AS PER M&E DESIGNER INFORMATION.

WAREHOUSE BUILDING (ADDITIONAL DRAINAGE)
FW PEAK FLOW RATE: 6.5 l/s BASED ON 87 DISCHARGE UNITS, AS PER M&E DESIGNER INFORMATION.
FOUL DRAINAGE AT HIGHER LEVELS, AND IS TO BE CONNECTED TO EXISTING ABOVE GROUND DRAINAGE.
UNDERGROUND DRAINAGE NETWORK CAPACITY TO BE CHECKED FOR SUFFICIENCY

BASEMENTS
LEVELS INDICATE THAT THE EXISTING BASEMENT AREAS WILL REQUIRE PUMPING TO DISCHARGE FOUL DRAINAGE.
FURTHER SURVEY WORKS MAY BE REQUIRED IN ORDER TO CONFIRM IF THERE IS ANY EXISTING GRAVITY DRAINAGE FROM THIS AREA.

A S106 (PART 1) APPLICATION WILL NEED TO BE SUBMITTED TO UNITED UTILITIES. A PART 2 APPLICATION WILL NOT BE REQUIRED.

TABLE 1: EXISTING AND PROPOSED DISCHARGE RATES

CATCHMENT	IMPERMEABLE AREA (Ha)	DISCHARGE FLOW RATES (l/s)		
		1-YR EVENT	30-YR EVENT	100-YR EVENT*
AREA E1	0.610	65	128	149
AREA E2	0.160	17	38	45
AREA E3	0.256	AS EXISTING - EXCLUDED FROM CALCULATIONS		
AREA E4	0.291	AS EXISTING - EXCLUDED FROM CALCULATIONS		
AREA E5	0.191	AS EXISTING - EXCLUDED FROM CALCULATIONS		
TOTAL IMPERMEABLE AREA (FOR DISCHARGE RATE CALCULATIONS)	**0.770**	**82**	**166**	**194**
		INCLUDES 50% REDUCTION IN ACCORDANCE WITH MCC REQUIREMENTS		
ALLOWABLE DISCHARGE		**41**	**83**	**97**
*PROPOSED INCLUDES FOR 45% CLIMATE CHANGE ALLOWANCE				

Rev:	Description:	Date:	By:	Chkd:
P02	PLANNING ISSUE	10.11.22	ATL	MW
P01	DRAFT PLANNING ISSUE	28.10.22	ATL	MW

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Birmingham • Bristol • Cambridge • Cardiff • Douglas • Dublin • Edinburgh • Glasgow • Kendal • Leeds • Liverpool • London • Manchester • Nottingham

Status: SUITABLE FOR INFORMATION — S2

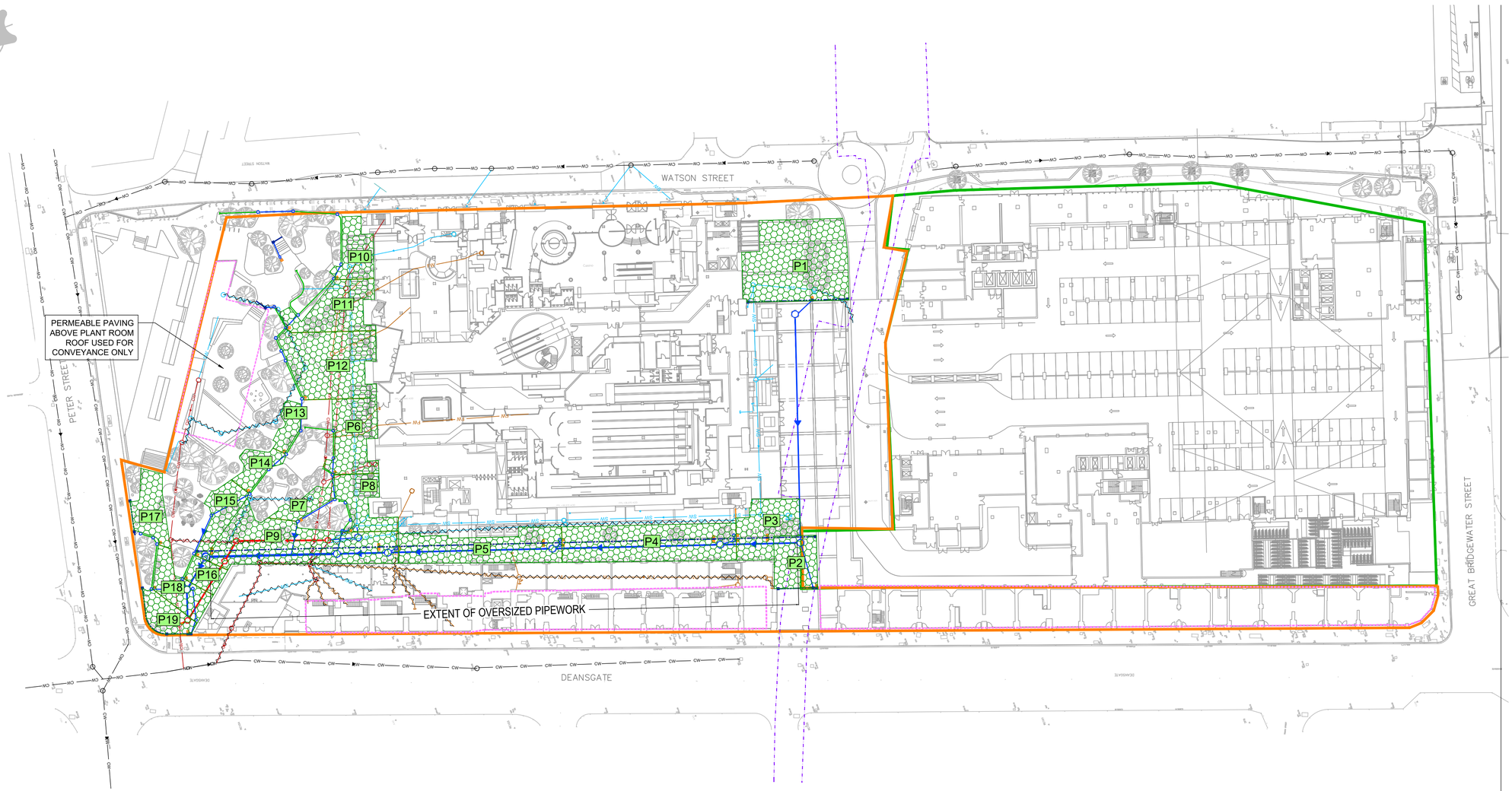
Project: GREAT NORTHERN WAREHOUSE

Drg Title: PROPOSED DRAINAGE STRATEGY SHEET 2

Drawn By	Designed By	Checked By
ATL	ATL	MW
	Date: 28/10/22	Scales @ A1: 1:200

Project No - Originator - Function - Spatial - Form - Discipline - Number: 064582 - CUR - XX - XX - D - C - 92002
Revision: P02

\\manfs02\Projects\064001 - 065000\064582 Phase 1 & 2 Great Northern Warehouse\GNS 4 Production\4B Models & Drawings_Civil\C\ACAD\



GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
2. DESIGN BASED ON TOPOGRAPHICAL SURVEY AND CCTV SURVEY INFORMATION AVAILABLE AT THE TIME OF DESIGN.
3. ALL EXISTING SEWERS, CONNECTIONS, PIPE SIZES AND INVERT LEVELS TO BE CONFIRMED BY CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS TO ENSURE CONNECTIVITY. ANY VARIANCE FROM THE INFORMATION SHOWN SHOULD BE REPORTED TO THE ENGINEER FOR REVIEW.
4. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
5. ALL DIMENSIONS ARE IN METRES AND LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE NOTED.
6. WHERE EXISTING DRAINAGE IS BEING USED, ALLOWANCES SHOULD BE MADE TO REMEDIATE THIS DRAINAGE IN LINE WITH AVAILABLE CCTV SURVEY INFORMATION. IF NO SURVEY IS AVAILABLE, IT IS ADVISED TO OBTAIN ONE PRIOR TO COMMENCEMENT OF WORKS.
7. ALL EXISTING SERVICES TO BE LOCATED PRIOR TO COMMENCEMENT OF ANY DRAINAGE WORKS, AND WHERE NECESSARY PROTECTION OR DIVERSIONS TO BE UNDERTAKEN TO AVOID CONFLICT WITH THE PROPOSED WORK.
8. ALL RAINWATER AND FOUL POP UPS LOCATIONS AND SIZES ARE TO BE CONFIRMED BY THE ARCHITECT AND M&E ENGINEER.
9. COVER LEVELS, GULLY POSITIONS, AND BUILDINGS LOCATION ARE APPROXIMATE AND SHALL BE CONFIRMED BY ARCHITECT/ LANDSCAPE ARCHITECT.
10. ALL PIPE DIAMETERS GIVEN ARE NOMINAL INTERNAL PIPE DIAMETERS. THESE ARE TO BE CONFIRMED ONCE A DETAILED CAPACITY CHECK HAS BEEN UNDERTAKEN AT A LATER DESIGN STAGE.
11. OUTFALL CONNECTION(S) SUBJECT TO AGREEMENT WITH THE APPROVING AUTHORITY.

KEY

- RED LINE BOUNDARY, TAKEN 10422-SHP-Z0-A-G100-PL-00-00
- CURTINS DRAINAGE WORKS EXTENTS

EXISTING DRAINAGE

- EXISTING PUBLIC COMBINED SEWER
- EXISTING PRIVATE COMBINED DRAIN
- EXISTING PRIVATE FOUL DRAIN
- EXISTING PRIVATE SURFACE WATER DRAIN
- DRAINAGE TO BE ABANDONED & REMOVED

PROPOSED DRAINAGE

- PROPOSED COMBINED DRAINAGE
- PROPOSED FOUL DRAINAGE
- PROPOSED SURFACE WATER DRAINAGE
- PROPOSED PERFORATED SURFACE WATER DRAIN IN LANDSCAPED AREA
- PROPOSED LINEAR DRAINAGE
- PERMEABLE SUB-BASE AREA - REFER TO TABLE FOR DETAILS

DRAWING IS BASED ON:

ARCHITECTS PLANS
- 10422-SHP-Z0-A-G100-PL-00-001 REV P08 SITE PLAN GROUND FLOOR
- 10422-SHP-Z0-A-G100-PL-01-001 REV P08 SITE PLAN FIRST FLOOR
- 10422-SHP-Z0-A-G100-PL-RF-001 REV P06 WAREHOUSE ROOF PLAN

LANDSCAPE ARCHITECT'S PLANS
- 2891-PLA-XX-00-DR-L-0001 REV P02 LANDSCAPE GA
- 2891-PLA-XX-XX-SK-L-0004 DRAFT LEVEL MARK UP

SERVICES
- 2891-PLA-XX-XX-SK-L-0002 REV P01 GN SQUARE WIP GA

SURVEY INFORMATION
- S13920-T-01 & 02 REV -- BY SEP MAR 2017
- CCTV SURVEY BY SEP DATED JUNE 2017
- 08979-P-01 TUNNEL SURVEY (WATERCOURSE) BY SEP DATED DEC 2013

SITE INVESTIGATION
- 064582-CUR-00-XX-RP-GE-001 REV P01 PHASE 1 PRELIMINARY RISK ASSESSMENT

TOPOGRAPHICAL SURVEY
- S13920-T-01 & T02 BY SEP RECEIVED APRIL 2017

UTILITY SURVEY
- S12020-U BY SEP DATED JAN 2016

CCTV SURVEY
- S14423-CCTV BY SEP DATED JAN 2016
- 1286 BY LAYER SURVEY DATED JUNE 2022

UNITED UTILITIES PUBLIC SEWER RECORDS
- EXTRACT DATED NOVEMBER 2018.

DESIGN RESPONSIBILITY PLANS (CIVIC ENGINEERS)
- 772-02-CIV-XX-00-SK-X-9001 REV P02
- 772-02-CIV-XX-00-SK-X-9002 REV P02
- 772-02-CIV-XX-00-SK-X-9001 REV P02

SURFACE WATER DRAINAGE DESIGN PHILOSOPHY

OUTFALL LOCATIONS
THE SURFACE WATER FOR THE PROPOSED BUILDING & EXTENSIONS TO THE 2400Ø PUBLIC COMBINED SEWER IN DEANSGATE, AS PER ADVICE RECEIVED FROM UNITED UTILITIES.

IT IS NOT CONSIDERED THAT INFILTRATION WILL BE SUITABLE FOR THIS SCHEME. HOWEVER, FURTHER TESTING MAY BE REQUIRED TO DEMONSTRATE THIS TO THE LLFA & UNITED UTILITIES.

LEVELS INDICATE THAT PUMPING WILL NOT BE REQUIRED.

PROPOSED FLOW RATES:
EXISTING FLOWS AS SHOWN IN TABLE 1.

THE MAXIMUM DISCHARGE OR THE 1-YEAR STORM IS 41 l/s, BASED ON A REDUCTION OF 50% FROM EXISTING FLOWS.

UNITED UTILITIES HAVE STATED THE MAXIMUM DISCHARGE RATE FROM THE SITE IS 47 l/s. THEREFORE, THIS DISCHARGE RATE HAS BEEN SET FOR THE 30 & 100-YEAR STORMS.

THIS IS BASED ON A 50% REDUCTION OF BROWNFIELD FLOWS FOR THE PROPOSED AREA (0.77hA), USING THE MODIFIED RATIONAL METHOD.

THE MAXIMUM DISCHARGE RATE IS TO BE AGREED WITH THE LLFA.

THE DRAINAGE HAS BEEN DESIGNED TO INCLUDE A 45% ALLOWANCE FOR CLIMATE CHANGE, IN ACCORDANCE WITH LLFA REQUIREMENTS

ATTENUATION REQUIREMENTS:

THE ATTENUATION STORAGE IS TO BE PROVIDED BY:
- PERMEABLE SUB-BASE TO EXTERNAL PAVING
- FILTER DRAINS
- OVERSIZED PIPEWORK.

NOTE - FURTHER STORAGE ELEMENTS, SUCH AS CELLULAR TANKS, MAY BE REQUIRED IF THE PROPOSED STORAGE METHODS CAN NOT PROVIDE SUFFICIENT VOLUME.

SUSTAINABLE DRAINAGE:
SuDS TREATMENT IS PROVIDED BY THE RAIN GARDENS AND FILTER DRAINS, AND ALSO BY PERMEABLE SUB-BASE, IF USED.

FINAL SuDS PROPOSALS ARE SUBJECT TO FURTHER CO-ORDINATION AT DETAILED DESIGN STAGE.

A S106 (PART 1) APPLICATION WILL NEED TO BE SUBMITTED TO UNITED UTILITIES. A PART 2 APPLICATION WILL NOT BE REQUIRED.

ATTENUATION NOTES

THE ATTENUATION VOLUMES SHOWN ARE INTENDED TO PROVIDE AN INDICATION OF THE REQUIRED ATTENUATION VOLUMES FOR THE SITE.

DESIGN BASED ON A 350mm THICK PERMEABLE SUB-BASE LAYER.

THE FINAL ATTENUATION REQUIREMENT MAY VARY AS PART OF THE DETAILED DESIGN.

THE FOLLOWING HAVE NOT BEEN INCLUDED IN THE ATTENUATION VOLUMES:
- STANDARD (NOT OVERSIZED) PIPEWORK
- MANHOLES
- SURROUND TO FILTER DRAINS.

ATTENUATION BREAKDOWN

PERMEABLE SUB-BASE

PERMEABLE SUB-BASE REF	CONNECTION POINT	PLAN AREA (M²)	ATTENUATION VOLUME CONTRIBUTION* (m³)
P1	LINEAR DRAIN OUTLET (S01)	365	10.0
P2	LINEAR DRAIN OUTLET (S02)	105	3.5
P3	S03	135	2.6
P4	S05	290	17.4
P5	S07	215	22.9
P6	S11	145	1.5
P7	S13	45	1.5
P8	S16	95	0.1
P9	S18	325	17.6
P10	S23	85	0.8
P11	S26	145	10.9
P12	S30	255	16.2
P13	S32	40	2.3
P14	S34	55	4.6
P15	S36	80	9.3
P16	S37	45	1.6
P17	S40	85	2.6
P18	S42	90	3.4
P19	LINEAR DRAIN OUTLET (42)	65	2.9
TOTAL VOLUME IN PERMEABLE SUB-BASE			**131.7**

*MAXIMUM NODE VOLUME TAKEN FROM DRAINAGE MODEL (CRITICAL 100-YR+45% CC STORM EVENT)

PERMEABLE SUB-BASE

U/S MANHOLE	PIPE DIAMETER (mm)	PIPE LENGTH	ATTENUATION VOLUME IN PIPE
S02	300	10.8	0.8
S04	300	34.7	2.5
S06	300	36.6	2.6
S08	300	19.2	1.4
S17	450	18.7	3.0
TOTAL VOLUME IN OVERSIZED PIPEWORK			**10.1**

ATTENUATION SUMMARY

TOTAL VOLUME IN PERMEABL SUB-BASE	131.7
TOTAL VOLUME IN OVERSIZED PIPEWORK	10.1
TOTAL ATTENUATION	**141.8**

Rev:	Description:	Date:	By:	Chkd:
P01	PLANNING ISSUE	10.11.22	ATL	MW

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Status: SUITABLE FOR INFORMATION — S2

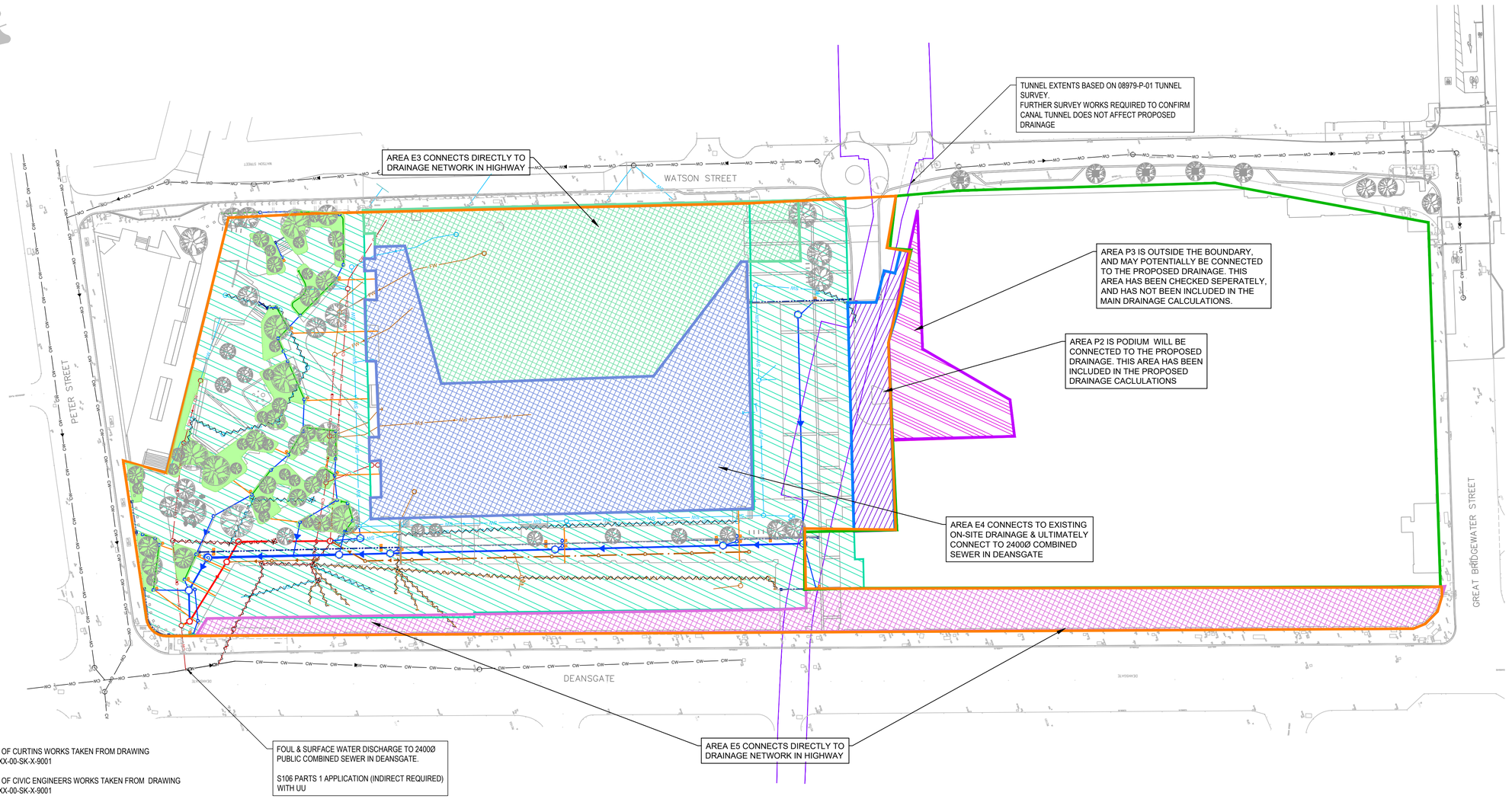
Project:
GREAT NORTHERN WAREHOUSE

Drg Title:
PROPOSED DRAINAGE INDICATIVE ATTENUATION VOLUMES & LOCATION

Drawn By	Designed By	Checked By
ATL	ATL	MW
	Date: 11.11.22	Scales @ A1: 1:500

Project No - Originator - Function - Spatial - Form - Discipline - Number: 064582 - CUR - XX - XX - D - C - 92003
Revision: P01

\\mwfs02\Projects\064001 - 065000\064582 Phase 1 & 2 Great Northern Warehouse\2MS 4 Production\4B Models & Drawings_Civil CAD\



KEY:

- BOUNDARY OF CURTINS WORKS TAKEN FROM DRAWING 772-02-CIV-XX-00-SK-X-9001
- BOUNDARY OF CIVIC ENGINEERS WORKS TAKEN FROM DRAWING 772-02-CIV-XX-00-SK-X-9001
- PROPOSED IMPERMEABLE AREA P1: 0.61 Ha
- PROPOSED IMPERMEABLE AREA P2: 0.05 Ha
  PODIUM AREA FALLS WITHIN CURTINS RESPONSIBILITY AND DRAINED BY THE PROPOSED SYSTEM.
- PROPOSED IMPERMEABLE AREA P3: 0.05 Ha
  THIS AREA FALLS WITHIN THE CIVIC ENGINEERS AREA OF RESPONSIBILITY, BUT IS POTENTIALLY MAY BE DRAINED BY THE PROPOSED SYSTEM. A CHECK OF THE CAPACITY OF THE SYTEM, INCLUDING THIS AREA, IS REQUIRED.
- SOFT LANDSCAPE
- EXISTING IMPERMEABLE AREA E3:
  THIS AREA CONSISTS OF EXISTING ROOF DRAINAGE THAT DRAINS DIRECTLY TO SEWERS IN WATSON STREET. CONNECTIONS ARE TO BE RETAINED, AND THEREFORE THIS AREA HAS BEEN EXCLUDED FROM DRAINAGE CALCULATIONS.
- EXISTING IMPERMEABLE AREA E4:
  THIS AREA CONSISTS OF EXISTING ROOF DRAINAGE THAT DRAINS VIA THE EXISTING DRAINAGE NETWORK ON THE SITE, AND OUTFALLS TO THE EXISTING PUBLIC SEWER IN DEANSGATE. CONNECTIONS ARE TO BE RETAINED, AND THEREFORE THIS AREA HAS BEEN EXCLUDED FROM DRAINAGE CALCULATIONS.
  THE EXISTING PRIVATE DRAINAGE WITHIN THE SITE WILL REQUIRE A DIVERSION.
- EXISTING IMPERMEABLE AREA E5:
  THIS AREA CONSISTS OF EXISTING ROOF DRAINAGE THAT DRAINS DIRECTLY TO SEWERS IN DEANSGATE. CONNECTIONS ARE TO BE RETAINED, AND THEREFORE THIS AREA HAS BEEN EXCLUDED FROM DRAINAGE CALCULATIONS.
- PROPOSED PRIVATE COMBINED DRAINAGE
- PROPOSED PRIVATE SURFACE WATER DRAINAGE
- PROPOSED PRIVATE FOUL DRAINAGE
- EXISTING PUBLIC COMBINED SEWER
- EXISTING PRIVATE COMBINED DRAINAGE
- EXISTING PRIVATE SURFACE WATER DRAINAGE
- EXISTING PRIVATE FOUL DRAINAGE

SURFACE WATER DRAINAGE DESIGN PHILOSOPHY

OUTFALL LOCATIONS
THE SURFACE WATER FOR THE PROPOSED BUILDING & EXTENSIONS TO THE 2400Ø PUBLIC COMBINED SEWER IN DEANSGATE, AS PER ADVICE RECEIVED FROM UNITED UTILITIES.

IT IS NOT CONSIDERED THAT INFILTRATION WILL BE SUITABLE FOR THIS SCHEME. HOWEVER, FURTHER TESTING MAY BE REQUIRED TO DEMONSTRATE THIS TO THE LLFA & UNITED UTILITIES.

LEVELS INDICATE THAT PUMPING WILL NOT BE REQUIRED.

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EXISTING FLOWS AS SHOWN IN TABLE 1.

THE MAXIMUM DISCHARGE OR THE 1-YEAR STORM IS 41 l/s, BASED ON A REDUCTION OF 50% FROM EXISTING FLOWS.

UNITED UTILITIES HAVE STATED THE MAXIMUM DISCHARGE RATE FROM THE SITE IS 47 l/s. THEREFORE, THIS DISCHARGE RATE HAS BEEN SET FOR THE 30 & 100-YEAR STORMS.

THIS IS BASED ON A 50% REDUCTION OF BROWNFIELD FLOWS FOR THE PROPOSED AREA (0.77HA), USING THE MODIFIED RATIONAL METHOD.

THE MAXIMUM DISCHARGE RATE IS TO BE AGREED WITH THE LLFA.

THE DRAINAGE HAS BEEN DESIGNED TO INCLUDE A 45% ALLOWANCE FOR CLIMATE CHANGE, IN ACCORDANCE WITH LLFA REQUIREMENTS

ATTENUATION REQUIREMENTS:
A QUICK STORAGE ESTIMATE INDICATES THAT THE REQUIRED ATTENUATION STORAGE IF APPROX. 300m³, FOR THE 1:100-YEAR STORM EVENT (INCLUDING 40% CLIMATE CHANGE).

THE ATTENUATION STORAGE IS TO BE PROVIDED BY:
- PERMEABLE SUB-BASE TO EXTERNAL PAVING
- FILTER DRAINS
- OVERSIZED PIPEWORK.

NOTE - FURTHER STORAGE ELEMENTS, SUCH AS CELLULAR TANKS, MAY BE REQUIRED IF THE PROPOSED STORAGE METHODS CAN NOT PROVIDE SUFFICIENT VOLUME.

SUSTAINABLE DRAINAGE:
SuDS TREATMENT IS PROVIDED BY THE RAIN GARDENS AND FILTER DRAINS, AND ALSO BY PERMEABLE SUB-BASE, IF USED.

FINAL SuDS PROPOSALS ARE SUBJECT TO FURTHER CO-ORDINATION AT DETAILED DESIGN STAGE.

A S106 (PART 1) APPLICATION WILL NEED TO BE SUBMITTED TO UNITED UTILITIES. A PART 2 APPLICATION WILL NOT BE REQUIRED.

TABLE 1: EXISTING AND PROPOSED DISCHARGE RATES

CATCHMENT	IMPERMEABLE AREA (Ha)	DISCHARGE FLOW RATES (l/s)		
		1-YR EVENT	30-YR EVENT	100-YR EVENT*
AREA E1	0.610	65	128	149
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AREA E5	0.191	AS EXISTING - EXCLUDED FROM CALCULATIONS		
TOTAL IMPERMEABLE AREA (FOR DISCHARGE RATE CALCULATIONS)	**0.770**	**82**	**166**	**194**
		INCLUDES 50% REDUCTION IN ACCORDANCE WITH MCC REQUIREMENTS		
ALLOWABLE DISCHARGE		**41**	**83**	**97**
***PROPOSED INCLUDES FOR 45% CLIMATE CHANGE ALLOWANCE**				
ALLOWABLE DISCHARGE FOR 30 & 100-YEAR STORMS IS 47 l/s, AS PER UNITED UTILITIES REQUIREMENTS				

DRAWING IS BASED ON:

ARCHITECTS PLANS
- 10422-SHP-Z0-A-G100-PL-00-001 REV P08 SITE PLAN GROUND FLOOR
- 10422-SHP-Z0-A-G100-PL-01-001 REV P08 SITE PLAN FIRST FLOOR
- 10422-SHP-Z0-A-G100-PL-RF-001 REV P06 WAREHOUSE ROOF PLAN

LANDSCAPE ARCHITECT'S PLANS
- 2891-PLA-XX-00-DR-L-0001 REV P02 LANDSCAPE GA
- 2891-PLA-XX-XX-SK-L-0004 DRAFT LEVEL MARK UP

SERVICES
- 2891-PLA-XX-XX-SK-L-0002 REV P01 GN SQUARE WIP GA

SURVEY INFORMATION
- S13920-T-01 & 02 REV -- BY SEP MAR 2017
- CCTV SURVEY BY SEP DATED JUNE 2017
- 08979-P-01 TUNNEL SURVEY (WATERCOURSE) BY SEP DATED DEC 2013

SITE INVESTIGATION
- 064582-CUR-00-XX-RP-GE-001 REV P01 PHASE 1 PRELIMINARY RISK ASSESSMENT

TOPOGRAPHICAL SURVEY
- S13920-T-01 & T02 BY SEP RECEIVED APRIL 2017

UTILITY SURVEY
- S12020-U BY SEP DATED JAN 2016

CCTV SURVEY
- S14423-CCTV BY SEP DATED JAN 2016
- 1286 BY LAYER SURVEY DATED JUNE 2022

UNITED UTILITIES PUBLIC SEWER RECORDS
- EXTRACT DATED NOVEMBER 2018.

DESIGN RESPONSIBILITY PLANS (CIVIC ENGINEERS)
- 772-02-CIV-XX-00-SK-X-9001 REV P02
- 772-02-CIV-XX-00-SK-X-9002 REV P02
- 772-02-CIV-XX-00-SK-X-9001 REV P02

GENERAL NOTES:

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
2. DESIGN BASED ON TOPOGRAPHICAL SURVEY AND CCTV SURVEY INFORMATION AVAILABLE AT THE TIME OF DESIGN.
3. ALL EXISTING SEWERS, CONNECTIONS, PIPE SIZES AND INVERT LEVELS TO BE CONFIRMED BY CONTRACTOR PRIOR TO COMMENCEMENT OF WORKS TO ENSURE CONNECTIVITY. ANY VARIANCE FROM THE INFORMATION SHOWN SHOULD BE REPORTED TO THE ENGINEER FOR REVIEW.
4. DO NOT SCALE THIS DRAWING. ANY AMBIGUITIES, OMISSIONS AND ERRORS ON DRAWINGS SHALL BE BROUGHT TO THE ENGINEERS ATTENTION IMMEDIATELY. ALL DIMENSIONS MUST BE CHECKED / VERIFIED ON SITE.
5. ALL DIMENSIONS ARE IN METRES AND LEVELS IN METRES ABOVE ORDNANCE DATUM UNLESS OTHERWISE NOTED.
6. WHERE EXISTING DRAINAGE IS BEING USED, ALLOWANCES SHOULD BE MADE TO REMEDIATE THIS DRAINAGE IN LINE WITH AVAILABLE CCTV SURVEY INFORMATION. IF NO SURVEY IS AVAILABLE, IT IS ADVISED TO OBTAIN ONE PRIOR TO COMMENCEMENT OF WORKS.
7. ALL EXISTING SERVICES TO BE LOCATED PRIOR TO COMMENCEMENT OF ANY DRAINAGE WORKS, AND WHERE NECESSARY PROTECTION OR DIVERSIONS TO BE UNDERTAKEN TO AVOID CONFLICT WITH THE PROPOSED WORK.
8. ALL RAINWATER AND FOUL POP UPS LOCATIONS AND SIZES ARE TO BE CONFIRMED BY THE ARCHITECT AND M&E ENGINEER.
9. COVER LEVELS, GULLY POSITIONS, AND BUILDINGS LOCATION ARE APPROXIMATE AND SHALL BE CONFIRMED BY ARCHITECT/ LANDSCAPE ARCHITECT.
10. ALL PIPE DIAMETERS GIVEN ARE NOMINAL INTERNAL PIPE DIAMETERS. THESE ARE TO BE CONFIRMED ONCE A DETAILED CAPACITY CHECK HAS BEEN UNDERTAKEN AT A LATER DESIGN STAGE.
11. OUTFALL CONNECTION(S) SUBJECT TO AGREEMENT WITH THE APPROVING AUTHORITY.

Rev:	Description:	Date:	By:	Chkd:
P02	PLANNING ISSUE	10.11.22	ATL	MW
P01	FIRST ISSUE	28.10.22	ATL	MW

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Status: SUITABLE FOR INFORMATION — S2

Project: GREAT NORTHERN WAREHOUSE, MANCHESTER

Drg Title: PROPOSED DRAINAGE CATCHMENTS

Drawn By	Designed By	Checked By
ATL	ATL	MW
	Date: 28/10/22	Scales @ A1: 1:500

Project No - Originator - Function - Spatial - Form - Discipline - Number: 064582 - CUR - XX - 00 - D - C - 92012

Revision: P02

\\LEF302\dd$\Software\AutoCAD\Templates\2022\

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	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	0.360	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)
OU1	0.059	5.00	36.420	350	350	383560.860	397811.620	0.750
1	0.049	5.00	36.420	1200		383559.570	397816.990	1.050
OU2	0.025	5.00	35.470	350	350	383502.540	397831.860	0.750
2	0.070	5.00	35.770	1500		383515.030	397837.780	1.770
3	0.008	5.00	35.910	600		383516.660	397846.250	0.600
4			35.770	1500		383518.630	397847.990	1.813
5	0.046	5.00	35.910	600		383528.380	397879.030	0.600
6			35.910	1500		383530.180	397880.720	2.092
7	0.055	5.00	35.940	600		383540.840	397913.850	0.600
8			35.910	1500		383542.350	397915.250	2.238
17	0.033	5.00	35.840	1500		383548.700	397933.400	2.395
18			35.160	1800		383554.980	397951.050	1.790
9	0.007	5.00	35.980	600		383569.670	397917.750	0.830
10	0.004	5.00	35.930	600		383564.100	397919.730	0.880
11			35.920	600		383560.870	397921.150	0.930
12	0.004	5.00	35.680	600		383555.690	397922.470	0.780
13			35.460	600		383553.960	397931.570	0.716
14	0.004	5.00	35.750	600		383554.280	397920.580	0.750
15			35.870	600		383550.390	397920.810	0.936
16			35.800	600		383548.800	397923.270	0.916
19	0.002	5.00	37.280	600		383619.250	397916.860	0.960
20	0.003	5.00	37.250	600		383616.850	397909.740	1.057
21	0.006	5.00	37.350	600		383613.010	397901.030	1.317
22			36.500	600		383602.620	397903.930	0.767
23	0.017	5.00	36.500	600		383600.280	397906.480	0.826
24			36.350	600		383595.560	397916.380	0.861
25	0.014	5.00	37.460	600		383598.970	397920.550	1.160
26	0.014	5.00	36.300	600		383593.900	397919.770	0.849
27	0.007	5.00	36.270	600		383592.570	397922.510	0.850
28			36.250	600		383589.590	397922.360	0.881
29	0.018	5.00	36.100	600		383587.280	397922.230	0.770
30			35.850	600		383578.390	397921.710	0.670
31	0.014	5.00	35.760	600		383572.050	397924.300	0.696
32			35.680	600		383568.350	397928.990	0.717
33	0.034	5.00	35.570	600		383566.580	397933.610	0.691
34	0.010	5.00	35.430	600		383563.010	397939.240	0.664
35			35.390	600		383561.530	397948.530	1.000

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Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)
36	0.027	5.00	35.150	600		383555.110	397954.840	1.011
37			34.900	600		383550.880	397959.000	0.861
38	0.022	5.00	35.100	600		383563.030	397964.130	0.900
39			35.150	600		383561.310	397961.920	0.978
40	0.006	5.00	35.150	600		383559.710	397961.580	0.994
41			34.950	600		383551.050	397966.040	0.891
OU42	0.013	5.00	34.650	350	350	383539.350	397961.950	0.750
42			34.650	600		383541.600	397959.320	0.850
43			34.850	600		383548.120	397957.660	1.117
44	0.015	5.00	34.850	1800		383548.360	397958.920	1.542
45			34.650	1200		383541.720	397960.590	1.370
45_OUT			34.630	1200		383541.840	397963.020	1.411

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)
1.000a	OU1	1	5.523	0.600	35.670	35.445	0.225	24.5	150	5.05	46.6
1.001	1	2	49.153	0.600	35.370	34.878	0.492	100.0	225	5.67	44.3
2.000	OU2	2	13.822	0.600	34.720	34.582	0.138	100.0	150	5.23	45.9
1.002	2	4	10.826	0.600	34.000	33.957	0.043	250.0	300	5.85	43.7
3.000	3	4	2.628	0.600	35.310	35.284	0.026	100.0	150	5.04	46.6
1.003	4	6	34.708	0.600	33.957	33.818	0.139	250.0	300	6.44	41.8
4.000	5	6	2.469	0.600	35.310	35.285	0.025	100.0	150	5.04	46.6
1.004	6	8	36.612	0.600	33.818	33.672	0.146	250.0	300	7.06	40.1
5.000	7	8	2.059	0.600	35.340	35.319	0.021	100.0	150	5.03	46.7
1.005	8	17	19.229	0.600	33.672	33.595	0.077	250.0	300	7.38	39.2
1.006	17	18	18.734	0.600	33.445	33.370	0.075	250.0	450	7.62	38.6
1.007	18	44	10.284	0.600	33.370	33.308	0.062	167.0	300	7.76	38.2
6.000	9	10	5.911	0.600	35.150	35.050	0.100	59.1	150	5.08	46.5

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)
1.000a	2.041	36.1	7.5	0.600	0.825	0.059	0.0	46	1.610
1.001	1.307	52.0	13.0	0.825	0.667	0.108	0.0	76	1.088
2.000	1.005	17.8	3.1	0.600	1.038	0.025	0.0	42	0.757
1.002	0.990	70.0	24.0	1.470	1.513	0.203	0.0	121	0.900
3.000	1.005	17.8	1.0	0.450	0.336	0.008	0.0	24	0.544
1.003	0.990	70.0	23.9	1.513	1.792	0.211	0.0	121	0.900
4.000	1.005	17.8	5.8	0.450	0.475	0.046	0.0	59	0.899
1.004	0.990	70.0	27.9	1.792	1.938	0.257	0.0	132	0.935
5.000	1.005	17.8	7.0	0.450	0.441	0.055	0.0	65	0.945
1.005	0.990	70.0	33.2	1.938	1.945	0.312	0.0	146	0.978
1.006	1.281	203.7	38.1	1.945	1.340	0.364	0.0	131	0.991
1.007	1.214	85.8	37.7	1.490	1.242	0.364	0.0	139	1.176
6.000	1.310	23.2	0.9	0.680	0.730	0.007	0.0	20	0.632

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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)
6.001	10	11	3.528	0.600	35.050	34.990	0.060	58.8	150	5.12	46.3
6.002	11	12	5.346	0.600	34.990	34.900	0.090	59.4	150	5.19	46.1
6.003	12	13	9.263	0.600	34.900	34.744	0.156	59.4	150	5.31	45.6
6.004	13	17	5.569	0.600	34.744	34.633	0.111	50.0	150	5.37	45.4
7.000	14	15	3.897	0.600	35.000	34.934	0.066	59.0	150	5.05	46.6
7.001	15	16	2.929	0.600	34.934	34.884	0.050	58.6	150	5.09	46.5
7.002	16	17	10.130	0.600	34.884	34.681	0.203	50.0	150	5.21	46.0
8.000	19	20	7.514	0.600	36.320	36.193	0.127	59.2	150	5.10	46.4
8.001	20	21	9.519	0.600	36.193	36.033	0.160	59.5	150	5.22	46.0
8.002	21	22	10.787	0.600	36.033	35.733	0.300	36.0	150	5.32	45.6
8.003	22	23	3.461	0.600	35.733	35.674	0.059	58.7	150	5.37	45.4
8.004	23	24	10.968	0.600	35.674	35.489	0.185	59.3	150	5.51	44.9
8.005	24	26	3.775	0.600	35.489	35.451	0.038	99.3	150	5.57	44.7
9.000	25	26	5.130	0.600	36.300	35.451	0.849	6.0	150	5.02	46.7
8.006	26	27	3.046	0.600	35.451	35.420	0.031	98.2	150	5.62	44.5
8.007	27	28	2.984	0.600	35.420	35.369	0.051	58.5	150	5.66	44.4
8.008	28	29	2.314	0.600	35.369	35.330	0.039	59.3	150	5.69	44.3
8.009	29	30	8.905	0.600	35.330	35.180	0.150	59.4	150	5.80	43.9
8.010	30	31	6.849	0.600	35.180	35.064	0.116	59.0	150	5.89	43.6
8.011	31	32	5.974	0.600	35.064	34.963	0.101	59.1	150	5.96	43.3
8.012	32	33	4.947	0.600	34.963	34.879	0.084	58.9	150	6.03	43.1
8.013	33	34	6.666	0.600	34.879	34.766	0.113	59.0	150	6.11	42.9

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)
6.001	1.314	23.2	1.4	0.730	0.780	0.011	0.0	25	0.723
6.002	1.307	23.1	1.4	0.780	0.630	0.011	0.0	25	0.720
6.003	1.307	23.1	1.9	0.630	0.566	0.015	0.0	29	0.790
6.004	1.426	25.2	1.8	0.566	1.057	0.015	0.0	27	0.830
7.000	1.311	23.2	0.5	0.600	0.786	0.004	0.0	16	0.533
7.001	1.316	23.3	0.5	0.786	0.766	0.004	0.0	16	0.535
7.002	1.426	25.2	0.5	0.766	1.009	0.004	0.0	15	0.566
8.000	1.310	23.1	0.3	0.810	0.907	0.002	0.0	11	0.418
8.001	1.306	23.1	0.6	0.907	1.167	0.005	0.0	17	0.570
8.002	1.684	29.8	1.4	1.167	0.617	0.011	0.0	22	0.858
8.003	1.315	23.2	1.4	0.617	0.676	0.011	0.0	24	0.713
8.004	1.308	23.1	3.4	0.676	0.711	0.028	0.0	39	0.940
8.005	1.008	17.8	3.4	0.711	0.699	0.028	0.0	44	0.777
9.000	4.126	72.9	1.8	1.010	0.699	0.014	0.0	16	1.734
8.006	1.014	17.9	6.8	0.699	0.700	0.056	0.0	64	0.942
8.007	1.317	23.3	7.6	0.700	0.731	0.063	0.0	59	1.180
8.008	1.308	23.1	7.6	0.731	0.620	0.063	0.0	59	1.171
8.009	1.308	23.1	9.6	0.620	0.520	0.081	0.0	68	1.250
8.010	1.311	23.2	9.6	0.520	0.546	0.081	0.0	67	1.249
8.011	1.310	23.1	11.2	0.546	0.567	0.095	0.0	74	1.299
8.012	1.313	23.2	11.1	0.567	0.541	0.095	0.0	73	1.298
8.013	1.312	23.2	15.0	0.541	0.514	0.129	0.0	88	1.392

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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)
8.014	34	35	9.407	0.600	34.766	34.390	0.376	25.0	150	6.19	42.6
8.015	35	36	9.002	0.600	34.390	34.139	0.251	35.9	150	6.28	42.3
8.016	36	37	5.933	0.600	34.139	34.039	0.100	59.3	150	6.35	42.1
8.017	37	44	2.521	0.600	34.039	33.458	0.581	4.3	150	6.36	42.1
10.000	38	39	2.800	0.600	34.200	34.172	0.028	100.0	225	5.04	46.7
10.001	39	40	1.636	0.600	34.172	34.156	0.016	100.0	225	5.06	46.6
10.002	40	41	9.741	0.600	34.156	34.059	0.097	100.0	225	5.18	46.1
10.003	41	44	7.611	0.600	34.059	33.983	0.076	100.0	225	5.28	45.7
11.000	OU42	42	3.461	0.600	33.900	33.800	0.100	34.6	150	5.03	46.7
11.001	42	43	6.728	0.600	33.800	33.733	0.067	100.0	150	5.15	46.2
11.002	43	44	1.283	0.600	33.733	33.720	0.013	100.0	150	5.17	46.2
1.008	44	45	6.847	0.600	33.308	33.280	0.028	244.5	300	7.88	38.0
1.009	45	45_OUT	2.433	0.600	33.280	33.219	0.061	40.0	300	7.89	37.9

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)
8.014	2.021	35.7	16.1	0.514	0.850	0.139	0.0	71	1.970
8.015	1.686	29.8	16.0	0.850	0.861	0.139	0.0	78	1.715
8.016	1.308	23.1	18.9	0.861	0.711	0.166	0.0	103	1.456
8.017	4.871	86.1	18.9	0.711	1.242	0.166	0.0	48	3.924
10.000	1.307	52.0	2.8	0.675	0.753	0.022	0.0	36	0.705
10.001	1.307	52.0	2.8	0.753	0.769	0.022	0.0	36	0.705
10.002	1.307	52.0	3.5	0.769	0.666	0.028	0.0	39	0.746
10.003	1.307	52.0	3.5	0.666	0.642	0.028	0.0	39	0.746
11.000	1.716	30.3	1.6	0.600	0.700	0.013	0.0	24	0.918
11.001	1.005	17.8	1.6	0.700	0.967	0.013	0.0	31	0.628
11.002	1.005	17.8	1.6	0.967	0.980	0.013	0.0	31	0.628
1.008	1.001	70.7	60.3	1.242	1.070	0.586	0.0	214	1.119
1.009	2.493	176.2	60.2	1.070	1.111	0.586	0.0	120	2.263

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)
1.000a	5.523	24.5	150	1 STANDARD	36.420	35.670	0.600	36.420	35.445	0.825
1.001	49.153	100.0	225	1 STANDARD	36.420	35.370	0.825	35.770	34.878	0.667
2.000	13.822	100.0	150	1 STANDARD	35.470	34.720	0.600	35.770	34.582	1.038
1.002	10.826	250.0	300	1 STANDARD	35.770	34.000	1.470	35.770	33.957	1.513

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000a	OU1	350	350	Manhole	1 STANDARD	1	1200	Manhole	1 STANDARD
1.001	1	1200		Manhole	1 STANDARD	2	1500	Manhole	1 STANDARD
2.000	OU2	350	350	Manhole	1 STANDARD	2	1500	Manhole	1 STANDARD
1.002	2	1500		Manhole	1 STANDARD	4	1500	Manhole	1 STANDARD

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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)
3.000	2.628	100.0	150	1 STANDARD	35.910	35.310	0.450	35.770	35.284	0.336
1.003	34.708	250.0	300	1 STANDARD	35.770	33.957	1.513	35.910	33.818	1.792
4.000	2.469	100.0	150	1 STANDARD	35.910	35.310	0.450	35.910	35.285	0.475
1.004	36.612	250.0	300	1 STANDARD	35.910	33.818	1.792	35.910	33.672	1.938
5.000	2.059	100.0	150	1 STANDARD	35.940	35.340	0.450	35.910	35.319	0.441
1.005	19.229	250.0	300	1 STANDARD	35.910	33.672	1.938	35.840	33.595	1.945
1.006	18.734	250.0	450	1 STANDARD	35.840	33.445	1.945	35.160	33.370	1.340
1.007	10.284	167.0	300	1 STANDARD	35.160	33.370	1.490	34.850	33.308	1.242
6.000	5.911	59.1	150	1 STANDARD	35.980	35.150	0.680	35.930	35.050	0.730
6.001	3.528	58.8	150	1 STANDARD	35.930	35.050	0.730	35.920	34.990	0.780
6.002	5.346	59.4	150	1 STANDARD	35.920	34.990	0.780	35.680	34.900	0.630
6.003	9.263	59.4	150	1 STANDARD	35.680	34.900	0.630	35.460	34.744	0.566
6.004	5.569	50.0	150	1 STANDARD	35.460	34.744	0.566	35.840	34.633	1.057
7.000	3.897	59.0	150	1 STANDARD	35.750	35.000	0.600	35.870	34.934	0.786
7.001	2.929	58.6	150	1 STANDARD	35.870	34.934	0.786	35.800	34.884	0.766
7.002	10.130	50.0	150	1 STANDARD	35.800	34.884	0.766	35.840	34.681	1.009
8.000	7.514	59.2	150	1 STANDARD	37.280	36.320	0.810	37.250	36.193	0.907
8.001	9.519	59.5	150	1 STANDARD	37.250	36.193	0.907	37.350	36.033	1.167
8.002	10.787	36.0	150	1 STANDARD	37.350	36.033	1.167	36.500	35.733	0.617
8.003	3.461	58.7	150	1 STANDARD	36.500	35.733	0.617	36.500	35.674	0.676
8.004	10.968	59.3	150	1 STANDARD	36.500	35.674	0.676	36.350	35.489	0.711
8.005	3.775	99.3	150	1 STANDARD	36.350	35.489	0.711	36.300	35.451	0.699

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
3.000	3	600		Manhole	1 STANDARD	4	1500	Manhole	1 STANDARD
1.003	4	1500		Manhole	1 STANDARD	6	1500	Manhole	1 STANDARD
4.000	5	600		Manhole	1 STANDARD	6	1500	Manhole	1 STANDARD
1.004	6	1500		Manhole	1 STANDARD	8	1500	Manhole	1 STANDARD
5.000	7	600		Manhole	1 STANDARD	8	1500	Manhole	1 STANDARD
1.005	8	1500		Manhole	1 STANDARD	17	1500	Manhole	1 STANDARD
1.006	17	1500		Manhole	1 STANDARD	18	1800	Manhole	1 STANDARD
1.007	18	1800		Manhole	1 STANDARD	44	1800	Manhole	1 STANDARD
6.000	9	600		Manhole	1 STANDARD	10	600	Manhole	1 STANDARD
6.001	10	600		Manhole	1 STANDARD	11	600	Manhole	1 STANDARD
6.002	11	600		Manhole	1 STANDARD	12	600	Manhole	1 STANDARD
6.003	12	600		Manhole	1 STANDARD	13	600	Manhole	1 STANDARD
6.004	13	600		Manhole	1 STANDARD	17	1500	Manhole	1 STANDARD
7.000	14	600		Manhole	1 STANDARD	15	600	Manhole	1 STANDARD
7.001	15	600		Manhole	1 STANDARD	16	600	Manhole	1 STANDARD
7.002	16	600		Manhole	1 STANDARD	17	1500	Manhole	1 STANDARD
8.000	19	600		Manhole	1 STANDARD	20	600	Manhole	1 STANDARD
8.001	20	600		Manhole	1 STANDARD	21	600	Manhole	1 STANDARD
8.002	21	600		Manhole	1 STANDARD	22	600	Manhole	1 STANDARD
8.003	22	600		Manhole	1 STANDARD	23	600	Manhole	1 STANDARD
8.004	23	600		Manhole	1 STANDARD	24	600	Manhole	1 STANDARD
8.005	24	600		Manhole	1 STANDARD	26	600	Manhole	1 STANDARD

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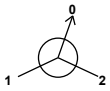
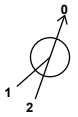
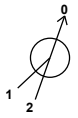
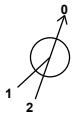
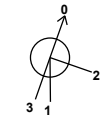
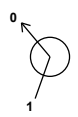
Pipeline Schedule

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)
9.000	5.130	6.0	150	1 STANDARD	37.460	36.300	1.010	36.300	35.451	0.699
8.006	3.046	98.2	150	1 STANDARD	36.300	35.451	0.699	36.270	35.420	0.700
8.007	2.984	58.5	150	1 STANDARD	36.270	35.420	0.700	36.250	35.369	0.731
8.008	2.314	59.3	150	1 STANDARD	36.250	35.369	0.731	36.100	35.330	0.620
8.009	8.905	59.4	150	1 STANDARD	36.100	35.330	0.620	35.850	35.180	0.520
8.010	6.849	59.0	150	1 STANDARD	35.850	35.180	0.520	35.760	35.064	0.546
8.011	5.974	59.1	150	1 STANDARD	35.760	35.064	0.546	35.680	34.963	0.567
8.012	4.947	58.9	150	1 STANDARD	35.680	34.963	0.567	35.570	34.879	0.541
8.013	6.666	59.0	150	1 STANDARD	35.570	34.879	0.541	35.430	34.766	0.514
8.014	9.407	25.0	150	1 STANDARD	35.430	34.766	0.514	35.390	34.390	0.850
8.015	9.002	35.9	150	1 STANDARD	35.390	34.390	0.850	35.150	34.139	0.861
8.016	5.933	59.3	150	1 STANDARD	35.150	34.139	0.861	34.900	34.039	0.711
8.017	2.521	4.3	150	1 STANDARD	34.900	34.039	0.711	34.850	33.458	1.242
10.000	2.800	100.0	225	1 STANDARD	35.100	34.200	0.675	35.150	34.172	0.753
10.001	1.636	100.0	225	1 STANDARD	35.150	34.172	0.753	35.150	34.156	0.769
10.002	9.741	100.0	225	1 STANDARD	35.150	34.156	0.769	34.950	34.059	0.666
10.003	7.611	100.0	225	1 STANDARD	34.950	34.059	0.666	34.850	33.983	0.642
11.000	3.461	34.6	150	1 STANDARD	34.650	33.900	0.600	34.650	33.800	0.700
11.001	6.728	100.0	150	1 STANDARD	34.650	33.800	0.700	34.850	33.733	0.967
11.002	1.283	100.0	150	1 STANDARD	34.850	33.733	0.967	34.850	33.720	0.980
1.008	6.847	244.5	300	1 STANDARD	34.850	33.308	1.242	34.650	33.280	1.070
1.009	2.433	40.0	300	1 STANDARD	34.650	33.280	1.070	34.630	33.219	1.111

Link	US Node	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
9.000	25	600		Manhole	1 STANDARD	26	600	Manhole	1 STANDARD
8.006	26	600		Manhole	1 STANDARD	27	600	Manhole	1 STANDARD
8.007	27	600		Manhole	1 STANDARD	28	600	Manhole	1 STANDARD
8.008	28	600		Manhole	1 STANDARD	29	600	Manhole	1 STANDARD
8.009	29	600		Manhole	1 STANDARD	30	600	Manhole	1 STANDARD
8.010	30	600		Manhole	1 STANDARD	31	600	Manhole	1 STANDARD
8.011	31	600		Manhole	1 STANDARD	32	600	Manhole	1 STANDARD
8.012	32	600		Manhole	1 STANDARD	33	600	Manhole	1 STANDARD
8.013	33	600		Manhole	1 STANDARD	34	600	Manhole	1 STANDARD
8.014	34	600		Manhole	1 STANDARD	35	600	Manhole	1 STANDARD
8.015	35	600		Manhole	1 STANDARD	36	600	Manhole	1 STANDARD
8.016	36	600		Manhole	1 STANDARD	37	600	Manhole	1 STANDARD
8.017	37	600		Manhole	1 STANDARD	44	1800	Manhole	1 STANDARD
10.000	38	600		Manhole	1 STANDARD	39	600	Manhole	1 STANDARD
10.001	39	600		Manhole	1 STANDARD	40	600	Manhole	1 STANDARD
10.002	40	600		Manhole	1 STANDARD	41	600	Manhole	1 STANDARD
10.003	41	600		Manhole	1 STANDARD	44	1800	Manhole	1 STANDARD
11.000	OU42	350	350	Manhole	1 STANDARD	42	600	Manhole	1 STANDARD
11.001	42	600		Manhole	1 STANDARD	43	600	Manhole	1 STANDARD
11.002	43	600		Manhole	1 STANDARD	44	1800	Manhole	1 STANDARD
1.008	44	1800		Manhole	1 STANDARD	45	1200	Manhole	1 STANDARD
1.009	45	1200		Manhole	1 STANDARD	45_OUT	1200	Manhole	1 STANDARD

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
OU1	383560.860	397811.620	36.420	0.750	350	350				
							0	1.000a	35.670	150
1	383559.570	397816.990	36.420	1.050	1200			1.000a	35.445	150
										
							0	1.001	35.370	225
OU2	383502.540	397831.860	35.470	0.750	350	350				
							0	2.000	34.720	150
2	383515.030	397837.780	35.770	1.770	1500			2.000	34.582	150
								1.001	34.878	225
							0	1.002	34.000	300
3	383516.660	397846.250	35.910	0.600	600					
							0	3.000	35.310	150
4	383518.630	397847.990	35.770	1.813	1500			3.000	35.284	150
								1.002	33.957	300
							0	1.003	33.957	300
5	383528.380	397879.030	35.910	0.600	600					
							0	4.000	35.310	150
6	383530.180	397880.720	35.910	2.092	1500			4.000	35.285	150
								1.003	33.818	300
							0	1.004	33.818	300
7	383540.840	397913.850	35.940	0.600	600					
							0	5.000	35.340	150
8	383542.350	397915.250	35.910	2.238	1500			5.000	35.319	150
								1.004	33.672	300
							0	1.005	33.672	300
17	383548.700	397933.400	35.840	2.395	1500			7.002	34.681	150
								6.004	34.633	150
								1.005	33.595	300
							0	1.006	33.445	450
18	383554.980	397951.050	35.160	1.790	1800			1.006	33.370	450
										
							0	1.007	33.370	300
9	383569.670	397917.750	35.980	0.830	600					
							0	6.000	35.150	150

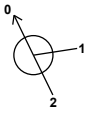
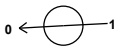
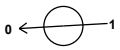
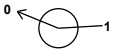
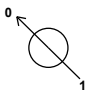
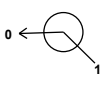
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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
10	383564.100	397919.730	35.930	0.880	600		1	6.000	35.050	150
							0	6.001	35.050	150
11	383560.870	397921.150	35.920	0.930	600		1	6.001	34.990	150
							0	6.002	34.990	150
12	383555.690	397922.470	35.680	0.780	600		1	6.002	34.900	150
							0	6.003	34.900	150
13	383553.960	397931.570	35.460	0.716	600		1	6.003	34.744	150
							0	6.004	34.744	150
14	383554.280	397920.580	35.750	0.750	600		0	7.000	35.000	150
15	383550.390	397920.810	35.870	0.936	600		1	7.000	34.934	150
							0	7.001	34.934	150
16	383548.800	397923.270	35.800	0.916	600		1	7.001	34.884	150
							0	7.002	34.884	150
19	383619.250	397916.860	37.280	0.960	600		0	8.000	36.320	150
20	383616.850	397909.740	37.250	1.057	600		1	8.000	36.193	150
							0	8.001	36.193	150
21	383613.010	397901.030	37.350	1.317	600		1	8.001	36.033	150
							0	8.002	36.033	150
22	383602.620	397903.930	36.500	0.767	600		1	8.002	35.733	150
							0	8.003	35.733	150
23	383600.280	397906.480	36.500	0.826	600		1	8.003	35.674	150
							0	8.004	35.674	150
24	383595.560	397916.380	36.350	0.861	600		1	8.004	35.489	150
							0	8.005	35.489	150

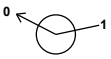
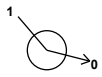
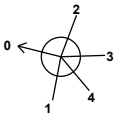
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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
25	383598.970	397920.550	37.460	1.160	600			0	9.000	36.300	150
26	383593.900	397919.770	36.300	0.849	600			1	9.000	35.451	150
								2	8.005	35.451	150
								0	8.006	35.451	150
27	383592.570	397922.510	36.270	0.850	600			1	8.006	35.420	150
								0	8.007	35.420	150
28	383589.590	397922.360	36.250	0.881	600			1	8.007	35.369	150
								0	8.008	35.369	150
29	383587.280	397922.230	36.100	0.770	600			1	8.008	35.330	150
								0	8.009	35.330	150
30	383578.390	397921.710	35.850	0.670	600			1	8.009	35.180	150
								0	8.010	35.180	150
31	383572.050	397924.300	35.760	0.696	600			1	8.010	35.064	150
								0	8.011	35.064	150
32	383568.350	397928.990	35.680	0.717	600			1	8.011	34.963	150
								0	8.012	34.963	150
33	383566.580	397933.610	35.570	0.691	600			1	8.012	34.879	150
								0	8.013	34.879	150
34	383563.010	397939.240	35.430	0.664	600			1	8.013	34.766	150
								0	8.014	34.766	150
35	383561.530	397948.530	35.390	1.000	600			1	8.014	34.390	150
								0	8.015	34.390	150
36	383555.110	397954.840	35.150	1.011	600			1	8.015	34.139	150
								0	8.016	34.139	150
37	383550.880	397959.000	34.900	0.861	600			1	8.016	34.039	150
								0	8.017	34.039	150

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Connections	Link	IL (m)	Dia (mm)
38	383563.030	397964.130	35.100	0.900	600		 0	10.000	34.200	225
39	383561.310	397961.920	35.150	0.978	600		 1	10.000	34.172	225
							0	10.001	34.172	225
40	383559.710	397961.580	35.150	0.994	600		 1	10.001	34.156	225
							0	10.002	34.156	225
41	383551.050	397966.040	34.950	0.891	600		 1	10.002	34.059	225
							0	10.003	34.059	225
OU42	383539.350	397961.950	34.650	0.750	350	350	 0	11.000	33.900	150
42	383541.600	397959.320	34.650	0.850	600		 1	11.000	33.800	150
							0	11.001	33.800	150
43	383548.120	397957.660	34.850	1.117	600		 1	11.001	33.733	150
							0	11.002	33.733	150
44	383548.360	397958.920	34.850	1.542	1800		 1	11.002	33.720	150
							2	10.003	33.983	225
							3	8.017	33.458	150
							4	1.007	33.308	300
							0	1.008	33.308	300
45	383541.720	397960.590	34.650	1.370	1200		 1	1.008	33.280	300
							0	1.009	33.280	300
45_OUT	383541.840	397963.020	34.630	1.411	1200		 1	1.009	33.219	300

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Normal
FSR Region	England and Wales	Skip Steady State	x
M5-60 (mm)	18.000	Drain Down Time (mins)	240
Ratio-R	0.360	Additional Storage (m³/ha)	20.0
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

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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 1 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.450	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	7.0		
Invert Level (m)	35.370	Diameter (m)	0.110		

Node 3 Online Orifice Control

Flap Valve	x	Invert Level (m)	35.310	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Diameter (m)	0.020		

Node 5 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.550	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	2.0		
Invert Level (m)	35.310	Diameter (m)	0.036		

Node 7 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.550	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	2.0		
Invert Level (m)	35.340	Diameter (m)	0.036		

Node 26 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.600	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	4.0		
Invert Level (m)	35.451	Diameter (m)	0.050		

Node 30 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.600	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	5.0		
Invert Level (m)	35.180	Diameter (m)	0.050		

Node 32 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.600	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	7.0		
Invert Level (m)	34.963	Diameter (m)	0.055		

Node 34 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.600	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	9.7		
Invert Level (m)	34.766	Diameter (m)	0.100		

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Node 36 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.600	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	9.0		
Invert Level (m)	34.139	Diameter (m)	0.095		

Node 37 Online Orifice Control

Flap Valve	x	Invert Level (m)	34.039	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Diameter (m)	0.075		

Node 41 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.900	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	2.0		
Invert Level (m)	34.059	Diameter (m)	0.030		

Node 42 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.600	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	1.0		
Invert Level (m)	33.800	Diameter (m)	0.025		

Node 11 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.600	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	1.0		
Invert Level (m)	34.990	Diameter (m)	0.025		

Node 13 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.550	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	1.5		
Invert Level (m)	34.744	Diameter (m)	0.030		

Node 16 Online Orifice Control

Flap Valve	x	Design Depth (m)	0.600	Discharge Coefficient	0.600
Replaces Downstream Link	✓	Design Flow (l/s)	1.0		
Invert Level (m)	34.884	Diameter (m)	0.025		

Node 18 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	33.370	Product Number	CTL-SHE-0225-2950-1750-2950
Design Depth (m)	1.750	Min Outlet Diameter (m)	0.300
Design Flow (l/s)	29.5	Min Node Diameter (mm)	1800

Node OU1 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	35.870	Slope (1:X)	34.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	10	Depth (m)	0.350
Safety Factor	2.0	Width (m)	14.000	Inf Depth (m)	
Porosity	0.33	Length (m)	28.000		

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Node OU2 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	34.920	Slope (1:X)	45.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	2	Depth (m)	0.350
Safety Factor	2.0	Width (m)	13.000	Inf Depth (m)	
Porosity	0.33	Length (m)	10.500		

Node 3 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	35.360	Slope (1:X)	34.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.350
Safety Factor	2.0	Width (m)	25.000	Inf Depth (m)	
Porosity	0.33	Length (m)	16.000		

Node 5 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	35.360	Slope (1:X)	60.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	122	Depth (m)	0.350
Safety Factor	2.0	Width (m)	35.000	Inf Depth (m)	
Porosity	0.33	Length (m)	7.500		

Node 7 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	35.360	Slope (1:X)	60.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	148	Depth (m)	0.350
Safety Factor	2.0	Width (m)	36.000	Inf Depth (m)	
Porosity	0.33	Length (m)	11.000		

Node 40 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	34.600	Slope (1:X)	60.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.350
Safety Factor	2.0	Width (m)	9.000	Inf Depth (m)	
Porosity	0.33	Length (m)	12.000		

Node 41 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	34.400	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	74	Depth (m)	0.350
Safety Factor	2.0	Width (m)	4.500	Inf Depth (m)	
Porosity	0.33	Length (m)	9.000		

Node OU42 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	34.050	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	18	Depth (m)	0.350
Safety Factor	2.0	Width (m)	12.000	Inf Depth (m)	
Porosity	0.33	Length (m)	5.000		

Node 23 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	35.950	Slope (1:X)	18.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	15	Depth (m)	0.350
Safety Factor	2.0	Width (m)	4.000	Inf Depth (m)	
Porosity	0.33	Length (m)	17.000		

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Node 26 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	35.750	Slope (1:X)	50.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	67	Depth (m)	0.350
Safety Factor	2.0	Width (m)	11.000	Inf Depth (m)	
Porosity	0.33	Length (m)	13.000		

Node 30 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	35.300	Slope (1:X)	60.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	142	Depth (m)	0.350
Safety Factor	2.0	Width (m)	14.000	Inf Depth (m)	
Porosity	0.33	Length (m)	16.000		

Node 32 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	35.130	Slope (1:X)	160.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	37	Depth (m)	0.350
Safety Factor	2.0	Width (m)	2.500	Inf Depth (m)	
Porosity	0.33	Length (m)	8.000		

Node 34 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	34.880	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	20	Depth (m)	0.350
Safety Factor	2.0	Width (m)	4.000	Inf Depth (m)	
Porosity	0.33	Length (m)	11.000		

Node 36 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	34.500	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	47	Depth (m)	0.350
Safety Factor	2.0	Width (m)	11.000	Inf Depth (m)	
Porosity	0.33	Length (m)	11.000		

Node 37 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	34.200	Slope (1:X)	37.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	74	Depth (m)	0.350
Safety Factor	2.0	Width (m)	2.500	Inf Depth (m)	
Porosity	0.33	Length (m)	6.000		

Node 18 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	34.610	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	25	Depth (m)	0.350
Safety Factor	2.0	Width (m)	18.000	Inf Depth (m)	
Porosity	0.33	Length (m)	10.000		

Node 13 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	34.910	Slope (1:X)	100.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	35	Depth (m)	0.350
Safety Factor	2.0	Width (m)	3.000	Inf Depth (m)	
Porosity	0.33	Length (m)	9.000		

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Node 11 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Invert Level (m)	35.370	Slope (1:X)	40.0
Side Inf Coefficient (m/hr)	0.00000	Time to half empty (mins)	0	Depth (m)	0.350
Safety Factor	2.0	Width (m)	10.000	Inf Depth (m)	
Porosity	0.33	Length (m)	9.000		

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Results for 1 year Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	OU1	10	35.715	0.045	7.2	0.0769	0.0000	OK
15 minute winter	1	11	35.657	0.287	13.2	0.5922	0.0000	SURCHARGED
15 minute winter	OU2	10	34.763	0.043	3.1	0.0341	0.0000	OK
15 minute winter	2	11	34.130	0.130	23.1	0.3319	0.0000	OK
30 minute winter	3	25	35.407	0.097	0.8	0.2879	0.0000	OK
15 minute winter	4	11	34.080	0.123	23.4	0.2171	0.0000	OK
60 minute winter	5	46	35.436	0.126	3.0	2.2224	0.0000	OK
15 minute winter	6	12	33.942	0.124	24.2	0.2196	0.0000	OK
60 minute winter	7	49	35.452	0.112	3.6	3.2310	0.0000	OK
15 minute winter	8	12	33.800	0.128	24.8	0.2267	0.0000	OK
15 minute winter	17	14	33.675	0.230	28.2	0.4698	0.0000	OK
15 minute winter	18	14	33.673	0.303	25.5	0.7709	0.0000	SURCHARGED
15 minute winter	9	10	35.170	0.020	0.9	0.0090	0.0000	OK
30 minute winter	10	23	35.155	0.105	1.8	0.0392	0.0000	OK
30 minute winter	11	22	35.155	0.165	2.6	0.0467	0.0000	SURCHARGED
15 minute winter	12	11	34.921	0.021	1.0	0.0080	0.0000	OK
30 minute winter	13	24	34.872	0.128	0.9	0.0363	0.0000	OK
15 minute winter	14	10	35.016	0.016	0.5	0.0061	0.0000	OK
15 minute winter	15	13	34.954	0.020	0.5	0.0056	0.0000	OK
15 minute winter	16	14	34.953	0.069	0.6	0.0196	0.0000	OK
30 minute summer	19	20	36.330	0.010	0.2	0.0033	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	OU1	1.000a	1	7.2	1.160	0.198	0.0610	
15 minute winter	1	Orifice	2	12.2				
15 minute winter	OU2	2.000	2	3.0	0.738	0.170	0.0566	
15 minute winter	2	1.002	4	23.2	0.825	0.331	0.3049	
30 minute winter	3	Orifice	4	0.2				
15 minute winter	4	1.003	6	23.4	0.860	0.334	0.9441	
60 minute winter	5	Orifice	6	0.9				
15 minute winter	6	1.004	8	24.1	0.859	0.344	1.0306	
60 minute winter	7	Orifice	8	0.8				
15 minute winter	8	1.005	17	24.3	0.892	0.348	0.5262	
15 minute winter	17	1.006	18	25.5	0.529	0.125	1.8260	
15 minute winter	18	Hydro-Brake®	44	24.7				
15 minute winter	9	6.000	10	0.9	0.497	0.038	0.0399	
30 minute winter	10	6.001	11	2.6	0.471	0.112	0.0542	
30 minute winter	11	Orifice	12	0.5				
15 minute winter	12	6.003	13	0.9	0.436	0.041	0.0750	
30 minute winter	13	Orifice	17	0.6				
15 minute winter	14	7.000	15	0.5	0.524	0.022	0.0040	
15 minute winter	15	7.001	16	0.6	0.435	0.024	0.0131	
15 minute winter	16	Orifice	17	0.3				
30 minute summer	19	8.000	20	0.2	0.297	0.009	0.0054	

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Results for 1 year Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	20	10	36.209	0.016	0.6	0.0055	0.0000	OK
15 minute winter	21	11	36.054	0.021	1.3	0.0079	0.0000	OK
30 minute winter	22	22	35.798	0.065	1.5	0.0183	0.0000	OK
15 minute winter	23	14	35.802	0.128	3.3	0.0886	0.0000	OK
15 minute winter	24	14	35.800	0.311	2.9	0.0880	0.0000	SURCHARGED
15 minute winter	25	10	36.316	0.016	1.7	0.0083	0.0000	OK
15 minute winter	26	14	35.797	0.346	5.0	0.4201	0.0000	SURCHARGED
15 minute winter	27	11	35.465	0.045	3.6	0.0200	0.0000	OK
60 minute winter	28	52	35.417	0.048	3.2	0.0136	0.0000	OK
60 minute winter	29	54	35.416	0.086	4.2	0.0648	0.0000	OK
30 minute winter	30	32	35.414	0.234	5.1	1.8623	0.0000	SURCHARGED
30 minute winter	31	24	35.184	0.120	3.5	0.0823	0.0000	OK
30 minute winter	32	25	35.183	0.220	3.3	0.2467	0.0000	SURCHARGED
15 minute winter	33	10	34.934	0.055	6.7	0.0694	0.0000	OK
15 minute winter	34	12	34.928	0.162	7.8	0.2505	0.0000	SURCHARGED
15 minute winter	35	14	34.564	0.174	7.0	0.0492	0.0000	SURCHARGED
15 minute winter	36	14	34.548	0.409	9.3	0.5046	0.0000	SURCHARGED
15 minute winter	37	16	34.402	0.363	7.9	0.7098	0.0000	SURCHARGED
30 minute winter	38	24	34.312	0.112	2.1	0.0866	0.0000	OK
30 minute winter	39	24	34.313	0.141	2.0	0.0399	0.0000	OK
30 minute winter	40	24	34.313	0.157	2.4	0.0632	0.0000	OK
30 minute winter	41	25	34.314	0.255	1.6	0.0720	0.0000	SURCHARGED
30 minute winter	OU42	23	34.021	0.121	1.7	0.0568	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	20	8.001	21	0.6	0.448	0.024	0.0119	
15 minute winter	21	8.002	22	1.2	0.764	0.042	0.0433	
30 minute winter	22	8.003	23	1.7	0.420	0.075	0.0382	
15 minute summer	23	8.004	24	3.1	0.551	0.133	0.1753	
15 minute winter	24	8.005	26	2.4	0.155	0.133	0.0665	
15 minute winter	25	9.000	26	1.7	0.387	0.023	0.0477	
15 minute winter	26	Orifice	27	3.0				
15 minute winter	27	8.007	28	3.6	0.802	0.156	0.0136	
15 minute winter	28	8.008	29	3.6	0.750	0.157	0.0139	
15 minute winter	29	8.009	30	5.7	0.524	0.248	0.1158	
30 minute winter	30	Orifice	31	2.4				
240 minute winter	31	8.011	32	3.9	0.378	0.167	0.0746	
30 minute winter	32	Orifice	33	2.8				
15 minute winter	33	8.013	34	6.6	0.523	0.285	0.0780	
15 minute winter	34	Orifice	35	7.0				
15 minute winter	35	8.015	36	6.7	0.501	0.226	0.1585	
15 minute winter	36	Orifice	37	7.9				
15 minute winter	37	Orifice	44	6.7				
15 minute winter	38	10.000	39	3.2	0.554	0.062	0.0571	
30 minute summer	39	10.001	40	2.5	0.497	0.048	0.0383	
15 minute winter	40	10.002	41	2.9	0.436	0.056	0.3264	
30 minute winter	41	Orifice	44	0.9				
15 minute winter	OU42	11.000	42	2.0	0.603	0.067	0.0567	

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Results for 1 year Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	42	24	34.019	0.219	1.9	0.0621	0.0000	SURCHARGED
30 minute winter	43	23	33.753	0.020	0.6	0.0058	0.0000	OK
15 minute winter	44	14	33.454	0.146	33.4	0.3986	0.0000	OK
15 minute winter	45	14	33.393	0.113	33.4	0.1276	0.0000	OK
15 minute winter	45_OUT	14	33.307	0.088	33.4	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	42	Orifice	43	0.6				
30 minute winter	43	11.002	44	0.6	0.443	0.033	0.0017	
15 minute winter	44	1.008	45	33.4	1.153	0.473	0.1988	
15 minute winter	45	1.009	45_OUT	33.4	1.621	0.190	0.0503	32.9

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	OU1	13	36.094	0.424	17.6	2.4084	0.0000	SURCHARGED
15 minute winter	1	12	36.064	0.694	21.2	1.4319	0.0000	SURCHARGED
15 minute winter	OU2	10	34.791	0.071	7.5	0.0558	0.0000	OK
30 minute winter	2	25	34.275	0.275	40.9	0.7024	0.0000	OK
60 minute winter	3	48	35.456	0.146	1.3	1.0573	0.0000	OK
30 minute winter	4	25	34.269	0.312	41.1	0.5507	0.0000	SURCHARGED
60 minute winter	5	58	35.505	0.195	7.3	7.5069	0.0000	SURCHARGED
30 minute winter	6	25	34.251	0.433	42.2	0.7644	0.0000	SURCHARGED
120 minute winter	7	98	35.526	0.186	5.5	10.1910	0.0000	SURCHARGED
30 minute winter	8	25	34.229	0.557	42.9	0.9845	0.0000	SURCHARGED
30 minute winter	17	25	34.215	0.770	45.2	1.5734	0.0000	SURCHARGED
30 minute winter	18	25	34.213	0.843	36.0	2.1451	0.0000	SURCHARGED
30 minute winter	9	25	35.389	0.239	1.6	0.1078	0.0000	SURCHARGED
30 minute winter	10	25	35.389	0.339	2.6	0.1268	0.0000	SURCHARGED
30 minute winter	11	25	35.389	0.399	1.7	0.1384	0.0000	SURCHARGED
60 minute winter	12	49	34.978	0.078	1.3	0.0300	0.0000	OK
60 minute winter	13	49	34.978	0.234	1.3	0.2983	0.0000	SURCHARGED
30 minute winter	14	23	35.024	0.024	0.9	0.0094	0.0000	OK
30 minute winter	15	24	35.026	0.092	1.9	0.0260	0.0000	OK
30 minute winter	16	23	35.027	0.143	1.5	0.0404	0.0000	OK
15 minute winter	19	11	36.337	0.017	0.6	0.0054	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	OU1	1.000a	1	13.8	1.178	0.383	0.0972	
15 minute winter	1	Orifice	2	20.2				
15 minute winter	OU2	2.000	2	7.4	0.932	0.414	0.1091	
15 minute winter	2	1.002	4	46.9	0.963	0.670	0.6656	
60 minute winter	3	Orifice	4	0.3				
15 minute winter	4	1.003	6	47.4	1.005	0.677	2.3625	
60 minute winter	5	Orifice	6	1.1				
15 minute winter	6	1.004	8	48.3	0.997	0.690	2.5782	
120 minute winter	7	Orifice	8	1.1				
15 minute summer	8	1.005	17	43.1	0.990	0.616	1.3541	
15 minute summer	17	1.006	18	39.5	0.536	0.194	2.9683	
60 minute winter	18	Hydro-Brake®	44	29.4				
15 minute winter	9	6.000	10	1.9	0.514	0.083	0.1041	
15 minute summer	10	6.001	11	3.7	0.516	0.159	0.0621	
30 minute winter	11	Orifice	12	0.8				
15 minute winter	12	6.003	13	1.8	0.469	0.077	0.1121	
60 minute winter	13	Orifice	17	0.9				
15 minute winter	14	7.000	15	1.2	0.619	0.051	0.0244	
15 minute winter	15	7.001	16	2.2	0.482	0.092	0.0404	
30 minute winter	16	Orifice	17	0.5				
15 minute winter	19	8.000	20	0.6	0.401	0.026	0.0115	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	20	10	36.219	0.026	1.5	0.0087	0.0000	OK
15 minute winter	21	10	36.066	0.033	3.3	0.0125	0.0000	OK
30 minute winter	22	25	35.956	0.223	2.6	0.0630	0.0000	SURCHARGED
30 minute winter	23	25	35.956	0.282	6.1	0.1961	0.0000	SURCHARGED
30 minute winter	24	25	35.954	0.465	5.8	0.1316	0.0000	SURCHARGED
15 minute winter	25	10	36.324	0.024	4.2	0.0128	0.0000	OK
30 minute winter	26	26	35.953	0.502	12.0	4.0766	0.0000	SURCHARGED
120 minute winter	27	110	35.537	0.117	4.0	0.0521	0.0000	OK
120 minute winter	28	112	35.536	0.167	3.9	0.0472	0.0000	SURCHARGED
120 minute winter	29	112	35.535	0.205	5.6	0.1535	0.0000	SURCHARGED
120 minute winter	30	114	35.531	0.351	5.5	7.5298	0.0000	SURCHARGED
30 minute winter	31	24	35.311	0.247	5.5	0.1692	0.0000	SURCHARGED
30 minute winter	32	24	35.308	0.345	5.2	1.1109	0.0000	SURCHARGED
15 minute winter	33	12	35.071	0.192	12.8	0.2437	0.0000	SURCHARGED
15 minute winter	34	13	35.045	0.279	15.2	1.7626	0.0000	SURCHARGED
30 minute winter	35	29	34.753	0.363	9.7	0.1028	0.0000	SURCHARGED
30 minute winter	36	31	34.729	0.590	15.0	4.3179	0.0000	SURCHARGED
30 minute winter	37	34	34.544	0.505	8.5	1.4497	0.0000	SURCHARGED
60 minute winter	38	46	34.605	0.405	3.5	0.3123	0.0000	SURCHARGED
60 minute winter	39	46	34.605	0.432	3.1	0.1224	0.0000	SURCHARGED
60 minute winter	40	46	34.604	0.448	3.7	0.1830	0.0000	SURCHARGED
60 minute winter	41	46	34.604	0.545	3.5	1.4069	0.0000	SURCHARGED
30 minute winter	OU42	26	34.151	0.251	3.0	0.9301	0.0000	SURCHARGED

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	20	8.001	21	1.5	0.600	0.064	0.0234	
15 minute winter	21	8.002	22	3.2	0.832	0.108	0.1106	
15 minute winter	22	8.003	23	2.6	0.467	0.114	0.0609	
15 minute winter	23	8.004	24	7.0	0.624	0.303	0.1931	
15 minute winter	24	8.005	26	6.6	0.376	0.371	0.0665	
15 minute winter	25	9.000	26	4.2	0.504	0.057	0.0499	
30 minute winter	26	Orifice	27	3.6				
15 minute winter	27	8.007	28	5.3	0.823	0.228	0.0323	
15 minute winter	28	8.008	29	5.2	0.686	0.225	0.0375	
15 minute winter	29	8.009	30	10.1	0.626	0.436	0.1568	
60 minute winter	30	Orifice	31	2.9				
15 minute winter	31	8.011	32	5.9	0.558	0.255	0.1052	
30 minute winter	32	Orifice	33	3.5				
15 minute winter	33	8.013	34	12.2	0.691	0.525	0.1174	
15 minute winter	34	Orifice	35	10.0				
15 minute winter	35	8.015	36	9.8	0.556	0.329	0.1585	
15 minute winter	36	Orifice	37	8.8				
30 minute winter	37	Orifice	44	8.0				
15 minute summer	38	10.000	39	5.9	0.595	0.114	0.1114	
15 minute winter	39	10.001	40	4.9	0.560	0.094	0.0651	
15 minute winter	40	10.002	41	5.8	0.555	0.111	0.3874	
60 minute winter	41	Orifice	44	1.4				
15 minute summer	OU42	11.000	42	2.7	0.679	0.089	0.0609	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	42	26	34.151	0.351	2.4	0.0993	0.0000	SURCHARGED
30 minute winter	43	27	33.756	0.023	0.8	0.0065	0.0000	OK
15 minute winter	44	11	33.474	0.166	42.1	0.4547	0.0000	OK
15 minute winter	45	12	33.409	0.129	42.0	0.1462	0.0000	OK
15 minute winter	45_OUT	12	33.318	0.099	42.0	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute winter	42	Orifice	43	0.8				
30 minute winter	43	11.002	44	0.8	0.473	0.043	0.0021	
15 minute winter	44	1.008	45	42.0	1.218	0.593	0.2362	
15 minute winter	45	1.009	45_OUT	42.0	1.710	0.238	0.0599	80.5

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute winter	OU1	14	36.388	0.718	35.0	10.2236	0.0000	FLOOD RISK
15 minute winter	1	13	36.357	0.987	27.4	2.0373	0.0000	FLOOD RISK
60 minute winter	OU2	52	35.100	0.380	7.5	3.4282	0.0000	SURCHARGED
60 minute winter	2	51	35.098	1.098	50.3	2.8079	0.0000	SURCHARGED
120 minute winter	3	94	35.513	0.203	1.5	2.5520	0.0000	SURCHARGED
60 minute winter	4	51	35.091	1.134	45.2	2.0029	0.0000	SURCHARGED
120 minute winter	5	112	35.617	0.307	8.7	17.4449	0.0000	FLOOD RISK
60 minute winter	6	52	35.073	1.255	46.2	2.2176	0.0000	SURCHARGED
180 minute winter	7	164	35.622	0.282	7.8	22.8908	0.0000	SURCHARGED
60 minute winter	8	52	35.053	1.381	44.5	2.4396	0.0000	SURCHARGED
60 minute winter	17	52	35.039	1.594	54.5	3.2565	0.0000	SURCHARGED
60 minute winter	18	52	35.037	1.667	52.9	17.6494	0.0000	FLOOD RISK
60 minute winter	9	47	35.512	0.362	2.1	0.1634	0.0000	SURCHARGED
60 minute winter	10	47	35.512	0.462	3.1	0.1729	0.0000	SURCHARGED
60 minute winter	11	47	35.512	0.522	3.0	1.4921	0.0000	SURCHARGED
60 minute winter	12	63	35.112	0.212	2.1	0.0817	0.0000	SURCHARGED
60 minute winter	13	63	35.112	0.368	1.9	1.5083	0.0000	SURCHARGED
30 minute winter	14	24	35.145	0.145	1.8	0.0566	0.0000	OK
30 minute winter	15	24	35.146	0.212	3.0	0.0600	0.0000	SURCHARGED
30 minute winter	16	24	35.146	0.262	2.7	0.0741	0.0000	SURCHARGED
15 minute winter	19	11	36.342	0.022	1.1	0.0072	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	OU1	1.000a	1	19.8	1.243	0.548	0.0972	
15 minute winter	1	Orifice	2	24.4				
15 minute winter	OU2	2.000	2	13.8	1.069	0.776	0.2433	
15 minute summer	2	1.002	4	71.4	1.046	1.021	0.7624	
120 minute winter	3	Orifice	4	0.4				
15 minute summer	4	1.003	6	70.7	1.078	1.010	2.4441	
120 minute winter	5	Orifice	6	1.5				
15 minute winter	6	1.004	8	60.2	1.025	0.861	2.5782	
180 minute winter	7	Orifice	8	1.4				
15 minute summer	8	1.005	17	47.4	0.941	0.678	1.3541	
30 minute winter	17	1.006	18	58.7	0.518	0.288	2.9683	
60 minute winter	18	Hydro-Brake®	44	29.4				
15 minute winter	9	6.000	10	3.3	0.567	0.141	0.1041	
15 minute winter	10	6.001	11	4.9	0.540	0.211	0.0621	
15 minute winter	11	Orifice	12	0.9				
15 minute summer	12	6.003	13	2.7	0.497	0.118	0.1443	
60 minute winter	13	Orifice	17	1.1				
15 minute summer	14	7.000	15	2.3	0.638	0.100	0.0581	
15 minute summer	15	7.001	16	3.5	0.519	0.150	0.0516	
30 minute winter	16	Orifice	17	0.7				
15 minute winter	19	8.000	20	1.1	0.473	0.048	0.0179	

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	20	48	36.235	0.042	1.5	0.0142	0.0000	OK
60 minute winter	21	48	36.235	0.202	3.7	0.0756	0.0000	SURCHARGED
60 minute winter	22	48	36.235	0.502	3.3	0.1421	0.0000	FLOOD RISK
60 minute winter	23	48	36.235	0.561	8.0	0.7716	0.0000	FLOOD RISK
60 minute winter	24	48	36.233	0.744	7.6	0.2105	0.0000	FLOOD RISK
15 minute winter	25	10	36.333	0.033	7.8	0.0173	0.0000	OK
60 minute winter	26	48	36.232	0.781	15.8	10.8971	0.0000	FLOOD RISK
120 minute winter	27	118	35.773	0.353	4.8	0.1577	0.0000	SURCHARGED
120 minute winter	28	118	35.771	0.402	4.7	0.1138	0.0000	SURCHARGED
120 minute winter	29	118	35.770	0.440	7.9	0.3297	0.0000	SURCHARGED
120 minute winter	30	118	35.765	0.585	7.9	16.2197	0.0000	FLOOD RISK
30 minute winter	31	23	35.535	0.471	7.9	0.3225	0.0000	FLOOD RISK
30 minute winter	32	23	35.532	0.569	7.2	2.3119	0.0000	FLOOD RISK
30 minute winter	33	23	35.314	0.435	17.5	0.5507	0.0000	FLOOD RISK
30 minute winter	34	23	35.279	0.513	21.1	4.5959	0.0000	FLOOD RISK
60 minute winter	35	45	35.113	0.723	11.6	0.2045	0.0000	FLOOD RISK
60 minute winter	36	44	35.093	0.954	19.3	9.2980	0.0000	FLOOD RISK
60 minute winter	37	45	34.807	0.768	10.5	1.5587	0.0000	FLOOD RISK
60 minute winter	38	52	34.763	0.563	6.6	0.4344	0.0000	SURCHARGED
60 minute winter	39	52	34.763	0.591	6.3	0.1672	0.0000	SURCHARGED
60 minute winter	40	52	34.763	0.607	7.9	2.6106	0.0000	SURCHARGED
60 minute winter	41	51	34.763	0.704	6.3	3.3914	0.0000	FLOOD RISK
60 minute winter	OU42	49	34.250	0.350	3.9	2.8847	0.0000	SURCHARGED

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute winter	20	8.001	21	2.8	0.720	0.120	0.0564	
15 minute winter	21	8.002	22	6.1	0.905	0.206	0.1438	
15 minute summer	22	8.003	23	4.9	0.475	0.210	0.0609	
15 minute winter	23	8.004	24	12.7	0.723	0.550	0.1931	
15 minute winter	24	8.005	26	12.2	0.691	0.683	0.0665	
15 minute winter	25	9.000	26	7.8	0.631	0.107	0.0525	
60 minute winter	26	Orifice	27	4.1				
15 minute summer	27	8.007	28	6.8	0.840	0.291	0.0513	
15 minute winter	28	8.008	29	6.7	0.683	0.289	0.0407	
15 minute winter	29	8.009	30	15.7	0.891	0.679	0.1568	
120 minute winter	30	Orifice	31	3.4				
15 minute winter	31	8.011	32	8.5	0.659	0.366	0.1052	
120 minute winter	32	Orifice	33	3.8				
15 minute winter	33	8.013	34	19.5	1.109	0.842	0.1174	
15 minute winter	34	Orifice	35	13.2				
15 minute winter	35	8.015	36	13.0	0.739	0.436	0.1585	
60 minute winter	36	Orifice	37	10.5				
60 minute winter	37	Orifice	44	10.0				
15 minute winter	38	10.000	39	11.3	0.613	0.217	0.1114	
15 minute winter	39	10.001	40	10.4	0.594	0.200	0.0651	
15 minute winter	40	10.002	41	12.7	0.586	0.244	0.3874	
60 minute winter	41	Orifice	44	1.6				
15 minute winter	OU42	11.000	42	3.3	0.766	0.108	0.0609	

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.95%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute winter	42	49	34.249	0.449	2.1	0.1272	0.0000	SURCHARGED
60 minute winter	43	50	33.758	0.025	0.9	0.0070	0.0000	OK
15 minute winter	44	10	33.484	0.176	46.5	0.4824	0.0000	OK
15 minute winter	45	10	33.417	0.137	46.5	0.1554	0.0000	OK
15 minute winter	45_OUT	10	33.323	0.104	46.4	0.0000	0.0000	OK

Link Event (Outflow)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute winter	42	Orifice	43	0.9				
60 minute winter	43	11.002	44	0.9	0.490	0.049	0.0023	
15 minute winter	44	1.008	45	46.5	1.248	0.657	0.2548	
15 minute winter	45	1.009	45_OUT	46.4	1.751	0.264	0.0647	150.5

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