

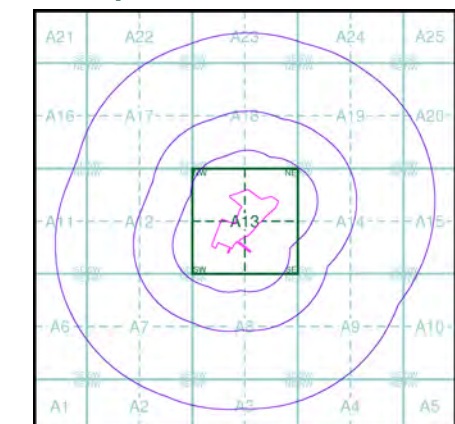
General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Agency and Hydrological (Flood)

- Extreme Flooding from Rivers or Sea without Defences (Zone 2)
- Flooding from Rivers or Sea without Defences (Zone 3)
- Area Benefiting from Flood Defence
- Flood Water Storage Areas
- Flood Defence

Flood Map - Slice A

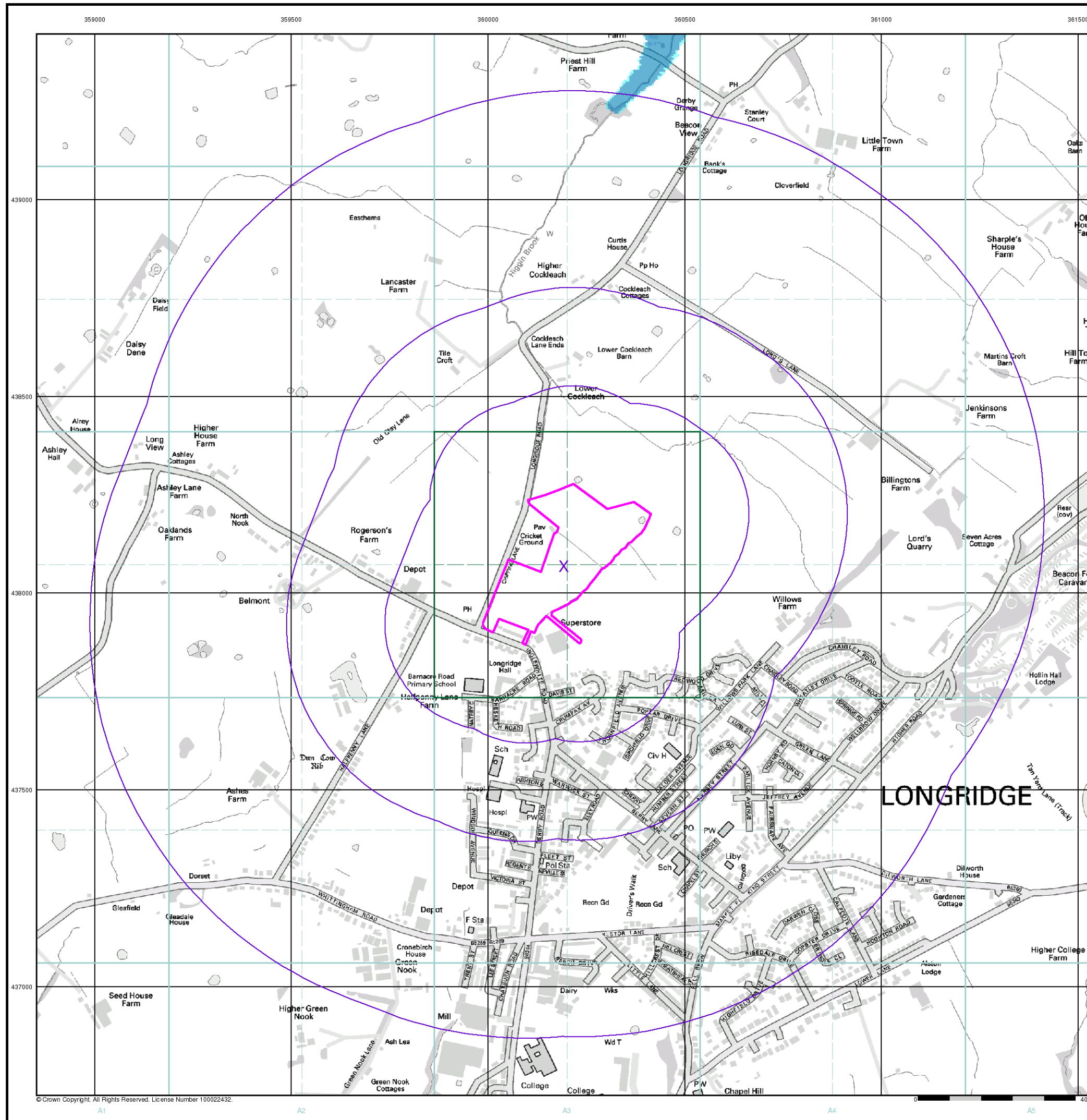


Order Details

Order Number: 55312619_1_1
 Customer Ref: EB1355
 National Grid Reference: 360190, 438070
 Slice: A
 Site Area (Ha): 7.22
 Search Buffer (m): 1000

Site Details

Site at 360130, 438020



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General

- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Map ID
- Several of Type at Location

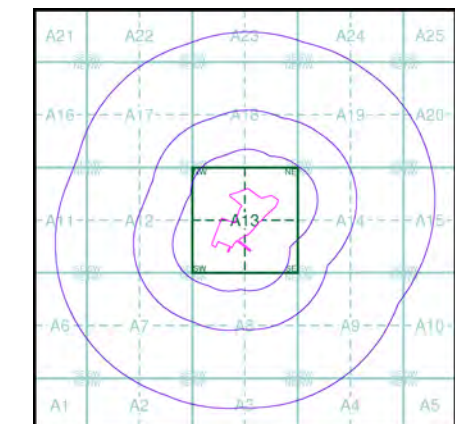
Agency and Hydrological (Boreholes)

- BGS Borehole Depth 0 - 10m
- BGS Borehole Depth 10 - 30m
- BGS Borehole Depth 30m +
- Confidential
- Other

For Borehole information please refer to the Borehole .csv file which accompanied this slice.

A copy of the BGS Borehole Ordering Form is available to download from the Support section of www.envirocheck.co.uk.

Borehole Map - Slice A



Order Details

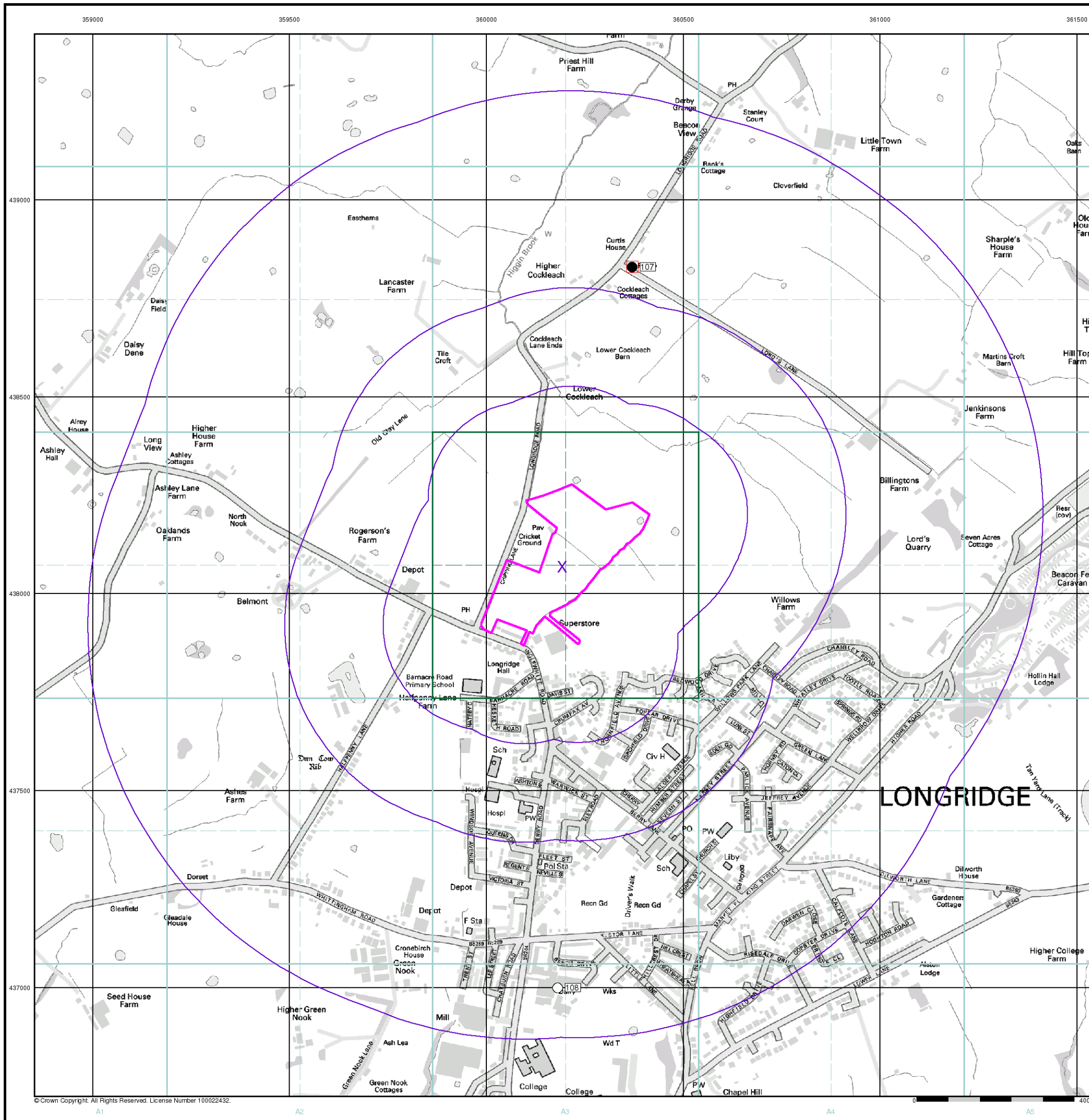
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 Customer Ref: EB1355
 National Grid Reference: 360190, 438070
 Slice: A
 Site Area (Ha): 7.22
 Search Buffer (m): 1000

Site Details

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General

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

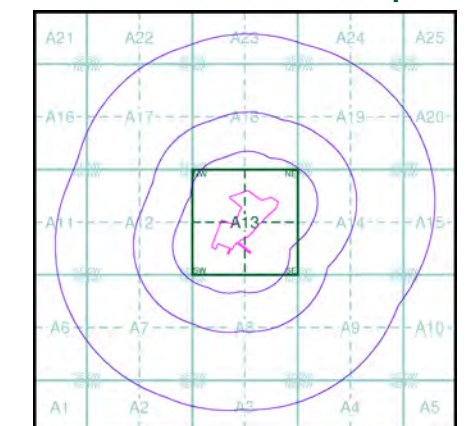
EA Detailed River Network Data

- Primary River
- Secondary River
- Tertiary River
- Canal
- Canal Tunnel
- Undefined River
- Lake/Reservoir
- Offline Drainage Feature
- Extended Culvert (greater than 50m)
- Underground River (inferred)
- Underground River (local knowledge)
- Downstream of High Water Mark
- Downstream of Seaward Extension
- Not assigned River feature

Contours (height in metres)

- Standard Contour 105
- Index Contour 100
- 167.3 Spot Height
- 45.8 Air Height

EA Detailed River Network Map - Slice A

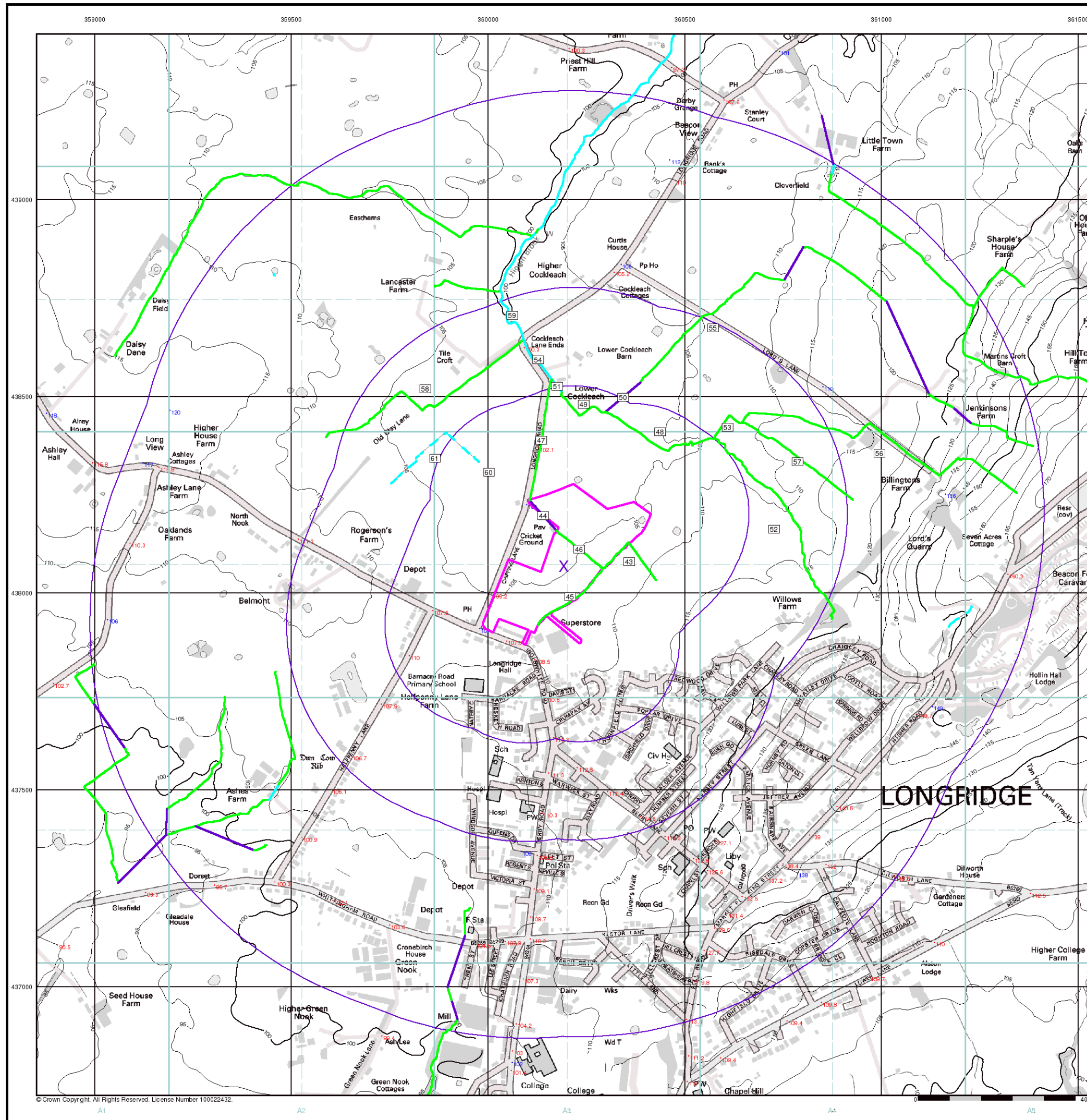


Order Details

Order Number: 55312619_1_1
 Customer Ref: EB1355
 National Grid Reference: 360190, 438070
 Slice: A
 Site Area (Ha): 7.22
 Search Buffer (m): 1000

Site Details

Site at 360130, 438020



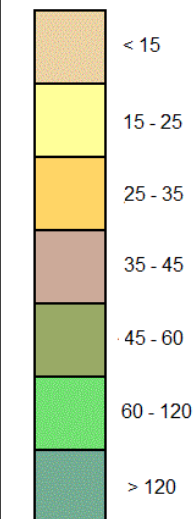
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General

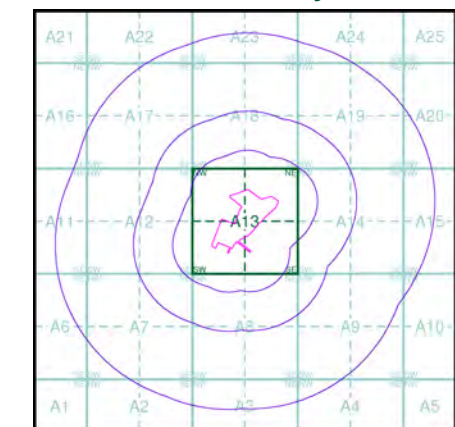
- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

Estimated Soil Chemistry Arsenic

Arsenic Concentrations mg/kg



Estimated Soil Chemistry Arsenic - Slice A

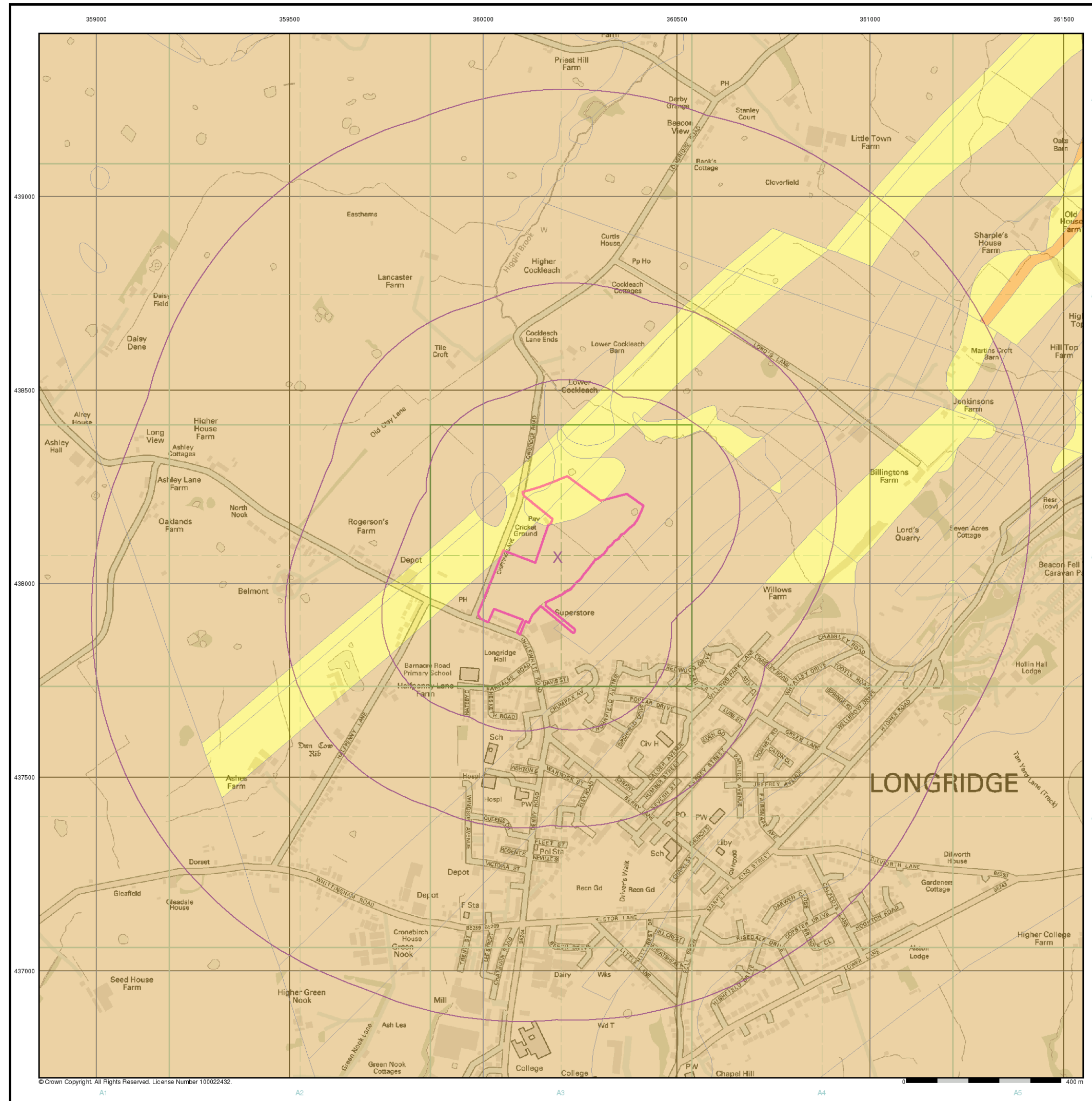


Order Details

Order Details: 55312619_1_1
 Customer Ref: EB1355
 National Grid Reference: 360190, 438070
 Slice: A
 Site Area (Ha): 7.22
 Search Buffer (m): 1000

Site Details

Site at 360130, 438020

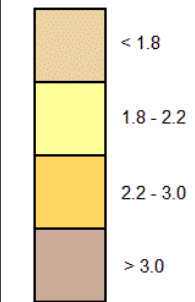


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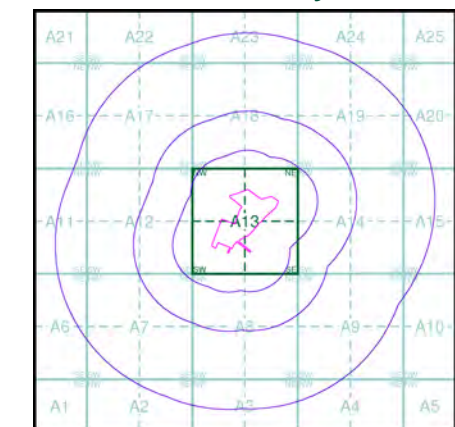
- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

Estimated Soil Chemistry Cadmium

Cadmium Concentrations mg/kg



Estimated Soil Chemistry Cadmium - Slice A



Order Details

Order Details: 55312619_1_1
 Customer Ref: EB1355
 National Grid Reference: 360190, 438070
 Slice: A
 Site Area (Ha): 7.22
 Search Buffer (m): 1000

Site Details

Site at 360130, 438020

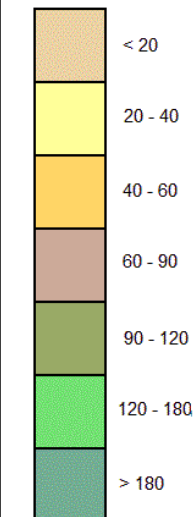


General

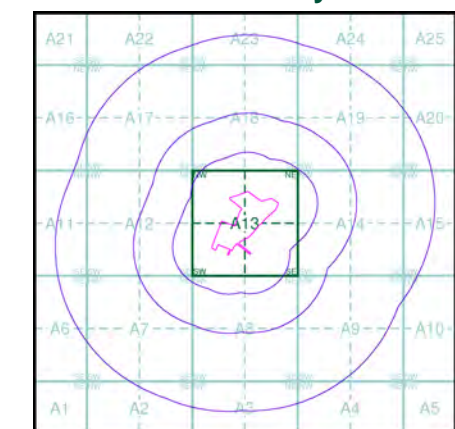
- Specified Site
- Specified Buffer(s)
- X Bearing Reference Point

Estimated Soil Chemistry Chromium

Chromium Concentrations mg/kg



Estimated Soil Chemistry Chromium - Slice A

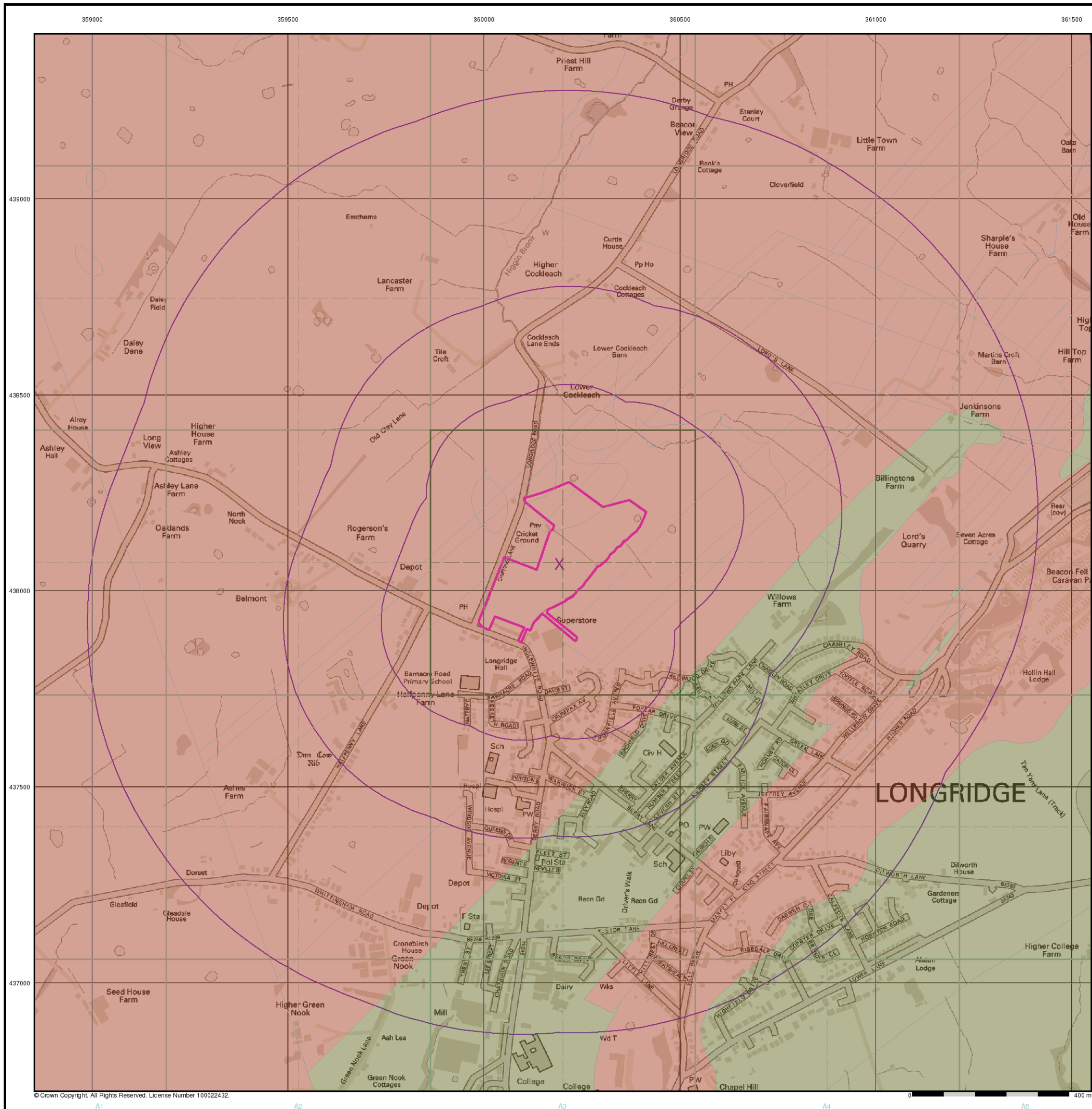


Order Details

Order Details: 55312619_1_1
 Customer Ref: EB1355
 National Grid Reference: 360190, 438070
 Slice: A
 Site Area (Ha): 7.22
 Search Buffer (m): 1000

Site Details

Site at 360130, 438020



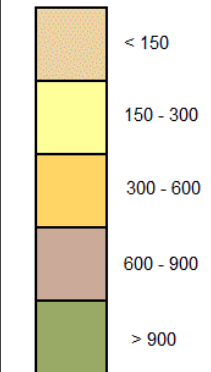
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General

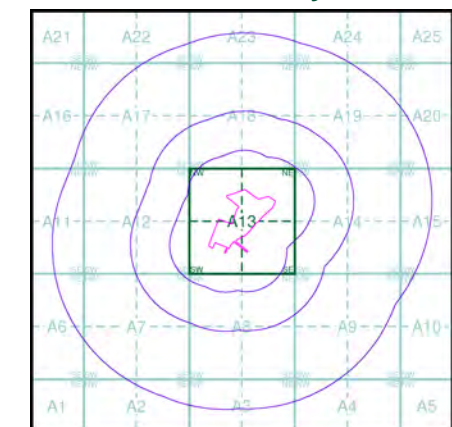
- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Estimated Soil Chemistry Lead

Lead Concentrations mg/kg



Estimated Soil Chemistry Lead - Slice A



Order Details

Order Details: 55312619_1_1
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 National Grid Reference: 360190, 438070
 Slice: A
 Site Area (Ha): 7.22
 Search Buffer (m): 1000

Site Details

Site at 360130, 438020



359000 359500 360000 360500 361000 361500

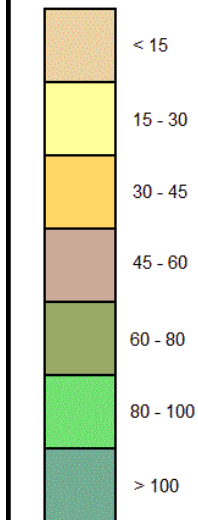


General

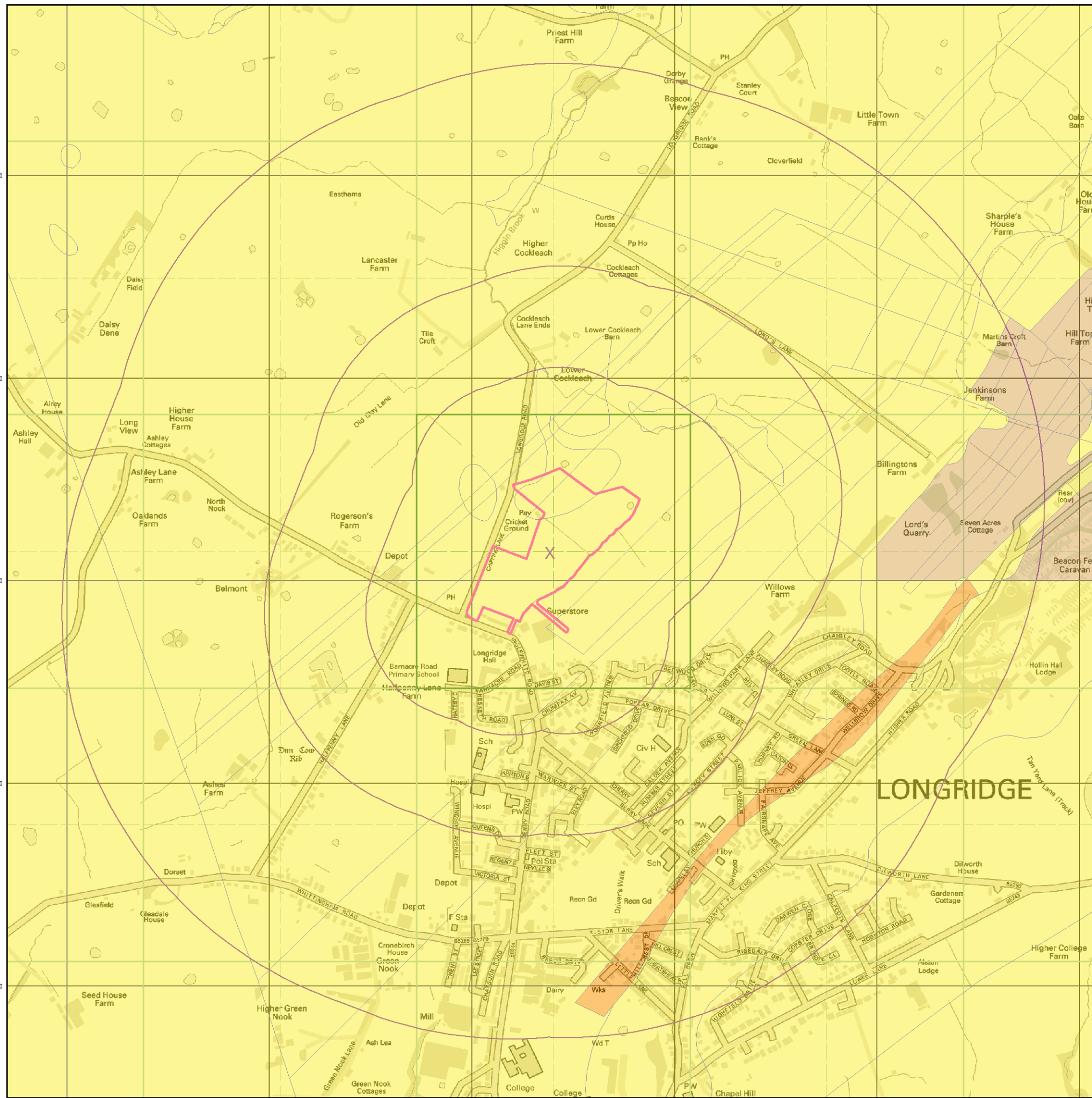
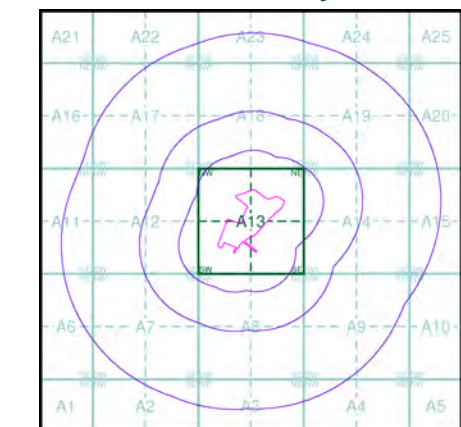
- Specified Site
- Specified Buffer(s)
- Bearing Reference Point

Estimated Soil Chemistry Nickel

Nickel Concentrations mg/kg



Estimated Soil Chemistry Nickel - Slice A



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Order Details

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 National Grid Reference: 360190, 438070
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 Search Buffer (m): 1000

Site Details



Site at 360130, 438020








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Geology 1:50,000 Maps Legends

Artificial Ground and Landslip




| Map Colour | Lex Code | Rock Name | Rock Type | Min and Max Age |
|---|----------|-------------------------|----------------------------|-------------------------|
|  | MGR | Made Ground (Undivided) | Artificial Deposit | Holocene - Holocene |
|  | SLIP | Landslide Deposit | Unknown/Unclassified Entry | Quaternary - Quaternary |

Superficial Geology

| Map Colour | Lex Code | Rock Name | Rock Type | Min and Max Age |
|---|----------|---|---|-------------------------|
|  | ALV | Alluvium | Clay, Silt, Sand and Gravel | Flandrian - Flandrian |
|  | TILLD | Till, Devensian | Diamicton | Devensian - Devensian |
|  | GFDUD | Glaciofluvial Deposits, Devensian | Sand and Gravel | Devensian - Devensian |
|  | PEAT | Peat | Peat [Unlithified Deposits Coding Scheme] | Quaternary - Quaternary |
|  | RTDU | River Terrace Deposits (Undifferentiated) | Sand and Gravel | Quaternary - Quaternary |

Bedrock and Faults

| Map Colour | Lex Code | Rock Name | Rock Type | Min and Max Age |
|---|----------|--------------------------------|--------------------------------------|------------------------------|
|  | SDSH | Sabden Shales | Mudstone and Siltstone | Kinderscoutian - Arnsbergian |
|  | PG | Pendle Grit Member | Sandstone and Siltstone, Interbedded | Pendleian - Pendleian |
|  | PG | Pendle Grit Member | Sandstone, Silty | Pendleian - Pendleian |
|  | PG | Pendle Grit Member | Mudstone | Pendleian - Pendleian |
|  | WWG | Warley Wise Grit | Sandstone | Pendleian - Pendleian |
|  | PNDS | Pendleside Sandstone Member | Sandstone | Brigantian - Brigantian |
|  | BSG | Bowland Shale Formation | Mudstone and Siltstone | Yeadonian - Asbian |
|  | BSG | Bowland Shale Formation | Mudstone | Yeadonian - Asbian |
|  | PDL | Pendleside Limestone Formation | Limestone | Asbian - Holkerian |
|  | BOH | Hodderense Limestone Formation | Limestone | Holkerian - Holkerian |

| Map Colour | Lex Code | Rock Name | Rock Type | Min and Max Age |
|---|----------|---------------------------|-----------|-----------------------|
|  | RKM | Rad Brook Mudstone Member | Mudstone | Holkerian - Holkerian |
|  | HOM | Hodder Mudstone Formation | Mudstone | Holkerian - Chadian |
|  | | Faults | | |



Geology 1:50,000 Maps

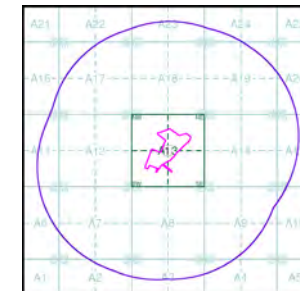
This report contains geological map extracts taken from the BGS Digital Geological map of Great Britain at 1:50,000 scale and is designed for users carrying out preliminary site assessments who require geological maps for the area around the site. This mapping may be more up to date than previously published paper maps.

The various geological layers - artificial and landslip deposits, superficial geology and solid (bedrock) geology are displayed in separate maps, but superimposed on the final 'Combined Surface Geology' map. All map legends feature on this page. Not all layers have complete nationwide coverage, so availability of data for relevant map sheets is indicated below.

Geology 1:50,000 Maps Coverage

| | |
|----------------------|--------------|
| Map ID: | 1 |
| Map Sheet No: | 067 |
| Map Name: | Garstang |
| Map Date: | 1990 |
| Bedrock Geology: | Available |
| Superficial Geology: | Available |
| Artificial Geology: | Available |
| Faults: | Not Supplied |
| Landslip: | Available |
| Rock Segments: | Not Supplied |

Geology 1:50,000 Maps - Slice A



Order Details:

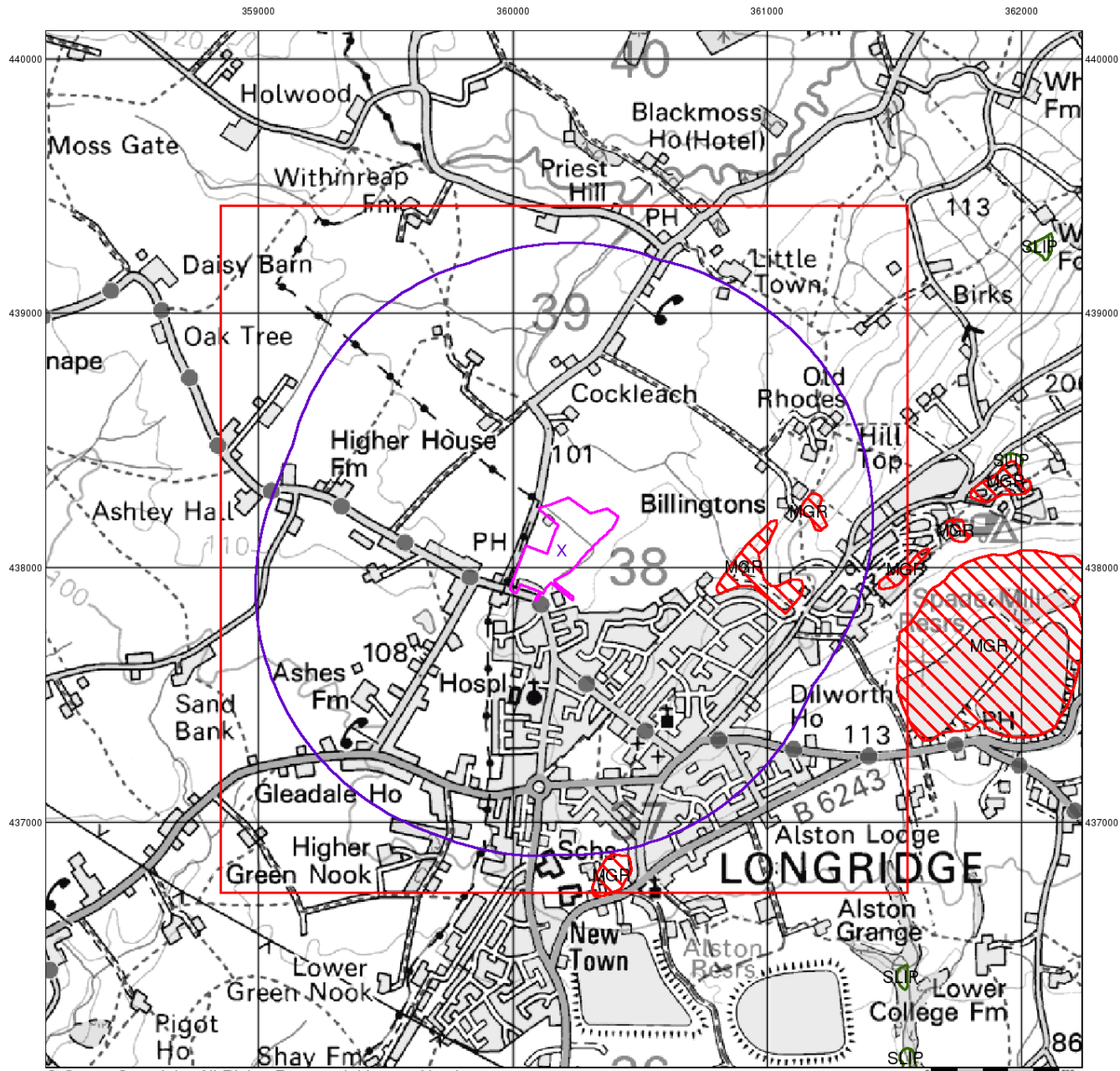
| | |
|--------------------------|----------------|
| Order Number: | 55312619_1_1 |
| Customer Reference: | EB1355 |
| National Grid Reference: | 360190, 438070 |
| Site: | A |
| Site Area (Ha): | 7.22 |
| Search Buffer (m): | 1000 |

Site Details:

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Artificial Ground and Landslip

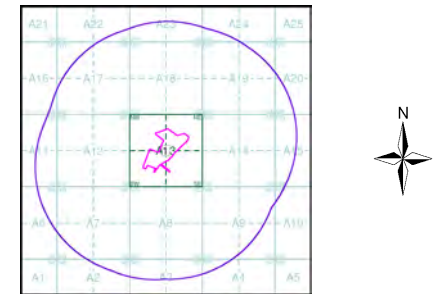
Artificial ground is a term used by BGS for those areas where the ground surface has been significantly modified by human activity. Information about previously developed ground is especially important, as it is often associated with potentially contaminated material, unpredictable engineering conditions and unstable ground.

Artificial ground includes:

- Made ground - man-made deposits such as embankments and spoil heaps on the natural ground surface.
- Worked ground - areas where the ground has been cut away such as quarries and road cuttings.
- Infilled ground - areas where the ground has been cut away then wholly or partially backfilled.
- Landscaped ground - areas where the surface has been reshaped.
- Disturbed ground - areas of ill-defined shallow or near surface mineral workings where it is impracticable to map made and worked ground separately.

Mass movement (landslip) deposits on BGS geological maps are primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground. The dataset also includes foundered strata, where the ground has collapsed due to subsidence.

Artificial Ground and Landslip Map - Slice A



Order Details:

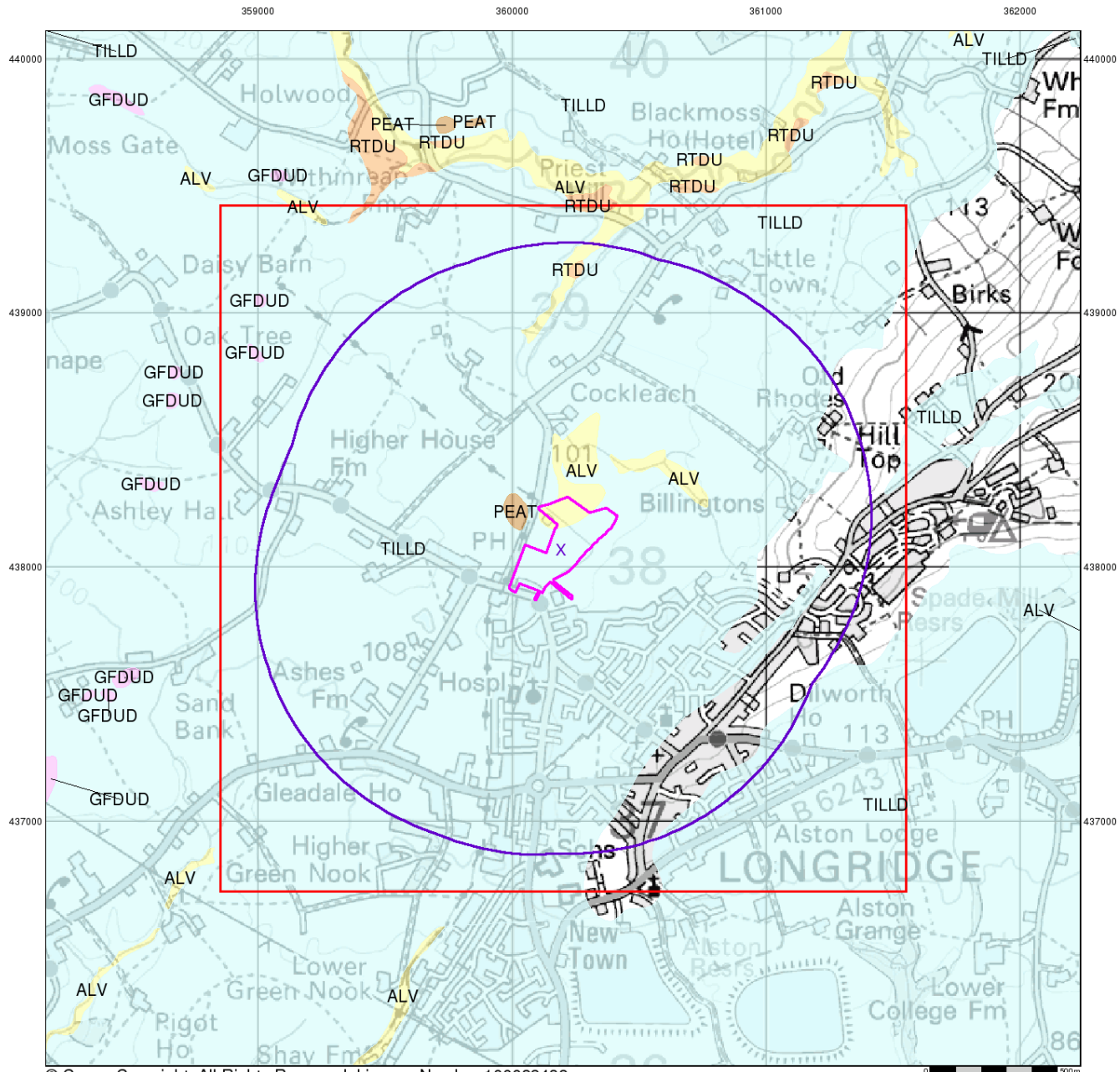
Order Number: 55312619_1_1
 Customer Reference: EB1355
 National Grid Reference: 360190, 438070
 Slice: A
 Site Area (Ha): 7.22
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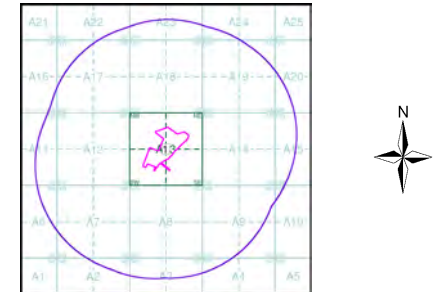
Superficial Geology

Superficial Deposits are the youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back about 1.8 million years from the present.

They rest on older deposits or rocks referred to as Bedrock. This dataset contains Superficial deposits that are of natural origin and 'in place'. Other superficial strata may be held in the Mass Movement dataset where they have been moved, or in the Artificial Ground dataset where they are of man-made origin.

Most of these Superficial deposits are unconsolidated sediments such as gravel, sand, silt and clay, and onshore they form relatively thin, often discontinuous patches or larger spreads.

Superficial Geology Map - Slice A



Order Details:

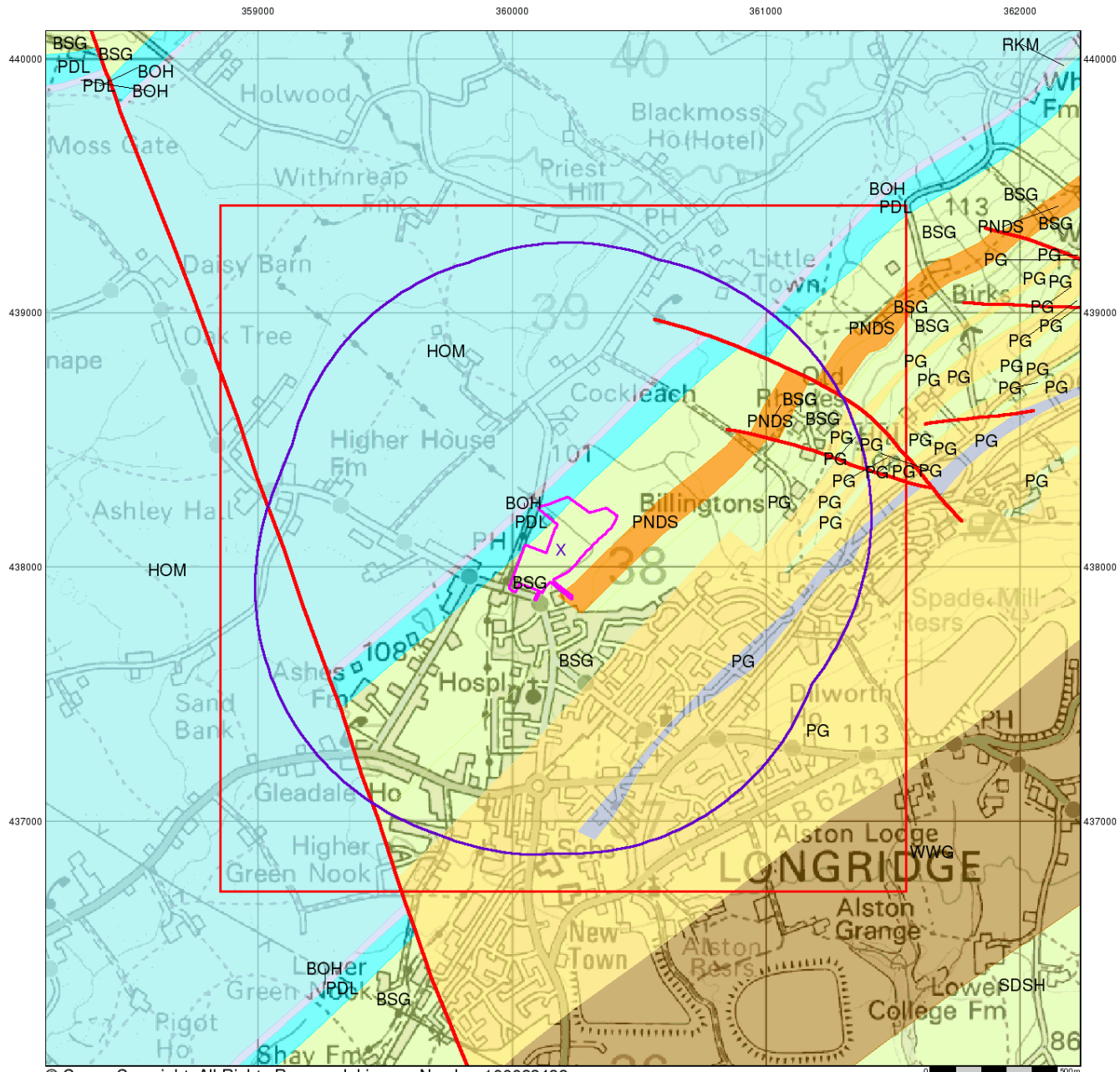
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 Site Area (Ha): 7.22
 Search Buffer (m): 1000

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Bedrock and Faults

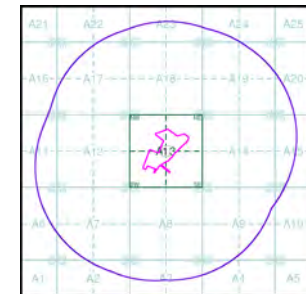
Bedrock geology is a term used for the main mass of rocks forming the Earth and are present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

The bedrock has formed over vast lengths of geological time ranging from ancient and highly altered rocks of the Proterozoic, some 2500 million years ago, or older, up to the relatively young Pliocene, 1.8 million years ago.

The bedrock geology includes many lithologies, often classified into three types based on origin: igneous, metamorphic and sedimentary.

The BGS Faults and Rock Segments dataset includes geological faults (e.g. normal, thrust), and thin beds mapped as lines (e.g. coal seam, gypsum bed). Some of these are linked to other particular 1:50,000 Geology datasets, for example, coal seams are part of the bedrock sequence, most faults and mineral veins primarily affect the bedrock but cut across the strata and post date its deposition.

Bedrock and Faults Map - Slice A



Order Details:

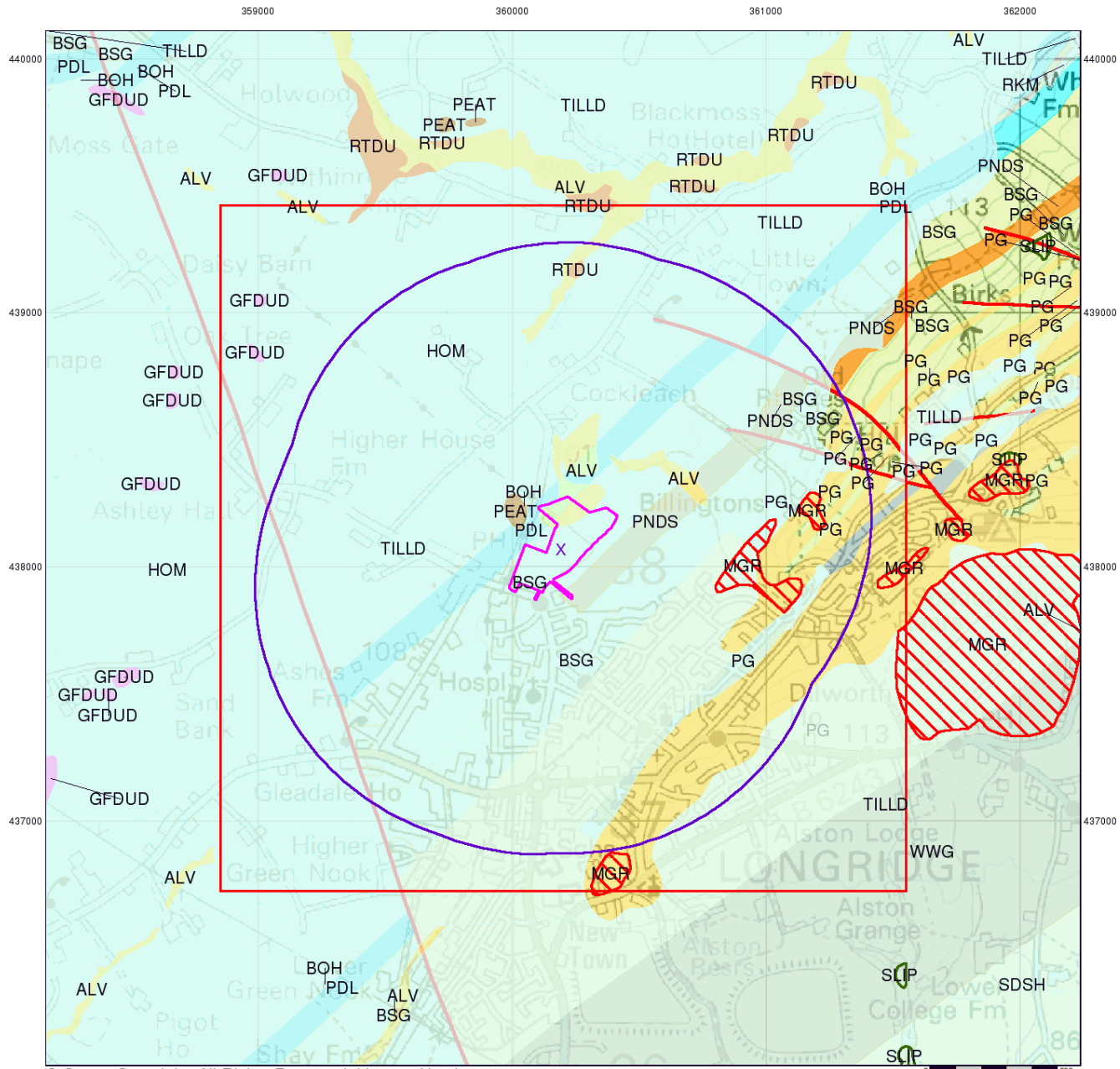
Order Number: 55312619_1_1
 Customer Reference: EB1355
 National Grid Reference: 360190, 438070
 Slice: A
 Site Area (Ha): 7.22
 Search Buffer (m): 1000

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Combined Surface Geology

The Combined Surface Geology map combines all the previous maps into one combined geological overview of your site.

Please consult the legends to the previous maps to interpret the Combined "Surface Geology" map.

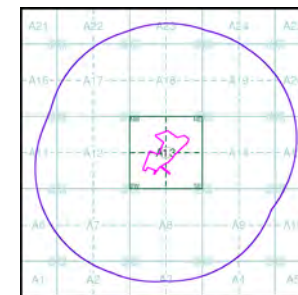
Additional Information

More information on 1:50,000 Geological mapping and explanations of rock classifications can be found on the BGS website. Using the LEX Codes in this report, further descriptions of rock types can be obtained by interrogating the 'BGS Lexicon of Named Rock Units'. This database can be accessed by following the 'Information and Data' link on the BGS website.

Contact

British Geological Survey
 Kingsley Dunham Centre
 Keyworth
 Nottingham
 NG12 5GG
 Telephone: 0115 936 3143
 Fax: 0115 936 3276
 email: enquiries@bgs.ac.uk
 website: www.bgs.ac.uk

Combined Geology Map - Slice A



Order Details:

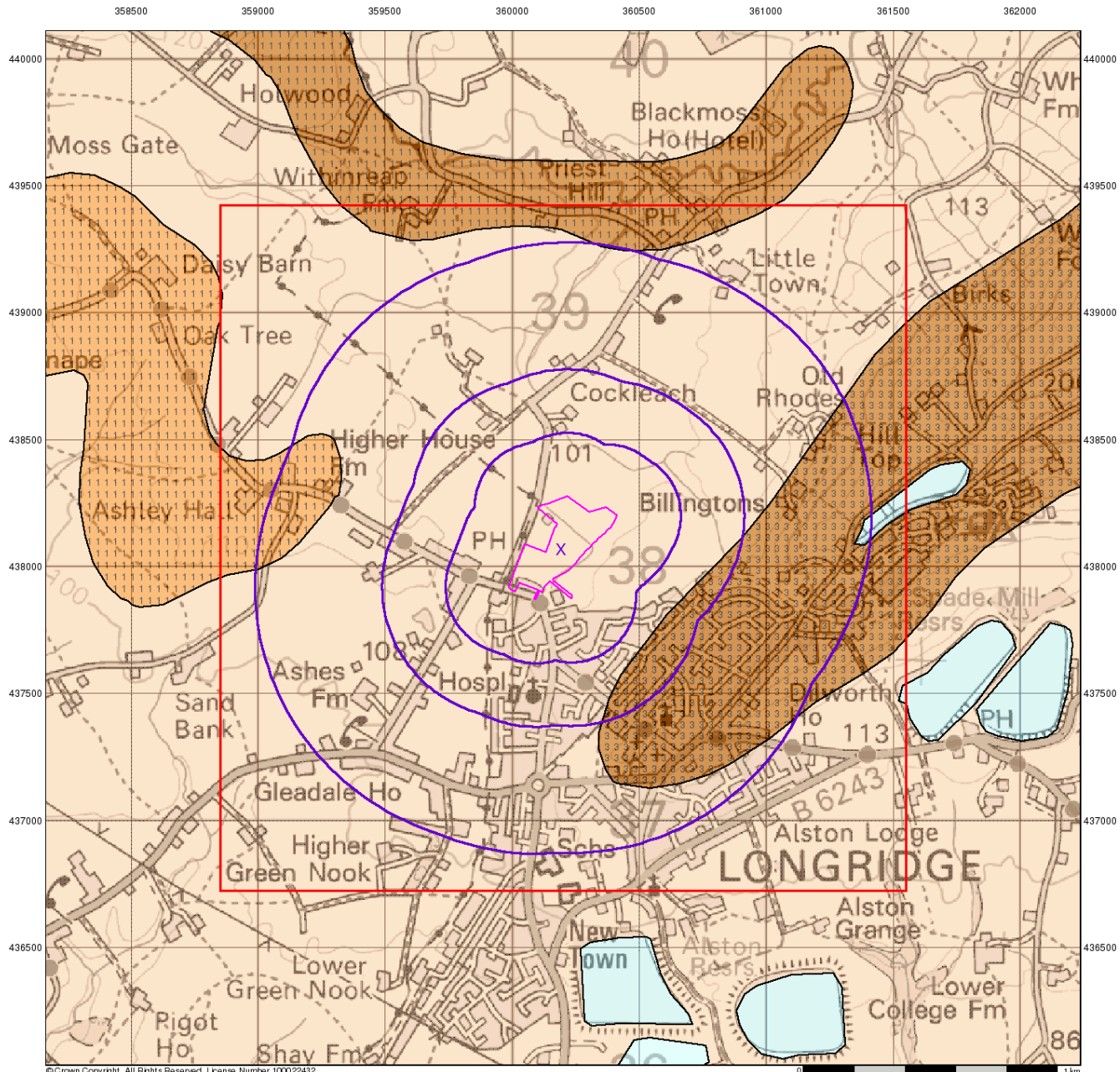
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 Customer Reference: EB1355
 National Grid Reference: 360190, 438070
 Slice: A
 Site Area (Ha): 7.22
 Search Buffer (m): 1000

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Groundwater Vulnerability

General

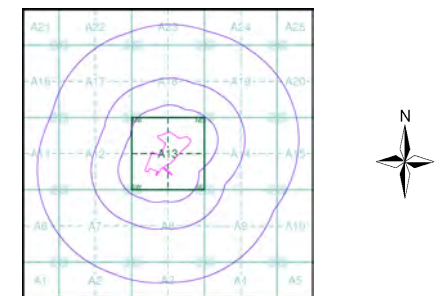
- ◊ Specified Site
- Specified Buffer(s)
- X Bearing Reference Point
- Slice
- B Map ID

Agency and Hydrological

Geological Classes

- | | |
|--|----------------------------|
| <p>Major Aquifer (Highly Permeable)</p> <ul style="list-style-type: none"> High (H) 1, 2, 3, U Intermediate (I) 1, 2 Low <p>Minor Aquifer (Variably Permeable)</p> <ul style="list-style-type: none"> High (H) 1, 2, 3, U Intermediate (I) 1, 2 Low <p>Non Aquifer (Negligibly Permeable)</p> <ul style="list-style-type: none"> <p>Water or Sea</p> <ul style="list-style-type: none"> <p>Drift Deposit</p> <ul style="list-style-type: none"> | <p>Soil Classes</p> |
|--|----------------------------|

Site Sensitivity Context Map - Slice A



Order Details

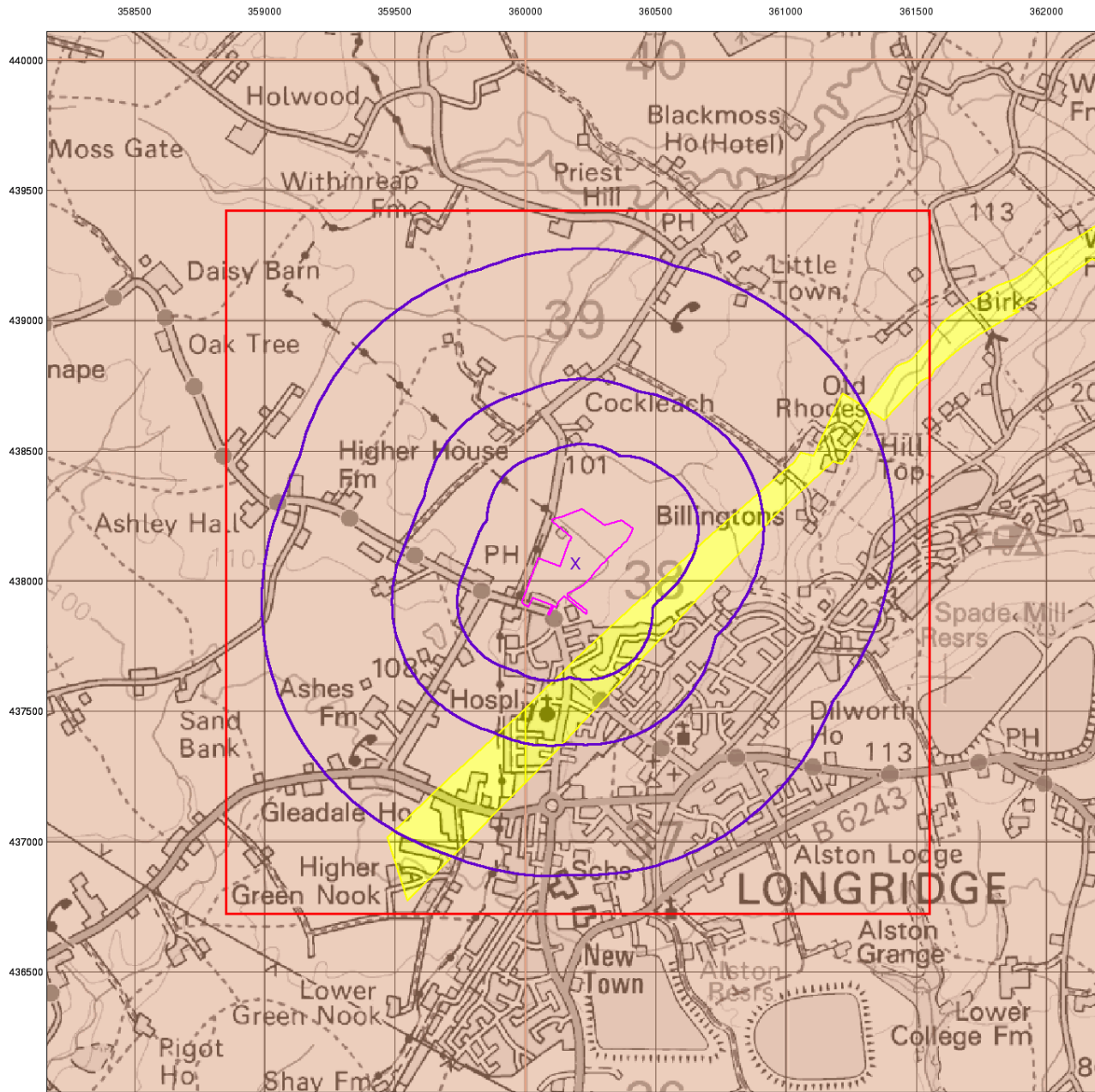
Order Number: 55312619_1_1
 Customer Ref: EB1355
 National Grid Reference: 360190, 438070
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 Search Buffer (m): 1000

Site Details

Site at 360130, 438020



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0 1 km



Bedrock Aquifer Designation

General

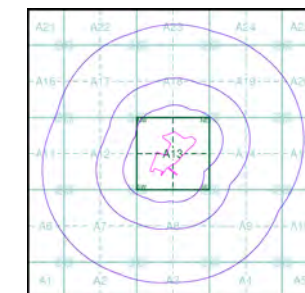
- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown

Site Sensitivity Context Map - Slice A



Order Details

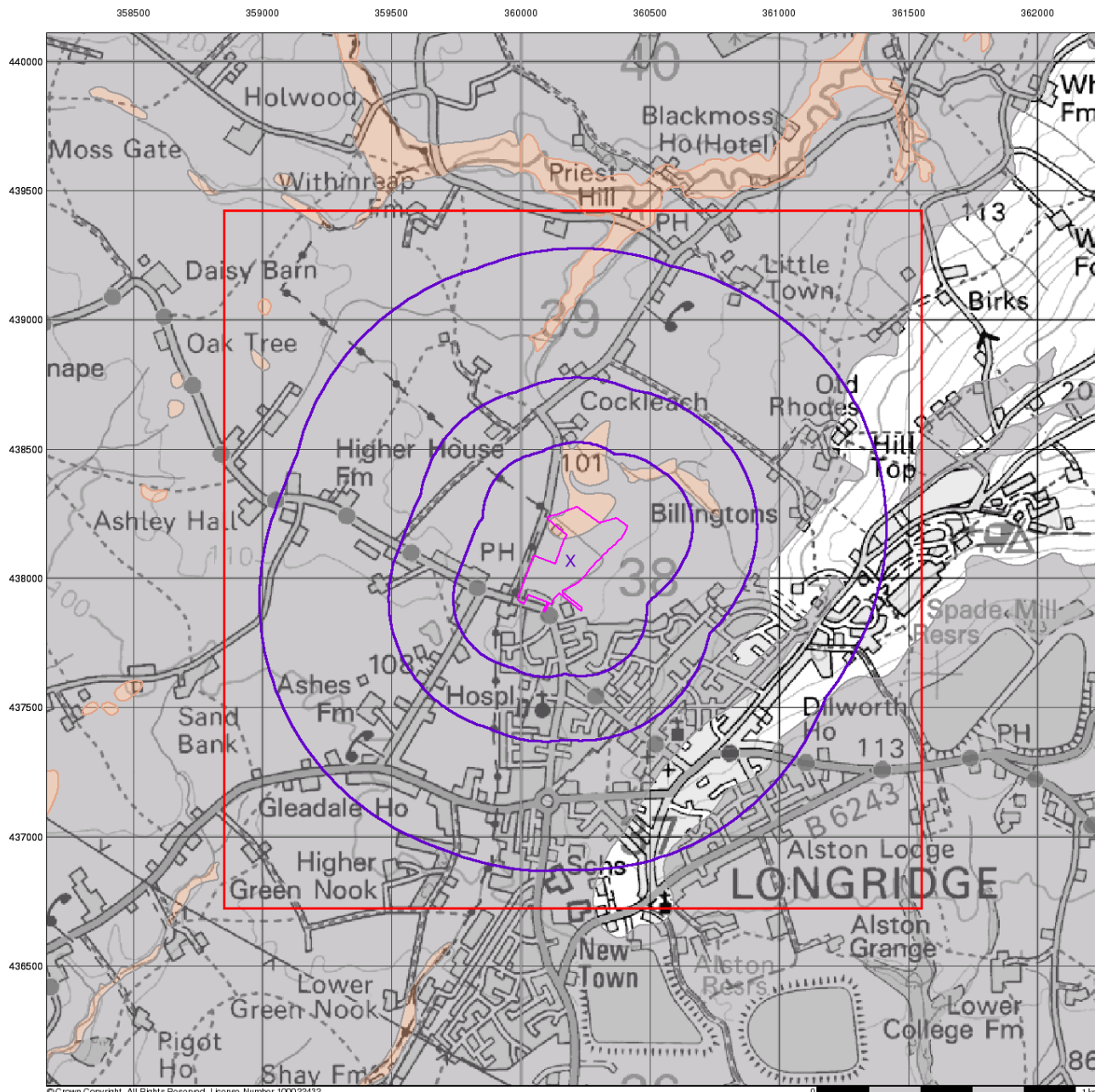
Order Number: 55312619_1_1
 Customer Ref: EB1355
 National Grid Reference: 360190, 438070
 Slice: A
 Site Area (Ha): 7.22
 Search Buffer (m): 1000

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Superficial Aquifer Designation

General

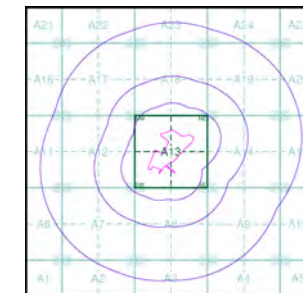
- Specified Site
- Specified Buffer(s)
- Bearing Reference Point
- Slice
- Map ID

Agency and Hydrological

Geological Classes

- Principal Aquifer
- Secondary A Aquifer
- Secondary B Aquifer
- Secondary Undifferentiated
- Unproductive Strata
- Unknown

Site Sensitivity Context Map - Slice A



Order Details

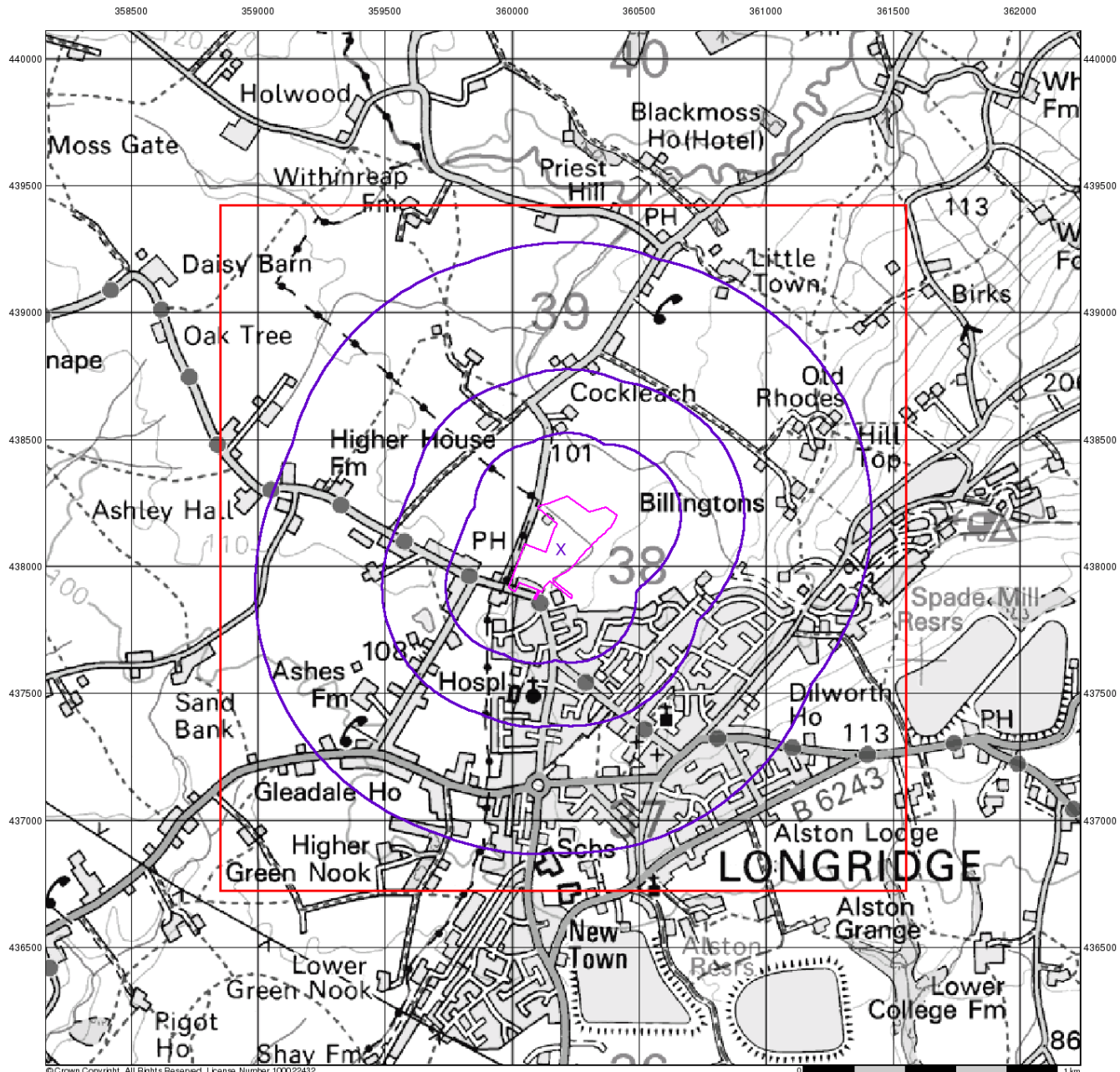
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Source Protection Zones

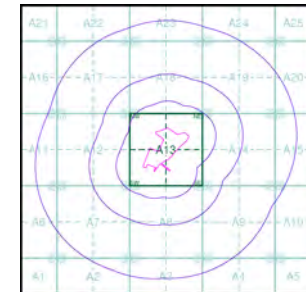
General

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

Agency and Hydrological

- Source Protection Zone I
- Source Protection Zone II
- Source Protection Zone III
- Zone of Special Interest
- Source Protection Zone Borehole

Site Sensitivity Context Map - Slice A



Order Details

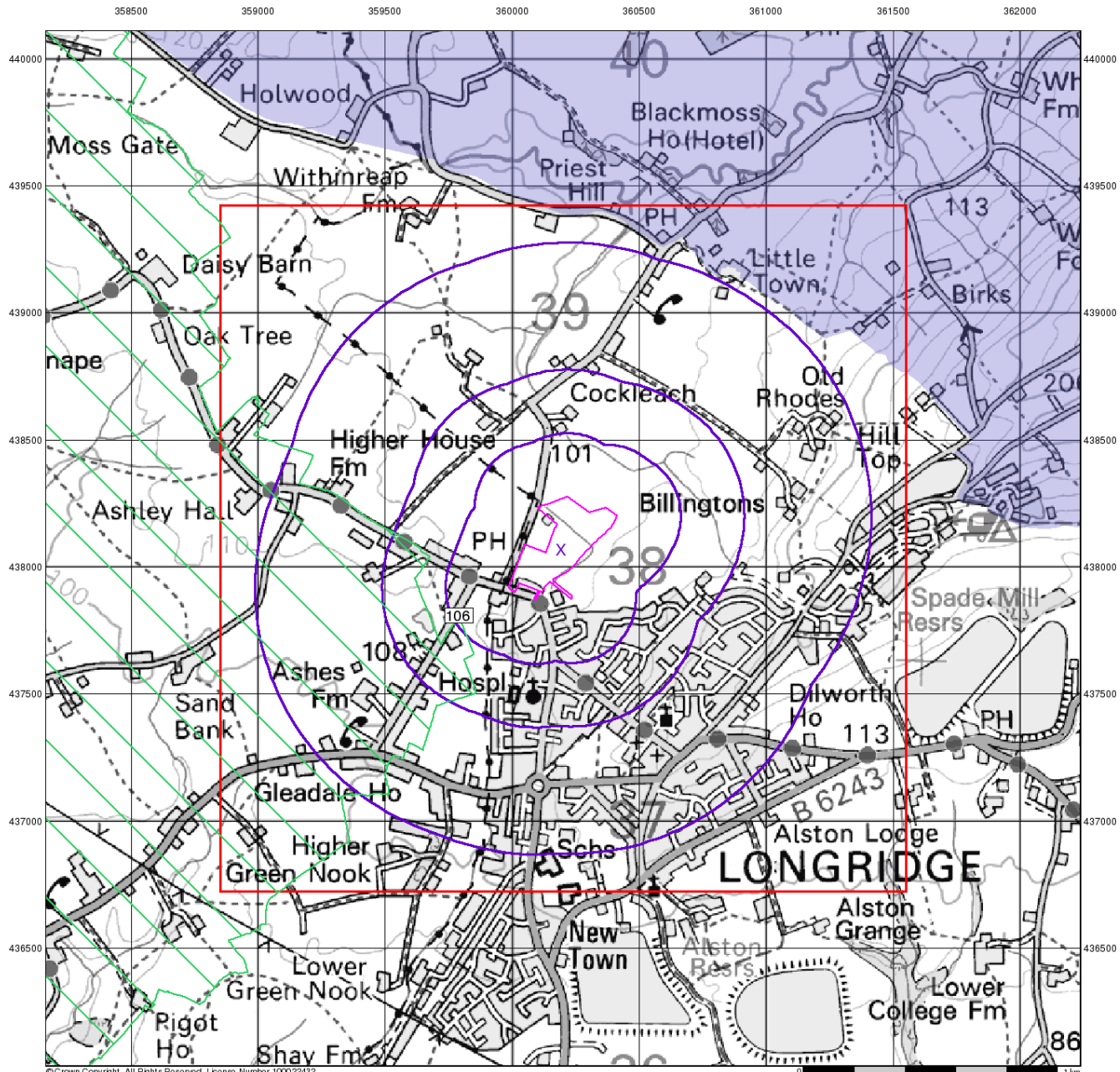
Order Number: 55312619_1_1
 Customer Ref: EB1355
 National Grid Reference: 360190, 438070
 Slice: A
 Site Area (Ha): 7.22
 Search Buffer (m): 1000

Site Details

Site at 360130, 438020



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Sensitive Land Uses

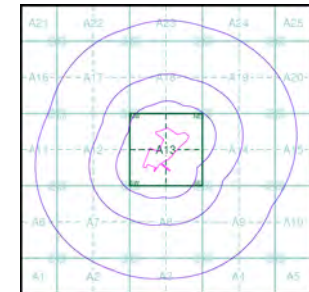
General

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

Sensitive Land Uses

- Area of Adopted Green Belt
- Area of Unadopted Green Belt
- Area of Outstanding Natural Beauty
- Environmentally Sensitive Area
- Forest Park
- Local Nature Reserve
- Marine Nature Reserve
- National Nature Reserve
- National Park
- Nitrate Sensitive Area
- Nitrate Vulnerable Zone
- Ramsar Site
- Site of Special Scientific Interest
- Special Area of Conservation
- Special Protection Area

Site Sensitivity Context Map - Slice A



Order Details

Order Number: 55312619_1_1
 Customer Ref: EB1355
 National Grid Reference: 360190, 438070
 Slice: A
 Site Area (Ha): 7.22
 Search Buffer (m): 1000

Site Details

Site at 360130, 438020



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 Fax: 0844 844 9951
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Index Map

For ease of identification, your site and buffer have been split into Slices, Segments and Quadrants. These are illustrated on the Index Map opposite and explained further below.

Slice

Each slice represents a 1:10,000 plot area (2.7km x 2.7km) for your site and buffer. A large site and buffer may be made up of several slices (represented by a red outline), that are referenced by letters of the alphabet, starting from the bottom left corner of the slice "grid". This grid does not relate to National Grid lines but is designed to give best fit over the site and buffer.

Segment

A segment represents a 1:2,500 plot area. Segments that have plot files associated with them are shown in dark green, others in light blue. These are numbered from the bottom left hand corner within each slice.

Quadrant

A quadrant is a quarter of a segment. These are labelled as NW, NE, SW, SE and are referenced in the datasheet to allow features to be quickly located on plots. Therefore a feature that has a quadrant reference of A7NW will be in Slice A, Segment 7 and the NW Quadrant.

A selection of organisations who provide data within this report:



Envirocheck reports are compiled from 136 different sources of data.

Client Details

Ms G Lownsbrough, Curtins Consulting Ltd, 10 Oxford Court, Bishopsgate, Manchester, M2 3WQ

Order Details

Order Number: 55312619_1_1
 Customer Ref: EB1355
 National Grid Reference: 360200, 438090
 Site Area (Ha): 7.22
 Search Buffer (m): 1000

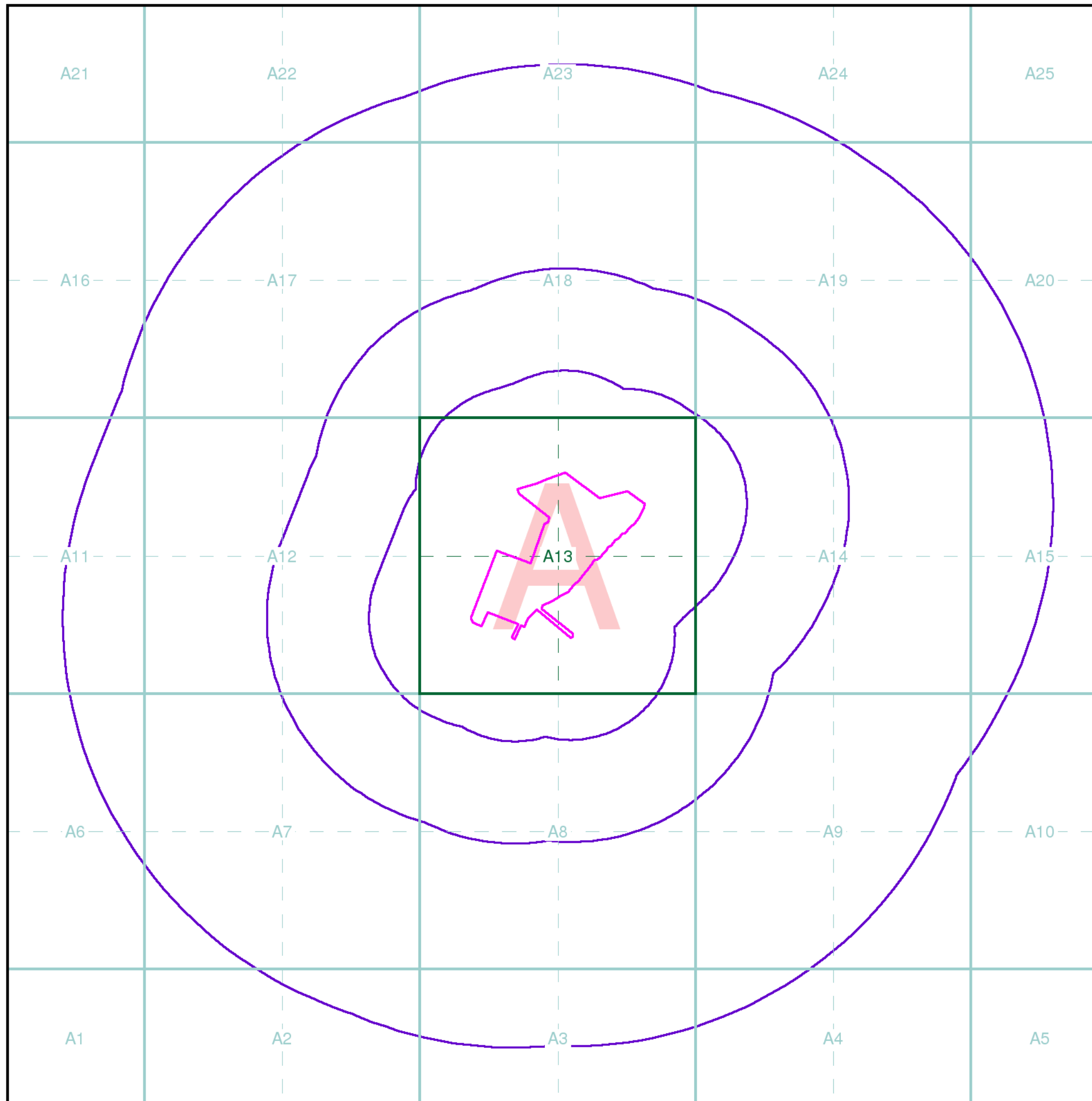
Site Details

Site at 360130, 438020

Full Terms and Conditions can be found on the following link:
<http://www.landmarkinfo.co.uk/Terms/Show/515>

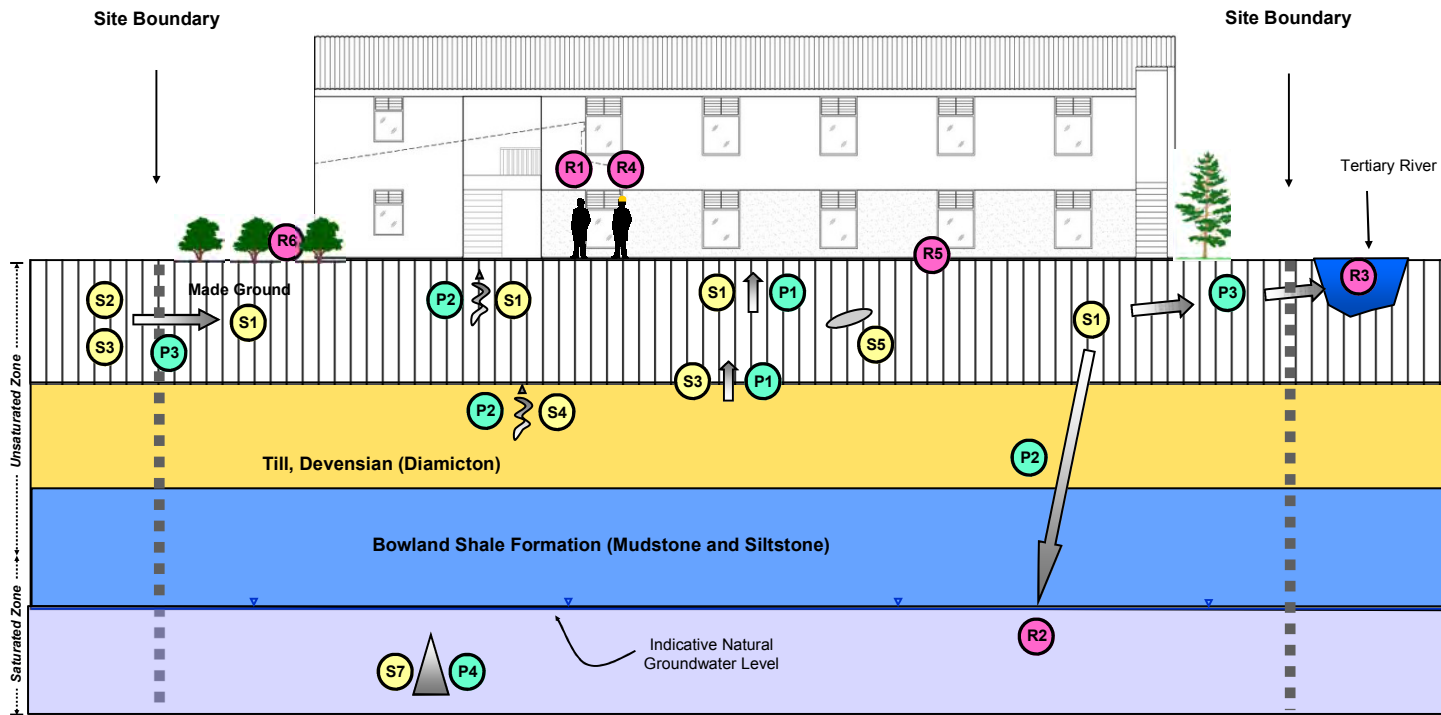


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Appendix A3 – Diagrammatic Conceptual Model

Boland Meadow, Higgin Brook



Sources

- S1** Made-ground (On site)
- S2** Made-ground (Off site)
- S3** Natural soils (On & off site)
- S4** Ground gas sources
- S5** Unexploded ordnance
- S6** Radon geology
- S7** Mine workings

Pathways

- P1** Direct contact, ingestion and or inhalation
- P2** Vertical migration
- P3** Horizontal migration
- P4** Collapse

Receptors

- R1** End users
- R2** Groundwater
- R3** Surface water
- R4** Construction workers
- R5** Construction materials
- R6** Local ecology



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Tel: 0161 236 2394

Project

Boland Meadow, Higgin Brook

Drawing Title

Diagrammatic Conceptual Model

Job Reference

EB1355

Date

28.03.2014

Author

GL

Checked

AW

Client

Barratt Homes

Scale

Not to scale

Appendix A4 – Qualitative Risk Assessment Rationale

The site-specific qualitative risk assessment of environmental harm, as detailed in Section 3.0 of this reporting, is summarised in Table A4.1 hereafter; the principle being to establish connecting links between a hazardous source to a potential receptor via an exposure pathway.

The qualitative risk assessment corresponds with the **total** site area.

Risk assessment is the process of collating known information on a hazard or set of hazards in order to estimate actual or potential risk to receptors. The receptor may be humans, a water resource, a sensitive local ecosystem or future construction materials. Receptors can be connected to the hazardous source by one or several exposure pathways such as direct contact for example. Risks are generally managed by isolating the receptor or intercepting the exposure pathway or by isolating or removing the hazard.

Without the three essential components of a source, pathway and receptor there can be no risk. Therefore the presence of hazard on a site does not necessarily mean there is a risk.

By considering where a viable pathway exists which connects a source with a receptor the risk assessment in Section 3.0 and Table A4.1 identifies where pollutant linkage exists. If there is no pollutant linkage there is no risk and only where a pollutant linkage is established does the risk assessment consider the level of risk.

The risk assessment considers the likelihood of a particular event taking place (accounting for the presence of the hazard and receptor and the integrity of the exposure pathway) in conjunction with the severity of the potential consequence (accounting for the potential severity of the hazard and the sensitivity of the receptor).

In the risk assessment the consequence of the hazard has been classified as severe or medium or mild or minor and the probability (likelihood) of the circumstances actually occurring classified as high likelihood or likely or low likelihood or unlikely.

The consequences and probabilities are subsequently cross-correlated to give a qualitative estimation of the risk using Department of the Environment risk classifications as detailed in the table below and as referenced in CIRIA C552.

| | | Consequence | | | |
|-----------------------------|-----------------|--------------------|-------------------|-------------------|-----------------|
| | | Severe | Medium | Mild | Minor |
| Probability (Likelihood) | High Likelihood | Very High Risk | High Risk | Moderate Risk | Negligible Risk |
| | Likely | High Risk | Moderate Risk | Moderate/Low Risk | Negligible Risk |
| | Low Likelihood | High/Moderate Risk | Moderate/Low Risk | Low Risk | Negligible Risk |
| | Unlikely | Moderate/Low Risk | Low Risk | Negligible Risk | Negligible Risk |

In accordance with DoE guidance, the following categorisation of **consequence** has been developed.

| Classification | Definition | Examples |
|----------------|--|--|
| Severe | Short-term (acute) risk to human health likely to result in “significant harm” as defined by the Environment Protection Act 1990, Part IIA. Short-term risk of pollution of sensitive water resource. Catastrophic damage to buildings/property. A short-term risk to a particular ecosystem or organisation forming part of such ecosystem. | High concentrations of cyanide on the surface of an informal recreation area. Major spillage of contaminants from site into controlled water. Explosion, causing building collapse (can also equate to a short-term human health risk if buildings are occupied). |
| Medium | Chronic damage to Human Health. Pollution of sensitive water resources. A significant change in a particular ecosystem or organism forming part of such ecosystem. | Concentration of a contaminant from site exceeds the generic or site-specific assessment criteria. Leaching of contaminants from a site to a Principal or Secondary A aquifer. Death of a species within a designated nature reserve. Lesser toxic and asphyxiate effects |
| Mild | Pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services. Damage to sensitive buildings/structures/services or the environment. | Pollution of non-classified groundwater (inc. Secondary B aquifers). Damage to building rendering it unsafe to occupy (e.g. foundation damage resulting in instability). |
| Minor | Harm, although not necessarily significant harm, which may result in a financial loss or expenditure to resolve. Non-permanent health effects to human health (easily prevented by means such as personal protective clothing, etc). Easily repairable effects of damage to buildings, structures and services. | The presence of contaminants at such concentrations that protective equipment is required during site works. The loss of plants in a landscaping scheme. Discoloration of concrete. |

In accordance with DoE guidance, the following categorisation of **probability** has been developed.

| Classification | Definition |
|------------------------|---|
| High Likelihood | There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term or there is evidence at the receptor of harm or pollution. |
| Likely | There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term. |
| Low Likelihood | There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such event would take place, and is less likely in the shorter term. |
| Unlikely | There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term. |

In accordance with DoE guidance, the following categorisation of **risk** has been developed.

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

The term 'risk' in this instance refers to the risk that the source, pathway, receptor linkage for a given source of contamination is complete. It does not refer to immediate risk to individuals or features present on the site from potential contaminants and is intended to be used as a tool to assess the necessity of further investigation.



Appendix A4.1 – Table and Summary of Potential Risks, Sheet 1

| Conceptual Site Model | | | Qualitative Risk Assessment | | |
|---------------------------------------|---|---|----------------------------------|--------------------------|--------------|
| Source | Pathway(s) | Receptor(s) | Consequence (Potential Severity) | Likelihood of Occurrence | Risk* |
| S1: Made ground soils on site | P2: Vertical migration | R2: Controlled waters (Groundwater) | Medium | Low Likelihood | Moderate/Low |
| | P3: Horizontal migration | R3: Controlled waters (Surface Waters) | Medium | Low Likelihood | Moderate/Low |
| | P1: Direct contact, ingestion, inhalation (dust and vapours) | R1: End user of site | Medium | Low Likelihood | Moderate/Low |
| | P1: Direct contact, ingestion, inhalation (dust and vapours) | R4: Construction workers | Minor | Low Likelihood | Negligible |
| | P1 & P3: Direct contact, ingestion, inhalation (dust and vapours) and horizontal migration | R5: Construction materials | Mild | Low Likelihood | Low |
| | P1 & P3: Direct contact, ingestion, inhalation (dust and vapours) and horizontal migration | R6: Local ecology | Minor | Low Likelihood | Negligible |
| S2: Made ground soils off site | P3 & P1: Horizontal migration and direct contact, ingestion, inhalation (dust and vapours) | R1: End user of site | Medium | Likely | Moderate |
| | P3 & P1: Horizontal migration and direct contact, ingestion, inhalation (dust and vapours) | R4: Construction workers | Minor | Likely | Negligible |



Appendix A4.1 – Table and Summary of Potential Risks, Sheet 2

| Conceptual Site Model | | | Qualitative Risk Assessment | | |
|---|---|---------------------------------|----------------------------------|--------------------------|---------------|
| Source | Pathway | Receptor | Consequence (Potential Severity) | Likelihood of Occurrence | Risk* |
| S3: Natural soils on or off site | P1 & P3: Direct contact, ingestion, inhalation (dust and vapours) and horizontal migration | R1: End user of site | Medium | Unlikely | Moderate/Low |
| | P1 & P3: Direct contact, ingestion, inhalation (dust and vapours) and horizontal migration | R4: Construction workers | Minor | Unlikely | Negligible |
| S4: Ground gases | P2 & P3: Vertical and horizontal migration | R1: End user of site | Severe | Low Likelihood | High/Moderate |
| S5: Radon | P2 & P3: Vertical and horizontal migration | R1: End user of site | Medium | Unlikely | Low |
| S6: Unexploded ordnance | P1: Direct contact | R1: End user of site | Severe | Unlikely | Moderate/Low |
| | P1: Direct contact | R4: Construction workers | Severe | Unlikely | Moderate/Low |

**Risk refers to the potential risk that the Source, Pathway, Receptor linkage is complete and is used to determine if any further investigation is required. It does not indicate immediate emergency risk to any individual or feature present on the site unless specifically noted.*

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Appendix D

MicroDrainage Simulations



DRAINAGE CALCULATIONS

**Chipping Lane
Longridge
Preston**

August 2016

Designed By: Barratt Manchester
4 Brindley Road
City Park
Manchester
M16 9HQ

CONTENTS

- **Network Layout**

Proposed Drainage Areas Plan

- **Storm Sewer Design**

Storm Drainage Design (1 in 2 yr)
Storm Manhole Schedules

- **1 in 30 yr Storm Event Rainfall Simulation**

Critical Storm results for summer & winter profile, 15-360 min.

- **1 in 30 yr Storm Event Rainfall Simulation- Surcharged Outfall**

Critical Storm results for summer & winter profile, 15-360 min.

- **1 in 100 yr + 30% Storm Event Rainfall Simulation**

Critical Storm results for summer & winter profile, 15-360 min

- **Foul Sewer Design**

Foul Drainage Design (1 in 2 yr)
Foul Manhole Schedules

Network Layout

Proposed Drainage Areas Plan

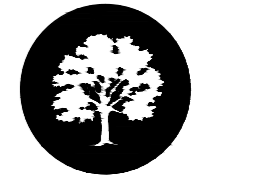


- WARNING TO HOUSE-PURCHASERS**
Property Misdescriptions Act 1991
- Buyers are warned that this is a working drawing and is not intended to be treated as definitive material descriptions. In relation to any particular property or development, any of the specified matters prescribed by any order made under the above Act. The contents of this drawing may be subject to change at any time and alterations and variations can occur during the progress of the works without provision of the drawing. Consequently the layout, form, content and dimensions of the finished construction may differ materially from those shown. Nor do the contents of this drawing constitute a contract, part of any contract or warranty.
- ENGINEERING NOTES**
- All applicable drainage works have been designed and are to be constructed in accordance with Towns for Adoption, the Code, and United Utilities' Guidance for Sewer for adoption 4th Edition. Where specification conflict, UK guidelines shall take precedence.
 - United Utilities Standard details to be used are:
 SWS/00/0000 Typical Outfall Details D, E and F
 SWS/00/0010 Typical Details C & H
 SWS/00/0020 Detail C and safety grille to manhole access shaft
 SWS/00/0030 Standard Detail No 4 (Type 1 Manhole)
 SWS/00/0040 Standard Detail No 5 (Type 2 Manhole)
 SWS/00/0050 Standard Detail No 6 (Manhole Access)
 SWS/00/0060 Standard Details 7, 8, 9 and 10
 SWS/00/0070 Lockers, Safety Chains and Handrails
 SWS/00/0080 Typical Details A, B, and C
 SWS/00/0090 Layout and Internal Roadways and Connection Details
 SWS/00/0100 Manhole and French Drain Details
 SWS/00/0110 Manhole and French Drain Details
 SWS/00/0120 Pipe Treatment Details
 SWS/00/0130 Manhole Access Details
 SWS/00/0150 Shallow Large Diameter Sewer
 - All clay pipe work shall be Extra Strength Clayware to BS 206 and BS 67 (SR pipes only).
 - All general concrete pipework shall be to Class 120 in accordance with BS911 Part 1, BS EN 1916 and bear the BS Mark.
 - All applicable drainage to be bedded in Class 5 granular surround unless otherwise stated.
 - All concrete manholes and coverways rings, concrete cover slabs and Gullies to be manufactured to BS EN 1917 and BS 5151/Part 3.
 - Using Manholes to Drainage Datum. Contractor to ensure that this drawing is read in conjunction with the site specific Topographical Survey provided by Barratt Manchester and the Benchmark information provided.
 - This drawing is to be read in accordance with all other relevant drawings.
 - The contractor shall be responsible for ensuring that any existing level markers indicated on the drawings are correct before work commences.
 - All proposed connections to the sewer shall be 150mm unless stated otherwise.
 - All private house drainage shall be 150mm and all drop-out connections shall be 150mm at a minimum gradient of 1:80 unless otherwise stated and laid in accordance with Part H of the Building Regulations.
 - Rooftop from private surfaces shall not discharge across the highway. Gullies or channels shall be provided as appropriate to prevent this.
 - Tree coverings shall be provided at the near target points of all junctions.
 - Pipes shall be protected from concentrated loading by construction traffic during the construction period when sufficient cover to the pipe may make them vulnerable to damage.
 - Soils CBR tests of the road formation level are to be carried out to determine the depth of pavement construction required. This is to be approved by the adopting authority prior to construction of the road pavements.
 - Groundwater to ensure that pipe drainage is within the surface of the plot they serve where possible and inspection covers kept within roadways where possible.
 - Contractor to provide United Utilities with sufficient notice prior to commencement of Sewer works on their inspection telephone number: Tel 0945 602 0406.
 - Contractor to obtain all necessary Highway opening notices from the relevant Local Authority, obtain approval to work on United Utilities Covering System, obtain approval to install pavement from the Government Agency for any works affecting a watercourse.
 - All methods adopted by MMC to have a minimum 150mm S4 concrete surround to full depth.

ENGINEERING KEY

| | |
|------------------|------------------|
| 1.000 = 0.168 Ha | 5.000 = 0.033 Ha |
| 1.001 = 0.034 Ha | 5.001 = 0.068 Ha |
| 1.002 = 0.039 Ha | 5.002 = 0 Ha |
| 1.003 = 0.030 Ha | 5.003 = 0 Ha |
| 1.004 = 0.049 Ha | 5.004 = 0.097 Ha |
| 1.005 = 0 Ha | 5.005 = 0.022 Ha |
| 1.006 = 0 Ha | 5.006 = 0.021 Ha |
| 1.007 = 0.057 Ha | 5.007 = 0.033 Ha |
| 1.008 = 0.046 Ha | 5.008 = 0 Ha |
| 1.009 = 0.022 Ha | 5.009 = 0.087 Ha |
| 1.010 = 0.068 Ha | 5.010 = 0 Ha |
| 1.011 = 0 Ha | 5.011 = 0.016 Ha |
| 1.012 = 0 Ha | 5.012 = 0.020 Ha |
| 2.000 = 0.051 Ha | 5.013 = 0.011 Ha |
| 3.001 = 0.016 Ha | 5.014 = 0.043 Ha |
| 3.002 = 0.060 Ha | 5.015 = 0.099 Ha |
| 3.003 = 0.115 Ha | 5.016 = 0.011 Ha |
| 3.000 = 0.075 Ha | 5.017 = 0.015 Ha |
| 3.001 = 0.009 Ha | 5.018 = 0.060 Ha |
| 4.000 = 0.044 Ha | 5.019 = 0.119 Ha |
| 4.001 = 0.084 Ha | 5.020 = 0.035 Ha |
| 5.021 = 0 Ha | 5.022 = 0.076 Ha |
| | 6.000 = 0.052 Ha |
| | 6.001 = 0.090 Ha |
| | 6.002 = 0.036 Ha |
| | 6.003 = 0.282 Ha |
| | 7.000 = 0.034 Ha |

| | | | |
|-----|--|----------|-------|
| B | REVISED IN LINE WITH ENGINEERING LAYOUT REV C | 18.07.16 | CD |
| A | FULL DRAINAGE DESIGN DUE TO FLOW RATE CHANGES & POND REMOVED | 24.03.16 | CD |
| REV | DESCRIPTION | DATE | DRAWN |



BARRATT HOMES


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Barratt Homes Manchester
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M16 9HQ
Tel: 0161 872 0161
Fax: 0161 855 2828

| | | | |
|-----------|----------------------------------|----------------|-----|
| Job | Chipping Lane Longridge | | |
| Task | Surface Water Drainage Area Plan | | |
| Design By | Date | Drawing Number | Rev |
| CD | Feb 2016 | 459/ED/04 | B |
| CAD By | Scale | | |
| CD | 1:500 @ A0 | | |

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Storm Sewer Design

Storm Drainage Design (1 in 2 yr)

| | | |
|--|---------------------------------|---|
| Barratt Homes Manchester | | Page 1 |
| 4 Brindley Road City Park Manchester M16 9HQ | Chipping Lane Longridge |  |
| Date 10.08.16 File SW Network 1, Rev C.mdx | Designed by CD Checked by SG | |
| Micro Drainage | Network 2014.1.1 | |

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for SW1.SWS

Pipe Sizes Surface Water Network 1 Manhole Sizes Surface Water Network 1








FSR Rainfall Model - England and Wales

| | | | |
|--------------------------------------|--------|---------------------------------------|-------|
| Return Period (years) | 2 | Add Flow / Climate Change (%) | 0 |
| M5-60 (mm) | 18.800 | Minimum Backdrop Height (m) | 0.200 |
| Ratio R | 0.280 | Maximum Backdrop Height (m) | 1.500 |
| Maximum Rainfall (mm/hr) | 50 | Min Design Depth for Optimisation (m) | 1.200 |
| Maximum Time of Concentration (mins) | 30 | Min Vel for Auto Design only (m/s) | 1.00 |
| Foul Sewage (l/s/ha) | 0.000 | Min Slope for Optimisation (1:X) | 500 |
| Volumetric Runoff Coeff. | 0.750 | | |

Designed with Level Soffits


Network Design Table for SW1.SWS

« - Indicates pipe capacity < flow
















| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Auto Design |
|-------|------------|----------|-------------|-------------|-------------|-----------------|--------|----------|----------|---|
| 1.000 | 34.856 | 0.087 | 400.6 | 0.168 | 5.00 | 0.0 | 0.600 | o | 1200 |  |
| 1.001 | 14.100 | 0.028 | 500.0 | 0.034 | 0.00 | 0.0 | 0.600 | o | 1500 |  |
| 2.000 | 26.078 | 0.153 | 170.0 | 0.051 | 5.00 | 0.0 | 0.600 | o | 225 |  |
| 2.001 | 26.997 | 0.429 | 62.9 | 0.016 | 0.00 | 0.0 | 0.600 | o | 225 |  |
| 2.002 | 9.582 | 0.056 | 170.0 | 0.050 | 0.00 | 0.0 | 0.600 | o | 225 |  |
| 2.003 | 30.639 | 0.361 | 84.8 | 0.115 | 0.00 | 0.0 | 0.600 | o | 225 |  |
| 1.002 | 12.887 | 0.026 | 495.7 | 0.039 | 0.00 | 0.0 | 0.600 | o | 1500 |  |

Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|-------|--------------|-------------|-----------|---------------|-------------------|------------|----------------|-----------|-----------|------------|
| 1.000 | 50.00 | 5.31 | 103.006 | 0.168 | 0.0 | 0.0 | 0.0 | 1.86 | 2106.9 | 22.7 |
| 1.001 | 50.00 | 5.43 | 102.619 | 0.202 | 0.0 | 0.0 | 0.0 | 1.91 | 3377.8 | 27.4 |
| 2.000 | 50.00 | 5.43 | 104.865 | 0.051 | 0.0 | 0.0 | 0.0 | 1.00 | 39.8 | 6.9 |
| 2.001 | 50.00 | 5.71 | 104.712 | 0.067 | 0.0 | 0.0 | 0.0 | 1.65 | 65.7 | 9.1 |
| 2.002 | 50.00 | 5.87 | 104.283 | 0.117 | 0.0 | 0.0 | 0.0 | 1.00 | 39.8 | 15.8 |
| 2.003 | 50.00 | 6.23 | 104.226 | 0.232 | 0.0 | 0.0 | 0.0 | 1.42 | 56.5 | 31.4 |
| 1.002 | 50.00 | 6.34 | 102.591 | 0.473 | 0.0 | 0.0 | 0.0 | 1.92 | 3392.6 | 64.1 |


| | | |
|--|---------------------------------|---|
| Barratt Homes Manchester | | Page 2 |
| 4 Brindley Road City Park Manchester M16 9HQ | Chipping Lane Longridge |  |
| Date 10.08.16 File SW Network 1, Rev C.mdx | Designed by CD Checked by SG | |
| Micro Drainage | | Network 2014.1.1 |

Network Design Table for SW1.SWS



















| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Auto Design |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|---|
| 3.000 | 37.925 | 0.181 | 210.0 | 0.075 | 5.00 | 0.0 | 0.600 | o | 300 |  |
| 3.001 | 12.547 | 0.031 | 400.0 | 0.009 | 0.00 | 0.0 | 0.600 | o | 450 |  |
| 1.003 | 20.839 | 0.042 | 496.2 | 0.030 | 0.00 | 0.0 | 0.600 | o | 1500 |  |
| 1.004 | 19.697 | 0.039 | 500.0 | 0.049 | 0.00 | 0.0 | 0.600 | o | 1500 |  |
| 1.005 | 11.281 | 0.023 | 490.5 | 0.000 | 0.00 | 0.0 | 0.600 | o | 1500 |  |
| 1.006 | 21.474 | 0.043 | 499.4 | 0.000 | 0.00 | 0.0 | 0.600 | o | 1500 |  |
| 1.007 | 11.233 | 0.022 | 510.6 | 0.057 | 0.00 | 0.0 | 0.600 | o | 1500 |  |
| 1.008 | 47.046 | 0.094 | 500.5 | 0.094 | 0.00 | 0.0 | 0.600 | o | 1500 |  |
| 4.000 | 32.098 | 0.597 | 53.8 | 0.044 | 5.00 | 0.0 | 0.600 | o | 225 |  |
| 4.001 | 27.069 | 0.068 | 398.1 | 0.084 | 0.00 | 0.0 | 0.600 | o | 525 |  |
| 1.009 | 39.272 | 0.080 | 490.9 | 0.022 | 0.00 | 0.0 | 0.600 | o | 1500 |  |
| 1.010 | 20.549 | 0.041 | 501.2 | 0.068 | 0.00 | 0.0 | 0.600 | o | 1500 |  |
| 5.000 | 31.163 | 0.663 | 47.0 | 0.033 | 5.00 | 0.0 | 0.600 | o | 225 |  |
| 5.001 | 24.755 | 0.688 | 36.0 | 0.068 | 0.00 | 0.0 | 0.600 | o | 225 |  |
| 5.002 | 7.704 | 0.198 | 39.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 |  |

Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|-------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 3.000 | 50.00 | 5.58 | 103.977 | 0.075 | 0.0 | 0.0 | 0.0 | 1.08 | 76.4 | 10.2 |
| 3.001 | 50.00 | 5.79 | 103.646 | 0.084 | 0.0 | 0.0 | 0.0 | 1.01 | 160.7 | 11.4 |
| 1.003 | 49.53 | 6.52 | 102.565 | 0.587 | 0.0 | 0.0 | 0.0 | 1.92 | 3390.9 | 78.7 |
| 1.004 | 49.00 | 6.69 | 102.523 | 0.636 | 0.0 | 0.0 | 0.0 | 1.91 | 3377.8 | 84.4 |
| 1.005 | 48.70 | 6.79 | 102.484 | 0.636 | 0.0 | 0.0 | 0.0 | 1.93 | 3410.6 | 84.4 |
| 1.006 | 48.14 | 6.98 | 102.461 | 0.636 | 0.0 | 0.0 | 0.0 | 1.91 | 3379.8 | 84.4 |
| 1.007 | 47.86 | 7.07 | 102.418 | 0.693 | 0.0 | 0.0 | 0.0 | 1.89 | 3342.3 | 89.8 |
| 1.008 | 46.71 | 7.48 | 102.396 | 0.787 | 0.0 | 0.0 | 0.0 | 1.91 | 3376.1 | 99.6 |
| 4.000 | 50.00 | 5.30 | 104.242 | 0.044 | 0.0 | 0.0 | 0.0 | 1.79 | 71.1 | 6.0 |
| 4.001 | 50.00 | 5.70 | 103.345 | 0.128 | 0.0 | 0.0 | 0.0 | 1.12 | 241.7 | 17.3 |
| 1.009 | 45.81 | 7.82 | 102.302 | 0.937 | 0.0 | 0.0 | 0.0 | 1.93 | 3409.1 | 116.3 |
| 1.010 | 45.35 | 8.00 | 102.222 | 1.005 | 0.0 | 0.0 | 0.0 | 1.91 | 3373.7 | 123.4 |
| 5.000 | 50.00 | 5.27 | 108.172 | 0.033 | 0.0 | 0.0 | 0.0 | 1.91 | 76.1 | 4.5 |
| 5.001 | 50.00 | 5.46 | 107.509 | 0.101 | 0.0 | 0.0 | 0.0 | 2.19 | 87.0 | 13.7 |
| 5.002 | 50.00 | 5.52 | 106.821 | 0.101 | 0.0 | 0.0 | 0.0 | 2.10 | 83.5 | 13.7 |


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| Barratt Homes Manchester | | Page 3 |
| 4 Brindley Road City Park Manchester M16 9HQ | Chipping Lane Longridge |  |
| Date 10.08.16 File SW Network 1, Rev C.mdx | Designed by CD Checked by SG | |
| Micro Drainage | | Network 2014.1.1 |

Network Design Table for SW1.SWS










| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Auto Design |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|---|
| 5.003 | 6.655 | 0.126 | 53.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 225 |  |
| 5.004 | 6.888 | 0.066 | 104.4 | 0.597 | 0.00 | 0.0 | 0.600 | o | 450 |  |
| 5.005 | 30.420 | 0.317 | 96.0 | 0.022 | 0.00 | 0.0 | 0.600 | o | 450 |  |
| 5.006 | 7.929 | 0.091 | 87.1 | 0.021 | 0.00 | 0.0 | 0.600 | o | 450 |  |
| 5.007 | 19.595 | 0.338 | 58.0 | 0.033 | 0.00 | 0.0 | 0.600 | o | 450 |  |
| 5.008 | 12.502 | 0.272 | 46.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 450 |  |
| 5.009 | 9.280 | 0.023 | 400.0 | 0.087 | 0.00 | 0.0 | 0.600 | o | 450 |  |
| 5.010 | 11.131 | 0.028 | 400.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 450 |  |
| 5.011 | 19.961 | 0.139 | 143.6 | 0.016 | 0.00 | 0.0 | 0.600 | o | 450 |  |
| 5.012 | 13.450 | 0.157 | 85.7 | 0.050 | 0.00 | 0.0 | 0.600 | o | 450 |  |
| 6.000 | 41.858 | 1.231 | 34.0 | 0.052 | 5.00 | 0.0 | 0.600 | o | 225 |  |
| 6.001 | 39.560 | 1.364 | 29.0 | 0.090 | 0.00 | 0.0 | 0.600 | o | 225 |  |
| 6.002 | 13.898 | 0.409 | 34.0 | 0.036 | 0.00 | 0.0 | 0.600 | o | 225 |  |
| 6.003 | 48.787 | 1.203 | 40.6 | 0.282 | 0.00 | 0.0 | 0.600 | o | 375 |  |
| 5.013 | 18.119 | 0.045 | 402.6 | 0.011 | 0.00 | 0.0 | 0.600 | o | 525 |  |
| 5.014 | 27.409 | 0.069 | 400.0 | 0.043 | 0.00 | 0.0 | 0.600 | o | 525 |  |
| 5.015 | 14.736 | 0.037 | 398.3 | 0.090 | 0.00 | 0.0 | 0.600 | o | 525 |  |
| 5.016 | 6.640 | 0.017 | 390.6 | 0.011 | 0.00 | 0.0 | 0.600 | o | 525 |  |

Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|-------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 5.003 | 50.00 | 5.58 | 106.623 | 0.101 | 0.0 | 0.0 | 0.0 | 1.80 | 71.6 | 13.7 |
| 5.004 | 50.00 | 5.64 | 106.273 | 0.698 | 0.0 | 0.0 | 0.0 | 1.99 | 316.5 | 94.5 |
| 5.005 | 50.00 | 5.88 | 106.207 | 0.720 | 0.0 | 0.0 | 0.0 | 2.08 | 330.1 | 97.5 |
| 5.006 | 50.00 | 5.95 | 105.890 | 0.741 | 0.0 | 0.0 | 0.0 | 2.18 | 346.6 | 100.3 |
| 5.007 | 50.00 | 6.07 | 105.799 | 0.774 | 0.0 | 0.0 | 0.0 | 2.67 | 425.3 | 104.8 |
| 5.008 | 50.00 | 6.14 | 105.461 | 0.774 | 0.0 | 0.0 | 0.0 | 3.01 | 477.9 | 104.8 |
| 5.009 | 50.00 | 6.29 | 105.189 | 0.861 | 0.0 | 0.0 | 0.0 | 1.01 | 160.7 | 116.6 |
| 5.010 | 49.67 | 6.47 | 105.166 | 0.861 | 0.0 | 0.0 | 0.0 | 1.01 | 160.7 | 116.6 |
| 5.011 | 49.06 | 6.67 | 105.138 | 0.877 | 0.0 | 0.0 | 0.0 | 1.69 | 269.5 | 116.6 |
| 5.012 | 48.75 | 6.77 | 104.999 | 0.927 | 0.0 | 0.0 | 0.0 | 2.20 | 349.5 | 122.4 |
| 6.000 | 50.00 | 5.31 | 108.448 | 0.052 | 0.0 | 0.0 | 0.0 | 2.25 | 89.5 | 7.0 |
| 6.001 | 50.00 | 5.58 | 107.217 | 0.142 | 0.0 | 0.0 | 0.0 | 2.44 | 97.0 | 19.2 |
| 6.002 | 50.00 | 5.68 | 105.853 | 0.178 | 0.0 | 0.0 | 0.0 | 2.25 | 89.5 | 24.1 |
| 6.003 | 50.00 | 5.97 | 105.294 | 0.460 | 0.0 | 0.0 | 0.0 | 2.85 | 315.1 | 62.3 |
| 5.013 | 47.94 | 7.04 | 103.941 | 1.398 | 0.0 | 0.0 | 0.0 | 1.11 | 240.3 | 181.5 |
| 5.014 | 46.79 | 7.45 | 103.896 | 1.441 | 0.0 | 0.0 | 0.0 | 1.11 | 241.1 | 182.6 |
| 5.015 | 46.20 | 7.67 | 103.827 | 1.531 | 0.0 | 0.0 | 0.0 | 1.12 | 241.6 | 191.6 |
| 5.016 | 45.95 | 7.77 | 103.790 | 1.542 | 0.0 | 0.0 | 0.0 | 1.13 | 244.0 | 191.9 |

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| Date 10.08.16 File SW Network 1, Rev C.mdx | Designed by CD Checked by SG | |
| Micro Drainage | Network 2014.1.1 | |

Network Design Table for SW1.SWS

| PN | Length (m) | Fall (m) | Slope (1:X) | I.Area (ha) | T.E. (mins) | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Auto Design |
|-------|---------------|-------------|----------------|----------------|----------------|--------------------|-----------|-------------|-------------|---|
| 7.000 | 24.649 | 0.325 | 75.8 | 0.034 | 5.00 | 0.0 | 0.600 | o | 225 |  |
| 5.017 | 17.660 | 0.044 | 401.4 | 0.015 | 0.00 | 0.0 | 0.600 | o | 525 |  |
| 5.018 | 66.145 | 0.165 | 400.0 | 0.090 | 0.00 | 0.0 | 0.600 | o | 525 |  |
| 5.019 | 62.798 | 0.157 | 400.0 | 0.119 | 0.00 | 0.0 | 0.600 | o | 525 |  |
| 5.020 | 26.670 | 0.067 | 400.0 | 0.035 | 0.00 | 0.0 | 0.600 | o | 1500 |  |
| 5.021 | 39.206 | 0.098 | 400.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 1500 |  |
| 5.022 | 34.028 | 0.085 | 400.3 | 0.076 | 0.00 | 0.0 | 0.600 | o | 1500 |  |
| 1.011 | 44.746 | 0.089 | 500.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 1500 |  |
| 1.012 | 8.914 | 0.053 | 168.0 | 0.000 | 0.00 | 0.0 | 0.600 | o | 300 |  |

Network Results Table

| PN | Rain (mm/hr) | T.C. (mins) | US/IL (m) | Σ I.Area (ha) | Σ Base Flow (l/s) | Foul (l/s) | Add Flow (l/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|-------|-----------------|----------------|--------------|------------------|----------------------|---------------|-------------------|--------------|--------------|---------------|
| 7.000 | 50.00 | 5.27 | 104.399 | 0.034 | 0.0 | 0.0 | 0.0 | 1.50 | 59.8 | 4.6 |
| 5.017 | 45.27 | 8.04 | 103.773 | 1.591 | 0.0 | 0.0 | 0.0 | 1.11 | 240.7 | 195.1 |
| 5.018 | 42.94 | 9.03 | 103.729 | 1.681 | 0.0 | 0.0 | 0.0 | 1.11 | 241.1 | 195.5 |
| 5.019 | 41.00 | 9.97 | 103.564 | 1.800 | 0.0 | 0.0 | 0.0 | 1.11 | 241.1 | 199.8 |
| 5.020 | 40.59 | 10.17 | 102.432 | 1.835 | 0.0 | 0.0 | 0.0 | 2.14 | 3779.1 | 201.7 |
| 5.021 | 40.02 | 10.48 | 102.365 | 1.835 | 0.0 | 0.0 | 0.0 | 2.14 | 3779.1 | 201.7 |
| 5.022 | 39.54 | 10.75 | 102.267 | 1.911 | 0.0 | 0.0 | 0.0 | 2.14 | 3777.5 | 204.6 |
| 1.011 | 38.86 | 11.14 | 102.182 | 2.916 | 0.0 | 0.0 | 0.0 | 1.91 | 3377.8 | 306.8 |
| 1.012 | 38.65 | 11.26 | 102.093 | 2.916 | 0.0 | 0.0 | 0.0 | 1.21 | 85.5<< | 306.8 |

Storm Sewer Design


Storm Manhole Schedules

| | | |
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| Barratt Homes Manchester | | Page 5 |
| 4 Brindley Road City Park Manchester M16 9HQ | | Chipping Lane Longridge |
| Date 10.08.16 File SW Network 1, Rev C.mdx | | Designed by CD Checked by SG |
| Micro Drainage | | Network 2014.1.1 |



Manhole Schedules for SW1.SWS

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam., L*W (mm) | PN | Pipe Out Invert Level (m) | Pipe Out Diameter (mm) | PN | Pipes In Invert Level (m) | Pipes In Diameter (mm) | Backdrop (mm) |
|---------|-----------|--------------|---------------|--------------------|-------|---------------------------|------------------------|-------|---------------------------|------------------------|---------------|
| 1 | 105.233 | 2.227 | Open Manhole | 2400 | 1.000 | 103.006 | 1200 | | | | |
| 2 | 105.924 | 3.305 | Open Manhole | 2400 | 1.001 | 102.619 | 1500 | 1.000 | 102.919 | 1200 | |
| 15 | 106.290 | 1.425 | Open Manhole | 1350 | 2.000 | 104.865 | 225 | | | | |
| 16 | 106.358 | 1.646 | Open Manhole | 1350 | 2.001 | 104.712 | 225 | 2.000 | 104.712 | 225 | |
| 17 | 105.854 | 1.571 | Open Manhole | 1350 | 2.002 | 104.283 | 225 | 2.001 | 104.283 | 225 | |
| 18 | 105.655 | 1.429 | Open Manhole | 1500 | 2.003 | 104.226 | 225 | 2.002 | 104.226 | 225 | |
| 3 | 105.961 | 3.370 | Open Manhole | 2400 | 1.002 | 102.591 | 1500 | 1.001 | 102.591 | 1500 | |
| | | | | | | | | 2.003 | 103.865 | 225 | |
| 19 | 105.531 | 1.554 | Open Manhole | 1800 | 3.000 | 103.977 | 300 | | | | |
| 20 | 105.820 | 2.174 | Open Manhole | 1500 | 3.001 | 103.646 | 450 | 3.000 | 103.796 | 300 | |
| 4 | 105.808 | 3.243 | Open Manhole | 2700 | 1.003 | 102.565 | 1500 | 1.002 | 102.565 | 1500 | |
| | | | | | | | | 3.001 | 103.615 | 450 | |
| 5 | 105.622 | 3.099 | Open Manhole | 2400 | 1.004 | 102.523 | 1500 | 1.003 | 102.523 | 1500 | |
| 6 | 105.847 | 3.363 | Open Manhole | 2400 | 1.005 | 102.484 | 1500 | 1.004 | 102.484 | 1500 | |
| 7 | 105.909 | 3.448 | Open Manhole | 2400 | 1.006 | 102.461 | 1500 | 1.005 | 102.461 | 1500 | |
| 8 | 105.721 | 3.303 | Open Manhole | 2400 | 1.007 | 102.418 | 1500 | 1.006 | 102.418 | 1500 | |
| 9 | 105.581 | 3.185 | Open Manhole | 2400 | 1.008 | 102.396 | 1500 | 1.007 | 102.396 | 1500 | |
| 21 | 105.667 | 1.425 | Open Manhole | 1350 | 4.000 | 104.242 | 225 | | | | |
| 22 | 105.259 | 1.914 | Open Manhole | 1800 | 4.001 | 103.345 | 525 | 4.000 | 103.645 | 225 | |
| 10 | 105.002 | 2.700 | Open Manhole | 3000 | 1.009 | 102.302 | 1500 | 1.008 | 102.302 | 1500 | |
| | | | | | | | | 4.001 | 103.277 | 525 | |
| 11 | 104.922 | 2.700 | Open Manhole | 3000 | 1.010 | 102.222 | 1500 | 1.009 | 102.222 | 1500 | |
| 23 | 109.597 | 1.425 | Open Manhole | 1350 | 5.000 | 108.172 | 225 | | | | |
| 24 | 108.947 | 1.438 | Open Manhole | 1500 | 5.001 | 107.509 | 225 | 5.000 | 107.509 | 225 | |
| 25 | 108.247 | 1.426 | Open Manhole | 1350 | 5.002 | 106.821 | 225 | 5.001 | 106.821 | 225 | |
| 26 | 108.049 | 1.426 | Open Manhole | 1350 | 5.003 | 106.623 | 225 | 5.002 | 106.623 | 225 | |
| 27 | 107.924 | 1.651 | Open Manhole | 1500 | 5.004 | 106.273 | 450 | 5.003 | 106.498 | 225 | |
| 28 | 107.857 | 1.650 | Open Manhole | 1500 | 5.005 | 106.207 | 450 | 5.004 | 106.207 | 450 | |
| 29 | 107.540 | 1.650 | Open Manhole | 1500 | 5.006 | 105.890 | 450 | 5.005 | 105.890 | 450 | |
| 30 | 107.449 | 1.650 | Open Manhole | 1500 | 5.007 | 105.799 | 450 | 5.006 | 105.799 | 450 | |
| 31 | 107.646 | 2.185 | Open Manhole | 1500 | 5.008 | 105.461 | 450 | 5.007 | 105.461 | 450 | |
| 32 | 107.569 | 2.380 | Open Manhole | 1500 | 5.009 | 105.189 | 450 | 5.008 | 105.189 | 450 | |
| 33 | 107.430 | 2.264 | Open Manhole | 1500 | 5.010 | 105.166 | 450 | 5.009 | 105.166 | 450 | |
| 34 | 107.241 | 2.103 | Open Manhole | 1500 | 5.011 | 105.138 | 450 | 5.010 | 105.138 | 450 | |


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| Micro Drainage | | Network 2014.1.1 |

Manhole Schedules for SW1.SWS

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam., L*W (mm) | PN | Pipe Out Invert Level (m) | Diameter (mm) | PN | Pipes In Invert Level (m) | Diameter (mm) | Backdrop (mm) |
|---------|-----------|--------------|---------------|--------------------|-------|---------------------------|---------------|-------|---------------------------|---------------|---------------|
| 35 | 106.909 | 1.910 | Open Manhole | 1500 | 5.012 | 104.999 | 450 | 5.011 | 104.999 | 450 | |
| 46 | 109.881 | 1.433 | Open Manhole | 1350 | 6.000 | 108.448 | 225 | | | | |
| 47 | 108.671 | 1.454 | Open Manhole | 1350 | 6.001 | 107.217 | 225 | 6.000 | 107.217 | 225 | |
| 48 | 107.297 | 1.444 | Open Manhole | 1350 | 6.002 | 105.853 | 225 | 6.001 | 105.853 | 225 | |
| 49 | 106.894 | 1.600 | Open Manhole | 1350 | 6.003 | 105.294 | 375 | 6.002 | 105.444 | 225 | |
| 36 | 106.895 | 2.954 | Open Manhole | 1800 | 5.013 | 103.941 | 525 | 5.012 | 104.842 | 450 | 826 |
| | | | | | | | | 6.003 | 104.091 | 375 | |
| 37 | 106.951 | 3.055 | Open Manhole | 1800 | 5.014 | 103.896 | 525 | 5.013 | 103.896 | 525 | |
| 38 | 106.608 | 2.781 | Open Manhole | 1800 | 5.015 | 103.827 | 525 | 5.014 | 103.827 | 525 | |
| 39 | 106.386 | 2.596 | Open Manhole | 1800 | 5.016 | 103.790 | 525 | 5.015 | 103.790 | 525 | |
| 50 | 105.824 | 1.425 | Open Manhole | 1350 | 7.000 | 104.399 | 225 | | | | |
| 40 | 106.262 | 2.489 | Open Manhole | 1800 | 5.017 | 103.773 | 525 | 5.016 | 103.773 | 525 | |
| | | | | | | | | 7.000 | 104.074 | 225 | 1 |
| 41 | 105.972 | 2.243 | Open Manhole | 1800 | 5.018 | 103.729 | 525 | 5.017 | 103.729 | 525 | |
| 42 | 105.729 | 2.165 | Open Manhole | 1800 | 5.019 | 103.564 | 525 | 5.018 | 103.564 | 525 | |
| 43 | 105.566 | 3.134 | Open Manhole | 2700 | 5.020 | 102.432 | 1500 | 5.019 | 103.407 | 525 | |
| 44 | 105.250 | 2.885 | Open Manhole | 2700 | 5.021 | 102.365 | 1500 | 5.020 | 102.365 | 1500 | |
| 45 | 104.968 | 2.701 | Open Manhole | 3000 | 5.022 | 102.267 | 1500 | 5.021 | 102.267 | 1500 | |
| 12 | 104.882 | 2.701 | Open Manhole | 3000 | 1.011 | 102.182 | 1500 | 1.010 | 102.181 | 1500 | |
| | | | | | | | | 5.022 | 102.182 | 1500 | |
| 13 | 104.793 | 2.700 | Open Manhole | 3000 | 1.012 | 102.093 | 300 | 1.011 | 102.093 | 1500 | |
| 14 | 102.473 | 0.433 | Open Manhole | 600 | | OUTFALL | | 1.012 | 102.040 | 300 | |

1 in 30yr Rainfall Simulation

Critical Storm results for summer & winter profile, 15-360 min.

| | | |
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| Micro Drainage | Network 2014.1.1 | |

Summary of Critical Results by Maximum Level (Rank 1) for SW1.SWS

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.282
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.800 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
DVD Status OFF
Inertia Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360
Return Period(s) (years) 30
Climate Change (%) 0


| PN | Storm | Return Climate Period | Change | First X Surcharge | First Y Flood | First Z Overflow | O/F Act. | Lvl Exc. |
|-------|------------|-----------------------|--------|-------------------|---------------|------------------|----------|----------|
| 1.000 | 120 Winter | 30 | 0% | | | | | |
| 1.001 | 120 Winter | 30 | 0% | | | | | |
| 2.000 | 15 Winter | 30 | 0% | | | | | |
| 2.001 | 15 Winter | 30 | 0% | | | | | |
| 2.002 | 15 Winter | 30 | 0% | 30/15 Summer | | | | |
| 2.003 | 15 Winter | 30 | 0% | 30/15 Summer | | | | |
| 1.002 | 120 Winter | 30 | 0% | | | | | |
| 3.000 | 15 Winter | 30 | 0% | | | | | |
| 3.001 | 15 Winter | 30 | 0% | | | | | |
| 1.003 | 120 Winter | 30 | 0% | | | | | |
| 1.004 | 120 Winter | 30 | 0% | | | | | |
| 1.005 | 120 Winter | 30 | 0% | | | | | |
| 1.006 | 120 Winter | 30 | 0% | | | | | |
| 1.007 | 120 Winter | 30 | 0% | | | | | |
| 1.008 | 120 Winter | 30 | 0% | | | | | |
| 4.000 | 15 Winter | 30 | 0% | | | | | |
| 4.001 | 120 Winter | 30 | 0% | | | | | |
| 1.009 | 120 Winter | 30 | 0% | | | | | |

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| Barratt Homes Manchester | | Page 2 |
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| Micro Drainage | Network 2014.1.1 | |

Summary of Critical Results by Maximum Level (Rank 1) for SW1.SWS

| PN | Storm | Return Period | Climate Change | First X Surcharge | First Y Flood | First Z Overflow | O/F Act. | Lvl Exc. |
|-------|------------|---------------|----------------|-------------------|---------------|------------------|----------|----------|
| 1.010 | 120 Winter | 30 | | 0% | | | | |
| 5.000 | 15 Winter | 30 | | 0% | | | | |
| 5.001 | 15 Winter | 30 | | 0% | | | | |
| 5.002 | 15 Winter | 30 | | 0% | | | | |
| 5.003 | 15 Winter | 30 | | 0% | | | | |
| 5.004 | 15 Winter | 30 | | 0% | | | | |
| 5.005 | 15 Winter | 30 | | 0% | | | | |
| 5.006 | 15 Winter | 30 | | 0% | | | | |
| 5.007 | 15 Winter | 30 | | 0% | | | | |
| 5.008 | 15 Winter | 30 | | 0% | 30/15 Winter | | | |
| 5.009 | 15 Winter | 30 | | 0% | 30/15 Summer | | | |
| 5.010 | 15 Winter | 30 | | 0% | 30/15 Summer | | | |
| 5.011 | 15 Winter | 30 | | 0% | | | | |
| 5.012 | 15 Winter | 30 | | 0% | | | | |
| 6.000 | 15 Winter | 30 | | 0% | | | | |
| 6.001 | 15 Winter | 30 | | 0% | | | | |
| 6.002 | 15 Winter | 30 | | 0% | | | | |
| 6.003 | 15 Winter | 30 | | 0% | | | | |
| 5.013 | 15 Winter | 30 | | 0% | 30/15 Summer | | | |
| 5.014 | 15 Winter | 30 | | 0% | 30/15 Summer | | | |
| 5.015 | 30 Winter | 30 | | 0% | 30/15 Summer | | | |
| 5.016 | 30 Winter | 30 | | 0% | 30/15 Summer | | | |
| 7.000 | 30 Winter | 30 | | 0% | 30/15 Winter | | | |
| 5.017 | 30 Winter | 30 | | 0% | 30/15 Summer | | | |
| 5.018 | 30 Winter | 30 | | 0% | 30/15 Summer | | | |
| 5.019 | 30 Winter | 30 | | 0% | 30/15 Summer | | | |
| 5.020 | 120 Winter | 30 | | 0% | | | | |
| 5.021 | 120 Winter | 30 | | 0% | | | | |
| 5.022 | 120 Winter | 30 | | 0% | | | | |
| 1.011 | 120 Winter | 30 | | 0% | | | | |
| 1.012 | 120 Winter | 30 | | 0% | 30/15 Summer | | | |

| PN | US/MH Name | Water | | Flooded | | | Pipe | Status |
|-------|------------|-----------|-------------------|-------------|-------------|--------------|------------|------------|
| | | Level (m) | Surch'd Depth (m) | Volume (m³) | Flow / Cap. | O'flow (l/s) | Flow (l/s) | |
| 1.000 | 1 | 103.627 | -0.579 | 0.000 | 0.01 | 0.0 | 18.2 | OK |
| 1.001 | 2 | 103.627 | -0.492 | 0.000 | 0.02 | 0.0 | 19.5 | OK |
| 2.000 | 15 | 104.964 | -0.126 | 0.000 | 0.39 | 0.0 | 14.2 | OK |
| 2.001 | 16 | 104.798 | -0.138 | 0.000 | 0.31 | 0.0 | 18.8 | OK |
| 2.002 | 17 | 104.606 | 0.098 | 0.000 | 0.97 | 0.0 | 31.9 | SURCHARGED |
| 2.003 | 18 | 104.556 | 0.105 | 0.000 | 1.14 | 0.0 | 60.1 | SURCHARGED |
| 1.002 | 3 | 103.627 | -0.464 | 0.000 | 0.04 | 0.0 | 42.7 | OK |
| 3.000 | 19 | 104.090 | -0.187 | 0.000 | 0.30 | 0.0 | 21.3 | OK |
| 3.001 | 20 | 103.793 | -0.303 | 0.000 | 0.23 | 0.0 | 23.8 | OK |
| 1.003 | 4 | 103.627 | -0.438 | 0.000 | 0.03 | 0.0 | 48.8 | OK |


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| Micro Drainage | Network 2014.1.1 | |

Summary of Critical Results by Maximum Level (Rank 1) for SW1.SWS

| PN | US/MH Name | Water | Surch'd Depth (m) | Flooded | Flow / Cap. | O'flow | Pipe | Status |
|-------|---------------|--------------|----------------------|----------------|----------------|--------|---------------|------------|
| | | Level (m) | | Volume (m³) | | (l/s) | Flow (l/s) | |
| 1.004 | 5 | 103.628 | -0.395 | 0.000 | 0.03 | 0.0 | 46.6 | OK |
| 1.005 | 6 | 103.628 | -0.356 | 0.000 | 0.04 | 0.0 | 41.0 | OK |
| 1.006 | 7 | 103.628 | -0.333 | 0.000 | 0.02 | 0.0 | 37.6 | OK |
| 1.007 | 8 | 103.628 | -0.289 | 0.000 | 0.03 | 0.0 | 36.3 | OK |
| 1.008 | 9 | 103.629 | -0.267 | 0.000 | 0.02 | 0.0 | 39.9 | OK |
| 4.000 | 21 | 104.308 | -0.159 | 0.000 | 0.19 | 0.0 | 12.3 | OK |
| 4.001 | 22 | 103.629 | -0.241 | 0.000 | 0.07 | 0.0 | 13.9 | OK |
| 1.009 | 10 | 103.629 | -0.173 | 0.000 | 0.01 | 0.0 | 34.2 | OK |
| 1.010 | 11 | 103.628 | -0.093 | 0.000 | 0.02 | 0.0 | 27.4 | OK |
| 5.000 | 23 | 108.226 | -0.171 | 0.000 | 0.13 | 0.0 | 9.3 | OK |
| 5.001 | 24 | 107.604 | -0.130 | 0.000 | 0.37 | 0.0 | 29.9 | OK |
| 5.002 | 25 | 106.931 | -0.115 | 0.000 | 0.47 | 0.0 | 29.7 | OK |
| 5.003 | 26 | 106.749 | -0.099 | 0.000 | 0.59 | 0.0 | 29.5 | OK |
| 5.004 | 27 | 106.670 | -0.053 | 0.000 | 1.00 | 0.0 | 169.1 | OK |
| 5.005 | 28 | 106.463 | -0.194 | 0.000 | 0.62 | 0.0 | 175.0 | OK |
| 5.006 | 29 | 106.340 | 0.000 | 0.000 | 1.04 | 0.0 | 176.1 | OK |
| 5.007 | 30 | 106.038 | -0.210 | 0.000 | 0.55 | 0.0 | 181.5 | OK |
| 5.008 | 31 | 105.915 | 0.004 | 0.000 | 0.62 | 0.0 | 181.1 | SURCHARGED |
| 5.009 | 32 | 105.810 | 0.172 | 0.000 | 2.05 | 0.0 | 194.6 | SURCHARGED |
| 5.010 | 33 | 105.687 | 0.072 | 0.000 | 1.96 | 0.0 | 195.1 | SURCHARGED |
| 5.011 | 34 | 105.482 | -0.105 | 0.000 | 0.94 | 0.0 | 197.7 | OK |
| 5.012 | 35 | 105.339 | -0.110 | 0.000 | 0.92 | 0.0 | 205.1 | OK |
| 6.000 | 46 | 108.511 | -0.162 | 0.000 | 0.17 | 0.0 | 14.6 | OK |
| 6.001 | 47 | 107.324 | -0.118 | 0.000 | 0.45 | 0.0 | 41.6 | OK |
| 6.002 | 48 | 105.990 | -0.088 | 0.000 | 0.67 | 0.0 | 52.2 | OK |
| 6.003 | 49 | 105.476 | -0.193 | 0.000 | 0.47 | 0.0 | 136.9 | OK |
| 5.013 | 36 | 105.201 | 0.735 | 0.000 | 1.67 | 0.0 | 291.5 | SURCHARGED |
| 5.014 | 37 | 105.079 | 0.658 | 0.000 | 1.47 | 0.0 | 293.1 | SURCHARGED |
| 5.015 | 38 | 104.947 | 0.594 | 0.000 | 1.86 | 0.0 | 284.6 | SURCHARGED |
| 5.016 | 39 | 104.813 | 0.498 | 0.000 | 1.95 | 0.0 | 285.7 | SURCHARGED |
| 7.000 | 50 | 104.687 | 0.063 | 0.000 | 0.14 | 0.0 | 7.8 | SURCHARGED |
| 5.017 | 40 | 104.676 | 0.378 | 0.000 | 1.70 | 0.0 | 291.2 | SURCHARGED |
| 5.018 | 41 | 104.533 | 0.278 | 0.000 | 1.36 | 0.0 | 299.3 | SURCHARGED |
| 5.019 | 42 | 104.223 | 0.134 | 0.000 | 1.42 | 0.0 | 311.3 | SURCHARGED |
| 5.020 | 43 | 103.639 | -0.294 | 0.000 | 0.08 | 0.0 | 184.3 | OK |
| 5.021 | 44 | 103.636 | -0.229 | 0.000 | 0.07 | 0.0 | 166.8 | OK |
| 5.022 | 45 | 103.633 | -0.134 | 0.000 | 0.06 | 0.0 | 148.0 | OK |
| 1.011 | 12 | 103.628 | -0.054 | 0.000 | 0.03 | 0.0 | 80.8 | OK |
| 1.012 | 13 | 103.612 | 1.219 | 0.000 | 0.81 | 0.0 | 49.7 | SURCHARGED |

1 in 30 yr Rainfall Simulation Surcharged Outfall

Critical Storm results for summer & winter profile, 15-360 min.

| | | |
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Surcharged Outfall Details for SW1.SWS

| | | | | | | |
|--------------------|----------------|-----------------|-----------------|-----------------|-------------|-------------|
| Outfall | Outfall | C. Level | I. Level | Min | D,L | W |
| Pipe Number | Name | (m) | (m) | I. Level | (mm) | (mm) |
| | | | | (m) | | |

1.012 14 102.473 102.040 102.040 600 0

Datum (m) 102.040 Offset (mins) 0

| Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) |
|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|
| 1 | 0.520 | 37 | 0.520 | 73 | 0.520 | 109 | 0.520 | 145 | 0.520 | 181 | 0.520 | 217 | 0.520 |
| 2 | 0.520 | 38 | 0.520 | 74 | 0.520 | 110 | 0.520 | 146 | 0.520 | 182 | 0.520 | 218 | 0.520 |
| 3 | 0.520 | 39 | 0.520 | 75 | 0.520 | 111 | 0.520 | 147 | 0.520 | 183 | 0.520 | 219 | 0.520 |
| 4 | 0.520 | 40 | 0.520 | 76 | 0.520 | 112 | 0.520 | 148 | 0.520 | 184 | 0.520 | 220 | 0.520 |
| 5 | 0.520 | 41 | 0.520 | 77 | 0.520 | 113 | 0.520 | 149 | 0.520 | 185 | 0.520 | 221 | 0.520 |
| 6 | 0.520 | 42 | 0.520 | 78 | 0.520 | 114 | 0.520 | 150 | 0.520 | 186 | 0.520 | 222 | 0.520 |
| 7 | 0.520 | 43 | 0.520 | 79 | 0.520 | 115 | 0.520 | 151 | 0.520 | 187 | 0.520 | 223 | 0.520 |
| 8 | 0.520 | 44 | 0.520 | 80 | 0.520 | 116 | 0.520 | 152 | 0.520 | 188 | 0.520 | 224 | 0.520 |
| 9 | 0.520 | 45 | 0.520 | 81 | 0.520 | 117 | 0.520 | 153 | 0.520 | 189 | 0.520 | 225 | 0.520 |
| 10 | 0.520 | 46 | 0.520 | 82 | 0.520 | 118 | 0.520 | 154 | 0.520 | 190 | 0.520 | 226 | 0.520 |
| 11 | 0.520 | 47 | 0.520 | 83 | 0.520 | 119 | 0.520 | 155 | 0.520 | 191 | 0.520 | 227 | 0.520 |
| 12 | 0.520 | 48 | 0.520 | 84 | 0.520 | 120 | 0.520 | 156 | 0.520 | 192 | 0.520 | 228 | 0.520 |
| 13 | 0.520 | 49 | 0.520 | 85 | 0.520 | 121 | 0.520 | 157 | 0.520 | 193 | 0.520 | 229 | 0.520 |
| 14 | 0.520 | 50 | 0.520 | 86 | 0.520 | 122 | 0.520 | 158 | 0.520 | 194 | 0.520 | 230 | 0.520 |
| 15 | 0.520 | 51 | 0.520 | 87 | 0.520 | 123 | 0.520 | 159 | 0.520 | 195 | 0.520 | 231 | 0.520 |
| 16 | 0.520 | 52 | 0.520 | 88 | 0.520 | 124 | 0.520 | 160 | 0.520 | 196 | 0.520 | 232 | 0.520 |
| 17 | 0.520 | 53 | 0.520 | 89 | 0.520 | 125 | 0.520 | 161 | 0.520 | 197 | 0.520 | 233 | 0.520 |
| 18 | 0.520 | 54 | 0.520 | 90 | 0.520 | 126 | 0.520 | 162 | 0.520 | 198 | 0.520 | 234 | 0.520 |
| 19 | 0.520 | 55 | 0.520 | 91 | 0.520 | 127 | 0.520 | 163 | 0.520 | 199 | 0.520 | 235 | 0.520 |
| 20 | 0.520 | 56 | 0.520 | 92 | 0.520 | 128 | 0.520 | 164 | 0.520 | 200 | 0.520 | 236 | 0.520 |
| 21 | 0.520 | 57 | 0.520 | 93 | 0.520 | 129 | 0.520 | 165 | 0.520 | 201 | 0.520 | 237 | 0.520 |
| 22 | 0.520 | 58 | 0.520 | 94 | 0.520 | 130 | 0.520 | 166 | 0.520 | 202 | 0.520 | 238 | 0.520 |
| 23 | 0.520 | 59 | 0.520 | 95 | 0.520 | 131 | 0.520 | 167 | 0.520 | 203 | 0.520 | 239 | 0.520 |
| 24 | 0.520 | 60 | 0.520 | 96 | 0.520 | 132 | 0.520 | 168 | 0.520 | 204 | 0.520 | 240 | 0.520 |
| 25 | 0.520 | 61 | 0.520 | 97 | 0.520 | 133 | 0.520 | 169 | 0.520 | 205 | 0.520 | 241 | 0.520 |
| 26 | 0.520 | 62 | 0.520 | 98 | 0.520 | 134 | 0.520 | 170 | 0.520 | 206 | 0.520 | 242 | 0.520 |
| 27 | 0.520 | 63 | 0.520 | 99 | 0.520 | 135 | 0.520 | 171 | 0.520 | 207 | 0.520 | 243 | 0.520 |
| 28 | 0.520 | 64 | 0.520 | 100 | 0.520 | 136 | 0.520 | 172 | 0.520 | 208 | 0.520 | 244 | 0.520 |
| 29 | 0.520 | 65 | 0.520 | 101 | 0.520 | 137 | 0.520 | 173 | 0.520 | 209 | 0.520 | 245 | 0.520 |
| 30 | 0.520 | 66 | 0.520 | 102 | 0.520 | 138 | 0.520 | 174 | 0.520 | 210 | 0.520 | 246 | 0.520 |
| 31 | 0.520 | 67 | 0.520 | 103 | 0.520 | 139 | 0.520 | 175 | 0.520 | 211 | 0.520 | 247 | 0.520 |
| 32 | 0.520 | 68 | 0.520 | 104 | 0.520 | 140 | 0.520 | 176 | 0.520 | 212 | 0.520 | 248 | 0.520 |
| 33 | 0.520 | 69 | 0.520 | 105 | 0.520 | 141 | 0.520 | 177 | 0.520 | 213 | 0.520 | 249 | 0.520 |
| 34 | 0.520 | 70 | 0.520 | 106 | 0.520 | 142 | 0.520 | 178 | 0.520 | 214 | 0.520 | 250 | 0.520 |
| 35 | 0.520 | 71 | 0.520 | 107 | 0.520 | 143 | 0.520 | 179 | 0.520 | 215 | 0.520 | 251 | 0.520 |
| 36 | 0.520 | 72 | 0.520 | 108 | 0.520 | 144 | 0.520 | 180 | 0.520 | 216 | 0.520 | 252 | 0.520 |

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Surcharged Outfall Details for SW1.SWS

| Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) | Time (mins) | Depth (m) |
|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|
| 253 | 0.520 | 269 | 0.520 | 285 | 0.520 | 301 | 0.520 | 317 | 0.520 | 333 | 0.520 | 349 | 0.520 |
| 254 | 0.520 | 270 | 0.520 | 286 | 0.520 | 302 | 0.520 | 318 | 0.520 | 334 | 0.520 | 350 | 0.520 |
| 255 | 0.520 | 271 | 0.520 | 287 | 0.520 | 303 | 0.520 | 319 | 0.520 | 335 | 0.520 | 351 | 0.520 |
| 256 | 0.520 | 272 | 0.520 | 288 | 0.520 | 304 | 0.520 | 320 | 0.520 | 336 | 0.520 | 352 | 0.520 |
| 257 | 0.520 | 273 | 0.520 | 289 | 0.520 | 305 | 0.520 | 321 | 0.520 | 337 | 0.520 | 353 | 0.520 |
| 258 | 0.520 | 274 | 0.520 | 290 | 0.520 | 306 | 0.520 | 322 | 0.520 | 338 | 0.520 | 354 | 0.520 |
| 259 | 0.520 | 275 | 0.520 | 291 | 0.520 | 307 | 0.520 | 323 | 0.520 | 339 | 0.520 | 355 | 0.520 |
| 260 | 0.520 | 276 | 0.520 | 292 | 0.520 | 308 | 0.520 | 324 | 0.520 | 340 | 0.520 | 356 | 0.520 |
| 261 | 0.520 | 277 | 0.520 | 293 | 0.520 | 309 | 0.520 | 325 | 0.520 | 341 | 0.520 | 357 | 0.520 |
| 262 | 0.520 | 278 | 0.520 | 294 | 0.520 | 310 | 0.520 | 326 | 0.520 | 342 | 0.520 | 358 | 0.520 |
| 263 | 0.520 | 279 | 0.520 | 295 | 0.520 | 311 | 0.520 | 327 | 0.520 | 343 | 0.520 | 359 | 0.520 |
| 264 | 0.520 | 280 | 0.520 | 296 | 0.520 | 312 | 0.520 | 328 | 0.520 | 344 | 0.520 | 360 | 0.520 |
| 265 | 0.520 | 281 | 0.520 | 297 | 0.520 | 313 | 0.520 | 329 | 0.520 | 345 | 0.520 | | |
| 266 | 0.520 | 282 | 0.520 | 298 | 0.520 | 314 | 0.520 | 330 | 0.520 | 346 | 0.520 | | |
| 267 | 0.520 | 283 | 0.520 | 299 | 0.520 | 315 | 0.520 | 331 | 0.520 | 347 | 0.520 | | |
| 268 | 0.520 | 284 | 0.520 | 300 | 0.520 | 316 | 0.520 | 332 | 0.520 | 348 | 0.520 | | |

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|--|----------------------------|
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|---|---------------------------------|

Micro Drainage Network 2014.1.1

Summary of Critical Results by Maximum Level (Rank 1) for SW1.SWS

Simulation Criteria


| | | | |
|---------------------------------|-------|--|-------|
| Areal Reduction Factor | 1.000 | Additional Flow - % of Total Flow | 0.000 |
| Hot Start (mins) | 0 | MADD Factor * 10m ³ /ha Storage | 2.000 |
| Hot Start Level (mm) | 0 | Inlet Coeffiecient | 0.800 |
| Manhole Headloss Coeff (Global) | 0.500 | Flow per Person per Day (l/per/day) | 0.000 |
| Foul Sewage per hectare (l/s) | 0.000 | | |

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

| | | | |
|------------------------------------|---------------------------------|-------------------|-------|
| Rainfall Model | FSR | Ratio R | 0.282 |
| Region | England and Wales | Cv (Summer) | 0.750 |
| M5-60 (mm) | 18.800 | Cv (Winter) | 0.840 |
| Margin for Flood Risk Warning (mm) | | | 300.0 |
| Analysis Timestep | 2.5 Second Increment (Extended) | | |
| DTS Status | | | ON |
| DVD Status | | | OFF |
| Inertia Status | | | OFF |
| Profile(s) | | Summer and Winter | |
| Duration(s) (mins) | 15, 30, 60, 120, 180, 240, 360 | | |
| Return Period(s) (years) | | | 30 |
| Climate Change (%) | | | 0 |


| PN | Storm | Return Period | Climate Change | First X Surcharge | First Y Flood | First Z Overflow | O/F Act. | Lvl Exc. |
|-------|-------|---------------|----------------|-------------------|---------------|------------------|----------|----------|
| 1.000 | 180 | Winter | 30 | 0% | | | | |
| 1.001 | 180 | Winter | 30 | 0% | | | | |
| 2.000 | 15 | Winter | 30 | 0% | | | | |
| 2.001 | 15 | Winter | 30 | 0% | | | | |
| 2.002 | 15 | Winter | 30 | 0% | 30/15 | Summer | | |
| 2.003 | 15 | Winter | 30 | 0% | 30/15 | Summer | | |
| 1.002 | 180 | Winter | 30 | 0% | | | | |
| 3.000 | 15 | Winter | 30 | 0% | | | | |
| 3.001 | 15 | Winter | 30 | 0% | | | | |
| 1.003 | 180 | Winter | 30 | 0% | | | | |
| 1.004 | 240 | Winter | 30 | 0% | | | | |
| 1.005 | 240 | Winter | 30 | 0% | | | | |
| 1.006 | 180 | Winter | 30 | 0% | | | | |
| 1.007 | 180 | Winter | 30 | 0% | | | | |
| 1.008 | 180 | Winter | 30 | 0% | | | | |
| 4.000 | 15 | Winter | 30 | 0% | | | | |
| 4.001 | 180 | Winter | 30 | 0% | | | | |
| 1.009 | 180 | Winter | 30 | 0% | | | | |

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Summary of Critical Results by Maximum Level (Rank 1) for SW1.SWS

| PN | Storm | Return Period | Climate Change | First X Surchage | First Y Flood | First Z Overflow | O/F Act. | Lvl Exc. |
|-------|-------|---------------|----------------|------------------|---------------|------------------|----------|----------|
| 1.010 | 180 | Winter | 30 | 0% | | | | |
| 5.000 | 15 | Winter | 30 | 0% | | | | |
| 5.001 | 15 | Winter | 30 | 0% | | | | |
| 5.002 | 15 | Winter | 30 | 0% | | | | |
| 5.003 | 15 | Winter | 30 | 0% | | | | |
| 5.004 | 15 | Winter | 30 | 0% | | | | |
| 5.005 | 15 | Winter | 30 | 0% | | | | |
| 5.006 | 15 | Winter | 30 | 0% | | | | |
| 5.007 | 15 | Winter | 30 | 0% | | | | |
| 5.008 | 15 | Winter | 30 | 0% | 30/15 | Winter | | |
| 5.009 | 15 | Winter | 30 | 0% | 30/15 | Summer | | |
| 5.010 | 15 | Winter | 30 | 0% | 30/15 | Summer | | |
| 5.011 | 15 | Winter | 30 | 0% | | | | |
| 5.012 | 15 | Winter | 30 | 0% | | | | |
| 6.000 | 15 | Winter | 30 | 0% | | | | |
| 6.001 | 15 | Winter | 30 | 0% | | | | |
| 6.002 | 15 | Winter | 30 | 0% | | | | |
| 6.003 | 15 | Winter | 30 | 0% | | | | |
| 5.013 | 15 | Winter | 30 | 0% | 30/15 | Summer | | |
| 5.014 | 15 | Winter | 30 | 0% | 30/15 | Summer | | |
| 5.015 | 30 | Winter | 30 | 0% | 30/15 | Summer | | |
| 5.016 | 30 | Winter | 30 | 0% | 30/15 | Summer | | |
| 7.000 | 30 | Winter | 30 | 0% | 30/15 | Winter | | |
| 5.017 | 30 | Winter | 30 | 0% | 30/15 | Summer | | |
| 5.018 | 30 | Winter | 30 | 0% | 30/15 | Summer | | |
| 5.019 | 30 | Winter | 30 | 0% | 30/15 | Summer | | |
| 5.020 | 180 | Winter | 30 | 0% | | | | |
| 5.021 | 180 | Winter | 30 | 0% | | | | |
| 5.022 | 180 | Winter | 30 | 0% | | | | |
| 1.011 | 180 | Winter | 30 | 0% | 30/180 | Winter | | |
| 1.012 | 180 | Winter | 30 | 0% | 30/15 | Summer | | |

| PN | US/MH Name | Water | | Flooded | | | Pipe | Status |
|-------|------------|-----------|--------------------|-------------|-------------|--------------|------------|------------|
| | | Level (m) | Surch'ed Depth (m) | Volume (m³) | Flow / Cap. | O'flow (l/s) | Flow (l/s) | |
| 1.000 | 1 | 103.693 | -0.513 | 0.000 | 0.01 | 0.0 | 12.6 | OK |
| 1.001 | 2 | 103.694 | -0.425 | 0.000 | 0.01 | 0.0 | 12.5 | OK |
| 2.000 | 15 | 104.964 | -0.126 | 0.000 | 0.39 | 0.0 | 14.2 | OK |
| 2.001 | 16 | 104.798 | -0.138 | 0.000 | 0.31 | 0.0 | 18.8 | OK |
| 2.002 | 17 | 104.606 | 0.098 | 0.000 | 0.97 | 0.0 | 31.9 | SURCHARGED |
| 2.003 | 18 | 104.556 | 0.105 | 0.000 | 1.14 | 0.0 | 60.1 | SURCHARGED |
| 1.002 | 3 | 103.694 | -0.397 | 0.000 | 0.02 | 0.0 | 27.6 | OK |
| 3.000 | 19 | 104.090 | -0.187 | 0.000 | 0.30 | 0.0 | 21.3 | OK |
| 3.001 | 20 | 103.793 | -0.303 | 0.000 | 0.23 | 0.0 | 23.8 | OK |
| 1.003 | 4 | 103.694 | -0.371 | 0.000 | 0.02 | 0.0 | 31.2 | OK |


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Summary of Critical Results by Maximum Level (Rank 1) for SW1.SWS

| PN | US/MH Name | Water | Surch'd Depth (m) | Flooded | Flow / Cap. | O'flow | Pipe | Status |
|-------|---------------|--------------|----------------------|----------------|----------------|--------|---------------|------------|
| | | Level (m) | | Volume (m³) | | (l/s) | Flow (l/s) | |
| 1.004 | 5 | 103.693 | -0.330 | 0.000 | 0.01 | 0.0 | 23.1 | OK |
| 1.005 | 6 | 103.693 | -0.291 | 0.000 | 0.02 | 0.0 | 18.1 | OK |
| 1.006 | 7 | 103.693 | -0.267 | 0.000 | 0.01 | 0.0 | 19.5 | OK |
| 1.007 | 8 | 103.693 | -0.224 | 0.000 | 0.02 | 0.0 | 21.8 | OK |
| 1.008 | 9 | 103.693 | -0.202 | 0.000 | 0.01 | 0.0 | 21.4 | OK |
| 4.000 | 21 | 104.308 | -0.159 | 0.000 | 0.19 | 0.0 | 12.3 | OK |
| 4.001 | 22 | 103.693 | -0.177 | 0.000 | 0.05 | 0.0 | 10.7 | OK |
| 1.009 | 10 | 103.692 | -0.109 | 0.000 | 0.01 | 0.0 | 29.3 | OK |
| 1.010 | 11 | 103.690 | -0.031 | 0.000 | 0.02 | 0.0 | 35.3 | OK |
| 5.000 | 23 | 108.226 | -0.171 | 0.000 | 0.13 | 0.0 | 9.3 | OK |
| 5.001 | 24 | 107.604 | -0.130 | 0.000 | 0.37 | 0.0 | 29.9 | OK |
| 5.002 | 25 | 106.931 | -0.115 | 0.000 | 0.47 | 0.0 | 29.7 | OK |
| 5.003 | 26 | 106.749 | -0.099 | 0.000 | 0.59 | 0.0 | 29.5 | OK |
| 5.004 | 27 | 106.670 | -0.053 | 0.000 | 1.00 | 0.0 | 169.1 | OK |
| 5.005 | 28 | 106.463 | -0.194 | 0.000 | 0.62 | 0.0 | 175.0 | OK |
| 5.006 | 29 | 106.340 | 0.000 | 0.000 | 1.04 | 0.0 | 176.1 | OK |
| 5.007 | 30 | 106.038 | -0.210 | 0.000 | 0.55 | 0.0 | 181.5 | OK |
| 5.008 | 31 | 105.915 | 0.004 | 0.000 | 0.62 | 0.0 | 181.1 | SURCHARGED |
| 5.009 | 32 | 105.810 | 0.172 | 0.000 | 2.05 | 0.0 | 194.6 | SURCHARGED |
| 5.010 | 33 | 105.687 | 0.072 | 0.000 | 1.96 | 0.0 | 195.1 | SURCHARGED |
| 5.011 | 34 | 105.482 | -0.105 | 0.000 | 0.94 | 0.0 | 197.7 | OK |
| 5.012 | 35 | 105.339 | -0.110 | 0.000 | 0.92 | 0.0 | 205.1 | OK |
| 6.000 | 46 | 108.511 | -0.162 | 0.000 | 0.17 | 0.0 | 14.6 | OK |
| 6.001 | 47 | 107.324 | -0.118 | 0.000 | 0.45 | 0.0 | 41.6 | OK |
| 6.002 | 48 | 105.990 | -0.088 | 0.000 | 0.67 | 0.0 | 52.2 | OK |
| 6.003 | 49 | 105.476 | -0.193 | 0.000 | 0.47 | 0.0 | 136.9 | OK |
| 5.013 | 36 | 105.201 | 0.735 | 0.000 | 1.67 | 0.0 | 291.5 | SURCHARGED |
| 5.014 | 37 | 105.079 | 0.658 | 0.000 | 1.47 | 0.0 | 293.1 | SURCHARGED |
| 5.015 | 38 | 104.947 | 0.594 | 0.000 | 1.86 | 0.0 | 284.6 | SURCHARGED |
| 5.016 | 39 | 104.813 | 0.498 | 0.000 | 1.95 | 0.0 | 285.7 | SURCHARGED |
| 7.000 | 50 | 104.687 | 0.063 | 0.000 | 0.14 | 0.0 | 7.8 | SURCHARGED |
| 5.017 | 40 | 104.676 | 0.378 | 0.000 | 1.70 | 0.0 | 291.2 | SURCHARGED |
| 5.018 | 41 | 104.533 | 0.278 | 0.000 | 1.36 | 0.0 | 299.3 | SURCHARGED |
| 5.019 | 42 | 104.223 | 0.134 | 0.000 | 1.42 | 0.0 | 311.3 | SURCHARGED |
| 5.020 | 43 | 103.707 | -0.225 | 0.000 | 0.07 | 0.0 | 148.0 | OK |
| 5.021 | 44 | 103.704 | -0.161 | 0.000 | 0.05 | 0.0 | 135.0 | OK |
| 5.022 | 45 | 103.698 | -0.069 | 0.000 | 0.05 | 0.0 | 122.1 | OK |
| 1.011 | 12 | 103.687 | 0.005 | 0.000 | 0.04 | 0.0 | 93.7 | SURCHARGED |
| 1.012 | 13 | 103.686 | 1.293 | 0.000 | 0.81 | 0.0 | 49.7 | SURCHARGED |

1 in 100 yr + 30% Rainfall Simulation

Critical Storm results for summer & winter profile, 15-360 min.

| | | |
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| Date 10.08.16 File SW Network 1, Rev C.mdx | Designed by CD Checked by SG | |
| Micro Drainage | Network 2014.1.1 | |

Summary of Critical Results by Maximum Level (Rank 1) for SW1.SWS

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.282
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 18.800 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
DVD Status OFF
Inertia Status OFF

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360
Return Period(s) (years) 100
Climate Change (%) 30


| PN | Storm | Return Period | Climate Change | First X Surcharge | First Y Flood | First Z Overflow | O/F Act. | Lvl Exc. |
|-------|------------|---------------|----------------|-------------------|---------------|------------------|----------|----------|
| 1.000 | 240 Winter | 100 | +30% | | | | | |
| 1.001 | 240 Winter | 100 | +30% | | | | | |
| 2.000 | 15 Winter | 100 | +30% | 100/15 | Summer | | | |
| 2.001 | 15 Winter | 100 | +30% | 100/15 | Summer | | | |
| 2.002 | 15 Winter | 100 | +30% | 100/15 | Summer | | | |
| 2.003 | 15 Winter | 100 | +30% | 100/15 | Summer | | | |
| 1.002 | 240 Winter | 100 | +30% | 100/180 | Winter | | | |
| 3.000 | 15 Winter | 100 | +30% | | | | | |
| 3.001 | 240 Winter | 100 | +30% | 100/180 | Winter | | | |
| 1.003 | 240 Winter | 100 | +30% | 100/120 | Winter | | | |
| 1.004 | 240 Winter | 100 | +30% | 100/120 | Winter | | | |
| 1.005 | 240 Winter | 100 | +30% | 100/120 | Winter | | | |
| 1.006 | 240 Winter | 100 | +30% | 100/120 | Winter | | | |
| 1.007 | 240 Winter | 100 | +30% | 100/60 | Winter | | | |
| 1.008 | 240 Winter | 100 | +30% | 100/60 | Winter | | | |
| 4.000 | 15 Winter | 100 | +30% | | | | | |
| 4.001 | 240 Winter | 100 | +30% | 100/60 | Winter | | | |
| 1.009 | 240 Winter | 100 | +30% | 100/60 | Summer | | | |

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| Micro Drainage | Network 2014.1.1 | |

Summary of Critical Results by Maximum Level (Rank 1) for SW1.SWS

| PN | Storm | Return Period | Climate Change | First X Surcharge | First Y Flood | First Z Overflow | O/F Act. | Lvl Exc. |
|-------|-------|---------------|----------------|-------------------|---------------|------------------|----------|----------|
| 1.010 | 240 | Winter | 100 | +30% | 100/30 | Winter | | |
| 5.000 | 15 | Winter | 100 | +30% | | | | |
| 5.001 | 30 | Winter | 100 | +30% | 100/15 | Winter | | |
| 5.002 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 5.003 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 5.004 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 5.005 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 5.006 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 5.007 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 5.008 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 5.009 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 5.010 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 5.011 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 5.012 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 6.000 | 15 | Winter | 100 | +30% | | | | |
| 6.001 | 15 | Winter | 100 | +30% | | | | |
| 6.002 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 6.003 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 5.013 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 5.014 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 5.015 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 5.016 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 7.000 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 5.017 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 5.018 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 5.019 | 30 | Winter | 100 | +30% | 100/15 | Summer | | |
| 5.020 | 240 | Winter | 100 | +30% | 100/60 | Winter | | |
| 5.021 | 240 | Winter | 100 | +30% | 100/60 | Winter | | |
| 5.022 | 240 | Winter | 100 | +30% | 100/30 | Winter | | |
| 1.011 | 240 | Winter | 100 | +30% | 100/30 | Summer | | |
| 1.012 | 240 | Winter | 100 | +30% | 100/15 | Summer | | |

| PN | US/MH Name | Water | | Flooded | | Pipe | | Status |
|-------|------------|-----------|-------------------|-------------|-------------|--------------|------------|------------|
| | | Level (m) | Surch'd Depth (m) | Volume (m³) | Flow / Cap. | O'flow (l/s) | Flow (l/s) | |
| 1.000 | 1 | 104.109 | -0.097 | 0.000 | 0.01 | 0.0 | 17.7 | OK |
| 1.001 | 2 | 104.109 | -0.010 | 0.000 | 0.01 | 0.0 | 18.4 | OK |
| 2.000 | 15 | 105.307 | 0.217 | 0.000 | 0.57 | 0.0 | 20.9 | SURCHARGED |
| 2.001 | 16 | 105.260 | 0.323 | 0.000 | 0.50 | 0.0 | 30.7 | SURCHARGED |
| 2.002 | 17 | 105.191 | 0.684 | 0.000 | 1.39 | 0.0 | 45.7 | SURCHARGED |
| 2.003 | 18 | 105.095 | 0.644 | 0.000 | 1.65 | 0.0 | 87.4 | SURCHARGED |
| 1.002 | 3 | 104.109 | 0.018 | 0.000 | 0.04 | 0.0 | 43.4 | SURCHARGED |
| 3.000 | 19 | 104.129 | -0.148 | 0.000 | 0.50 | 0.0 | 35.1 | OK |
| 3.001 | 20 | 104.109 | 0.013 | 0.000 | 0.09 | 0.0 | 9.7 | SURCHARGED |
| 1.003 | 4 | 104.110 | 0.045 | 0.000 | 0.03 | 0.0 | 53.2 | SURCHARGED |


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| Date 10.08.16 File SW Network 1, Rev C.mdx | Designed by CD Checked by SG | |
| Micro Drainage | Network 2014.1.1 | |

Summary of Critical Results by Maximum Level (Rank 1) for SW1.SWS

| PN | US/MH Name | Water | Surch'd | Flooded | Flow / | O'flow | Pipe | Status |
|-------|---------------|--------------|-----------|----------------|--------|--------|---------------|------------|
| | | Level (m) | Depth (m) | Volume (m³) | Cap. | (l/s) | Flow (l/s) | |
| 1.004 | 5 | 104.110 | 0.087 | 0.000 | 0.03 | 0.0 | 53.7 | SURCHARGED |
| 1.005 | 6 | 104.111 | 0.127 | 0.000 | 0.04 | 0.0 | 50.4 | SURCHARGED |
| 1.006 | 7 | 104.111 | 0.150 | 0.000 | 0.03 | 0.0 | 47.7 | SURCHARGED |
| 1.007 | 8 | 104.110 | 0.192 | 0.000 | 0.04 | 0.0 | 49.2 | SURCHARGED |
| 1.008 | 9 | 104.110 | 0.215 | 0.000 | 0.02 | 0.0 | 56.0 | SURCHARGED |
| 4.000 | 21 | 104.329 | -0.138 | 0.000 | 0.31 | 0.0 | 20.7 | OK |
| 4.001 | 22 | 104.110 | 0.240 | 0.000 | 0.07 | 0.0 | 14.1 | SURCHARGED |
| 1.009 | 10 | 104.110 | 0.309 | 0.000 | 0.03 | 0.0 | 59.7 | SURCHARGED |
| 1.010 | 11 | 104.110 | 0.389 | 0.000 | 0.04 | 0.0 | 59.5 | SURCHARGED |
| 5.000 | 23 | 108.244 | -0.153 | 0.000 | 0.22 | 0.0 | 15.6 | OK |
| 5.001 | 24 | 107.760 | 0.026 | 0.000 | 0.50 | 0.0 | 40.4 | SURCHARGED |
| 5.002 | 25 | 107.708 | 0.662 | 0.000 | 0.60 | 0.0 | 37.5 | SURCHARGED |
| 5.003 | 26 | 107.686 | 0.837 | 0.000 | 0.70 | 0.0 | 35.0 | SURCHARGED |
| 5.004 | 27 | 107.668 | 0.945 | 0.000 | 1.35 | 0.0 | 228.2 | FLOOD RISK |
| 5.005 | 28 | 107.550 | 0.894 | 0.000 | 0.82 | 0.0 | 231.9 | SURCHARGED |
| 5.006 | 29 | 107.399 | 1.059 | 0.000 | 1.28 | 0.0 | 217.8 | FLOOD RISK |
| 5.007 | 30 | 107.277 | 1.028 | 0.000 | 0.66 | 0.0 | 216.1 | FLOOD RISK |
| 5.008 | 31 | 107.145 | 1.234 | 0.000 | 0.70 | 0.0 | 206.3 | SURCHARGED |
| 5.009 | 32 | 107.012 | 1.374 | 0.000 | 2.35 | 0.0 | 223.6 | SURCHARGED |
| 5.010 | 33 | 106.854 | 1.238 | 0.000 | 2.26 | 0.0 | 225.3 | SURCHARGED |
| 5.011 | 34 | 106.697 | 1.109 | 0.000 | 1.10 | 0.0 | 231.0 | SURCHARGED |
| 5.012 | 35 | 106.538 | 1.089 | 0.000 | 1.08 | 0.0 | 241.8 | SURCHARGED |
| 6.000 | 46 | 108.531 | -0.142 | 0.000 | 0.29 | 0.0 | 24.5 | OK |
| 6.001 | 47 | 107.366 | -0.076 | 0.000 | 0.76 | 0.0 | 69.7 | OK |
| 6.002 | 48 | 106.762 | 0.684 | 0.000 | 0.84 | 0.0 | 65.4 | SURCHARGED |
| 6.003 | 49 | 106.577 | 0.908 | 0.000 | 0.54 | 0.0 | 156.0 | SURCHARGED |
| 5.013 | 36 | 106.365 | 1.899 | 0.000 | 2.06 | 0.0 | 360.1 | SURCHARGED |
| 5.014 | 37 | 106.147 | 1.726 | 0.000 | 1.85 | 0.0 | 368.0 | SURCHARGED |
| 5.015 | 38 | 105.912 | 1.560 | 0.000 | 2.53 | 0.0 | 387.8 | SURCHARGED |
| 5.016 | 39 | 105.658 | 1.342 | 0.000 | 2.66 | 0.0 | 390.0 | SURCHARGED |
| 7.000 | 50 | 105.419 | 0.795 | 0.000 | 0.19 | 0.0 | 10.3 | SURCHARGED |
| 5.017 | 40 | 105.401 | 1.103 | 0.000 | 2.33 | 0.0 | 400.4 | SURCHARGED |
| 5.018 | 41 | 105.130 | 0.875 | 0.000 | 1.89 | 0.0 | 416.1 | SURCHARGED |
| 5.019 | 42 | 104.534 | 0.445 | 0.000 | 1.99 | 0.0 | 437.4 | SURCHARGED |
| 5.020 | 43 | 104.113 | 0.181 | 0.000 | 0.09 | 0.0 | 208.5 | SURCHARGED |
| 5.021 | 44 | 104.112 | 0.247 | 0.000 | 0.08 | 0.0 | 208.1 | SURCHARGED |
| 5.022 | 45 | 104.111 | 0.344 | 0.000 | 0.09 | 0.0 | 215.9 | SURCHARGED |
| 1.011 | 12 | 104.111 | 0.429 | 0.000 | 0.11 | 0.0 | 248.0 | SURCHARGED |
| 1.012 | 13 | 104.109 | 1.716 | 0.000 | 0.81 | 0.0 | 49.7 | SURCHARGED |

Foul Sewer Design
















Foul Drainage Design (1 in 2 yr)

| | | |
|--|---------------------------------|---|
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| 4 Brindley Road City Park Manchester M16 9HQ | Chipping Lane Longridge |  |
| Date 10.10.16 File FW Network 1, Rev D.mdx | Designed by CD Checked by SG | |
| Micro Drainage | Network 2014.1.1 | |

FOUL SEWERAGE DESIGN


Network Design Table for FW1 - PDS Export.FWS

« - Indicates pipe capacity < flow

| PN | Length (m) | Fall (m) | Slope (1:X) | Area (ha) | Houses | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Auto Design |
|-------|------------|----------|-------------|-----------|--------|-----------------|--------|----------|----------|---|
| 1.000 | 21.577 | 0.755 | 28.6 | 0.000 | 6 | 0.0 | 1.500 | o | 150 |  |
| 1.001 | 10.136 | 0.507 | 20.0 | 0.000 | 0 | 0.0 | 1.500 | o | 150 |  |
| 1.002 | 9.531 | 0.071 | 135.0 | 0.000 | 6 | 0.0 | 1.500 | o | 150 |  |
| 1.003 | 36.247 | 0.324 | 111.9 | 0.000 | 0 | 0.0 | 1.500 | o | 150 |  |
| 1.004 | 36.094 | 0.690 | 52.3 | 0.000 | 0 | 0.0 | 1.500 | o | 150 |  |
| 1.005 | 9.292 | 0.069 | 135.0 | 0.000 | 3 | 0.0 | 1.500 | o | 150 |  |
| 1.006 | 7.293 | 0.054 | 135.0 | 0.000 | 0 | 0.0 | 1.500 | o | 150 |  |
| 1.007 | 29.244 | 0.491 | 59.6 | 0.000 | 0 | 0.0 | 1.500 | o | 150 |  |
| 1.008 | 9.888 | 0.482 | 20.5 | 0.000 | 8 | 0.0 | 1.500 | o | 150 |  |
| 2.000 | 46.275 | 1.361 | 34.0 | 0.000 | 200 | 0.0 | 1.500 | o | 150 |  |
| 2.001 | 35.226 | 1.761 | 20.0 | 0.000 | 5 | 0.0 | 1.500 | o | 150 |  |
| 2.002 | 10.901 | 0.081 | 134.6 | 0.000 | 5 | 0.0 | 1.500 | o | 150 |  |
| 2.003 | 23.107 | 0.098 | 235.8 | 0.000 | 195 | 0.0 | 1.500 | o | 225 |  |
| 2.004 | 25.222 | 1.264 | 20.0 | 0.000 | 0 | 0.0 | 1.500 | o | 225 |  |
| 1.009 | 27.745 | 0.118 | 235.1 | 0.000 | 0 | 0.0 | 1.500 | o | 225 |  |














Network Results Table

| PN | US/IL (m) | Σ Area (ha) | Σ Base Flow (l/s) | Σ Hse | Add Flow (l/s) | P.Dep (mm) | P.Vel (m/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|-------|-----------|-------------|-------------------|-------|----------------|------------|-------------|-----------|-----------|------------|
| 1.000 | 107.117 | 0.000 | 0.0 | 6 | 0.0 | 11 | 0.50 | 1.64 | 29.0 | 0.3 |
| 1.001 | 106.362 | 0.000 | 0.0 | 6 | 0.0 | 10 | 0.57 | 1.97 | 34.7 | 0.3 |
| 1.002 | 105.855 | 0.000 | 0.0 | 12 | 0.0 | 21 | 0.37 | 0.75 | 13.3 | 0.6 |
| 1.003 | 105.784 | 0.000 | 0.0 | 12 | 0.0 | 20 | 0.39 | 0.83 | 14.6 | 0.6 |
| 1.004 | 105.460 | 0.000 | 0.0 | 12 | 0.0 | 17 | 0.51 | 1.21 | 21.4 | 0.6 |
| 1.005 | 104.770 | 0.000 | 0.0 | 15 | 0.0 | 24 | 0.39 | 0.75 | 13.3 | 0.7 |
| 1.006 | 104.702 | 0.000 | 0.0 | 15 | 0.0 | 24 | 0.39 | 0.75 | 13.3 | 0.7 |
| 1.007 | 104.648 | 0.000 | 0.0 | 15 | 0.0 | 19 | 0.52 | 1.14 | 20.1 | 0.7 |
| 1.008 | 104.157 | 0.000 | 0.0 | 23 | 0.0 | 18 | 0.86 | 1.94 | 34.3 | 1.1 |
| 2.000 | 108.240 | 0.000 | 0.0 | 200 | 0.0 | 62 | 1.37 | 1.51 | 26.6 | 9.4 |
| 2.001 | 106.879 | 0.000 | 0.0 | 205 | 0.0 | 54 | 1.68 | 1.96 | 34.7 | 9.6 |
| 2.002 | 105.118 | 0.000 | 0.0 | 210 | 0.0 | 96 | 0.83 | 0.75 | 13.3 | 9.8 |
| 2.003 | 104.962 | 0.000 | 0.0 | 405 | 0.0 | 131 | 0.79 | 0.75 | 29.7 | 19.0 |
| 2.004 | 104.864 | 0.000 | 0.0 | 405 | 0.0 | 66 | 1.97 | 2.58 | 102.4 | 19.0 |
| 1.009 | 103.600 | 0.000 | 0.0 | 428 | 0.0 | 136 | 0.80 | 0.75 | 29.7 | 20.1 |

| | | |
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| Micro Drainage | Network 2014.1.1 | |


FOUL SEWERAGE DESIGN

Network Design Table for FW1 - PDS Export.FWS

| PN | Length (m) | Fall (m) | Slope (1:X) | Area (ha) | Houses | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Auto Design |
|-------|---------------|-------------|----------------|--------------|--------|--------------------|-----------|-------------|-------------|---|
| 1.010 | 21.277 | 0.091 | 235.0 | 0.000 | 3 | 0.0 | 1.500 | o | 225 |  |
| 1.011 | 9.211 | 0.039 | 235.0 | 0.000 | 7 | 0.0 | 1.500 | o | 225 |  |
| 1.012 | 16.634 | 0.071 | 235.0 | 0.000 | 0 | 0.0 | 1.500 | o | 225 |  |
| 1.013 | 34.291 | 1.593 | 21.5 | 0.000 | 2 | 0.0 | 1.500 | o | 225 |  |
| 3.000 | 28.025 | 0.208 | 135.0 | 0.000 | 2 | 0.0 | 1.500 | o | 150 |  |
| 3.001 | 23.238 | 0.332 | 70.0 | 0.000 | 0 | 0.0 | 1.500 | o | 150 |  |
| 3.002 | 12.851 | 0.643 | 20.0 | 0.000 | 4 | 0.0 | 1.500 | o | 150 |  |
| 3.003 | 28.939 | 1.453 | 19.9 | 0.000 | 7 | 0.0 | 1.500 | o | 150 |  |
| 4.000 | 35.578 | 0.404 | 88.1 | 0.000 | 7 | 0.0 | 1.500 | o | 150 |  |
| 4.001 | 13.249 | 0.103 | 128.9 | 0.000 | 4 | 0.0 | 1.500 | o | 150 |  |
| 3.004 | 13.280 | 0.099 | 134.0 | 0.000 | 4 | 0.0 | 1.500 | o | 150 |  |
| 5.000 | 32.509 | 1.086 | 29.9 | 0.000 | 4 | 0.0 | 1.500 | o | 150 |  |
| 5.001 | 13.165 | 0.663 | 19.9 | 0.000 | 0 | 0.0 | 1.500 | o | 150 |  |














Network Results Table

| PN | US/IL (m) | Σ Area (ha) | Σ Base Flow (l/s) | Σ Hse Add | Flow (l/s) | P.Dep (mm) | P.Vel (m/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|-------|--------------|----------------|----------------------|--------------|---------------|---------------|----------------|--------------|--------------|---------------|
| 1.010 | 103.482 | 0.000 | 0.0 | 431 | 0.0 | 136 | 0.80 | 0.75 | 29.7 | 20.2 |
| 1.011 | 103.391 | 0.000 | 0.0 | 438 | 0.0 | 138 | 0.81 | 0.75 | 29.7 | 20.5 |
| 1.012 | 103.352 | 0.000 | 0.0 | 438 | 0.0 | 138 | 0.81 | 0.75 | 29.7 | 20.5 |
| 1.013 | 103.281 | 0.000 | 0.0 | 440 | 0.0 | 70 | 1.96 | 2.48 | 98.6 | 20.6 |
| 3.000 | 104.652 | 0.000 | 0.0 | 2 | 0.0 | 9 | 0.21 | 0.75 | 13.3 | 0.1 |
| 3.001 | 104.444 | 0.000 | 0.0 | 2 | 0.0 | 8 | 0.26 | 1.05 | 18.5 | 0.1 |
| 3.002 | 104.112 | 0.000 | 0.0 | 6 | 0.0 | 10 | 0.57 | 1.96 | 34.7 | 0.3 |
| 3.003 | 103.470 | 0.000 | 0.0 | 13 | 0.0 | 14 | 0.73 | 1.97 | 34.8 | 0.6 |
| 4.000 | 102.524 | 0.000 | 0.0 | 7 | 0.0 | 15 | 0.36 | 0.93 | 16.5 | 0.3 |
| 4.001 | 102.120 | 0.000 | 0.0 | 11 | 0.0 | 20 | 0.36 | 0.77 | 13.6 | 0.5 |
| 3.004 | 102.017 | 0.000 | 0.0 | 28 | 0.0 | 32 | 0.48 | 0.76 | 13.4 | 1.3 |
| 5.000 | 103.667 | 0.000 | 0.0 | 4 | 0.0 | 9 | 0.43 | 1.61 | 28.4 | 0.2 |
| 5.001 | 102.581 | 0.000 | 0.0 | 4 | 0.0 | 8 | 0.49 | 1.97 | 34.8 | 0.2 |

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| Micro Drainage | Network 2014.1.1 | |


FOUL SEWERAGE DESIGN

Network Design Table for FW1 - PDS Export.FWS

| PN | Length (m) | Fall (m) | Slope (1:X) | Area (ha) | Houses | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Auto Design |
|-------|---------------|-------------|----------------|--------------|--------|--------------------|-----------|-------------|-------------|---|
| 3.005 | 20.894 | 0.155 | 134.8 | 0.000 | 0 | 0.0 | 1.500 | o | 150 |  |
| 1.014 | 17.155 | 0.073 | 235.0 | 0.000 | 0 | 0.0 | 1.500 | o | 225 |  |
| 1.015 | 13.743 | 0.058 | 235.0 | 0.000 | 2 | 0.0 | 1.500 | o | 225 |  |
| 1.016 | 21.770 | 0.093 | 235.0 | 0.000 | 0 | 0.0 | 1.500 | o | 225 |  |
| 1.017 | 11.274 | 0.162 | 69.6 | 0.000 | 8 | 0.0 | 1.500 | o | 225 |  |
| 6.000 | 34.974 | 0.259 | 135.0 | 0.000 | 5 | 0.0 | 1.500 | o | 150 |  |
| 7.000 | 13.792 | 0.521 | 26.5 | 0.000 | 8 | 0.0 | 1.500 | o | 150 |  |
| 6.001 | 51.228 | 0.379 | 135.0 | 0.000 | 0 | 0.0 | 1.500 | o | 150 |  |
| 6.002 | 27.732 | 0.590 | 47.0 | 0.000 | 13 | 0.0 | 1.500 | o | 150 |  |
| 6.003 | 10.422 | 0.077 | 135.0 | 0.000 | 5 | 0.0 | 1.500 | o | 150 |  |
| 6.004 | 56.806 | 0.421 | 135.0 | 0.000 | 0 | 0.0 | 1.500 | o | 750 |  |
| 1.018 | 3.254 | 0.024 | 135.0 | 0.000 | 0 | 0.0 | 1.500 | o | 150 |  |
| 1.019 | 185.986 | -4.482 | -41.5 | 0.000 | 0 | 0.0 | 1.500 | o | 300 |  |


Network Results Table

| PN | US/IL (m) | Σ Area (ha) | Σ Base Flow (l/s) | Σ Hse Add | Flow (l/s) | P.Dep (mm) | P.Vel (m/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) |
|-------|--------------|----------------|----------------------|--------------|---------------|---------------|----------------|--------------|--------------|---------------|
| 3.005 | 101.918 | 0.000 | 0.0 | 32 | 0.0 | 34 | 0.50 | 0.75 | 13.3 | 1.5 |
| 1.014 | 101.688 | 0.000 | 0.0 | 472 | 0.0 | 145 | 0.82 | 0.75 | 29.7 | 22.1 |
| 1.015 | 101.615 | 0.000 | 0.0 | 474 | 0.0 | 145 | 0.82 | 0.75 | 29.7 | 22.2 |
| 1.016 | 101.557 | 0.000 | 0.0 | 474 | 0.0 | 145 | 0.82 | 0.75 | 29.7 | 22.2 |
| 1.017 | 101.464 | 0.000 | 0.0 | 482 | 0.0 | 101 | 1.31 | 1.38 | 54.8 | 22.6 |
| 6.000 | 103.029 | 0.000 | 0.0 | 5 | 0.0 | 14 | 0.28 | 0.75 | 13.3 | 0.2 |
| 7.000 | 103.291 | 0.000 | 0.0 | 8 | 0.0 | 12 | 0.56 | 1.71 | 30.2 | 0.4 |
| 6.001 | 102.770 | 0.000 | 0.0 | 13 | 0.0 | 22 | 0.38 | 0.75 | 13.3 | 0.6 |
| 6.002 | 102.390 | 0.000 | 0.0 | 26 | 0.0 | 24 | 0.67 | 1.28 | 22.6 | 1.2 |
| 6.003 | 101.800 | 0.000 | 0.0 | 31 | 0.0 | 34 | 0.49 | 0.75 | 13.3 | 1.5 |
| 6.004 | 101.723 | 0.000 | 0.0 | 31 | 0.0 | 22 | 0.39 | 2.15 | 950.7 | 1.5 |
| 1.018 | 101.302 | 0.000 | 0.0 | 513 | 0.0 | 150 | 0.75 | 0.75 | 13.3 | 24.0 |
| 1.019 | 101.278 | 0.000 | 0.0 | 513 | 0.0 | 300 | 0.14 | 0.14 | 9.6 | 24.0 |

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| Micro Drainage | Network 2014.1.1 | |

FOUL SEWERAGE DESIGN

Network Design Table for FW1 - PDS Export.FWS


| PN | Length (m) | Fall (m) | Slope (1:X) | Area (ha) | Houses | Base Flow (l/s) | k (mm) | HYD SECT | DIA (mm) | Auto Design |
|-------|---------------|-------------|----------------|--------------|--------|--------------------|-----------|-------------|-------------|---|
| 1.020 | 7.073 | 0.021 | 340.0 | 0.000 | 0 | 0.0 | 1.500 | o | 300 |  |

Network Results Table

| PN | US/IL (m) | Σ Area (ha) | Σ Base Flow (l/s) | Σ Hse Add Flow (l/s) | P.Dep (mm) | P.Vel (m/s) | Vel (m/s) | Cap (l/s) | Flow (l/s) | |
|-------|--------------|----------------|----------------------|-------------------------|---------------|----------------|--------------|--------------|---------------|------|
| 1.020 | 105.760 | 0.000 | 0.0 | 513 | 0.0 | 142 | 0.73 | 0.75 | 53.0 | 24.0 |


Foul Sewer Design

Foul Manhole Schedules

| | | |
|--|---------------------------------|---|
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| 4 Brindley Road City Park Manchester M16 9HQ | Chipping Lane Longridge |  |
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Manhole Schedules for FW1 - PDS Export.FWS

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam.,L*W (mm) | PN | Pipe Out Invert Level (m) | Pipe Out Diameter (mm) | PN | Pipes In Invert Level (m) | Pipes In Diameter (mm) | Backdrop (mm) |
|---------|-----------|--------------|---------------|-------------------|-------|---------------------------|------------------------|-------|---------------------------|------------------------|---------------|
| 1 | 108.762 | 1.645 | Open Manhole | 1350 | 1.000 | 107.117 | 150 | | | | |
| 2 | 108.164 | 1.802 | Open Manhole | 1200 | 1.001 | 106.362 | 150 | 1.000 | 106.362 | 150 | |
| 3 | 107.960 | 2.105 | Open Manhole | 1350 | 1.002 | 105.855 | 150 | 1.001 | 105.855 | 150 | |
| 4 | 107.858 | 2.074 | Open Manhole | 1200 | 1.003 | 105.784 | 150 | 1.002 | 105.784 | 150 | |
| 5 | 107.505 | 2.045 | Open Manhole | 1200 | 1.004 | 105.460 | 150 | 1.003 | 105.460 | 150 | |
| 6 | 107.578 | 2.808 | Open Manhole | 1200 | 1.005 | 104.770 | 150 | 1.004 | 104.770 | 150 | |
| 7 | 107.447 | 2.745 | Open Manhole | 1200 | 1.006 | 104.702 | 150 | 1.005 | 104.702 | 150 | |
| 8 | 107.337 | 2.689 | Open Manhole | 1200 | 1.007 | 104.648 | 150 | 1.006 | 104.648 | 150 | |
| 9 | 106.880 | 2.723 | Open Manhole | 1200 | 1.008 | 104.157 | 150 | 1.007 | 104.157 | 150 | |
| 20 | 109.898 | 1.658 | Open Manhole | 1200 | 2.000 | 108.240 | 150 | | | | |
| 21 | 108.550 | 1.671 | Open Manhole | 1200 | 2.001 | 106.879 | 150 | 2.000 | 106.879 | 150 | |
| 22 | 107.328 | 2.210 | Open Manhole | 1350 | 2.002 | 105.118 | 150 | 2.001 | 105.118 | 150 | |
| 23 | 106.952 | 1.990 | Open Manhole | 1200 | 2.003 | 104.962 | 225 | 2.002 | 105.037 | 150 | |
| 24 | 106.615 | 1.751 | Open Manhole | 1200 | 2.004 | 104.864 | 225 | 2.003 | 104.864 | 225 | |
| 10 | 106.852 | 3.252 | Open Manhole | 1200 | 1.009 | 103.600 | 225 | 1.008 | 103.675 | 150 | |
| | | | | | | | | 2.004 | 103.600 | 225 | |
| 11 | 106.898 | 3.416 | Open Manhole | 1200 | 1.010 | 103.482 | 225 | 1.009 | 103.482 | 225 | |
| 12 | 106.549 | 3.158 | Open Manhole | 1200 | 1.011 | 103.391 | 225 | 1.010 | 103.391 | 225 | |
| 13 | 106.397 | 3.045 | Open Manhole | 1200 | 1.012 | 103.352 | 225 | 1.011 | 103.352 | 225 | |
| 14 | 106.160 | 2.879 | Open Manhole | 1350 | 1.013 | 103.281 | 225 | 1.012 | 103.281 | 225 | |
| 25 | 106.302 | 1.650 | Open Manhole | 1200 | 3.000 | 104.652 | 150 | | | | |
| 26 | 106.321 | 1.877 | Open Manhole | 1200 | 3.001 | 104.444 | 150 | 3.000 | 104.444 | 150 | |
| 27 | 105.875 | 1.763 | Open Manhole | 1200 | 3.002 | 104.112 | 150 | 3.001 | 104.112 | 150 | |
| 28 | 105.655 | 2.185 | Open Manhole | 1200 | 3.003 | 103.470 | 150 | 3.002 | 103.470 | 150 | |
| 31 | 105.283 | 2.759 | Open Manhole | 1200 | 4.000 | 102.524 | 150 | | | | |
| 32 | 105.918 | 3.798 | Open Manhole | 1200 | 4.001 | 102.120 | 150 | 4.000 | 102.120 | 150 | |
| 29 | 105.942 | 3.925 | Open Manhole | 1200 | 3.004 | 102.017 | 150 | 3.003 | 102.017 | 150 | |
| | | | | | | | | 4.001 | 102.017 | 150 | |
| 33 | 105.617 | 1.950 | Open Manhole | 1200 | 5.000 | 103.667 | 150 | | | | |
| 34 | 105.795 | 3.214 | Open Manhole | 1200 | 5.001 | 102.581 | 150 | 5.000 | 102.581 | 150 | |
| 30 | 105.781 | 3.863 | Open Manhole | 1200 | 3.005 | 101.918 | 150 | 3.004 | 101.918 | 150 | |
| | | | | | | | | 5.001 | 101.918 | 150 | |
| 15 | 105.682 | 3.994 | Open Manhole | 1350 | 1.014 | 101.688 | 225 | 1.013 | 101.688 | 225 | |
| | | | | | | | | 3.005 | 101.763 | 150 | |

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| Micro Drainage | Network 2014.1.1 | |

Manhole Schedules for FW1 - PDS Export.FWS

| MH Name | MH CL (m) | MH Depth (m) | MH Connection | MH Diam.,L*W (mm) | PN | Pipe Out Invert Level (m) | Diameter (mm) | PN | Pipes In Invert Level (m) | Diameter (mm) | Backdrop (mm) |
|---------|-----------|--------------|---------------|-------------------|-------|---------------------------|---------------|-------|---------------------------|---------------|---------------|
| 16 | 105.764 | 4.149 | Open Manhole | 1350 | 1.015 | 101.615 | 225 | 1.014 | 101.615 | 225 | |
| 17 | 105.885 | 4.328 | Open Manhole | 1200 | 1.016 | 101.557 | 225 | 1.015 | 101.557 | 225 | |
| 18 | 105.724 | 4.260 | Open Manhole | 1500 | 1.017 | 101.464 | 225 | 1.016 | 101.464 | 225 | |
| 36 | 105.595 | 2.566 | Open Manhole | 1200 | 6.000 | 103.029 | 150 | | | | |
| 41 | 105.841 | 2.550 | Open Manhole | 1200 | 7.000 | 103.291 | 150 | | | | |
| 37 | 106.021 | 3.251 | Open Manhole | 1200 | 6.001 | 102.770 | 150 | 6.000 | 102.770 | 150 | |
| | | | | | | | | 7.000 | 102.770 | 150 | |
| 38 | 105.301 | 2.911 | Open Manhole | 1350 | 6.002 | 102.390 | 150 | 6.001 | 102.390 | 150 | |
| 39 | 104.996 | 3.196 | Open Manhole | 1200 | 6.003 | 101.800 | 150 | 6.002 | 101.800 | 150 | |
| 43 | 105.000 | 3.277 | Open Manhole | 2100 | 6.004 | 101.723 | 750 | 6.003 | 101.723 | 150 | |
| 19 | 105.800 | 4.498 | Open Manhole | 2400 | 1.018 | 101.302 | 150 | 1.017 | 101.302 | 225 | |
| | | | | | | | | 6.004 | 101.302 | 750 | |
| 42 | 105.800 | 4.522 | Open Manhole | 1200 | 1.019 | 101.278 | 300 | 1.018 | 101.278 | 150 | |
| 44 | 108.350 | 2.590 | Open Manhole | 1200 | 1.020 | 105.760 | 300 | 1.019 | 105.760 | 300 | |
| UU1802 | 108.570 | 2.831 | Open Manhole | 0 | | OUTFALL | | 1.020 | 105.739 | 300 | |