



BURY INTERCHANGE

PHASE 1 – SOUTHERN ACCESS FOOTBRIDGE & METROLINK PLATFORM DRAINAGE STRATEGY

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1. INTRODUCTION

1.1 Purpose of this Report

This Drainage Strategy has been prepared for Willmott Dixon in support of a full planning application for the first phase (known as 'Phase 1 Bury Tram Stop') of the redevelopment of Bury Interchange. The description of development is as follows:

Full planning application for the infill of the existing underpass, engineering works (including remediation works; foundation/piling works; and other associated engineering works) to recontour the land within Pyramid Park to tie into existing levels, the construction of a fully accessible pedestrian bridge structure (including alterations to Metrolink-related infrastructure) across the existing Metrolink line to allow access between Knowsley Place, the Metrolink platform (via lift and stairs) and Pyramid Park; improvements to the existing Metrolink platforms and canopies; construction of a new sloped footpath with stairs within Pyramid Park site from bridge; hard/soft landscaping; and associated drainage and lighting schemes.

There are two main elements to the planning application:

- Creation of a new Southern Footbridge Access and Metrolink Crossing to allow access between Knowsley Place, the existing Metrolink platform and Pyramid Park.
- Refurbishment of the existing Metrolink platforms including replacement of the existing platform canopy and enhanced passenger amenities/facilities.

A more detailed summary of the proposals is provided in the Planning Statement/Design and Access Statement submitted with the planning application. However, in summary, the construction of the new Southern Access is key to enable Bury Tram Stop to continue operating during Phase 2 of the wider Interchange scheme which includes the demolition and replacement of the existing Interchange Building with a new modern facility.

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

This report should be read in conjunction with the Flood Risk Assessment, renaissance, March 2025 and the completed North-West SuDS Pro-Forma in Appendix H.

2. THE SITE

2.1 Site Location

The application site is bounded by Pyramid Park/Market Street to the east, East Lancashire railway line to the south, Duke Street/Knowsley Place to the west and Bury Interchange to the north (platforms located below interchange building and associated road infrastructure including Angouleme Way).

The site comprises three distinct elements:

- Knowsley Place/Union Square (west of Metrolink)
- Metrolink corridor and platform
- Pyramid Park (east of Metrolink)

The site location is described below:

- | | |
|---------------------------|-----------|
| • Post Code | BL9 0EJ |
| • OS Reference (X) | 380381 |
| • OS Reference (Y) | 410401 |
| • National Grid Reference | SJ 895902 |

The site location is illustrated in Figure 2.1 below.



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Figure 2.1: Indicative Site Location

2.2 Site Description

Knowsley Place/Union Square - situated to the west of the Metrolink, union square is a hard and soft landscaped area associated with the Premier Inn. It provides stepped access to the underpass that passes beneath the Metrolink tracks.

Metrolink corridor and platform – The existing Metrolink platform with associated canopy and tracks pass through the centre of the site.

Pyramid Park – situated the east of the Metrolink, Pyramid Park is an undeveloped parcel of land that is relatively flat with distinct landscaping mounds and slopes to the perimeter to tie into the surrounding higher ground. An access track from Market Street is also contained within this section of the site and runs along the southern site boundary towards market street to the east.

Refer to Appendix A for further details of the existing topography of the site.

2.3 Existing Site Drainage

United Utilities (UU) sewer records indicate there to be 2 combined sewers that pass beneath the Metrolink tracks and run parallel with the railway tracks. They also show the presence of a private/highway surface water network to the west of the site that discharges into the combined sewer network.

Drainage surveys have been undertaken for each of the three distinct areas of the site. A Summary of the findings is as follows:

Knowsley Place/Union Square – Separate private foul and surface water networks have been identified which serve the Union Square landscaping and Premier Inn building and discharge into the public sewer network. The surface water network includes a below ground attenuation tank and flow control which attenuate flows. The survey also indicates that the ‘private’ sewer shown on the UU records has been diverted around the Premier Inn building.

Metrolink corridor and platform – A surface water drainage network has been identified that serves the existing platform and tracks. A separate system drains the underpass and path that extends into Pyramid Park. Both networks discharge into a pumping station that is located in the underpass which then pumps run-off into a chamber situated into landscaping slope between Union Square and the Metrolink tracks. This chamber then discharges to the public sewer to the south that runs parallel to the railway tracks.

Pyramid Park – No private drainage networks have been identified within Pyramid which is to be expected given it is undeveloped land.

Refer to Appendix B for United Utilities Sewer Map

Refer to Appendix C for the Drainage Surveys

2.4 Geology

The following sections provide an overview of the Geology, Hydrogeology and Hydrology. Refer to 16012-TRE-BRY-XXX-RP-EN-000001 - Preliminary Risk Assessment Report produced by Tier Consult Group for further details.

BGS mapping does not display any made ground deposits on site, however based on the historical mapping and the development that has taken place, extensive made ground is anticipated which poses a risk of potentially hazardous materials and the potential for groundwater / surface water contamination.

BGS mapping indicates the site to be underlain by Devensian Till. This stratum typically comprises sand, silt, clay and gravel.

The deeper solid geology is indicated to be part of the Pennine Lower Coal Measures Formation which consists of mudstone and silt stone interbedded with subordinate medium-grained sandstones and coal seams.

2.5 Hydrogeology & Hydrology

Based on the inferred geology, a summary of the Environment Agency aquifer designations is presented in the table below:

Stratum	Coverage	Aquifer Designation
Devensian Till	Full Site	Secondary (A) Aquifer. These are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.
Pennine Lower Coal Measures	Full Site	Secondary (A) These are permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

Table 2.1: Aquifer Designations

The nearest named watercourse to the site is the River Irwell, located 675m to the west of the site.

2.6 Proposed Development

The description of development is set out in the introduction to the report. In summary, the application proposes the creation of a Southern Access and Metrolink Crossing to allow access between Knowsley Place, the Metrolink platform and Pyramid Park, including infill of the existing Metrolink underpass. Upgrades to the Metrolink platform and associated infrastructure and alterations to overhead lines.

Specific works include:

- Infill of the existing Metrolink underpass and associated pump room.
- Relocation of the pump room.
- New Footbridge linking Union Square and Pyramid Park with vertical circulation leading to the southern end of the existing Metrolink Platform(s).
- New accessible graded footpath (illuminated and drained) connecting bridge to Pyramid Park development area ground level.
- Engineering works, including land re-profiling, within Pyramid Park to tie into existing/proposed levels.
- Vegetation clearance with replacement landscaping and associated biodiversity enhancement works.
- Refurbishment and resurface of the Metrolink platform(s) and necessary structural alterations associated with construction of the vertical circulation and the access from the bridge. Works also include emergency level escape from the southern end of platform.
- Replacement of the platform canopy (main supporting steel frame to be reused, solid metal canopy to be replaced with glazed)
- Works associated with Overhead Line Equipment (OLE) and signalling equipment limited to necessary alterations resulting from the installation of the new footbridge.
- Extension of the SER room.

Refer to Appendix D for the proposed development plans.

3. SURFACE WATER DRAINAGE HIERARCHY

3.1 Surface Water Discharge Assessment

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

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

Infiltration Based Systems

Based upon desktop studies and historic ground investigation it is understood that the site is underlain by varying depths of made ground, clays and sands. It is also understood that contaminated land has been placed with Pyramid Park. Based on the above infiltration is not considered viable at this stage. Further investigations, including infiltration and contamination testing, are to be undertaken to validate this conclusion.

Surface Waterbody

Opportunities for discharge into a watercourse have been considered. The closest watercourse is the River Irwell which is located 675m to the west. It is not possible to form a connection to the river as this would be through 3rd party land. The United Utilities records indicate surface water drain/ culvert within Market Street that discharges to a 'lake' feature within Pyramid Park. This surface water feature has not been identified onsite and does not appear to have an outfall. As such it is not deemed an appropriate point of discharge. Bury Lead Local Flood Authority are to be consulted to provide additional information relating to this surface water feature.

Public Sewer Network

The United Utilities asset records indicate there to be various sewers within close proximity to the site. Whilst there is a surface water sewer to the south of Pyramid Park this becomes a combined water sewer shortly downstream. As such it is proposed that a connection is sought to the public combined sewer network.

3.0 SURFACE WATER DISCHARGE RATE ASSESSMENT

3.2 Pre-Development Surface Water Run-Off Rates

The site is split into 3 distinct areas which are known as Union Square, Metrolink Platform and Pyramid Park.

Union Square has an existing drainage system associated with the Premier Inn development that is to remain.

The Metrolink platform has an existing drainage network that is to be improved as part of the development, however the overall drained area will remain unchanged.

Pyramid Park is currently undeveloped and is therefore considered as greenfield. The development area is approximately 0.049 ha.

Union Square has an extended drained area of 0.017 ha which has been assessed within this report.

Existing Greenfield Run-Off Rates

The greenfield run-off for Pyramid Park and Union Square has been calculated using Microdrainage ICP SuDS method, which utilises IH124 method and linearly interpolates the results for areas less than 50ha. (Appendix E). The rates presented below are what would be typical of a site with an equivalent surface area which remains undeveloped / covered in grass or vegetation.

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

Return Period	$Q_{\text{Greenfield}}$ (l/s)
1 in 1 year	0.3
1 in 2 year	0.4
1 in 30 year	0.7
1 in 100 year	0.8
Q_{BAR}	0.4

Table 3.2.1 – Greenfield Run-off Rates for Pyramid Park

Return Period	$Q_{\text{Greenfield}}$ (l/s)
1 in 1 year	0.10
1 in 2 year	0.14
1 in 30 year	0.25
1 in 100 year	0.28
Q_{BAR}	0.14

Table 3.2.2 – Greenfield Run-off Rates for Union Square

3.3 Proposed Surface Water Discharge Rates and Volume

The non-Statutory Technical Standards for Sustainable Drainage Systems (2015) states that for greenfield developments, the peak runoff rate from the development to any highway drain, sewer or surface water body for the 1 in 1-year and 100-year rainfall events should never exceed the peak greenfield runoff rate for the same event. For developments which were previously developed (brownfield), the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1-year and 1 in 100-year rainfall events must be as close as reasonably practicable to

the greenfield runoff rate from the development for the same rainfall event but should never exceed the rate of discharge from the development prior to redevelopment for that event.

As set out within the Bury Council SFRA, developments should aim to restrict the runoff rate from site to greenfield run-off rate where feasible

Policy JP-S 5 of the recently adopted Places for Everyone Joint Development Plan expects developments to manage surface water runoff through sustainable drainage systems and as close to source as possible (unless demonstrably inappropriate) so as to not exceed greenfield run-off rates or alternative rates specified in district local plans, such as those identified for areas with critical drainage issues.

It is not considered feasible to restrict the flow rate to Q_{BAR} due to the associated blockage risk it would pose. It is therefore proposed that the total runoff from the site is limited to 2.0 l/s to minimise the risk of blockage and overland flooding.

It is also not considered feasible to reduce the discharge volume to greenfield volume or provide long term storage for the additional runoff volume over the Greenfield volume. This is due to the low infiltration rates and the limited space available over the site to provide long term storage.

4. ATTENUATION AND SUDS ASSESSMENT

4.1 Attenuation requirements

The proposed development results in circa 0.049 ha of external landscaping to Pyramid Park and 0.017 ha to Union Square.

Due to the nature of the development, urban creep has not been considered as it is unlikely that the percentage of impermeable area will increase during the lifetime of the development.

The post development discharge rates will include for an increase in the rainfall intensity of 40% and 45% for the 3.3% and 1% annual exceedance probability (AEP) respectively, to allow for climate change as is consistent with a design life of the development of 100 years, as outlined by the National Planning Practice Framework (NPPF).

A quick storage estimate for the 1% AEP +45% CC event using Micro Drainage, indicates that the approximate attenuation volume shown in table 3.4 is required to limit the peak surface water discharge to 2.0 l/s.

Return Period	Development Area (ha)	Surface Water Attenuation Estimate (m ³)
1:100 Year +45%CC	0.049	23-37
1:100 Year +45%CC	0.017	30

Table 5.1 – Attenuation Volumes

4.2 Sustainable Urban Drainage Assessment

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

SUDS Technique	Description	Suitability for Development Sites	
Rainwater Harvesting	Collection of rainwater run-off for use	Development has no water demand	✗
Soft Landscaping	Grassed areas that allow direct infiltration of rainwater	Soft landscaping will be utilised to limit the impermeable area	✓
Filter Drains	Granular filled Linear drains / soakaway with either granular fill and perforated pipe, or dense vegetation that treat runoff from adjacent impermeable areas	Not suitable due to known ground conditions	✗
Swales	Shallow landscape channel that can infiltrate or convey runoff.	Not suitable due to known ground conditions	✗
Infiltration Basins	Depressions in the ground designed to store and infiltration runoff to the ground. Can be landscaped to provide amenity value.	Not suitable due to known ground conditions and limited space	✗
Wet Ponds	Basins with permanent pool of water providing water quality treatment, wildlife, and amenity benefit. Designed to provide temporary storage for additional runoff.	Not suitable due to known ground conditions and limited space	✗

Extended Detention Basins	Dry basins that are designed to temporarily store runoff providing water quality treatment.	Not suitable due to known ground conditions and limited space	✗
Constructed Wetland	Ponds and shallow wetland areas with vegetation to improve pollution removal and enhance wildlife habitat.	Not suitable due to known ground conditions and limited space	✗
Porous Paving	Granular build-up beneath permeable paving systems that can be used to either store runoff (lined system) and increase time of concentration or allow percolation into the ground.	Suitable as part of the pavement build up to convey and treat run-off	✓
Trees Pits	Managed permeable paving systems around tree pits that can be used to either store runoff (lined system) and increase time of concentration or allow percolation into the ground.	Not suitable due to conflict between ramp and retaining wall	✗
Soakaways	Infiltration device to temporarily store runoff and allow it to percolate into the ground.	Not suitable due to known ground conditions	✗
Green Roof	Vegetated roof area that reduces runoff and increases time of concentration.	N/A	✗
Blue Roof	Roof area designed to store and reduce peak runoff rates during intense storms.	N/A	✗
Underground Storage	Attenuation structures installed below ground to provide runoff storage.	Suitable	✓

✗ Not suitable

? Potentially suitable subject to further investigation

✓ Suitable

Table 5.2 – SuDS Techniques & Suitability for Development Site

4.3 Water Quality Assessment

Water quality is generally affected by frequent rainfall events, 1 in 1-year events or less. To assess the water quality consideration will be given to the guidance with CIRIA Guide C753 The SuDS Manual. The pollution hazard levels for different land uses are presented in the table below.

Land Use	Pollution Hazard Level	Total Suspended Solids	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 within 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	Medium	0.7	0.6	0.7

parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways				
Site with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), site where chemical and other fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured, industrial sites; trunk roads and motorways	High	0.8	0.8	0.9

Table 5.3 – Pollution Hazard Levels

The surface water run-off from the development associated with the pyramid park proposals will be from the pedestrian bridge and ramp. This results in a low pollution hazard level.

Discharge of surface water to the receiving public surface water sewer requires no treatment stages due to the low pollution hazard level. However, the use of SuDS, catchpits and silt traps will provide inherent treatment.

The SuDS Manual sets out various approaches to water quality risk management. The Simple Index approach uses hazard mitigation indices to ensure sufficient treatment is provided before discharge to a surface water body or groundwater. If infiltration is found to be viable upstream treatment will be required prior to discharge to ground. Table 26.4 extracted from the SuDS Manual sets out the characteristics of potential systems.

Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates	Total Suspended Solids	Metals	Hydro-carbons
A layer of dense vegetation underlain by a soil with good contaminant attenuation potential of at least 300 mm in depth	0.6	0.5	0.6
A soil with good contaminant attenuation potential of at least 300 mm in depth	0.4	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment, i.e. graded gravel with sufficient smaller particles but not single size coarse aggregate such as 20mm gravel) underlain by a soil with good contaminant attenuation potential of at least 300mm in depth	0.4	0.4	0.4
Constructed permeable pavement (where a suitable filtration layer is included that provides treatment, and including a geotextile at the base separating the foundation from the subgrade) underlain by a soil with good contaminant attenuation potential of at least 300 mm in depth	0.7	0.6	0.7
Bioretention underlain by a soil with good contaminant attenuation potential of at least 300 mm in depth	0.8	0.8	0.8

Table 5.4 – Indicative SuDS Mitigation Indices for discharges to groundwater (Table 2643 'The SuDS Manual C753)

4.4 SuDS Maintenance and Management Plan

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

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

The Main Contractor delivering the development is to update the general requirements to reflect the product specific requirements of the as installed proprietary SuDS and incorporate these into the Operation & Maintenance manual for the building. A Verification Report, including photographic evidence, to demonstrate that the drainage has been constructed as per the design drawings. As-built drawings should be supplied by the Main Contractor where the construction of the drainage varies from the design drawings.

Maintenance Schedule	Required Action	Typical Frequency
Regular Maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional Maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than sprays	As required - once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50mm of the level of the paving	As required
	Remedial works to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10-15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three month after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 hours after large storms in first 6 months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

Table 5.5 - Operation and Maintenance requirements for Pervious Pavements (Table 20.15 'The SuDS Manual C753)

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

Table 5.6 - Operation and Maintenance requirements for Attenuation Storage Tanks (Table 21.3 'The SuDS Manual C753)

5. DRAINAGE STRATEGY

Refer to Appendix F for the Below Ground Drainage Plans

5.1 Surface Water System

The site is split into 3 distinct areas which are known as Union Square, Metrolink Platform and Pyramid. Each area has/ will have a dedicated surface water network that collects the run-off from the impermeable areas.

Union Square

Union Square is currently drained via a surface water network that was installed as part of the Premier Inn development, and this is to be retained as part of the Bury Interchange proposals. This network includes a below ground attenuation tank and flow control which limits the discharge from site. It is understood that this network discharges to the UU combined sewer adjacent to the railway tracks.

The right side of the bridge and bridge approach are to be actively drained and will have a new surface water network that is to collect the rainwater from the bridge and footpath approach. The system is to discharge under gravity into an extended attenuation tank within Union Square, subject to agreement with the LLFA and the management company for the tank.

The surface water discharge from the site is to be limited to 4l/s using a vortex flow control device prior to discharge into the attenuation tank, as per the current discharge requirements. The proposed discharge rate is to be confirmed by the LLFA and the management company for the tank.

The surface water discharging from the site will be from the bridge and the approach hard standing, which results in a low pollution hazard level. As the run-off is to ultimately discharge into a combined sewer no treatment is required.

Metrolink Platform

The Metrolink platform has an existing surface network that collects the run-off generated from the platform and associated canopy. This network discharges into an existing pumping station that is located within the underpass that pumps the run-off into a chamber situated into landscaping slope between Union Square and the Metrolink tracks. This chamber then discharges to the public sewer to the south that runs parallel to the railway tracks. It is proposed that the existing system is to be upgraded by providing a new package pumping station which pumps the run-off to the same location. The existing drainage associated with the platform is to be cleansed and repaired as required.

Pyramid Park

The external ramp located within Pyramid Park is to have a new dedicated surface water network that is to collect the rainwater from the footpath and bridge. The system is to discharge under gravity into the UU combined sewer, subject to agreement with the LLFA and UU.

The surface water discharge from the site is to be limited to 2l/s using a vortex flow control device prior to discharge into the sewer. The proposed discharge rate is to be confirmed by the LLFA and UU.

The footpath is to be a lined permeable paving system that conveys water to the bottom of the ramp. Due to the sloped nature of the ramp, it is not possible to provide sufficient attenuation within the sub-base and as such attenuation will be provided by a geo-cellular attenuation tank.

The surface water discharging from the site will be from footpath and bridge, which results in a low pollution hazard level. As the run-off is to discharge into a combined sewer no treatment is required, however the use of permeable paving will provide inherent treatment.

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

- The below ground drainage system will be designed to ensure flooding does not occur on site for the 1 in 30 year and no internal flooding for the 1 in 100-year rainfall events
- The surface water system is to be designed to accommodate the 1, 2, 30 and 100 year return events with 40% and 45% climate change allowances for the 30 and 100 year events respectively. The system will be designed for a maximum storm duration of 24 hours.

Micro Drainage calculations for the proposed Pyramid Park surface water system are available in Appendix G.

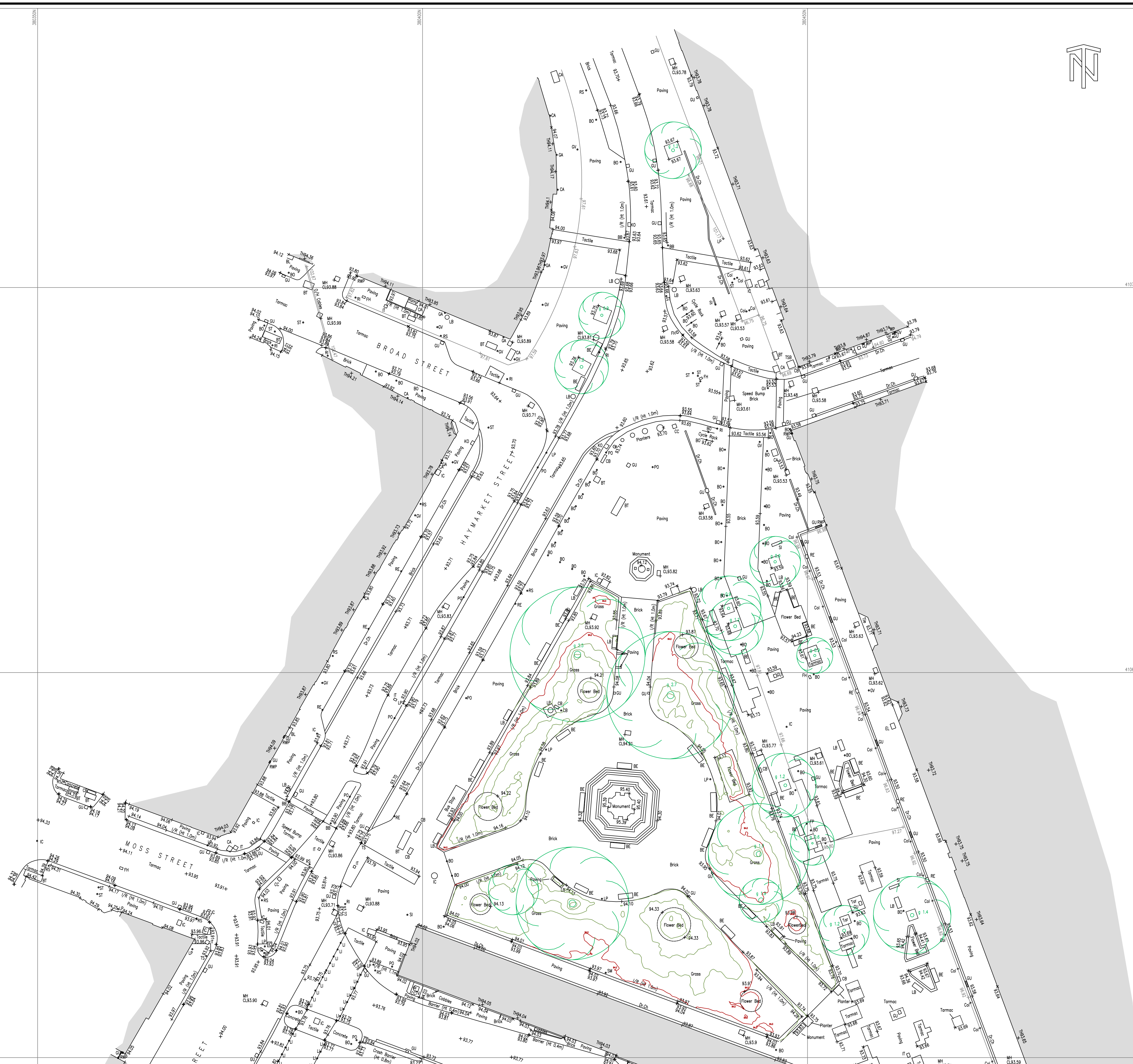
The North-West SuDS Proforma has been completed to support this application, refer to Appendix H.

5.2 Foul Water System

As part of the improvements to the Metrolink platform a foul water network is to be installed to collect waste associated with the toilets, cleaners sink etc. that are located on the platform. The foul system is to discharge into a new network, directed out to Pyramid Park and running parallel with the surface water runs from the pathway in this area prior to connecting in to a final manhole and discharging into a combined sewer along with the surface water from Pyramid Park.

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

APPENDIX A TOPOGRAPHICAL SURVEY



NOTE

KEY

Grid & Datum - Local plane grid fitted to the original AECOM topographical survey using the surviving control points AE24 and AE25.

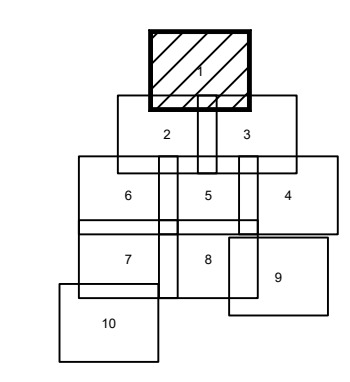
STANDARD ABBREVIATIONS

[illegible]

SYMBOLS

SYMBOLS			
	HEDGE		GATE
	BUILDING		
	TREE CANOPY		CONTROL STATION
			TREE
	CONTOURS		BRIDGE & TUNNEL DETAIL

SHEET LAYOUT



Rev	Date	Drawn	Description	Ch'kd	A



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Title	BURY INTERCHANGE BURY BL9 0AY TOPOGRAPHICAL SURVEY SHEET 1 OF 10
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Surveyed	AM	Drawn	AM	Drawn Date:	
Checked	JP	Approved	NDO	12/04/2024	
Scale	Project	12498			Status
1:250 @ A1	CAD File	V:\NDO\BSP\Project\1234\CD\DRAWING\12498_001.DWG			ORI
Drawing No	12498 / 001 / 1				Rev
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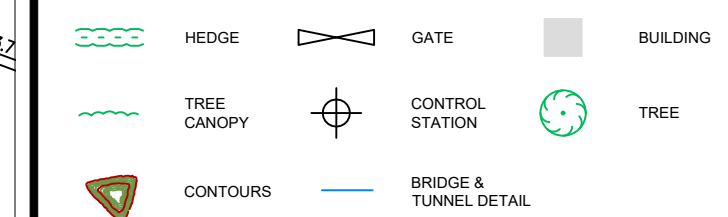
U KEY

Grid & Datum	- Local plane grid fitted to the original AECOM topographical survey using the surviving control points AE24 and AE25.
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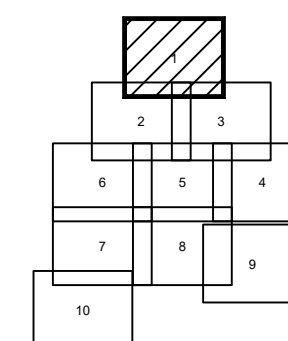
STANDARD ABBREVIATIONS

[illegible]

SYMBOLS



SHEET LAYOUT



Rev	Date	Drawn	Description	Ch'k'd	A



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✓		Title

BURY INTERCHANGE
BURY
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TOPOGRAPHICAL SURVEY
SHEET 2 OF 10

Surveyed	AM	Drawn	AM	Drawn Date:	12/04/2024
Checked		Approved	NDO		
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Drawing No 12498 / 001 / 2					Rev 0



Grid & Datum - Local plane grid fitted to the original AECOM topographical survey using the surviving control points AE24 and AE25.

STANDARD ABBREVIATIONS

STREET FURNITURE	LC - LIGHTING COLUMN LP - LAMP POST MB - MOORING BOLLARD MA - MAST MV - MANHOLE MO - MONUMENT MP - MILE POST MR - MOORING RING MW - MONITORING WELL OB - OBSTACLE OH - OVERHEAD OSM - ORDNANCE SURVEY PA - PLAY APPARATUS PB - PILLAR BOX PC - PUBLIC HOUSE PI - PILE PJ - PLANTER PM - PARKING METER PO - POST PP - POST & RAIL PS - POST & WIRE PW - WIRE MESH	UTL - UNABLE TO LIFT VOP - VEHICLE DETECTOR PAD VP - VENT PIPE WM - WATER METER WO - WASH OUT WP - WASTE PIPE
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SYMBOLS

HEDGE	GATE	BUILDING
TREE CANOPY	CONTROL STATION	TREE
CONTOURS	BRIDGE & TUNNEL DETAIL	

SHEET LAYOUT

Rev Date Drawn Description Ch'gd App'd

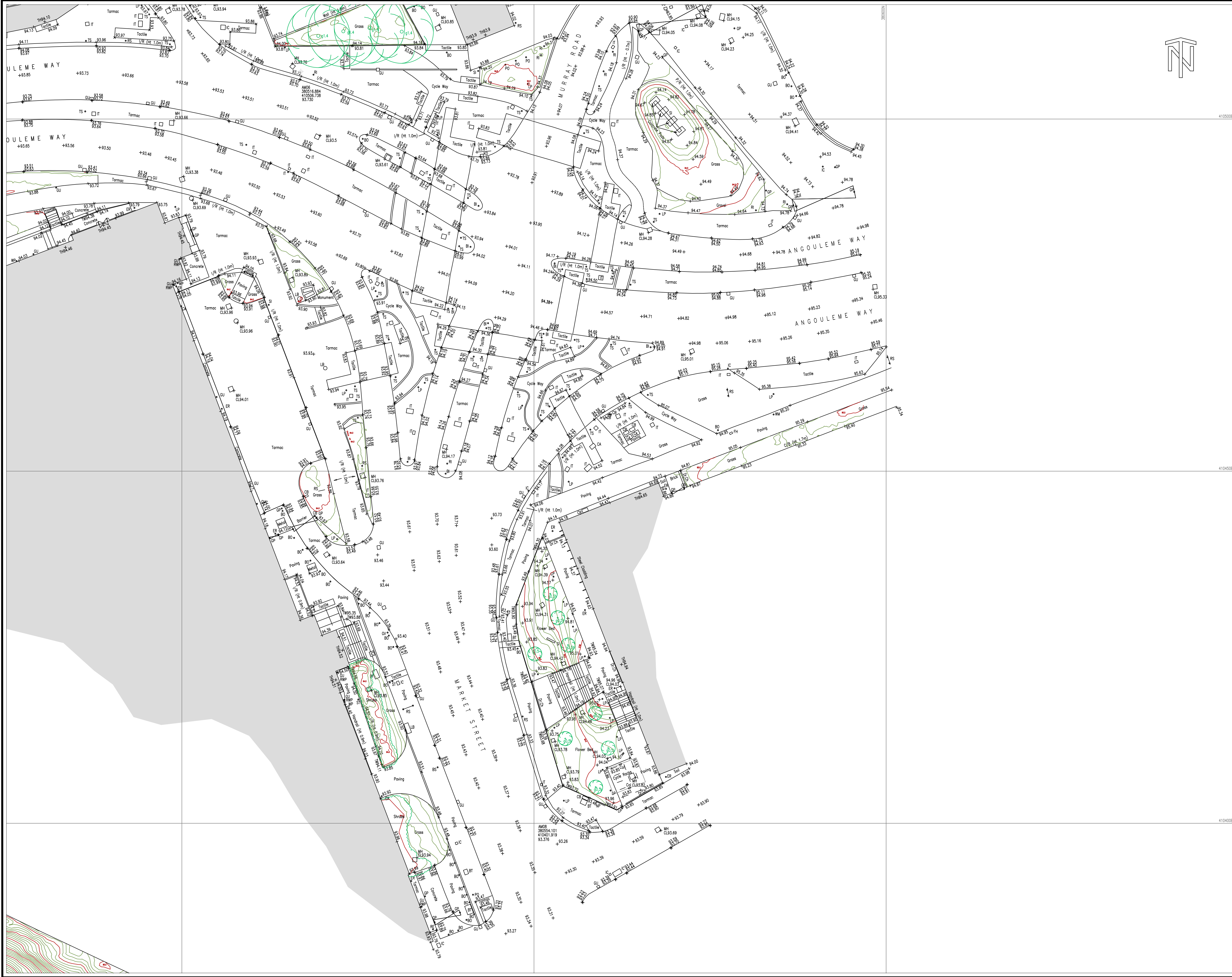
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BURY INTERCHANGE
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TOPOGRAPHICAL SURVEY
SHEET 3 OF 10

Surveyed	AM	Drawn	AM	Drawn Date
Checked	JP	Approved	NDO	12/04/2024
Scale	1:250 @ A1	Project	12498	Status
Drawing No	12498 / 001 / 3	CAD File	12498_001_Paper_12498_001.dwg	ORIG
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STANDARD ABBREVIATIONS

STREET FURNITURE	LC - LIGHTING COLUMN LP - LAMP POST MA - MAST MB - MONUMENT MO - MONUMENT MR - MONUMENT MT - MONUMENT MU - MONUMENT MV - MONUMENT MW - MONUMENT MX - MONUMENT MY - MONUMENT MZ - MONUMENT	UL - UNABLE TO LOCATE VP - VENT PIPE WM - WATER METER WO - WASH OUT WP - WASTE PIPE
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SYMBOLS

HEDGE	GATE	BUILDING
TREE CANOPY	CONTROL STATION	TREE
CONTOURS	BRIDGE & TUNNEL DETAIL	

SHEET LAYOUT

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SYMBOLS

HEDGE	GATE	BUILDING
TREE CANOPY	CONTROL STATION	TREE
CONTOURS	BRIDGE & TUNNEL DETAIL	

SHEET LAYOUT

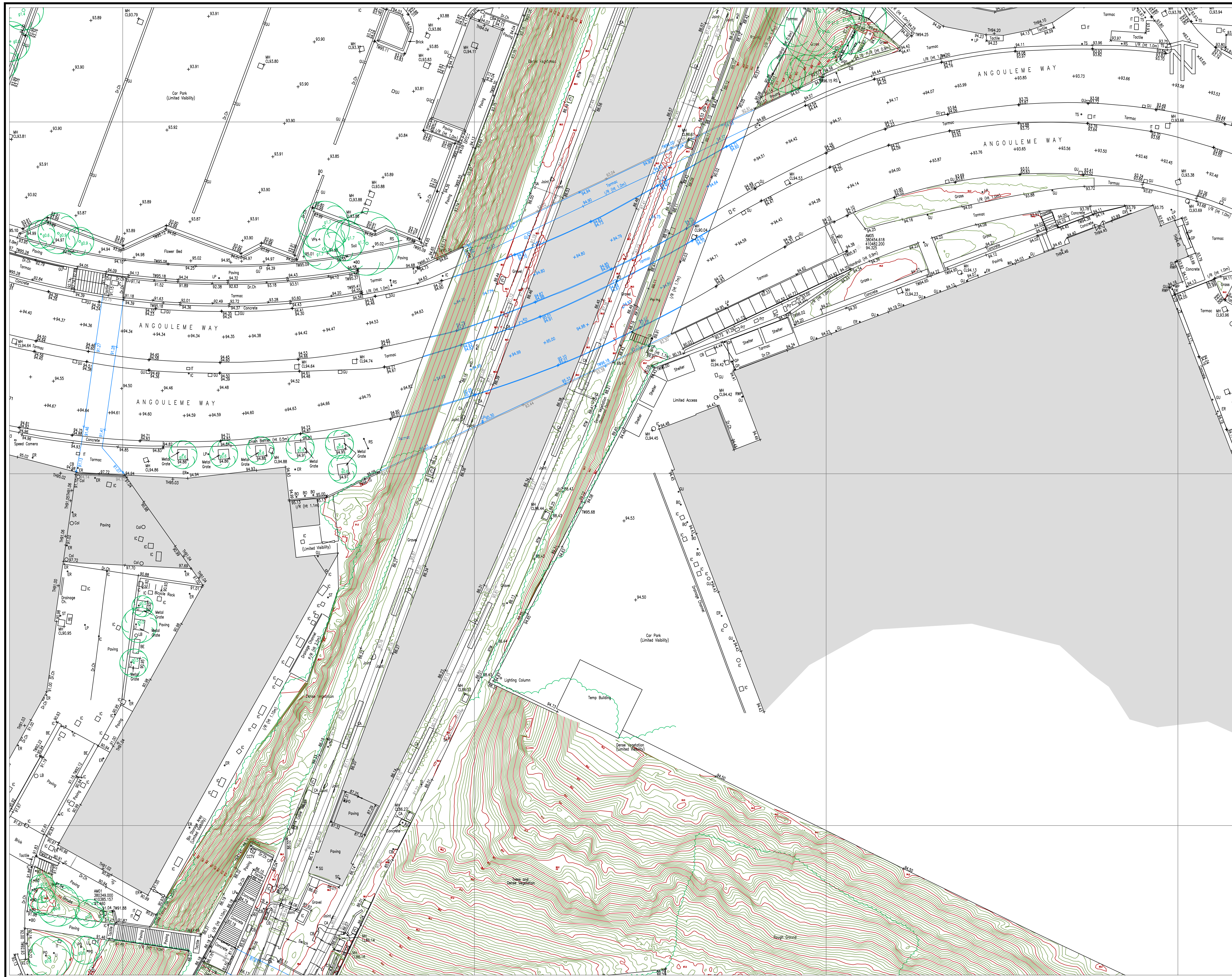
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TOPOGRAPHICAL SURVEY
SHEET 4 OF 10

Surveyed	AM	Drawn	AM	Drawn Date:
Checked	JP	Approved	ND	12/04/2024
Scale	1:250 @ A1	Project	12498	Status
Drawing No	12498 / 001 / 4	CAD File	12498_001.dwg	ORIG
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NOTES

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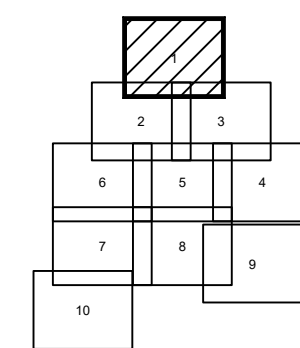
STANDARD ABBREVIATIONS

[illegible]

SYMBOLS

	HEDGE		GATE		BUILDING
	TREE CANOPY		CONTROL STATION		TREE
	CONTOURS		BRIDGE & TUNNEL DETAIL		

SHEET LAYOUT



Rev	Date	Drawn	Description	Ch'k'd
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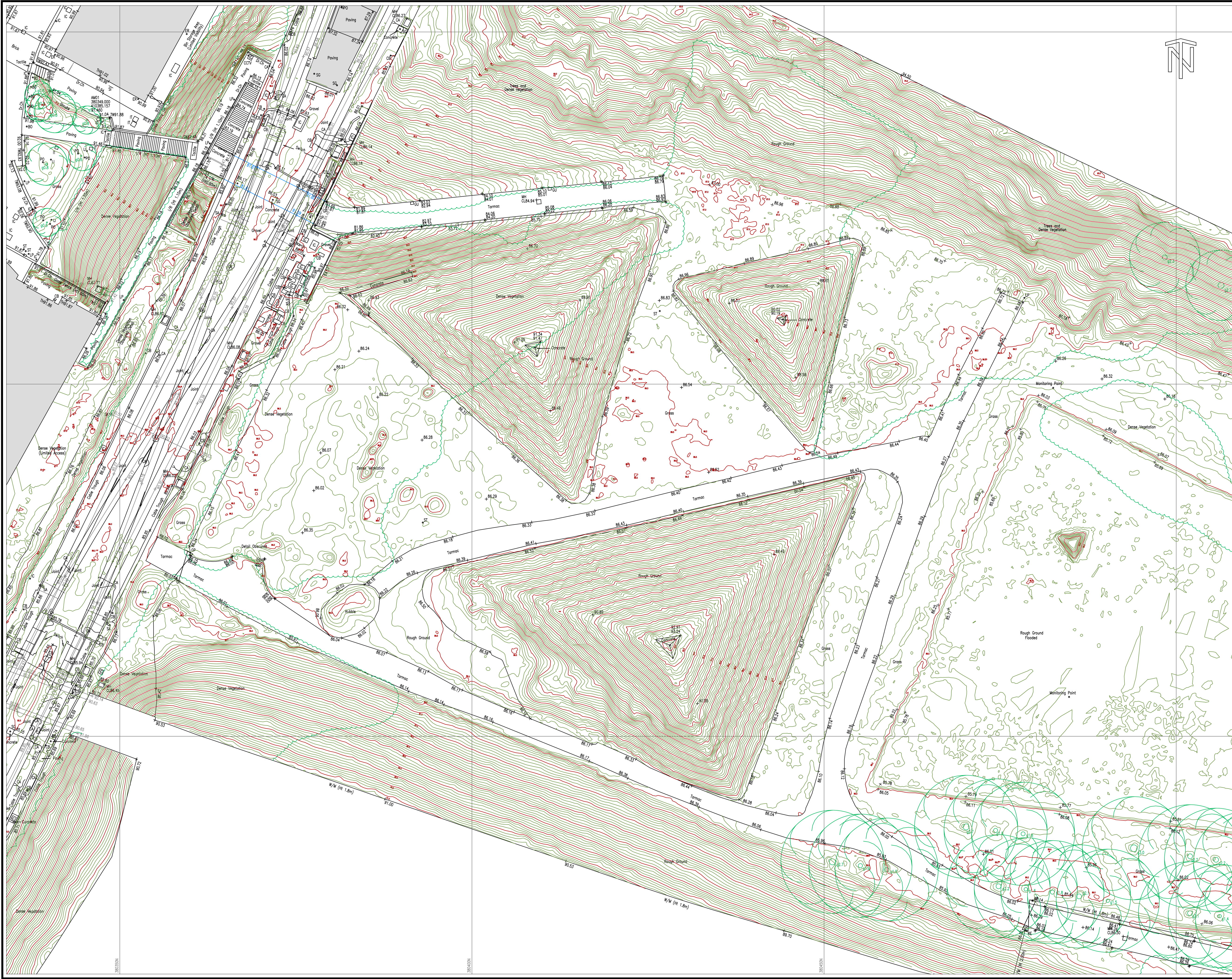
EC1V 4QJ

Title

BURY INTERCHANGE
BURY
BL9 0AY

TOPOGRAPHICAL SURVEY
SHEET 5 OF 10

Surveyed	AM	Drawn	AM	Drawn Date:	12/04/2021
Checked	JP	Approved	NDO		
Scale 1:250 @ A1		Project 12498			Status OF
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Drawing No		12498 / 001 / 5			Rev



NOTES

KEY
Grid & Datum - Local plane grid fitted to the original AECOM topographical survey using the surviving control points AE24 and AE25.

STANDARD ABBREVIATIONS

STREET FURNITURE A/C - AIR CONDITIONING A/E - AERIAL AL - ALARM AV - AIR VALVE BA - BUILDING AID BB - BUILDING BEACON BD - BUILDING DRIVE BE - BENCH MARK BF - BOUNDARY POST BS - BUS STOP BU - BUSH CA - CABLE CB - CONTROL BOX CC - CLOSE CIRCUIT TV CD - CLOTH PIPE CE - CIGARETTE BIN CF - CLOTH PIPE CH - CHIMNEY CI - CLOTH PIPE CL - CLOTH PIPE CM - CLOTH PIPE CN - CLOTH PIPE CO - CLOTH PIPE CP - CLOTH PIPE CS - CLOTH PIPE CT - CLOTH PIPE CU - CLOTH PIPE CV - CLOTH PIPE CW - CLOTH PIPE CX - CLOTH PIPE CY - CLOTH PIPE CZ - CLOTH PIPE DA - DRAINAGE DB - DRAINAGE DC - DRAINAGE DD - DRAINAGE DE - DRAINAGE DF - DRAINAGE DG - DRAINAGE DH - DRAINAGE DI - DRAINAGE DJ - DRAINAGE DK - DRAINAGE DL - DRAINAGE DM - DRAINAGE DN - DRAINAGE DO - DRAINAGE DP - DRAINAGE DQ - DRAINAGE DR - DRAINAGE DS - DRAINAGE DT - DRAINAGE DU - DRAINAGE DV - DRAINAGE DW - DRAINAGE DX - DRAINAGE DY - DRAINAGE DZ - DRAINAGE EA - EARTH EB - EARTH EC - EARTH ED - EARTH EE - EARTH EF - EARTH EG - EARTH EH - EARTH EI - EARTH EJ - EARTH EK - EARTH EL - EARTH EM - EARTH EN - EARTH EO - EARTH EP - EARTH EQ - EARTH ER - EARTH ES - EARTH ET - EARTH EU - EARTH EV - EARTH EW - EARTH EX - EARTH EY - EARTH EZ - EARTH FA - FENCE FB - FENCE FC - FENCE FD - FENCE FE - FENCE FF - FENCE FG - FENCE FH - FENCE FI - FENCE FJ - FENCE FK - FENCE FL - FENCE FM - FENCE FN - FENCE FO - FENCE FP - FENCE FQ - FENCE FR - FENCE FS - FENCE FT - FENCE FU - FENCE FV - FENCE FW - FENCE FX - FENCE FY - FENCE FZ - FENCE GA - GATE GB - GATE GC - GATE GD - GATE GE - GATE GF - GATE GG - GATE GH - GATE GI - GATE GJ - GATE GK - GATE GL - GATE GM - GATE GN - GATE GO - GATE GP - GATE GQ - GATE GR - GATE GS - GATE GT - GATE GU - GATE GV - GATE GW - GATE GX - GATE GY - GATE GZ - GATE HA - HEDGE HB - HEDGE HC - HEDGE HD - HEDGE HE - HEDGE HF - HEDGE HG - HEDGE HH - HEDGE HI - HEDGE HJ - HEDGE HK - HEDGE HL - HEDGE HM - HEDGE HN - HEDGE HO - HEDGE HP - HEDGE HQ - HEDGE HR - HEDGE HS - HEDGE HT - HEDGE HU - HEDGE HV - HEDGE HW - HEDGE HX - HEDGE HY - HEDGE HZ - HEDGE IA - ILLUMINATION IB - ILLUMINATION IC - ILLUMINATION ID - ILLUMINATION IE - ILLUMINATION IF - ILLUMINATION IG - ILLUMINATION IH - ILLUMINATION II - ILLUMINATION IJ - ILLUMINATION IK - ILLUMINATION IL - ILLUMINATION IM - ILLUMINATION IN - ILLUMINATION IO - ILLUMINATION IP - ILLUMINATION IQ - ILLUMINATION IR - ILLUMINATION IS - ILLUMINATION IT - ILLUMINATION IU - ILLUMINATION IV - ILLUMINATION IW - ILLUMINATION IX - ILLUMINATION IY - ILLUMINATION IZ - ILLUMINATION JA - JUNCTION JB - JUNCTION JC - JUNCTION JD - JUNCTION JE - JUNCTION JF - JUNCTION JG - JUNCTION JH - JUNCTION JI - JUNCTION JJ - JUNCTION JK - JUNCTION JL - JUNCTION JM - JUNCTION JN - JUNCTION JO - JUNCTION JP - JUNCTION JQ - JUNCTION JR - JUNCTION JS - JUNCTION JT - JUNCTION JU - JUNCTION JV - JUNCTION JW - JUNCTION JX - JUNCTION JY - JUNCTION JZ - JUNCTION KA - KILN KB - KILN KC - KILN KD - KILN KE - KILN KF - KILN KG - KILN KH - KILN KI - KILN KJ - KILN KK - KILN KL - KILN KM - KILN KN - KILN KO - KILN KP - KILN KQ - KILN KR - KILN KS - KILN KT - KILN KU - KILN KV - KILN KW - KILN KX - KILN KY - KILN KZ - KILN LA - LAMP LB - LAMP LC - LAMP LD - LAMP LE - LAMP LF - LAMP LG - LAMP LH - LAMP LI - LAMP LJ - LAMP LK - LAMP LL - LAMP LM - LAMP LN - LAMP LO - LAMP LP - LAMP LQ - LAMP LR - LAMP LS - LAMP LT - LAMP LU - LAMP LV - LAMP LW - LAMP LX - LAMP LY - LAMP LZ - LAMP MA - MAST MB - MAST MC - MAST MD - MAST ME - MAST MF - MAST MG - MAST MH - MAST MI - MAST MJ - MAST MK - MAST ML - MAST MN - MAST MO - MAST MP - MAST MQ - MAST MR - MAST MS - MAST MT - MAST MU - MAST MV - MAST MW - MAST MX - MAST MY - MAST MZ - MAST NA - NAIL NB - NAIL NC - NAIL ND - NAIL NE - NAIL NF - NAIL NG - NAIL NH - NAIL NI - NAIL NJ - NAIL NK - NAIL NL - NAIL NM - NAIL NN - NAIL NO - NAIL NP - NAIL NQ - NAIL NR - NAIL NS - NAIL NT - NAIL NU - NAIL NV - NAIL NW - NAIL NX - NAIL NY - NAIL NZ - NAIL OA - OIL OB - OIL OC - OIL OD - OIL OE - OIL OF - OIL OG - OIL OH - OIL OI - OIL OJ - OIL OK - OIL OL - OIL OM - OIL ON - OIL OO - OIL OP - OIL OQ - OIL OR - OIL OS - OIL OT - OIL OU - OIL OV - OIL OW - OIL OX - OIL OY - OIL OZ - OIL PA - PAVEMENT PB - PAVEMENT PC - PAVEMENT PD - PAVEMENT PE - PAVEMENT PF - PAVEMENT PG - PAVEMENT PH - PAVEMENT PI - PAVEMENT PJ - PAVEMENT PK - PAVEMENT PL - PAVEMENT PM - PAVEMENT PN - PAVEMENT PO - PAVEMENT PP - PAVEMENT PQ - PAVEMENT PR - PAVEMENT PS - PAVEMENT PT - PAVEMENT PU - PAVEMENT PV - PAVEMENT PW - PAVEMENT PX - PAVEMENT PY - PAVEMENT PZ - PAVEMENT QA - QUARRY QB - QUARRY QC - QUARRY QD - QUARRY QE - QUARRY QF - QUARRY QG - QUARRY QH - QUARRY QI - QUARRY QJ - QUARRY QK - QUARRY QL - QUARRY QM - QUARRY QN - QUARRY QO - QUARRY QP - QUARRY QQ - QUARRY QR - QUARRY QS - QUARRY QT - QUARRY QU - QUARRY QV - QUARRY QW - QUARRY QX - QUARRY QY - QUARRY QZ - QUARRY RA - RAIL RB - RAIL RC - RAIL RD - RAIL RE - RAIL RF - RAIL RG - RAIL RH - RAIL RI - RAIL RJ - RAIL RK - RAIL RL - RAIL RM - RAIL RN - RAIL RO - RAIL RP - RAIL RQ - RAIL RR - RAIL RS - RAIL RT - RAIL RU - RAIL RV - RAIL RW - RAIL RX - RAIL RY - RAIL RZ - RAIL SA - SAND SB - SAND SC - SAND SD - SAND SE - SAND SF - SAND SG - SAND SH - SAND SI - SAND SJ - SAND SK - SAND SL - SAND SM - SAND SN - SAND SO - SAND SP - SAND SQ - SAND SR - SAND SS - SAND ST - SAND SU - SAND SV - SAND SW - SAND SX - SAND SY - SAND SZ - SAND TA - TANK TB - TANK TC - TANK TD - TANK TE - TANK TF - TANK TG - TANK TH - TANK TI - TANK TJ - TANK TK - TANK TL - TANK TM - TANK TN - TANK TO - TANK TP - TANK TU - TANK TV - TANK TW - TANK TX - TANK TY - TANK TZ - TANK UA - URBAN UB - URBAN UC - URBAN UD - URBAN UE - URBAN UF - URBAN UG - URBAN UH - URBAN UI - URBAN UJ - URBAN UK - URBAN UL - URBAN UM - URBAN UN - URBAN UO - URBAN UP - URBAN UQ - URBAN UR - URBAN US - URBAN UT - URBAN UU - URBAN UV - URBAN UW - URBAN UX - URBAN UY - URBAN UZ - URBAN VA - VALVE VB - VALVE VC - VALVE VD - VALVE VE - VALVE VF - VALVE VG - VALVE VH - VALVE VI - VALVE VJ - VALVE VK - VALVE VL - VALVE VM - VALVE VN - VALVE VO - VALVE VP - VALVE VQ - VALVE VR - VALVE VS - VALVE VT - VALVE VU - VALVE VV - VALVE VW - VALVE VX - VALVE VY - VALVE VZ - VALVE WA - WATER WB - WATER WC - WATER WD - WATER WE - WATER WF - WATER WG - WATER WH - WATER WI - WATER WJ - WATER WK - WATER WL - WATER WM - WATER WN - WATER WO - WATER WP - WATER WQ - WATER WR - WATER WS - WATER WT - WATER WU - WATER WV - WATER WW - WATER WX - WATER WY - WATER WZ - WATER XA - X-ROAD XB - X-ROAD XC - X-ROAD XD - X-ROAD XE - X-ROAD XF - X-ROAD XG - X-ROAD XH - X-ROAD XI - X-ROAD XJ - X-ROAD XK - X-ROAD XL - X-ROAD XM - X-ROAD XN - X-ROAD XO - X-ROAD XP - X-ROAD XQ - X-ROAD XR - X-ROAD XS - X-ROAD XT - X-ROAD XU - X-ROAD XV - X-ROAD XW - X-ROAD XX - X-ROAD XY - X-ROAD XZ - X-ROAD YA - YARD YB - YARD YC - YARD YD - YARD YE - YARD YF - YARD YG - YARD YH - YARD YI - YARD YJ - YARD YK - YARD YL - YARD YM - YARD YN - YARD YO - YARD YP - YARD YQ - YARD YR - YARD YS - YARD YT - YARD YU - YARD YV - YARD YW - YARD YX - YARD YZ - YARD ZA - ZONE ZB - ZONE ZC - ZONE ZD - ZONE ZE - ZONE ZF - ZONE ZG - ZONE ZH - ZONE ZI - 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SYMBOLS
HEDGE
TREE CANOPY
CONTOURS
GATE
CONTROL STATION
BRIDGE & TUNNEL DETAIL
BUILDING
TREE

SHEET LAYOUT

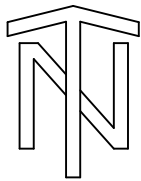
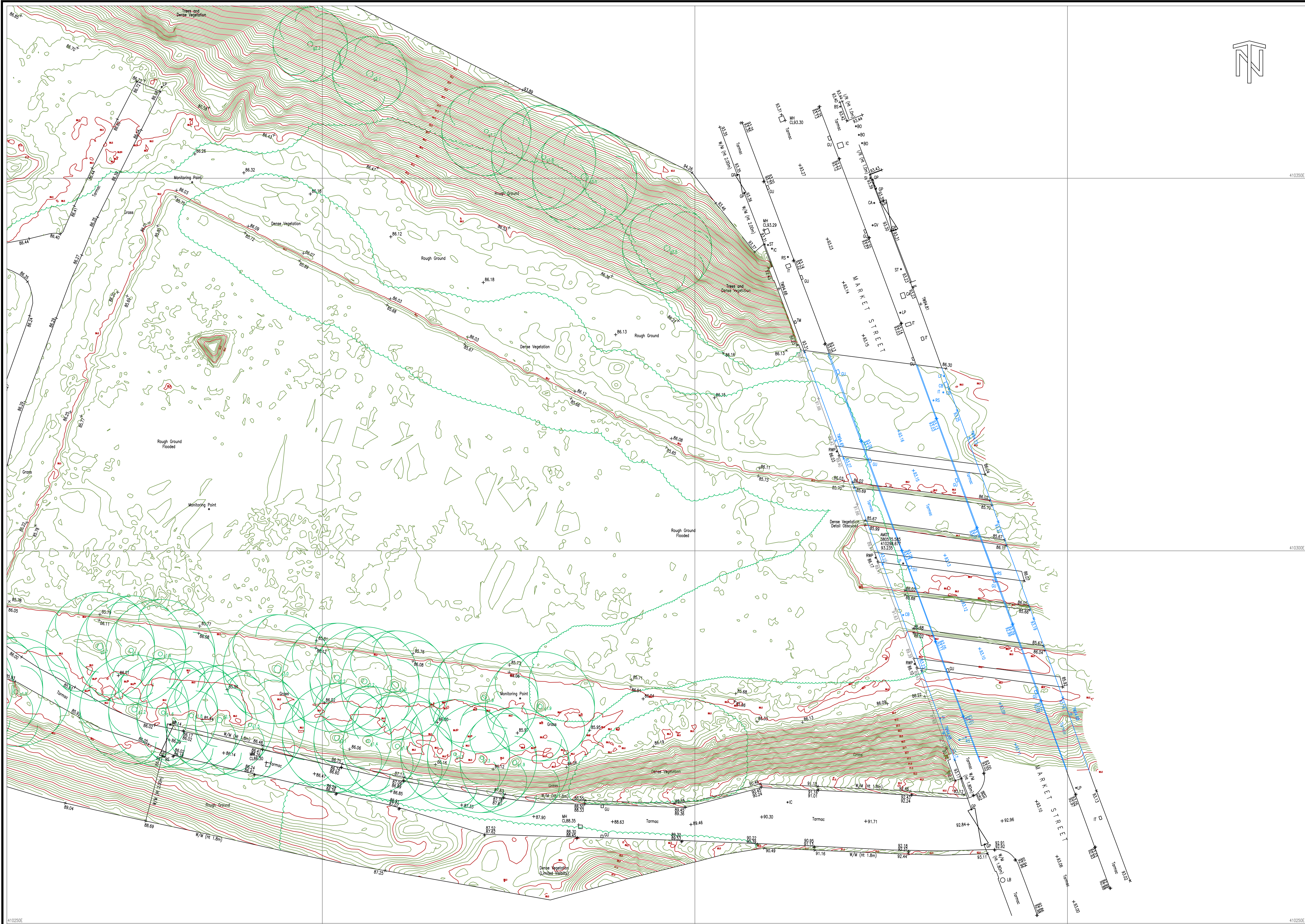
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Scale	1:250 @ A1	Project	12498	Status
Drawing No	12498 / 001 / 8	CAD File	12498_001.dwg	ORIG



NOTES

KEY

Grid & Datum Local plane grid fitted to the original AECOM topographical survey using the surviving control points AE24 and AE25.

STANDARD ABBREVIATIONS

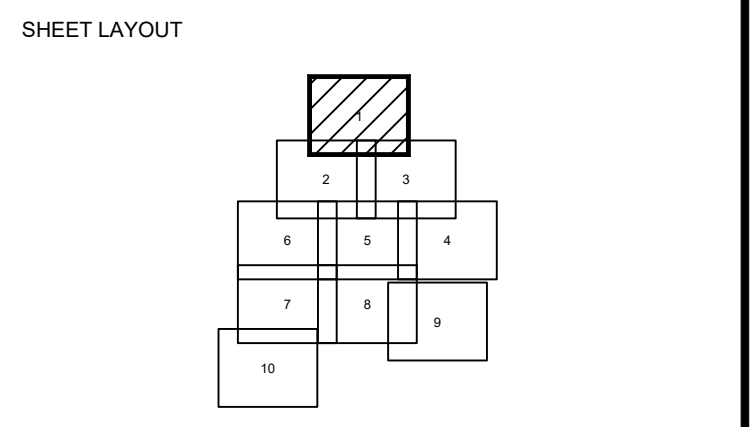
STREET FURNITURE

AC	AIR CONDITIONING	LC	LIGHTING COLUMN
AL	AIR VALVE	LP	LAMP POST
AV	AIR VALVE	MBO	MOORING BOLLARD
BA	BUILDING AID	MA	MAST
BB	BELLSIA BEACON	MM	MANHOLE
BD	BUILDING DIVIDE	MO	MOORING
BE	BELLSIA BEACON	MR	MOORING RING
BF	BELLSIA BEACON	MP	MONITORING WELL
BL	BELLSIA BEACON	NP	NON-PERMANENT
BO	BOLLARD	OH	OVERHEAD
BP	BOUNDARY POST	OSM	ORANGE SURVEY
BS	BUS STOP	PA	PARKING AREA
BU	BUSH	PB	PILLAR BOX
CA	CABLE	PH	PUBLIC HOUSE
CB	CONTROL BOX	PI	PIPE
CC	CLOSE CIRCUIT TV	PM	PARKING METER
CD	CIGARETTE BIN	PN	PLANTER
CE	CLOSE CIRCUIT TV POLE	PO	POST
CF	DOWN PIPE	PS	POST & SIGN
CG	DOWN PIPE	RS	ROD SIGN
CH	DOWN PIPE	RTM	ROAD TUNNEL
CI	DOWN PIPE	SA	STAND
CL	ELECTRIC	SC	SPEED CAMERA
CM	ELECTRICITY POLE	SD	SATELLITE DISH
CP	ELECTRICITY POLE	SE	SAFETY FENCE
CR	ELECTRICITY POLE	SI	SIGN
CS	ELECTRICITY POLE	SM	SERVICE MARKER POST
CT	ELECTRICITY POLE	SS	SECURITY SENSOR
CU	ELECTRICITY POLE	ST	STOP TAP
CV	ELECTRICITY POLE	SU	STUMP
CW	ELECTRICITY POLE	SV	STOP VALVE
CX	ELECTRICITY POLE	SW	SWITCHGEAR
CY	ELECTRICITY POLE	SY	STAY
CZ	ELECTRICITY POLE	TA	TAP
DA	ELECTRICITY POLE	TB	TEMPORARY BENCH MARK
DB	ELECTRICITY POLE	TC	TELEPHONE CALL BOX
DC	ELECTRICITY POLE	TE	TELEPHONE
DD	ELECTRICITY POLE	TF	TELEPHONE
DE	ELECTRICITY POLE	TM	TELEPHONE
DF	ELECTRICITY POLE	TS	TRAFFIC SIGNAL
DG	ELECTRICITY POLE	TP	TELEGRAPH POLE

FENCE TYPES

BW	BARRIED WIRE
CB	CORROGATED IRON
CC	CORROGATED IRON
CP	CORROGATED IRON
HA	HANDRAIL
PA	PALISADE
PS	POST & RAIL
PSB	PEDESTRIAN SAFETY
PSB	PEDESTRIAN SAFETY
PSB	PEDESTRIAN SAFETY
PSB	PEDESTRIAN SAFETY
PSB	PEDESTRIAN SAFETY
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PSB	PEDESTRI

SYMBOLS		



Rev	Date	Drawn	Description	Ch'd	App'd
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CHARTERED GEOMATIC SURVEYORS

Jupiter House, 21 Roebuck Lane, Sale, Manchester, M33 7SY
T: 0161 973 3495 F: 0161 962 6819
E: mail@ndoliver.com www.ndoliver.com

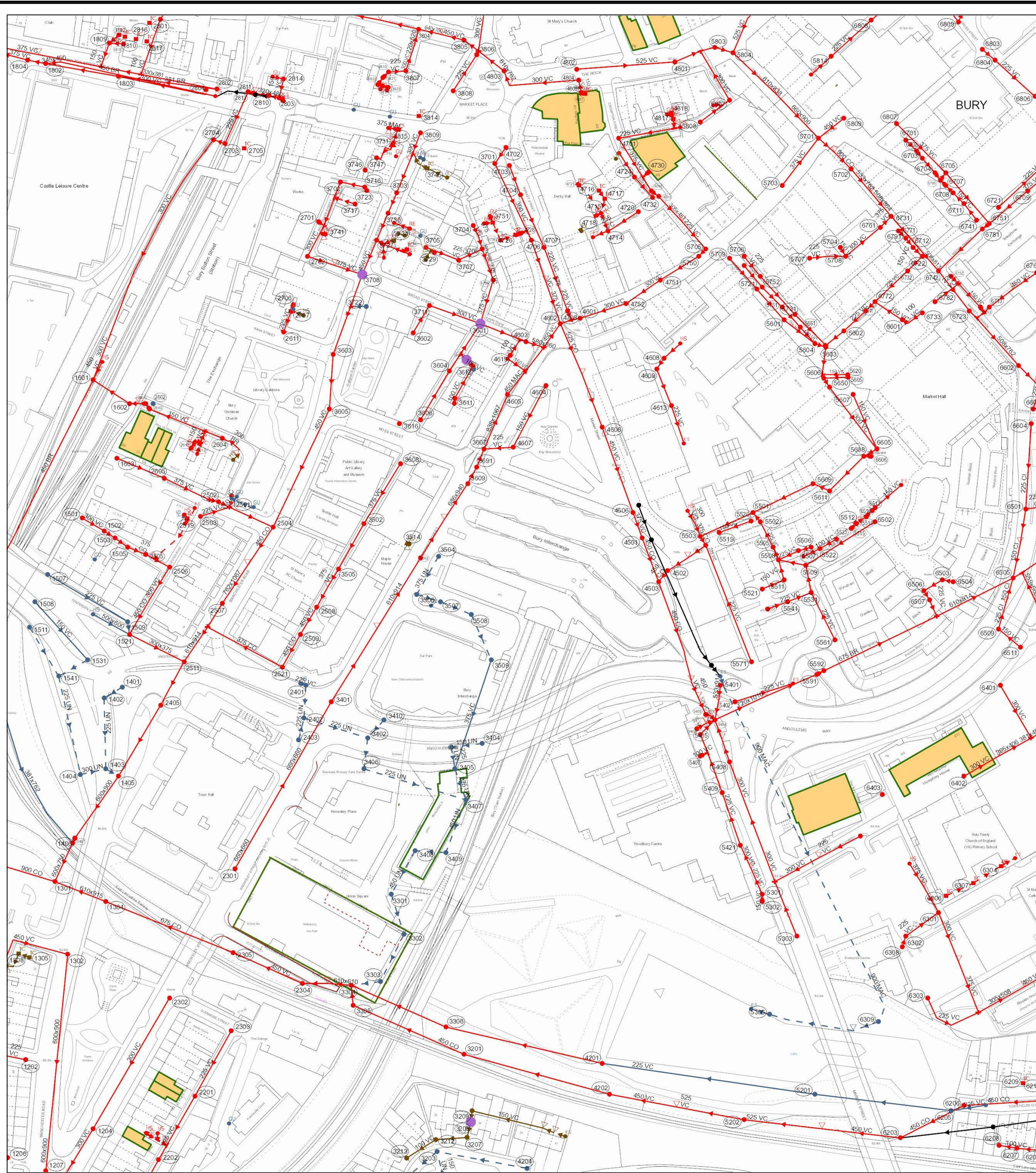
Client
HAWKINS/BROWN
159 ST JOHN STREET
LONDON
EC1V 4JQ

Title
BURY INTERCHANGE
BURY
BL9 0AY
TOPOGRAPHICAL SURVEY
SHEET 9 OF 10

Surveyed	AM	Drawn	AM	Drawn Date:
Checked	JP	Approved	NDO	12/04/2024
Scale	Project 12498			Status
1:250 @ A1	CAD File \\INDO-585\Projects\1234\CAD\DWG\12498_001.DWG			ORIG
Drawing No	12498 / 001 / 9			Rev
				0

APPENDIX B

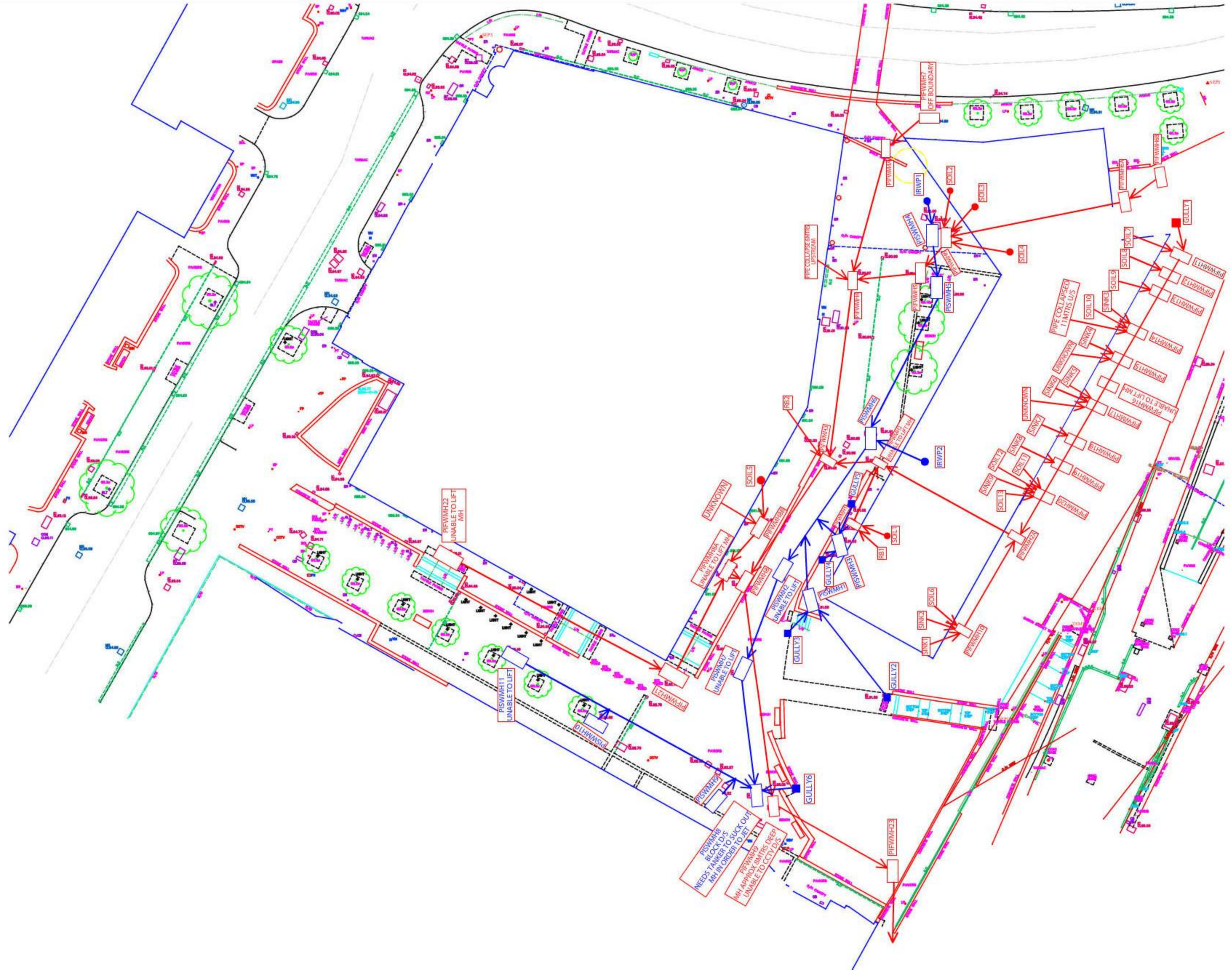
UNITED UTILITIES SEWER MAP



Reflow	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	In Grad	Reflow	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length	In Grad
5959	93.21	CO	91.73	300			VC	1.8603	1 in 54	5959	93.21	CO	91.73	300			VC	1.8603	1 in 54
6708	94.74	CO	93.17	150			VC	5.66584	1 in 44	6708	94.74	CO	93.17	150			VC	5.66584	1 in 44
5751	93.85	CO	92.42	225			VC	14.86007	1 in 51	5751	93.85	CO	92.42	225			VC	14.86007	1 in 51
6206	94.11	CO	92.42	225			VC	30.3916		6206	94.11	CO	92.42	225			VC	30.3916	
5407	94.16	CO	93.26	100			VC	4.472138		5407	94.16	CO	93.26	100			VC	4.472138	
3401	94.63	CO	93.72	300			BR	57.10691		3401	94.63	CO	93.72	300			BR	57.10691	
3604	94.11	CO	91.23	300			VC	31.06445	1 in 163	3604	94.11	CO	91.23	300			VC	31.06445	1 in 163
4505	93.75	CO	90.65	450			VC	17.492634		4505	93.75	CO	90.65	450			VC	17.492634	
5751	94.97	CO	90.68	375			MAC	32.80244		5751	94.97	CO	90.68	375			MAC	32.80244	
5302	93.46	CO	92.58	150			VC	4	1 in 1	5302	93.46	CO	92.58	150			VC	4	1 in 1
1531	95.91	SW	93.27	4			VC	4	1 in 1	1531	95.91	SW	93.27	4			VC	4	1 in 1
5531	93.72	CO	92.51	225			VC	15.29708	1 in 306	5531	93.72	CO	92.51	225			VC	15.29708	1 in 306
5704	94.09	CO	93.21	300			VC	18.93092	1 in 3	5704	94.09	CO	93.21	300			VC	18.93092	1 in 3
1207	87.71	CO	83.3	600			BR	43.73998	1 in 43	1207	87.71	CO	83.3	600			BR	43.73998	1 in 43
2702	95.79	CO	91.24	300			VC	27.3227	1 in 93.13/508	2702	95.79	CO	91.24	300			VC	27.3227	1 in 93.13/508
1405	94.91	CO	88.28	600			BR	41.67131	1 in 39	1405	94.91	CO	88.28	600			BR	41.67131	1 in 39
5701		CO	0	660			BR	12.04158		5701		CO	0	660			BR	12.04158	
5909	93.57	CO	92.46	225			VC	15.29708	1 in 127	5909	93.57	CO	92.46	225			VC	15.29708	1 in 127
6605	93.82	CO	91.39	300			VC	8.062228		6605	93.82	CO	91.39	300			VC	8.062228	
6806		CO	0	300			VC	17.64306		6806		CO	0	300			VC	17.64306	
6741	94.79	CO	93.46	150			VC	11.40175	1 in 52	6741	94.79	CO	93.46	150			VC	11.40175	1 in 52
1802		CO	0	375			VC	10.18904		1802		CO	0	375			VC	10.18904	
2704		CO	0	300			VC	148.7126		2704		CO	0	300			VC	148.7126	
5708	94.08	CO	90.77	300			VC	24.83948	1 in 276	5708	94.08	CO	90.77	300			VC	24.83948	1 in 276
2405	95.89	CO	88.52	600			BR	45.43818	1 in 93	2405	95.89	CO	88.52	600			BR	45.43818	1 in 93
4707	93.93	CO	90.69	225			VC	37.33631	1 in 267	4707	93.93	CO	90.69	225			VC	37.33631	1 in 267
5507	93.78	CO	92.44	225			VC	12.06305	1 in 81	5507	93.78	CO	92.44	225			VC	12.06305	1 in 81
6731	95.26	CO	90.58	508			BR	19.84943	1 in 188	6731	95.26	CO	90.58	508			BR	19.84943	1 in 188
1521	95.74	CO	92.67	300			VC	35.54102	1 in 94	1521	95.74	CO	92.67	300			VC	35.54102	1 in 94
6605	93.92	CO	92.74	150			VC	14.06872		6605	93.92	CO	92.74	150			VC	14.06872	
6906	95.34	CO	90.88	300			VC	15.45022	1 in 182	6906	95.34	CO	90.88	300			VC	15.45022	1 in 182
1406	88.41	CO	87.22	600			BR	3.034797	1 in 1	1406	88.41	CO	87.22	600			BR	3.034797	1 in 1
1508	96.05	SW	94.1	150			VC	43.18565	1 in 81	1508	96.05	SW	94.1	150			VC	43.18565	1 in 81
5703	94.84	CO	92.37	375			VC	22.82044	1 in 154	5703	94.84	CO	92.37	375			VC	22.82044	1 in 154
1804		CO	0	375			VC	23.76973		1804		CO	0	375			VC	23.76973	
2303	93.32	CO	90.6	600			VC	11.15052	1 in 21	2303	93.32	CO	90.6	600			VC	11.15052	1 in 21
3605	95.22	CO	91.01	450			VC	72.01389	1 in 195	3605	95.22	CO	91.01	450			VC	72.01389	1 in 195
3705	94.71	CO	91.18	225			VC	6.31321	1 in 77	3705	94.71	CO	91.18	225			VC	6.31321	1 in 77
6402	94.23	CO	90.97	300			VC	2.19545		6402	94.23	CO	90.97	300			VC	2.19545	
4702	95.09	CO	91.24	300			VC	10.81865	1 in 52	4702	95.09	CO	91.24	300			VC	10.81865	1 in 52
6742	95.24	CO	90.38	508			BR	7.878088	1 in 154	6742	95.24	CO	90.38	508			BR	7.878088	1 in 154
5504	93.46	CO	89.25	550			MAR	12.20656		5504	93.46	CO	89.25	550			MAR	12.20656	
3807	93.78	CO	90.86	300			VC	36.9168	1 in 156	3807	93.78	CO	90.86	300			VC	36.9168	1 in 156
4503	93.74	CO	88.44	450			CO	57.99769		4503	93.74	CO	88.44	450			CO	57.99769	
5711	94.52	CO	92.39	300			VC	20.3196	1 in 283	5711	94.52	CO	92.39	300			VC	20.3196	1 in 283
3704	94.12	CO	92.16	375			VC	6.708204	1 in 34	3704	94.12	CO	92.16	375			VC	6.708204	1 in 34
2708	95.10	CO	91.24	408			VC	2.202	90.05	2708	95.10	CO	91.24	408			VC	2.202	90.05
2702	94.74	CO	91.52	300			VC	83.35687	1 in 151	2702	94.74	CO	91.52	300			VC	83.35687	1 in 151
4704		CO	0	225			VC	31.7805		4704		CO	0	225			VC	31.7805	
5505	93.89	CO	92.55	225			VC	15.85248	1 in 120	5505	93.89	CO	92.55	225			VC	15.85248	1 in 120
6602	94.89	CO	89.97	508			BR	15.55035	1 in 259	6602	94.89	CO	89.97	508			BR	15.55035	1 in 259
3608	95.34	CO	91.88	300			VC	7.071068		3608	95.34	CO	91.88	300			VC	7.071068	
6712	95.35	CO	0	150			VC	38.58758		6712	95.35	CO	0	150			VC	38.58758	
4609	94.45	CO	91.63	225			VC	2.236068	1 in 57	4609	94.45	CO	91.63	225			VC	2.236068	1 in 57
4506		CO	0	375			VC	14.86007		4506		CO	0	375			VC	14.86007	
4720		CO	0	285			VC	18.79228		4720		CO	0	285			VC	18.79228	
3603	95.12	CO	91.23	450			VC	30.06059	1 in 137	3603	95.12	CO	91.23	450			VC	30.06059	1 in 137
3702	95.83	CO	93.46	300			VC	17.62032		3702	95.83	CO	93.46	300			VC	17.62032	
1206	87.87	CO	86.17	225			VC	44.89739	1 in 30	1206	87.87	CO	86.17	225			VC	44.89739	1 in 30
6772	94.15	CO	92.05	225			VC	25.31798	1 in 31	6772	94.15	CO	92.05	225			VC	25.31798	1 in 31
4804	95.08	CO	91.44	300			VC	7.071068	1 in 12	4804	95.08	CO	91.44	300			VC	7.071068	1 in 12
5306		CO	0	150			VC	38.11624		5306		CO	0	150			VC	38.11624	
6309		SW	92.01	900			MAC	14.86007		6309		SW	92.01	900			MAC	14.86007	
5501	95.71	CO	92.37	300			VC	10.44031		5501	95.71	CO	92.37	300			VC	10.44031	
6702	94.71	CO	93.16	150			VC	5	1 in 62	6702	94.71	CO	93.16	150			VC	5	1 in 62
3708	94.87	CO	91.85	375			VC	11.7047	1 in 206	3708	94.87	CO	91.85	375			VC	11.7047	1 in 206
5501	93.55	CO	92.71	225			VC	11.7047	1 in 206	5501	93.55	CO	92.71	225			VC	11.7047	1 in 206
4506	93.5	CO	89.4	450			VC	49.98		4506	93.5	CO	89.4	450			VC	49.98	
2511	95.7	CO	89.05	225			BR	27.13518	1 in 97	2511	95.7	CO	89.05	225			BR	27.13518	1 in 97
4801	95.48	CO	92.36	525			VC	23.50092	1 in 39	4801	95.48	CO	92.36	525			VC	23.50092	1 in 39
4607	93.86	CO	91.53	300			VC	16.01122	1 in 94	4607	93.86	CO	91.53	300			VC	16.01122	1 in 94
5402	93.96	CO	92.41	225			VC	33.52011		5402	93.96	CO	92.41	225			VC	33.52011	
5902		CO	0	675			VC	16.89187		5902		CO	0	675			VC	16.89187	
5804	95.24	CO	91.03	610			BR	33.24154	1 in 1	5804	95.24	CO	91.03	610			BR	33.24154	1 in 1
6721	94.85	CO	94.1	225			VC	38.62233	1 in 90	6721	94.85	CO	94.1	225			VC	38.62233	1 in 90
3305	95.85	CO	93.49	450			VC	14.86007	1 in 50	3305	95.85	CO	93.49	450			VC	14.86007	1 in 50
2507	95.83	CO	89.46	610			BR	38.28067		2507	95.83	CO	89.46	610			BR	38.28067	
6707	94.74	CO	92.37	300			VC	12.42094											

APPENDIX C

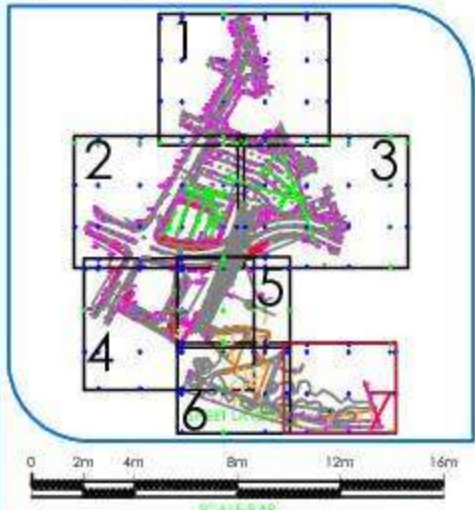
DRAINAGE SURVEYS





Adm. v. www.vic.gov.au to O2 (Shovel) Court, Canberra using network RIK.
Survey plotted on a plan to find grid point closest to Pollard Gold
using survey coordinates and coordinates from RIK. S22

	Survey stations		
Name	Easting	Northing	Height
SP1	297465.287	409406.280	94.183
SP2	297465.283	409406.280	95.028
SP3	297465.729	411416.280	95.020
SP4	297466.101	411416.284	94.917
SP5	297466.101	411416.284	94.917
SP6	297465.257	409406.280	94.285
SP7	297465.257	409406.280	95.089
SP8	297467.089	409406.280	95.017
SP9	297467.089	409406.280	95.017
SP10	297466.280	409406.280	95.017
SP11	297466.280	409406.280	95.146
SP12	297467.083	409406.280	95.017
SP13	297467.083	409406.280	95.017
SP14	297467.176	409406.280	95.060
SP15	297467.176	409406.280	95.060
SP16	297465.042	409406.280	95.060
SP17	297465.042	409406.280	95.060
SP18	297464.043	409387.180	95.063
SP19	297464.043	409387.180	95.063
SP20	297464.280	409387.180	95.063
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SP64	297464.280	409387.180	95.063
SP65	297464.280	409387.180	95.063
SP66	297464.280	409387.180	95.



Year	Cost	Discretion



Client
Willmott Dixon Construction Ltd (Oldham)
Hollinwood Business Centre
Albert Mill
Albert Street
Oldham
OL8 3QL

Project title:
Topographical Survey of Land at:
Bury Interchange
Haymarket Street
Bury
BL9 0AY

Surveyed D.B.H.K.M.L.		Drawn S.Ranagani		Checked R.Critchley	
Scale 1:200	Date Nov 24	Drawing Ref. S25436-2dT	No. 7	Size A1	Rev -

