mayer brown

GLEESON LAND
LAND EAST OF BLACKMORE FARM
SANDRIDGE COMMON
MELKSHAM

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

APRIL 2026

the journey is the reward

GLEESON LAND
LAND EAST OF BLACKMORE FARM
SANDRIDGE COMMON
MELKSHAM

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APRIL 2026

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Gleeson Land

Land East of Blackmore Farm

Sandridge Common

Melksham

Flood Risk Assessment & Drainage Strategy

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1 Introduction

1.1 Mayer Brown Ltd has been commissioned by Gleeson Land to undertake a Flood Risk Assessment (FRA) and Drainage Strategy in support of an outline planning application for the erection of up to 275 dwellings (including affordable), associated infrastructure, landscape and biodiversity enhancements, all matters reserved except for access from Sandridge Common.

1.2 According to the Environment Agency's (EA) Flood Map for Planning (see **Appendix A**) a small area of the site in the south-west is at a medium risk Flood Zone 2 and high-risk Flood Zone 3 with the majority of the site in a low risk Flood Zone 1. The EA Risk of Flooding from Surface Water Flood Map shows that while most of the site is located in a very low risk of surface water flooding there are areas of low, medium and high risk of surface water flooding seen throughout (**Appendix B**).

1.3 As the site is partly within a Flood Zone 2 and 3 and partly at risk of surface water flooding, a Flood Risk Assessment is a planning requirement as per footnote 63 of the National Planning Policy Framework.

1.4 This FRA considers the impact of the proposed development in addition to the common ways in which flooding can occur. The conditions currently existing in the location of the site are described, together with the methods used to identify and assess potential impacts caused by the development proposals. The mitigation measures proposed have been identified in order to avoid and/or reduce the impacts caused by introducing the development proposals.

1.5 This Flood Risk Assessment & Drainage Strategy has been compiled in accordance with NPPF published by the Ministry of Housing, Communities and Local Government in December 2024, "Technical Guidance to the National Planning Policy Framework", 'CIRIA C624: Development and Flood Risk Guidance' and the National standards for sustainable drainage systems (SuDS).

2 Existing Site Description

Site Location

2.1 The application site is located in Melksham to the east of the consented Blackmore Farm site and to the south of the A3102 Sandridge Common. The site is made up of 9 fields with a wooded area to the southeast of the site.

2.2 The surrounding area is a mixture of urban and rural with residential developments located to the west, greenfield land to the north and south and a large solar farm to the east. Please refer to **Figure 2.1** below and **Appendix C** for the Site Location Plan.

2.3 The site falls under the administrative boundary of Wiltshire Council. The nearest postcode is SN12 7GT and the approximate co-ordinates to the centre of the site are E392748, N164475.

2.4 The site is 27.41ha and is greenfield.

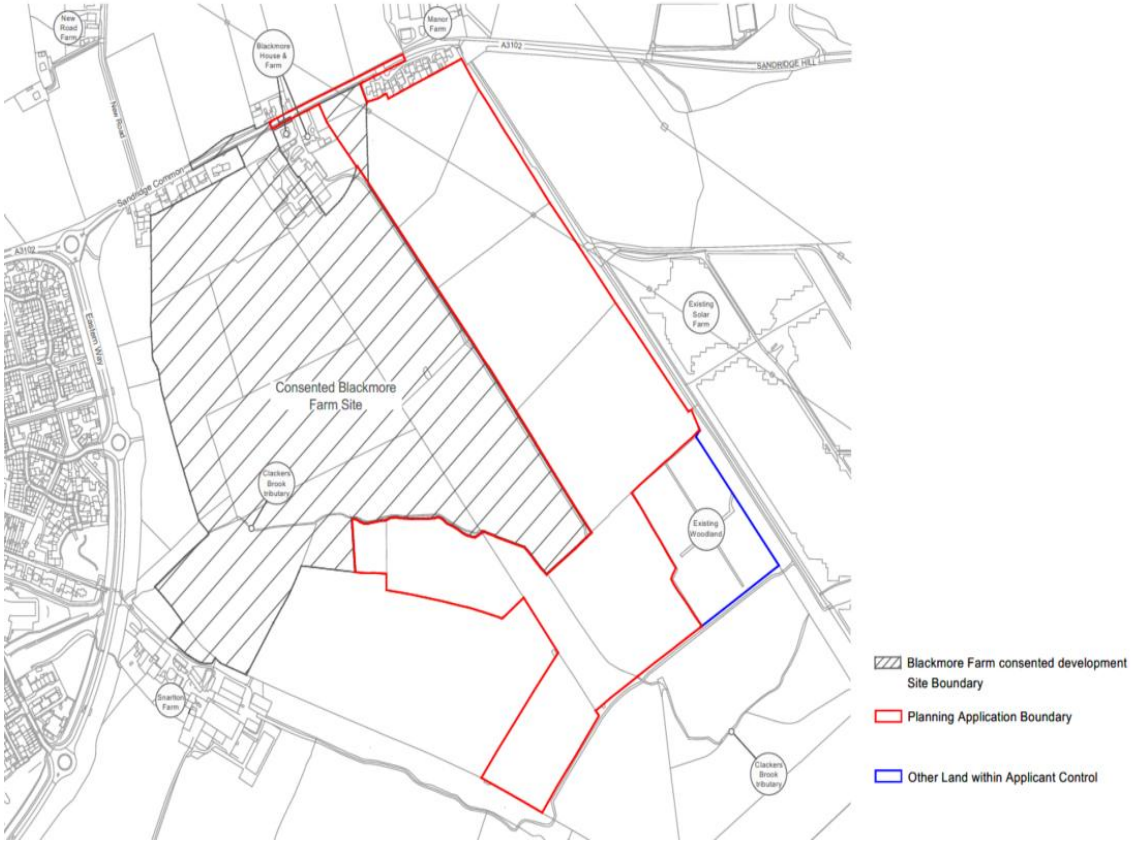


Figure 2.1: Site Location Plan

Geology & Infiltration

2.5 The BRD Phase 1 Geo-Environmental Desk Study Report undertaken in June 2025 (**Appendix D**) describes the local geology as a bedrock of Oxford Clay Formation with some superficial deposits of alluvium seen across the southwestern area, associated with the watercourse in the southwestern area of the site.

2.6 The BRD Geo-Environmental Site Investigation Report issued in April 2026 undertook soil infiltration testing at the site (**Appendix E**). The permeability of the soil was too low to calculate infiltration rates as the ground conditions were consistent with clayey soils. Therefore, it is deemed that soakaway drainage will not be feasible at the site, and an alternative drainage outfall is required.

Topography

2.7 A topographic survey was undertaken in August 2018 (verified and updated in December 2024) by Healer Surveys and is included in **Appendix F**.

2.8 The topographic survey shows that ground levels across the site fall from east to south-west towards the watercourse running through the southern region of the site. Existing ground levels range from approximately 52.50m AOD in the east of the site to 38.75m AOD in the southwestern region of the site.

Hydrology & Hydrogeology

2.9 A watercourse runs through the south of the site flowing from east to west which is a tributary of the Clackers Brook.

2.10 Several ditches run alongside the perimeter of the field boundaries, which are expected to discharge into the watercourse downstream via the existing interconnecting ditch network.

2.11 According to the Geo-Environmental Site Investigation Report (**Appendix D**), the site is not located within a Source Protection Zone.

Existing Drainage

Surface Water Drainage

2.12 The Wessex Water Sewer Records (**Appendix G**) show a public surface water sewer network running along Lopes Close to the north of the site with 300mm diameter pipes.

2.13 As the site is currently greenfield and infiltration drainage is not viable, it is considered that the surface water originating on site flows overland into adjacent ditches.

2.14 An existing catchment plan has been produced and can be found in **Appendix H**.

Foul Water Infrastructure

2.15 As the site is greenfield, there is currently no discharge of foul effluent. Therefore, the topographic survey (**Appendix F**) did not record any drainage features, routes, or details regarding an existing foul drainage system within the site.

2.16 The Wessex Water Sewer Records (**Appendix G**) show a public foul sewer network running from Lopes Close, along Sandridge Common Road to Eastern Way with 150mm diameter pipes.

3 Proposed Development

3.1 The development proposal is for an outline application for the erection of up to 275 dwellings (including affordable), associated infrastructure, landscape and biodiversity enhancements, all matters reserved except for access from Sandridge Common. Please see **Figure 3.1** below and **Appendix I** for the proposed masterplan layout.

Figure 3.1: Proposed Masterplan Layout

3.2 In terms of hard landscaping, an approximate breakdown has been provided based on 100% impermeable area of the roads and 70% hardstanding of the development areas.

3.3 These figures will be revised at the reserved matters stage once a more detailed site layout is available.

- Roads: 3.38ha
- Residential Blocks: 3.40ha
- Total hardstanding: 6.78ha
- Total soft landscaping: 25.03ha
- Site boundary: 30.81ha

4 Flood Risk Overview and Mitigation Measures

4.1 In theory there are seven principal types/sources of flooding that could affect the proposed development – these are described below. If any mitigation is needed, this is noted and detailed in a subsequent section.

- **Fluvial** – A review of the EA Flood Map for Planning (**Appendix A**) shows the development is situated in low-risk Flood Zone 1 with medium risk Flood Zone 2 and high-risk Flood Zone 3 seen in the southwestern section of the site emanating from the watercourse running through this area. It is proposed to take the sequential approach to design and all development will be located within the low risk Flood Zone 1 area. Therefore, risk of fluvial flooding will not pose a risk to the development meaning no mitigation measures are required and it will not be addressed further in this report.
- **Tidal** – The site is geographically remote from any tidal flood risk meaning that the risk to the site is low, no mitigation measures are required, and it will not be addressed further in this report.
- **Groundwater** – The Geo-Environmental Site Investigation Report issued in April 2026 (**Appendix E**) provides an insight into the varying groundwater levels at the site. Groundwater levels ranged from 2.98m below ground level to 4.94m below ground level however higher water levels were encountered from 0.72m AOD however the report notes that standing water levels are considered to be related to perched water within fractures and fissures of the bedrock and therefore these readings should not be considered a true groundwater level. The geology has been described as clayey soil which is known for its low permeability and poor drainage and can act as a barrier to groundwater flow preventing it from reaching the surface level. The Wiltshire Council Strategic Flood Risk Assessment (SFRA) from November 2024 Groundwater Flood Map (**Appendix J**) shows the site falls within a zone deemed to be at negligible risk from groundwater flooding. There is no basement development proposed, and the finished floor levels of the buildings will be set no lower than existing ground therefore the risk of groundwater flooding is low.
- **Surface Water Runoff** – The EA Risk of Flooding from Surface Water Flood Map shows there are isolated areas of medium and high-risk of surface water flooding throughout the site, refer to **Appendix B**. Typically, this is due to depressions within the ground topography as a result of the existing ditch network within the site boundary. It is proposed that all development will be kept outside of the medium and

high risk flood zones and therefore the natural flow paths at the site will be maintained. A SuDS strategy will be implemented to positively drain the proposed development and contributing areas and discharge them back to the surrounding ditch network at greenfield rates, which is discussed further in Section 5 below.

- **Infrastructure Failure** – The Wiltshire Council's Level 1 SFRA from November 2024 provides a Risk of Flooding from Sewers Map (**Appendix K**). This shows in Melksham and surrounding areas there have been 1-10 sewer flooding incidents, however, the catchment area is large and there is no data to suggest that these incidents happened on or around the development site. Therefore, it is considered that the risk of sewer flooding is low, meaning no mitigation measures are required, and it will not be addressed further in this report.
- **Reservoirs** – The Wiltshire Council SFRA Reservoir Flood Extents Map (**Appendix L**) shows the site is not within a reservoir flood risk area meaning no mitigation measures are required and it will not be addressed further in this report.
- **Canals** - The Wiltshire Council SFRA Canal and Recorded Incident Map (**Appendix M**) shows that there are no canals in the vicinity of the site and therefore no recorded flood incidents relating to canals. This means no mitigation measures are required and it will not be addressed further in this report.

Historic Flooding

4.2 The Wiltshire Council's Level 1 SFRA has a map showing historic flood incidents (**Appendix N**). This shows that there is one recorded incident of surface water flooding to the west, outside of the site boundary however this dates back to the 1960's with no recorded incidents since.

Sequential Test

4.3 The Planning Policy Guidance for Flood Risk and Coastal Change states that where a site-specific Flood Risk Assessment demonstrates that occupiers and users would remain safe from current and future surface water flood risk for the lifetime of the development without increasing flood risk elsewhere, the sequential test need not be applied.

4.4 As the Flood Risk Assessment has taken the sequential approach to design, this FRA will demonstrate that no built development within the site boundary, including access or escape routes, land raising or other potentially vulnerable elements, would be located on an area that would be at risk of flooding from any source, now and in the future (having regard to potential changes in flood risk) and that all occupiers and users would be safe

from current or future surface water flood risk. Therefore, in accordance with paragraph 175 of the NPPF and paragraph 27 of the Planning Policy Guidance for Flood Risk and Coastal Change, the sequential test is not required.

Buffer Zone

4.5 As there is an existing watercourse in the south-west of the site, a buffer zone will be required between the top of bank of the watercourse and any development. A minimum 8m buffer zone will be provided.

4.6 It should also be noted that no new crossing points are proposed across this watercourse with the proposed new footpath to use the existing crossing point.

Flood Mechanism	Source	Flood Risk to the Development	Mitigation Required?
Fluvial	Unnamed Watercourse	Low	All development will be located within the low risk Flood Zone 1.
Tidal	N/A	Low	No
Groundwater	Underlying geology and groundwater levels	Low	The clay will act as a barrier, preventing groundwater from rising to the surface. All development has been located away from the watercourse, no basement development is proposed and FFLs will be set above existing ground.
Surface Water / Overland Flow	Runoff from surrounding elevated land.	Low	Natural flow paths to be maintained with all development located in the low and very low risk flood areas. A site-specific surface water drainage strategy is proposed for the development.
Infrastructure Failure	Surface water systems and Water mains	Low	No
Reservoir Flooding	Local Reservoirs	Low	No
Canal Flooding	N/A	Low	No

Table 4.1: Flood Risk Summary

5 Surface Water Drainage

Existing Surface Water Drainage

5.1 The Wessex Water Sewer Records (**Appendix G**) show a public surface water sewer network running along Lopes Close to the north of the site with 300mm diameter pipes.

5.2 As the site is currently greenfield and infiltration drainage is not viable, it is considered that the surface water originating on site flows overland into adjacent ditches.

5.3 An existing catchment plan has been produced and can be found in **Appendix H**.

Infiltration & Underlying Geology

5.4 The BRD Phase 1 Geo-Environmental Desk Study Report undertaken in June 2025 (**Appendix D**) describes the local geology as a bedrock of Oxford Clay Formation with some superficial deposits of alluvium seen across the southwestern area, associated with the watercourse in the southwestern area of the site.

5.5 The BRD Geo-Environmental Site Investigation Report issued in April 2026 undertook soil infiltration testing at the site (**Appendix E**). The permeability of the soil was too low to calculate infiltration rates as the ground conditions were consistent with clayey soils. Therefore, it is deemed that soakaway drainage will not be feasible at the site, and an alternative drainage outfall is required.

Sustainable Drainage (SuDS) and Drainage Hierarchy

5.6 In its role as the Lead Local Flood Authority (LLFA), Wiltshire Council will be concerned about the quantity, quality, and rate of surface water runoff from development sites. This will be achieved at this site by introducing SuDS features to restrict, attenuate and treat surface water before it leaves the site.

5.7 The Wiltshire Council SuDS Validation Checklist has been completed and can be found in **Appendix O**.

5.8 Sustainable Urban Drainage Systems (SUDS) are a range of techniques that aim to mimic the way rainfall drains in natural systems and so reduces the hydraulic and hydrological impact on the local area and downstream catchments. There are several options available to impose surface water restrictions on proposed development plots such as oversized sewers, below ground storage tanks, attenuation ponds and basins, swales, permeable paving, or infiltration systems.

5.9 To determine the most suitable method of surface water disposal, the SuDS hierarchy from the National Standards of Sustainable Drainage Systems published by DEFRA has been used, see below:

- **Collected for non-potable use** – Water Butts are to be included to collect surface water and use it for irrigation purposes in gardens.
- **Infiltrate into the ground** – BRD Environmental soil infiltration testing at the adjacent site (**Appendix E**) determined that infiltration into the ground is not a viable option for surface water discharge.
- **Discharge to an above ground surface water body** – Several ditches run alongside the site boundary and there is an existing watercourse in the south-west corner.
- **Discharge to a surface water sewer or another piped surface water drainage system** – The Wessex Water Sewer Records (**Appendix G**) show a sewer network to the north of the site which could be utilised with the introduction of a pumping system.

5.10 Following the drainage hierarchy, it is proposed to discharge surface water to the surrounding ditch network via attenuation SuDS Basins, restricted to greenfield run-off rates with 30% betterment implemented in accordance with the Wiltshire Council's Drainage and Betterment Strategy.

Proposed Surface Water Disposal

5.11 A surface water drainage strategy has been undertaken for the site and can be seen in **Appendix P**.

5.12 The proposed SuDS features will reduce the rate of discharge by providing storage during heavy rainfall events and will ensure that the site will not flood for up to and including the 1 in 100 year return period plus 45% climate change storm event.

5.13 The site has been split into 3 catchments each with their own attenuation basins, flow control and outfall into the ditch network that runs through and around the site.

5.14 Surface water from the roofs of buildings will drain via rainwater downpipes into water butts and be used for irrigation purposes.

5.15 Surface water from the roads will drain into the underground piped network and conveyed into the attenuation basins.

5.16 Surface water from the site will be discharged into the existing ditches that run through and around the site, restricted to 30% betterment over greenfield run-off rates by hydrobrake flow controls. Excess water will back up into the attenuation basins provided in each catchment on site.

5.17 Ordinary watercourse consent and any other appropriate permissions to discharge surface water into the surrounding drainage ditch network will be obtained at the detailed design stage.

5.18 The first 5mm of surface water landing on the site will be captured and stored in line with the National Sustainable Drainage Standards.

5.19 The attenuation basins provide the majority of the interception storage required at the site. The rest will be provided through plot level features such as:

- Permeable Paving
- Rainwater Planters
- Rain Gardens

5.20 Further details will be provided at the reserved matters stage.

Proposed Discharge Rates

5.21 The existing greenfield rates for the development area for each catchment has been calculated using the IH124 method in Causeway Flow (for full calculations refer to **Appendix Q**):

Catchment 1:

- Q1 years: 4.6l/s
- Q30 years: 13.0l/s
- Q100 years: 17.3l/s
- QBar: 5.4l/s

Catchment 2:

- Q1 years: 7.9l/s
- Q30 years: 22.2l/s
- Q100 years: 29.6l/s
- QBar: 9.3l/s

Catchment 3:

- Q1 years: 15.2l/s
- Q30 years: 42.8l/s

- Q100 years: 56.9l/s
- QBar: 17.8l/s

5.22 The discharge rates for each catchment will be restricted back to 30% betterment over the Qbar rate via a flow control and attenuation system. Therefore, the following peak discharge rates are proposed:

- Catchment 1 – 3.8l/s
- Catchment 2 – 6.5l/s
- Catchment 3 – 12.5l/s

5.23 The proposed attenuation storage has been modelled using Causeway Flow which demonstrates that the site is designed and will not flood for up to and including the 1in100yr+45% climate change event (**Appendix R**).

5.24 A conservative allowance of 70% of the residential development blocks has been assumed as a hardstanding area to also include a 10% allowance for urban creep. The CV values are set to 1 and the MADD Factor has been set to 0.

5.25 The basins have been designed with a 300mm freeboard.

Exceedance Flows

5.26 In the event the capacity of the proposed surface water drainage network is exceeded, the excess water will follow the topography of the ground and flow overland towards the western and southern boundary into the drainage ditches at an unrestricted rate, leaving properties unaffected.

Surface Water Treatment

5.27 Table 26.2 of the SuDS Manual identifies the pollution hazard level associated with the land uses within the proposed development as being 'Low'. On a scale from 0-1 a 'Low" pollution hazard level relates to the following pollution hazard indices (See table 26.2 of the SuDS Manual). This is applicable to individual property driveways, residential car parks, low traffic roads (e.g. Cul de sacs, homezones and general access roads):

- Total Suspended Solids = 0.5
- Metals = 0.4
- Hydrocarbons = 0.4

5.28 Table 26.3 of the SuDS Manual sets out the indicative mitigation indices provided by:

Attenuation Basins

5.29 Attenuation basins provide surface water treatment primarily via the gravitational settling of particles.

5.30 Basins provide adequate pollution mitigation for runoff from low hazard land uses and provide mitigation indices of 0.5, 0.5, and 0.6.

Adoption and Maintenance

5.31 The surface water sewer will be offered for adoption under an S104 application however all SuDS features within the network will remain in private ownership and be maintained by a management company organised by the Applicant. This should enable tight control over the operation and maintenance of the drainage/SuDS systems on site.

Design Criteria

5.32 The positive drainage will be designed in accordance with Design and Construction Guidance, BS EN 752 – Drain and Sewer Systems Outside Buildings and the Building Regulations – Part H (2015).

5.33 The surface water network design and rate of surface water run-off is based on the Flood Estimation Handbook data downloaded from the FEH Web Services.

5.34 The positive surface water system would be designed such that:

- The pipes remain unsurcharged during the 1 in 1-year design storm;
- The system should not flood during the worst case 1 in 30-year storm with a free outfall;
- The surface water run-off from the proposed development would be contained on site for up to and including the worst case 1 in 100-year storm event, plus an additional 45% increase in peak rainfall intensity for climate change;
- The pipe velocities are such that self-cleansing is achieved at lesser more moderate storm intensities: -
    - Pipe roughness (ks) = 0.6
    - Minimum pipe velocity at full flow = 0.75m/s
    - Percentage Impermeable areas:
        - Buildings = 100%
        - Carriageways, footpaths, and parking = 100%
        - Private and Communal Parking = 100%
        - Soft Landscaping = 0%

6 Foul Water Drainage

Existing Foul Water Drainage

6.1 As the site is greenfield, there is currently no discharge of foul effluent. Therefore, the topographic survey (**Appendix F**) did not record any drainage features, routes, or details regarding an existing foul drainage system within the site.

6.2 The Wessex Water Sewer Records (**Appendix G**) show a public foul sewer network running from Lopes Close, along Sandridge Common Road to Eastern Way with 150mm diameter pipes.

Proposed Foul Flow Rates

6.3 The proposals are for up to 275 new residential dwellings.

6.4 Using the Design and Construction Guidance calculation method for residential development, 4000 litres per dwelling per day, gives a peak flow of 12.73l/s.

- Peak Flow: (275x4000)/86,400 = 12.73l/s

6.5 This results in a total peak foul flow from the development of 12.73l/s.

Proposed Foul Water Drainage

6.6 An indicative foul drainage strategy has been undertaken and is provided in **Appendix P**.

6.7 It is proposed that foul effluent will drain via gravity to a foul pump station in the south of the site. Foul effluent will then be pumped to a demarcation chamber in the north by the access point onto Sandridge Common and discharge by gravity into the Wessex Water public foul sewer network.

6.8 The capacity check was submitted and Wessex Water have confirmed capacity within the surrounding foul sewer network to accommodate the proposed development.

6.9 A section 106 application will be made to Wessex Water at the detailed design stage in order to gain permission to connect to the public sewer.

Adoption and Maintenance

6.10 The foul network will either be offered for adoption or will remain in private ownership and maintained by a management company organised by the developer. This should enable tight control over the operation and maintenance of the drainage/SuDS systems on site.

Design Criteria

6.11 The proposed foul sewers will be designed in accordance with the Design and Construction Guidance, BS EN 752 – Drain and sewer systems outside buildings and Building Regulations – Part H (2015).

7 Conclusion

7.1 The EA flood maps indicate that the site is mainly located in a low risk Flood Zone 1 with areas of Flood Zone 2 and Flood Zone 3 seen in the south-west. However, the developable area will be restricted to Flood Zone 1 removing the risk of fluvial flooding.

7.2 The site is also located within areas of medium and high risk of surface water flooding however the development will be located in the very low to low risk areas, removing the risk from surface water flooding.

7.3 The development is also at a low risk of flooding from the following sources: groundwater, infrastructure failure, reservoir flooding and canal flooding (see Table 7.1).

Flood Mechanism	Source	Flood Risk to the Development	Mitigation Required?
Fluvial	Unnamed Watercourse	Low	All development will be located within the low risk Flood Zone 1.
Tidal	N/A	Low	No
Groundwater	Underlying geology and groundwater levels	Low	The clay will act as a barrier, preventing groundwater from rising to the surface. All development has been located away from the watercourse, no basement development is proposed and FFLs will be set above existing ground.
Surface Water / Overland Flow	Runoff from surrounding elevated land.	Low	Natural flow paths to be maintained with all development located in the low and very low risk flood areas. A site-specific surface water drainage strategy is proposed for the development.
Infrastructure Failure	Surface water systems and Water mains	Low	No
Reservoir Flooding	Local Reservoirs	Low	No
Canal Flooding	N/A	Low	No

Table 7.1: Flood Risk Summary

7.4 It is proposed to discharge surface water from the development to the drainage ditches running through and around the site at 30% betterment over greenfield run-off rates via a SuDS system. The SuDS features will ensure excess water will be safely contained

within the site boundary for all storm events up to and including the 1 in 100-year event plus 45% Climate Change.

7.5 Sufficient surface water treatment in line with the CIRIA SuDS Manual will be provided by the attenuation basins.

7.6 In the event the capacity of the proposed surface water drainage network is exceeded, the excess water will follow the topography of the ground and flow overland towards the western and southern boundary into the drainage ditches running along the boundary at an unrestricted rate, leaving properties unaffected

7.7 It is proposed that foul effluent will be discharged to the public foul sewer via a pumped solution.

7.8 Having completed this Flood Risk Assessment and Drainage Strategy, the conclusion is that the proposed development at Land East of Blackmore Farm, Melksham can be safely implemented without increasing the risk of flooding to downstream/surrounding areas.

APPENDIX A: EA Flood Map for Planning

ENVIRONMENT AGENCY FLOOD MAP FOR PLANNING

August 2025

Land at Blackmore Farm, Melksham

Wiltshire County Council, Postcode: SN12 7GT Co-ords: E392748, N164475

1. Floodplain

A floodplain is the area that would naturally be affected by flooding if a river rises above its banks, or high tides and stormy seas cause flooding in coastal areas.

There are two different kinds of area shown on the Flood Map. They can be described as follows:

- **Flood Zone 3** shows the area that could be affected by flooding, either from rivers or the sea, if there were no flood defences. This area could be flooded:

  - from the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year;
  - or from a river by a flood that has a 1% (1 in 100) or greater chance of happening each year.

- **Flood Zone 2** shows the additional extent of an extreme flood from rivers or the sea. These outlying areas are likely to be affected by a major flood, with up to a 0.1% (1 in 1000) chance of occurring each year.

These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements.

- Where there is no blue shading, this shows the area where flooding from rivers and the sea is very unlikely. There is less than a 0.1% (1 in 1000) chance of flooding occurring each year.

2. Flood Defences

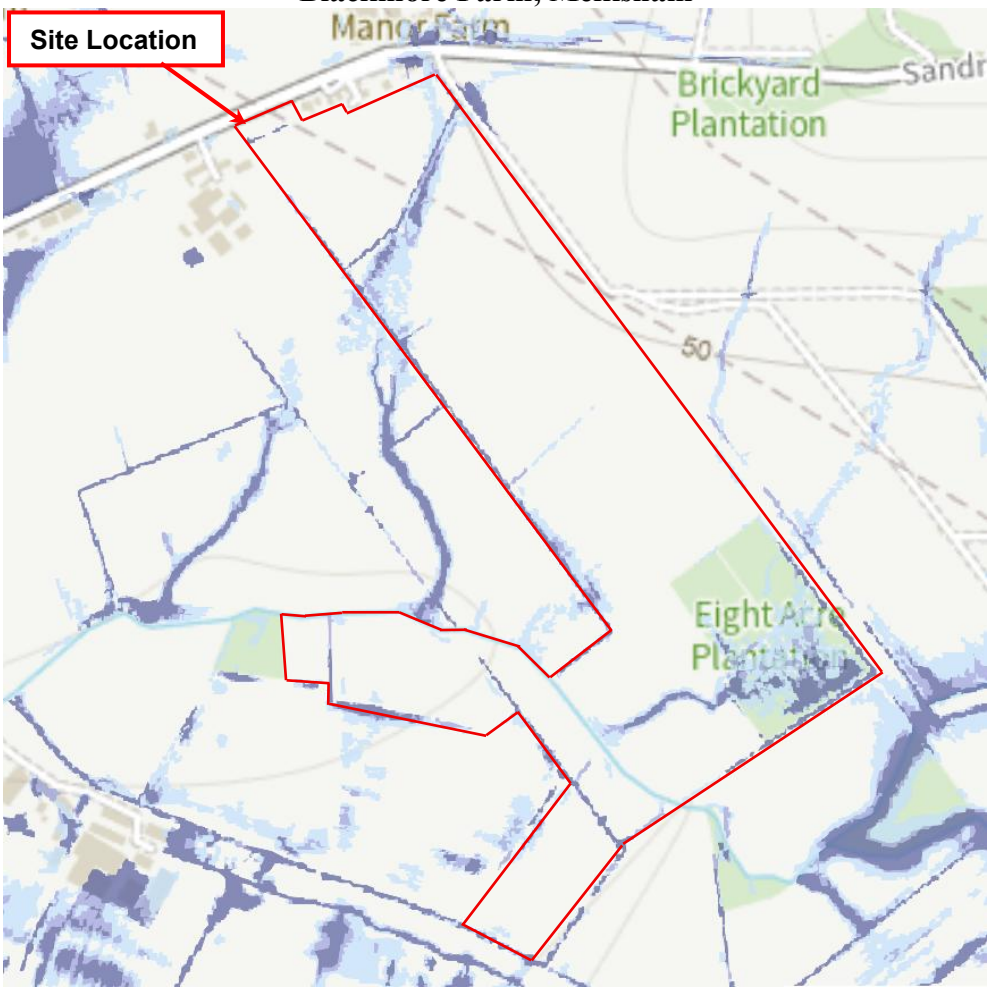
- The orange line shows all flood defences built in the last five years to protect against river floods with a 1% (1 in 100) chance of happening each year, or floods from the sea with a 0.5% (1 in 200) chance of happening each year, together with some, but not all, older defences and defences which protect against smaller floods. Flood defences that are not yet shown, and the areas that benefit from them, will be gradually added.

3. Main Rivers

The blue line shows the main rivers, these are usually larger streams and rivers.

APPENDIX B: EA Surface Water Flood Risk Map

ENVIRONMENT AGENCY SURFACE WATER FLOOD MAP
August 2025
Blackmore Farm, Melksham



Wiltshire Council, Postcode:SN12 7GT, Co-ords: E392748, N164475

Risk of Flooding from Surface Water

Surface water flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead.

The shading on the map shows the yearly chance of flooding from surface water between 2040 and 2060 in this particular area.

There are four different kinds of area shown on the Flood Map. They can be described as follows:

- High Risk Area – Each year this area has a greater than 1in30 (3.3%) chance of flooding from surface water:
- Medium Risk Area – Each year this area has between a 1in100 and a 1in30 (1%-3.3%) chance of experiencing flooding from Surface Water:
- Low Risk Area – Each year this area has a between a 1in1000 and 1in100 (0.1%-1%) chance of experiencing flooding from Surface Water.
- Very Low Risk Area – Each year this area has a less than 1in1000 (0.1%) chance of experiencing flooding from Surface Water.

APPENDIX C: Site Location Plan

New Road Farm
Blackmore House & Farm
Manor Farm
A3102
SANDRIDGE HILL
New Road
Sandridge Common
A3102
Eastern Way
Existing Solar Farm
Consented Blackmore Farm Site
Clackers Brook tributary
Existing Woodland
Snarlton Farm
Clackers Brook tributary

Blackmore Farm consented development Site Boundary

Planning Application Boundary

Other Land within Applicant Control

proj: 25-004 drg: 206 date: 14/11/25 rev: -

FOR ISSUE

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N

Land East of Blackmore Farm, Melksham

SITE LOCATION PLAN

Gleeson Land

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APPENDIX D: BRD Geo-Environmental Desk Study Extracts

Report Title:

Phase 1 Geo-Environmental Desk Study

Project Name:

Blackmore Farm – Phase 2, Melksham

Report Reference: **BRD4599-OR1-A**

Date: **June 2025**

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REPORT CONTROL SHEET

REPORT TITLE	**GEO-ENVIRONMENTAL DESK STUDY**
PROJECT	**BLACKMORE FARM – PHASE 2, MELKSHAM**
CLIENT	**GLEESON LAND**

REPORT REFERENCE	ISSUE DETAIL	DATE	PREPARED BY	CHECKED BY
BRD4599-OR1-A	First Issue	30/06/2025	L Chippington	J Brockwell

BRD Environmental Limited

Geotechnical and Environmental Services

- Ground Investigation
- Japanese Knotweed Removal
- Soil, Water and Gas Testing
- Contamination Assessment
- Geotechnical Advice
- Remediation Solutions

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REPORT LAYOUT

This report is divided into the following four sections: Summary Report, Technical Report, Supporting Information and Appendices.

SUMMARY REPORT
This expanded executive summary provides the main findings of the work undertaken in brief non-technical language. This section provides an overview of the key outcomes for the benefit of non-specialists and concludes with the main recommendations for any further work required. This section should only be relied upon in the context of the whole report and the detailed within the Technical Report should be referred to with respect to any design decisions.
TECHNICAL REPORT
The main report section is intended to provide the technical detail of the works completed and meet the information required by current guidance and practice. The Technical Report is written in a language that, in part, assumes knowledge of the subject matter so that it can be written in as concise a form as possible. Its primary audience is clients, peers, regulators and other professionals in related disciplines.

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SUPPORTING INFORMATION

This section of the report provides background details of a generic nature together with specific technical approaches adopted by BRD and details of the guidance documents that are commonly referenced in the report. The section also includes explanations of technical terms to assist non-specialist readers in understanding the Technical Report. It should be noted that not all the information within this section is necessarily applicable to this specific report.

APPENDICES

The final section of the report presents the factual data collected and employed as part of the preparation of the report.

APPENDIX 1	**SITE PLANS & PHOTOGRAPHS**	
	Site Location Plan	Ref. BRD4599-OP1-A
	Site Walkover Photographs	Ref. BRD4599-OP2-A
	Proposed Development Layout	'Phase 2 Development – Framework Plan #Option1,' ORIGIN$_3$, reference 25-004 420, 28/05/25
	Initial Conceptual Site Model	Ref. BRD4599-OP3-A
APPENDIX 2	**HISTORICAL PLANS**	
	Historical 1:2,500 & 1:10,000 Ordnance Survey maps	82No. x A3 pages
APPENDIX 3	**GEOLOGY REPORT**	
	Geology 1:50,000 Maps	20No. x A3 pages
APPENDIX 4	**MINING AND GROUND STABILITY DATA**	
	Envirocheck Order No. 376962185_1_1	41No. x A4 pages & 20No. x A3 pages
APPENDIX 5	**ENVIRONMENTAL DATA**	
	Envirocheck Order No. 376962185_1_1	111No. x A4 pages & 77No. x A3 pages
APPENDIX 6	**UXO REPORT**	
	Zetica PDSA Report ref. PA023602	2No. x A4 pages

SUMMARY REPORT

SUBJECT	COMMENTS
CURRENT SITE CONDITION	The site is a large irregular shaped parcel of land comprising 9No. separate grass fields and a wooded area in the southeastern part of the site. The external and internal boundaries are formed by hedgerows with some mature trees. There is a west flowing stream across the southwestern area of the site and some of the site boundaries and internal field boundaries include ditches that drain into this stream.
PROPOSED DEVELOPMENT	The proposed development involves housing, with gardens, access roads and driveways, across the northern and central areas of the site and public open space, including the retention of the woodland, across the southern area.
HISTORICAL SUMMARY	The site has been used for agricultural purposes since the earliest available map of 1886 until present.
PUBLISHED GEOLOGY	The site is shown to be underlain by bedrock of the Oxford Clay Formation, with some localised deposits of superficial Alluvium, associated with the stream, present across the southwestern area.
UNEXPLODED ORDNANCE	The site is at low risk from unexploded ordnance.
RADON GAS	Radon gas protection measures are not required.
HYDROGEOLOGY	The site is situated on Unproductive Strata, the Oxford Clay Formation, however the localised areas of Alluvium across the southwestern area is considered to be a Superficial secondary A Aquifer.
HYDROLOGY	There is a west flowing stream across the southwestern area of the site and a network of ditches around some of the field boundaries drain into the stream. The site is not in an area indicated to be at risk of flooding.
PREVIOUS GROUND REPORTS	BRD have previously undertaken a ground investigation across a larger site adjacent to the west that also included part of this current site. This ground investigation identified the anticipated ground conditions, although a thin surface cover of glacial clays was found over the Oxford Clay that covered the site. The previous investigation did not identify any contamination from the testing undertaken and the gas monitoring programme did not show any need for gas protection measures in the adjacent site.

PRELIMINARY CONTAMINATION RISK ASSESSMENT	
Generally, the site is agricultural land and does not offer any significant or widespread contamination risks, with the potential for residual pesticides in the near surface soils being the only widespread contamination source. In addition, there are some localised contamination sources associated with potentially infilled ponds and a former stockpile, all in the northern area of the site.	
PRELIMINARY GEOTECHNICAL ASSESSMENT	
Based on the anticipated ground conditions, it is considered that shallow strip foundations are suitable, however, the following constraining factors should be noted: • There could be localised deep Made Ground associated with the infilled ponds that would require deepened foundations, but only for those few plots straddling the former pond locations. • Due to the likelihood of the underlying soils having a medium volume change potential, any foundations within areas of tree influence will have to be deepened. Due to the likely presence of fine-grained soils and possibility for shallow groundwater, the use of soakaway drainage is unlikely to be suitable for this site.	
RECOMMENDATIONS	
PHASE 2 CONTAMINATION ASSESSMENT	Whilst there are no significant contamination risks, some minor low potential contamination risks have been identified by this Phase 1 Desk Study and therefore some targeted Phase 2 Contamination Assessment is necessary to assess the significance of these potential pollutant linkages. However, whilst the need for a Phase 2 contamination assessment has been identified, this Phase 1 report has shown that there should be no significant contamination on the site which would preclude any redevelopment and therefore no reason why the subsequent contamination assessment could not be addressed through appropriately worded conditions on any future planning permission for the proposed development.
GEOTECHNICAL GROUND INVESTIGATION	For any form of development, BRD recommend that an intrusive ground investigation is undertaken in order to confirm ground conditions and allow design of the new structures.

1. INTRODUCTION TO TECHNICAL REPORT

1.1. CONTRACT DETAILS

CLIENT	Gleeson Land Limited trading as Gleeson Land.
SITE	Blackmore Farm – Phase 2, Melksham.
CLIENT'S ADVISORS	BRD Environmental Limited (BRD) has been commissioned directly by the Client.
REPORT CONTEXT	It is understood that the Client intends market the site for a residential development.
REPORT TYPE	Factual and interpretative geo-environmental desk study.
REPORT OBJECTIVES	The purpose of the report is to undertake a preliminary geo-environmental assessment of the site for due diligence purposes and to accompany a planning application for the proposed development.

1.2. SCOPE OF WORKS

The agreed scope of works was:

- Desk based research through the purchase of an Envirocheck report, including:
    - Environmental database search.
    - Environment Agency data.
    - BGS radon maps.
    - Mining and natural cavities database search.
    - Available historical Ordnance Survey plans.
- Interpretation of the geological, hydrogeological and hydrology setting of the site from published sources.
- Undertake a preliminary UXO risk assessment in line with CIRIA 681, 'Unexploded Ordnance (UXO) A Guide for the Construction Industry.'
- Review of the previous BRD desk study and site investigation reports for the Phase 1 development land.
- A site walkover will be undertaken to identify any potential sources of contamination or indication of other ground related hazards at the site and its surroundings.
- Prepare a Phase 1 desk study report including copies of the purchased information, interpretation of the collected data to identify and assess contamination hazards together with any other environmental/geotechnical issues.

1.3. REPORT LIMITATIONS

Any site boundary lines depicted on plans included within this report are approximate only and do not imply legal ownership of land. Any observations of tree species, asbestos containing materials within structures or invasive weeds, does not constitute a formal survey of such features. The identification of such features is therefore tentative only. In the case of Japanese Knotweed and other non-aqueous invasive weeds, BRD can undertake separate surveys for this plant undertaken by a Property Care Association qualified surveyor.

The report does not consider whether sensitive ecology or archaeology is present as these require consideration by professionals specialising in these matters. For excavations planned within six metres of a third part structure then separate professional advice should be sought in respect of the requirements of the Party Wall Act.

It is emphasised that a desk study and walkover can only indicate the potential for contamination on the site. This study aims to highlight potential pollutant linkages in line with current guidance. The plausibility of these linkages can only be proved by an intrusive ground investigation.

It should be noted that a desk study and walkover can only reveal the potential for certain types of ground conditions and geotechnical hazards. For any form development an intrusive ground investigation is recommended. The scope of this investigation excludes a formal slope stability study and any observations made regarding slopes are for information only.

2. SITE CHARACTERISTICS

2.1. SITE SETTING

SITE ADDRESS AND POST CODE	Blackmore Farm, Sandridge Common, Melksham, SN12 7QS.
NATIONAL GRID REFERENCE	Approximate centre of the site – 393043, 164055.

2.2. SITE DESCRIPTION

2.2.1. Overview

The site comprises a large irregular shaped parcel of land consisting of 9No. separate grass fields and a wooded area in the southeastern part of the site. The external and internal boundaries are formed by hedgerows that include some mature trees, including oak. There is a west flowing stream across the southwestern area of the site and some of the site boundaries and internal field boundaries include ditches that drain into this stream.

2.2.2. Details

INSPECTION DATE	30th May 2025.
CURRENT USE	The site is comprised of 9No. grassed fields and 1No. wooded area in the southeastern part of the site.
AREA	The site covers an area of approximately 31 hectares.
SHAPE	The site is formed by an irregular shaped parcel of land.
ACCESS	Access to the site is gained from Sandridge Common through a gate in the northern boundary.
BOUNDARIES	The site boundaries are formed by mixed hedgerows, which include some mature trees.
TOPOGRAPHY	Generally, the site slopes gently downwards towards the stream in the southwestern area of the site, however, one of the fields in the northern area slopes downwards gently towards the northwest.
SURFACING	There is no hardstanding on the site, with most of the site being grassed fields.
BUILDINGS	There are no buildings present on the site.
VEGETATION	The external and internal hedgerows are formed by mixed hedgerows, including Hawthorn. The hedgerows include some mature trees, which are mainly oak. The wooded area forming the southern part of the site includes oak, sycamore, ash and hawthorn.

NOTABLE FEATURES AND OBSERVATIONS	There is a west flowing stream across the southwestern part of the site and along some of the site boundaries. Ditches that drain into this stream are present around some of the internal field boundaries. At the time the walkover all of the ditches were dry. The exposed soils displayed no evidence of any manmade components or ground contamination.

SURROUNDING LAND USE	The site is set in an agricultural area just to the east of the town of Melksham.
TO THE NORTH	Manor Farm and associated agricultural land.
TO THE EAST	Agricultural land and a solar farm.
TO THE SOUTH	Agricultural land.
TO THE WEST	Blackmore Farm to the northwest, with agricultural land to the south of the farm.

2.3. SITE HISTORY

MAPPED HISTORY		
DATE RANGE	**SITE**	**SURROUNDING AREA**
1886 to 1942	The earliest map shows most of the site was formed by fields, with many internal boundaries that were mainly aligned roughly southwest to northeast. In addition, there was a wooded plantation in the southeastern area, a west flowing stream across the southwestern area and several ponds across the site.	The earliest map shows the surrounding area to mainly comprise further fields, however, there was a school just to the north, some farm buildings associated with Manor Farm approximately 50m north and more farm buildings associated with Blackmore Farm just to the northwest. In addition, there was a plantation named 'Brickyard Plantation' approximately 250m east of the site.
1961 to 2006	By the 1961 map, overhead electricity lines were constructed across the northern area of the site with the associated cables aligned roughly northwest to southeast. The ponds appear to have been infilled between 1961 and 1972.	The electricity lines extend to the northwest and southeast. By 1972 a pumping station was constructed just to the northwest of the site.
2024	No significant changes on the site.	The school to the north was demolished and houses constructed just beyond the northern boundary. A solar farm was constructed to the east of the site.

AERIAL IMAGERY	Google Earth imagery from 1999 onwards shows the site similar to its current state, with most of the site formed by fields and a wooded plantation in the southeastern area and a school building just to the north of the site. The aerial images show the demolition of the school and construction of houses just to the north of the site and the construction of the solar farm to the east occurred in 2015 and 2016.
INTERNET SEARCH	No information specific to the site was identified.
ANECDOTAL	No anecdotal evidence of site history was gained during the study.
UNEXPLODED ORDANANCE (UXO) ASSESSMENT	BRD has commissioned Zetica Ltd to undertake a Pre-Desk Study Assessment (PDSA) with respect of the risk from UXO on the site. Their PDSA report is included in Appendix 6. The findings of the PDSA are that no significant military activity affecting the site has been identified and that there are no readily available records indicating that the site was bombed. Zetica's conclusions are that, while always prudent, a detailed desk study is not considered essential for this site.

2.4. GEOLOGY

GEOLOGICAL CONTEXT	The local geology is anticipated to mainly comprise bedrock of the Jurassic age Oxford Clay Formation, with some superficial Alluvium, associated with the stream, in the southwestern area of the site. No Made Ground or artificial ground is shown on, or close to, the site. There are no faults on, or close to, the site.
SUPERFICIAL DEPOSITS	Alluvium is unconsolidated river deposits and commonly consists of compressible clay that may be organic, however may also be silt, sand, peat or gravel. Any Alluvium on site will be limited in extent and local to the stream running through the site.
BEDROCK GEOLOGY	The Oxford Clay Formation is described as mainly grey mudstone, with sporadic limestone nodules, although a more weathered clay would be expected as the shallow strata. In this area the Oxford Clay Formation is known to be up to 150m thick and is underlain by the Kellaways Member, which is described as mudstone, siltstone and sandstone.
BGS BOREHOLE RECORDS	There are no nearby publicly available British Geological Survey (BGS) borehole records.
SOIL GEOCHEMISTRY	The site is not situated in an area where the natural background concentrations of metals is elevated.

2.5. RADON

The site is not situated within an area where radon gas protection measures are required in new buildings.

2.6. HYDROGEOLOGY

SUPERFICIAL AQUIFER	The Alluvium is classified as a Secondary A Aquifer.
BEDROCK AQUIFER	The Oxford Clay Formation is classified as Unproductive Strata.
AQUIFER PROPERTIES	Generally the site is underlain by unproductive strata and therefore groundwater would not be expected. Some local perched groundwater could be found in any Alluvium deposits associated with the on-site stream. Based on the local topography, the flow of any groundwater (if present) is likely to be towards the west flowing stream crossing the southwestern area of the site.
LICENSED GROUNDWATER ABSTRACTIONS	There are no licensed groundwater abstractions within 250m of the site.
GROUNDWATER SOURCE PROTECTION ZONE (SPZ)	The site is not located within an SPZ.

2.7. HYDROLOGY

SITE DRAINAGE CHARACTERISTICS	The ground generally slopes gently downwards towards the west flowing stream in the southwestern area of the site, however, one of the fields in the northern area slopes downwards gently towards the northwest. Ditches that drain into the stream are present around some of the field boundaries, however, at the time of the walkover, all these ditches were dry. There are no buildings or areas of hardstanding on the site, therefore, all the rainwater will infiltrate into the ground and migrate towards the stream.
SURFACE WATER FEATURES	As noted above, there is a west flowing stream in the southwestern area of the site. This stream flows into Clackers Brook approximately 750m west of the site, which eventually meets the River Avon approximately 2.3km west of the site.
SURFACE WATER ABSTRACTIONS	There are no surface water abstraction licenses within 250m of the site.
DISCHARGE CONSENTS	The Envirocheck report records a discharge consent 30m from the site. However, the postcode given in the report locates the consent over 1km to the south of the site and, therefore, it is not considered relevant to the site.

FLOODING	The site falls in a Zone 1 area and is therefore considered highly unlikely to be affected by flooding. However, as the site is greater than one hectare in area, a Flood Risk Assessment will still have to be undertaken for the site.

2.8. ENVIRONMENTAL ASPECTS

LANDFILL	The Envirocheck report records 2No historical landfill sites within 250m of the site. These relate to refuse tips at Hack Farm and Brickyard Plantation, recorded to both be around 250m to the northeast. Reference to the accompanying Site Sensitivity drawings indicates these are the same site. The deposited waste is recorded as inert, household, commercial and unknown material, and landfilling is recorded to have taken place between 1977 and 1984.
CONTEMPORARY TRADE DIRECTORY ENTRIES	The Envirocheck report records 1No contemporary trade entry within 100m of the site. This is a vehicle repair and servicing workshop and located 66m to the north. There are no active or historical fuel filling stations recorded by the Envirocheck report within 250m of the site.
REGISTERED HAZARDOUS SITES	None within 250m of the site.
POLLUTION INCIDENTS TO CONTROLLED WATERS	There have been no recorded pollution incidents within 250m of the site.
ECOLOGICALLY SENSITIVE LAND USE	None identified within 250m.

2.9. PREVIOUS GROUND INVESTIGATIONS

BRD have previously undertaken two reports for larger sites of which all or sections of this current site forms a part. These reports are referenced as follows:

- 'Phase 1 Geo-Environmental Desk Study', reference BRD3304-OR1-A and dated August 2018
- 'Preliminary Phase 2 Geo-Environmental Site Investigation', reference BRD3304-OR2-B and dated June 2023,

2.9.1. BRD Phase 1 Geo-Environmental Desk Study, August 2018.

The previous desk study included the whole of this current site as well as the Phase 1 area of proposed development to the west. The general findings of the desk study are similar to this report. Some localised contamination sources in the form of infilled ponds and stockpiled soils were identified in the northern area of the site, however, these areas were not within the boundary of the current Phase 2 development land.

2.9.2. BRD Preliminary Phase 2 Geo-Environmental Investigation, June 2023.

In support of the Phase 1 development land to the west, a preliminary ground investigation was undertaken. This investigation only included part of the northern area of this current site.

Within northern part of the site, this previous investigation comprised 5No. machine excavated trial pits and 3No. windowless sample boreholes.

The ground conditions encountered generally comprised Topsoil or Made Ground down to 0.2m to 0.5m depth underlain by a thin layer of glacial Oadby Member soils down to a maximum depth of 0.7m depth. Below the Oadby Member soils, clay soils of the Oxford Clay Formation were encountered down to the base of the exploratory points at 5.45m. However, at one test location, which had been targeted at one of the former ponds, Made Ground, which included some man-made materials, was encountered down to 1.0m depth onto Alluvium down to 1.7m depth onto the Oxford Clay Formation.

Little groundwater was encountered during the fieldworks, however, at the subsequent monitoring variable standing water levels were recorded. With the exception of those boreholes located close to the stream, this standing water was considered to be surface water ingress into the wells rather than being a continuous groundwater body.

Geotechnical testing recorded the Oxford Clay Formation soils to have mainly medium volume change potential and indicated the potential for them to be pyritic.

None of the contamination testing undertaken, including two samples from the current site, recorded any elevated concentrations of potential contaminants.

The wider site was subject to a programme of ground gas monitoring. This included targeting any potential gas migration from the nearby historic landfill sites and from any infilled ponds. Following this monitoring the wider site was classified as having a Characteristic Situation CS-1 gas regime with no requirement for any gas protection measures.

3. PRELIMINARY CONTAMINATION RISK ASSESSMENT

3.1. HAZARD IDENTIFICATION

INVALID CONTAMINATION SOURCES	
HISTORIC LAND USE	**DISCUSSION AS TO WHY THE HISTORICAL USE IS NOT CONSIDERED TO PRESENT A PLAUSIBLE HAZARD**
Vehicle repair and servicing workshop, 66m north	Based on the observed site activities and the presence of a concrete slab across the yard area, the previous desk study investigation classified the vehicle repair and service workshop as an invalid contamination source. This current investigation has not revealed any findings to contradict the previous assessment, and therefore, it remains as an invalid contamination source.
The historical landfill site to the northeast	Taking account of the distance of the landfill site to this site and the known local geology, which comprises fine-grained Oxford Clay Formation, it is considered there is no viable pathway for carbon dioxide and/or methane gases to migrate to the site. Therefore, the landfill site is not considered to present a cause for concern and is not a valid source.
Blackmore Farm to the west	Farm activities are not considered likely to pose a significant source of concern to the site. The soil testing carried out as part of the previous Phase 2 investigation substantiates this assessment.

POTENTIAL ON SITE SOURCES		
HISTORIC LAND USE	**DESCRIPTION OF POTENTIAL CONTAMINATION HAZARD**	**POTENTIAL CONTAMINANTS OF CONCERN**
Agricultural fields.	The historical use of most of the site was open fields, and it is unlikely that there is any significant on-site sources of contamination in these areas. However, the historic use of pesticides may have occurred.	Pesticides
Infilled ponds in the northern area of the site.	The materials used to fill the ponds could contain a variety of contaminants, depending on the source of the material. Should they include organic rich wastes then these could degrade to form hazardous gases. In addition, water seeping through the materials could become polluted.	Metals Hydrocarbons Asbestos containing materials Hazardous ground gases
Contamination associated with the former stockpile in the northern area	The stockpile is no longer present, however residual contamination may still be present in the near surface soils	Metals Hydrocarbons Asbestos containing materials

POTENTIAL OFF-SITE SOURCES
No potential off-site sources of contamination have been identified that warrant consideration for this site.

3.2. RECEPTOR ASSESSMENT

CONTEXT	
ASSESSMENT LAND USE CATEGORY	Residential with plant uptake.
DESCRIPTION OF PROPOSED LAND USE	The proposed development involves housing, with gardens, access roads and driveways, across the northern and central areas of the site and public open space, including the retention of the woodland, across the southern area.

RECEPTORS	
RECEPTOR	**DISCUSSION**
HUMAN HEALTH	Residents with zero to 6 year old child most sensitive receptor.
CONTROLLED WATERS GROUNDWATER	Generally Unproductive Strata associated with the Oxford Clay, but limited extent of Secondary A aquifer from Alluvium alongside the stream.
CONTROLLED WATERS SURFACE WATER	The west flowing stream in the southwestern area of the site.
BUILDING MATERIALS AND SERVICES	Water service pipes. Buried concrete.

3.3. INITIAL CONCEPTUAL SITE MODEL

POLLUTANT LINKAGES	The pollutant linkages are best presented in a diagrammatic form and therefore the initial conceptual site model plan is presented in Appendix 1. The individual pollutant linkages as numbered on the plan are described further below.
INVALID POLLUTANT LINKAGES	No invalid pollutant linkages have been identified.
LIMITATIONS AND UNCERTAINTIES	The preliminary conceptual model has been developed based solely on desk based research and assessment. The only way to conclusively determine the presence or absence of contamination is with intrusive site investigation.

3.4. PRELIMINARY ASSESSMENT OF CONTAMINATION RISKS

The following table identifies the potential risks that exist to the receptors through each of the identified pollutant linkages in the conceptual site model. It should be noted that the numbers referred to for each of the pathways refers to the numbered pollutant linkages from the Initial Conceptual Site Model Plan, as presented in Appendix 1.

POTENTIAL SOURCES AND CONTAMINANTS	PATHWAYS (REFERENCE FROM MODEL)	RECEPTORS	HAZARD SEVERITY	PROBABILITY OF OCCURRENCE	POTENTIAL RISK
Agricultural fields: - Pesticides	Ingestion Inhalation Direct Contact (1)	Future residents	Reduced human health effects given residual nature – Mild	If present, only residual concentrations of pesticides would likely remain – Low Likelihood	Low
	Surface run-off and lateral migration (2)	Stream	Limited exposure to surface water – Mild		Low
	Vertical and lateral migration (3)	Groundwater	Limited exposure to Secondary A Aquifer – Mild		Low
	Direct contact (4)	Building materials and services	Limited exposure to building materials - Mild		Low
Infilled ponds in the northern area - Metals - Hydrocarbons - Asbestos - Hazardous ground gases	Ingestion Direct Contact (5)	Future residents	Human health effects – Medium, albeit very localised to the ponds	Backfill is likely to include some man-made and organic materials, although any contamination will be localised – Low Likelihood	Moderate / Low
	Inhalation of ground gases (6)		Any gas generation would be minor given pond sizes - Mild	The clayey nature of the surrounding soils will limit any gas migration – Low Likelihood	Low
	Surface run-off and lateral migration	Stream	Limited exposure to surface water – Mild	The ponds are distant from the stream and Alluvium - Unlikely	Negligible
	Vertical and lateral migration	Groundwater	Limited exposure to Secondary A Aquifer – Mild		Negligible
	Direct contact (7)	Building materials and services	Building materials - Mild	Backfill is likely to include some man-made and organic materials, although any contamination will be localised – Low Likelihood	Low

POTENTIAL SOURCES AND CONTAMINANTS	PATHWAYS (REFERENCE FROM MODEL)	RECEPTORS	HAZARD SEVERITY	PROBABILITY OF OCCURRENCE	POTENTIAL RISK
Former stockpile in the northern area the northern area - Metals - Hydrocarbons - Asbestos	Ingestion Inhalation Direct Contact (8)	Future residents	Human health effects – Medium, albeit very localised to the stockpile locations	The stockpile has been removed; however, it is possible some residual contamination remains - Low Likelihood	Moderate / Low
	Surface run-off and lateral migration	Stream	Limited exposure to surface water – Mild	The stockpile was distant from the stream and Alluvium - Unlikely	Negligible
	Horizontal and lateral migration	Groundwater	Limited exposure to Secondary A Aquifer – Mild		Negligible
	Direct contact (9)	Building materials and services	Building materials - Mild	The stockpile has been removed; however, it is possible some residual contamination remains – Low Likelihood	Low

3.5. RECOMMENDATIONS

Generally, no significant potential contamination risks have been identified by this Phase 1 Desk Study. However, some localised risks have been identified in the locations of possibly backfilled ponds and in an area containing a former stockpile. Some Phase 2 Contamination Assessment is therefore necessary to assess these potential risks. It is recommended that this next phase of assessment includes the following investigation elements:

- A spread of test locations across the site and targeted investigations at the infilled ponds and former stockpile in the northern area. These should include a combination of mechanical trial pitting and windowless sample boreholes, including gas monitoring wells.
- Chemical testing of soil samples, with associated analysis of the results. The testing should include metals, inorganics, petroleum hydrocarbons, PAHs, pesticides, semi-volatile organic compounds (SVOCs) and asbestos.
- Quantitative risk assessment of the results with recommendations for further targeted investigations and/or remedial measures.

Whilst the need for a Phase 2 contamination assessment has been identified, this Phase 1 report has shown that there should be no significant contamination on the site which would preclude any redevelopment and therefore no reason why the subsequent contamination assessment could not be addressed through appropriately worded conditions on any future planning permission for the proposed development.

4. IMPLICATIONS FOR CONSTRUCTION

4.1. GEOTECHNICAL CONSIDERATIONS

The following is a checklist summary of geotechnical hazards and their likelihood to have an impact on the proposed development of the site.

GEOTECHNICAL HAZARD	LIKELY TO AFFECT SITE?	COMMENT
Removal of existing sub-structures affecting new foundations.	✘	-
Deep Made Ground.	✓	Possible localised deep Made Ground associated with the backfill of the ponds. If present, this may complicate the design and construction of foundations but the affected areas are expected to be very localised.
Historic wells.	✘	-
Soft or compressible natural deposits such as Alluvium or Peat.	✓	There is the possibility for localised Alluvium deposits in the proximity of the stream and former ponds. Such deposits could complicate the design and construction of foundations in those areas, but again this is expected to be very localised and in all likelihood will be outside of the development area.
Changes in ground conditions within short distances.	✓	There is the potential for variable Alluvium and Oxford Clay Formations soils in the southern area close to the stream. If present, variable soils may complicate the design and construction of foundations.
Fine soils that have a volume change capacity.	✓	The Oxford Clay Formation is a fine-grained soil typically has a medium volume change potential. This will have an impact on foundation design and depths. Existing and proposed vegetation will further complicate foundations.
Dissolution features or 'swallow holes'.	✘	-
Cambering of valley sides with possibility of 'gulls'.	✘	-
Risk of slope instability.	✘	-

GEOTECHNICAL HAZARD	LIKELY TO AFFECT SITE?	COMMENT
Shallow groundwater.	✓	Shallow groundwater is likely in areas close to the stream. If present, shallow groundwater could present construction difficulties and have implications for the design of sub-surface structures.
Underground mining.	✘	-
Geological faults.	✘	-
Aggressive chemical environment for concrete e.g. expansive slag or high sulphate soils.	✓	The Oxford Clay Formation is known to be potentially pyrite bearing and contains elevated sulphates. This may affect the design and construction of sub-surface structures.

4.2. PRELIMINARY GEOTECHNICAL ASSESSMENT

Based on the anticipated ground conditions, it is considered that shallow strip foundations are likely to be suitable, however, the following constraining factors should be noted:

- There could be localised deep Made Ground associated with the infilled ponds that would require deepened foundations, but only for those few plots straddling the former pond locations.
- Due to the likelihood of the underlying soils having a medium volume change potential, any foundations within areas of tree influence will have to be deepened.

Due to the likely presence of fine-grained soils and possibility for shallow groundwater, the use of soakaway drainage is unlikely to be suitable for this site.

For any form of development, BRD recommend that an intrusive ground investigation is undertaken in order to confirm ground conditions and allow design of the new structures. The geotechnical investigation could easily be undertaken alongside the proposed Phase 2 contamination assessment.

4.3. CONSTRUCTION CONSIDERATIONS

As with any construction site, if any anomalous material is encountered during the redevelopment then expert environmental advice should be sought.

REPORT SPECIFIC REFERENCES

- British Geological Survey sheet 265 'Bath' Solid and Drift edition (1:50,000) published 2011.

SUPPORTING INFORMATION

SITE CHARACTERISTICS

The site characteristics are collated from various information sources, including but not limited to Ordnance Survey, British Geological Survey (BGS), Environment Agency (EA) and local authorities.

BRD generally commission the Landmark Information Group to produce an Envirocheck Report for study sites and where employed this is included in the Appendices. It should be noted that some of the data provided in the Envirocheck report is not considered within BRD's interpretation for the site characteristics as it is not relevant. Examples of this are:

- *Nitrate Sensitive Zones and Nitrate Vulnerable Zones are ignored as these are only applicable to agricultural activities relating to the application of manure and fertilisers to land.*
- *River Quality is ignored as at this preliminary stage of risk assessment as all surface water bodies are considered equally sensitive to contamination risks.*

In assessing site characteristics, BRD also consider the area within a surrounding 250m buffer zone extending from the site boundary.

HISTORY

Mapped History

The site history summarises the changes in use or layout of the site over time and is largely developed from a study of available Ordnance Survey maps. It should be noted that changes to the site may have occurred between the editions of the maps employed to assess the history of the site. Historical information of relevance within the 250m surrounding the site is also discussed in a separate section. The historical plans referred to in the text are generally included in an Appendix.

Aerial Photography

As a minimum, current and historical aerial images of the site and surrounding areas are studied from the Google Earth program. Where additional historic aerial photographs have been purchased then these are referenced within the technical report.

Internet Searches

A simple search of the internet for relevant material relating to the use or history of the site is made. Information obtained from internet searches has been accepted as fact without validation by BRD except for ensuring the source is reputable. It should be recognised that due to programme and budgetary constraints the search conducted may not have revealed all the information available.

GEOLOGY

The geology of the site is assessed by reference to the relevant British Geological Survey (BGS) online mapping. The 1:50,000 scale sheet in Bedrock and Superficial (historically Solid and Drift) map editions may also be referred to. Many of these geological maps are relatively old with superseded terminology and descriptions. BRD therefore employ the BGS Open Geoscience website to determine current nomenclature of strata and to assist in determining geological boundaries against current topographic features. BRD also employ BGS Regional Geology Guides to assist in understanding the geological context of the site.

Ground Stability Hazards

Ground stability hazards caused by mining, ground dissolution, landslide potential, collapsible ground and natural cavities are identified by the Envirocheck database search of records held by The Coal Authority, British Geological Survey and studies completed by Ove Arup and Peter Brett Associates.

The Envirocheck database ground stability hazard entries for compressible ground, running sands and shrinking or swelling clays are not discussed directly. This is because these hazards are very common and are considered within the preliminary geotechnical assessment where necessary.

Radon

Radon is a naturally occurring colourless and odourless gas that is radioactive. It is formed by the radioactive decay of radium which in turn is derived from the radioactive decay of uranium, both of which are minerals that can be found in many soil types. Whilst it is recognised that the air inside every house contains radon, some houses built in certain defined areas of the country might have unacceptably high concentrations and require special precautions to be taken during construction to reduce this risk.

Radon can move through cracks and fissures in the soil into the atmosphere or into buildings via basements and/or underfloor voids. If radon enters the living space of buildings its concentration can potentially increase and provide a risk to human health as the inhalation of the radioactive decay products of radon gas can increase the risk of developing lung cancer.

The maps contained within 'Radon: Guidance on protective measures for new buildings' (2023) identify areas where no radon protection measures are necessary or where higher concentrations are present that either basic or full radon protection measures are required to be fitted to all new buildings together with supplementary advice concerning extensions, conversions and refurbishments. However, some local authorities have local bylaws, that BRD may not be aware of, that insist on radon protection to all new dwellings within their area regardless of the recommendations of the 'Radon: Guidance on protective measures for new buildings' (2023) report.

Basic radon protection measures comprise incorporation of a continuous gas resistant membrane sealed at joints and around service entries into the floor construction and extended across the cavity tray.

Full radon protection measures comprise incorporating a continuous gas resistant membrane into the floor construction together with a ventilated sub-floor void through either the use of suspended floor construction or a 'radon sump'. The membrane is sealed at joints and around service entries into the floor and extended across the cavity tray.

'Radon: Guidance on protective measures for new buildings' (2023) should be referred to for detail on the construction of the protective measures.

HYDROGEOLOGY

Aquifer Designations

The Environment Agency's Groundwater Protection Policy uses designations that reflect the importance of aquifers in terms of groundwater as a drinking water resource, but also their role in supporting surface water flows and wetland ecosystems.

In defining groundwater vulnerability, both the superficial (drift) deposits and bedrock (solid) geology are considered separately with the following aquifer designations:

- *Principal Aquifers: These are layers of rock or drift deposits that have high intergranular and/or fracture permeability - meaning they usually provide a high level of water storage. They may support water supply and/or river base flow on a strategic scale.*

- *Secondary Aquifers: These include a wide range of rock layers or drift deposits with an equally wide range of water permeability and storage. Secondary aquifers are subdivided into two types:*

    - *Secondary A - permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.*

    - *Secondary B - predominantly lower permeability layers which may store and yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering.*

- *Secondary Undifferentiated - has been assigned in cases where it has not been possible to attribute either category A or B to a rock type.*

- *Unproductive Strata: These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow.*

Source Protection Zones

The Environment Agency (EA) has defined Source Protection Zones for groundwater sources, such as boreholes and springs, that are used for public water supply. The EA uses the zones to target pollution prevention measures and monitor the activities of potential polluters within the affected area. There are three types Source Protection Zone:

- *Zone 1(Inner Protection Zone) is the most sensitive area within which pollution could reach the borehole within 50 days. Alternatively it is defined by a minimum 50m radius around the borehole.*

- *Zone 2 (Outer Protection Zone) are defined by the area within which pollution could reach the borehole within 400 days or 25% of the total catchment area.*

- *Zone 3 (Total Catchment) are defined by the total area required to support the removal of water from the borehole.*

HYDROLOGY

Flooding

The Environment Agency has zoned England and Wales in respect of the risk from flooding from 'highly unlikely' in Zone 1 to 'likely' in Zone 3. The zones ignore the presence of flood defences or certain other manmade structures and channel improvements.

National Planning Policy Framework, Department for Communities and Local Government, dated March 2012 states "A site-specific flood risk assessment is required for proposals of 1 hectare or greater in Flood Zone 1; all proposals for new development (including minor development and change of use) in Flood Zones 2 and 3, or in an area within Flood Zone 1 which has critical drainage problems (as notified to the local planning authority by the Environment Agency); and where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding".

ENVIRONMENTAL ASPECTS

Landfill

The database of the Environment Agency of active and historic landfills is searched for all sites. Sometimes additional historic landfill data is available from the British Geological Society and local authorities to identify nearby landfill sites. It should be noted that landfill sites that closed prior to 1974 and unlicensed disposal activities will not necessarily be revealed by this search.

Pollution Incidents

The Environment Agency ceased recording 'Pollution Incidents to Controlled Waters' in 2000, when they commenced the replacement 'Substantiated Pollution Incident Register'. BRD do not consider any 'Category 3 – Minor Incident' on the 'Pollution Incidents to Controlled Waters' database as relevant to assessing the site due to the time elapsed and the low level of impact that occurred. Again, due to the time elapsed and the fact that remedial measures would have been undertaken at the time, 'Category 1 – Major Incident' and 'Category 2 – Significant Incident' are only considered relevant if the impacted controlled water was on or immediately adjacent to the site.

On the 'Substantiated Pollution Incident Register', BRD approach to this information in the following manner:

- *Pollution incidents impacting 'air' only are not considered relevant to the purpose of this report.*
- *Pollution incidents to 'water' are only considered where the surface water impacted is either on, flows through or is immediately adjacent to the site.*
- *Pollution incidents to 'land' are only considered where these are on or immediately adjacent to the site unless there are grounds to consider that the incident had the potential to impact groundwater that may have migrated beneath the site.*
- *Category 4 potential pollutant incidents are recorded, but upon investigation were found to have had no impact and accordingly are not considered relevant.*

Ecologically Sensitive Land Use

The land uses that are identified as ecologically sensitive are those identified as Sites of Special Scientific Interest (SSSI), Special Areas of Conservation, Special Protection Areas, Ramsar sites, Natural Parks, Natural Nature Reserves, Marine Nature Reserves, Local Nature Reserves, Green Belt, Forest Parks, Environmentally Sensitive Areas, or Areas of Outstanding Natural Beauty.

CONTAMINATION ASSESSMENT METHODOLOGY

UK Policy

The UK Government's policy in relation to land affected by historic contamination is based on a 'suitable for use' approach. The approach recognises that the risks presented by any given level of contamination will vary greatly according to the use of the land and a wide range of other factors, such as the underlying geology of the site. Contamination risks therefore need to be assessed on a site-by-site basis. The 'suitable for use' approach limits requirements for remediation to the work necessary to prevent unacceptable risks to human health or the environment in relation to either the current use or future use of the land.

The three main drivers for contamination assessment and remediation are:

- *Voluntary action.*
- *Development as part of the planning regime.*
- *Regulatory action to mitigate unacceptable risks e.g. Part 2A of the Environmental Protection Act 1990.*

Contaminant Linkages

For a contamination risk to exist there must be a 'contaminant linkage' from the source (contaminant or pollutant) via a pathway (the route from contaminant to receptor) to a receptor (the entity that could be harmed). The absence of a source, pathway or receptor breaks the contaminant linkage and therefore no contamination risk exists.

Contamination is typically present at a site (in the ground and/or in the underlying groundwater) as a result of a historic or current industrial use, usually as a result of leaks, spills or disposal of residues, wastes and excess raw materials from the industrial processes. Contamination may also be present due to:

- *The deliberate application of chemicals e.g. the spraying of herbicide/pesticide.*
- *Migration of pollutants from adjacent land.*
- *Naturally occurring processes e.g. elevated concentrations of particular heavy metals associated with specific geological strata.*
- *Atmospheric deposition.*

Conceptual Site Model

The conceptual site model can be defined as a textual or graphical representation of the identified contaminant linkages for a given site. The model forms the basis for designing the investigation as the aim will be to target all of the potential contaminant linkages to determine, through the subsequent phases of risk assessment, whether or not they pose an actual risk.

It is important that the conceptual site model is updated with new information as the various investigation, risk assessment and remediation works are completed.

Technical Guidance

The technical and legal framework for contamination assessment is complex. The process adopted through this report for assessing contamination risks is in general accordance with the following guidance, as listed below:

- *'Investigation of Potentially Contaminated Sites - Code of Practice - BS 10175:2011+A2:2017', (BSi, 2017).*
- *Land Contamination Risk Management (LCRM) website, (Environment Agency, 2023).*
- *'Guidance for the safe development of housing on land affected by contamination - R&D66: 2008', (NHBC/Environment Agency, 2008).*

Land Contamination Risk Management: Stage 1 Risk Assessment

In line with the technical guidance, the contamination risk assessment follows a series of steps for each tier of risk assessment:

- *Identify the hazard – A preliminary stage of risk assessment concerned with identifying and characterising the contamination source that may be associated with a particular site.*
- *Assess the hazard – Use a source-pathway-receptor (S-P-R) linkage approach to find out if there is the potential for unacceptable risk.*
- *Estimate the risk – predict what degree of harm or pollution might result and how likely it is to occur by using the tiered approach to risk assessment.*
- *Evaluate the risk – Decide whether a risk is unacceptable, taking into account the nature and scale of the risk estimates, any uncertainties associated with the assessment and the broad costs and benefits of taking action to mitigate risks.*

The separate staged tiers of risk assessment are as follows:

TIER	***DESCRIPTION***
TIER 1: PRELIMINARY RISK ASSESSMENT	*Generally limited to desk based research and a site walkover survey (site reconnaissance) to develop an initial conceptual site model and identify what risks, if any, are likely to be presented by the site. Occasionally it may include assessment of a limited exploratory ground investigation or previous investigation data.*
TIER 2: GENERIC QUANTITATIVE RISK ASSESSMENT	*This phase is concerned with establishing whether contamination is present, usually through intrusive ground investigation, and then evaluating the magnitude of the associated risks with test results compared to generic assessment criteria.*
TIER 3: DETAILED QUANTITATIVE RISK ASSESSMENT	*To further evaluate risks the development of site-specific assessment criteria are values for concentrations of contaminants derived using risk estimation models*

Risk Classification

The objective of risk assessment is to identify the nature and magnitude of the potential risks and should be based on a consideration of both:

- *The likelihood/probability of an event [taking into account both the presence of the hazard and receptor and the integrity of the pathway].*
- *The severity of the potential consequence [taking into account both the potential severity of the hazard and the sensitivity of the receptor].*

There is a need for a logical, transparent and repeatable system in defining the categories of severity of consequence and likelihood as well as for the risk itself and therefore the following risk rating matrix is employed:

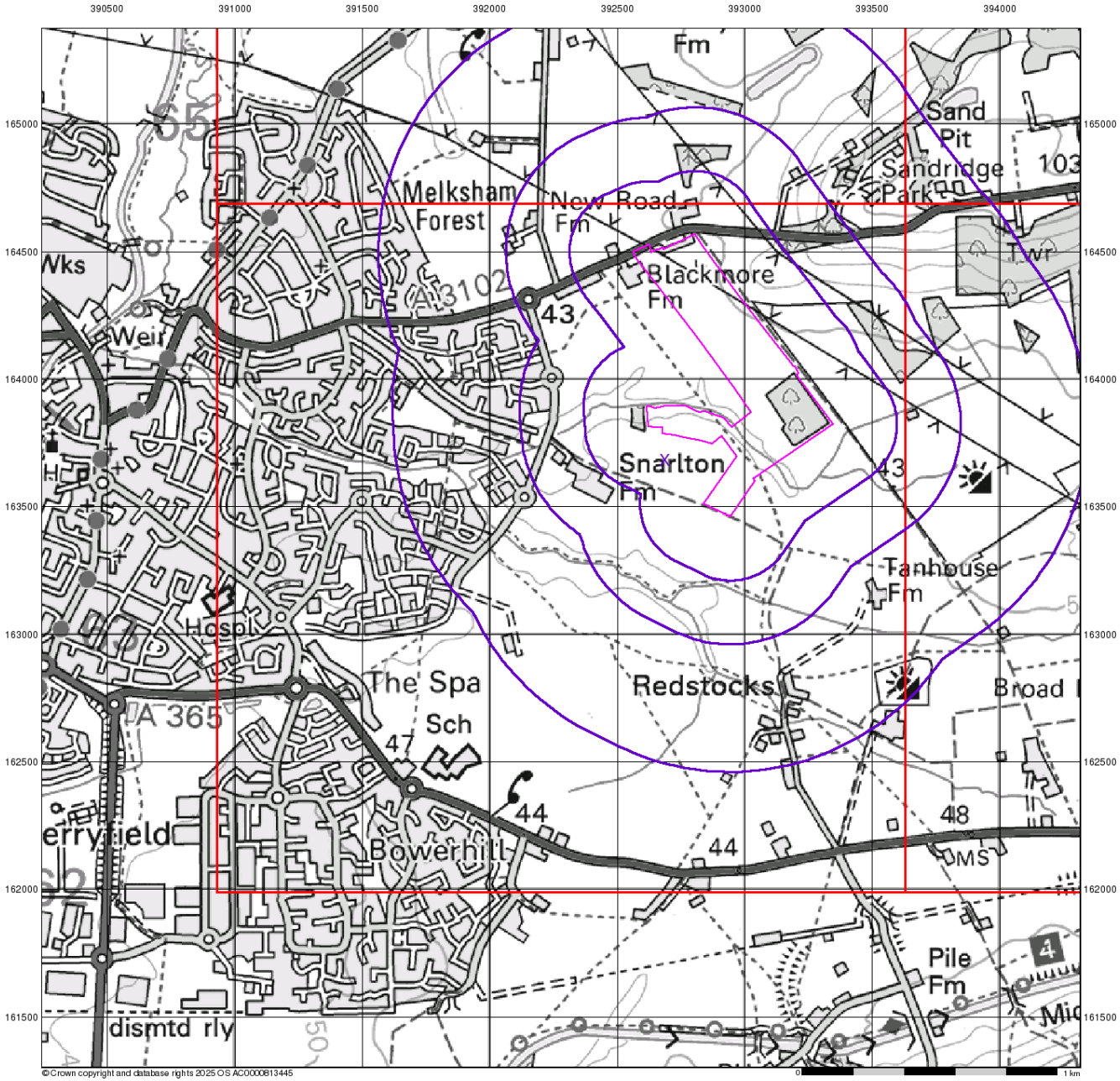
		SEVERITY OF CONSEQUENCE			
		SEVERE	MEDIUM	MILD	MINOR
PROBABILITY	HIGH LIKELIHOOD	Very High Risk	High Risk	Moderate Risk	Moderate/Low Risk
	LIKELY	High Risk	Moderate Risk	Moderate/Low Risk	Low Risk
	LOW LIKELIHOOD	Moderate Risk	Moderate/Low Risk	Low Risk	Negligible Risk
	UNLIKELY	Moderate/Low Risk	Low Risk	Negligible Risk	Negligible Risk

These risk classifications are defined as follows:

- *Very High Risk - There is a high probability that severe harm could arise to a designated receptor from an identified hazard at the site without appropriate remediation action.*
- *High Risk - Harm is likely to arise to a designated receptor from an identified hazard at the site without appropriate remediation action.*
- *Moderate Risk - It is possible that without appropriate remediation action harm could arise to a designated receptor. It is relatively unlikely that any such harm would be severe, and if any harm were to occur it is more likely that such harm would be relatively mild.*
- *Low Risk - It is possible that harm could arise to a designated receptor from an identified hazard. It is likely that, at worst if any harm was realised any effects would be mild.*
- *Negligible Risk - The presence of an identified hazard does not give rise to the potential to cause harm to a designated receptor.*

This risk assessment matrix and classification system is based on guidance produced by Department for Environment, Food and Rural Affairs (Defra) and the Environment Agency in connection with contaminated land assessment.

APPENDIX 5



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BRD

Source Protection Zones

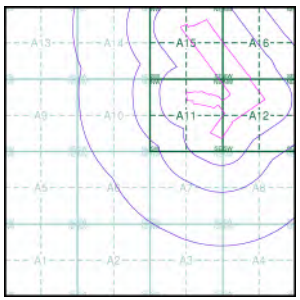
General

Specified Site
Specified Buffer(s)
Bearing Reference Point
Slice
Map ID

Agency and Hydrological

- Inner zone (Zone 1)
- Inner zone - subsurface activity only (Zone 1c)
- Outer zone (Zone 2)
- Outer zone - subsurface activity only (Zone 2c)
- Total catchment (Zone 3)
- Total catchment - subsurface activity only (Zone 3c)
- Special interest (Zone 4)

Site Sensitivity Context Map - Slice A



N

Order Details

Order Number:	376962185_1_1
Customer Ref:	BRD4599
National Grid Reference:	392690, 163680
Slice:	A
Site Area (Ha):	30.8
Search Buffer (m):	1000

Site Details

Blackmore Farm, Sandridge Common, MELKSHAM, SN12 7QS

Landmark INFORMATION GROUP
Tel: 0844 844 9952
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Web: www.envirocheck.co.uk

APPENDIX E: BRD Environmental Site Investigation Extracts

Report Title: Geo-Environmental Site Investigation

Project Name: Land east of Blackmore Farm, Sandridge Common, Melksham

Report Reference: **BRD4599-OR2-D**

Date: **April 2026**

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REPORT CONTROL SHEET

REPORT TITLE	**GEO-ENVIRONMENTAL SITE INVESTIGATION**
PROJECT	**LAND EAST OF BLACKMORE FARM, SANDRIDGE COMMON, MELKSHAM**
CLIENT	**GLEESON LAND**

REPORT REFERENCE	ISSUE DETAIL	DATE	PREPARED BY	CHECKED BY
BRD4599-OR2-A	First issue – Interim draft	09/10/2025	A Leon	B Devonshire
BRD4599-OR2-B	Second issue	12/12/2025	A Leon Z Betteley	J Brockwell
BRD4599-OR2-C	Third issue	18/03/2026	J Brockwell	J Brockwell
BRD4599-OR2-D	Fourth issue	17/04/2026	J Brockwell	J Brockwell

BRD Environmental Limited

Geotechnical and Environmental Services

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REPORT LAYOUT

This report is divided into the following four sections: Summary Report, Technical Report, Supporting Information and Appendices.

SUMMARY REPORT
This expanded executive summary provides the main findings of the work undertaken in brief non-technical language. This section provides an overview of the key outcomes for the benefit of non-specialists and concludes with the main recommendations for any further work required. This section should only be relied upon in the context of the whole report and the detailed within the Technical Report should be referred to with respect to any design decisions.
TECHNICAL REPORT
The main report section is intended to provide the technical detail of the works completed and meet the information required by current guidance and practice. The Technical Report is written in a language that, in part, assumes knowledge of the subject matter so that it can be written in as concise a form as possible. Its primary audience is clients, peers, regulators and other professionals in related disciplines.

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SUPPORTING INFORMATION

This section of the report provides background details of a generic nature together with specific technical approaches adopted by BRD and details of the guidance documents that are commonly referenced in the report. The section also includes explanations of technical terms to assist non-specialist readers in understanding the Technical Report. It should be noted that not all the information within this section is necessarily applicable to this specific report.

APPENDICES

The final section of the report presents the factual data collected and employed as part of the preparation of the report.

APPENDIX 1	**SITE PLANS**	
	Site Location Plan	Ref. BRD4599-OP1-B
	Proposed Development Layout	'Masterplan' ORIGIN$_3$, ref. 25-004 421 Rev E, dated 09/04/26
	Exploratory Point Plan	Ref. BRD4599-OD1-A
	Revised Conceptual Site Model	Ref. BRD4599-OP6-C
APPENDIX 2	**EXTRACTS FROM PREVIOUS INVESTIGATION**	
	Logs of previous trial pits.	Ref. TP22-TP26
	Photographic records of previous trial pits.	Extracts ref. BRD3304-OP12-A
	Logs of previous boreholes.	Ref. WS01-WS03
	Extracts of DETS report 22-09839.2	6 x pages
	Extracts of SPT report 41803_1	6 x pages
APPENDIX 3	**EXPLORATORY HOLE & MONITORING RECORDS**	
	Logs of trial pits.	Ref. TP101-TP130 & HD01
	Photographic records of trial pits.	Ref. BRD4599-OP5-A
	Logs of boreholes.	Ref. WS101-WS120
	BRE365 soakage test records.	3 x pages
	Gas monitoring records.	6 x pages
	Groundwater monitoring records.	1 x page
APPENDIX 4	**LABORATORY TEST RESULTS**	
	DETS report 25-08171.1, 25-08396.1 & 25-08726.1	37 x pages
	SPT report 48593_1	29 x pages

SUMMARY REPORT- GENERAL INFORMATION

SUBJECT	COMMENTS
CURRENT SITE CONDITION	The site is a large irregular shaped parcel of land comprising 9No. separate grass fields and a wooded area in the southeastern part of the site. The external and internal boundaries are formed by hedgerows with some mature trees. There is a west flowing stream across the southwestern area of the site and some of the site boundaries and internal field boundaries include ditches that drain into this stream.
PROPOSED DEVELOPMENT	Outline application for the erection of up to 275No. dwellings (including affordable), associated infrastructure, landscape and biodiversity enhancements, all matters reserved except for access from Sandridge Common.
HISTORICAL SUMMARY	The site has been used for agricultural purposes since the earliest available Ordnance Survey map of 1886 until present.
PUBLISHED GEOLOGY	The site is shown to be underlain by bedrock of the Oxford Clay Formation, with some localised deposits of superficial Alluvium, associated with the stream, present across the southwestern area.
ACTUAL GROUND CONDITIONS	The investigation has proved the clay soils of the Oxford Clay Formation across the entire site beneath a consistent layer of the Topsoil and/or Made Ground Topsoil. The previous investigation identified some Alluvium in a single trial pit located close to field boundary ditch.
HYDROGEOLOGY	The site is situated on Unproductive Strata, the Oxford Clay Formation, however the localised areas of Alluvium across the southwestern area is considered to be a Superficial secondary A Aquifer.
HYDROLOGY	There is a west flowing stream across the southwestern area of the site and a network of ditches around some of the field boundaries drain into the stream. The site is not in an area indicated to be at risk of flooding.
PREVIOUS GROUND REPORTS	During the investigation of the first phase of the Blackmore Farm development some exploratory holes were located in land that was subsequently included in the second phase site area. The logs and extracts of the testing from these previous exploratory holes are included within this report. BRD has also undertaken geo-environmental desk study research and this has been reported separately.

SUMMARY REPORT - GEOTECHNICAL

SUBJECT	COMMENTS
EXCAVATIONS	It should be possible to forward excavations employing normal equipment. Specific groundwater control unlikely to be required at this site but limited groundwater control in the form of pumping from sumps is likely to be required.
SLOPE STABILITY	It is considered that slope stability is unlikely to be a concern at this site.
EARTHWORKS	It is likely that earthworks will be required on site to level the site or to provide development levels suitable for drainage falls.
PAVEMENT DESIGN	A preliminary design California Bearing Ratio (CBR) of 3% has been recommended.
SUB-SURFACE CONCRETE	Design Sulphate Class of DS-4 and Aggressive Chemical Environment for Concrete (ACEC) class of AC-3s applies.
SOAKAWAYS	Site is not suitable for surface water disposal to soakaways or other forms of infiltration device.
FOUNDATIONS	
LIKELY FOUNDATION TYPE	Shallow strip or deeper trench fill footings bearing upon Oxford Clay Formation. Deep trench fill (or possibly piles) for plots located within the influence zones of trees predominantly affecting proposed plots adjacent to the boundary field hedges.
VOLUME CHANGE POTENTIAL	Medium i.e. moderate swelling or shrinking with moisture content changes.
ESTIMATED FOUNDATION DEPTHS	The minimum footing depth required is 0.90m, but 1.25m where required to allow for restricted new tree planting. Pile lengths to be determined by specialist piling contractor.
FOUNDATION HEAVE PROTECTION	Will be required for those plots located in close proximity to the existing trees and boundary hedges.

SUMMARY REPORT – CONTAMINATION ISSUES

SUBJECT	COMMENTS
SOIL RISKS TO HUMAN HEALTH	No unacceptable contamination in respect of human health have been identified by this investigation.
ASBESTOS	No asbestos has been detected in the soil samples tested.
LANDFILL GAS	There is no requirement for any landfill gas protection measures within the proposed development.
RADON GAS	Radon gas protection measures are not required.
RISKS TO THE WATER ENVIRONMENT	No unacceptable contamination risks to water resources have been identified by this investigation.
RISKS TO BUILDING MATERIALS AND SERVICES	No unacceptable contamination risks to building materials and services have been identified by this investigation.
OUTLINE REMEDIATION STRATEGY	No remedial works are considered necessary to facilitate the development at this stage.
WASTE SOIL DISPOSAL	It is considered that the Made Ground soils disposed of from the site would be classified as 'non-hazardous waste'. It is considered that the natural sub-soils disposed of from the site would be classified as 'non-hazardous waste' and would be characterised for disposal to landfill as 'inert waste'.

SUMMARY REPORT – KEY RECOMMENDATIONS

CONTAMINATION RECOMMENDATIONS
It is recommended that this report is submitted to the planning department of the Local Authority, warranty providers and the organisation undertaking the Building Control function to confirm that the investigation completed to date is satisfactory.
GEOTECHNICAL RECOMMENDATIONS
Once the areas of proposed earthworks cut are confirmed, further ground investigation will be required to classify materials for the Earthworks Specification. A Geotechnical Design Report (GDR) will be required to develop an Earthworks Specification for the cut and fill required for the development platforms. A tree survey is required as this information is required for detailed foundation design. This survey with topographic survey data should be undertaken prior to any site clearance to accurately record the location of any previously felled trees and existing trees both within the site and close to the site boundaries. The survey should record the trunk location, height and species of the trees. Consideration should be given in the detailed design of the development to minimise or eliminate the need for piling due to tree influence. If piling is required, then in order to confirm deeper ground conditions for pile design further ground investigation comprising deep cable percussive boreholes is recommended. Insitu Standard Penetration Tests should be conducted during forwarding of the boreholes and collected soil samples submitted for appropriate geotechnical laboratory testing.

1. INTRODUCTION TO TECHNICAL REPORT

1.1. CONTRACT DETAILS

CLIENT	Gleeson Land Limited trading as Gleeson Land.
SITE	Land situated at Blackmore Farm, located in the eastern outskirts of the town of Melksham.
CLIENT'S ADVISORS	BRD Environmental Limited (BRD) has been commissioned directly by the Client.
REPORT CONTEXT	It is understood that the Client intends to purchase the site and promote it for a residential housing development.
REPORT TYPE	Geo-environmental site investigation (i.e. combined geotechnical ground investigation and Phase 2 contamination assessment).
REPORT OBJECTIVES	The purpose of the report is to undertake a geo-environmental assessment of the site as part of the pre-acquisition due diligence review.

1.2. SCOPE OF WORKS

The agreed scope of works was:

- Mobilisation to site and production of health and safety documentation.
- Four days of windowless sampling using a percussive drilling rig to provide approximately 20No. boreholes to a nominal depth of 3m-5m, ground conditions permitting. Undertake Standard Penetration Tests (SPT) at 1m intervals. Installation of a 5m depth combined gas and groundwater monitoring well (nominal 50mm diameter) into 10No. boreholes. Installations will be finished with a flush fitting metal stopcock cover.
- Four days of trial pitting using a mechanical excavator to provide approximately 30No. trial pits to a nominal depth of 3m, ground conditions permitting.
- Performance of soakage tests based upon BRE Digest 365 within 3No. of the trial pit locations. Supply of water to site via a 4WD water bowser unit on one day for the filling of each test pit. A Geo-Environmental Technician will monitor the soakage tests. As the pits are expected to fail we are not envisaging the need for any return visits.
- All exploratory points will be logged and sampled in general accordance with BS5930:2015 by supervising Geo-Environmental Consultant. In-situ geotechnical testing of fine soils using a Hand Shear Vane and/or Pocket Penetrometer.
- Determination of the accurate location and level of exploratory points by topographical GPS unit.
- Geo-Environmental Technician to undertake 6No. combined gas and groundwater monitoring visits in the first instance. For gas, the determination of oxygen, carbon dioxide, methane, hydrogen sulphide and carbon monoxide concentrations, together with atmospheric pressure and flow rates, using portable equipment. For vapours, determination of the concentration of volatile organic compounds by photo ionisation detector. For groundwater, the determination of groundwater levels.

- Chemical testing of soil samples to confirm the soils are uncontaminated, to determine waste classification for muckaway and to meet the requirements for new water supply pipe specification. Budget based on the following testing schedule:

    - 20No. Metals Suite - As, Cd, Cr, CrVI, Hg, Pb, Se, Cu, Ni and Zn.
    - 20No. Inorganics Suite – water soluble sulphate, pH, organic matter.
    - 20No. Speciated Polycyclic Aromatic Hydrocarbons (PAH).
    - 6No. Banded aliphatic/aromatic Total Petroleum Hydrocarbons (TPH).
    - 6No. Benzene, Toluene, Ethylbenzene, Xylene (BTEX) and Methyl Tertiary Butyl Ether (MTBE) compounds.
    - 4No. Semi-Volatile Organic Compounds (SVOC) suite.
    - 5No. Asbestos quantification.
    - 10No. Organochlorine Pesticides suite.

- Geotechnical testing as appropriate to the nature of the ground conditions encountered, but the budget is based on the following testing schedule:

    - 15No. Moisture content.
    - 15No. Plasticity indices.
    - 3No. Particle size distribution by wet sieve and hydrometer.
    - 12No. pH and water soluble sulphate analysis - soil.
    - 12No. Total sulphate and sulphur analysis - soil.
    - 4No. pH and sulphate analysis – water.

- Provision of a combined factual and interpretative investigation report. Factual findings to include all exploratory point records, monitoring and test results. Interpretative reporting to include a summary of information from desk study research, a Generic Quantitative Contamination Risk Assessment (GQRA), waste classification and a Geotechnical Assessment providing comments on pavement design, concrete classification, soakaway feasibility, foundation design recommendations. Report to be supplied in an electronic Adobe pdf format.

1.3. REPORT LIMITATIONS

Any site boundary lines depicted on plans included within this report are approximate only and do not imply legal ownership of land. Any observations of tree species, asbestos containing materials within structures or invasive weeds, does not constitute a formal survey of such features. The identification of such features is therefore tentative only. In the case of Japanese Knotweed and other non-aqueous invasive weeds, BRD can undertake separate surveys for this plant undertaken by a Property Care Association qualified surveyor.

The report does not consider whether sensitive ecology or archaeology is present as these require consideration by professionals specialising in these matters. For excavations planned within six metres of a third part structure then separate professional advice should be sought in respect of the requirements of the Party Wall Act.

It should be recognised that the collection of desk study information may not be exhaustive and that other information pertinent to the site may be available.

The recommendations, interpretations and conclusions of this report are based solely on the ground conditions found at the exploratory holes. Due to the variability in the nature of ground, conditions between exploratory holes can only be interpreted and not defined. The description of the site and the ground conditions is accurate only for the dates of the field works. In particular, groundwater levels can vary due to seasonal and other effects.

The assessment and interpretation of contamination risks is based on the scope of works agreed with the Client together with the budgetary and programme constraints imposed. Further investigation, analysis and assessment of contamination may be required by regulators or other

third parties with an interest in the site. An ecological risk assessment of contaminated soils is beyond the scope of this report. This report is concerned with assessing those contamination risks which apply to the future use of the site through the proposed development as part of the planning regime. The assessment does not consider the risk to current site users or continued future use of the site in its current state. If development of the site should occur that differs from that proposed, then the findings of the contamination assessment would need to be re-evaluated.

At the time of writing, detailed information on the proposed structure, such as detailed layout, loadings and serviceability limits, were not available. Accordingly, where geotechnical design advice is provided it is on the prescriptive basis allowed for by Eurocode 7: employing conventional and conservative design rules. The scope of this investigation excludes a formal slope stability study and any observations made regarding slopes are for information only.

2. SITE CHARACTERISTICS

2.1. SITE SETTING

SITE ADDRESS AND POST CODE	Land to the east of Blackmore Farm, Sandridge Common, Melksham, Wiltshire, SN12 7QS.
NATIONAL GRID REFERENCE	Approximate centre of the site at 393043E, 164055N.

2.2. SITE DESCRIPTION

SUBJECT	COMMENTS
CURRENT SITE DESCRIPTION	The site is formed by an irregular shaped parcel of land comprising 9No. grassed fields and 1No. wooded area in the southeastern part of the site, overall, covering about 27 Ha. Generally, the site slopes gently downwards towards the stream in the southwestern area of the site, however, one of the fields in the northern area slopes downwards gently towards the northwest. The site boundaries are formed by mixed hedgerows, which include some mature trees. The external and internal hedgerows are formed by mixed species, including hawthorn and brambles with some mature trees, which are mainly oak. The wooded area forming the southern part of the site includes oak, sycamore, ash and hawthorn. There is a west flowing stream across the southwestern part of the site and along some of the site boundaries. Ditches that drain into this stream are present around some of the internal field boundaries. At the time the investigation all of the ditches were dry.
SURROUNDING LAND USE	The site is set in an agricultural area just to the east of the town of Melksham.
PROPOSED DEVELOPMENT	Outline application for the erection of up to 275No. dwellings (including affordable), associated infrastructure, landscape and biodiversity enhancements, all matters reserved except for access from Sandridge Common.
HISTORICAL SUMMARY	From the previous desk study report, the following summary of the site's history is presented. The site has been used for agricultural purposes since the earliest available map of 1886 until present.
PUBLISHED GEOLOGY	The site is shown to be underlain by bedrock of the Oxford Clay Formation, with some localised deposits of superficial Alluvium, associated with the stream, present across the southwestern area.
HYDROGEOLOGY	The site is situated on Unproductive Strata, the Oxford Clay Formation, however the localised areas of Alluvium across the southwestern area is considered to be a Superficial secondary A Aquifer.

SUBJECT	COMMENTS
HYDROLOGY	There is a west flowing stream across the southwestern area of the site and a network of ditches around some of the field boundaries drain into the stream. The site is not in an area indicated to be at risk of flooding.

2.3. PREVIOUS INVESTIGATIONS

2.3.1. Upper Northern Field

Part of the site, specifically the upper north field, was part of a geo-environmental ground investigation report for Blackmore Farm - Phase 1 development, which was commissioned by Gleeson Land Development and carried out by BRD in 2022. However, during the investigation, the site boundaries of Phase 1 development area were modified and the upper northern field was removed. This area was subsequently included in Blackmore Farm - Phase 2. Although a limited number of field works had already been carried out they were not included as part of the final BRD Phase 1 report issued in January 2023.

Those site works that now fall within the Blackmore Farm - Phase 2 development are summarised below. The records of these site works and related testing are included in Appendix 2 of this report.

2.3.1.1. Site Works

The site works undertaken in the northern field of the site comprised 5No. trial pits (ref. TP22 to TP25) and 3No. windowless sampling boreholes (ref. WS01-WS03).

2.3.1.2. Ground Conditions

The ground conditions encountered in the exploratory holes across the upper, northern field were as expected based on the published geological maps. A thin layer of Made Ground Topsoil was present across the field overlying clay-rich soils of the Oxford Clay Formation, typically recorded as stiff to very stiff, grey mottled orange brown to brown, silty clay with selenite crystals, relict rootlets and fossil shell fragments.

Made Ground was recorded in trial pit TP22 and borehole WS02, at the location of a former backfilled pond. This material was deeper in the trial pit proved to about 1.0m depth comprising ‘brown mottled grey, gravelly, silty clay. Gravel of fine to coarse, subangular to subrounded charcoal, brick fragments, flint, slate, whole and half bricks’. Decaying wood was recorded below 0.8m depth. Beneath the Made Ground, Alluvium deposits were recorded to 1.7m depth, comprising ‘brown mottled grey stained natural black, silty clay with decaying wood/ logs and a natural organic odour’. Underneath, the competent Oxford Clay Formation was recorded. The Alluvium was not encountered in any other hole.

Groundwater was not recorded in any of the exploratory holes.

A variety of samples were submitted for chemical and geotechnical testing.

2.3.1.3. Geotechnical

The following geotechnical test results were recorded during the investigation works:

- Standard Penetration Tests: The N-values recorded in the clay-rich soils of the Oxford Clay Formation range from N=10 to N=39 which is indicative of stiff to hard soil type.

- Plasticity Index: A total 3No. samples of the Oxford Clay Formation were analysed recording values ranging from 32% to 33% which equates to a medium volume change potential.

- Undrained Shear Strength:

  - *Hand Shear Vane Tests*: the undrained shear strength of the clay soils recorded in trial pits TP22 to TP26 range between 49kPa and 87kPa, averaging 75kPa which is indicative of high strength soils type.

  - *Pocket Penetrometer Tests*: The recorded undrained shear strength within boreholes WS01 to WS03, range between 54kPa and 104kPa, averaging 83kPa which is indicative of high strength soil type.

  - *Standard Penetration Test Correlations:* the undrained shear strength of the clay soils recorded in boreholes WS01 to WS03 range between 63kPa and 246kPam which is indicative of medium to high strength soil type.

2.3.1.4. Contamination

The investigation recorded no elevated concentrations of contaminants and also of note was that the analysis of the soils for speciated polycyclic aromatic hydrocarbons (PAHs) generally recorded no concentrations above detection limits.

The trial pit (TP22) within the former pond confirmed the backfill to comprise natural materials with no signs of any soil contamination.

After an eight month of monitoring period, the gas monitoring confirmed that there was no evidence of soil gases migrating from this backfilled pond to the site.

2.3.2. Desk Study Report

Subsequently for the Blackmore Farm - Phase 2 development area, the site has been the subject of geo-environmental desk study research by BRD and this has been reported separately in 'Phase 1 Geo-Environmental Desk Study – Blackmore Farm – Phase 2, Melksham', BRD Environmental Ltd, ref. BRD4599-OR1-A, dated June 2025. This current report should be read in conjunction with the previous desk study report.

2.4. PRELIMINARY CONCEPTUAL MODEL

2.4.1. Potential Contamination Sources

Based on the previous desk study, the following potential contamination sources have been identified:

- Due to the historical use and current of the site as being open fields, it is unlikely that there is any on site source of contamination. However, any pesticides used on the site may be a hazard although this is a minor concern.

- Potentially infilled ponds are present in the northern of the site. There is no current evidence of the pond in the north of the site which is shown on historical maps. Whilst it may have just dried up or been re-graded into the field, it may also have been infilled with waste materials. The waste materials may contain hazardous chemicals. Organic rich wastes degrade to form hazardous gases under anaerobic conditions. Water seeping through the waste can be become polluted. Due to the small size of the ponds on site this impact is likely to be localised within small areas in the north of the site.

- A former stockpile was present in the northern end of the site, although the stockpile has been already removed, an then removed the potential source of contamination, residual contamination may still be present in the near surface soils.

The desk study also identified the following invalid contamination sources:

- The off-site vehicle repair and servicing workshop located across the road to the north of the site are considered unlikely to present any viable source of contamination to the site given that a concrete slab across the yard area paves it. It is considered any pollutants within these off-site areas are unlikely to migrate to the site and cause contamination.

- The off-site landfill site is a such distance together with the known local geology which comprises fine-grained Oxford Clay Formation, it is unlikely to be a viable source of contamination.

- The Farm activities are not considered likely to pose a significant source of concern to the site.

2.4.2. Invalid Contamination Linkages

Any potential pesticide contamination on the fields will likely be residual and unlikely to present a valid risk to the future residents. Such residual contamination will not present any viable contamination source to the underlying groundwater and building materials or services.

Very low permeability clay soils are anticipated and therefore it is not considered that there will be any viable contamination linkages to the water environment.

2.4.3. Preliminary Conceptual Model

The preliminary risks, based on the potential contaminant linkages, are detailed in the table below.

SOURCES AND CONTAMINANTS	PATHWAYS	RECEPTORS	POTENTIAL RISK
Agricultural fields: - Pesticides	Ingestion Inhalation Direct Contact	Future residents	Low
	Surface run-off and lateral migration	Stream	Low
	Vertical and lateral migration	Groundwater	Low
	Direct contact	Building materials and services	Low
Infilled ponds in the northern area - Metals - Hydrocarbons - Asbestos - Hazardous ground gases	Ingestion Direct Contact	Future residents	Moderate / Low
	Inhalation of ground gases		Low
	Surface run-off and lateral migration	Stream	Negligible
	Vertical and lateral migration	Groundwater	Negligible
	Direct contact	Building materials and services	Low
Former stockpile in the northern area the northern area - Metals - Hydrocarbons - Asbestos	Ingestion Inhalation Direct Contact	Future residents	Moderate / Low
	Surface run-off and lateral migration	Stream	Negligible
	Horizontal and lateral migration	Groundwater	Negligible
	Direct contact	Building materials and services	Low

3. GROUND INVESTIGATION

3.1. INVESTIGATION DESIGN

METHODOLOGY	Trial pits were selected as they expose more soils which enables a more reliable record of the ground conditions encountered and they enabled BRE365 soakage tests to be undertaken. Windowless sample boreholes were selected as monitoring installations were needed and because in-situ density tests were required in the coarse soils. Gas and groundwater monitoring visits were selected in order to access the potential gas risk at the site and to record the resting groundwater levels.	
DATES OF SITE WORKS	The main field works were undertaken between 9th and 12th September 2025. Monitoring visits were undertaken on the 19th & 25th September, 2nd & 16th October and 5th & 14th November 2025.	
CONSTRAINTS TO EXPLORATORY HOLE LAYOUT	No exploratory holes were undertaken within close proximity to any of the services present at the site.	
EXPLORATORY HOLE SPACING	Approximately 60m grid.	
LAYOUT RATIONALE	**SOURCE / FEATURE**	**EXPLORATORY HOLE**
CONTAMINATION SOURCES TARGETED	Former stockpile in the northern most part of the site.	HD101.
	Potentially infilled ponds in the north.	WS117 WS115, WS116, TP120 and TP121
	Agricultural fields.	TP101 to TP103 and WS101 to WS120.
GROUND FEATURES TARGETED	General site coverage.	TP101 to TP103 and WS101 to WS120.
	Soakage Tests.	TP107 to TP109.
CONTAMINATION SAMPLING PLAN	Based on the proposed end use, the sampling and analysis plan is more positively biased towards near surface samples as these represent the soils most likely to be available to future site users. The analysis is more biased towards the Made Ground samples as this stratum represents the soils most likely to be contaminated. The analytical frequency has been increased for samples around the agricultural storage area and the potentially infilled pond as these represent the most likely area for contamination.	

ANALYSIS PLAN	The samples have been tested for a range of commonly occurring contaminants in soils including heavy metals, asbestos, polycyclic aromatic hydrocarbons (PAH), total petroleum hydrocarbons (TPH) and benzene, toluene, ethylbenzene and xylene (BTEX).

3.2. BRD FIELDWORK

HAND DUG INSPECTION PITS	
REFERENCES	HD101.
DEPTH RANGE	0.40m.
BACKFILL	The inspection pit was backfilled with arisings upon completion.

TRIAL PITS	
REFERENCES	TP101 to TP130.
DEPTH RANGE	From 1.80m to 3.10m.
EXCAVATOR	JCB 3CX style wheeled backactor.
BACKFILL	All the trial pits were backfilled with arisings upon completion and compacted with rams of the excavator bucket.

WINDOWLESS SAMPLING BOREHOLES	
REFERENCES	WS101 to WS120.
DEPTH RANGE	From 1.00m to 5.45m.
RIG TYPE	Premier Drilling Rig.
INSTALLATION / BACKFILL	Boreholes WS102, WS105, WS106 to WS108, WS112, WS114, WS116, WS118 and WS119 were backfilled with arisings only. Boreholes WS101, WS103, WS104, WS109, WS110, WS111, WS113, WS115, WS117 and WS120 had monitoring wells installed. These comprised 50mm nominal diameter standpipes fitted with a gas tap finished with a flush metal cover. The slotted response length of the well is shown on the individual logs. Bentonite seals are also indicated on the logs. The filter medium used was pea gravel. Borehole WS106 was relocated a couple of times due to the presence of wasp nests which stung the drillers several times. Finally, it was abandoned at 1.0m depth due to the associated risk.

MONITORING	
TYPE	Ground gases and vapours. Groundwater monitoring.
DATES	Monitoring visits were undertaken on the 19th & 25th September, 2nd & 16th October and 5th & 14th November 2025.
GROUNDWATER SAMPLING METHOD	Samples were retrieved using a sampling bailer dedicated to each well.

3.3. LABORATORY TESTING

GEOTECHNICAL TESTING	
The soil samples for geotechnical testing were forwarded to the laboratory of Soil Property Testing Ltd with pH and sulphate analysis undertaken at the laboratory of DETS Ltd. The geotechnical testing suite is detailed below. The UKAS accreditation of the individual test methods is shown on the laboratory test report included in the Appendices.	
TEST	**NUMBER OF SAMPLES TESTED**
Moisture content.	21
Liquid and plastic limits.	21
pH and Water soluble Sulphate.	12
Total Sulphur and Sulphate.	12

GROUNDWATER CHEMICAL TESTING	
The water samples for contamination and/or chemical geotechnical testing were forwarded to the laboratory of DETS Ltd and the testing suite is detailed below. The UKAS or MCERTS accreditation of the individual test methods is shown on the laboratory test report included in the Appendices.	
WATER TESTS	**NUMBER OF SAMPLES TESTED**
pH.	2
Sulphate.	2

SOIL CHEMICAL TESTING	
The soil samples for contamination and/or chemical geotechnical testing were forwarded to the laboratory of DETS Ltd and the testing suite is detailed below. The UKAS or MCERTS accreditation of the individual test methods is shown on the laboratory test report included in the Appendices.	
SOIL TESTS	**NUMBER OF SAMPLES TESTED**
Arsenic, Cadmium, Chromium, Chromium VI, Copper, Lead, Mercury, Nickel, Selenium, Zinc.	20
Speciated Polycyclic Aromatic Hydrocarbons (PAH).	20
Total Petroleum Hydrocarbons (TPH) with full carbon banding and aliphatic/aromatic split.	6
Benzene, Toluene, Ethylbenzene and Xylenes (BTEX) plus Methyl Tert Butyl Ether (MTBE).	6
Organic Matter.	20
Asbestos Screen.	4
Semi-Volatile Organic Compounds (SVOCs).	4
Organochlorine Pesticides.	10

4. GROUND CONDITIONS

4.1. OVERVIEW

Generally, the ground conditions encountered were as anticipated from the published geology maps with a thin cover of Topsoil or Made Ground Topsoil overlying the Oxford Clay Formation.

In localised different areas across the site, limited shallow Made Ground was recorded. In the southernmost field, Made Ground was recorded at two locations between 0.6m and 0.9m depth below ground level (bgl). Made Ground soils to a depth of 1.1m bgl were also encountered within a former backfilled pond located at the southern boundary of the northern field and in the northernmost section of the site, where a stockpile was formerly present. Made Ground was also recorded.

Details of the various stratigraphic units are given in the following sections.

4.2. ARTIFICIAL GROUND

4.2.1. Made Ground

Made Ground was recorded in the upper most section of the site in hand dug pit inspection HD101. At the location of a backfilled pond, in the southern boundary of the upper field at borehole WS117 and in the lowest field of the site at the location of trial pits TP104 and TP105. Below, the Made Ground recorded at these locations is described:

- HD101: Recorded below a layer of Made Ground/Topsoil at 0.25m depth and to an inspection depth of 0.40m bgl, Made Ground in the hand dug pit was described as 'dry, stiff, orange brown, slightly silty clay with rare brick and charcoal fragments'.

- WS117: Recorded below a thin layer of Made Ground/Topsoil at 0.1m depth and to a maximum depth of 1.1m, the Made Ground was recorded as 'dry, brownish grey, reddish oxidised, silty clay with angular to sub-angular fragments of bricks, tile and concrete'.

- TP104 and TP105: Recorded below a layer of Made Ground/Topsoil at 0.3m depth and to a maximum depth of 0.9m (TP104), the Made Ground was recorded as 'stiff, dry, orange brown, slightly sandy, silty clay with occasional rootlets, rare chert, limestone, chalk, brick and ceramic tile gravel'.

4.3. TOPSOIL AND MADE GROUND TOPSOIL

Most of the site was underlain by Topsoil and/or Made Ground Topsoil, the latter being most consistent towards the central and northern fields. These surface materials were recorded to depths ranging from 0.2m to 0.3m bgl, averaging 0.25m.

Typically, the Topsoil was described as a brown, occasionally mottled red, silty clay with fine active roots. The Made Ground Topsoil was similar but contained occasional brick fragments.

4.4. SUPERFICIAL DEPOSITS

Superficial deposits were not encountered in any of the new exploratory holes.

4.5. BEDROCK

4.5.1. Oxford Clay Formation

The bedrock was recorded with a very consistent distribution laterally and with depth across the site and proved to maximum investigation depths of 5.45m bgl. Typically, the thickness of the bedrock exceeds 5.0m.

As mentioned in previous sections, the soils from the surface were dry due to the last summer's exceptional dry weather, and the Oxford Clay was recorded with vertical desiccation cracks extending to depths of about 1.0m below ground level. It is worth noting that in trial pit TP111, located about 10m from a mature oak tree present among the hedge, the soil dryness was recorded up to 1.5m depth.

Below, the typical Oxford Clay soil sequence with depth of the Oxford Clay recorded across the site is detailed.

Initially, below the Topsoil/Made Ground Topsoil, a layer of dry, blocky, light brown mottled light grey and orange silty clay with fine active roots was recorded to depths of about 1.0m or less, typically excavated as gravel to cobble size. Hand shear vane testing was unable to be done in this layer due to the desiccation of the soil.

Below, starting with a thin layer of white, rounded calcareous concretions a stiff, dry, blocky, light grey mottled brown, silty clay with white powder sized selenite crystals excavated as gravel to cobble size was recorded to depths of about 1.5m. Typically, this material was no longer dry below 1.0m depth. Hand shear vane testing was unable to be done in this layer due to the dryness of the soil.

After this was a distinctive layer containing white both calcareous concretions and powder sized selenite deposits, thinly laminated, crumbly texture, grey mottled orange brown, silty clay with sand sized selenite crystals, orange sandy patches, fossil shell fragments and vertical brown relict rootlets was typically recorded to about 2.0m depth. Finally, all the exploratory holes terminated in very stiff, fissured, very thinly bedded, grey brown to bluish grey, silty clay with sand sized selenite crystals.

It is worth noting that at the base of some of the pits what seemed to be extremely weak mudstone rock beds was recorded.

What seems to be a near surface layer of geologically reworked Oxford Clay deposits has been recorded in the lowest end fields at trial pits TP102, TP103, TP104 and TP106 and borehole WS103 below the topsoil or Made Ground and to depths ranging from 0.4m to 1.3m bgl. This material is similar to the near surface clay soils of the Oxford Clay Formation recorded across the site, but with the presence of quartzite and chert gravel, together with ferruginous nodules. This material has not been recorded in any other fields across the site.

4.6. GEOTECHNICAL COMMENTS

Nothing significant noted other than the expected desiccation.

4.7. CONTAMINATION OBSERVATIONS

No visual or olfactory evidence of contamination was noted during the forwarding of exploratory holes.

4.8. OBSERVED GROUNDWATER BEHAVIOUR

Groundwater was not encountered whilst forwarding the exploratory holes during the site works.

4.9. GROUNDWATER MONITORING

Standing water levels are considered to be related to perched water within the fractures and fissures of the impermeable Oxford Clay Formation, also fed by surface water infiltration. These readings should therefore not be considered as a true groundwater level.

DATE	RESTING GROUNDWATER RANGE	COMMENTS
19/09/25	From 2.98m to dry (>5.08m bgl).	Monitoring wells WS104, WS111, WS113, WS115 and WS120 were recorded dry. Access to monitoring wells WS101 and WS103 was blocked by the cattle. Wells WS109, WS110 and WS117 were recorded with standing water levels at depths of between 2.98m and 4.47m bgl. Wells WS109 and WS110 were purged in this visit for groundwater sampling and a slow recharge was recorded.
25/09/25	From 2.98m to dry (>5.08m bgl).	Monitoring wells WS101, WS103, WS111, WS113, and WS120 were recorded as dry, as recorded in previous visit. The rest of the monitoring wells were recorded with standing water levels ranging from 2.98m to 4.94m bgl. Well purged in previous visit, (WS109 and WS110) were recorded with similar standing water levels to those recorded in previous visit.
02/10/25	From 2.28m to dry (>5.10m bgl).	Monitoring wells WS101, WS103, WS111, WS113 and WS120 were recorded dry. Slightly shallower resting water levels than those recorded during the previous visit were observed in the remaining wells, with standing water levels ranging from 2.98m to 4.94m bgl.
16/10/25	From 1.59m to dry (>5.09m bgl).	Monitoring wells WS101, WS111 and WS120 were recorded dry. This visit recorded slightly shallower resting water levels than previous visits, reflecting wetter weather conditions.
05/11/25	From 1.24m to dry (>5.09m bgl).	
14/11/25	From 0.72m to dry (>5.10m bgl)	The water levels across the site continued to rise with more wells recording standing water. The water level in WS113 was such that the installation response zone was flooded.

5. GEOTECHNICAL PROPERTIES

5.1. OXFORD CLAY FORMATION

5.1.1. Index Property Testing

SOIL TYPE	Oxford Clay Formation.
WATER CONTENT	12.8%to 26.0% (21No. samples)
LIQUID LIMIT	32% to 73% (21No. samples)
PLASTIC LIMIT	17% to 30% (21No. samples)
PLASTICITY INDEX (I_p)	12% to 43% (19No. samples)
MODIFIED I_p	21% and 26% (2No. samples)
NHBC CLASS	Medium volume change potential.
COMMENT	Modified *Ip* were recorded in two samples from trial pit TP111 and borehole WS117. Sample from trial pit TP111 at 1.3m depth was recorded with calcareous concretions of sand and gravel sized resulting in a modified *Ip* = 21%. Likewise, sample from borehole WS117 at 3.1m depth, was recorded mudstone gravel resulting in a modified *Ip* = 26%. Only three out twenty-one samples tested (14%) have been recorded with high volume change potential. It is considered that there is a wide range of samples tested, and an average Ip = 32% has been recorded, which is considered representative of the Oxford Clay plasticity.

5.1.2. Standard Penetration Tests (SPTs)

A total of 94No. SPTs were carried out in the clay-rich soils of the Oxford Clay Formation. N-values range from 9 to >50 (refusal). The lowest values was recorded at 1.0m depth in borehole WS117, at the location of the former backfilled pond and the SPT at 1.0m depth commenced in the Made Ground and finished in the natural.

Typically, stiff to very stiff soils, were recorded in the upper metre and very stiff to hard soils below.

One single test was finished at 50 blows (refusal), as the test was unable to penetrate the required 300mm, below are correlated N_{300} values provided:

CORRELATED SPT N-VALUES >50: Oxford Clay Formation				
HOLE	**DEPTH (m bgl)**	**N**	**PENETRATION (mm)**	**N_{300}**
WS108	4.0	50	288	52

5.1.3. Undrained Shear Strength

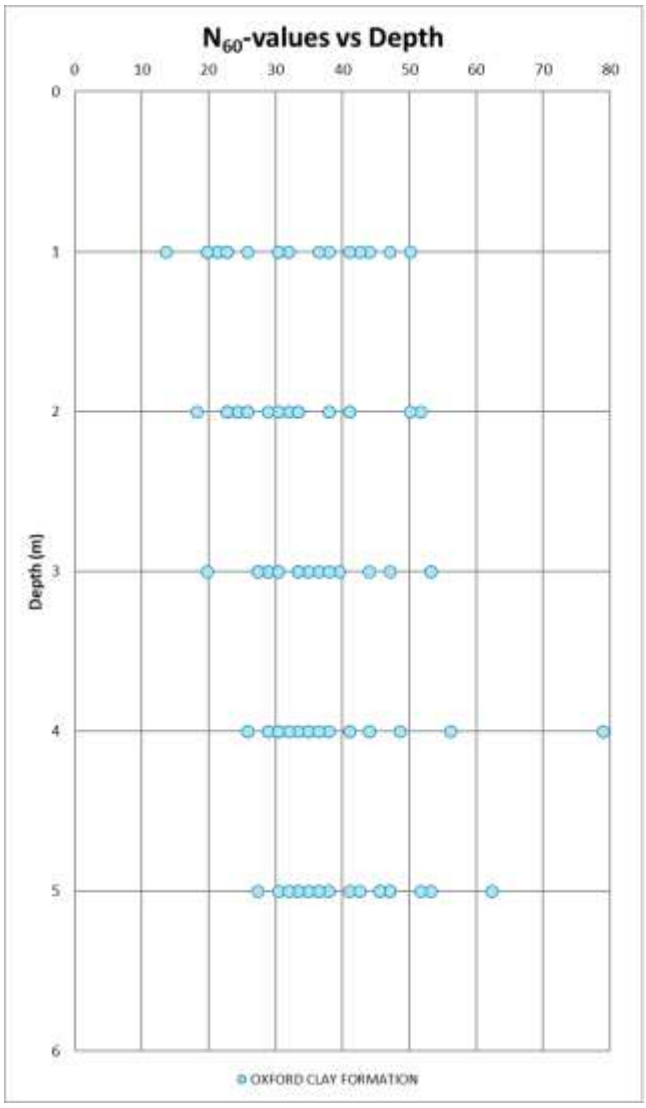
The SPT N-values have been corrected to N_{60}-values, and then correlated to an equivalent undrained shear strength (c_u) using the approach by Stroud (1985) based upon a relationship of c_u=4.5N_{60}, derived from an average I_P of 32%. A hammer efficiency value for the windowless sample rig of Er=91.09% based on the annual calibration certificate provided by the sub-contractor.

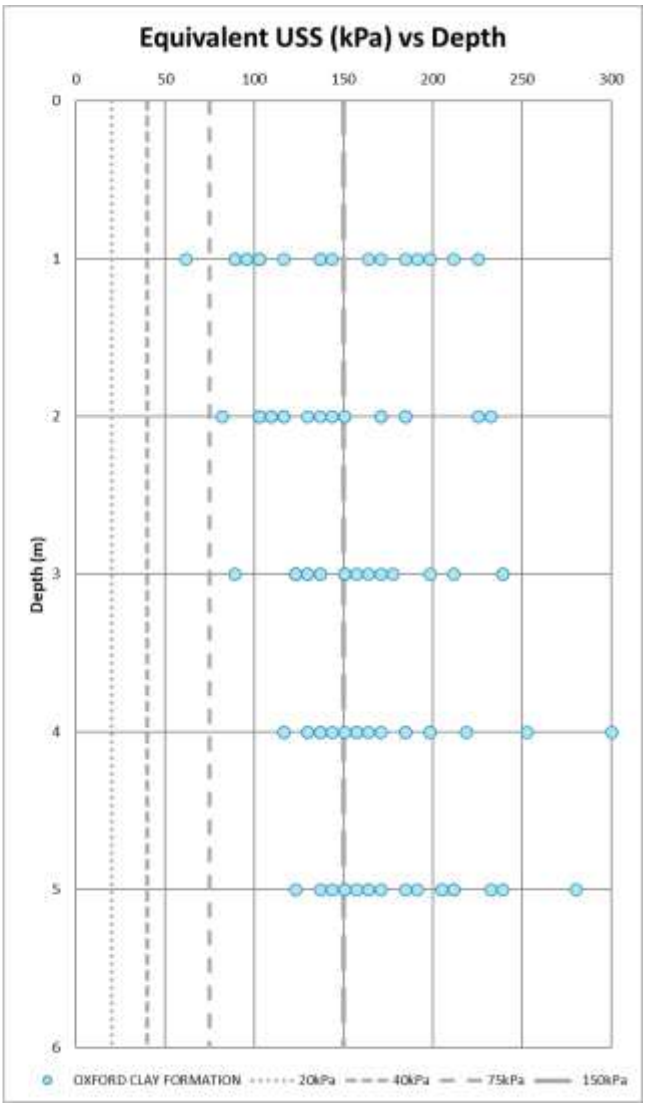
The equivalent undrained shear strengths values for the Oxford Clay Formation typically increase with depth. At 1m depth, undrained shear strength values ranging between 61kPa and 225kPa, have been recorded, averaging 138kPa, which is indicative high strength soil type.

Between 2m and 3m depth, higher undrained shear strength values have been recorded raging from 82kPa and 139kPa, averaging 150kPa, which is indicative of high to very high strength soil type.

Below, between 4m and 5m depth, high to extremely high strength values have been recorded ranging, from 116kPa to >300kPa.

The following charts show the distribution with depth of the N_{60} values considered in every borehole together with the derived equivalent undrained shear strength values.





Hand Shear Vane Testing was carried out within the clay-rich soils recorded on site. Typically, hand shear vane tests undertaken in the upper metre recorded undrained shear strength in excess of 140kPa, indicating very high strength soil type but also indicative of the seasonal desiccation recorded across the site. It is worth noting that due to the soil dryness testing in the upper metre was not possible in most of the pits. These values should not be considered for geotechnical design purposes. Therefore, the recorded undrained shear strength ranged between 70kPa and 137kPa. Applying the Bjerrun correction factor due to the plasticity of the soils provides corrected undrained shear strengths of between 77kPa and 127kPa, averaging 101kPa, which is indicative of a high strength soil type.

Hand penetrometer readings (Uncompressive Strength – UCS) range between 1.5kg/cm^2 and >5.0kg/cm^2. It is worth noting that the highest readings were recorded in the upper metre soils affected by seasonal desiccation. These values should not be considered for geotechnical design purposes. The tests have been carried out within the windowless sampling boreholes to maximum depths of 4.7m bgl. A reduction factor of 1.5 has been employed to adjust penetrometer results to correlate with shear vane values and soil consistency. Undrained shear strengths of between 50kPa and 150kPa were recorded with the Hand Pocket Penetrometer tests, averaging 104kPa, which is indicative of high strength soil type.

Therefore, an undrained shear strength value representative of this soil at typical trench fill foundation depths has been considered:

$$c_u = 75\text{kPa}$$

5.1.4. Compressibility

Using Stroud & Butler (1975) to determine the coefficient of volume compressibility (m_v) from SPT N-value and I_P. The average I_P value of the cohesive deposits of the Oxford Clay Formation is of 32%. This result in correlations to f_2 = 0.45. The lowest corrected N_{60} = 18 from 2m depth, has been recorded from the SPTs undertaken in these deposits. Therefore,

$$m_v = 0.12\text{m}^2/\text{MN}$$

indicative of medium compressibility soil type

5.1.5. Shearing Resistance

The BS 8004:2015 allows for the estimation of the critical state effective angle of shearing resistance (ϕ') based on the soils Plasticity Index. Therefore, based on the average plasticity index recorded:

$$\phi' = 24^\circ$$

5.2. SOAKAGE POTENTIAL

The records of the BRE365 soakage tests are presented in the Appendices. A summary of results are presented in the table below:

TRIAL PIT	SOIL INFILTRATION RATE		STRATUM TESTED
TP07	Test 1	Permeability too low to calculate soil infiltration rate.	Stiff, fissured, thinly laminated bluish grey silty CLAY.
TP08	Test 1	Permeability too low to calculate soil infiltration rate.	Stiff, fissured, blocky, light grey mottled light brown, silty CLAY.
TP09	Test 1	Permeability too low to calculate soil infiltration rate.	Stiff, fissured, light grey mottled light brown, silty CLAY.

6. GEOTECHNICAL ASSESSMENT

6.1. INTRODUCTION

At this stage, a development layout has not been defined, and the following advice and recommendations are general for the construction of low-rise two to three-storey residential properties across the site. From assessment of the nature of the ground conditions and the type of proposed structures, it is considered that the situation generally falls within EC7 Geotechnical Category 1, with some aspects likely Category 2.

Should the nature of the development be changed then the results of this investigation would need to be reviewed and reassessed.

6.2. EXCAVATIONS

STABILITY	Any excavation requiring man entry should be battered back to a safe angle, supported by an appropriate proprietary trench support system or adequately shored to provide safe working conditions. Shoring to any excavation requiring man entry must be designed by a suitably qualified and experienced engineer. Any support system will require regular inspection as detailed in published guidelines to ensure the excavation support is adequate and appropriate for the ground conditions present. It is anticipated that narrow trench excavations will remain relatively stable and open for short periods, but minor spalling of side walls could still occur.
EQUIPMENT	It should be possible to progress excavations with conventional equipment.
GROUNDWATER CONTROL	Specific groundwater control is unlikely to be required at this site. Limited pumping from sumps or bailing out may be required to deal with slight seepages or surface water ingress during periods of inclement weather. Existing land drainage will need to be maintained or diverted as part of the development. Land drainage to divert groundwater may assist during construction. Further land drainage may need to be incorporated into the construction of the development to avoid water logging of gardens.

6.3. SLOPE STABILITY

Slopes across the site are gentle and overall, the site is relatively flat. No significant changes in level as part of the development are anticipated. It is therefore considered that slope stability is unlikely to be a significant concern.

6.4. EARTHWORKS

It is likely that some earthworks will be required on site due to the existing site levels and the proposed development that will require some form of cut and fill to form development platforms. An Earthworks Specification should be developed for the Contractor to work in accordance with informed by a Geotechnical Design Report (GDR).

Where a Method based specification is adopted then it is an inherent requirement of such an approach that professional supervision of the contractor is needed.

The soil classification which has been undertaken as part of this investigation will assist in the preparation of an earthworks specification. Further classification tests will be required to develop the earthworks specification.

Whilst the filling needs to be undertaken in a controlled engineered manner that will greatly reduce settlement, the settlement of fill cannot be avoided entirely. In addition, where ground levels are raised the natural soils will undergo consolidation settlement from the imposed loading of the fill materials. Such settlements would be in addition to settlements arising from any imposed structural loads. It would therefore be prudent to delay construction by a several weeks in areas of deep fill (say greater than 1.0m as a guide) to allow the immediate component of settlement to be completed. The thicker the fill, the longer the delay required.

Substantial earthworks cut operations can cause stress relief heave of the natural ground. Such unloading cannot be countered and so a delay to construction by a several weeks in areas of deep cut (say greater than 2.0m as a guide) to allow the immediate uplift to occur is recommended. The deeper the cut, the longer delay required.

6.5. SOAKAWAY DESIGN ADVICE

Soakage tests were carried out in trial pits TP107, TP108 and TP109, located at the areas of the proposed attenuation ponds. None of the tests was able to record any infiltration rate.

Therefore, it is considered that the disposal of collected surface water to soakaways will not be feasible at this site due to the cohesive nature and proved low permeability of the underlying soils. A positive drainage solution to a local sewer or surface watercourse should be pursued.

6.5.1. Attenuation Basins

It is noted on the masterplan that basins for the temporary storage of water are proposed in the southern most fields.

The attenuation ponds will be constructed within the clayey soils of the Oxford Clay Formation. Although the bedrock has been proved as a low permeability clay, perched water might be recorded. Therefore, when digging the ponds, attention to the presence of water will be required and if recorded parts of the basins will need to be re-engineered with clay to prevent the seepage entering the basins and land drains.

6.6. PAVEMENT CONSTRUCTION

From consideration of the observed ground conditions and the plasticity of the clay, it is recommended that a preliminary design California Bearing Ratio (CBR) of 3% is assumed. The cohesive deposits will be prone to rapid degradation during wet weather working and this should be avoided where possible.

Once the alignment and finished levels of adoptable roads has been determined, further targeted ground investigation may be required to meet the design CBR requirements of the local highways authority.

All unsuitable soils, such as topsoil or desiccated soils, should be removed from beneath proposed paved areas. The exposed sub-grade formation should then be proof rolled to reveal any excessively soft or compressible zones and any such features identified also removed by excavation. Where unsuitable materials are removed, the resultant voids should be filled in layers with appropriately compacted suitable granular fill. To reduce the loss of granular construction materials into the sub-grade, consideration should be given to utilising a geotextile starter layer across the formation level.

6.7. SUB-SURFACE CONCRETE

6.7.1.1. Sulphate and pH

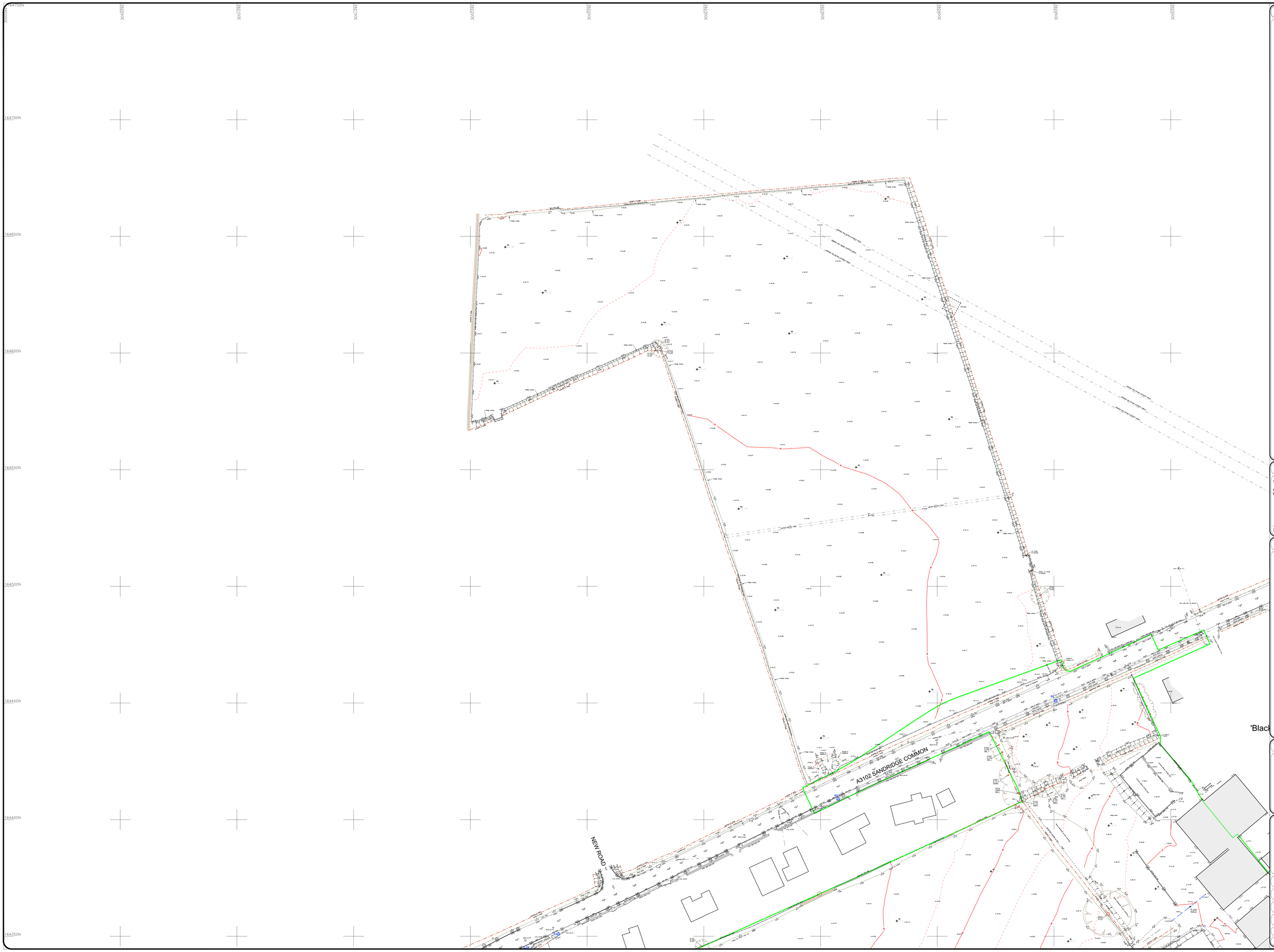
	ALL ON-SITE SOILS			
	Sulphate		**pH**	
Characteristic Value	12.48%		6.5 units	
Justification	Based on Highest Total Potential Sulphate.		Mean of lowest 20% results.	
	No. of tests	Results Range	No. of tests	Results Range
Soil	30	<10 – 3,340mg/l	30	6.2 – 7.9 units
Groundwater	2	5,020 – 5,460 mg/l	2	8.0 – 8.1 units
Total Potential Sulphate	12	0.15% - 12.48% Seven out of twelve samples tested have been recorded potentially pyritic.		

6.7.1.2. Aggressive Chemical Environment for Concrete (ACEC) Class

Classification of the ACEC has been undertaken in accordance with the BRE SD1:2005 Concrete in Aggressive Ground.

OXFORD CLAY FORMATION	
SITE / SOIL CATEGORY	Natural ground containing pyrite.
DESIGN SULPHATE CLASS	DS-4
GROUNDWATER REGIME	Static.
ACEC CLASS	AC-3s
COMMENTS	Concrete in pyritic ground that is initially low in soluble sulphate does not have to be designed to withstand a high potential sulphate class unless ground disturbance is such that pyrite may be oxidised. This may prompt a change in construction e.g. employing piled foundations instead of trench fill footings. The restriction to DS-4 has been applied. Whilst water accumulated in some monitoring wells, the ground has been proven to be practically impermeable and so static conditions are appropriate.

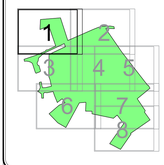
APPENDIX F: Topographic Survey



Station Schedule:

Station	Easting	Northing	Level
S1	392237.753	164351.003	43.704
S2	392257.523	164396.876	44.156
S3	392157.523	164406.876	44.156
S4	392223.172	164344.527	43.749
S5	392158.840	164308.143	43.753
S6	392148.948	164228.084	44.478
S7	392216.955	164215.118	43.470
S8	392236.955	164215.118	43.470
S9	392217.191	163940.443	41.739
S10	392590.265	164512.881	46.941
S11	392659.029	164543.220	49.798
S13	392822.433	164584.952	50.359

Sheet Index:



Notes:

TRUE GPS OSGB36(15) Co-Ordinates & Levels Used.

GPS Grid to Ground Scale Factor Used :1.000
For TPS measures apply Scale factor 0.9996786

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LEGEND:

- Kerb
- Hedge
- Surface Edge
- Fence
- Building
- Wall
- Embankment
- Gate
- Crash Barrier
- Foliage Extents
- Tree Canopy
- Footpath
- Ditch
- Top Wire
- Overhead Lines
- Rock Outcrop
- Bus Shelter
- RS Road Sign
- Road Sign
- Road Name Plate
- Post Fence Post
- TL Traffic Lights
- Bin Rubbish Bin
- Trh Trial Hole / Pit
- BH Bore Hole
- LB Letter Box
- BT British Telecom
- BT British Telecom
- CAT Cable TV
- CAT Cable TV
- ER Earth Rod
- TP Telegraph Pole
- LP Lampost
- EP Electricity Pole
- B. Bollard
- vp Vent Pipe
- MHCL Manhole
- MHCL Manhole
- MHCL Manhole
- CCL Inspection Chamber
- LH Lamp Hole
- RE Rodding Eye
- G. Road Gully
- E.E. Electricity Cables
- W. Water IC
- W Stop Tap
- SV Stop Valve
- FH Fire Hydrant
- WM Water Meter
- Gas Gas Valve
- Mkr Service Marker
- TCB Telephone Box
- 50.0 Trn. Contour & Height Label
- Half Metre Contour
- Tree (Spread & Girth)
- Bush
- S1 Survey Station & Ref.
- 50.25 Spot Level & Position

Revisions:

A	Access survey at south west corner 7/12/22
B	Survey verified and updated 4th-5th Dec. 2024
C	Additional verification and boundary stakeout Feb. 25
D	
E	

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8 Oldfield Road, Bocam Park, Pencoed, Bridgend, CF35 5LJ
tel. 01656 865586
web. www.healersurveys.co.uk

Client: Gleeson Homes

Project: Blackmore Farm, Melksham.

Drawing: Site Survey - Verified December 2024

Scale	Date
1:500	August 2018

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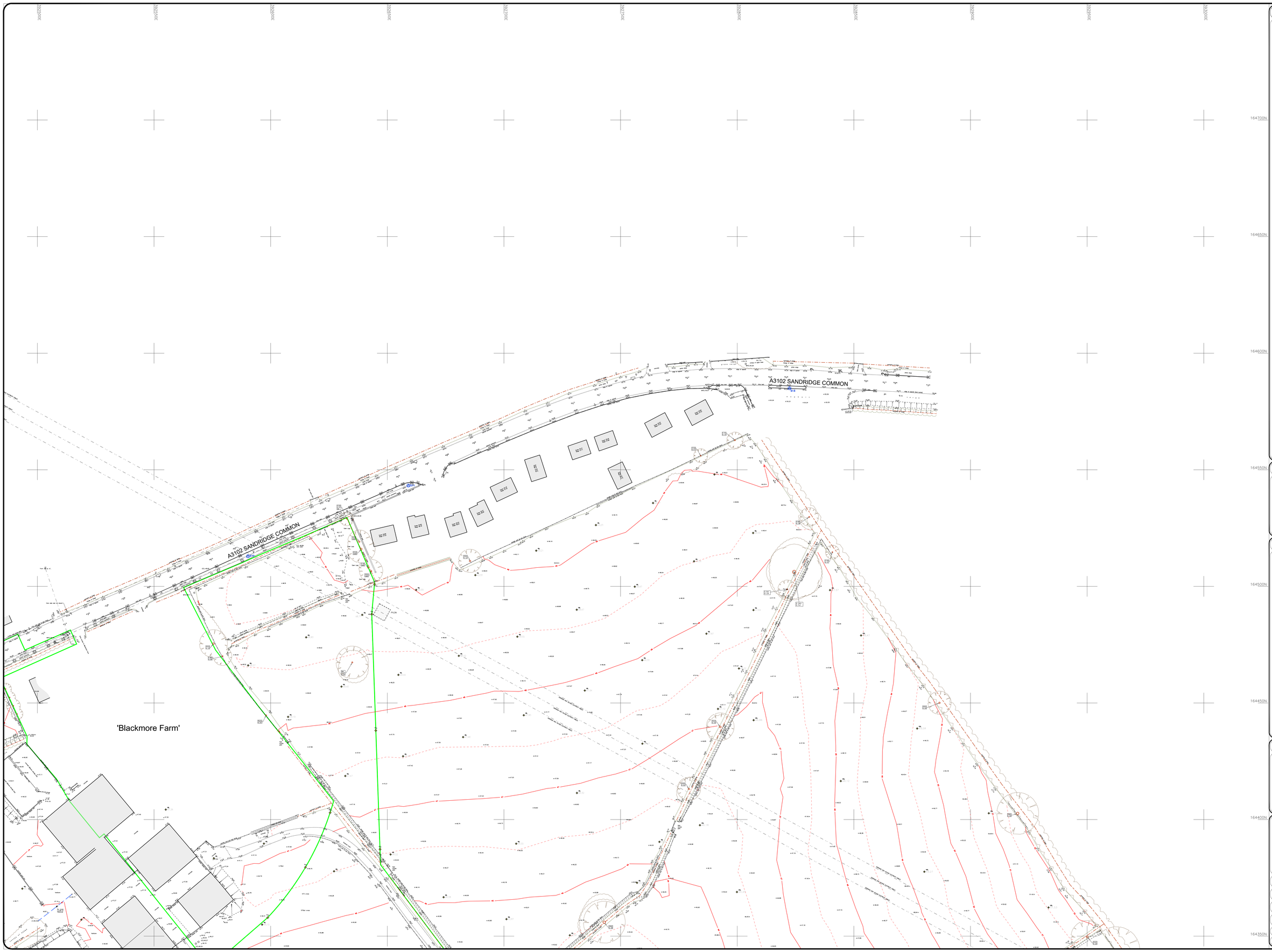
JH/FA.07	R.E.	P2863C

Sheet	Paper Size
1 of 8	A0



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S3	392357.523	164408.876	44.156
S4	392223.172	164344.527	43.749
S5	392214.945	164229.084	43.478
S6	392148.948	164228.084	44.478
S7	392200.728	164056.704	44.416
S8	392236.900	164015.118	43.470
S9	392217.191	163940.443	41.739
S10	392259.029	164543.220	49.798
S11	392859.029	164543.220	49.798
S13	392822.433	164584.952	50.359

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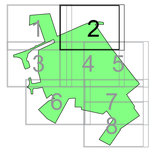

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LEGEND:

Kerb
Hedge
Surface Edge
Fence
Building
Wall
Embankment
Gate
Crash Barrier
Foliage Extents
Tree Canopy
Footpath
Ditch
Stay Wire
Overhead Lines
Rock Outcrop
Bus Shelter
RS Road Sign
Road Sign
Road Name Plate
Fence Post
TL Traffic Lights
Bin Rubbish Bin
Trial Hole / Pit
Bore Bore Hole
LB Letter Box
50.0 1m. Contour & Height Label
Half Metre Contour
Tree (Spread & Girth)
Bush
S1 Survey Station & Ref.
50.25 Spot Level & Position
BT British Telecom
BT British Telecom
CAT Cable TV
CAT Cable TV
EK Earth Rod
TP Telegraph Pole
LP Lampost
EP Electricity Pole
B. Bollard
VP Vent Pipe
MHCL Manhole
MHCL Manhole
CCL Inspection Chamber
LH Lamp Hole
RE Rodding Eye
G. Road Gully
E.C. Electricity Cables
W.M. Water C.
W Stop Tap
SV Stop Valve
FH Fire Hydrant
WM Water Meter
Gas Gas Valve
MW Service Worker
Telephone Box

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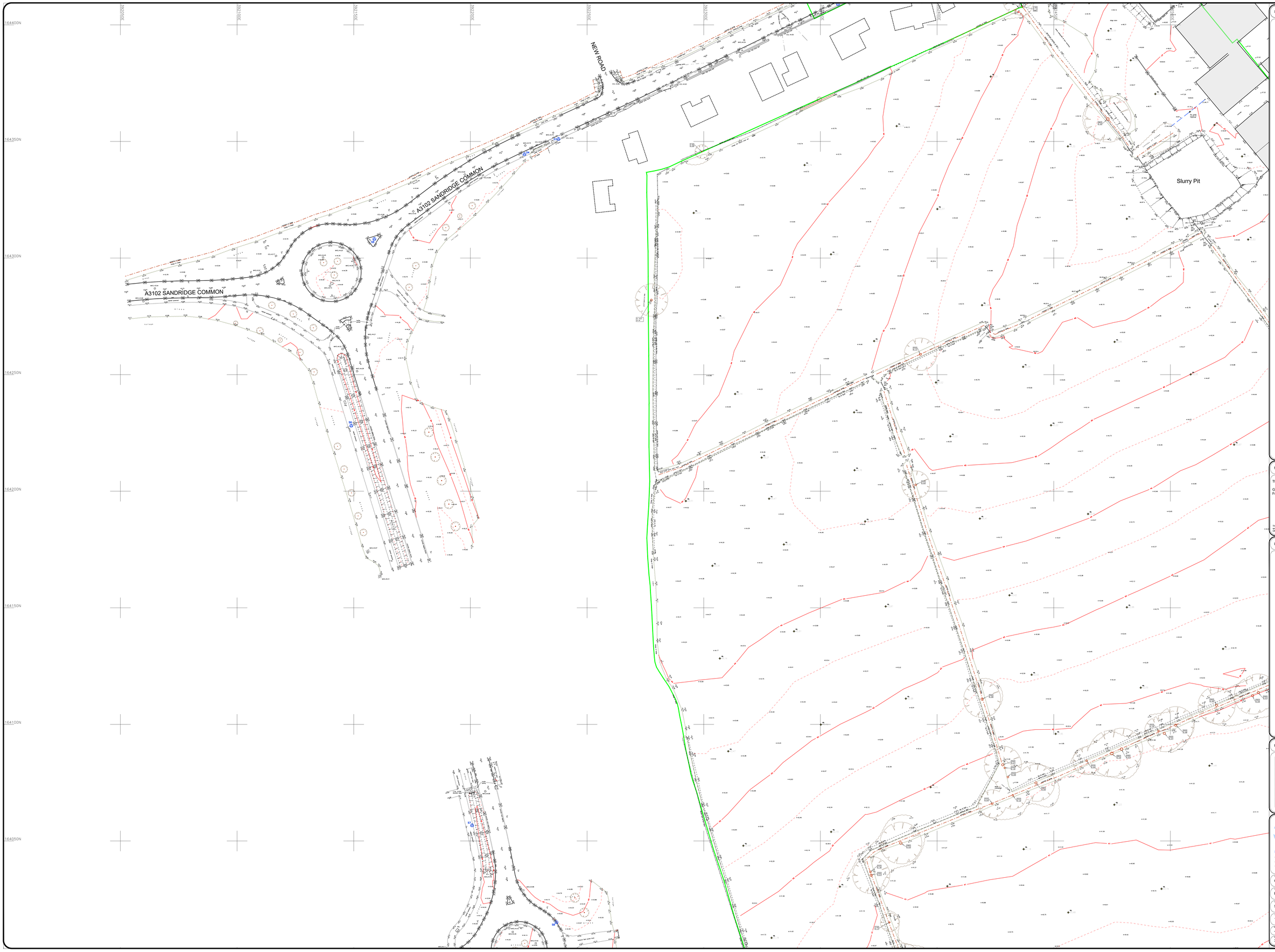

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S3	392357.523	164408.876	44.156
S4	392258.842	164363.561	43.756
S5	392158.840	164308.143	43.753
S6	392148.948	164228.084	44.478
S7	392200.728	164056.704	44.416
S8	392236.900	164015.118	43.470
S9	392581.265	164512.881	48.941
S10	392590.265	164512.881	48.941
S11	392659.029	164543.220	49.798
S13	392822.433	164584.952	50.559

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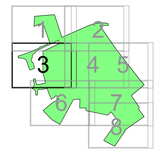

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- Rock Outcrop
- Bus Shelter
- RS Road Sign
- Road Sign
- Road Name Plate
- Post Fence Post
- TL Traffic Lights
- Bin Rubbish Bin
- Trap Trap Hole / Pit
- Bore Bore Hole
- LB Letter Box
- BT British Telecom
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- CAT Cable TV
- CAT Cable TV
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- TP Telegraph Pole
- LP Lamppost
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- B. Bollard
- vp Vent Pipe
- MHCL Manhole
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- MHCL Manhole
- CCL Inspection Chamber
- LH Lamp Hole
- RG Rodding Cap
- G. Road Gully
- E. Electricity Cables
- W. Water IC
- W Stop Tap
- SV Stop Valve
- FH Fire Hydrant
- WM Water Meter
- Gas Gas Valve
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Sheet No	Paper Size	Drawing No
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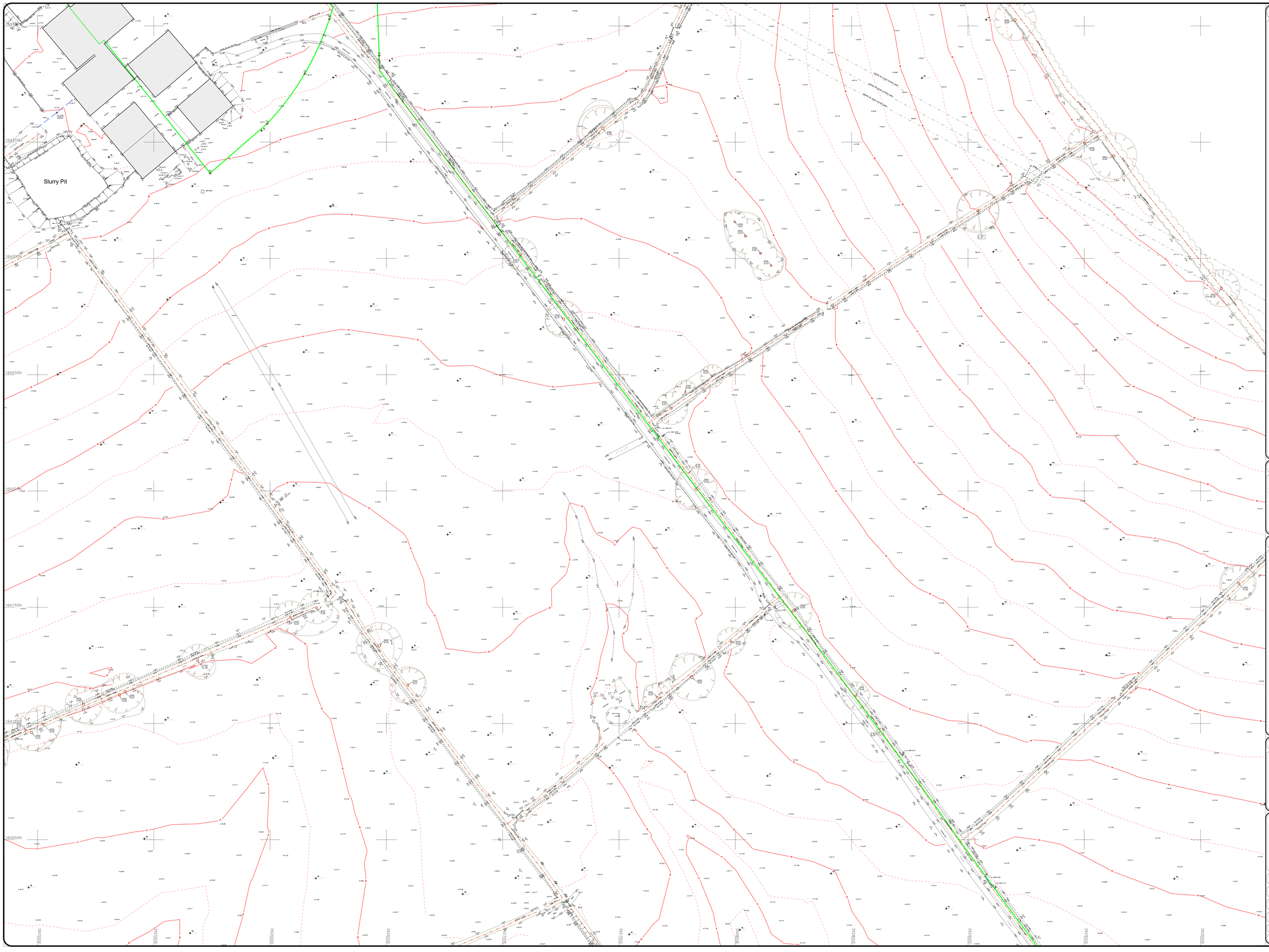

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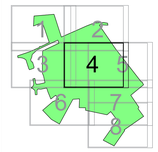
S4	392351.162	164368.876	44.156
S5	392158.840	164308.143	43.753
S6	392148.948	164228.084	44.478
S7	392220.728	164056.704	44.416
S8	392236.900	164015.118	43.430
S9	392251.265	164000.265	43.430
S10	392590.265	164512.881	48.941
S11	392859.029	164543.220	49.798
S13	392822.433	164584.952	50.359

Sheet Index:



Notes:

TRUE GPS OSGB36(15) Co-Ordinates & Levels Used.

GPS Grid to Ground Scale Factor Used :1.000
For TPS measures apply Scale factor 0.9996786

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LEGEND:

- Kerb
- Hedge
- Surface Edge
- Fence
- Building
- Wall
- Embankment
- Crib
- Crash Barrier
- Foliage Extents
- Tree Canopy
- Footpath
- Stairs
- Stay Wire
- Overhead Lines
- Rock Outcrop
- Bus Shelter
- Road Sign
- Road Sign
- Road Name Plate
- Fence Post
- Traffic Lights
- Rubbish Bin
- Tns Trial Hole / Pit
- Bh Bore Hole
- LB Letter Box
- BT British Telecom
- BT British Telecom
- CAT Cable TV
- CAT Cable TV
- EK Earth Rod
- TP Telegraph Pole
- LP Lamppost
- EP Electricity Pole
- B. Bollard
- v.p. Vent Pipe
- MHCL Manhole
- MHCL Manhole
- MHCL Manhole
- ICCL Inspection Chamber
- LH Lamp Hole
- RE Rodding Eye
- G. Road Gully
- E. Electricity Cables
- W. Water ID
- S Stop Tap
- SV Stop Valve
- FH Fire Hydrant
- WM Water Meter
- Gas Gas Valve
- Mkr Service Marker
- TCB Telephone Box
- 50.0 Inv. Contour & Height Label
- Half Metre Contour
- Tree (Spread & Girth)
- Bush Bush
- S1 Survey Station & Ref.
- × 50.25 Spot Level & Position

Revisions:

A	Access survey at south west corner 7/12/22
B	Survey verified and updated 4th-5th Dec. 2024
C	Additional verification and boundary stakeout Feb. 25
D	
E	

healer surveys
Land Surveyors
8 Oldfield Road, Bocam Park, Pencoed, Bridgend, CF35 9LJ
tel. 01656 865566
web. www.healersurveys.co.uk

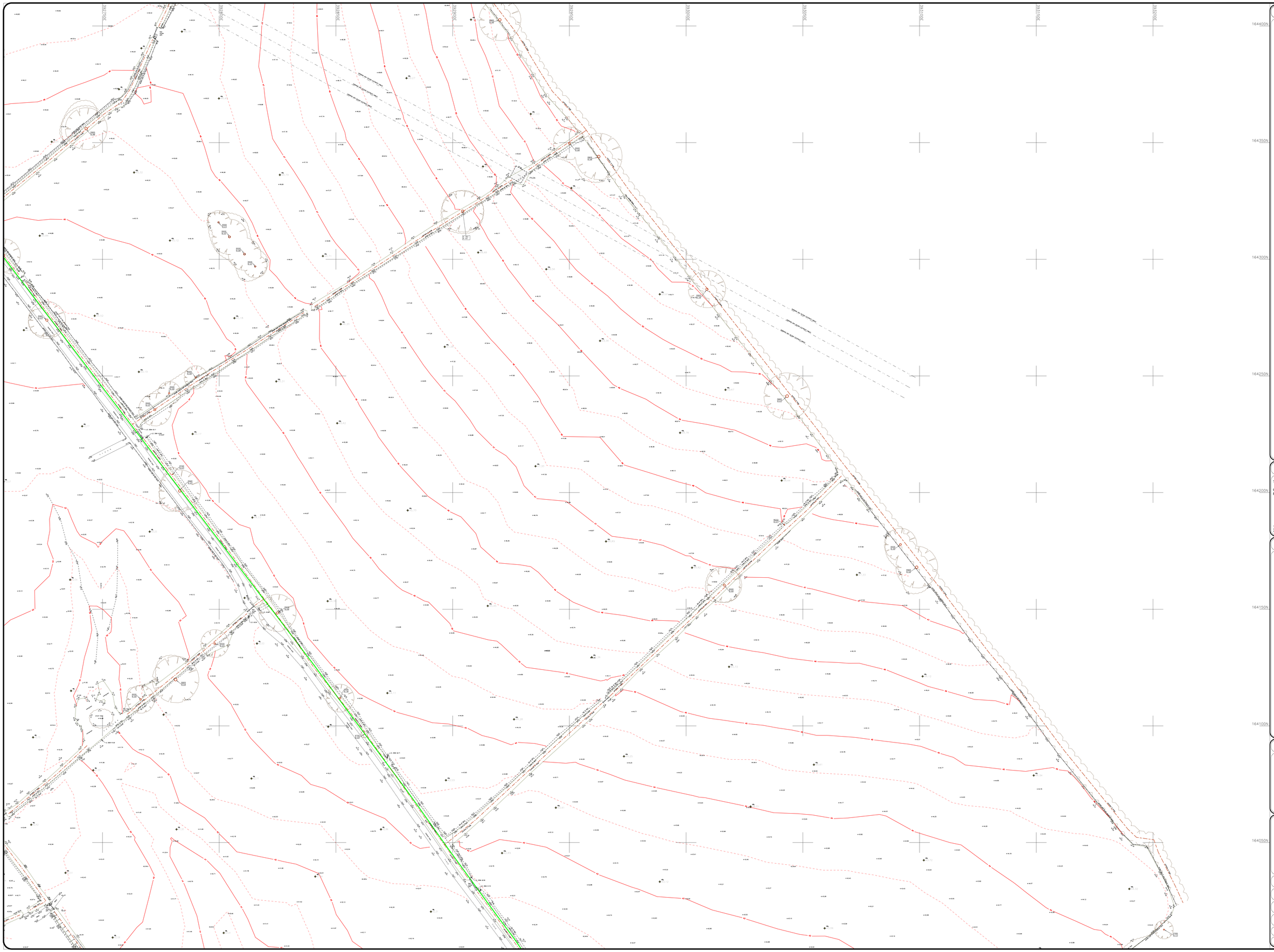
Client: Gleeson Homes

Project: Blackmore Farm, Melksham.

Drawing: Site Survey - Verified December 2024

Scale: 1:500	Date: August 2018
Surveyor / Drawn: J.H.P. & G.T.	Checked: R.E.
Sheet No: 4 of 8	Sheet Size: A0

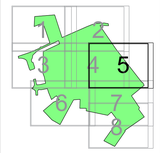
P2863C



Station Schedule:

Station	Easting	Northing	Level
01	392237.753	164351.003	43.704
S2	392252.521	164416.976	44.156
S3	392357.523	164428.876	44.156
S4	392233.172	164344.527	43.749
S5	392158.840	164308.143	43.753
S6	392148.948	164228.084	44.478
S7	392200.728	164206.104	44.410
S8	392236.991	164046.415	43.720
S9	392237.791	163940.443	43.739
S10	392590.265	164312.881	48.941
S11	392659.029	164543.220	49.798
S13	392822.433	164584.952	50.359

Sheet Index:



Notes:

TRUE GPS OSGB36(15) Co-Ordinates & Levels Used

GPS Grid to Ground Scale Factor Used :1.000
For TPS measures apply Scale factor 0.9996786

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LEGEND:

Kerb
Hedge
Surface Edge
Fence
Building
Wall
Embankment
Gate
Crash Barrier
Foliage Extents
Tree Canopy
Footpath
Deck
Stay Wire
Overhead Lines
Rock Outcrop
Bus Shelter
Road Sign
Road Sign
Road Name Plate
Post: Fence Post
Traffic Lights
Rubbish Bin
Test Hole / Pit
Box Hole
Letter Box
BT British Telecom
BT British Telecom
CAT Cable TV
CAT Cable TV
Earth Rod
Telegraph Pole
Lamppost
Electricity Pole
Bollard
Vent Pipe
MHCL Manhole
MHCL Manhole
MHCL Manhole
ICCL Inspection Chamber
LH Lamp Hole
RE Rodding Eye
G Road Gully
E Electricity Cables
WC Water IC
W Stop Tap
SV Stop Valve
FH Fire Hydrant
WM Water Meter
Gas Gas Valve
Mov Service Worker
TB Telephone Box
1m. Contour & Height Label
Half Metre Contour
Tree (Spread & Girth)
Bush Bush
S1 Survey Station & Ref.
50.25 Spot Level & Position

Revisions:

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Client: Gleeson Homes

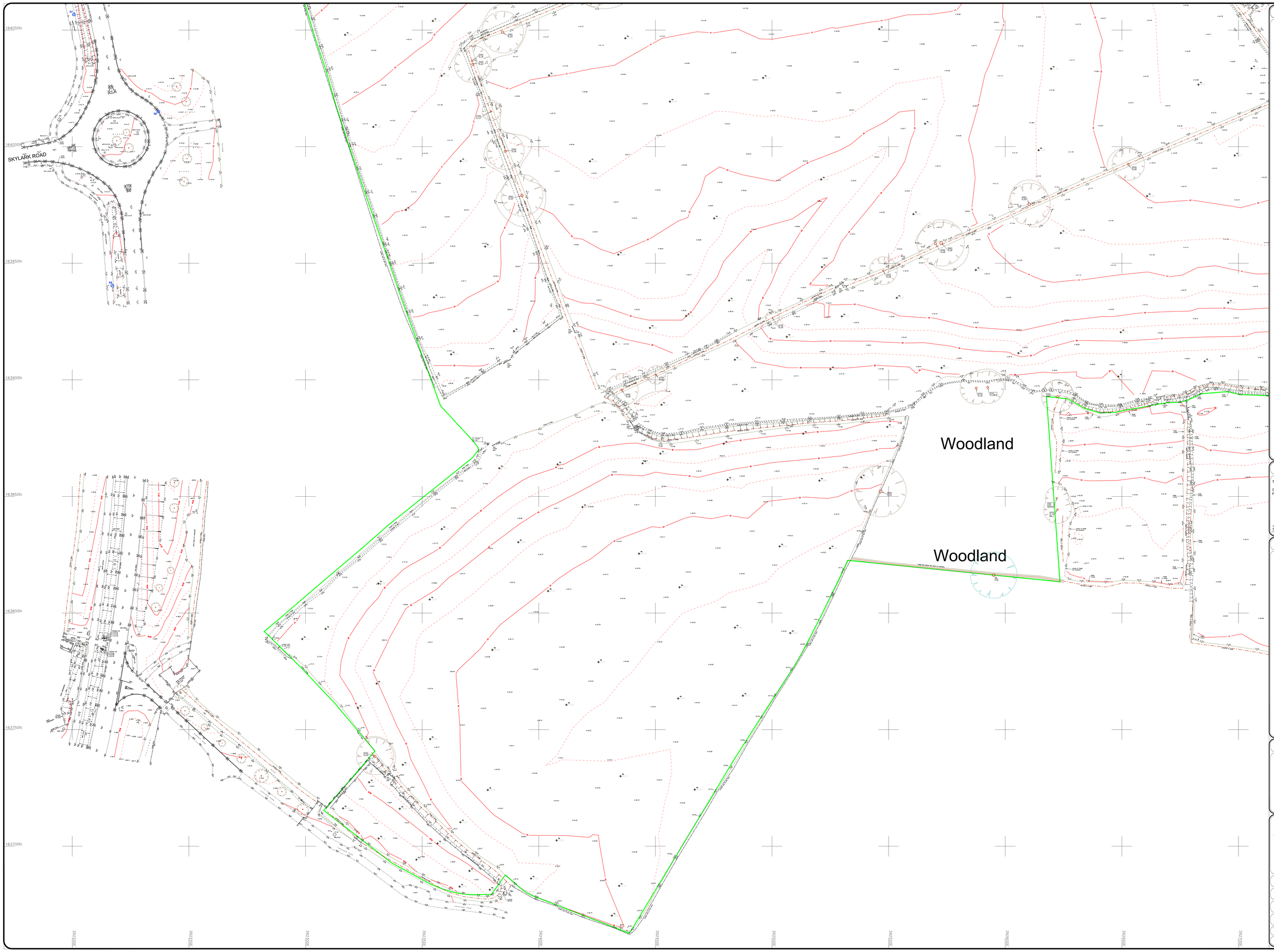
Project: Blackmore Farm, Melksham.

Drawing: Site Survey - Verified december 2024

Scale:	Date:
1:500	August 2018

Surveyor / Drawn:	Checked:	File:
J.H.P. & D.T.	R.E.	P2863C

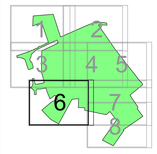
Sheet No:	Paper Size:
5 of 8	A0



Station Schedule:

Station	Easting	Northing	Level
01	392237.753	164351.003	45.704
02	392257.523	164407.876	44.156
03	392357.523	164408.876	44.156
04	392223.172	164344.527	43.749
05	392158.840	164308.143	43.753
06	392148.848	164228.084	44.478
07	392236.905	164215.118	43.470
08	392236.905	164015.118	43.470
09	392217.191	163940.443	41.739
010	392590.265	164012.881	48.941
011	392659.029	164543.220	49.798
013	392822.433	164584.952	50.359

Sheet Index:



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For TPS measures apply Scale factor 0.9996786

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LEGEND:

- Kerb
- Hedge
- Surface Edge
- Fence
- Building
- Wall
- Embankment
- Gate
- Crash Barrier
- Foliage Extents
- Tree Canopy
- Footpath
- Stairs
- Stay Wire
- Overhead Lines
- Rock Outcrop
- Bus Shelter
- Road Sign
- Road Sign
- Road Name Plate
- Fence Post
- Traffic Lights
- Rubbish Bin
- Tri Trap Hole / Pit
- Bore Hole
- Letter Box
- BT British Telecom
- BT British Telecom
- CAT Cable TV
- CAT Cable TV
- ER Earth Rod
- TP Telegraph Pole
- LP Lamppost
- EP Electricity Pole
- BL Bollard
- vp Vent Pipe
- MHCL Manhole
- MHCL Manhole
- MHCL Manhole
- CCL Inspection Chamber
- LH Lamp Hole
- RE Rodding Eye
- G Road Gully
- E.E. Electricity Cables
- W Water IC
- W Stop Tap
- SV Stop Valve
- FH Fire Hydrant
- WM Water Meter
- Gas Gas Valve
- SM Service Meter
- TCB Telephone Box
- 50.0 1m. Contour & Height Label
- Half Metre Contour
- Tree (Spread & Girth)
- Bush Bush
- S1 Survey Station & Ref.
- 50.25 Spot Level & Position

Revisions:

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web. www.healersurveys.co.uk

Client: Gleeson Homes

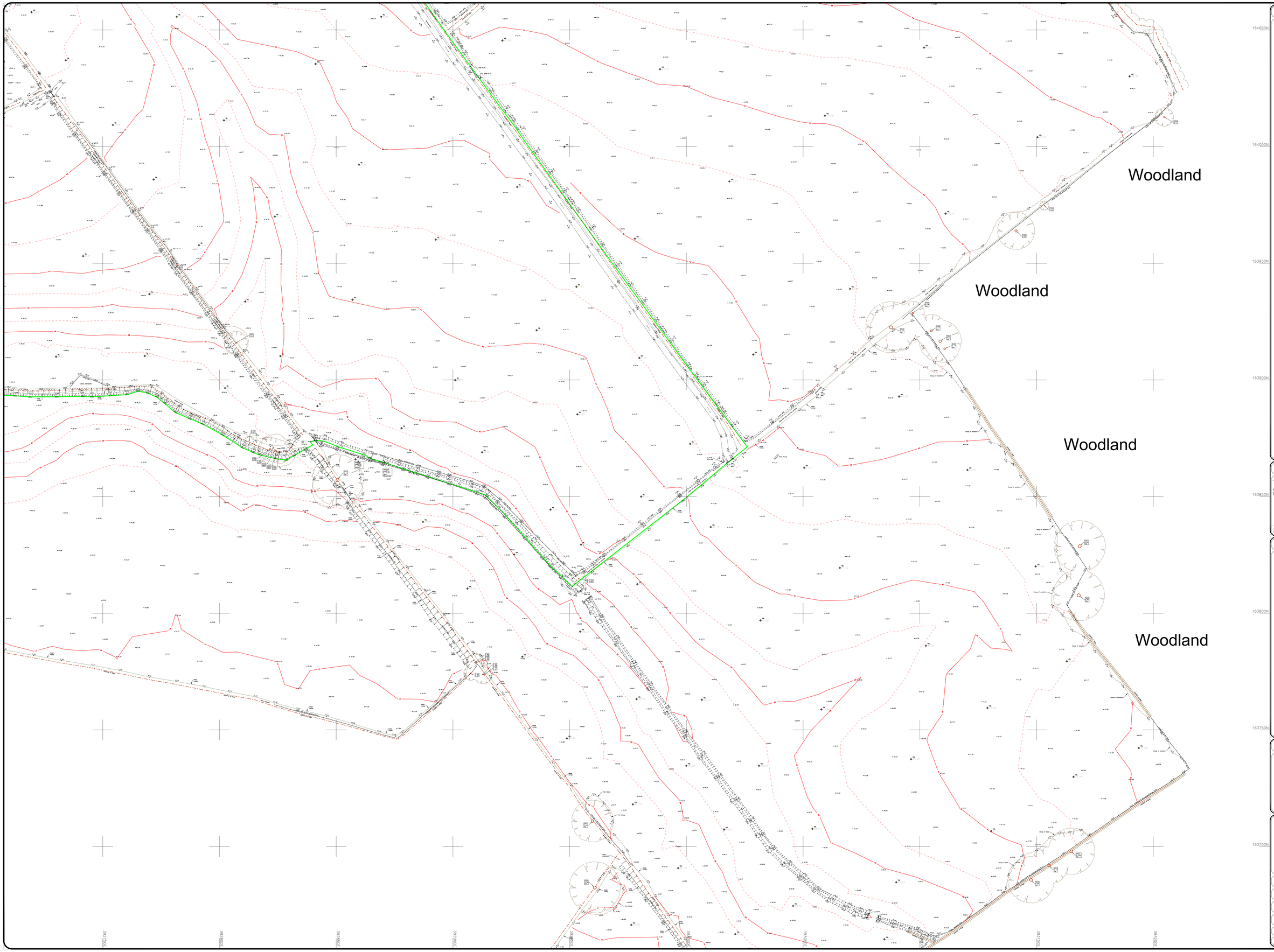
Project: Blackmore Farm, Melksham.

Drawing: Site Survey - Verified december 2024

Scale	Date
1:500	August 2018

Surveyor / Draft	Checked	Dwg No.
J.N.P. & D.P.	R.E.	P2863C

Sheet No.	Paper Size
6 of 8	A0



Station Schedule:

Station	Easting	Northing	Level
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S2	392450.790	164431.020	45.174
S3	392357.523	164406.876	44.156
S4	392357.523	164406.876	44.156
S5	392158.846	164308.143	43.753
S6	392148.948	164228.084	44.478
S7	392200.728	164056.704	44.416
S8	392236.900	164015.118	43.420
S9	392590.265	164512.881	48.941
S10	392590.265	164512.881	48.941
S11	392659.029	164543.220	49.798
S13	392822.433	164584.952	50.359

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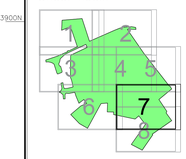

Notes:

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LEGEND:

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- Hedge
- Surface Edge
- Fence
- Building
- Wall
- Embankment
- Gate
- Crash Barrier
- Foliage Extents
- Tree Canopy
- Footpath
- Ditch
- Stop Wire
- Overhead Lines
- Rock Outcrop
- Bus Shelter
- Road Sign
- Road Sign
- Road Name Plate
- Fence Post
- Traffic Lights
- Rubbish Bin
- Test Trial Hole / Pit
- Bore Hole
- Letter Box
- 50.0 Tm. Contour & Height Label
- Half Metre Contour
- Tree (Spread & Girth)
- Bush
- S1 Survey Station & Ref.
- 50.25 Spot Level & Position
- BT British Telecom
- BT British Telecom
- CAT Cable TV
- CAT Cable TV
- ER Earth Rod
- TP Telegraph Pole
- LP Lampost
- EP Electricity Pole
- B. Bollard
- vp Vent Pipe
- MHCL Manhole
- MHCL Manhole
- MHCL Inspection Chamber
- LH Lamp Hole
- RE Rodding Eye
- G. Road Gully
- E. Electricity Cabinet
- W. Water ID
- W Stop Tap
- SV Stop Valve
- FH Fire Hydrant
- WM Water Meter
- GSV Gas Valve
- Mkr Service Marker
- TB Telephone Box

Revisions:

A	Access survey at south west corner 7/12/22
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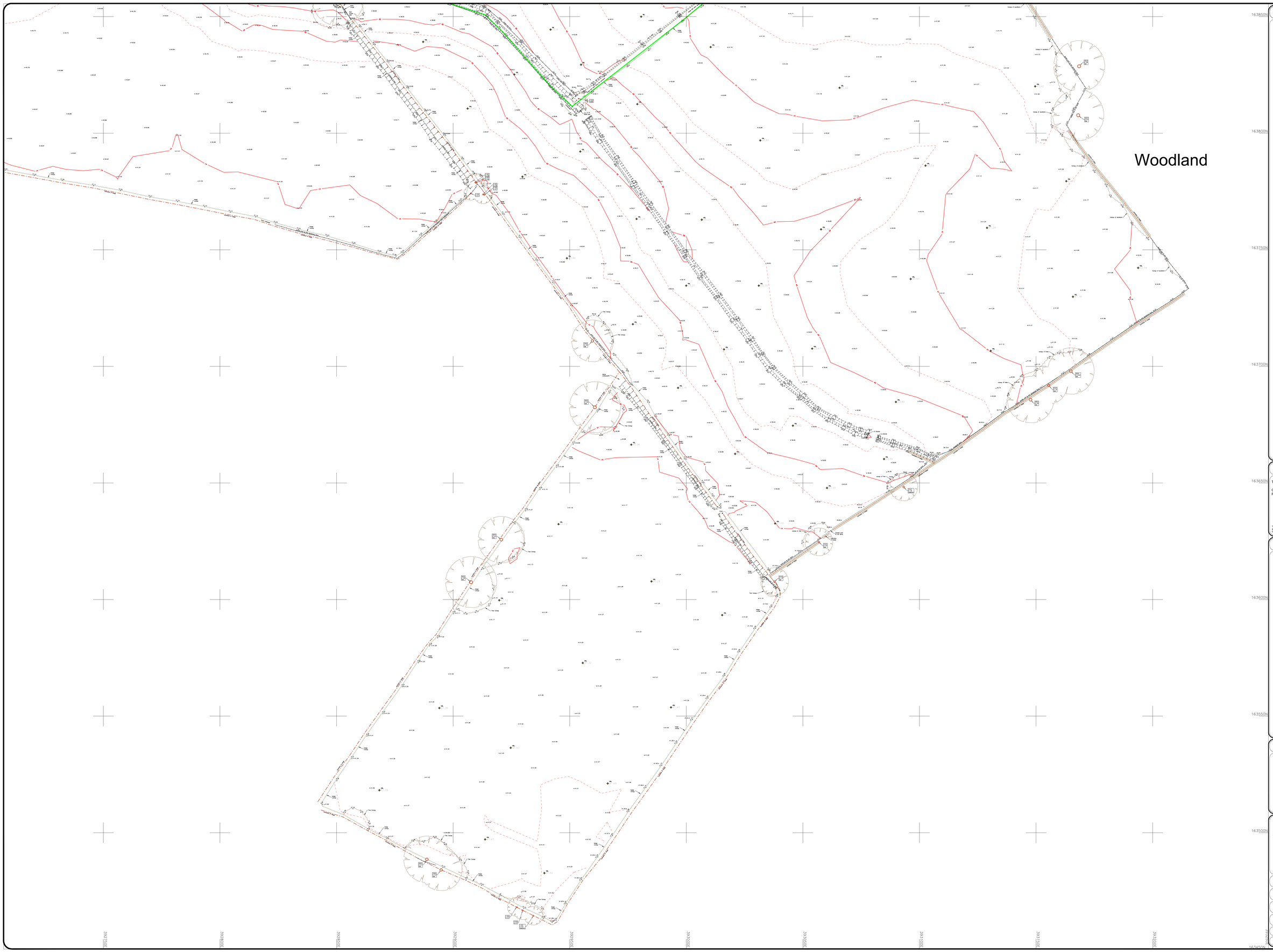
tel. 01656 865566
web. www.healersurveys.co.uk

Client: Gleeson Homes

Project: Blackmore Farm, Melksham.

Drawing: Site Survey - Verified December 2024

Scale: 1:500	Date: August 2018
Surveyed / Drawn: JA/R &DT	Checked: R.E.
Sheet No: 7 of 8	Paper Size: A0
Drawing No: P2863C	

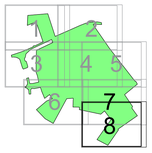


Station Schedule:

Station	Easting	Northing	Level
01	392237.753	164281.003	43.727
02	392314.141	164478.894	45.130
03	392257.790	164468.716	45.139
03	392257.523	164468.876	44.134
S4	392223.172	164344.527	43.749
S5	392158.840	164308.143	43.753
S6	392148.948	164228.084	44.478
S7	392136.900	164215.118	43.470
S8	392236.900	164015.118	43.470
S9	392217.191	163940.443	41.708
S10	392590.265	164512.881	48.922
S11	392659.029	164543.220	49.786
S12	392787.119	164584.322	50.214
S13	392822.433	164584.952	50.359

NORTH

Sheet Index:



Notes:

TRUE GPS OSGB36(15) Co-Ordinates & Levels Used.

GPS Grid to Ground Scale Factor Used :1.000
For TPS measures apply Scale factor 0.9996786

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LEGEND:

Kerb
Hedge
Surface Edge
Fence
Building
Wall
Embankment
Gate
Drain Barrier
Foliage Extents
Tree Canopy
Footpath
Stop Wire
Overhead Lines
Rock Outcrop
Bus Shelter
RS Road Sign
Road Sign
Road Name Plate
Post Fence Post
Traffic Lights
Bin Rubbish Bin
Trip Trip Hole / Pit
Bh Bore Hole
LB Letter Box
BT British Telecom
BT British Telecom
CAT Cable TV
CAT Cable TV
ER Earth Rod
TP Telegraph Pole
LP Lamppost
EP Electricity Pole
B. Bollard
vp Vent Pipe
MHCL Manhole
MHCL Manhole
MHCL Manhole
ICCL Inspection Chamber
LH Lamp Hole
RE Rodding Eye
G. Road Gully
E. Electricity Cables
W. Water IC
W Stop Tap
SV Stop Valve
FH Fire Hydrant
WM Water Meter
Gas Gas Valve
MSV Service Worker
CB Telephone Box
50.0 1m. Contour & Height Label
Half Metre Contour
Tree (Spread & Girth)
Bush Bush
S1 Survey Station & Ref.
+50.25 Spot Level & Position

Revisions:

A	Access survey at south west corner 7/12/22
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web: www.healersurveys.co.uk

Client: Gleeson Homes

Project: Blackmore Farm, Melksham.

Drawing: Site Survey

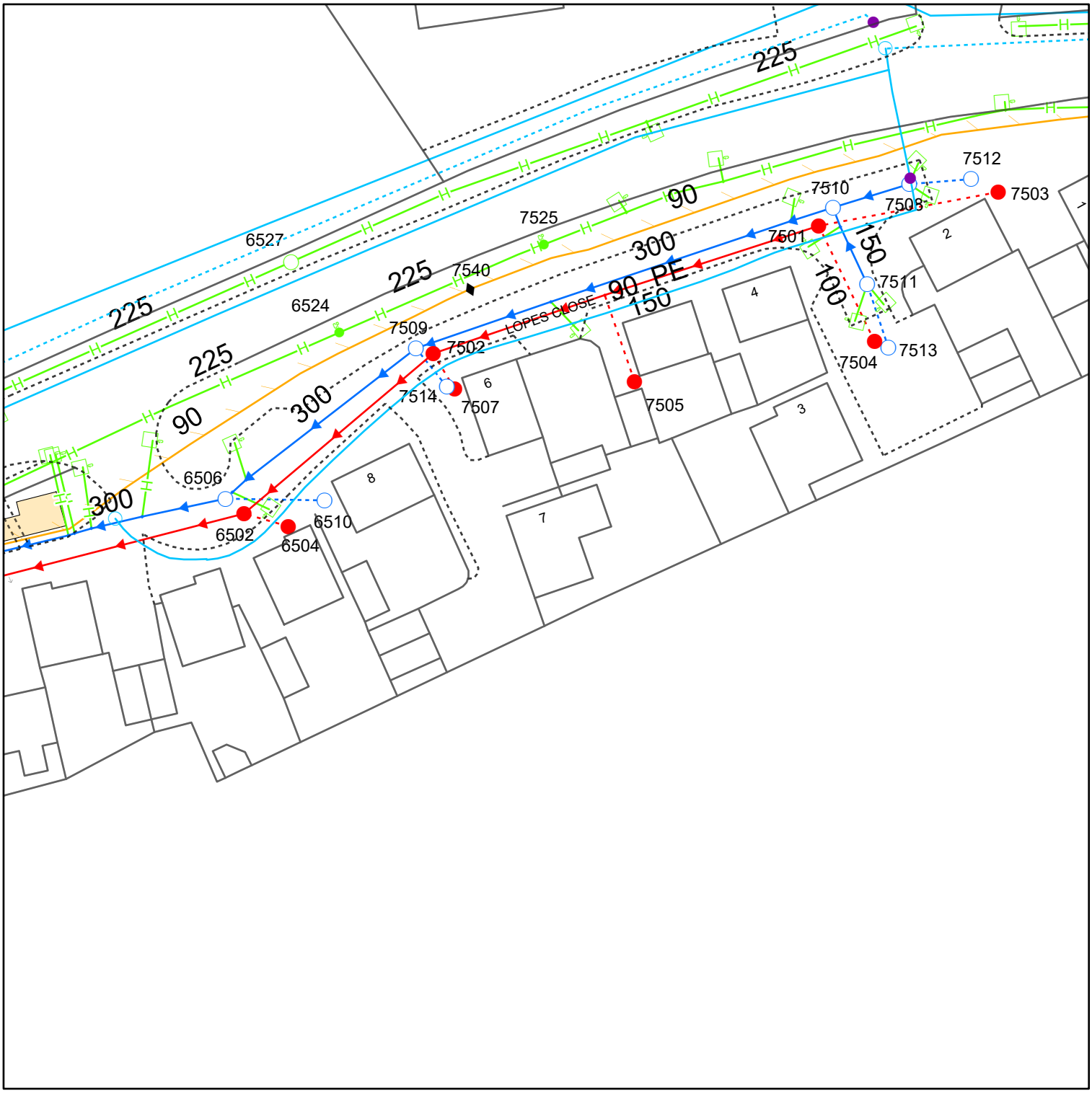
Scale	Date
1:500	August 2018

Surveyed / Drawn	Checked	Dwg. No
J.H.P. & DT	R.E.	P2863a

Sheet No.	Paper Size
8 of 8	A0

APPENDIX G: Wessex Water Sewer Records

Wessex Water Network Map



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WATER MAINS
- Distribution
- Washout
- Raw Water
- Abandoned
- Private

FITTINGS
- Hydrant
- Other

SEWERS — STRATEGIC / PUBLIC / PRIVATE / SECTION 104
- Foul
- Surface
- Combined
- Abandoned

Colours generally indicate the use of the sewer/drain (i.e Red - Foul, Dark Blue - Surface, Magenta - Combined/Dual Use, Light Green - Highway Drain, Mid Green - Overflow). Some styles of line and symbol are shown on the key in sample/typical colours.

STRUCTURES
- Manhole - Foul
- Manhole - Surface
- Manhole - Combined
- Inlet
- Outfall
- Lamphole
- Bifurcation - Foul
- Bifurcation - Surface
- Bifurcation - Combined
- Combined Sewage Overflow
- Pumping Station - Surface
- Pumping Stn - Foul/Combined
- Gully
- Vent Column
- Rodding Eye
- Catchpit
- Flushing Chamber
- Soakaway
- Non Return Valve
- Air Valve
- Hatch Box
- Washout

OTHER WESSEX PIPES
- Rising Mains
- Standby Rising Mains
- EDM — Effluent Disposal
- Overflow
- S — Syphon

NON-WESSEX / UNKNOWN
- Private Rising Mains
- CW — Culverted Watercourse
- H — Highway Drain
- ? — Use Unknown
- SU — Status Unknown

OTHER STRUCTURES
- Attenuation Tank
- Storage Tank
- Chamber
- Tunnel
- Interceptor

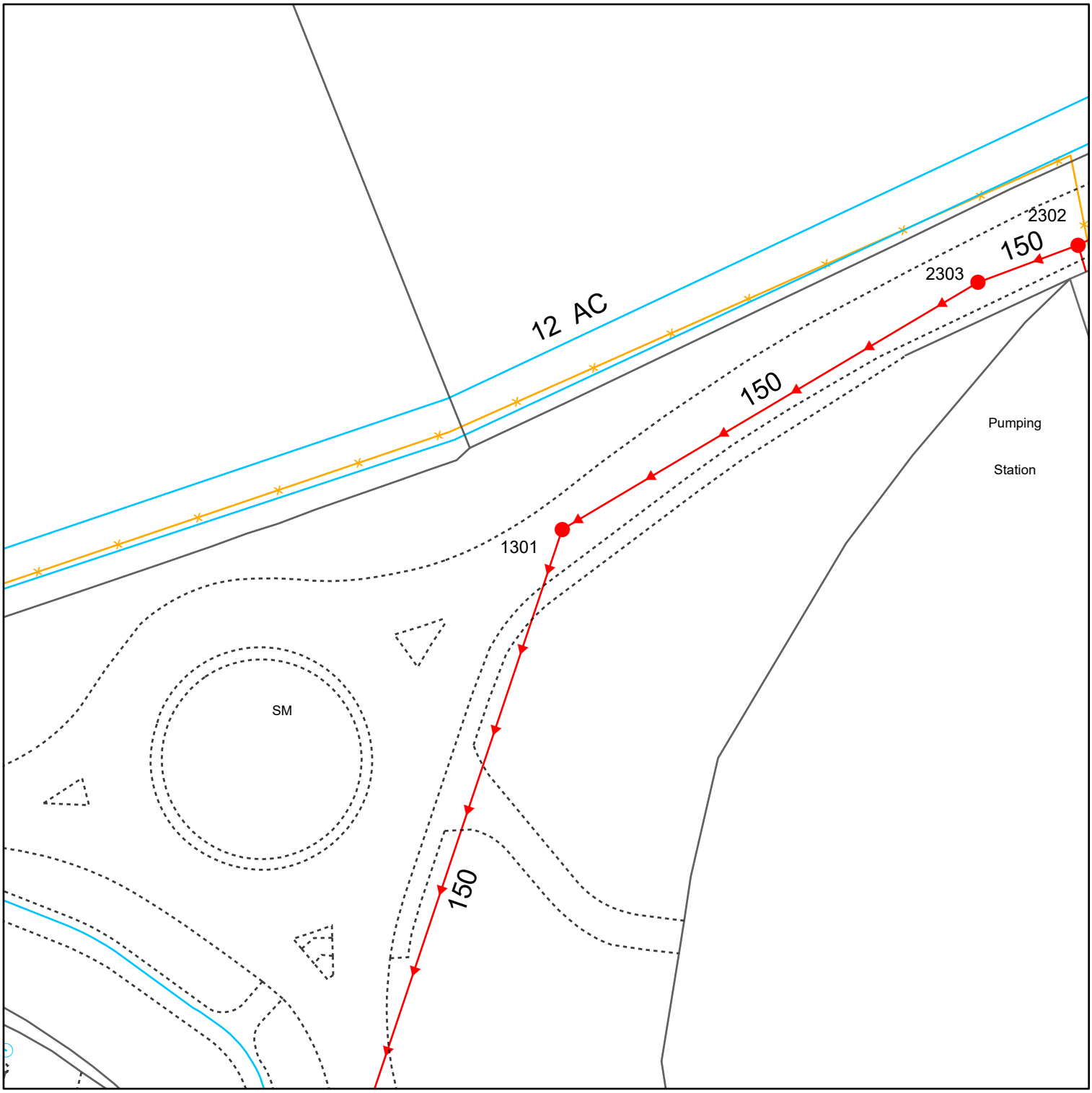
Wessex Water
YTL GROUP

Information in this map is provided for identification purposes only. No warranty as to accuracy is given or implied. The precise route of pipe work may not exactly match that shown. Wessex Water does not accept liability for inaccuracies. Sewers and lateral drains adopted by Wessex Water under the Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011 are to be plotted over time and may not yet be shown. In carrying out any works, you accept liability for the cost of any repairs to Wessex Water apparatus damaged as a result of your works. You are advised to commence excavations using hand tools only. Mechanical digging equipment should not be used until pipe work has been precisely located. If you are considering any form of building works and pipe work is shown within the boundary of your property or a property to be purchased (or very close by) a surveyor should plot its exact position prior to commencing works or purchase. If you are proposing to build over or near Wessex Water's apparatus you should contact the Developer Services Team, tel: 01225 526333 or e-mail: developer.enquiries@wessexwater.co.uk to discuss your proposals. Details of assets within Wessex Water's land ownership are unavailable through this service.

Date: 06/05/2025
Centre: 392719E, 164535N
Scale: 1:625
(when printed at A4 size)

N W E S

Wessex Water Network Map



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WATER MAINS
- Distribution
- Washout
- Raw Water
- Abandoned
- Private

FITTINGS
- Hydrant
- Other

SEWERS — STRATEGIC / PUBLIC / PRIVATE / SECTION 104
- Foul
- Surface
- Combined
- Abandoned

Colours generally indicate the use of the sewer/drain (i.e Red - Foul, Dark Blue - Surface, Magenta - Combined/Dual Use, Light Green - Highway Drain, Mid Green - Overflow).
Some styles of line and symbol are shown on the key in sample/typical colours.

STRUCTURES
- Manhole - Foul
- Manhole - Surface
- Manhole - Combined
- Inlet
- Outfall
- Lamphole
- Bifurcation - Foul
- Bifurcation - Surface
- Bifurcation - Combined
- Combined Sewage Overflow
- Pumping Station - Surface
- Pumping Stn - Foul/Combined
- Gully
- Vent Column
- Rodding Eye
- Catchpit
- Flushing Chamber
- Soakaway
- Non Return Valve
- Air Valve
- Hatch Box
- Washout

OTHER WESSEX PIPES
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- Standby Rising Mains
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OTHER STRUCTURES
- Attenuation Tank
- Storage Tank
- Chamber
- Tunnel
- Interceptor

Wessex Water
YTL GROUP

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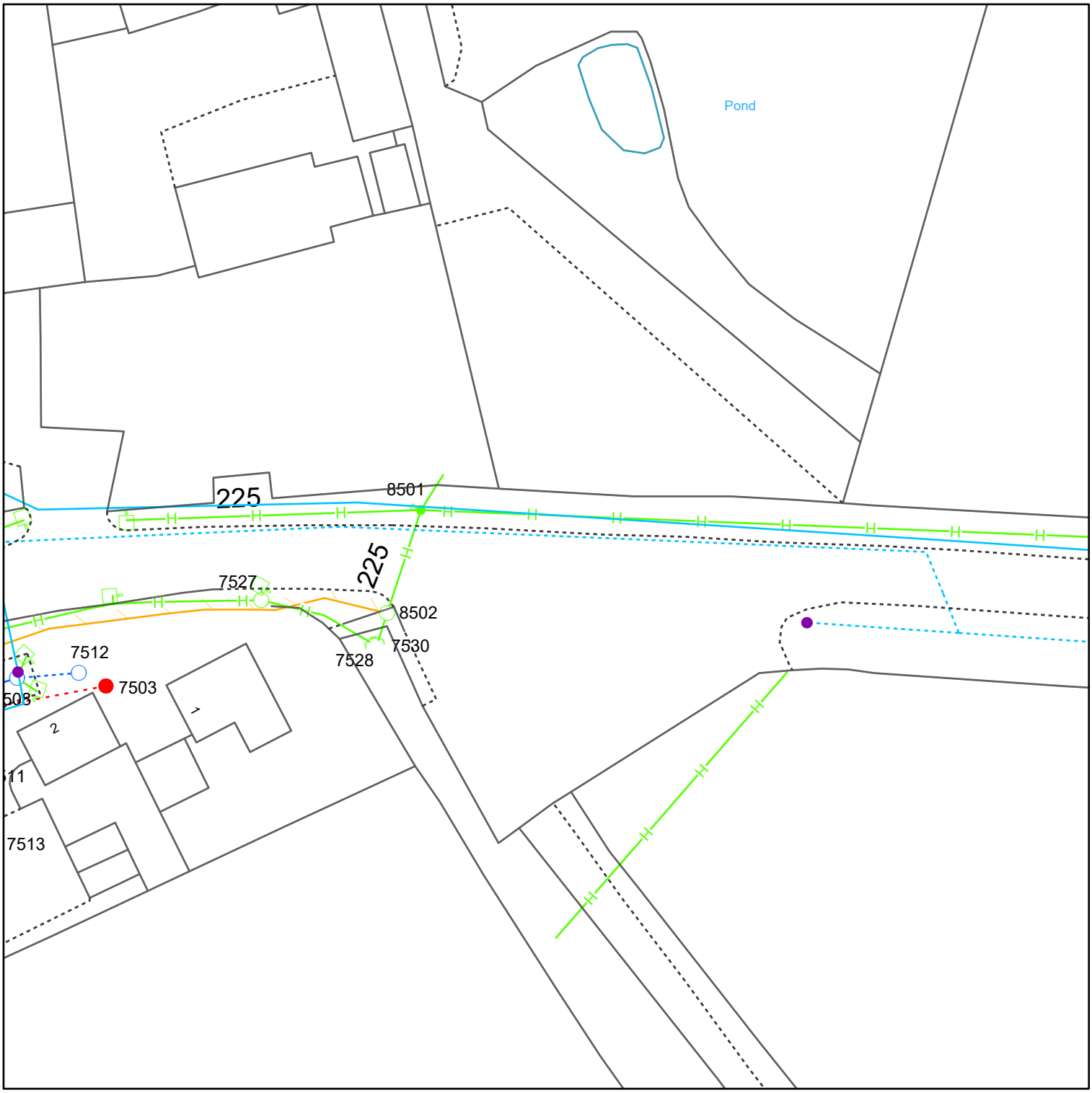
Date: 06/05/2025
Centre: 392173E, 164318N
Scale: 1:625
(when printed at A4 size)

N W E S

Wessex Water Network Map



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WATER MAINS
- Distribution
- Washout
- Raw Water
- Abandoned
- Private

FITTINGS
- Hydrant
- Other

SEWERS — STRATEGIC / PUBLIC / PRIVATE / SECTION 104
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- Surface
- Combined
- Abandoned

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- Manhole - Foul
- Manhole - Surface
- Manhole - Combined
- Inlet
- Outfall
- Lamphole
- Bifurcation - Foul
- Bifurcation - Surface
- Bifurcation - Combined
- Combined Sewage Overflow
- Pumping Station - Surface
- Pumping Stn - Foul/Combined
- Gully
- Vent Column
- Rodding Eye
- Catchpit
- Flushing Chamber
- Soakaway
- Non Return Valve
- Air Valve
- Hatch Box
- X Washout

OTHER WESSEX PIPES
- Rising Mains
- Standby Rising Mains
- EDM Effluent Disposal
- Overflow
- S Syphon

NON-WESSEX / UNKNOWN
- Private Rising Mains
- CW Culverted Watercourse
- H Highway Drain
- ? Use Unknown
- SU Status Unknown

OTHER STRUCTURES
- Attenuation Tank
- Storage Tank
- Chamber
- Tunnel
- Interceptor

Wessex Water
YTL GROUP

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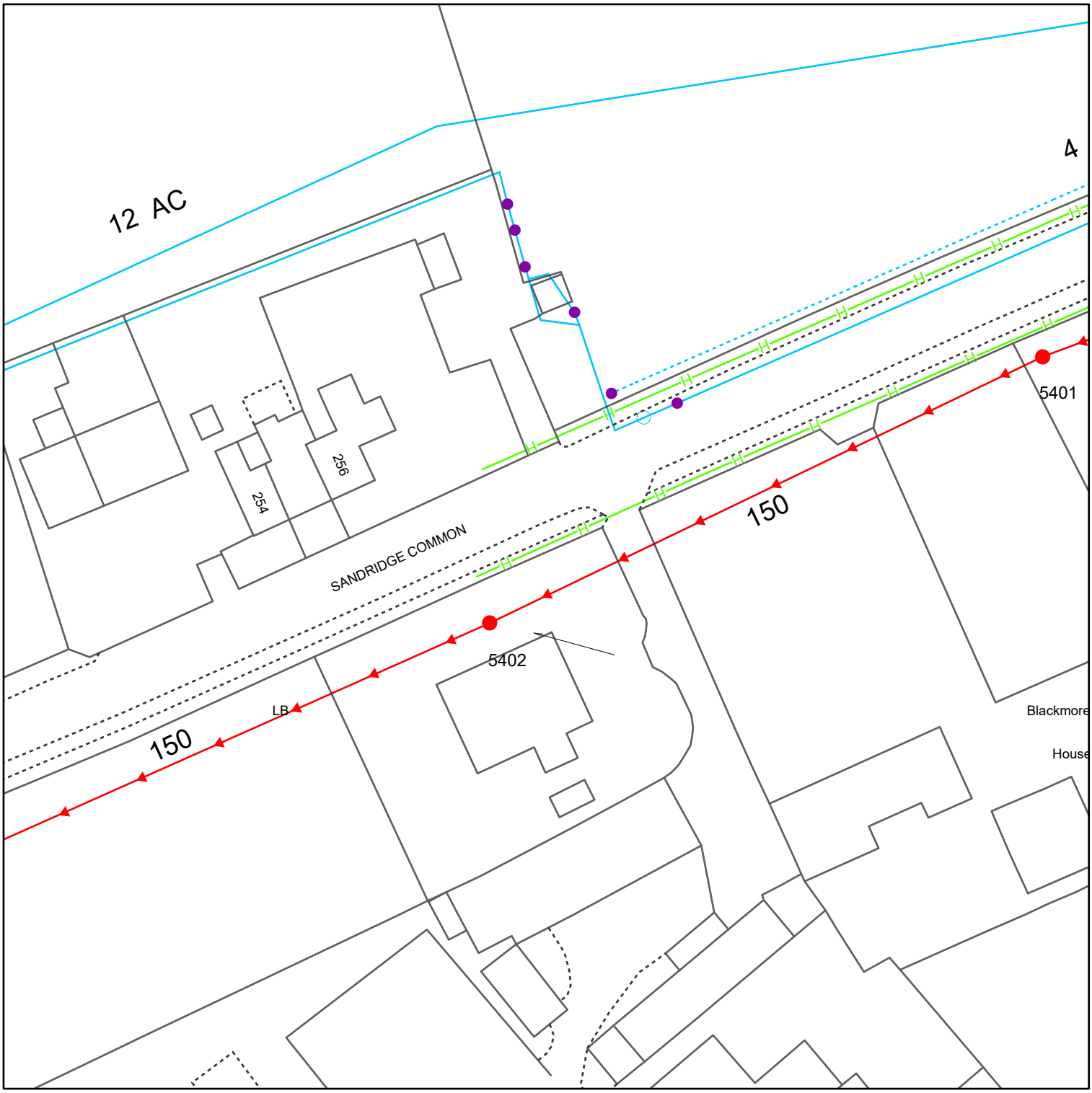
Date: 06/05/2025
Centre: 392821E, 164591N
Scale: 1:625
(when printed at A4 size)

N W E S

Wessex Water Network Map



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WATER MAINS
- Distribution
- Washout
- Raw Water
- Abandoned
- Private

FITTINGS
- Hydrant
- Other

SEWERS — STRATEGIC / PUBLIC / PRIVATE / SECTION 104
- Foul
- Surface
- Combined
- Abandoned

Colours generally indicate the use of the sewer/drain (i.e Red - Foul, Dark Blue - Surface, Magenta - Combined/Dual Use, Light Green - Highway Drain, Mid Green - Overflow).
Some styles of line and symbol are shown on the key in sample/typical colours.

STRUCTURES
- Manhole - Foul
- Manhole - Surface
- Manhole - Combined
- Inlet
- Outfall
- Lamphole
- Bifurcation - Foul
- Bifurcation - Surface
- Bifurcation - Combined
- Combined Sewage Overflow
- Pumping Station - Surface
- Pumping Stn - Foul/Combined
- Gully
- Vent Column
- Rodding Eye
- Catchpit
- Flushing Chamber
- Soakaway
- Non Return Valve
- Air Valve
- Hatch Box
- Washout

OTHER WESSEX PIPES
- Rising Mains
- Standby Rising Mains
- Effluent Disposal
- Overflow
- Syphon

NON-WESSEX / UNKNOWN
- Private Rising Mains
- Culverted Watercourse
- Highway Drain
- Use Unknown
- Status Unknown

OTHER STRUCTURES
- Attenuation Tank
- Storage Tank
- Chamber
- Tunnel
- Interceptor

Wessex Water
YTL GROUP

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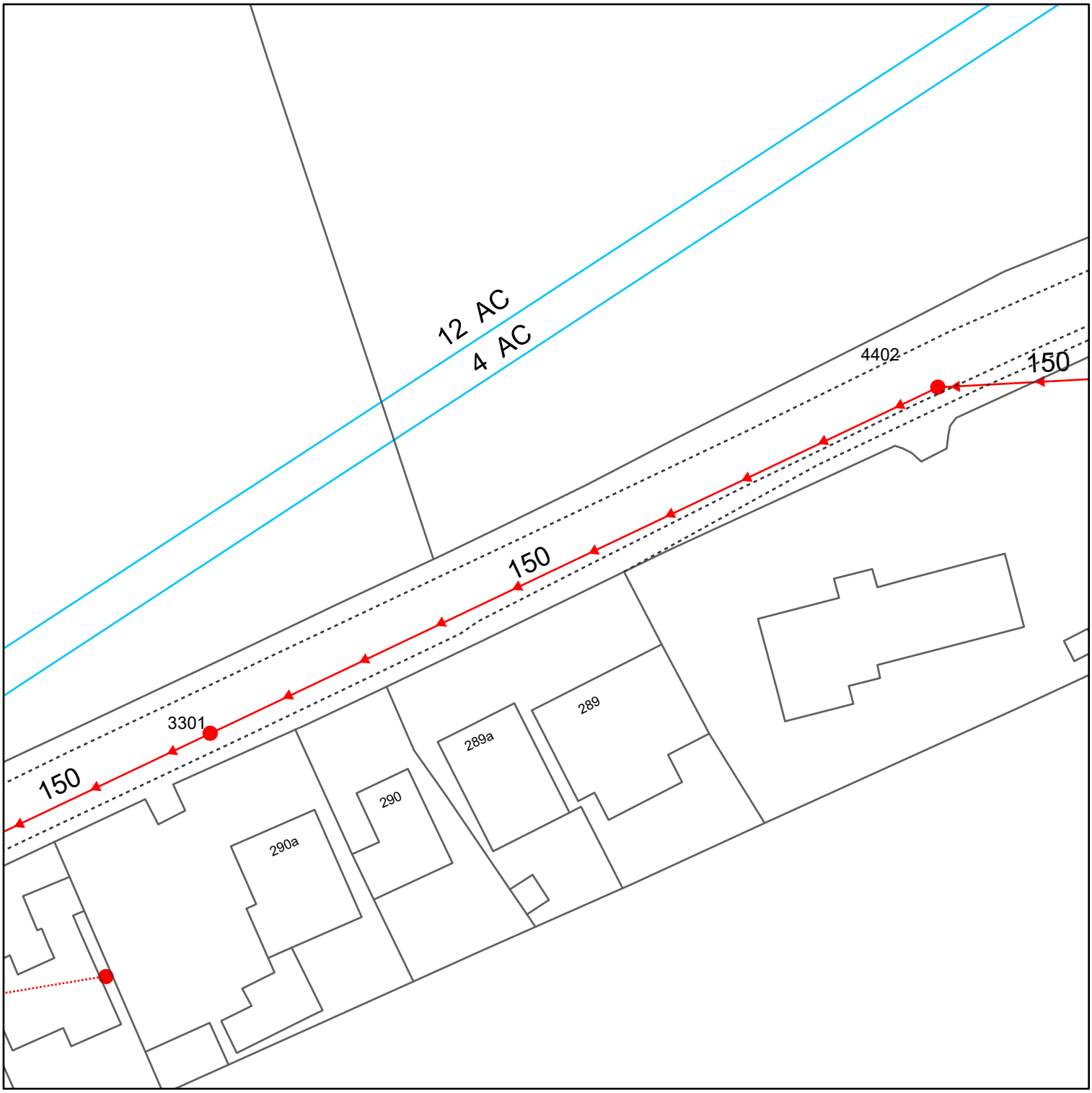
N W E S

Wessex Water Network Map



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WATER MAINS
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- Washout
- Raw Water
- Abandoned
- Private

FITTINGS
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- Other

SEWERS — STRATEGIC / PUBLIC / PRIVATE / SECTION 104
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Some styles of line and symbol are shown on the key in sample/typical colours.

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- Pumping Station - Surface
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- Gully
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Wessex Water
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Centre: 392356E, 164414N
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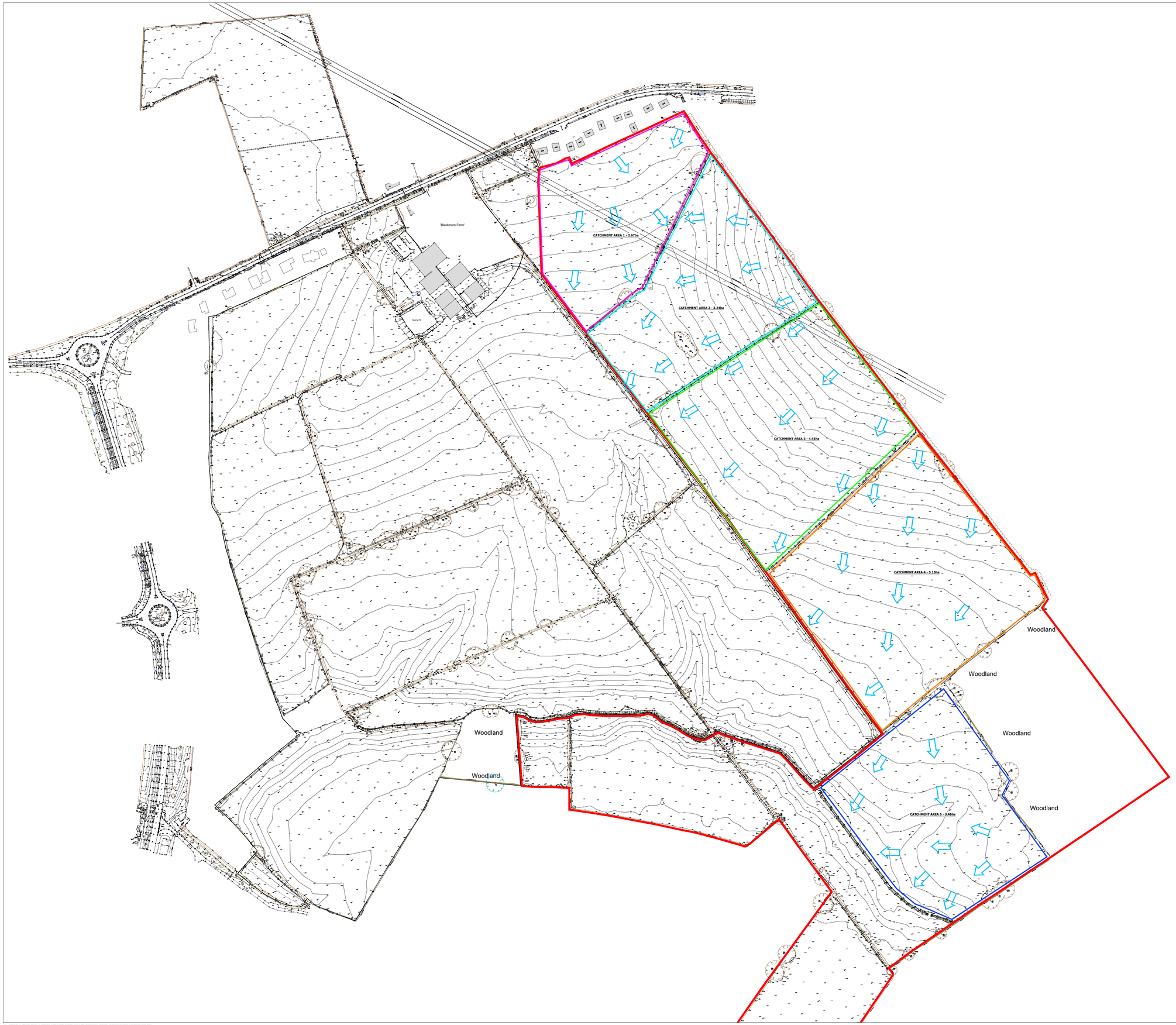
N W E S

APPENDIX H: Existing Catchment Plan



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KEY

- SITE BOUNDARY
- CATCHMENT 1 AREA
- CATCHMENT 2 AREA
- CATCHMENT 3 AREA
- CATCHMENT 4 AREA
- CATCHMENT 5 AREA
- FLOW ROUTE

NOTES:

1. This drawing is based on the Topographic Survey undertaken by Healer Surveys dated August 2018.

FOR INFORMATION
NOT FOR CONSTRUCTION

rev.	amendment	checked	date
P1	Initial Issue. (FA)	CG	17/12/2025

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client
GLEESON LAND

project
BLACKMORE FARM, MELKSHAM

scale	drawn by	checked by
1:500	FA	CG

date	cad file
DECEMBER 2025	MASTER

title
EXISTING SURFACE WATER DRAINAGE CATCHMENTS DRAWING

Mayer Brown Limited jobcode	suitability	revision
SL/GLMELKSHAM.23	-	P1

drawing number
GLMELKSHAM.23/24

APPENDIX I: Proposed Masterplan Layout

- Site Area (Land East of Blackmore Farm)
- Indicative Residential Blocks
- Accessible POS Greenspace inc Park with Destination Equipped Play
- Allotments & Orchards
- Naturally Characterised Landscape (inc Accessible Greenspace, stream corridor, SUDs basins / drainage infrastructure, hedgerows and habitat areas)
- (indicative SUDs basins)
- Urban Spaces & Highway Areas
- New highway connections
- Existing PRoWs / Existing Bridleways
- Proposed key pedestrian routes on-site
- Land identified for ecological habitat enhancement, with managed footpath access
- Scope for Foot/Cycle routes on-site
- Scope for Foot/Cycle connections
- Existing trees & hedgerows
- Proposed trees & planting area
- Existing deciduous woodland
- Proposed orchard trees

proj: 25-004 drg: 421 date: 09/04/26 rev: E

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Bristol,
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N

Land East of Blackmore Farm, Melksham

Masterplan

Gleeson Land

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Sketch proposals are for illustrative purposes only & as such are subject to detailed site investigation including ground conditions/contaminants, drainage, design & planning/density negotiations. Sketch proposals may be based upon enlargements of OS sheets & visual estimations of existing site features, accuracy will therefore need to be verified by survey.

1:2500 @ A1 / 1:5000 @ A3

m 50 100 150 200 250

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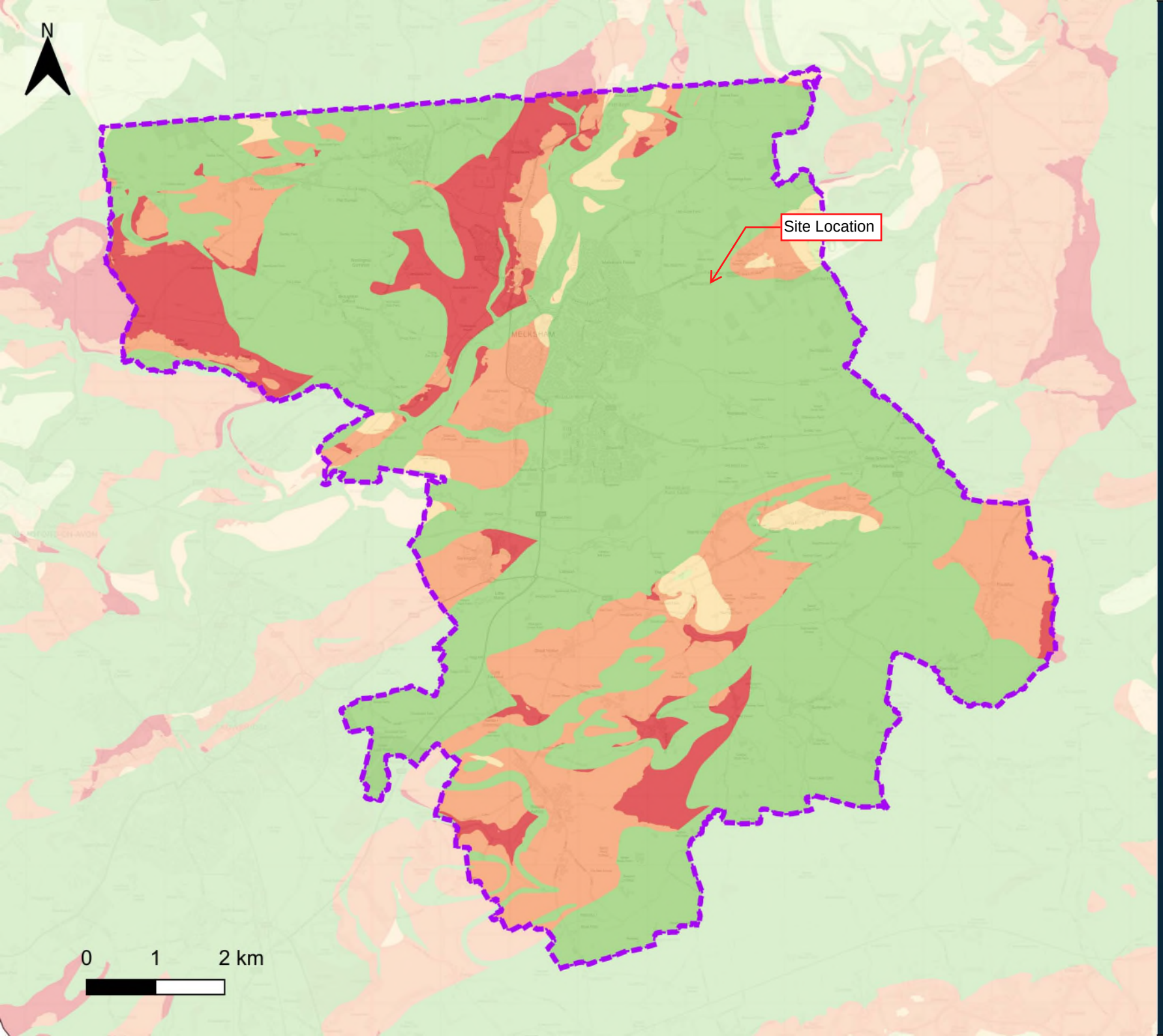
W:\PLANNING\25-004 Blackmore Farm, Melksham Ph2, Gleeson\Urban Design\2 Graphics\1 In Progress\CAD\25004_421E East of Blackmore Farm - Masterplan_090426.dwg

APPENDIX J: Wiltshire Council SFRA Groundwater Flood Map



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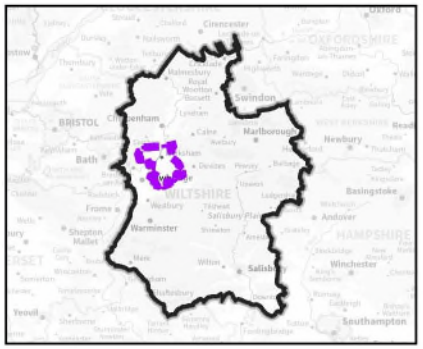

Groundwater Emergence: Melksham

Legend

- Wiltshire boundary
- Community Partnership Area

Groundwater Emergence

- This zone is deemed as having a negligible risk from groundwater flooding due to the nature of the local geological deposits.
- Flooding from groundwater is not likely.
- There is a risk of flooding to subsurface assets but surface manifestation of groundwater is unlikely.
- Within this zone there is a risk of groundwater flooding to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.
- Within this zone there is a risk of groundwater flooding to both surface and subsurface assets. Groundwater may emerge at significant rates and has the capacity to flow overland and/or pond within any topographic low spots.

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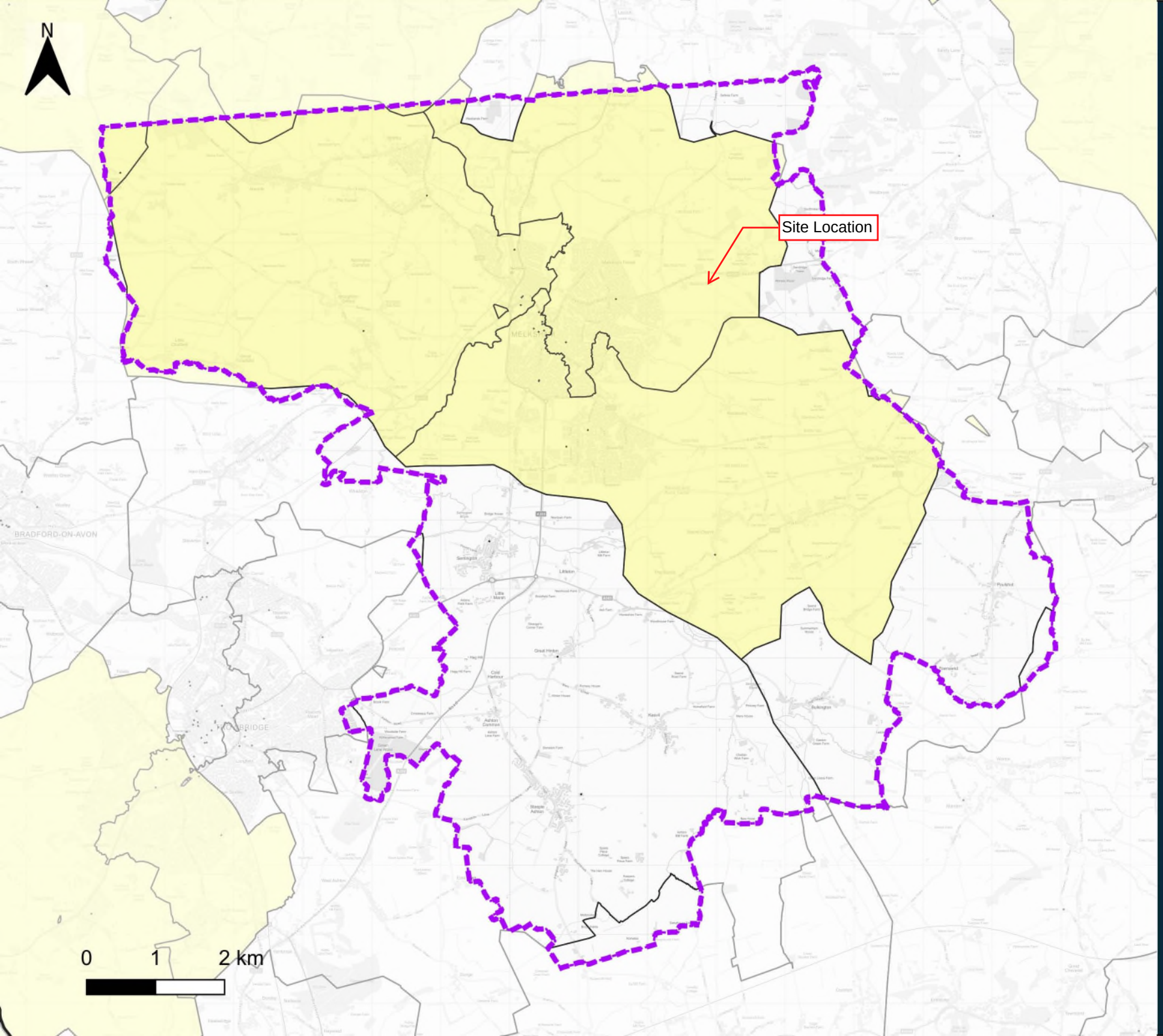
APPENDIX K: Wiltshire Council SFRA Sewer Flood Map



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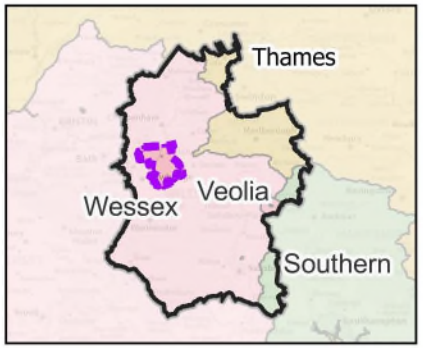

Risk of Flooding from Sewers: Melksham

Legend

- Wiltshire boundary
- Community Partnership Area

Sewer Flood Incidents

- 0
- 1 - 10
- 11 - 20
- 20 - 50
- 100 - 130
- >200

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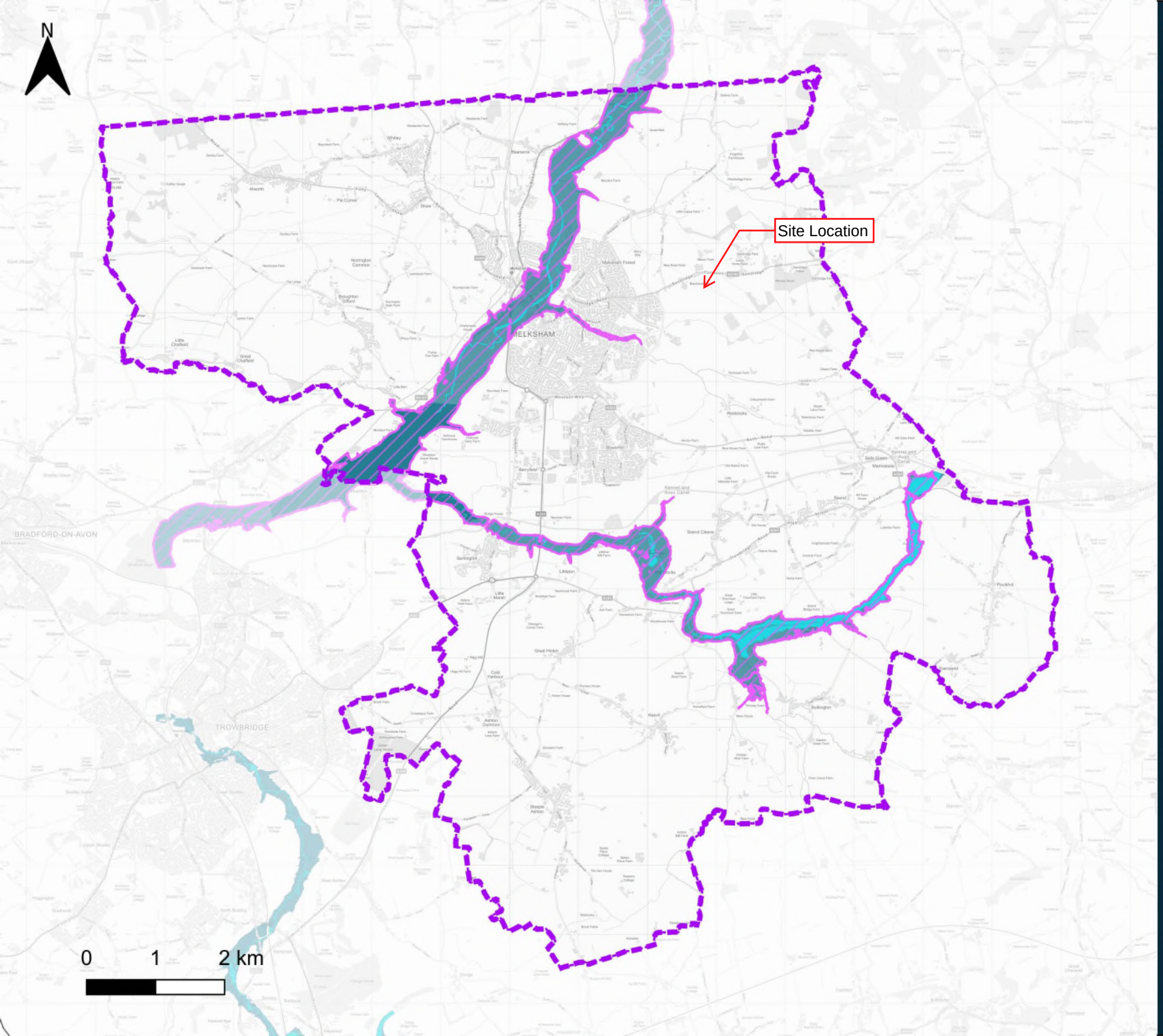
APPENDIX L: Wiltshire Council SFRA Reservoir Flood Map



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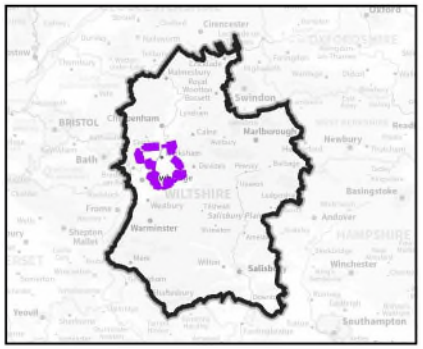

Reservoir Flood Extents: Melksham

Legend

- Wiltshire boundary
- Community Partnership Area
- Dry Day Extent
- Wet Day Extent
- Fluvial Contribution

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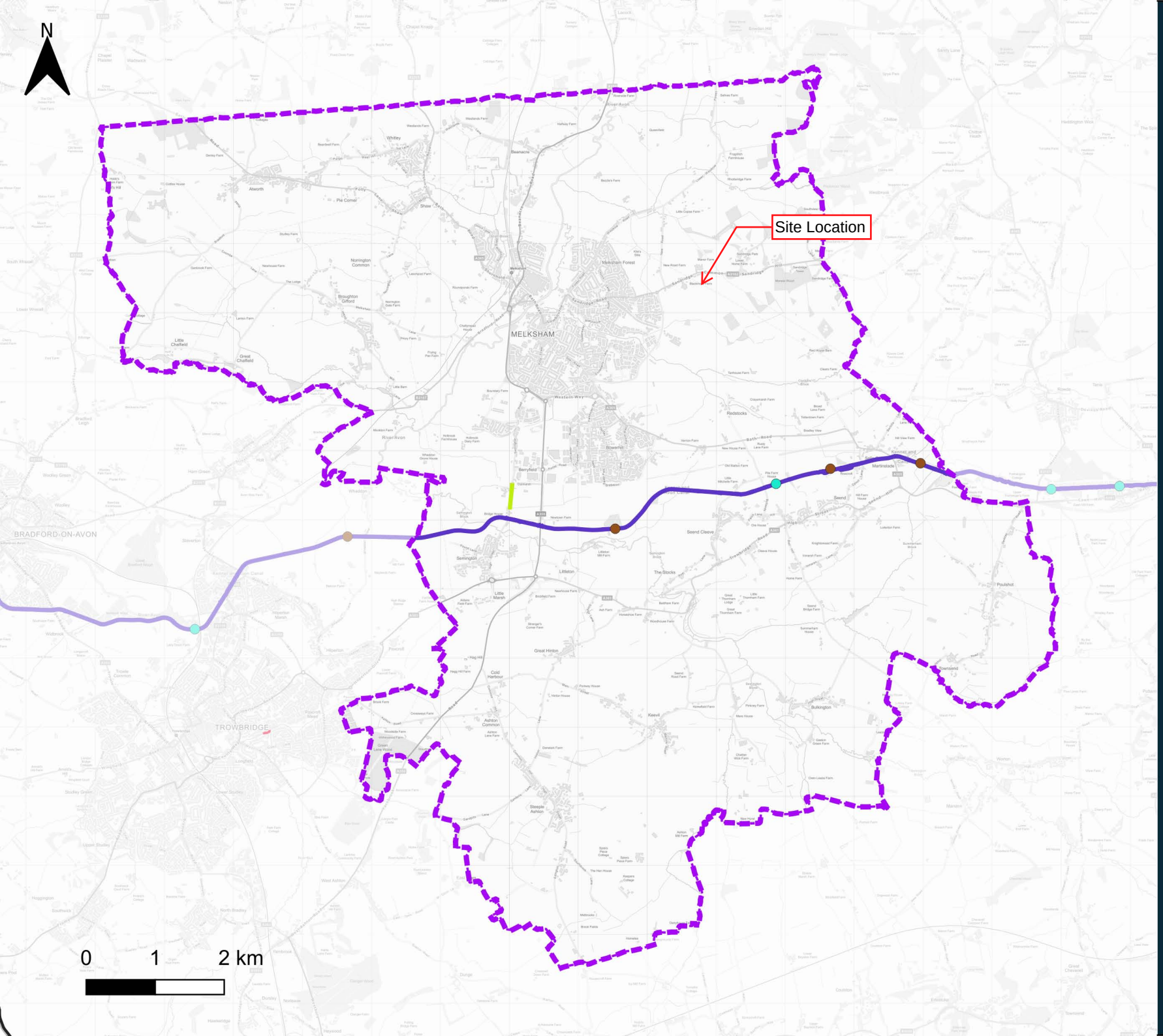
APPENDIX M: Wiltshire Council SFRA Canal Flood Map



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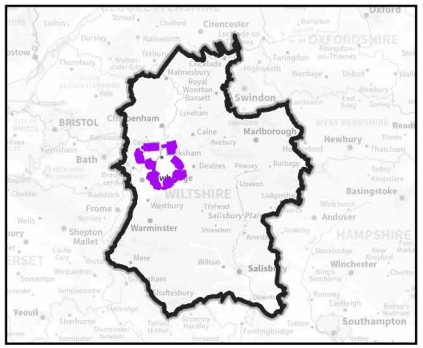

Canals & Recorded Incidents: Melksham

Legend

- Wiltshire boundary
- Community Partnership Area
- Embankment
- Breach archive
- Overtopping archive

Canals

- Kennet and Avon Canal
- Old Canal
- Somerset Coal Canal
- Wilts and Berks Canal

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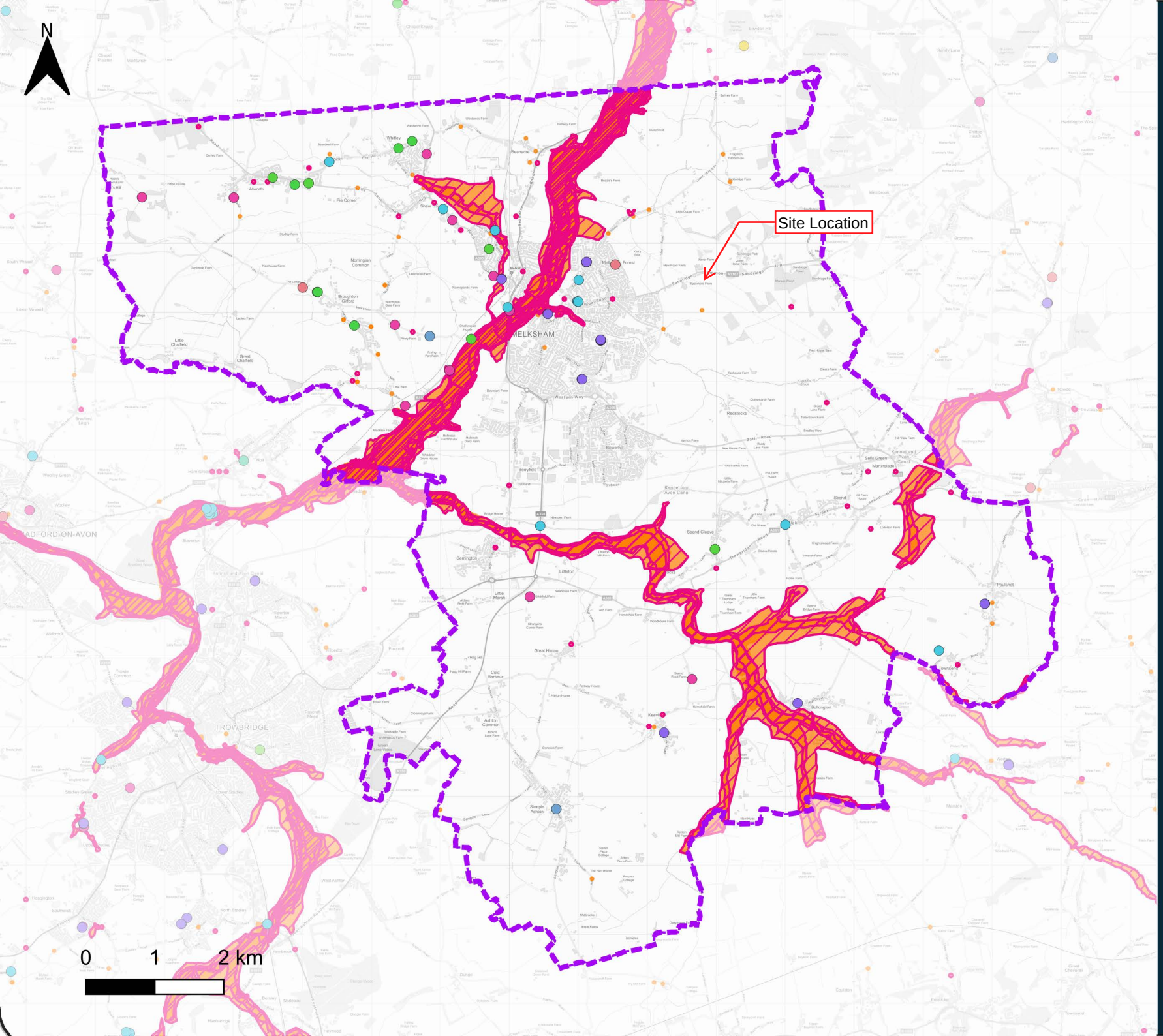
APPENDIX N: Wiltshire Council SFRA Historic Flood Map



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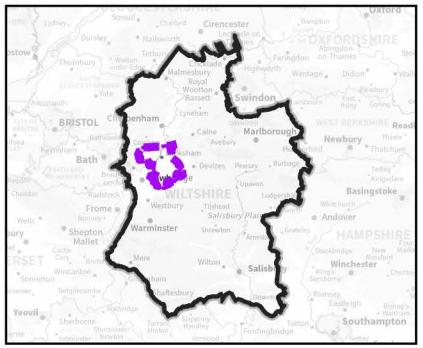

Recorded Flood History: Melksham

Legend

- Wiltshire boundary
- Community Partnership Area
- Surface Water Recorded Flood Outlines
- Recorded Flood Outlines

LLFA Recorded Flood Incidents

- Blocked Gully
- Culvert
- Blocked Drains
- Property Flooding
- Road Flooding
- Sewer
- Surface Water

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APPENDIX O: Wiltshire Council Validation Checklist

Detailed Technical Check List

Outline	Full	Reserved Matters	<---STAGE OF APPLICATION (✓/ DENOTES REQUIRED INFORMATION RELEVANT TO STAGE)	Further Context / Useful Links	*To be populated by the applicant* Has this been provided?	Justification for not supplying information	Where has this been information been provided?
			Flood Risk Assessment / Statement				
			Has a Flood Risk Assessment been Provided which assesses flood risk from all sources, and assesses the suitability of the development in line with its Flood Vulnerability Classification (as per PPG). Specific flood risk sources, are outlined below	Wiltshire Flood Maps: https://wiltscouncil.maps.arcgis.com/apps/webappviewer/index.html?id=28c00215d87b468a9a0cd79b53d3d270			
Y	Y		Records of historic Flooding (based historic flood records, SFRA, consultee concerns on planning portal (where there are adjacent / historic applications, and S19 investigation reports)		Yes		GLMELKSHAM.23-FRA Section 4
Y	Y		Risk of Pluvial Flooding?		Yes		GLMELKSHAM.23-FRA Section 4
Y	Y		Risk of Groundwater Flooding?		Yes		GLMELKSHAM.23-FRA Section 4
Y	Y		Risk of Reservoir Flooding?		Yes		GLMELKSHAM.23-FRA Section 4
Y	Y		Risk of Canal Flooding?				GLMELKSHAM.23-FRA Section 4
Y	Y		Risk of Sewer Flooding?		Yes		GLMELKSHAM.23-FRA Section 4
Y	Y		Risk of Fluvial Flooding (including climate change allowances)?		Yes		GLMELKSHAM.23-FRA Section 4
Y	Y		Has a SEQUENTIAL TEST been undertaken? :	https://www.gov.uk/guidance/flood-risk-and-coastal-change#The-Exception-Test-section	N/A	Sequential Test not required - refer to GLMELKSHAM.23-FRA Section 4	
Y	Y		Evidence of sequential approach to the site layout i.e. the most vulnerable development should be steered to the areas at lowest flood risk		Yes		GLMELKSHAM.23-FRA Section 4
Y	Y		If required, evidence of the EXCEPTION required (MAJOR DEVELOPMENTS ONLY) and based on the Vulnerability Classification)?	Sequential test & Exception test: https://www.gov.uk/guidance/flood-risk-and-coastal-change#The-Exception-Test-section	N/A	Exception Test not required	
			Surface Water Drainage Strategy	**All drainage systems must comply with the National SuDS Standards, unless the Wiltshire Council Standard provides a stricter level of restriction. Applicants should expect to provide a matrix of how they have complied with the National SuDS Standards in full**			
			We would expect the following information to be provided as part of the drainage strategy for the site. To aid clarity, we have broken this down by theme				
			Existing Runoff Rates				
Y	Y		Catchment plans showing the existing catchment areas draining to each outfall	The applicant should provide catchment plans showing the current catchment areas which drain to an outfall. This is to ensure that calculations of existing discharge rates (either greenfield or brownfield) accurately represent the current drainage regime, therefore avoiding increasing catchment areas draining to a specific outfall (i.e. catchment transfer).			GLMELKSHAM.23-FRA Appendix H
Y	Y		Calculations for Greenfield runoff rates using one of two methods: 1. Flood Estimation Handbook (FEH); or 2. Institute of Hydrology Report 124 (IH124) based on Flood Studies Report (FSR)	The applicant should undertake greenfield runoff calculations using both the FEH and FSR datasets and select the most conservative rainfall dataset for their specific site. If this comparison cannot be undertaken, the applicant should provide justification for this.	Yes		GLMELKSHAM.23-FRA Section 5 & Appendix Q
Y	Y		If applicable, calculations for Brownfield Site existing discharge rates	Only relevant for brownfield sites. The calculations can be provided in the form of hydraulic model outputs from an existing drainage model or can be based on Modified Rational Method Calculations in accordance with the Wallingford Proceedure.	N/A	Greenfield Site	
			Surface Water Drainage Hierarchy and Point of Discharge Requirements				
Y	Y		Evidence the surface water disposal hierachy (outlined below) has been implemented: a) Surface water runoff is collected for use. b) Discharge into the ground via infiltration. c) Discharge to a watercourse or other surface water body. d) Discharge to surface water sewer e) Discharge to another drainage system (e.g. highways drainage) which ultimately dischges to a watercourse / waterbody f) Discharge to a combined sewer.	As per National SuDS Standards Additional requirements dependent on the level of the hierarchy are detailed below.	Yes		GLMELKSHAM.23-FRA Section 5
			Where an Infiltration Based Drainage Strategy is Proposed				
Y	Y	Y	Soakaway tests carried out in accordance with BRE365 methodology at the location and depth of proposed soakaway features. Test logs, and calculations of infiltration rates to be provided	Wiltshire Council Soakaway Guidance CIRIA C753 BRE Digest 365	No	Infiltration not proposed	
Y	Y	Y	Desk study, supported by ground investigations to establish the peak winter groundwater level.	Wiltshire Council Soakaway Guidance CIRIA C753 BRE Digest 365	No	Infiltration not proposed	
	Y	Y	For sites in chalk-based geologies (or where there is a risk of dissolution features forming), desk study supported by ground investigations to establish the density and dissolution risk of the underlying chalk.	Wiltshire Council Soakaway Guidance CIRIA C753 BRE Digest 365 CIRIA C753	No	Infiltration not proposed	
Y	Y	Y	Calculations that demonstrate that the soakaway has been designed for: • 1 in 100yr + cc flows (for multiple properties) • 1 in 10yr + cc flows (for individual properties) • Half drain time <24hrs • Appropriate factor of safety in line with CIRIA C753 (Table 25.2) guidance has been included.	Wiltshire Council Soakaway Guidance CIRIA C753 BRE Digest 365	No	Infiltration not proposed	
	Y	Y	Demarcation on drainage plan drawings showing the minimum clearance (5m / 10m / 20m depending on underlying ground conditions and dissolution risk) from point-soakaway to structures, buildings, public highways, site boundaries, other soakaways	Wiltshire Council Soakaway Guidance CIRIA C753 BRE Digest 365	No	Infiltration not proposed	
	Y	Y	Details of how silt ingress into soakaways will be prevented, to ensure that soakaway performance is maintained across its full design life, and does not fail due to siltation over time	CIRIA C753 National SuDS Standards	No	Infiltration not proposed	
			Where an Attenuation Based Drainage Strategy is Proposed (i.e. Discharge to watercourse, sewers etc.)				
	Y	Y	Catchment plans showing the proposed (post-development) catchment areas draining to each outfall		N/A	Outline Application	
Y	Y	Y	Proposed discharge rates from the site (post-development) in compliance with Wiltshire Council's policy for Discharge Rates. Proposed Discharge Rates to be provided for the 1 in 1, 1 in 30, 1 in 100yr events, including climate change allowances in line with EA Guidance	Wiltshire Council Discharge Rate Policy	Yes		GLMELKSHAM.23-FRA Section 5 & Appendix R
Y	Y	Y	When discharging to an above ground surface water body, sewer or other piped drainage system, the surface water runoff volume for the 1 in 100yr, 6hr event shall be controlled to ensure the runoff from the development does not increase flood risk elsewhere	National SuDS Standards	Yes		GLMELKSHAM.23-FRA Section 5
Y	Y		Demonstration via plans that proposed attenuation features are located outside of Flood Zones 2 and 3, or that they are either protected from inundation from the 1 in 100yr + climate change flood event or adequately sized to accommodate the inundation volume in addition to the required attenuation	National SuDS Standards	Yes		GLMELKSHAM.23-FRA Section 5 & Appendix R
			Additional requirements where there is proposed discharge Highways Drainage System				
	Y	Y	There is no automatic right of connection to the highways drainage system, and therefore other methods of discharge should be prioritised. Where there is a request to discharge to the Highways Drainage Systems the following will also need to be provided: - CCTV condition survey from the proposed point of connection to the ultimate discharge point to watercourse / waterbody. - Hydraulic modelling of the existing highways drainage system - Hydraulic modelling to demonstrate that the proposed discharge can be fully and safely accomodated within the highways drainage system, without increasing flood risk to the highway in the 1in 100yr + climate change event. - Details of any proposed remedial works and mitigations to facilitate the discharge to the highways drainage system.		N/A	Discharging to a watercourse	
			Additional requirements where there is proposed discharge to Sewer				
	Y	Y	Where there is a request to discharge to existing sewers the following will also need to be provided: - Agreement from the asset owner on the point and location of discharge - Any other information required by the asset owner			Discharging to a watercourse	
			Drainage Calculations				
Y	Y	Y	Where relevant, infiltration calculations to size proposed infiltration based features and demonstrate compliance with the Council's Soakaway Policy		N/A	Infiltration not proposed	
Y			Outline calculations to determine the volume of attenuation storage required on site in order to limit discharge rates in line with the Discharge Rate Policy		Yes		GLMELKSHAM.23-FRA Section 5 & Appendix R
Y	Y	Y	Evidence shall be provided to demonstrate that Interception shall be delivered within the development for the first 5mm of rainfall for the majority of rainfall events, for both winter and summer seasons. This is to prevent runoff from the site for the majority of small (frequent) rainfall events and for the initial depth of rainfall for larger events. For compliance to be demonstrated, 80% interception shall be achieved during the summer (May to October) and 50% in winter (November to April).	National SuDS Standards	Yes		GLMELKSHAM.23-FRA Section 5
	Y	Y	Detailed hydraulic calculations demonstrating that the required discharge rates in line with WC policy/ external asset owner agreements are met whilst also demonstrating: • Calculations and drawings for the drainage system design showing designated holding areas and conveyance routes based on no flooding on site for a 1 in 30 year plus climate change rainfall event. • Calculations and drawings for the drainage system design showing designated holding areas and conveyance routes based on no flooding on site for a 1 in 100 year plus climate change rainfall event in respect to a building (including basement) or utility plant susceptible to water within the development. • Calculations should include an allowance for increased surface water runoff, as a result of urban creep, in accordance with LASOO guidance. • Hydraulic Models should set the MADD factor / additional storage volume factor to 0m3 / ha in order to prevent an overestimation of storage capacity in the proposed drainage network. • If attenuation tanks are proposed that an allowance for reduced attenuation volume due to silt ingress (as per Section 21.9.9 of the SuDS Manual CIRIA C753)		N/A	Outline Application	
	Y	Y	Evidence that a sensitivity analysis on the network considering surcharged outfall conditions has been undertaken.	National SuDS Standards	N/A	Outline Application	
	Y	Y	Evidence that in attenuation basins / infiltration basins / ponds, a min 300mm freeboard above the critical 1 in 100yr + cc storm is achieved		N/A	Outline Application but 300mm freeboard provided in most basins in the design	
	Y	Y	Demonstration that in the 1 in 30yr storm event, attenuation / infiltration features half drain within 24hrs		N/A	Outline Application	
	Y	Y	Water quality calculations based on a developed SuDS Treatment Train (and not a Pipe-to-Pond) to demonstrate that water quality within surface water runoff can be appropriately managed to prevent an increased pollution risk.	National SuDS Standards	N/A	Outline Application	
	Y	Y	Structural calculations to demonstrate that proposed drainage components are sufficiently designed to resist anticipated forces. (Depending on the system this may require consideration of vertical and lateral loads)		N/A	Outline Application	
			Drainage Drawings				
Y			Preliminary layout plans showing the existing site location, and proposed drainage strategy for the site (to an outline design level of detail)		Yes		GLMELKSHAM.23-FRA Section 5 & Appendix P
	Y	Y	A detailed topographical survey that clearly identifies the existing drainage features on the site as well as level contours to show overland flow routes.		N/A	Outline Application	
	Y	Y	A detailed plan showing the existing and proposed drainage features on the site and how the proposed drainage strategy will be implemented. Pipe numbers, manhole numbers etc. should link to those used in the hydraulic model so as the design can be correlated. Nature based SuDS Solutions shall be included within the design in accordance with NPPF, and holistically planned into the overall development layout.		N/A	Outline Application	
	Y	Y	Demonstration on drainage drawings that finished floor levels will be set a min 150mm above surrounding ground levels and above the 1 in 100yr + cc flood level, and in areas where the 100yr + cc flood depth is uncertain that FFL are set mm above this in line with EA Guidance		N/A	Outline Application	
	Y	Y	Drawing showing how overland exceedance flows in excess of the 1 in 100yr + cc storm event will be wholly and safely managed on site, such that flood risk is not increased to people, property, public highways. Existing overland flow routes and watercourses originating outside of the site and flowing through the site should be shown on the plan to demonstrate how these will be managed.	National SuDS Standards	N/A	Outline Application	
	Y	Y	Cross-section and long-section drawings through any attenuation and infiltration features showing top water levels for the 1 in 100yr + cc storm event		N/A	Outline Application	
			Management of Safe Access / Egress from the site				
Y	Y		If access to the site (vehicular or pedestrian) predicted to flood, evidence that the Flood Hazard Rating has been assessed in accordance with FD2320 Guidance and PPG with regards maintaining safe access/ egress during the design storm.		N/A	Access to the site is not predicted to flood	
	Y	Y	If access to the site (vehicular or pedestrian) predicted to flood, evidence of an emergency plan in place that has been agreed with Wiltshire Council.	Guidance on the preparation of an emergency plan can be found here. https://www.adaptnet.org.uk/floodriskemergencyplan	N/A	Access to the site is not predicted to flood	
			Construction Management				
	Y	Y	Provision of a Construction Management Plan detailing measures during construction to control pollution to existing watercourses and groundwater and prevent an increase in flood risk.		N/A	Outline Application	
			Contamination water quality				
	Y	Y	Production of contamination risk assessment for brownfield / contaminated sites / sites that are shown to interact with sensitive environmental receptors (SPZ1, Principal Aquifers, RAMSAR sites, SSSI etc.) to demonstrate contaminaition risk will be appropriately managed		N/A	Outline Application	
	Y	Y	Calculations which demonstrate that the proposed drainage design provides a sufficient level of water treatment.		N/A	Outline Application	
			Amenity and biodiversity				
	Y	Y	Evidence that the drainage proposal takes opportunities available for improving the character and quality of the area through the provision of amenity, biodiversity, maintaining water quality and climate change resilience in accordance with the National Planning Policy Guidance.	National SuDS Standards	N/A	Outline Application	
			Legal and Permissions				
	Y	Y	Consent for any outfalls from the proposed drainage systems into a public sewer, canal, or other drainage system not owned by the applicant.		N/A	Outline Application	
	Y	Y	Evidence of permissions to cross third party land and permissions from riparian owners to discharge to the watercourse/river in perpetuity.		N/A	Outline Application	
			Maintenance				
	Y	Y	Evidence of clear arrangements for the ownership and ongoing maintenance of the SUDS over the lifetime of the development		N/A	Outline Application	
	Y	Y	Details of how the proposed and existing drainage features on the site will be maintained and managed after completion with confirmation from the relevant authority that they will adopt any systems that are being offered for adoption. This must include access arrangements / access easements, proposed maintenance activities, maintenance frequency, responsible parties, and funding mechanisms for ongoing maintenance		N/A	Outline Application	
	Y	Y	Where the design life of proposed drainage features is less than the design life of the development, details of how the drainage will be replaced at the end of its design life	National SuDS Standards	N/A	Outline Application	

APPENDIX P: Drainage Strategy Drawing

NOTES:

1. The proposed drainage strategy is indicative and is subject to detailed design.
2. This drawing is based on the topographic survey undertaken by Healer Surveys Ltd in August 2018.
3. This drawing is based on the proposed layout undertaken by Origin 3 in December 2025.
4. CLs and ILs are based on the existing levels on the topographic survey with areas of localised raising to allow a gravity system and are subject to detailed design.
5. The location of the existing Wessex Water foul sewer has been estimated and the invert level of the foul outfall to the existing sewer should be confirmed at detailed design.
6. All infrastructure proposed in the RPAs is to be reviewed and confirmed acceptable by the Project Arboriculturist.
7. Habitable dwellings should be located 15m from the wet well of the private foul pump station, where possible. Where this is not possible, this should be confirmed by a pump designer/ manufacturer.
8. The Climate Change Allowances have been obtained from the Department for Environment, Food and Rural Affairs Climate Change Allowances Webpage for peak rainfall.

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A1 ORIGINAL

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KEY

- CATCHMENT 1
- CATCHMENT 2
- CATCHMENT 3
- PROPOSED SURFACE WATER SEWER & MANHOLE
- SUDS ATTENUATION BASIN LOCATION
- ASSUMED ROUTE OF EXISTING WESSEX WATER FOUL SEWER
- PROPOSED FOUL SEWER & MANHOLE
- PROPOSED FOUL RISING MAIN (SHOWN INDICATIVELY)
- PROPOSED ADOPTABLE TYPE 3 FOUL PUMP STATION
- 15M OFFSET FROM WET WELL OF FOUL PUMP STATION

FOR PLANNING PURPOSES ONLY
NOT FOR CONSTRUCTION

rev.	amendment	checked	date
P2	Outfall 3 updated. (JC)	CG	21/04/2026
P1	Initial Issue (CG)	SL	19/12/2025

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client: GLEESON LAND

project: LAND EAST OF BLACKMORE FARM, MELKSHAM

scale	drawn by	checked by
1:2000	CG	SL

date	cad file
APRIL 2026	MASTER

title: DRAINAGE STRATEGY PLAN

Mayer Brown Limited jobcode	suitability	revision
SL/GLMELKSHAM.23	-	P2

drawing number: GLMELKSHAM.23/23

T:__DESIGN SL PROJECTS\02 - CURRENT JOBS\GLMELKSHAM.23\03 MB Drawings\01 Working Drawings\MASTER.dwg

APPENDIX Q: Greenfield Run-off Rates

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)		100 year (l/s)	51.7
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	✓	Check Discharge Volume	x
Summer CV	1.000	Drain Down Time (mins)	1440	1 year (l/s)	13.8		
Winter CV	1.000	Additional Storage (m³/ha)	0.0	30 year (l/s)	38.9		

Storm Durations

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

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

Pre-development Discharge Rate

Site Makeup	Greenfield	Soil Index	4	Growth Factor 30 year	2.40	Q 1 year (l/s)	4.6
Greenfield Method	IH124	SPR	0.47	Growth Factor 100 year	3.19	Q 30 year (l/s)	13.0
Positively Drained Area (ha)	1.131	Region	6	Betterment (%)	0	Q 100 year (l/s)	17.3
SAAR (mm)	696	Growth Factor 1 year	0.85	QBar	5.4		

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Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)		100 year (l/s)	51.7
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	✓	Check Discharge Volume	x
Summer CV	1.000	Drain Down Time (mins)	1440	1 year (l/s)	13.8		
Winter CV	1.000	Additional Storage (m³/ha)	0.0	30 year (l/s)	38.9		

Storm Durations

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

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

Pre-development Discharge Rate

Site Makeup	Greenfield	Soil Index	4	Growth Factor 30 year	2.40	Q 1 year (l/s)	7.9
Greenfield Method	IH124	SPR	0.47	Growth Factor 100 year	3.19	Q 30 year (l/s)	22.2
Positively Drained Area (ha)	1.931	Region	6	Betterment (%)	0	Q 100 year (l/s)	29.6
SAAR (mm)	696	Growth Factor 1 year	0.85	QBar	9.3		

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Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)		100 year (l/s)	51.7
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	✓	Check Discharge Volume	x
Summer CV	1.000	Drain Down Time (mins)	1440	1 year (l/s)	13.8		
Winter CV	1.000	Additional Storage (m³/ha)	0.0	30 year (l/s)	38.9		

Storm Durations

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

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

Pre-development Discharge Rate

Site Makeup	Greenfield	Soil Index	4	Growth Factor 30 year	2.40	Q 1 year (l/s)	15.2
Greenfield Method	IH124	SPR	0.47	Growth Factor 100 year	3.19	Q 30 year (l/s)	42.8
Positively Drained Area (ha)	3.720	Region	6	Betterment (%)	0	Q 100 year (l/s)	56.9
SAAR (mm)	696	Growth Factor 1 year	0.85	QBar	17.8		

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APPENDIX R: Proposed Network Calculations

Design Settings

Rainfall Methodology	FEH-22	Maximum Time of Concentration (mins)	30.00	Preferred Cover Depth (m)	1.200
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0	Include Intermediate Ground	✓
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00	Enforce best practice design rules	x
CV	1.000	Connection Type	Level Soffits		
Time of Entry (mins)	5.00	Minimum Backdrop Height (m)	0.500		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
Basin 3	0.186	5.00	44.620	1200	392752.465	164308.660	1.000	43.620
Basin 5	0.873	5.00	44.300	1200	392870.235	164115.628	1.000	43.300
Basin 4	0.873	5.00	44.200		392859.170	164177.543	1.000	43.200
Hydrobrake 3	0.000	5.00	44.200	1500	392826.300	164163.373	1.200	43.000
Outfall 2	0.000		43.640	1200	392818.825	164157.484	0.680	42.960
Basin 6	3.720	10.00	42.000		393113.419	163874.481	2.000	40.000
Basin 7			41.200		393055.122	163853.459	1.500	39.700
Hydrobrake 4			41.200	1800	393031.225	163819.205	1.550	39.650
Basin 8			40.130	1200	393003.406	163812.505	1.000	39.130
Hydrobrake 5	0.000		40.130	1500	392980.974	163817.309	1.130	39.000
Outfall 3	0.000		38.730	1200	392960.714	163802.888	0.640	38.090
Basin 1	1.029	5.00	46.500		392693.764	164400.950	1.000	45.500
Hydrobrake 1			46.500	1350	392724.122	164386.248	1.600	44.900
Basin 2	0.102	5.00	45.550	1200	392716.627	164348.097	1.000	44.550
Hydrobrake 2	0.000		45.550	1200	392710.993	164334.642	1.020	44.530
Outfall 1	0.000		45.000	1200	392711.174	164329.183	0.500	44.500

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Links (Input)

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	Basin 3	Basin 4	169.049	0.600	43.620	43.200	0.420	402.5	300	8.62	50.0
2.000	Basin 5	Basin 4	62.896	0.600	43.300	43.200	0.100	629.0	525	6.18	50.0
1.001	Basin 4	Hydrobrake 3	35.794	0.600	43.200	43.000	0.200	179.0	525	8.98	50.0
1.002	Hydrobrake 3	Outfall 2	9.516	0.600	43.000	42.960	0.040	237.9	300	9.14	50.0
3.000	Basin 6	Basin 7	61.971	0.600	40.000	39.700	0.300	206.6	300	10.95	50.0
3.001	Basin 7	Hydrobrake 4	41.766	0.600	39.700	39.650	0.050	835.3	900	11.59	50.0
3.002	Hydrobrake 4	Basin 8	28.614	0.600	39.650	39.130	0.520	55.0	300	11.82	50.0
3.003	Basin 8	Hydrobrake 5	22.941	0.600	39.130	39.000	0.130	176.5	300	12.14	50.0
3.004	Hydrobrake 5	Outfall 3	24.868	0.600	39.000	38.090	0.910	27.3	300	12.28	50.0
4.000	Basin 1	Hydrobrake 1	33.731	0.600	45.500	44.900	0.600	56.2	375	5.23	50.0
4.001	Hydrobrake 1	Basin 2	38.880	0.600	44.900	44.550	0.350	111.1	375	5.61	50.0
4.002	Basin 2	Hydrobrake 2	14.587	0.600	44.550	44.530	0.020	729.3	300	6.03	50.0
4.003	Hydrobrake 2	Outfall 1	5.462	0.600	44.530	44.500	0.030	182.1	300	6.11	50.0

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)		100 year (l/s)	56.9
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	✓	Check Discharge Volume	✓
Summer CV	1.000	Drain Down Time (mins)	2880	1 year (l/s)	15.2	100 year 360 minute (m³)	
Winter CV	1.000	Additional Storage (m³/ha)	0.0	30 year (l/s)	42.8		

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

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Pre-development Discharge Rate

Site Makeup	Greenfield	Soil Index	4	Growth Factor 30 year	2.40	Q 1 year (l/s)	15.2
Greenfield Method	IH124	SPR	0.47	Growth Factor 100 year	3.19	Q 30 year (l/s)	42.8
Positively Drained Area (ha)	3.720	Region	6	Betterment (%)	0	Q 100 year (l/s)	56.9
SAAR (mm)	696	Growth Factor 1 year	0.85	QBar	17.8		

Pre-development Discharge Volume

Site Makeup	Greenfield	Soil Index	4	Return Period (years)	100	Betterment (%)	0
Greenfield Method	FSR/FEH	SPR	0.47	Climate Change (%)	0	PR	
Positively Drained Area (ha)	3.720	CWI		Storm Duration (mins)	360	Runoff Volume (m^3)	

Node Hydrobrake 2 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	44.530	Product Number	CTL-SHE-0092-3800-1020-3800
Design Depth (m)	1.020	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	3.8	Min Node Diameter (mm)	1200

Node Hydrobrake 3 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	43.000	Product Number	CTL-SHE-0117-6500-1200-6500
Design Depth (m)	1.200	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	6.5	Min Node Diameter (mm)	1200

Node Hydrobrake 5 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	39.000	Product Number	CTL-SHE-0161-1250-1000-1250
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	12.5	Min Node Diameter (mm)	1500

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Node Hydrobrake 1 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	44.900	Product Number	CTL-SHE-0082-3000-1050-3000
Design Depth (m)	1.050	Min Outlet Diameter (m)	0.100
Design Flow (l/s)	3.0	Min Node Diameter (mm)	1200

Node Hydrobrake 4 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	39.650	Product Number	CTL-SHE-0174-1650-1550-1650
Design Depth (m)	1.550	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	16.5	Min Node Diameter (mm)	1500

Node Basin 2 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	44.550
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	1590

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	64.0	0.0	1.000	250.0	0.0

Node Basin 3 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	43.620
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	0

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	268.0	0.0	1.000	527.0	0.0

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Node Basin 5 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	43.300
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	2850

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	309.0	0.0	1.000	553.0	0.0

Node Basin 8 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	39.130
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)
0.000	1340.0	0.0	1.000	1950.0	0.0

Node Basin 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	45.500
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)
0.000	1630.0	1630.0	1.000	2144.0	2166.5

Node Basin 4 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	43.200
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)
0.000	2144.0	2144.0	1.000	2819.0	2841.6

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Node Basin 7 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	39.700
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	2520

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	2299.0	2299.0	1.500	3311.0	3349.1

Node Basin 6 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	40.000
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	136

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	841.0	841.0	2.000	1700.0	1735.4

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Results for 1 year Critical Storm Duration. Lowest mass balance: 99.98%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
240 minute summer	Basin 3	144	43.672	0.052	7.6	14.3455	0.0000	OK
120 minute summer	Basin 5	72	43.434	0.134	47.9	43.6469	0.0000	OK
960 minute summer	Basin 4	705	43.327	0.127	31.2	278.7437	0.0000	OK
960 minute summer	Hydrobrake 3	675	43.381	0.381	30.9	0.6736	0.0000	SURCHARGED
720 minute summer	Outfall 2	510	43.020	0.060	6.5	0.0000	0.0000	OK
180 minute summer	Basin 6	112	40.269	0.269	164.2	242.2267	0.0000	OK
960 minute summer	Basin 7	690	39.926	0.226	55.3	537.7113	0.0000	OK
960 minute summer	Hydrobrake 4	690	39.926	0.276	15.0	0.7020	0.0000	OK
1440 minute summer	Basin 8	1350	39.253	0.123	15.0	169.0314	0.0000	OK
1440 minute summer	Hydrobrake 5	1530	39.260	0.260	16.4	0.4591	0.0000	OK
2880 minute summer	Outfall 3	2160	38.138	0.048	12.2	0.0000	0.0000	OK
960 minute summer	Basin 1	720	45.599	0.099	23.8	163.1845	0.0000	OK
960 minute summer	Hydrobrake 1	630	45.617	0.717	12.8	1.0261	0.0000	SURCHARGED
720 minute summer	Basin 2	435	44.719	0.169	4.5	13.6336	0.0000	OK
720 minute summer	Hydrobrake 2	435	44.718	0.188	3.5	0.2130	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
240 minute summer	Basin 3	1.000	Basin 4	3.7	0.402	0.067	2.0870	
120 minute summer	Basin 5	2.000	Basin 4	28.8	1.233	0.150	1.6207	
960 minute summer	Basin 4	1.001	Hydrobrake 3	30.9	0.375	0.085	3.7244	
960 minute summer	Hydrobrake 3	1.002	Outfall 2	6.5	0.621	0.090	0.0995	471.5
180 minute summer	Basin 6	3.000	Basin 7	84.1	2.316	1.092	2.4247	
960 minute summer	Basin 7	3.001	Hydrobrake 4	15.0	0.127	0.022	6.0415	
960 minute summer	Hydrobrake 4	3.002	Basin 8	15.0	1.495	0.100	0.5003	
1440 minute summer	Basin 8	3.003	Hydrobrake 5	16.4	0.386	0.196	1.0283	
1440 minute summer	Hydrobrake 5	3.004	Outfall 3	12.2	1.633	0.057	0.1853	1005.8
960 minute summer	Basin 1	4.000	Hydrobrake 1	12.8	0.173	0.048	2.2492	
960 minute summer	Hydrobrake 1	4.001	Basin 2	3.0	0.221	0.016	1.0005	
720 minute summer	Basin 2	4.002	Hydrobrake 2	3.5	0.106	0.085	0.6370	
720 minute summer	Hydrobrake 2	4.003	Outfall 1	3.5	0.563	0.042	0.0337	254.7

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Results for 1 year Critical Storm Duration. Lowest mass balance: 99.98%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute summer	Outfall 1	435	44.542	0.042	3.5	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	Basin 3	41	43.739	0.119	53.5	33.7836	0.0000	OK
30 minute summer	Basin 5	21	43.624	0.324	342.0	113.3497	0.0000	OK
960 minute winter	Basin 4	930	43.581	0.381	66.1	866.2054	0.0000	OK
720 minute summer	Hydrobrake 3	690	43.604	0.604	30.8	1.0680	0.0000	SURCHARGED
60 minute winter	Outfall 2	46	43.020	0.060	6.5	0.0000	0.0000	OK
120 minute summer	Basin 6	90	40.870	0.870	655.8	894.7744	0.0000	SURCHARGED
960 minute winter	Basin 7	930	40.310	0.610	84.4	1527.8180	0.0000	OK
960 minute winter	Hydrobrake 4	930	40.310	0.660	23.4	1.6796	0.0000	SURCHARGED
2880 minute winter	Basin 8	3660	39.577	0.447	16.5	659.9920	0.0000	SURCHARGED
2880 minute winter	Hydrobrake 5	3660	39.573	0.573	12.5	1.0129	0.0000	SURCHARGED
360 minute summer	Outfall 3	2072	38.139	0.049	12.5	0.0000	0.0000	OK
960 minute winter	Basin 1	945	45.817	0.317	29.7	543.4171	0.0000	OK
960 minute winter	Hydrobrake 1	945	45.817	0.917	12.8	1.3129	0.0000	SURCHARGED
600 minute summer	Basin 2	435	44.919	0.369	8.7	36.6878	0.0000	SURCHARGED
600 minute summer	Hydrobrake 2	435	44.919	0.389	3.8	0.4396	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
60 minute summer	Basin 3	1.000	Basin 4	18.7	0.678	0.340	6.1056	
30 minute summer	Basin 5	2.000	Basin 4	186.7	2.318	0.974	5.3246	
960 minute winter	Basin 4	1.001	Hydrobrake 3	30.9	0.354	0.086	6.8719	
720 minute summer	Hydrobrake 3	1.002	Outfall 2	6.5	0.621	0.091	0.0997	1147.2
120 minute summer	Basin 6	3.000	Basin 7	129.2	2.363	1.677	4.3640	
960 minute winter	Basin 7	3.001	Hydrobrake 4	23.4	0.127	0.034	19.9596	
960 minute winter	Hydrobrake 4	3.002	Basin 8	16.5	1.483	0.110	1.1725	
2880 minute winter	Basin 8	3.003	Hydrobrake 5	12.5	0.340	0.150	1.6155	
2880 minute winter	Hydrobrake 5	3.004	Outfall 3	12.5	1.645	0.059	0.1887	2997.3
960 minute winter	Basin 1	4.000	Hydrobrake 1	12.8	0.175	0.048	3.5387	
960 minute winter	Hydrobrake 1	4.001	Basin 2	3.0	0.246	0.016	2.1195	
600 minute summer	Basin 2	4.002	Hydrobrake 2	3.8	0.106	0.095	1.0272	
600 minute summer	Hydrobrake 2	4.003	Outfall 1	3.8	0.578	0.046	0.0359	576.4

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute winter	Outfall 1	136	44.544	0.044	3.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
1440 minute winter	Basin 3	1410	43.968	0.347	7.5	109.1608	0.0000	SURCHARGED
1440 minute winter	Basin 5	1410	43.967	0.667	35.4	261.3593	0.0000	SURCHARGED
1440 minute winter	Basin 4	1410	43.967	0.767	75.9	1844.2600	0.0000	FLOOD RISK
1440 minute winter	Hydrobrake 3	1380	43.982	0.982	32.2	1.7354	0.0000	FLOOD RISK
15 minute summer	Outfall 2	14	43.020	0.060	6.5	0.0000	0.0000	OK
180 minute summer	Basin 6	132	41.550	1.550	948.7	1819.0360	0.0000	SURCHARGED
1440 minute winter	Basin 7	1440	40.891	1.191	99.0	3215.1170	0.0000	SURCHARGED
1440 minute winter	Hydrobrake 4	1440	40.890	1.240	17.0	3.1571	0.0000	SURCHARGED
2880 minute winter	Basin 8	5760	39.750	0.620	16.5	947.9203	0.0000	SURCHARGED
2880 minute winter	Hydrobrake 5	5760	39.747	0.747	12.5	1.3196	0.0000	SURCHARGED
60 minute summer	Outfall 3	1112	38.139	0.049	12.5	0.0000	0.0000	OK
1440 minute winter	Basin 1	1410	46.174	0.674	41.7	1214.6880	0.0000	SURCHARGED
1440 minute winter	Hydrobrake 1	1410	46.174	1.274	12.4	1.8225	0.0000	SURCHARGED
960 minute summer	Basin 2	960	45.264	0.714	11.0	93.8725	0.0000	FLOOD RISK
960 minute summer	Hydrobrake 2	960	45.264	0.734	3.8	0.8297	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
1440 minute winter	Basin 3	1.000	Basin 4	7.4	0.251	0.135	11.9043	
1440 minute winter	Basin 5	2.000	Basin 4	25.4	0.649	0.133	13.5876	
1440 minute winter	Basin 4	1.001	Hydrobrake 3	32.2	0.358	0.089	7.7327	
1440 minute winter	Hydrobrake 3	1.002	Outfall 2	6.5	0.621	0.091	0.0996	1409.2
180 minute summer	Basin 6	3.000	Basin 7	181.6	2.581	2.357	4.3640	
1440 minute winter	Basin 7	3.001	Hydrobrake 4	17.0	0.125	0.025	26.4702	
1440 minute winter	Hydrobrake 4	3.002	Basin 8	16.5	1.473	0.110	1.1733	
2880 minute winter	Basin 8	3.003	Hydrobrake 5	12.5	0.340	0.150	1.6155	
2880 minute winter	Hydrobrake 5	3.004	Outfall 3	12.5	1.645	0.059	0.1887	3701.9
1440 minute winter	Basin 1	4.000	Hydrobrake 1	12.4	0.166	0.046	3.7204	
1440 minute winter	Hydrobrake 1	4.001	Basin 2	3.1	0.253	0.016	4.2200	
960 minute summer	Basin 2	4.002	Hydrobrake 2	3.8	0.106	0.095	1.0272	
960 minute summer	Hydrobrake 2	4.003	Outfall 1	3.8	0.578	0.046	0.0359	758.2

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Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 99.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
180 minute summer	Outfall 1	92	44.544	0.044	3.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)

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