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Detailed Drainage Strategy and Flood Risk Statement

Gelderd Road, Birstall

Tesla Motors Ltd

CRM.3030.020.HY.R.001.A

'Experience and expertise working in union'

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Executive Summary

A Detailed Drainage Strategy (surface water and foul), inclusive of a Flood Risk Statement, has been prepared for the demolition of two existing buildings and development of an Electric Vehicle (EV) charging station including associated access, parking bays, seating areas and amenity block.

The hierarchy of discharge has been considered alongside SuDS options and concluded that surface water will be attenuated in a geocellular tank for the 1 in 100-year plus 45% climate change event, with an outfall to the existing soakaway chamber within the Site.

It is proposed that foul flows discharge to a cesspool within the Site, to be tankered away for disposal by a suitably licensed operator.

The Flood Risk Statement identified the following:

- The risk of surface water flooding is assessed as negligible for most of the Site and as low to medium associated with the area of ponding in the central extent.
- The risk of flooding from all other sources is assessed as negligible.

Flood risk can be mitigated to a negligible or low and acceptable level through the following approach:

- Adoption of a surface water management strategy.
- Set building finished floor levels +150mm above external levels.
- Ensure the system has safety features in which the system automatically cuts off the electrical supply if there is flooding in the area.
- Ensure the equipment is water resilient and waterproof any vulnerable equipment up to at least 300mm.

All development types are acceptable in Flood Zone 1 (low risk). Surface water flooding has been identified as a source of flooding. Subject to the above mitigation measures, the Sequential Test would be passed, and the Exception Test would not be required.

This report demonstrates that the proposed development would be operated with minimal risk from flooding, would not increase flood risk elsewhere and is compliant with the requirements of national policy and guidance.

The development should not therefore be precluded on the grounds of surface water/foul drainage and flood risk.

1.0 Introduction

1.1 Background

1.1.1 Enzygo Ltd was commissioned by Tesla Motors Ltd to produce a Detailed Drainage Strategy (surface water and foul), inclusive of a Flood Risk Statement, for an Electric Vehicle (EV) charging station including associated access, parking bays, seating areas, and amenity block.

1.1.2 A copy of the proposed layout is included in Appendix 1.

1.2 Purpose

1.2.1 The purpose of the drainage strategy is to provide an assessment of the surface water and foul drainage requirements for the proposed development, in accordance with the requirements of the Local Planning Authority for a full planning application. The drainage strategy also includes a Flood Risk Statement.

1.3 Scope of Works

1.3.1 This report is a Level 3 (detailed quantitative study) assessment of the surface water drainage requirements for the proposed development. The Drainage Strategy should also make allowances for climate change[1] and consider surface water quality.

1.3.2 The scope of works is as follows:

- Site walkover to confirm land use, topography, and drainage features.
- Consult with the water regulators (i.e. Environment Agency and Lead Local Flood Authority [LLFA]) to obtain flood data, discuss mitigation measures, and drainage requirements.
- A desktop study of Ordnance Survey mapping, soils and geology mapping, and borehole records.
- Review online drainage and flood risk policy/guidance documents.
- Obtain Yorkshire Water asset plans and request a pre-development enquiry from Yorkshire Water for the surface water and foul connection to sewer, should this be pursued in future. The pre-development enquiry is required to agree a point of connection and allowable discharge rate.
- Develop a surface water and foul drainage strategy for the proposed development that will aim to identify appropriate discharge points/rates, surface water attenuation storage, pipe sizes, water quality, and maintenance and management.
- Obtain detailed fluvial/surface water/groundwater flood mapping, review online flood mapping, and assess existing and future flood risks to the Site from all sources (i.e. fluvial, tidal, surface water, groundwater, infrastructure, and reservoirs). The effects of climate change will be accounted for using the industry standard advice given in the NPPG ID:7. We would provide mitigation measures, including recommendations on flood resilience and resistance measures.
- Prepare a Drainage Strategy report, inclusive of a Flood Risk Statement.

[1] Environment Agency (published February 2016 and updated May 2022). Flood Risk Assessments: Climate Change Allowances [https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances].

1.4 Report Structure

1.4.1 This report is structured as follows:

- Section 2 identifies the national/regional/local policy and guidance, as well as best practice and guidance, applicable to the Site.
- Section 3 identifies the sources of information that were consulted.
- Section 4 describes the Site.
- Section 5 presents the Flood Risk Statement, including an assessment of flood risk from all sources and proposed mitigation measures.
- Section 6 presents the proposed surface water and foul drainage strategy that will serve the proposed development.
- Section 7 includes the maintenance and management plan.
- Section 8 presents a summary and conclusions.

2.0 Planning Context

2.1 Introduction

2.1.1 This section sets out the national, regional, and local planning policy and guidance relevant to the management of surface water and foul drainage applicable to the proposed development.

2.2 National Policy

- HM Government (2017 as updated) Flood Risk Assessments: Climate Change Allowances. Making an allowance for climate change in a flood risk assessment will help to minimise vulnerability and provide resilience to flooding and coastal change in the future. The climate change allowances are produced by the Environment Agency and are predictions of anticipated change for:
  - Peak river flow by river basin district.
  - Peak rainfall intensity.
  - Sea level rise.
  - Offshore wind speed and extreme wave height.

  They are based on climate change projections and different scenarios of carbon dioxide (CO2) emissions to the atmosphere. There are allowances for different periods of time over the next century.
- Department for Communities and Local Government (2012 as updated) National Planning Policy Framework [NPPF]. The NPPF was published on 27 March 2012; it sets out the Government planning policies for England and outlines how these are expected to be applied. Paragraphs 161-186 of the NPPF are relevant to flooding and drainage.
- Department for Communities and Local Government (2014 as updated) National Planning Practice Guidance [NPPG] ID7-001-20220825 to 080-20220825: Flood Risk & Coastal Change. The NPPG supports the NPPF by providing advice on how planning can take account of the risks associated with flooding in plan-making and the application process.
- Department for Environment, Food and Rural Affairs (2015) Non-Statutory Technical Standards for Sustainable Drainage Systems. These standards provide advice and guidance for the design, maintenance, and operation of sustainable drainage systems to support the LLFA consultee role.

2.3 Regional/Local Policy and Guidance

- Kirklees Council Preliminary Flood Risk Assessment (2009)[2].
- Kirklees Council Surface Water Management Plan (2011)[3].
- Kirklees Council Local Flood Risk Management Strategy (2012)[4].

[2] https://www.kirklees.gov.uk/beta/flooding-and-drainage/pdf/PreliminaryFloodRisk.pdf
[3] https://www.kirklees.gov.uk/beta/flooding-and-drainage/pdf/SurfaceWaterManagement.pdf
[4] https://www.kirklees.gov.uk/beta/flooding-and-drainage/pdf/FloodRiskStrategy.pdf

- Calder Catchment Strategic Flood Risk Assessment – Volume II (Kirklees Council) (2016)[5]
- Leeds City Region Enterprise Partnership (March 2018) Leeds City Region Green Infrastructure Strategy[6].
- West Yorkshire Combined Authority (February 2020) Leeds City Region Sustainable Drainage Systems Guidance[7].

2.4 Best Practice and Guidance

- Local Authority SUDS Officer Organisation – LASOO (2016). Non-Statutory technical Standards for Sustainable Drainage - Practice Guidance.
- UK Sustainable Drainage Guidance. The UK SUDS Tools website http://www.uksuds.com/drainagecalculation-tools/greenfield-runoff-rate-estimation provides estimation tools for the design and evaluation of surface water management systems. The website has been developed and is supported by HR Wallingford. The website provides estimates for greenfield runoff and storage analysis.
- BS 8582:2013 Code of practice for surface water management for development sites. The British Standard gives recommendation on the planning, design, construction, and maintenance of surface water management systems for new development and redevelopment sites in minimizing and/or mitigating flooding and maximizing the social and environmental benefits.
- CIRIA SUDS Manual (C753), 2015. This guidance document provides comprehensive information on all aspects of the life cycle of sustainable drainage from initial planning, design through to construction and management including landscaping, waste management and costs.
- DG Digest 365 (2019) Soakaway Design. Provides guidance for designers to support planning and development applications.
- WRC (2012) Sewers for Adoption (7th Edition): Contains guidance for the design and construction of sewers that are adoptable by Sewerage Undertakers in England and Wales in accordance with Section 104 of the Water Industry Act 1991. In areas covered by Water and Sewerage Companies where Section 42 of the Flood and Water Management Act has not been implemented, the existing Sewers for Adoption 6th edition is still applicable.
- Building Regulations 2010: Drainage and Waste Disposal - Part H.
- BS EN 752 (2008) Drain and Sewer Systems Outside Buildings.

[5] https://www.kirklees.gov.uk/beta/planning-policy/pdf/flood-risk/strategic-flood-risk-assessment-2.pdf
[6] https://www.westyorks-ca.gov.uk/media/8791/leeds-city-region-gbi-strategy.pdf
[7] https://www.westyorks-ca.gov.uk/media/5397/lcr-suds-guidance-final-february-2020-1.pdf

3.0 Sources of Information

3.1 Sources of Information

3.1.1 The following information was used in preparation of this Drainage Strategy:

- Ordnance Survey mapping (Drawings 0001 and 0002).
- Detailed topographic survey (Appendix 2).
- EA online mapping (Flood Map for Planning[8], Long Term Flood Risk Assessment for Locations in England[9], Catchment Data Explorer[10] and Main River Map[11]).
- EA Reduction in Risk of Flooding from Rivers and Sea online mapping[12].
- Online mapping for Climate Change Allowances for Peak River Flow and Peak Rainfall in England online mapping[13].
- National Soils Resources Institute [NSRI]: Soilscapes online mapping[14].
- British Geological Survey [BGS] online mapping: Geology of Britain Viewer[15].
- British Geological Survey [BGS] Borehole Records online mapping[16].
- Landmark's Promap: Flood Data package (see Drawings).
- Geosmart 1 in 100-year groundwater flood risk map (Drawing 0004).
- DEFRA's Magic Map for identifying Source Protect Zones [SPZ], Aquifer Designations and Designated Sites[17].
- River Levels UK for identifying Flood Alert and Flood Warning areas[18].

3.2 Consultation and Discussion with Regulators

3.2.1 Consultation and discussions were undertaken with the relevant water regulators.

Environment Agency

2.1.1 The Environment Agency [EA] is a statutory consultee on flood risk and planning and is directly responsible for the prevention, mitigation, and remediation of flood damage for main rivers and coastal areas; and it has a strategic overview for all forms of flooding.

2.1.2 EA Standing Advice[19] and the NPPF/PPG ID: 7 was consulted and reviewed.

2.1.3 Correspondence with the EA is included in Appendix 4.

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[8] https://flood-map-for-planning.service.gov.uk/
[9] https://check-long-term-flood-risk.service.gov.uk/postcode
[10] http://environment.data.gov.uk/catchment-planning/
[11] https://environment.maps.arcgis.com/apps/webappviewer/index.html?id=17cd53dfc524433980cc333726a56386
[12] ArcGIS - My Map
[13] https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances
[14] http://www.landis.org.uk/soilscapes/
[15] http://mapapps.bgs.ac.uk/geologyofbritain/home.html
[16] https://www.bgs.ac.uk/information-hub/borehole-records/
[17] http://www.natureonthemap.naturalengland.org.uk/
[18] https://riverlevels.uk/flood-map#.XclKwPn7RPZ
[19] Environment Agency and Department for Environment, Food & Rural Affairs (published April 2012 and updated April 2025). Preparing a Flood Risk Assessment: Standing Advice [https://www.gov.uk/guidance/flood-risk-assessment-standing-advice].

Lead Local Flood Authority

3.2.2 Kirklees Council as the Lead Local Flood Authority [LLFA] is responsible for local flood risk management in their area and for maintaining a register of flood risk assets. They also have lead responsibility for managing the risk of flooding from surface water, groundwater, and ordinary watercourses.

3.2.3 At the time this report was prepared, a response has not yet been received from the LLFA.

Water Utility

3.2.4 Drainage and sewerage services in the UK are provided by a number of water and sewerage companies. Yorkshire Water is responsible for sewerage within the area of the Site.

3.2.5 All sewerage undertakers maintain the 'DG5 register' of properties and external areas (such as gardens, highways, open spaces) which have suffered flooding from public foul/combined sewers. It does not include flooding caused by blockages.

3.2.6 Yorkshire Water asset plans are included in Appendix 3.

3.3 Site Walkover

3.3.1 Enzygo staff carried out a walkover of the Site during April 2024. Observations made were used to inform the Site description.

4.0 Site Location and Description

4.1 Location

4.1.1 The Site is located on land north of Gelderd Road (A62), Birstall Retail Park, Birstall, Batley WF17 9DT.

4.1.2 The Site is centred on National Grid Reference [NGR] 423658, 427671.

4.1.3 The 0.23ha Site location is shown in Drawing 0001 and in more detail in Drawing 0002.

4.2 Existing Use

4.2.1 The Site is comprised of a disused two storey commercial building and an outbuilding with hardstanding surrounding both. Additionally, a substation is located in the eastern corner of the site, which is to be retained (Figure 4.1).

4.2.2 The Site is bounded by Birstall Retail Park to the north and west, with the M62 (J27) beyond, and by Gelderd Road (A62) to the south and east, with further areas of the Birstall Retail Park beyond.

4.2.3 The Site is accessed from Gelderd Road (A62 eastbound) along the south-eastern boundary.

Figure 4.1: Aerial Image of the Site

Image © 2025 Maxar Technologies.

4.3 Topographic Information

4.3.1 A detailed topographic survey was carried out during April 2024 and a copy is included in Appendix 2.

4.3.2 The Site falls generally east from a high point at 158.59 metres Above Ordnance Datum (m AOD) on the north-western boundary to 155.12m AOD in the eastern corner. The fall of 3.47m over 54.24m gives an approximate gradient of 1:16. There are some areas of the Site with

steeper gradients, though this is associated with retaining banks on the western and southern boundaries of the Site.

4.4 Catchment Hydrology

4.4.1 OS mapping shows there are no watercourses within or bounding the Site. The nearest watercourse is the Howden Clough Beck (an 'ordinary watercourse'), located approximately 380m southeast of the Site. Howden Clough Beck joins Howley Beck and then Batley Beck, approximately 3.63km south of the Site, the nearest main river to the Site as shown by the Environment Agency's Statutory Main River Map.

4.4.2 The Environment Agency Catchment Data Explorer Mapping shows that the Site resides within the Batley Beck from Source to Calder Water Body, which is in the Calder Lower Operational Catchment, Aire and Calder Management Catchment, and Humber River Basin district.

4.5 Soils and Geology

4.5.1 The Soilscapes online soils map viewer shows the Site is underlain freely draining, slightly acid loamy soils.

4.5.2 The Geology of Britain online map viewer shows there is no superficial deposits recorded beneath the Site. The bedrock beneath the Site is Emley Rock – Sandstone.

4.5.3 Given the previously developed state of the Site, the presence of made ground is likely.

4.6 Hydrogeology

4.6.1 The online Defra Magic Map mapping shows the Site is not located above a Source Protection Zone [SPZ].

4.6.2 The Site is located above a Secondary A Aquifer (bedrock designation). The Site is not located above any aquifers in the superficial deposit designation.

4.7 Public Sewerage and Mains Assets

Public Assets

4.7.1 Yorkshire Water sewer asset plans (Appendix 3) show a Ø300mm surface water sewer, orientated north-east to south-west beneath Gelderd Road to the south of the Site.

Private Assets

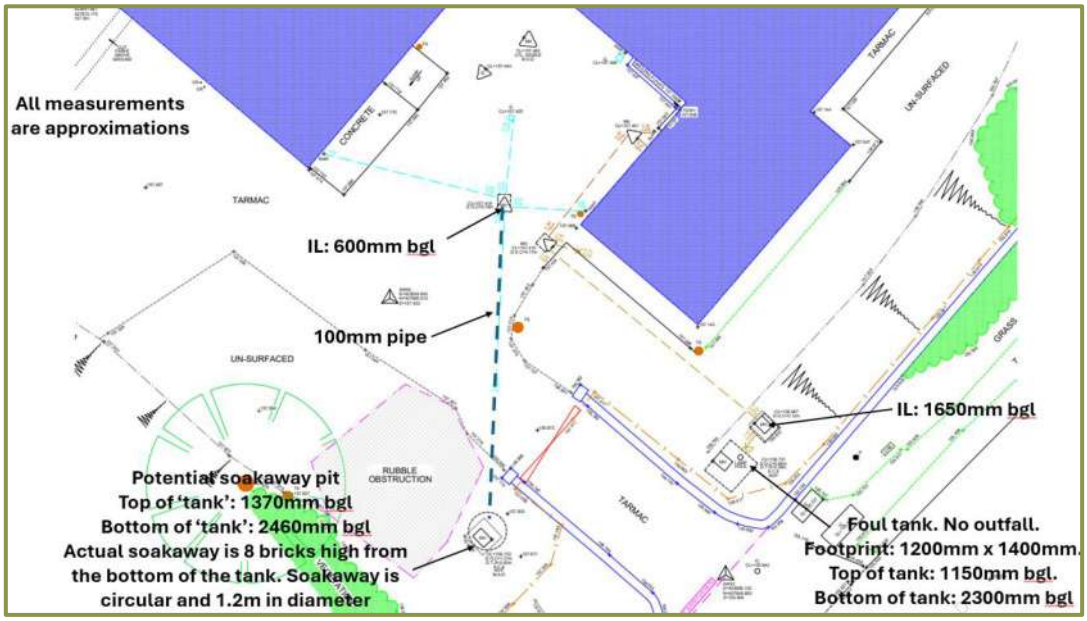
4.7.2 The Site is currently served by private surface water and foul drainage networks, used to drain the existing disused commercial unit. Some of these assets were recorded during the topographic survey, included in Appendix 2.

4.7.3 A CCTV drainage survey was then conducted during November 2024 to further understand the existing drainage networks within the Site (Appendix 7). The findings of this survey are detailed below and a summary sketch is included in Figure 4.2.

4.7.4 The surface water drainage within the Site currently comprises of downpipes from the existing buildings and gullies in areas of hardstanding that connect via Ø100mm surface water drains into a manhole in the centre of the Site, as shown on the topographic survey. The CCTV survey identified that a further Ø100mm surface water sewer then provides an onward connection from this central manhole to a Ø1200mm soakaway chamber in the southern corner of the Site. The soakaway has been shown to be operational, as detailed later in this report.

4.7.5 The foul drainage within the Site currently comprises of a small network of Ø100mm foul sewers in the southern extent of the Site, positioned to achieve a gravity connection to a cesspool near the south-eastern boundary, adjacent to the Site entrance.

Figure 4.2: CCTV Survey Findings



4.8 Designated Sites

4.8.1 The DEFRA Magic Map (England and Wales) shows there are no designated sites within the vicinity of the Site or hydrologically connected to the Site from a flood risk and drainage perspective.

5.0 Flood Risk Statement

5.1 Introduction

5.1.1 A Flood Risk Assessment (FRA) is required where a development is:

- In Flood Zone 2 or 3 including minor development and change of use.
- More than 1 hectare (ha) in Flood Zone 1.
- Less than 1 ha in Flood Zone 1, including a change of use in development type to a more vulnerable class (for example from commercial to residential), where they could be affected by sources of flooding other than rivers and the sea (for example surface water drains, reservoirs).
- In an area within Flood Zone 1 which has critical drainage problems as notified by the Environment Agency.
- In land identified in a strategic flood risk assessment as being at increased flood risk in the future.

5.1.2 The proposal is for an Electric Vehicle (EV) charging station including associated access, parking bays, seating areas, and amenity block located in Flood Zone 1 (low risk).

5.1.3 Within PPG ID: 7, the proposed development is as 'less vulnerable'. The development would only be compatible with NPPF and PPG ID: 7 after the completion of a satisfactory Detailed Drainage Strategy for a full planning application and proportionate assessment of flood risk inclusive of mitigation measures.

5.1.4 Correspondence with the Environment Agency (Appendix 4) reported no historic flooding records within the Site boundary or immediate vicinity.

5.2 Fluvial/Tidal Flooding

5.2.1 The Environment Agency Flood Zones are the current best information on the extent of the extremes of flooding from rivers or the sea that would occur without the presence of flood defences, since these can be breached, overtopped and may not be in existence for the lifetime of a development.

5.2.2 Environment Agency Flood Zones mapping (Drawing 0003) shows the Site is in Flood Zone 1, which is land outside the 1 in 1000-year (0.1% Annual Exceedance Probability [AEP]) extent of fluvial (river) or tidal (sea) flooding, at 'low' risk.

5.2.3 The risk of fluvial/tidal flooding is assessed as negligible.

5.3 Surface Water Flooding

5.3.1 The Environment Agency Risk of Flooding from Surface Water mapping (Drawings 0006.1 to 0006.2) shows most of the Site is located outside the extent of surface water flooding. There is, however, an area of ponding in the northern and eastern extents, where surface water is shown to pond round the perimeter of the existing building on the Site. This is likely to be associated the existing impermeable surfaces and Site topography.

5.3.2 Under the current scenario (Drawing 0006.1), the flood extents for this area of ponding are at 'Low' risk (0.1% to 1% AEP) of flooding. This risk increases to 'Low' to 'Moderate' (1% to 3.3% AEP), considering the 2040 and 2060 epoch as a worst-case scenario, for the pre-applied 'Central Allowance' climate change uplift (Drawing 0006.2).

5.3.3 A review of the online Environment Agency Risk of Flooding from Surface Water data showed that no inundation greater than 200mm would occur on the Site.

5.3.4 The risk of surface water flooding is assessed as negligible for most of the Site, with areas of low to medium risk associated with surface water ponding. Mitigation outlined later in this document will deal with the risk of surface water ponding.

5.4 Groundwater Flooding

5.4.1 Consultation with the Environment Agency (Appendix 4) reported no historical groundwater flooding within the Site boundary or immediate vicinity.

5.4.2 The Geosmart 1 in 100-year groundwater flood risk map (Drawing 0004) shows the Site is at negligible risk of groundwater flooding and falls within Risk Class 4.

5.4.3 The risk of groundwater flooding is assessed as negligible.

5.5 Sewer Flooding

5.5.1 Yorkshire Water asset plans (Appendix 3) show there are no public sewers located within the Site boundary; however, a Ø300mm surface water sewer is located beneath Gelderd Road to the south of the Site.

5.5.2 The topographic survey (Appendix 2) and CCTV survey (Appendix 7) confirmed there are surface water and foul drainage networks within the Site, serving the existing derelict buildings and hardstanding areas. A network of Ø100mm surface water sewers within the Site connect into a soakaway chamber in the southern corner of the Site. A network of Ø100mm foul sewers connect into a cesspool near the south-eastern boundary of the Site, adjacent to the Site entrance.

5.5.3 The risk of flooding from sewers is assessed as negligible.

5.6 Infrastructure Failure

5.6.1 The Environment Agency online flood mapping shows the Site is located outside the extent of flooding sourced from reservoirs.

5.6.2 The risk of flooding from this source is assessed as negligible.

5.7 Flood Guidance and Sequential Test

5.7.1 The proposal is for an Electric Vehicle (EV) charging station development including associated access, parking bays, seating areas, and amenity block within Flood Zone 1 (low risk). Table 2 of PPG ID: 7 (not included in this report) classifies the proposed use as ‘less vulnerable’.

5.7.2 All development types (including less vulnerable uses) are acceptable in Flood Zone 1 (low risk). Surface water flooding has been identified as a source of flooding. Subject to the below mitigation measures, the Sequential Test would be passed, and the Exception Test would not be required.

5.8 Mitigation Measures

5.8.1 Flood risk can be mitigated to a negligible or low and acceptable level through the following approach:

- Adoption of a surface water management strategy (see Section 6).

- Set building finished floor levels +150mm above external levels.
- Ensure the system has safety features in which the system automatically cuts off the electrical supply if there is flooding in the area.
- Ensure the equipment is water resilient and waterproof any vulnerable equipment up to at least 300mm.

6.0 Site Drainage

6.1 Surface Water Drainage

Introduction

6.1.1 A surface water management strategy for the development is proposed to manage and reduce the flood risk posed by surface water runoff from the Site. The developer will be required to ensure that any scheme for surface water should build in sufficient capacity for the entire Site.

6.1.2 The surface water drainage arrangements for any development Site should be such that the volume and peak flow rates of surface water leaving a developed Site are no greater than the rates prior to the proposed development unless specific off-Site arrangements are made and result in the same net effect.

6.1.3 An assessment of the surface water runoff rates was undertaken to determine the surface water options and attenuation requirements for the Site.

Existing Drainage System

6.1.1 The 0.23ha Site is comprised of a disused two storey commercial building, an outbuilding and hardstanding surrounding both; a substation is located on the northeast corner of the Site.

6.1.4 Downpipes are observed on the building's exterior and the topographical survey (Appendix 2) which shows possible connections from downpipes into the existing manholes.

6.1.5 The topographic survey (Appendix 2) and CCTV survey (Appendix 7) confirmed there is an existing surface water drainage network within the Site, serving the existing derelict buildings and hardstanding areas. A network of Ø100mm surface water sewers within the Site connect into a soakaway chamber in the southern corner of the Site.

6.1.6 Soakaway testing was undertaken in accordance with DG365 'Soakaway Design' methodology, during April 2025 to understand the infiltration potential across the Site, and a copy of the Soakaway Testing Results are included in Appendix 5. The soakaway testing confirmed an infiltration rate of 3.08×10^{-4} m/s for the existing soakaway chamber within the Site.

6.1.7 A pre-development consultation has been undertaken with Yorkshire Water, should a surface water or foul connection into one of their assets need to be pursued in future. A S106 application will be required prior to any connection to the public sewer. At the time this report was prepared, a response to the pre-development enquiry has not yet been received.

Impermeable Areas

6.1.8 An existing impermeable area of 0.105ha (existing building footprints and asphalt surfacing) was measured from the topographic survey, which accounts for 45.65% of the total 0.23ha Site area.

6.1.9 A proposed impermeable area 0.149ha (proposed parking bays and amenity block footprint) was measured from the proposed layout, which accounts for 64.78% of the total 0.23ha Site area.

6.1.10 There is an increase between the existing and proposed impermeable areas, so the amount of runoff post development will increase.

Hierarchy of Discharge

6.1.11 In accordance with requirement H3 of the Building Regulations 2010[20] rainwater runoff must discharge to one of the following, listed in order of priority:

1. **An adequate soakaway or some other adequate infiltration system:** The existing soakaway chamber, located in the southern corner of the Site, is to be reused by the new development. This will be the proposed outfall for surface water drainage.
2. **A watercourse:** There are no watercourses in the immediate vicinity of the Site.
3. **A sewer:** The Site currently has no connections to the existing public surface water sewer network beneath Gelderd Road to the south of the Site.

6.1.12 The potential route to discharge surface water flows from the proposed development will be by gravity connection to an existing soakaway chamber within the southern corner of the Site which has be demonstrated to be operational to a sufficient rate. An offline geocellular tank is proposed as part of the attenuation requirements for the Site.

Sustainable Drainage Options (SUDS) / Attenuation

Choice of SuDS Options

6.1.13 Sustainable water management measures should be used to control the surface water runoff from the proposed development Site, thereby managing the flood risk to the Site and surrounding areas from surface water runoff. These measures will also improve the quality of water discharged from the Site.

6.1.14 Current guidance promotes sustainable water management using SuDS. Options applicable to this Site are identified in Table 6.1.

Table 6.1: SuDS Options

Green roofs	Infiltration basins
Water butts	Detention basins
Permeable paving	Oversized pipes
Rainwater harvesting	Brown roofs
Filter strips	Swales
Wetland Areas	Cellular Storage
Soakaways	

Note: *SuDS appropriate to the development are highlighted green.*

6.1.15 A hierarchy of SuDS techniques is identified[21]:

1. **Prevention** - the use of good Site design and housekeeping measures on individual Sites to prevent runoff and pollution (e.g. minimise areas of hard standing).
2. **Source Control** - control of runoff at or very near its source (such as the use of rainwater harvesting).

[20] Office of the Deputy Prime Minister, The Building Regulations 2010, amended 2021.
[21] CIRIA (2004) Report C609, Sustainable Drainage Systems – Hydraulic, Structural and Water Quality advice.

3. **Site Control** - management of water from several sub-catchments (including routing water from roofs and car parks to one/several large soakaways for the whole Site).
4. **Regional Control** - management of runoff from several Sites, typically in a detention pond or wetland.

6.1.16 Using SuDS as opposed to conventional drainage systems provides several benefits by:

- Reducing peak flows to watercourses or sewers and potentially reducing the risk of flooding downstream.
- Reducing the volumes and frequency of water flowing directly to watercourses or sewers from developed Sites.
- Improving water quality over conventional surface water sewers by removing pollutants from diffuse pollutant sources.
- Reducing potable water demand through rainwater harvesting.
- Improving amenity through the provision of public open spaces and wildlife habitat.
- Replicating natural drainage patterns, including the recharge of groundwater so that base flows are maintained.

6.2 Surface Water Management Strategy

Proposed Drainage System

6.2.1 Surface water runoff would be directed to the drainage system through rainwater pipes located around the perimeter of the paved parking bay areas and amenity block.

6.2.2 Surface water will be directed to the existing soakaway chamber in the southern corner of the Site via a gravity connection. An offline geocellular tank will be provided to attenuate flows where the infiltration rate is exceeded by rainfall events.

6.2.3 The proposed surface water and foul drainage layouts are included in Drawing CRM.3030.020-ENZ-XX-XX-DR-D-0001-P01.

Attenuation Requirements

6.2.4 Attenuation storage is required to make up the shortfall between the infiltration values of the existing soakaway chamber and the design rainfall events, up to and including the 1 in 100-year (+45%CC) rainfall event.

6.2.5 The following input parameters were assumed in the calculations:

- Impermeable Area: 0.149ha
- Cv (proportion of rainfall forming surface water runoff): 100%
- Infiltration losses: 0.00m/hour
- With outfall to soakaway chamber: Design infiltration rate 3.08×10^{-4} m/s based on Enzygo Soakaway Testing in document CRM.3030.020.GE.R.003.A (Appendix 5).

6.2.6 The attenuation volume for the 1 in 100-year event (plus climate change) is 112m³ within the geocellular attenuation tank.

6.2.7 Attenuation calculations are included in Appendix 6.

Exceedance

6.2.8 A storm event in excess of this design standard would cause the drainage network to surcharge (with no sudden deluge) and would then shed south-east towards Gelderd Road as shallow flows (<150mm).

6.2.9 It is recommended that finished floor levels are set +150mm above external levels to mitigate any residual risk of flooding from the drainage network surcharge.

6.3 Foul Drainage

Existing Drainage System

6.3.1 The topographic survey (Appendix 2) and CCTV survey (Appendix 7) confirmed there is a private foul drainage network within the Site, serving the existing derelict buildings. A network of Ø100mm foul sewers connect into a cesspool near the south-eastern boundary of the Site, adjacent to the Site entrance, which is to be abandoned.

Proposed Drainage System

6.3.2 It is proposed that foul flows are discharged to a new cesspool within the Site, to be tankered away for disposal by a suitably licensed operator.

6.3.3 All foul sewerage should be designed in accordance with Building Regulations Part H.

7.0 Maintenance and Management Plan

7.1 Drainage Layout

7.1.1 The drainage layout drawing (CRM.3030.020-ENZ-XX-XX-DR-D-0001-P01) includes information on:

- Surface water drainage runs, including pipe sizes, invert levels. All cover levels TBC prior to construction.
- The position of the onsite geocellular storage, including invert level, total volume, and tank dimensions.
- Outfall arrangements.

7.2 Operation Phase

Principles of the Maintenance and Management Plan

7.2.2 Key areas of maintenance have been identified from the drainage layout. The following identifies how the drainage layout has considered access, the anticipated maintenance activities and who might be responsible for the maintenance.

7.2.3 Maintenance of the SuDS features would be in line with the SuDS Manual (CIRIA C753, 2015). The maintenance shall be undertaken by the Site Owner or management company. In the event that the company goes into administration, maintenance will be contracted to the new Site owner or management company.

7.2.4 The schedule should be a living document as it may change, where inspections advise changes to the scheme maintenance requirements.

Proprietary Systems

i. Below Ground Drainage Pipes

7.2.5 Pipes between the development and attenuation tank, and from the attenuation tank to the outfall to the existing soakaway chamber, will be the responsibility of the private maintenance company.

7.2.6 Typical maintenance activities and frequency are summarised in Table 7.1.

Table 7.1: Below Ground Drainage Pipes

Maintenance Frequency	Required Action	Maintenance 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 can cause risks to performance.	Monthly for 3 months, then Quarterly
	Remove sediment from pre-treatment inlet structures and inspection chambers.	Quarterly/as required.
	Maintain vegetation to design limits within the vicinity of the below ground drainage pipes/soakaways to avoid damage to the system.	Monthly/as required.
Remedial Work	Repair physical damage if necessary.	As required.
Monitoring	Inspect all inlets, outlets, and wets to ensure that they are in good condition and operating as designed.	Annually.
	Survey inside of pipe runs for sediment build up and remove if necessary.	Every 5 years/as required.

ii. Geocellular Storage

7.2.7 The geocellular attenuation tank will be the responsibility of the private maintenance company. The SuDS attenuation features were designed in line with design guidance by the LLFA.

7.2.8 Typical maintenance activities and frequency are summarised in Table 7.2.

Table 7.2: Geocellular Attenuation Tank Storage Maintenance Activities

Maintenance Frequency	Required Action	Maintenance Frequency
Regular Maintenance	Inspect and remove debris from inlet structure.	Quarterly or as required.
	Remove sediment from pre-treatment structure where present.	Quarterly or as required.
	Check inlets, outlets, control structure and overflows.	Annually or as required.
Occasional Maintenance	Jetting and suction where silt has settled in the structure.	On completion of drainage works, Year 1, Year 3, then every 5 years. This would allow for first year flush when sediment from construction would be greatest, then less frequently as the Site matures (i.e. compaction of ground and vegetation growth reduces erosion).
Remedial Work	Full replacement of the structure if permanently silted or structural failure.	As required.

iii. Soakaway Chamber

7.2.9 The soakaway chamber will be the responsibility of the private maintenance company.

7.2.10 Typical maintenance activities and frequency are summarised in Table 7.3.

Table 7.3: Soakaway Chamber Maintenance Activities

Maintenance Frequency	Required Action	Maintenance Frequency
Regular Maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings.	Annually.
	Cleaning of gutters and any filters on downpipes.	Annually (or as required, based on inspections).
	Trimming any roots that may cause blockage.	Annually (or as required).
Occasional Maintenance	Remove sediment and debris from pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings.	As required, based on inspections.
Remedial Work	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs.	As required.
	Replacement of clogged geotextile (will require reconstruction of soakaway).	As required.

7.3 Construction Phase

7.3.2 Mitigation measures are designed in to reduce the potential for impacts on hydrology, flood risk and water quality:

7.3.3 A summary of the mitigation measures during the construction phase, timetable for implementation and validation of the final drainage design is provided below.

- Good environmental practice based on legal responsibilities and guidance in accordance with the general overarching guidance on good environmental management in PPG1 (Environment Agency, 2013) and more specific guidance including:
  - CIRIA C650 (2005) Control of Water Pollution from Construction Sites - Guidance for Consultants and Contractors.
  - CIRIA C648 (2006) Control of Water Pollution from Linear Construction Projects.
  - PPG21: Pollution Prevention Guidelines. Incident Response Planning.
- Minimise where practicable the production of silt and contaminated water by minimising:
  - Dewatering and pumping of excavations and subsequent disposal of water.
  - Runoff from exposed ground and stockpiles.
  - Plant and wheel washing.
  - Site roads.

  - Fuel and other spillages.
  - Waste storage and disposal.
- Surface Water Management (SuDS) Scheme. The development will result in the construction of low permeability surfacing, increasing the rate of surface water run-off. The surface water drainage scheme ensures the runoff rates to the surrounding water environment are maintained at pre-development greenfield rates incorporating the effects of climate change.

7.3.4 The maintenance and management of the SuDS during the construction phase is essential in managing runoff on and from the Site. It is also key in ensuring the prevention of sediment and pollutants entering the bounding watercourses.

7.3.5 A separate Construction Environmental Management Plan (CEMP) will be required to control environmental issues during the construction process. The CEMP forms part of the Project Management Plan, which integrates the core arrangements for health and safety, quality and environmental management for the construction phase. This integrated approach ensures that environmental aspects are considered at all stages of the design and construction process.

7.3.6 The construction phase will be undertaken in accordance with good practice guidelines on hydrology, flood risk and water quality for consultants and contractors, including:

- CIRIA Environmental Good Practice on Site (C502) (1999).
- CIRIA Control of Water Pollution from Construction Sites (C532) (2001).
- Environment Agency Pollution Prevention Guidelines.

Timetable for Implementation

7.3.7 The attenuation and conveyance features will be constructed before development begins, so that they are ready to accept runoff from impermeable areas (i.e. roofs and car park) as these are constructed.

8.0 Summary and Conclusions

8.1 Introduction

8.1.1 A Detailed Drainage Strategy (surface water and foul), inclusive of a Flood Risk Statement, has been prepared for demolition of two existing buildings and development of an Electric Vehicle (EV) charging station including associated access, parking bays, seating areas and amenity block.

8.2 Site Drainage

8.2.1 The Site has existing private surface water and foul drainage networks, with outfalls to a soakaway chamber (that is to be retained) and a cesspool (that is to be abandoned) respectively.

8.2.2 The hierarchy of discharge has been considered alongside SuDS options and concluded that surface water will be directed to the existing soakaway chamber in the southern corner of the Site via a gravity connection. An offline geocellular tank will be provided to attenuate flows where the infiltration rate is exceeded by rainfall events.

8.2.3 It is proposed that foul flows are discharged to a cesspool within the Site, to be tankered away for disposal by a suitably licensed operator.

8.3 Flood Risk

8.3.1 The Flood Risk Statement identified the following:

- The risk of surface water flooding is assessed as negligible for most of the Site and as low to medium associated with the area of ponding in the central extent.
- The risk of flooding from all other sources is assessed as negligible.

8.3.2 Flood risk can be mitigated to a negligible or low and acceptable level through the following approach:

- Adoption of a surface water management strategy.
- Set building finished floor levels +150mm above external levels.
- Ensure the system has safety features in which the system automatically cuts off the electrical supply if there is flooding in the area.
- Ensure the equipment is water resilient and waterproof any vulnerable equipment up to at least 300mm.

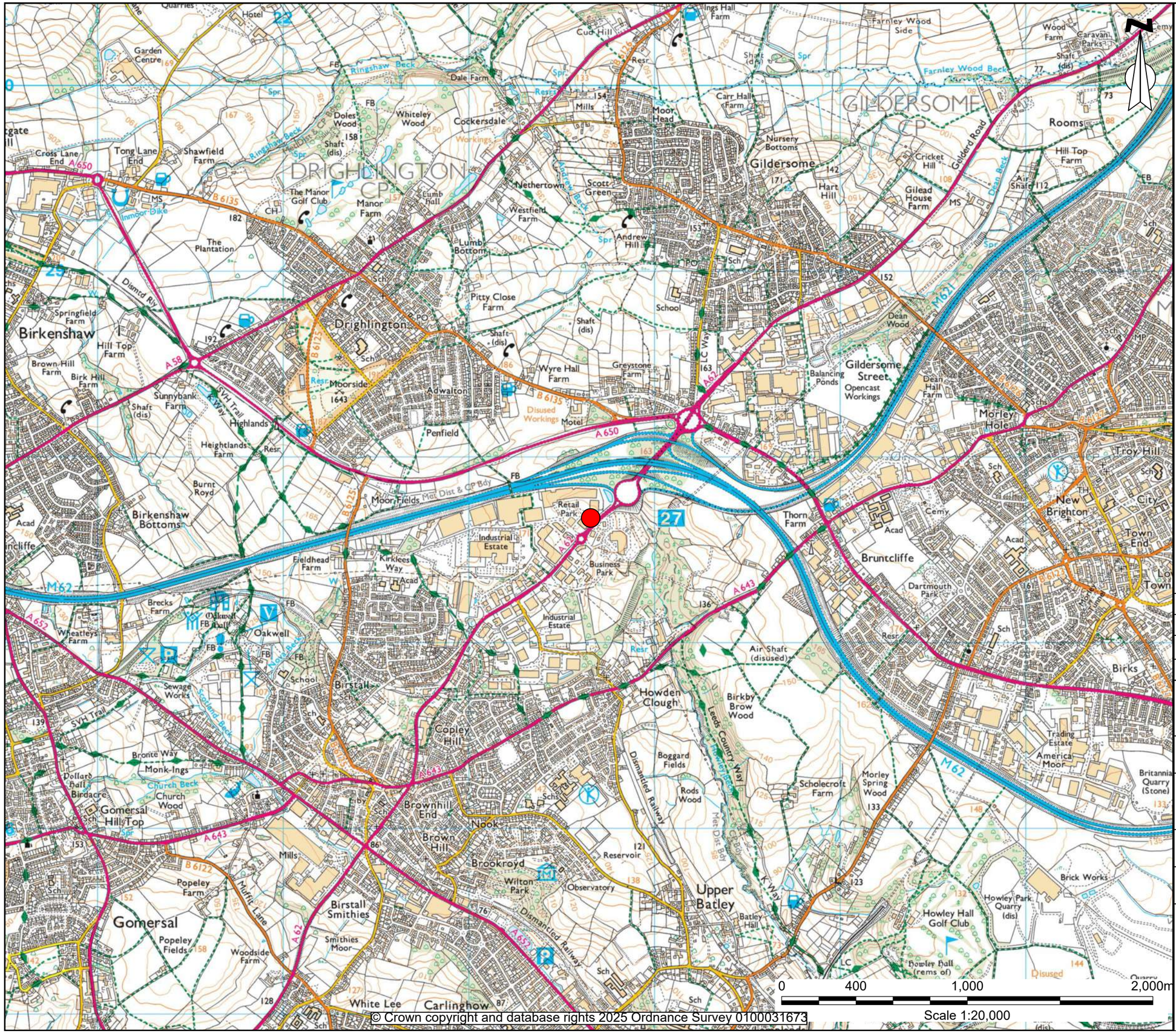
8.3.3 All development types (including less vulnerable uses) are acceptable in Flood Zone 1 (low risk). Surface water flooding has been identified as a source of flooding. Subject to the below mitigation measures, the Sequential Test would be passed, and the Exception Test would not be required.

8.4 Conclusion

8.4.1 This drainage strategy demonstrates that the proposed development would be operated with minimal risk from flooding, would not increase flood risk elsewhere and is compliant with the requirements of national policy and guidance.

8.4.2 The development should not therefore be precluded on the grounds of surface water and foul drainage.

DRAWINGS



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KEY:

Site Location

Rev	Date	Description	DRA	CHK	APP
P02	18/06/25	RLB Update	EW	CW	CW
P01	13/06/25	Issued for comment / approval	LW	EW	EW

Project
Gelderd Road, Birstall

Client
Tesla Motors Ltd

Drawing Title
Site Location Plan

Scale	Date	Status
1:20,000@A3	18/06/25	Preliminary

DWG No. CRM3030020-ENZ-XX-XX-DR-Y-0001 **Revision** P02

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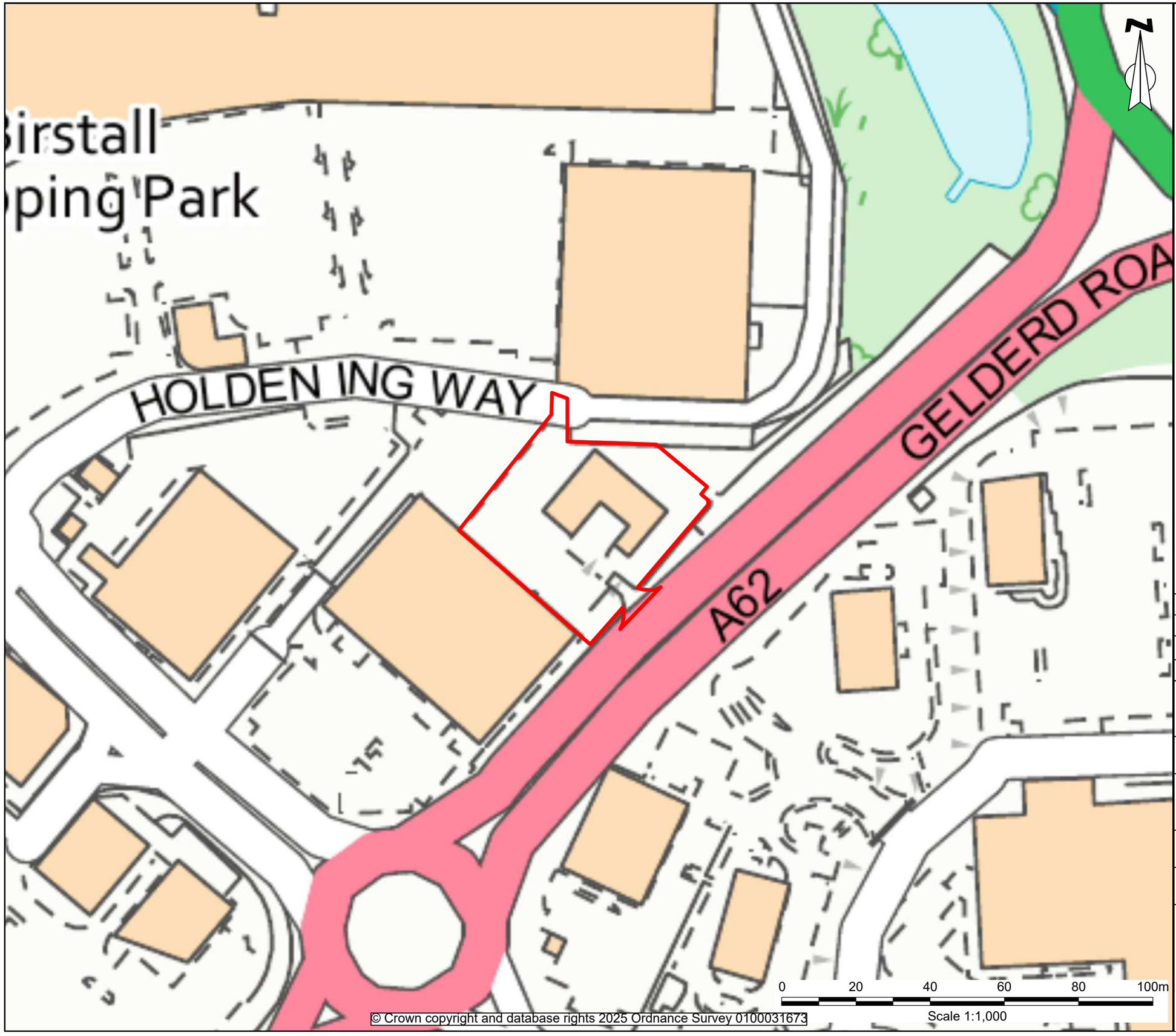

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KEY:

- Site Boundary
- Surface Water Features

Rev	Date	Description	DRA	CHK	APP
P02	18/06/25	RLB Update	EW	CW	CW
P01	13/06/25	Issued for comment / approval	LW	EW	EW

Project
Gelderd Road, Birstall

Client
Tesla Motors Ltd

Drawing Title
Surface Water Features

Scale	Date	Status
1:1000@A3	18/06/25	Preliminary

DWG No. CRM3030020-ENZ-XX-XX-DR-Y-0002
Revision P02

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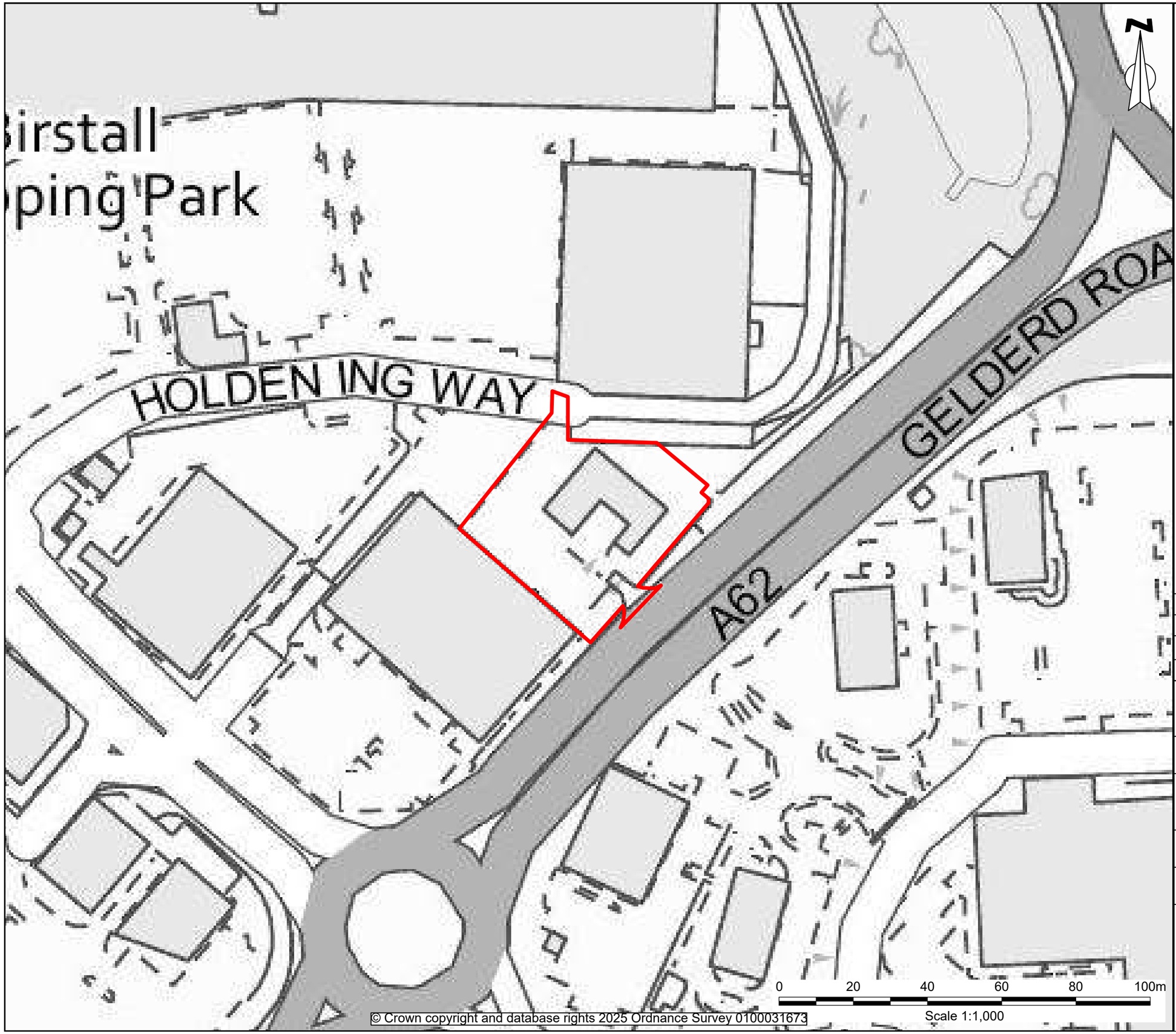

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KEY:

- Site Boundary
- Flood Zone 3
- Flood Zone 2
- Flood Zone 1

Rev	Date	Description	DRA	CHK	APP
P02	18/06/25	RLB Update	EW	CW	CW
P01	13/06/25	Issued for comment / approval	LW	EW	EW

Project
Gelderd Road, Birstall

Client
Tesla Motors Ltd

Drawing Title
EA Flood Zones

Scale	Date	Status
1:1000@A3	18/06/25	Preliminary

DWG No. CRM3030020-ENZ-XX-XX-DR-Y-0003 **Revision** P02

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KEY:

- Site Boundary
- Class 1 - High Risk
- Class 2 - Moderate Risk
- Class 3 - Low Risk
- Class 4 - Negligible Risk
- Search Extent

Rev	Date	Description	DRA	CHK	APP
P02	18/06/25	RLB Update	EW	CW	CW
P01	13/06/25	Issued for comment / approval	LW	EW	EW

Project
Gelderd Road, Birstall

Client
Tesla Motors Ltd

Drawing Title
Groundwater Flood Risk

Scale	Date	Status
1:1000@A3	18/06/25	Preliminary

DWG No. CRM3030020-ENZ-XX-XX-DR-Y-0004 **Revision** P02

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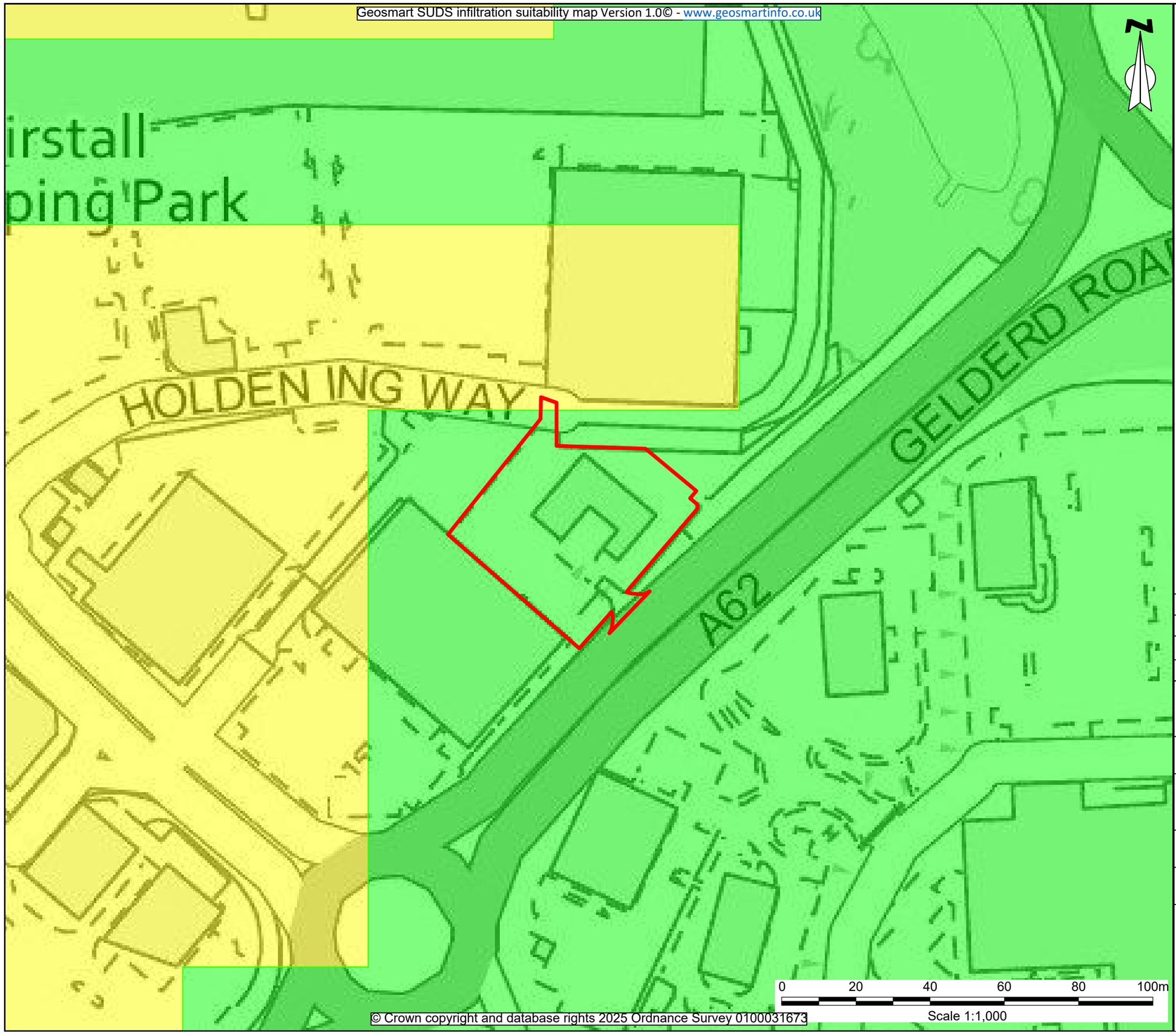

KEY:

- Site Boundary
- High Potential
- Moderate Potential
- Low Potential
- Search Extent

Rev	Date	Description	DRA	CHK	APP
P02	18/06/25	RLB Update	EW	CW	CW
P01	13/06/25	Issued for comment / approval	LW	EW	EW

Project
Gelderd Road, Birstall

Client
Tesla Motors Ltd

Drawing Title
SuDS Infiltration Potential

Scale	Date	Status
1:1000@A3	18/06/25	Preliminary

DWG No. CRM3030020-ENZ-XX-XX-DR-Y-0005 **Revision** P02

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KEY:

- Site Boundary
- High Risk
- Moderate Risk
- Low Risk

Rev	Date	Description	DRA	CHK	APP
P02	18/06/25	RLB Update	EW	CW	CW
P01	13/06/25	Issued for comment / approval	LW	EW	EW

Project
Gelderd Road, Birstall

Client
Tesla Motors Ltd

Drawing Title
EA Risk of Flooding from Surface Water

Scale	Date	Status
1:1000@A3	18/06/25	Preliminary

DWG No. CRM3030020-ENZ-XX-XX-DR-Y-0006.1 **Revision** P02

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KEY:

- Site Boundary
- High Risk
- Moderate Risk
- Low Risk

Rev	Date	Description	DRA	CHK	APP
P02	18/06/25	RLB Update	EW	CW	CW
P01	13/06/25	Issued for comment / approval	LW	EW	EW

Project
Gelderd Road, Birstall

Client
Tesla Motors Ltd

Drawing Title
EA Risk of Flooding from Surface Water (Climate Change)

Scale	Date	Status
1:1000@A3	18/06/25	Preliminary

DWG No. CRM3030020-ENZ-XX-XX-DR-Y-0006.2 **Revision** P02

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KEY:

- Site Boundary
- Contours
- Surface Water Flow Path

Rev	Date	Description	DRA	CHK	APP
P02	18/06/25	RLB Update	EW	CW	CW
P01	13/06/25	Issued for comment / approval	LW	EW	EW

Project
Gelderd Road, Birstall

Client
Tesla Motors Ltd

Drawing Title
Flow Pathway Analysis

Scale	Date	Status
1:1000@A3	18/06/25	Preliminary

DWG No. CRM3030020-ENZ-XX-XX-DR-Y-0007 **Revision** P02

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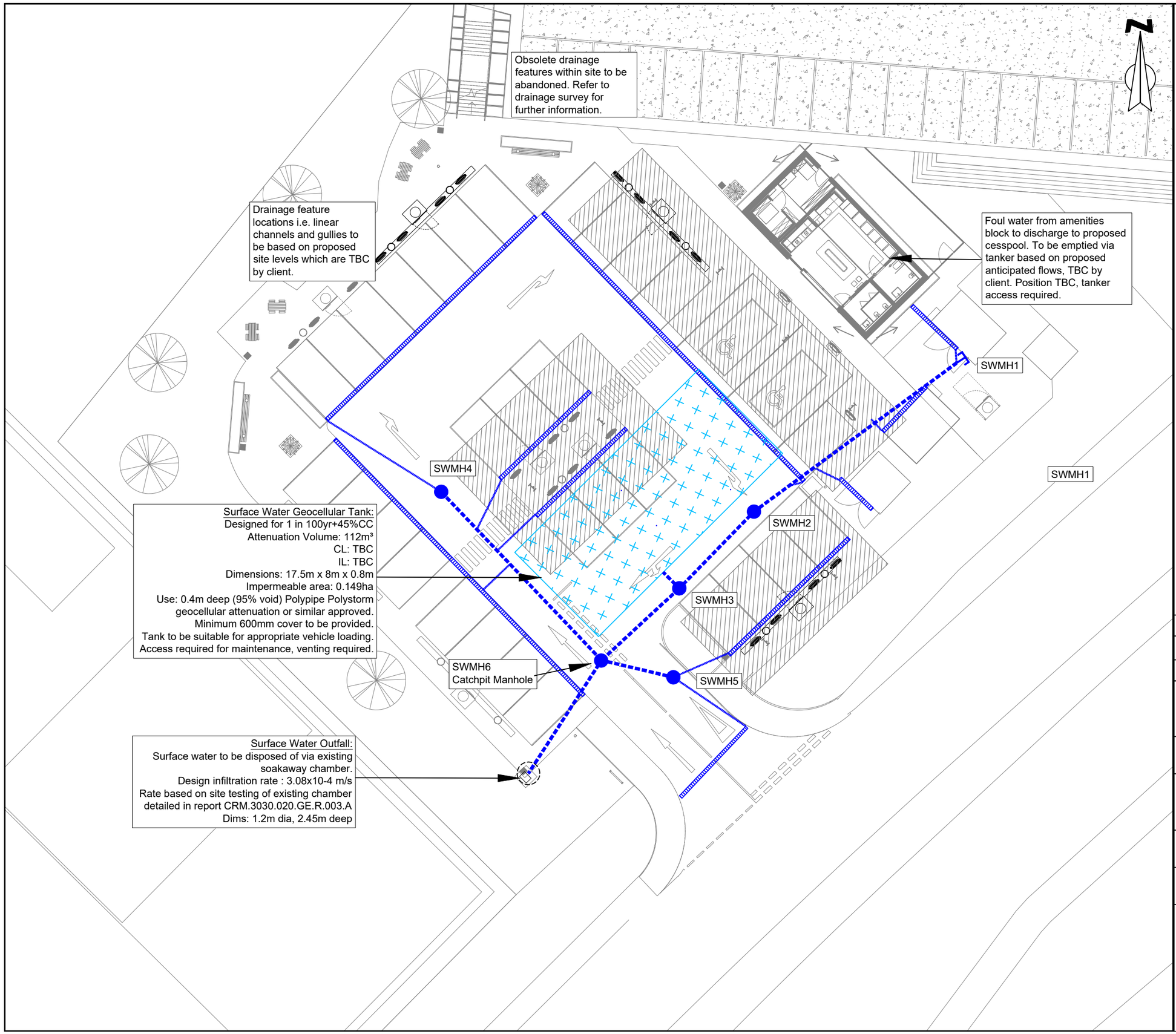

KEY:

- Surface Water Pipe
- Surface Water Attenuation Tank
- Linear channel drain

NOTES:
ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS AND DOCUMENTS ASSOCIATED WITH THIS PROJECT.

ALL EXISTING AND PROPOSED DIMENSIONS, LEVELS AND LOCATIONS TO BE CHECKED AND VERIFIED BY THE MAIN CONTRACTOR ON SITE PRIOR TO THE COMMENCEMENT OF THE WORKS AND ANY ANOMALIES REPORTED TO THE ENGINEER.

DRAWING IS NOT TO BE USED FOR SETTING OUT PURPOSES.

ALL WORKS TO BE CARRIED OUT TO COMPLY WITH BUILDING REGULATIONS

SITE LEVELS TO BE CONFIRMED BY CLIENT

Rev	Date	Description	DRA	CHK	APP
P01	02/07/25	Issued for comment / approval	RB	RB	SD

Project
Gelderd Road, Birstall

Client
Tesla Motors Ltd

Drawing Title
Drainage Layout

Scale	Date	Status
1:250	02/07/25	Preliminary

DWG No. CRM.3030.020-ENZ-XX-XX-DR-D-0001 **Revision** P01

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APPENDICES

Appendix 1 - Proposed Layout

NOTES

(32) V4 SUPERCHARGING STALLS INC 2 DDA

ONE WAY ROAD MARKINGS, PEDESTRIAN CROSSINGS AND BAY MARKINGS

LANDSCAPING (INCLUDING SOFT PLANTING) TO BE DEVELOPED AS FOCAL POINT CONNECTING WITH STAIR DESIGN

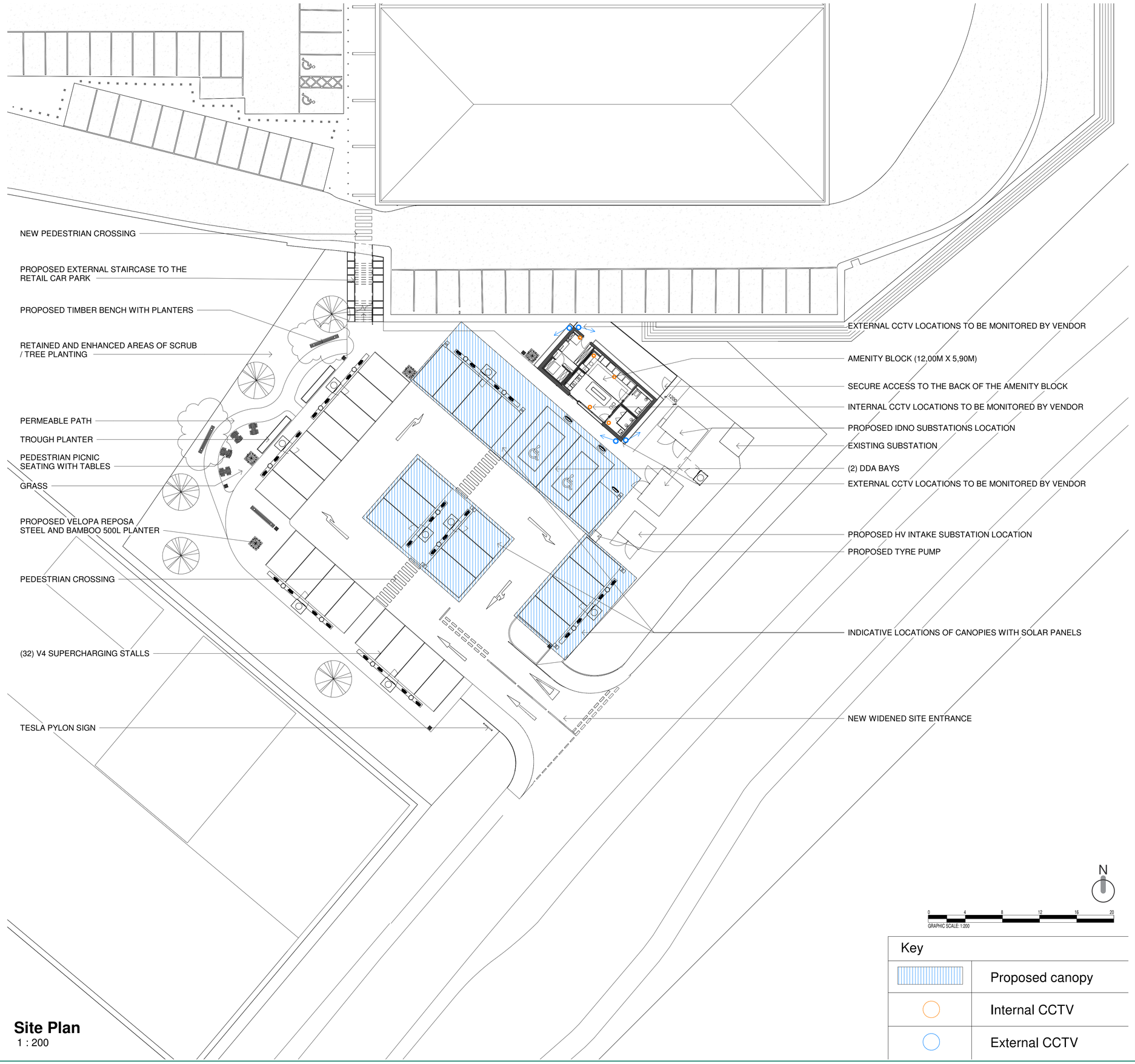
SECURITY CAMERAS & LIGHTING TO BE REVIEWED AND DEVELOPED

LIGHTING WITHIN LANDSCAPED AREAS AND PAVEMENTS TO BE CONSIDERED

EXAMPLE AMENITY BLOCK

EXTERNAL DESIGN LANGUAGE

EXAMPLE STALL (V4)



Site Plan
1 : 200

Key	
	Proposed canopy
	Internal CCTV
	External CCTV

Birstall Leeds SUC

Gelderd Road, Birstall, Batley, WF17 9TB

ISSUE / REVISIONS

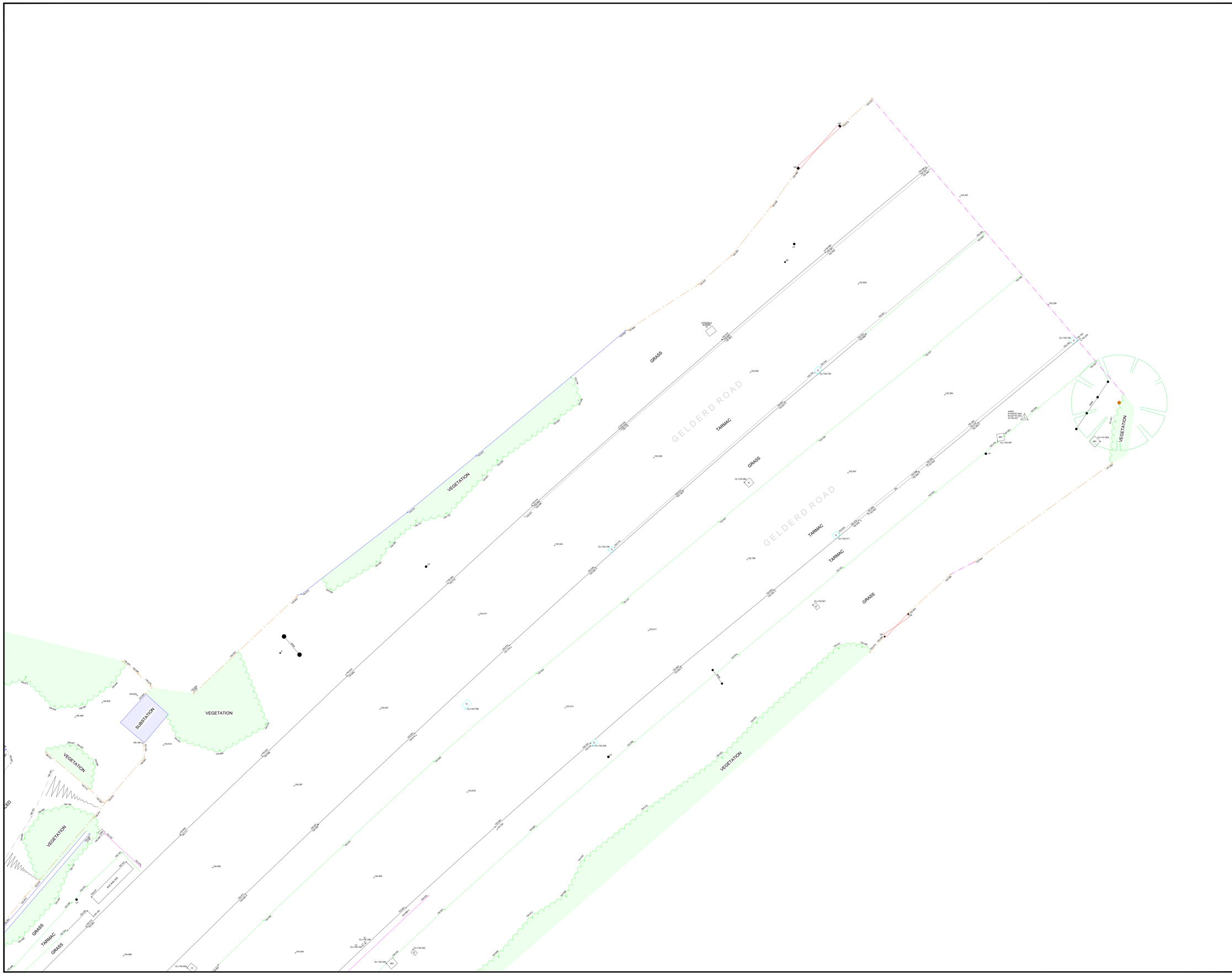
A	Layout Update	20250528
B	Benches moved outside RPA	20250617

DRAWING TITLE

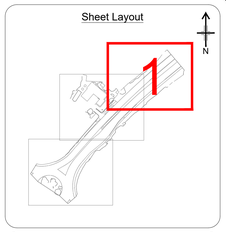
Proposed Site Plan (PSU)

SCALE	1 : 200 @ A1
PROJECT NO	LB_SUC 01
STATUS	
DRAWING NO	A111
REVISION	B

Appendix 2 - Topographic Survey



Sheet Layout



Topographic Abbreviations

ACU	Air Conditioning Unit	KO	Kerb Outlet
AV	Air Vent	LB	Litter Bin
BB	Belisha Beacon	LP	Lamp Post
BK	Brick	MB	Metal Base
BL	Bases/Bed Level	MH	Man Hole
BO	Bollard	MK	Service Marker
BP	Brick Pillar	MW	Monitoring Well
BPV	Brick Pavieur	OSBM	Ordnance Survey Benchmark
BR	Bike Rack	O	Orchard
BS	Bus Stop	PB	Post Box
BT	BT Inspection Cover	PCP	Pedestrian Control Point
CA	Camera	PLT	Planter
CAJB	Cable Junction Box	PM	Parking Meter
CATV	Cable Inspection Cover	PPL	Parapet Level
CB	Control Box	PU	Pump
CCTV	Close Circuit Television	RE	Rodding Eye
CO	Cable Duct	RL	Ridge Level
CG	Cattle Grid	RS	Road Sign
CH	Coal Hole	RW	Retaining Wall
CIP	Cable Inspection Point	RWC	Rain Water Channel
CL	Cover Level	RWP	Rain Water Pipe
COL	Column	S/A	Soakaway
CR	Cable Riser	SB	Sliding Bollard
DK	Drop Kerb	SC	Water Stopcock
DPC	Damp Proof Course	SD	Slot Drain
EB	Electricity Control Box	SEG	Side Entry Gully
EJB	Electricity Junction Box	SL	Sill Level
EL	Eave Level	SP	Sign Post
ELEC	Electricity Inspection Cover	ST	Stay Cable
EM	Electricity Meter	SV	Stop Valve
EP	Electricity Pylon/Pole	SVP	Soil Vent Pipe
ER	Earth Rod	TB	Telephone Call Box
FB	Flower Bed	TBM	Temporary Bench Mark
FC	Fuel Cover	TC	Traffic Control Inspection Cover
FH	Fire Hydrant	TH	Trial Hole
FL	Floor Level	THL	Threshold Level
FLT	Flood Light	TIC	Telephone Inspection Cover
FO	Fibre Optic	TJB	Telephone Junction Box
FP	Footpath	TL	Traffic Light
FRL	Flat Roof Level	TOF	Top of Fence Level
G	Gully	TOW	Top of Wall Level
GAS	Gas Inspection Cover	TP	Telephone Pole
GJB	Gas Junction Box	TS	Tree Stump
GM	Gas Meter	UTSF	Unable to Survey Further
GP	Gate Post	VP	Vent Pipe
GV	Gas Vent	WL	Water Level
HL	Head Level	WM	Water Meter
IC	Inspection Cover	WO	Wash Out
IL	Invert Level	WP	Waste Pipe
JB	Junction Box	WTR	Water Inspection Cover

Topographic Legend

- Gate
- Paving
- Bottom Of Batter
- Top Of Batter
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- Bore Hole
- Tree
- Bush
- Survey Station
- Photograph Origin

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D.T.S	DEPTH TO SILT	OSA	OUT OF SURVEY AREA
D.T.W	DEPTH TO WATER	PT	POOR TRACE
EOC	END OF CAMERA	R.O.D	RISK OF DAMAGE
EOS	END OF SONDE	SA	SURVEY ABANDONED
	END OF STATUTORY	TFR	TAKEN FROM RECORDS
EOSR	RECORD INFORMATION	UTL	UNABLE TO LIFT
	END OF TRACE	UTC	UNABLE TO CAMERA
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Title:
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Topographic & Drainage Survey
(Sheet 1 of 3)

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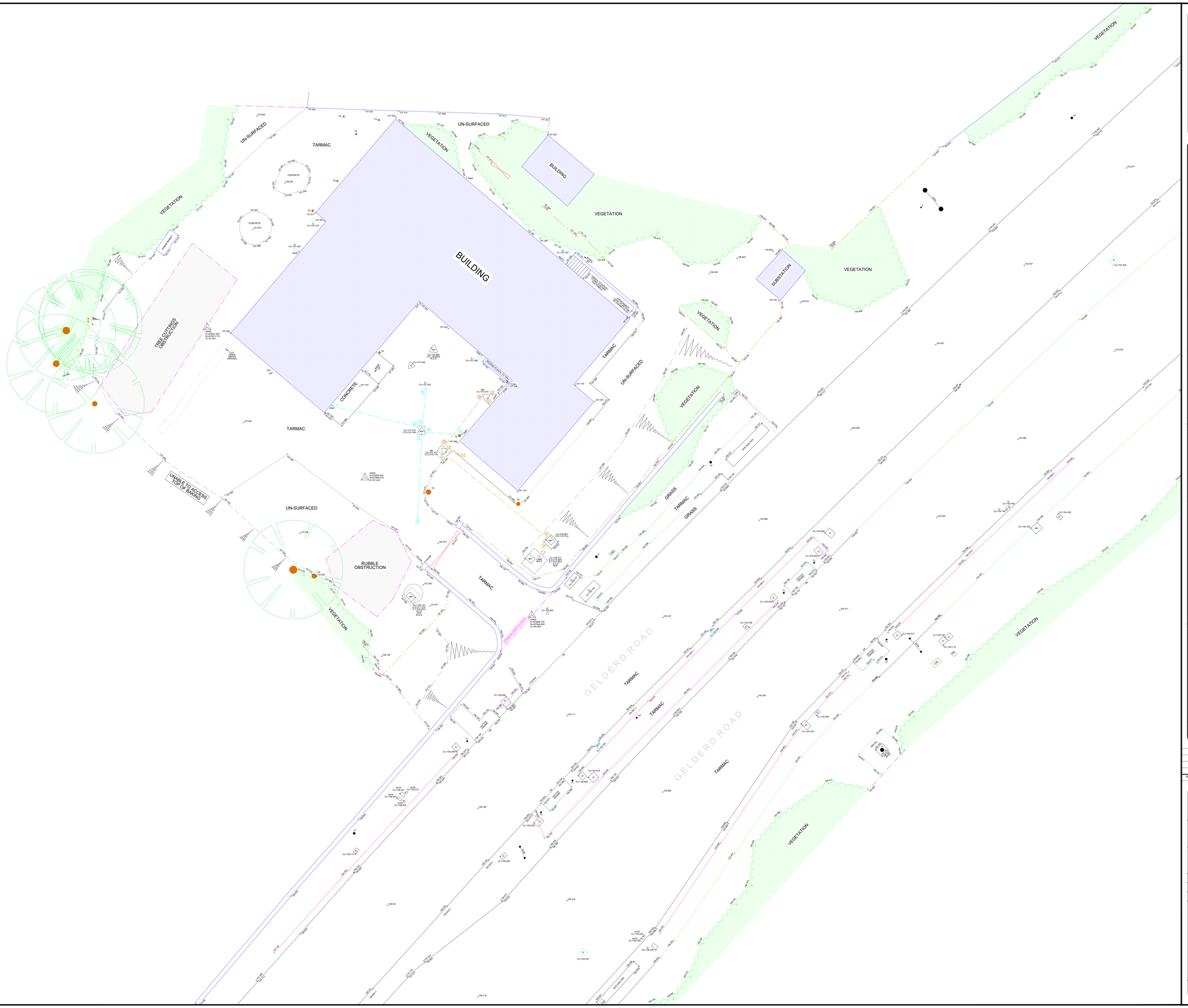

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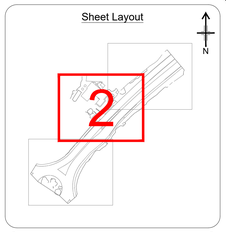

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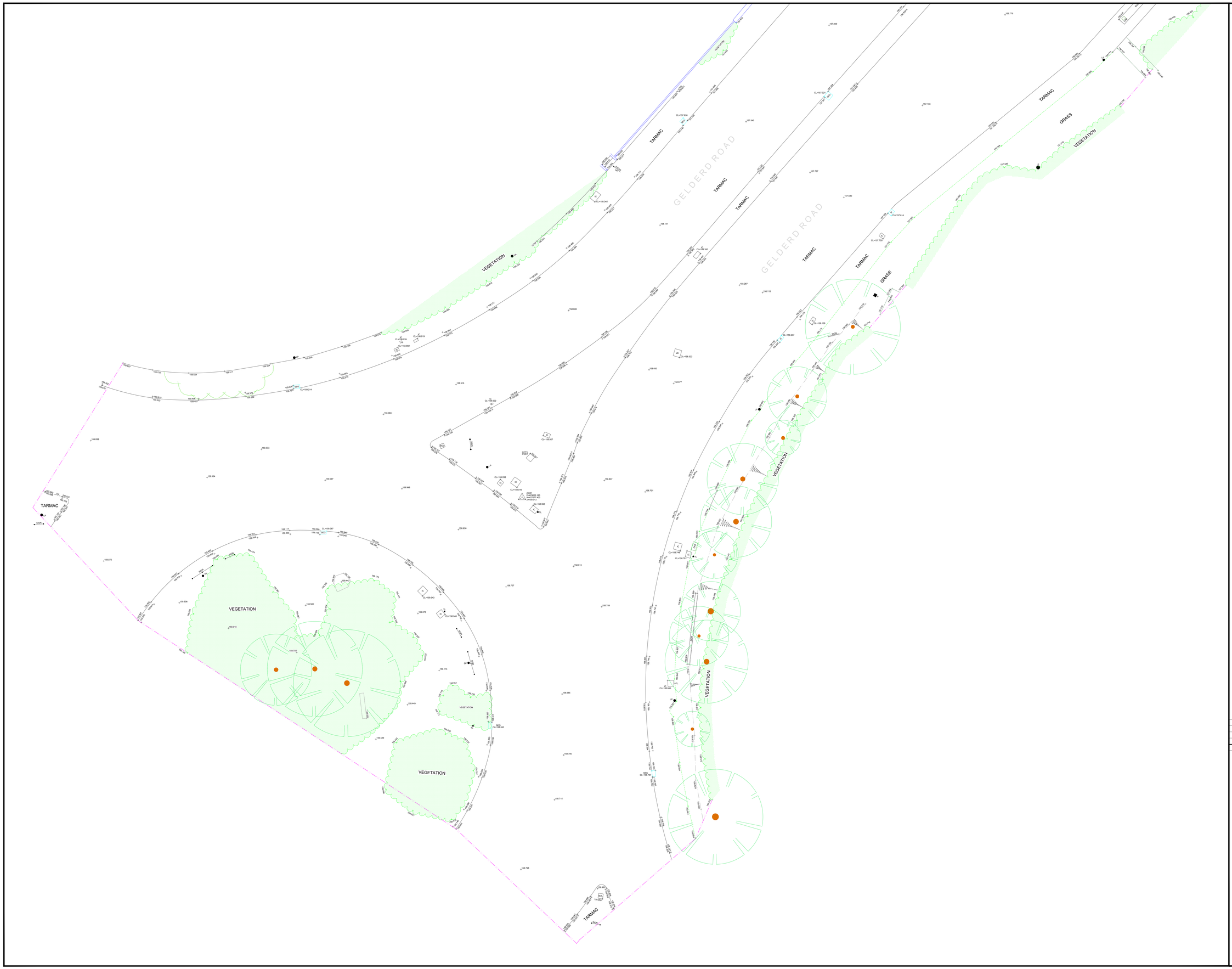

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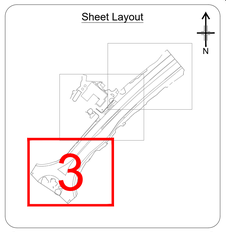

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Rev: -

Appendix 3 - Yorkshire Water Asset Plans

YORKSHIRE WATER
PROTECTION OF MAINS AND SERVICES

1. The position of Yorkshire Water Services Ltd (YWS) apparatus shown on the existing mains record drawing(s) indicates the ***general*** position and nature of our apparatus and the accuracy of this information cannot be guaranteed. Any damage to YWS apparatus as a result of your works may have serious consequences and you will be held responsible for all costs incurred. Prior to commencing major works, the exact location of apparatus must be determined on site, if necessary by excavating trial holes. The actual position of such apparatus and that of service pipes which have not been indicated must be established on site by contacting the Customer Helpline on 0845 124 24 24 for both water and sewerage.

2. The public sewer and water network is lawfully retained in its existing position and the sewerage and water undertaker is entitled to have it remain so without any disturbance. The provisions of section 159 of the Water Industry Act 1991 provides that the undertaker may "inspect, maintain, adjust, repair or alter" the network. Those rights are given to enable the undertaker to perform its statutory duties. Any development of the land or any other action that unacceptably hindered the exercise of those rights would be unlawful. The provisions contained in Section 185 of the Water Industry Act 1991 state that where it is reasonable to do so, a person may require the water supply undertaker to alter or remove a pipe where it is necessary to enable that person to carry out a proposed change of use of the land. The provisions contained in Section 185 also require the person making the request to pay the full cost of carrying out the necessary works.

3. Ground levels over existing YWS apparatus are to be maintained. Sewers in highways will ***generally*** be laid to give 1200mm of cover from finished ground level working to kerb races, other permanent identification of the limits of the road or to an agreed line and level. Substantial increases or decreases to this 1200mm depth of cover will result in the sewer being re-laid at your expense. Water mains and services will ***generally*** be laid with a minimum of 750mm depth of cover however some mains and services usually those installed over 50 years ago may have less ground cover.

4. If surface levels are to be decreased / increased significantly the effects on existing water supply apparatus will be carefully considered and if any alterations are necessary, the costs of the alterations will be recharged to you in full. Outlets on fire hydrants must be no more than 300mm below the new levels and all surface boxes must be adjusted as part of the scheme.

5. To enable future repair works to be carried out without hindrance; any pipe, cable, duct, etc. installed parallel to a water main or service pipe should not be installed directly over or within 300mm of a water main or service pipe or 1000mm of a waste water asset. Where a pipe, cable, duct, etc. crosses a main or service it should preferably cross perpendicular or at an angle of no less than 45o and with a minimum clearance of 150mm. These requirements apply to activities within an existing highway and are relevant to the installation of pipes, cables, ducts, etc. up to and including 250mm in diameter *(see illustration below).* Necessary protection measures for installations greater than 250mm in diameter and/or in private land will need to be agreed on an individual basis. Installations within a new development site must comply with the National Joint Utilities Group publication Volume 2: NJUG Guidelines On The Positioning Of Underground Utilities Apparatus For New Development Sites.

6. All excavation works near to YW apparatus should be by hand digging only.

7. Backfilling with a suitable material to a minimum 300mm above YW apparatus is required.

8. Adequate support must be provided where any works pass under YW apparatus.

9. Jointing chambers, lighting columns and other structures must be installed in such a way that future repair or maintenance works to YW apparatus will not be hindered.

10. Apparatus such as; railings, sign posts, etc. must not be placed in such a way that they prevent access to or full operation of controlling valves, hydrants or similar apparatus. YWS surface boxes must not be covered or buried. Any adjustment, alteration or replacement of manhole covers must be agreed on site prior to the commencement of the works with a YWS Inspector who may be contacted via our Call Centre on 0845 124 24 24.

11. Explosives shall not be used within 100 metres of any Yorkshire Water Services apparatus or installations.

12. Vibrating plant should not be used directly over any apparatus. Movement or operation by vehicles or heavy plant is not to be permitted in the immediate vicinity of YWS plant or apparatus unless there has been prior consultation and, if necessary, adequate protection provided without cost to YWS.

13. ***Under no circumstances*** should thrust boring or similar trenchless techniques commence until the actual position of the Company's mains/services along the proposed route have been confirmed by trial holes.

14. Any alterations to the highway should be notified following the procedures outlined in the New Road and Street Works Act 1991 Code of Practice; Measures Necessary Where Apparatus Is Affected By Major Works (Diversionary Works).

15. You will be held responsible for any damage or loss to YWS apparatus during and after completion of work, caused by yourselves, your servant or agent. Any damage caused or observed to YWS plant or apparatus should be immediately reported to YWS. Should YW incur any costs as a result of non-compliance with the above, all costs will be rechargeable in full.

16. You should ensure that nothing is done on the site to prejudice the safety or operation of YWS employees, plant or apparatus.

17. In accordance with the New Roads and Street Works Act 1991, Chapter 22, Part 3, Section 80. The location of any identified YW asset "*which is not marked, or is wrongly marked, on the records made available*" should be communicated back to Yorkshire Water. The location of the apparatus should be identified on copies of the supplied plans which should be returned to Yorkshire Water (Asset Records Team) with photographic supporting evidence where possible.

18. The Government has decided that responsibility for private sewers serving two or more properties and lateral drains (the section of pipe beyond the boundary of a single property, connecting it to the public sewer) will be transferred to the water companies on Oct 1 2011.

Private pumping stations will also transfer during the period 1 October 2011 – 1 Oct 2016. Records of these assets may not yet be shown on the existing mains record drawing(s). If you encounter any of these assets you must inform Yorkshire Water Services Ltd (YWS).

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20. This information is for guidance only and the position and depth of any YW apparatus is approximate only. Likewise, the nature and condition of any YW apparatus cannot be guaranteed. YW has no responsibility for recording the locations of privately owned apparatus. As of 1 October 2011, there may be some lateral drains and/or public sewers which are not documented on YW records but may still be present. For the avoidance of doubt, this information is not a substitute for appropriate professional and/or legal advice. YW accepts no responsibility for any inaccuracy or omissions in this information. The actual position of YW apparatus must be determined on site by excavating trail holes by hand. YW requires a minimum of two working days' written notice of the intention to excavate any trial holes before any excavation can be undertaken. If there are any queries in this respect please contact Yorkshire Water on 0845 124 24 24.

Property Identfier

or

Sewer Legend

Combined Sewer

S24 Combined Sewer

Surface Water Sewer

S24 Surface Water Sewer

Foul Sewer

S24 Foul Sewer

Section 104 Sewer

Rising Main

Overflow Sewer

Abandoned Sewer

Syphone Sewer & Vacuum Sewer

Pumping Station

STW Public Sewer Tretment Works

Please note that the direction of flow arrows may not always appear depending on the scale of the map.

Water Legend

Water Main 4" and below

Water Main 4" and above

Raw Water Main

Private Water Main

H Fire Hydrant

Pumping Station

NAV The assets in this area are the responsibility of another Water Undertaker

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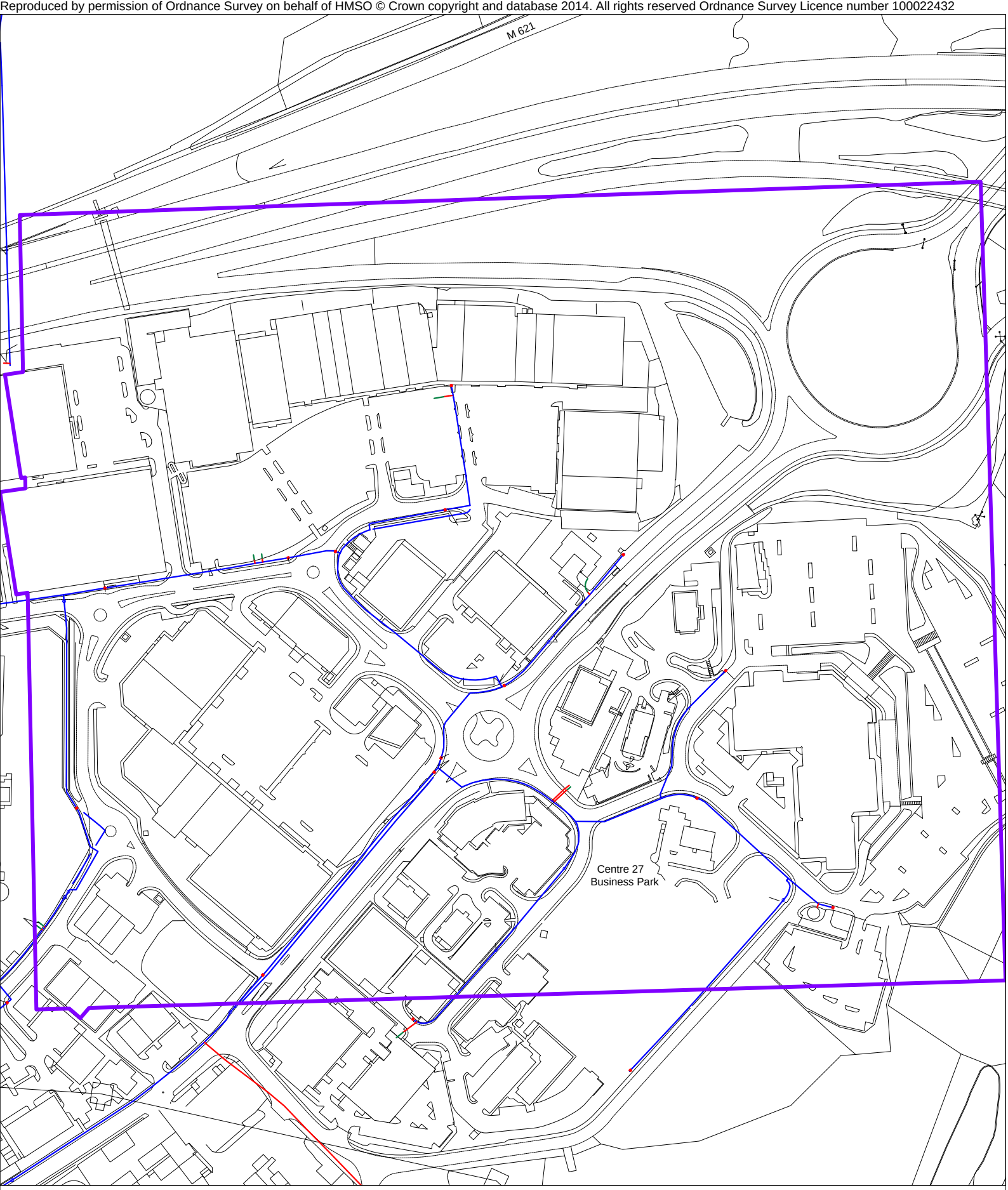

Public Clean Water Network 08/04/2024 16:57:47 OS Grid Coordinates: 423293 : 427272 Map Name : SE2327SW svcGISSafeMovePD

Registered office, Yorkshire water Services Limited. 1
Western House, Halifax Road, Bradford BD62SZ.
Registered in England and wales No. 2366682

SafeMove
A part of YorkshireWater

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Public Waste Water Network 08/04/2024 16:57:50 OS Grid Coordinates: 423293 : 427272 Map Name : SE2327SW svcGISSafeMovePD

Registered office, Yorkshire water Services Limited. 1
Western House, Halifax Road, Bradford BD62SZ.
Registered in England and wales No. 2366682

SafeMove
A part of YorkshireWater

Appendix 4 - Environment Agency Correspondence

Charlotte Whitham

From: Brown-Bennett, Melanie <Melanie.Brown-Bennett@environment-agency.gov.uk>
Sent: 10 May 2024 09:24
To: Charlotte Whitham
Subject: Your Enquiry: RFI/2024/355897

> You don't often get email from melanie.brown-bennett@environment-agency.gov.uk. Learn why this is important

Our Ref: RFI/2024/355897

Dear Charlotte

RE: Gelderd Road, Birstall, Batley, WF17 9DT [NGR: 423661, 427671]
Request for information under the Freedom of Information Act 2000 (FOIA) / Environmental Information Regulations 2004 (EIR)

Thank you for your enquiry which was received on 11 April 2024.

- Can you confirm the Flood Zone within the Site boundary as described above?
- Do you agree with our above interpretation of surface water flooding?
- Do you have any records of historic flooding events on this Site, either from fluvial, surface water, groundwater, sewers or infrastructure failure sources? If you are aware of historical flooding at the Site, can you please provide us with details of these historical flood events where it is available, including flood levels, estimated return periods, photographs, and other such data as may be relevant to our study?
- Do you have any information on drainage within the Site and in the local area, including any known drainage problems?
- Please can you also indicate to us whether you are aware of any relevant environmentally sensitive receptors [such as aquatic wildlife in receiving watercourses, etc.] in the area around the Site that we should be aware of when preparing the surface water drainage strategy?

After forwarding to various teams the following information has been provided.

There is no flood history for this location.

Response FBG

This is not near a watercourse . The site does however lie just over 100m from a pond, so if there any anticipated impacts, mitigation measures should be considered.

Response GW

In most areas, we do not hold any information on groundwater flooding, and we are not aware of any historical groundwater flooding at the location in question. Lead local flood authorities (LLFAs) have responsibilities for local flood risk (including groundwater) under the Flood and Water Management Act 2010. This Act gives LLFAs duties to prepare local flood risk management strategies and to co-operate with other risk management authorities, and powers to carry out local flood risk management. If you want to find out if your property could be

at risk of flooding from groundwater or may have flooded in the past you should contact your Lead Local Flood Authority.
Please refer to the Local Government Association leaflet linked below. If you are still unsure whether your property could be affected by flooding from groundwater, then you may wish to carry out a flood risk assessment. To do this, you will need to contact a professional consultant/engineer or chartered surveyor.
EA/Local Government Association groundwater flooding guidance document:
https://www.gov.uk/government/publications/flooding-from-groundwater

I hope that we have correctly interpreted your request. Please see the Open Government Licence (here) for details of permitted use.

We respond to requests for recorded information that we hold under the Freedom of Information Act 2000 (FOIA) and the associated Environmental Information Regulations 2004 (EIR).

If you are not satisfied with our response to your request for information you can contact us within 2 calendar months to ask for our decision to be reviewed.

If you require any further help, please do not hesitate to contact me.

Yours sincerely

Melanie Brown-Bennett

Enquiries Officer | Customer & Engagement Team | Yorkshire Area

Tel:02077141903 (+442077141903)

Melanie.brown-bennett@environment-agency.gov.uk

Environment Agency

Enquiries Team Tel: 020 847 48174

neyorkshire@environment-agency.gov.uk

Working Days: Monday to Friday between 7:00 and 15:00

Information in this message may be confidential and may be legally privileged. If you have received this message by mistake, please notify the sender immediately, delete it and do not copy it to anyone else. We have checked this email and its attachments for viruses. But you should still check any attachment before opening it. We may have to make this message and any reply to it public if asked to under the Freedom of Information Act, Data Protection Act or for litigation. Email messages and attachments sent to or from any Environment Agency address may also be accessed by someone other than the sender or recipient, for business purposes.

Appendix 5 - Soakaway Testing Results

The Byre, Woodned Lane
Cromhall, Gloucestershire GL12 8AA

Tel: 01454 269 237
www.enzygo.com

Your Ref:
Our Ref: CRM.3030.020.GE.R.003.A

Date: 1st April 2025
Email: Daniel.James@enzygo.com

Gezim Alia
Tesla UK
galia@tesla.com

Dear

RE: Gelderd Rd, Birstall

Enzygo Geoenvironmental Ltd have undertaken soakaway testing at the above named site.

Site Works

The site works were undertaken on 11TH April 2025 and comprised four soakaway tests (SA01 to SA03 and the existing Chamber) located to provide coverage as requested by the Engineer for the scheme.

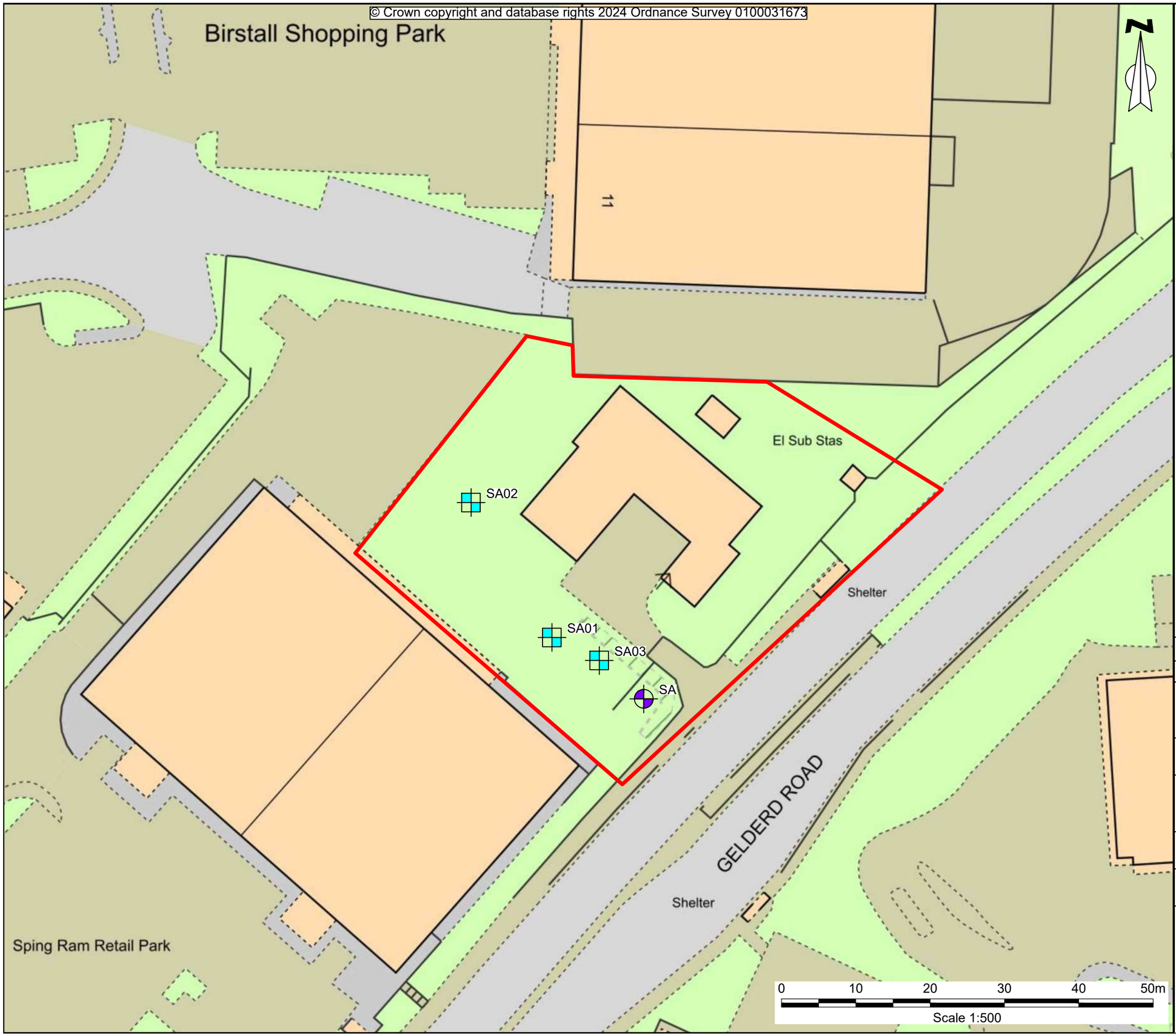
Soakaway Test Results

Soakaway sheets are attached, and results are summarised on the table below:

Soakaway	Depth	Test	Soil Infiltration Rate (m/s)
SA01	1.45m	Test 1	Insufficient Uptake to calculate infiltration rate
SA02	1.1m	Test 1	Insufficient Uptake to calculate infiltration rate
SA03	1.1m	Test1	3.84E-04
		Test 2	2.43E-04
		Test 3	1.64E-04
Chamber	2.35m	Test 1	4.31E-04
		Test 2	3.82E-04
		Test 3	3.08E-04

Yours sincerely,
For and on behalf of Enzygo

Daniel James BSc(hons)
Environmental Consultant
Enzygo Geoenvironmental Ltd



KEY:

- Site Boundary
- Soak Away Pits (SA01-SA03)
- Previously Existing Soakaway Chamber (SA)

NOTES:

DO NOT SCALE FROM THIS DRAWING

ALL DIMENSIONS ARE IN METRES UNLESS STATED OTHERWISE

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT DRAWINGS AND DOCUMENTS ASSOCIATED WITH THIS PROJECT.

ALL EXISTING AND PROPOSED DIMENSIONS, LEVELS AND LOCATIONS TO BE CHECKED AND VERIFIED BY THE MAIN CONTRACTOR ON SITE PRIOR TO THE COMMENCEMENT OF THE WORKS AND ANY ANOMALIES REPORTED TO THE ENGINEER.

Rev	Date	Description	DRA	CHK	APP
P01	26.03.25	Issued for comment / approval	SD	DJ	DJ

Project
Gelderd Road, Birstall

Client
Tesla Motors Ltd

Drawing Title
Location Plan

Scale	Date	Status
1:500 @ A3	26.03.25	Preliminary

DWG No. CRM3030020-ENZ-XX-XX-DR-G-0001 **Revision** P01

Bristol 01454 269 237
Cardiff 02920 023 700
Manchester 0161 413 6444
Cambridge 01799 542 473
Sheffield 0114 321 5151
Belfast 07377673948

enzygo
@enzygo
enzygo.com
hello@enzygo.com

Soakaway Results

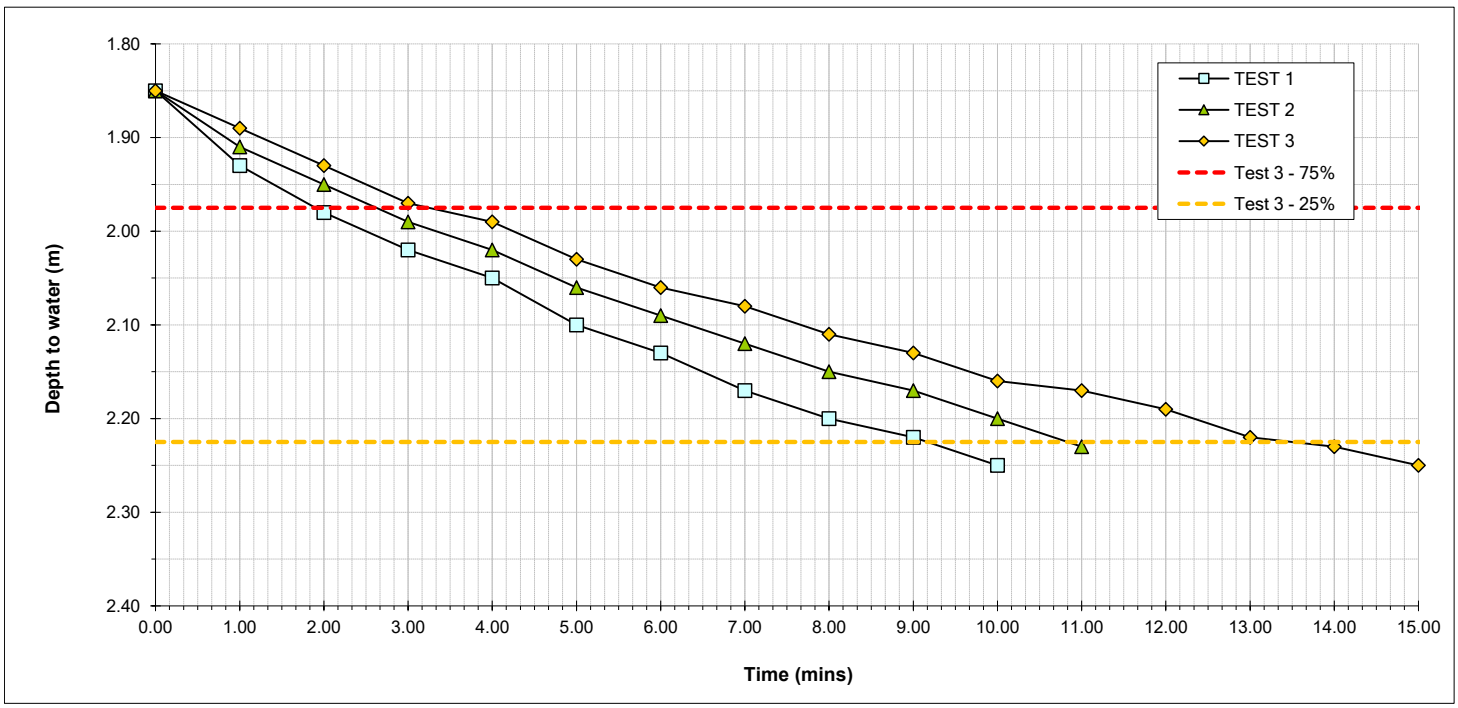
enzygo	Site..... Gelderd Road, Birstall Job Number..... CRM.3030.020 Date of Test..... 11.03.25	Soakaway Number..... Chamber Diameter..... 1.20 m Depth..... 2.35 m
	SOIL INFILTRATION RATE TEST - SOAKAWAY CHAMBER	Groundwater Level..... Dry m

Remarks -

TEST 1		TEST 2		TEST 3	
Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
0.0	1.85	0.0	1.85	0.0	1.85
1.0	1.93	1.0	1.91	1.0	1.89
2.0	1.98	2.0	1.95	2.0	1.93
3.0	2.02	3.0	1.99	3.0	1.97
4.0	2.05	4.0	2.02	4.0	1.99
5.0	2.10	5.0	2.06	5.0	2.03
6.0	2.13	6.0	2.09	6.0	2.06
7.0	2.17	7.0	2.12	7.0	2.08
8.0	2.20	8.0	2.15	8.0	2.11
9.0	2.22	9.0	2.17	9.0	2.13
10.0	2.25	10.0	2.20	10.0	2.16
		11.0	2.23	11.0	2.17
				12.0	2.19
				13.0	2.22
				14.0	2.23
				15.0	2.25

		TEST 1	TEST 2	TEST 3
Effective Storage Depth	m	0.50	0.50	0.50
75% Effective Storage Depth	m	0.38	0.38	0.38
(i.e. depth below GL)	m	**1.98**	**1.98**	**1.98**
25% Effective Storage Depth	m	0.13	0.13	0.13
(i.e. depth below GL)	m	**2.23**	**2.23**	**2.23**
Effective Storage Depth 75%-25%	m	0.25	0.25	0.25
Time to fall to 75% effective depth	mins	1.92	2.67	3.34
Time to fall to 25% effective depth	mins	9.17	10.84	13.50
V (75%-25%)	m3	0.28	0.28	0.28
a (50%)	m2	1.51	1.51	1.51
t (75%-25%)	mins	7.25	8.17	10.16
SOIL INFILTRATION RATE	m/s	**4.31E-04**	**3.82E-04**	**3.08E-04**

DESIGN SOIL INFILTRATION RATE, f **3.08E-04** **m/s**



Compiled By:	Date:	Checked By:	Date:	Aproved By:	Date:
R.Kelliher	16/03/25	D.James	26/03/2025	M.Ward	26/03/2025

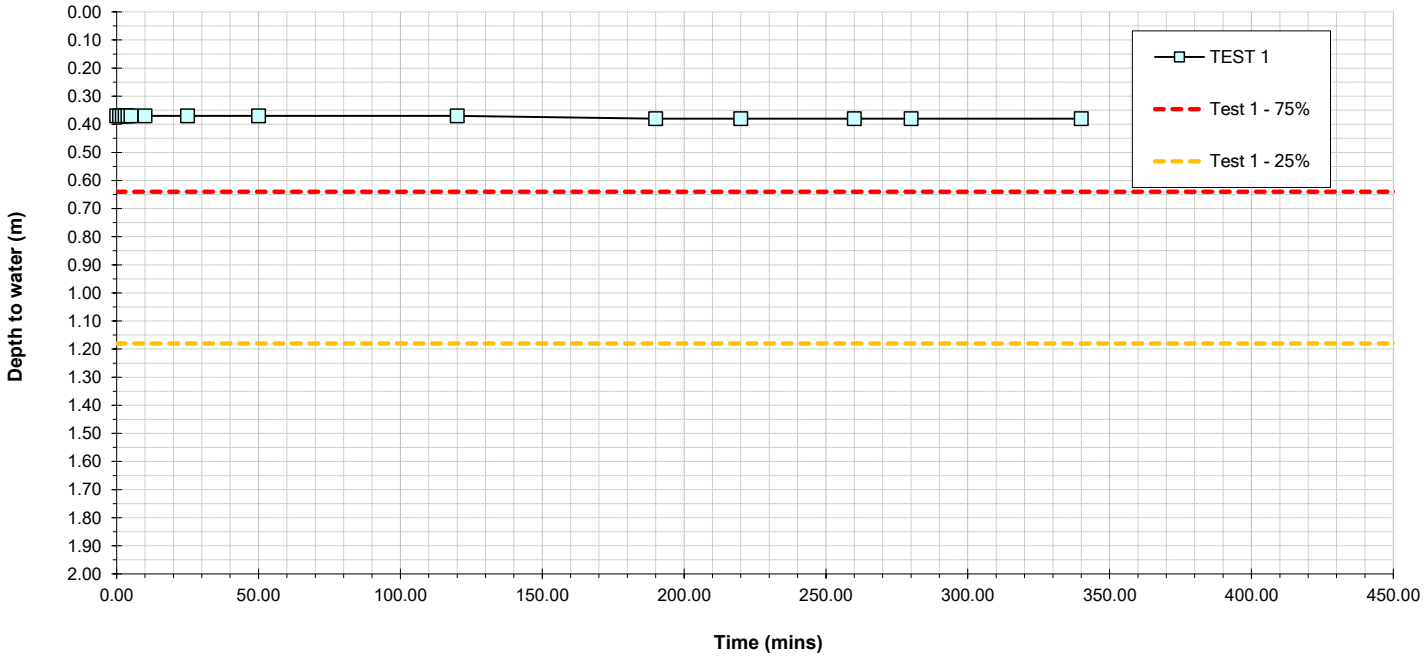
enzygo	Site..... Gelderd Rd, Birstall Job Number..... CRM.3030.020 Date of Test..... 12.03.25	Soakaway Number..... SA01 Length..... 1.30 m Width..... 0.50 m Depth..... 1.45 m
	SOIL INFILTRATION RATE TEST See B.R.E. Digest 365, 1991, Soakaway Design.	Groundwater Level..... Dry m

Remarks -

TEST 1		TEST 2		TEST 3	
Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
0.0	0.37				
1.0	0.37				
2.0	0.37				
3.0	0.37				
4.0	0.37				
5.0	0.37				
10.0	0.37				
25.0	0.37				
50.0	0.37				
120.0	0.37				
190.0	0.38				
220.0	0.38				
260.0	0.38				
280.00	0.38				
340.00	0.38				

Effective Storage Depth	m	1.08		
75% Effective Storage Depth	m	0.81		
(i.e. depth below GL)	m	**0.64**		
25% Effective Storage Depth	m	0.27		
(i.e. depth below GL)	m	**1.18**		
Effective Storage Depth 75%-25%	m	0.54		
Time to fall to 75% effective depth	mins	N/A		
Time to fall to 25% effective depth	mins	N/A		
V (75%-25%)	m3	0.35		
a (50%)	m2	2.59		
t (75%-25%)	mins	N/A		
SOIL INFILTRATION RATE	m/s	**N/A**		

DESIGN SOIL INFILTRATION RATE, f **Insufficient uptake to calculate infiltration rate** **m/s**



Compiled By:	Date:	Checked By:	Date:	Approved By:	Date:
R.Kelliher	17/03/2025	D.James	26/03/2025	M.Ward	26/03/2025

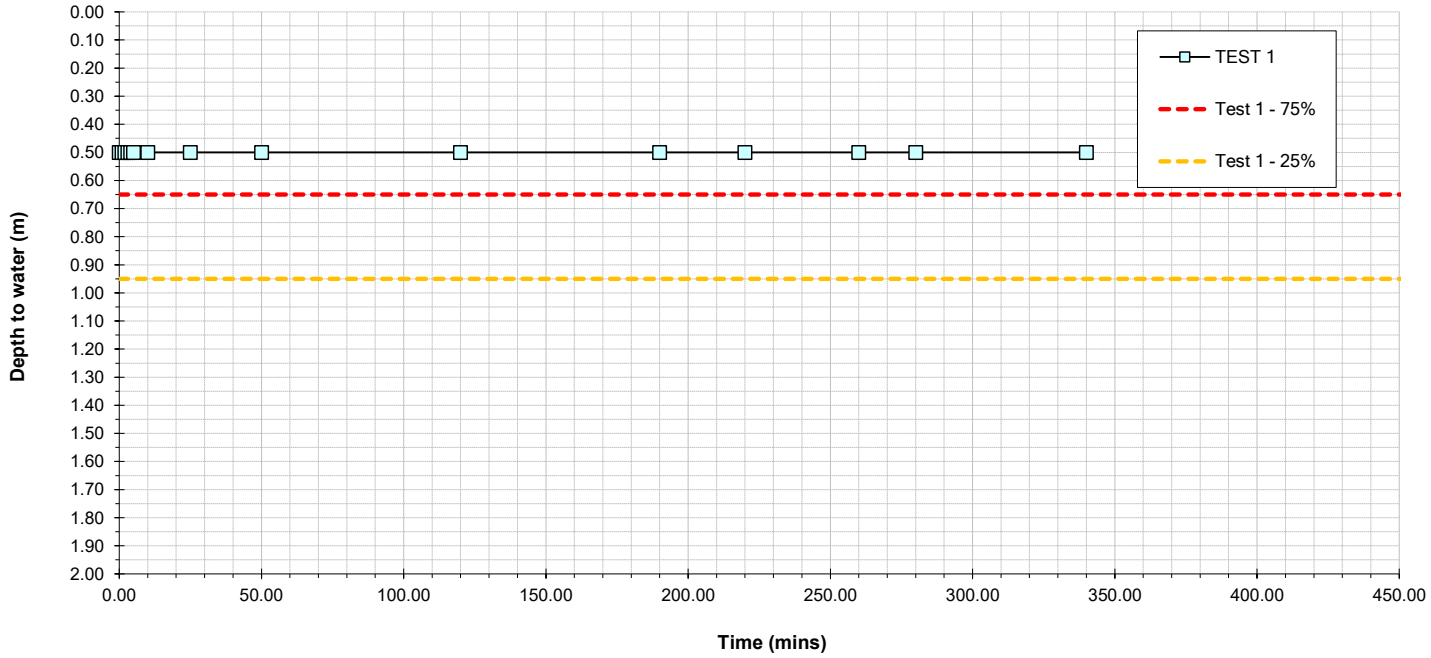
enzygo	Site..... Gelderd Rd, Birstall Job Number..... CRM.3030.020 Date of Test..... 12.03.25	Soakaway Number..... SA02 Length..... 1.60 m Width..... 0.55 m Depth..... 1.10 m
	SOIL INFILTRATION RATE TEST See B.R.E. Digest 365, 1991, Soakaway Design.	Groundwater Level..... Dry m

Remarks -

TEST 1		TEST 2		TEST 3	
Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
0.0	0.50				
1.0	0.50				
2.0	0.50				
3.0	0.50				
4.0	0.50				
5.0	0.50				
10.0	0.50				
25.0	0.50				
50.0	0.50				
120.0	0.50				
190.0	0.50				
220.0	0.50				
260.0	0.50				
280.00	0.50				
340.00	0.50				

Effective Storage Depth	m	0.60		
75% Effective Storage Depth	m	0.45		
(i.e. depth below GL)	m	**0.65**		
25% Effective Storage Depth	m	0.15		
(i.e. depth below GL)	m	**0.95**		
Effective Storage Depth 75%-25%	m	0.30		
Time to fall to 75% effective depth	mins	N/A		
Time to fall to 25% effective depth	mins	N/A		
V (75%-25%)	m3	0.26		
a (50%)	m2	2.17		
t (75%-25%)	mins	N/A		
SOIL INFILTRATION RATE	m/s			

DESIGN SOIL INFILTRATION RATE, f **Insufficient uptake to calculate infiltration rate** **m/s**



Compiled By:	Date:	Checked By:	Date:	Approved By:	Date:
R.Kelliher	17/03/2025	D.James	26/03/2025	M.Ward	26/03/2025

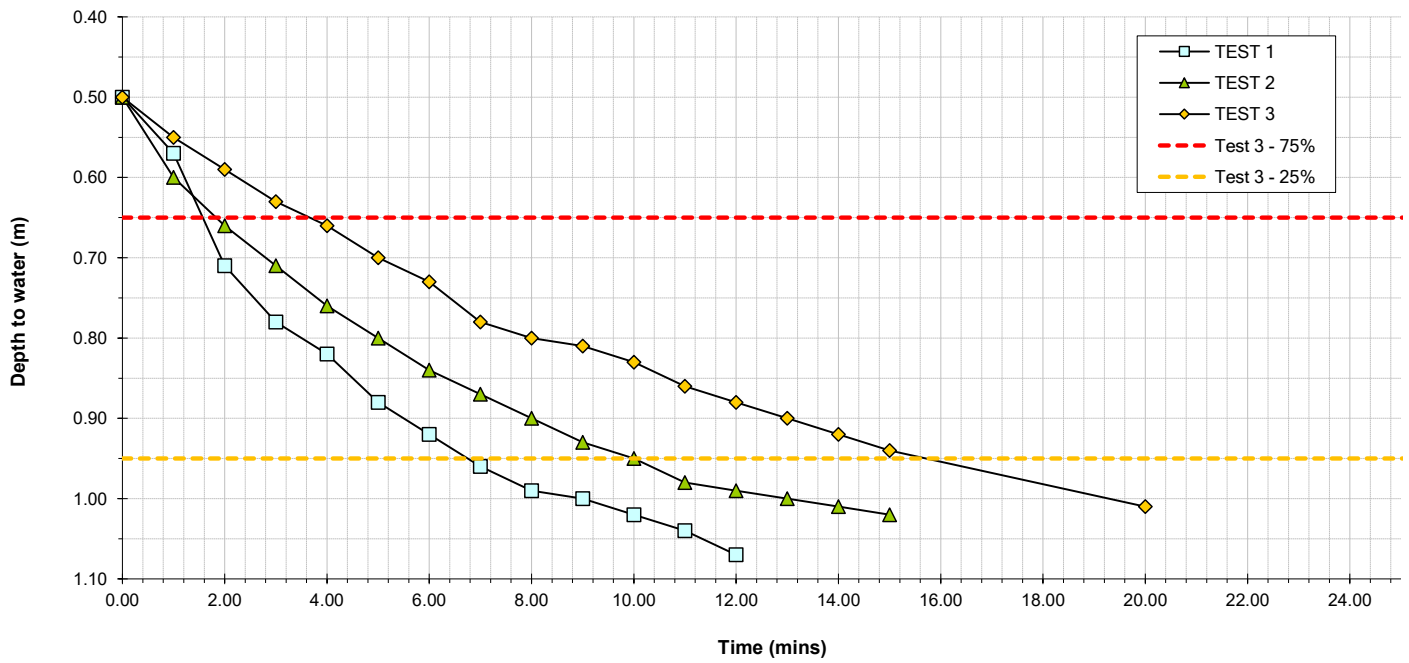
enzygo	Site..... Gelderd Rd, Birstall Job Number..... CRM.3030.020 Date of Test..... 12.03.2025	Soakaway Number..... SA03 Length..... 1.45 m Width..... 0.55 m Depth..... 1.10 m
	SOIL INFILTRATION RATE TEST See B.R.E. Digest 365, 1991, Soakaway Design.	Groundwater Level..... Dry m

Remarks -

TEST 1		TEST 2		TEST 3	
Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)	Time(min)	Depth to Water (m)
0.0	0.50	0.0	0.50	0.0	0.50
1.0	0.57	1.0	0.60	1.0	0.55
2.0	0.71	2.0	0.66	2.0	0.59
3.0	0.78	3.0	0.71	3.0	0.63
4.0	0.82	4.0	0.76	4.0	0.66
5.0	0.88	5.0	0.80	5.0	0.70
6.0	0.92	6.0	0.84	6.0	0.73
7.0	0.96	7.0	0.87	7.0	0.78
8.0	0.99	8.0	0.90	8.0	0.80
9.0	1.00	9.0	0.93	9.0	0.81
10.0	1.02	10.0	0.95	10.0	0.83
11.0	1.04	11.0	0.98	11.0	0.86
12.0	1.07	12.0	0.99	12.0	0.88
		13.0	1.00	13.0	0.90
		14.00	1.01	14.0	0.92
		15.0	1.02	15.0	0.94
				20.0	1.01

Effective Storage Depth	m	0.60	0.60	0.60
75% Effective Storage Depth	m	0.45	0.45	0.45
(i.e. depth below GL)	m	**0.65**	**0.65**	**0.65**
25% Effective Storage Depth	m	0.15	0.15	0.15
(i.e. depth below GL)	m	**0.95**	**0.95**	**0.95**
Effective Storage Depth 75%-25%	m	0.30	0.30	0.30
Time to fall to 75% effective depth	mins	1.60	1.80	3.60
Time to fall to 25% effective depth	mins	6.80	10.00	15.80
V (75%-25%)	m3	0.24	0.24	0.24
a (50%)	m2	2.00	2.00	2.00
t (75%-25%)	mins	5.20	8.20	12.20
SOIL INFILTRATION RATE	m/s	**3.84E-04**	**2.43E-04**	**1.64E-04**

DESIGN SOIL INFILTRATION RATE, f **1.64E-04** **m/s**



Compiled By:	Date:	Checked By:	Date:	Approved By:	Date:
R.Kelliher	17/03/2025	D.James	26/03/2025	M.Ward	26/03/2025

Appendix 6 - Proposed Drainage Calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	75.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
1	0.048	5.00	157.400	1200	423687.403	427678.290	0.600
2			157.400	1200	423673.099	427668.831	0.770
3			157.400	1200	423668.293	427663.552	0.841
4	0.040	5.00	157.400	1200	423652.689	427669.615	1.350
5	0.026	5.00	157.000	1200	423668.330	427657.124	1.050
6	0.035	5.00	157.400	1200	423663.488	427658.273	1.483
7			158.100	1200	423658.568	427650.651	2.433

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	17.149	0.600	156.800	156.630	0.170	100.9	150	5.29	45.8
1.001	2	3	7.139	0.600	156.630	156.559	0.071	100.5	150	5.40	45.4
1.002	3	6	7.138	0.600	156.559	156.488	0.071	100.5	150	5.52	45.0
2.000	4	6	15.661	0.600	156.050	155.946	0.104	150.0	150	5.32	45.7
3.000	5	6	4.976	0.600	155.950	155.917	0.033	150.0	150	5.10	46.5
1.003	6	7	9.072	0.600	155.917	155.667	0.250	36.3	150	5.61	44.7

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.000	17.7	6.0	0.450	0.620	0.048	0.0	60	0.904
1.001	1.002	17.7	5.9	0.620	0.691	0.048	0.0	59	0.901
1.002	1.002	17.7	5.9	0.691	0.762	0.048	0.0	59	0.901
2.000	0.818	14.5	5.0	1.200	1.304	0.040	0.0	61	0.743
3.000	0.818	14.5	3.3	0.900	1.333	0.026	0.0	48	0.661
1.003	1.676	29.6	18.1	1.333	2.283	0.149	0.0	85	1.757

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	17.149	100.9	150	Circular_Default Sewer Type	157.400	156.800	0.450	157.400	156.630	0.620
1.001	7.139	100.5	150	Circular_Default Sewer Type	157.400	156.630	0.620	157.400	156.559	0.691
1.002	7.138	100.5	150	Circular_Default Sewer Type	157.400	156.559	0.691	157.400	156.488	0.762
2.000	15.661	150.0	150	Circular_Default Sewer Type	157.400	156.050	1.200	157.400	155.946	1.304
3.000	4.976	150.0	150	Circular_Default Sewer Type	157.000	155.950	0.900	157.400	155.917	1.333
1.003	9.072	36.3	150	Circular_Default Sewer Type	157.400	155.917	1.333	158.100	155.667	2.283

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	1	1200	Manhole	Adoptable	2	1200	Manhole	Adoptable
1.001	2	1200	Manhole	Adoptable	3	1200	Manhole	Adoptable
1.002	3	1200	Manhole	Adoptable	6	1200	Manhole	Adoptable
2.000	4	1200	Manhole	Adoptable	6	1200	Manhole	Adoptable
3.000	5	1200	Manhole	Adoptable	6	1200	Manhole	Adoptable
1.003	6	1200	Manhole	Adoptable	7	1200	Manhole	Adoptable

Flow v10.8 Copyright © 1988-2025 Causeway Technologies Ltd

Simulation Settings

Rainfall Methodology	FEH-22	Skip Steady State	✓	Check Discharge Volume	✓
Summer CV	1.000	Drain Down Time (mins)	240	100 year 360 minute (m³)	
Winter CV	1.000	Additional Storage (m³/ha)	20.0		
Analysis Speed	Normal	Check Discharge Rate(s)	✓		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440	2160	2880

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

Pre-development Discharge Rate

Site Makeup	Greenfield	SPR	0.10	Betterment (%)	0
Greenfield Method	IH124	Region	1	QBar	
Positively Drained Area (ha)		Growth Factor 1 year	0.85	Q 1 year (l/s)	
SAAR (mm)		Growth Factor 30 year	1.95	Q 30 year (l/s)	
Soil Index	1	Growth Factor 100 year	2.48	Q 100 year (l/s)	

Pre-development Discharge Volume

Site Makeup	Greenfield	SPR	0.10	Storm Duration (mins)	360
Greenfield Method	FSR/FEH	CWI		Betterment (%)	0
Positively Drained Area (ha)		Return Period (years)	100	PR	
Soil Index	1	Climate Change (%)	0	Runoff Volume (m³)	

Node 7 Lined Soakaway Storage Structure

Base Inf Coefficient (m/hr)	1.10100	Invert Level (m)	155.667	Pit Length (m)	1.500
Side Inf Coefficient (m/hr)	1.10100	Time to half empty (mins)	30	Depth (m)	
Safety Factor	2.0	Ring Diameter (m)	1.200	Inf Depth (m)	
Porosity	1.00	Pit Width (m)	1.500	Number Required	1

Node 6 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	155.917
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	140.0	0.0	0.800	140.0	0.0	0.801	0.0	0.0

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.72%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	1	10	157.400	0.600	36.9	1.6386	1.6524	FLOOD
30 minute summer	2	20	157.007	0.377	25.0	0.4261	0.0000	SURCHARGED
30 minute summer	3	20	156.815	0.256	24.3	0.2893	0.0000	SURCHARGED
720 minute winter	4	690	156.715	0.665	2.5	1.1458	0.0000	SURCHARGED
720 minute winter	5	690	156.715	0.765	1.6	1.2434	0.0000	FLOOD RISK
720 minute winter	6	690	156.715	0.798	9.1	112.9560	0.0000	SURCHARGED
720 minute winter	7	690	156.714	1.047	1.3	3.5400	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)
15 minute summer	1	1.000	2	24.8	1.408	1.403	0.3019
30 minute summer	2	1.001	3	24.3	1.380	1.372	0.1257
30 minute summer	3	1.002	6	24.3	1.380	1.372	0.1233
720 minute winter	4	2.000	6	2.4	0.378	0.166	0.2757
720 minute winter	5	3.000	6	1.5	0.486	0.104	0.0876
720 minute winter	6	1.003	7	1.3	0.364	0.044	0.1597
720 minute winter	7	Infiltration		1.3			

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Appendix 7 - CCTV Survey

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Tel. 0113 3858400
cctvsurveys@lanesgroup.co.uk

WEB PROJECT
CLICK TO OPEN THIS PROJECT

Project

Project Name:	Enzygo Limited - Gelderd Road - LSO0479773
Project Status:	Complete
Project Date:	04/12/2024
Lanes Division:	Leeds

Lanes Group plc
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Enzygo Limited - Gelderd Road - LSO0479773	04/12/2024

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Section Item 2: MHF1 > LINE X (MHF1X) 3
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Project Information

Project Name	Project Date
Enzygo Limited - Gelderd Road - LSO0479773	04/12/2024

Client

Company: Enzygo Limited
Department: Samuel House First Floor
Street: 5 Fox Valley Way
Town or City: Stocksbridge
County: Sheffield
Post Code: S36 2AA

Site

Street: Gelderd Road
Town or City: Birstall
County: Wakefield
Post Code: WF17 9DT

Contractor

Company: Lanes Group
Description: Leeds Depot
Contact: Tony Moore
Department: Depot Manager
Street: 17 Parkside Lane
Town or City: Leeds, LS11 5TD
County: West Yorkshire
Phone: 0113 3858400
Email: Leedsops@lanesgroup.co.uk

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Project Information

Project Name	Project Date
Enzygo Limited - Gelderd Road - LSO0479773	04/12/2024

Project Summary

Dear Customer,

As requested, we have recently carried out a drainage CCTV survey at the site location and our full and detailed findings are contained in the attached CCTV report which you can review at your leisure.

We have identified the need for further works and will provide a quotation which will highlight the areas of concern, the most appropriate remedial technique and all associated costings.

We would like to take this opportunity to thank you for using Lanes Group plc and we hope we can be of service to you again soon. Please visit our website for full details of all services we can provide, follow us on social media or even share details of your customer experience with us:

www.lanesgroup.co.uk

If you require any technical assistance understanding the findings of the CCTV report then please contact us at:

cctvsurveys@lanesgroup.co.uk

Kind regards,
Lanes Group

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Project Information

Project Name	Project Date
Enzygo Limited - Gelderd Road - LSO0479773	04/12/2024

Project Notes

Summary of issues highlighted by survey:

Section 01: Fracture, deposits fine 15%
Section 02: Fracture, roots tap, deposits fine 10%

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Project Pictures

Project Name	Project Date
Enzygo Limited - Gelderd Road - LSO0479773	04/12/2024

Site picture (1)_1

Site picture (2)_1

Site picture (3)_1

Site picture (4)_1

Site picture (5)_1

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Section Profile

Project Name	Project Date
Enzygo Limited - Gelderd Road - LSO0479773	04/12/2024

Circular, 100 mm

Item No.	Upstream Node	Downstream Node	Date	Road	Asset Material	Total Length	Inspected Length
1	MHS1	LINE X	02/12/2024	Geldard Road	Vitrified clay	12.20 m	12.20 m
2	MHF1	LINE X	02/12/2024	Geldard Road	Vitrified clay	1.66 m	**0.66 m**

Total: 2 Inspections x Circular 100 mm, 0 mm = 13.86 m Total Length and 12.86 m Inspected Length

Circular, 150 mm

Item No.	Upstream Node	Downstream Node	Date	Road	Asset Material	Total Length	Inspected Length
3	SepticTank	SepticTank	02/12/2024	Geldard Road	Concrete pipe	3.24 m	3.24 m

Total: 1 Inspection x Circular 150 mm, 0 mm = 3.24 m Total Length and 3.24 m Inspected Length

Circular, 1250 mm

Item No.	Upstream Node	Downstream Node	Date	Road	Asset Material	Total Length	Inspected Length
4	Soakaway	Soakaway	02/12/2024	Geldard Road	Brick	3.72 m	3.72 m

Total: 1 Inspection x Circular 1250 mm, 0 mm = 3.72 m Total Length and 3.72 m Inspected Length

Total: 4 Inspections = 20.82 m Total Length and 19.82 m Inspected Length

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Section Inspection - 02/12/2024 - MHS1X

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Item No.	Insp. No.	Date	Time	Lanes Job Number	Weather	Pre Cleaned	PLR
1	1	02/12/24	12:17	LSO4779773	Dry	Yes	MHS1X

Operator	Asset Location:	Camera	Preset Length	Legal Status	Alternative ID
D. Stagles	Building site	Push Rod	Not Specified	Private Drain	Not Specified

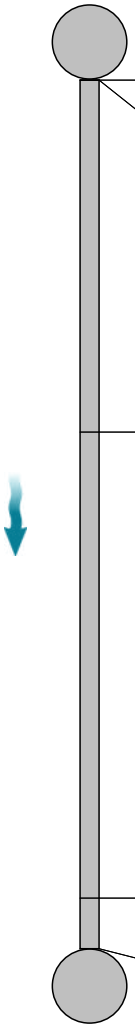
Town or Village:	Birstall	**Inspection Direction:**	Downstream	**Upstream Node:**	MHS1
Road:	Geldard Road	**Inspected Length:**	12.20 m	**Upstream Pipe Depth:**	1.50
Post Code:		**Total Length:**	12.20 m	**Downstream Node:**	LINE X
Surface Type:	Asphalt Footway	**Joint Length:**	1.00 m	**Downstream Pipe Depth:**	0

Asset Use:	Surface waste	**Asset Shape:**	Circular
Asset Type:	Gravity drain/sewer	**Dia/Height:**	100 mm
Asset Owner:	Private	**Asset Material:**	Vitrified clay
Year Constructed:	Not Specified	**Asset Lining Type:**	No Lining
Inspection Purpose:	Condition survey	**Asset Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:106

Depth: 1.50 m
MHS1



LINE X
Depth: m

Position [m]	Code	Observation	Grade
0.00	MH	Start node, manhole, reference: MHS1	
0.00	WL	Water level, 5% of the vertical dimension	
4.95	FC	Fracture, circumferential from 7 o'clock to 5 o'clock	3
11.48	DES	Settled deposits, fine, 15% cross-sectional area loss	3
12.20	MHF	Finish node, manhole, reference: SOAKAWAY	

MH - 0.00

FC - 4.95

DES - 11.48

MHF - 12.20

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
1	40.0	3.3	40.0	3.0	1	2.0	0.2	2.0	3.0

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Section Pictures - 02/12/2024 - MHS1X

Item No.	Inspection Direction	PLR	Insp. No.	Lanes Job Number
1	Downstream	MHS1X	1	LSO4779773

1, 00:00:00, 0.00 m
Start node, manhole, reference: MHS1

2, 00:00:13, 4.95 m
Fracture, circumferential from 7 o'clock to 5 o'clock

3, 00:00:24, 11.48 m
Settled deposits, fine, 15% cross-sectional area loss

4, 00:00:28, 12.20 m
Finish node, manhole, reference: SOAKAWAY

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Section Inspection - 02/12/2024 - MHF1X

WEB PROJECT
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Item No.	Insp. No.	Date	Time	Lanes Job Number	Weather	Pre Cleaned	PLR
2	1	02/12/24	12:17	LSO4779773	Dry	Yes	MHF1X

Operator	Asset Location:	Camera	Preset Length	Legal Status	Alternative ID
D. Stagles	Building site	Push Rod	Not Specified	Private Drain	Not Specified

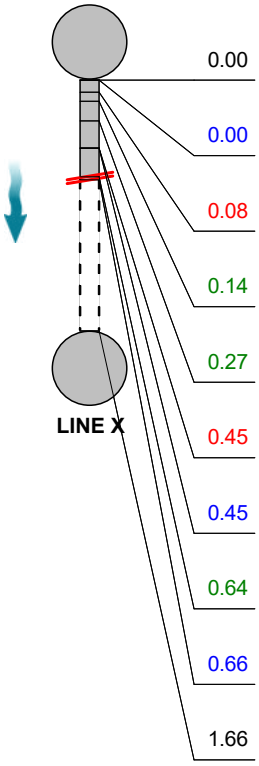
Town or Village:	Birstall	**Inspection Direction:**	Downstream	**Upstream Node:**	MHF1
Road:	Geldard Road	**Inspected Length:**	0.66 m	**Upstream Pipe Depth:**	1.30
Post Code:		**Total Length:**	1.66 m	**Downstream Node:**	LINE X
Surface Type:	Asphalt Footway	**Joint Length:**	1.00 m	**Downstream Pipe Depth:**	0

Asset Use:	Foul waste	**Asset Shape:**	Circular
Asset Type:	Gravity drain/sewer	**Dia/Height:**	100 mm
Asset Owner:	Private	**Asset Material:**	Vitrified clay
Year Constructed:	Not Specified	**Asset Lining Type:**	No Lining
Inspection Purpose:	Condition survey	**Asset Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:50

Depth: 1.30 m
MHF1



LINE X

Position [m]	Code	Observation	Grade
0.00	MH	Start node, manhole, reference: MHF1	
0.00	WL	Water level, 5% of the vertical dimension	
0.08	FC	Fracture, circumferential from 7 o'clock to 10 o'clock	3
0.14	RTJ	Roots, tap at joint	4
0.27	DES	Settled deposits, fine, 10% cross-sectional area loss	3
0.45	SS	Surface damage, spalling from 3 o'clock to 5 o'clock	2
0.45	REM	General remark: Blurred lens	
0.64	LD	Line deviates down	
0.66	SA	Survey abandoned: Unable to pass debris	
1.66		End of pipe	

Depth: m

MH - 0.00

FC - 0.08

RTJ - 0.14

SA - 0.66

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	**STR Peak**	**STR Mean**	**STR Total**	**STR Grade**	**SER No. Def**	**SER Peak**	**SER Mean**	**SER Total**	**SER Grade**
2	40.0	36.1	60.0	3.0	2	5.0	4.2	7.0	4.0

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Section Pictures - 02/12/2024 - MHF1X

Item No.	Inspection Direction	PLR	Insp. No.	Lanes Job Number
2	Downstream	MHF1X	2	LSO4779773

1, 00:00:00, 0.00 m
Start node, manhole, reference: MHF1

2, 00:00:04, 0.08 m
Fracture, circumferential from 7 o'clock to 10 o'clock

3, 00:00:05, 0.14 m
Roots, tap at joint

4, 00:00:10, 0.66 m
Survey abandoned, Unable to pass debris

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Section Inspection - 02/12/2024 - SepticTankX

WEB PROJECT CLICK TO OPEN THIS SECTION

Item No.	Insp. No.	Date	Time	Lanes Job Number	Weather	Pre Cleaned	PLR
3	1	02/12/24	12:18	LSO4779773	Dry	Yes	SEPTICTANKX

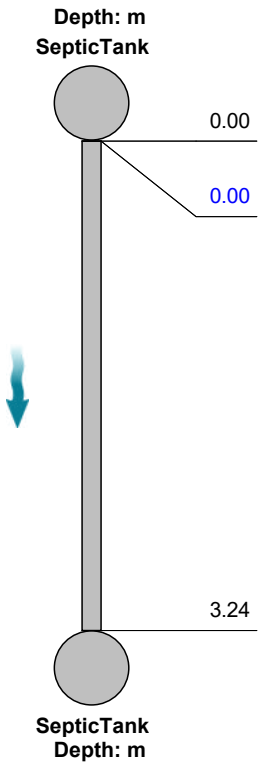
Operator	Asset Location:	Camera	Preset Length	Legal Status	Alternative ID
D. Stagles	Building site	Push Rod	Not Specified	Private Drain	Not Specified

Town or Village:	Birstall	**Inspection Direction:**	Downstream	**Upstream Node:**	SEPTICTANK
Road:	Geldard Road	**Inspected Length:**	3.24 m	**Upstream Pipe Depth:**	0
Post Code:		**Total Length:**	3.24 m	**Downstream Node:**	SEPTICTANK
Surface Type:	Asphalt Footway	**Joint Length:**	0.30 m	**Downstream Pipe Depth:**	0

Asset Use:	Foul waste	**Asset Shape:**	Circular
Asset Type:	Gravity drain/sewer	**Dia/Height:**	150 mm
Asset Owner:	Private	**Asset Material:**	Concrete pipe
Year Constructed:	Not Specified	**Asset Lining Type:**	No Lining
Inspection Purpose:	Condition survey	**Asset Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:50



Position [m]	Code	Observation	Grade
0.00	OC	Start node, other special chamber, reference: Septic Tank: Septic Tank	
0.00	REM	General remark: Visual inspection of septic tank	
3.24	OCF	Finish node, other special chamber, reference: Septic Tank: Septic Tank	

OC - 0.00

OCF - 3.24

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

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Section Pictures - 02/12/2024 - SepticTankX

Item No.	Inspection Direction	PLR	Insp. No.	Lanes Job Number
3	Downstream	SEPTICTANKX	3	LSO4779773

1, 00:00:00, 0.00 m
Start node, other special chamber, reference: Septic Tank, Septic Tank

2, 00:01:54, 3.24 m
Finish node, other special chamber, reference: Septic Tank, Septic Tank

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Section Inspection - 02/12/2024 - SoakawayX

WEB PROJECT CLICK TO OPEN THIS SECTION

Item No.	Insp. No.	Date	Time	Lanes Job Number	Weather	Pre Cleaned	PLR
4	1	02/12/24	12:18	LSO4779773	Dry	Yes	SOAKAWAYX

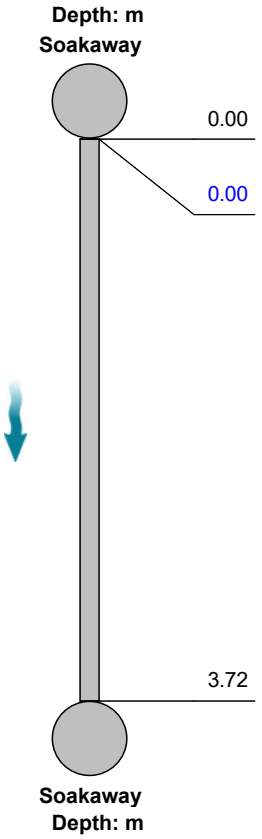
Operator	Asset Location:	Camera	Preset Length	Legal Status	Alternative ID
D. Stagles	Building site	Push Rod	Not Specified	Private Drain	Not Specified

Town or Village:	Birstall	**Inspection Direction:**	Downstream	**Upstream Node:**	SOAKAWAY
Road:	Geldard Road	**Inspected Length:**	3.72 m	**Upstream Pipe Depth:**	0
Post Code:		**Total Length:**	3.72 m	**Downstream Node:**	SOAKAWAY
Surface Type:	Asphalt Footway	**Joint Length:**	1.50 m	**Downstream Pipe Depth:**	0

Asset Use:	Surface waste	**Asset Shape:**	Circular
Asset Type:	Gravity drain/sewer	**Dia/Height:**	1,250 mm
Asset Owner:	Private	**Asset Material:**	Brick
Year Constructed:	Not Specified	**Asset Lining Type:**	No Lining
Inspection Purpose:	Condition survey	**Asset Lining Material:**	No Lining

Comments:
Recommendations:

Scale: 1:50



Position [m]	Code	Observation	Grade
0.00	MH	Start node, manhole, reference: Soakaway	
0.00	REM	General remark: Visual inspection of Soakaway	
3.72	MHF	Finish node, manhole, reference: Soakaway	

MH - 0.00

MHF - 3.72

Construction Features					Miscellaneous Features				
Structural Defects					Service & Operational Observations				
STR No. Def	STR Peak	STR Mean	STR Total	STR Grade	SER No. Def	SER Peak	SER Mean	SER Total	SER Grade
0	0.0	0.0	0.0	1.0	0	0.0	0.0	0.0	1.0

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Section Pictures - 02/12/2024 - SoakawayX

Item No.	Inspection Direction	PLR	Insp. No.	Lanes Job Number
4	Downstream	SOAKAWAYX	4	LSO4779773

1, 00:00:00, 0.00 m
Start node, manhole, reference: Soakaway

2, 00:01:40, 3.72 m
Finish node, manhole, reference: Soakaway

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