REDROW HOMES LIMITED

BURBAGE FILEDS FARM

BURBAGE

LE10 2HS

FLOOD RISK ASSESSMENT

MARCH 2024

FW2285_FRA_001 V7

REVISION HISTORY

Revision	Reason for Issue	Author	Checker	Approved	Date
DRAFT	Draft Issue for Comment	JR	OP	JD	27.01.2023
DRAFT	Second Draft Issue for Comment	JR	OP	JD	10.02.2023
V1	First Issue	JR	OP	JD	15.03.2023
V2	Appendix B has been updated	JR	JD	JD	04.05.2023
V3	Minor update to foul strategy following client instruction	JD	JR	JD	19.05.2023
V4	Appendices plans updated to suit current layout	JR	JD	JD	19.06.2023
V5	Appendices A, B, J & K have been updated to suit the updated development layout.	JR	EC	JD	15.11.2023
V6	NPPF (2021) has been revised. References to this document have been updated to “NPPF (2023)”	JR	JD	JD	21.12.2023
V7	Section 6.0 Foul Water Drainage Strategy has been updated to suit the revised proposals. Correspondence from STW has been added to Appendix F.	JR	JD	JD	04.03.2024

EXECUTIVE SUMMARY

1. The site is at NO quantifiable risk of flooding from tidal events.

2. The property is identified within the Environment Agency Flood Risk mapping as being at very low risk of flooding from Rivers and Seas.

3. The site is identified by the Environment Agency as having a High and Medium risk of flooding from overland Surface Water.

4. The site is considered to be at a Low quantifiable risk of flooding from groundwater sources.

5. The site is identified by the Environment Agency as being at NO quantifiable risk of flooding from manmade lakes within the topographical catchment of the site.

6. The site is at a negligible risk of flooding from the existing sewerage network in the vicinity of the site.

7. The site is at a negligible risk of flooding from its own private drainage connections, however this can be mitigated by regular maintenance to ensure the ongoing performance of the system.

8. We therefore conclude that the proposed residential development is above the modelled flood level of the local watercourses and sits within Flood Zone 1 as defined in the National Planning Policy Framework September 2023 Table 1.

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1.0 INTRODUCTION

1.1.1 Farrow Walsh Consulting has been engaged by the applicant Redrow Homes Limited to produce a Flood Risk Assessment to accompany the planning application for a proposed residential industrial development to be situated at Burbage Field Farm, Hinckley.

1.1.2 The development proposals include the demolition of two existing residential properties located adjacent to Coventry Road and an existing farm with all the associated buildings and hardstand. A site location plan is included within Appendix A and the development proposals can be found within Appendix B.

1.1.3 This report considers the flood risk associated with a development proposal of this type and considers mitigation measures to ensure user safety.

1.1.4 The Flood Risk Assessment (FRA) report has been informed by the guidance contained within The National Planning Framework (September 2023, Department for Communities and Local Government) (NPPF).

1.1.5 Reference has been made to basic flood maps contained within the Environment Agency websites and the Environment Agency Standing Advice for Local Planning Authorities.

1.1.6 In consulting the Environment Agency website this report examines the following:

- Assessment of Flood risk and the likely sources of flooding
- Managing Residual Flood Risk
- Managing surface water
- Remedial Measures

1.1.7 This FRA examines the flood implications of the proposed development based on the following objectives, set out within the NPPF.

- Appraising risk
- Managing risk
- Reducing risk
- A partnership approach

1.1.8 This report has been prepared using the following policy and guidance documentation:

- National Planning Policy Guidance (NPPG)
- Ciria C753 – The SUDs Manual
- Adapting to Climate Change: Advice for Flood and Coastal Erosion Risk Management Authorities (EA - February 2016)
- Strategic Flood Risk Assessment (JBA – 2019-2020)
- Non-Statutory Technical Standards 2015
- Written Ministerial Statement regarding Sustainable Drainage (HCWS161) 2014
- The Water Framework Directive (2000)
- Building Regulations Part H 2015

1.1.9 In consulting with key stakeholders and policies this report aims to assess the risk of flooding both to the site and the impact of any development on the downstream network.

1.1.10 The flood management strategy, including consideration of safe access and egress from the site and flood resilience measures, is based on relevant British Standards (BS8533), the standing advice provided by the Environment Agency and on best engineering judgement. The approach for the FRA is based on the requirements of the Environment Agency and Hinckley and Bosworth Council.

1.1.11 Any comments and opinions expressed in this report, including any conclusions are based on the information available to Farrow Walsh Consulting Ltd at the time of writing. The conclusions therefore could differ if the information is found to be inaccurate, incomplete or misleading. Farrow Walsh Consulting Ltd. accepts no liability should this be proven to be the case, or, if additional information is made available with respect to this site.

2.0 SITE DETAILS

2.1 SITE LOCATION

2.1.1 The proposed development site is located towards the southern area of Burbage.

2.1.2 The site location is bounded by the M69 motorway to the south. The western and eastern boundaries are formed of existing properties, green fields, existing Bullfurlong Lane and Workhouse Lane. The northern boundary is bounded by Coventry Road.

2.1.3 A site location plan can be found within Appendix A.

2.2 SITE DESCRIPTION

2.2.1 The application site is irregular in shape in orientation north to south and covers a total area of 264,996m^2 or 26.5 hectares.

2.2.2 For the purpose of this report the site is classified as greenfield land, having 2 existing properties to the frontage and existing hardstand and buildings associated with the existing farm.

2.2.3 The site has existing access points already in place along Bullfurlong Lane and Workhouse Lane.

2.3 TOPOGRAPHY

2.3.1 The ground levels on the site are recorded to OS datum as between 126.91 to 103.83mAOD and the site generally slopes in a south-east direction towards the existing ditch.

2.3.2 A copy of the topographical survey can be located within Appendix C.

2.4 HYDROLOGICAL CONTEXT

2.4.1 An existing unnamed watercourse is running through the site and crosses M69 motorway and discharges into Soar Brook. Several sections of the watercourse are culverted. Please refer to Appendix K.

2.4.2 Soar Brook is a tributary of the River Soar and is located 776m south of the development site.

2.4.3 The site lies within the operation catchment of the Soar River operational catchment and the overall catchment of the Humber Basin District.

2.4.4 The site lies within upper reaches of the overall Soar operational catchment area.

2.5 GEOLOGICAL CONTEXT

2.5.1 The British Geological Society (BGS) online mapping indicates that the site geology comprises of:

- Dunsmore Gravel – Sand and gravel. Sedimentary superficial deposit
- Wolston Sand and Gravel – sand and gravel
- Oadby Member – Diamicton Alluvium – Clay, silt, and gravel

2.5.2 The bedrock is identified by the British Geological Society as Mercia Mudstone Group – Mudstone.

2.5.3 A Phase 1 ground investigation has been undertaken by the client, with an extract included within Appendix D.

2.6 GROUNDWATER VULNERABILITY

2.6.1 The bedrock stratum below the site is classified by the Environment Agency as a Secondary B Aquifer

2.6.2 In terms of vulnerability, the ground is classified as Medium Vulnerability, as can be seen in the Ground Investigation in Appendix D.

2.6.3 The site does not lie within a Source Protection Zone.

2.7 EXISTING DRAINAGE

2.7.1 Severn Trent are responsible for maintaining the public sewers within the area of Burbage and the sewer records have been obtained and can be found within Appendix F.

2.7.2 The sewer records confirm existing 355mm combined rising main crossing the development.

2.7.3 An existing Ø225mm foul sewer is located within Westminster Drive and Robinson Way which is discharging into the combined Ø450mm sewer. The combined Ø450mm sewer is crossing then private land and discharges downstream beneath De Havilland Way.

2.7.4 In the developer enquiry response received from STW states that the existing Ø450mm combined sewer doesn't have enough capacity to accommodate the additional foul flows from the new development.

2.7.5 An offline water storage tank has been installed to limit the existing network surcharge and flooding occurrence.

2.7.6 There are existing surface water sewers with a diameter between 225 – 450mm located within Coventry Road, Bull furlong Lane and Robinson Way. Ultimately these are discharging into the unnamed watercourse which crosses the development.

2.7.7 An existing spring has been located outside of the site boundary which ultimately discharges into the existing unnamed watercourse which crosses the development.

2.7.8 An existing 225Ø pipe is crossing the site on the eastern boundary. The pipe is serving the adjacent constructed development and discharges into the existing unnamed watercourse.

2.7.9 An existing unnamed watercourse is crossing the site from northwest to south east, which ultimately is crossing M69 motorway.

2.7.10 In several locations the existing ditch is culverted. Some of the existing culverts are damaged and will require to be replaces, subject to LLFA's comments and OWC technical applications.

2.7.11 Within Appendix L, more information can be found regarding existing ditch, including photos and hydraulic model results.

2.7.12 The existing topographical survey identifies manholes and below ground drainage within the site.

2.7.13 The topographical and drainage surveys can be found contained within Appendix C.

2.8 ARTIFICIAL WATER BODIES

2.8.1 There is an unnamed pond 30 metres to the east of the site. It is assumed that Workhouse Lane is has been constructed recently as part of an adjacent development.

2.8.2 Another 2 unnamed ponds are located 550m and 847m to the southeast of the new development which are assumed to serve the Amazon and DPD industrial parks.

2.8.3 Two more unnamed ponds are located adjacent to the north eastern boundary, in line with the existing watercourse.

2.8.4 Lakeside fishery is located 500m to the southwest of the development.

3.0 ASSESSMENT OF FLOOD RISK

3.1 FLUVIAL

3.1.1 The site lies in the Humber Basin Catchment and Soar Brook is classified as a main river and falls under the administrative jurisdiction of the Environment Agency.

3.1.2 The Environment Agency have derived flood maps of England from which it is possible to initially identify whether a site is located within an area that is at risk of fluvial flooding. The maps, which are available on the Environment Agency's website, categorise land as being within Flood Zone 1, Flood Zone 2 or Flood Zone 3, with Flood Zone 1 being all land falling outside of the flood plain and Flood Zones 2 and 3 being all land within the floodplain. Flood Zone 3 is split into two further categories, namely Flood Zone 3a and Flood Zone 3b with Flood Zone 3b considered to be the functional floodplain.

3.1.3 The definitions of the Flood Zones extracted from the National Planning Policy Framework (NPPF) are described below:

- Flood Zone 1 – low probability. This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding (<0.1%).
- Flood Zone 2 – medium probability. This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (15 – 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.
- Flood Zone 3a – high probability. This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.
- Flood Zone 3b – the functional floodplain. This zone comprises land where water has to flow or be stored in times of flood. Typically, land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood.

3.1.4 The extent of flooding on main rivers is indicated on the Environment Agency web site and an extract from the indicative flood maps can be seen in Figure 1. The areas of dark blue identify flooding probability of 1 percent (1 in 100 year) and the light blue areas are areas of extreme flood between the 1 percent and 0.1 percent (1 in 1000 year) probability.

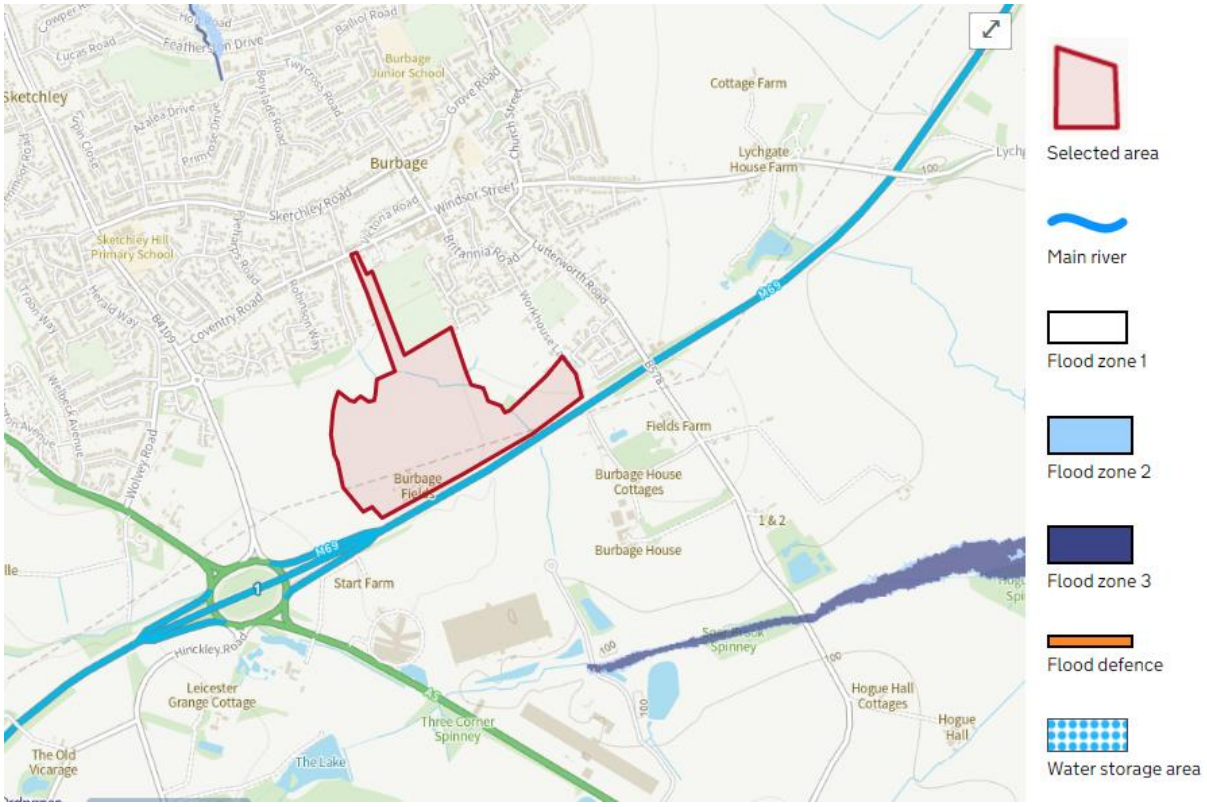


Figure 1 - Extract from EA Flood Map for Planning (January 2023)

3.1.5 It is identified on the EA indicative planning flood mapping the site lies within Flood Zone 1.

3.1.6 Based on Table 1 of the NPPF the site has a low probability of flooding due to main rivers within the extents outlined within Figure 1.

3.1.7 The SFRA indicates that no historic fluvial flood events have been recorded within the vicinity of the site.

3.2 TIDAL OR COASTAL

3.2.1 The ground levels on the site are recorded to OS datum as between 126.91 to 103.83mAOD and the site generally slopes in a south-east direction towards the existing ditch. Topographical survey can be found within Appendix C.

3.2.2 The site lies in the Humber Basin Catchment and Soar Brook is classified as a main river and falls under the administrative jurisdiction of the Environment Agency.

3.2.3 The site is indicated by mapping as being remote from the areas at risk of tidal flooding with the existing coastal defences intact or removed.

3.2.4 The site is therefore considered comprehensively free from risk from tidal or coastal flooding effects, being horizontally and vertically remote from such influences at present, and after consideration of climate change effects.

3.3 GROUNDWATER FLOODING

3.3.1 Groundwater flooding occurs as a result of rising water from underlying aquifers or from water flowing from abnormal springs. This tends to occur after long periods of sustained high rainfall, and the areas at most risk are often low-lying where the water table is more likely to be at a shallow depth. Groundwater flooding is known to occur in areas underlain by major aquifers, although it is increasingly being associated with localised floodplain sand and gravels.

3.3.2 SFRA states that in general, the majority of Hinckley and Bosworth borough is within the <25% susceptible classification, therefore it is at lower risk of groundwater flooding.

3.3.3 LLFA advised previously that high levels of groundwater were encountered on an adjacent site during construction.

3.3.4 As part of the Phase 2 Ground Investigation, groundwater monitoring should be undertaken.

3.4 ARTIFICIAL WATER BODIES FLOODING

3.4.1 All the artificial water bodies within in in the vicinity of the site are described in the paragraph 2.8.

3.4.2 The EA online mapping indicates that there are no areas within the vicinity of the site at risk of flooding from reservoirs.

3.4.3 We conclude that the risk of failure of the water main is remote. It must however be noted that for a failure adjacent to the site the nature of the escape and probable pressurized column of water could itself cause some local flood damage, but this is beyond practical mitigation.

3.4.4 The SFRA indicates there have been no recorded historic incidents of flooding due to artificial sources.

3.5 SURFACE WATER FLOODING

3.5.1 Surface water flooding occurs when natural and engineered systems drainage network capacity is exceeded and thus cannot accommodate the volume of rainfall / runoff. Surface water flooding occurs often in urban areas during extreme, high intensity, low duration rainfall events which overwhelm the local surface water drainage systems. In rural areas this type of flooding can occur during medium intensity, long duration events where saturated ground conditions prevent natural infiltration into the subsoils below the surface. Flood water arising from such events is then conveyed above ground following the topography of the surrounding land.

3.5.2 The site is located within the upper reaches of the overall catchment as on the Environment Agency catchment website. The local catchment tends east to south towards to Soar Brook from source to Soar Water Body.

3.5.3 The Environment Agency have modelled locations along critical flow paths and area situated in topographic depressions, which could flood following an extreme rainfall event when drainage capacity has been exceeded. Figure 3 indicates the predicted surface water flood risk map taken from the Environment Agency's website.

3.5.4 The EA mapping indicates that the existing unnamed watercourse that crosses the development is flooding, with the southern section being at high risk.

3.5.5 The EA Mapping indicates the following risk depth of flooding:

- Low risk depth: between 300 – 900mm
- Medium risk: between 300 and 900mm and higher than 900mm at the outfall point from the development where the ditch is culverted beneath M69 motorway
- High risk: between 300 and 900mm and higher than 900mm at the outfall point from the development where the ditch is culverted beneath M69 motorway.

3.5.6 No flooding information has been found related to this site in the SFRA.

3.5.7 Based on the above, the developer instructed JBA Consulting to undertake a hydraulic modelling study of an unnamed watercourse, which can be found within Appendix K.

3.5.8 The study revealed that the existing culvert located to the south of the boundary, culvert which crosses M69 motorway and location where the major flooding occurs, has enough capacity to accommodate the existing flows.

3.5.9 The majority of the site is considered to be at very low risk from overland flows by the EA with areas at the perimeter of the site to the north and east are noted to be low or medium risk.

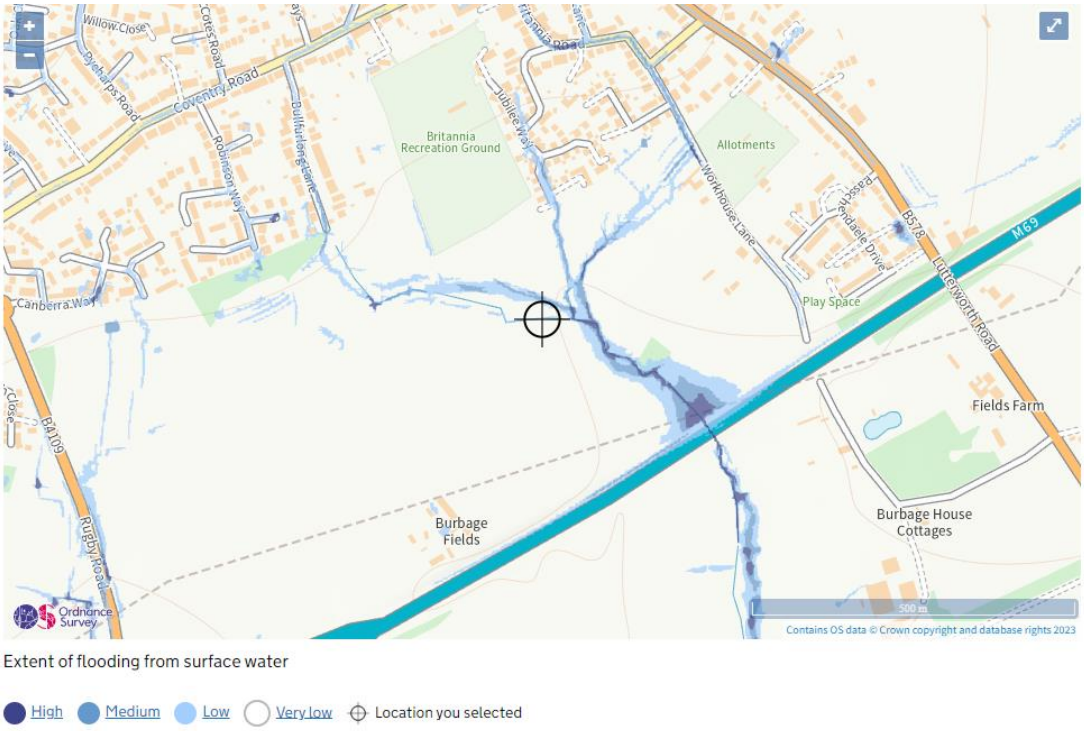


Figure 2 – Extract from the EA Mapping Risk of Surface Water Flooding (January 2023)

3.6 EXISTING SEWER FLOODING

3.6.1 The sewer network surrounding the development is owned and maintained by Severn Trent Water. A copy of the sewer records for the area can be found within Appendix F.

3.6.2 The sewer records confirm existing 355mm combined rising main crossing the development.

3.6.3 An existing Ø225mm foul sewer is located within Westminster Drive and Robinson Way which is discharging into the combined Ø450mm sewer. The combined Ø450mm sewer is crossing then private land and discharges downstream beneath De Havilland Way.

3.6.4 In the developer enquiry response received from STW states that the existing Ø450mm combined sewer doesn't have enough capacity to accommodate the additional foul flows from the new development.

3.6.5 There are existing surface water sewers with a diameter between 225 – 450mm located within Coventry Road, Bull Furlong Lane and Robinson Way. Ultimately these are discharging into the unnamed watercourse which crosses the development.

3.6.6 Generally, due to the site levels and those of the surrounding areas it is considered that any breach of the sewers would follow the natural topography of the land and drain south into the existing unnamed watercourse.

3.6.7 The site is also not recorded as a critical drainage area by the SFRA.

3.6.8 At the time of SFRA study no information was received from STW regarding existing sewer flooding.

3.6.9 The developer enquiry response received from STW states that the existing foul network is surcharged and in order to limit the existing sewer surcharge and flooding an offline tank has been installed. Please refer to Appendix F for the STW correspondence and records.

3.6.10 It should be noted that the sewerage systems are designed to accommodate the 1 in 30-year storm events and thus for storm events above this probability flooding from sewers will occur.

4.0 PROPOSED DEVELOPMENT

4.1 DEVELOPMENT PROPOSALS

4.1.1 The development proposal includes the demolition of the 2 residential properties and farm the construction of a new residential development containing 442 plots. A site location plan is included within Appendix A and the development proposals can be found within Appendix B.

4.1.2 The buildings shall be a minimum 150mm above the final ground levels to ensure that the overland flows do not enter the properties, with the exception of the level thresholds which must be provided with threshold drains to prevent flows entering the properties.

4.1.3 For the purpose of this report the site is classified as greenfield land, having 2 existing properties to the frontage and existing hardstand and buildings associated with the existing farm.

4.1.4 The current use of the application site is classed as greenfield use, with a hardstand area of 6,572m² (2.5%) which currently drains into the existing watercourse.

4.1.5 In accordance with Table 2 of NPPG (2019), a residential land use has a flood vulnerability classification of 'more vulnerable'.

4.1.6 In accordance with Table 3 of NPPG (2019), the more vulnerable development within Flood Zone 1 is appropriate.

5.0 SURFACE WATER MANAGEMENT

5.1 FLOOD RISK FROM THE DEVELOPMENT

5.1.1 In accordance with NPPG site specific flood risk assessments should consider and assess how runoff from the development will be managed and whether it will increase flood risk elsewhere.

5.1.2 The primary flood risk generated by the new development is likely to be the risk posed by overland surface water flooding due to exceedance of the existing drainage network.

5.2 EXISTING SURFACE WATER DISCHARGE

5.2.1 The existing 2 residential properties drainage network it is assumed to be drain into the existing STW located within Coventry Road.

5.2.2 Topographical survey shows existing inspection chamber and tanks which served the Burbage Filed Farm. The outfall of the existing sewers is to be confirmed.

5.2.3 All existing Severn Trent Water sewers can be seen in Appendix F.

5.2.4 For the purpose of this report the site is classified as greenfield, due to the size of the existing hardstand.

5.3 CLIMATE CHANGE

5.3.1 National Planning Policy Guidance requires that climate change be incorporated within the surface water drainage design in accordance with The Environment Agency's 'Adapting to Climate Change: Advice for Flood and Coastal Erosion Risk Management Authorities' February 2016 when assessing flood risk for a development.

5.3.2 The design life of the development is beyond 2070, therefore in accordance with the Environment Agency guidance the development should make allowances for an increase in extreme rainfall intensity of an additional 40% when compared to the 1961-1990 baseline.

5.4 PROPOSED SURFACE WATER DRAINAGE STRATEGY

5.4.1 Surface Water runoff from the proposed development should mimic, as far as possible, the surface flows from an undeveloped greenfield site.

5.4.2 Building Regulations 2010 Part H guidance for disposal of surface water is as follows:

- A soakaway or infiltration system, or where not reasonably practical;
- A surface water ditch or watercourse, or where not reasonably practical;
- A below ground sewer

5.4.3 The ground investigation undertaken on the site has advised that use of soakaways for surface water drainage may be locally feasible where sand and gravel deposits lie (northern extents), however impermeable cohesive soils are anticipated which is likely to make soakaway drainage ineffective and unfeasible.

5.4.4 LLFA advised that that high level of groundwater was encountered on an adjacent site during construction and de-watering works were required to be undertaken.

5.4.5 Based on the above, discharge of surface water using infiltration techniques is not a feasible solution.

5.4.6 Therefore, surface water disposal by the means of treatment and detention prior to controlled release into the existing unnamed watercourse which crosses the site is deemed the most appropriate solution.

5.4.7 Existing greenfield runoff rates have been calculated for the development area and can be found within Appendix I and are also shown below.

Greenfield Runoff Rates	
Storm Event	Site 26.5ha (l/s)
$Q_{BAR,GR}$	115.62
$Q_{1,GR}$	95.97
$Q_{30,GR}$	231.25
$Q_{100,GR}$	297.16

Table 1 - Greenfield Runoff Rates

5.4.8 The development area of the site is 26.5 hectares, and it is proposed that 40.3% (10.69ha) of the development will be impermeable and require collecting and attenuating prior to discharge. The above areas are based on the current site layout available contained within Appendix B.

5.4.9 It is currently proposed that the drains within the proposed access road will be offered for adoption to STW and the plot drainage will remain under private ownership.

5.4.10 It is proposed that the surface water from the development will be controlled using flow controls prior to discharge into the existing unnamed watercourse at the southern boundary, upstream of the existing culvert crossing M69 motorway.

5.4.11 A copy of the Drainage Strategy can be found within Appendix J.

5.5 PROPOSED SURFACE WATER DISCHARGE

5.5.1 Surface water drainage will be provided in new below ground gravity drains constructed around the properties, and in the shared driveways mirroring the existing runoff arrangement with surplus flows being attenuated using attenuation basins. The proposed surface water runoff rates for each parcel will match the existing greenfield runoff rates and are shown below.

Storm Event	(l/s/ha)
$Q_{1,PR}$	4.30
$Q_{30,PR}$	4.30
$Q_{100+40\%cc,PR}$	4.30

Table 2 – Proposed Discharge Rates

5.5.2 This rate is subject to approval from the LLFA.

5.5.3 By controlling the discharge rate from the site for a 1in100 year + 40% storm event the site is offering a betterment to the downstream network by utilising on site flood storage at an earlier stage in the overall river catchment potentially reducing flooding downstream.

5.5.4 All sewers and drainage are to be constructed in accordance with all relevant industry standards, including but not limited to:

- Building Regulations Approved Document Part H 2010
- Sewer Sector Design Guidance

5.5.5 The drawings & schedules of the as-built site drainage system are to be made available to the building occupier to enable drainage maintenance and future works to be undertaken.

5.6 CONSIDERATION OF SUDS

5.6.1 With reference to CIRIA 753 and the surface water treatment process, the provision of filter drains, rain gardens and attenuation basins will aid in the removal of sediment, hydrocarbons and heavy metals.

5.6.2 Rain gardens are small depressions that can act as infiltration points for clean water. These are attractive features, easy to retrofit, maintain which can reduce rate of run and some volume reduction. The rain gardens will be provided with a perforated pipe connected to the drainage system.

5.6.3 Filter drains will be located adjacent to the shared private drives (where possible). Filter drain stone will collect particles and helps to prevent pollutants from entering groundwater.

5.6.4 The Environment Agency and Leicestershire County Council require Sustainable Drainage (SuDS) techniques to be incorporated within new developments where possible.

5.6.5 Consideration should therefore be given to the use of the Sustainable Urban Drainage Systems. Table 2 below gives commentary in relation to the suitability of SuDS techniques for the proposed development.

SUDS Technique	Commentary	Suitability
Green Roof	Due to the large roof size and pitched nature of roof within the development, the option of incorporating a green roof into the development is not suitable for this site.	No
Rain Gardens	Limited, to be used to collect roof clean water and discharged into the drainage network. Final locations subject to detailed drainage design	Potential
Infiltration by Soakaway	LLFA advised previously that high levels of groundwater were encountered on the adjacent site during construction.	No
Water Butt	Storage of roof runoff via the use of water butts has the potential to be utilised.	Potential
Filter Drain	Filter strips to be located where possible adjacent private shared drives	Yes
Infiltration Trench	There is no suitable area within the site for infiltration trenches/filter trenches	No
Swale	Based on the presence of the existing watercourse, topography and proposed site layout, there is no suitable position for this feature	No
Bio-retention	There are limited areas for this to be sited, and concerns over maintenance by the private dwelling owners.	No
Permeable Paving	Permeable paving has potential to be used.	Potential
Infiltration Basin	LLFA advised previously that high levels of groundwater were encountered on the adjacent site during construction.	No
Detention Basin	Detention basins to be located to the south eastern boundary.	Yes

Table 3 – SuDs Consideration Table

5.6.6 The table above identifies that due to site constraints, the most feasible method for providing SuDS is to utilise a detention basin, rainwater gardens and filter drains.

5.7 ATTENUATION PROPOSALS

5.7.1 In accordance with current design guidelines the attenuation volume for a site should be calculated based on a 1 in 100 year + climate change allowance.

5.7.2 It is proposed that some roof areas are to be collected and drained through rain gardens and connected into the drainage system.

5.7.3 Filter drains to be located adjacent with the shared driveways, where possible and connected into the drainage system.

5.7.4 Hydraulic modelling of the drainage network to be undertaken using industry recognised software to confirm the drainage design suitability and calculations to be provided to LLFA.

5.8 MAINTENANCE

5.8.1 At this stage it has been assumed that the dwelling owners will maintain the drainage elements as outlined within this report. Future maintenance schedules for the SuDS features have been provided within Appendix L.

5.8.2 The drawings and schedules of the as built drainage are to be made available to the building owner to enable drainage maintenance and future works to be undertaken.

5.8.3 At this stage, the maintenance company has not yet been appointed and as such the applicant will be responsible until such time as they are appointed. Once appointed the contact details will be provided to the LLFA for records.

5.9 EXCEEDANCE FLOWS

5.9.1 Exceedance flows are to be contained within the site and directed away from buildings towards the areas of driveway and landscaping. The intention is to direct flows away from the building with the FFL being a minimum of 150mm above the external surrounding levels, with the exception of level threshold entrances.

5.9.2 Exceedance flow routes can be seen on the drainage strategy drawing within Appendix J.

5.10 WATER QUALITY

5.10.1 With reference to CIRIA 753 and the surface water treatment process, the provision of filter drains, rain gardens and attenuation basins will aid in the removal of sediment, hydrocarbons and heavy metals.

5.10.2 Rain gardens are small depressions that can act as infiltration points for clean water. These are attractive features, easy to retrofit, maintain which can reduce rate of run and some volume reduction. The rain gardens will be provided with a perforated pipe connected to the drainage system.

5.10.3 Filter drains will be located adjacent to the shared private drives (where possible). Filter drain stone will collect particles and helps to prevent pollutants from entering groundwater.

5.11 CONSTRUCTION SEQUENCING

5.11.1 The main drainage runs and attenuation tanks are to be constructed at the start of the programme to ensure that runoff is controlled from the site throughout the duration of the construction works. This will minimise the impact of the developed at the start of the project potentially lessening the effects of flooding downstream.

5.11.2 Protection is to be provided to the sewer through the lifetime of the works and the drainage outfalls are to have mesh grillage installed during the construction phase to prevent the entry of construction debris entering the sewer network.

5.12 DRAINAGE SUMMARY

5.12.1 The proposed surface water drainage system can be summarised as follows:

- Surface water runoff from the site will be conveyed by pipes, rain gardens and filter drains attenuated within detention basins, then discharged into the existing unnamed watercourse at a controlled rate.
- Use of rain gardens and filter drains in suitable locations.
- Detention ponds to be sized, to store runoff volumes in extreme storm events up to the 1 in 100 year +40% climate change storm event. The 10% urban creep should be considered.
- Use of Flow control to control discharge rate into the existing watercourse.
- The existing watercourse is culverted in several locations. We would recommend replacing the damaged culverts, where required.

6.0 FOUL WATER DRAINAGE STRATEGY

6.1 FOUL WATER DRAINAGE DESIGN

6.1.1 In the developer enquiry response received from STW dated December 2022 it states that the existing Ø450mm combined sewer doesn't have sufficient capacity to accommodate the additional foul flows from the new development. However, upon further review and discussions with STW they have confirmed an alternative discharge arrangement would be acceptable.

6.1.2 Due to the existing topography and existing STW sewerage, the foul of up to 377 dwellings will be pumped via an adoptable pumping station into the combined sewer located within Coventry Road and up to 65 dwellings will be pumped via a private pumping station to the 150mm Dia. S104 foul water sewer located within Flanders Close.

6.1.3 377 dwellings will be pumped at controlled rate of 4.0l/s discharging into a new manhole located between manholes 8101 & 7002. This pumping station and sewers will be offered for adoption under a S104 agreement.

6.1.4 65 dwellings will be pumped at a controlled rate of 2.5l/s into the S104 sewers located within Flanders Close. Due to the low discharge rate the pumping station and associated sewers will be private as the minimum acceptable discharge rate for a STW adoptable pumping station is 3.8l/s.

6.1.5 STW have recommended that we pursue this avenue and that the proposals have a 'very low' impact on flood risk and a 'very low' operational impact risk. Correspondence from STW confirming this is located within Appendix F.

7.0 FLOOD MITIGATION STRATEGY

7.1 PRINCIPLES FOR MITIGATION STRATEGY

7.1.1 In accordance with Table 3 of NPPG (2019), a building used for general industry has a flood vulnerability classification of 'more vulnerable'.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test Required	✓	✓	✓
Zone 3a	Exception Test Required	×	Exception Test Required	✓	✓
Zone 3b	Exception Test Required	×	×	×	✓

Table 4 – Extract from NPPG2019 (Table 3)

✓ Denotes Development is appropriate

× Development should not be permitted

7.1.2 The findings of the FRA indicate that the site is located within FZ1 and thus deemed appropriate for development in accordance with NPPG.

7.1.3 The findings of the FRA indicate that the site may be susceptible to surface water flooding when considering the impacts of climate change. As such the plots have been located outside of the extents of the existing unnamed watercourse and flooding areas.

7.1.4 All the FFL's to be 150mm above the surrounding levels.

7.1.5 The drainage to be designed to accommodate a surcharged outfall such that in extreme storm events the drainage system can accommodate the runoff.

7.1.6 Flood plain compensation area to be designed, not less than the existing one.

7.1.7 The drainage design should account for any residual risk of flooding from surface water as a result of exceedance events.

7.2 SEQUENTIAL APPROACH

7.2.1 The site is located within Flood Zone 1, however surface water flooding is observed to the existing unnamed watercourse which runs through the site. Properties and the attenuation basins have been positioned outside of the existing surface water flood extents to ensure a sequential approach is taken by trying to position buildings as far away from the source of flooding as practical.

7.3 FINISHED FLOOR LEVELS

7.3.1 Floor levels should be set such that they are a minimum of 150mm above the final surrounding ground levels.

7.4 SAFE ACCESS

7.4.1 In accordance with current guidance and DEFRA FD2320 safe access is to be provided for users in the event of flooding. Where safe access cannot be provided measures are to be implemented to ensure the users' safety until the emergency services have been able to reach them.

7.4.2 The EA online mapping indicates that the site access lies within FZ1 have therefore has a low probability of flooding. The access points lie outside the mapped extents of flooding caused by rivers and seas.

7.4.3 The mapping indicates that the main site access will encounter a flood depth between 300 and 900mm with flows over than 0.25m/s. It should be noted that the proposed access road will be designed higher than the existing levels to accommodate for the existing watercourse to be culverted and as such the risk of main road flooding is minimal.

7.4.4 The south eastern parcel of the development access is through Flanders Close. The mapping indicates the flood depths are between 300 – 900mm with flows less than 0.2m/s.

7.4.5 While the emergency vehicles will have access to the residents in extreme events, an alternative route will be available to be used, the 3.0m wide track connecting this parcel with the rest of the development will grant safe egress should extreme events occur.

7.4.6 In accordance with DEFRA FD2320 Table 13.1 shown in Figure 3 a flood depth between 300 and 900mm and a velocity over 0.25m/s would represent a danger to most, meaning the majority of users would be required to maintain a stay put approach.

Table 13.1 Danger to people for different combinations of depth and velocity

Velocity (m/s)	Depth of flooding (m)											
	0.05	0.10	0.20	0.30	0.40	0.50	0.60	0.80	1.00	1.50	2.00	2.50
0.00												
0.10												
0.25												
0.50												
1.00												
1.50												
2.00												
2.50												
3.00												
3.50												
4.00												
4.50												
5.00												

Key:
- Danger for some
- Danger for most
- Danger for all

Figure 3 - Extract from DEFRA FD2320 showing Table 13.1

7.4.7 In extreme flood events above the 1 in 1000-year (0.1%) storm event the development would operate a 'stay put' approach in extreme flooding events for residents. They would be advised to stay within the development and await assistance from emergency services.

7.5 FLOOD WARNING & EVACUATION

7.5.1 Whilst the site is considered to have a low probability of flooding from all sources, and a stay put approach can be adopted, access and egress from the site in storm events above the 1 in 100 year probability will impact on the ability of some users to be able to access / egress the site. Therefore, it is important that all users of the development are made aware of the flood warning procedures

7.5.2 By utilising the flood warning systems available it is anticipated that the residents will be able to egress from the site in a safe manner in advance of an extreme (1.0 – 0.1 percent probability) storm event occurring.

7.5.3 Flood warnings are published by the Met Office can be found here:

https://flood-warning-information.service.gov.uk/warnings

7.5.4 The Met Office Flood Forecasting Centre in conjunction with the Environment Agency publishes Flood Guidance Statements containing:

- General overview of the flood risk
- Assessment of the flood risk
- Weather warnings and flood warnings
- Specific area of concern map

7.5.5 The Met Office uses a Flood Risk Matrix (see Figure 4) to assess the likelihood against the potential impact and assigns a risk colour and level.

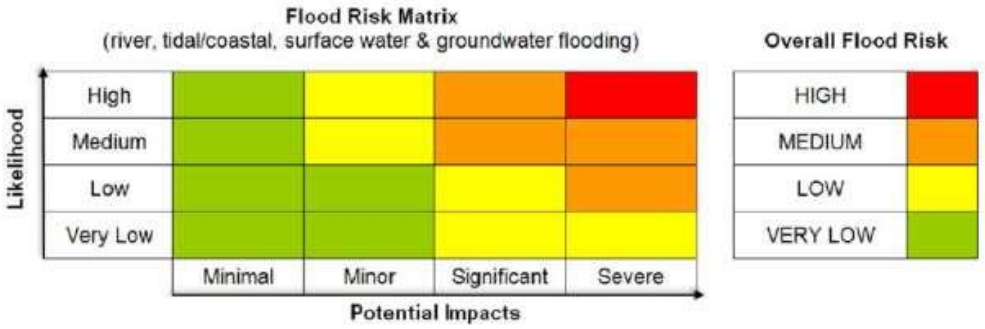


Figure 4 - Flood Risk Matrix

7.5.6 Typical examples of impacts from flooding aligned with the flood risk matrix are shown in Table 4.

Flood Impacts Table			
Minimal Impacts	**Minor Impacts**	**Significant Impacts**	**Severe Impacts**
Generally, no impact, however there may still be Isolated and minor flooding of low-lying land and roads Isolated instances of spray/wave overtopping on coastal promenades Little or no disruption to travel although wet road surfaces could lead to difficult driving conditions	Localised flooding of land and roads – risk of aquaplaning Localised flooding could affect individual properties Individual properties in coastal location affected by spray and/or wave overtopping Localised disruption to key sites identified in flood plans (e.g. Railways, utilities) Local disruption to travel – longer journey times	Flooding affecting properties and parts of communities Damage to buildings/structures is possible Possible danger to life due to fast flowing/deep water/wave overtopping/wave inundation Disruption to key sites identified in flood plains (e.g. railways, utilities, hospitals) Disruption to travel is expected. A number of roads are likely to be closed	Widespread flooding affecting significant numbers of properties and whole communities Collapse of buildings/structures is possible Danger to life due to fat flowing/deep water/wave overtopping/wave inundation Widespread disruption or loss of infrastructure identified in flood plans (e.g. railways, utilities, hospitals) Large scale evacuation of properties may be required Severe disruption to travel. Risk of motorists becoming stranded.

Table 5 - Flood Impact Table

7.5.7 The Environment Agency constantly monitors rainfall, river levels and sea conditions to forecast the possibility of flooding. If necessary, the Environment Agency can be contacted:

Incident hotline 0800 80 70 60 (24hrs)

Floodline 0345 988 1188

7.5.8 The Environment Agency Flood Warning Levels:

Warning type		Meaning	When it is used
	**Flood Alert**	Flooding is possible. Be prepared.	Two hours to two days in advance of flooding
	**Flood Warning**	Flooding is expected. Immediate action required	Half an hour to one day in advance of flooding
	**Severe Flood Warning**	Severe Flooding. Danger to life.	When flooding poses a significant threat to life.

Table 6 – Environment Agency Flood Warning Levels

8.0 SEQUENTIAL AND EXCEPTION TESTS

8.1 SEQUENTIAL TEST

8.1.1 For clarity the aim of the sequential test is to steer new development to areas with the lowest probability of flooding. Furthermore, approval of the Sequential Test lies with the Local Planning Authority.

8.1.2 The NPPF indicates that for a less vulnerable land use within Flood Zone 1, development is appropriate. Environment Agency mapping and the SFRA both indicate that the entirety of the site lies within Flood Zone 1.

8.1.3 The site is in an existing green land with 2 existing properties adjacent Coventry Road and an existing farm to the south western boundary.

8.1.4 In view of the facts as identified the applicant does not own other sites considered to be more suitable for use for residential development in the immediate vicinity.

8.1.5 The above clearly demonstrates that the sequential test would be satisfied provided it can be demonstrated that flood water will not pose excessive risk to the development, safe ingress and egress can be created and the development will not increase risk of flooding elsewhere.

8.1.6 The NPPF defines what type of development is appropriate in an individual location and seeks to guide development generally away from areas of flood risk. It nevertheless accepts implicitly that some development in areas of higher potential risk may be appropriate or indeed essential, and seeks to classify zones of risk, types of development and development suitability.

8.2 EXCEPTION TEST

8.2.1 Table 3 within the NPPF indicates that the site is appropriate for use as a more vulnerable land use due to the site being within Flood Zone 1.

8.2.2 Wider sustainable benefits to the community include:

- Potential for reduced risk of flooding elsewhere by increasing flood storage volume within the site
- Reduction in surface water runoff when compared to the existing situation delaying discharge into the watercourse and potentially providing a betterment downstream

8.2.3 The FRA demonstrates safety and flooding sustainability by:

- Maintaining floor level 150mm proud of surrounding ground level to reduce opportunity for surface water flows to run towards building.
- Controlling runoff on site to greenfield runoff rates to delay the discharge into the watercourse network.
- Safe and dry ingress and egress routes for pedestrians being available from the property to the surrounding highways.

8.2.4 There will be a significant reduction in the level of surface water runoff rate over the current land use.

8.2.5 In view of the above the exception test is deemed to have passed.

9.0 MITIGATION

9.1 FLOOD PLAIN COMPENSATION

9.1.1 The existing unnamed watercourse is flooding during extreme flood events.

9.1.2 In order to protect the proposed housing against the risks of flooding in the future climate change scenarios, the plots and associated structures have been located outside of the flooding zones associated with the existing unnamed watercourse.

9.1.3 As a future mitigation solution, it is being proposed to increase the existing flood compensation area adjacent to the outfall (culvert running beneath M69), at the source of the flooding.

9.1.4 The Developer instructed JBA Consulting to undertake a hydraulic modelling study of an unnamed watercourse, which can be found within Appendix K.

9.1.5 The report states that the maximum flood depth outside of the river channel during the 100 year with 50% climate change event is approximately 0.1m.

9.1.6 It is considered that the construction of the new development, regular maintenance of the existing ditch, increased flood compensation area to the south and controlled discharge rate into the unnamed watercourse will reduce the flooding depths in the future.

10.0 CONCLUSIONS

10.1 CONCLUSIONS

10.1.1 The site proposed for development is free of potential risk of flooding from tidal events.

10.1.2 The site is outside the extents of the mapped flood plain of main river systems while being classified as a very low risk area.

10.1.3 The site is at medium and high risk of flooding from overland flow routing from surface water.

10.1.4 The site is at a low susceptibility of flooding from groundwater sources.

10.1.5 The site is at no risk of flooding from manmade lakes.

10.1.6 The escape flow route from the strategic water mains has also been considered. In the unlikely event of failure of the mains the flows would not reach the properties.

10.1.7 The site is at no risk of flooding from existing sewerage systems for the same reason as the water mains issue.

10.1.8 The proposed surface water discharge rate matches the undeveloped greenfield runoff rates for the 1in100 year + 40% climate change combined with the use of above ground SUDS will treat and delay runoff entering the watercourse network. The hydraulic models of the proposed drainage systems have been checked using a surcharged outfall to confirm the performance of the system for extreme events.

10.1.9 The site is at a negligible risk of flooding from its own private drainage systems; however, this can be mitigated against by regular maintenance in accordance with the maintenance strategy provided within this report and channelling of flows within the development away from the properties.

10.1.10 We therefore conclude the application site lies within Flood Zone 1 as defined in the NPPF Table 1 and since the exception test for this has been passed more vulnerable development uses should be permitted.

APPENDICES

APPENDIX A – SITE LOCATION PLAN

SAFETY, HEALTH AND ENVIRONMENTAL HAZARD INFORMATION BOX

THE HAZARDS NOTED BELOW ARE IN ADDITION TO THE NORMAL HAZARDS AND RISKS FACED BY A COMPETENT CONTRACTOR WHEN DEALING WITH THE TYPES OF WORKS DETAILED ON THIS DRAWING.

CONSTRUCTION RISKS

NONE RELEVANT TO THIS DRAWING.

MAINTENANCE / CLEANING RISKS

NONE RELEVANT TO THIS DRAWING.

DEMOLITION RISKS

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General Notes

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4. Until technical approval has been obtained from the relevant Authority, it should be understood that all drawings issued are Preliminary and NOT for construction. Should the Contractor commence site work prior to such approval being given it is entirely at their own risk.
5. Sketch proposals are for illustrative purposes only and as such are subject to detailed site investigation including ground conditions / contaminants, drainage, design and planning / density negotiations.
6. All dimensions are in millimetres unless otherwise stated.
7. The Farrow Walsh Consulting Designers Risk Assessments for this project must be reviewed PRIOR to the commencement of any works on site.

NOTES

1. This drawing to be read in conjunction with all other relevant Engineers and Architect's details.
2. All work is to be carried out in accordance with the current British Standards, codes of practice and building regulations.
3. The design of any temporary works required shall be the responsibility of the Contractor.
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7. All workmanship and materials are to be to current British A15s.
8. All services are to be located and protected as necessary by the Contractor prior to the commencement of the works.
9. Any existing details which are shown on this drawing are for guidance only and are to be checked on site by the Contractor. Any variations are to be recorded and reported to the Engineer immediately.

LEGEND

Development Area

Rev	Description of updates	Drawn	Check'd	App'd	Date
A2	Plan has been updated to suit the revised plans received from Redrow Homes on 08.11.2023.	JR	EC	JD	15.11.23
A1	Issued for Approval	JR	OP	JD	15.03.23

Revision Schedule

farrow walsh
62 Highcross Street, Leicester LE1 4NN
321 Bradford Street, Birmingham B5 6ET
☎ 0330 100 0363
www.farrowwalsh.com

FOR APPROVAL

Client:
Redrow Homes Limited

Project:
Burbage Field Farm,
Bullfurlong Lane, Hinckley

Title:
Site Location Plan

Drawn:	Checked:	Approved:	Date:	Scale:
JR	OP	JD	March 2023	1:5000 @ A1

Drawing No.: **FW2285-C-000**

Revision: **A2**

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CONSTRUCTION RISKS

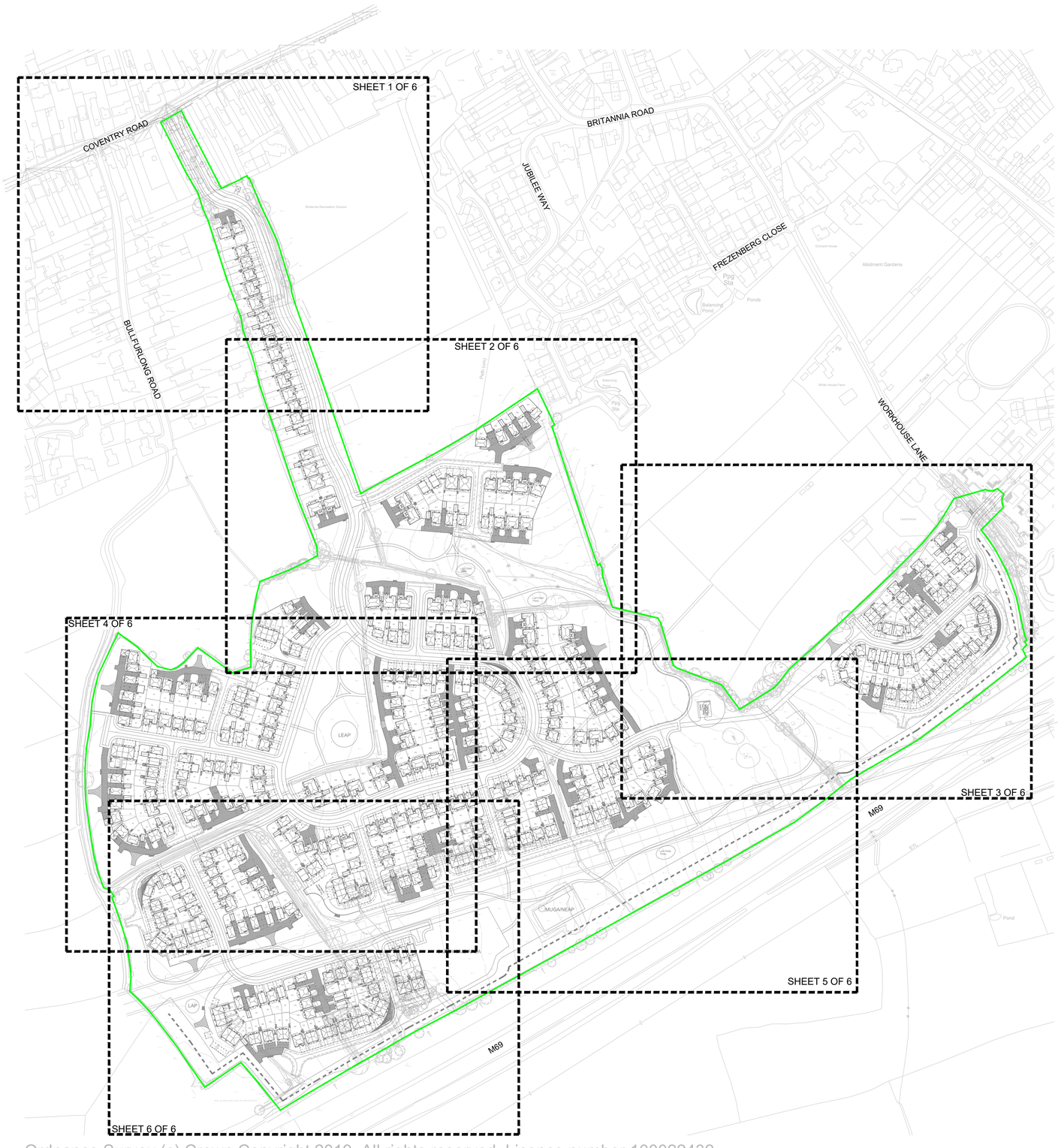
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MAINTENANCE / CLEANING RISKS

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LEGEND

Development Area

Rev	Description of updates	Drawn	Check'd	App'd	Date
A2	Plan has been updated to suit the revised plans received from Redrow Homes on 08.11.2023.	JR	EC	JD	15.11.23
A1	Issued for Approval	JR	OP	JD	15.03.23

Revision Schedule

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62 Highcross Street, Leicester LE1 4NN
321 Bradford Street, Birmingham B5 6ET
☎ 0330 100 0363
www.farrowwalsh.com

FOR APPROVAL

Client: Redrow Homes Limited

Project: Burbage Field Farm, Bullfurlong Lane, Hinckley

Title: Sheet Location Plan

Drawn:	Checked:	Approved:	Date:	Scale:
JR	OP	JD	March 2023	1:5000 @ A1

Drawing No.: **FW2285-C-001**

Revision: **A2**

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APPENDIX B – DEVELOPMENT PROPOSALS

LAND SOUTH OF BURBAGE, BURBAGE - SITE LAYOUT

SELF BUILD HOUSE MIX (PHASE 3)					
HOUSE NAME	DESCRIPTION	ABBREVIATION	QUANTITY	FLOOR AREA (sqft)	TOTAL AREA (sqft)
AMERTON	3b / 2 storey	AMER	2	1144	2288
SHERBORNE	3b / 2 storey	SHER	1	1211	1211
BEMBRIDGE	3b / 2 storey	BEMB	2	1389	2778
SALISBURY	3b / 2 storey	SALI	1	1423	1423
HENLEY	4b / 2 storey	HENL	2	1768	3536
HAMPSTEAD	5b / 2 storey	HAMP	2	1850	3700
RICHMOND	4b / 2 storey	RICH	1	2030	2030
		TOTAL	11		16966
Net site area (acres)	1.15				
Coverage (ft²/net acre)	14,753				
Average unit size (ft²)	1,542				

KEY

- Indicates brindle block paviors
- Indicates green screeding
- Indicates sewer pipe easement
- Application boundary
- Public Right of Way
- Indicates affordable housing
- Additional window
- Plot handing
- Removable ballard
- Road central line
- Service margine
- Tree line verge
- 5m acoustic barrier
- Wall and Fence
- Closed Board Fence
- Metal Estate Railings
- Timber Knee Rail
- Post and Rail

PRIVATE HOUSE MIX (OVERALL EXC. SELFBUILD)							
HOUSE NAME	DESCRIPTION	INC. STUDY	M4(2)	ABBREVIATION	QUANTITY	FLOOR AREA (sqft)	TOTAL AREA (sqft)
BUXTON	2b / 2 storey			BUXT	18	716	12888
BASLOW	2b / 2 storey		X	BASL	42	716	30072
FAIRFORD	2b / 1 storey			FAIR	4	948	3792
BLACKWELL LS	2b / 2 storey	X		BLAQ	34	832	28288
WARWICK	3b / 2 storey			WARW	18	1075	19350
AMBERLEY	3b / 2 storey		X	AMBY	8	1144	9152
AMERTON	3b / 2 storey			AMER	5	1144	5720
SHERBORNE	3b / 2 storey	X		SHER	23	1211	27853
SOMERTON	3b / 2 storey	X		SOME	12	1159	13908
OXHILL	3b / 2 storey	X	X	OXHL	33	1316	43428
CALVERTON	3b / 2 storey	X	X	CALV	10	1482	14820
BEMBRIDGE	3b / 2 storey	X	X	BEMB	36	1389	50004
OAKLEY	3b / 2 storey	X	X	OAKL	13	1392	18096
SALISBURY	3b / 2 storey	X		SALI	13	1423	18499
HENLEY	4b / 2 storey		X	HENL	18	1768	31824
HAMPSTEAD	5b / 2 storey		X	HAMP	31	1850	57350
RICHMOND	4b / 2 storey		X	RICH	20	2030	40600
				TOTAL	338		425644
AFFORDABLE HOUSE MIX (20%)							
SPEY	1b / 2 storey			**MAIS G**	14	546	7644
	1b / 2 storey			**MAIS F**	14	592	8288
BUNG	2b / 1 storey			BUNG	3	665	1995
TAVY	2b / 2 storey			TAVY	28	823	23044
DART	3b / 2 storey			DART	17	896	15232
TWEED	4b / 2 storey		X	TWEE	8	1024	8192
				TOTAL	84		64395
				GRAND TOTAL	422		490039

Gross site area (acres)	65.48						
Net site area (acres)	32.45						
POS area (acres)	0.00						
Coverage (ft²/net acre)	15,101						
Average unit size (ft²)	1,161						

Revision	Date	Amendment	Initials

Drawing Status: PRELIMINARY / PLANNING / CONSTRUCTION ✓

Development	LAND SOUTH OF BURBAGE
Location	BURBAGE
Marketing Name	
Drawing Title	SITE LAYOUT
Drawing Number	1693-08-02-100
Revision	
Scale @A0	1:1000
Drawn By	DL
Date Started	OCT 23
Checked by	
Date	

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Redrow House, Kinsall Green, Wilnecote, Tamworth
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Legal Disclaimer TBC

This layout has been designed after due consideration of our Context & Constraints Plan

APPENDIX C – TOPOGRAPHICAL SURVEY



STANDARD ABBREVIATIONS

AV	AIR VALVE	PGM	PERMANENT GROUND MARKER
BOL	BOLLARD	PRF	POST & RAIL FENCE
BS	BUS STOP	PS	PAVING SLABS
BT	BRITISH TELECOM IC	PWF	POST & WIRE FENCE
BW	BRICK WALL	RE	RODDING EYE
BWF	BARBED WIRE FENCE	RL	RIDGE LEVEL
CATV	CABLE TV IC	RP	REFLECTOR POST
CBF	CLOSE BOARDED FENCE	RS	ROAD SIGN
CL	COVER LEVEL	RSJ	ROLLED STEEL JOIST
CLF	CHAIN LINK FENCE	RW	RETAINING WALL
CM	CABLE MARKER	RWP	RAIN WATER PIPE
CONC.	CONCRETE	SAP.	SAPLING
CP	CATCH PIT	SFL	SOFFIT LEVEL
CPF	CONCRETE PANEL FENCE	SL	SILT LEVEL
CSL	COVER SLAB LEVEL	SMH	SURFACE MANHOLE
(dilap)	DILAPIDATED	SNP	STREET NAME PLATE
(dis)	DISUSED	SP	SIGN POST
DK	DROP KERB	ST	STAY(S)
DPC	DAMP PROOF COURSE	STCH.	STANCHION
DSW	DWARF STONE WALL	SV	STOP VALVE
EL	EAVES LEVEL	SVP	SOIL & VENT PIPE
ELEC.	ELECTRICITY	SW	STONE WALL
EP	ELECTRICITY POLE	TCB	TELEPHONE CALL BOX
FB	FLOWER BED	TEL	TELEPHONE
FFL	FINISHED FLOOR LEVEL	TL	TRAFFIC LIGHTS
FH	FIRE HYDRANT	TM	TARMAC
FL	FLOOR LEVEL	TP	TELEGRAPH POLE
FMH	FOUL MAN HOLE	TR	TRANSFORMER
FP	FLAG POLE	U/S	UNDERSIDE
GY	GULLY	UTL	UNABLE TO LIFT
GAS	GAS VALVE	VP	VENT PIPE
HW	HEAD WALL	WM	WATER METER
IC	INSPECTION COVER	WO	WASH OUT
IL	INVERT LEVEL	WT	WATER TAP
IRF	IRON RAIL FENCE	WV	WATER VALVE
KO	KERB OUTLET	F/Cr	FLOOR TO CROWN HEIGHT
LB	LETTER BOX	F/H	FLOOR TO HEAD HEIGHT
LP	LAMP POST	F/S	FLOOR TO SILL HEIGHT
MH	MAN HOLE	F/Sp	FLOOR TO SPRINGING
OH	OVERHEAD	S/Cr	SILL TO CROWN HEIGHT
PO	POST/POLE	S/H	SILL TO HEAD HEIGHT
PF	PANEL FENCE	S/Sp	SILL TO SPRINGING
CB	CONTROL BOX	Tac	TACTILE PAVING
FRL	FLAT ROOF LEVEL		
■	PEG/MARKER	STN 2	SURVEY STATION
+12.34	SPOT LEVEL	—11.50—	CONTOUR VALUE

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SURVEYING

Client:
Redrow Homes Ltd

Project:
Coventry Road
Burbage

Title:
Site Survey
Sheet 1 of 4

Date: Nov 2019 **Scale:** 1:500 @ A0
Drawn by: ICP **Checked by:** XXX

Job No.	Drg No.	Rev.
S 219	1067	A

Scale Check:

1:1250 - 0 10m 20m 30m 40m 50m 60m 70m 80m
1:100 - 0 1m 2m 3m 4m 5m 6m 7m
1:50 - 0 1m 2m 3m
1:500 - 0 10m 20m 30m

A0 SHEET SIZE
1189 x 841 mm

291750 N
447200 E
291700 N
447200 E
291650 N
447200 E
291600 N
447200 E
291550 N
447200 E
291500 N
447200 E
291450 N
447200 E
291400 N
447200 E

Note: All water levels taken w/b 04th Nov 2019

STANDARD ABBREVIATIONS

AV	AIR VALVE
BO	BOLLARD
BR	BRICK WALL
BRT	BRICK TELEGRAPH 'C'
BW	BARBED WIRE FENCE
CBF	CHAIN LINK FENCE
CBW	CHAIN BOARDED FENCE
CH	CHIMNEY
CLF	CLOSE LINK FENCE
CW	CHAIN WIRE
CP	CONCRETE POST
CPF	CLOSE POST & PANEL FENCE
CT	CENTRE TUBE LEVEL
D	DRAIN
DF	DRAIN FLOOR
DP	DRAIN INSPECT COVER
DW	DRAIN WATER PIPE
EB	ELECTRIC BOX
EP	ELECTRIC POLE
FB	FLOWER BED
FC	FLOOR CLOSING
FL	FLOOR LEVEL
FP	FLOOR PANEL
GP	GUARDPOST WINDOLE
GT	GUARDPOST WOOD SUPP.
HH	HOSE HYDRANT
HT	HYDRANT
IC	INSPECTION CHAMBER
IL	INVERT LEVEL
LP	LAMP POST
MH	MANHOLE
NF	NEW FENCE
OF	OPEN FENCE
OH	OVERHEAD WIRES
PC	PEDESTRIAN CALL BOX
PH	PUBLIC PHONE
PO	POST
RB	RAILING
RP	REMOVABLE POLE
RW	RAINWATER
SP	SIGN POST
TB	TRIANGLE TO LEFT
TC	TRIANGLE
TP	WATER TAP
WC	WATER COCK
WT	WATER TANK
FCOV	FLOOR TO CROWN HEIGHT
FCR	FLOOR TO HEAD HEIGHT
FSC	FLOOR TO SOFFIT
FTC	FLOOR TO STRINGER
ECH	EAVES TO HEAD HEIGHT
ECV	EAVES TO CROWN HEIGHT
OP	OUTLET PIPING

STN 2 SURVEY STATION
11.50 CONTOUR VALUE
108.45 SPOT LEVEL

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Redrow Homes Ltd

Project:
Coventry Road
Burbage

Title:
Site Survey
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A0 SHEET SIZE
1189 x 841 mm

Note: All water levels taken w/b 04th Nov 2019

STANDARD ABBREVIATIONS

AV	AIR VALVE	PFM	PERMANENT GROUND MARKER
BH	BOX HEDGE	PF	POST & RAIL FENCE
BT	BRITISH TELECOM 'A'	PWF	POST & WIRE FENCE
BW	BRICK WALL	RE	RAILWAY LINE
CBW	BRICK/ BLOCK WALL	RB	RODDING EYE
CPW	CABLE BOUNDRY FENCE	RS	REFLECTOR POST
CP	CABLE POLE	RW	RETAINING WALL
CTW	CABLE LINK TOWER	RWF	RETAINING WALL JOINT
CW	CABLE MARKER	SWI	SAN WATER PIPE
CL	CABLE TV	SL	SIGN
CH	CATCH PIT	SP	SPOT LEVEL
CWF	CHAIN LINK FENCE	SW	STORM WATER
CBL	CENTRE SUB LEVEL	SMH	SURFACE MANHOLE
CF	CHAIN FENCE	SVP	SURFACE WATER PIPE
DW	DRAIN	TP	TEE POST
DMH	DRAIN MANHOLE	TEL	TELEPHONE
DCH	DRAIN CHAMBER	TC	TELEPHONE CABLE
DWF	DRAIN WATER COURSE	TBM	TEMPORARY BENCH MARK
EW	ELECTRIC WALL	TH	TERMINAL
EL	ELECTRICITY	TP	TRANSFORMER POLE
EP	ELECTRICITY POLE	TRANS	TRANSFORMER
FL	FLORENCE ROOM LEVEL	TW	TRAVERSE WALL
FH	FIRE HYDRANT	TS	TURNING
FP	FLAG POLE	UP	UTILITY POLE
FW	FOCE WIRE FENCE	VC	VENT CONDUIT
GT	GATE	VP	VENT PIPE
GV	GAS VALVE	VL	VERGE TO LEFT
GW	GATE WAY	VR	VERGE TO RIGHT
HW	HOOK WALL	WV	WATER VALVE
HT	HYDRANT TOWER	WT	WATER TANK
IL	INVERT LEVEL	WC	WATER TROUGH
LP	LAMP POST	WM	WATER METER
LB	LETTER BOX	TOCH	TO CROWN HEIGHT
MH	MAN HOLE	TOEH	TO EAVES HEIGHT
MO	MAST ARM	TOGH	TO GUTTER HEIGHT
PO	POST HOLE	TOSH	TO SILL HEIGHT
PB	POST BOX	TOWH	TO WIRE HEIGHT
PC	POWER CONTROL BOX	TOP	TOP OF BANK
PBL	FLAT ROOF LEVEL	TOE	OUTLE PIPING

ETR 2 SURVEY STATION

11.50 CONTOUR VALUE

12.34 SPOT LEVEL

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Client: Redrow Homes Ltd

Project: Coventry Road Burbage

Title: Site Survey Sheet 3 of 4

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APPENDIX D – PHASE 1 GEO-ENVIRONMENTAL DESK STUDY

RLRE Consulting Engineers

Burbage Fields, Burbage

Phase 1

Geo-environmental

Desk Study

BURBAGE FIELDS, BURBAGE

PHASE 1 GEO-ENVIRONMENTAL DESK STUDY

For

REDROW HOMES LTD.

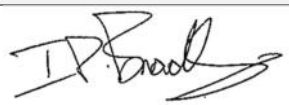
DATE: 30th September 2020

REV: P01

P20-291

Document Reference & Control

Project Name:	**Burbage Fields, Burbage**
Project Reference:	**P20-291**
Report Title:	**Phase 1 Geo-environmental Desk Study**
Client:	**Redrow Homes Ltd.**
Document Reference:	**20291-RLE-20-XX-RP-O-0002**
Report Status:	**Final**

Approval Status	Name & Position	Signature
Prepared by:	Ian Bradley IEng MICE	
Reviewed by:	James Bee MSci PDip FGS Principal Engineer	
Approved by:	James Bee MSci PDip FGS Principal Engineer	

Revision Status	Date	Summary of Revision
P01	30/09/20	First issue to client

Executive Summary

This summary presents the salient points of the report and should not be referred to in isolation.

Instruction	In September 2020 Redrow Homes Ltd commissioned Rodgers Leask Environmental (RLE) Ltd to compile a Phase One Desk Study for a site at Burbage Fields, Burbage, Leicestershire.
Site Location and Description	The site is located between the M69 Motorway (to the south) and the village of Burbage (to the north) in Leicestershire. The site comprises 7 No. grass pasture fields which are generally separated by hedgerow, trees and post and rail fencing. A farm and associated barns are present in the south and 2 No. residential properties are in the far northern extemes. A high voltage electricity line crosses the southern extents and a stream/unnamed river crosses the site.
History	The site has generally remained greenfield for much of its history. Burbage Fields Farm has existed in the southern site area from before 1886. Fieldgate Pit existed in the far northern site area, from before 1886 to about the 1920s. Residential properties were constructed by 1938 and remain on this area. Allotment gardens occupied the northern site area from about 1920s to the 1990s. An overhead electricity line was constructed across the southern site extents in the 1930s with additional lines added and subsequently rerouted and or removed in subsequent years. The original line remains to date.
Geology	Superficial deposits – Oadby Member (Glacial Till) beneath majority of the site. Alluvium along the far eastern boundary. Wolston Sand & Gravel Member mapped beneath the northern area. Dunsmore Gravel - Sand & Gravel mapped in the far northern extents. Bedrock comprises the Mercia Mudstone Group.
Hydrogeology	Alluvium and Sand & Gravel Members – Secondary A Aquifers. Oadby Member – Secondary Undifferentiated. Mercia Mudstone Group – Secondary B Aquifer.
Mining	Negligible risk.
Hydrology	Unnamed Inland River recorded crosses the northern half of the site then following the eastern/south eastern boundary.
Ecology and Wildlife	The site is within a SSSI impact assessment zone but is not itself within a SSSI.
Archaeology	Heritage Gateway website indicates that there are medieval records on the site itself with medieval and roman activity in the locality. Early consultation with the Local Authority is recommended to confirm the requirements for surveys.

UXB Risk	Regional Unexploded Bomb Risk maps obtained from Zetica indicates that the site is in a low risk area for Unexploded Bombs (UXB).
Flood Risk	Available information would suggest that there is a low risk of flooding. However, this preliminary risk assessment should be confirmed by carrying out a Flood Risk Assessment (FRA) for the site.
Public Register Information	No records on site and limited records within surrounding area. Site is not classed as contaminated land under the Environmental Protection Act 1990.
Potential Contamination Issues	Moderate/ Low risk to human health receptors. Moderate/ Low risk to controlled waters. Moderate gassing risk associated with Alluvium, Fieldgate Pit and M69 motorway embankment. Ground investigation required to confirm the contamination/gas risk.
Foundations and Geotechnical issues	Intrusive works shall be required in order to identify ground conditions and provide foundation recommendations for the site. The geology suggests that traditional strip/trenchfill foundations are likely to be appropriate across the majority of the site, subject to verification by intrusive investigation. Deepened strip/trenchfill foundations or piled foundations may be required where Alluvium is mapped in the east, and where foundations are within the influence of trees (adjacent trees and hedgerows); a tree survey is recommended. A medium VCP is anticipated for cohesive strata. Instability and groundwater may be encountered within the Alluvium and Sand and Gravel deposits; allowance for shoring and localised dewatering should be made.
Drainage	The geology suggests use of soakaways for surface water drainage may be locally feasible where sand and gravel deposits lie (northern site extents). Generally however, impermeable cohesive soils are anticipated which is likely to make soakaway drainage ineffective and unfeasible. Alternative solutions should be considered, such as on site attenuation and positive discharge to an appropriate outfall (the on site unnamed river may be an option).

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Appendix E: BGS Borehole Records
Appendix F: CLR 11 Terminology

1.0 Introduction

1.1. Terms of Reference

In September 2020, Redrow Homes Ltd commissioned Rodgers Leask Environmental (RLE) Ltd to compile a Phase One Desk Study (DTS) for a site at Burbage Fields, Burbage, Leicestershire LE10 3AS.

1.2. Proposed Development

No specific development plans were available at the time of writing however, It is understood that the site will be redeveloped into a new residential development with associated infrastructure.

1.3. Objectives

The objectives of the investigation were to:

- Obtain desktop study information to assist in the assessment of potential environmental and ground related issues that may have implications for proposed development.
- Produce a conceptual model for the site using the findings of the desktop study.

1.4. Scope

In order to achieve the outlined objectives, the scope of the study encompassed:

- A site walkover survey.
- A study of historical maps.
- Review of geological and mining information.
- An examination of regulatory authority information.
- A screen for unexploded bombs (UXB).
- Production of a conceptual model.

Mineral rights assessment is outside the scope of this study.

1.5. Pernicious Plants

No assessment has been made for the presence of pernicious plant species e.g. Japanese Knotweed, Giant Hogweed, within the remit of this investigation.

1.6. Limitations and Confidentiality

All conclusions and recommendations made within this report are based upon and limited to the factual information obtained as part of this investigation. No responsibility can be taken by RLE Ltd for information obtained by third parties and it has been assumed that all third-party information provided is true and correct.

RLE Ltd has undertaken the work in accordance with our understanding of current best practice at the time of undertaking the report. Further assessment and revision of the report may be required should new information come to light or legislation/changes to best practice be introduced after the date of issue of the report.

RLE Ltd has prepared the report for the sole use and reliance of the Client. The report may not be used or relied upon by any unauthorised third party without the explicit written agreement of RLE Ltd.

The interpretive work undertaken within this report remains the intellectual property of RLE Ltd and must not be divulged to any commercial third-party without prior written agreement of RLE Ltd.

2.0 Site Location and Description

2.1. Site Location

The site is located between the M69 Motorway (to the south) and the village of Burbage (to the north) in Leicestershire, and is approximately centred on National Grid Reference 444031E, 291670N.

The site location and extents plan is given in Appendix A.

The land within the red line boundary will henceforth be referred to as the "site".

2.2. Site Description

A site walkover was undertaken by RLE on 24th September 2020. The purpose of the site walkover was to provide a general description of the site. Detailed surveys such as wildlife or tree surveys were outside the scope of this report.

The site has an irregular outline and covers an area of approximately 21.8 hectares (ha). The site was accessed from Workhouse Lane to the east and Bullfurlong Lane to the west. Vehicular access is feasible from Bullfurlong Lane but not Workhouse Lane. Site levels generally fall towards the centre, where a ditch and small stream flows approximately northwest to southeast.

The site comprises 7 No. grass pasture fields which are generally separated by hedgerows, trees and post and rail fencing. A farm and associated barns and outbuildings are present in the south of the site at the southern end of Bullfurlong Lane. At the time of the walkover the fields were grazed by a small herd of cattle. 2 No. houses and gardens are also located in the far northern site extents, off Coventry Road.

Pertinent features of the site comprise:

- Overhead electric power cables (assumed 132kV) pass over the site at approximately 20-30m height, trending east to west through the southern site extents.
- Overhead electric power cables (assumed 11kV) pass over the site at approximately 6-10m height, trending east to west through the centre of the site. This cable terminates with a transformer at a wooden pole close to the farm in the south-centre of the site and is assumed to continue underground.
- Several soil and rubble mounds are present in the south of the site, to the east of the farm. Several stockpiles appear recent whilst others are grassed over.

- Farm machinery including trailers, spreaders and cultivators was noted in the southwest of the site adjacent to the farm.
- A public footpath crosses the west of the site from north to south, from Bullfurlong Lane (near to the farm) towards Burbage in the north. Several users of this right of way were noted during the walkover.
- A ditch with a small stream runs from northwest to southeast through the centre of the site. An area of waterlogged ground with reeds was noted in the north of the site close to this stream, possibly indicating a spring.
- A possible animal burrow (likely fox or rabbit) was noted in a hedgerow along the western boundary with Bullfurlong Lane.

Photographs and a site features plan are located in Appendix B.

2.3. Site Boundaries

The site boundaries generally comprise the following:

- Hedgerows to the west (with Bull Furlong Lane beyond) and eastern perimeter.
- Residential fencing/properties to the north leading to Coventry Road.
- Timber post and rail fencing along the southern boundary with the M69 motorway beyond.

2.4. Site Access

Vehicular access to the site is gained from Bullfurlong Lane situated adjacent to the western site boundary. There are however numerous field boundaries across the site, predominantly comprising hedgerows.

2.5. Surrounding Area

The land use beyond the site boundaries consists of:

- M69 motorway to the south with fields/agricultural land beyond.
- Agricultural land to the west, northwest and northeast.
- Residential land to the north and northwest.

3.0 Historical Review

3.1. Ordnance Survey Maps

Historical Ordnance Survey Maps at various scales have been obtained via an Emapsite MapInsight Report in order to review the historical land use on the site. These maps are presented within Appendix C.

A summary of the historical features is as follows:

Map Date	Site Feature	Adjacent Features
1886 1:10,000	Site comprises greenfield land devided by numerous fields. A stream flows ~west to east across the northern extents. Burbage Fields Farm lies to the south. Fieldgate Pit (possibly shown as a pond) in the far northern extents on/adjacent Three Pots Lane. Two footpaths are shown. One runs ~north to south the other ~northwest to south east.	Burbage village is located to the northeast. Surrounding land is predominantly agricultural.
1888 1:2,500	Three small ponds in the western extents.	No significant change.
1901 1:10,00	No significant change.	A hosiery manufactury is located at about 250m to the northeast.
1923 1:10,000	Fieldgate Pit is no longer shown. Allotment gardens occupy the far northern extents.	Allotment gardens to the west of the northern site extents. Three Posts Road has been renamed Coventry Road.
1938 1:10,00 1:2,500	An electricity line (with three pylons) crossing ~west to east. A small building (likely house) is located in the far northern extents (off Coventry road).	An additional hosiery factory is located at about 200m to the west.
1950-55 1:10,000	No significant change.	No significant change.
1959-60 1:1,250	Some small rectangular buildings are shown within the northern area of the site associated with the allotment gardens.	

Map Date	Site Feature	Adjacent Features
1963-68 1:10,000	An additional overhead electricity line is shown in the far southwest extents heading south and connected tangentally to the existing line.	A spring is shown adjacent the site to the east.
1977-79 1:10,000	An additional building (probable house) is shown in the far northern extents. Alterations to the overhead electricity line evident. The electricity pylons appear to have been replaced and now comprise two pylons. The additional electricity line (shown in 1968) is no longer shown. Three additional lines fan out (off site) from the southwest marginally encroaching the far southwest extents.	A cutting associated with the construction of the M69 motorway is shown adjacent the site to the south.
1986 1:2,500	A pond has been constructed within the south eastern site area. Further alterations to the overhead electricity line are evident with the three additional lines (shown in 1977) relocated ~40m south off site.	No significant change.
1993	A pond is shown in the western site area. The allotments are no longer shown and the associated buildings/sheds removed.	No significant change.
2010 1:10,000	No significant change.	No significant change.
2020 1:10,000	The ponds are no longer indicated.	No significant change.

3.2. Summary

The site has generally remained greenfield for much of its history. Burbage Fields Farm has existed in the southern site area from before 1886. Fieldgate Pit existed, in the far northern site area, from before 1886 to about the 1920s. Residential properties were constructed by 1938 and remain on this area. Allotment gardens occupied the northern site area from about 1920s to the 1990s.

An overhead electricity line was constructed across the southern site extents in the 1930s with additional lines added and subsequently rerouted and or removed in subsequent years. The original line remains to date.

The surrounding area has predominantly comprised agricultural land with residential properties to the north. The M69 Motorway was constructed adjacent to the south of the site by about 1980 and included an embankment close to the site boundary. Several off site hosiery works were located within the vicinity of the northern site area from the 1900s.

4.0 Geology, Hydrology, Hydrogeology and Mining

Information regarding the geological and associated conditions at the site has been obtained via a GroundSure Enviro + Geo Insight report, a copy of which has been included within Appendix D.

4.1. Geology and Hydrogeology

Information considered pertinent to the site is presented below.

	Geological Unit	Permeability	Aquifer status
Made Ground	None recorded.	N/A	N/A
Superficial Deposits	Oadby Member - Diamicton – covers majority of the site.	Mixed flow– low to moderate	Secondary Undifferentiated: Assigned where it is not possible to attribute either category A or B to a rock type. In general, these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type
	Wolston Sand & Gravel Member – mapped beneath northern corner of site only.	Intergranular – high to very high	Secondary A: Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
	Alluvium – Sand with Clay and Gravel – mapped along far eastern boundary only.	Intergranular – high to very high	Secondary A
	Dunsmore Gravel - Sand & Gravel – mapped in the far northern extents.	Intergranular – very low to high	Secondary A
Bedrock Geology	Mercia Mudstone Group	Fracture flow type- low.	Secondary B: Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeable horizons and weathering. These are generally the water-bearing parts of the former non-aquifers.

4.1.1. Structure

No linear bedrock features are mapped on site or within the site vicinity.

4.1.2. BGS Borehole Records

There is 1 No. BGS borehole recorded on site and 4No. within close proximity of the site. All boreholes run on or adjacent to the southern site boundary and are likely associated with the construction of the M69 motorway. These are summarised below and presented in Appendix E:

BGS Borehole Reference	Depth	Strata Encountered	Comments
On site SP49SW32	9.0m	GL-0.3m: Topsoil 0.3-2.4m: Brown silty clayey sand and sandy clay with stones 2.4-4.60m: Gravel and brown silty clayey sand. 4.6-6.0m: Soft grey sandy boulder clay with traces of marl and chalk 6.0-9.0m: Firm grey sandy very silty clay with bands of silty calcareous sand, small stones and traces of chalk.	
Off site SP49SW30 SP49SW31 SP49SW33 SP49SW34	1.0m – 8.5m	Generally initial topsoil 0.2m to 0.45m thick, underlain by Stiff (soft in places) boulder clay with occasional silty/sandy bands.	Generally dry with seepages 2-4m depth.

4.1.3. Groundwater Body

The site lies within the Soar and Tame Anker Mease - Secondary Combined water bodies (GB40402G990600 and GB40402G990800 respectively). These are indicated to have a good chemical rating in 2015.

4.1.4. Groundwater Abstractions

There are 7 No. historical groundwater abstraction licenses between 201m-640m from the site related to general farming and domestic use.

There are 4 No. active licenses between 556m and 661m from the site for spray irrigation storage.

4.1.5. Source Protection Zone

There are no Source Protection Zones within 500m of the site boundary.

4.1.6. Groundwater Vulnerability and Soil Leaching Potential

The underlying superficial Secondary Aquifer is classified as Medium Vulnerability (intermediate between high and low vulnerability).

The underlying bedrock Secondary Aquifer is classified as Low Vulnerability; areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils.

4.1.7. Soluble rock risk

Significant soluble rocks are not recorded on site.

4.2. Hydrology and Flooding

	Summary	
Surface Water Features	On-Site: Unnamed Inland River recorded crossing the northern half of the site then following the eastern/south eastern boundary flowing approximately east across the site and then south along the site boundary. 10No. water features listed as inland river, lake, loch or reservoir are recorded, one of which is recorded as underground. Off-Site: The Unnamed Inland River heads north and south respectively as it leaves the site. 3No. off-site records for water features within 250m of the site boundary are associated with the river.	
Surface Water Body catchment	Soar Brook from Source to Soar water body ID GB104028042590.	
Biological & Chemical Data	No biological or chemical data is available on site. The Soar Brook from Source to Source water body had a good chemical and poor ecological rating in 2016 at 1448m northeast of the site (upstream).	
Surface Water Abstractions	1 No. active record at 983m south east from the site related to spray irrigation storage.	
Flood Risk	*Risk of Flooding from Rivers and Seas (RoFRaS)*	On-site: No records 0-50m: No records
	Historical Flood Events	No records
	Flood Zones	On-site: No records
	Surface Water Flooding	Highest risk on site: 1 in 30 year, 0.3- 1.0m depth in the northern site extents and along the eastern boundary (associated with the inland river). Highest risk within 50m: 1 in 30 year, 0.3- 1.0m depth

	Summary	
	Groundwater Flooding	Highest risk on site: Moderate associated with Wolston Sand and Gravel in northern extents. Low risk elsewhere. Highest risk within 50m: Moderate

4.3. Radon

The site is not in a radon affected area, as less than 1% of properties are above the action level. Therefore, radon protective measures are not required for new developments.

4.4. Mining and Ground Workings

	Summary
Ground Workings Map	*Historical:* *On-site* 8No. records including 4No. ponds (mapped 1938), 2 No. unspecified pits (mapped 1886 and 1901 and likely associated with the Fieldgate Pit) and 2 No. cuttings (mapped 1977 and 1983 associated with the M69 motorway, which are not actually on the site but abut the southern site boundary). *Off-site* 16No. records within 250m of the site. These include 2 No. cuttings (associated with the M69) and 14 No. ponds.
Underground Workings	No records on site.
Mining and Extraction	No records on site.
Coal Mining	The site is not located within a Coal Mining Area.
Non-Coal Mining / Mineral Extraction	No records on site.
Non-Coal Mining Cavities / Natural Cavities	No records on or within 500m of the site boundary.
Brine / Gypsum Extraction	No records on or within close proximity to the site.
Clay Mining	No records on or within close proximity to the site.

4.5. Potential for Natural Ground Subsidence

Hazard	Hazard Rating	Comments
Shrink -Swell Clays	Low across majority of site. Negligible in the northern extents associated with recorded sand and gravel deposits and very low along the eastern boundary associated with alluvium deposits.	Ground conditions predominantly medium plasticity. Non-plastic where sand and gravel is present. Low plasticity where alluvium is present.
Running Sands	Very low across the vast majority of the site. Low associated with Alluvium along the eastern boundary.	Running sand conditions may be present along the eastern boundary and unlikely elsewhere.
Compressible deposits	Moderate associated with Alluvium along the eastern boundary. Negligible elsewhere.	Compressibility and uneven settlement hazards are probably present associated with the alluvium. Land use should consider specifically the compressibility and variability. Elsewhere, accorss the majority of the site, compressible strata are not thought to occur.
Collapsible deposits	Negligible across the vast majority of the site. Very low associated with Alluvium along the eastern boundary.	Deposits with potential to collapse when loaded and saturated are believed not to be present over the vast majority of the site and unlikely to be present associated with alluvim deposits along the eastern site boundary.
Landslides	Very low	Slope instability problems are not likely to occur
Ground dissolution of soluble rocks	Negligible	Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.

4.6. Estimated background soil chemistry

The following estimates are provided for the site based upon Rural soil:

Arsenic mg/kg	Cadmium mg/kg	Chromium mg/kg	Nickel mg/kg	Lead mg/kg
15	1.8	60-90	15-30	100

4.7. Railways and Tunnels

4.7.1. Tunnels

No records of tunnels are identified within or within 250m of, the site boundary.

4.7.2. Historical Railways

3 No. records of tunnels are identified 92m northeast of the site.

4.7.3. Active Railways

No records of active railways are identified within the site boundary, or within 250m of the site.

4.7.4. HS2

The site does not lie within 500m of HS2.

4.8. Coal Authority records

The site does not lie within a Coal Authority Reporting area and hence there are no records of coal mining activities for the site.

5.0 Environmental Database records and UXO

5.1. Regulatory data

Data regarding Environment Agency and Local Authority regulatory information has been obtained via an Emapsite Enviro + Geo Insight report, a copy of this is contained within Appendix D.

The EnviroInsight report contains factual information which is produced from a database of records which have been obtained from various sources including; Local Authorities, Environment Agency, National Radiological Protection Board and English Nature. Only the information considered pertinent to the site has been included below.

Category		Summary
Historical Industrial Sites From 1:10,000 Mapping	*Potentially contaminative land use within 250m*	*On-site* 4 No. records; 2No. of Unspecified Pits (in the far northern extents) likely associated with the Fieldgate Pit and 2 No. of Cuttings adjacent the southern boundary associated with the M69 motorway. *Off-site* 20 No. between 67m to 250m of the site. Including, Unspecified Works (closest 67m west) and Factory (closest 113m west), Nursery (closest 90m west), Hosiery Manufactory (closest 106m southwest), Cuttings (closest 126m northeast) and Unspecified Tanks (183m northeast).
	Historical Tank Database	*On-site* No records. *Off-site* 7 No. records between 12m to 250m. 6 No. Unspecified Tanks and 1 No. Tank.
	Historical Energy Features	None on or within 250m of the site.
	Potentially infilled Land within 250m	*On-site* No records. *Off-site* No records.
Environmental Permits,	*Part IIA EPA 1990*	The site is not determined as Contaminated Land.

Category		Summary
Incidents and Authorisations	*Records of List 1 and 2 Dangerous Substance Inventory Sites*	No records within 500m of the site.
	Licensed Discharge Consents	3No. off-site records within 500m of the site; all between 86m and 97m west of the site for Sewage Discharges.
	Pollution Incidents	No records within 500m of the site.
Landfills and other Waste Disposal Sites	*EA registered, BGS survey, Local Authority and Historical Mapping*	No on-site records. 24 No. waste exemptions within 500m generally related to agriculture.
Current land Use	*Current Industrial Sites*	3No. on site in the southern extents. 2 No. pylons and 1 No. silo. 7No. off-site between 68m and 250m of the site. These include a Telecom Mast, Medals and Trophies Goods, 2 No. Electrical Features, Business Park, Aviation Engineers and Published Goods.
Designated Environmentally Sensitive Sites	SSSI's, NNR's, AONB's	None on site. 2No. Designated Ancient Woodlands 964m south and 1990m northeast respectively. 1 No. Local Nature Reserve 1989m northeast 1 No. SSSI 1990m northeast 1 No. Greenbelt at 469m southwest named Birmingham. None of the above are considered likely to be unduly impacted by the site.

5.2. Unexploded Bombs (UXB)

Regional Unexploded Bomb Risk maps obtained from Zetica indicates that the site is in a low risk area for Unexploded Bombs (UXB).

Zetica state that low-risk regions are those with a bombing density of up to 15 bombs per 1000 acres or less. These areas are considered to have significant but low UXB risk. In general, further action to mitigate the risk is considered prudent, although not essential. Care is required when assessing the risk for specific sites where the risk may be higher because of local wartime activity.

Given that the site has historically remained greenfield land and that the historical maps do not show any obvious signs of wartime activity within the site locality, the risk of encountering UXB is therefore considered low. No further risk assessment is therefore considered to be required in this regard.

5.3. Archaeology

A preliminary search of the Heritage Gateway archaeological database (www.heritagegateway.org.uk, accessed September 2020) indicates that there are records on the site itself and in the locality, a summary is given below:

HER Ref and location	Details
On site MLE24420 Grid Reference: SP 4397 9134	FARMSTEAD (Late Post-medieval to Modern - 1840 AD to 2050 AD)
On site MLE22160 Grid Reference: SP 4383 9181	DITCH (Unknown date) GULLY (Unknown date)
Off site	Several records to the northwest and northeast of the site relating to medieval and roman archaeology.

6.0 Conceptual Site Model (CSM)

This section provides a qualitative risk assessment of the risk posed from potential on and off-site contamination sources, identified by the information presented in the previous sections.

The conceptual model below has been developed based on the commonly adopted source-pathway-receptor model as recommended within CLR11 Model Procedures for the Management of Land Contamination.'

6.1. Proposed Development

It is proposed to redevelop the site into residential dwellings with gardens, landscaped areas and an area of public open space.

6.2. Potential Sources of Soil Contamination related to the sites past and current use

6.3. On-site

The site has remained almost entirely undeveloped throughout its history with records indicating it has been used for largely agricultural purposes. Other historical and current potential sources of soil contamination identified are as follows:

- The former Fieldgate Pit, located in the far northern tip (adjacent Coventry Road). This pit appears to have been filled in ~1923 with 2No. houses (present today) subsequently built on the locality. Given the predominant geology (Clay) and existence of clay pits in the Hinkley area it is considered most likely that Fieldgate Pit was a clay pit for brick and tile manufacture.

- Burbage Fields Farm located in the southern site extents.

- Any historic electrical transformers associated with the historic electricity lines. Current transformers complying to modern standards are not considered a potential source.

- Soil / rubble mounds identified during the site walkover.

- Although the emap data identifies cuttings (associated with the adjacent M69 motorway to the south) to be on site the site walkover has confirmed that the top of the cutting forms the boundary to the site and does not encroach into the site. Although some localised on-site ground

disturbance/reprofiling may have occurred historically during the construction of the embankment.

Based on the above the following potential contaminants have been identified:

Locality/Source	Inorganic Contaminants	Organic Contaminants
Site wide agricultural land	Heavy metals	PAH, Fuel/Oils, Pesticides
Burbage Fields Farm	Heavy metals	PAH, Fuel/Oils, Pesticides, Asbestos
Former pylon locations where transformers may have been located.		PCB's
Former Fieldgate Pit	Heavy metals	PAH, Fuel/Oils, Asbestos
Any made ground materials placed during the M69 motorway embankment construction along with soil / rubble mounds to the west of Burbage Fields Farm.	Heavy metals	PAH, Fuel/Oils, Asbestos

6.4. Off-site

The surrounding area has predominantly been used for agriculture along with residential use. Some historical industrial uses have been identified however they are not considered likely to have impacted the site with any additional contaminants not already being considered for site wide agricultural use.

6.5. Ground Gassing

The following potential sources of soil gas have been identified:

Source	Distance from Site	Source Generation Potential
Alluvium	On-site	Generally low (dependant on nature and organic content within Alluvium)
Any made ground used to fill in the former Fieldgate Pit.	On-site	Dependant on the content of organic material used.
Any made ground used to raise ground levels associated with the M69 motorway embankment.	Adjacent to and possibly on site	Dependant on the content of organic material used. Generally low however as construction was relatively recent and good practices are likely to have been adopted.

6.6. Potential Pathways

With regard to the assessment of risk to human health, the following pathways are considered to be potential exposure routes based on residential end-use, in accordance with the CLEA Documentation:

- Dermal contact.
- Direct ingestion of soil.
- Inhalation and ingestion of soil dust.
- Inhalation of gases.
- Ingestion of contaminated water via plastic pipes.

With regard to Controlled Waters, the following pathways are considered applicable:

- Overland flow into unnamed river.
- Downward infiltration through soils and bedrock
- Lateral migration through soils and bedrock towards the nearest surface feature
- Newly created preferential pathways associated with the redevelopment of the site e.g. deep boreholes/piles/sewers.

6.7. Potential Receptors

The following are considered to be potential receptors for contamination:

Receptor		Additional information
Human Health	Site end users Construction/maintenance workers	A female child will be regarded as the critical receptor.
Controlled Waters	Secondary Aquifers	Low sensitivity with respect to groundwater Moderate sensitivity to surface waters.
	Unnamed River on site.	
Other	Neighbouring buildings	Residential properties adjacent the site to the north. Overhead power lines cross southern site area.
	Underground structures	
	Flora and fauna	

6.8. Pollutant linkages

Based on the information above, the following potential pollutant linkages are considered applicable to the site. The risk classification has been qualitatively derived in accordance with CLR 11 Model Procedures for the Management of Land Contamination. The terminology used is taken from CLR 11, and a summary of the principal terms are provided in Appendix F.

Pollutant Linkage	Source	Pathway	Receptor	Probability	Consequence	Risk
1	Contaminated Soils	Ingestion of soil, dermal contact, inhalation of dust	Site end users Construction workers; maintenance workers	Low likelihood	Medium	Moderate/ low
2	Contaminated Soils	Inhalation of soil dust	Members of the public adjacent to the site during construction	Low likelihood	Medium	Moderate/ low
3	Contaminated Water Supplies	Ingestion of water, Migration of organic contaminants via plastic pipes	Humans – Site End Users	Low likelihood	Medium	Moderate/ low
4	Contaminated Soils and Groundwater	Overland flow Leaching and groundwater flow to surface water	Unnamed River on site.	Low likelihood	Medium	Moderate/ low
5	Contaminated Soils and Groundwater	Downward migration into groundwater.	Secondary Aquifers	Unlikely	Medium	Low
6	Contaminated Soils and Groundwater	Leaching of sulphate and corrosive contaminants	Buried concrete structures and services	Low likelihood	Mild	Low
7	Ground gasses from potential infilled land associated with Fieldgate Pit and M69 motorway embankment and natural Alluvial deposits.	Migration of asphyxiant and explosive gasses into confined spaces	Site end users, construction/ maintenance workers in trenches.	Low likelihood	Severe	Moderate

7.0 Conclusions and Recommendations

7.1. Site Setting and Historical Development

The site largely comprises agricultural farmland/fields segregated by hedgerows within a semi-rural setting. A farm and high voltage electricity line occupy the southern extents with 2No. residential properties located in the far northern extents.

The majority of the site has remained greenfield throughout its history with the exception of the far northern extents where a pit (likely clay pit) is documented.

The surrounding area has predominantly comprised agricultural land with residential properties to the north and the M69 Motorway to the south.

The site is underlain predominantly by the Oadby Member (Glacial Till). Alluvium is mapped in the eastern extents with sand and gravel in the northern extents. The bedrock geology underlying the site is the Mercia Mudstone Group.

7.2. Planning/Enabling Works Considerations

Any clearance of existing hedgerows and trees required to facilitate some of the development should be undertaken outside of bird nesting season.

A survey should be undertaken prior to removal of any trees/hedges in order to enable foundation design with respect to tree influence should new structures be proposed. The survey should include boundary vegetation and extend beyond the site boundary to cover any trees that may influence the foundations of proposed structures.

Ecological surveys are likely to be required given the undeveloped nature of the site.

There are overhead powerlines across the southern corner of the site; a development standoff zone is likely to be required. Safe passing points will need to be established for plant.

It is anticipated that the main access to the site will be via the strip of land abutting Coventry Road to the north. Demolition of the existing houses will be required if this is the case.

Records indicate that the existing farm may be of archaeological interest and Roman finds have also been identified close to the site.

A pre-demolition asbestos survey is recommended for buildings to be demolished/renovated on the site.

7.3. Flood Risk

The site is not located on a flood zone nor are there records of 'Risk of Flooding from Rivers and Seas' on site. The highest risk on site from surface water flooding is a 1 in 30 year event with flood levels 0.3 - 1.0m depth. The highest risk on site for groundwater flooding is moderate.

As such, available information would suggest that there is a low risk of flooding. However, this preliminary risk assessment should be confirmed by carrying out a Flood Risk Assessment (FRA) for the site.

7.4. Access

Vehicular access to the site is currently gained from Workhouse Lane.

7.5. Qualitative Contamination Risk Assessment

The site is predominantly agricultural land of greenfield status. The main sources of contamination are likely to be associated with farming activities and the risk of contamination is generally considered to be low. Pesticides may have also been used and PAHs may be resultant from the burning of crops. In addition, small areas of potentially infilled/disturbed ground have been identified associated with a probable clay pit in the north and construction of the M69 motorway immediately to the south. Localised surface soil/rubble mounds have also been identified and a farmyard with outbuildings are present.

It is therefore considered there is a low to moderate risk of contamination existing from the past land use and taking into account the surrounding area. This should be confirmed through testing of soils at the ground investigation stage prior to construction.

The risk to Controlled Waters from on-site soils and groundwater is considered low to moderate on the basis of current information and given the presence of a watercourse on site. Should contaminants be present within soils, the risk that they will affect groundwater and subsequent surface waters shall be related to the mobility of the contaminants, the permeability of strata and distance to receptor. The sensitivity of the site with respect to the identified controlled water receptors is considered Low to moderate at this stage.

7.6. Ground Gas

The CSM has indicated the on-site gas generation potential is generally considered to be very low, with potential on site sources limited to naturally occurring alluvium and localised areas of potentially disturbed/filled ground.

The sensitivity of the proposed development in accordance with CIRIA C665 is considered to be high given the intended residential end use and would equate to building type 'A' in accordance with British Standard BS8485:2015+A1:2019.

Based on the findings of the conceptual model, it is generally considered unlikely that gas protection measures will be required however a moderate risk is attributable to the localised potential made ground identified, which increases the likelihood of some gas protection measures being required. This should be confirmed by an appropriate intrusive investigation.

During construction works, entry into deep trenches should be avoided, gas may accumulate within the confined space created. Permit to work systems and personal gas monitors may be required for such works.

No radon protection measures are necessary for new structures.

7.7. Surface Water Drainage

The geology suggests use of soakaways for surface water drainage may be locally feasible where sand and gravel deposits lie (northern site extents). Generally however, impermeable cohesive soils are anticipated which is likely to make soakaway drainage ineffective and unfeasible. Alternative solutions should be considered, such as on-site attenuation and positive discharge to an appropriate outfall (the on-site unnamed river may be an option).

Infiltration testing should be undertaken across the site to confirm the viability of soakaways if proposed.

7.8. Foundation Design and Geotechnical Issues for Construction

Intrusive works shall be required in order to identify ground conditions and provide foundation recommendations for the site.

The BGS have indicated the majority of the site to be considered negligible to very low hazard ratings for natural subsidence. There is a moderate risk of compressible deposits associated with Alluvium along the eastern extents; this may affect the foundation solution within this area of the site elsewhere the rating is negligible.

Overall, geology suggests that traditional strip/trenchfill foundations are likely to be appropriate, subject to verification by intrusive investigation. The near surface strength of the Glacial Till will dictate foundation depths together with proposed levels, soil volume change potential (VCP) and tree influence.

A tree survey may be required which extends beyond the site boundaries for use in foundation design; Trees and hedges are currently indicated around the perimeter of the site and forming field boundaries within the site. Plots proposed within the influence of these trees/hedges may require deepening or piled foundations. Medium plasticity is indicated for cohesive strata by the BGS.

Significant problems with groundwater are not anticipated across the majority of the site. However,. where granular deposits are expected within the northern extents. Shoring and localised pumping may be required. Instability may also be possible with the Alluvium in the east.

7.9. Mining and Geological Issues

There are no known mining issues within the site.

7.10. Radon

No radon protection measures are required.

7.11. Ecology and Wildlife Issues

The site is within a SSSI impact assessment zone but is not itself within a SSSI.

7.12. Archaeological Issues

A preliminary search of the Heritage Gateway archaeological database (www.heritagegateway.org.uk, accessed September 2020) indicates that there are medieval records on the site itself with medieval and roman activity in the locality.

It is recommended that the Local Authority is consulted at an early stage to confirm the requirements for any archaeological surveys.

7.13. UXB

Regional Unexploded Bomb Risk maps obtained from Zetica indicates that the site is in a low risk area for Unexploded Bombs (UXB). Given that the site has historically remained undeveloped, and that the historical maps do not show any obvious signs of wartime activity within the site locality, the risk of encountering UXB is therefore considered low. No further risk assessment is therefore considered to be required in that regard.

7.14. Geo-environmental Abnormal Risk Register

The following table presents a summary of the main risks identified by the CSM. The table should be read in conjunction with the main body of the report and not in isolation.

Hazard/ Risk	Cause	Risk Rating	Recommendations
Soil & groundwater contamination	Agricultural land and potentially infilled land	Moderate/ Low	Intrusive ground investigation required.
Asbestos	Demolition of existing and former structures/sub-structures. Buried waste	Moderate/ Low	Intrusive ground investigation required. Ensure removal of asbestos in accordance with Control of Asbestos Regulations (2012).
Soil Gas	Potential infilled land associacted with Fieldgate Pit and M69 motorway embankment and natural Alluvial deposits.	Moderate	Intrusive ground investigation required. Low level (e.g. CS-2/Amber 1) gas protection may be required in some areas.
UXO	WWII	Low	No further action considered necessary.
Archaeology	Preliminary screen suggests medieval activity on the site and roman activity to the north	Moderate/ Low	Consult with LA with regards requirements for surveys.
Flooding	Not within flood zone. No records of RoFRaS	Low	Undertake Flood Risk Assessment. Minimum FFLs may be stipulated by planning.
Foundation Design / Geotechnical issues	Medium plasticity Tree influence on site. Softening of clays near surface Instability where Alluvium/sand and gravel mapped.	Moderate/ Low	Intrusive ground investigation required Deepening of foundations due to soft ground and /or tree influence. Possible Piled foundations required in close proximity to trees/hedgerows. Allow for shoring/localised dewatering.
Surplus topsoil	Site is field.	Low	Characterise topsoil. Re-use of topsoil on-site where possible under Materials Management Plan (MMP).

Hazard/ Risk	Cause	Risk Rating	Recommendations
Earthworks	Unsuitable materials may require stabilisation to ensure geotechnically suitable for use.	Low	Intrusive investigation required. Importation of material may be required to meet minimum FFLs. Place fill material in accordance with an Engineers Specification.
Drainage	Impermeable cohesive strata covering the majority of the site. Soakaway drainage generally unlikely feasible.	Moderate	Intrusive investigation required. Drainage assessment required.

7.15. Recommendations for Site Investigation Works

The following works are recommended as part of an intrusive investigation:

- Trial pits across the site to provide a visual appreciation of the ground conditions and to assess stability of excavations.
- Boreholes with in-situ testing to determine the strength and settlement characteristics of the underlying soil profile to assist with foundation design.
- Chemical laboratory testing of soils samples for contaminants identified within the CSM to enable a contamination risk assessment for the site.
- Geotechnical laboratory testing to determine geotechnical soil properties. This should include plasticity index tests to determine the volume change potential, particularly where foundations are proposed within proximity to trees/hedgerows. Where significant earthworks are proposed, moisture content and compaction testing should be undertaken to assess the suitability of soils for re-use in earthworks.
- It would be prudent to undertake soil gas monitoring to determine the soil gas regime. Alluvium deposit and any deep made ground identified should be targeted.
- Infiltration testing to determine surface water drainage solutions.

References

1. British Standards Institution. BS 5930:2015. Code of practice for ground investigations. 2015.

2. British Standards Institution. BS 10175:2015. Investigation of potentially contaminated sites – Code of practice. 2015.

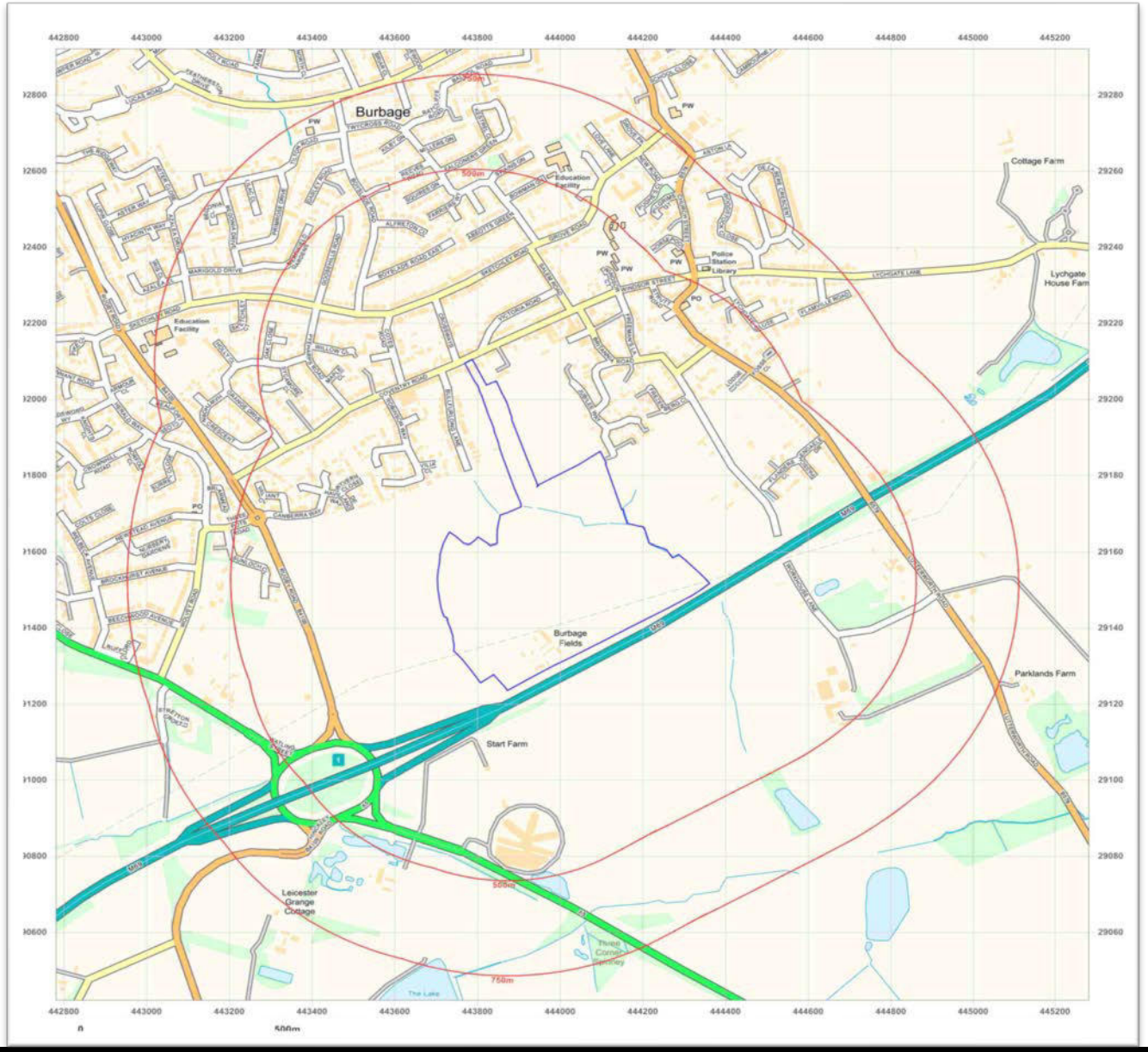
3. CL:AIRE Industry Profile 'Ceramics, cement and asphalt manufacturing works'

4. British Standards Institution. BS 8485:2015+A1:2019. Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings.

5. Construction Industry Research and Information Association. 2008. Assessing the risk posed by hazardous gases to buildings. C665.

Appendices

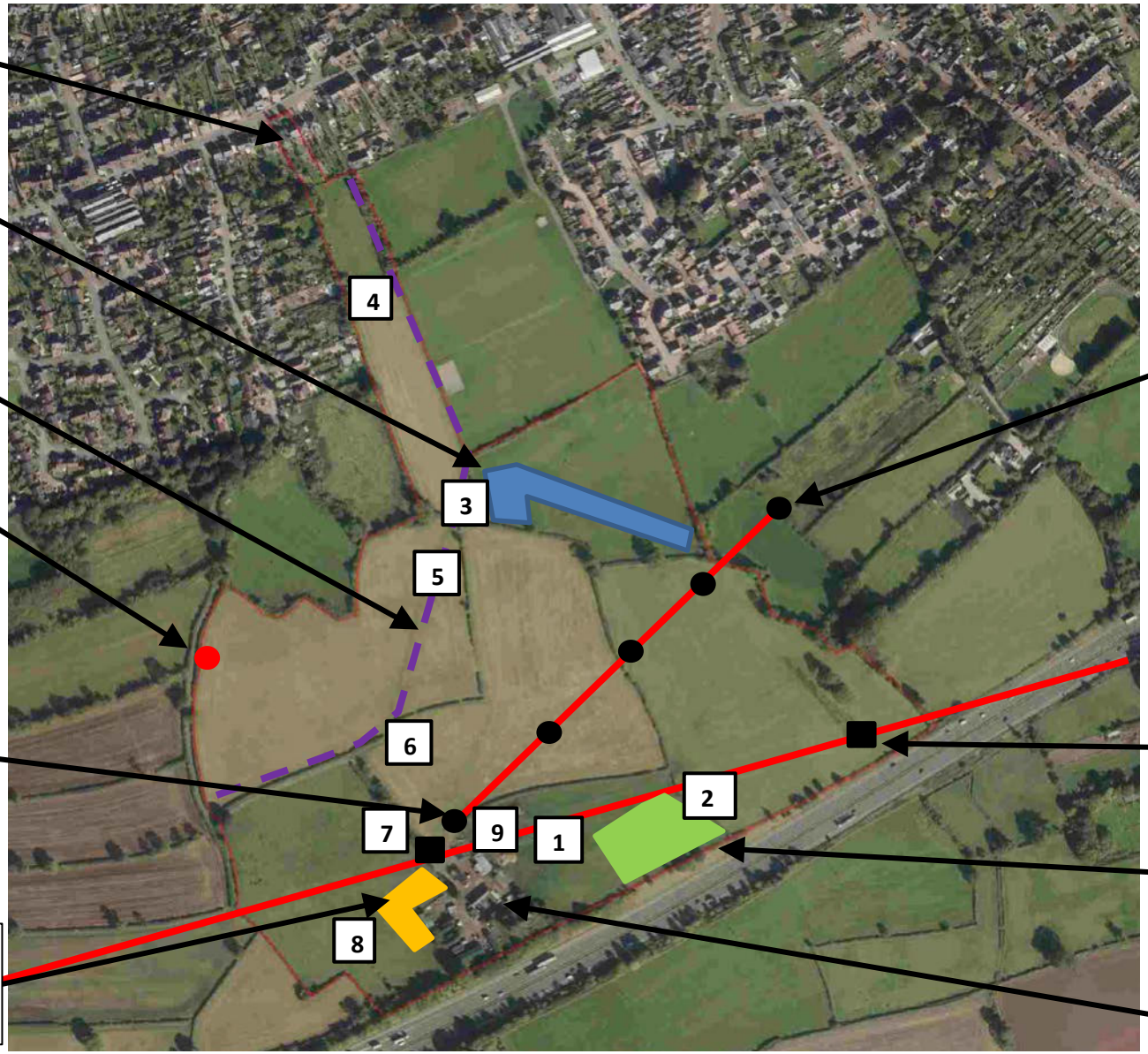
Appendix A: Site Extents Plan



North

Project No.	P20-291	Title	Site Location and Extents Plan	Drawn	AT
Client	Redrow Homes			Checked	IB
Project	Burbage Fields			Approved	SF
		Scale	N/A		
		Revision	0		

Appendix B: Site Walkover Photos



Project No.	P20-291	Title	Site Features Plan	Drawn	AT
Client	Redrow Homes			Checked	IB
Project	Burbage Fields			Approved	SF
		Scale	N/A		
		Revision	0		



Project No.	P20-291			Title	Walkover Photographs	Drawn	AT
Client	Redrow Homes					Checked	JB
Project	Burbage Fields				Photo 1	Approved	SF
Page No.	1	of	11	Scale	N/A		
				Revision	0		



Project No.	P20-291			Title	Walkover Photographs	Drawn	AT
Client	Redrow Homes					Checked	JB
Project	Burbage Fields				Photo 2	Approved	SF
Page No.	2	of	11	Scale	N/A		
				Revision	0		



Project No.	P20-291			Title	Walkover Photographs	Drawn	AT
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Project	Burbage Fields				Photo 3	Approved	SF
Page No.	3	of	11	Scale	N/A		
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Project No.	P20-291			Title	Walkover Photographs	Drawn	AT
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Page No.	4	of	11	Scale	N/A		
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Page No.	6	of	11	Scale	N/A		
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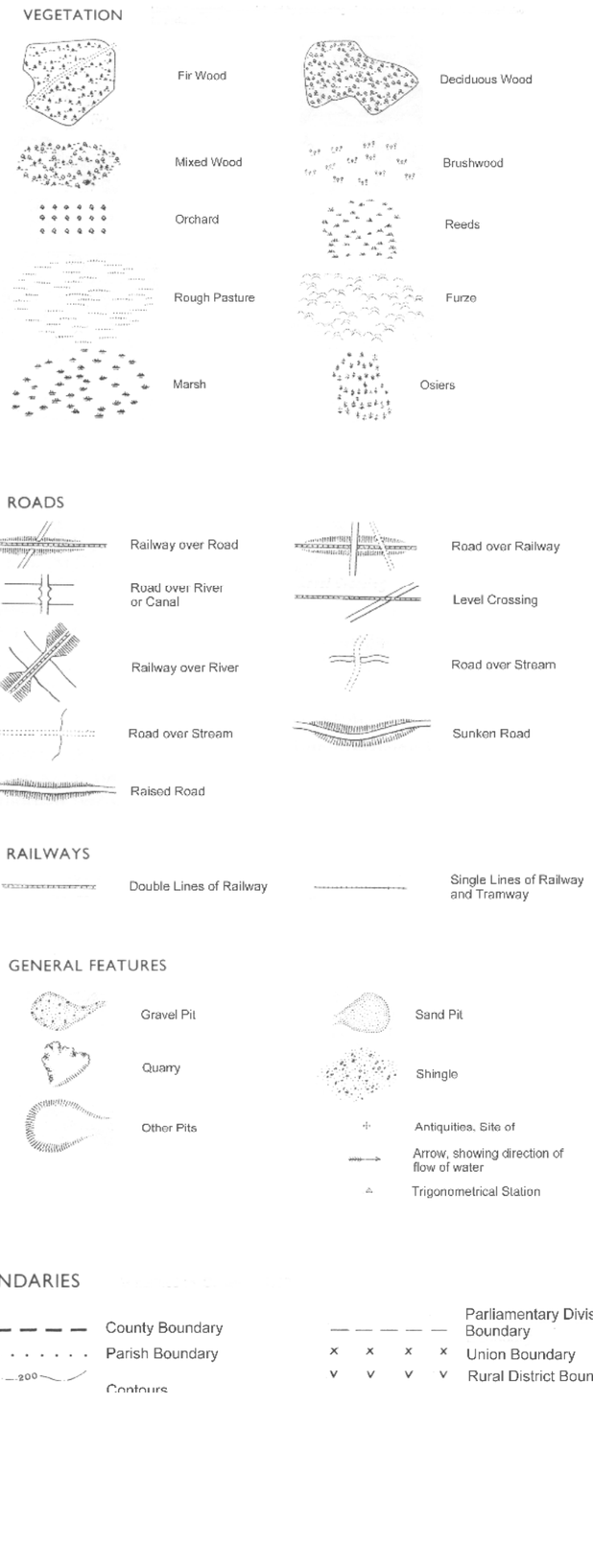
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Appendix C: OS Historic Maps

County Series 1:10,560 scale



National Grid 1:10,000 scale



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Historical Map Pack Legend

County Series & National Grid

1:10,560 scale

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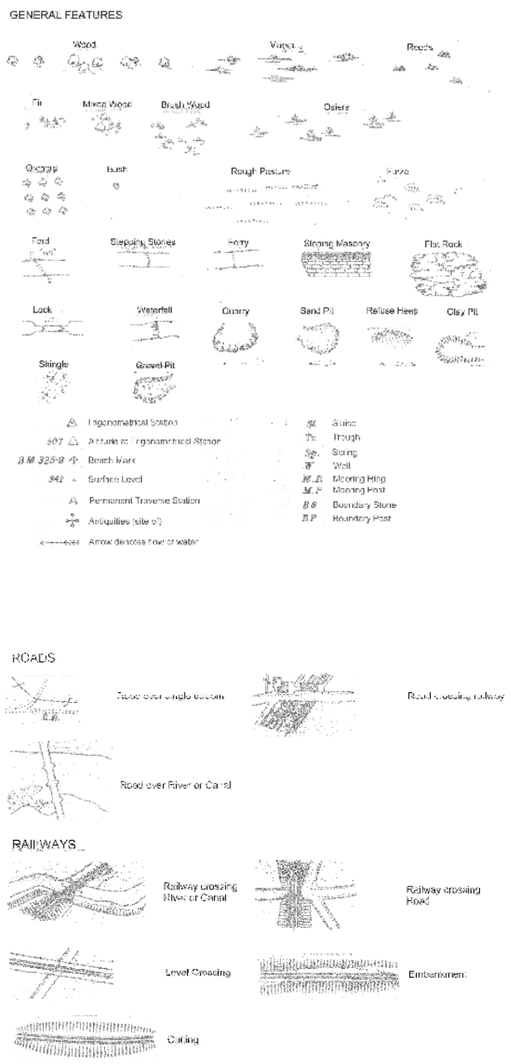
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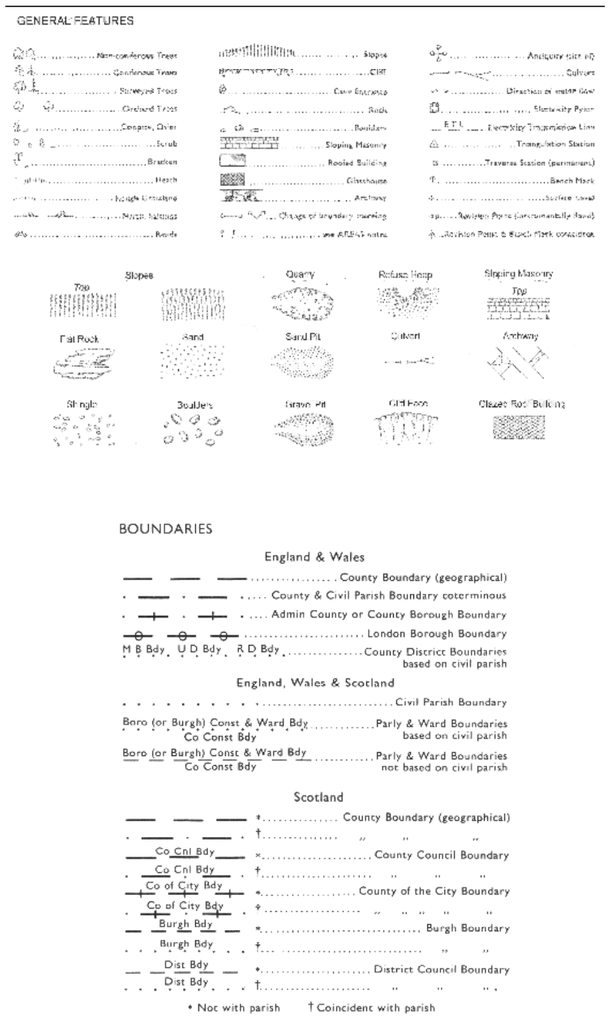
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County Series 1:2,500 scale



National Grid 1:2,500 / 1:1,250 scale



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Historical Map Pack Legend

County Series

1:1,250 scale

~

County Series & National Grid

1:2,500 scale

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Report Ref: EMS-632820_841667
Grid Ref: 444031, 291670

Map Name: County Series

Map date: **1886**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1886
Revised 1886
Edition N/A
Copyright N/A
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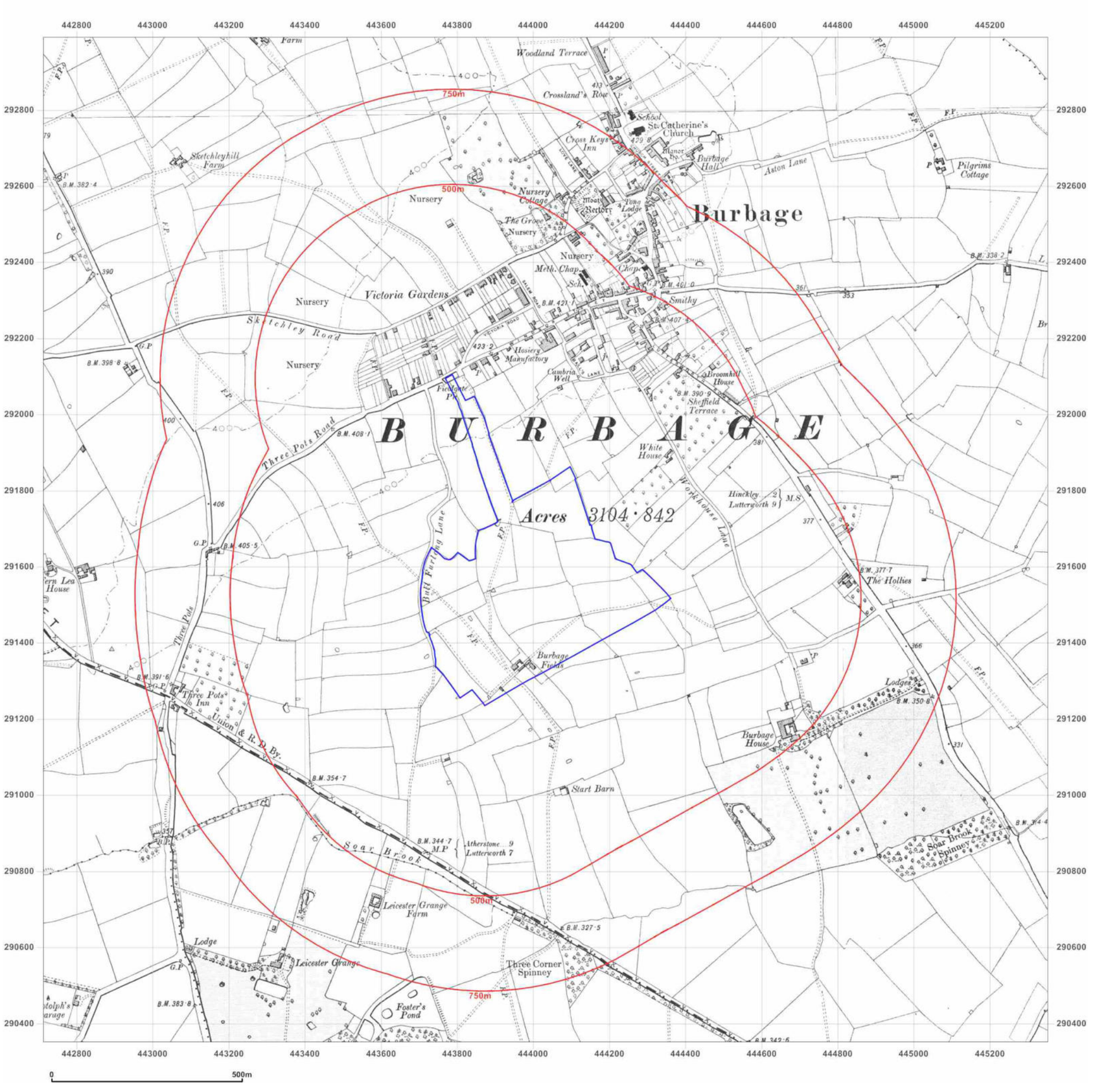
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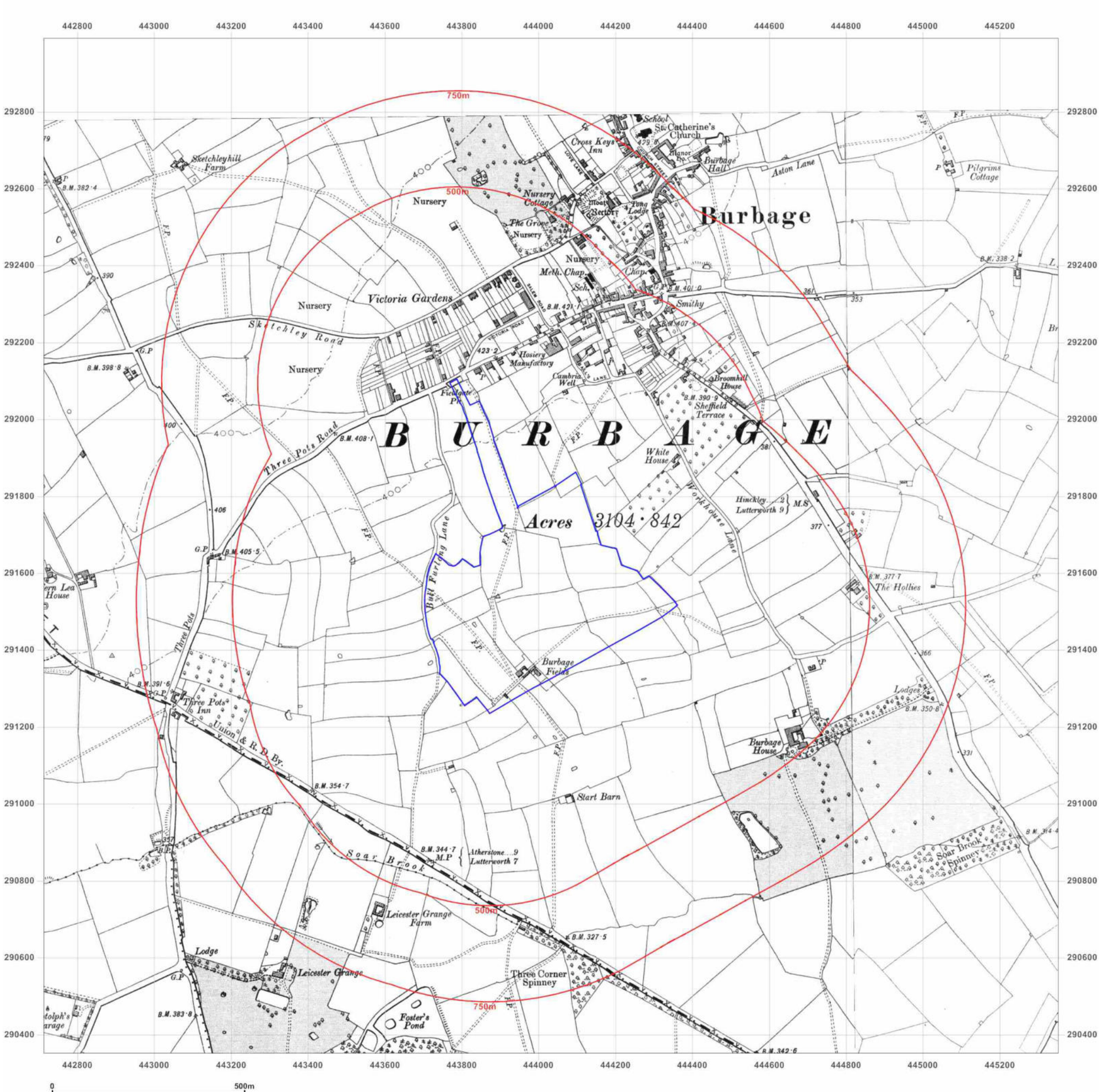
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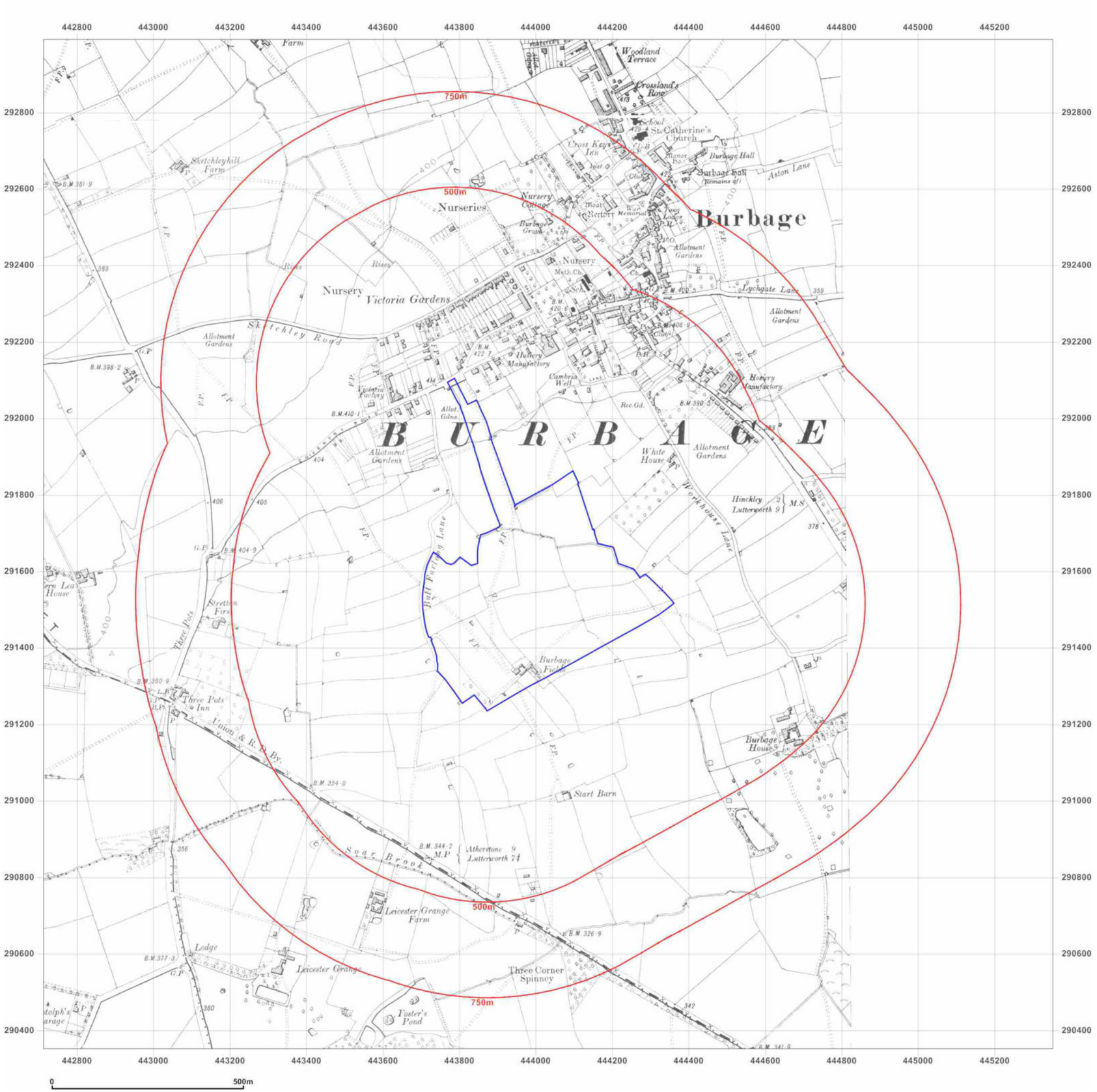
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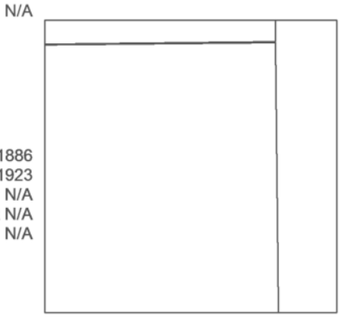
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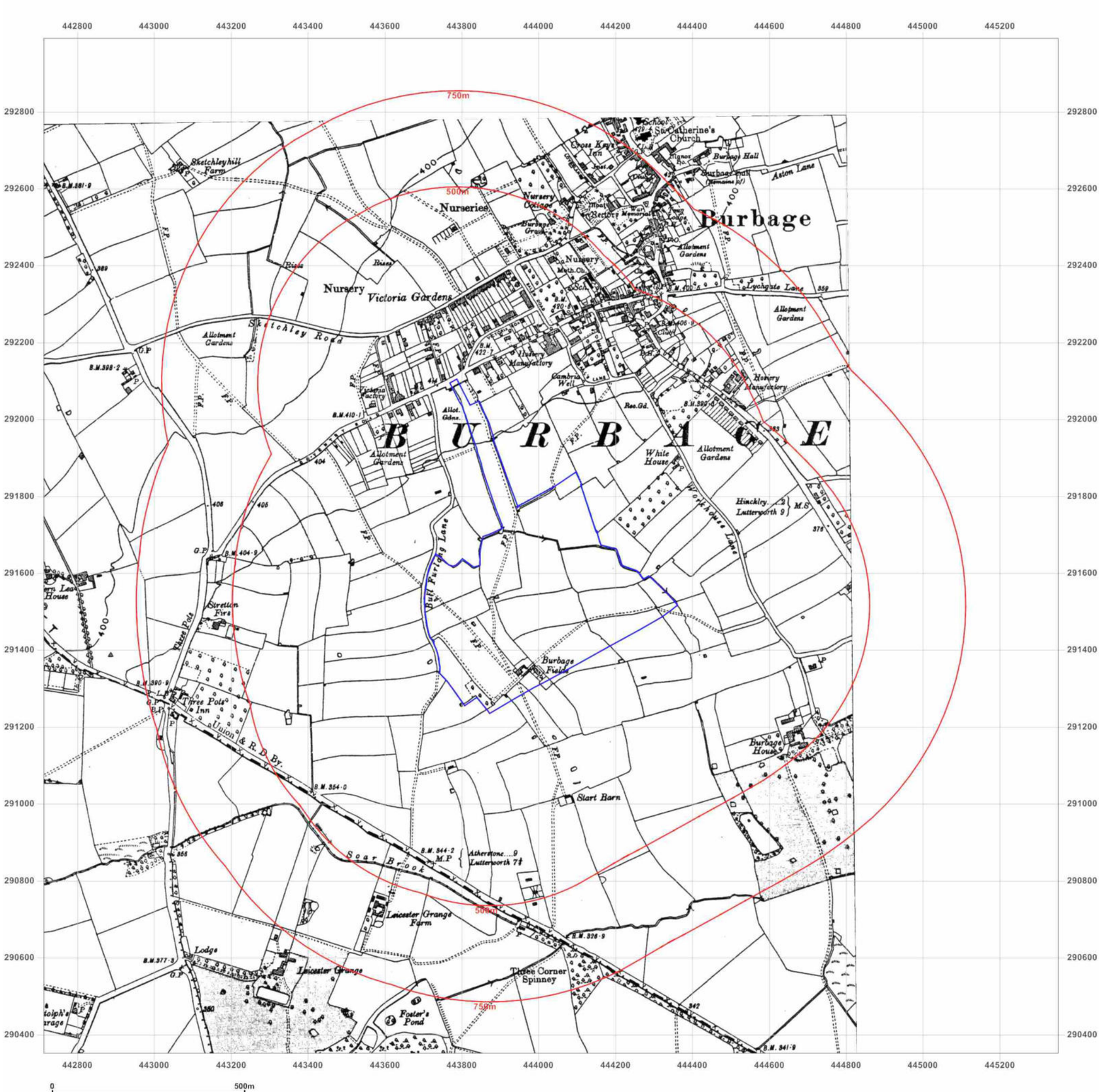
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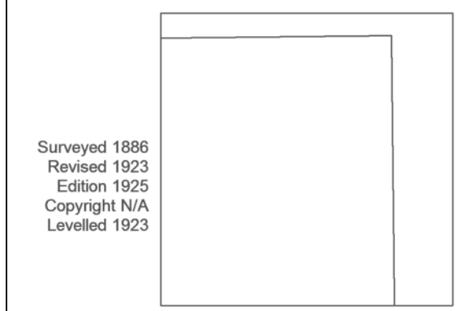
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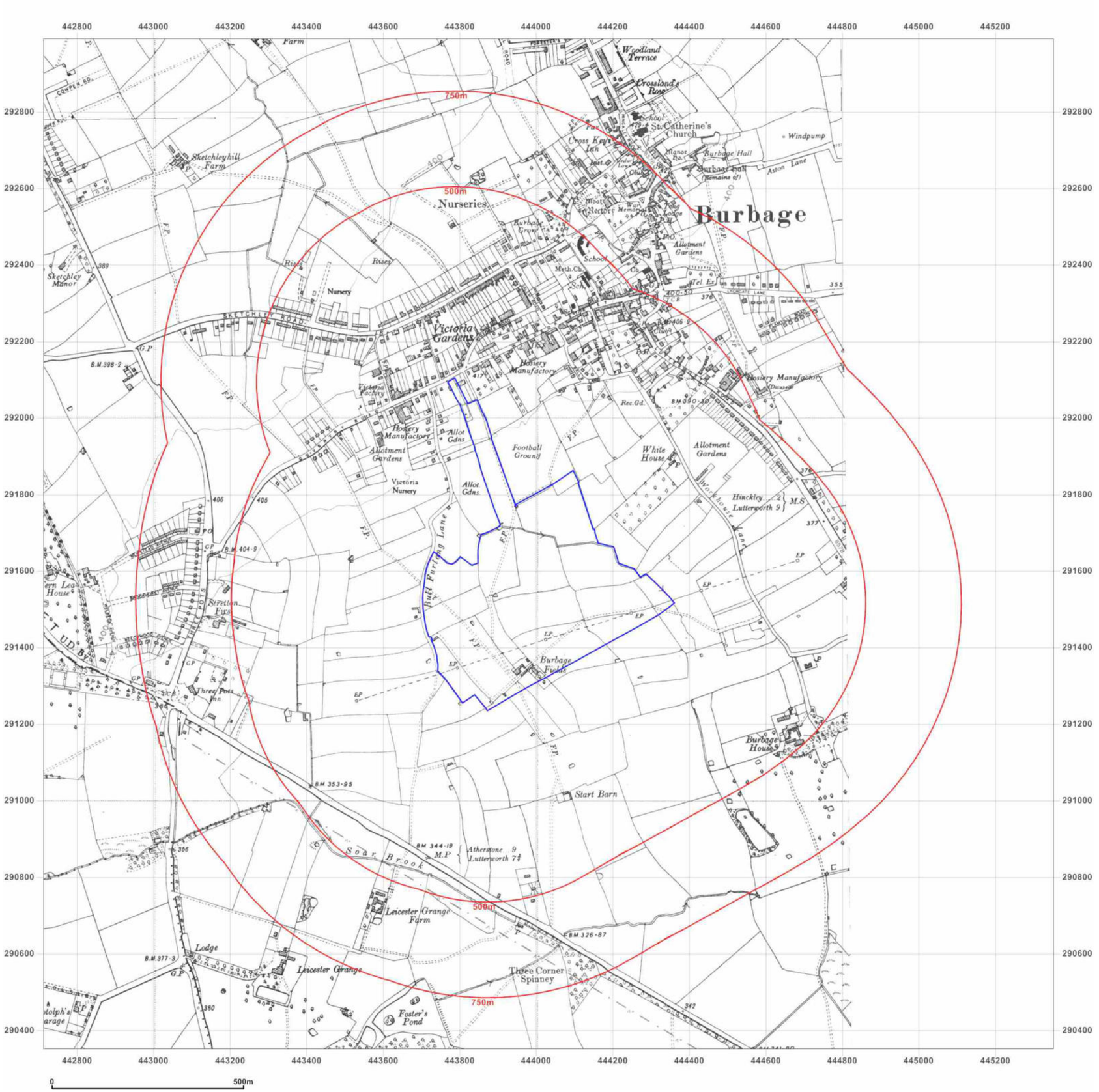
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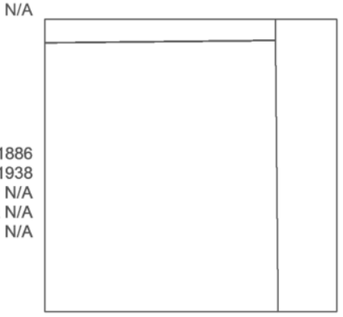
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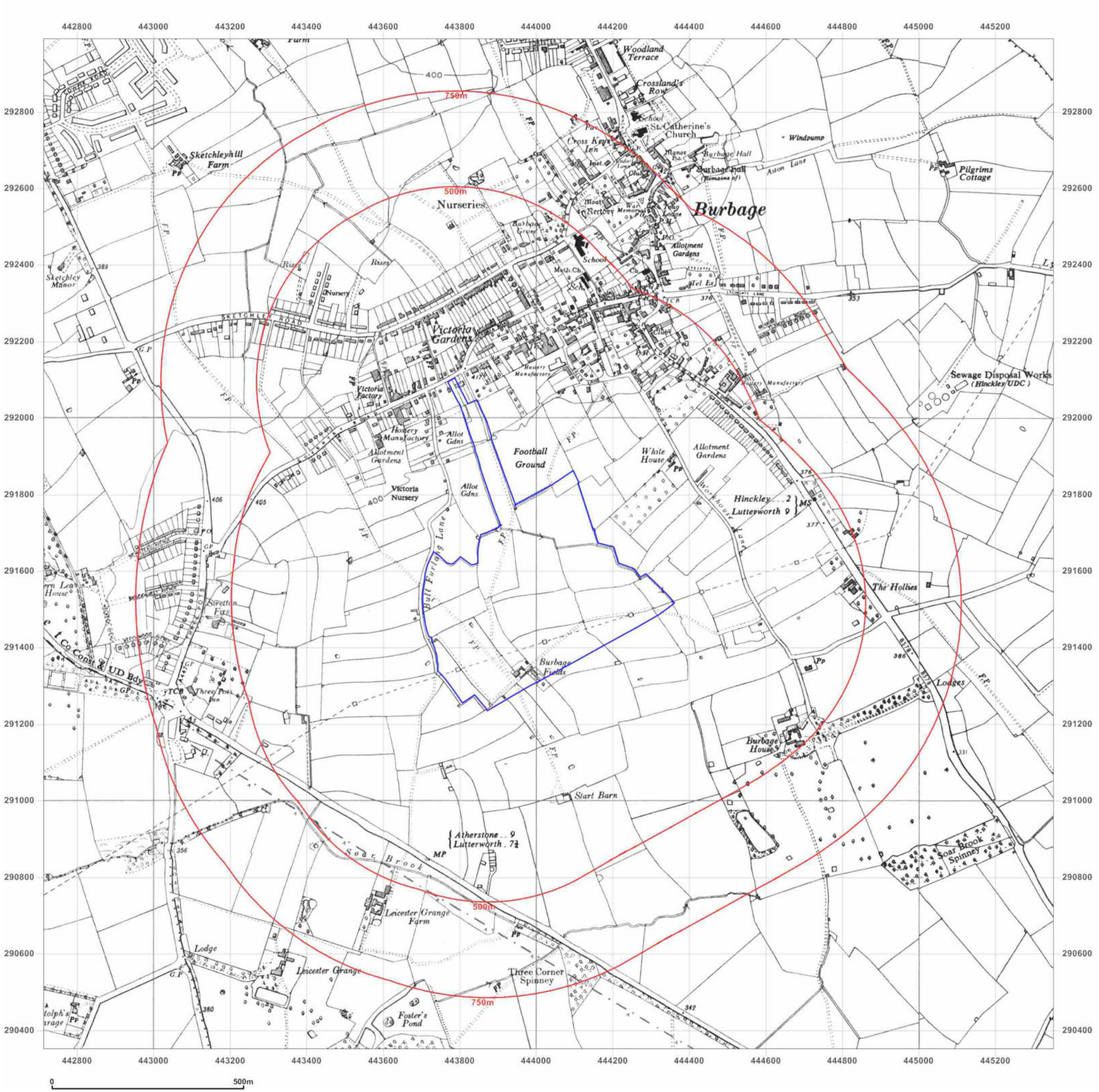
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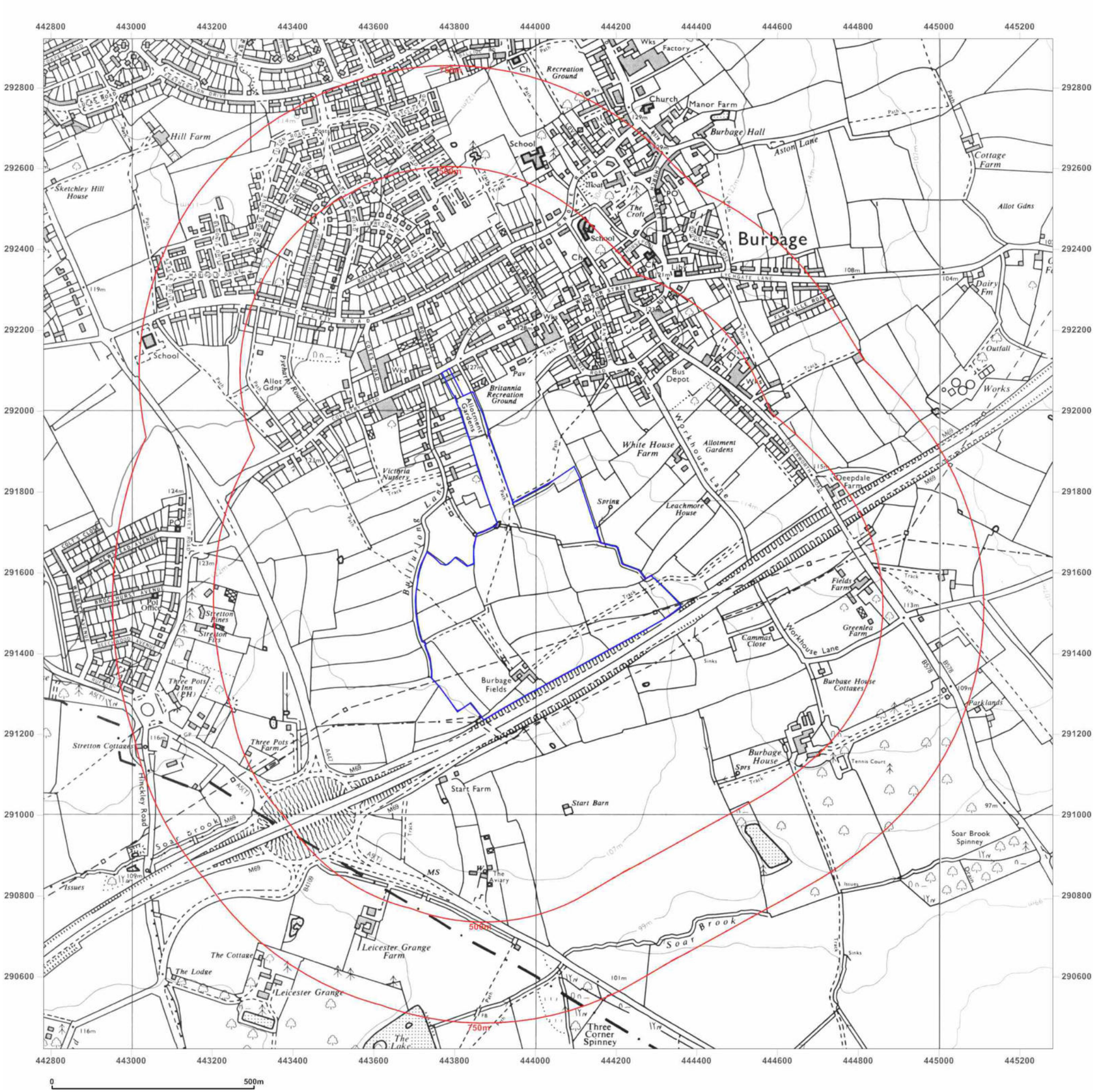
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Report Ref: EMS-632820_841667
Grid Ref: 444031, 291670

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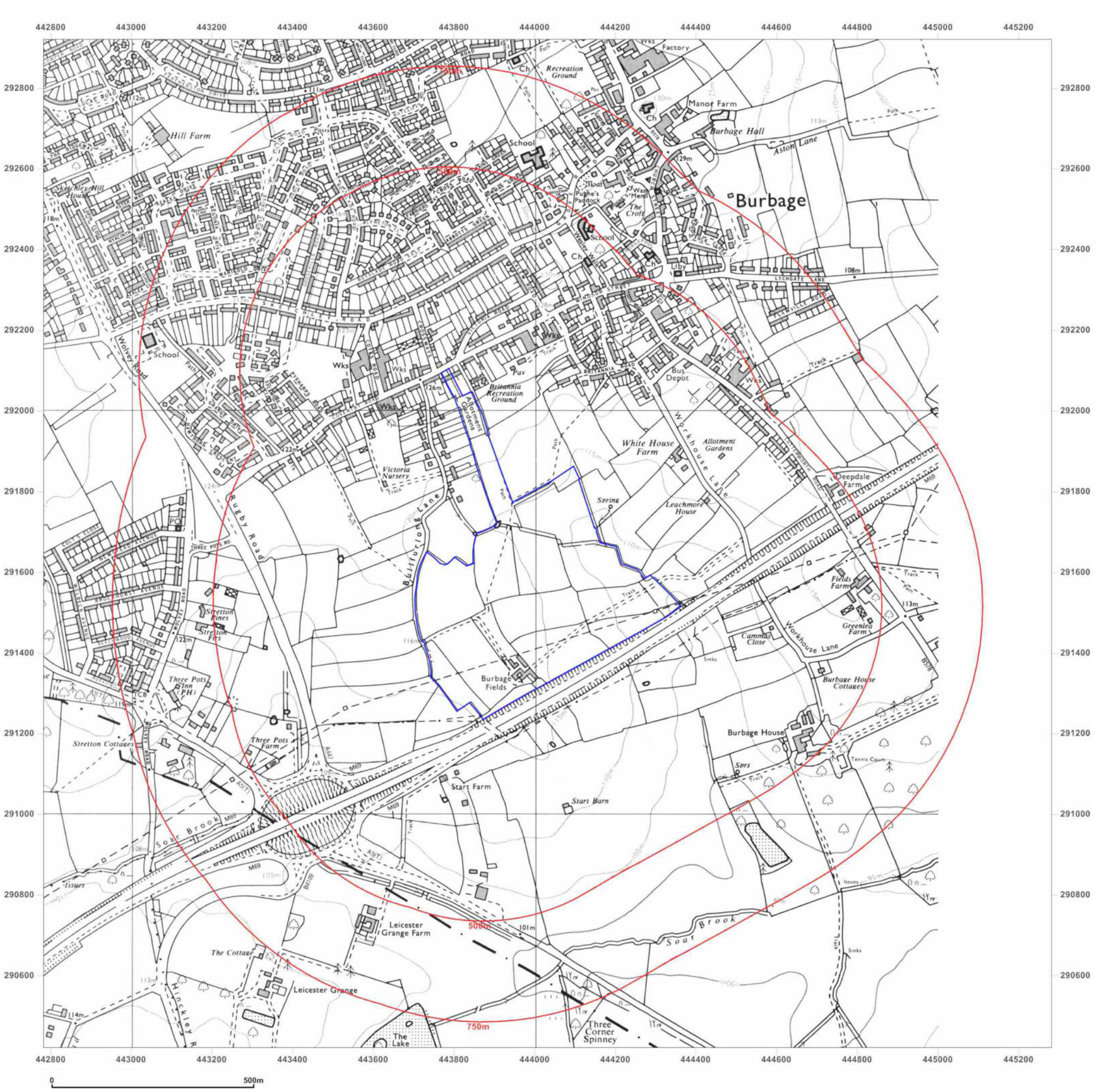
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Site Details:

Burbage Field
Farm,Burbage,Leicestershire,LE
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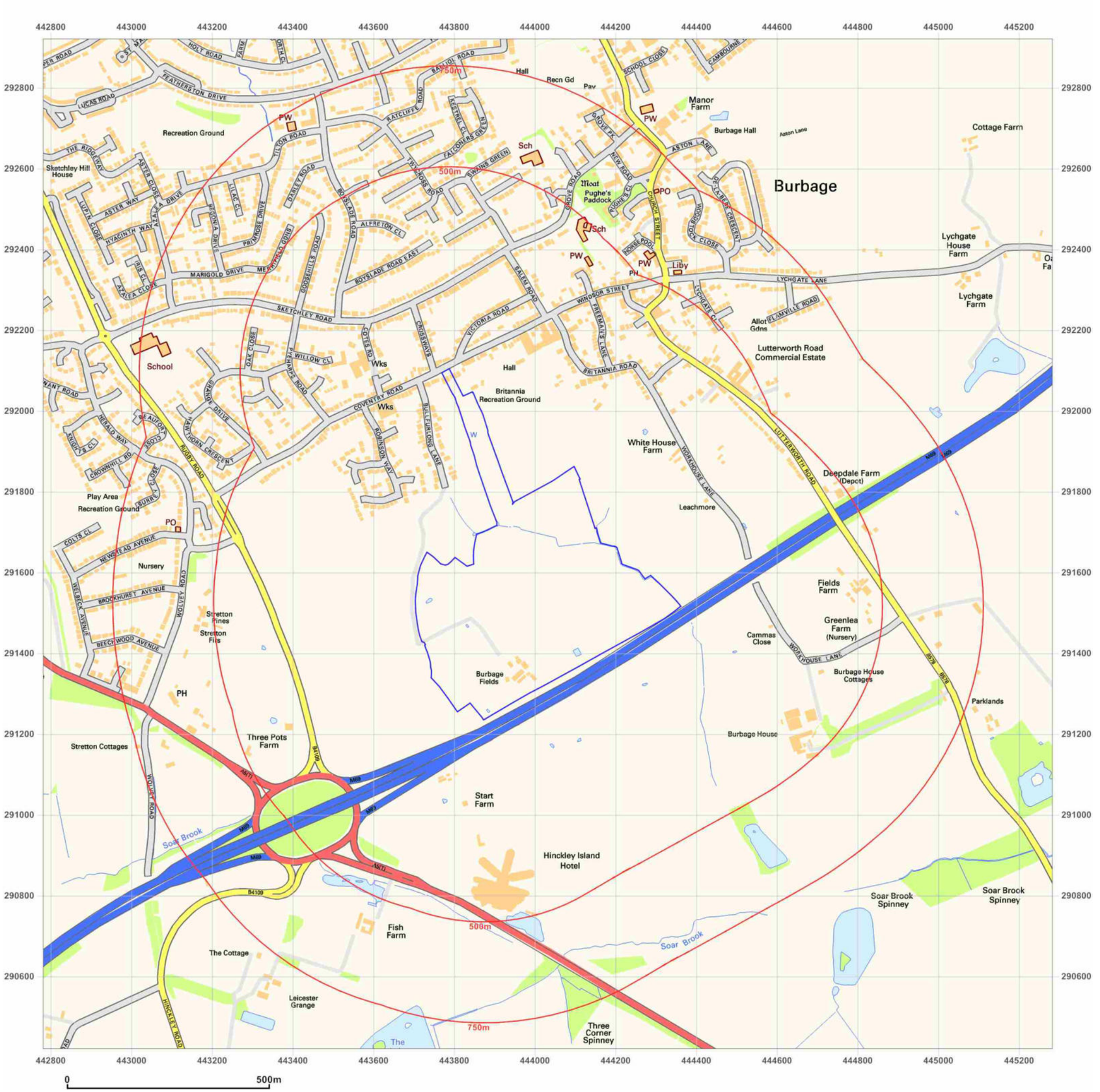
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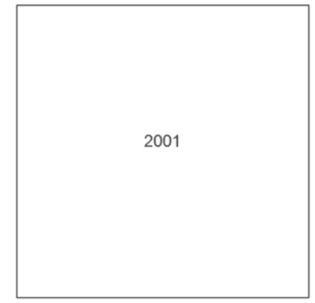
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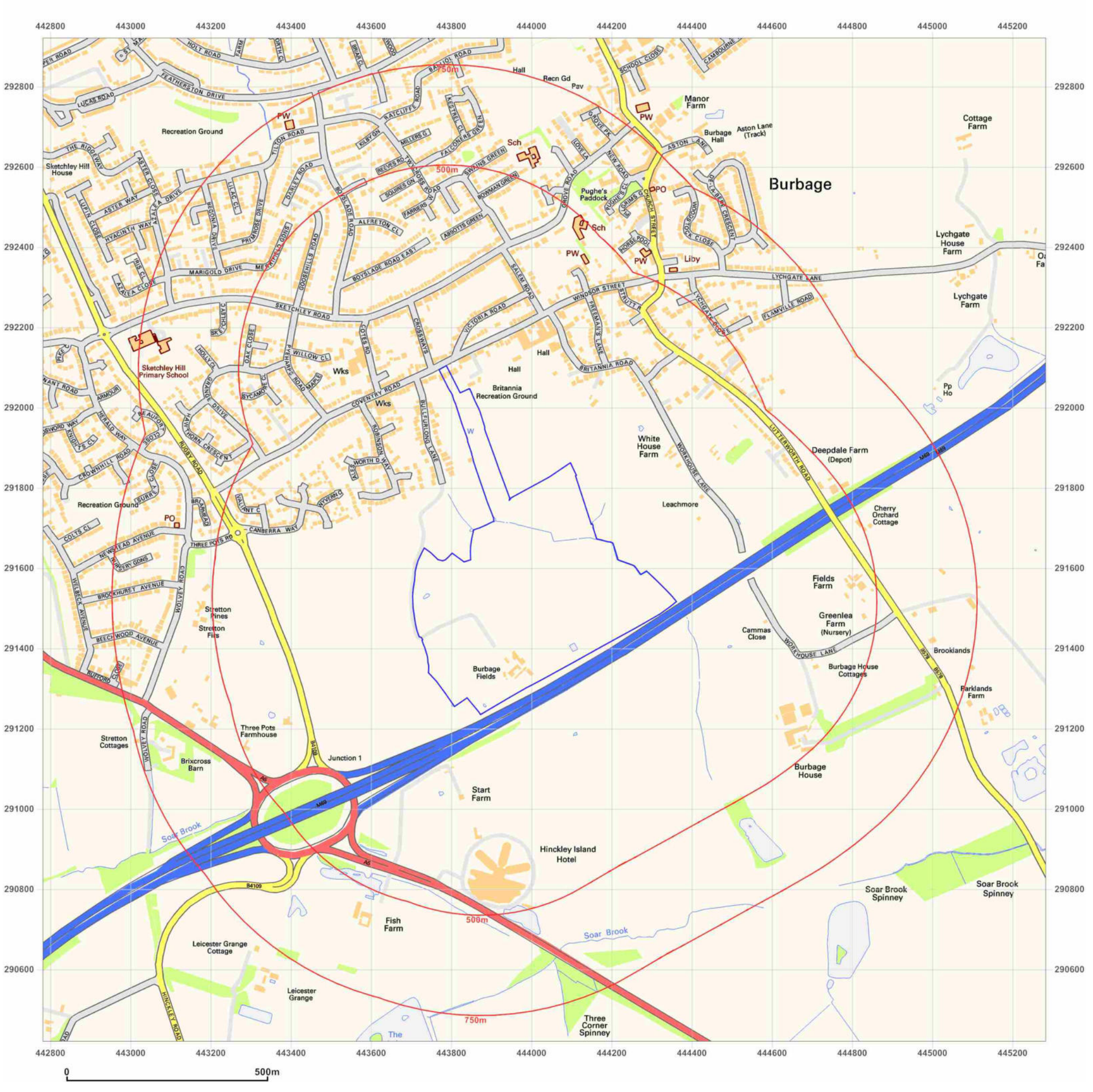
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Site Details:

Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667
Grid Ref: 444031, 291670

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

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2010

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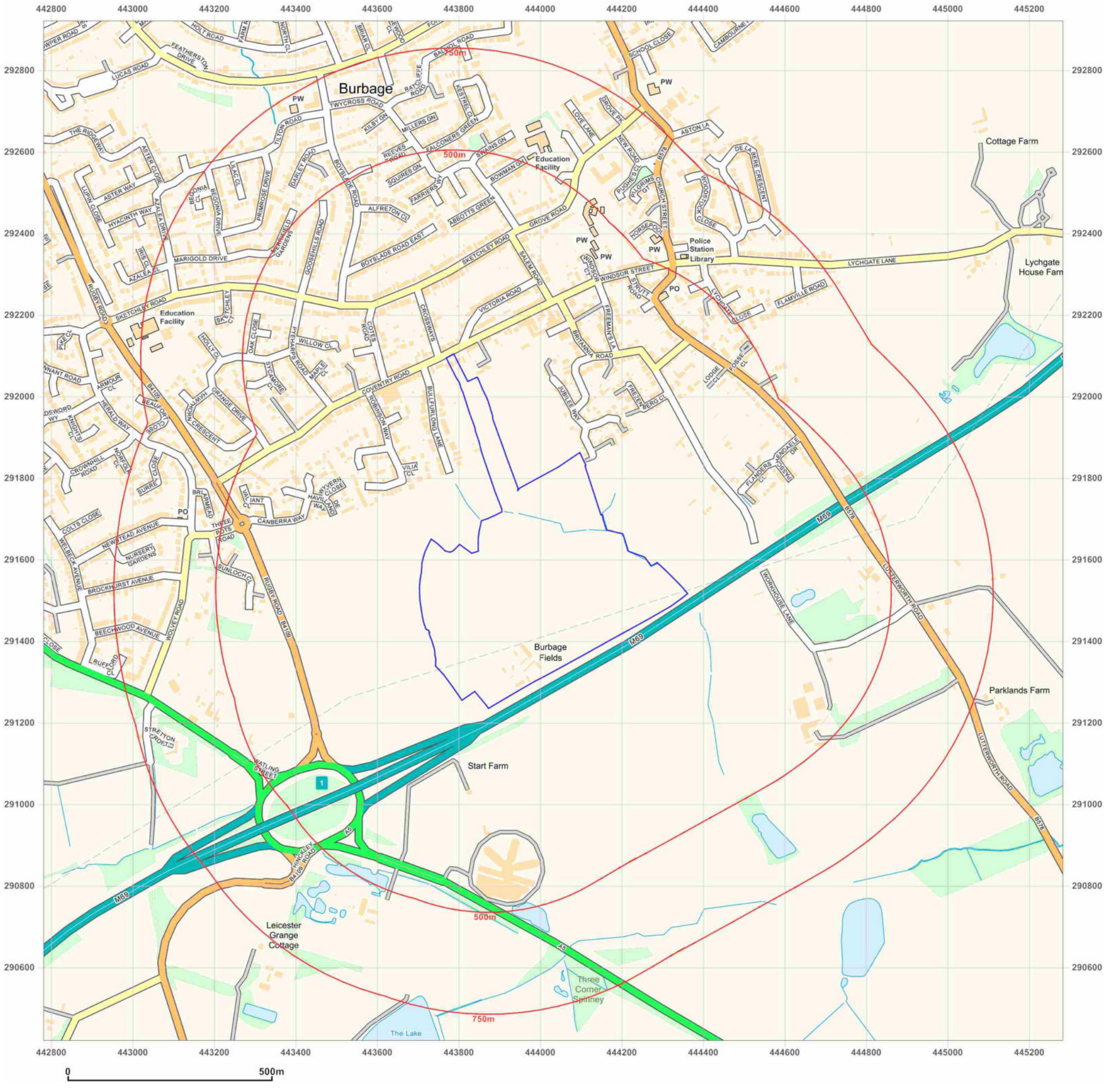
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Site Details:

Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667
Grid Ref: 444031, 291670

Map Name: National Grid

Map date: **2020**

Scale: 1:10,000

Printed at: 1:10,000

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2020

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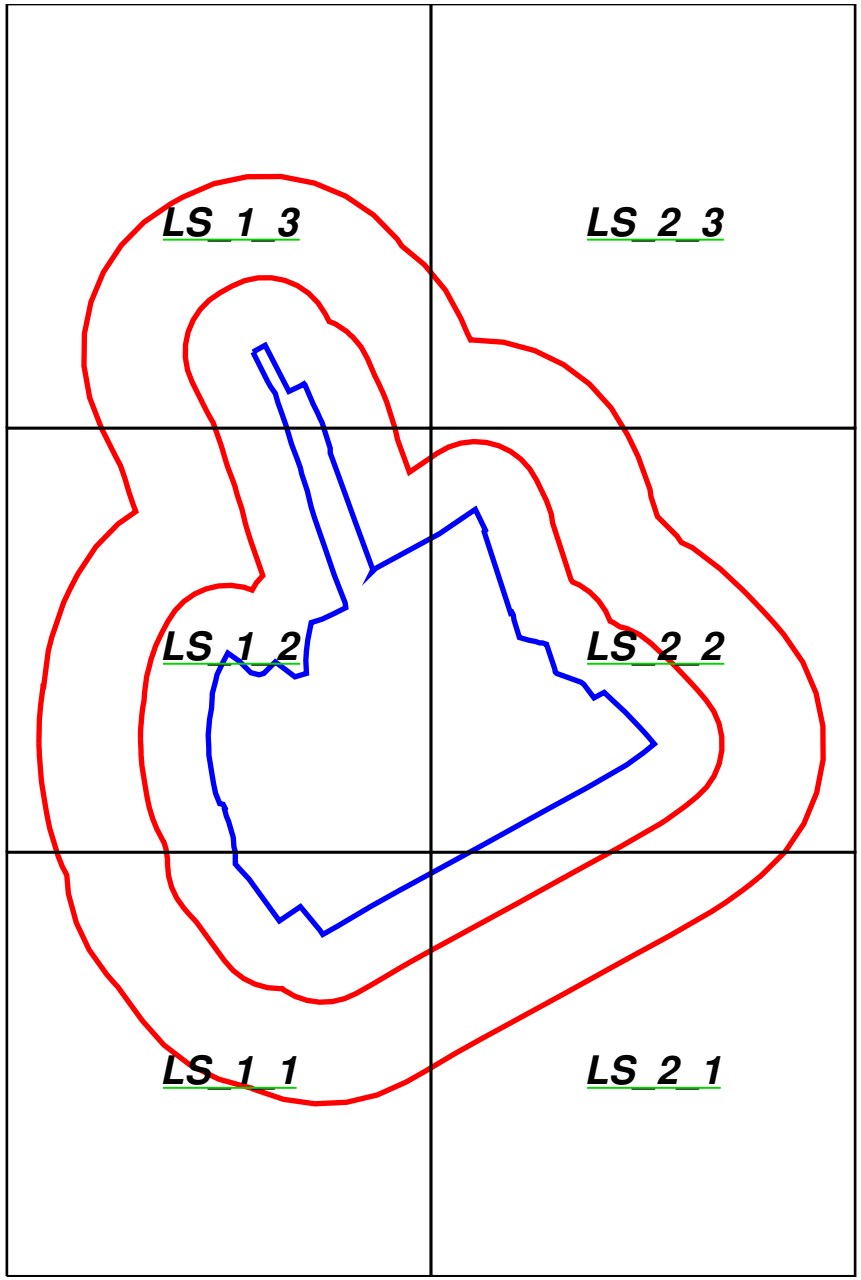
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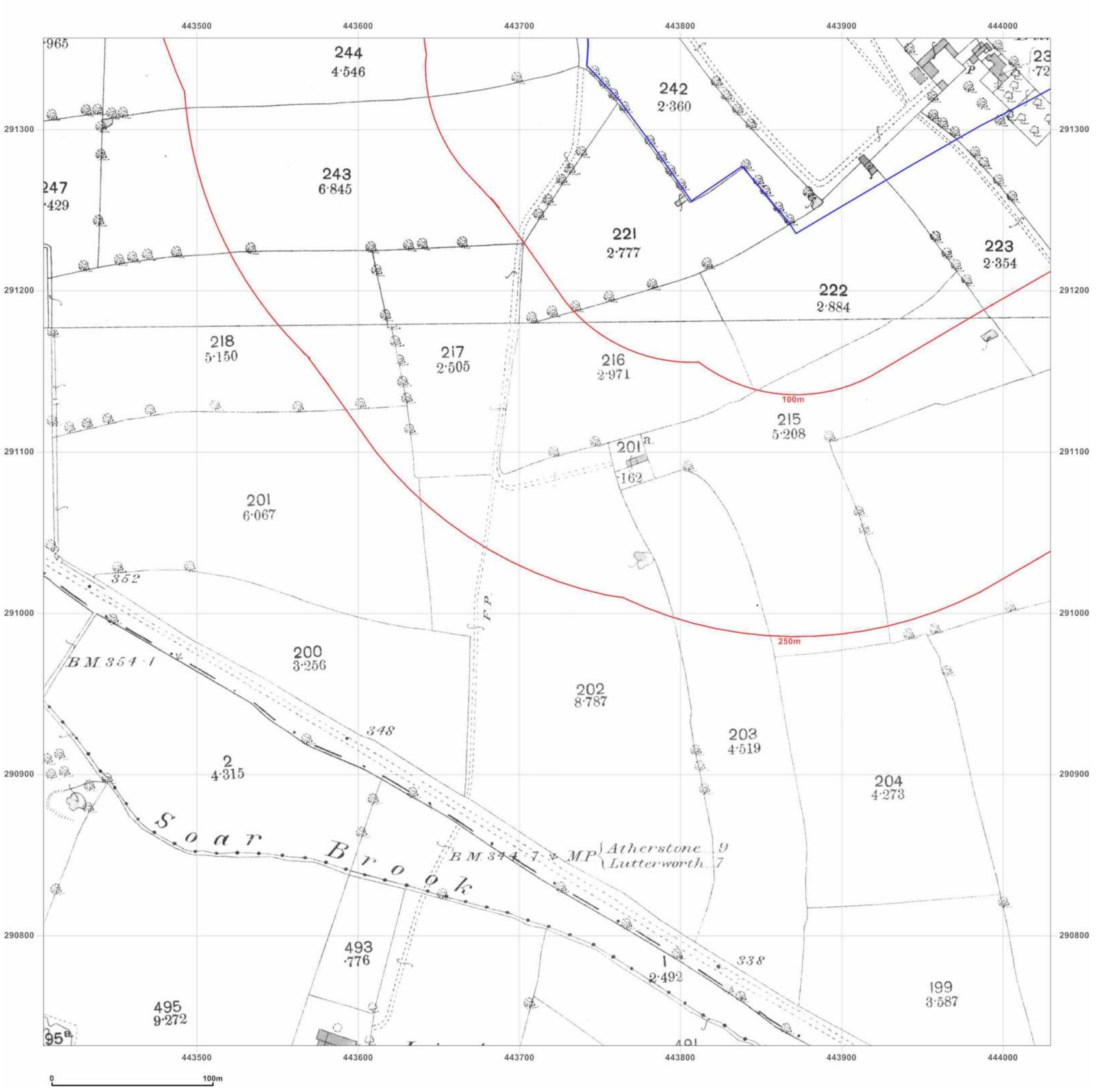
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LS_1_3
LS_2_3
LS_1_2
LS_2_2
LS_1_1
LS_2_1



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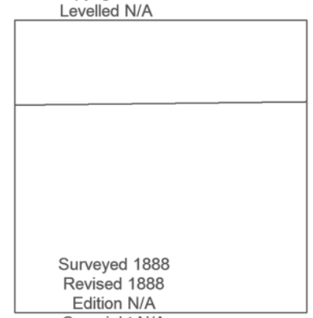
Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_1
Grid Ref: 443717, 291044

Map Name: County Series
Map date: **1888**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
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Surveyed 1888
Revised 1888
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1888
Revised 1888
Edition N/A
Copyright N/A
Levelled N/A

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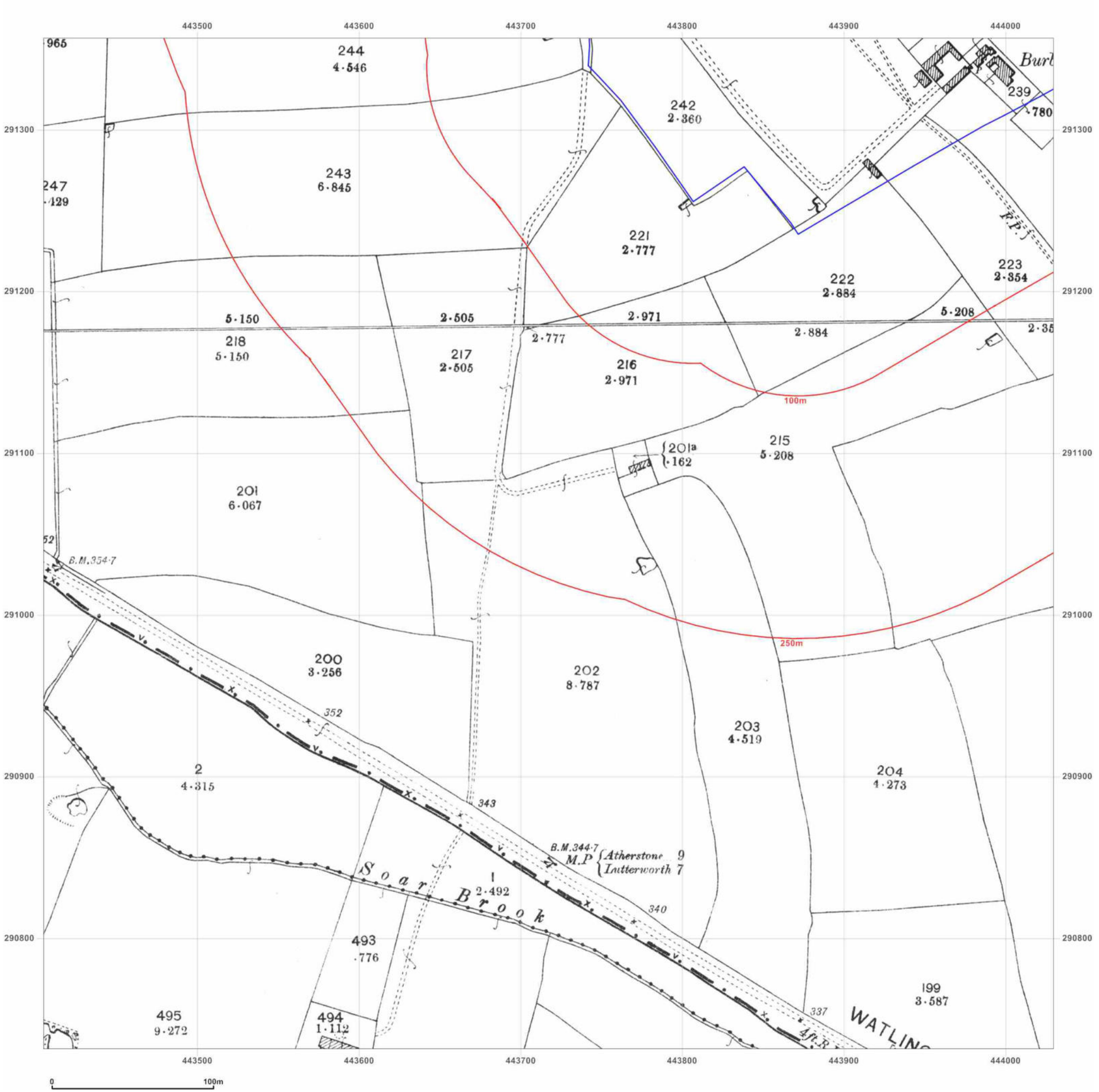
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Site Details:

Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_1
Grid Ref: 443717, 291044

Map Name: County Series

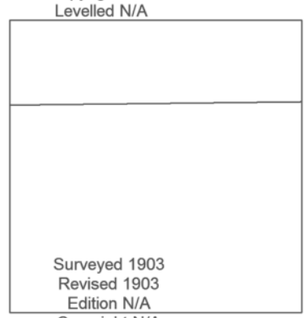
Map date: **1903**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1903
Revised 1903
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1903
Revised 1903
Edition N/A
Copyright N/A
Levelled N/A

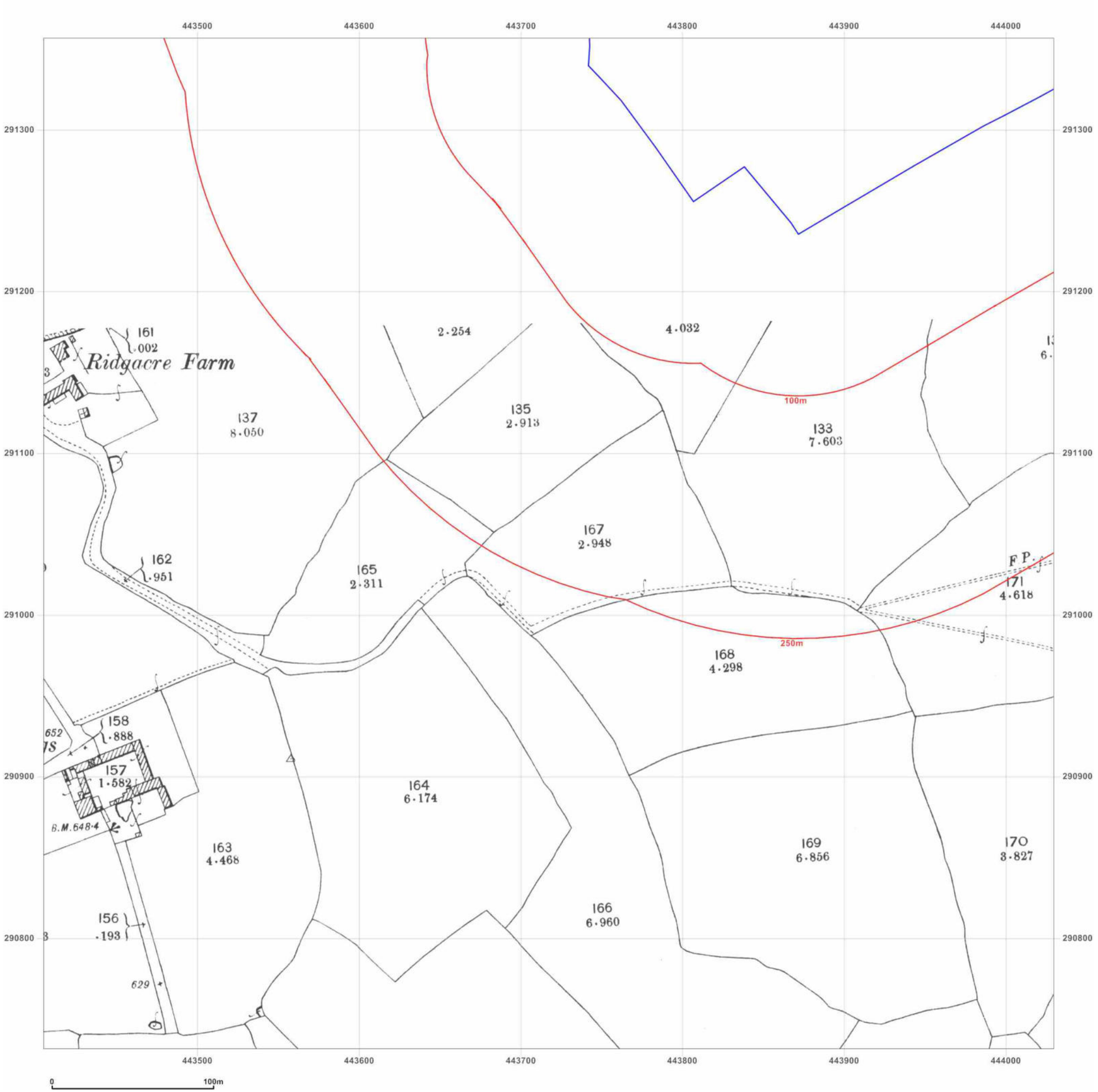
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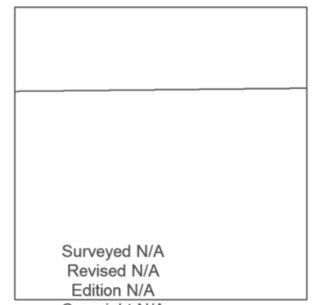
Site Details:

Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_1
Grid Ref: 443717, 291044

Map Name: County Series
Map date: **1904**
Scale: 1:2,500
Printed at: 1:2,500

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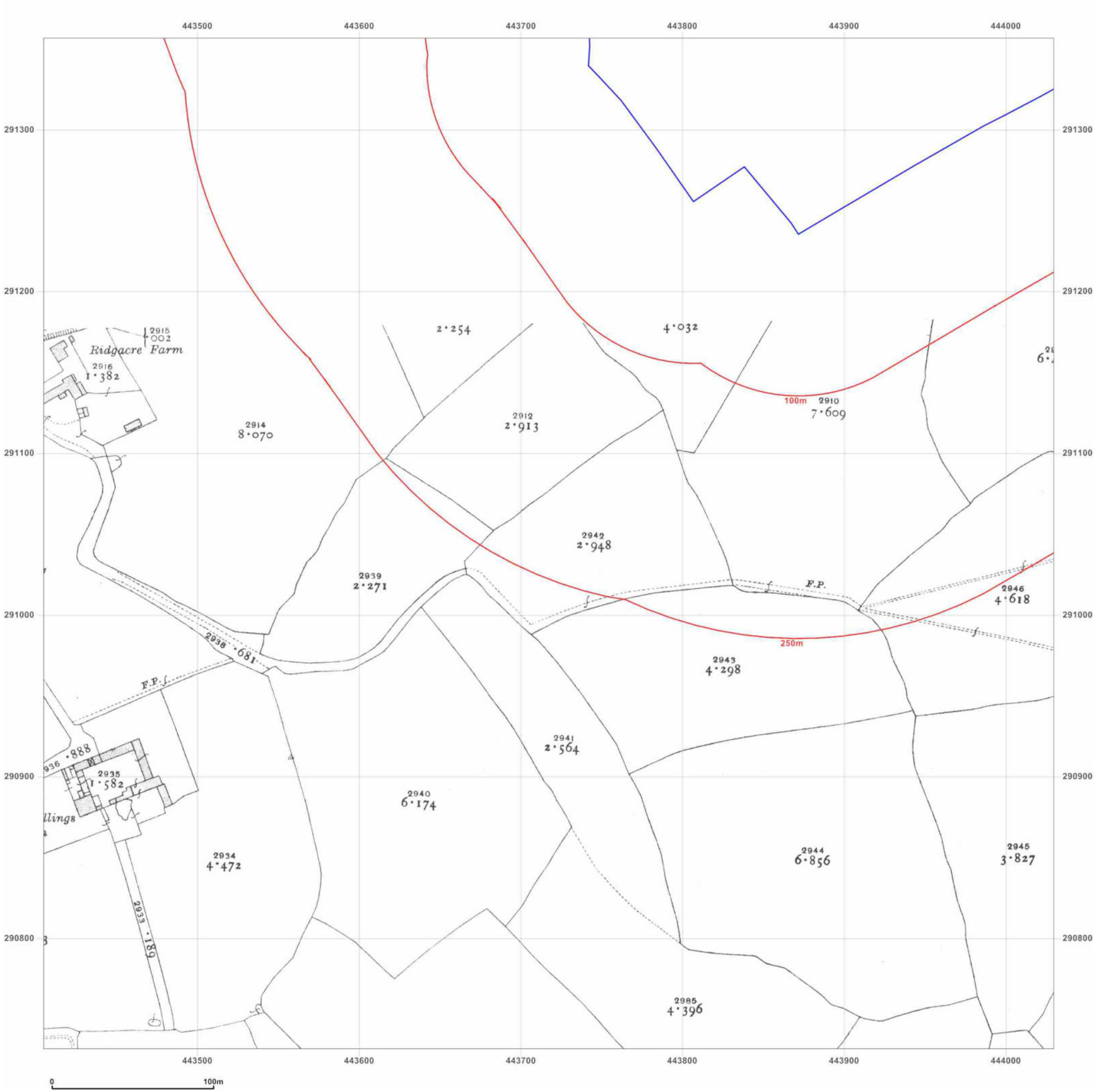
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_1
Grid Ref: 443717, 291044

Map Name: County Series
Map date: **1916**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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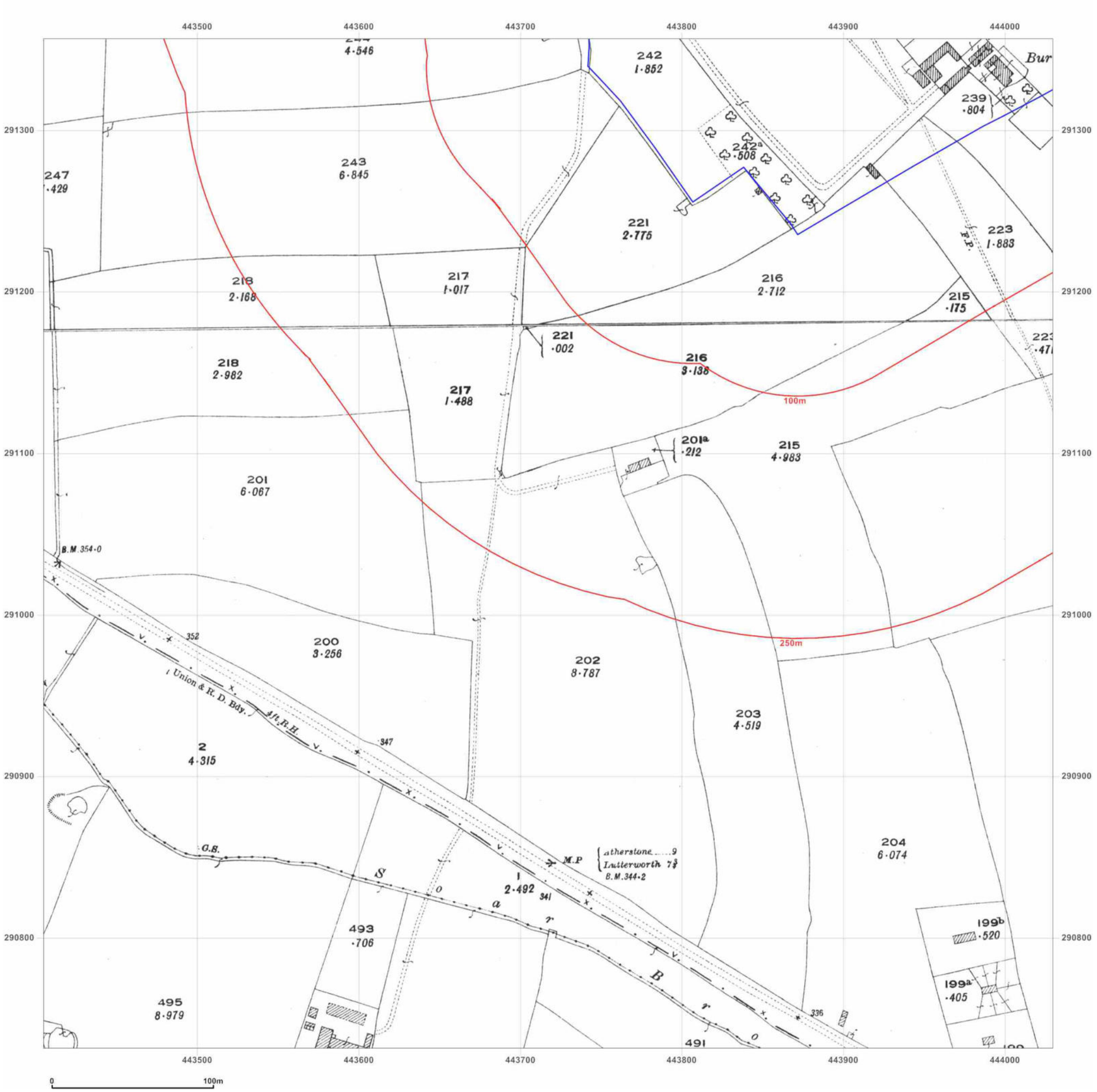
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Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_1
Grid Ref: 443717, 291044

Map Name: County Series
Map date: **1924-1925**
Scale: 1:2,500
Printed at: 1:2,500

N
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Surveyed 1925
Revised 1925
Edition N/A
Copyright N/A
Levelled N/A

Surveyed 1924
Revised 1924
Edition N/A
Copyright N/A
Levelled N/A

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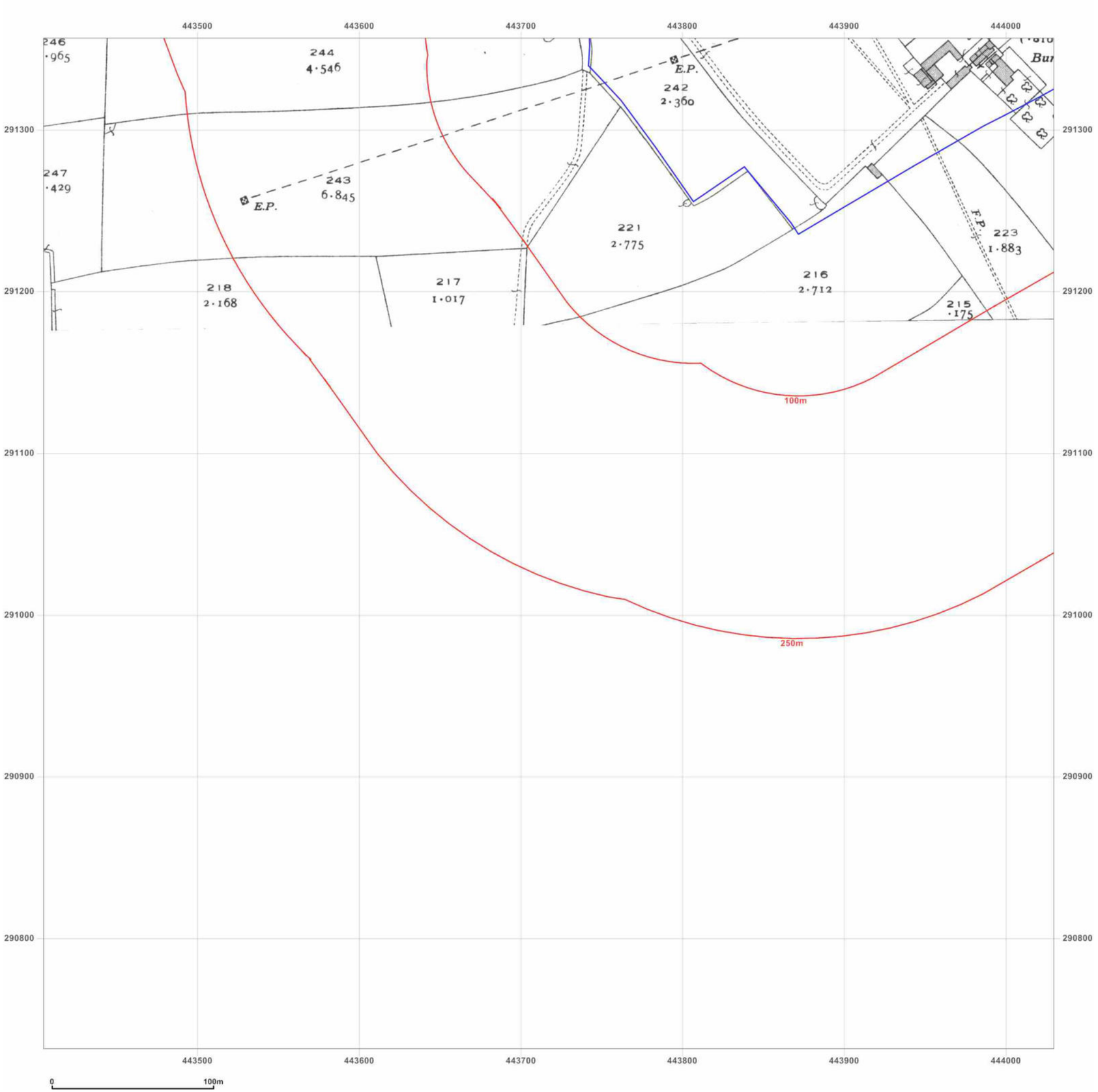
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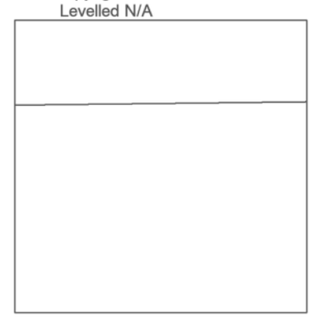
Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_1
Grid Ref: 443717, 291044

Map Name: County Series
Map date: **1938**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed 1938
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A



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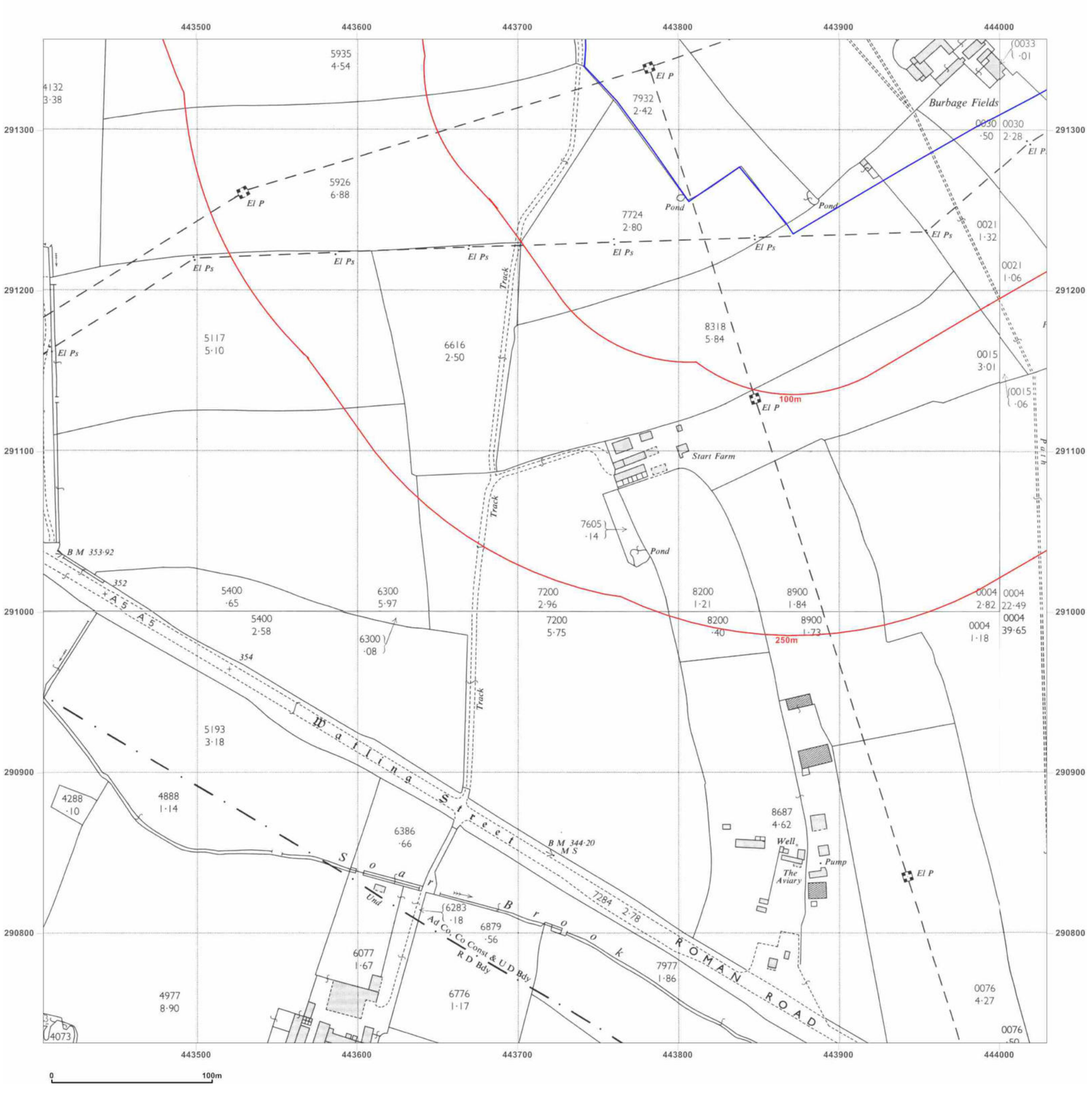
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_1
Grid Ref: 443717, 291044

Map Name: National Grid

Map date: **1963**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1963
Revised 1963
Edition N/A
Copyright 1964
Levelled 1949

Surveyed 1963
Revised 1963
Edition N/A
Copyright 1964
Levelled 1945

Surveyed 1963
Revised 1963
Edition N/A
Copyright 1964
Levelled 1949

Surveyed 1963
Revised 1963
Edition N/A
Copyright 1964
Levelled 1958

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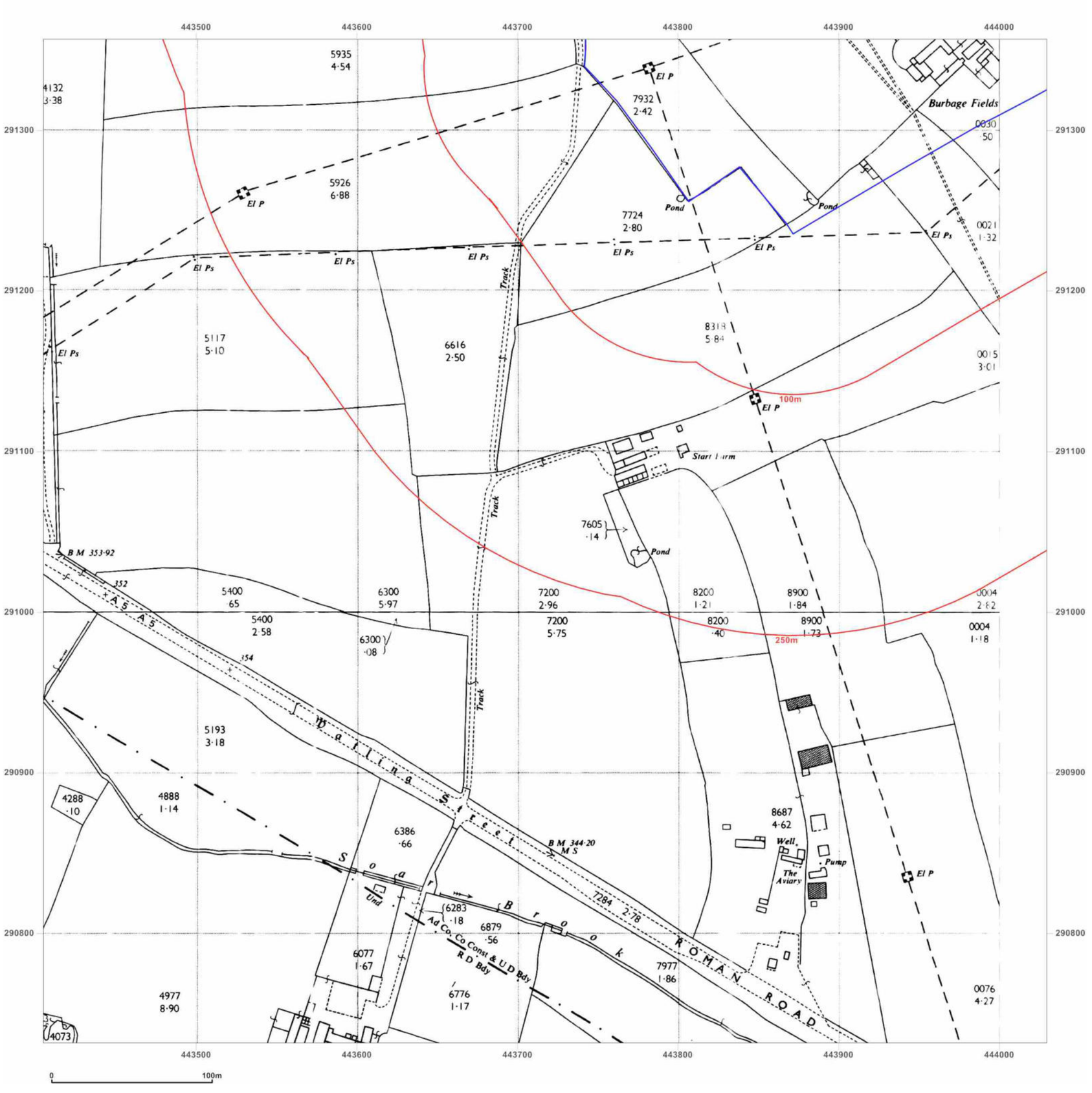
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_1
Grid Ref: 443717, 291044

Map Name: National Grid

Map date: **1964**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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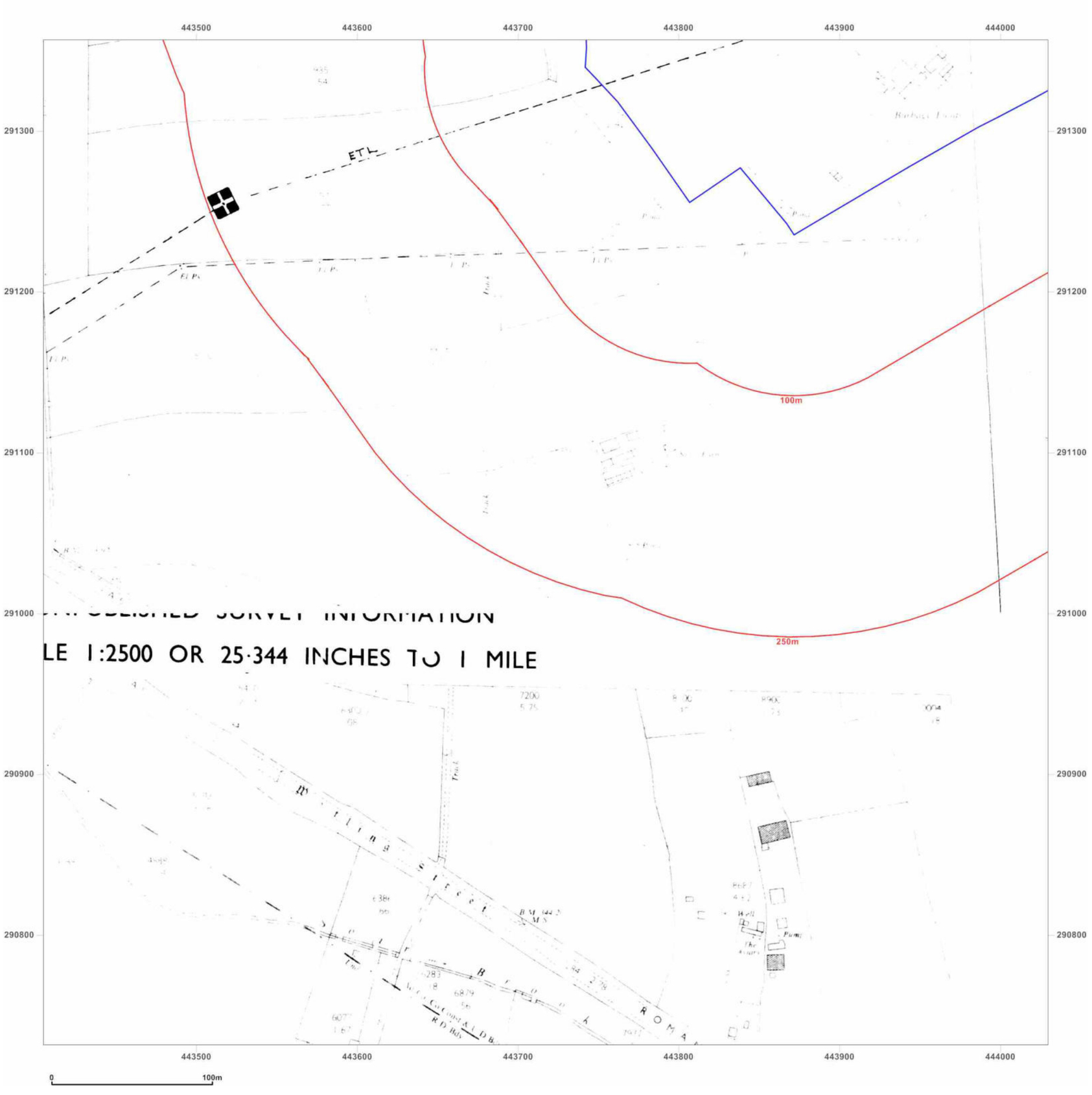
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_1
Grid Ref: 443717, 291044

Map Name: National Grid
Map date: **1975**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
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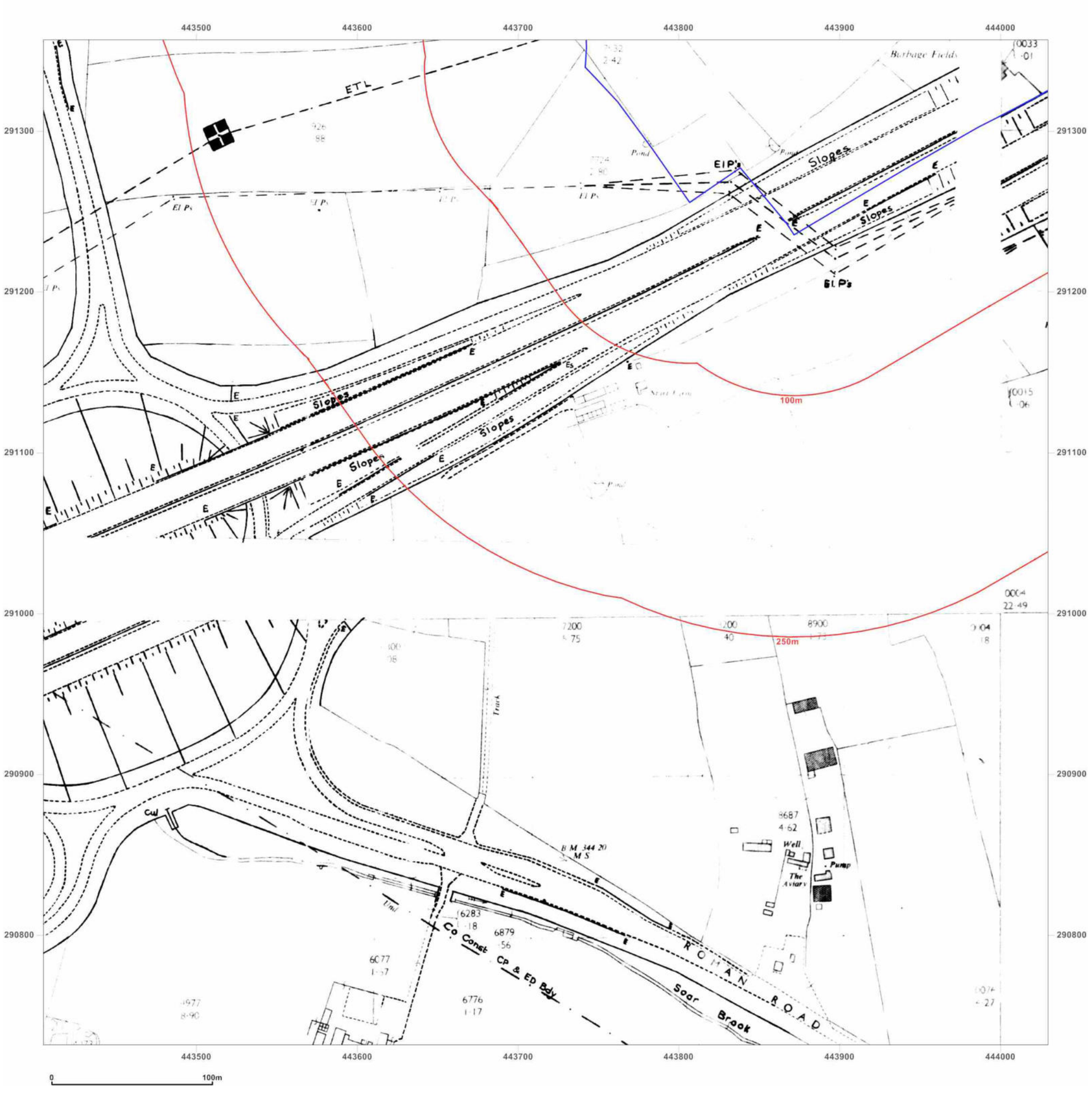
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Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_1
Grid Ref: 443717, 291044

Map Name: National Grid
Map date: **1977-1978**
Scale: 1:2,500
Printed at: 1:2,500

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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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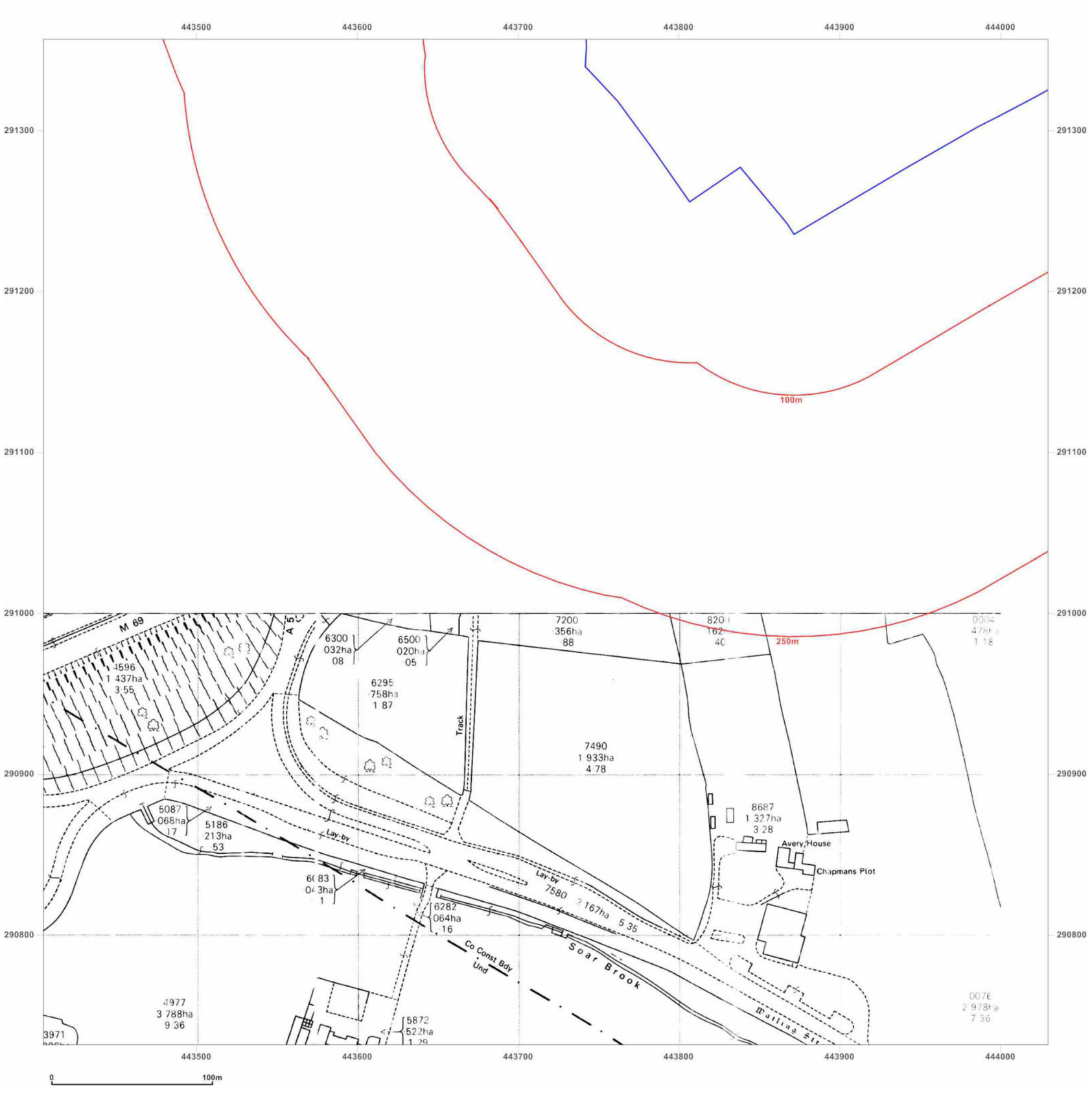
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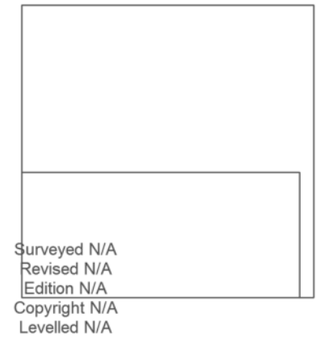
Site Details:

Burbage Field Farm,Burbage,Leicestershire,LE 10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_1
Grid Ref: 443717, 291044

Map Name: National Grid
Map date: **1983**
Scale: 1:2,500
Printed at: 1:2,500

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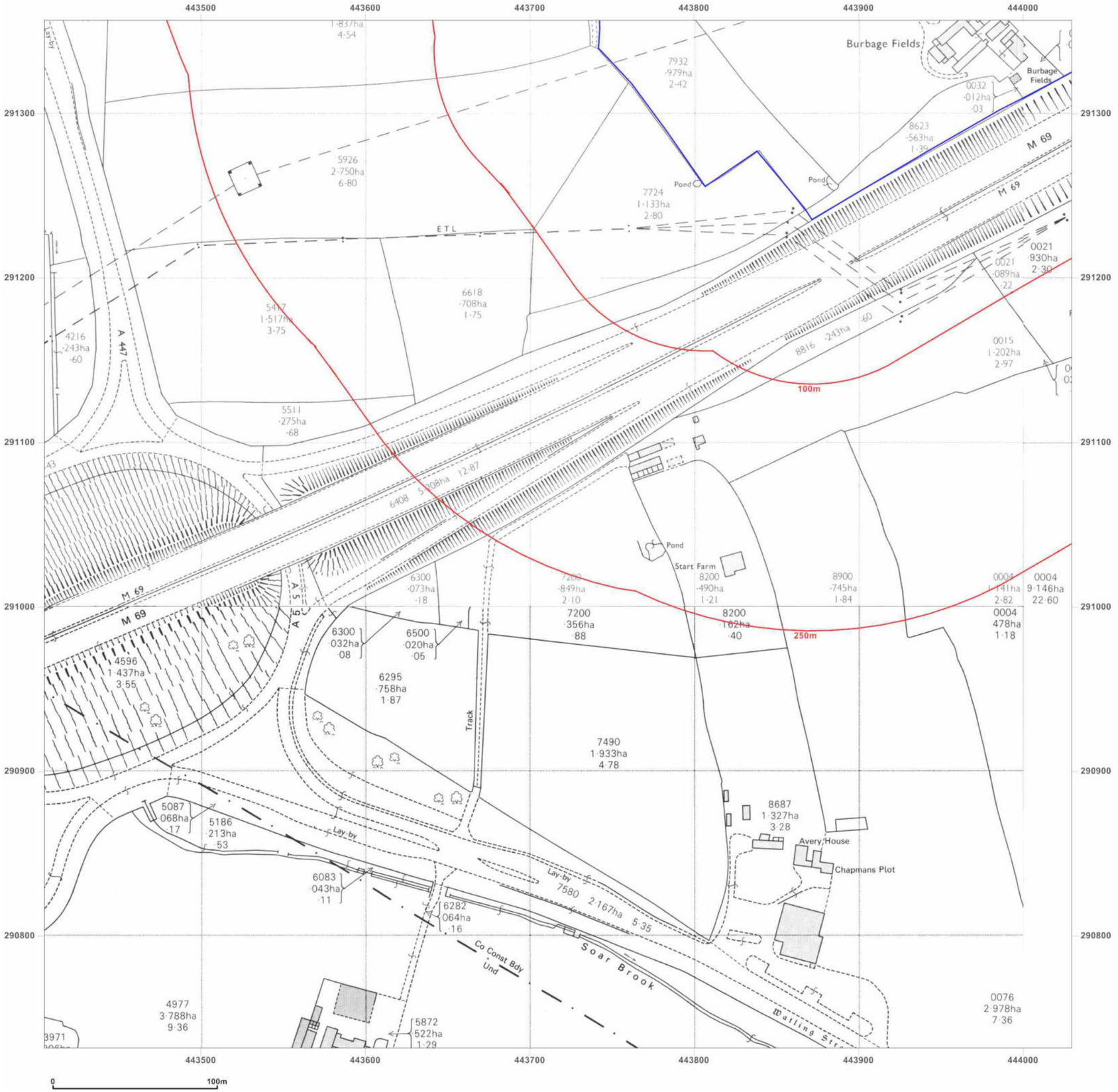
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Site Details:

Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_1
Grid Ref: 443717, 291044

Map Name: National Grid

Map date: **1981-1986**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1981
Revised 1981
Edition N/A
Copyright 1982
Levelled 1964

Surveyed 1986
Revised 1986
Edition N/A
Copyright 1987
Levelled 1964

Surveyed 1982
Revised 1982
Edition N/A
Copyright 1983
Levelled 1964

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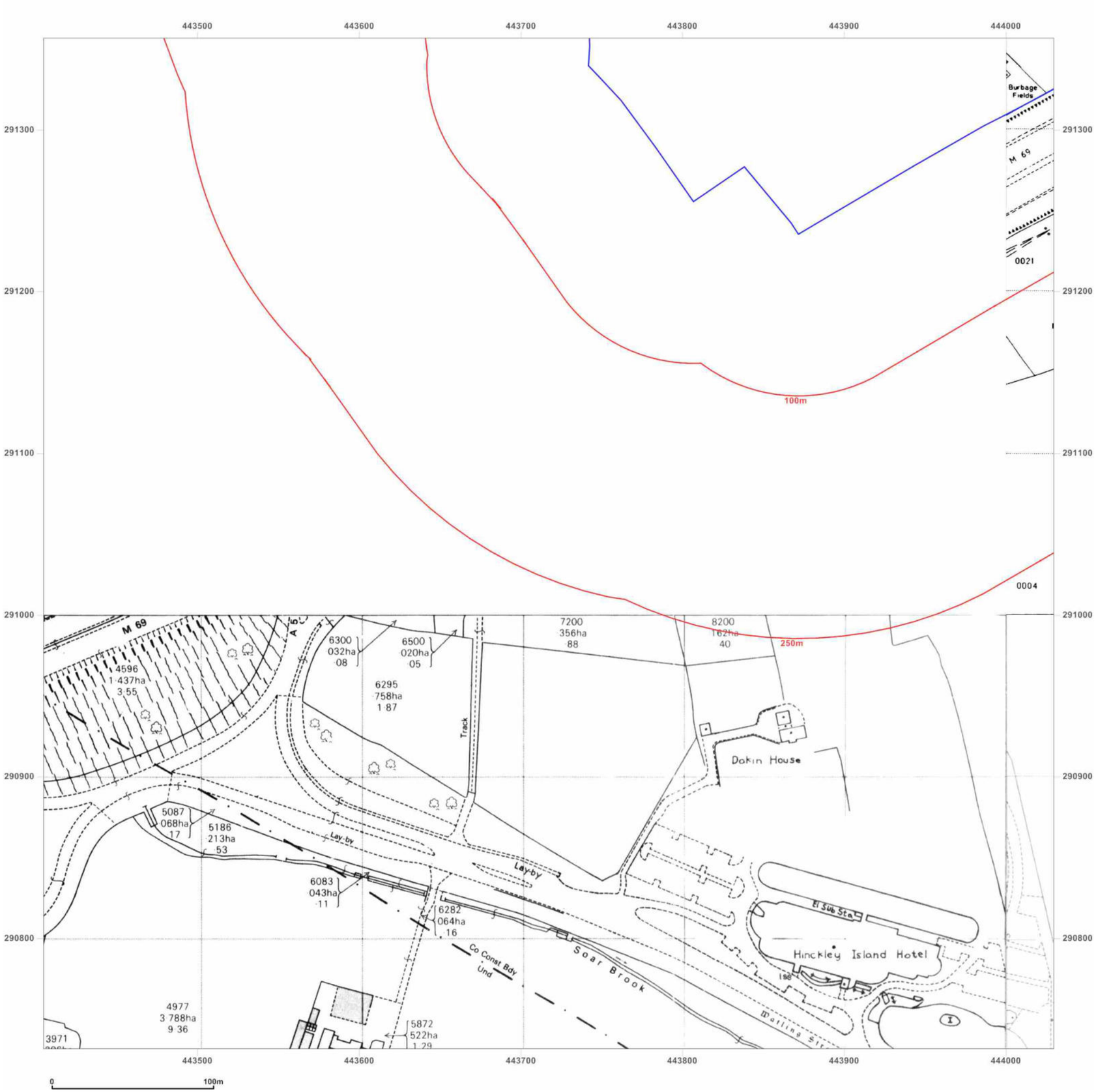
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Site Details:

Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_1
Grid Ref: 443717, 291044

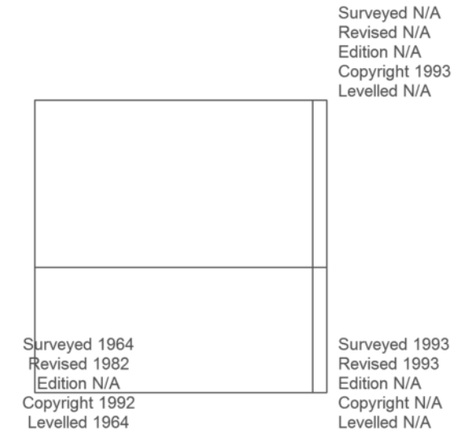
Map Name: National Grid

Map date: **1992-1993**

Scale: 1:2,500

Printed at: 1:2,500

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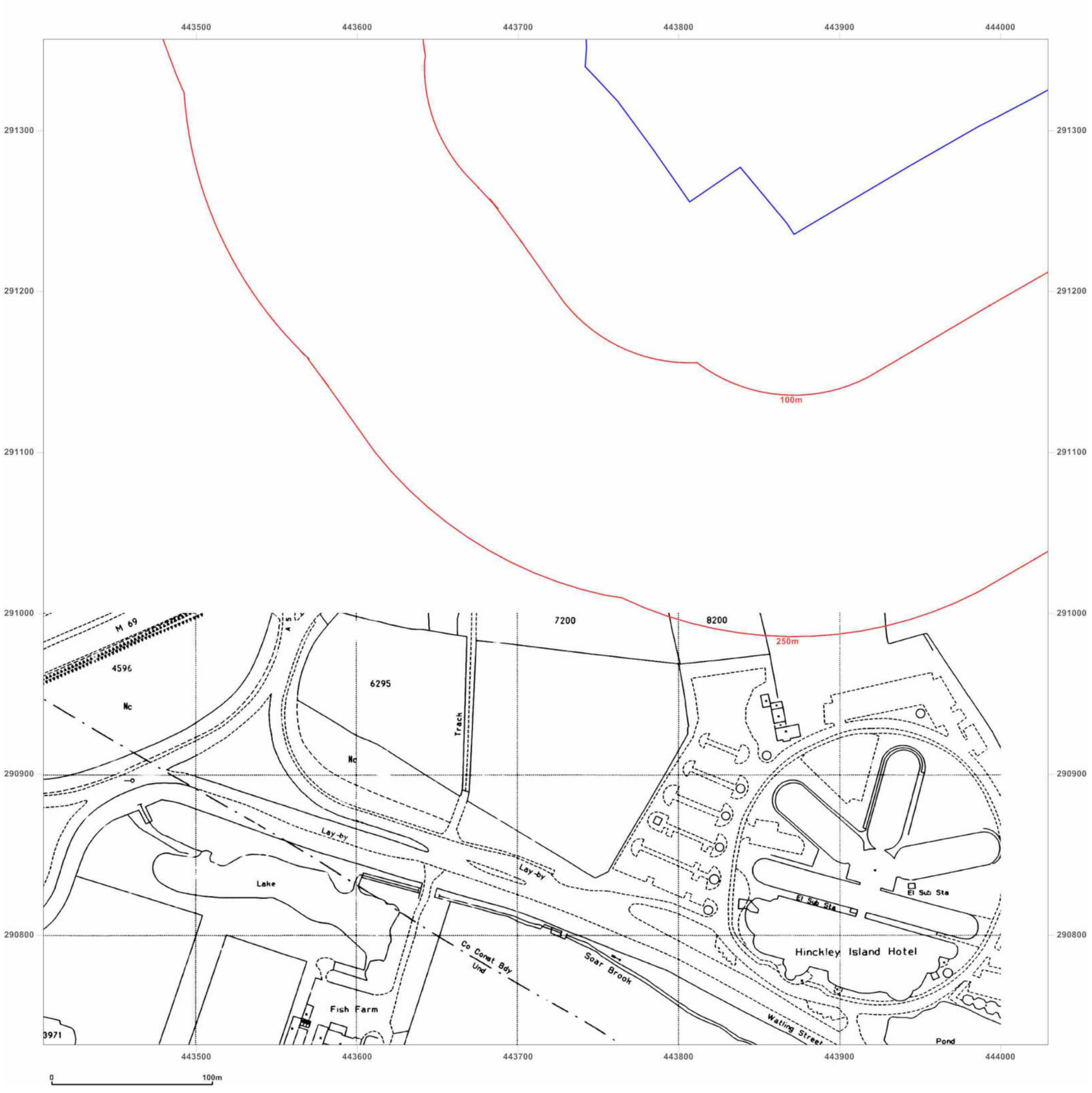
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Site Details:

Burbage Field
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_1
Grid Ref: 443717, 291044

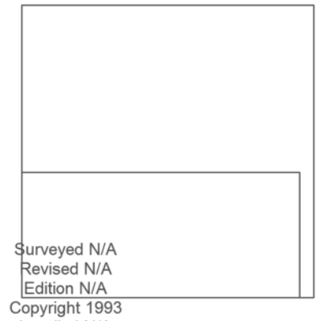
Map Name: National Grid

Map date: **1993**

Scale: 1:2,500

Printed at: 1:2,500

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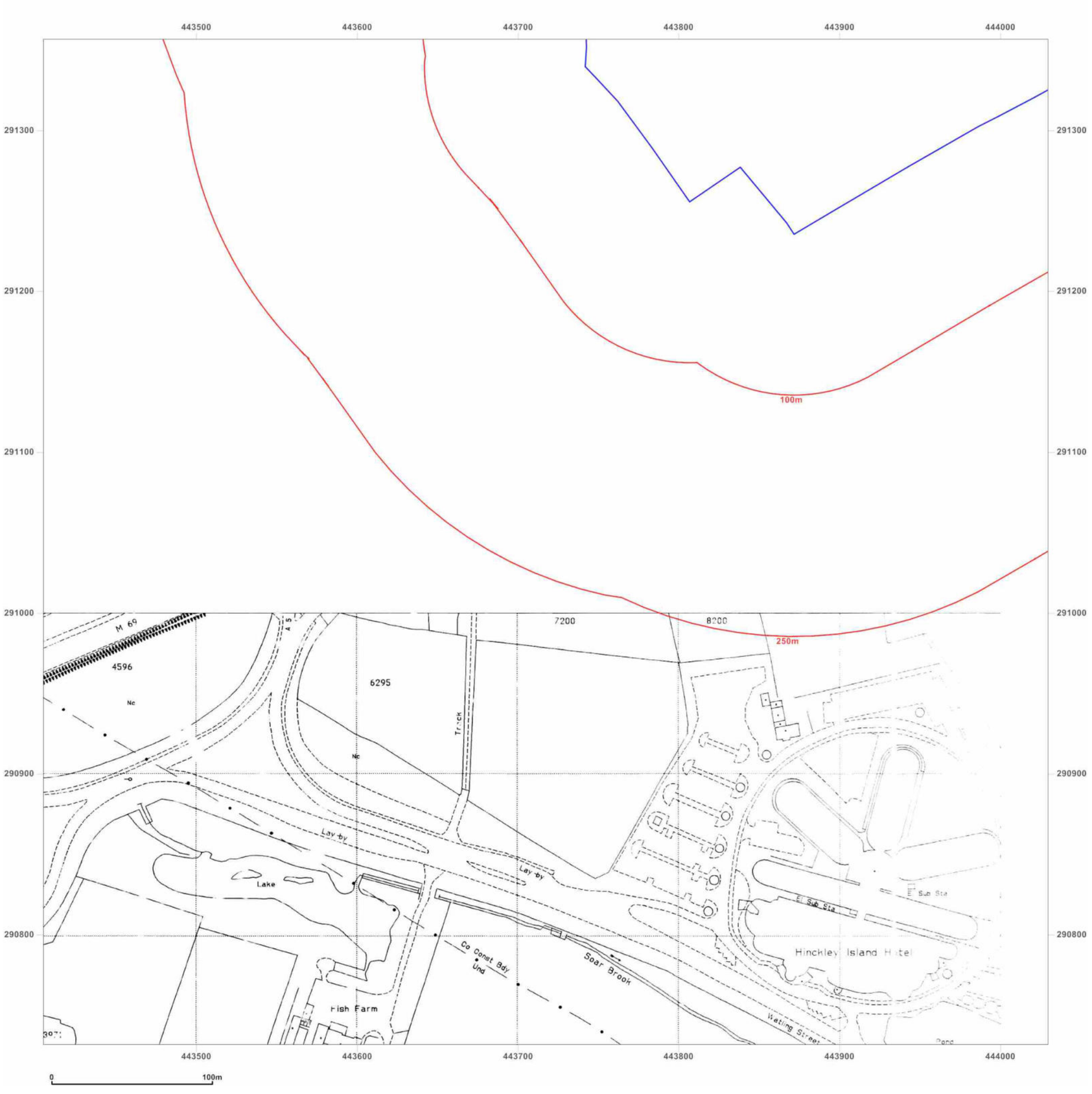
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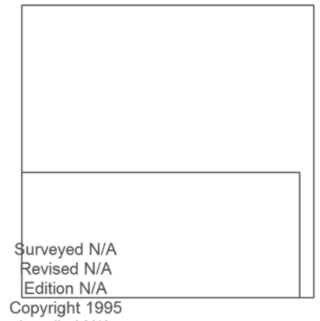
Site Details:

Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_1
Grid Ref: 443717, 291044

Map Name: National Grid
Map date: **1995**
Scale: 1:2,500
Printed at: 1:2,500

N
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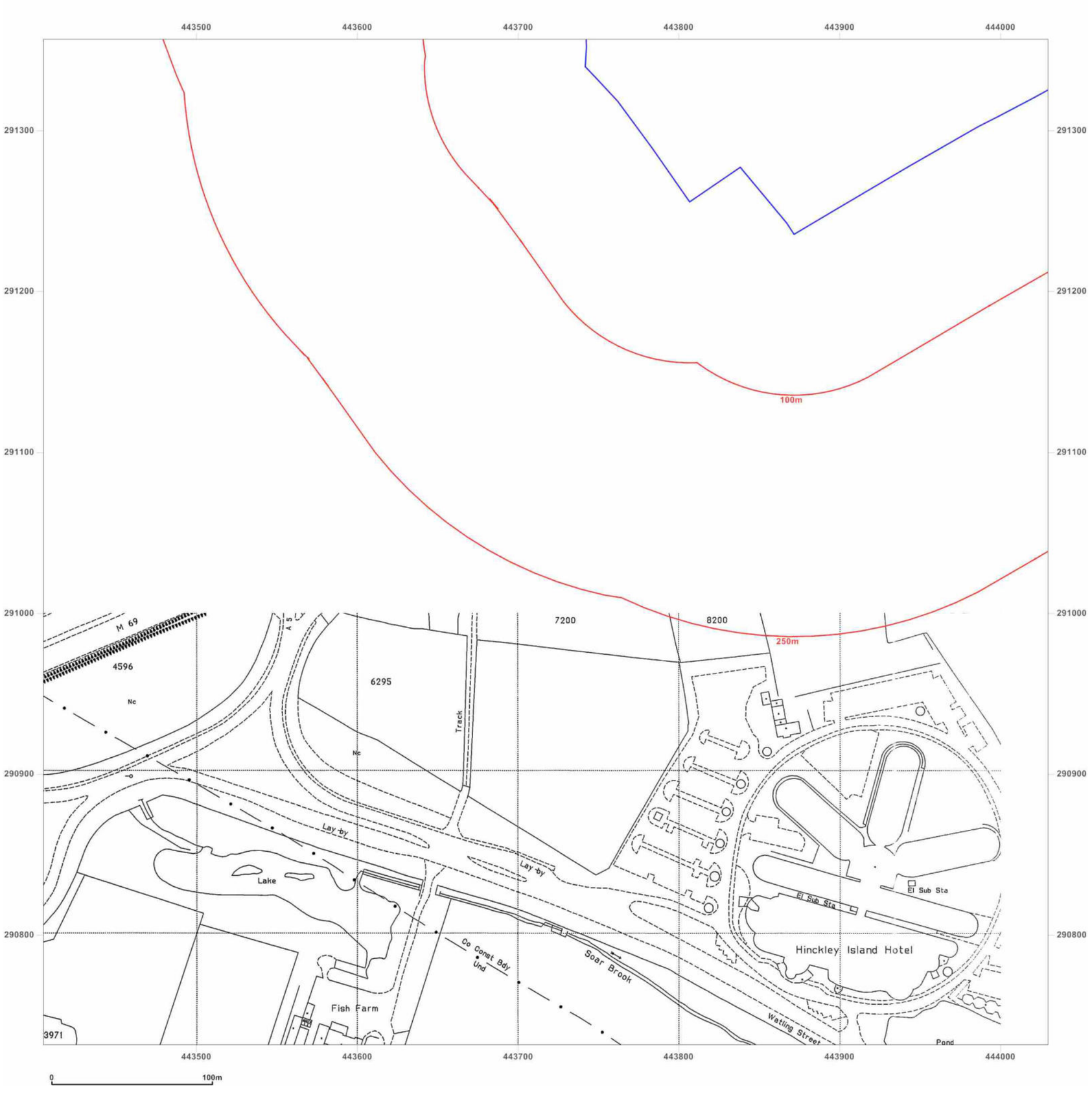
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Site Details:

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_1
Grid Ref: 443717, 291044

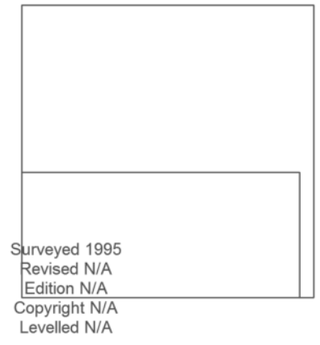
Map Name: National Grid

Map date: **1995**

Scale: 1:2,500

Printed at: 1:2,500

N
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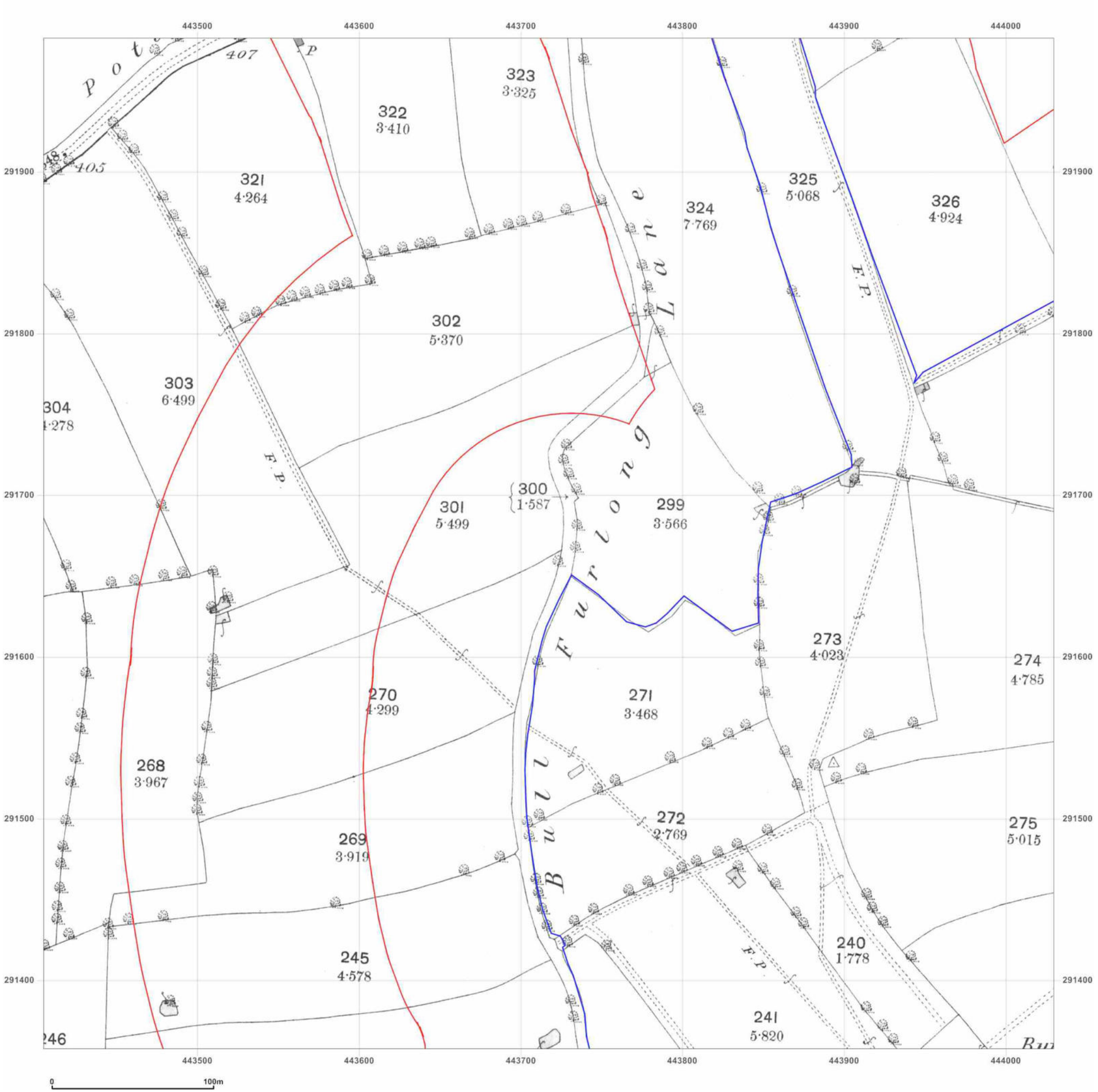
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_2
Grid Ref: 443717, 291670

Map Name: County Series

Map date: **1888**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1888
Revised 1888
Edition N/A
Copyright N/A
Levelled N/A

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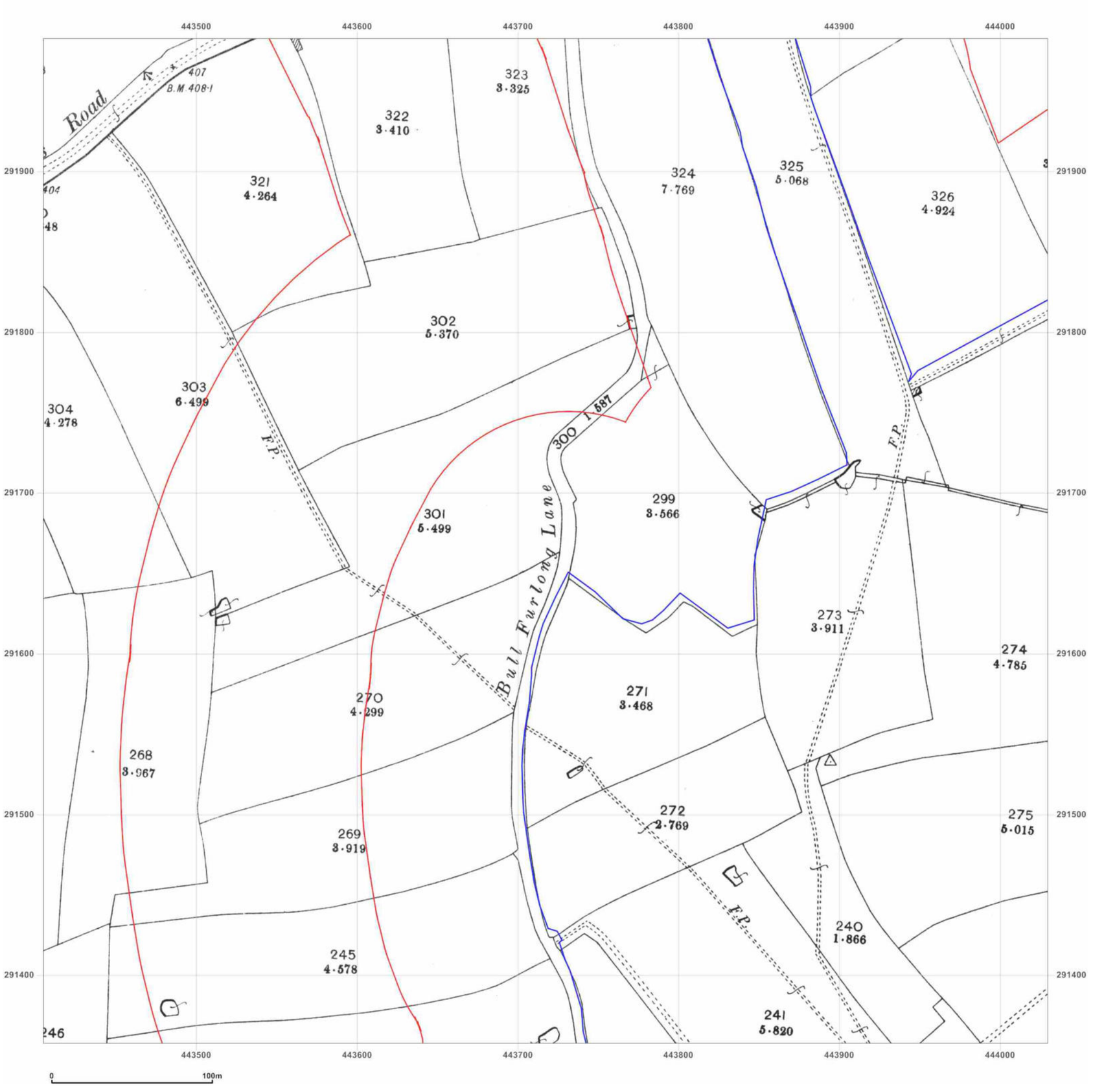
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_2
Grid Ref: 443717, 291670

Map Name: County Series

Map date: **1903**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1903
Revised 1903
Edition N/A
Copyright N/A
Levelled N/A

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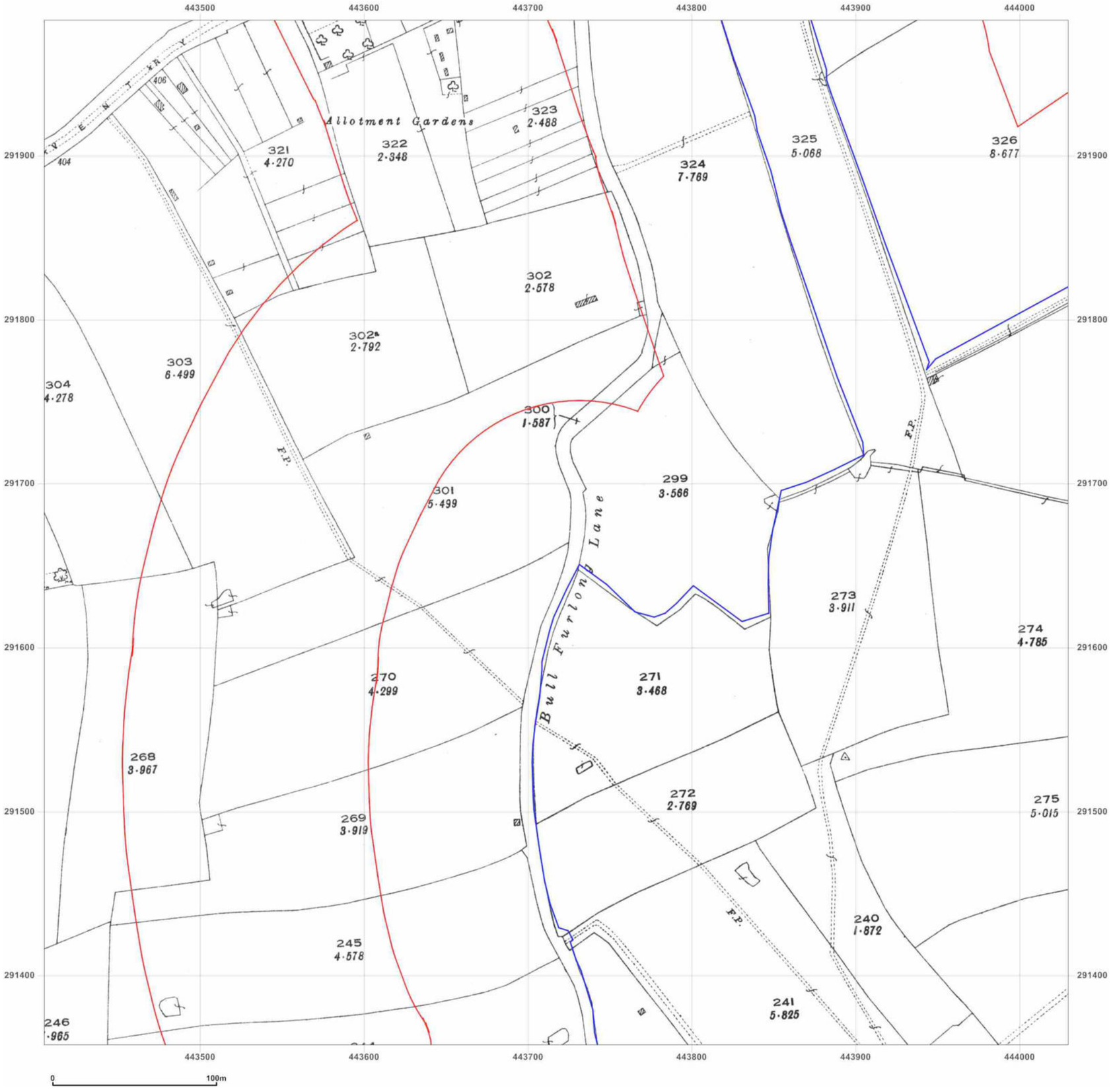
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_2
Grid Ref: 443717, 291670

Map Name: County Series

Map date: **1925**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1925
Revised 1925
Edition N/A
Copyright N/A
Levelled N/A

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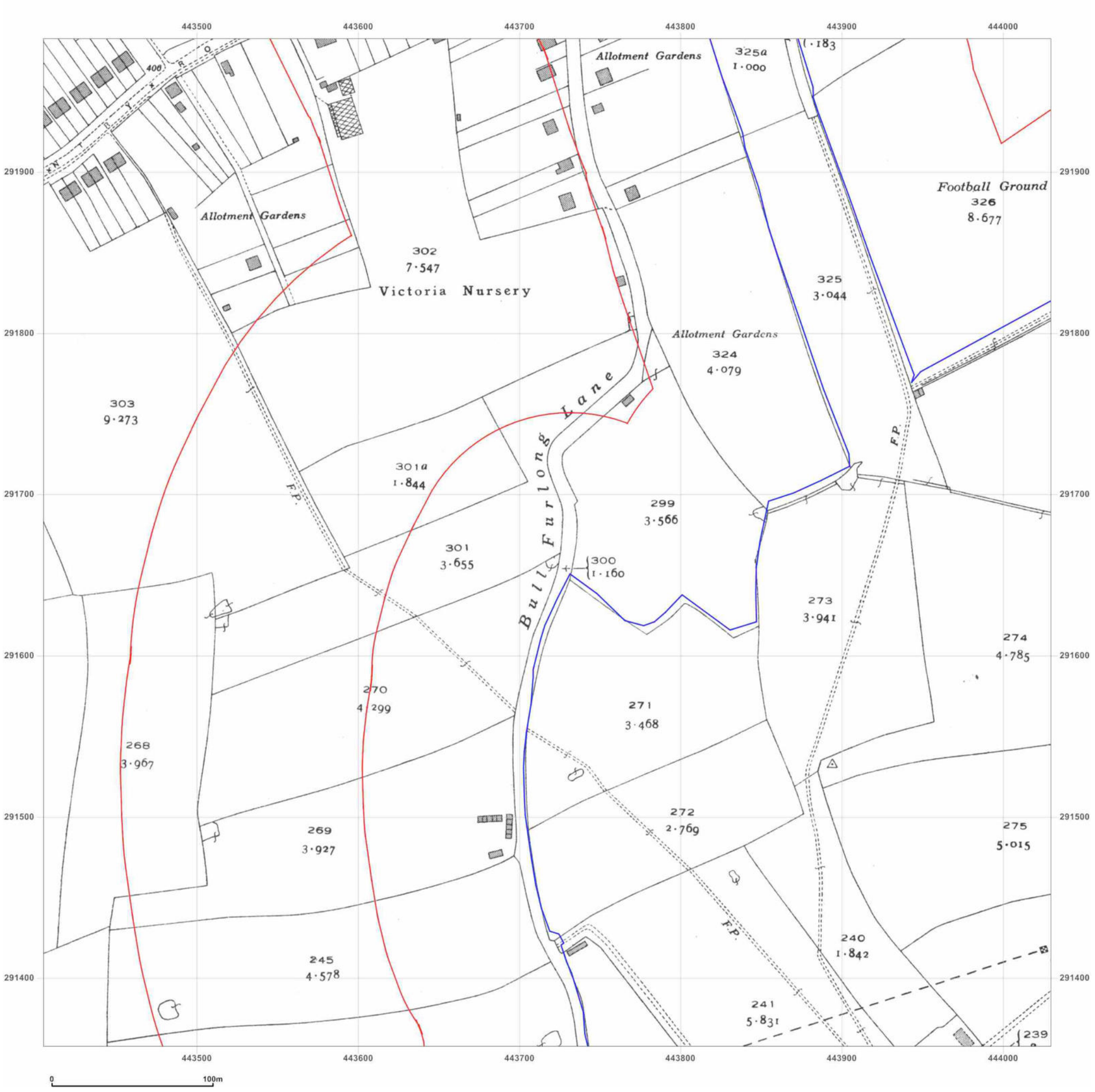
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_2
Grid Ref: 443717, 291670

Map Name: County Series
Map date: **1938**
Scale: 1:2,500
Printed at: 1:2,500

N
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Surveyed 1938
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_2
Grid Ref: 443717, 291670

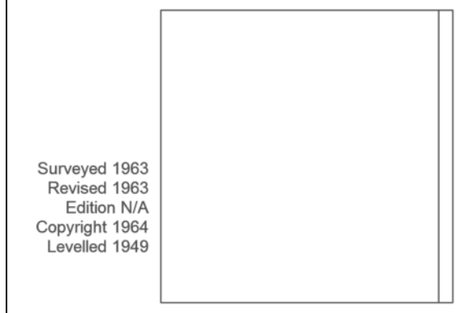
Map Name: National Grid

Map date: **1963**

Scale: 1:2,500

Printed at: 1:2,500

N
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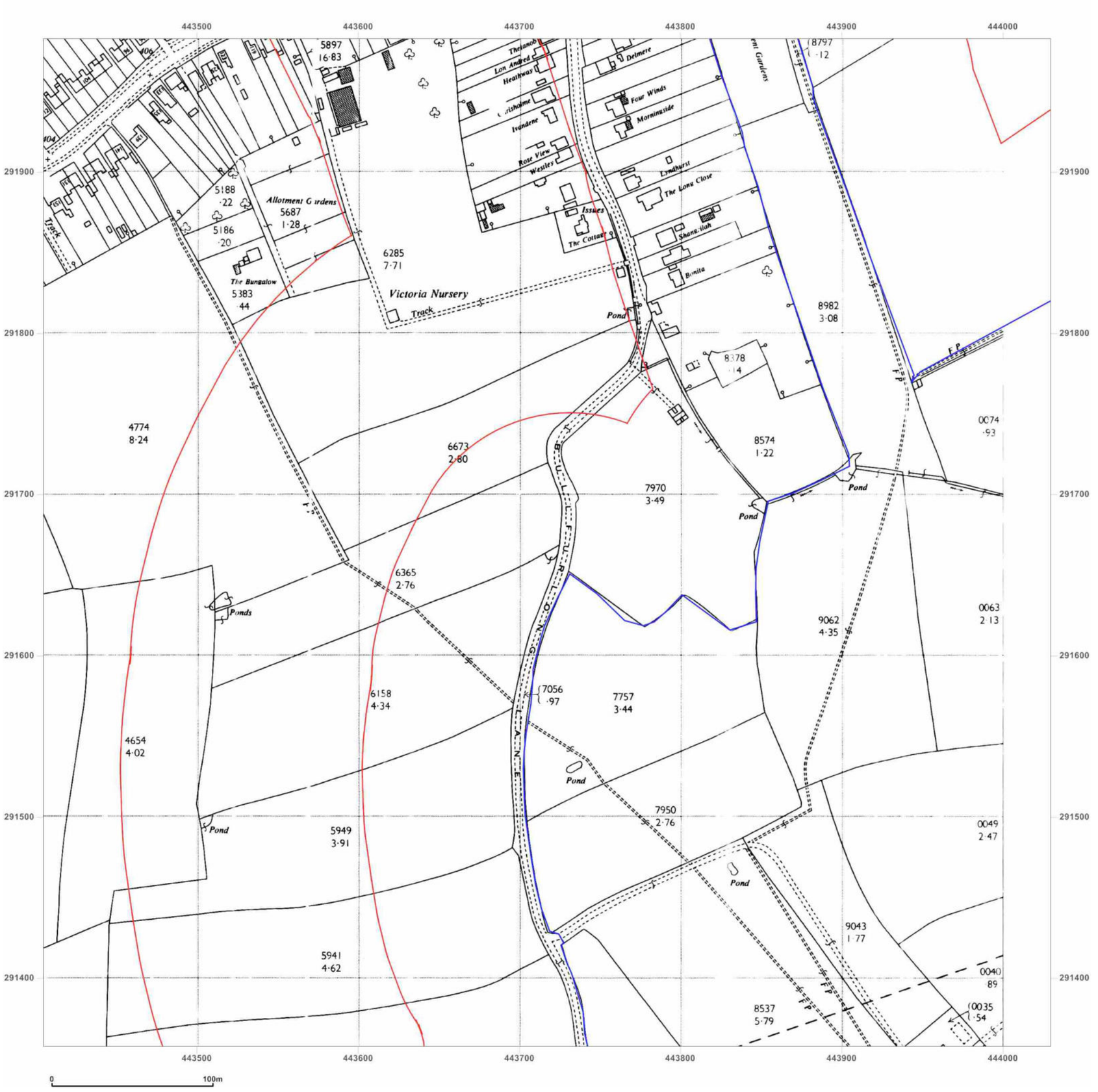
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_2
Grid Ref: 443717, 291670

Map Name: National Grid

Map date: **1964**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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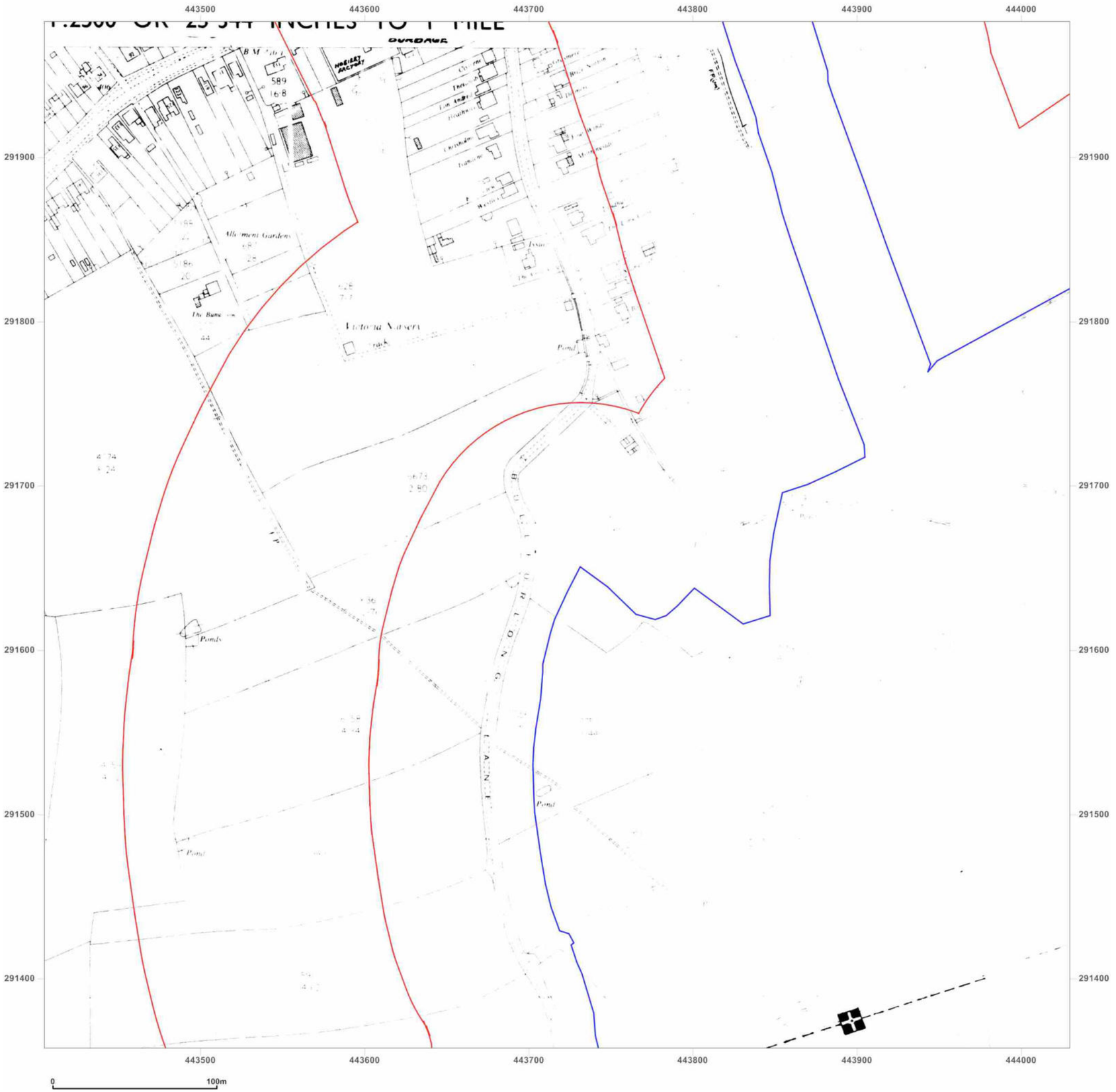
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_2
Grid Ref: 443717, 291670

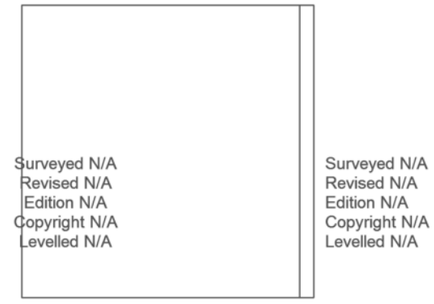
Map Name: National Grid

Map date: **1975**

Scale: 1:2,500

Printed at: 1:2,500

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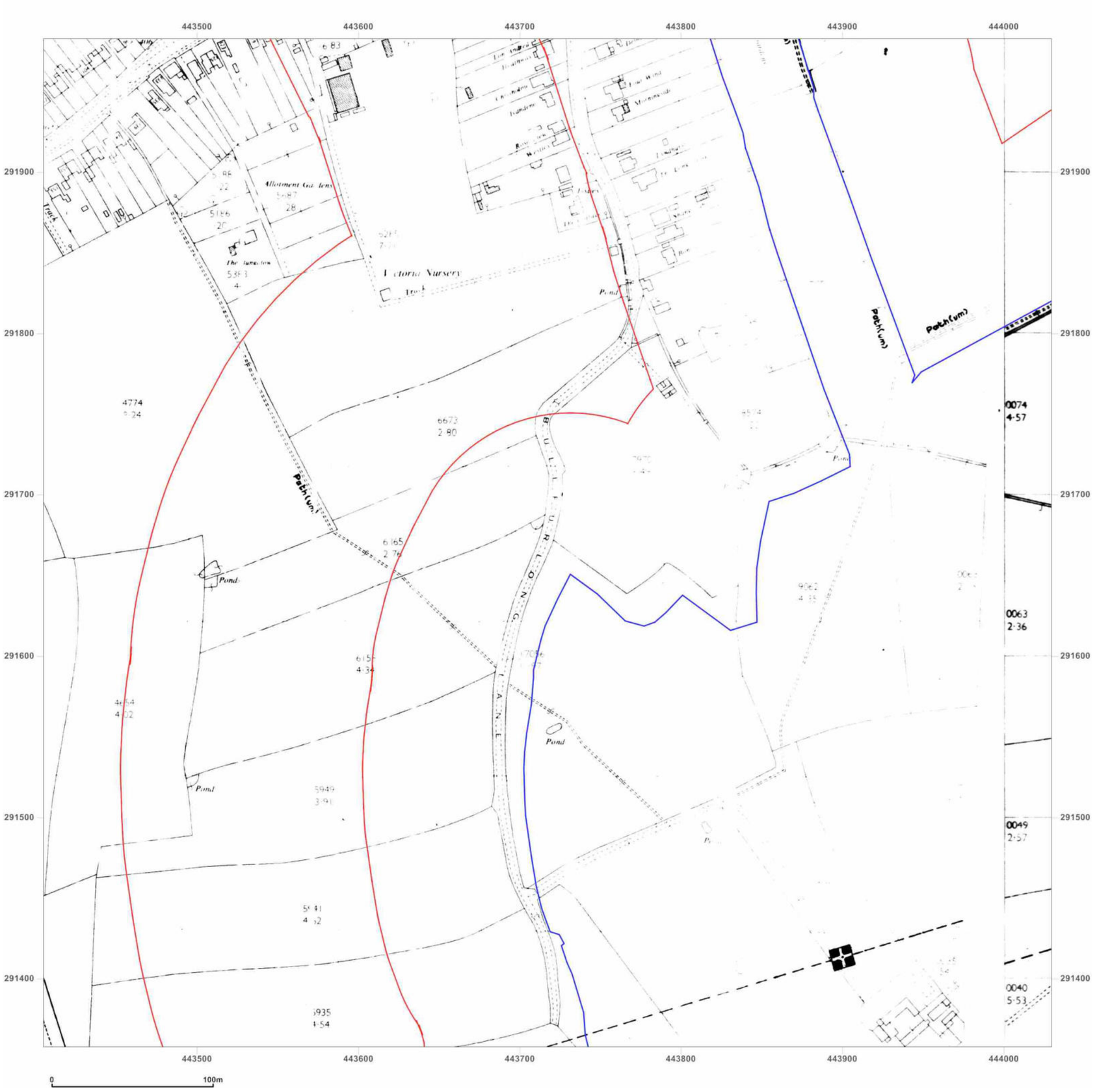
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_2
Grid Ref: 443717, 291670

Map Name: National Grid

Map date: **1977-1978**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_2
Grid Ref: 443717, 291670

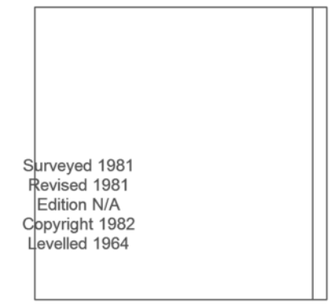
Map Name: National Grid

Map date: **1981-1986**

Scale: 1:2,500

Printed at: 1:2,500

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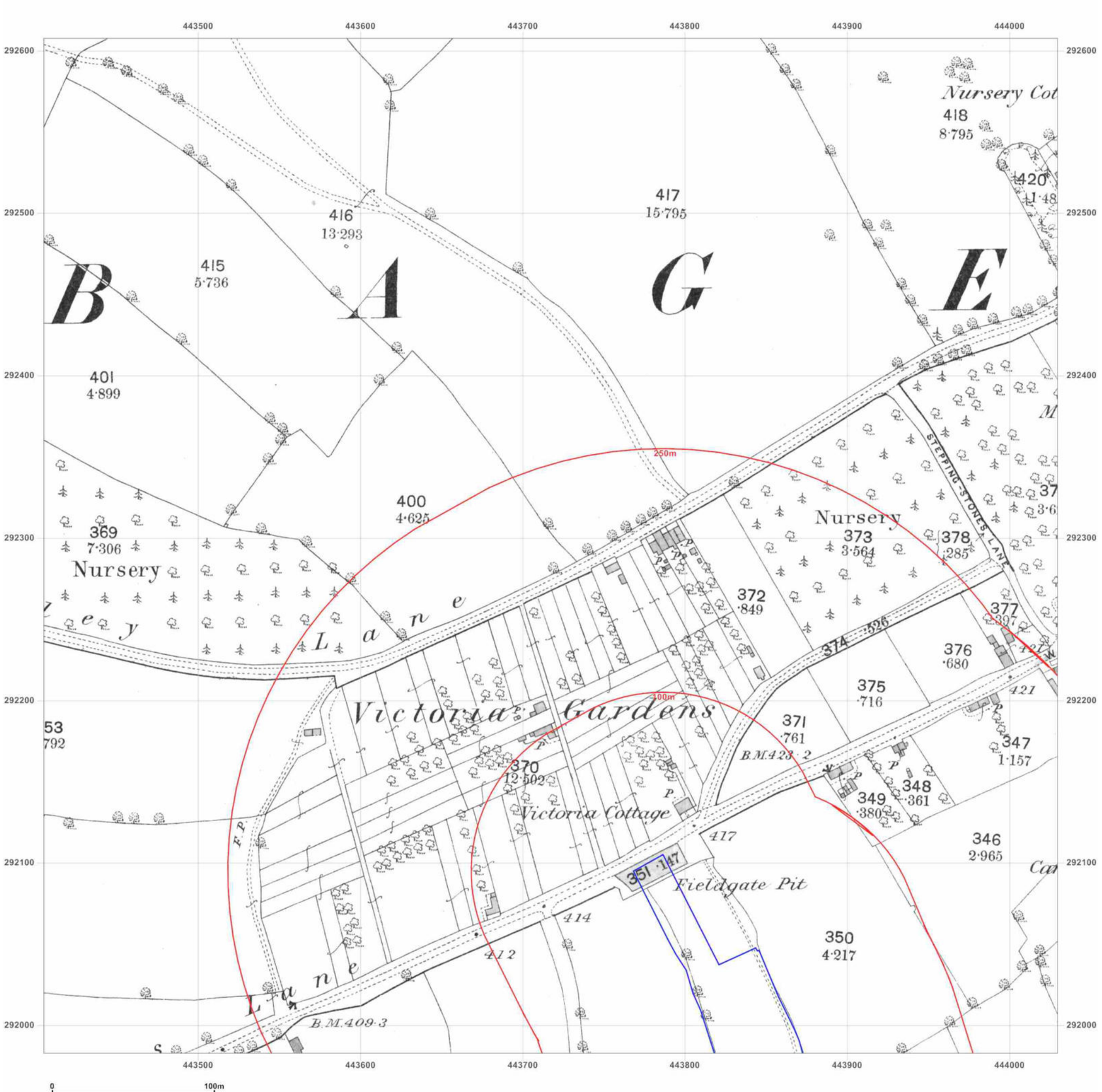
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Site Details:

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_3
Grid Ref: 443717, 292295

Map Name: County Series

Map date: **1888**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1888
Revised 1888
Edition N/A
Copyright N/A
Levelled N/A

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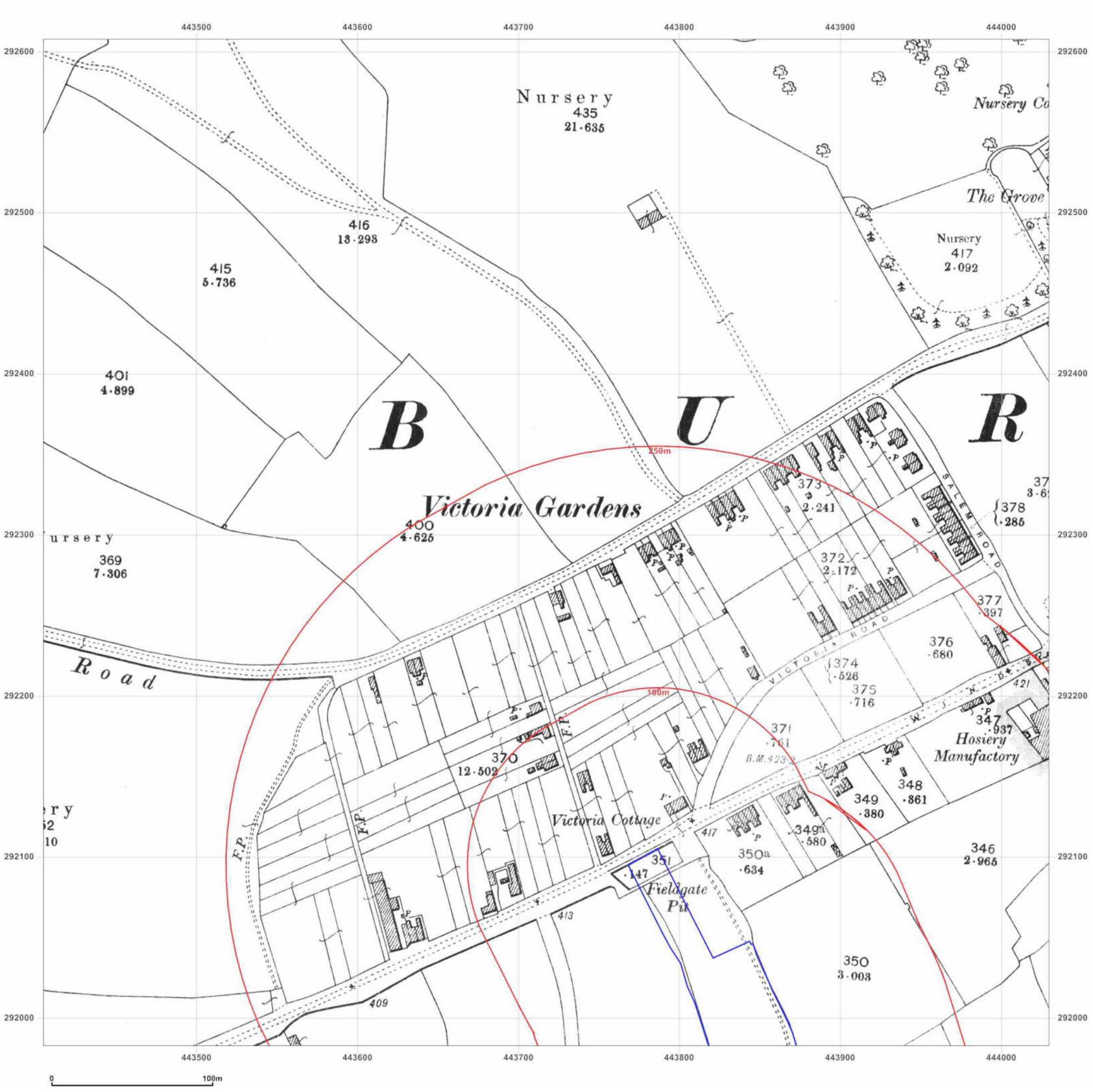
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_3
Grid Ref: 443717, 292295

Map Name: County Series
Map date: **1903**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
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Surveyed 1903
Revised 1903
Edition N/A
Copyright N/A
Levelled N/A

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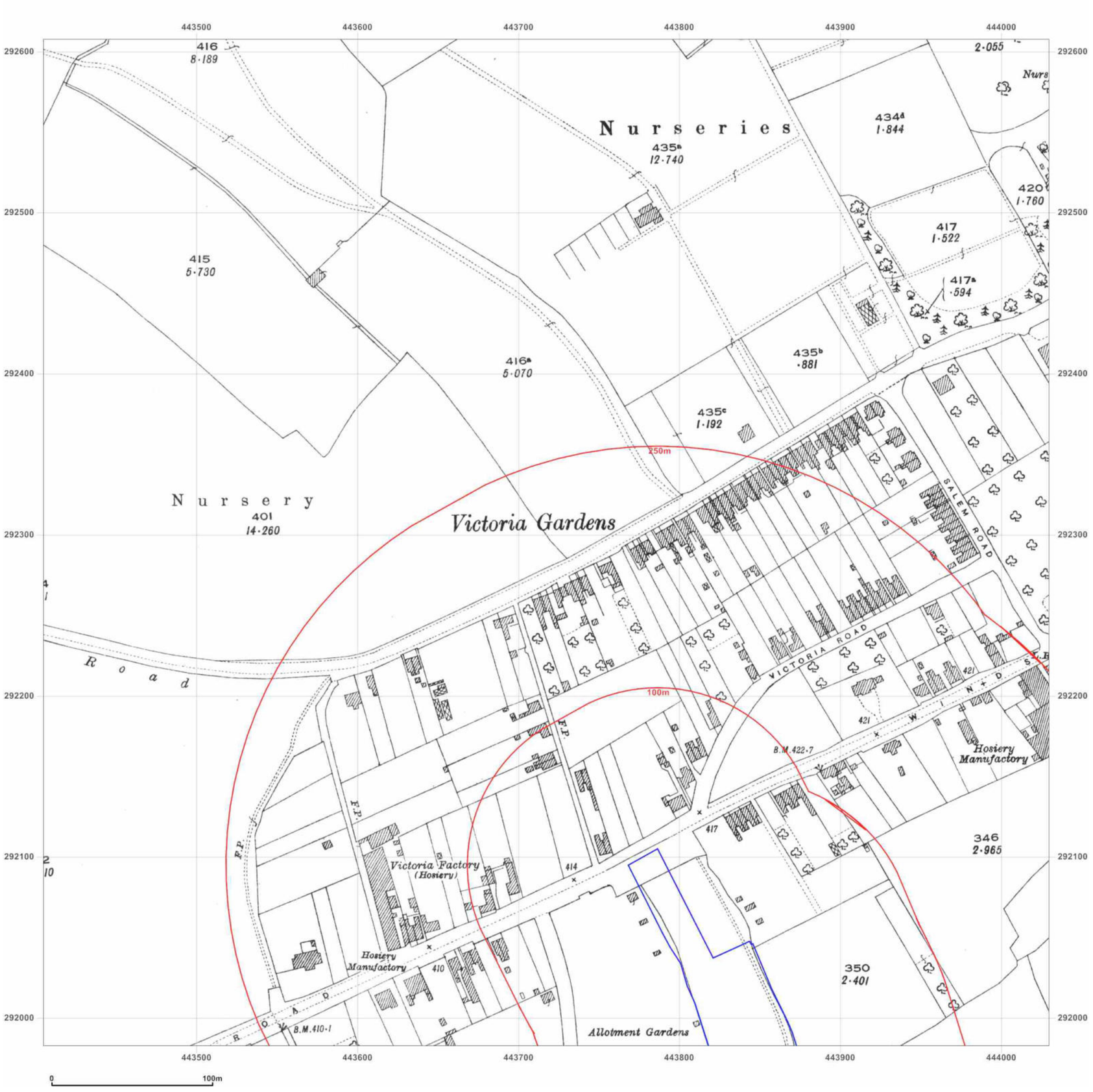
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_3
Grid Ref: 443717, 292295

Map Name: County Series
Map date: **1925**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
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Surveyed 1925
Revised 1925
Edition N/A
Copyright N/A
Levelled N/A

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Site Details:

Burbage Field Farm,Burbage,Leicestershire,LE 10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_3
Grid Ref: 443717, 292295

Map Name: County Series
Map date: **1938**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
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Surveyed 1938
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_1_3
Grid Ref: 443717, 292295

Map Name: National Grid

Map date: **1960-1963**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1960 Revised 1960 Edition 1961 Copyright 1961 Levelled 1923	Surveyed 1963 Revised 1963 Edition 1964 Copyright 1964 Levelled 1945
Surveyed 1963 Revised 1963 Edition N/A Copyright 1964 Levelled 1949	Surveyed 1963 Revised 1963 Edition N/A Copyright 1964 Levelled 1945

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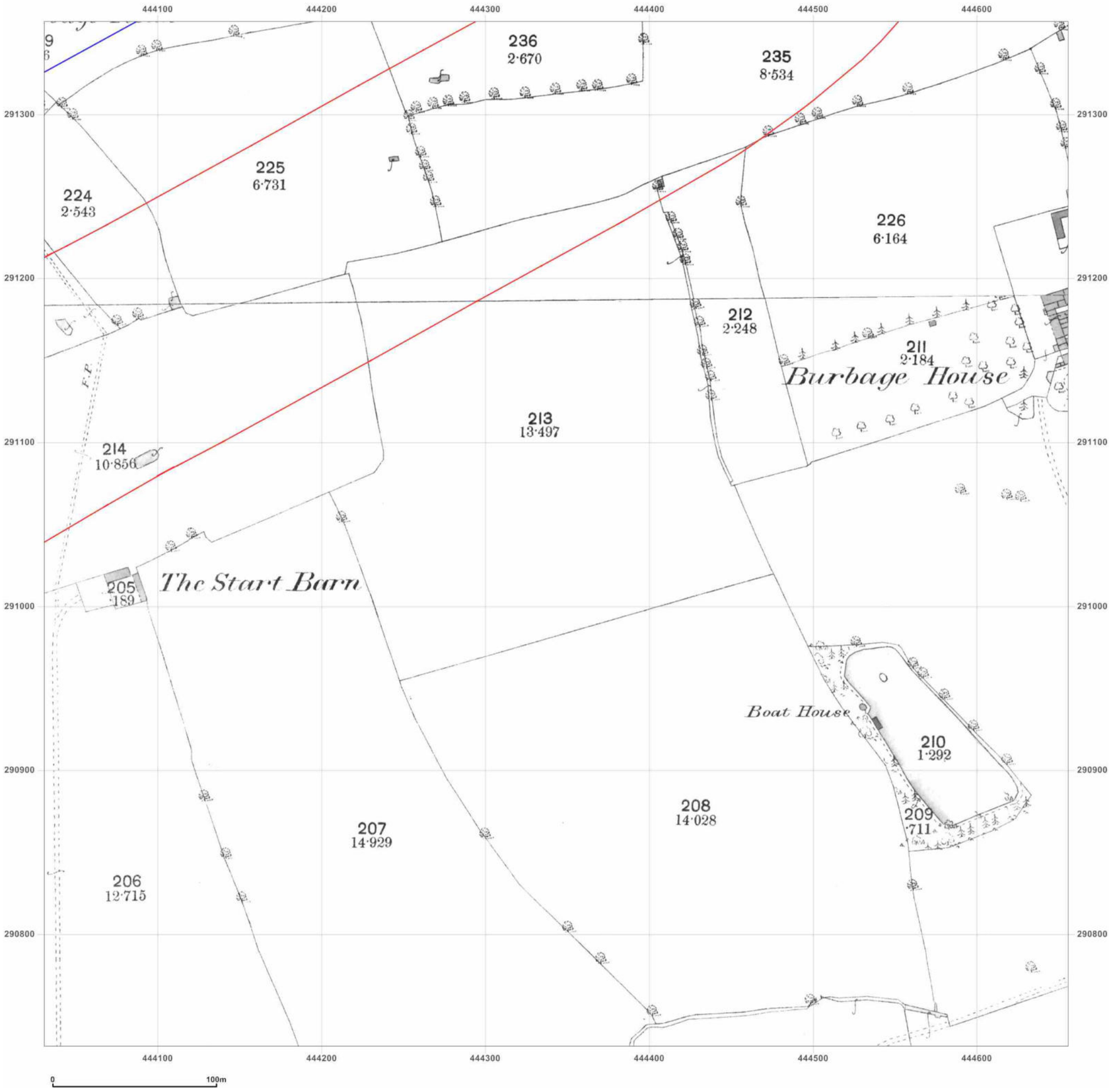
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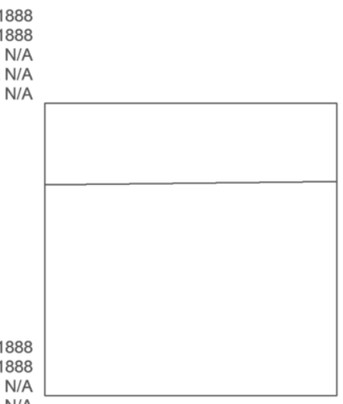
Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_1
Grid Ref: 444343, 291044

Map Name: County Series
Map date: **1888**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1888
Revised 1888
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1888
Revised 1888
Edition N/A
Copyright N/A
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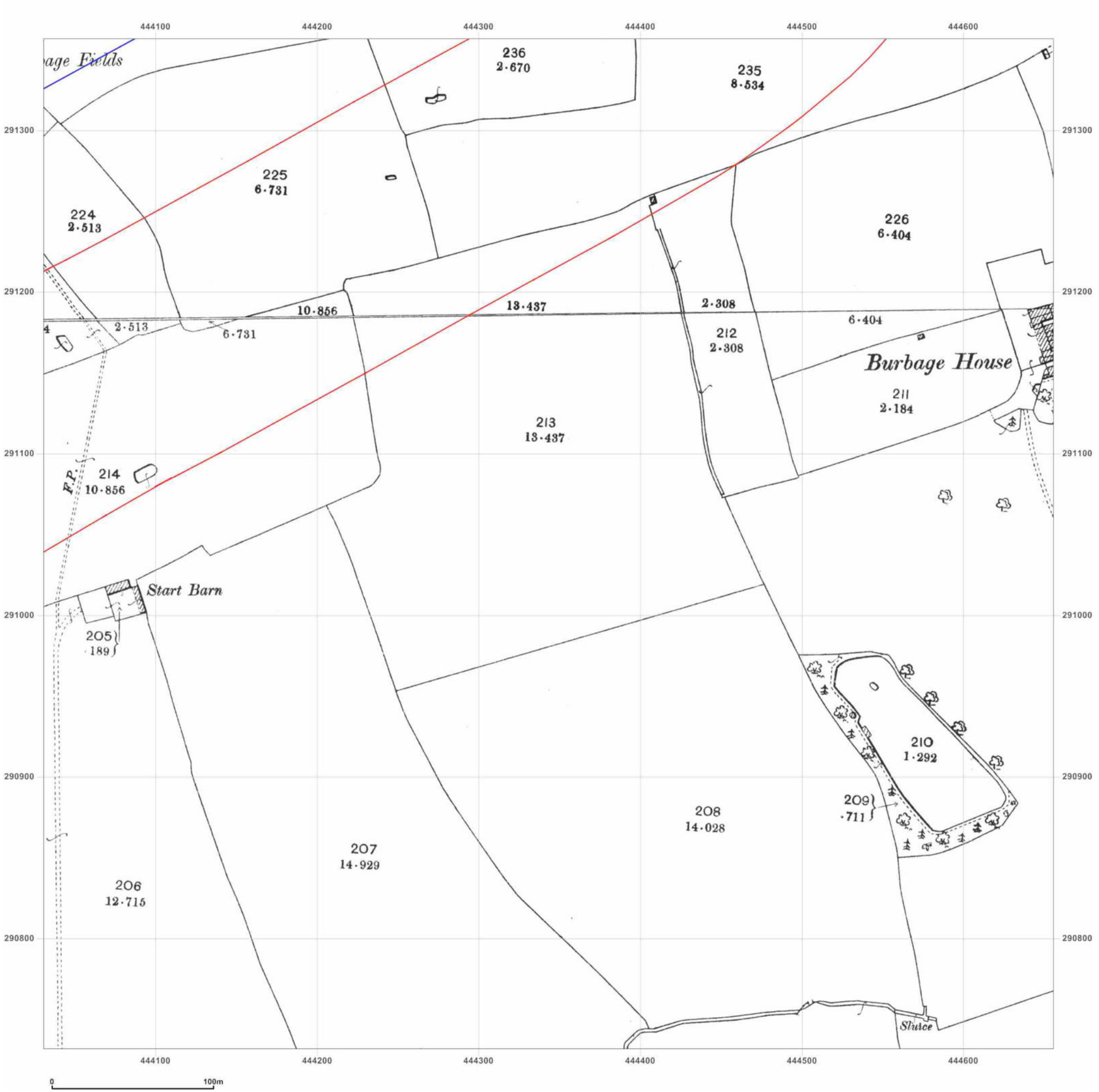
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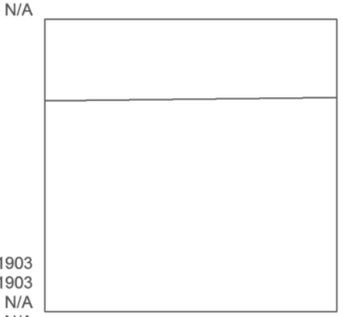
Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_1
Grid Ref: 444343, 291044

Map Name: County Series
Map date: **1903**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1903
Revised 1903
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1903
Revised 1903
Edition N/A
Copyright N/A
Levelled N/A

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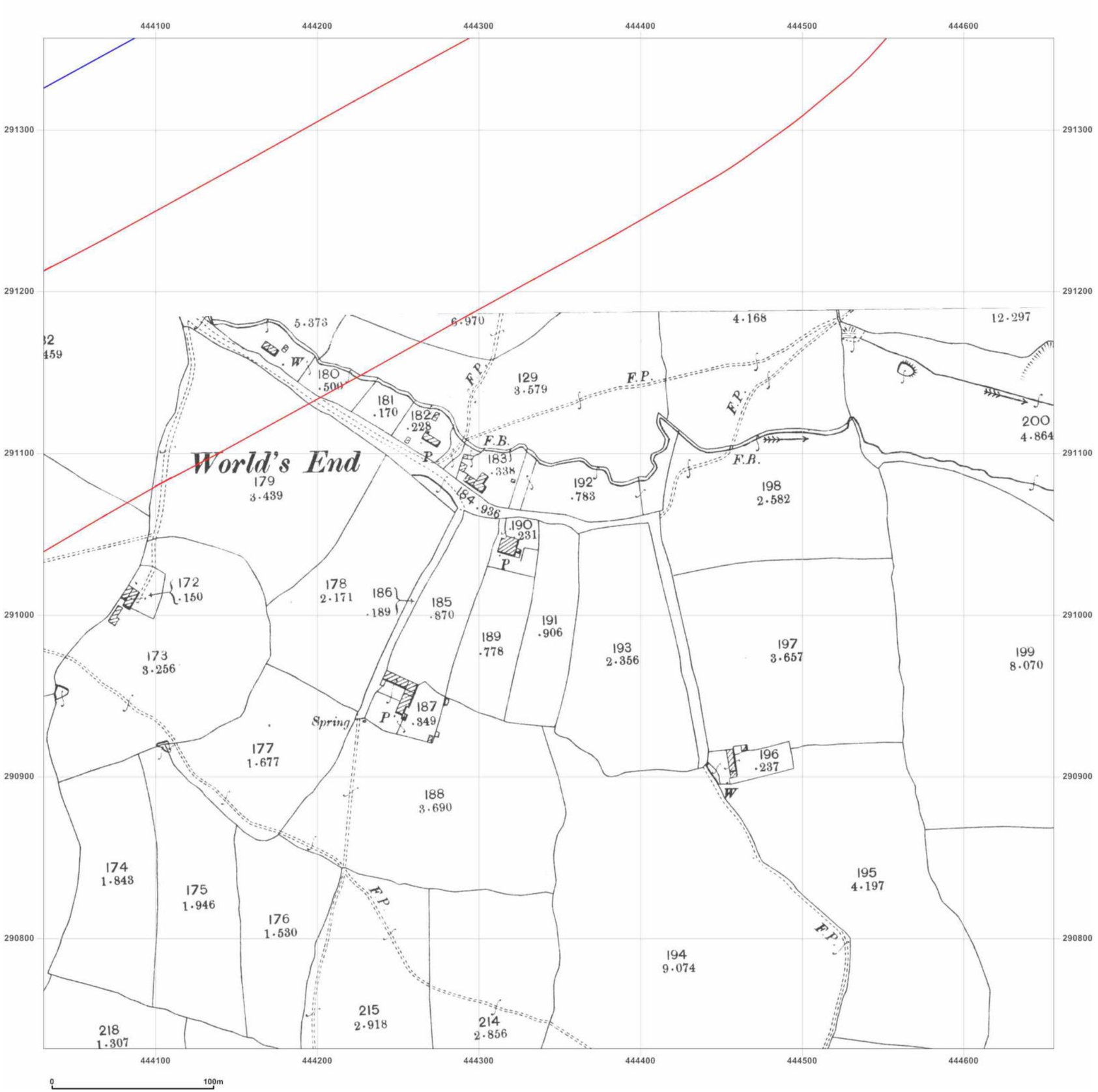
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_1
Grid Ref: 444343, 291044

Map Name: County Series
Map date: **1904**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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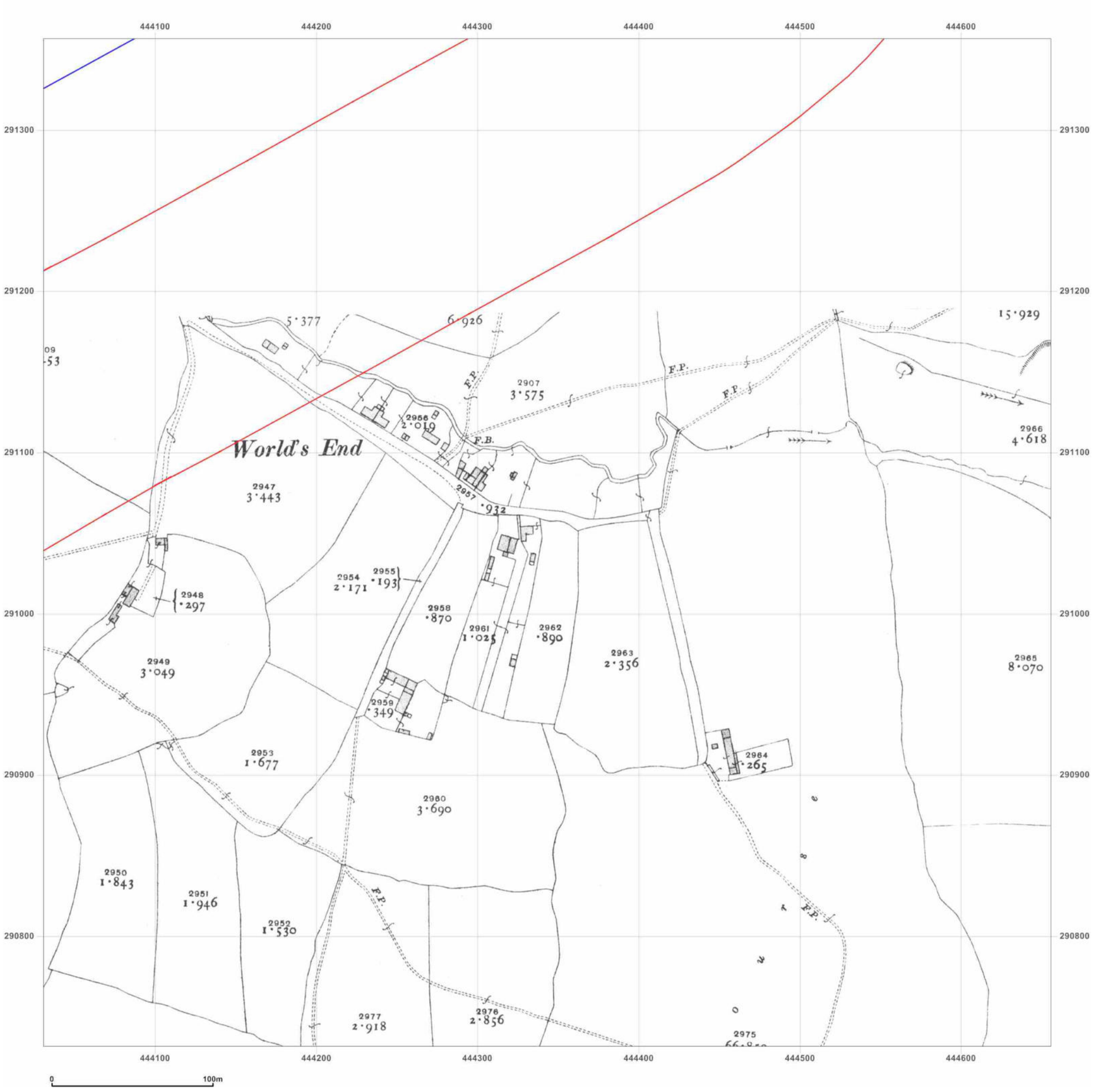
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_1
Grid Ref: 444343, 291044

Map Name: County Series
Map date: **1916**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
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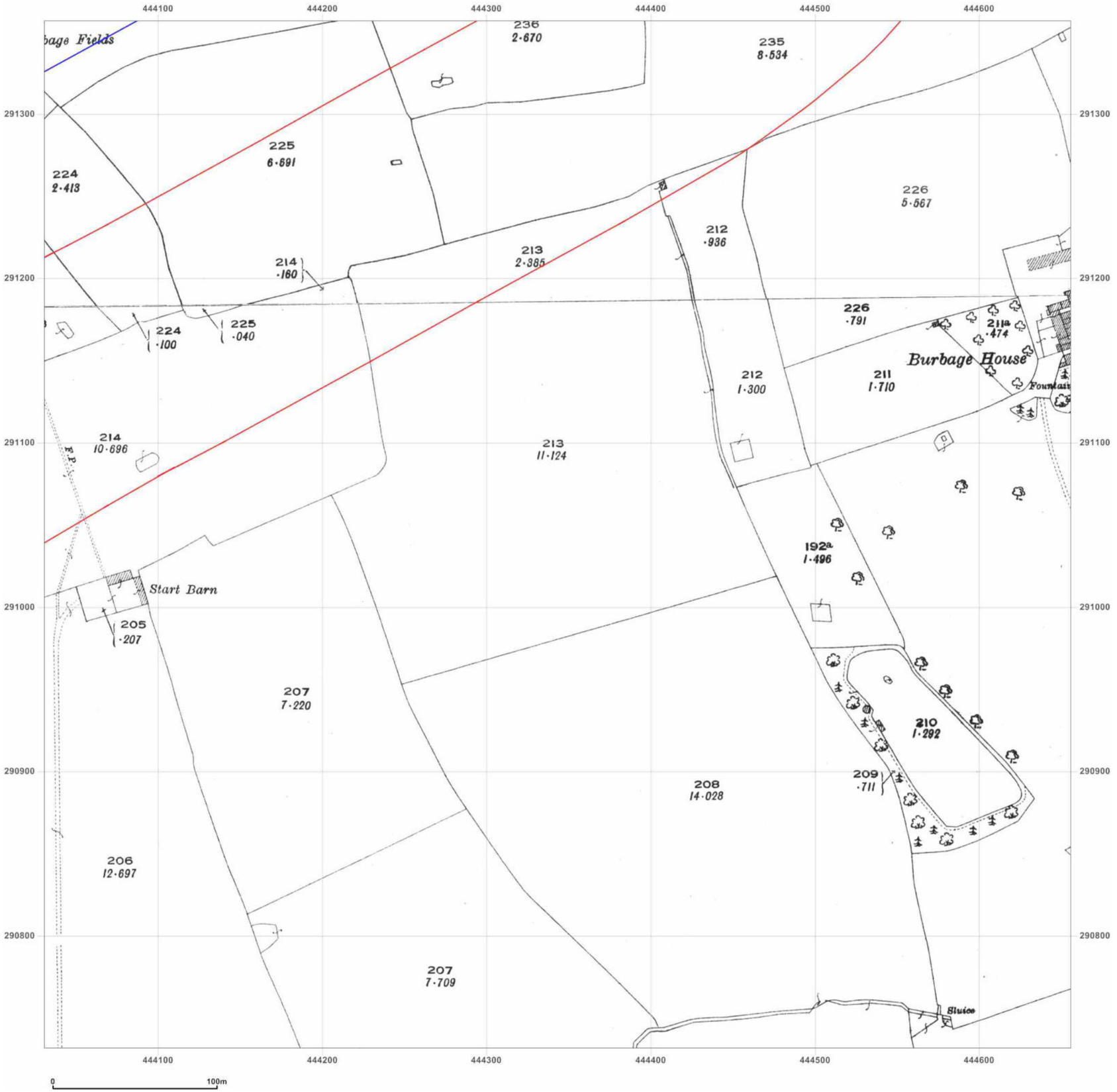
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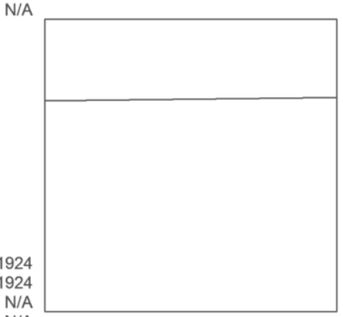
Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_1
Grid Ref: 444343, 291044

Map Name: County Series
Map date: **1924-1925**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1925
Revised 1925
Edition N/A
Copyright N/A
Levelled N/A



Surveyed 1924
Revised 1924
Edition N/A
Copyright N/A
Levelled N/A

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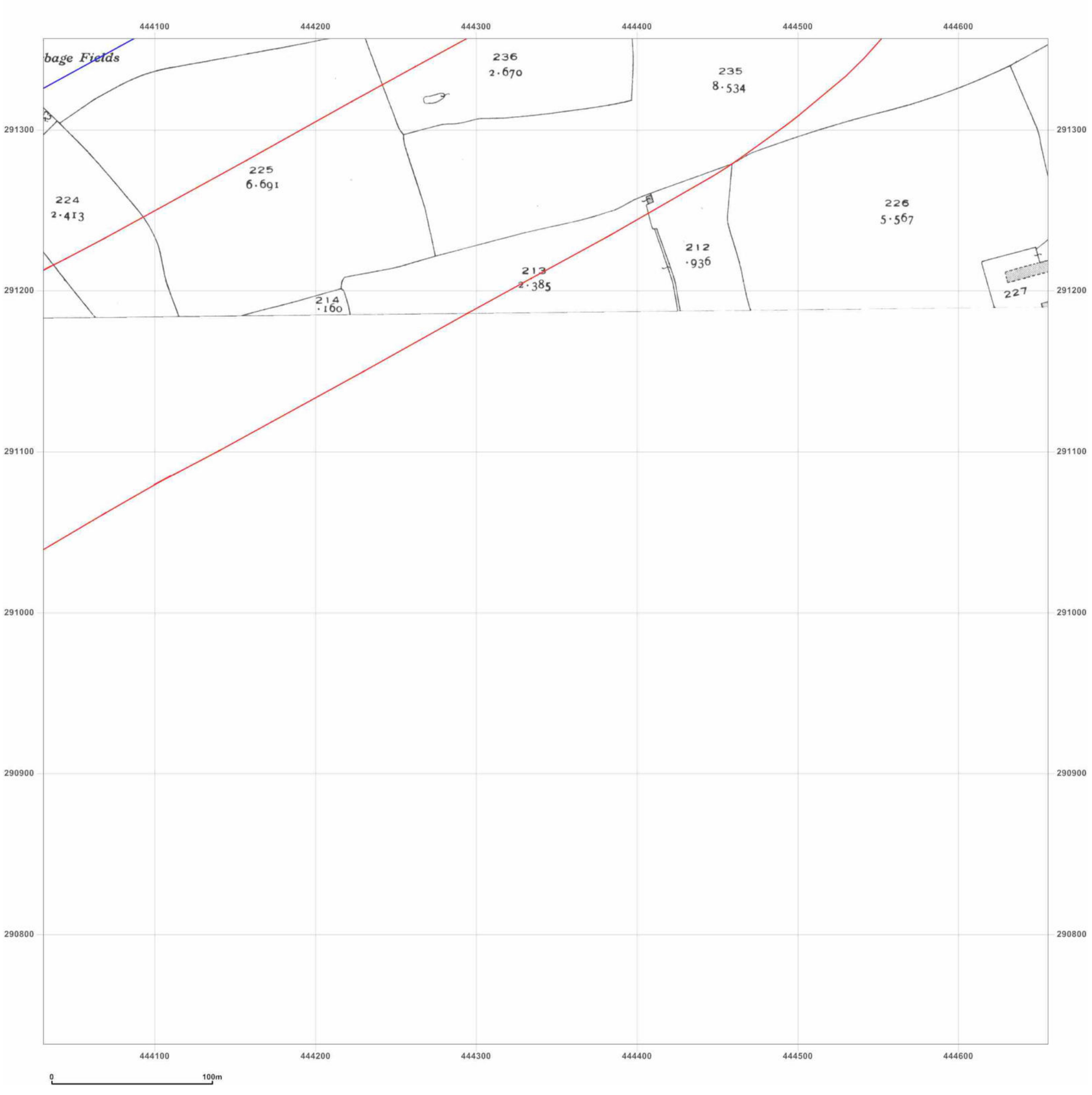
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_1
Grid Ref: 444343, 291044

Map Name: County Series

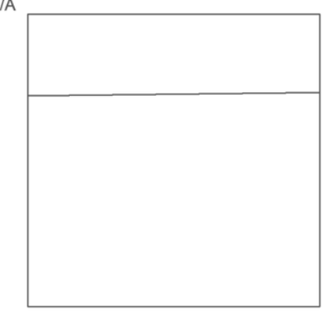
Map date: **1938**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1938
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A



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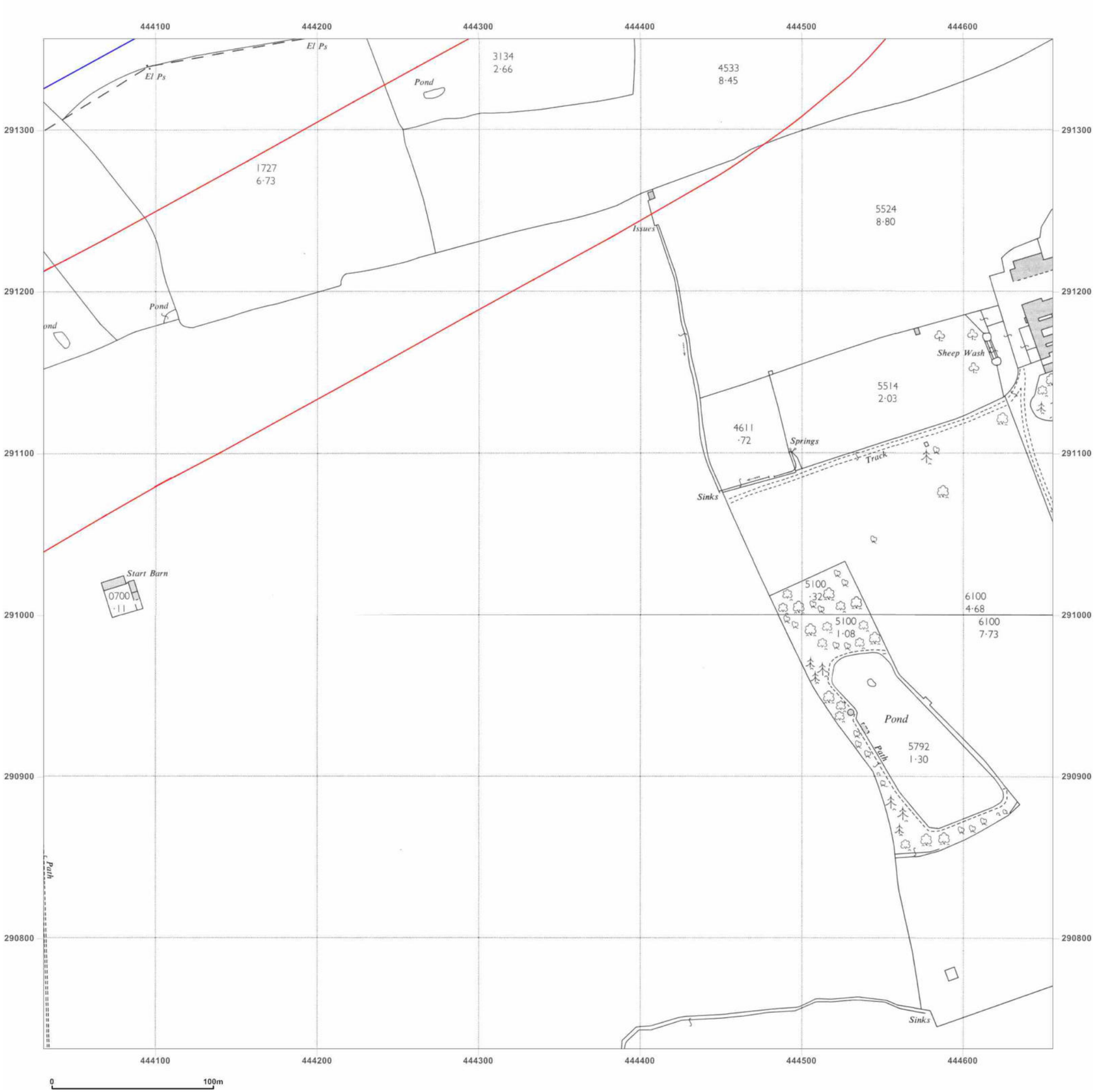
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Site Details:

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_1
Grid Ref: 444343, 291044

Map Name: National Grid

Map date: **1963**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1963
Revised 1963
Edition N/A
Copyright 1964
Levelled 1945

Surveyed 1963
Revised 1963
Edition N/A
Copyright 1964
Levelled 1958

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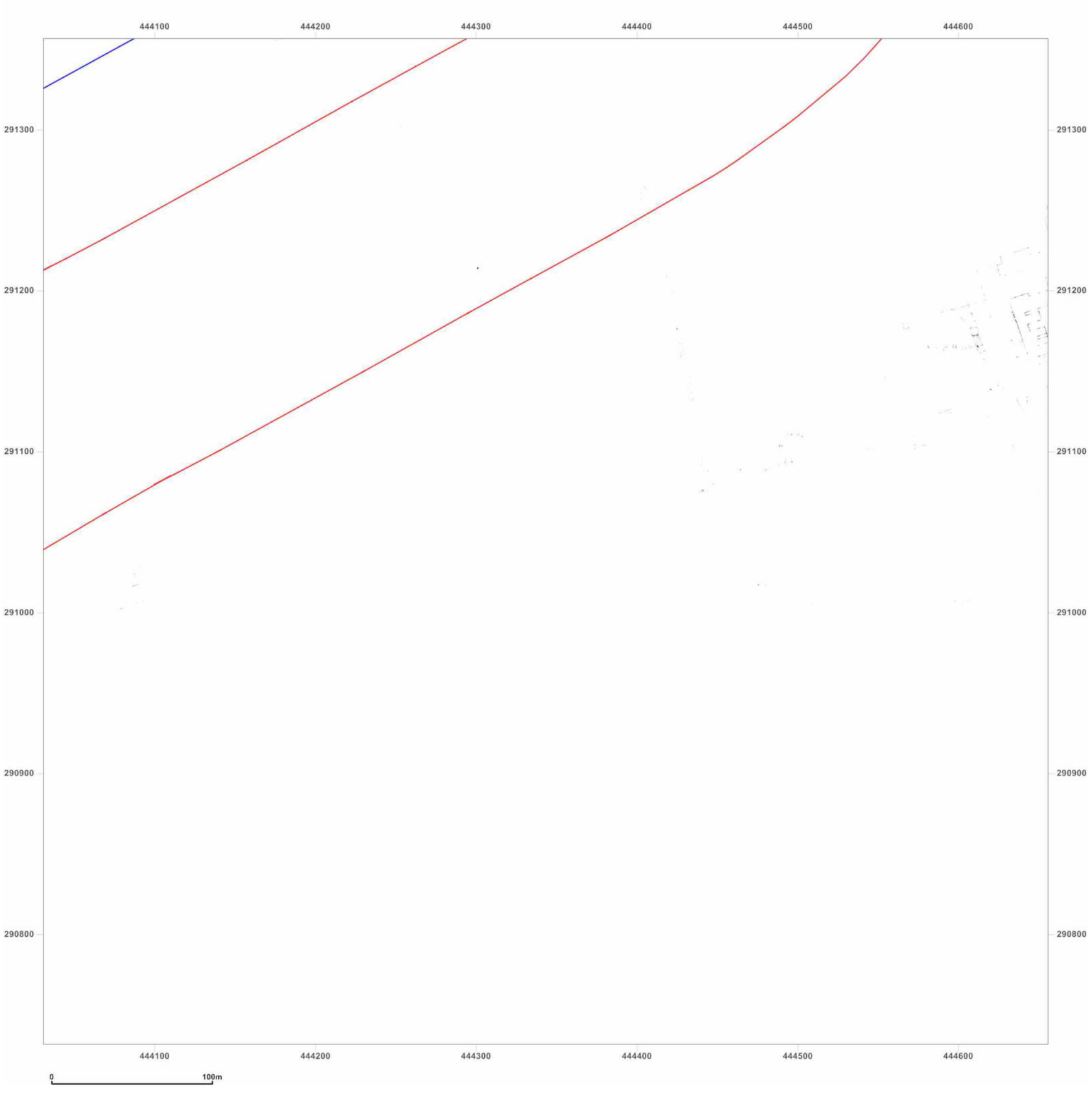
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_1
Grid Ref: 444343, 291044

Map Name: National Grid
Map date: **1975**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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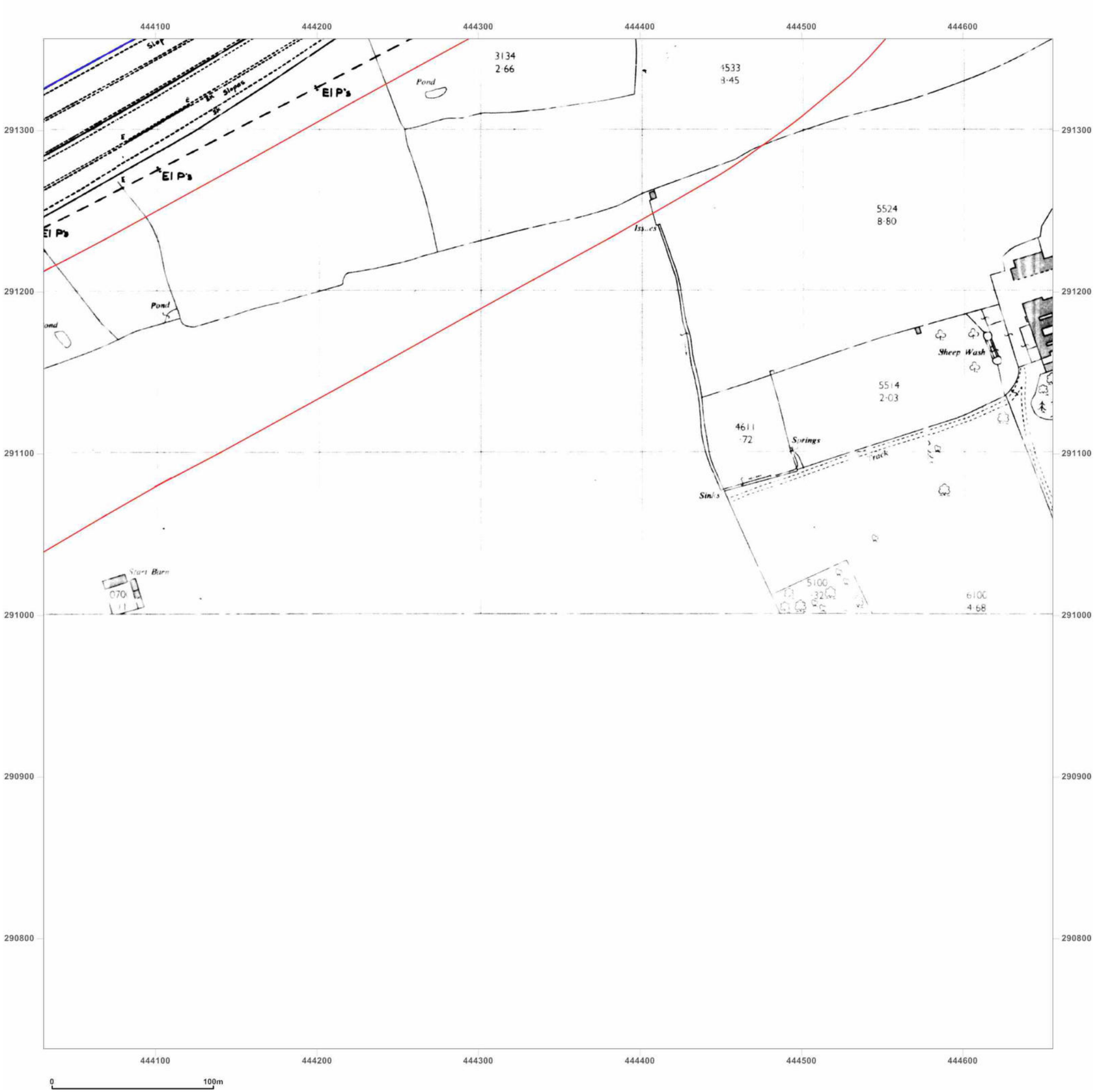
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_1
Grid Ref: 444343, 291044

Map Name: National Grid

Map date: **1978**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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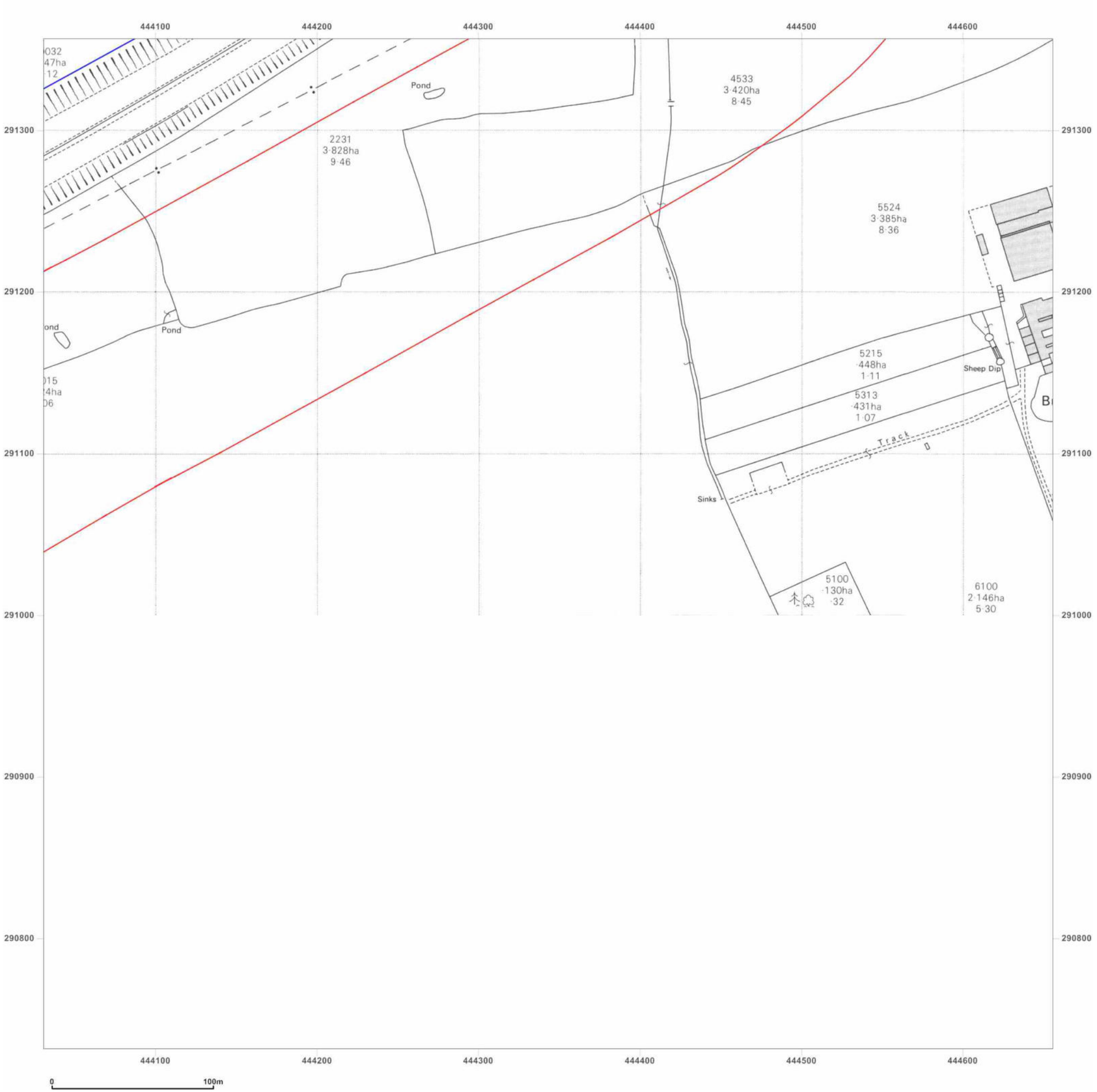
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_1
Grid Ref: 444343, 291044

Map Name: National Grid

Map date: **1986**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1986
Revised 1986
Edition N/A
Copyright 1987
Levelled 1964

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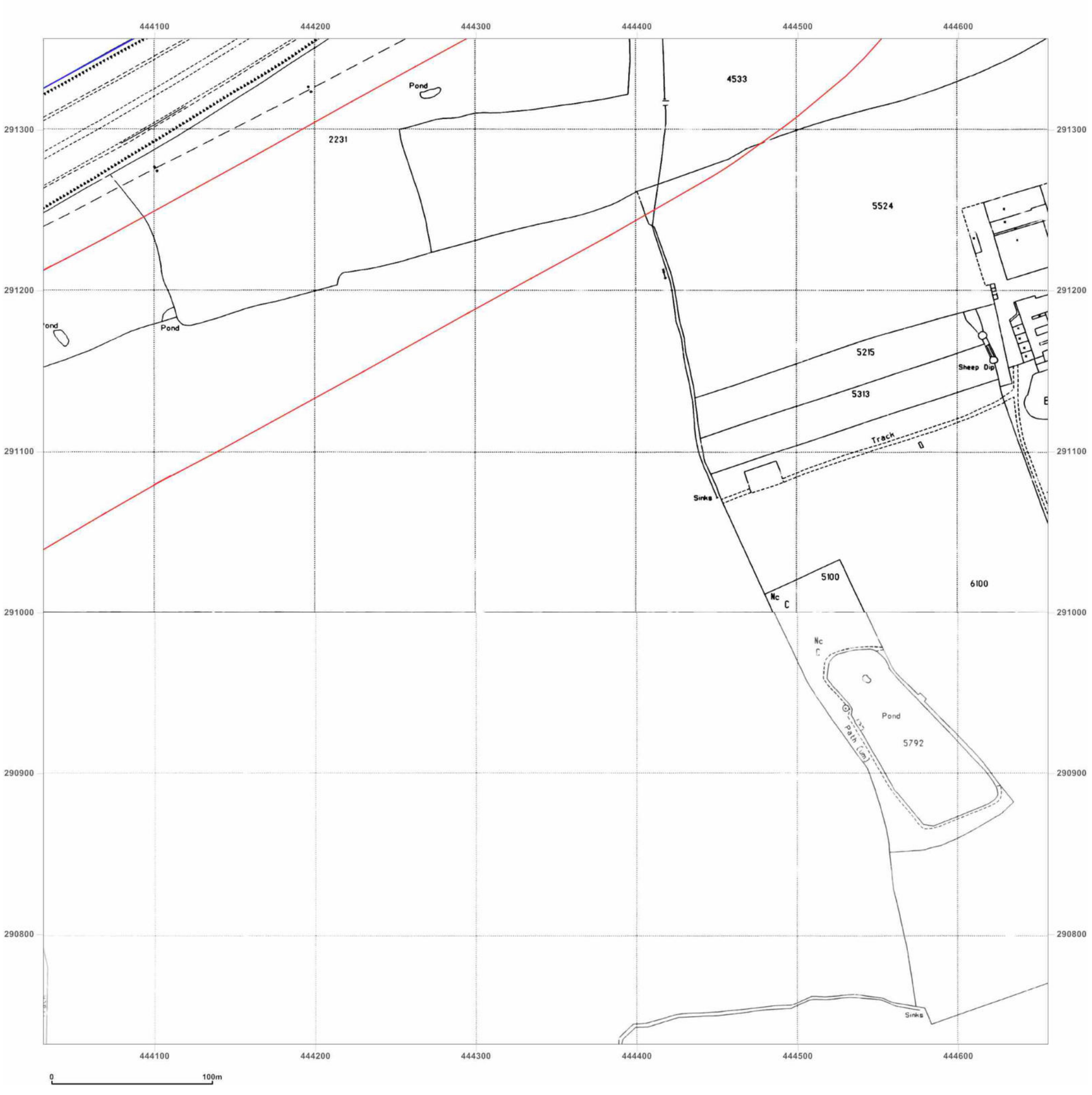
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_1
Grid Ref: 444343, 291044

Map Name: National Grid

Map date: **1993**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

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Revised 1993
Edition N/A
Copyright N/A
Levelled N/A

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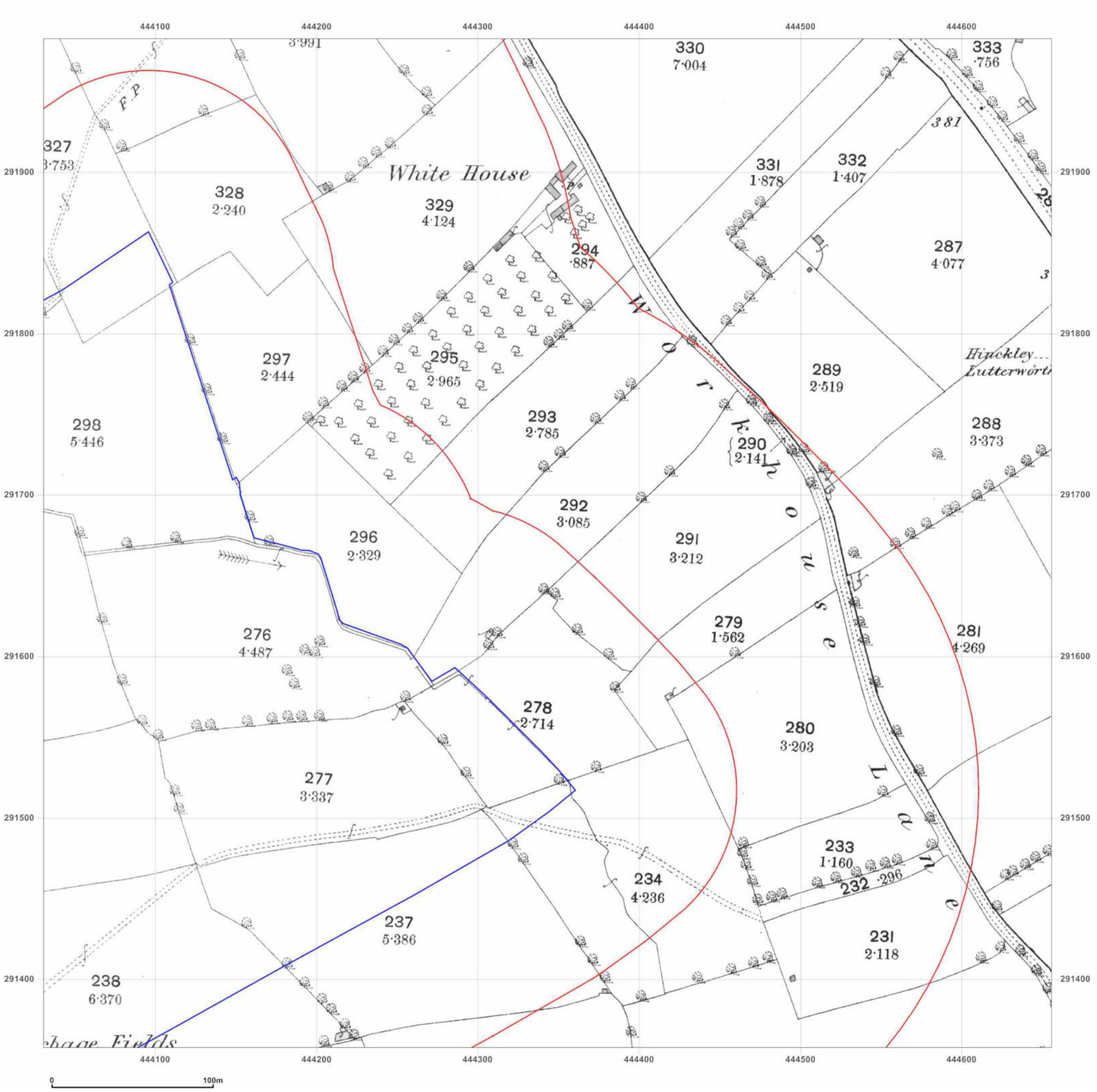
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_2
Grid Ref: 444343, 291670

Map Name: County Series

Map date: **1888**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1888
Revised 1888
Edition N/A
Copyright N/A
Levelled N/A

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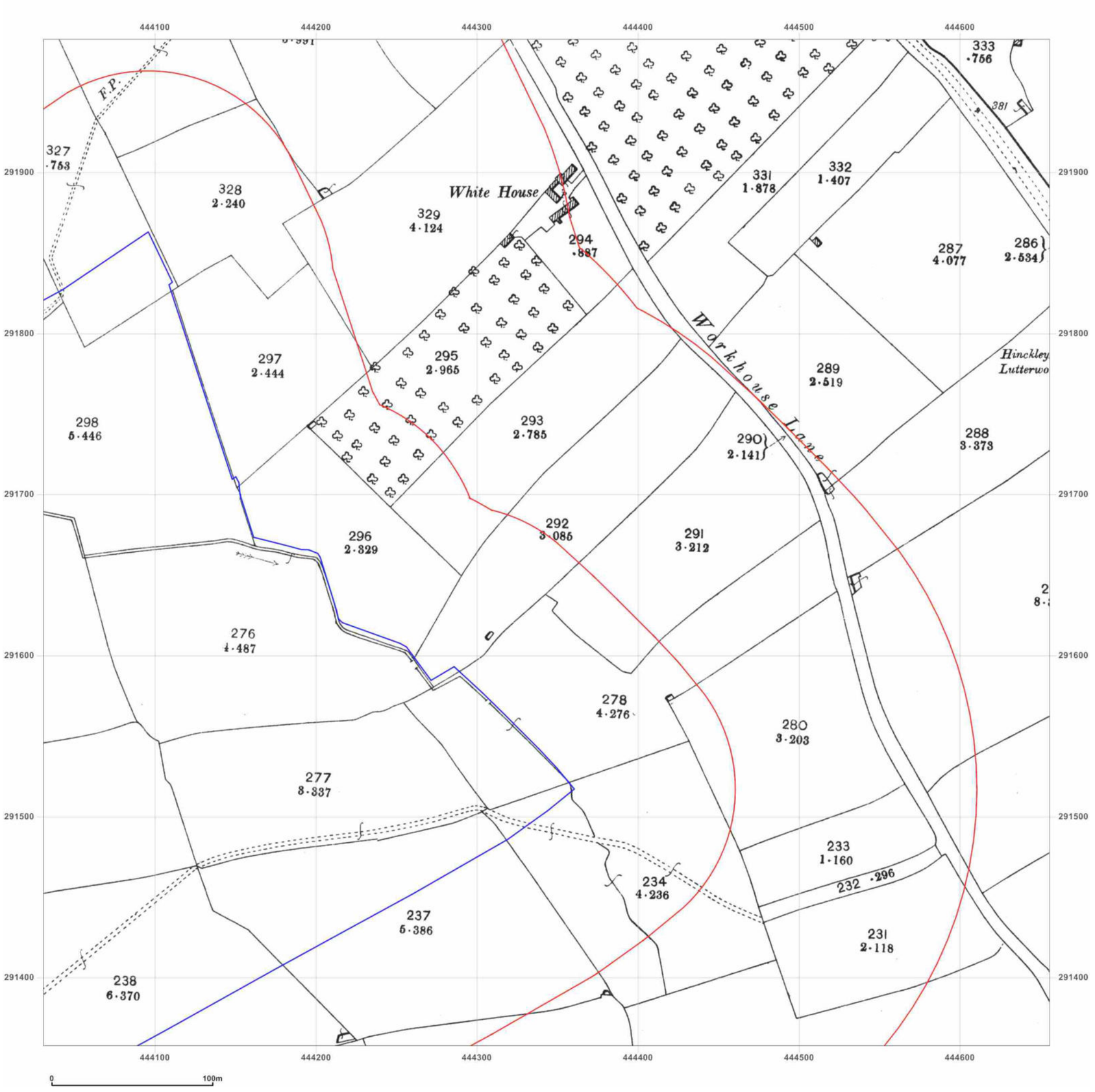
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_2
Grid Ref: 444343, 291670

Map Name: County Series

Map date: **1903**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1903
Revised 1903
Edition N/A
Copyright N/A
Levelled N/A

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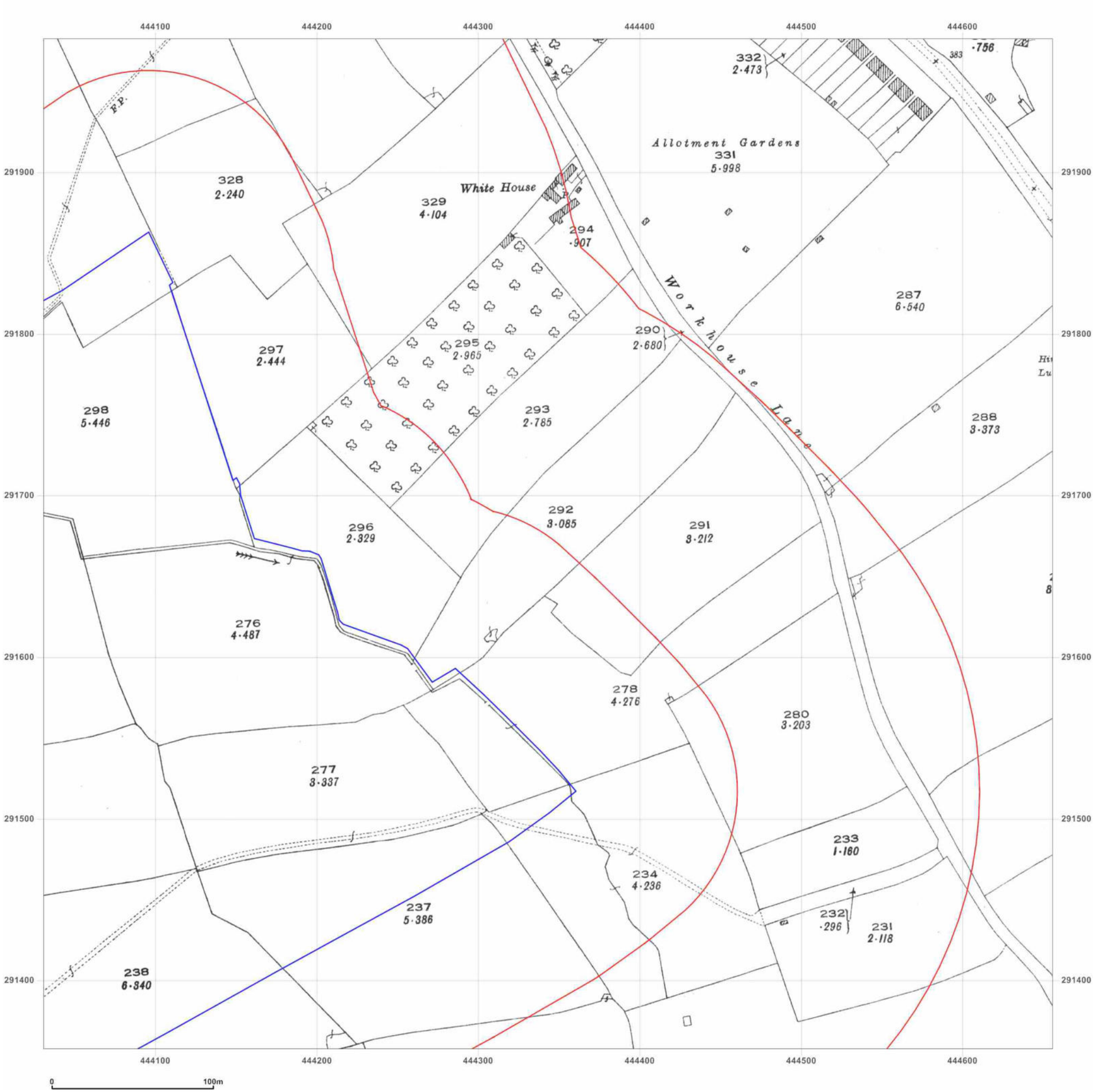
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_2
Grid Ref: 444343, 291670

Map Name: County Series
Map date: **1925**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1925
Revised 1925
Edition N/A
Copyright N/A
Levelled N/A

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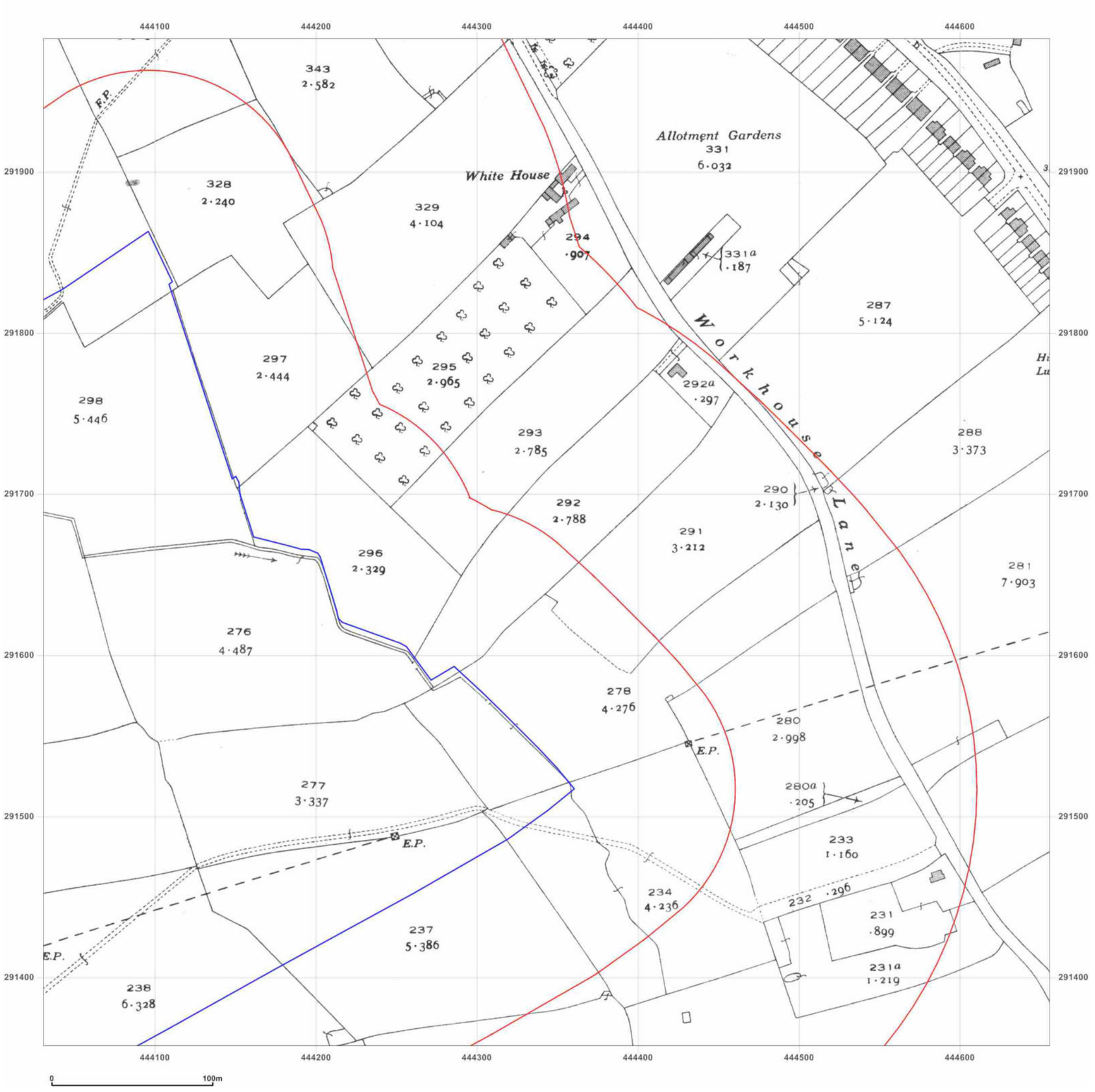
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_2
Grid Ref: 444343, 291670

Map Name: County Series
Map date: **1938**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed 1938
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

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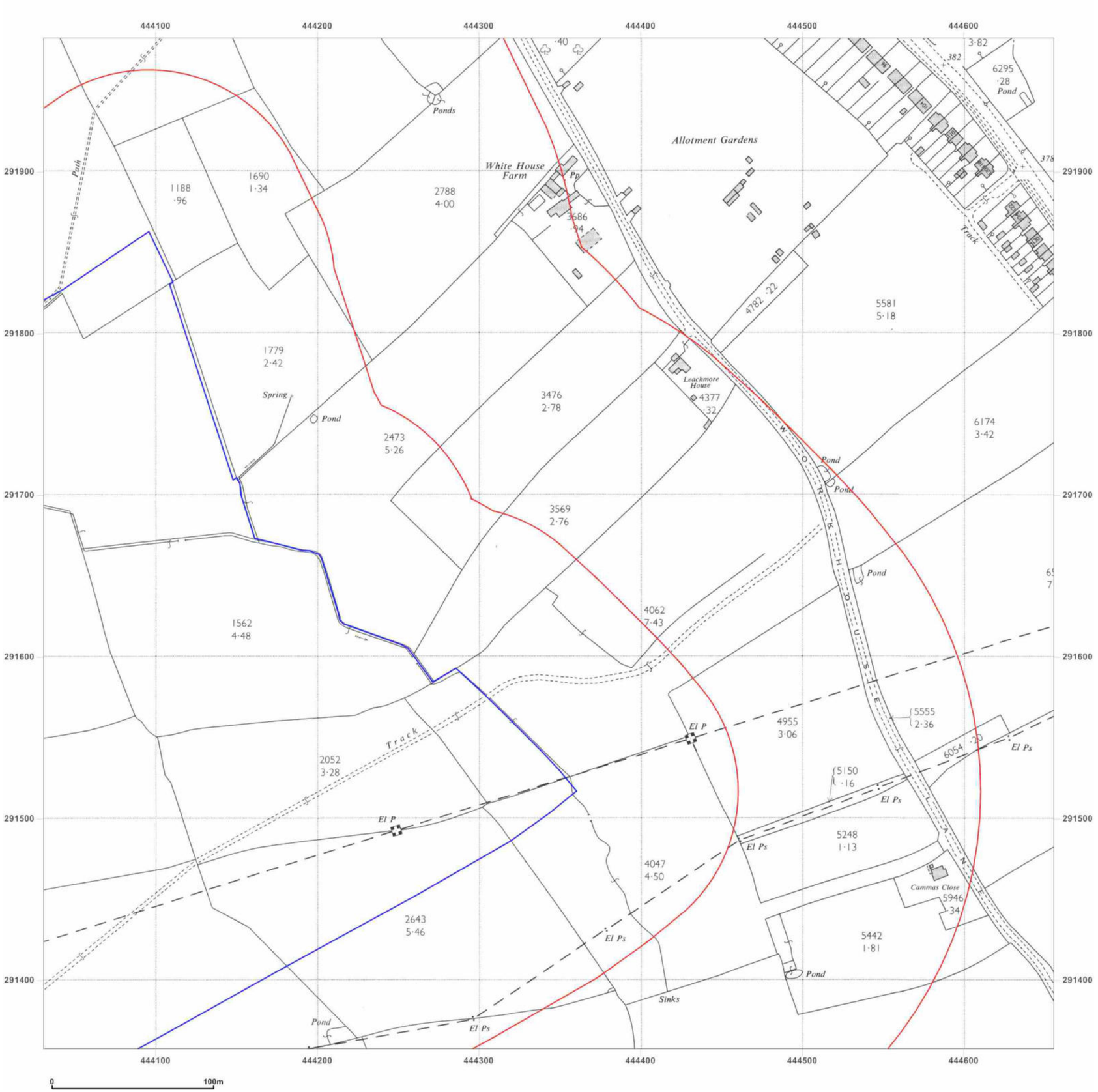
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_2
Grid Ref: 444343, 291670

Map Name: National Grid

Map date: **1963**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1963
Revised 1963
Edition N/A
Copyright 1964
Levelled 1945

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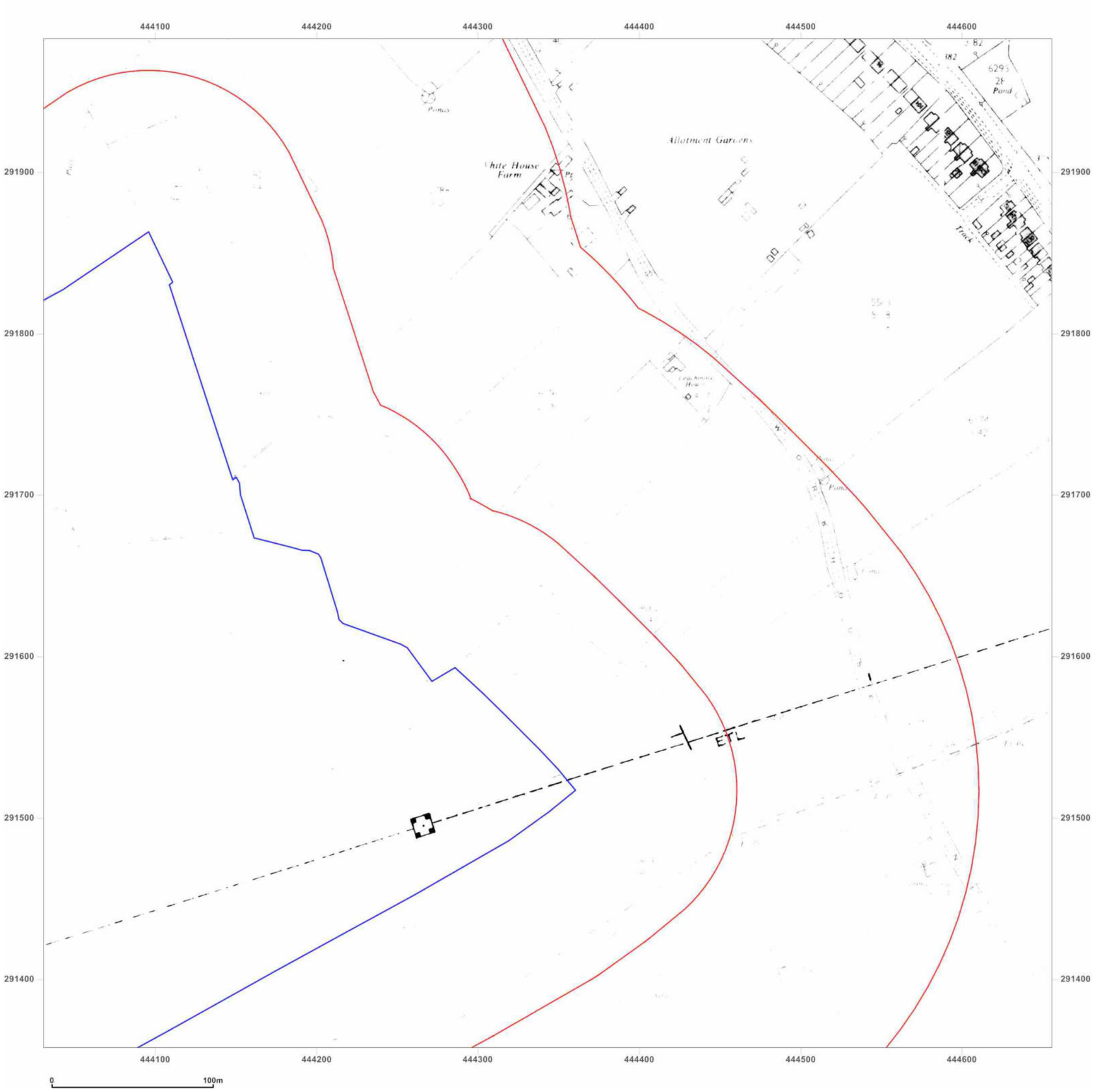
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_2
Grid Ref: 444343, 291670

Map Name: National Grid
Map date: **1975**
Scale: 1:2,500
Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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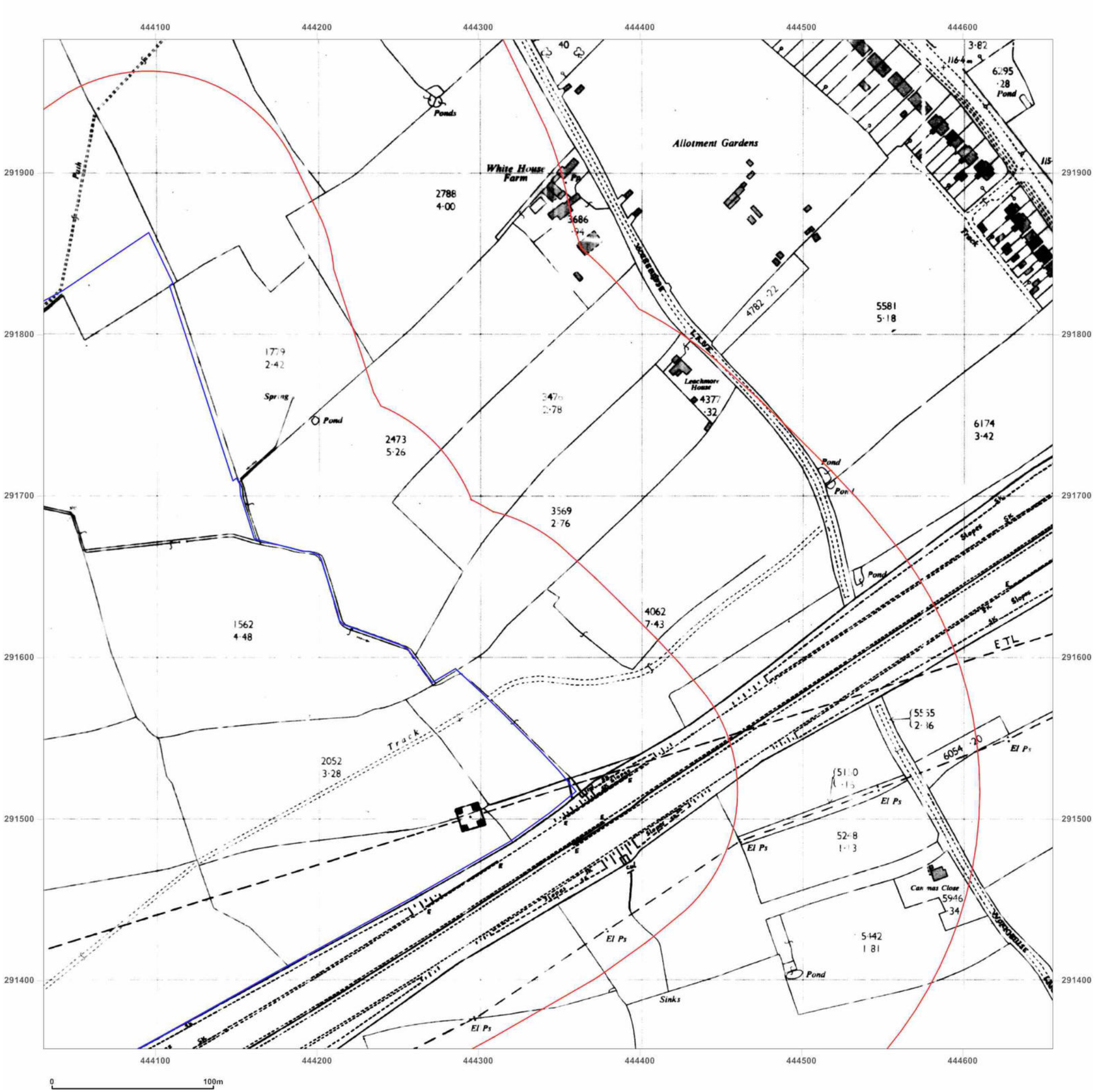
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_2
Grid Ref: 444343, 291670

Map Name: National Grid

Map date: **1978**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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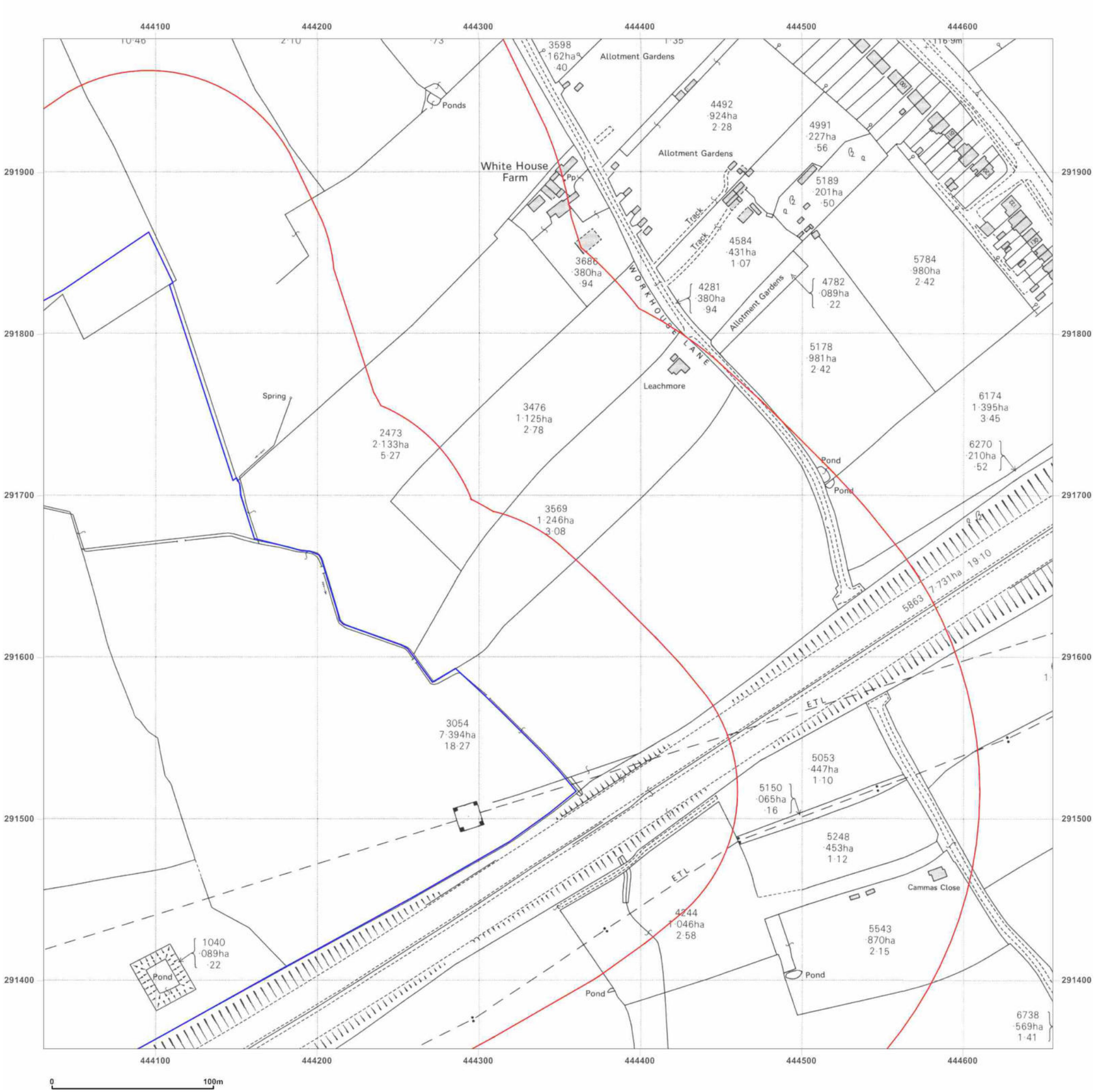
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_2
Grid Ref: 444343, 291670

Map Name: National Grid

Map date: **1986**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1986
Revised 1986
Edition N/A
Copyright 1987
Levelled 1964

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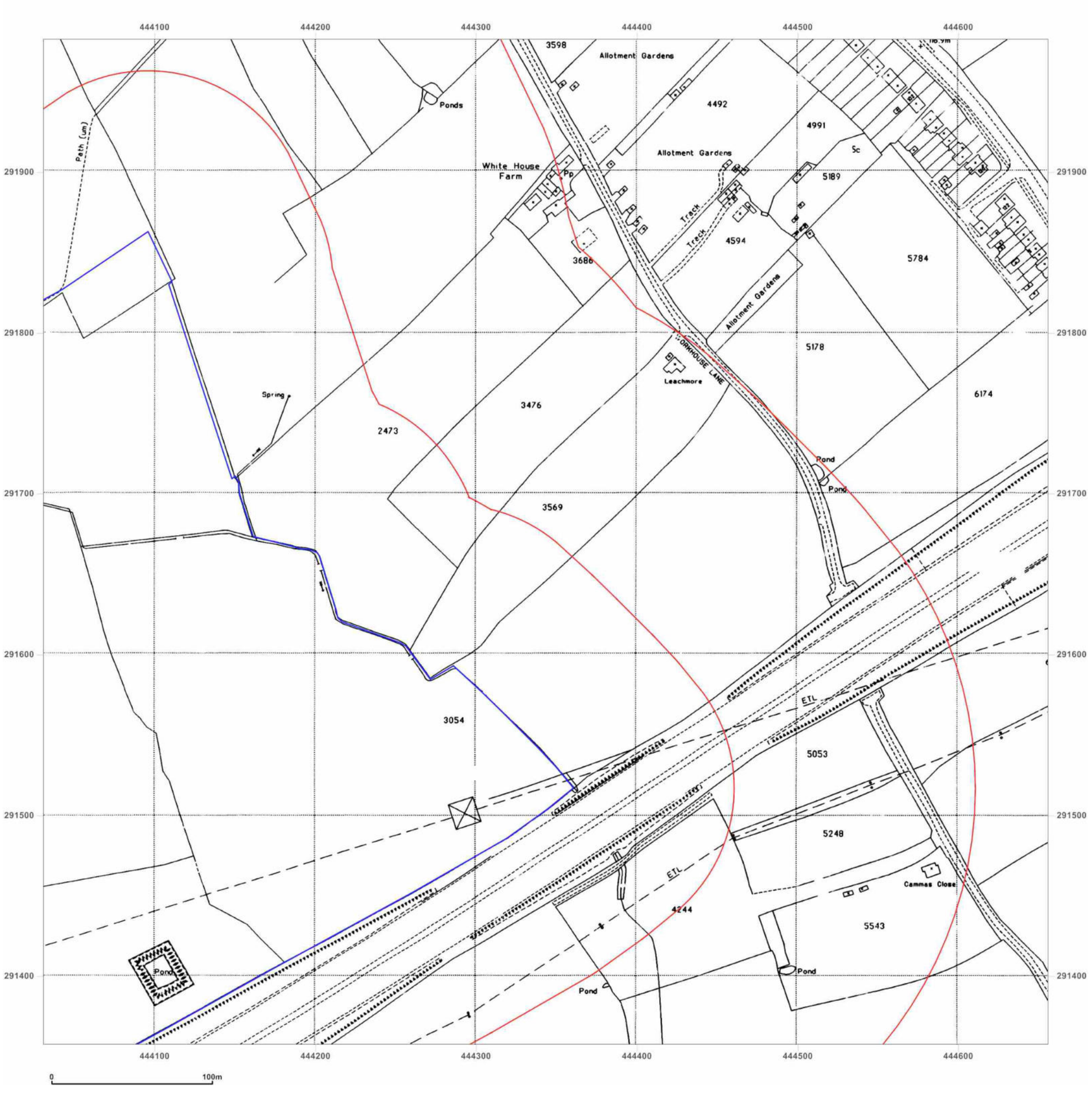
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_2
Grid Ref: 444343, 291670

Map Name: National Grid

Map date: **1993**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

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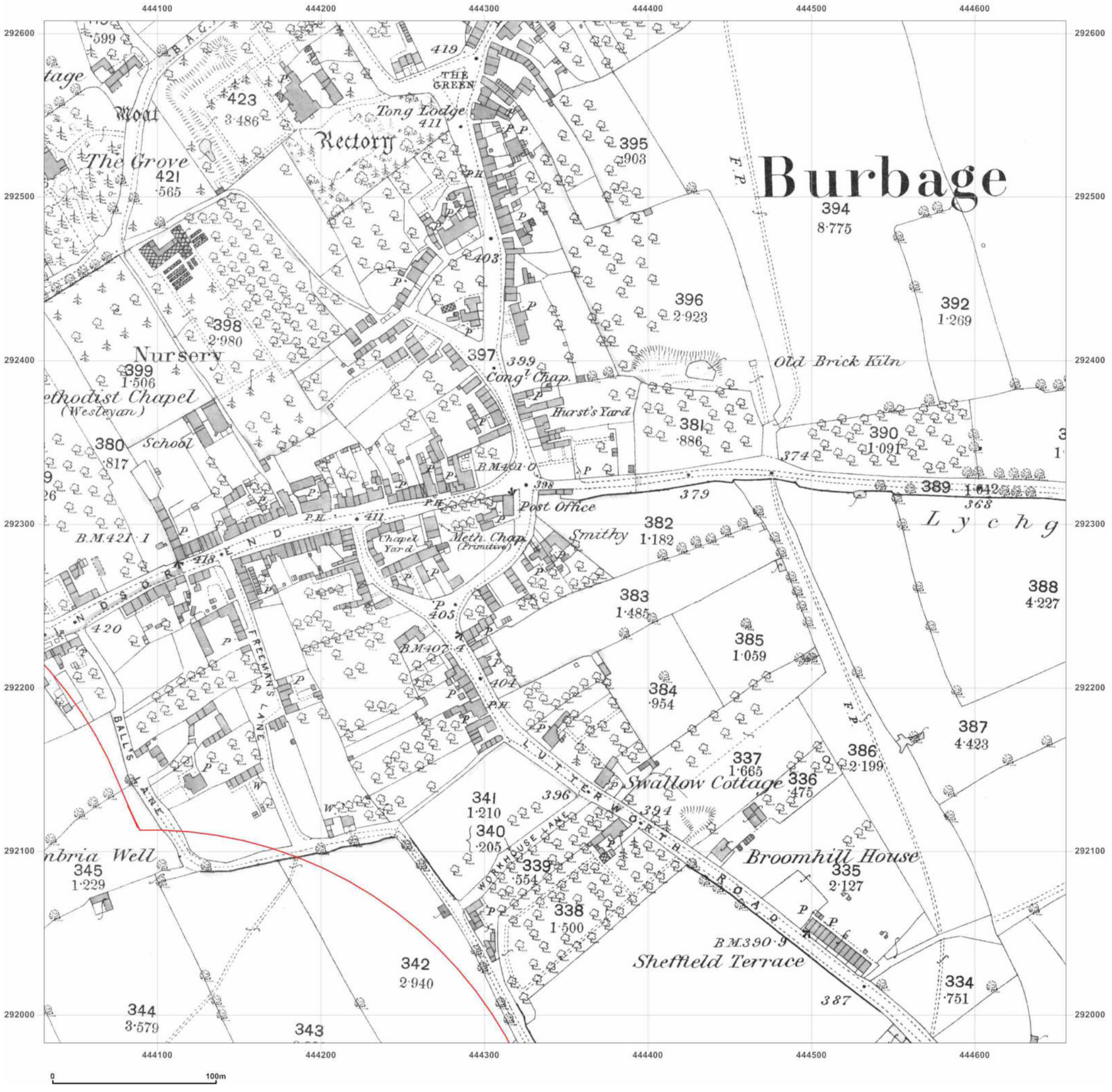
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Site Details:

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_3
Grid Ref: 444343, 292295

Map Name: County Series

Map date: **1888**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1888
Revised 1888
Edition N/A
Copyright N/A
Levelled N/A

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Site Details:

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_3
Grid Ref: 444343, 292295

Map Name: County Series

Map date: **1903**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1903
Revised 1903
Edition N/A
Copyright N/A
Levelled N/A

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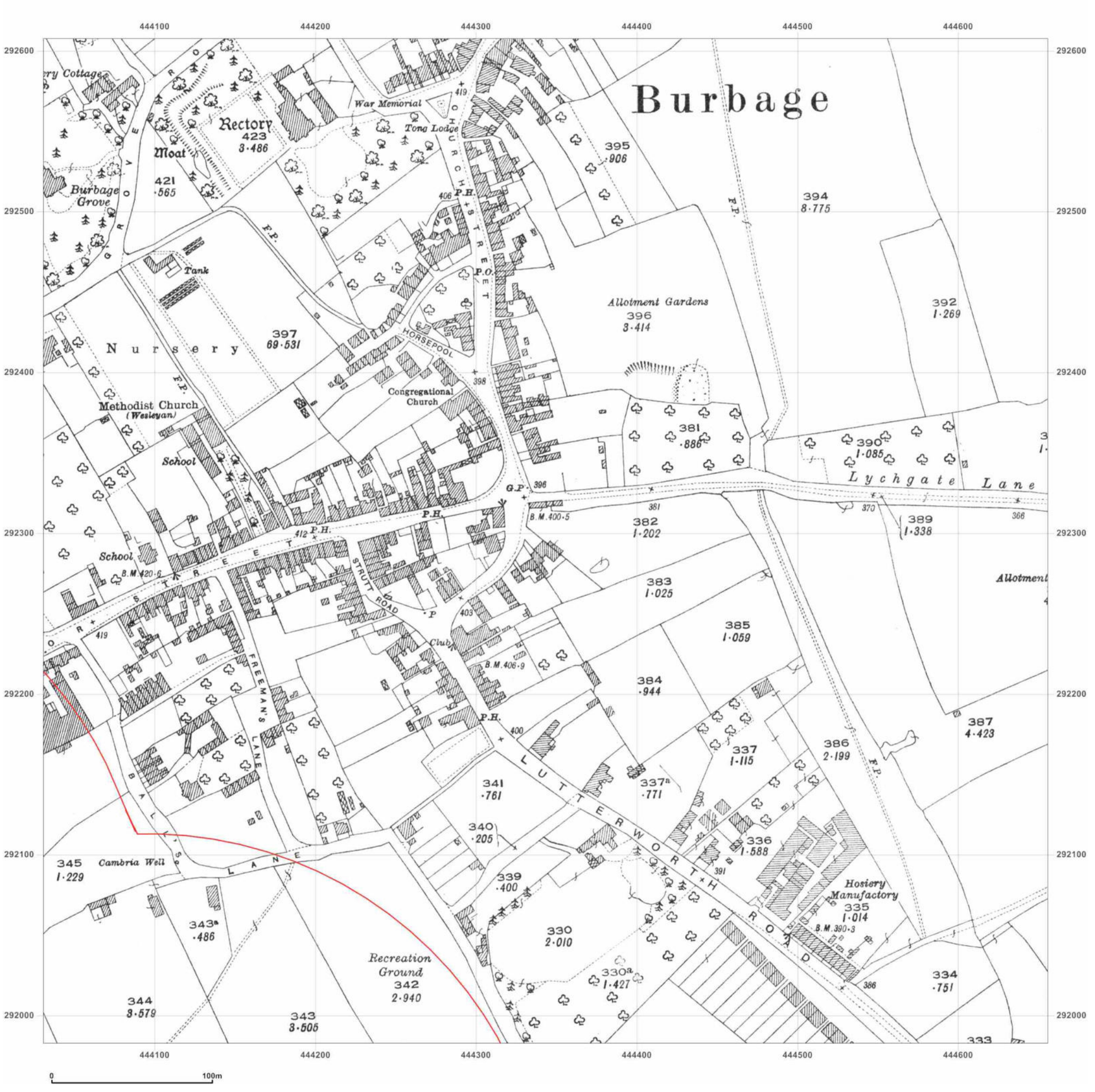
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Site Details:

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_3
Grid Ref: 444343, 292295

Map Name: County Series

Map date: **1925**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1925
Revised 1925
Edition N/A
Copyright N/A
Levelled N/A

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_3
Grid Ref: 444343, 292295

Map Name: County Series

Map date: **1938**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
S

Surveyed 1938
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

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Site Details:

Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_3
Grid Ref: 444343, 292295

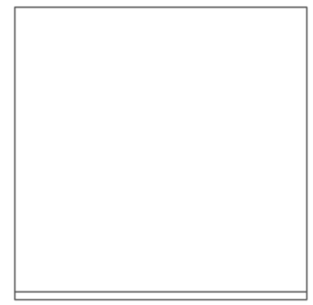
Map Name: National Grid

Map date: **1963**

Scale: 1:2,500

Printed at: 1:2,500

N
W E
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Surveyed 1963
Revised 1963
Edition 1964
Copyright 1964
Levelled 1945

Surveyed 1963
Revised 1963
Edition N/A
Copyright 1964
Levelled 1945

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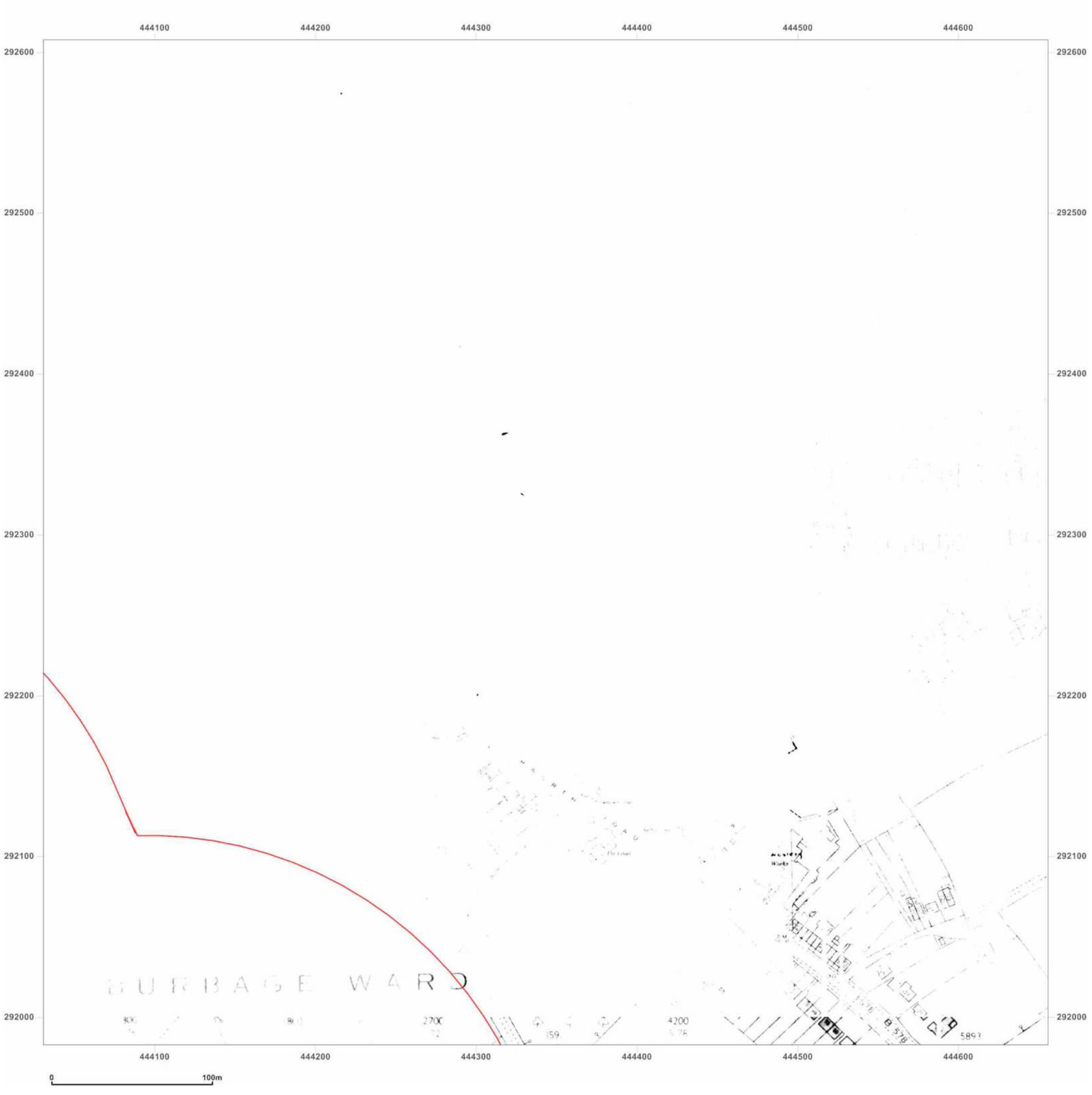
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Site Details:

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_3
Grid Ref: 444343, 292295

Map Name: National Grid

Map date: **1975**

Scale: 1:2,500

Printed at: 1:2,500

N
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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_LS_2_3
Grid Ref: 444343, 292295

Map Name: National Grid

Map date: **1986-1987**

Scale: 1:2,500

Printed at: 1:2,500

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Surveyed 1972
Revised 1987
Edition N/A
Copyright 1988
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Surveyed 1986
Revised 1986
Edition N/A
Copyright 1987
Levelled 1964

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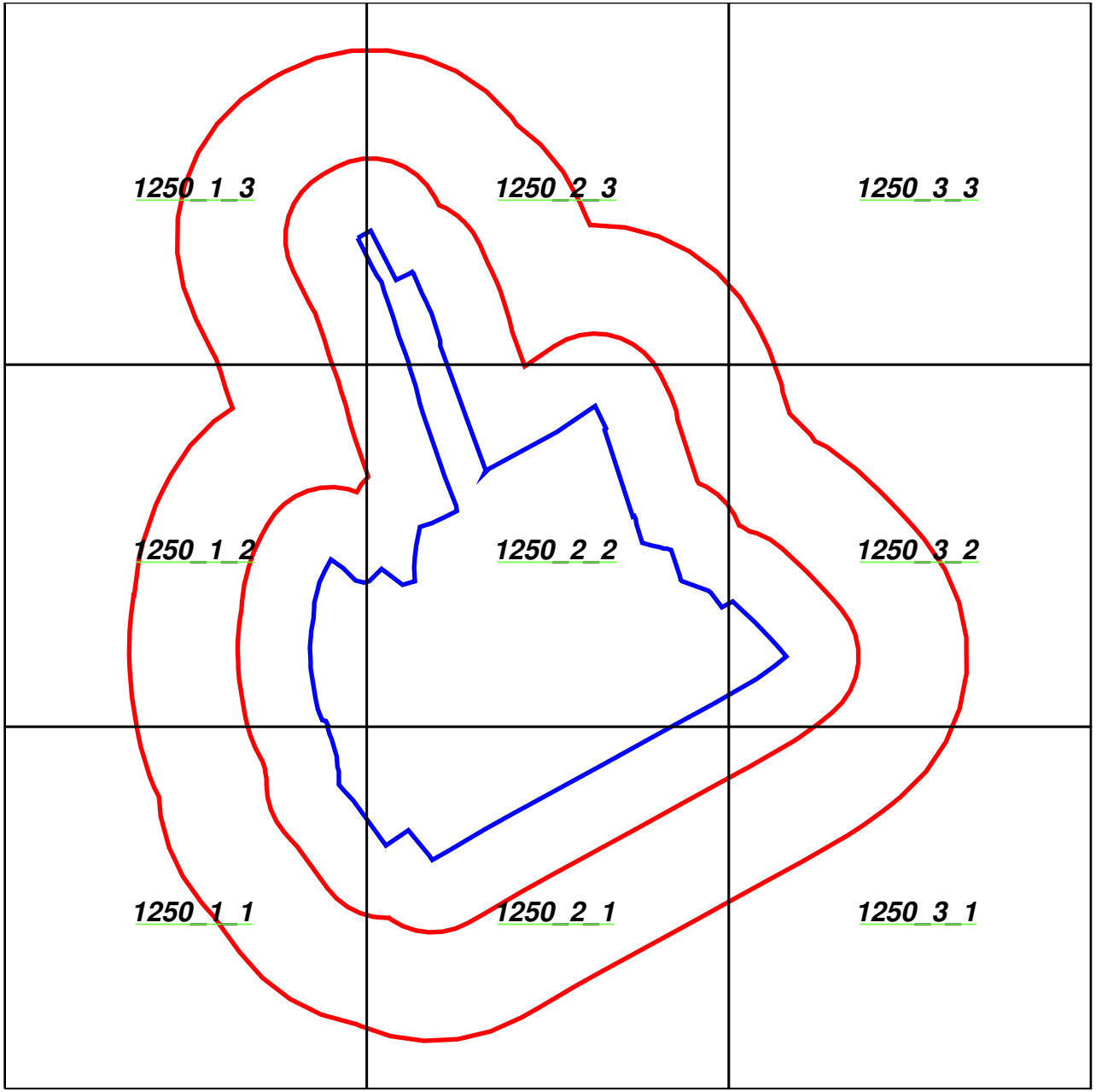
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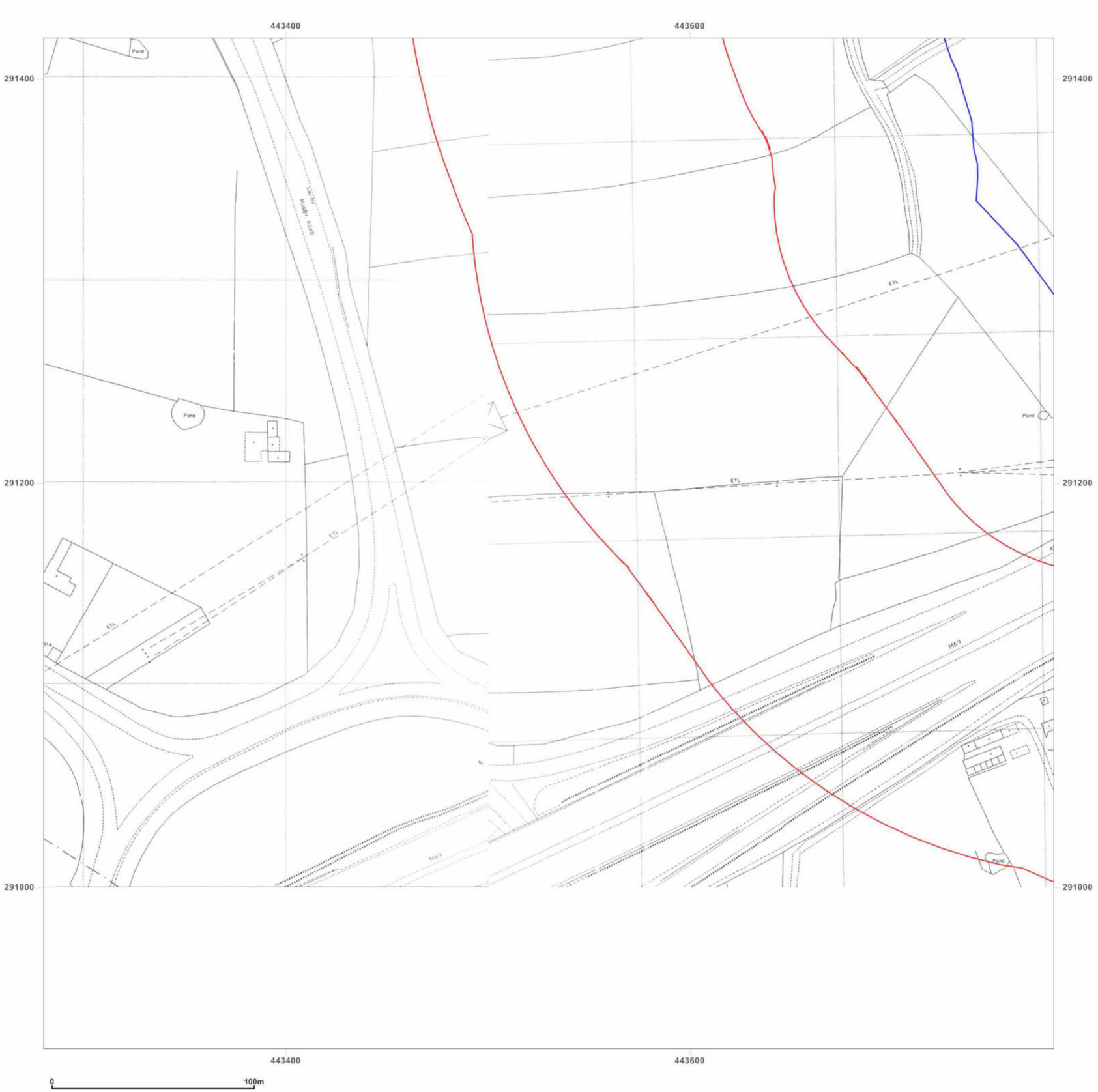
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1250_1_3
1250_2_3
1250_3_3
1250_1_2
1250_2_2
1250_3_2
1250_1_1
1250_2_1
1250_3_1



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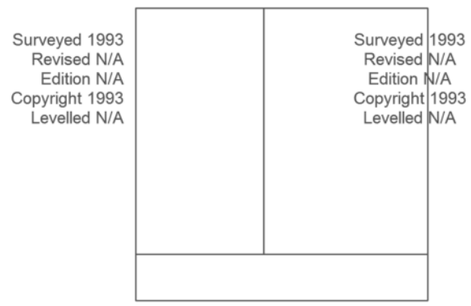
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Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_1_1
Grid Ref: 443530, 291170

Map Name: National Grid
Map date: **1993**
Scale: 1:1,250
Printed at: 1:2,000

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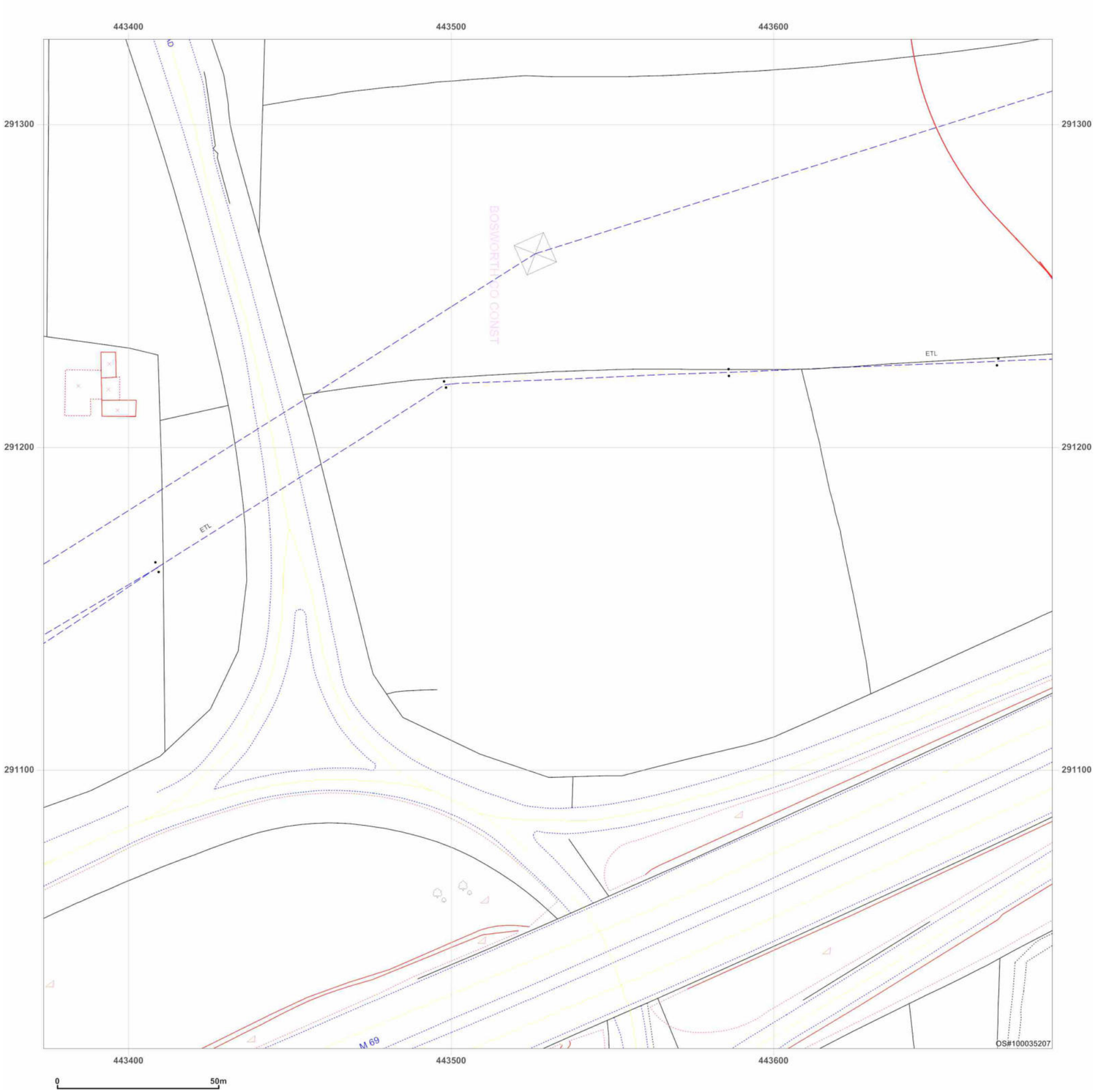
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Site Details:

Burbage Field
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_1_1
Grid Ref: 443530, 291170

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_1_2
Grid Ref: 443530, 291670

Map Name: National Grid
Map date: **1993**
Scale: 1:1,250
Printed at: 1:2,000

N
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Surveyed 1993
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A

Surveyed 1993
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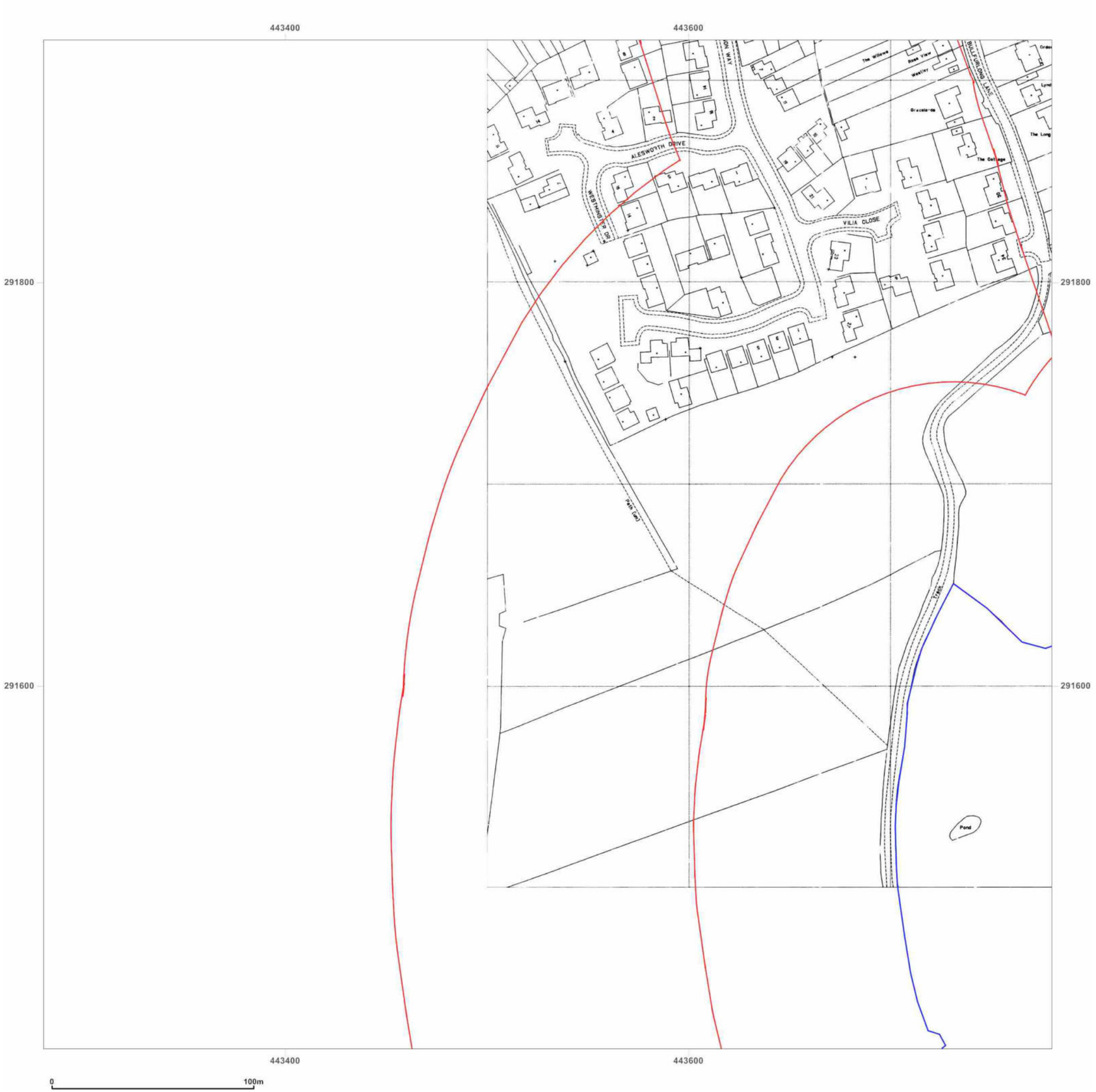
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_1_2
Grid Ref: 443530, 291670

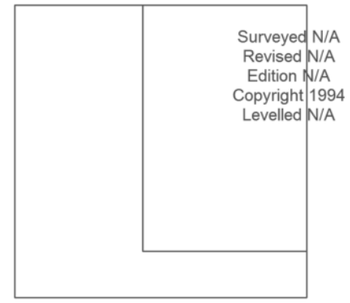
Map Name: National Grid

Map date: **1994**

Scale: 1:1,250

Printed at: 1:2,000

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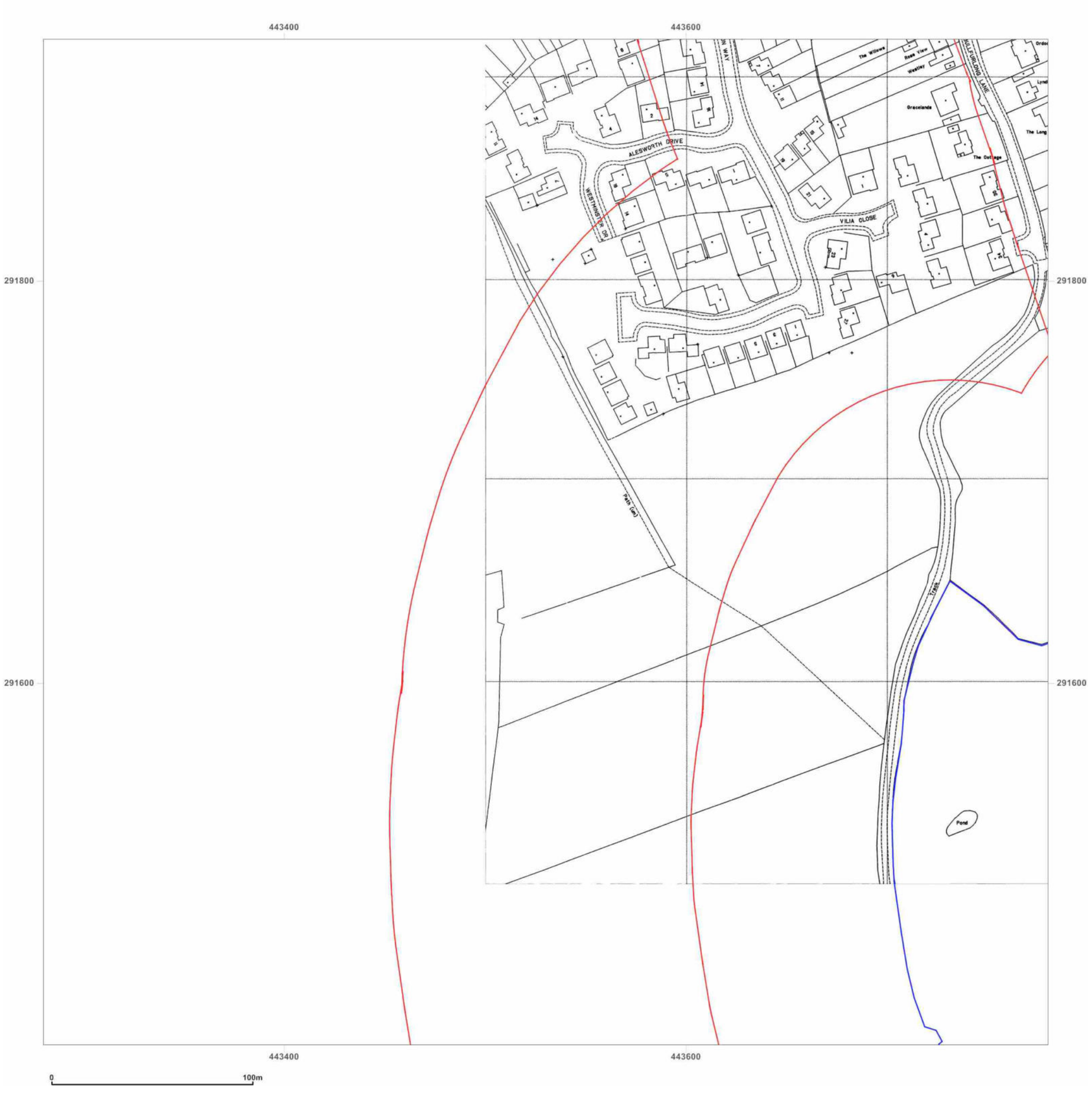
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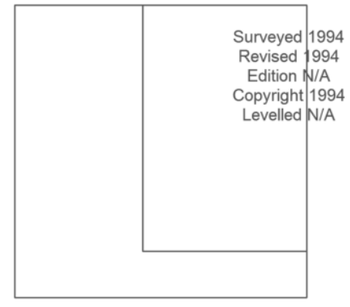
Site Details:

Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_1_2
Grid Ref: 443530, 291670

Map Name: National Grid
Map date: **1994**
Scale: 1:1,250
Printed at: 1:2,000

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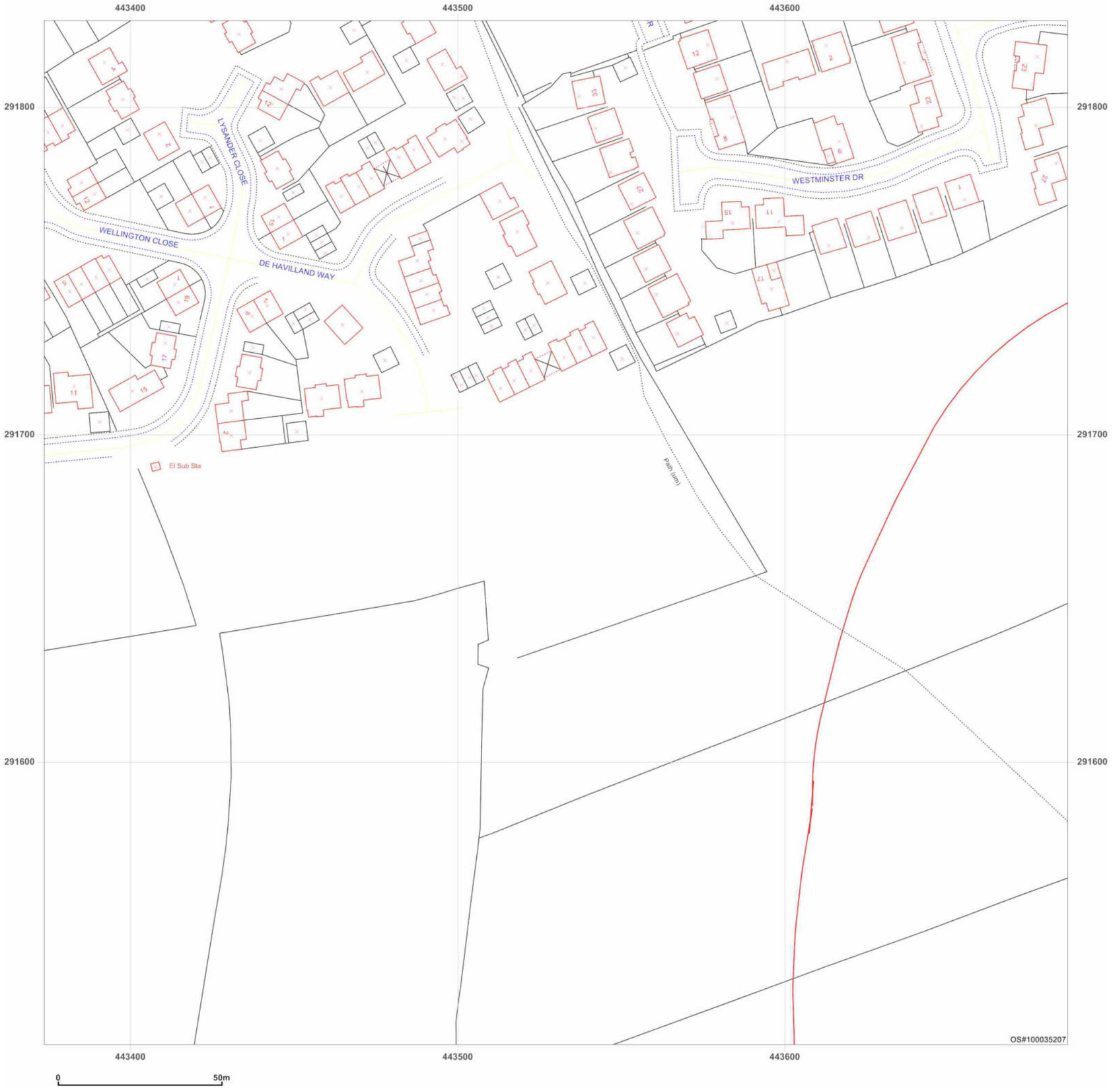
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_1_2
Grid Ref: 443530, 291670

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_1_3
Grid Ref: 443530, 292170

Map Name: National Grid

Map date: **1960**

Scale: 1:1,250

Printed at: 1:2,000

N
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Revised 1960
Edition N/A
Copyright 1960
Levelled 1923

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Revised 1960
Edition N/A
Copyright 1960
Levelled 1923

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_1_3
Grid Ref: 443530, 292170

Map Name: National Grid

Map date: **1967-1972**

Scale: 1:1,250

Printed at: 1:2,000

N
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Surveyed 1960
Revised 1971
Edition N/A
Copyright 1972
Levelled 1964

Surveyed 1960
Revised 1966
Edition N/A
Copyright 1967
Levelled 1964

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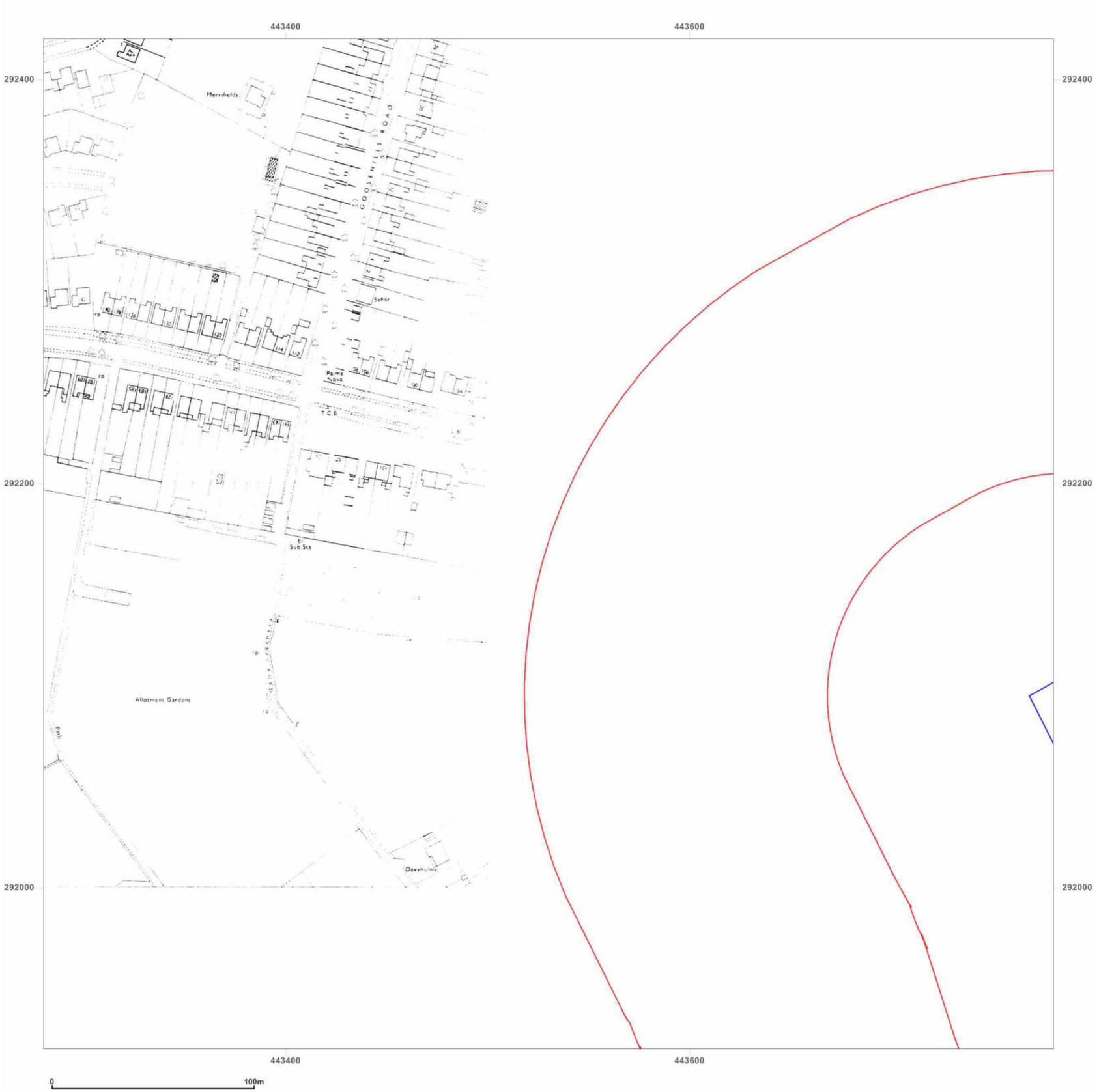
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_1_3
Grid Ref: 443530, 292170

Map Name: National Grid

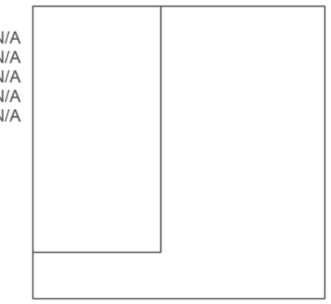
Map date: **1977**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A



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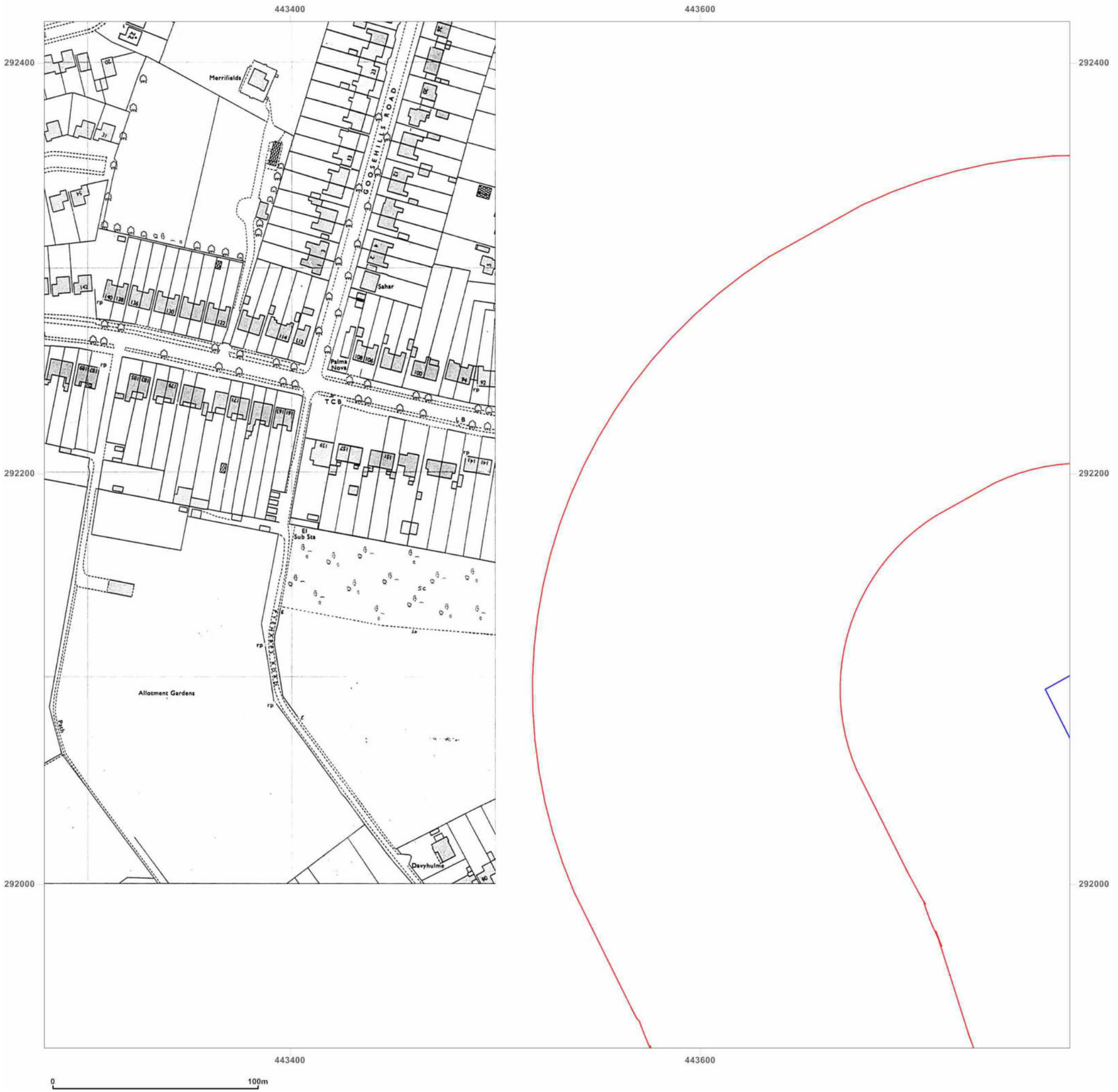
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_1_3
Grid Ref: 443530, 292170

Map Name: National Grid

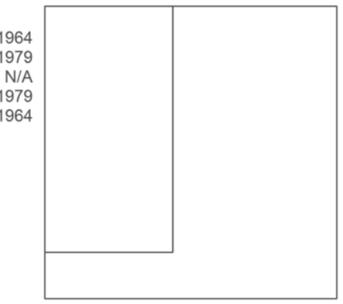
Map date: **1979**

Scale: 1:1,250

Printed at: 1:2,000

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Revised 1979
Edition N/A
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_1_3
Grid Ref: 443530, 292170

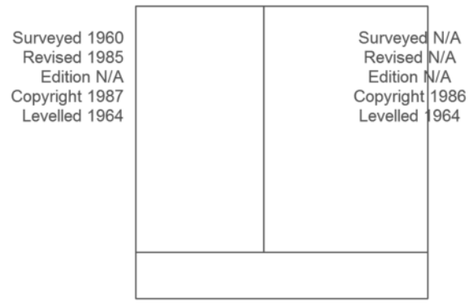
Map Name: National Grid

Map date: **1986-1987**

Scale: 1:1,250

Printed at: 1:2,000

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_1_3
Grid Ref: 443530, 292170

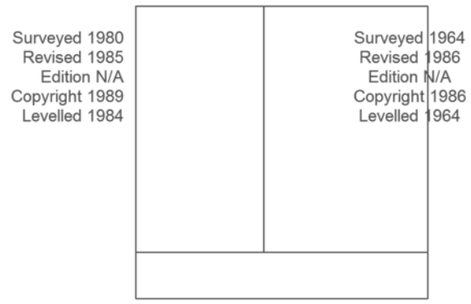
Map Name: National Grid

Map date: **1986-1989**

Scale: 1:1,250

Printed at: 1:2,000

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Site Details:

Burbage Field
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_1_3
Grid Ref: 443530, 292170

Map Name: National Grid

Map date: **1993**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1993 Revised N/A Edition N/A Copyright 1993 Levelled N/A	Surveyed N/A Revised N/A Edition N/A Copyright 1993 Levelled N/A
Surveyed 1993 Revised N/A Edition N/A Copyright 1993 Levelled N/A	Surveyed N/A Revised N/A Edition N/A Copyright 1993 Levelled N/A

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Site Details:

Burbage Field
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_1_3
Grid Ref: 443530, 292170

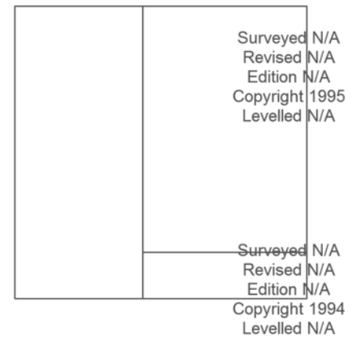
Map Name: National Grid

Map date: **1994-1995**

Scale: 1:1,250

Printed at: 1:2,000

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Site Details:

Burbage Field
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_1_3
Grid Ref: 443530, 292170

Map Name: National Grid

Map date: **1994-1995**

Scale: 1:1,250

Printed at: 1:2,000

N
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Revised 1995
Edition N/A
Copyright 1995
Levelled N/A

~~Surveyed~~ 1994
Revised 1994
Edition N/A
Copyright 1994
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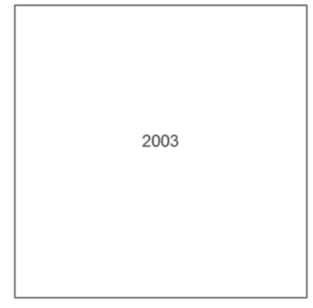
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Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_1_3
Grid Ref: 443530, 292170

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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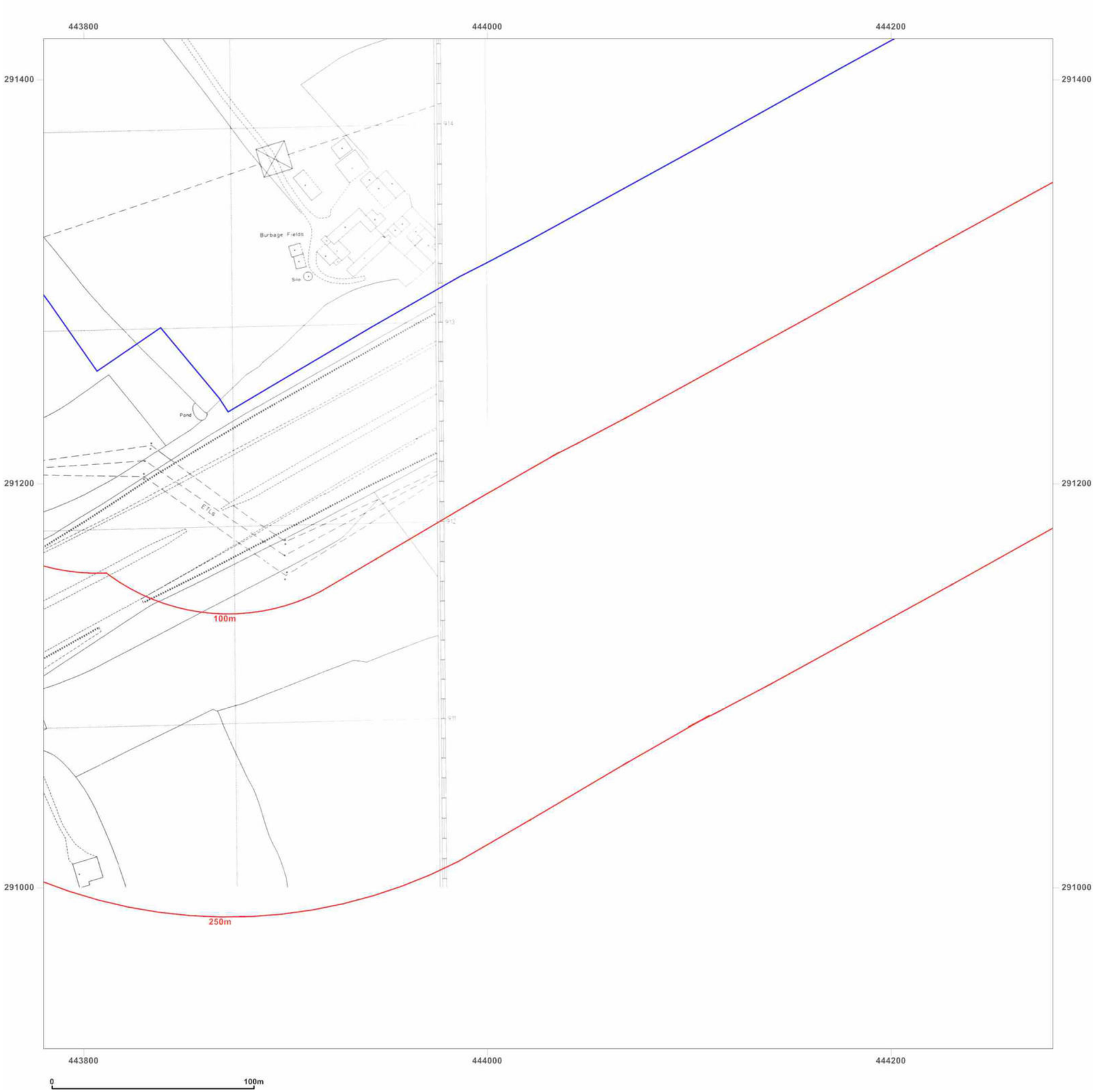
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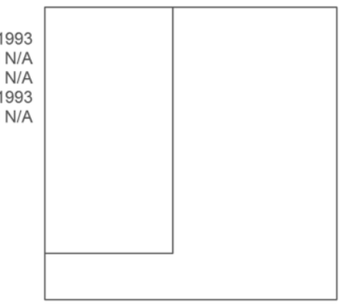
Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_2_1
Grid Ref: 444030, 291170

Map Name: National Grid
Map date: **1993**
Scale: 1:1,250
Printed at: 1:2,000

N
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Surveyed 1993
Revised N/A
Edition N/A
Copyright 1993
Levelled N/A



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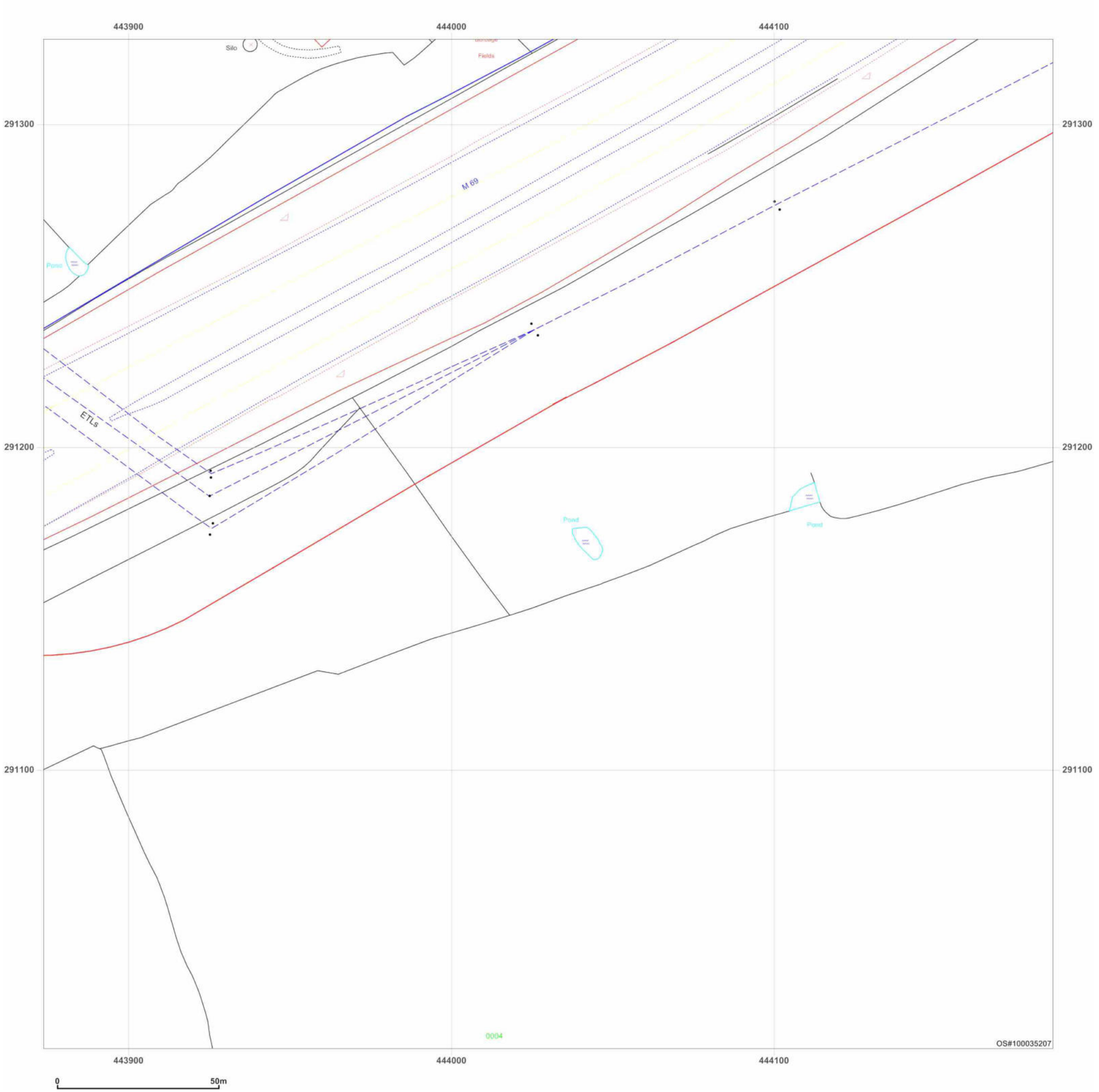
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Site Details:

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_2_1
Grid Ref: 444030, 291170

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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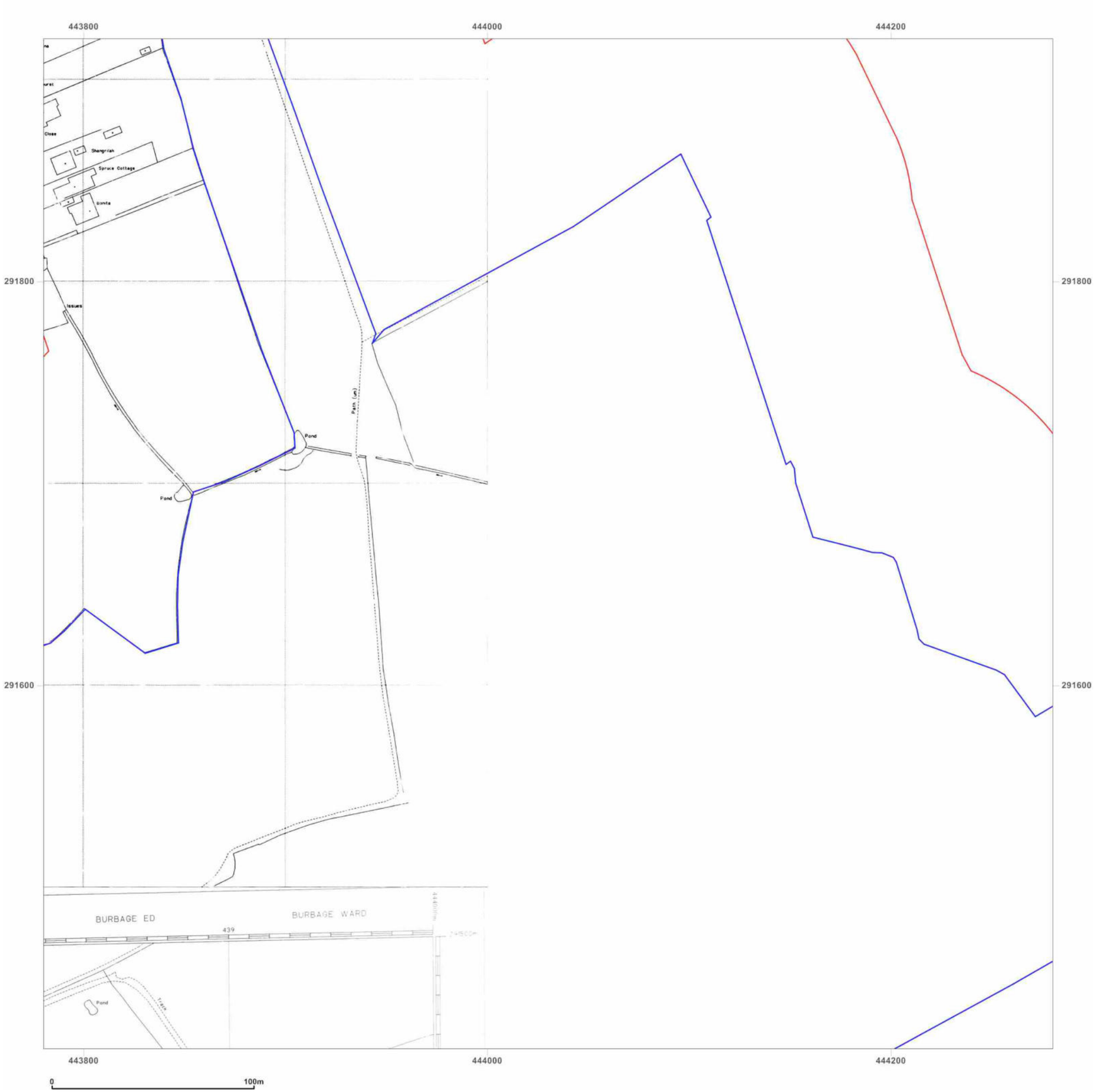
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Site Details:

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_2_2
Grid Ref: 444030, 291670

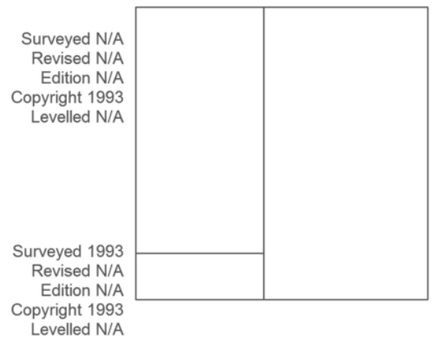
Map Name: National Grid

Map date: **1993**

Scale: 1:1,250

Printed at: 1:2,000

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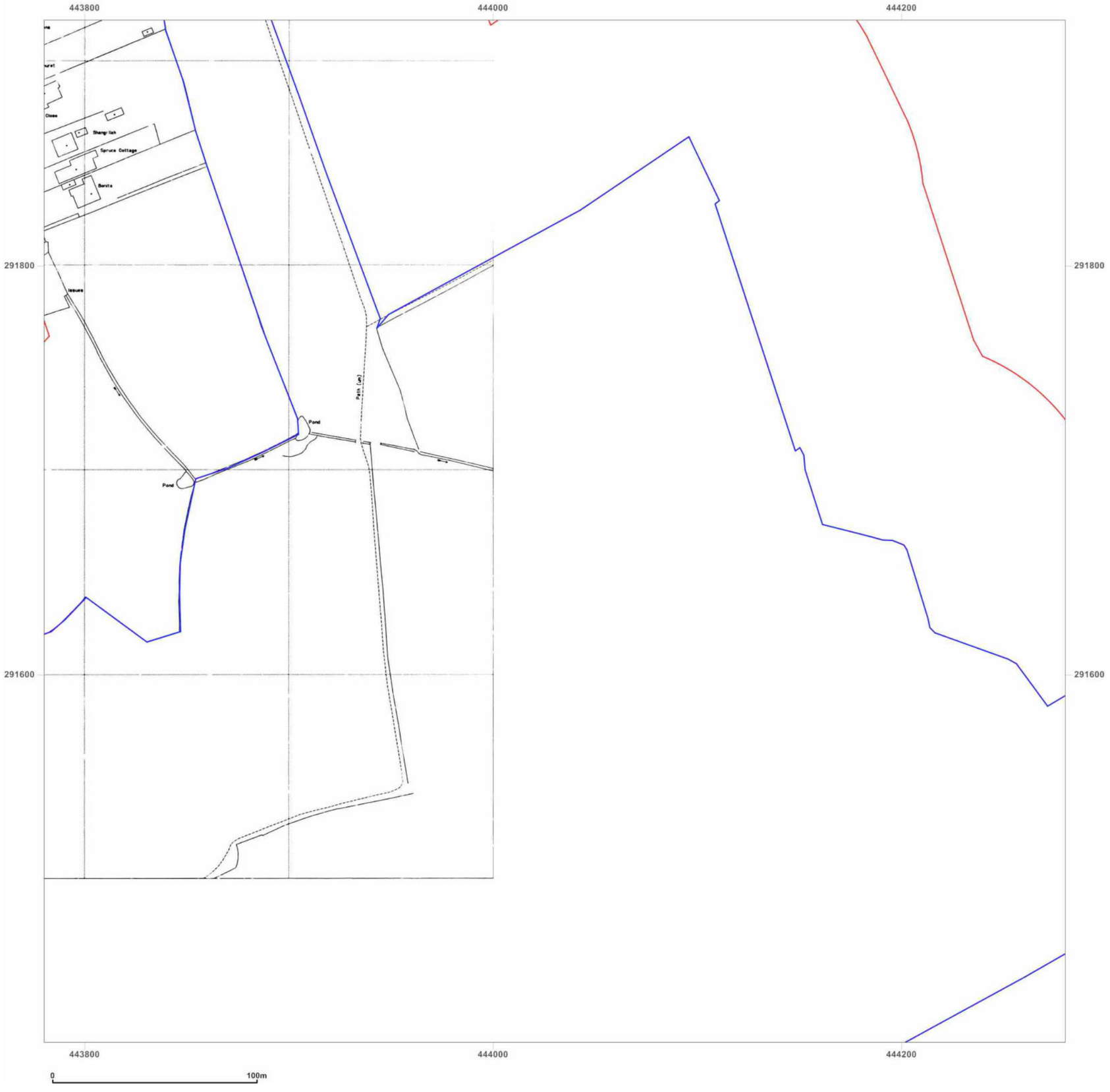
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_2_2
Grid Ref: 444030, 291670

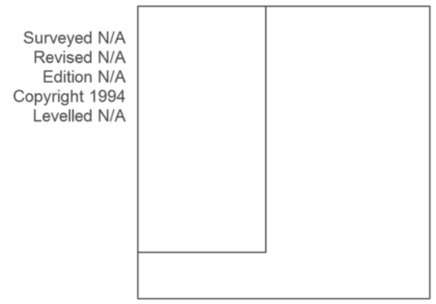
Map Name: National Grid

Map date: **1994**

Scale: 1:1,250

Printed at: 1:2,000

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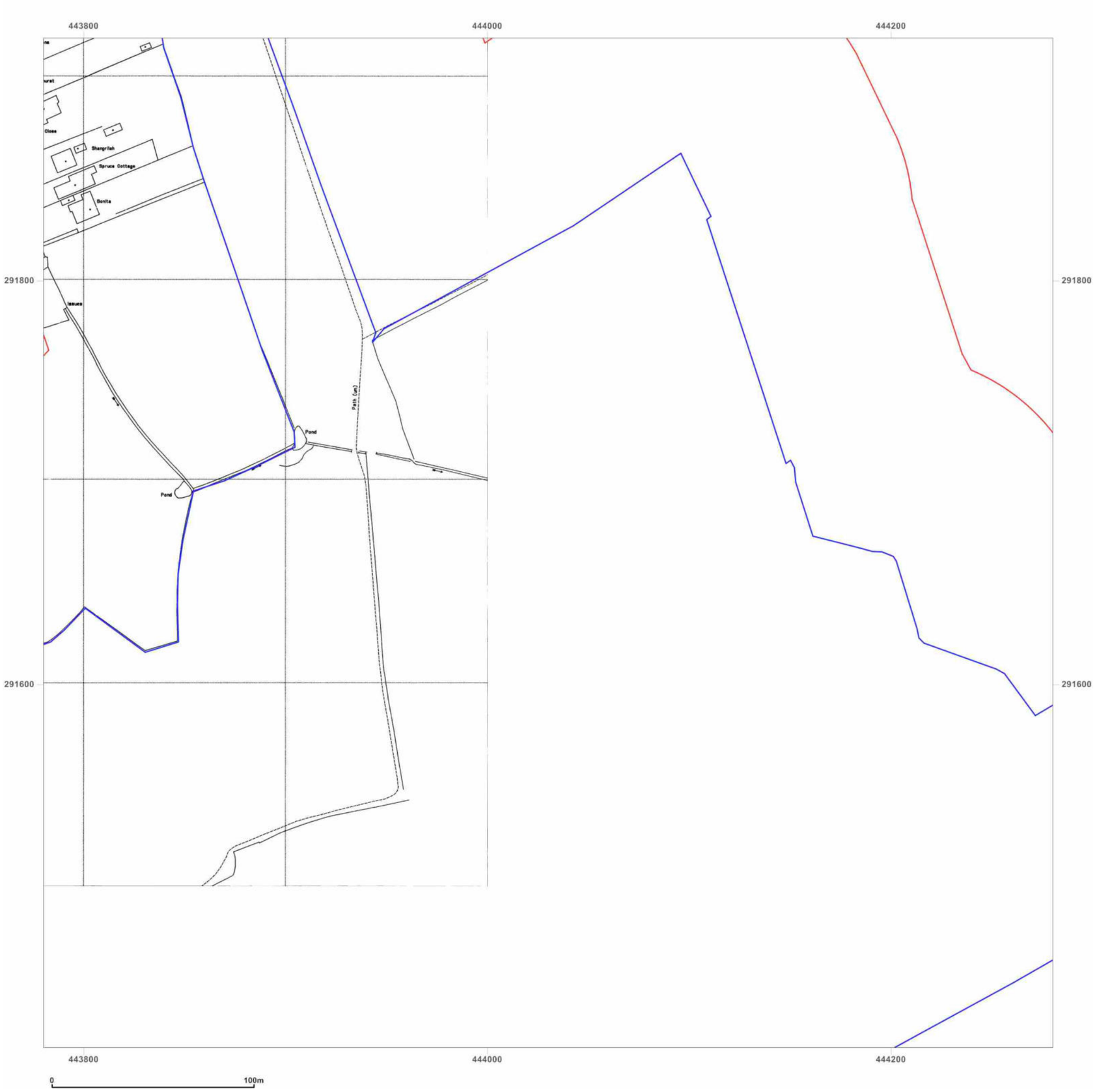
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_2_2
Grid Ref: 444030, 291670

Map Name: National Grid

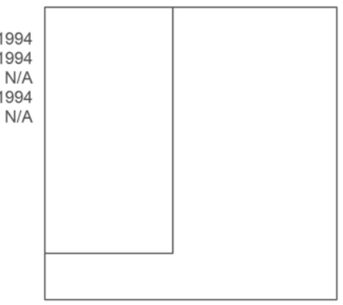
Map date: **1994**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1994
Revised 1994
Edition N/A
Copyright 1994
Levelled N/A



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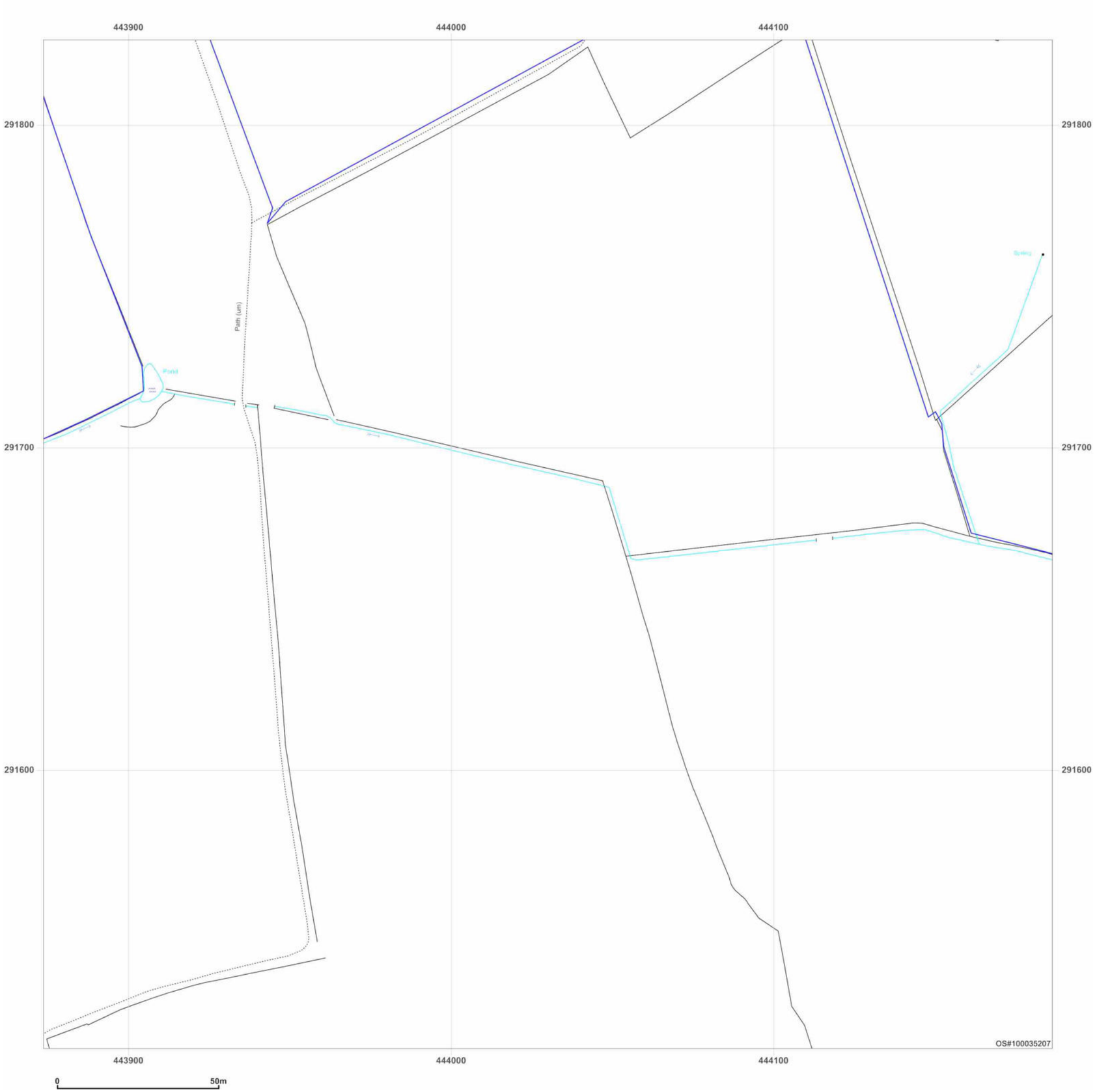
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Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_2_2
Grid Ref: 444030, 291670

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_2_3
Grid Ref: 444030, 292170

Map Name: National Grid

Map date: **1959-1960**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1960	Surveyed 1958
Revised 1960	Revised 1958
Edition N/A	Edition N/A
Copyright 1960	Copyright N/A
Levelled 1923	Levelled N/A

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Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_2_3
Grid Ref: 444030, 292170

Map Name: National Grid

Map date: **1967**

Scale: 1:1,250

Printed at: 1:2,000

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Edition N/A
Copyright 1967
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Edition N/A
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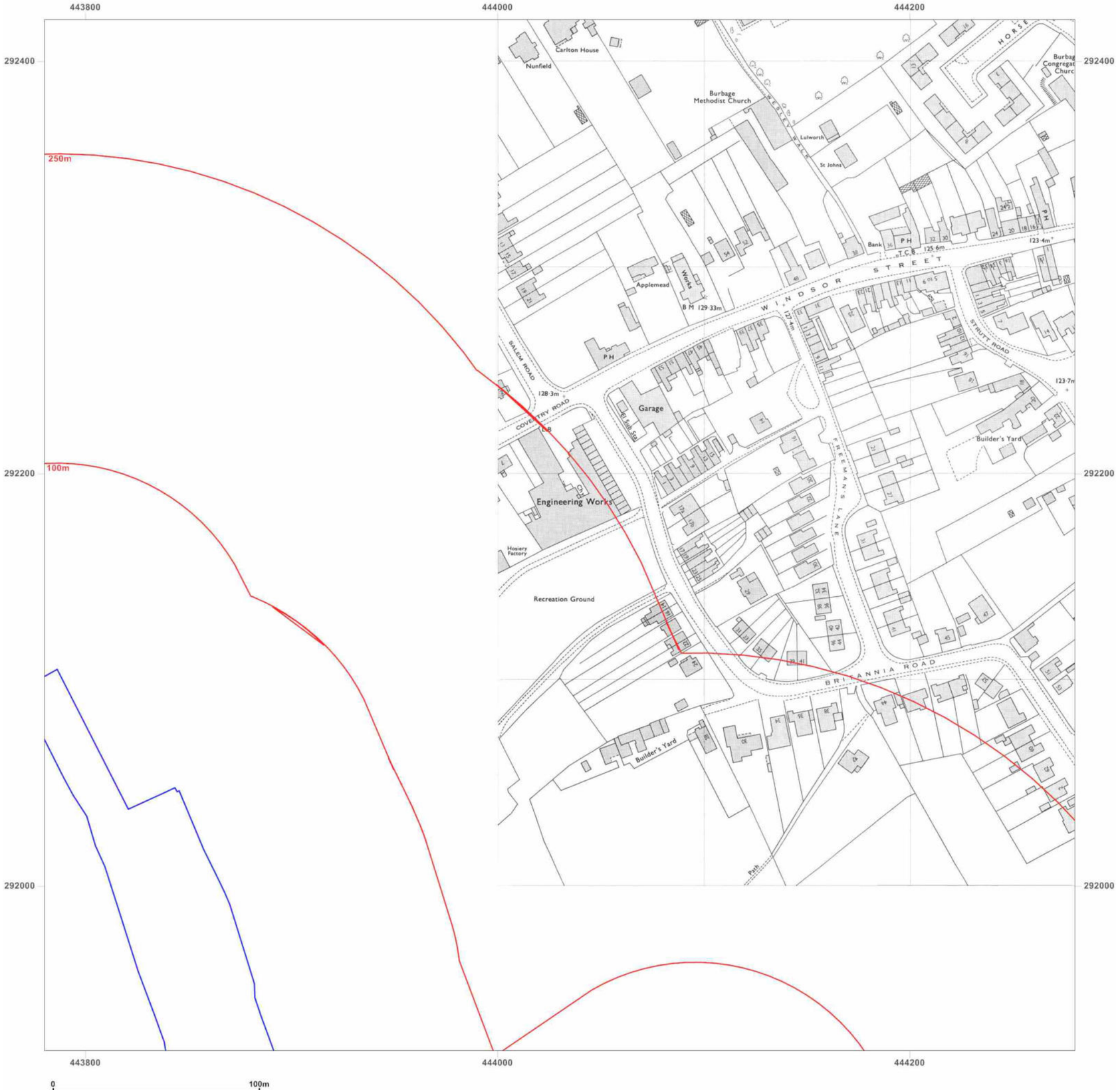
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Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_2_3
Grid Ref: 444030, 292170

Map Name: National Grid

Map date: **1973**

Scale: 1:1,250

Printed at: 1:2,000

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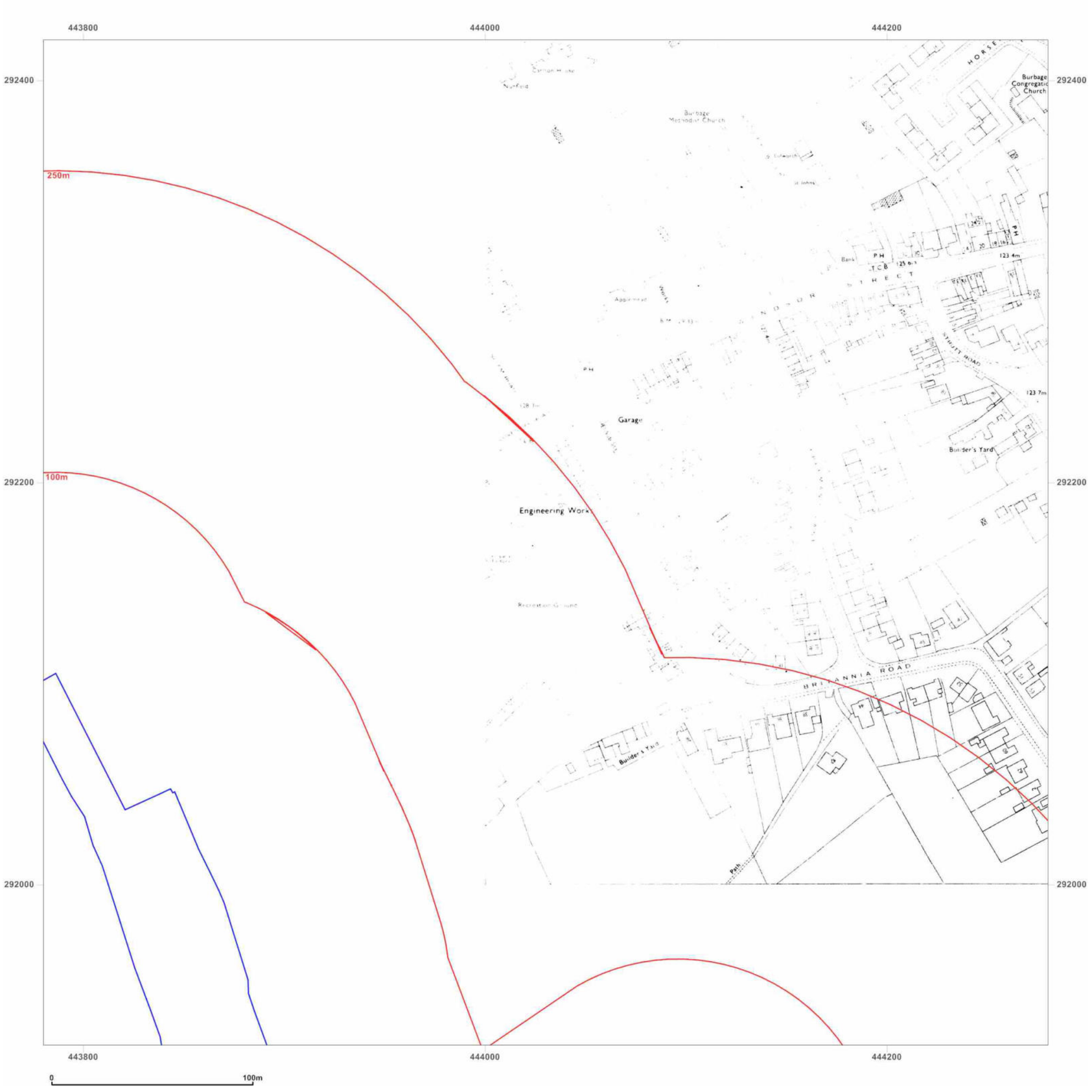
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Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_2_3
Grid Ref: 444030, 292170

Map Name: National Grid
Map date: **1975**
Scale: 1:1,250
Printed at: 1:2,000

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Revised N/A
Edition N/A
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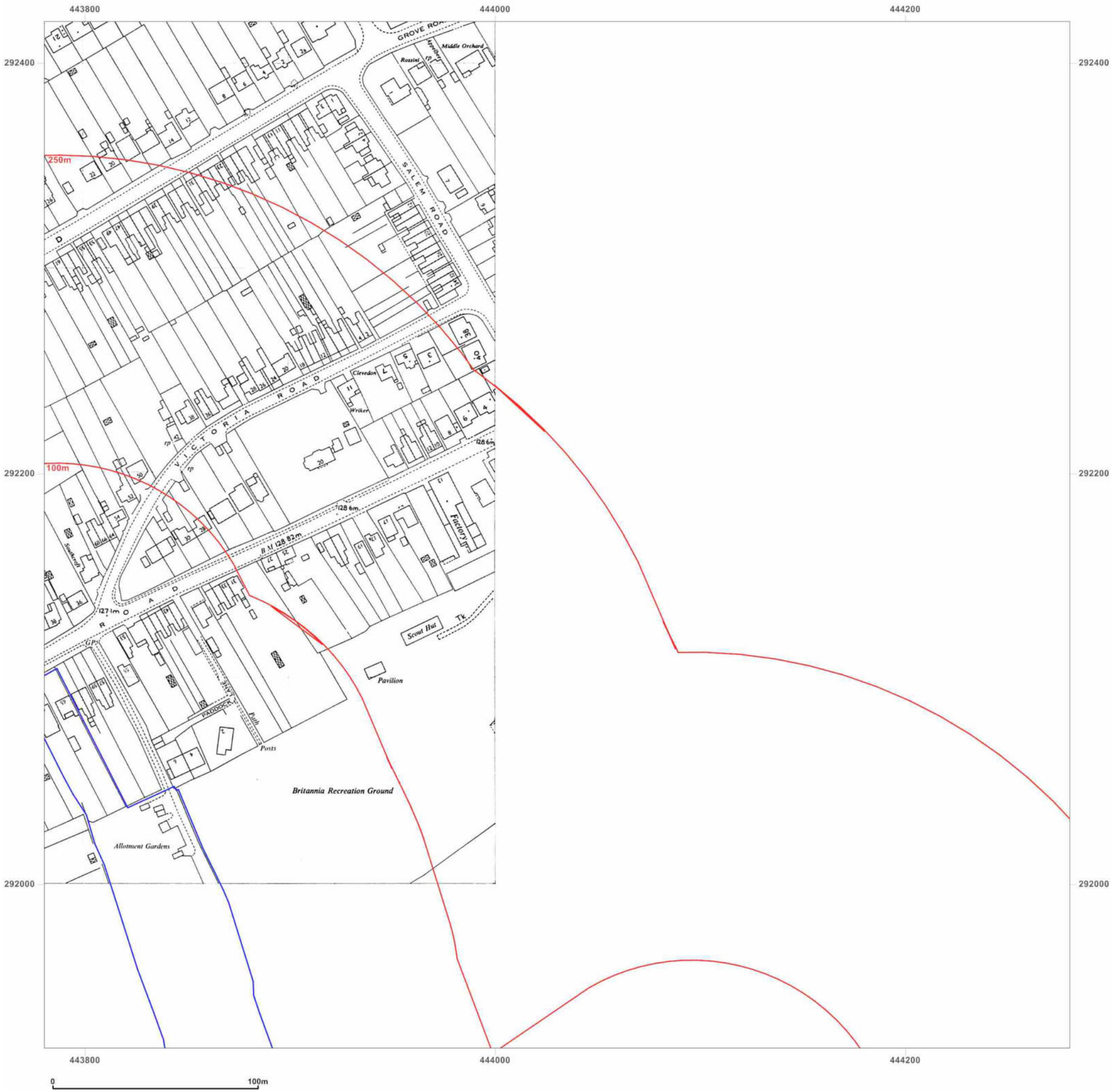
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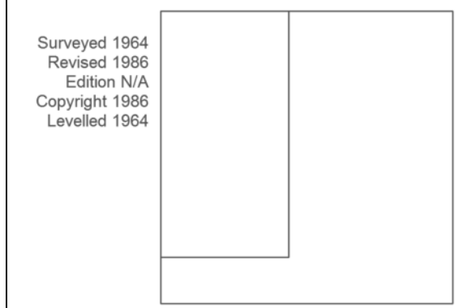
Site Details:

Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_2_3
Grid Ref: 444030, 292170

Map Name: National Grid
Map date: **1986**
Scale: 1:1,250
Printed at: 1:2,000

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_2_3
Grid Ref: 444030, 292170

Map Name: National Grid

Map date: **1986-1990**

Scale: 1:1,250

Printed at: 1:2,000

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Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_2_3
Grid Ref: 444030, 292170

Map Name: National Grid

Map date: **1993**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed N/A Revised N/A Edition N/A Copyright 1993 Levelled N/A	Surveyed N/A Revised N/A Edition N/A Copyright 1993 Levelled N/A
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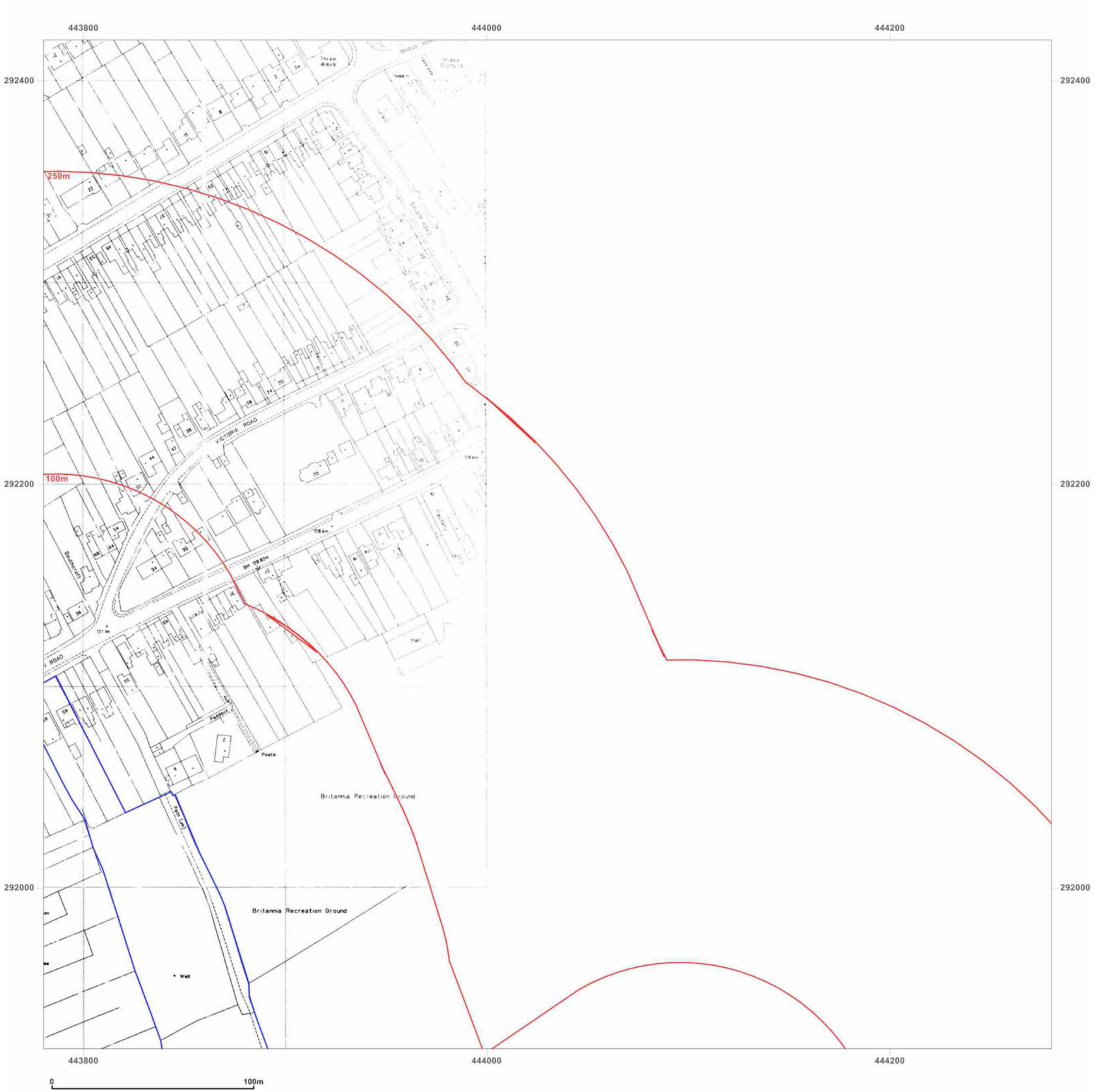
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_2_3
Grid Ref: 444030, 292170

Map Name: National Grid

Map date: **1994-1995**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed N/A
Revised N/A
Edition N/A
Copyright 1995
Levelled N/A

Surveyed N/A
Revised N/A
Edition N/A
Copyright 1994
Levelled N/A

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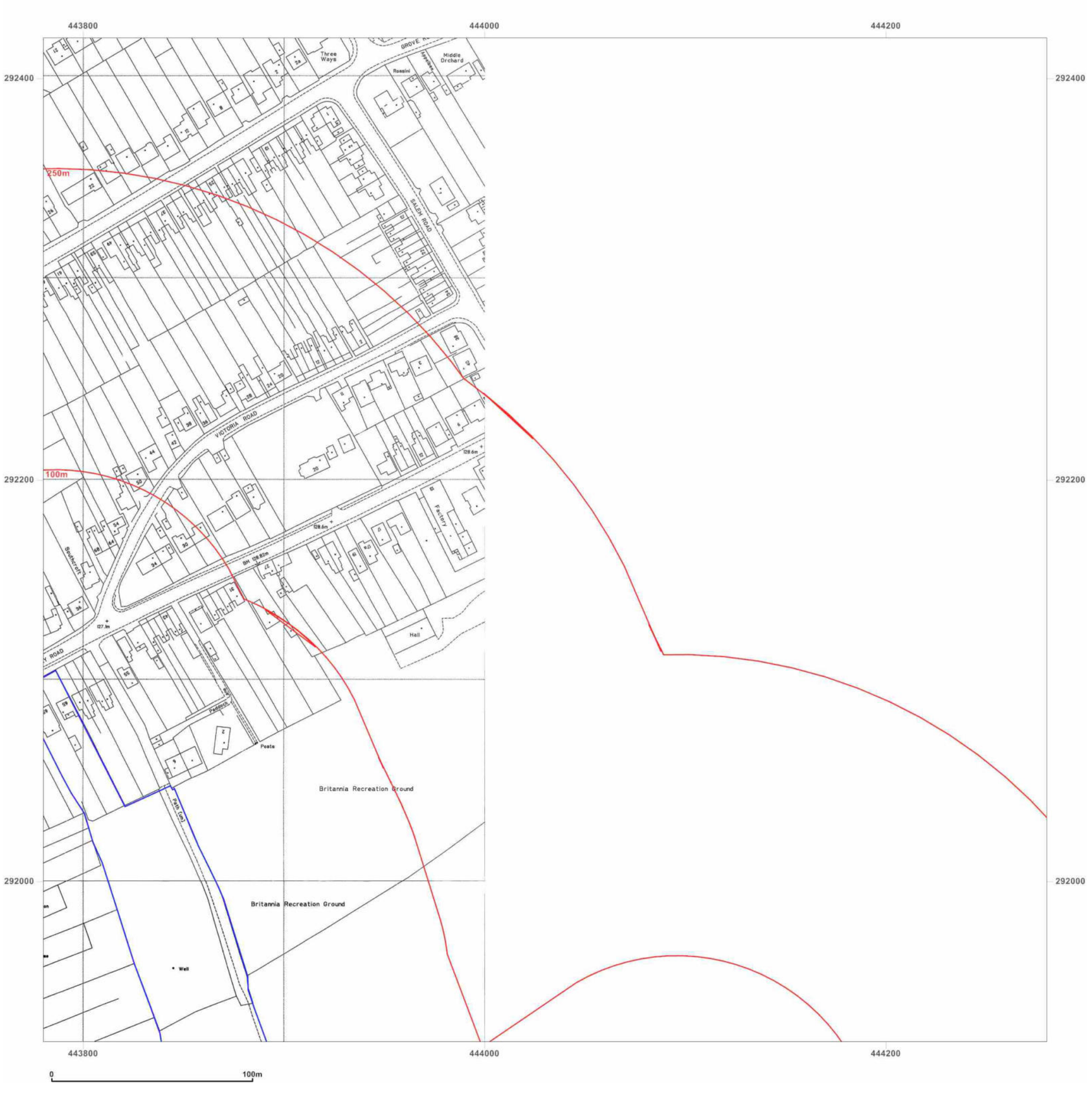
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Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_2_3
Grid Ref: 444030, 292170

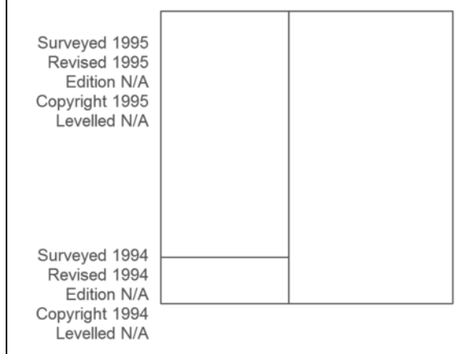
Map Name: National Grid

Map date: **1994-1995**

Scale: 1:1,250

Printed at: 1:2,000

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_2_3
Grid Ref: 444030, 292170

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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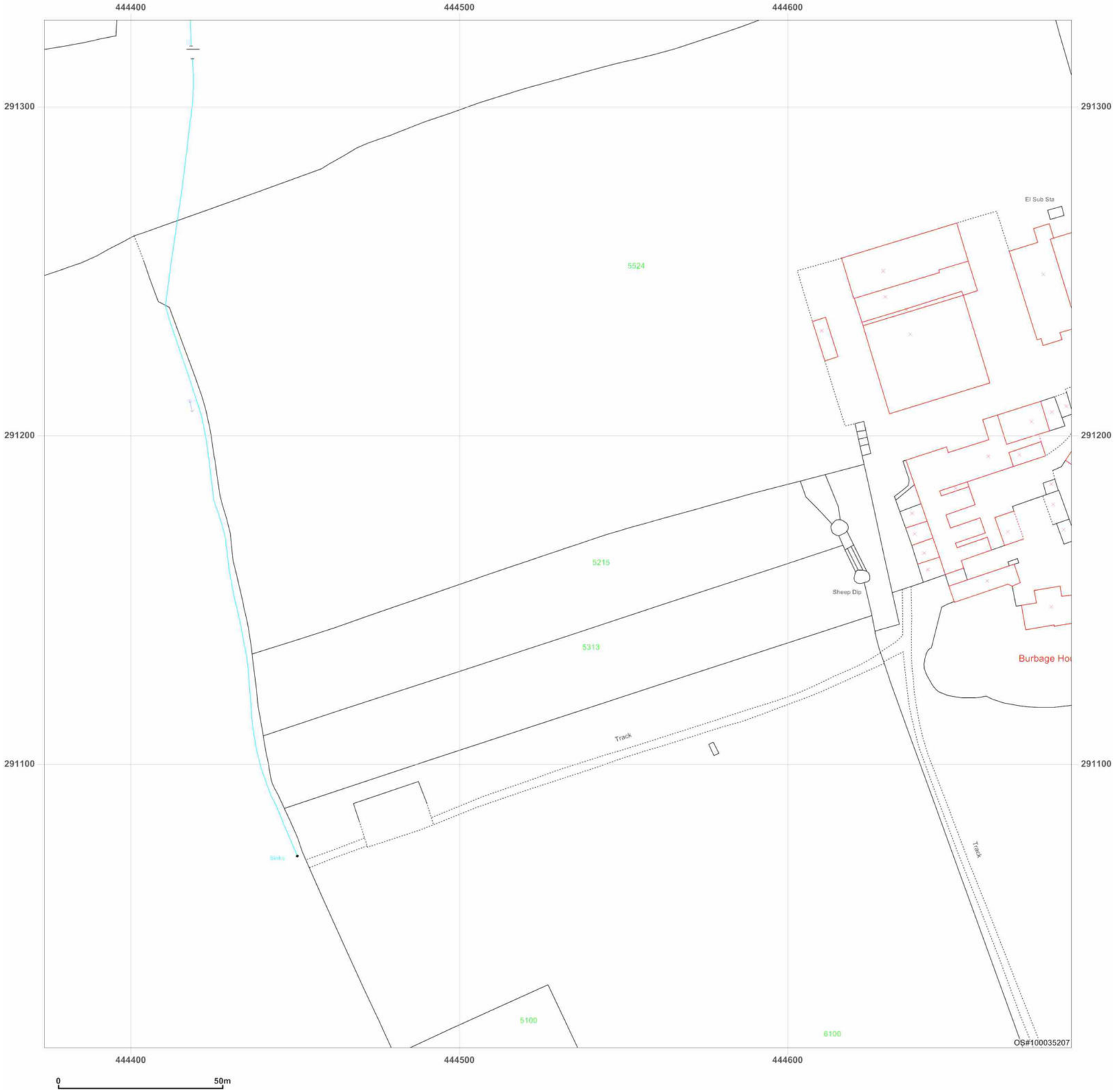
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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_3_1
Grid Ref: 444530, 291170

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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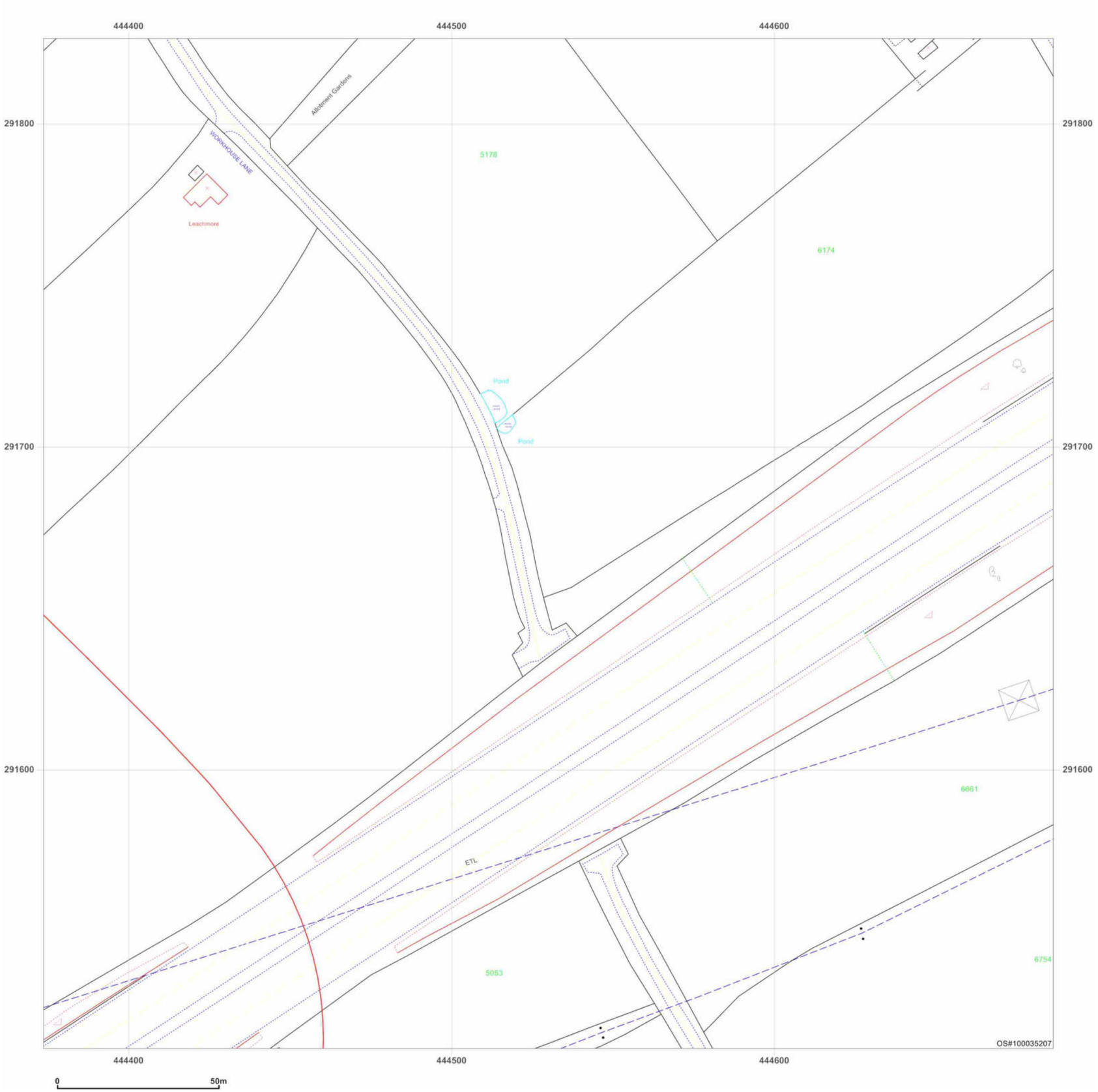
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Site Details:

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_3_2
Grid Ref: 444530, 291670

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_3_3
Grid Ref: 444530, 292170

Map Name: National Grid

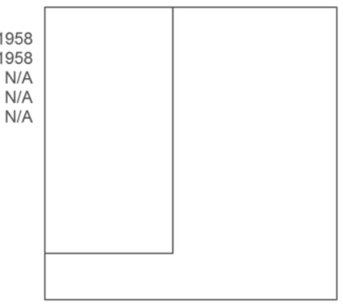
Map date: **1959**

Scale: 1:1,250

Printed at: 1:2,000

N
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Surveyed 1958
Revised 1958
Edition N/A
Copyright N/A
Levelled N/A



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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_3_3
Grid Ref: 444530, 292170

Map Name: National Grid

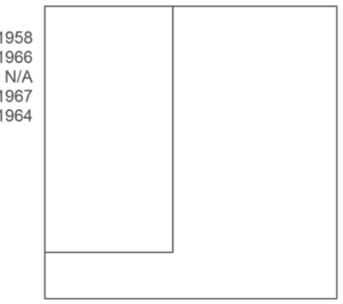
Map date: **1967**

Scale: 1:1,250

Printed at: 1:2,000

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Revised 1966
Edition N/A
Copyright 1967
Levelled 1964



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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_3_3
Grid Ref: 444530, 292170

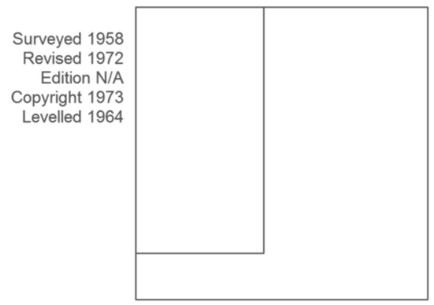
Map Name: National Grid

Map date: **1973**

Scale: 1:1,250

Printed at: 1:2,000

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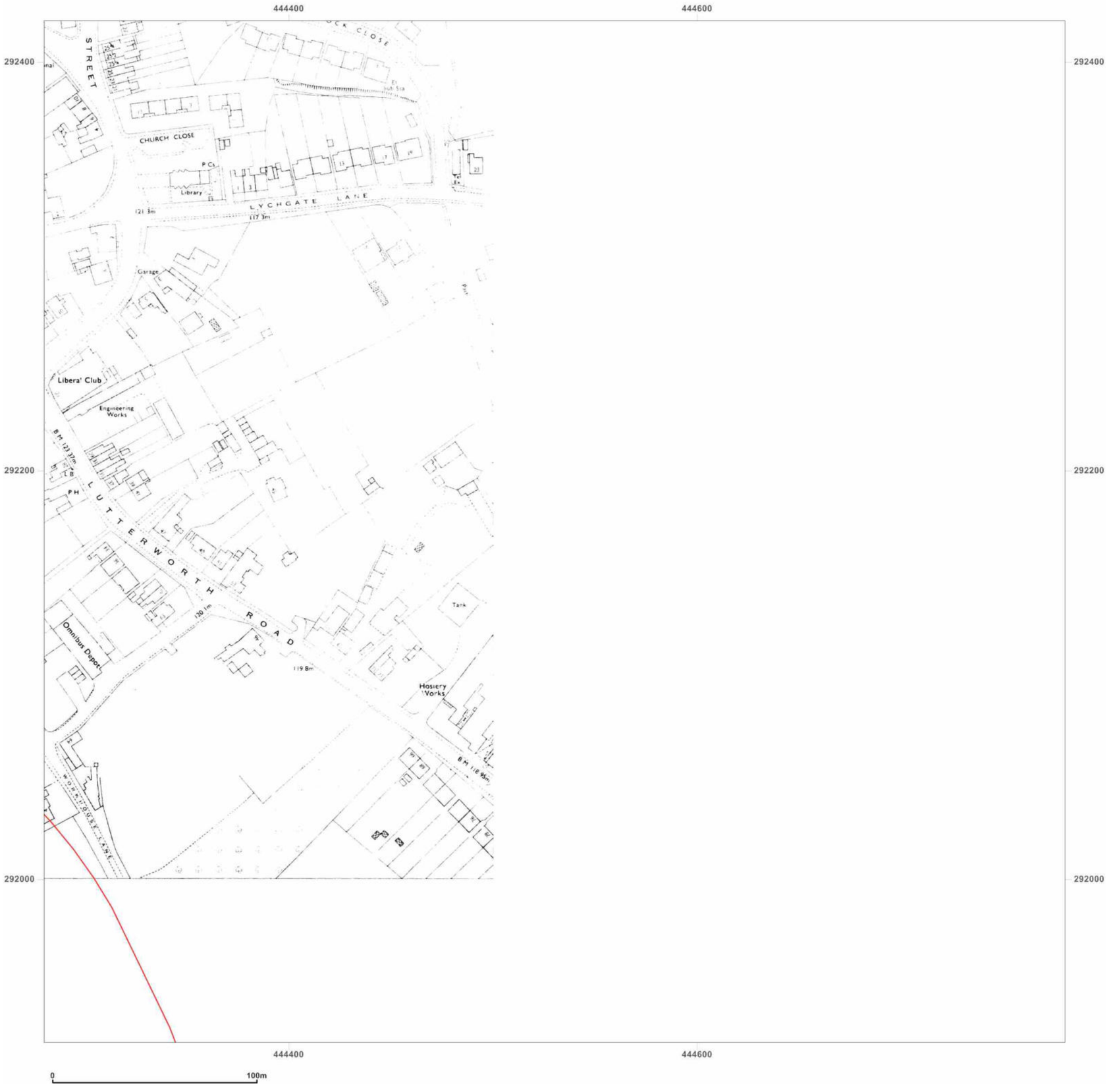
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Map legend available at:
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Site Details:

Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_3_3
Grid Ref: 444530, 292170

Map Name: National Grid
Map date: **1975**
Scale: 1:1,250
Printed at: 1:2,000

N
W E
S

Surveyed N/A
Revised N/A
Edition N/A
Copyright N/A
Levelled N/A

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Site Details:

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10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_3_3
Grid Ref: 444530, 292170

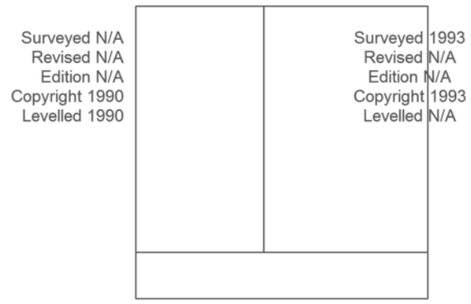
Map Name: National Grid

Map date: **1990-1993**

Scale: 1:1,250

Printed at: 1:2,000

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Site Details:

Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_3_3
Grid Ref: 444530, 292170

Map Name: National Grid

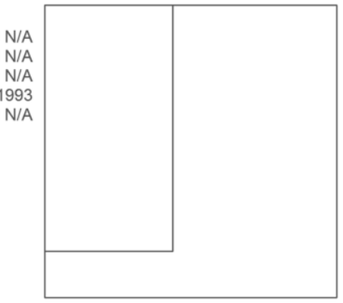
Map date: **1993**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed N/A
Revised N/A
Edition N/A
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Map legend available at:
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Site Details:

Burbage Field
Farm,Burbage,Leicestershire,LE
10 2EX

Client Ref: EMS_632820_841667
Report Ref: EMS-632820_841667_1250scale_3_3
Grid Ref: 444530, 292170

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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S



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Production date: 09 September 2020

Map legend available at:
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Appendix D: Enviro + Geo Insight Report

Groundsure LOCATION INTELLIGENCE

Enviro+Geo Insight

Burbage Field Farm, Burbage, Leicestershire, LE10 2EX,

Order Details

Date: 09/09/2020

Your ref: EMS_632820_841668

Our Ref: EMS-632820_841668

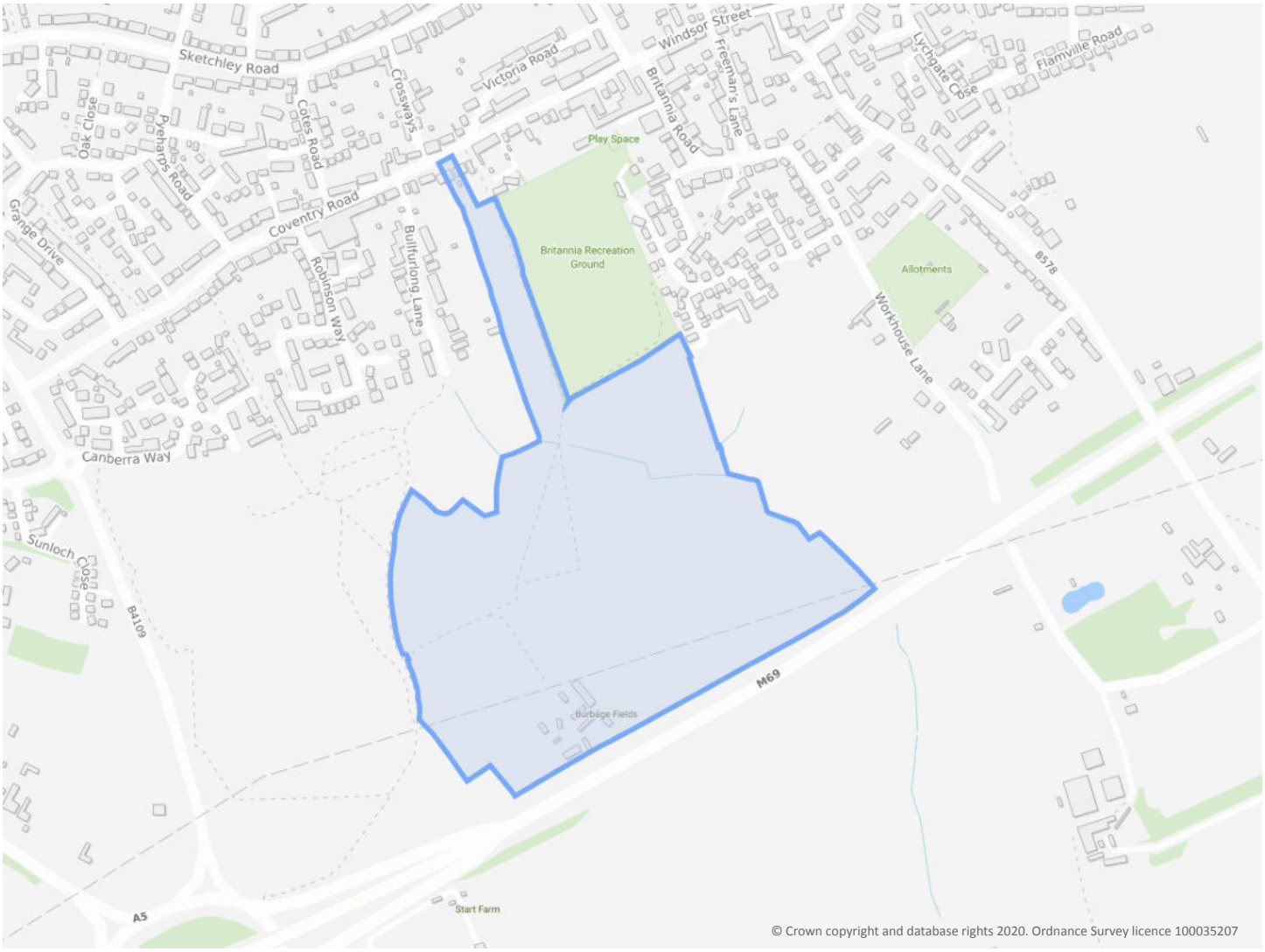
Client: emapsite

Site Details

Location: 443979 291556

Area: 23.63 ha

Authority: Hinckley and Bosworth Borough Council



Summary of findings p. 2

OS MasterMap site plan N/A: >10ha

Aerial image p. 8

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Contact us with any questions at:
info@groundsure.com
08444 159 000

Summary of findings

Page	Section	Past land use	On site	0-50m	50-250m	250-500m	500-2000m
13	1.1	Historical industrial land uses	3	0	20	18	-
15	1.2	Historical tanks	0	1	6	12	-
16	1.3	Historical energy features	0	0	0	7	-
17	1.4	Historical petrol stations	0	0	0	0	-
17	1.5	Historical garages	0	0	0	11	-
18	1.6	Historical military land	0	0	0	0	-
Page	Section	Past land use - un-grouped	On site	0-50m	50-250m	250-500m	500-2000m
19	2.1	Historical industrial land uses	4	0	28	29	-
22	2.2	Historical tanks	0	1	9	17	-
23	2.3	Historical energy features	0	0	0	18	-
24	2.4	Historical petrol stations	0	0	0	0	-
24	2.5	Historical garages	0	0	0	16	-
Page	Section	Waste and landfill	On site	0-50m	50-250m	250-500m	500-2000m
26	3.1	Active or recent landfill	0	0	0	0	-
26	3.2	Historical landfill (BGS records)	0	0	0	0	-
27	3.3	Historical landfill (LA/mapping records)	0	0	0	0	-
27	3.4	Historical landfill (EA/NRW records)	0	0	0	0	-
27	3.5	Historical waste sites	0	0	0	0	-
27	3.6	Licensed waste sites	0	0	0	0	-
27	3.7	Waste exemptions	0	0	0	24	-
Page	Section	Current industrial land use	On site	0-50m	50-250m	250-500m	500-2000m
30	4.1	Recent industrial land uses	3	0	7	-	-
31	4.2	Current or recent petrol stations	0	0	0	0	-
31	4.3	Electricity cables	0	0	0	0	-
31	4.4	Gas pipelines	0	0	0	0	-
32	4.5	Sites determined as Contaminated Land	0	0	0	0	-

32	4.6	Control of Major Accident Hazards (COMAH)	0	0	0	0	-
32	4.7	Regulated explosive sites	0	0	0	0	-
32	4.8	Hazardous substance storage/usage	0	0	0	0	-
32	4.9	Historical licensed industrial activities (IPC)	0	0	0	0	-
33	4.10	Licensed industrial activities (Part A(1))	0	0	0	0	-
33	4.11	Licensed pollutant release (Part A(2)/B)	0	0	0	0	-
33	4.12	Radioactive Substance Authorisations	0	0	0	0	-
33	**4.13**	**Licensed Discharges to controlled waters**	0	0	3	0	-
34	4.14	Pollutant release to surface waters (Red List)	0	0	0	0	-
34	4.15	Pollutant release to public sewer	0	0	0	0	-
34	4.16	List 1 Dangerous Substances	0	0	0	0	-
35	4.17	List 2 Dangerous Substances	0	0	0	0	-
35	4.18	Pollution Incidents (EA/NRW)	0	0	0	0	-
35	4.19	Pollution inventory substances	0	0	0	0	-
35	4.20	Pollution inventory waste transfers	0	0	0	0	-
35	4.21	Pollution inventory radioactive waste	0	0	0	0	-

Page	Section	Hydrogeology	On site	0-50m	50-250m	250-500m	500-2000m
36	**5.1**	**Superficial aquifer**	Identified (within 500m)				
38	**5.2**	**Bedrock aquifer**	Identified (within 500m)				
39	**5.3**	**Groundwater vulnerability**	Identified (within 50m)				
41	5.4	Groundwater vulnerability- soluble rock risk	None (within 0m)				
41	5.5	Groundwater vulnerability- local information	None (within 0m)				
42	**5.6**	**Groundwater abstractions**	0	0	2	4	6
45	**5.7**	**Surface water abstractions**	0	0	0	0	3
46	5.8	Potable abstractions	0	0	0	0	0
46	5.9	Source Protection Zones	0	0	0	0	-
47	5.10	Source Protection Zones (confined aquifer)	0	0	0	0	-

Page	Section	Hydrology	On site	0-50m	50-250m	250-500m	500-2000m
48	**6.1**	**Water Network (OS MasterMap)**	9	5	0	-	-

50	6.2	Surface water features	1	1	3	-	-
50	6.3	WFD Surface water body catchments	1	-	-	-	-
50	6.4	WFD Surface water bodies	0	0	0	-	-
51	6.5	WFD Groundwater bodies	2	-	-	-	-

Page	Section	River and coastal flooding	On site	0-50m	50-250m	250-500m	500-2000m
52	7.1	Risk of Flooding from Rivers and Sea (RoFRaS)	None (within 50m)				
52	7.2	Historical Flood Events	0	0	0	-	-
52	7.3	Flood Defences	0	0	0	-	-
52	7.4	Areas Benefiting from Flood Defences	0	0	0	-	-
53	7.5	Flood Storage Areas	0	0	0	-	-
54	7.6	Flood Zone 2	None (within 50m)				
54	7.7	Flood Zone 3	None (within 50m)				

Page	Section	Surface water flooding	
55	8.1	Surface water flooding	1 in 30 year, 0.3m - 1.0m (within 50m)

Page	Section	Groundwater flooding	
57	9.1	Groundwater flooding	Moderate (within 50m)

Page	Section	Environmental designations	On site	0-50m	50-250m	250-500m	500-2000m
58	10.1	Sites of Special Scientific Interest (SSSI)	0	0	0	0	1
59	10.2	Conserved wetland sites (Ramsar sites)	0	0	0	0	0
59	10.3	Special Areas of Conservation (SAC)	0	0	0	0	0
59	10.4	Special Protection Areas (SPA)	0	0	0	0	0
59	10.5	National Nature Reserves (NNR)	0	0	0	0	0
60	10.6	Local Nature Reserves (LNR)	0	0	0	0	1
60	10.7	Designated Ancient Woodland	0	0	0	0	2
60	10.8	Biosphere Reserves	0	0	0	0	0
61	10.9	Forest Parks	0	0	0	0	0
61	10.10	Marine Conservation Zones	0	0	0	0	0
61	10.11	Green Belt	0	0	0	1	0
61	10.12	Proposed Ramsar sites	0	0	0	0	0

62	10.13	Possible Special Areas of Conservation (pSAC)	0	0	0	0	0
62	10.14	Potential Special Protection Areas (pSPA)	0	0	0	0	0
62	10.15	Nitrate Sensitive Areas	0	0	0	0	0
62	**10.16**	**Nitrate Vulnerable Zones**	3	0	0	1	0
64	**10.17**	**SSSI Impact Risk Zones**	2	-	-	-	-
65	**10.18**	**SSSI Units**	0	0	0	0	1
Page	Section	Visual and cultural designations	On site	0-50m	50-250m	250-500m	500-2000m
67	11.1	World Heritage Sites	0	0	0	-	-
67	11.2	Area of Outstanding Natural Beauty	0	0	0	-	-
67	11.3	National Parks	0	0	0	-	-
67	11.4	Listed Buildings	0	0	0	-	-
68	11.5	Conservation Areas	0	0	0	-	-
68	11.6	Scheduled Ancient Monuments	0	0	0	-	-
68	11.7	Registered Parks and Gardens	0	0	0	-	-
Page	Section	Agricultural designations	On site	0-50m	50-250m	250-500m	500-2000m
69	**12.1**	**Agricultural Land Classification**	Grade 3a (within 250m)				
71	12.2	Open Access Land	0	0	0	-	-
71	12.3	Tree Felling Licences	0	0	0	-	-
71	**12.4**	**Environmental Stewardship Schemes**	0	0	1	-	-
72	12.5	Countryside Stewardship Schemes	0	0	0	-	-
Page	Section	Habitat designations	On site	0-50m	50-250m	250-500m	500-2000m
73	**13.1**	**Priority Habitat Inventory**	0	0	2	-	-
74	13.2	Habitat Networks	0	0	0	-	-
74	13.3	Open Mosaic Habitat	0	0	0	-	-
74	13.4	Limestone Pavement Orders	0	0	0	-	-
Page	Section	Geology 1:10,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
75	**14.1**	**10k Availability**	Identified (within 500m)				
76	**14.2**	**Artificial and made ground (10k)**	0	0	1	1	-
77	**14.3**	**Superficial geology (10k)**	4	0	2	3	-

78	14.4	Landslip (10k)	0	0	0	0	-
79	**14.5**	**Bedrock geology (10k)**	1	0	0	0	-
80	14.6	Bedrock faults and other linear features (10k)	0	0	0	0	-
Page	Section	Geology 1:50,000 scale	On site	0-50m	50-250m	250-500m	500-2000m
81	**15.1**	**50k Availability**	Identified (within 500m)				
82	15.2	Artificial and made ground (50k)	0	0	0	0	-
82	15.3	Artificial ground permeability (50k)	0	0	-	-	-
83	**15.4**	**Superficial geology (50k)**	4	0	2	3	-
84	**15.5**	**Superficial permeability (50k)**	Identified (within 50m)				
84	15.6	Landslip (50k)	0	0	0	0	-
85	15.7	Landslip permeability (50k)	None (within 50m)				
86	**15.8**	**Bedrock geology (50k)**	1	0	0	0	-
87	**15.9**	**Bedrock permeability (50k)**	Identified (within 50m)				
87	15.10	Bedrock faults and other linear features (50k)	0	0	0	0	-
Page	Section	Boreholes	On site	0-50m	50-250m	250-500m	500-2000m
88	**16.1**	**BGS Boreholes**	1	3	9	-	-
Page	Section	Natural ground subsidence					
90	**17.1**	**Shrink swell clays**	Low (within 50m)				
92	**17.2**	**Running sands**	Low (within 50m)				
94	**17.3**	**Compressible deposits**	Moderate (within 50m)				
96	**17.4**	**Collapsible deposits**	Very low (within 50m)				
97	**17.5**	**Landslides**	Very low (within 50m)				
98	**17.6**	**Ground dissolution of soluble rocks**	Negligible (within 50m)				
Page	Section	Mining, ground workings and natural cavities	On site	0-50m	50-250m	250-500m	500-2000m
99	18.1	Natural cavities	0	0	0	0	-
100	18.2	BritPits	0	0	0	0	-
100	**18.3**	**Surface ground workings**	8	3	13	-	-
101	18.4	Underground workings	0	0	0	0	0
101	18.5	Historical Mineral Planning Areas	0	0	0	0	-

101	18.6	Non-coal mining	0	0	0	0	0
102	18.7	Mining cavities	0	0	0	0	0
102	18.8	JPB mining areas	None (within 0m)				
102	18.9	Coal mining	None (within 0m)				
102	18.10	Brine areas	None (within 0m)				
102	18.11	Gypsum areas	None (within 0m)				
103	18.12	Tin mining	None (within 0m)				
103	18.13	Clay mining	None (within 0m)				

Page	Section	Radon	
104	**19.1**	**Radon**	Less than 1% (within 0m)

Page	Section	Soil chemistry	On site	0-50m	50-250m	250-500m	500-2000m
105	**20.1**	**BGS Estimated Background Soil Chemistry**	13	3	-	-	-
106	20.2	BGS Estimated Urban Soil Chemistry	0	0	-	-	-
106	20.3	BGS Measured Urban Soil Chemistry	0	0	-	-	-

Page	Section	Railway infrastructure and projects	On site	0-50m	50-250m	250-500m	500-2000m
107	21.1	Underground railways (London)	0	0	0	-	-
107	21.2	Underground railways (Non-London)	0	0	0	-	-
108	21.3	Railway tunnels	0	0	0	-	-
108	**21.4**	**Historical railway and tunnel features**	0	0	3	-	-
108	21.5	Royal Mail tunnels	0	0	0	-	-
108	21.6	Historical railways	0	0	0	-	-
109	21.7	Railways	0	0	0	-	-
109	21.8	Crossrail 1	0	0	0	0	-
109	21.9	Crossrail 2	0	0	0	0	-
109	21.10	HS2	0	0	0	0	-

Recent aerial photograph



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Capture Date: 22/09/2017

Site Area: 23.63ha

Recent site history - 2013 aerial photograph



Capture Date: 10/07/2013

Site Area: 23.63ha

Recent site history - 2010 aerial photograph



Capture Date: 03/06/2010

Site Area: 23.63ha

Recent site history - 2008 aerial photograph



Capture Date: 20/09/2008

Site Area: 23.63ha

Recent site history - 1999 aerial photograph

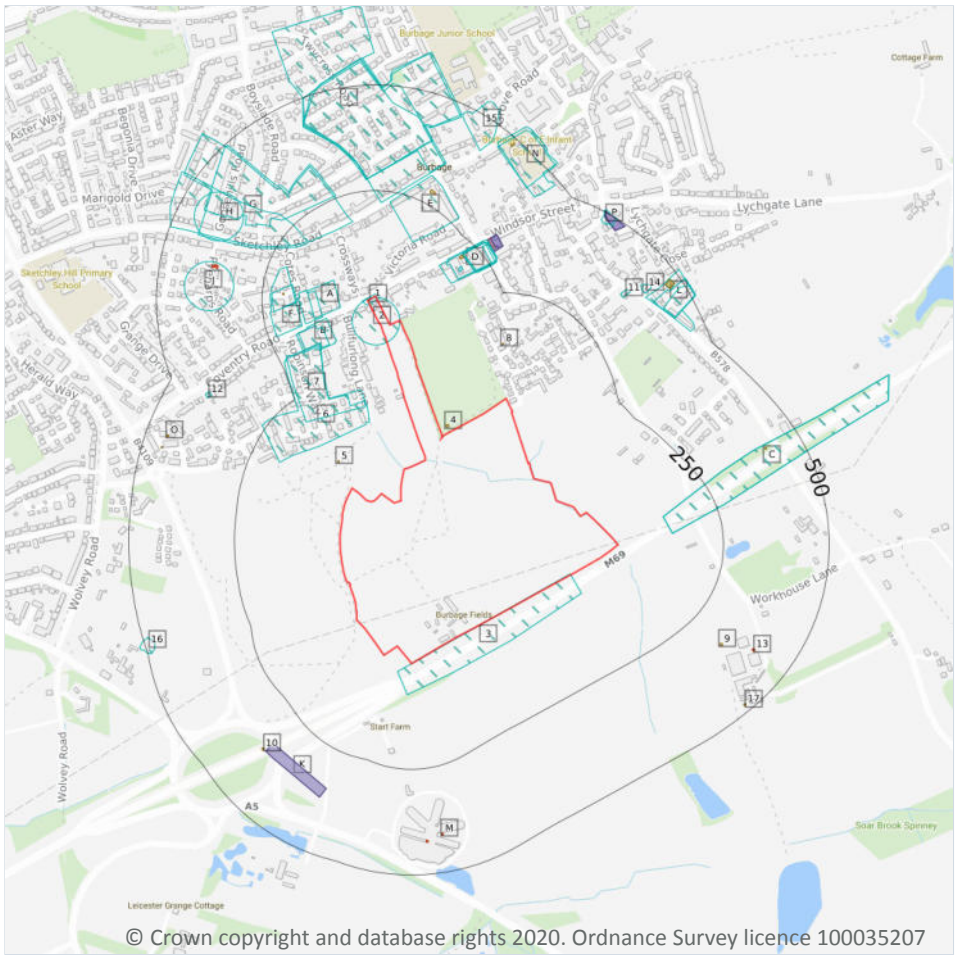


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Capture Date: 05/10/1999

Site Area: 23.63ha

1 Past land use



Site Outline

Search buffers in metres (m)

Historical industrial land uses

Historical tanks

Historical energy features

Historical garages

1.1 Historical industrial land uses

Records within 500m	41

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 1:10,560 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
1	**On site**	**Unspecified Pits**	**1886**	**1759681**

ID	Location	Land use	Dates present	Group ID
2	**On site**	**Unspecified Pit**	**1901**	**1777103**
3	**On site**	**Cuttings**	**1977 - 1983**	**1812863**
A	67m W	Unspecified Works	1977 - 1983	1783515
6	90m W	Nursery	1938 - 1950	1805548
7	94m W	Nursery	1968 - 1983	1814899
B	106m SW	Hosiery Manufactory	1938 - 1950	1834587
A	113m W	Unspecified Factory	1923	1765600
B	124m SW	Unspecified Works	1983	1771276
C	126m NE	Cuttings	1983	1781370
C	126m NE	Cuttings	1977	1804154
D	150m NE	Hosiery Manufactory	1950	1803551
E	156m NE	Nursery	1886	1772188
F	165m W	Unspecified Factory	1938 - 1950	1837346
D	170m NE	Hosiery Manufactory	1938	1849288
F	171m W	Unspecified Works	1983	1771274
G	182m NW	Nursery	1923	1849834
D	183m NE	Unspecified Tanks	1938 - 1950	1788640
H	202m NW	Nursery	1886	1820024
D	211m NE	Unspecified Works	1977 - 1983	1844341
D	213m NE	Hosiery Manufactory	1923	1799834
D	216m NE	Hosiery Manufactory	1901	1795815
I	222m N	Nursery	1901	1772191
G	255m NW	Nursery	1938 - 1950	1810730
I	277m N	Nurseries	1938 - 1950	1831637
I	278m N	Nurseries	1968	1810148
I	279m N	Nurseries	1923	1832508
J	319m W	Nursery	1901	1772187
H	346m NW	Nursery	1901	1814372

ID	Location	Land use	Dates present	Group ID
11	366m NE	Bus Depot	1977 - 1983	1804995
12	399m NW	Unspecified Tank	1968 - 1983	1805379
L	408m NE	Hosiery Manufactory	1950	1781488
14	411m NE	Unspecified Pit	1886	1777104
L	417m NE	Hosiery Manufactory	1923	1798302
15	424m NE	Nursery	1901	1772189
L	430m NE	Unspecified Works	1968 - 1983	1796502
N	433m NE	Nursery	1886 - 1901	1807443
N	435m NE	Nursery	1923	1811647
L	464m NE	Unspecified Tank	1977 - 1983	1788253
P	474m NE	Smithy	1886 - 1901	1794226
16	476m W	Unspecified Pit	1977 - 1983	1848735

This data is sourced from Ordnance Survey / Groundsure.

1.2 Historical tanks

Records within 500m	**19**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
4	12m NW	Unspecified Tank	1938	283226
5	68m NW	Unspecified Tank	1904 - 1918	301165
8	128m N	Unspecified Tank	1904 - 1918	293056
F	199m W	Unspecified Tank	1995	295403
F	199m W	Unspecified Tank	1995	297678
F	199m W	Unspecified Tank	1986	300250

ID	Location	Land use	Dates present	Group ID
D	204m NE	Tanks	1938	287096
E	277m NE	Tanks	1938	287095
9	337m SE	Unspecified Tank	1918	283236
10	359m SW	Unspecified Tank	1904	283237
C	416m NE	Unspecified Tank	1918	289787
C	416m NE	Unspecified Tank	1938	298296
O	447m W	Unspecified Tank	1938	294935
O	447m W	Unspecified Tank	1904 - 1918	300209
O	452m W	Unspecified Tank	1904 - 1918	288719
O	452m W	Unspecified Tank	1938	293016
L	462m NE	Unspecified Tank	1973 - 1990	293959
N	479m NE	Unspecified Tank	1925	283227
17	480m SE	Unspecified Tank	1963	283235

This data is sourced from Ordnance Survey / Groundsure.

1.3 Historical energy features

Records within 500m	**7**

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
D	278m NE	Electricity Substation	1990	175467
D	279m NE	Electricity Substation	1967 - 1997	185173
J	363m W	Electricity Substation	1972 - 1993	183315
J	365m W	Electricity Substation	1989	186953
13	402m SE	Electricity Substation	1986 - 1993	178488

ID	Location	Land use	Dates present	Group ID
M	408m S	Electricity Substation	1995	181507
M	419m S	Electricity Substation	1992 - 1995	182144

This data is sourced from Ordnance Survey / Groundsure.

1.4 Historical petrol stations

Records within 500m	**0**

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

1.5 Historical garages

Records within 500m	**11**

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale, intelligently grouped into contiguous features. To prevent misrepresentation of the size of historical features at any given time, features are only grouped if they have similar geometries within immediately preceding or succeeding map editions. See section 2 for a breakdown of grouping if required. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use map on **page 13**

ID	Location	Land use	Dates present	Group ID
D	277m NE	Garage	1990	55974
D	277m NE	Garage	1988	57337
D	286m NE	Garage	1997	55309
D	286m NE	Garage	1963 - 1987	59965
D	286m NE	Garage	1959 - 1973	59301
K	329m SW	Carriage Shed	1890	55621
K	329m SW	Carriage Shed	1904	55884
P	473m NE	Garage	1988	56517
P	474m NE	Garage	1990	55035

ID	Location	Land use	Dates present	Group ID
P	474m NE	Garage	1967 - 1973	59765
P	475m NE	Garage	1987 - 1997	58668

This data is sourced from Ordnance Survey / Groundsure.

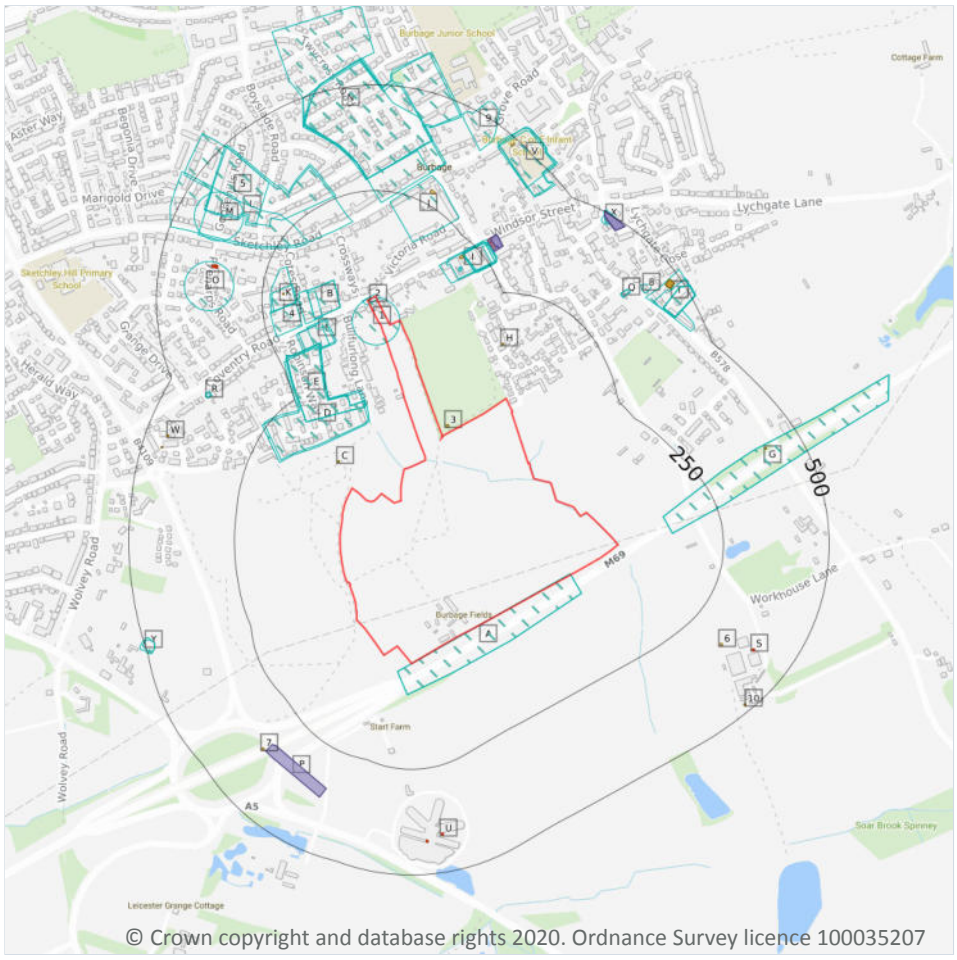
1.6 Historical military land

Records within 500m	0

Areas of military land digitised from multiple sources including the National Archives, local records, MOD records and verified other sources, intelligently grouped into contiguous features.

This data is sourced from Ordnance Survey / Groundsure / other sources.

2 Past land use - un-grouped



2.1 Historical industrial land uses

Records within 500m	61

Potentially contaminative land use features digitised from historical Ordnance Survey mapping at 1:10,000 and 10,560 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 19**

ID	Location	Land Use	Date	Group ID
1	**On site**	**Unspecified Pit**	**1901**	**1777103**
2	**On site**	**Unspecified Pits**	**1886**	**1759681**
A	**On site**	**Cuttings**	**1977**	**1812863**

ID	Location	Land Use	Date	Group ID
A	**On site**	**Cuttings**	**1983**	**1812863**
B	67m W	Unspecified Works	1977	1783515
B	67m W	Unspecified Works	1983	1783515
D	90m W	Nursery	1938	1805548
E	94m W	Nursery	1977	1814899
E	94m W	Nursery	1983	1814899
E	94m W	Nursery	1968	1814899
D	96m W	Nursery	1950	1805548
F	106m SW	Hosiery Manufactory	1938	1834587
F	111m SW	Hosiery Manufactory	1950	1834587
B	113m W	Unspecified Factory	1923	1765600
F	124m SW	Unspecified Works	1983	1771276
G	126m NE	Cuttings	1977	1804154
G	126m NE	Cuttings	1983	1781370
I	150m NE	Hosiery Manufactory	1950	1803551
J	156m NE	Nursery	1886	1772188
4	165m W	Unspecified Factory	1950	1837346
K	167m W	Unspecified Factory	1938	1837346
I	170m NE	Hosiery Manufactory	1938	1849288
K	171m W	Unspecified Works	1983	1771274
L	182m NW	Nursery	1923	1849834
I	183m NE	Unspecified Tanks	1950	1788640
I	188m NE	Unspecified Tanks	1938	1788640
M	202m NW	Nursery	1886	1820024
I	211m NE	Unspecified Works	1977	1844341
I	211m NE	Unspecified Works	1983	1844341
I	213m NE	Hosiery Manufactory	1923	1799834
I	216m NE	Hosiery Manufactory	1901	1795815

ID	Location	Land Use	Date	Group ID
N	222m N	Nursery	1901	1772191
L	255m NW	Nursery	1938	1810730
N	277m N	Nurseries	1950	1831637
N	278m N	Nurseries	1968	1810148
N	279m N	Nurseries	1938	1831637
N	279m N	Nurseries	1923	1832508
O	319m W	Nursery	1901	1772187
5	319m NW	Nursery	1950	1810730
M	346m NW	Nursery	1901	1814372
Q	366m NE	Bus Depot	1977	1804995
Q	366m NE	Bus Depot	1983	1804995
R	399m NW	Unspecified Tank	1977	1805379
R	399m NW	Unspecified Tank	1983	1805379
R	399m NW	Unspecified Tank	1968	1805379
T	408m NE	Hosiery Manufactory	1950	1781488
8	411m NE	Unspecified Pit	1886	1777104
T	417m NE	Hosiery Manufactory	1923	1798302
9	424m NE	Nursery	1901	1772189
T	430m NE	Unspecified Works	1977	1796502
T	430m NE	Unspecified Works	1983	1796502
T	430m NE	Unspecified Works	1968	1796502
V	433m NE	Nursery	1886	1807443
V	433m NE	Nursery	1901	1807443
V	435m NE	Nursery	1923	1811647
T	464m NE	Unspecified Tank	1977	1788253
T	464m NE	Unspecified Tank	1983	1788253
X	474m NE	Smithy	1886	1794226
Y	476m W	Unspecified Pit	1977	1848735

ID	Location	Land Use	Date	Group ID
Y	477m W	Unspecified Pit	1983	1848735
X	479m NE	Smithy	1901	1794226

This data is sourced from Ordnance Survey / Groundsure.

2.2 Historical tanks

Records within 500m	**27**

Tank features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 19**

ID	Location	Land Use	Date	Group ID
3	12m NW	Unspecified Tank	1938	283226
C	68m NW	Unspecified Tank	1904	301165
C	68m NW	Unspecified Tank	1918	301165
H	128m N	Unspecified Tank	1904	293056
H	128m N	Unspecified Tank	1918	293056
K	199m W	Unspecified Tank	1995	295403
K	199m W	Unspecified Tank	1995	297678
K	199m W	Unspecified Tank	1986	300250
K	199m W	Unspecified Tank	1986	300250
I	204m NE	Tanks	1938	287096
J	277m NE	Tanks	1938	287095
6	337m SE	Unspecified Tank	1918	283236
7	359m SW	Unspecified Tank	1904	283237
G	416m NE	Unspecified Tank	1918	289787
G	416m NE	Unspecified Tank	1938	298296
W	447m W	Unspecified Tank	1904	300209
W	447m W	Unspecified Tank	1918	300209
W	447m W	Unspecified Tank	1938	294935

ID	Location	Land Use	Date	Group ID
W	452m W	Unspecified Tank	1904	288719
W	452m W	Unspecified Tank	1918	288719
W	452m W	Unspecified Tank	1938	293016
T	462m NE	Unspecified Tank	1988	293959
T	463m NE	Unspecified Tank	1990	293959
T	463m NE	Unspecified Tank	1973	293959
T	464m NE	Unspecified Tank	1987	293959
V	479m NE	Unspecified Tank	1925	283227
10	480m SE	Unspecified Tank	1963	283235

This data is sourced from Ordnance Survey / Groundsure.

2.3 Historical energy features

Records within 500m	**18**

Energy features digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 19**

ID	Location	Land Use	Date	Group ID
I	278m NE	Electricity Substation	1990	175467
I	279m NE	Electricity Substation	1997	185173
I	282m NE	Electricity Substation	1988	185173
I	282m NE	Electricity Substation	1973	185173
I	282m NE	Electricity Substation	1987	185173
I	282m NE	Electricity Substation	1967	185173
O	363m W	Electricity Substation	1987	183315
O	363m W	Electricity Substation	1979	183315
O	363m W	Electricity Substation	1972	183315
O	364m W	Electricity Substation	1993	183315
O	365m W	Electricity Substation	1989	186953

ID	Location	Land Use	Date	Group ID
S	402m SE	Electricity Substation	1993	178488
S	405m SE	Electricity Substation	1986	178488
U	408m S	Electricity Substation	1995	181507
U	408m S	Electricity Substation	1995	181507
U	419m S	Electricity Substation	1995	182144
U	419m S	Electricity Substation	1995	182144
U	420m S	Electricity Substation	1992	182144

This data is sourced from Ordnance Survey / Groundsure.

2.4 Historical petrol stations

Records within 500m	0

Petrol stations digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

This data is sourced from Ordnance Survey / Groundsure.

2.5 Historical garages

Records within 500m	16

Garages digitised from historical Ordnance Survey mapping at high-detail 1:1,250 and 1:2,500 scale. Any records shown are available intelligently grouped in section 1. Grouped and the original un-grouped features can be cross-referenced across sections 1 and 2 using the 'Group ID'.

Features are displayed on the Past land use - un-grouped map on **page 19**

ID	Location	Land Use	Date	Group ID
I	277m NE	Garage	1990	55974
I	277m NE	Garage	1988	57337
I	286m NE	Garage	1997	55309
I	286m NE	Garage	1987	59965
I	286m NE	Garage	1963	59965
I	286m NE	Garage	1967	59301

ID	Location	Land Use	Date	Group ID
I	286m NE	Garage	1973	59301
I	286m NE	Garage	1959	59301
P	329m SW	Carriage Shed	1890	55621
P	329m SW	Carriage Shed	1904	55884
X	473m NE	Garage	1988	56517
X	474m NE	Garage	1990	55035
X	474m NE	Garage	1967	59765
X	474m NE	Garage	1973	59765
X	475m NE	Garage	1997	58668
X	475m NE	Garage	1987	58668

This data is sourced from Ordnance Survey / Groundsure.

3 Waste and landfill



Site Outline

Search buffers in metres (m)

Waste exemptions

3.1 Active or recent landfill

Records within 500m	0

Active or recently closed landfill sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.2 Historical landfill (BGS records)

Records within 500m	0

Landfill sites identified on a survey carried out on behalf of the DoE in 1973. These sites may have been closed or operational at this time.

This data is sourced from the British Geological Survey.

3.3 Historical landfill (LA/mapping records)

Records within 500m	0

Landfill sites identified from Local Authority records and high detail historical mapping.

This data is sourced from the Ordnance Survey/Groundsure and Local Authority records.

3.4 Historical landfill (EA/NRW records)

Records within 500m	0

Known historical (closed) landfill sites (e.g. sites where there is no PPC permit or waste management licence currently in force). This includes sites that existed before the waste licensing regime and sites that have been licensed in the past but where a licence has been revoked, ceased to exist or surrendered and a certificate of completion has been issued.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.5 Historical waste sites

Records within 500m	0

Waste site records derived from Local Authority planning records and high detail historical mapping.

This data is sourced from Ordnance Survey/Groundsure and Local Authority records.

3.6 Licensed waste sites

Records within 500m	0

Active or recently closed waste sites under Environment Agency/Natural Resources Wales regulation.

This data is sourced from the Environment Agency and Natural Resources Wales.

3.7 Waste exemptions

Records within 500m	24

Activities involving the storage, treatment, use or disposal of waste that are exempt from needing a permit. Exemptions have specific limits and conditions that must be adhered to.

Features are displayed on the Waste and landfill map on **page 26**

ID	Location	Site	Reference	Category	Sub-Category	Description
1	317m SE	-	WEX193743	Storing waste exemption	On a Farm	Storage of sludge

ID	Location	Site	Reference	Category	Sub-Category	Description
A	423m SE	Burbage House Farm Lutterworth Road HINCKLEY Leicestershire LE10 3AH	EPR/ZH0279HQ/A001	Using waste exemption	Agricultural Waste Only	Use of waste in construction
A	423m SE	Burbage House Farm Lutterworth Road HINCKLEY Leicestershire LE10 3AH	EPR/ZH0279HQ/A001	Using waste exemption	Agricultural Waste Only	Spreading waste on agricultural land to confer benefit
A	423m SE	Burbage House Farm Lutterworth Road HINCKLEY Leicestershire LE10 3AH	EPR/ZH0279HQ/A001	Using waste exemption	Agricultural Waste Only	Burning of waste as a fuel in a small appliance
A	423m SE	Burbage House Farm Lutterworth Road HINCKLEY Leicestershire LE10 3AH	EPR/ZH0279HQ/A001	Disposing of waste exemption	Non-Agricultural Waste Only	Deposit of waste from dredging of inland waters
A	423m SE	Burbage House Farm Lutterworth Road HINCKLEY Leicestershire LE10 3AH	EPR/ZH0279HQ/A001	Disposing of waste exemption	Non-Agricultural Waste Only	Burning waste in the open
A	423m SE	Burbage House Farm Lutterworth Road HINCKLEY Leicestershire LE10 3AH	EPR/ZH0279HQ/A001	Storing waste exemption	Non-Agricultural Waste Only	Storage of sludge
A	423m SE	Burbage House Farm Lutterworth Road HINCKLEY Leicestershire LE10 3AH	EPR/ZH0279HQ/A001	Treating waste exemption	Non-Agricultural Waste Only	Cleaning, washing, spraying or coating relevant waste
A	423m SE	Burbage House Farm Lutterworth Road HINCKLEY Leicestershire LE10 3AH	EPR/ZH0279HQ/A001	Using waste exemption	Non-Agricultural Waste Only	Use of waste for a specified purpose
B	436m SE	BURBAGE HOUSE FARM, LUTTERWORTH ROAD, HINCKLEY, LE10 3AH	WEX182062	Using waste exemption	On a farm	Burning of waste as a fuel in a small appliance
B	436m SE	BURBAGE HOUSE FARM, LUTTERWORTH ROAD, HINCKLEY, LE10 3AH	WEX182062	Disposing of waste exemption	On a farm	Deposit of waste from dredging of inland waters
B	436m SE	BURBAGE HOUSE FARM, LUTTERWORTH ROAD, HINCKLEY, LE10 3AH	WEX182062	Disposing of waste exemption	On a farm	Burning waste in the open

ID	Location	Site	Reference	Category	Sub-Category	Description
B	436m SE	BURBAGE HOUSE FARM, LUTTERWORTH ROAD, HINCKLEY, LE10 3AH	WEX182062	Treating waste exemption	On a farm	Cleaning, washing, spraying or coating relevant waste
B	436m SE	BURBAGE HOUSE FARM, LUTTERWORTH ROAD, HINCKLEY, LE10 3AH	WEX182062	Storing waste exemption	On a farm	Storage of sludge
B	436m SE	BURBAGE HOUSE FARM, LUTTERWORTH ROAD, HINCKLEY, LE10 3AH	WEX182062	Using waste exemption	On a farm	Spreading waste on agricultural land to confer benefit
B	436m SE	BURBAGE HOUSE FARM, LUTTERWORTH ROAD, HINCKLEY, LE10 3AH	WEX182062	Using waste exemption	On a farm	Use of waste in construction
B	436m SE	BURBAGE HOUSE FARM, LUTTERWORTH ROAD, HINCKLEY, LE10 3AH	WEX020598	Disposing of waste exemption	On a farm	Deposit of waste from dredging of inland waters
B	436m SE	BURBAGE HOUSE FARM, LUTTERWORTH ROAD, HINCKLEY, LE10 3AH	WEX020598	Disposing of waste exemption	On a farm	Burning waste in the open
B	436m SE	BURBAGE HOUSE FARM, LUTTERWORTH ROAD, HINCKLEY, LE10 3AH	WEX020598	Storing waste exemption	On a farm	Storage of sludge
B	436m SE	BURBAGE HOUSE FARM, LUTTERWORTH ROAD, HINCKLEY, LE10 3AH	WEX020598	Treating waste exemption	On a farm	Cleaning, washing, spraying or coating relevant waste
B	436m SE	BURBAGE HOUSE FARM, LUTTERWORTH ROAD, HINCKLEY, LE10 3AH	WEX020598	Using waste exemption	On a farm	Use of waste in construction
B	436m SE	BURBAGE HOUSE FARM, LUTTERWORTH ROAD, HINCKLEY, LE10 3AH	WEX020598	Using waste exemption	On a farm	Spreading waste on agricultural land to confer benefit
B	436m SE	BURBAGE HOUSE FARM, LUTTERWORTH ROAD, HINCKLEY, LE10 3AH	WEX020598	Using waste exemption	On a farm	Burning of waste as a fuel in a small appliance
2	486m NW	MERRIFIELD HOUSE, MERRIFIELD GARDENS, BURBAGE, HINCKLEY, LE10 2TE	WEX086324	Disposing of waste exemption	Not on a farm	Burning waste in the open

This data is sourced from the Environment Agency and Natural Resources Wales.

4 Current industrial land use



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Site Outline

Search buffers in metres (m)

Recent industrial land uses

Licensed Discharges to controlled waters

4.1 Recent industrial land uses

Records within 250m	10

Current potentially contaminative industrial sites.

Features are displayed on the Current industrial land use map on **page 30**

ID	Location	Company	Address	Activity	Category
1	**On site**	**Pylon**	**Leicestershire, LE10**	**Electrical Features**	**Infrastructure and Facilities**
2	**On site**	**Silo**	**Leicestershire, LE10**	**Hoppers and Silos**	**Farming**
3	**On site**	**Pylon**	**Leicestershire, LE10**	**Electrical Features**	**Infrastructure and Facilities**

ID	Location	Company	Address	Activity	Category
4	68m S	Mast	Leicestershire, LE10	Telecommunications Features	Infrastructure and Facilities
5	89m NE	Service Commemoratives	30, Coventry Road, Burbage, Hinckley, Leicestershire, LE10 2HP	Medals, Trophies, Ceremonial and Religious Goods	Consumer Products
6	153m W	Electricity Sub Station	Leicestershire, LE10	Electrical Features	Infrastructure and Facilities
7	174m NE	Business Centre	Leicestershire, LE10	Business Parks and Industrial Estates	Industrial Features
8	225m W	Pylon	Leicestershire, LE10	Electrical Features	Infrastructure and Facilities
B	233m NE	Weblark Engineering Ltd	Britannia Buildings, Coventry Road, Burbage, Hinckley, Leicestershire, LE10 2HL	Aviation Engineers	Engineering Services
B	233m NE	Burbage Photo Centre	Ground Floor Britannia Buildings, Coventry Road, Burbage, Hinckley, Leicestershire, LE10 2HL	Published Goods	Industrial Products

This data is sourced from Ordnance Survey.

4.2 Current or recent petrol stations

Records within 500m	0

Open, closed, under development and obsolete petrol stations.

This data is sourced from Experian.

4.3 Electricity cables

Records within 500m	0

High voltage underground electricity transmission cables.

This data is sourced from National Grid.

4.4 Gas pipelines

Records within 500m	0

High pressure underground gas transmission pipelines.

This data is sourced from National Grid.

4.5 Sites determined as Contaminated Land

Records within 500m	0

Contaminated Land Register of sites designated under Part 2a of the Environmental Protection Act 1990.

This data is sourced from Local Authority records.

4.6 Control of Major Accident Hazards (COMAH)

Records within 500m	0

Control of Major Accident Hazards (COMAH) sites. This data includes upper and lower tier sites, and includes a historical archive of COMAH sites and Notification of Installations Handling Hazardous Substances (NIHHS) records.

This data is sourced from the Health and Safety Executive.

4.7 Regulated explosive sites

Records within 500m	0

Sites registered and licensed by the Health and Safety Executive under the Manufacture and Storage of Explosives Regulations 2005 (MSER). The last update to this data was in April 2011.

This data is sourced from the Health and Safety Executive.

4.8 Hazardous substance storage/usage

Records within 500m	0

Consents granted for a site to hold certain quantities of hazardous substances at or above defined limits in accordance with the Planning (Hazardous Substances) Regulations 2015.

This data is sourced from Local Authority records.

4.9 Historical licensed industrial activities (IPC)

Records within 500m	0

Integrated Pollution Control (IPC) records of substance releases to air, land and water. This data represents a historical archive as the IPC regime has been superseded.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.10 Licensed industrial activities (Part A(1))

Records within 500m	0

Records of Part A(1) installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.11 Licensed pollutant release (Part A(2)/B)

Records within 500m	0

Records of Part A(2) and Part B installations regulated under the Environmental Permitting (England and Wales) Regulations 2016 for the release of substances to the environment.

This data is sourced from Local Authority records.

4.12 Radioactive Substance Authorisations

Records within 500m	0

Records of the storage, use, accumulation and disposal of radioactive substances regulated under the Radioactive Substances Act 1993.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.13 Licensed Discharges to controlled waters

Records within 500m	3

Discharges of treated or untreated effluent to controlled waters under the Water Resources Act 1991.

Features are displayed on the Current industrial land use map on **page 30**

ID	Location	Address	Details	
A	86m W	BULLFURLONG LANE CSO, BULLFURLONG LANE, BURBAGE, HINCKLEY, LEICESTERSHIRE, LE10 2HQ	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: T/50/45424/O Permit Version: 2 Receiving Water: TRIBUTARY OF SOAR BROOK	Status: VARIED UNDER EPR 2010 Issue date: 21/11/2017 Effective Date: 21/11/2017 Revocation Date: 30/03/2018

ID	Location	Address	Details	
A	86m W	BULLFURLONG LANE CSO, BULLFURLONG LANE, BURBAGE, HINCKLEY, LEICESTERSHIRE, LE10 2HQ	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: T/50/45424/O Permit Version: 3 Receiving Water: TRIBUTARY OF SOAR BROOK	Status: VARIED UNDER EPR 2010 Issue date: 21/11/2017 Effective Date: 31/03/2018 Revocation Date: -
A	97m W	BULLFURLONG LANE CSO, BULLFURLONG LANE, BURBAGE, HINCKLEY, LEICESTERSHIRE, LE10 2HQ	Effluent Type: SEWAGE DISCHARGES - SEWER STORM OVERFLOW - WATER COMPANY Permit Number: T/50/45424/O Permit Version: 1 Receiving Water: TRIB OF RIVER SOAR	Status: NEW CONSENT (WRA 91, S88 & SCHED 10 AS AMENDED BY ENV ACT 1995) Issue date: 10/01/2001 Effective Date: 10/01/2001 Revocation Date: 20/11/2017

This data is sourced from the Environment Agency and Natural Resources Wales.

4.14 Pollutant release to surface waters (Red List)

Records within 500m	**0**

Discharges of specified substances under the Environmental Protection (Prescribed Processes and Substances) Regulations 1991.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.15 Pollutant release to public sewer

Records within 500m	**0**

Discharges of Special Category Effluents to the public sewer.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.16 List 1 Dangerous Substances

Records within 500m	**0**

Discharges of substances identified on List I of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.17 List 2 Dangerous Substances

Records within 500m	0

Discharges of substances identified on List II of European Directive E 2006/11/EC, and regulated under the Environmental Damage (Prevention and Remediation) Regulations 2015.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.18 Pollution Incidents (EA/NRW)

Records within 500m	0

Records of substantiated pollution incidents. Since 2006 this data has only included category 1 (major) and 2 (significant) pollution incidents.

This data is sourced from the Environment Agency and Natural Resources Wales.

4.19 Pollution inventory substances

Records within 500m	0

The pollution inventory (substances) includes reporting on annual emissions of certain regulated substances to air, controlled waters and land. A reporting threshold for each substance is also included. Where emissions fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

4.20 Pollution inventory waste transfers

Records within 500m	0

The pollution inventory (waste transfers) includes reporting on annual transfers and recovery/disposal of controlled wastes from a site. A reporting threshold for each waste type is also included. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

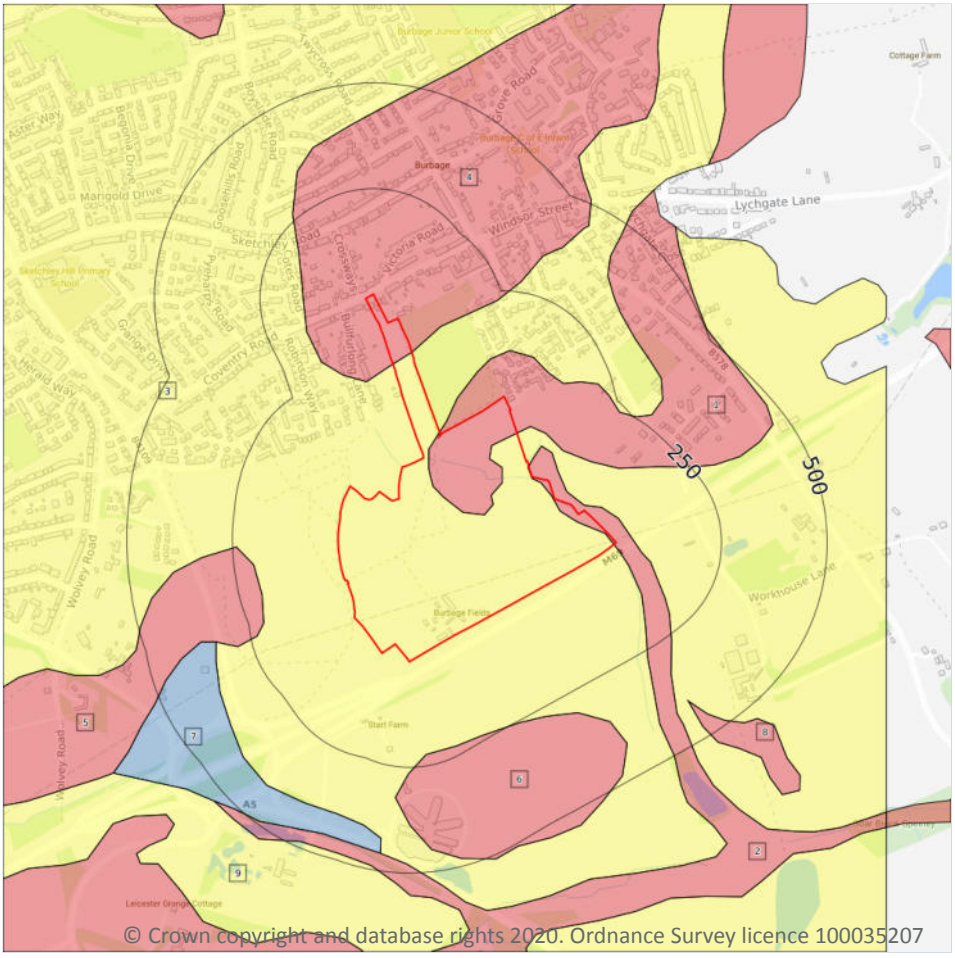
4.21 Pollution inventory radioactive waste

Records within 500m	0

The pollution inventory (radioactive wastes) includes reporting on annual releases of radioactive substances from a site, including the means of release. Where releases fall below the reporting threshold, no value will be given. The data is given for the most recent complete year available.

This data is sourced from the Environment Agency and the Scottish Environment Protection Agency.

5 Hydrogeology - Superficial aquifer



5.1 Superficial aquifer

Records within 500m	9

Aquifer status of groundwater held within superficial geology.

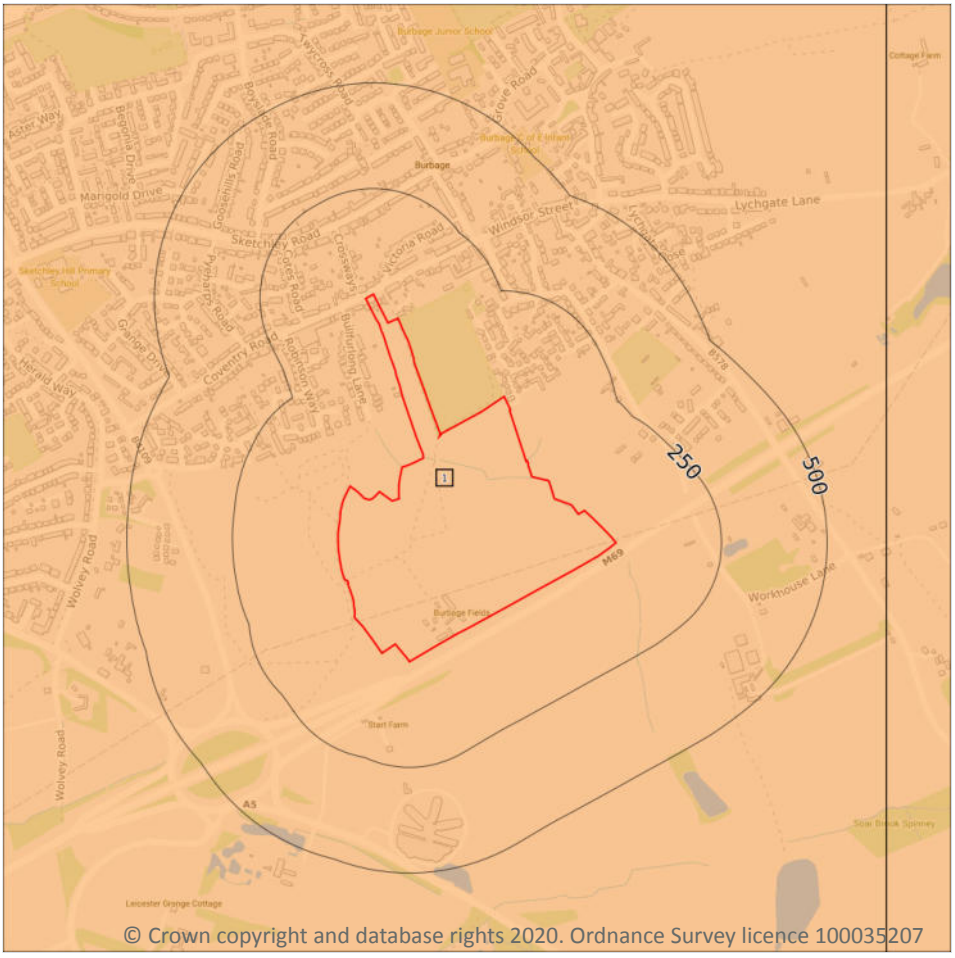
Features are displayed on the Hydrogeology map on **page 36**

ID	Location	Designation	Description
1	On site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
2	On site	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers

ID	Location	Designation	Description
3	**On site**	**Secondary Undifferentiated**	**Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type**
4	**On site**	**Secondary A**	**Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers**
5	197m W	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
6	222m S	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
7	333m W	Unproductive	These are rock layers or drift deposits with low permeability that have negligible significance for water supply or river base flow
8	403m SE	Secondary A	Permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers. These are generally aquifers formerly classified as minor aquifers
9	483m S	Secondary Undifferentiated	Assigned where it is not possible to attribute either category A or B to a rock type. In general these layers have previously been designated as both minor and non-aquifer in different locations due to the variable characteristics of the rock type

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Bedrock aquifer



Site Outline

Search buffers in metres (m)

- Principal
- Secondary A
- Secondary B
- Secondary Undifferentiated
- Unproductive

5.2 Bedrock aquifer

Records within 500m	1

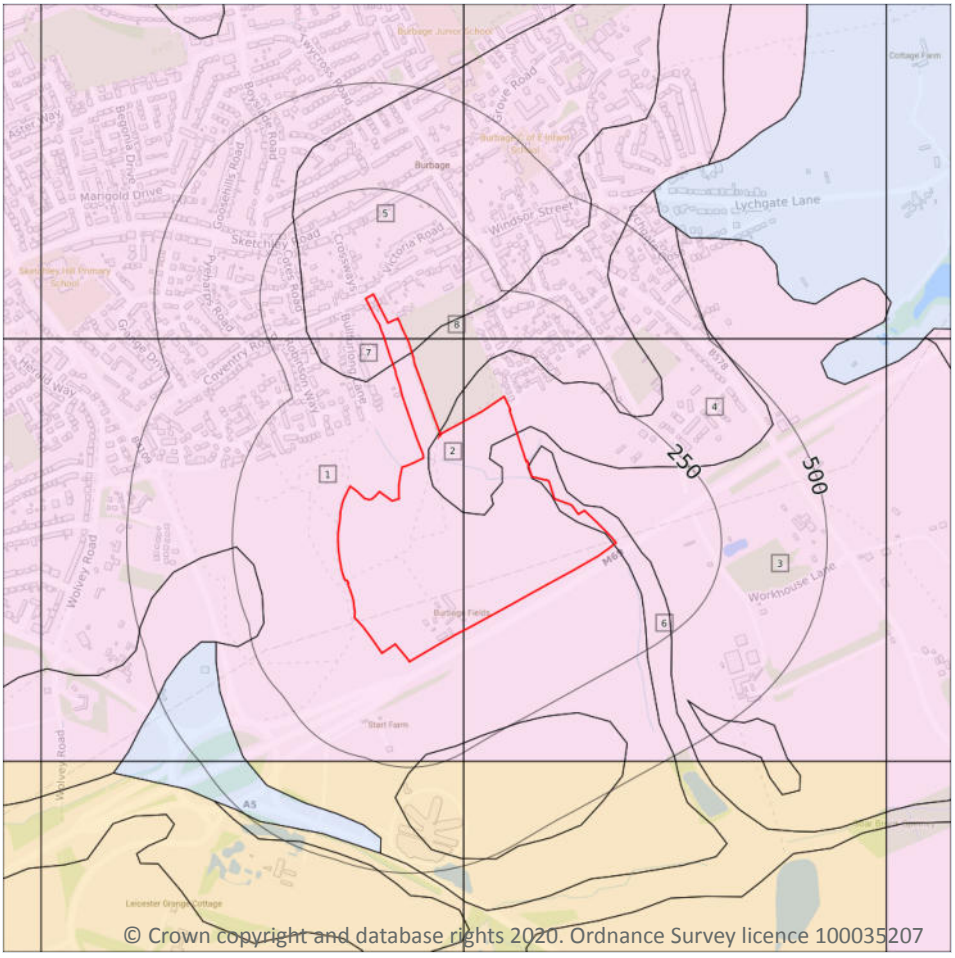
Aquifer status of groundwater held within bedrock geology.

Features are displayed on the Bedrock aquifer map on **page 38**

ID	Location	Designation	Description
1	On site	Secondary B	Predominantly lower permeability layers which may store/yield limited amounts of groundwater due to localised features such as fissures, thin permeablehorizons and weathering. These are generally the water-bearing parts of the former non-aquifers

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

Groundwater vulnerability



Site Outline

Search buffers in metres (m)

Superficial vulnerability
- Principal superficial aquifer, high vulnerability
- Secondary superficial aquifer, high vulnerability
- Principal superficial aquifer, medium vulnerability
- Secondary superficial aquifer, medium vulnerability
- Principal superficial aquifer, low vulnerability
- Secondary superficial aquifer, low vulnerability

Bedrock vulnerability
- Principal bedrock aquifer, high vulnerability
- Secondary bedrock aquifer, high vulnerability
- Principal bedrock aquifer, medium vulnerability
- Secondary bedrock aquifer, medium vulnerability
- Principal bedrock aquifer, low vulnerability
- Secondary bedrock aquifer, low vulnerability

Other information
- Unproductive aquifer
- Soluble rock risk
- Local information

5.3 Groundwater vulnerability

Records within 50m	8

An assessment of the vulnerability of groundwater to a pollutant discharged at ground level based on the hydrological, geological, hydrogeological and soil properties within a one kilometre square grid. Groundwater vulnerability is described as High, Medium or Low as follows:

- High - Areas able to easily transmit pollution to groundwater. They are likely to be characterised by high leaching soils and the absence of low permeability superficial deposits.
- Medium - Intermediate between high and low vulnerability.
- Low - Areas that provide the greatest protection from pollution. They are likely to be characterised by low leaching soils and/or the presence of superficial deposits characterised by a low permeability.

Features are displayed on the Groundwater vulnerability map on **page 39**

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
1	On site	Summary Classification: Secondary superficial aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Intermediate Infiltration value: 40-70% Dilution value: <300mm/year	Vulnerability: Medium Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: High	Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures
2	On site	Summary Classification: Secondary superficial aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Intermediate Infiltration value: 40-70% Dilution value: <300mm/year	Vulnerability: Medium Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: High	Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures
3	On site	Summary Classification: Secondary superficial aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Intermediate Infiltration value: 40-70% Dilution value: <300mm/year	Vulnerability: Medium Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: High	Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures
4	On site	Summary Classification: Secondary superficial aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Intermediate Infiltration value: 40-70% Dilution value: <300mm/year	Vulnerability: Medium Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: High	Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures
5	On site	Summary Classification: Secondary superficial aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Intermediate Infiltration value: 40-70% Dilution value: <300mm/year	Vulnerability: Medium Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: High	Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures

ID	Location	Summary	Soil / surface	Superficial geology	Bedrock geology
6	**On site**	**Summary Classification: Secondary superficial aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer**	**Leaching class: Intermediate Infiltration value: 40-70% Dilution value: <300mm/year**	**Vulnerability: Medium Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: High**	**Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures**
7	**On site**	**Summary Classification: Secondary superficial aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer**	**Leaching class: Intermediate Infiltration value: 40-70% Dilution value: <300mm/year**	**Vulnerability: Medium Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: High**	**Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures**
8	44m E	Summary Classification: Secondary superficial aquifer - Medium Vulnerability Combined classification: Productive Bedrock Aquifer, Productive Superficial Aquifer	Leaching class: Intermediate Infiltration value: 40-70% Dilution value: <300mm/year	Vulnerability: Medium Aquifer type: Secondary Thickness: >10m Patchiness value: >90% Recharge potential: High	Vulnerability: Low Aquifer type: Secondary Flow mechanism: Well connected fractures

This data is sourced from the British Geological Survey, the Environment Agency and Natural Resources Wales.

5.4 Groundwater vulnerability- soluble rock risk

Records on site	**0**

This dataset identifies areas where solution features that enable rapid movement of a pollutant may be present within a 1km grid square.

This data is sourced from the British Geological Survey and the Environment Agency.

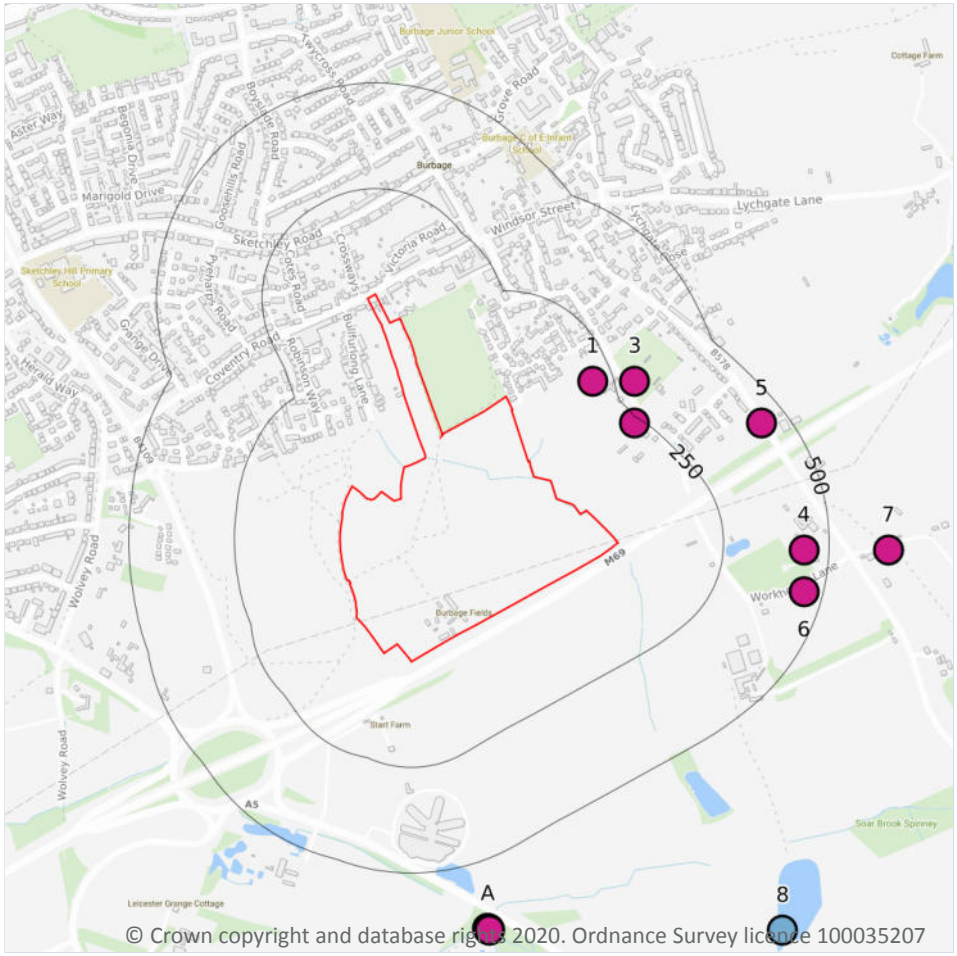
5.5 Groundwater vulnerability- local information

Records on site	**0**

This dataset identifies areas where additional local information affecting vulnerability is held by the Environment Agency. Further information can be obtained by contacting the Environment Agency local Area groundwater team through the Environment Agency National Customer Call Centre on 03798 506 506 or by email on enquiries@environment-agency.gov.uk.

This data is sourced from the British Geological Survey and the Environment Agency.

Abstractions and Source Protection Zones



Site Outline

Search buffers in metres (m)

- Source Protection Zone 1 — Inner catchment
- Source Protection Zone 2 — Outer catchment
- Source Protection Zone 3 — Total catchment
- Source Protection Zone 4 — Zone of Special Interest
- Source Protection Zone 1c — Inner catchment - confined aquifer
- Source Protection Zone 2c — Outer catchment - confined aquifer
- Source Protection Zone 3c — Total catchment - confined aquifer
- Drinking water abstraction licences
- Drinking water abstraction licences — Polygon features
- Drinking water abstraction licences — Linear features
- Groundwater abstraction licence (point)
- Groundwater abstraction licence (area)
- Groundwater abstraction licence (linear)
- Surface Water Abstractions (point)
- Surface Water Abstractions (area)
- Surface Water Abstractions (linear)

5.6 Groundwater abstractions

Records within 2000m	12

Licensed groundwater abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, between two points (line data) or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 42**

ID	Location	Details	
1	201m E	Status: Historical Licence No: 03/28/50/0120 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: 88 LUTTERWORTH ROAD - WELL (1) Data Type: Point Name: JUDKINS Easting: 444300 Northing: 291900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 04/07/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date: -
2	236m NE	Status: Historical Licence No: 03/28/50/0120 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: 88 LUTTERWORTH ROAD - WELL (2) Data Type: Point Name: JUDKINS Easting: 444400 Northing: 291800	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 04/07/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date: -
3	297m E	Status: Historical Licence No: 03/28/50/0120 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: 88 LUTTERWORTH ROAD - WELL (3) Data Type: Point Name: JUDKINS Easting: 444400 Northing: 291900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 04/07/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date: -
4	440m E	Status: Historical Licence No: 03/28/50/0119 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: GREENLEA FARM - BOREHOLE Data Type: Point Name: PK & J PATERSON Easting: 444800 Northing: 291500	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 23/11/1965 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date: -
5	442m NE	Status: Historical Licence No: 03/28/50/0058 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: DEEPDALE FARM - WELL (1) Data Type: Point Name: MOORE Easting: 444700 Northing: 291800	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date: -

ID	Location	Details	
6	455m E	Status: Historical Licence No: 03/28/50/0119 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: GREENLEA FARM - WELL Data Type: Point Name: PK & J PATERSON Easting: 444800 Northing: 291400	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 23/11/1965 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date: -
7	640m E	Status: Historical Licence No: 03/28/50/0058 Details: General Farming & Domestic Direct Source: Groundwater Midlands Region Point: DEEPDALE FARM - WELL (2) Data Type: Point Name: MOORE Easting: 445000 Northing: 291500	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 20/01/1966 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date: -
A	656m S	Status: Active Licence No: MD/028/0050/003 Details: Spray Irrigation - Storage Direct Source: Groundwater Midlands Region Point: WELLPOINT 4 AT COPSTON LODGE FARM, WOLVEY Data Type: Point Name: P A Wright & Sons Limited Easting: 444052 Northing: 290604	Annual Volume (m^3): 34,560 Max Daily Volume (m^3): 192 Original Application No: - Original Start Date: 22/05/2012 Expiry Date: 31/03/2025 Issue No: 1 Version Start Date: 03/12/2018 Version End Date: -
A	658m S	Status: Active Licence No: MD/028/0050/003 Details: Spray Irrigation - Storage Direct Source: Groundwater Midlands Region Point: WELLPOINT 3 AT COPSTON LODGE FARM, WOLVEY Data Type: Point Name: P A Wright & Sons Limited Easting: 444053 Northing: 290603	Annual Volume (m^3): 34,560 Max Daily Volume (m^3): 192 Original Application No: - Original Start Date: 22/05/2012 Expiry Date: 31/03/2025 Issue No: 1 Version Start Date: 03/12/2018 Version End Date: -
A	659m S	Status: Active Licence No: MD/028/0050/003 Details: Spray Irrigation - Storage Direct Source: Groundwater Midlands Region Point: WELLPOINT 2 AT COPSTON LODGE FARM, WOLVEY Data Type: Point Name: P A Wright & Sons Limited Easting: 444055 Northing: 290602	Annual Volume (m^3): 34,560 Max Daily Volume (m^3): 192 Original Application No: - Original Start Date: 22/05/2012 Expiry Date: 31/03/2025 Issue No: 1 Version Start Date: 03/12/2018 Version End Date: -

ID	Location	Details	
A	661m S	Status: Active Licence No: MD/028/0050/003 Details: Spray Irrigation - Storage Direct Source: Groundwater Midlands Region Point: WELLPOINT 1 AT COPSTON LODGE FARM, WOLVEY Data Type: Point Name: P A Wright & Sons Limited Easting: 444057 Northing: 290601	Annual Volume (m^3): 34,560 Max Daily Volume (m^3): 192 Original Application No: - Original Start Date: 22/05/2012 Expiry Date: 31/03/2025 Issue No: 1 Version Start Date: 03/12/2018 Version End Date: -
-	1902m SE	Status: Historical Licence No: 03/28/50/0127 Details: General use relating to Secondary Category (Medium Loss) Direct Source: Groundwater Midlands Region Point: RED LION FARM Data Type: Point Name: HUNT BROS LTD Easting: 445370 Northing: 289900	Annual Volume (m^3): - Max Daily Volume (m^3): - Original Application No: - Original Start Date: 28/10/1987 Expiry Date: - Issue No: 100 Version Start Date: 01/04/2000 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.7 Surface water abstractions

Records within 2000m **3**

Licensed surface water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

Features are displayed on the Abstractions and Source Protection Zones map on **page 42**

ID	Location	Details	
8	983m SE	Status: Active Licence No: 03/28/50/0128 Details: Spray Irrigation - Storage Direct Source: Surface Water Midlands Region Point: BURBAGE HOUSE FARM - TRIB OF SOAR BROOK Data Type: Point Name: BURBAGE FARMS Easting: 444750 Northing: 290600	Annual Volume (m^3): 45,461 Max Daily Volume (m^3): 1,559 Original Application No: - Original Start Date: 09/01/1989 Expiry Date: - Issue No: 100 Version Start Date: 03/12/2018 Version End Date: -

ID	Location	Details	
-	1428m NW	Status: Historical Licence No: 03/28/19/0043 Details: Process Water Direct Source: Surface Water Midlands Region Point: RICHARD ROBERTS HOLDINGS LTD - TRIB OF SKETCHLEY BROOK Data Type: Point Name: RICHARD ROBERTS HOLDINGS LTD Easting: 443000 Northing: 293300	Annual Volume (m^3): 83105.4 Max Daily Volume (m^3): 280.94 Original Application No: - Original Start Date: 10/02/1966 Expiry Date: - Issue No: 100 Version Start Date: 24/10/1978 Version End Date: -
-	1618m NW	Status: Historical Licence No: 03/28/19/0042 Details: Laundry Use Direct Source: Surface Water Midlands Region Point: SKETCHLEY LTD - SKETCHLEY BROOK Data Type: Point Name: JOHNSON TEXTILE SERVICES LTD Easting: 442500 Northing: 293100	Annual Volume (m^3): 772820 Max Daily Volume (m^3): 10910.4 Original Application No: - Original Start Date: 02/02/1971 Expiry Date: - Issue No: 101 Version Start Date: 22/06/2000 Version End Date: -

This data is sourced from the Environment Agency and Natural Resources Wales.

5.8 Potable abstractions

Records within 2000m	0

Licensed potable water abstractions for sites extracting more than 20 cubic metres of water a day and includes active and historical records. The data may be for a single abstraction point, a stretch of watercourse or a larger area.

This data is sourced from the Environment Agency and Natural Resources Wales.

5.9 Source Protection Zones

Records within 500m	0

Source Protection Zones define the sensitivity of an area around a potable abstraction site to contamination.

This data is sourced from the Environment Agency and Natural Resources Wales.

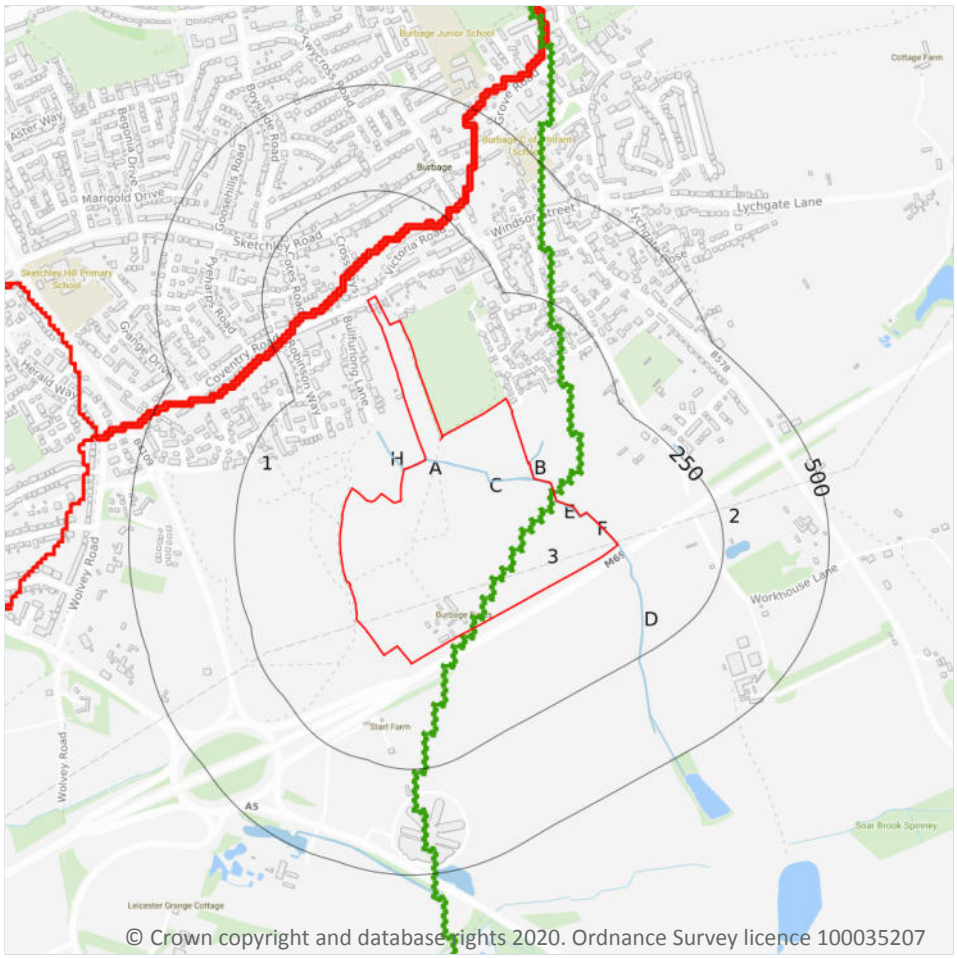
5.10 Source Protection Zones (confined aquifer)

Records within 500m	0

Source Protection Zones in the confined aquifer define the sensitivity around a deep groundwater abstraction to contamination. A confined aquifer would normally be protected from contamination by overlying geology and is only considered a sensitive resource if deep excavation/drilling is taking place.

This data is sourced from the Environment Agency and Natural Resources Wales.

6 Hydrology



Site Outline

Search buffers in metres (m)

Water Network (OS MasterMap)

Surface water features (wider than 5m)

Surface water features (narrower than 5m)

WFD River, canal and surface water transfer water bodies

WFD Lake water bodies

WFD Transitional and coastal water bodies

WFD Surface water body catchments boundaries

WFD Groundwater body boundaries

6.1 Water Network (OS MasterMap)

Records within 250m	14

Detailed water network of Great Britain showing the flow and precise central course of every river, stream, lake and canal.

Features are displayed on the Hydrology map on **page 48**

ID	Location	Type of water feature	Ground level	Permanence	Name
A	**On site**	**Lake, loch or reservoir.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**

ID	Location	Type of water feature	Ground level	Permanence	Name
A	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
A	**On site**	**Lake, loch or reservoir.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
A	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
A	**On site**	**Lake, loch or reservoir.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
B	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
C	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
D	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
E	**On site**	**Inland river not influenced by normal tidal action.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
A	**On site**	**Lake, loch or reservoir.**	**On ground surface**	**Watercourse contains water year round (in normal circumstances)**	**-**
F	**On site**	**Inland river not influenced by normal tidal action.**	**Underground**	**Watercourse contains water year round (in normal circumstances)**	**-**
A	3m W	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
A	3m W	Lake, loch or reservoir.	On ground surface	Watercourse contains water year round (in normal circumstances)	-
H	5m NW	Inland river not influenced by normal tidal action.	On ground surface	Watercourse contains water year round (in normal circumstances)	-

This data is sourced from the Ordnance Survey.

6.2 Surface water features

Records within 250m	5

Covering rivers, streams and lakes (some overlap with OS MasterMap Water Network data in previous section) but additionally covers smaller features such as ponds. Rivers and streams narrower than 5m are represented as a single line. Lakes, ponds and rivers or streams wider than 5m are represented as polygons.

Features are displayed on the Hydrology map on **page 48**

This data is sourced from the Ordnance Survey.

6.3 WFD Surface water body catchments

Records on site	1

The Water Framework Directive is an EU-led framework for the protection of inland surface waters, estuaries, coastal waters and groundwater through river basin-level management planning. In terms of surface water, these basins are broken down into smaller units known as management, operational and water body catchments.

Features are displayed on the Hydrology map on **page 48**

ID	Location	Type	Water body catchment	Water body ID	Operational catchment	Management catchment
3	**On site**	**River WB catchment**	**Soar Brook from Source to Soar**	**GB104028042590**	**Soar River**	**Soar**

This data is sourced from the Environment Agency and Natural Resources Wales.

6.4 WFD Surface water bodies

Records identified	1

Surface water bodies under the Directive may be rivers, lakes, estuary or coastal. To achieve the purpose of the Directive, environmental objectives have been set and are reported on for each water body. The progress towards delivery of the objectives is then reported on by the relevant competent authorities at the end of each six-year cycle. The river water body directly associated with the catchment listed in the previous section is detailed below, along with any lake, canal, coastal or artificial water body within 250m of the site. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each water body listed.

Features are displayed on the Hydrology map on **page 48**

ID	Location	Type	Name	Water body ID	Overall rating	Chemical rating	Ecological rating	Year
-	1448m NE	River	Soar Brook from Source to Soar	GB104028042590	Poor	Good	Poor	2016

This data is sourced from the Environment Agency and Natural Resources Wales.

6.5 WFD Groundwater bodies

Records on site	2

Groundwater bodies are also covered by the Directive and the same regime of objectives and reporting detailed in the previous section is in place. Click on the water body ID in the table to visit the EA Catchment Explorer to find out more about each groundwater body listed.

Features are displayed on the Hydrology map on **page 48**

ID	Location	Name	Water body ID	Overall rating	Chemical rating	Quantitative	Year
1	**On site**	**Tame Anker Mease - Secondary Combined**	**GB40402G990800**	**Good**	**Good**	**Good**	**2015**
2	**On site**	**Soar - Secondary Combined**	**GB40402G990600**	**Good**	**Good**	**Good**	**2015**

This data is sourced from the Environment Agency and Natural Resources Wales.

7 River and coastal flooding

7.1 Risk of Flooding from Rivers and Sea (RoFRaS)

Records within 50m	0

The chance of flooding from rivers and/or the sea in any given year, based on cells of 50m. Each cell is allocated one of four flood risk categories, taking into account flood defences and their condition; Very low (less than 1 in 1000 chance in any given year), Low (less than 1 in 100 but greater than or equal to 1 in 1000 chance), Medium (less than 1 in 30 but greater than or equal to 1 in 100 chance) or High (greater than or equal to 1 in 30 chance).

This data is sourced from the Environment Agency and Natural Resources Wales.

7.2 Historical Flood Events

Records within 250m	0

Records of historic flooding from rivers, the sea, groundwater and surface water. Records began in 1946 when predecessor bodies started collecting detailed information about flooding incidents, although limited details may be included on flooding incidents prior to this date. Takes into account the presence of defences, structures, and other infrastructure where they existed at the time of flooding, and includes flood extents that may have been affected by overtopping, breaches or blockages.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.3 Flood Defences

Records within 250m	0

Records of flood defences owned, managed or inspected by the Environment Agency and Natural Resources Wales. Flood defences can be structures, buildings or parts of buildings. Typically these are earth banks, stone and concrete walls, or sheet-piling that is used to prevent or control the extent of flooding.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.4 Areas Benefiting from Flood Defences

Records within 250m	0

Areas that would benefit from the presence of flood defences in a 1 in 100 (1%) chance of flooding each year from rivers or 1 in 200 (0.5%) chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

7.5 Flood Storage Areas

Records within 250m	0

Areas that act as a balancing reservoir, storage basin or balancing pond to attenuate an incoming flood peak to a flow level that can be accepted by the downstream channel or to delay the timing of a flood peak so that its volume is discharged over a longer period.

This data is sourced from the Environment Agency and Natural Resources Wales.

River and coastal flooding - Flood Zones

7.6 Flood Zone 2

Records within 50m	0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land between Flood Zone 3 (see next section) and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year.

This data is sourced from the Environment Agency and Natural Resources Wales.

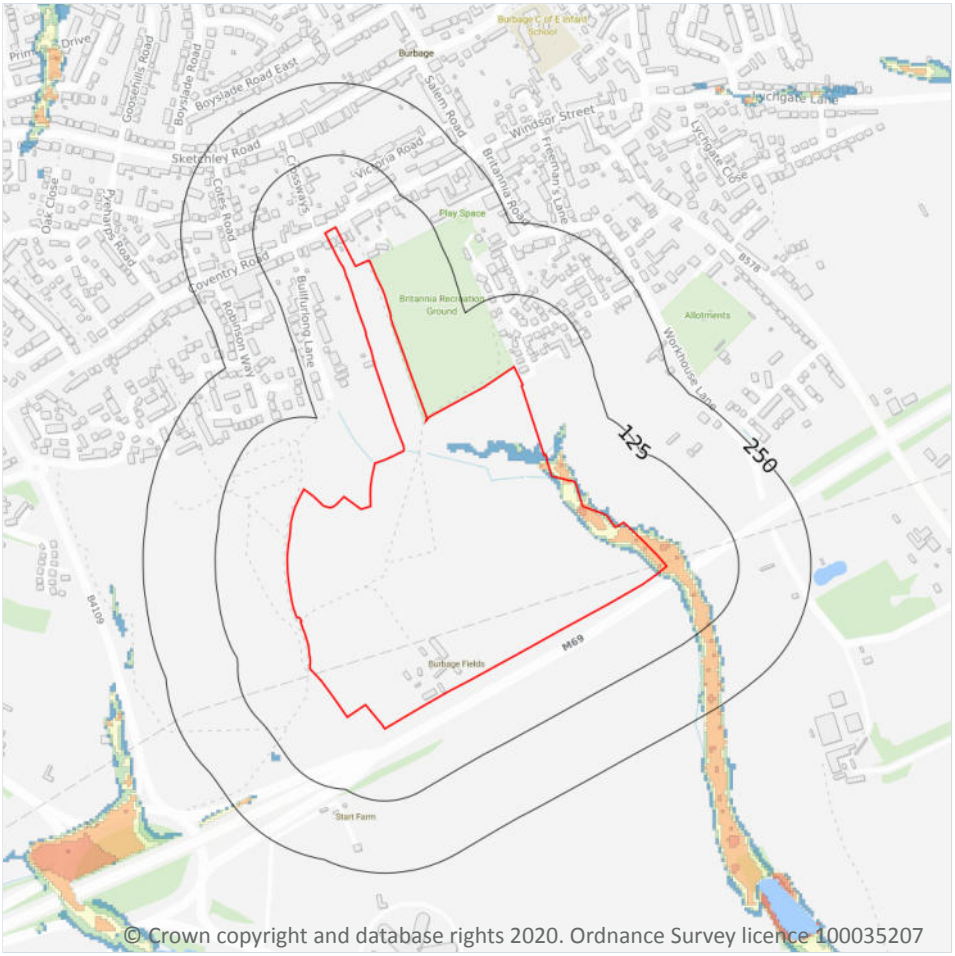
7.7 Flood Zone 3

Records within 50m	0

Areas of land at risk of flooding, when the presence of flood defences are ignored. Covering land with a 1 in 100 (1%) or greater chance of flooding each year from rivers or a 1 in 200 (0.5%) or greater chance of flooding each year from the sea.

This data is sourced from the Environment Agency and Natural Resources Wales.

8 Surface water flooding



Site Outline
Search buffers in metres (m)

1 in 1000 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 250 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 100 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

1 in 30 return period
- Depth between 0.1m - 0.3m
- Depth between 0.3m - 1.0m
- Depth greater than 1.0m

8.1 Surface water flooding

Highest risk on site	**1 in 30 year, 0.3m - 1.0m**
Highest risk within 50m	**1 in 30 year, 0.3m - 1.0m**

Ambiental Risk Analytics surface water (pluvial) FloodMap identifies areas likely to flood as a result of extreme rainfall events, i.e. land naturally vulnerable to surface water ponding or flooding. This data set was produced by simulating 1 in 30 year, 1 in 100 year, 1 in 250 year and 1 in 1,000 year rainfall events. Modern urban drainage systems are typically built to cope with rainfall events between 1 in 20 and 1 in 30 years, though some older ones may flood in a 1 in 5 year rainfall event.

Features are displayed on the Surface water flooding map on **page 55**

The data shown on the map and in the table above shows the highest likelihood of flood events happening at the site. Lower likelihood events may have greater flood depths and hence a greater potential impact on a site.

The table below shows the maximum flood depths for a range of return periods for the site.

Return period	Maximum modelled depth
1 in 1000 year	Between 0.3m and 1.0m
1 in 250 year	Between 0.3m and 1.0m
1 in 100 year	Between 0.3m and 1.0m
1 in 30 year	Between 0.3m and 1.0m

This data is sourced from Ambiental Risk Analytics.

9 Groundwater flooding



Site Outline

Search buffers in metres (m)

- High
- Moderate - High
- Moderate
- Low
- Negligible

9.1 Groundwater flooding

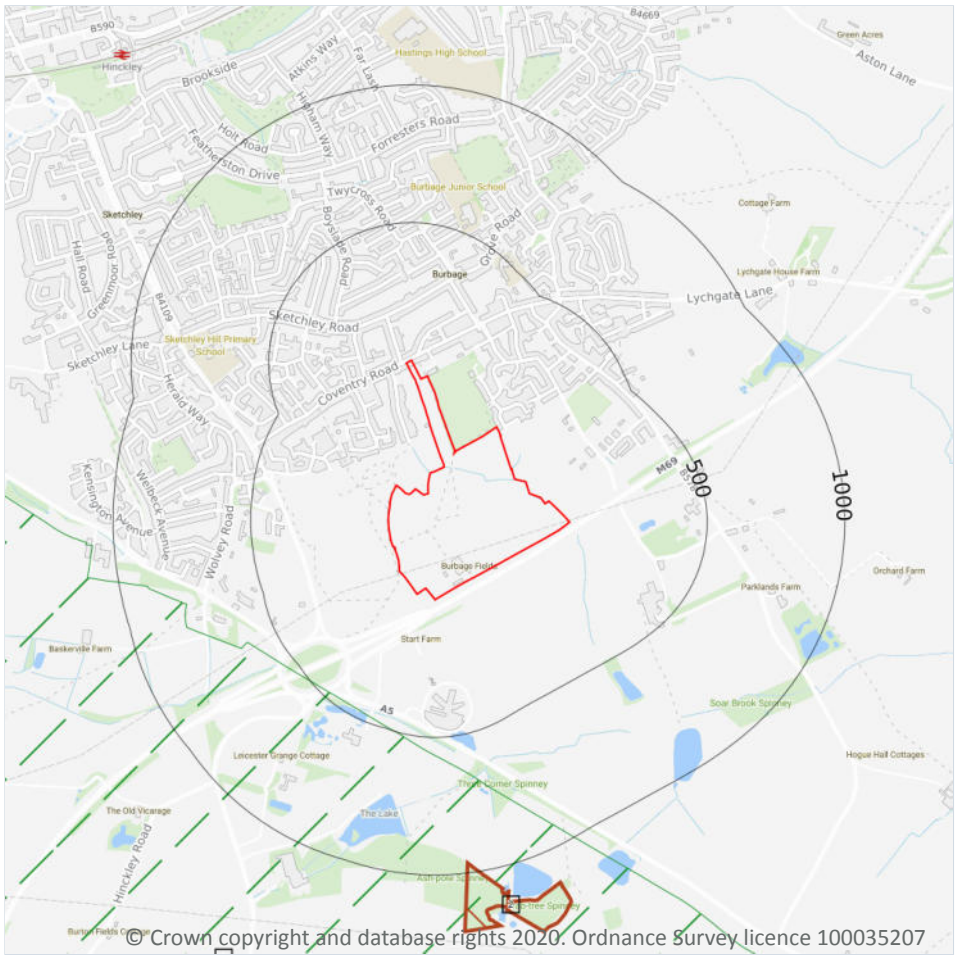
Highest risk on site	**Moderate**
Highest risk within 50m	**Moderate**

Groundwater flooding is caused by unusually high groundwater levels. It occurs when the water table rises above the ground surface or within underground structures such as basements or cellars. Groundwater flooding tends to exhibit a longer duration than surface water flooding, possibly lasting for weeks or months, and as a result it can cause significant damage to property. This risk assessment is based on a 1 in 100 year return period and a 5m Digital Terrain Model (DTM).

Features are displayed on the Groundwater flooding map on **page 57**

This data is sourced from Ambiental Risk Analytics.

10 Environmental designations



Site Outline

Search buffers in metres (m)

Sites of Special Scientific Interest (SSSI)

Local Nature Reserves (LNR)

Designated Ancient Woodland

Green Belt

10.1 Sites of Special Scientific Interest (SSSI)

Records within 2000m	1

Sites providing statutory protection for the best examples of UK flora, fauna, or geological or physiographical features. Originally notified under the National Parks and Access to the Countryside Act 1949, SSSIs were re-notified under the Wildlife and Countryside Act 1981. Improved provisions for the protection and management of SSSIs were introduced by the Countryside and Rights of Way Act 2000 (in England and Wales) and (in Scotland) by the Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act 2010.

Features are displayed on the Environmental designations map on **page 58**

ID	Location	Name	Data source
-	1990m NE	Burbage Wood and Aston Firs	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.2 Conserved wetland sites (Ramsar sites)

Records within 2000m	0

Ramsar sites are designated under the Convention on Wetlands of International Importance, agreed in Ramsar, Iran, in 1971. They cover all aspects of wetland conservation and wise use, recognizing wetlands as ecosystems that are extremely important for biodiversity conservation in general and for the well-being of human communities. These sites cover a broad definition of wetland; marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, and even some marine areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.3 Special Areas of Conservation (SAC)

Records within 2000m	0

Areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.4 Special Protection Areas (SPA)

Records within 2000m	0

Sites classified by the UK Government under the EC Birds Directive, SPAs are areas of the most important habitat for rare (listed on Annex I to the Directive) and migratory birds within the European Union.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.5 National Nature Reserves (NNR)

Records within 2000m	0

Sites containing examples of some of the most important natural and semi-natural terrestrial and coastal ecosystems in Great Britain. They are managed to conserve their habitats, provide special opportunities for scientific study or to provide public recreation compatible with natural heritage interests.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.6 Local Nature Reserves (LNR)

Records within 2000m	1

Sites managed for nature conservation, and to provide opportunities for research and education, or simply enjoying and having contact with nature. They are declared by local authorities under the National Parks and Access to the Countryside Act 1949 after consultation with the relevant statutory nature conservation agency.

Features are displayed on the Environmental designations map on **page 58**

ID	Location	Name	Data source
-	1989m NE	Burbage Common & Woods	Natural England

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.7 Designated Ancient Woodland

Records within 2000m	2

Ancient woodlands are classified as areas which have been wooded continuously since at least 1600 AD. This includes semi-natural woodland and plantations on ancient woodland sites. 'Wooded continuously' does not mean there is or has previously been continuous tree cover across the whole site, and not all trees within the woodland have to be old.

Features are displayed on the Environmental designations map on **page 58**

ID	Location	Name	Woodland Type
2	964m S	Unknown	Ancient & Semi-Natural Woodland
-	1990m NE	Aston Firs	Ancient & Semi-Natural Woodland

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.8 Biosphere Reserves

Records within 2000m	0

Biosphere Reserves are internationally recognised by UNESCO as sites of excellence to balance conservation and socioeconomic development between nature and people. They are recognised under the Man and the Biosphere (MAB) Programme with the aim of promoting sustainable development founded on the work of the local community.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.9 Forest Parks

Records within 2000m	0

These are areas managed by the Forestry Commission designated on the basis of recreational, conservation or scenic interest.

This data is sourced from the Forestry Commission.

10.10 Marine Conservation Zones

Records within 2000m	0

A type of marine nature reserve in UK waters established under the Marine and Coastal Access Act (2009). They are designated with the aim to protect nationally important, rare or threatened habitats and species.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

10.11 Green Belt

Records within 2000m	1

Areas designated to prevent urban sprawl by keeping land permanently open.

Features are displayed on the Environmental designations map on **page 58**

ID	Location	Name	Local Authority name
1	469m SW	Birmingham	Rugby

This data is sourced from the Ministry of Housing, Communities and Local Government.

10.12 Proposed Ramsar sites

Records within 2000m	0

Ramsar sites are areas listed as a Wetland of International Importance under the Convention on Wetlands of International Importance especially as Waterfowl Habitat (the Ramsar Convention) 1971. The sites here supplied have a status of 'Proposed' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.13 Possible Special Areas of Conservation (pSAC)

Records within 2000m	0

Special Areas of Conservation are areas which have been identified as best representing the range and variety within the European Union of habitats and (non-bird) species listed on Annexes I and II to the Directive. SACs are designated under the EC Habitats Directive. Those sites supplied here are those with a status of 'Possible' having been identified for potential adoption under the framework.

This data is sourced from Natural England and Natural Resources Wales.

10.14 Potential Special Protection Areas (pSPA)

Records within 2000m	0

Special Protection Areas (SPAs) are areas designated (or 'classified') under the European Union Wild Birds Directive for the protection of nationally and internationally important populations of wild birds. Those sites supplied here are those with a status of 'Potential' having been identified for potential adoption under the framework.

This data is sourced from Natural England.

10.15 Nitrate Sensitive Areas

Records within 2000m	0

Areas where nitrate concentrations in drinking water sources exceeded or was at risk of exceeding the limit of 50 mg/l set by the 1980 EC Drinking Water Directive. Voluntary agricultural measures as a means of reducing the levels of nitrate were introduced by DEFRA as MAFF, with payments being made to farmers who complied. The scheme was started as a pilot in 1990 in ten areas, later implemented within 32 areas. The scheme was closed to further new entrants in 1998, although existing agreements continued for their full term. All Nitrate Sensitive Areas fell within the areas designated as Nitrate Vulnerable Zones (NVZs) in 1996 under the EC Nitrate Directive (91/676/EEC).

This data is sourced from Natural England.

10.16 Nitrate Vulnerable Zones

Records within 2000m	4

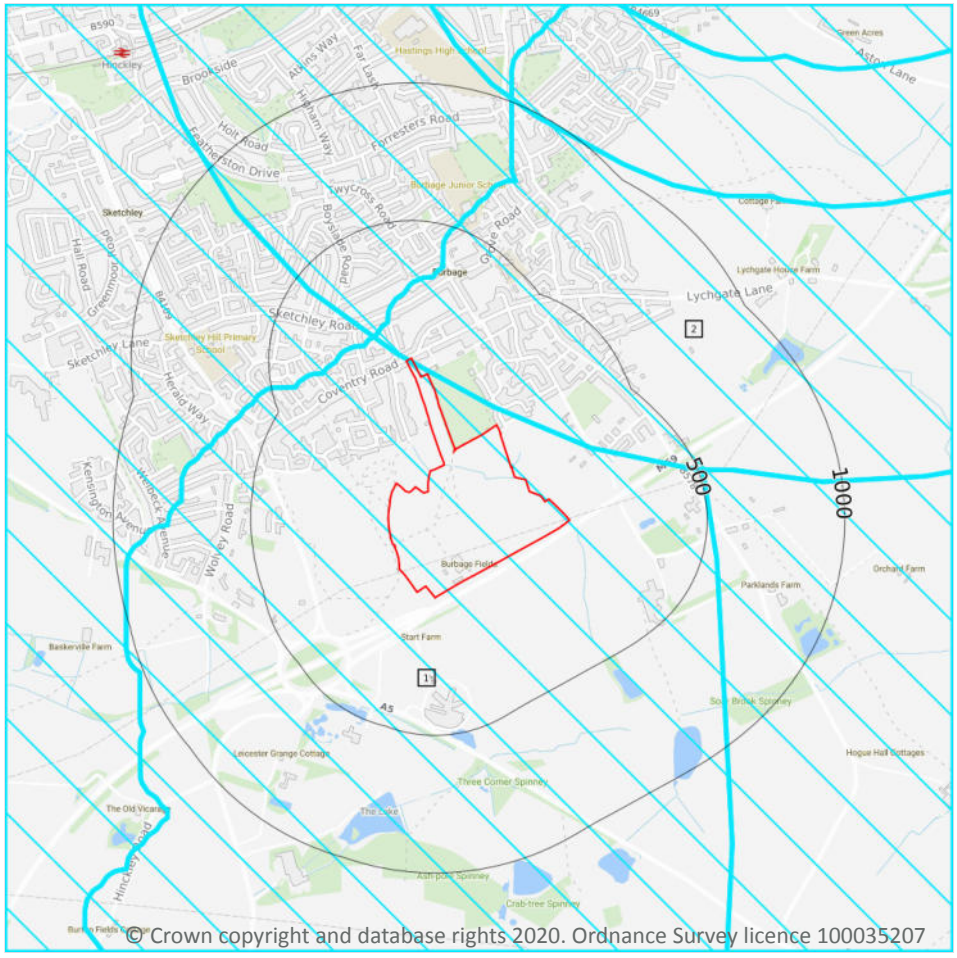
Areas at risk from agricultural nitrate pollution designated under the EC Nitrate Directive (91/676/EEC). These are areas of land that drain into waters polluted by nitrates. Farmers operating within these areas have to follow mandatory rules to tackle nitrate loss from agriculture.

Location	Name	Type	NVZ ID	Status
On site	**SOAR R NVZ**	**Surface Water**	**S309**	**Existing**

Location	Name	Type	NVZ ID	Status
On site	**River Trent (source to confluence with Derwent)**	**Surface Water**	**S308**	**Changed**
On site	**SOAR R NVZ**	**Surface Water**	**S309**	**Existing**
499m S	River Trent (source to confluence with Derwent)	Surface Water	S308	Changed

This data is sourced from Natural England and Natural Resources Wales.

SSSI Impact Zones and Units



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Site Outline

Search buffers in metres (m)

SSSI Impact Risk Zones

SSSI Units

- Not recorded
- Favourable
- Unfavourable - Recovering
- Unfavourable - No change
- Unfavourable - Declining
- Partially destroyed
- Destroyed

10.17 SSSI Impact Risk Zones

Records on site	2

Developed to allow rapid initial assessment of the potential risks to SSSIs posed by development proposals. They define zones around each SSSI which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

Features are displayed on the SSSI Impact Zones and Units map on **page 64**

ID	Location	Type of developments requiring consultation
1	On site	**Infrastructure - Airports, helipads and other aviation proposals. Air pollution - Livestock & poultry units with floorspace > 500m², slurry lagoons > 750m² & manure stores > 3500t. Combustion - General combustion processes >50MW energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion Discharges - Any discharge of water or liquid waste of more than 20m³/day to ground (ie to seep away) or to surface water, such as a beck or stream (NB This does not include discharges to mains sewer which are unlikely to pose a risk at this location)**
2	On site	**Infrastructure - Airports, helipads and other aviation proposals. Air pollution - Any industrial/agricultural development that could cause AIR POLLUTION (incl: industrial processes, livestock & poultry units with floorspace > 500m², slurry lagoons > 200m² & manure stores > 250t). Combustion - General combustion processes >20MW energy input. Incl: energy from waste incineration, other incineration, landfill gas generation plant, pyrolysis/gasification, anaerobic digestion, sewage treatment works, other incineration/ combustion Waste - Landfill. Incl: inert landfill, non-hazardous landfill, hazardous landfill. Composting - Any composting proposal with more than 75000 tonnes maximum annual operational throughput. Incl: open windrow composting, in-vessel composting, anaerobic digestion, other waste management Discharges - Any discharge of water or liquid waste of more than 20m³/day to ground (ie to seep away) or to surface water, such as a beck or stream (NB This does not include discharges to mains sewer which are unlikely to pose a risk at this location)**

This data is sourced from Natural England.

10.18 SSSI Units

Records within 2000m	**1**

Divisions of SSSIs used to record management and condition details. Units are the smallest areas for which Natural England gives a condition assessment, however, the size of units varies greatly depending on the types of management and the conservation interest.

Features are displayed on the SSSI Impact Zones and Units map on **page 64**

ID: -
Location: 1990m NE
SSSI name: Burbage Wood and Aston Firs
Unit name: Burbage Wood South
Broad habitat: Broadleaved, Mixed And Yew Woodland - Lowland
Condition: Unfavourable - Recovering
Reportable features:

Feature name	Feature condition	Date of assessment
Lowland mixed deciduous woodland	Unfavourable - Recovering	07/01/2010

This data is sourced from Natural England and Natural Resources Wales.

11 Visual and cultural designations

11.1 World Heritage Sites

Records within 250m	0

Sites designated for their globally important cultural or natural interest requiring appropriate management and protection measures. World Heritage Sites are designated to meet the UK's commitments under the World Heritage Convention.

This data is sourced from Historic England, Cadw and Historic Environment Scotland.

11.2 Area of Outstanding Natural Beauty

Records within 250m	0

Areas of Outstanding Natural Beauty (AONB) are conservation areas, chosen because they represent 18% of the finest countryside. Each AONB has been designated for special attention because of the quality of their flora, fauna, historical and cultural associations, and/or scenic views. The National Parks and Access to the Countryside Act of 1949 created AONBs and the Countryside and Rights of Way Act, 2000 added further regulation and protection. There are likely to be restrictions to some developments within these areas.

This data is sourced from Natural England, Natural Resources Wales and Scottish Natural Heritage.

11.3 National Parks

Records within 250m	0

In England and Wales, the purpose of National Parks is to conserve and enhance landscapes within the countryside whilst promoting public enjoyment of them and having regard for the social and economic well-being of those living within them. In Scotland National Parks have the additional purpose of promoting the sustainable use of the natural resources of the area and the sustainable social and economic development of its communities. The National Parks and Access to the Countryside Act 1949 established the National Park designation in England and Wales, and The National Parks (Scotland) Act 2000 in Scotland.

This data is sourced from Natural England, Natural Resources Wales and the Scottish Government.

11.4 Listed Buildings

Records within 250m	0

Buildings listed for their special architectural or historical interest. Building control in the form of 'listed building consent' is required in order to make any changes to that building which might affect its special interest. Listed buildings are graded to indicate their relative importance, however building controls apply to all buildings equally, irrespective of their grade, and apply to the interior and exterior of the building in its entirety, together with any curtilage structures.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

11.5 Conservation Areas

Records within 250m	0

Local planning authorities are obliged to designate as conservation areas any parts of their own area that are of special architectural or historic interest, the character and appearance of which it is desirable to preserve or enhance. Designation of a conservation area gives broader protection than the listing of individual buildings. All the features within the area, listed or otherwise, are recognised as part of its character. Conservation area designation is the means of recognising the importance of all factors and of ensuring that planning decisions address the quality of the landscape in its broadest sense.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

11.6 Scheduled Ancient Monuments

Records within 250m	0

A scheduled monument is an historic building or site that is included in the Schedule of Monuments kept by the Secretary of State for Digital, Culture, Media and Sport. The regime is set out in the Ancient Monuments and Archaeological Areas Act 1979. The Schedule of Monuments has c.20,000 entries and includes sites such as Roman remains, burial mounds, castles, bridges, earthworks, the remains of deserted villages and industrial sites. Monuments are not graded, but all are, by definition, considered to be of national importance.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

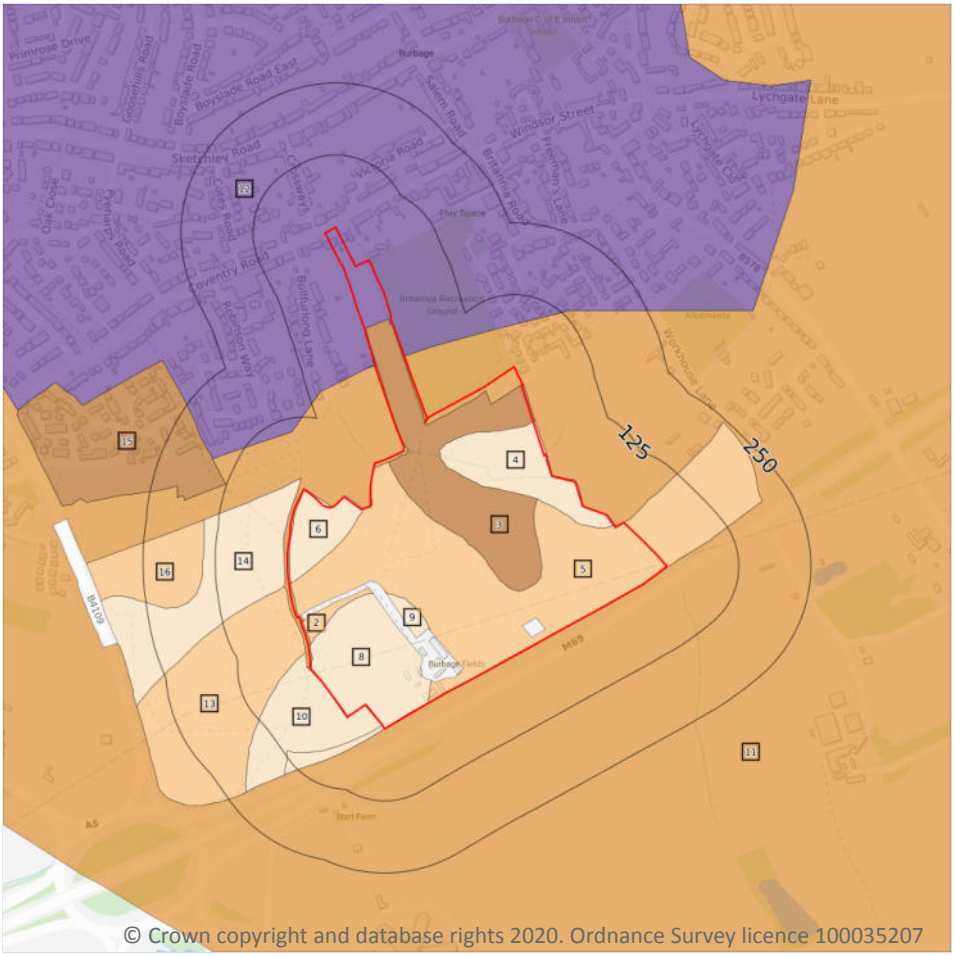
11.7 Registered Parks and Gardens

Records within 250m	0

Parks and gardens assessed to be of particular interest and of special historic interest. The emphasis being on 'designed' landscapes, rather than on planting or botanical importance. Registration is a 'material consideration' in the planning process, meaning that planning authorities must consider the impact of any proposed development on the special character of the landscape.

This data is sourced from English Heritage, Cadw and Historic Environment Scotland.

12 Agricultural designations



Site Outline

Search buffers in metres (m)

- Grade 1 - excellent quality
- Grade 2 - very good quality
- Grade 3 - good to moderate quality
- Grade 3a - good quality
- Grade 3b - moderate quality
- Grade 4 - poor quality
- Grade 5 - very poor quality
- Non-agricultural land
- Urban land
- Exclusion land
- Tree felling licences
- Open Access land

12.1 Agricultural Land Classification

Records within 250m	14

Classification of the quality of agricultural land taking into consideration multiple factors including climate, physical geography and soil properties. It should be noted that the categories for the grading of agricultural land are not consistent across England, Wales and Scotland.

Features are displayed on the Agricultural designations map on **page 69**

ID	Location	Classification	Description
2	**On site**	**Grade 3a**	**Good quality agricultural land. Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.**

ID	Location	Classification	Description
3	**On site**	**Grade 2**	**Very good quality agricultural land. Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.**
4	**On site**	**Grade 3b**	**Moderate quality agricultural land. Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.**
5	**On site**	**Grade 3a**	**Good quality agricultural land. Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.**
6	**On site**	**Grade 3b**	**Moderate quality agricultural land. Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.**
8	**On site**	**Grade 3b**	**Moderate quality agricultural land. Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.**
9	**On site**	**Grade 3b**	**Moderate quality agricultural land. Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.**
10	**On site**	**Grade 3b**	**Moderate quality agricultural land. Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.**
11	**On site**	**Grade 3**	**Good to moderate quality agricultural land. Land with moderate limitations which affect the choice of crops, timing and type of cultivation, harvesting or the level of yield. Where more demanding crops are grown yields are generally lower or more variable than on land in Grades 1 and 2.**
12	**On site**	**Urban**	**-**
13	5m W	Grade 3a	Good quality agricultural land. Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.
14	5m W	Grade 3b	Moderate quality agricultural land. Land capable of producing moderate yields of a narrow range of crops, principally cereals and grass or lower yields of a wider range of crops or high yields of grass which can be grazed or harvested over most of the year.

ID	Location	Classification	Description
15	126m W	Grade 2	Very good quality agricultural land. Land with minor limitations which affect crop yield, cultivations or harvesting. A wide range of agricultural and horticultural crops can usually be grown but on some land in the grade there may be reduced flexibility due to difficulties with the production of the more demanding crops such as winter harvested vegetables and arable root crops. The level of yield is generally high but may be lower or more variable than Grade 1.
16	145m W	Grade 3a	Good quality agricultural land. Land capable of consistently producing moderate to high yields of a narrow range of arable crops, especially cereals, or moderate yields of a wide range of crops including cereals, grass, oilseed rape, potatoes, sugar beet and the less demanding horticultural crops.

This data is sourced from Natural England.

12.2 Open Access Land

Records within 250m	**0**

The Countryside and Rights of Way Act 2000 (CROW Act) gives a public right of access to land without having to use paths. Access land includes mountains, moors, heaths and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path. Generally permitted activities on access land are walking, running, watching wildlife and climbing.

This data is sourced from Natural England and Natural Resources Wales.

12.3 Tree Felling Licences

Records within 250m	**0**

Felling Licence Application (FLA) areas approved by Forestry Commission England. Anyone wishing to fell trees must ensure that a licence or permission under a grant scheme has been issued by the Forestry Commission before any felling is carried out or that one of the exceptions apply.

This data is sourced from the Forestry Commission.

12.4 Environmental Stewardship Schemes

Records within 250m	**1**

Environmental Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment.

Location	Reference	Scheme	Start Date	End date
124m SE	AG00307944	Entry Level plus Higher Level Stewardship	01/08/2010	31/07/2020

This data is sourced from Natural England.

12.5 Countryside Stewardship Schemes

Records within 250m	0

Countryside Stewardship covers a range of schemes that provide financial incentives to farmers, foresters and land managers to look after and improve the environment. Main objectives are to improve the farmed environment for wildlife and to reduce diffuse water pollution.

This data is sourced from Natural England.

13 Habitat designations



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Site Outline

Search buffers in metres (m)

- Priority Habitat Inventory
- Open Mosaic Habitat
- Limestone Pavement Orders

Habitat Networks

- Primary Habitat
- Restorable Habitat
- Associated Habitats
- Habitat Restoration-Creation
- Network Enhancement Zone 1
- Network Enhancement Zone 2

13.1 Priority Habitat Inventory

Records within 250m	2

Habitats of principal importance as named under Natural Environment and Rural Communities Act (2006) Section 41.

Features are displayed on the Habitat designations map on **page 73**

ID	Location	Main Habitat	Other habitats
1	85m N	Deciduous woodland	Main habitat: DWOOD (INV > 50%)
2	212m NE	Deciduous woodland	Main habitat: DWOOD (INV > 50%)

This data is sourced from Natural England.

13.2 Habitat Networks

Records within 250m	0

Habitat networks for 18 priority habitat networks (based primarily, but not exclusively, on the priority habitat inventory) and areas suitable for the expansion of networks through restoration and habitat creation.

This data is sourced from Natural England.

13.3 Open Mosaic Habitat

Records within 250m	0

Sites verified as Open Mosaic Habitat. Mosaic habitats are brownfield sites that are identified under the UK Biodiversity Action Plan as a priority habitat due to the habitat variation within a single site, supporting an array of invertebrates.

This data is sourced from Natural England.

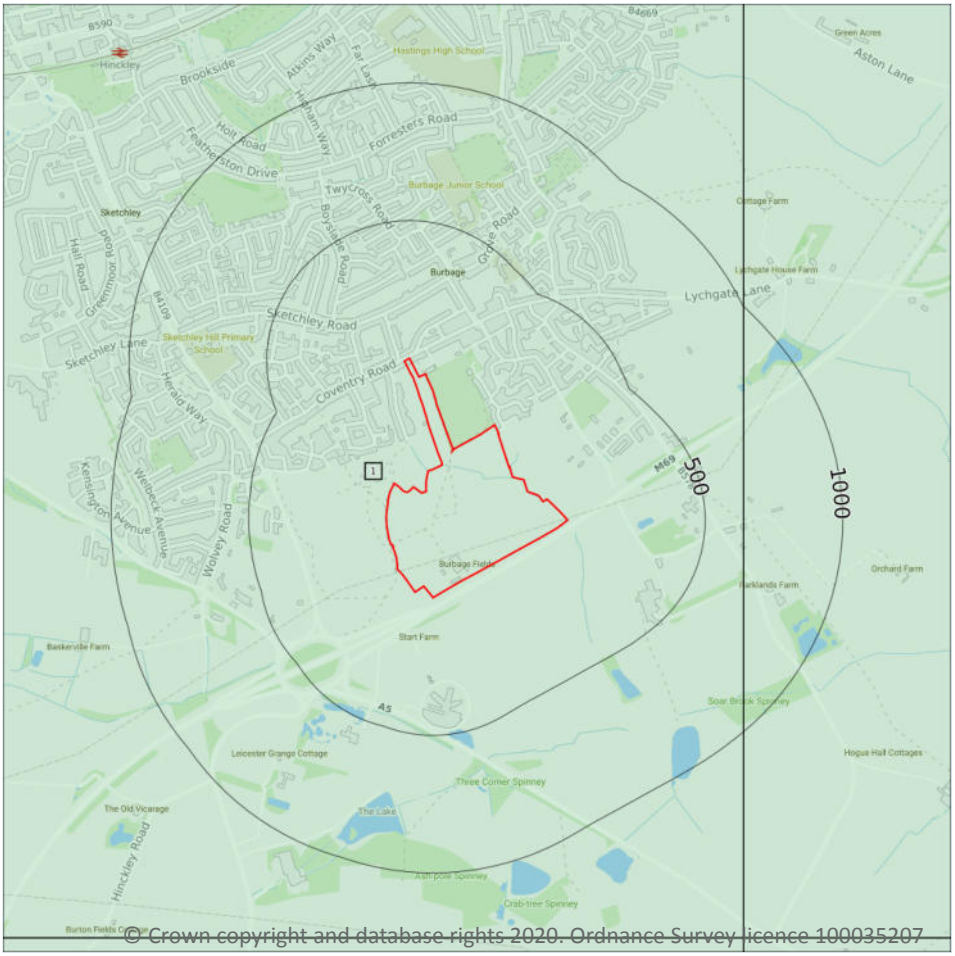
13.4 Limestone Pavement Orders

Records within 250m	0

Limestone pavements are outcrops of limestone where the surface has been worn away by natural means over millennia. These rocks have the appearance of paving blocks, hence their name. Not only do they have geological interest, they also provide valuable habitats for wildlife. These habitats are threatened due to their removal for use in gardens and water features. Many limestone pavements have been designated as SSSIs which affords them some protection. In addition, Section 34 of the Wildlife and Countryside Act 1981 gave them additional protection via the creation of Limestone Pavement Orders, which made it a criminal offence to remove any part of the outcrop. The associated Limestone Pavement Priority Habitat is part of the UK Biodiversity Action Plan priority habitat in England.

This data is sourced from Natural England.

14 Geology 1:10,000 scale - Availability



14.1 10k Availability

Records within 500m	1

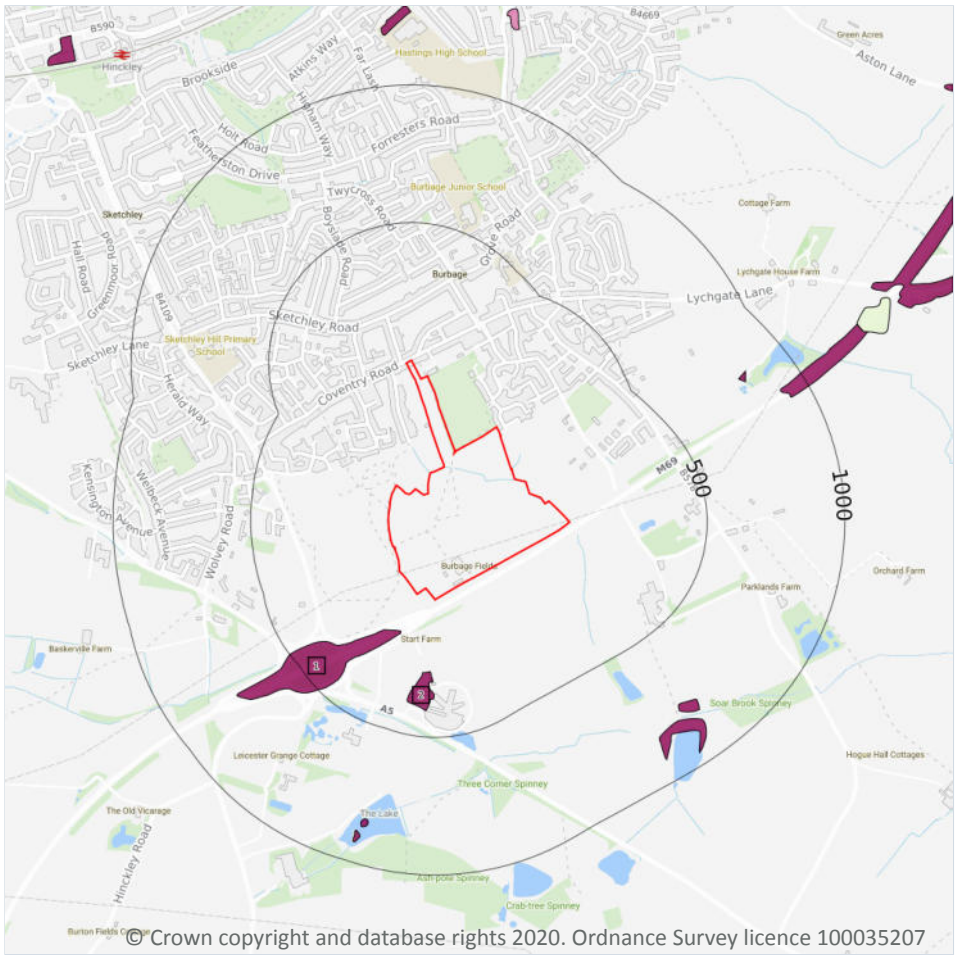
An indication on the coverage of 1:10,000 scale geology data for the site, the most detailed dataset provided by the British Geological Survey. Either 'Full', 'Partial' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:10,000 scale - Availability map on **page 75**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**No coverage**	**SP49SW**

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Artificial and made ground



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14.2 Artificial and made ground (10k)

Records within 500m	2

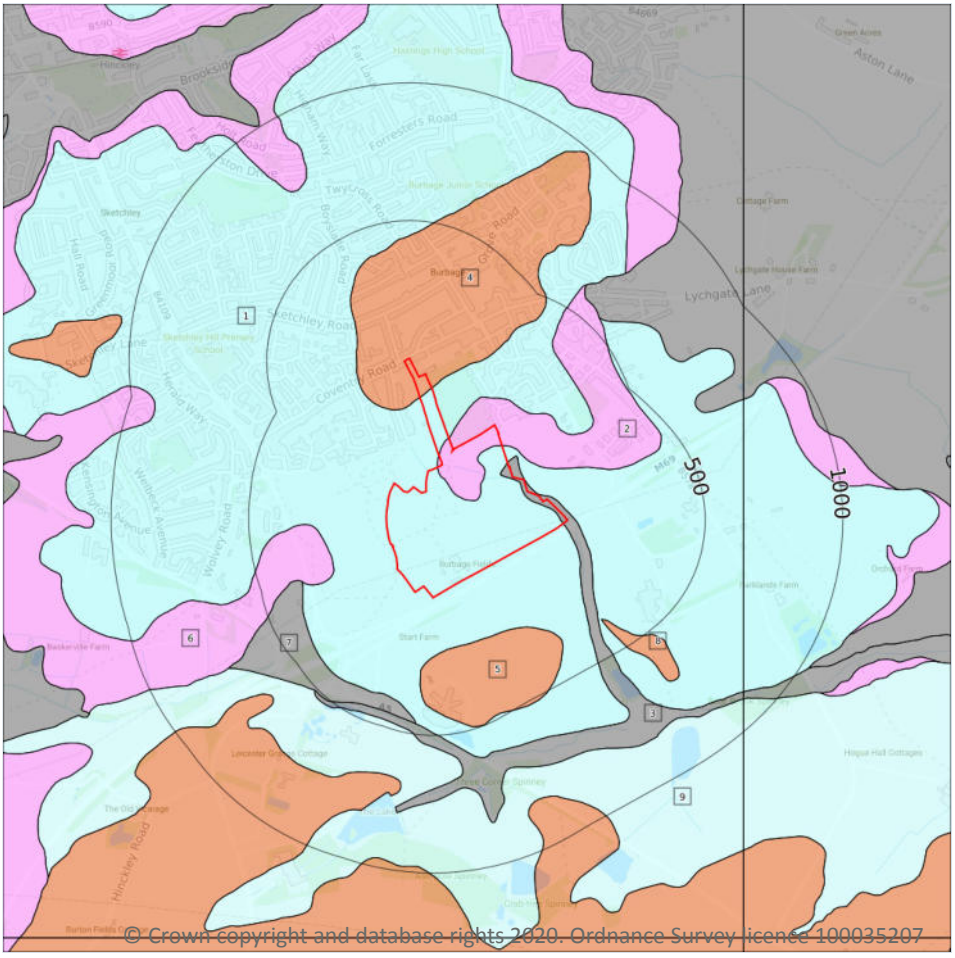
Details of made, worked, infilled, disturbed and landscaped ground at 1:10,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

Features are displayed on the Geology 1:10,000 scale - Artificial and made ground map on **page 76**

ID	Location	LEX Code	Description	Rock description
1	147m SW	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit
2	262m S	MGR-ARTDP	Made Ground (Undivided)	Artificial Deposit

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (10k)

Superficial geology (10k)
Please see table for more details.

14.3 Superficial geology (10k)

Records within 500m **9**

Superficial geological deposits at 1:10,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:10,000 scale - Superficial map on **page 77**

ID	Location	LEX Code	Description	Rock description
1	**On site**	**ODT-DMTN**	**Oadby Member - Diamicton**	**Diamicton**
2	**On site**	**WOSG-XSV**	**Wolston Sand And Gravel - Sand And Gravel**	**Sand And Gravel**
3	**On site**	**ALV-XSWCV**	**Alluvium - Sand With Clay And Gravel**	**Sand With Clay And Gravel [unlithified Deposits Coding Scheme - Extended]**

ID	Location	LEX Code	Description	Rock description
4	**On site**	**DMG-XSV**	**Dunsmore Gravel - Sand And Gravel**	**Sand And Gravel**
5	195m S	DMG-XSV	Dunsmore Gravel - Sand And Gravel	Sand And Gravel
6	219m W	WOSG-XSV	Wolston Sand And Gravel - Sand And Gravel	Sand And Gravel
7	348m W	WOC-XCZ	Wolston Clay - Clay And Silt	Clay And Silt
8	368m SE	DMG-XSV	Dunsmore Gravel - Sand And Gravel	Sand And Gravel
9	474m S	THT-DMTN	Thrussington Member - Diamicton	Diamicton

This data is sourced from the British Geological Survey.

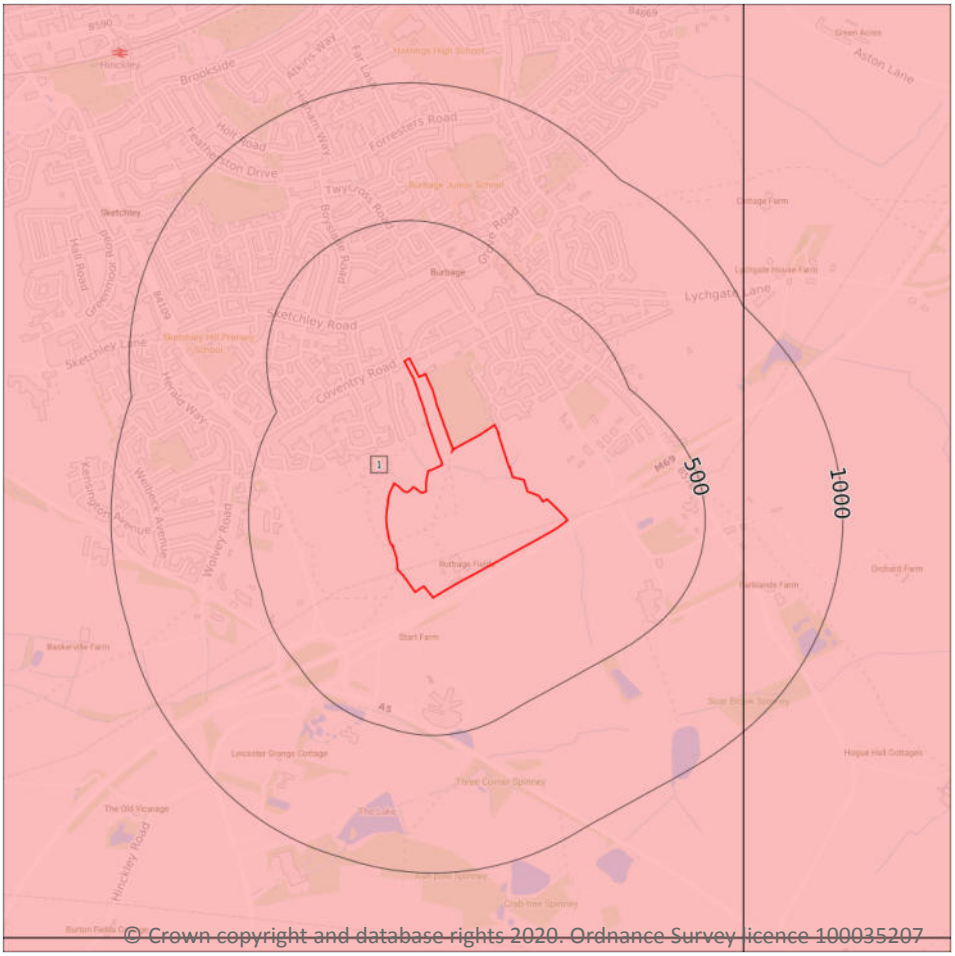
14.4 Landslip (10k)

Records within 500m	**0**

Mass movement deposits on BGS geological maps at 1:10,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

Geology 1:10,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (10k)

Bedrock geology (10k)
Please see table for more details.

14.5 Bedrock geology (10k)

Records within 500m	1

Bedrock geology at 1:10,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:10,000 scale - Bedrock map on **page 79**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**MMG-MDST**	**Mercia Mudstone Group - Mudstone**	**Rhaetian Age - Early Triassic Epoch**

This data is sourced from the British Geological Survey.

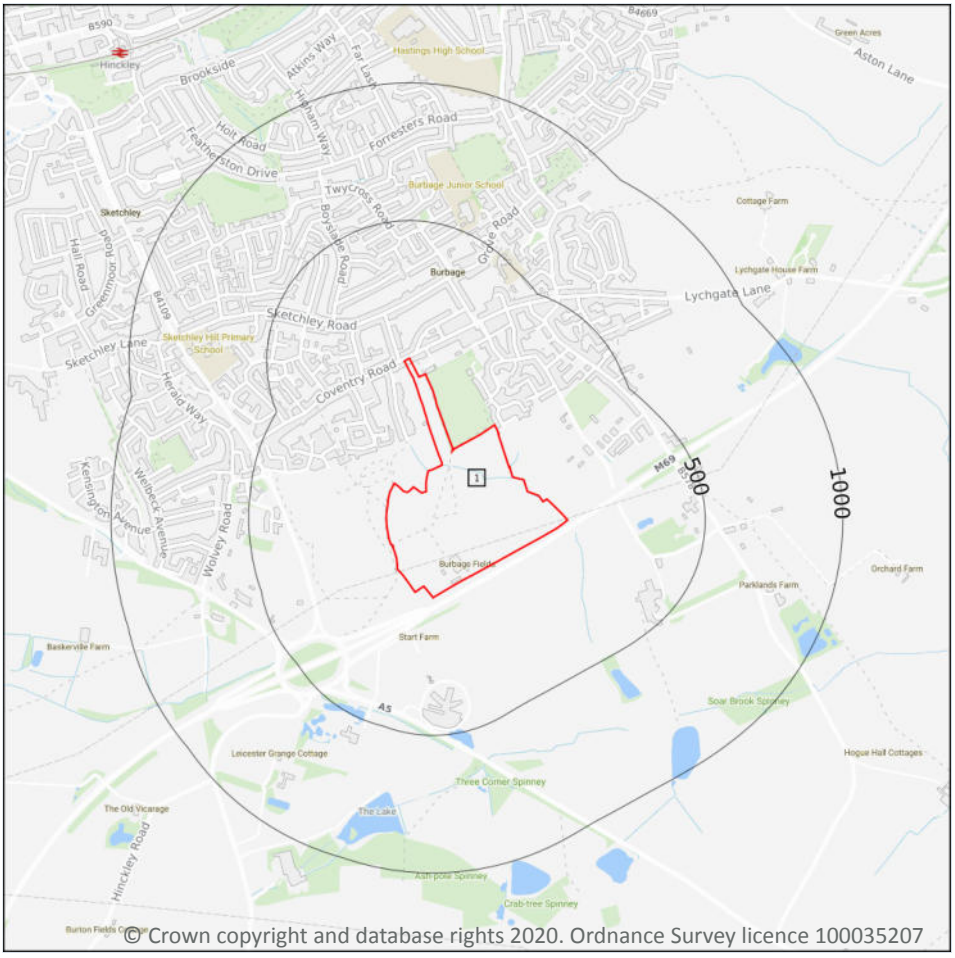
14.6 Bedrock faults and other linear features (10k)

Records within 500m	0

Linear features at the ground or bedrock surface at 1:10,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

15 Geology 1:50,000 scale - Availability



Site Outline

Search buffers in metres (m)

Geological map tile

15.1 50k Availability

Records within 500m	1

An indication on the coverage of 1:50,000 scale geology data for the site. Either 'Full' or 'No coverage' for each geological theme.

Features are displayed on the Geology 1:50,000 scale - Availability map on **page 81**

ID	Location	Artificial	Superficial	Bedrock	Mass movement	Sheet No.
1	**On site**	**Full**	**Full**	**Full**	**No coverage**	**EW169_coventry_v4**

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Artificial and made ground

15.2 Artificial and made ground (50k)

Records within 500m	0

Details of made, worked, infilled, disturbed and landscaped ground at 1:50,000 scale. Artificial ground can be associated with potentially contaminated material, unpredictable engineering conditions and instability.

This data is sourced from the British Geological Survey.

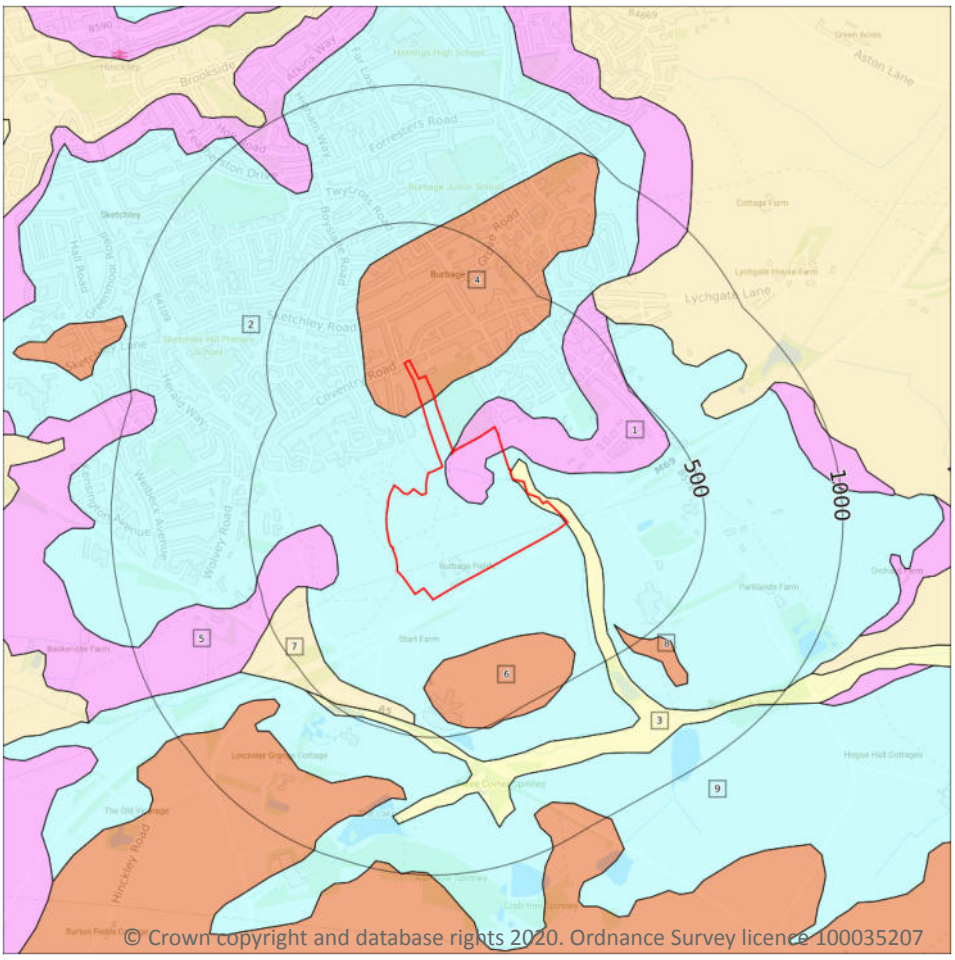
15.3 Artificial ground permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any artificial deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Superficial



Site Outline

Search buffers in metres (m)

Landslip (50k)

Superficial geology (50k)
Please see table for more details.

15.4 Superficial geology (50k)

Records within 500m **9**

Superficial geological deposits at 1:50,000 scale. Also known as 'drift', these are the youngest geological deposits, formed during the Quaternary. They rest on older deposits or rocks referred to as bedrock.

Features are displayed on the Geology 1:50,000 scale - Superficial map on **page 83**

ID	Location	LEX Code	Description	Rock description
1	On site	WOSG-XSV	WOLSTON SAND AND GRAVEL	SAND AND GRAVEL
2	On site	ODT-DMTN	OADBY MEMBER	DIAMICTON
3	On site	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
4	On site	DMG-XSV	DUNSMORE GRAVEL	SAND AND GRAVEL

ID	Location	LEX Code	Description	Rock description
5	197m W	WOSG-XSV	WOLSTON SAND AND GRAVEL	SAND AND GRAVEL
6	222m S	DMG-XSV	DUNSMORE GRAVEL	SAND AND GRAVEL
7	333m W	BOSW-XCZ	BOSWORTH CLAY MEMBER	CLAY AND SILT
8	403m SE	DMG-XSV	DUNSMORE GRAVEL	SAND AND GRAVEL
9	483m S	ODT-DMTN	OADBY MEMBER	DIAMICTON

This data is sourced from the British Geological Survey.

15.5 Superficial permeability (50k)

Records within 50m	**4**

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any superficial deposits (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Mixed**	**Moderate**	**Low**
On site	**Intergranular**	**Very High**	**High**
On site	**Intergranular**	**Very High**	**High**
On site	**Intergranular**	**High**	**Very Low**

This data is sourced from the British Geological Survey.

15.6 Landslip (50k)

Records within 500m	**0**

Mass movement deposits on BGS geological maps at 1:50,000 scale. Primarily superficial deposits that have moved down slope under gravity to form landslips. These affect bedrock, other superficial deposits and artificial ground.

This data is sourced from the British Geological Survey.

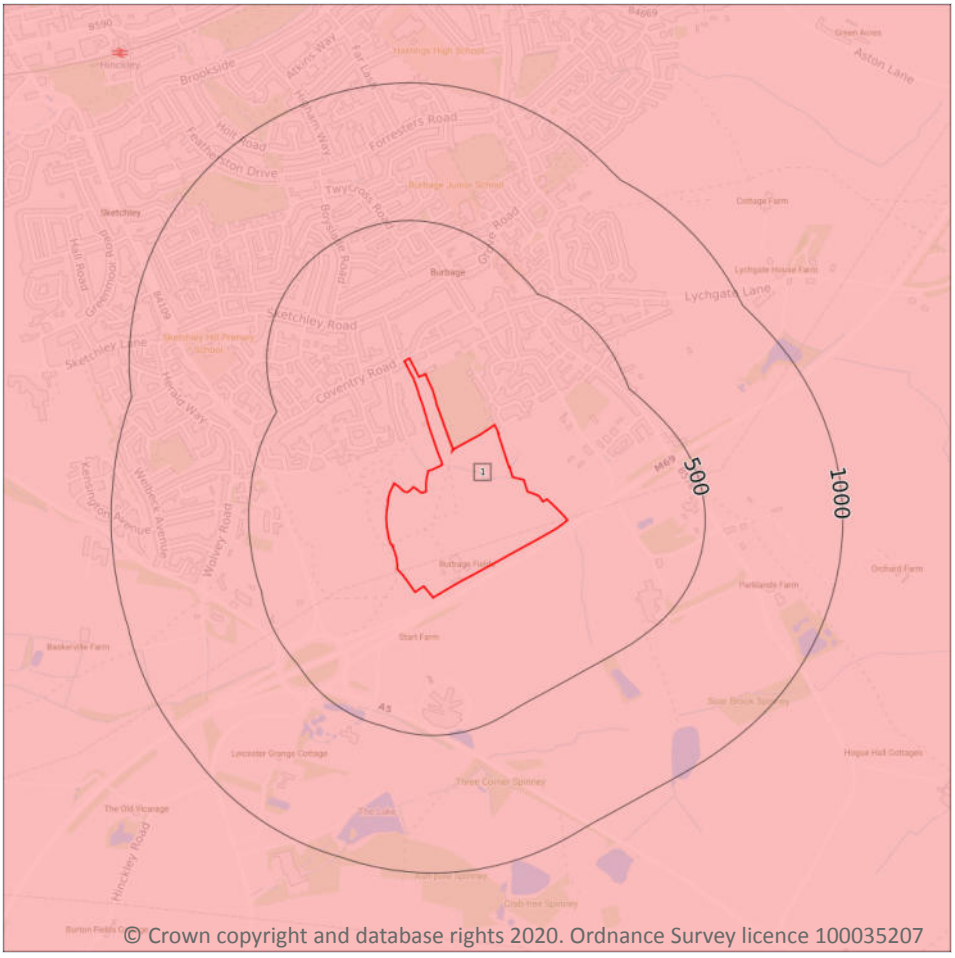
15.7 Landslip permeability (50k)

Records within 50m	0

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of any landslip deposits (the zone between the land surface and the water table).

This data is sourced from the British Geological Survey.

Geology 1:50,000 scale - Bedrock



Site Outline

Search buffers in metres (m)

Bedrock faults and other linear features (50k)

Bedrock geology (50k)
Please see table for more details.

15.8 Bedrock geology (50k)

Records within 500m	1

Bedrock geology at 1:50,000 scale. The main mass of rocks forming the Earth and present everywhere, whether exposed at the surface in outcrops or concealed beneath superficial deposits or water.

Features are displayed on the Geology 1:50,000 scale - Bedrock map on **page 86**

ID	Location	LEX Code	Description	Rock age
1	**On site**	**MMG-MDST**	**MERCIA MUDSTONE GROUP - MUDSTONE**	**-**

This data is sourced from the British Geological Survey.

15.9 Bedrock permeability (50k)

Records within 50m	1

A qualitative classification of estimated rates of vertical movement of water from the ground surface through the unsaturated zone of bedrock (the zone between the land surface and the water table).

Location	Flow type	Maximum permeability	Minimum permeability
On site	**Fracture**	**Low**	**Low**

This data is sourced from the British Geological Survey.

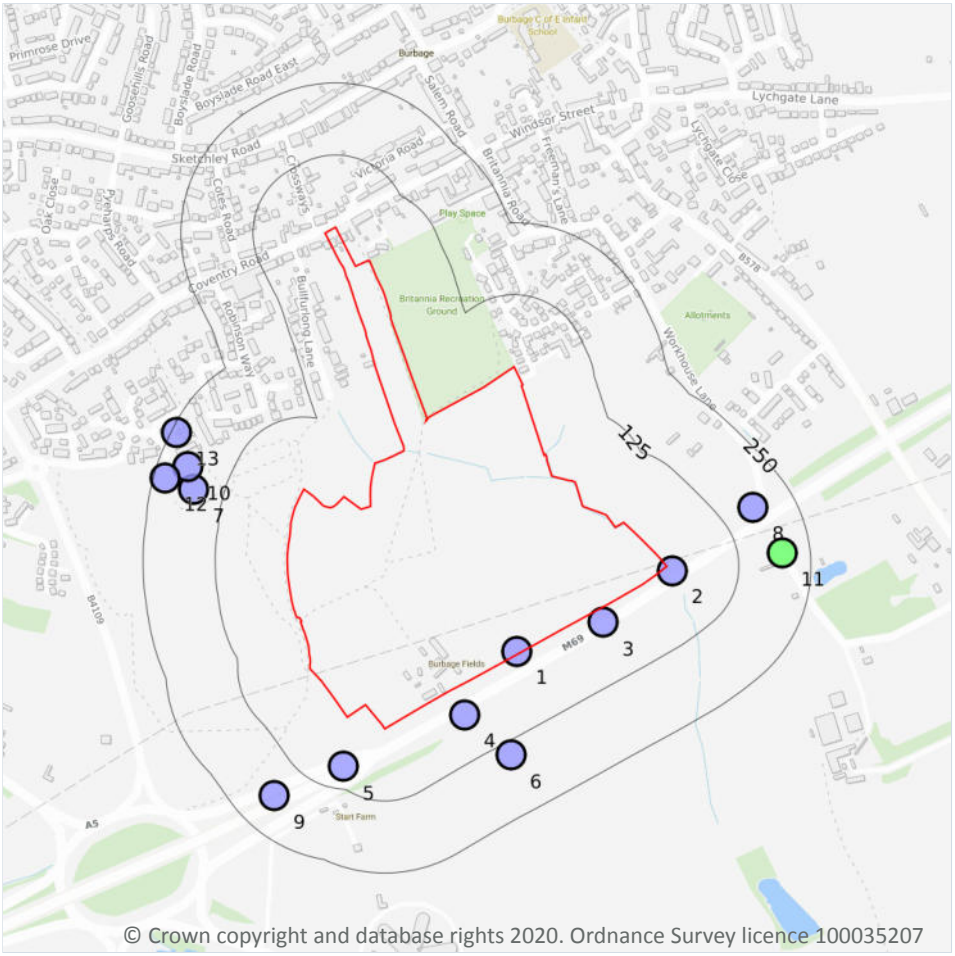
15.10 Bedrock faults and other linear features (50k)

Records within 500m	0

Linear features at the ground or bedrock surface at 1:50,000 scale of six main types; rock, fault, fold axis, mineral vein, alteration area or landform. Features are either observed or inferred, and relate primarily to bedrock.

This data is sourced from the British Geological Survey.

16 Boreholes



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Site Outline

Search buffers in metres (m)

Confidential

0 - 10m

10 - 30m

30m+

Unknown

16.1 BGS Boreholes

Records within 250m **13**

The Single Onshore Boreholes Index (SOBI); an index of over one million records of boreholes, shafts and wells from all forms of drilling and site investigation work held by the British Geological Survey. Covering onshore and nearshore boreholes dating back to at least 1790 and ranging from one to several thousand metres deep.

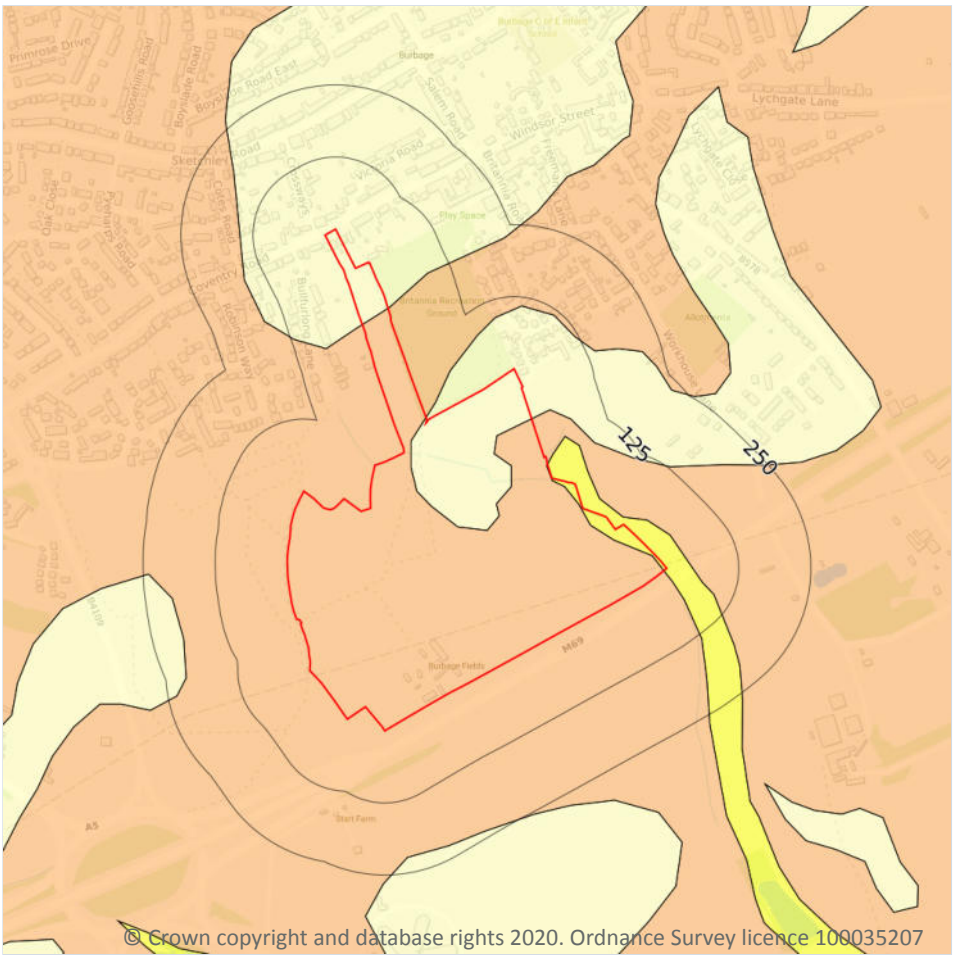
Features are displayed on the Boreholes map on **page 88**

ID	Location	Grid reference	Name	Length	Confidential	Web link
1	**On site**	**444100 291370**	**COVENTRY-LEICESTER M69 BH214**	**9.0**	**N**	**334246**
2	12m SE	444370 291510	COVENTRY-LEICESTER M69 TH H	2.0	N	334248
3	24m SE	444250 291420	COVENTRY-LEICESTER M69 BH215Z	4.0	N	334247

ID	Location	Grid reference	Name	Length	Confidential	Web link
4	49m SE	444010 291260	COVENTRY-LEICESTER M69 BH212	8.5	N	334245
5	86m S	443800 291170	COVENTRY-LEICESTER M69 THG	1.0	N	334244
6	148m SE	444090 291190	COVENTRY-LEICESTER NEW ROUTE BH33	6.6	N	334220
7	177m W	443540 291650	RUGBY ROAD/COVENTRY ROAD BURBAGE	3.5	N	334575
8	182m NE	444510 291620	COVENTRY-LEICESTER M69 BH217	5.5	N	334249
9	186m SW	443680 291120	COVENTRY-LEICESTER M69 TH211Z	4.0	N	334243
10	199m W	443530 291690	RUGBY ROAD/COVENTRY ROAD BURBAGE	3.5	N	334574
11	201m E	444560 291540	COVENTRY-LEICESTER M69 BH218	17.0	N	334250
12	231m W	443490 291670	RUGBY ROAD/COVENTRY ROAD BURBAGE	3.5	N	334577
13	242m NW	443510 291750	RUGBY ROAD/COVENTRY ROAD BURBAGE	3.5	N	334573

This data is sourced from the British Geological Survey.

17 Natural ground subsidence - Shrink swell clays



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.1 Shrink swell clays

Records within 50m	3

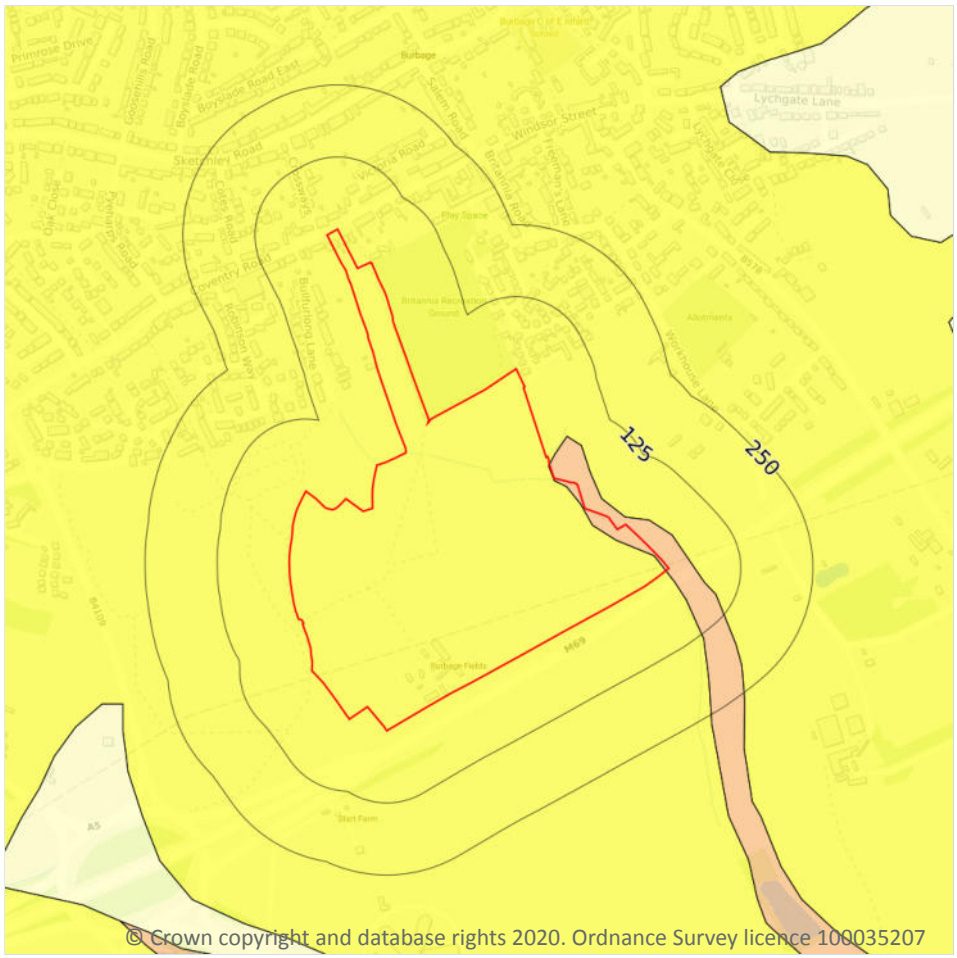
The potential hazard presented by soils that absorb water when wet (making them swell), and lose water as they dry (making them shrink). This shrink-swell behaviour is controlled by the type and amount of clay in the soil, and by seasonal changes in the soil moisture content (related to rainfall and local drainage).

Features are displayed on the Natural ground subsidence - Shrink swell clays map on **page 90**

Location	Hazard rating	Details
On site	**Negligible**	**Ground conditions predominantly non-plastic.**
On site	**Very low**	**Ground conditions predominantly low plasticity.**
On site	**Low**	**Ground conditions predominantly medium plasticity.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Running sands



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.2 Running sands

Records within 50m	2

The potential hazard presented by rocks that can contain loosely-packed sandy layers that can become fluidised by water flowing through them. Such sands can 'run', removing support from overlying buildings and causing potential damage.

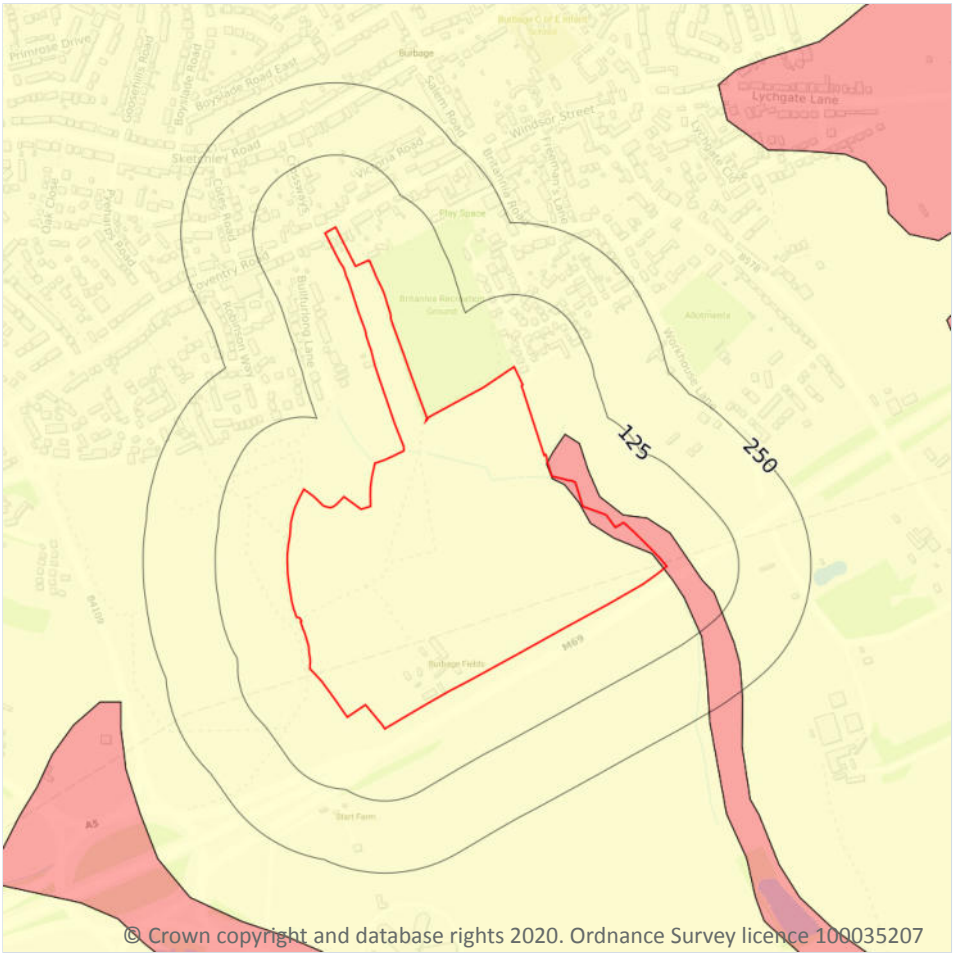
Features are displayed on the Natural ground subsidence - Running sands map on **page 92**

Location	Hazard rating	Details
On site	**Very low**	**Running sand conditions are unlikely. No identified constraints on land use due to running conditions unless water table rises rapidly.**

Location	Hazard rating	Details
On site	**Low**	**Running sand conditions may be present. Constraints may apply to land uses involving excavation or the addition or removal of water.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Compressible deposits



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Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.3 Compressible deposits

Records within 50m	2

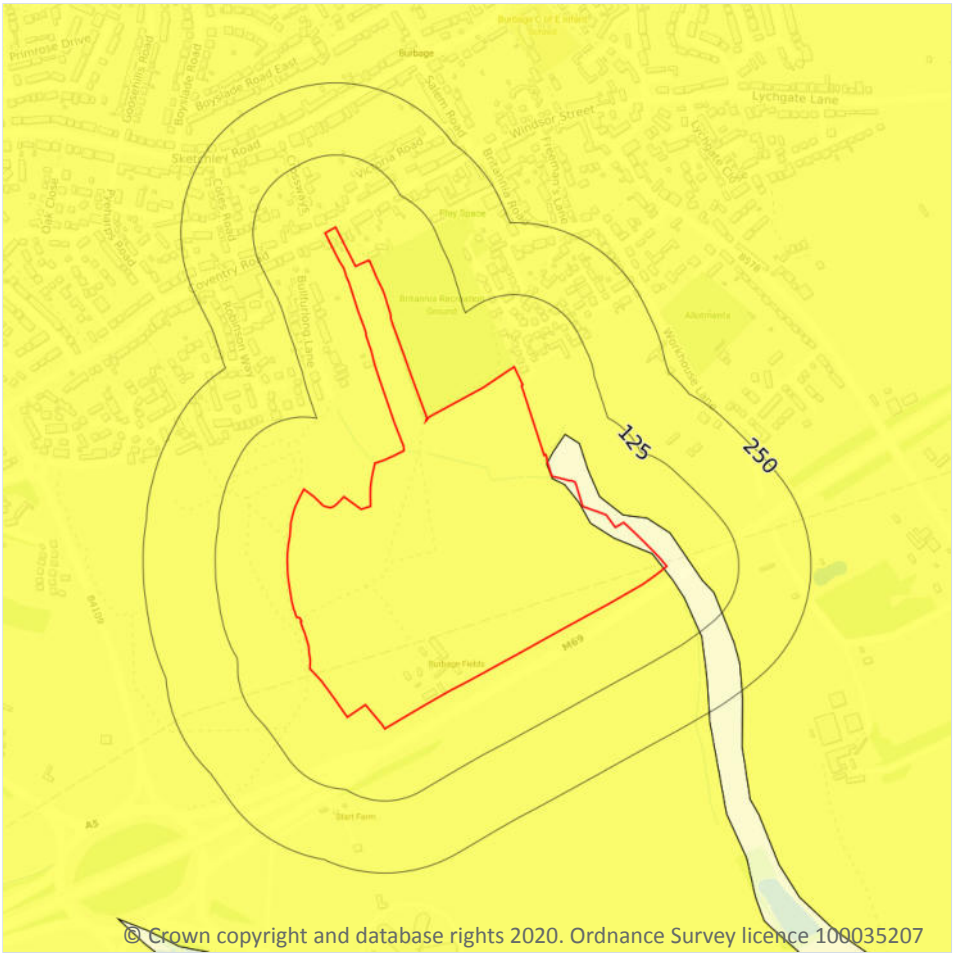
The potential hazard presented by types of ground that may contain layers of very soft materials like clay or peat and may compress if loaded by overlying structures, or if the groundwater level changes, potentially resulting in depression of the ground and disturbance of foundations.

Features are displayed on the Natural ground subsidence - Compressible deposits map on **page 94**

Location	Hazard rating	Details
On site	**Negligible**	**Compressible strata are not thought to occur.**
On site	**Moderate**	**Compressibility and uneven settlement hazards are probably present. Land use should consider specifically the compressibility and variability of the site.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Collapsible deposits



Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.4 Collapsible deposits

Records within 50m	2

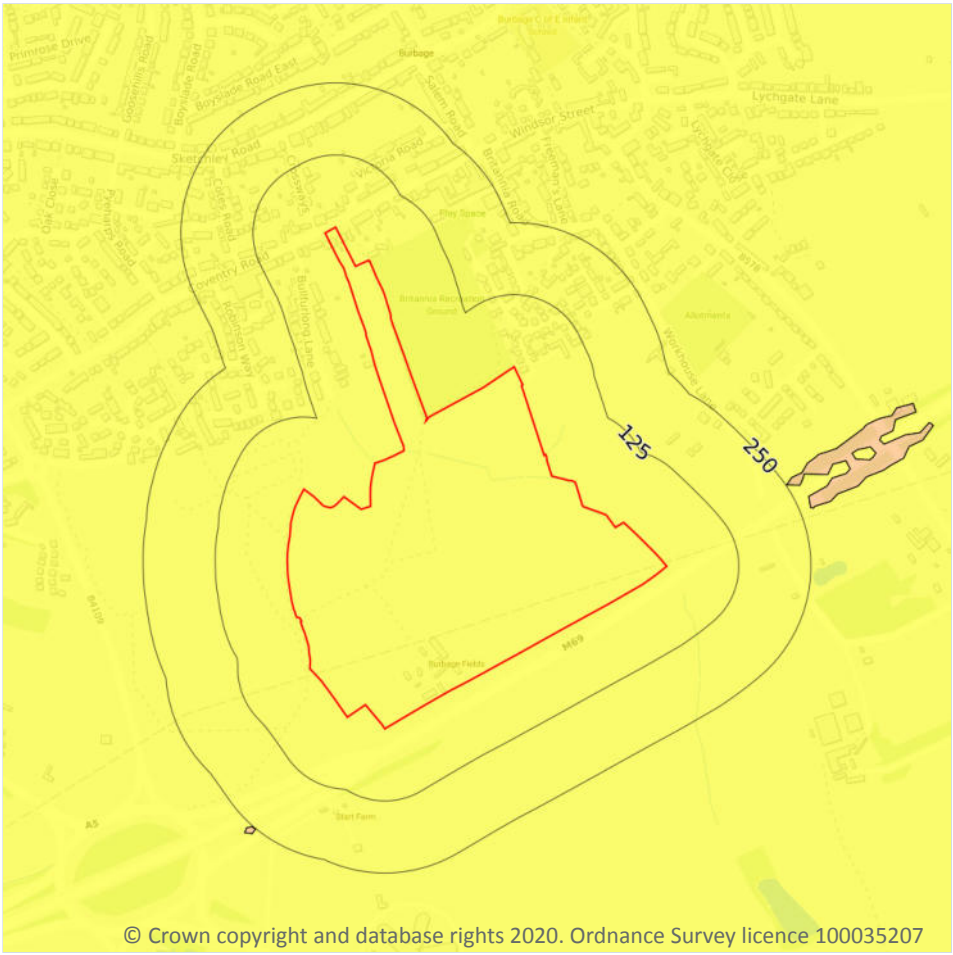
The potential hazard presented by natural deposits that could collapse when a load (such as a building) is placed on them or they become saturated with water.

Features are displayed on the Natural ground subsidence - Collapsible deposits map on **page 96**

Location	Hazard rating	Details
On site	**Negligible**	**Deposits with potential to collapse when loaded and saturated are believed not to be present.**
On site	**Very low**	**Deposits with potential to collapse when loaded and saturated are unlikely to be present.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Landslides



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Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.5 Landslides

Records within 50m	1

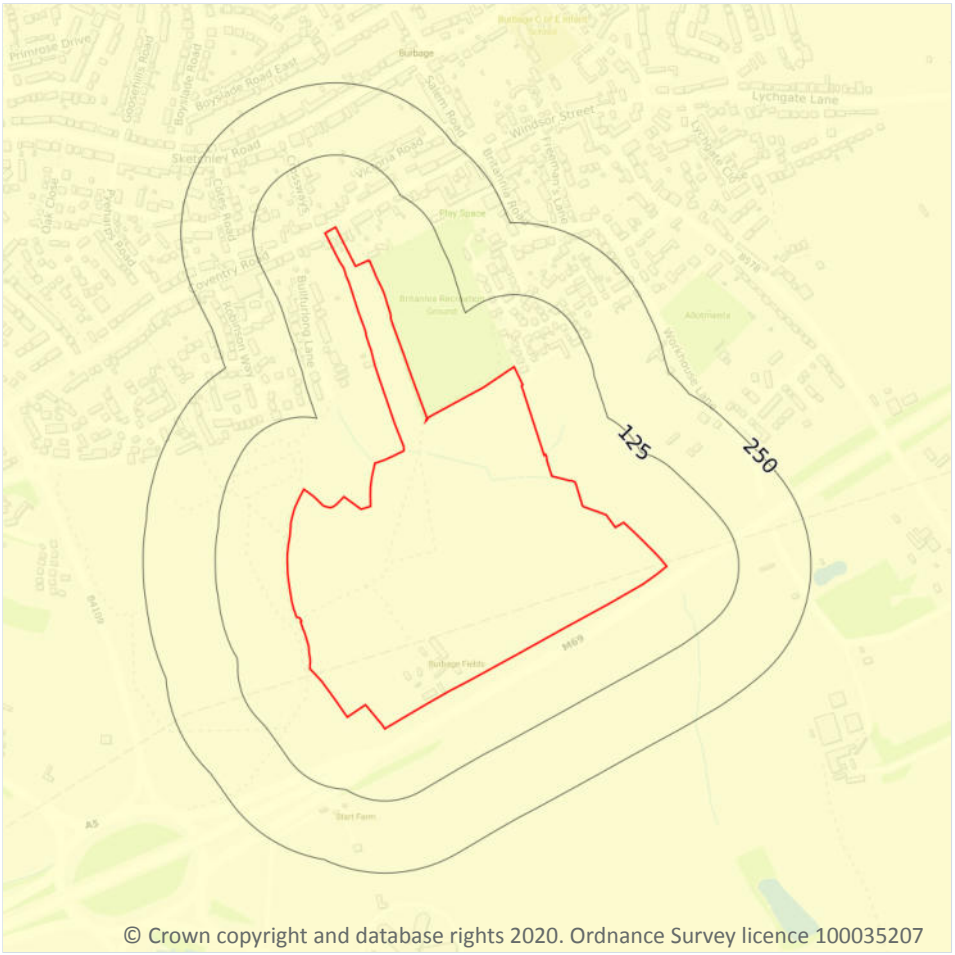
The potential for landsliding (slope instability) to be a hazard assessed using 1:50,000 scale digital maps of superficial and bedrock deposits, combined with information from the BGS National Landslide Database and scientific and engineering reports.

Features are displayed on the Natural ground subsidence - Landslides map on **page 97**

Location	Hazard rating	Details
On site	**Very low**	**Slope instability problems are not likely to occur but consideration to potential problems of adjacent areas impacting on the site should always be considered.**

This data is sourced from the British Geological Survey.

Natural ground subsidence - Ground dissolution of soluble rocks



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Site Outline

Search buffers in metres (m)

- No data
- Negligible
- Very low
- Low
- Moderate
- High

17.6 Ground dissolution of soluble rocks

Records within 50m	1

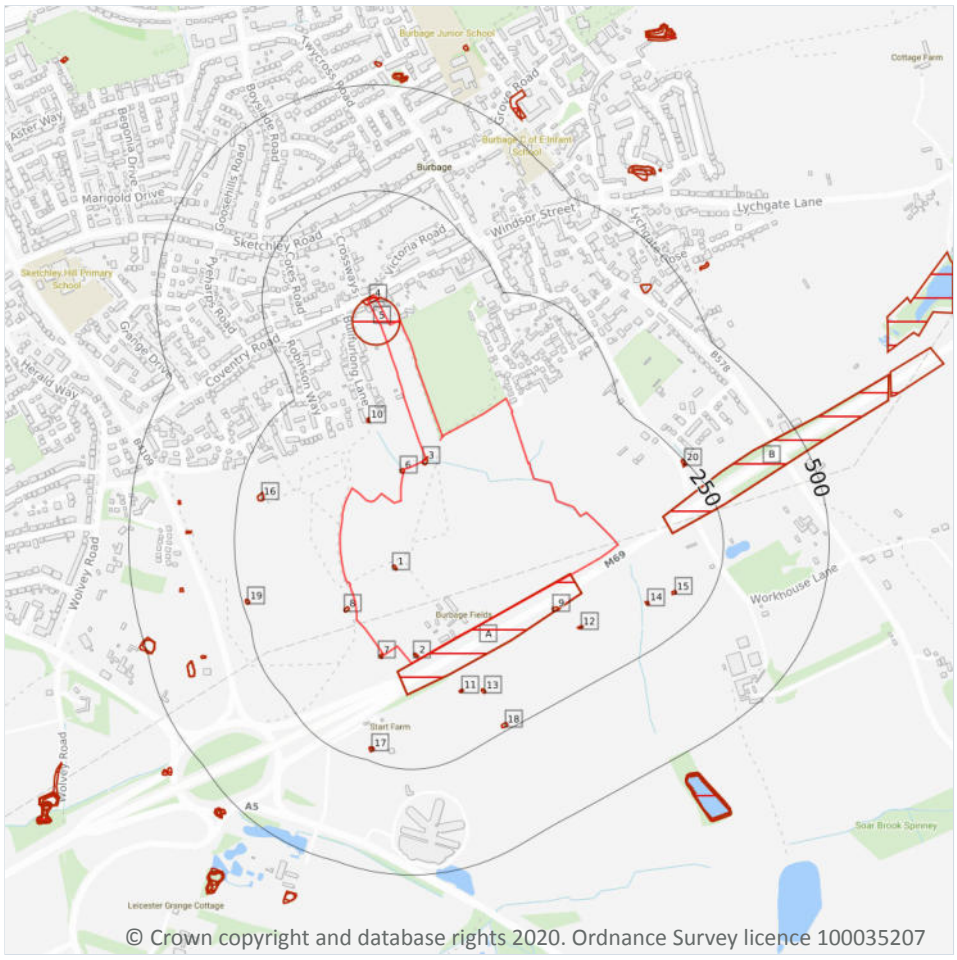
The potential hazard presented by ground dissolution, which occurs when water passing through soluble rocks produces underground cavities and cave systems. These cavities reduce support to the ground above and can cause localised collapse of the overlying rocks and deposits.

Features are displayed on the Natural ground subsidence - Ground dissolution of soluble rocks map on **page 98**

Location	Hazard rating	Details
On site	**Negligible**	**Soluble rocks are either not thought to be present within the ground, or not prone to dissolution. Dissolution features are unlikely to be present.**

This data is sourced from the British Geological Survey.

18 Mining, ground workings and natural cavities



Site Outline

Search buffers in metres (m)

Natural cavities (Area)

Natural cavities (Point)

BritPits

Surface ground workings

Underground workings

Historical Mineral Planning Areas

Mining Cavities

Non Coal Mining

Sporadic underground mining of restricted extent possible

Localised small scale underground mining possible

Small scale mining possible

Underground mining known or likely within or in close proximity

Underground mining known within or in very close proximity

18.1 Natural cavities

Records within 500m	0

Industry recognised national database of natural cavities. Sinkholes and caves are formed by the dissolution of soluble rock, such as chalk and limestone, gulls and fissures by cambering. Ground instability can result from movement of loose material contained within these cavities, often triggered by water.

This data is sourced from Peter Brett Associates (PBA).

18.2 BritPits

Records within 500m	0

BritPits (an abbreviation of British Pits) is a database maintained by the British Geological Survey of currently active and closed surface and underground mineral workings. Details of major mineral handling sites, such as wharfs and rail depots are also held in the database.

This data is sourced from the British Geological Survey.

18.3 Surface ground workings

Records within 250m	24

Historical land uses identified from Ordnance Survey mapping that involved ground excavation at the surface. These features may or may not have been subsequently backfilled.

Features are displayed on the Mining, ground workings and natural cavities map on **page 99**

ID	Location	Land Use	Year of mapping	Mapping scale
1	**On site**	**Pond**	**1938**	**1:10560**
2	**On site**	**Pond**	**1938**	**1:10560**
3	**On site**	**Pond**	**1938**	**1:10560**
4	**On site**	**Unspecified Pits**	**1886**	**1:10560**
5	**On site**	**Unspecified Pit**	**1901**	**1:10560**
6	**On site**	**Pond**	**1938**	**1:10560**
A	**On site**	**Cuttings**	**1977**	**1:10000**
A	**On site**	**Cuttings**	**1983**	**1:10000**
7	2m SW	Pond	1938	1:10560
8	17m W	Pond	1938	1:10560
9	48m SE	Pond	1938	1:10560
10	94m W	Pond	1938	1:10560
11	113m SE	Pond	1938	1:10560
12	117m SE	Pond	1938	1:10560
B	126m NE	Cuttings	1977	1:10000
B	126m NE	Cuttings	1983	1:10000
13	136m SE	Pond	1938	1:10560

ID	Location	Land Use	Year of mapping	Mapping scale
14	147m SE	Pond	1938	1:10560
15	170m SE	Pond	1938	1:10560
16	190m W	Ponds	1938	1:10560
17	218m SW	Pond	1938	1:10560
18	233m SE	Pond	1938	1:10560
19	234m W	Pond	1938	1:10560
20	238m NE	Pond	1938	1:10560

This is data is sourced from Ordnance Survey/Groundsure.

18.4 Underground workings

Records within 1000m	0

Historical land uses identified from Ordnance Survey mapping that indicate the presence of underground workings e.g. mine shafts.

This is data is sourced from Ordnance Survey/Groundsure.

18.5 Historical Mineral Planning Areas

Records within 500m	0

Boundaries of mineral planning permissions for England and Wales. This data was collated between the 1940s (and retrospectively to the 1930s) and the mid 1980s. The data includes permitted, withdrawn and refused permissions.

This data is sourced from the British Geological Survey.

18.6 Non-coal mining

Records within 1000m	0

The potential for historical non-coal mining to have affected an area. The assessment is drawn from expert knowledge and literature in addition to the digital geological map of Britain. Mineral commodities may be divided into seven general categories - vein minerals, chalk, oil shale, building stone, bedded ores, evaporites and 'other' commodities (including ball clay, jet, black marble, graphite and chert).

This data is sourced from the British Geological Survey.

18.7 Mining cavities

Records within 1000m	0

Industry recognised national database of mining cavities. Degraded mines may result in hazardous subsidence (crown holes). Climatic conditions and water escape can also trigger subsidence over mine entrances and workings.

This data is sourced from Peter Brett Associates (PBA).

18.8 JPB mining areas

Records on site	0

Areas which could be affected by former coal mining. This data includes some mine plans unavailable to the Coal Authority.

This data is sourced from Johnson Poole and Bloomer.

18.9 Coal mining

Records on site	0

Areas which could be affected by past, current or future coal mining.

This data is sourced from the Coal Authority.

18.10 Brine areas

Records on site	0

The Cheshire Brine Compensation District indicates areas that may be affected by salt and brine extraction in Cheshire and where compensation would be available where damage from this mining has occurred. Damage from salt and brine mining can still occur outside this district, but no compensation will be available.

This data is sourced from the Cheshire Brine Subsidence Compensation Board.

18.11 Gypsum areas

Records on site	0

Generalised areas that may be affected by gypsum extraction.

This data is sourced from British Gypsum.

18.12 Tin mining

Records on site	0

Generalised areas that may be affected by historical tin mining.

This data is sourced from Mining Searches UK.

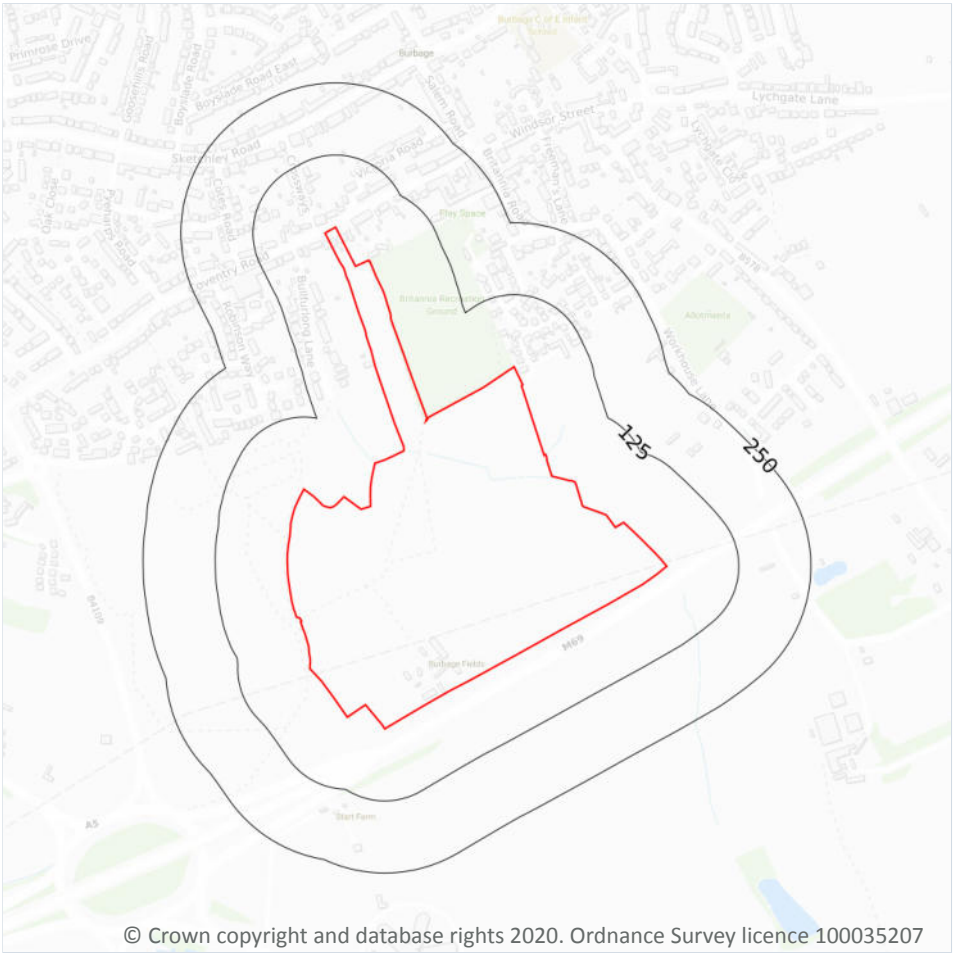
18.13 Clay mining

Records on site	0

Generalised areas that may be affected by kaolin and ball clay extraction.

This data is sourced from the Kaolin and Ball Clay Association (UK).

19 Radon



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Site Outline

Search buffers in metres (m)

Greater than 30%

Between 10% and 30%

Between 5% and 10%

Between 3% and 5%

Between 1% and 3%

Less than 1%

19.1 Radon

Records on site	1

Estimated percentage of dwellings exceeding the Radon Action Level. This data is the highest resolution radon dataset available for the UK and is produced to a 75m level of accuracy to allow for geological data accuracy and a 'residential property' buffer. The findings of this section should supersede any estimations derived from the Indicative Atlas of Radon in Great Britain. The data was derived from both geological assessments and long term measurements of radon in more than 479,000 households.

Features are displayed on the Radon map on **page 104**

Location	Estimated properties affected	Radon Protection Measures required
On site	**Less than 1%**	**None****

This data is sourced from the British Geological Survey and Public Health England.

20 Soil chemistry

20.1 BGS Estimated Background Soil Chemistry

Records within 50m	**16**

The estimated values provide the likely background concentration of the potentially harmful elements Arsenic, Cadmium, Chromium, Lead and Nickel in topsoil. The values are estimated primarily from rural topsoil data collected at a sample density of approximately 1 per 2 km^2. In areas where rural soil samples are not available, estimation is based on stream sediment data collected from small streams at a sampling density of 1 per 2.5 km^2; this is the case for most of Scotland, Wales and southern England. The stream sediment data are converted to soil-equivalent concentrations prior to the estimation.

Location	Arsenic	Bioaccessible Arsenic	Lead	Bioaccessible Lead	Cadmium	Chromium	Nickel
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**40 - 60 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**40 - 60 mg/kg**	**15 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**40 - 60 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**40 - 60 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**60 - 90 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**40 - 60 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**40 - 60 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**40 - 60 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**40 - 60 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**40 - 60 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**40 - 60 mg/kg**	**15 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**40 - 60 mg/kg**	**15 - 30 mg/kg**
On site	**15 mg/kg**	**No data**	**100 mg/kg**	**60 mg/kg**	**1.8 mg/kg**	**40 - 60 mg/kg**	**15 - 30 mg/kg**
17m SE	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	60 - 90 mg/kg	15 - 30 mg/kg
44m N	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg
44m N	15 mg/kg	No data	100 mg/kg	60 mg/kg	1.8 mg/kg	40 - 60 mg/kg	15 - 30 mg/kg

This data is sourced from the British Geological Survey.

20.2 BGS Estimated Urban Soil Chemistry

Records within 50m	0

Estimated topsoil chemistry of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc and bioaccessible Arsenic and Lead in 23 urban centres across Great Britain. These estimates are derived from interpolation of the measured urban topsoil data referred to above and provide information across each city between the measured sample locations (4 per km^2).

This data is sourced from the British Geological Survey.

20.3 BGS Measured Urban Soil Chemistry

Records within 50m	0

The locations and measured total concentrations (mg/kg) of Arsenic, Cadmium, Chromium, Copper, Nickel, Lead, Tin and Zinc in urban topsoil samples from 23 urban centres across Great Britain. These are collected at a sample density of 4 per km^2.

This data is sourced from the British Geological Survey.

21 Railway infrastructure and projects



Site Outline

Search buffers in metres (m)

- Crossrail 1 Stations
- Crossrail 1 Route
- Crossrail 1 Worksites
- Crossrail 2 Stations
- Crossrail 2 Route
- Crossrail 2 Worksites
- Crossrail 2 Safeguarding
- Crossrail 2 Headhouses
- Railway stations
- Active railways
- Active tunnels
- Abandoned railways
- Historic railways
- Historic tunnels
- Underground stations
- Underground Lines
- Royal Mail tunnels
- HS2 optimised route
- HS2 Stations
- HS2 Depots
- HS2 Surface Safeguarding
- HS2 Subsurface Safeguarding

21.1 Underground railways (London)

Records within 250m	0

Details of all active London Underground lines, including approximate tunnel roof depth and operational hours.

This data is sourced from publicly available information by Groundsure.

21.2 Underground railways (Non-London)

Records within 250m	0

Details of the Merseyrail system, the Tyne and Wear Metro and the Glasgow Subway. Not all parts of all systems are located underground. The data contains location information only and does not include a depth assessment.

This data is sourced from publicly available information by Groundsure.

21.3 Railway tunnels

Records within 250m	0

Railway tunnels taken from contemporary Ordnance Survey mapping.

This data is sourced from the Ordnance Survey.

21.4 Historical railway and tunnel features

Records within 250m	3

Railways and tunnels digitised from historical Ordnance Survey mapping as scales of 1:1,250, 1:2,500, 1:10,000 and 1:10,560.

Features are displayed on the Railway infrastructure and projects map on **page 107**

Location	Land Use	Year of mapping	Mapping scale
92m NE	Tunnel	1904	2500
92m NE	Tunnel	1918	2500
92m NE	Tunnel	1938	2500

This data is sourced from Ordnance Survey/Groundsure.

21.5 Royal Mail tunnels

Records within 250m	0

The Post Office Railway, otherwise known as the Mail Rail, is an underground railway running through Central London from Paddington Head District Sorting Office to Whitechapel Eastern Head Sorting Office. The line is 10.5km long. The data includes details of the full extent of the tunnels, the depth of the tunnel, and the depth to track level.

This data is sourced from Groundsure/the Postal Museum.

21.6 Historical railways

Records within 250m	0

Former railway lines, including dismantled lines, abandoned lines, disused lines, historic railways and razed lines.

This data is sourced from OpenStreetMap.

21.7 Railways

Records within 250m	0

Currently existing railway lines, including standard railways, narrow gauge, funicular, trams and light railways.

This data is sourced from Ordnance Survey and OpenStreetMap.

21.8 Crossrail 1

Records within 500m	0

The Crossrail railway project links 41 stations over 100 kilometres from Reading and Heathrow in the west, through underground sections in central London, to Shenfield and Abbey Wood in the east.

This data is sourced from publicly available information by Groundsure.

21.9 Crossrail 2

Records within 500m	0

Crossrail 2 is a proposed railway linking the national rail networks in Surrey and Hertfordshire via an underground tunnel through London.

This data is sourced from publicly available information by Groundsure.

21.10 HS2

Records within 500m	0

HS2 is a proposed high speed rail network running from London to Manchester and Leeds via Birmingham. Main civils construction on Phase 1 (London to Birmingham) of the project began in 2019, and it is currently anticipated that this phase will be fully operational by 2026. Construction on Phase 2a (Birmingham to Crewe) is anticipated to commence in 2021, with the service fully operational by 2027. Construction on Phase 2b (Crewe to Manchester and Birmingham to Leeds) is scheduled to begin in 2023 and be operational by 2033.

This data is sourced from HS2 ltd.

Data providers

Groundsure works with respected data providers to bring you the most relevant and accurate information. To find out who they are and their areas of expertise see https://www.groundsure.com/sources-reference.

Terms and conditions

Groundsure's Terms and Conditions can be accessed at this link: https://www.groundsure.com/terms-and-conditions-jan-2020/.

Appendix E: BGS Borehole Records

soil mechanics department

BOREHOLE No. 214

CONTRACT Coventry-Leicester Motorway Stage II.

REPORT No. 8640/JD

Client Midland R.C.U.

SP 49 SW/32
4410 · 9137
1 : 169

Ground Level 112.61 m.O.D.

Site Address Ansty to Enderby.

Boring Commenced 29.6.71
Boring Completed 29.6.71

Type and Dia. of Boring Shell and Auger 0.2 m. diameter.

Water Strikes	Water Levels Recorded During Boring									
1. 2.4	Hole Depth	4.7	9.0							
2. 6.0 seepage	Casing Depth	4.7	9.0							
3.	Water Level	None	8.5							

Remarks

Description	Depth	Legend	Ref. No.	Type	Depth	S.P.T. N blows/ft
Topsoil.			6472	J	0.20	
	0.35					
Brown silty clayey sand and sandy clay with stones. (sf)			6473	U	0.50- 0.95	
			6474	J	1.30	
			6475	U	2.00- 2.45	
	2.40					
Gravel and brown silty clayey sand. (sf)			6476	D	2.80	12
			6477	J	3.30	
			6478	D	4.30	13
	4.60					
Soft grey sandy boulder clay with traces of marl and chalk. (ci)			6479	U	4.70- 5.15	
			6480	J	5.40	
	6.00					
Firm grey sandy very silty clay with bands of silty calcareous sand, small stones and traces of chalk. (CL)			6481	U	6.00- 6.45	
			6482	J	6.80	
			6483	U	7.50- 7.95	
			6484	J	8.20	
			6485	U	8.55- 9.00	
			6486	J	9.00	
	9.00		6487	W	(2.40)	

Codes: U—Undisturbed Sample D—Large Disturbed Sample J—Jar Sample W—Water Sample

soil mechanics department | TEST PIT 11

CONTRACT Coventry - Leicester Motorway Stage 11 SP 49 SW/34 | REPORT No. 8640/JD

Client Midland R.C.U. | Ground Level 105.17 m.O.D.

Site Address Ansty to Enderby. 44380 91512 . | Boring Commenced 21.7.71 Boring Completed 21.7.71

Type and Dia. of Boring Mechanical Excavator

Water Strikes	Water Levels Recorded During Boring									
1. None	Hole Depth									
2.	Casing Depth									
3.	Water Level									

Remarks: Test Pit. Density at 1.00 m. Pit extended to 2.00 m. and logged.

Description	Depth	Samples Ref. No.	Samples Type	Depth	S.P.T. N blows/ft.
Topsoil.		7012	J	0.30	
Soft brown mottled silty sandy clay with occasional root fibres and carbonaceous traces. (cl)	0.40				
Brown sandy clay with stones and occasional root fibres. (cl)	0.90	7013	J	1.10	
Soft grey silty sandy clay with grey veins. (cl)	1.20	7014	J	1.40	
	2.00				

Scale 20mm = 1 m. Legend

Code: U—Undisturbed Sample D—Large Disturbed Sample J—Jar Sample W—Water Sample

soil mechanics department

TEST & TRIAL PIT 215%

CONTRACT Coventry - Leicester Motorway Stage II SP-49SW/33

REPORT No. 8640/JD

Client Midland R.C.U.

Ground Level 108.12 m.O.D.

Site Address Ansty to Enderby. 44252 91410

Boring Commenced 21.7.71
Boring Completed 21.7.71

Type and Dia. of Boring Mechanical Excavator

Water Strikes	Water Levels Recorded During Boring									
1. None	Hole Depth									
2.	Casing Depth									
3.	Water Level									

Remarks Test & Trial Pit. C.B.R. and Density at 1.00 m.
Pit extended to 4.00 m. and logged.

Description	Scale 20mm = 1 m. Depth	Legend	Samples Ref. No.	Type	Depth	S.P.T. N blows/ft
Topsoil.	0.20					
Stiff brown clay with occasional stones, root fibres and pockets of sand. (cl)			7010	D	1.00	
			7026	J	1.20	
	1.50					
Stiff brown boulder clay with chalk fragments. (ci)			7027	J	1.90	
	4.00					

Code: U—Undisturbed Sample D—Large Disturbed Sample J—Jar Sample W—Water Sample

British Geological Survey

soil mechanics department

BOREHOLE No. 212

CONTRACT Coventry-Leicester Motorway Stage II.

REPORT No. 8640/JD

Client Midland R.C.U.

SP 49 SW/31
4401.9126
1":169

Ground Level 114.431 m.O.D.

Site Address An[illegible] to Enderby.

Boring Commenced 29.6.71
Boring Completed 29.6.71

Type and Dia. of Boring Shell and Auger 0.2 m. diameter. 44016 91234.

Water Strikes	Water Levels Recorded During Boring									
1. 2.8	Hole Depth	3.0	3.8							
2. 3.45 seepage	Casing Depth	3.0	3.6							
3.	Water Level	None	None							

Remarks Installed 2 piezometers - one at each water strike.

Description	Scale 20mm = 1 m. Depth	Legend	Samples Ref. No.	Type	Depth	S.P.T. N blows/ft
Topsoil.			6488	J	0.30	
	0.45					
Stiff brown/grey mottled calcareous boulder clay. (CI)			6489	U	0.50- 0.95	
			6490	J	1.30	
			6491	U	2.00- 2.45	
			6492	J	2.60	
	2.80					
Stiff brown calcareous boulder clay with traces of marl and occasional bands of silty sand. Low stone content at some levels. (ci)			6493	U	3.00- 3.45	
			6494	J	3.80	
			6495	U	4.50- 4.95	
	5.20					
Stiff brown marly boulder clay.(ch)			6496	U	5.20- 5.65	
			6497	J	5.90	
			6498	U	6.50- 6.95	
			6499	J	7.30	
			6500	U	8.05- 8.50	
	8.50		5282	J	8.50	
			5283	W	(2.80)	

Code: U—Undisturbed Sample D—Large Disturbed Sample J—Jar Sample W—Water Sample

soil mechanics department

BOREHOLE No. TEST PIT G

CONTRACT Coventry - Leicester Motorway Stage II

REPORT No. 8640/JD

Client Midland Road Construction Unit

Ground Level 112.06m. O.D.

Site Address Ansty - Enderby

SP 49 SW/30
4380.9117

Boring Commenced 28.7.71
Boring Completed 28.7.71

Type and Dia. of Boring Mechanical Excavator 1":169 43790 91169

Water Strikes	Water Levels Recorded During Boring									
1. NONE	Hole Depth									
2.	Casing Depth									
3.	Water Level									

Remarks

Description	Scale 20mm = 1m. Depth	Legend	Samples Ref. No.	Type	Depth	S.P.T. N blows/ft
Topsoil	0.30		7339	J	0.30	
Brown weakly cemented sand. (SU).	0.40					
Stiff brown sandy clay with occasional stones. (cl).	1.00		7340	J	1.00	

Code: U—Undisturbed Sample D—Large Disturbed Sample J—Jar Sample W—Water Sample

Appendix F: CLR 11 Terminology

The likelihood of an event can be classified on a four-point system using the following terms and definitions based on CIRIA C552:

- Highly likely: the event 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: it is probable that an event will occur or circumstances are such that the event is not inevitable, but possible in the short term and likely over the long term;
- Low likelihood; circumstances are possible under which an event could occur, but it is not certain even in the long term that an event would occur and it is less likely that in the short term; and
- Unlikely: circumstances are such that it is improbable the event would occur even in the long term

The severity can be classified using a similar system also based on CIRIA C552. The terms and definitions relating to severity are:

- Severe: short term (acute) risk to human health likely to result in 'significant harm' as defined by the Environment Protection Act 1990, Part 11A. Short term risk of pollution of sensitive water resources. Catastrophic damage to buildings or property. Short-term risk to an ecosystem or organism forming part of that ecosystem (note definition of ecosystem in 'Draft Circular on Contaminated Land' DETR 2000);
- Medium; chronic damage to human health ('significant harm' as defined in Draft Circular on Contaminated Land', DETR 2000), pollution of sensitive water resources, significant change in an ecosystem or organism forming part of that ecosystem (note definition of ecosystem in Draft Circular on Contaminated Land', DETR 2000);
- Mild: pollution of non-sensitive water resources. Significant damage to crops, buildings, structures and services ('significant harm' as defined in 'Draft Circular on Contaminated Land', DETR 2000). Damage to sensitive buildings, structures or the environment; and
- Minor: harm, not necessarily significant, but that could result in financial loss or expenditure to resolve. Non-permanent human health effects easily prevented by use of personal protective clothing. Easily repairable damage to buildings, structures and services.

Once the likelihood of an event occurring and its severity have been classified, a risk category can be assigned from the table below:

		Consequences			
		Severe	**Medium**	**Mild**	**Minor**
Probability	**Highly likely**	Very high	high	Moderate	Moderate / low
	Likely	High	Moderate	Moderate / low	Low
	Low likelihood	Moderate	Moderate / low	Low	Very low
	Unlikely	Moderate / low	Low	Very low	Very low

Definitions of these risk categories are as shown below with an assessment of the further work that might be required:

- Very high: there is a high probability that severe harm could occur or there is evidence harm is currently happening. This risk, if realised, could result in substantial liability and urgent investigation and remediation are likely to be required;

- High: harm is likely to occur. Realisation of the risk is likely to present a substantial liability and urgent investigation is required and remedial works may be necessary in the short term and are likely over the long term;

- Moderate: it is possible that harm could arise, but it is unlikely that the harm would be severe and it is more likely that harm would be relatively mild. Investigation is normally required to clarify the risk and determine the liability. Some remedial works may be required in the longer term;

- Low: it is possible that harm could occur, but it is likely that if realised this harm would at worst normally be mild; and

- Very Low: there is a low possibility that harm could occur and if realised the harm is likely to be sever.

Rodgers Leask Limited & Rodgers Leask Environmental Limited
01332 285000 • rlderby@rodgersleask.co.uk • **rodgersleask.co.uk**
St James House, St Mary's Wharf, Mansfield Road, Derby DE1 3TQ
Seven House, 18 High Street, Longbridge, Birmingham B31 2UQ

APPENDIX F – SEVERN TRENT WATER SEWER RECORDS & CORRESPONDENCE

WONDERFUL ON TAP

Severn Trent Water Ltd
Oxley Moor Road
Wolverhampton
WV9 5HN

Tel: 07976 449091
www.stwater.co.uk
network.solutions@severntrent.co.uk

Contact: Pierce Meguer

Reference: 1068193

15th December 2022

Redrow Homes
Redrow House
Kinsall Green
Wilnecote
Tamworth
B77 5PX

FAO: jen.towers@redrow.co.uk

Dear Jen,

Proposed development: 430 domestic properties at Burbage Fields Farm, off Bullfurlong Lane, Hinckley, Leicestershire

X: 444038 / Y: 291558

I refer to your 'Development Enquiry Request' in respect of the above site. Please find enclosed the sewer records that are included in the fee together with the Supplementary Guidance Notes which refer to surface water disposal from development sites.

Public Sewers in Site – Required Protection

Having viewed our statutory sewer records, they demonstrate the following sewers passing through the site, with associated protection/no build zones:

- The 300mm combined rising main within the site boundary requires a 10-metre easement across it, 5 metres each side from the centreline of the pipe.

Please consider, due to a change in legislation on 1 October 2011, there may be former private sewers on the site which have transferred to the responsibility of Severn Trent Water Ltd, which are not shown on the statutory sewer records but are located in your client's land. These sewers would also have protective strips that we will not allow to be built over. If such sewers are identified to be present on the site, please contact us for further guidance.

Foul Water Drainage

The topography of the site suggests that a pumping station will be required to establish a connection to the public network. Severn Trent Water anticipate that there is insufficient capacity within the network to accommodate the additional 7l/s (at 2 x DWF) from the development. Hydraulic modelling will be required to determine the impact on the network and whether upgrade works are required in the public network.

The closest point of connection from the site would be the 450mm combined sewer to the Northwest. This network has limited capacity and an offline wastewater storage tank has had to be installed to limit the surcharging and flooding occurrences within the network.

Whilst the flooding events have been reduced the network is still known to flood at the 1 in 20-year storm period, as such a connection upstream of manhole SP43915701 should not be considered.

Severn Trent Water would prefer that a connection into the 450mm combined network at manhole SP43914701 is explored as the primary point of connection.

To connect to this sewer work will be required in 3rd party land, the developer will need to obtain permission from the landowner. If terms cannot be agreed, then you may want to consider approaching Severn Trent Water to lay a sewer on your behalf via Section 98 Water Industry Act 1991, guidance on the process can be found here:

https://www.stwater.co.uk/content/dam/stw/stw_buildinganddeveloping/Guidance-notes-for-developers-adoption-of-sewers_1.pdf

In a change to our previous process, we no longer charge developers for the hydraulic modelling service. We will liaise with you over time with regards to the outcome of our investigations and any impact that may have on the planning status, occupation, or phasing of the site. However, while we can provide a brief summary of our findings if you need us to, we will no longer provide the full external capacity assessment report.

From the application you have submitted, I am assuming that the development has not been granted planning approval. Please inform us as and when planning has progressed as this will help determine how quick we carry out the modelling exercise. In the meantime, the site will be added to our modelling tracker and

reviewed regularly until the site can be progressed for sewer modelling. I would therefore be grateful if you would forward as soon as possible the following details:

- Proposed submission of your Planning Application
- Confirmation whether a pumped solution is required.
- Proposed planned start and completion date.
- Any phasing details of the proposed development.
- Confirm how many properties will discharge into each of the connections to the public sewer.
- Planned occupation date.

Surface Water Drainage

Under the terms of Section H of the Building Regulations 2000, the disposal of surface water by means of soakaways should be considered as the primary method. If these are found to be unsuitable, satisfactory evidence will need to be submitted. The evidence should percolation test results carried out to the BRE365 standard. Previous developments in the area have suggested that soakaways are viable around this location.

Subject to above Severn Trent Water expects all surface water from the development to be drained in a sustainable way to the nearest watercourse or land drainage channel, subject to the developer discussing all aspects of the developments surface water drainage with the Local Lead Flood Authority (LLFA). Any discharge rate to a watercourse or drainage ditch will be determined by the LLFA / EA.

The OS maps show that the multiple land drainage networks exist with the site. This network of drains appears to travel Southwards from the site, under the M69 motorway before discharging into Soar Brook. These drains should be explored as the secondary option should soakaways prove not to be viable.

New Connections

For any new connections (including the re-use of existing connections) to the public sewerage system, the developer will need to submit Section 106 application forms. Our New Connections department are responsible for handling all such enquiries and applications. To contact them for an application form and associated guidance notes please call 0800 707 6600 or download from www.stwater.co.uk.

WONDERFUL ON TAP

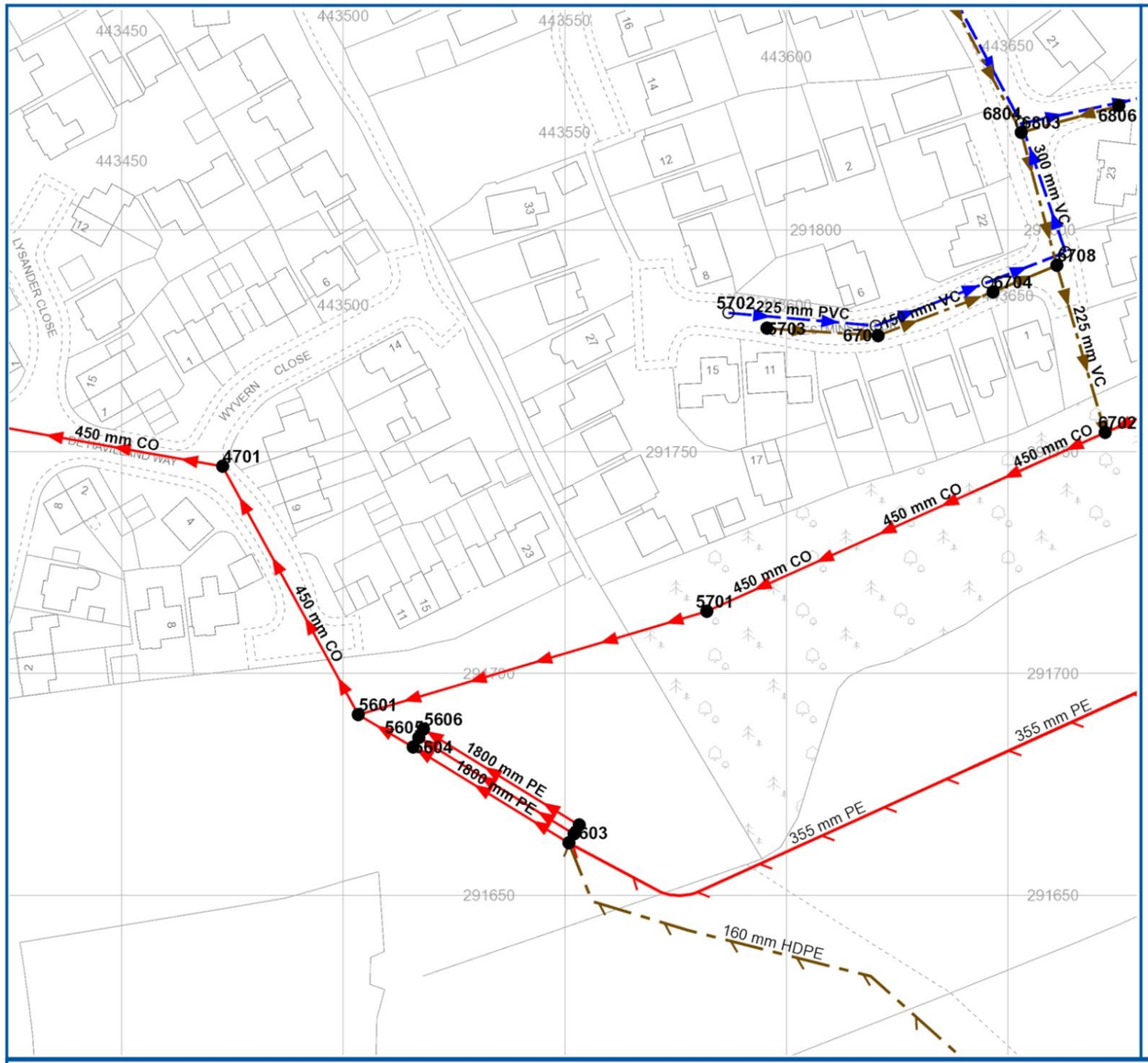
SEVERN TRENT

Please quote is 1068193 in any future correspondence (including e-mails) with STW Limited. Please note that 'Development Enquiry' responses are only valid for 6 months from the date of this letter.

Yours sincerely,

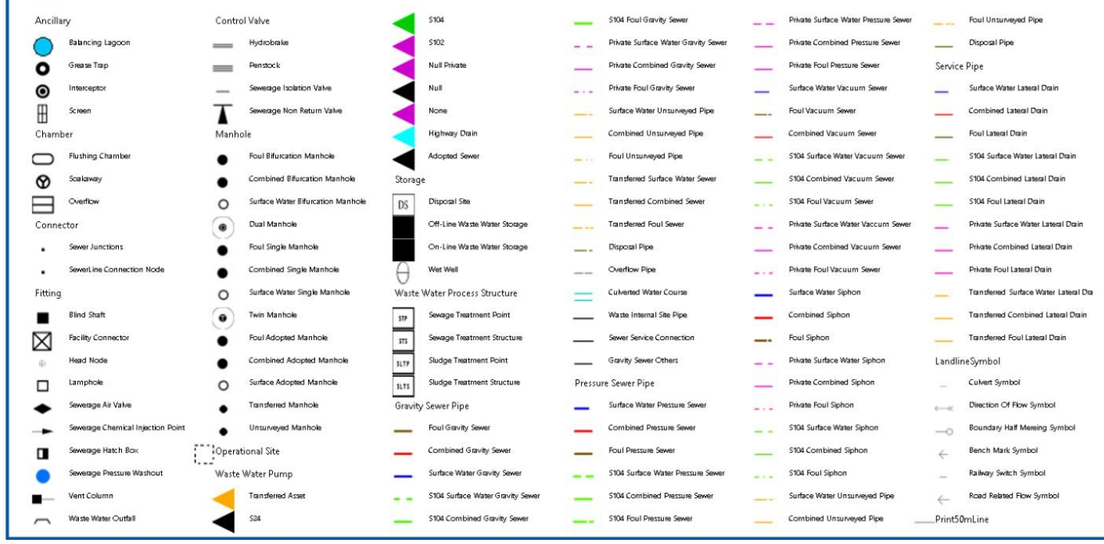


Pierce Meguer
Senior Evaluation Technician
Network Solutions



Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SP43915701	<UNK>	<UNK>	117.12	C	<UNK>	<UNK>	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP43916706	121.384	119.09	118.62	F	VC	C	150	<UNK>	58.91	31/12/1899 00:00:00
SP43916707	120.844	119.54	119.18	S	VC	C	300	<UNK>	85.22	31/12/1899 00:00:00
SP43916703	120.985	119.62	119.55	S	VC	C	300	<UNK>	269.57	31/12/1899 00:00:00
SP43915601	121.26	117.11	117.03	C	CO	C	450	<UNK>	833.13	31/12/1899 00:00:00
SP43915702	121.9079	120.19	119.87	S	PVC	C	225	<UNK>	104.47	31/12/1899 00:00:00
SP43916702	115.98	112.79	<UNK>	C	CO	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP43916708	120.83	118.25	113.04	F	VC	C	225	<UNK>	7.53	31/12/1899 00:00:00
SP43916804	121.372	118.99	118.77	S	CO	C	450	<UNK>	218.41	31/12/1899 00:00:00
SP43916806	120.9169	119.37	118.69	F	VC	C	150	<UNK>	33.53	31/12/1899 00:00:00
SP43915703	121.705	119.59	119.14	F	VC	C	150	<UNK>	55.89	31/12/1899 00:00:00
SP43916705	121.4039	119.86	119.66	S	PVC	C	225	<UNK>	135.2	31/12/1899 00:00:00
SP43916803	121.3949	118.6	118.37	F	VC	C	225	<UNK>	135	31/12/1899 00:00:00
SP43914701	122.08	117.01	115.97	C	CO	C	450	<UNK>	107.58	31/12/1899 00:00:00
SP43916704	120.9629	118.56	118.33	F	VC	C	225	<UNK>	67.83	31/12/1899 00:00:00
SP43915600	119.92	116.69	116.475	C	PE	C	1800	<UNK>	<UNK>	25/01/2017 00:00:00
SP43915602	119.97	116.645	116.43	C	PE	C	1800	<UNK>	<UNK>	25/01/2017 00:00:00
SP43915602	119.97	<UNK>	<UNK>	C	PE	C	1800	<UNK>	<UNK>	25/01/2017 00:00:00
SP43915603	119.86	116.6	116.385	C	PE	C	1800	<UNK>	<UNK>	25/01/2017 00:00:00
SP43915603	119.86	<UNK>	<UNK>	C	PE	C	1800	<UNK>	<UNK>	25/01/2017 00:00:00
SP43915604	120.508	116.385	116.23	C	PP	C	450	<UNK>	<UNK>	25/01/2017 00:00:00
SP43915605	120.493	<UNK>	<UNK>	C	PE	C	1800	<UNK>	<UNK>	25/01/2017 00:00:00
SP43915606	120.574	<UNK>	<UNK>	C	PE	C	1800	<UNK>	<UNK>	25/01/2017 00:00:00

LEGEND



MATERIALS

- - NONE
- AC - ASBESTOS CEME
- BR - BRICK
- CC - CONCRETE BOX CULVERT
- CI - CAST IRON
- CO - CONCRETE
- CSB CONCRETE SEGMENTS (BOLTED)
- CSU - CONCRETE SEGMENTS (UNBOLTED)
- DI - DUCTILE IRON
- GRP - GLASS REINFORCED PLASTIC
- MAC - MASONRY IN REGULAR COURSES
- MAR - MASONRY RANDOMLY COURSED
- PE - POLYETHLENE
- PF - PITCH
- PP - POLYPROPYLENE
- PSC - PLASTIC STEEL COMPOSITE
- PVC - POLYVINYL CHLORIDE
- RPM - REINFORCED PLASTIC MATRIX
- SI - SPUN (GREY) IRON
- ST - STEEL
- U - UNKNOWN
- VC - VITRIFIED CLAY
- XXX - OTHER

CATEGORIES

- W - WEIR
- C - CASCADE
- DB - DAMBOARD
- SE - SIDE ENTRY
- FV - FLAP VALVE
- BD - BACK DROP
- S - SIPHON
- D - HIGHWAY DRAIN
- S104 - SECTION 104

SHAPE

- C - CIRCULAR
- E - EGG SHAPED
- O - OTHER
- R - RECTANGLE
- S - SQUARE
- T - TRAPEZOIDAL
- U - UNKNOWN

PURPOSE

- C - COMBINED
- E - FINAL EFFLUENT
- F - FOUL
- L - SLUDGE
- S - SURFACE WATER



SEVERN TRENT
Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0345 601 6616

SEWER RECORD (Tabular)

O/S Map Scale: 1:1,250 **This map is centred upon:**

Date of Issue: 15-12-22 **X:** 443551.79 **Y:** 291731.81

Disclaimer Statement:

1 Do not scale off this Map.

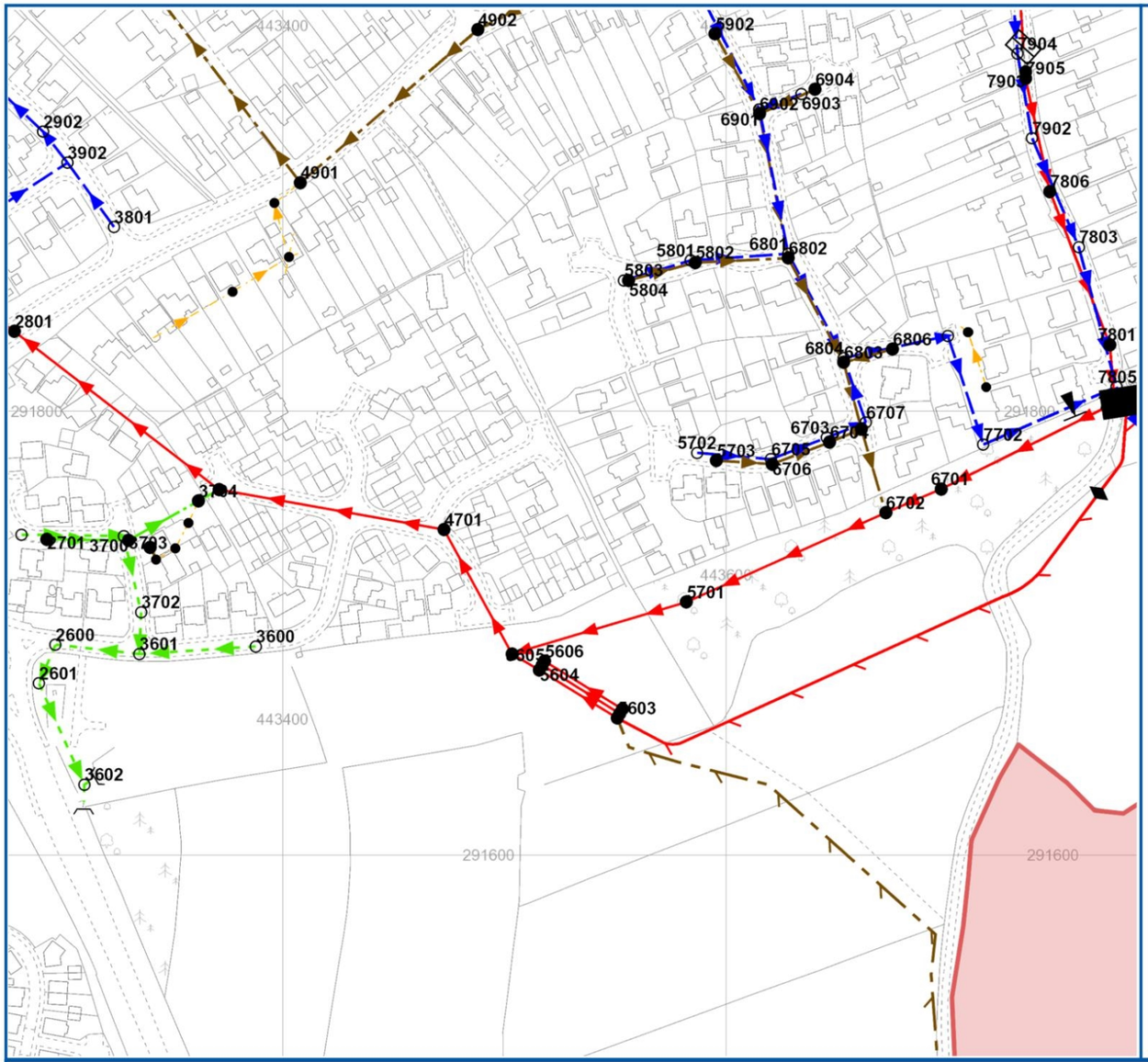
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Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
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SP43914902	124.5699	<UNK>	121.92	F	<UNK>	<UNK>	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP43917803	116.15	115.02	118.44	S	CO	C	375	<UNK>	<UNK>	31/12/1899 00:00:00
SP43917811	0	113.25	112.83	C	CO	C	450	<UNK>	208	31/12/1899 00:00:00
SP43917801	115.4199	114.16	<UNK>	C	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SP43917802	115.36	114.15	113.04	S	CO	C	600	<UNK>	20.24	31/12/1899 00:00:00
SP43917903	118.9499	117.81	117.75	C	VC	C	225	<UNK>	50	31/12/1899 00:00:00
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SP43917805	119.444	118.37	114.29	S	CO	C	375	<UNK>	0.77	31/12/1899 00:00:00
SP43917806	117.0299	114.92	114.18	C	VC	C	225	<UNK>	100.12	31/12/1899 00:00:00
SP43913902	123.1399	121.1	121	S	CO	C	300	<UNK>	178	31/12/1899 00:00:00
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SP43916902	123.582	121.18	120.15	F	VC	C	225	<UNK>	64.36	31/12/1899 00:00:00

LEGEND

Ancillary
- Balancing Lagoon
- Grease Trap
- Interceptor
- Screen

Chamber
- Flushing Chamber
- Scalaway
- Overflow

Fitting
- Blind Shaft
- Facility Connector
- Head Node
- Lamphole
- Sewerage Air Valve
- Sewerage Chemical Injection Point
- Sewerage Hatch Box
- Sewerage Pressure Washout
- Vent Column
- Waste Water Outfall

Control Valve
- Hydrobrake
- Penstock
- Sewerage Isolation Valve
- Sewerage Non Return Valve

Manhole
- Foul Bifurcation Manhole
- Combined Bifurcation Manhole
- Surface Water Bifurcation Manhole
- Dual Manhole
- Foul Single Manhole
- Combined Single Manhole
- Surface Water Single Manhole
- Twin Manhole
- Foul Adopted Manhole
- Combined Adopted Manhole
- Surface Adopted Manhole
- Transferred Manhole
- Unsurveyed Manhole

Operational Site

Waste Water Pump
- Transferred Asset
- S24
- S104
- S102
- Null Private
- Null
- None
- Highway Drain
- Adopted Sewer

Storage
- DS Disposal Site
- Off-Line Waste Water Storage
- On-Line Waste Water Storage
- Wet Well

Waste Water Process Structure
- STP Sewage Treatment Point
- STS Sewage Treatment Structure
- SLTP Sludge Treatment Point
- SLTS Sludge Treatment Structure

Gravity Sewer Pipe
- Foul Gravity Sewer
- Combined Gravity Sewer
- Surface Water Gravity Sewer
- S104 Surface Water Gravity Sewer
- S104 Combined Gravity Sewer
- S104 Foul Gravity Sewer
- Private Surface Water Gravity Sewer
- Private Combined Gravity Sewer
- Private Foul Gravity Sewer
- Surface Water Unsurveyed Pipe
- Combined Unsurveyed Pipe
- Foul Unsurveyed Pipe
- Transferred Surface Water Sewer
- Transferred Combined Sewer
- Transferred Foul Sewer
- Disposal Pipe
- Overflow Pipe
- Culverted Water Course
- Waste Internal Site Pipe
- Sewer Service Connection
- Gravity Sewer Others

Pressure Sewer Pipe
- Surface Water Pressure Sewer
- Combined Pressure Sewer
- Foul Pressure Sewer
- S104 Surface Water Pressure Sewer
- S104 Combined Pressure Sewer
- S104 Foul Pressure Sewer
- Private Surface Water Pressure Sewer
- Private Combined Pressure Sewer
- Private Foul Pressure Sewer
- Surface Water Vacuum Sewer
- Foul Vacuum Sewer
- Combined Vacuum Sewer
- S104 Surface Water Vacuum Sewer
- S104 Combined Vacuum Sewer
- S104 Foul Vacuum Sewer
- Private Surface Water Vaccum Sewer
- Private Combined Vacuum Sewer
- Private Foul Vacuum Sewer
- Surface Water Siphon
- Combined Siphon
- Foul Siphon
- Private Surface Water Siphon
- Private Combined Siphon
- Private Foul Siphon
- S104 Surface Water Siphon
- S104 Combined Siphon
- S104 Foul Siphon
- Surface Water Unsurveyed Pipe
- Combined Unsurveyed Pipe
- Foul Unsurveyed Pipe
- Disposal Pipe

Service Pipe
- Surface Water Lateral Drain
- Combined Lateral Drain
- Foul Lateral Drain
- S104 Surface Water Lateral Drain
- S104 Combined Lateral Drain
- S104 Foul Lateral Drain
- Private Surface Water Lateral Drain
- Private Combined Lateral Drain
- Private Foul Lateral Drain
- Transferred Surface Water Lateral Dra
- Transferred Combined Lateral Drain
- Transferred Foul Lateral Drain

Print200mLine

MATERIALS

-	- NONE
AC	- ASBESTOS CEME
BR	- BRICK
CC	- CONCRETE BOX CULVERT
CI	- CAST IRON
CO	- CONCRETE
CSB	CONCRETE SEGMENTS (BOLTED)
CSU	- CONCRETE SEGMENTS (UNBOLTED)
DI	- DUCTILE IRON
GRP	- GLASS REINFORCED PLASTIC
MAC	- MASONRY IN REGULAR COURSES
MAR	- MASONRY RANDOMLY COURSED
PE	- POLYETHLENE
PF	- PITCH
PP	- POLYPROPYLENE
PSC	- PLASTIC STEEL COMPOSITE
PVC	- POLYVINYL CHLORIDE
RPM	- REINFORCED PLASTIC MATRIX
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ST	- STEEL
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VC	- VITRIFIED CLAY
XXX	- OTHER

CATEGORIES

W	- WEIR
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DB	- DAMBOARD
SE	- SIDE ENTRY
FV	- FLAP VALVE
BD	- BACK DROP
S	- SIPHON
D	- HIGHWAY DRAIN
S104	- SECTION 104

SHAPE

C	- CIRCULAR
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O	- OTHER
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PURPOSE

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N W E S

SEVERN TRENT

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Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0345 601 6616

SEWER RECORD (Tabular)

O/S Map Scale: 1:2,500 **This map is centred upon:**

Date of Issue: 15-12-22 **X:** 443530.63 **Y:** 291745.24

Disclaimer Statement:

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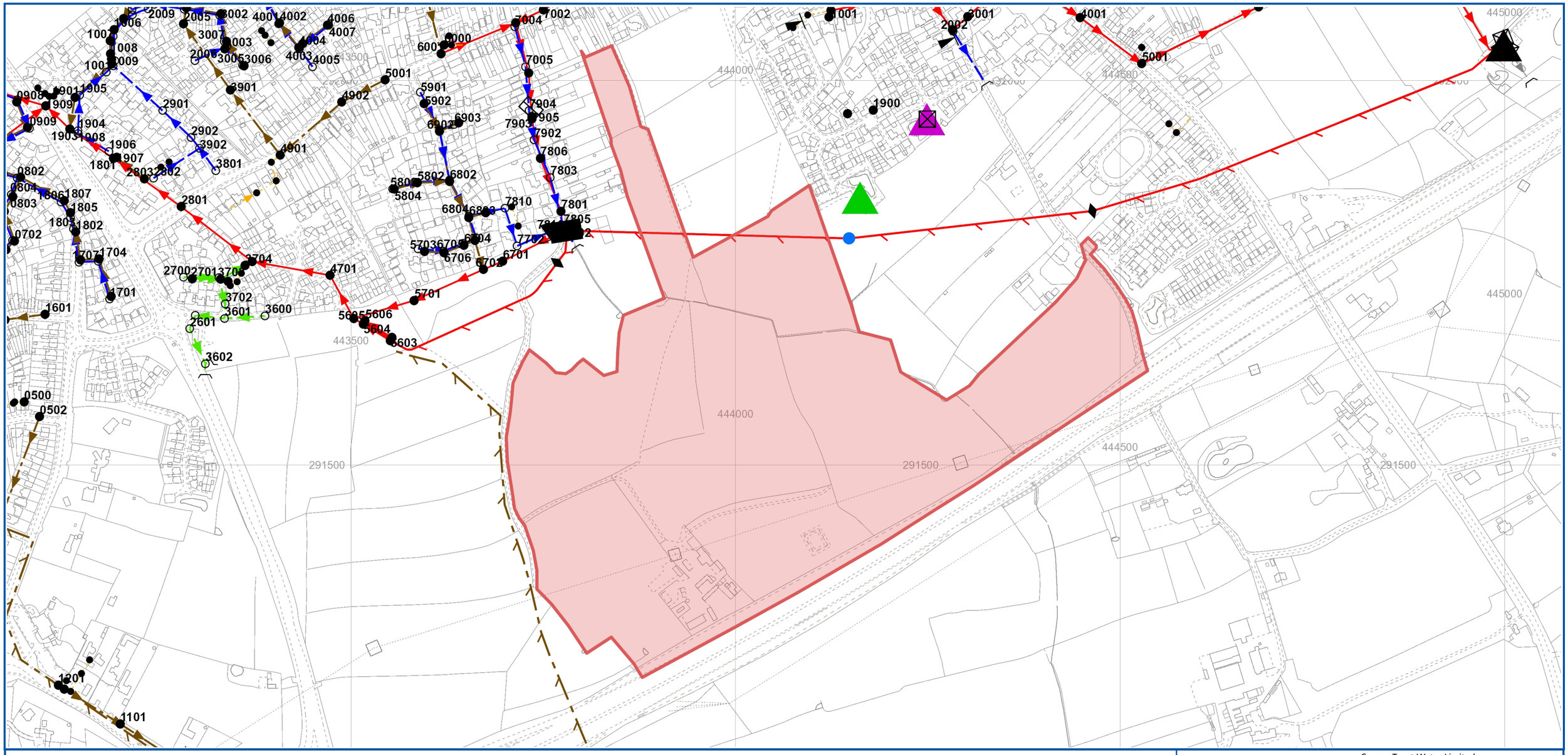
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LEGEND

Ancillary
- Balancing Lagoon
- Grease Trap
- Interceptor
- Screen

Chamber
- Flushing Chamber
- Soakaway
- Overflow

Fitting
- Blind Shaft
- Facility Connector
- Head Node
- Lamphole
- Sewerage Air Valve
- Sewerage Chemical Injection Point
- Sewerage Hatch Box
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Control Valve
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Manhole
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- Surface Adopted Manhole
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Operational Site

Waste Water Pump
- Transferred Asset
- S24
- S104

S102
- Null Private
- Null
- None
- Highway Drain
- Adopted Sewer

Storage
- Disposal Site
- Off-Line Waste Water Storage
- On-Line Waste Water Storage
- Wet Well

Waste Water Process Structure
- Sewage Treatment Point
- Sewage Treatment Structure
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Gravity Sewer Pipe
- Foul Gravity Sewer
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- Surface Water Gravity Sewer
- S104 Surface Water Gravity Sewer
- S104 Combined Gravity Sewer
- S104 Foul Gravity Sewer
- Private Surface Water Gravity Sewer
- Private Combined Gravity Sewer
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- Surface Water Unsurveyed Pipe
- Combined Unsurveyed Pipe
- Foul Unsurveyed Pipe
- Transferred Surface Water Sewer
- Transferred Combined Sewer
- Transferred Foul Sewer
- Disposal Pipe
- Overflow Pipe
- Culverted Water Course
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- Sewer Service Connection
- Gravity Sewer Others

Pressure Sewer Pipe
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- Combined Pressure Sewer
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- S104 Surface Water Pressure Sewer
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- S104 Foul Vacuum Sewer
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- Private Foul Vacuum Sewer
- Surface Water Siphon
- Combined Siphon
- Foul Siphon
- Private Surface Water Siphon
- Private Combined Siphon
- Private Foul Siphon
- S104 Surface Water Siphon
- S104 Combined Siphon
- S104 Foul Siphon

Service Pipe
- Surface Water Lateral Drain
- Combined Lateral Drain
- Foul Lateral Drain
- S104 Surface Water Lateral Drain
- S104 Combined Lateral Drain
- S104 Foul Lateral Drain
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- Private Combined Lateral Drain
- Private Foul Lateral Drain
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- Transferred Combined Lateral Drain
- Transferred Foul Lateral Drain

Print500mLine

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N W E S

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Asset Data Management
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Coventry
CV3 9FT
Telephone: 0345 601 6616

SEWER RECORD

O/S Map Scale: 1:5,000

Date of Issue: 15-12-22

This map is centred upon:

X: 444062.90 **Y:** 291614.34

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Jamie Royle

From: Nowak, Emma <Emma.Nowak@severntrent.co.uk>
Sent: 23 August 2023 15:24
To: Jon Davey; Alan Staley
Cc: Jamie Royle; Akehurst, Gareth-SV
Subject: RE: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193 [Filed 23 Aug 2023 17:15]

ST Classification: OFFICIAL PERSONAL

Hi Jon & Alan,

I can now confirm we have received the results for the follow up modelling.

For this follow-on assessment the impact of the proposed development discharging to the sewer network is as follows :

- 377 dwellings pumped at a rate of 4l/s, discharging into the public sewer in Coventry Road between manholes 8101 & 7002, with the remaining 65 No dwellings discharging with a pumped connection at a rate of 2.5 l/s into the neighbouring S104 development site that eventually discharges into manhole 9102 upstream of BURBAGE LYCHGATE LANE SPS.

In summary this proposal triggers a 'Very Low' Flooding impact risk, a 'Low' Pollution impact risk and a 'Very Low' Operational impact risk. In summary network improvements are not thought to be required to accommodate this proposal. On this basis, it is recommendation that you pursue this avenue for your connection points for the proposed development.

Kind regards
Emma Nowak
Senior Evaluation Technician
Network Solutions
Developer Services

For further information on guidance and applications please follow the link below:
https://www.stwater.co.uk/building-and-developing/regulations-and-forms/application-forms-and-guidance/

We have listened to our customers & local communities and as a result, Severn Trent have made a pledge to transform and protect the health of our rivers. For more information please follow the link below:
https://www.stwater.co.uk/get-river-positive/our-river-pledges/

WONDERFUL ON TAP
SEVERN TRENT
Proudly supporting LGBTQ+ inclusion
Mental Health Aware
MHFA England

From: Nowak, Emma
Sent: 11 August 2023 15:06
To: Jon Davey <jon@farrowwalsh.co.uk>; Akehurst, Gareth-SV <Gareth-SV.Akehurst@severntrent.co.uk>
Cc: Jamie Royle <jamie@farrowwalsh.co.uk>; Alan Staley <alan.staley@redrow.co.uk>
Subject: RE: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193

Hi Jon, hope you are well.

Speaking to our TAP (Tactical Asset Planning Team), Lychgate Lane is currently on the AMP8 WINEP list, with AMP 8 starting from April 2025. However as it has fairly low activation numbers it's possible it may fall out of the programme in favour of a different asset within the catchment with a higher number of activations. As the storage

provision at this site is sufficient and the CSO spill volume increase is not significant we'd probably not be looking to invest at this site currently. However, the modelling teams for the catchment have been made aware about this development though to ensure that it is included in assessments. It'd still be preferential to discharge to the west to avoid any detriment to Lychgate Lane, thus if the modelling comes back for the larger part of the site as OK to connect towards the west in Coventry Road, this is the direction we should pursue. I will update you once we receive the modelling results.

Kind Regards

Emma Nowak
Senior Evaluation Technician
Network Solutions
Developer Services

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SEVERN TRENT
Proudly supporting LGBTQ+ inclusion
Mental Health Aware
MHFA England

From: Jon Davey <jon@farrowwalsh.co.uk>
Sent: 11 August 2023 13:46
To: Nowak, Emma <Emma.Nowak@severntrent.co.uk>; Akehurst, Gareth-SV <Gareth-SV.Akehurst@severntrent.co.uk>
Cc: Jamie Royle <jamie@farrowwalsh.co.uk>; Alan Staley <alan.staley@redrow.co.uk>
Subject: RE: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193

ST Classification: OFFICIAL PERSONAL

Caution: This is an external email originating outside Severn Trent. Think before you click on links or open attachments.

Afternoon Emma

Just following up on our meeting last week.

Can you provide an udpate on the actions discussed, in particular the potential upgrade works to the Lychgate PS.

Best Wishes

Jon Davey Principal Engineer

Office Telephone 0330 100 0363

Leicester 62 Highcross Street LE1 4NN – Birmingham 321 Bradford Street B5 6ET

Company Number 06682625

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From: Nowak, Emma <Emma.Nowak@severntrent.co.uk>
Sent: Wednesday, August 2, 2023 9:20 AM
To: Akehurst, Gareth-SV <Gareth-SV.Akehurst@severntrent.co.uk>; Jon Davey <jon@farrowwalsh.co.uk>
Cc: Jamie Royle <jamie@farrowwalsh.co.uk>; Alan Staley <alan.staley@redrow.co.uk>
Subject: RE: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193 [Filed 02 Aug 2023 13:14]

ST Classification: OFFICIAL PERSONAL

Hi Gareth, no problem. We will still go ahead with Friday's meeting, however if there's any questions relating to the 102/104 site, and I cannot answer them myself, I will pass these on to you following the meeting.

Kind Regards

Emma Nowak
Senior Evaluation Technician
Network Solutions
Developer Services
Mobile : 07970361864
Emma.Nowak@severntrent.co.uk

For further information on guidance and applications please follow the link below:
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WONDERFUL ON TAP
SEVERN TRENT
Proudly supporting LGBTQ+ inclusion
Mental Health Aware
MHFA England

From: Akehurst, Gareth-SV <Gareth-SV.Akehurst@severntrent.co.uk>
Sent: 02 August 2023 09:18
To: Nowak, Emma <Emma.Nowak@severntrent.co.uk>; Jon Davey <jon@farrowwalsh.co.uk>
Cc: Jamie Royle <jamie@farrowwalsh.co.uk>; Alan Staley <alan.staley@redrow.co.uk>
Subject: RE: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193

ST Classification: OFFICIAL PERSONAL

Morning Emma.

Thanks for the Teams invite.

I unfortunately cannot make Friday as I'm on annual leave. Is there any other date/time available for the meeting?

Thanks.

Kind regards.

Gareth Akehurst
Adoptions Engineering Technician
Developer Services
Mobile: 07966722211
Gareth-sv.akehurst@severntrent.co.uk

Postal Address
Developer Services
Severn Trent Centre
PO Box 5311
Coventry
CV3 9FL
Sat Nav CV1 2LZ

www.stwater.co.uk

We have now made it easier to apply and pay online
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Codes for Adoption

Codes for Adoption went live April 2020 - Please click on the above link for more information on the new processes for sewer adoptions

WONDERFUL ON TAP SEVERN TRENT

From: Nowak, Emma <Emma.Nowak@severntrent.co.uk>
Sent: 02 August 2023 08:08
To: Jon Davey <jon@farrowwalsh.co.uk>; Akehurst, Gareth-SV <Gareth-SV.Akehurst@severntrent.co.uk>
Cc: Jamie Royle <jamie@farrowwalsh.co.uk>; Alan Staley <alan.staley@redrow.co.uk>
Subject: RE: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193

Hi Jon, that's fine with me I'll send an invite out.

Kind Regards

Emma Nowak
Senior Evaluation Technician
Network Solutions
Developer Services
Mobile : 07970361864
Emma.Nowak@severntrent.co.uk

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https://www.stwater.co.uk/building-and-developing/regulations-and-forms/application-forms-and-guidance/

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https://www.stwater.co.uk/get-river-positive/our-river-pledges/

WONDERFUL ON TAP SEVERN TRENT Proudly supporting LGBTQ+ inclusion Mental Health Aware MHFA England

---

From: Jon Davey <jon@farrowwalsh.co.uk>
Sent: 01 August 2023 16:31
To: Nowak, Emma <Emma.Nowak@severntrent.co.uk>; Akehurst, Gareth-SV <Gareth-SV.Akehurst@severntrent.co.uk>
Cc: Jamie Royle <jamie@farrowwalsh.co.uk>; Alan Staley <alan.staley@redrow.co.uk>
Subject: RE: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193

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Hi Emma

IS Friday at 1300 ok for you?

Best Wishes

Jon Davey Principal Engineer

Office Telephone 0330 100 0363

farrow walsh CONSULTING

Leicester 62 Highcross Street LE1 4NN – Birmingham 321 Bradford Street B5 6ET

Company Number 06682625

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From: Nowak, Emma <Emma.Nowak@severntrent.co.uk>
Sent: Tuesday, August 1, 2023 4:10 PM
To: Jon Davey <jon@farrowwalsh.co.uk>; Akehurst, Gareth-SV <Gareth-SV.Akehurst@severntrent.co.uk>
Cc: Jamie Royle <jamie@farrowwalsh.co.uk>; Alan Staley <alan.staley@redrow.co.uk>
Subject: RE: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193

HI Jon, absolutely – no problem.

Please let me know your availability for this week, and I'll send out a TEAMS invite.

Apologies, this was meant to read Lychgate Lane SPS (Sewerage Pumping Station) and refers to the name of the receiving pumping station downstream of the proposed connection point.

Kind Regards,

Emma Nowak
Senior Evaluation Technician
Network Solutions
Developer Services

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From: Jon Davey <jon@farrowwalsh.co.uk>
Sent: 01 August 2023 10:44
To: Network Solutions <Network.Solutions@severntrent.co.uk>; Akehurst, Gareth-SV <Gareth-SV.Akehurst@severntrent.co.uk>
Cc: Jamie Royle <jamie@farrowwalsh.co.uk>; Alan Staley <alan.staley@redrow.co.uk>
Subject: RE: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193

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Hi Emma

Thanks for the response.

Would it be possible to arrange to a quick Teams call to discuss this matter further later week?

Can you also clarify what Lychgate Lane SS refers to?

Best Wishes

Jon Davey Principal Engineer

Office Telephone 0330 100 0363

Leicester 62 Highcross Street LE1 4NN – Birmingham 321 Bradford Street B5 6ET

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From: Network Solutions <Network.Solutions@severntrent.co.uk>
Sent: Wednesday, July 26, 2023 11:33 AM
To: Jon Davey <jon@farrowwalsh.co.uk>; Akehurst, Gareth-SV <Gareth-SV.Akehurst@severntrent.co.uk>
Cc: Jamie Royle <jamie@farrowwalsh.co.uk>
Subject: RE: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193 [Filed 01 Aug 2023 09:29]

Hi Jon, I hope you are well.

I can confirm we have now received the modelling results for the proposed development at Burbage Fields Farm.

Two scenarios were modelled for foul flows from the development, and triggered the following results:-

- 442 residential dwelling development with pumped connection into the neighbouring S104 development site at a rate of 4l/s. This proposal triggers a 'Very Low' flood risk impact, a 'High' Pollution impact and a 'Very Low' Operational impact risk. The high pollution impact risk is triggered as a result of increased spills of the LYCHGATE LANE SS).

- 442 residential dwelling development with pumped connection into the existing sewer network in De Haviland Way at manhole 4701 at a rate of 4l/s. This proposal triggers a 'Very Low' Flooding impact risk and a 'Low' Pollution impact risk.

In conclusion the proposal to connect into the neighbouring S104 development site would require network improvements, whereas the proposal to connect into the existing sewers of De Haviland Way does not require network improvements. Please note that it make take many years before a growth scheme/improvement works are prioritised for this site. Therefore on this basis, as previously advised, it is preferred that a connection is made to the combined network west of the site in De Haviland Way.

Kind Regards,
Emma Nowak
Senior Evaluation Technician
Network Solutions
Developer Services

For further information on guidance and applications please follow the link below:
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From: Network Solutions
Sent: 04 July 2023 11:15
To: Jon Davey <jon@farrowwalsh.co.uk>; Akehurst, Gareth-SV <Gareth-SV.Akehurst@severntrent.co.uk>
Cc: Jamie Royle <jamie@farrowwalsh.co.uk>
Subject: RE: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193

Many thanks for confirming this Jon.

I shall be in touch as soon as we receive the modelling results.

Kind Regards

Emma Nowak
Senior Evaluation Technician
Network Solutions
Developer Services

For further information on guidance and applications please follow the link below:
https://www.stwater.co.uk/building-and-developing/regulations-and-forms/application-forms-and-guidance/

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From: Jon Davey <jon@farrowwalsh.co.uk>
Sent: 26 June 2023 10:42
To: Network Solutions <Network.Solutions@severntrent.co.uk>; Akehurst, Gareth-SV <Gareth-SV.Akehurst@severntrent.co.uk>
Cc: Jamie Royle <jamie@farrowwalsh.co.uk>
Subject: RE: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193

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Emma

Having discussed the existing S104 capacity with eh client they have advised, they feel the S104 sewers will have more than enough capacity but are happy to adjust the size of the wet well in the new site if required.

Best Wishes

Jon Davey Principal Engineer

Office Telephone 0330 100 0363



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From: Jon Davey
Sent: Monday, June 26, 2023 9:05 AM
To: Network Solutions <Network.Solutions@severntrent.co.uk>; Akehurst, Gareth-SV <Gareth-SV.Akehurst@severntrent.co.uk>
Cc: Jamie Royle <jamie@farrowwalsh.co.uk>
Subject: RE: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193 [Filed 26 Jun 2023 09:05]

Morning Emma

Thanks for the confirmation.

I will ask for clarity from the client regarding the S104 sewers to the east.

Best Wishes

Jon Davey Principal Engineer

Office Telephone 0330 100 0363



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From: Network Solutions <Network.Solutions@severntrent.co.uk>
Sent: Saturday, June 24, 2023 11:47 AM
To: Jon Davey <jon@farrowwalsh.co.uk>; Akehurst, Gareth-SV <Gareth-SV.Akehurst@severntrent.co.uk>
Cc: Jamie Royle <jamie@farrowwalsh.co.uk>
Subject: RE: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193

Hi Jon,

I can confirm the site has now progressed for modelling, please allow 6-8 weeks for completion. Although we do not issue the external report, we will contact you upon receipt of the assessment to provide a brief summary of our findings.

To confirm, the site of 442 houses is to pump flows (foul only) at 4l/s into the adjacent 102 site (72 houses). From here, both sites will drain via gravity into the 525mm combined sewer network upstream of the SPS. I presume that the 104 sewers at the adjacent site to the east (approx. 72 houses) have been designed to accommodate the pump flows from the 442 houses.

Kind Regards
Emma Nowak
Senior Evaluation Technician
Network Solutions
Developer Services

For further information on guidance and applications please follow the link below:
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https://www.stwater.co.uk/get-river-positive/our-river-pledges/

WONDERFUL ON TAP SEVERN TRENT Proudly supporting LGBTQ+ inclusion Mental Health Aware MHFA England

From: Jon Davey <jon@farrowwalsh.co.uk>
Sent: 16 June 2023 15:20
To: Network Solutions <Network.Solutions@severntrent.co.uk>; Akehurst, Gareth-SV <Gareth-SV.Akehurst@severntrent.co.uk>
Cc: Jamie Royle <jamie@farrowwalsh.co.uk>; Dsengwaste <Dsengwaste@severntrent.co.uk>
Subject: RE: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193

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Hi Emma

See attached the S104 design ad S104 as built survey for the adjacent site.

I understand these have or are about to be submitted in for S102. The connection would be via a pumped connection, with a flow rate of circa 4.0l/s (Based on 442 plots but requires detailed design by a specialist).

Best Wishes

Jon Davey Principal Engineer

Office Telephone 0330 100 0363

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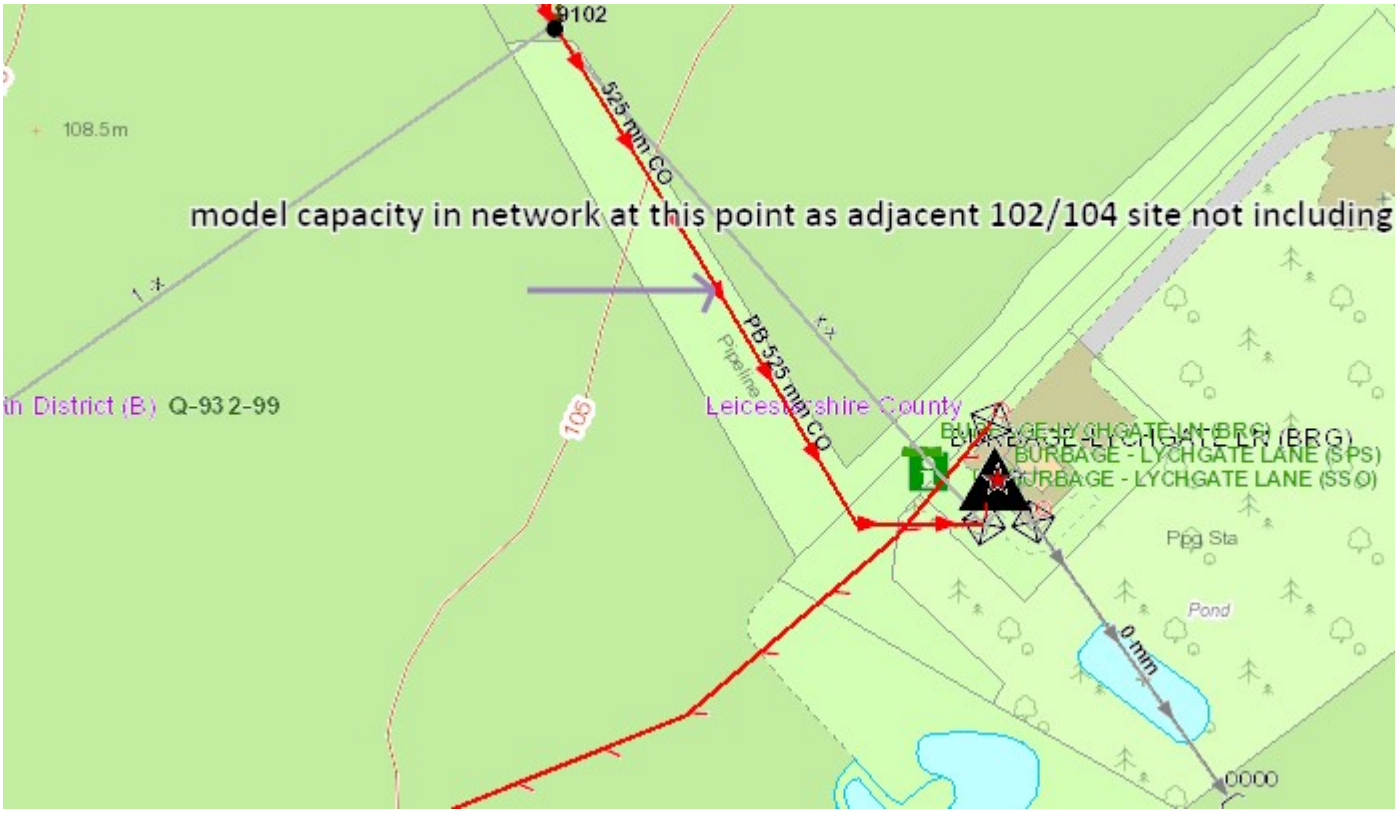
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From: Network Solutions <Network.Solutions@severntrent.co.uk>
Sent: Thursday, June 15, 2023 2:33 PM
To: Jon Davey <jon@farrowwalsh.co.uk>; Akehurst, Gareth-SV <Gareth-SV.Akehurst@severntrent.co.uk>
Cc: Jamie Royle <jamie@farrowwalsh.co.uk>; Dsengwaste <Dsengwaste@severntrent.co.uk>
Subject: RE: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193 [Filed 16 Jun 2023 09:41]

Thanks for the clarification Jon.

Please note that the 102/104 sewers in the adjacent site that the proposed Burbage Fields Farm will connect into will not be included within the model. Therefore any levels, gradients, further details you have on this development will improve the model confidence. I will pass the 104 drawings over with the modelling submission, however, it is likely that the development will be assessed as though it is directly connecting to the public 525mm combined network upstream of the pumping station – please see screen shot below.



Before I progress the modelling, it is likely that the site will need a pumped connection to the adjacent site from the land contours on our records, has this been confirmed?. Could you please confirm if you will connect to the site via gravity or pumped connection. If the site is to be pumped, please confirm the pumped rate (3.8 l/s being the minimum rate STW will adopt).

Kind Regards

Emma Nowak
Senior Evaluation Technician
Network Solutions
Developer Services

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WONDERFUL ON TAP
SEVERN TRENT
Proudly supporting LGBTQ+ inclusion
Mental Health Aware
MHFA England

From: Jon Davey <jon@farrowwalsh.co.uk>
Sent: 14 June 2023 10:05
To: Akehurst, Gareth-SV <Gareth-SV.Akehurst@severntrent.co.uk>
Cc: Network Solutions <Network.Solutions@severntrent.co.uk>; Jamie Royle <jamie@farrowwalsh.co.uk>; Dsengwaste <Dsengwaste@severntrent.co.uk>
Subject: RE: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193

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Thanks Gareth

Yes for context, the client owns the sewers and is in the process of preparing the S102 submission. Only once this is adopted to STW requirements would the connection into this sewer be made under a S106 with the sewers on the site offer for adoption under a S104.

What further information is required for the foul modelling to be progressed?

Best Wishes

Jon Davey Principal Engineer

Office Telephone 0330 100 0363

Leicester 62 Highcross Street LE1 4NN – Birmingham 321 Bradford Street B5 6ET

Company Number 06682625

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From: Akehurst, Gareth-SV <Gareth-SV.Akehurst@severntrent.co.uk>
Sent: Wednesday, June 14, 2023 9:57 AM
To: Jon Davey <jon@farrowwalsh.co.uk>
Cc: Network Solutions <Network.Solutions@severntrent.co.uk>; Jamie Royle <jamie@farrowwalsh.co.uk>; Dsengwaste <Dsengwaste@severntrent.co.uk>
Subject: RE: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193

ST Classification: OFFICIAL PERSONAL

ST Classification: OFFICIAL PERSONAL

Good morning.

Thank you for your email. It has been forwarded to myself as I am the technician for the Leicestershire area.

If you wanted to connect a site to a private sewer that is connected to a public sewer, we would need that adopting before we could adopt anything else.

I have attached to this email our requirements when it comes to adoption under an S102.

Kind regards.

Gareth Akehurst
Adoptions Engineering Technician
Developer Services
Mobile: 07966722211
Gareth-sv.akehurst@severntrent.co.uk

Postal Address
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Severn Trent Centre
PO Box 5311
Coventry
CV3 9FL
Sat Nav CV1 2LZ

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Click here

Codes for Adoption

Codes for Adoption went live April 2020 - Please click on the above link for more information on the new processes for sewer adoptions

WONDERFUL ON TAP SEVERN TRENT

From: Jon Davey <jon@farrowwalsh.co.uk>
Sent: 08 June 2023 16:36
To: Network Solutions <Network.Solutions@severntrent.co.uk>; Sewer.Adoptions <Sewer.Adoptions@severntrent.co.uk>
Cc: Jamie Royle <jamie@farrowwalsh.co.uk>; Dsengwaste <Dsengwaste@severntrent.co.uk>
Subject: RE: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193

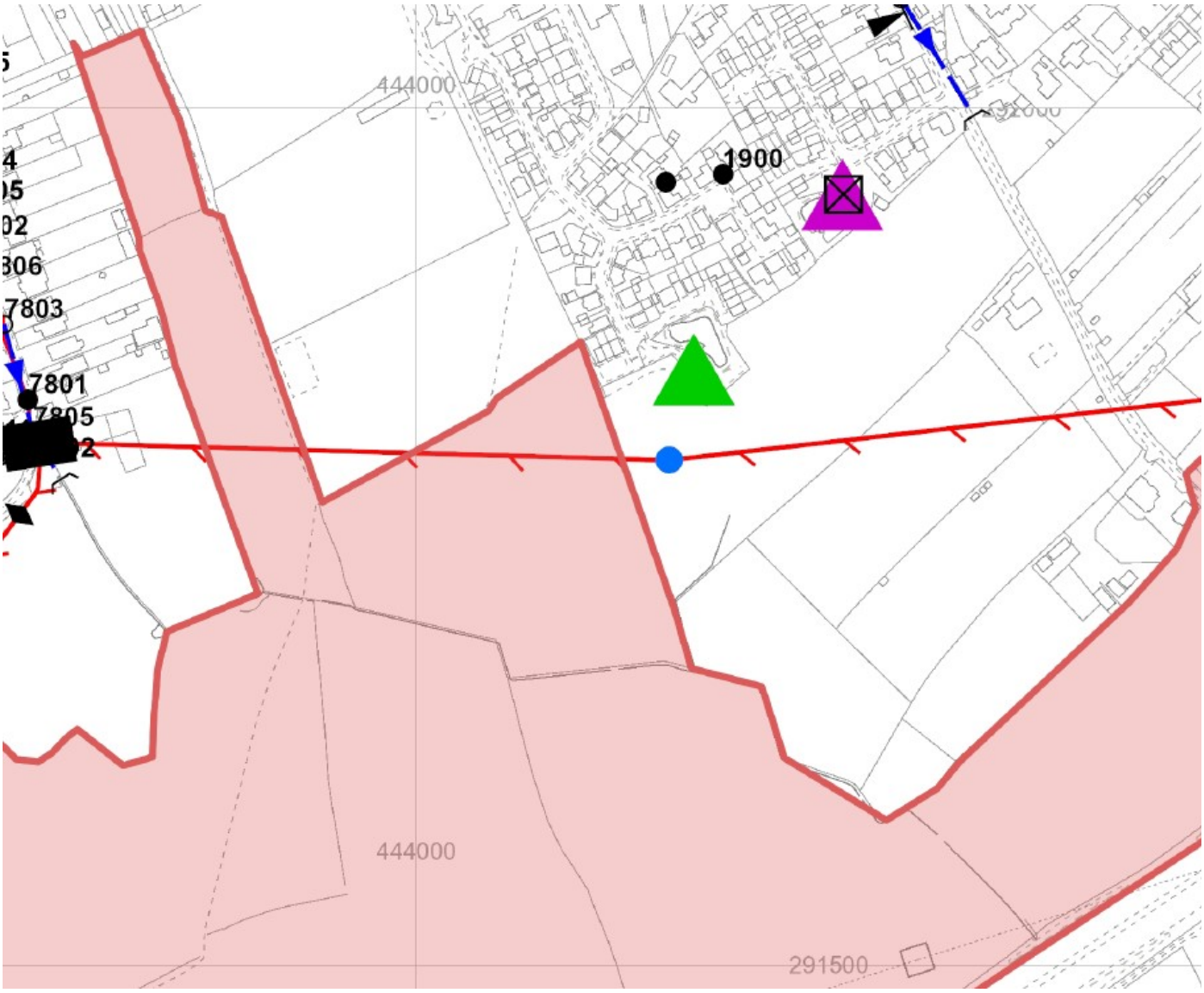
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Hi Emma

I have responded to your summary for ease:

In summary, it is advised that you explore the feasibility of a sewer requisition to MH4701. Our client only wishes to explore the sewer requisition as a last resort. Clarity is needed on where the 102/104 sewers to the development connect onto the public network see the image below, they connect into the existing pump station to the east as indicated with green line, as well as which pumping station on our records the fouls will discharge too they will discharge to the pumping station to the east and then cascade through the pumping stations to the west. Consent will be needed from the owner of the adjacent site to connect to the 104 network our client owns the adjacent site. @Sewer.Adoptions can clarify if the same requirements to connect to 102 sewers apply in the same way they do to 104 sewers. Sewer modelling will be needed to determine if there is capacity in the public network to accommodate the site, therefore please submit the requested information above as soon as possible. If capacity

requirements are needed, STW will fund the improvements to accommodate the site. Foul discharge of 7.0l/s is anticipated as per the Devlopment enquiry responses dated 15.12.2023.



Can you confirm what further information would be required to assess the modelling of the connection to the pumping station located to the east?

Best Wishes

Jon Davey Principal Engineer

Office Telephone 0330 100 0363

Company Number 06682625

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From: Network Solutions <Network.Solutions@severntrent.co.uk>
Sent: Thursday, June 8, 2023 3:18 PM
To: Jon Davey <jon@farrowwalsh.co.uk>; Sewer.Adoptions <Sewer.Adoptions@severntrent.co.uk>
Cc: Jamie Royle <jamie@farrowwalsh.co.uk>; Dsengwaste <Dsengwaste@severntrent.co.uk>
Subject: RE: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193

Hi Jon,

Apologies for the delay in responding back to your original query dated 16.05.23.

Please see my responses within your original email below in red text for ease of reference.

I trust this assists however please do not hesitate to contact me for further guidance.

Kind Regards

Emma Nowak
Senior Evaluation Technician
Network Solutions
Developer Services

For further information on guidance and applications please follow the link below:
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From: Jon Davey
Sent: Monday, May 15, 2023 11:05 AM
To: Network Solutions <Network.Solutions@severntrent.co.uk>
Cc: Jamie Royle <jamie@farrowwalsh.co.uk>
Subject: FW2285 Burbage Fields Farm, off Bullfurlong Lane, Hinckley - Ref: 1068193

Good Morning Pierce

We have been passed the developer enquiry provided by our client Redrow for the residential devlopment in Burbage.

We understand that current advice is that the foul should discharge into MH4701. However, our client has had difficulty in liaising with the landowner whom we understand is anti development of any kind in Burbage.

If your client is having trouble negotiating a deal with the land owner, STW have the right to lay sewers through 3rd party land under a Section 98 Sewer Requisition of the WIA. This includes unregistered land and also the right to discharge flows through the pipe if it connects to an existing STW asset i.e. a public sewer, which it does in this case. I have included a S98 Sewer Requisition application and guidance notes for your information, additionally you can also apply online via the following link: -

https://www.stwater.co.uk/building-and-developing/regulations-and-forms/application-forms-and-guidance/sewer-requisition-application/

To speak to an engineer in more detail about the S98 process including potential costs and timescales, please contact dsengwaste@severntrent.co.uk

Please note however, that the PoC is subject to whether there is capacity in the sewer. Reading the original Developer Enquiry response, sewer modelling was advised but reading the notes on file I see that this was never progressed. Once the decision on the point of connection has been confirmed, it would be worth undertaking modelling prior to applying for the sewer requisition. As requested in Pierce's original response, I would therefore be grateful if you would forward as soon as possible the following details:

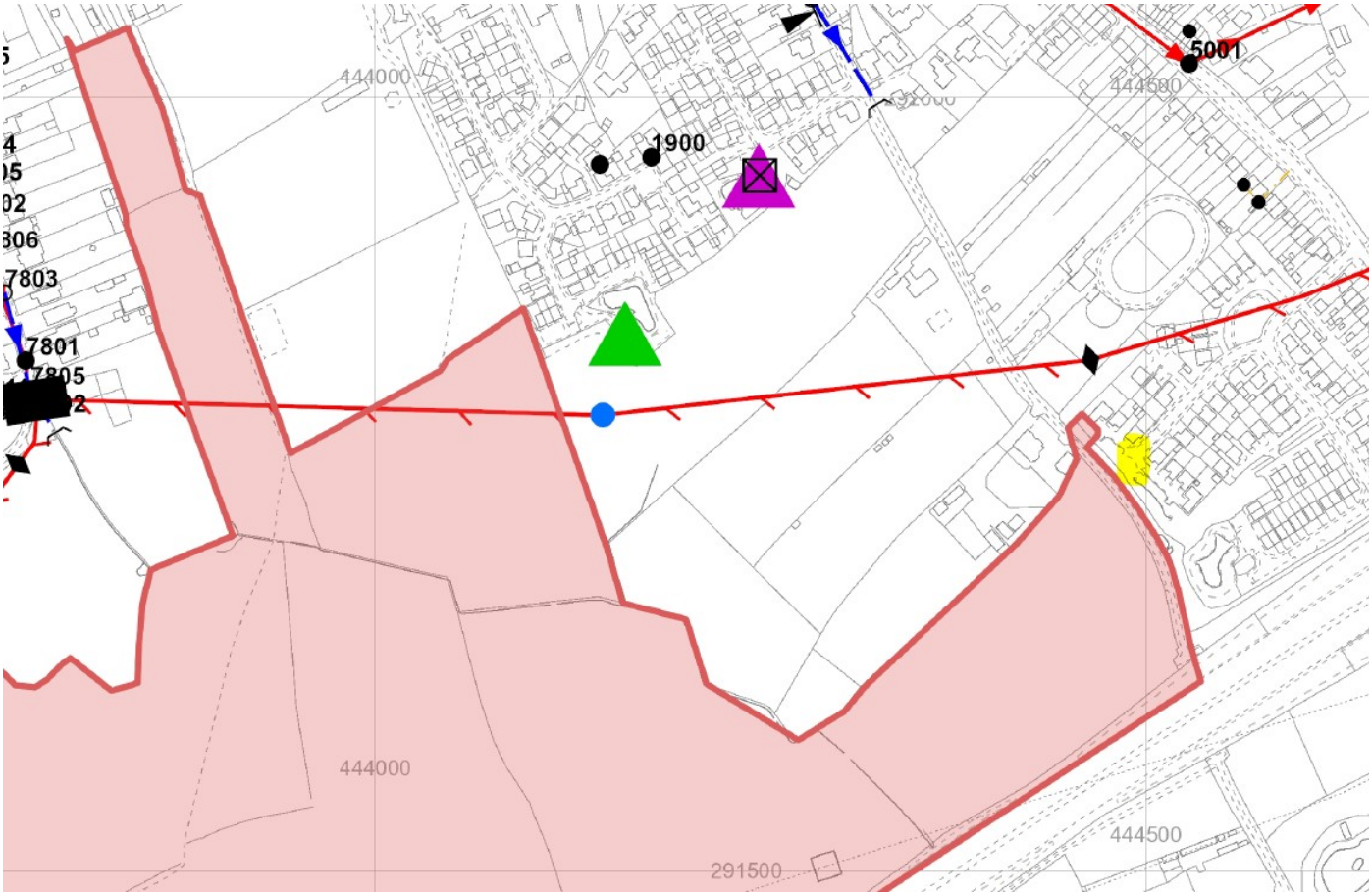
- Proposed submission of your Planning Application and reference
- Confirmation whether a pumped solution is required and proposed pump rate
- Preferred connection point
- Any phasing details of the proposed development.
- Proposed planned start and completion date.

Our client is currently offering the sewers constructed for the devlopment to the east of the application to STW under a S102 application (plan attached showing the sewers).

Can the pumped flows be accommodated into this S102 sewers and ultimately into the existing pumping station?

Firstly, do you mean 104 sewers as opposed to 102, as the plan attached showing the sewers for the development to the east refers to a 104 application. Has a 104 application been submitted for this site. Ultimately, to connect to the 104 network would require consent from the current owner of the sewers, as they are essentially still under private ownership until officially adopted by STW. STW can only comment on the capacity within the public network. Where do the 104 foul sewers from the development to the east connect onto the public network as it isn't clear from the attached plan. Additionally could you please confirm which existing pumping station you are referring to, as I am struggling to locate it from the image below.

If the site does in fact refer to 102 sewers, @Sewer.Adoptions can additional flows be added to this, or wouldn't consent from the current owner still be needed. In additional, @Sewer.Adoptions do we have any further information on the development in the attached 104 plan. Gisst Co-ords are X: 444580 / Y: 291787



Could we potentially restrict the pumped discharge rate and provide additional storage within our site? As a potential mitigation method?

A potential mitigation method would only be necessary following confirmation that capacity improvements were needed which is determined by further modelling. It would be STW's duty to provide capacity within the network, and we would not expect the developer to provide onsite foul storage due to insufficient capacity. We can request however, that pump rates are restricted, this is usually determined by the size of the rising main. The minimum pump rate that STW will adopt is 3.8 l/s with a 63mm internal diameter rising main. Please confirm the proposed rate for the site.

In summary, it is advised that you explore the feasibility of a sewer requisition to MH4701. Clarity is needed on where the 102/104 sewers to the development connect onto the public network, as well as which pumping station on our records the fouls will discharge too. Consent will be needed from the owner of the adjacent site to connect to the 104 network. @Sewer.Adoptions can clarify if the same requirements to connect to 102 sewers apply in the same way they do to 104 sewers. Sewer modelling will be needed to determine if there is capacity in the public network to accommodate the site, therefore please submit the requested information above as soon as possible. If capacity requirements are needed, STW will fund the improvements to accommodate the site.

Kind Regards,
Emma

Best Wishes

Jon Davey Principal Engineer

Office Telephone 0330 100 0363



Leicester 62 Highcross Street LE1 4NN – Birmingham 321 Bradford Street B5 6ET

Company Number 06682625

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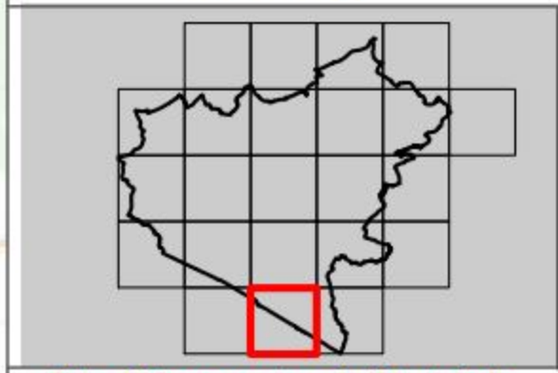
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APPENDIX G – SFRA FLOOD RISK MAPPING [EXTRACTED JANUARY 2023]

HINCKLEY AND BOSWORTH BOROUGH LEVEL 1 STRATEGIC FLOOD RISK ASSESSMENT

APPENDIX A: GEOPDF FLOOD RISK MAPPING

INDEX GRID: E3



Note: All layers are turned off by default. Click the box next to the layer of interest to

Authority Information

- Council Boundary
- Main Rivers
- Detailed River Network

Flood Zones

- Flood Zone 3b
- Indicative Flood Zone 3b
- Flood Zone 3a
- Flood Zone 2

Surface Water

- RoFfSW 3.3% AEP
- RoFfSW 1% AEP
- RoFfSW 0.1% AEP

Emergency Planning

- Flood Warning Areas
- Flood Alert Areas

Climate Change

- Climate Change Central
- Climate Change Higher Central
- Climate Change Upper
- Indicative Flood Zone 2

Areas Susceptible to Groundwater Flooding

- >= 75%
- >= 50% <75%
- >= 25% <50%
- < 25%

Historical Flooding

- Historic Flooding

Defences

- demountable defence
- embankment
- wall

0 0.35 0.7 1.4 Km

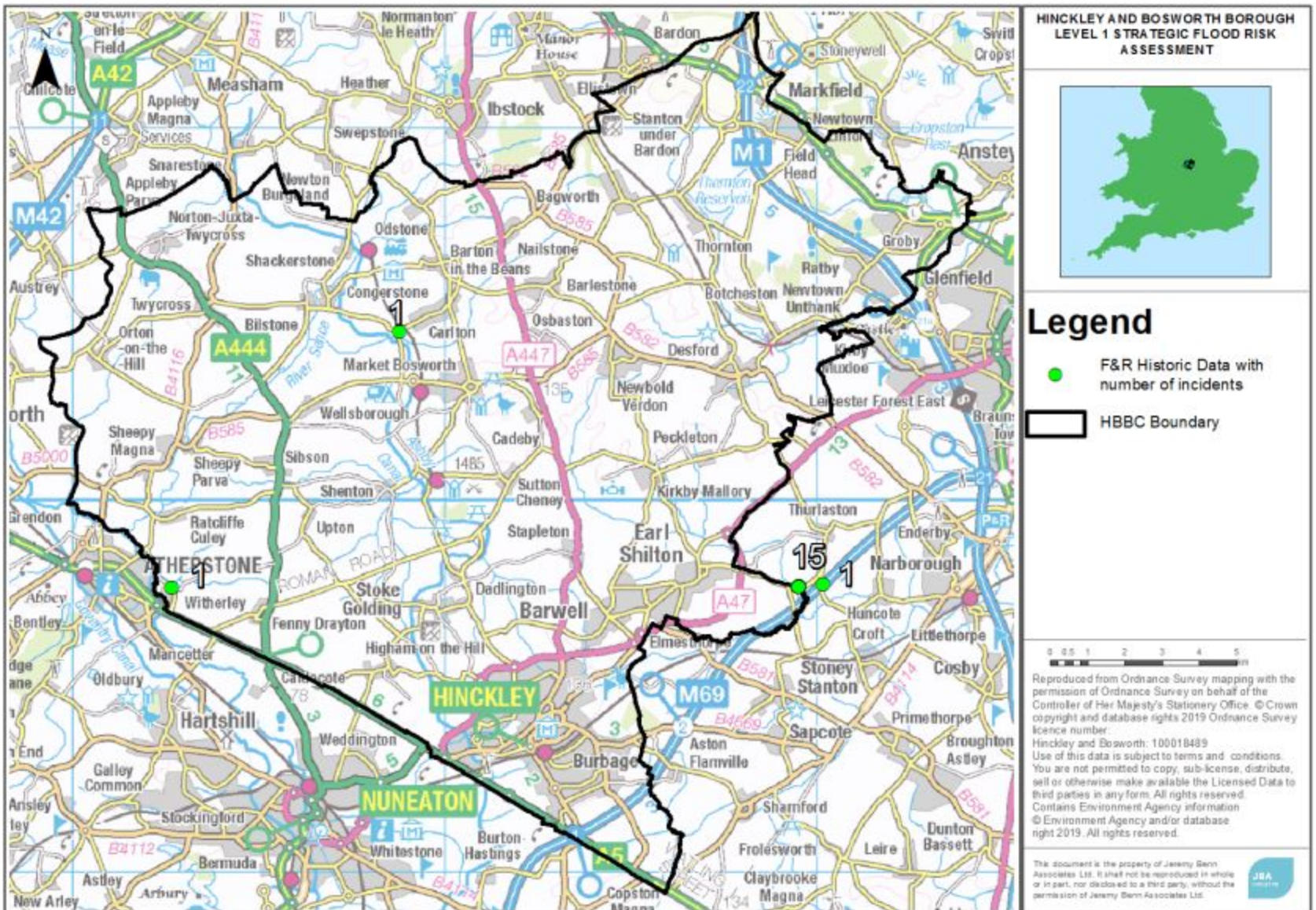
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APPENDIX H – SFRA FLOOD INCIDENT DATA [EXTRACTED JANUARY 2023]

Figure 5-1: Map of Leicestershire Fire and Rescue Service's flooding incident data for Hinckley and Bosworth borough



APPENDIX I – GREENFIELD RUNOFF RATE CALCULATIONS

Print | Close Report

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Olga Prisacaru
Site name:	Burbage Fields Farm
Site location:	Hinckley

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:	52.52083° N
Longitude:	1.35286° W
Reference:	3526438856
Date:	Jan 05 2023 10:44

Runoff estimation approach IH124

Site characteristics

Total site area (ha): 26.5

Methodology

Q_{BAR} estimation method: Calculate from SPR and SAAR

SPR estimation method: Calculate from SOIL type

Soil characteristics	Default	Edited
SOIL type:	4	4
HOST class:	N/A	N/A
SPR/SPRHOST:	0.47	0.47

Hydrological characteristics	Default	Edited
SAAR (mm):	642	642
Hydrological region:	4	4
Growth curve factor 1 year:	0.83	0.83
Growth curve factor 30 years:	2	2
Growth curve factor 100 years:	2.57	2.57
Growth curve factor 200 years:	3.04	3.04

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates	Default	Edited
Q_{BAR} (l/s):	115.62	115.62
1 in 1 year (l/s):	95.97	95.97
1 in 30 years (l/s):	231.25	231.25
1 in 100 year (l/s):	297.16	297.16
1 in 200 years (l/s):	351.5	351.5

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

APPENDIX J – ENGINEERING DRAWINGS

SAFETY, HEALTH AND ENVIRONMENTAL HAZARD INFORMATION BOX

THE HAZARDS NOTED BELOW ARE IN ADDITION TO THE NORMAL HAZARDS AND RISKS FACED BY A COMPETENT CONTRACTOR WHEN DEALING WITH THE TYPES OF WORKS DETAILED ON THIS DRAWING.

CONSTRUCTION RISKS

EXISTING UNNAMED WATERCOURSE
EXISTING HIGHWAY
EXISTING SERVICES

MAINTENANCE / CLEANING RISKS

NONE RELEVANT TO THIS DRAWING.

DEMOLITION RISKS

NONE RELEVANT TO THIS DRAWING.

Flow Control Chamber	Catchment Area ha	Proposed Discharge Rate 1:100+40%CC
S19	1.783	7.0 l/s
S66	5.527	23.3 l/s
S101	2.507	10.70 l/s
S121	1.145	4.90 l/s

Site Details

264,996m² / 26.5ha : Development area

6,572m² / 0.66ha : Existing impermeable area

109,618m² / 10.96ha : Proposed impermeable area

115.6 l/s : Existing Qbar storm discharge rate

4.3l/s/ha : Existing Qbar / hectare storm discharge rate

Development impermeable areas to be drained into the storm sewers via filter drains, attenuation basins and rain garden with minimum SUDs treatment to Ciria753, to unnamed watercourse.

Minimum pipe cover to soffits to be per the Sewer Sector Guidance Appendix C BS.1.7:
- 0.35m - domestic gardens and pathways without vehicle access
- 0.5m - domestic driveways, parking areas and yards for vehicles <7.5T gross weight
- 0.9m - domestic driveways, parking areas, shared spaces with limited access for vehicles >7.5T gross weight
- 0.9m - agricultural land and public open space
- 1.2m - highway and parking areas with unrestricted access for vehicles >7.5T gross weight

Any pipes with cover to soffit less than those stated above are to have a Class Z concrete pipe bed & surround.

Internal foul drain pipe minimum gradients:
- 1:80 from SVP & WC to IC
- 1:40 from Basin & Sink to IC

Refer to Architect's/M&E drawings for pipe sizes and setting-out information.

Maximum Drainage Chamber Depths:
- Ø315mm PPIC - 1.2m - Type 4 (BS EN 13598-2)
- Ø450mm PPIC - 3.0m - Type 3/4 (BS EN 13598-2)
- Ø600mm PPIC - 3.0m - Type 3 (BS EN 13598-2)
- Ø1200mm Concrete - 6.0m (with standard detail)

All drainage to be constructed in accordance with Sewer Sector Guidance and Building Regulations Part H.

A CCTV and level survey of the as-built drainage to OS Datum and Grid is to be undertaken by the Contractor and provided to the Engineer for final approval.

Sewer details shown have been taken from STW Water sewer records. Contractor to validate drainage locations and levels prior to commencement of the works.

Construction Note:
It is essential that new drainage associated with the development is laid from the outfall(s) into the site. This is essential to avoid unforeseen obstructions along drainage route (such as unrecorded services). If the drainage is laid from the site out to the outfall, it can result in significant abortive works to relay and overcome such obstructions.

LEGEND

PLOT FFL 54.000 — Proposed Finished Floor Level

Development Boundary

STW Combined Water Sewer

STW Surface Water Sewer

STW Foul/Surface Water Manholes

Adoptable Drainage

1200mm Dia. Inspection Chamber

S104 Surface Water Sewer

S104 Foul Water Sewer

S104 Foul Water Rising Main

S38 Surface Water Sewer

Domestic Drainage

450mm dia. IC Max Depth 3.0m

600mm dia. Catchpit

Domestic Storm Water Sewer

Filter Drain - 150mmØ Perforated Pipe surrounded by Clear Filter Stone

Domestic Foul Water Sewer

Foul/Surface Water Lateral Inspection Chamber

Foul/Surface Water Lateral Connections

NOTES

1. **Proposed Section 106 Connection (Foul)**
Discharge into Existing Sewers subject to S106 approval by Severn Trent Water (to be submitted by Contractor).

2. **Mesh Screening**
Mesh screen to be placed over the outlet pipe of chambers during site construction works and removed immediately prior to the first occupancy of the dwellings served by the sewers.

General Notes

1. DO NOT SCALE.
2. This drawing is to be read in conjunction with all other relevant drawings and details.
3. Should there be any conflict between the details indicated on this drawing and those on other drawings the Engineer should be informed PRIOR to construction on site.
4. Until technical approval has been obtained from the relevant Authority, it should be understood that all drawings issued are Preliminary and NOT for construction. Should the Contractor commence site work prior to such approval being given it is entirely at their own risk.
5. Sketch proposals are for illustrative purposes only and as such are subject to detailed site investigation including ground conditions / contaminants, drainage, design and planning / density negotiations.
6. All dimensions are in millimetres unless otherwise stated.
7. The Farrow Walsh Consulting Designers Risk Assessments for this project must be reviewed PRIOR to the commencement of any works on site.

NOTES

1. This drawing to be read in conjunction with all other relevant Engineers and Architect's details.
2. All work is to be carried out in accordance with the current British Standards, codes of practice and building regulations.
3. The design of any temporary works required shall be the responsibility of the Contractor.
4. Do not scale this drawing. All dimensions are in millimetres unless noted otherwise. Any discrepancies are to be recorded and reported to the Engineers immediately.
5. All work is to be to the satisfaction of the Engineer.
6. The Contractor is responsible for and must take all necessary precautions to ensure the stability of the works at all times during construction.
7. All workmanship and materials are to be to current British Standards.
8. All services are to be located and protected as necessary by the Contractor prior to the commencement of the works.
9. Any existing details which are shown on this drawing are for guidance only and are to be checked on site by the Contractor. Any variations are to be recorded and reported to the Engineer immediately.

General Drainage Notes

1. Information shown is for APPROVAL purposes only and not to be used for construction.
2. This drawing to be read in conjunction with all other relevant Engineers and Architect's details.
3. All work is to be carried out in accordance with the current British Standards, codes of practice and building regulations.
4. The exact position, level, size and use of existing sewers to be confirmed on site. Any discrepancies to be reported to the Engineer prior to commencement of works.
5. All uncovered and shallow pipework to be protected against construction traffic as part of the Contractors temporary works requirements.
6. Proposed drainage passing through new foundations to be sleeved with cast-in oversized pipework.
7. Exact location line and level of existing stubs to existing manholes in the road to be confirmed on site prior to construction.
8. See Architect's details for all setting out dimensions to buildings and boundaries etc.
9. All connections to road gullies and channels shall be 150mm nominal bore pipework. Connections to RWPs to be 100mm nominal bore pipework subject to confirmation of RWP sizes and/or design flow. No pipe work to be downsized in the direction of flow.
10. Connections to foul terminal fittings to be 100mm nominal bore pipework subject to confirmation of above ground pipe diameters and/or design flow. No pipe work to be downsized in the direction of flow.
11. All un-noted pipework to be 100mm dia. Unless subject to the notes above.
12. All pipework to be U-PVC type in accordance with WIS 4-35-01 unless otherwise noted.
13. All pipes connecting to adopted manholes up to and including 300mm dia. to be U-PVC.
14. All pipes connecting to adopted manholes greater than 300mm dia. to be Concrete.
15. All pipes under buildings without suspended floors shall have Class S bedding.
16. All pipework entering and exiting manholes to be connected with pipe soffits level.
17. Pre-formed channels to be used at all manholes.
18. High strength concrete benching to be steel trowelled to a dense smooth face neatly shaped and finished to all branch connections and laid in accordance with the specification.

NOTE: DRAWING IS FOR APPROVAL AND SUBJECT TO DETAILED DESIGN

Rev	Description of updates	Drawn	Check'd	App'd	Date
A3	Plan has been updated to suit the latest development layout.	JR	EC	DM	10.11.23
A2	Rising main outfall has been updated as per client instruction	JR	JD	JD	22.05.23
A1	Issued for Approval.	JR	OP	JD	15.03.23

Revision Schedule

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62 Highcross Street, Leicester LE1 4NN
321 Bradford Street, Birmingham B5 6ET
☎ 0330 100 0363
www.farrowwalsh.com

FOR APPROVAL

Client: Redrow Homes Limited

Project: Burbage Field Farm, Bullfurlong Lane, Hinckley

Title: Drainage Strategy Sheet 1 of 7

Drawn:	Checked:	Approved:	Date:	Scale:
JR	OP	JD	March 2023	1:500 @ A1

Drawing No. FW2285-D-400-01 Revision: A3

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4.3l/s/ha : Existing Qbar / hectare storm discharge rate

Development impermeable areas to be drained into the storm sewers via filter drains, attenuation basins and rain garden with minimum SUDs treatment to Ciria753, to unnamed watercourse.

Minimum pipe cover to soffits to be per the Sewer Sector Guidance Appendix C B5.1.7:
- 0.35m - domestic gardens and pathways without vehicle access
- 0.5m - domestic driveways, parking areas and yards for vehicles <7.5T gross weight
- 0.9m - domestic driveways, parking areas, shared spaces with limited access for vehicles >7.5T gross weight
- 0.9m - agricultural land and public open space
- 1.2m - highway and parking areas with unrestricted access for vehicles >7.5T gross weight

Any pipes with cover to soffit less than those stated above are to have a Class Z concrete pipe bed & surround.

Internal foul drain pipe minimum gradients:
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- 1:40 from Basin & Sink to IC

Refer to Architect's/M&E drawings for pipe sizes and setting-out information.

Maximum Drainage Chamber Depths:
- Ø315mm PPIC - 1.2m - Type 4 (BS EN 13598-2)
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- Ø600mm PPIC - 3.0m - Type 3 (BS EN 13598-2)
- Ø1200mm Concrete - 6.0m (with standard detail)

All drainage to be constructed in accordance with Sewer Sector Guidance and Building Regulations Part H.

A CCTV and level survey of the as-built drainage to OS Datum and Grid is to be undertaken by the Contractor and provided to the Engineer for final approval.

Sewer details shown have been taken from STW Water sewer records. Contractor to validate drainage locations and levels prior to commencement of the works.

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Flow Control Chamber	Catchment Area ha	Proposed Discharge Rate 1:100+40%CC
S19	1.783	7.0 l/s
S66	5.527	23.3 l/s
S101	2.507	10.70 l/s
S121	1.145	4.90 l/s

NOTES

1. Invert levels of the existing ditch TBC prior to any construction works by the Contractor and Non-return flap valve installed to headwall
2. Storm discharge from site restricted to 7.0 l/s l/s for up to a 1in100 year+40% climate change storm event, using a flow control chamber. Subject to LLFA approval.
3. New headwall construction subject to OWC by LLFA
4. New culverts to be installed where required subject to OWC approval by LLFA

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EXISTING UNNAMED WATERCOURSE
EXISTING HIGHWAY
EXISTING SERVICES

MAINTENANCE / CLEANING RISKS

NONE RELEVANT TO THIS DRAWING.

DEMOLITION RISKS

NONE RELEVANT TO THIS DRAWING.

LEGEND

- Proposed Finished Floor Level (PLOT FFL 54.000)
- Development Boundary
- Sewer Easement
- Private Surface Water Sewer
- STW Combined Water Sewer
- STW Foul Rising Main
- STW Combined and Private Surface Water Manholes
- Existing Watercourse

Adoptable Drainage

- 1200mm Dia. Inspection Chamber
- 2700mm Dia. Flow Control Chamber
- S104 Surface Water Sewer
- S104 Headwall
- S104 Foul Water Sewer
- S104 Foul Water Rising Main
- S38 Surface Water Sewer

Domestic Drainage

- 450mm dia. IC Max Depth 3.0m
- 600mm dia. Catchpit
- Domestic Storm Water Sewer
- Filter Drain - 150mmØ Perforated Pipe surrounded by Clear Filter Stone
- Domestic Foul Water Sewer
- Foul/Surface Water Lateral Inspection Chamber
- Foul/Surface Water Lateral Connections

General Notes

1. DO NOT SCALE.
2. This drawing is to be read in conjunction with all other relevant drawings and details.
3. Should there be any conflict between the details indicated on this drawing and those on other drawings the Engineer should be informed PRIOR to construction on site.
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5. Sketch proposals are for illustrative purposes only and as such are subject to detailed site investigation including ground conditions / contaminants, drainage, design and planning / density negotiations.
6. All dimensions are in millimetres unless otherwise stated.
7. The Farrow Walsh Consulting Designers Risk Assessments for this project must be reviewed PRIOR to the commencement of any works on site.

NOTES

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5. All work is to be to the satisfaction of the Engineer.
6. The Contractor is responsible for and must take all necessary precautions to ensure the stability of the works at all times during construction.
7. All workmanship and materials are to be to current British Standards.
8. All services are to be located and protected as necessary by the Contractor prior to the commencement of the works.
9. Any existing details which are shown on this drawing are for guidance only and are to be checked on site by the Contractor. Any variations are to be recorded and reported to the Engineer immediately.

General Drainage Notes

1. Information shown is for APPROVAL purposes only and not to be used for construction.
2. This drawing to be read in conjunction with all other relevant Engineers and Architect's details.
3. All work is to be carried out in accordance with the current British Standards, codes of practice and building regulations.
4. The exact position, level, size and use of existing sewers to be confirmed on site. Any discrepancies to be reported to the Engineer prior to commencement of works.
5. All uncovered and shallow pipework to be protected against construction traffic as part of the Contractors temporary works requirements.
6. Proposed drainage passing through new foundations to be sleeved with cast-in oversized pipework.
7. Exact location line and level of existing stubs to existing manholes in the road to be confirmed on site prior to construction.
8. See Architect's details for all setting out dimensions to buildings and boundaries etc.
9. All connections to road gullies and channels shall be 150mm nominal bore pipework. Connections to RWPs to be 100mm nominal bore pipework subject to confirmation of RWP sizes and/or design flow. No pipe work to be downsized in the direction of flow.
10. Connections to foul terminal fittings to be 100mm nominal bore pipework subject to confirmation of above ground pipe diameters and/or design flow. No pipe work to be downsized in the direction of flow.
11. All un-noted pipework to be 100mm dia. Unless subject to the notes above.
12. All pipework to be U-PVC type in accordance with WIS 4-35-01 unless otherwise noted.
13. All pipes connecting to adopted manholes up to and including 300mm dia. to be U-PVC.
14. All pipes connecting to adopted manholes greater than 300mm dia. to be Concrete.
15. All pipes under buildings without suspended floors shall have Class S bedding.
16. All pipework entering and exiting manholes to be connected with pipe soffits level.
17. Pre-formed channels to be used at all manholes.
18. High strength concrete benching to be steel trowelled to a dense smooth face neatly shaped and finished to all branch connections and laid in accordance with the specification.

NOTE: DRAWING IS FOR APPROVAL AND SUBJECT TO DETAILED DESIGN

Rev	Description of updates	Drawn	Checked	Appr'd	Date
A3	Plan has been updated to suit the latest development layout.	JR	EC	DM	10.11.23
A2	Rising main outfall has been updated as per client instruction	JR	JD	JD	22.05.23
A1	Issued for Approval.	JR	OP	JD	15.03.23

Revision Schedule

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321 Bradford Street, Birmingham B5 6ET
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FOR APPROVAL

Client: Redrow Homes Limited

Project: Burbage Field Farm, Bullfurlong Lane, Hinckley

Title: Drainage Strategy Sheet 2 of 7

Drawn:	Checked:	Approved:	Date:	Scale:
JR	OP	JD	March 2023	1:500 @ A1

Drawing No. FW2285-D-400-02 Revision: A3

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Site Details

264,996m² / 26.5ha : Development area

6,572m² / 0.66ha : Existing impermeable area

109,618m² / 10.96ha : Proposed impermeable area

115.6 l/s : Existing Qbar storm discharge rate

4.3l/s/ha : Existing Qbar / hectare storm discharge rate

Development impermeable areas to be drained into the storm sewers via filter drains, attenuation basins and rain garden with minimum SUDs treatment to Ciria753, to unnamed watercourse.

Minimum pipe cover to soffits to be per the Sewer Sector Guidance Appendix C B5.1.7:
- 0.35m - domestic gardens and pathways without vehicle access
- 0.5m - domestic driveways, parking areas and yards for vehicles <7.5T gross weight
- 0.9m - domestic driveways, parking areas, shared spaces with limited access for vehicles >7.5T gross weight
- 0.9m - agricultural land and public open space
- 1.2m - highway and parking areas with unrestricted access for vehicles >7.5T gross weight

Any pipes with cover to soffit less than those stated above are to have a Class Z concrete pipe bed & surround.

Internal foul drain pipe minimum gradients:
- 1:80 from SVP & WC to IC
- 1:40 from Basin & Sink to IC

Refer to Architect's/M&E drawings for pipe sizes and setting-out information.

Maximum Drainage Chamber Depths:
- Ø315mm PPIC - 1.2m - Type 4 (BS EN 13598-2)
- Ø450mm PPIC - 3.0m - Type 3/4 (BS EN 13598-2)
- Ø600mm PPIC - 3.0m - Type 3 (BS EN 13598-2)
- Ø1200mm Concrete - 6.0m (with standard detail)

All drainage to be constructed in accordance with Sewer Sector Guidance and Building Regulations Part H.

A CCTV and level survey of the as-built drainage to OS Datum and Grid is to be undertaken by the Contractor and provided to the Engineer for final approval.

Sewer details shown have been taken from STW Water sewer records. Contractor to validate drainage locations and levels prior to commencement of the works.

Construction Note:
It is essential that new drainage associated with the development is laid from the outfall(s) into the site. This is essential to avoid unforeseen obstructions along drainage route (such as unrecorded services). If the drainage is laid from the site out to the outfall, it can result in significant abortive works to relay and overcome such obstructions.

NOTES

1. Invert levels of the existing ditch TBC prior to any construction works by the Contractor and Non-return flap valve installed to headwall
2. New headwall construction subject to OWC by LLFA
3. New culverts to be installed where required subject to OWC approval by LLFA
4. Adoptable foul pumping station. Location and discharge rates to be agreed with STW
5. New filter drain at the base of the noise bund to replace the existing. Discharge into the existing watercourse subject to LLFA approval
6. Existing levels do be locally lowered by 150mm, to provide flooding compensation
7. Invert levels of the existing sewer TBC by Contractor prior any works
8. Foul rising main route subject to agreement with STW and third party land owners.
9. Proposed foul connection to discharge into Existing Sewers subject to an agreement with third party land owners
10. Mesh screen to be placed over the outlet pipe of chambers during site construction works and removed immediately prior to the first occupancy of the dwellings served by the sewers.
11. Private foul rising main route subject to agreement with STW and third party land owners.

Flow Control Chamber	Catchment Area ha	Proposed Discharge Rate 1:100+40%CC
S19	1.783	7.0 l/s
S66	5.527	23.3 l/s
S101	2.507	10.70 l/s
S121	1.145	4.90 l/s

SAFETY, HEALTH AND ENVIRONMENTAL HAZARD INFORMATION BOX

THE HAZARDS NOTED BELOW ARE IN ADDITION TO THE NORMAL HAZARDS AND RISKS FACED BY A COMPETENT CONTRACTOR WHEN DEALING WITH THE TYPES OF WORKS DETAILED ON THIS DRAWING.

CONSTRUCTION RISKS

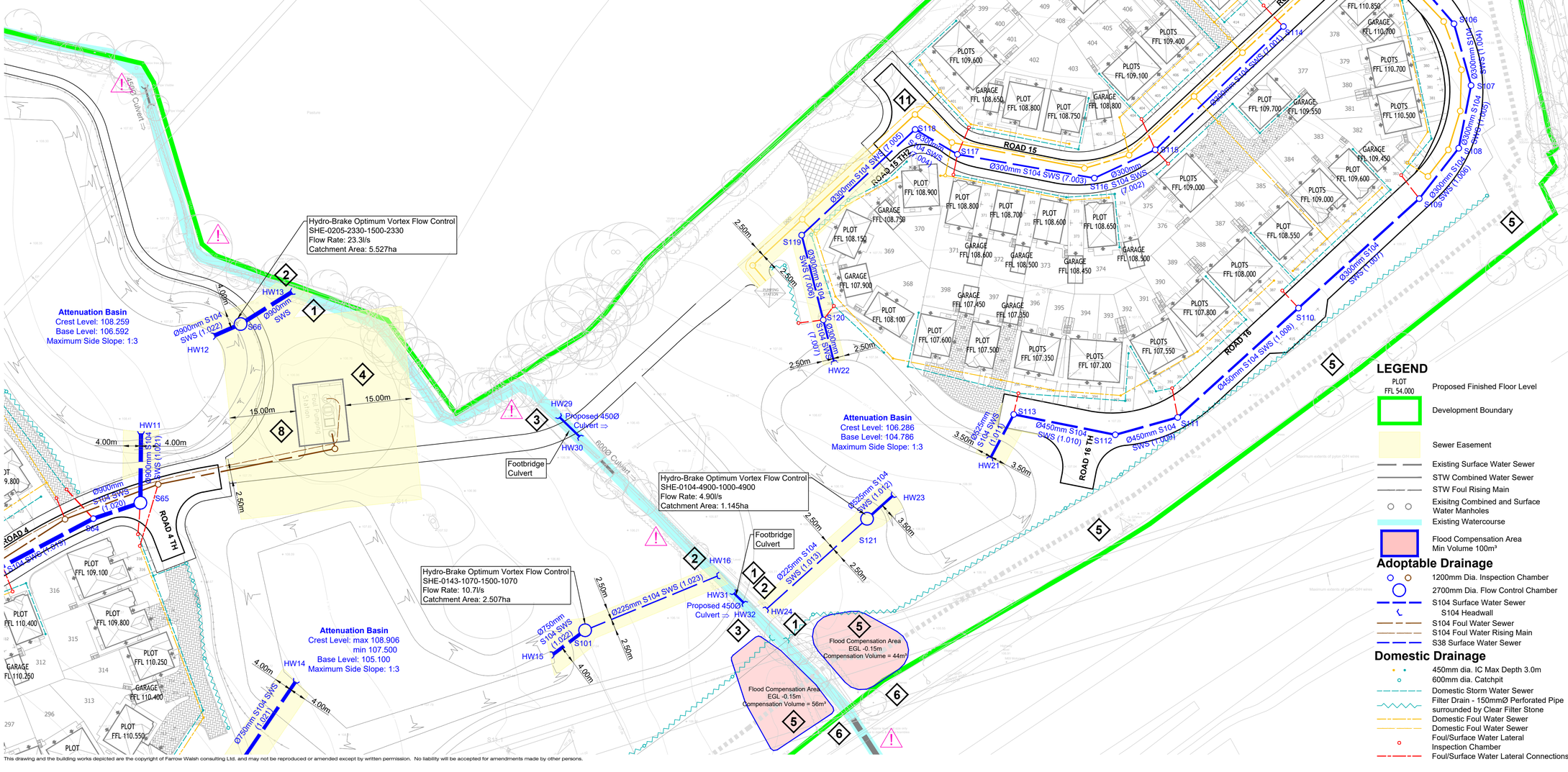
EXISTING UNNAMED WATERCOURSE
EXISTING HIGHWAY
EXISTING SERVICES

MAINTENANCE / CLEANING RISKS

NONE RELEVANT TO THIS DRAWING.

DEMOLITION RISKS

NONE RELEVANT TO THIS DRAWING.



LEGEND

- PLOT FFL 54.000 — Proposed Finished Floor Level
- Development Boundary
- Sewer Easement
- Existing Surface Water Sewer
- STW Combined Water Sewer
- STW Foul Rising Main
- Exisitng Combined and Surface Water Manholes
- Existing Watercourse
- Flood Compensation Area Min Volume 100m³

Adoptable Drainage

- 1200mm Dia. Inspection Chamber
- 2700mm Dia. Flow Control Chamber
- S104 Surface Water Sewer
- S104 Headwall
- S104 Foul Water Sewer
- S104 Foul Water Rising Main
- S38 Surface Water Sewer

Domestic Drainage

- 450mm dia. IC Max Depth 3.0m
- 600mm dia. Catchpit
- Domestic Storm Water Sewer
- Filter Drain - 150mmØ Perforated Pipe surrounded by Clear Filter Stone
- Domestic Foul Water Sewer
- Domestic Foul Water Sewer
- Foul/Surface Water Lateral
- Inspection Chamber
- Foul/Surface Water Lateral Connections

General Notes

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2. This drawing is to be read in conjunction with all other relevant drawings and details.
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5. Sketch proposals are for illustrative purposes only and as such are subject to detailed site investigation including ground conditions / contaminants, drainage, design and planning / density negotiations.
6. All dimensions are in millimetres unless otherwise stated.
7. The Farrow Walsh Consulting Designers Risk Assessments for this project must be reviewed PRIOR to the commencement of any works on site.

NOTES

1. This drawing to be read in conjunction with all other relevant Engineers and Architect's details.
2. All work is to be carried out in accordance with the current British Standards, codes of practice and building regulations.
3. The design of any temporary works required shall be the responsibility of the Contractor.
4. Do not scale this drawing. All dimensions are in millimetres unless noted otherwise. Any discrepancies are to be recorded and reported to the Engineers immediately.
5. All work is to be to the satisfaction of the Engineer.
6. The Contractor is responsible for and must take all necessary precautions to ensure the stability of the works at all times during construction.
7. All workmanship and materials are to be to current British Standards.
8. All services are to be located and protected as necessary by the Contractor prior to the commencement of the works.
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General Drainage Notes

1. Information shown is for Approval only.
2. This drawing to be read in conjunction with all other relevant Engineers and Architect's details.
3. All work is to be carried out in accordance with the current British Standards, codes of practice and building regulations.
4. The exact position, level, size and use of existing sewers to be confirmed on site. Any discrepancies to be reported to the engineer prior to commencement of works.
5. All uncovered and shallow pipework to be protected against construction traffic as part of the contractors temporary works requirements.
6. Proposed drainage passing through new foundations to be sleeved with cast-in oversized pipework.
7. Exact location line and level of existing stubs to existing manholes in the road to be confirmed on site prior to construction.
8. Cover levels shown are approximate only, subject to the Architect's external works and landscaping scheme.
9. See Architect's details for all setting out dimensions to buildings and boundaries etc
10. All connections to road gullies and channels shall be 150mm nominal bore pipework. Connections to RWPs to be 100mm nominal bore pipework subject to confirmation of RWP sizes and/or design flow. No pipe work to be downsized in the direction of flow.
11. Connections to foul terminal fittings to be 100mm nominal bore pipework subject to confirmation of above ground pipe diameters and/or design flow. No pipe work to be downsized in the direction of flow.
12. All un-noted pipework to be 100mm dia. Unless subject to the notes above.
13. All pipework to be U-PVC type in accordance with WIS 4-35-01 unless otherwise noted.
14. All pipes connecting to adopted manholes up to and including 300mm dia. to be Wavin Ultrarib or similar approved.
15. All pipes connecting to adopted manholes greater than 300mm dia. to be Concrete.
16. All pipes under buildings without suspended floors shall have Class S bedding.
17. All pipework entering and exiting manholes to be connected with pipe soffits level.
18. Pre-formed channels to be used at all manholes.
19. High strength concrete benching to be steel trowelled to a dense smooth face neatly shaped and finished to all branch connections and laid in accordance with the specification.

NOTE: DRAWING IS FOR APPROVAL AND SUBJECT TO DETAILED DESIGN

Rev	Description of updates	Drawn	Checked	Approved	Date
A3	Plan has been updated to suit the latest development layout.	JR	EC	DM	10.11.23
A2	Rising main outfall has been updated as per client instruction	JR	JD	JD	22.05.23
A1	Issued for Approval.	JR	OP	JD	15.03.23

Revision Schedule

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FOR APPROVAL

Client: Redrow Homes Limited

Project: Burbage Field Farm, Bullfurlong Lane, Hinckley

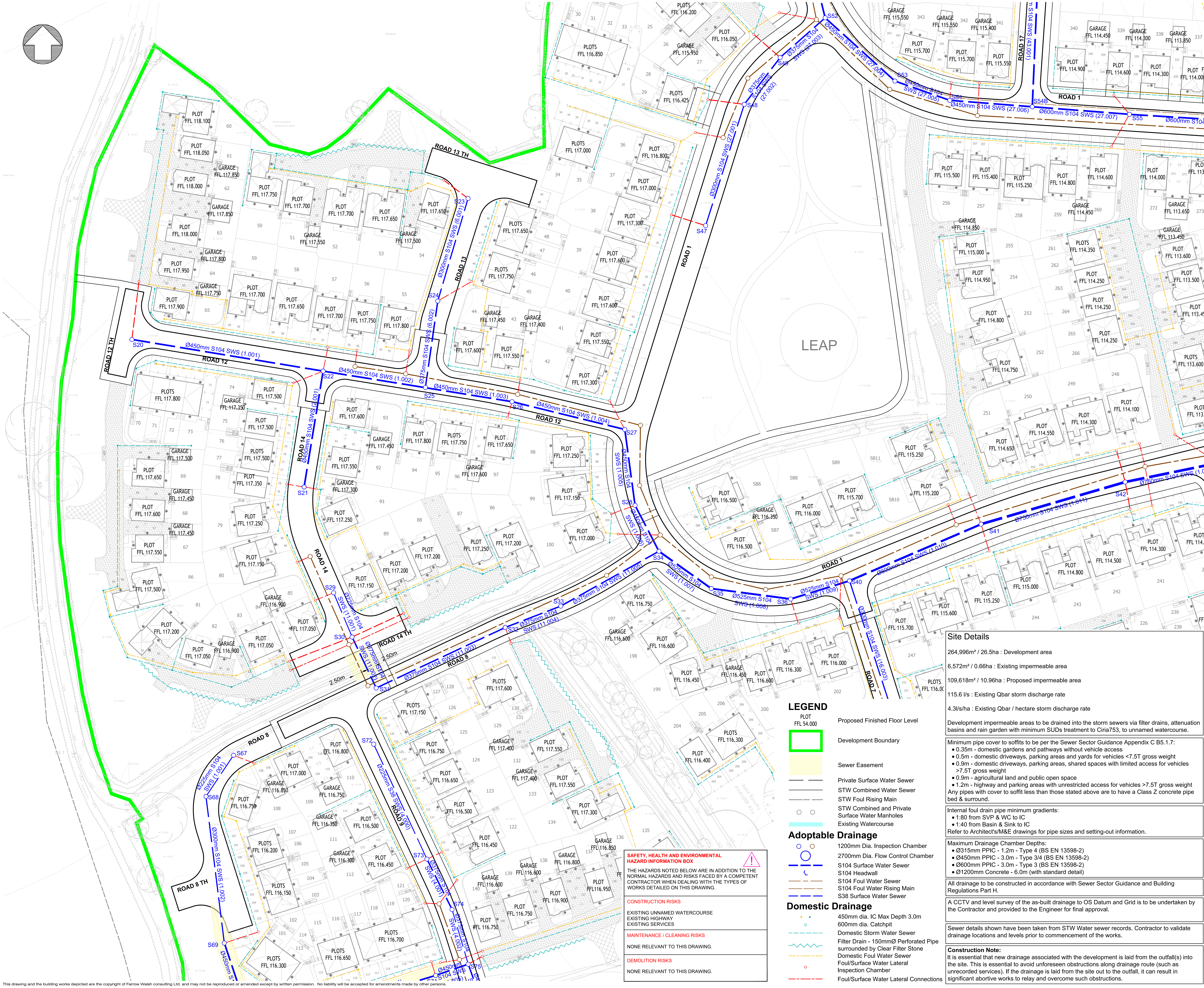
Title: Drainage Strategy Sheet 3 of 7

Drawn:	Checked:	Approved:	Date:	Scale:
JR	OP	JD	March 2023	1:500 @ A1

Drawing No.: **FW2285-D-400-03**

Revision: **A3**

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LEGEND

PLOT FFL 54.000	Proposed Finished Floor Level
	Development Boundary
	Sewer Easement
	Private Surface Water Sewer
	STW Combined Water Sewer
	STW Foul Rising Main
	STW Combined and Private Surface Water Manholes
	Existing Watercourse

Adoptable Drainage

	1200mm Dia. Inspection Chamber
	2700mm Dia. Flow Control Chamber
	S104 Surface Water Sewer
	S104 Headwall
	S104 Foul Water Sewer
	S104 Foul Water Rising Main
	S38 Surface Water Sewer

Domestic Drainage

	450mm dia. IC Max Depth 3.0m
	600mm dia. Catchpit
	Domestic Storm Water Sewer
	Filter Drain - 150mmØ Perforated Pipe surrounded by Clear Filter Stone
	Domestic Foul Water Sewer
	Foul/Surface Water Lateral Inspection Chamber
	Foul/Surface Water Lateral Connections

SAFETY, HEALTH AND ENVIRONMENTAL HAZARD INFORMATION BOX

THE HAZARDS NOTED BELOW ARE IN ADDITION TO THE NORMAL HAZARDS AND RISKS FACED BY A COMPETENT CONTRACTOR WHEN DEALING WITH THE TYPES OF WORKS DETAILED ON THIS DRAWING.

CONSTRUCTION RISKS

EXISTING UNNAMED WATERCOURSE
EXISTING HIGHWAY
EXISTING SERVICES

MAINTENANCE / CLEANING RISKS

NONE RELEVANT TO THIS DRAWING.

DEMOLITION RISKS

NONE RELEVANT TO THIS DRAWING.

Site Details

264,996m² / 26.5ha : Development area

6,572m² / 0.66ha : Existing impermeable area

109,618m² / 10.96ha : Proposed impermeable area

115.6 l/s : Existing Qbar storm discharge rate

4.3l/s/ha : Existing Qbar / hectare storm discharge rate

Development impermeable areas to be drained into the storm sewers via filter drains, attenuation basins and rain garden with minimum SUDs treatment to Ciria753, to unnamed watercourse.

Minimum pipe cover to soffits to be per the Sewer Sector Guidance Appendix C B5.1.7:
- 0.35m - domestic gardens and pathways without vehicle access
- 0.5m - domestic driveways, parking areas and yards for vehicles <7.5T gross weight
- 0.9m - domestic driveways, parking areas, shared spaces with limited access for vehicles >7.5T gross weight
- 0.9m - agricultural land and public open space
- 1.2m - highway and parking areas with unrestricted access for vehicles >7.5T gross weight

Any pipes with cover to soffit less than those stated above are to have a Class Z concrete pipe bed & surround.

Internal foul drain pipe minimum gradients:
- 1:80 from SVP & WC to IC
- 1:40 from Basin & Sink to IC

Refer to Architect's/M&E drawings for pipe sizes and setting-out information.

Maximum Drainage Chamber Depths:
- Ø315mm PPIC - 1.2m - Type 4 (BS EN 13598-2)
- Ø450mm PPIC - 3.0m - Type 3/4 (BS EN 13598-2)
- Ø600mm PPIC - 3.0m - Type 3 (BS EN 13598-2)
- Ø1200mm Concrete - 6.0m (with standard detail)

All drainage to be constructed in accordance with Sewer Sector Guidance and Building Regulations Part H.

A CCTV and level survey of the as-built drainage to OS Datum and Grid is to be undertaken by the Contractor and provided to the Engineer for final approval.

Sewer details shown have been taken from STW Water sewer records. Contractor to validate drainage locations and levels prior to commencement of the works.

Construction Note:
It is essential that new drainage associated with the development is laid from the outfall(s) into the site. This is essential to avoid unforeseen obstructions along drainage route (such as unrecorded services). If the drainage is laid from the site out to the outfall, it can result in significant abortive works to relay and overcome such obstructions.

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General Drainage Notes

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5. All uncovered and shallow pipework to be protected against construction traffic as part of the Contractors temporary works requirements.
6. Proposed drainage passing through new foundations to be sleeved with cast-in oversized pipework.
7. Exact location line and level of existing stubs to existing manholes in the road to be confirmed on site prior to construction.
8. See Architect's details for all setting out dimensions to buildings and boundaries etc.
9. All connections to road gullies and channels shall be 150mm nominal bore pipework. Connections to RWPs to be 100mm nominal bore pipework subject to confirmation of RWP sizes and/or design flow. No pipe work to be downsized in the direction of flow.
10. Connections to foul terminal fittings to be 100mm nominal bore pipework subject to confirmation of above ground pipe diameters and/or design flow. No pipe work to be downsized in the direction of flow.
11. All un-noted pipework to be 100mm dia. Unless subject to the notes above.
12. All pipework to be U-PVC type in accordance with WIS 4-35-01 unless otherwise noted.
13. All pipes connecting to adopted manholes up to and including 300mm dia. to be U-PVC.
14. All pipes connecting to adopted manholes greater than 300mm dia. to be Concrete.
15. All pipes under buildings without suspended floors shall have Class S bedding.
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17. Pre-formed channels to be used at all manholes.
18. High strength concrete benching to be steel trowelled to a dense smooth face neatly shaped and finished to all branch connections and laid in accordance with the specification.

NOTE: DRAWING IS FOR APPROVAL AND SUBJECT TO DETAILED DESIGN

Flow Control Chamber	Catchment Area ha	Proposed Discharge Rate 1:100+40%CC
S19	1.783	7.0 l/s
S66	5.527	23.3 l/s
S101	2.507	10.70 l/s
S121	1.145	4.90 l/s

Rev	Description of updates	Drawn	Check'd	App'd	Date
A3	Plan has been updated to suit the latest development layout.	JR	EC	DM	10.11.23
A2	Rising main outfall has been updated as per client instruction	JR	JD	JD	22.05.23
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Revision Schedule

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FOR APPROVAL

Client:
Redrow Homes Limited

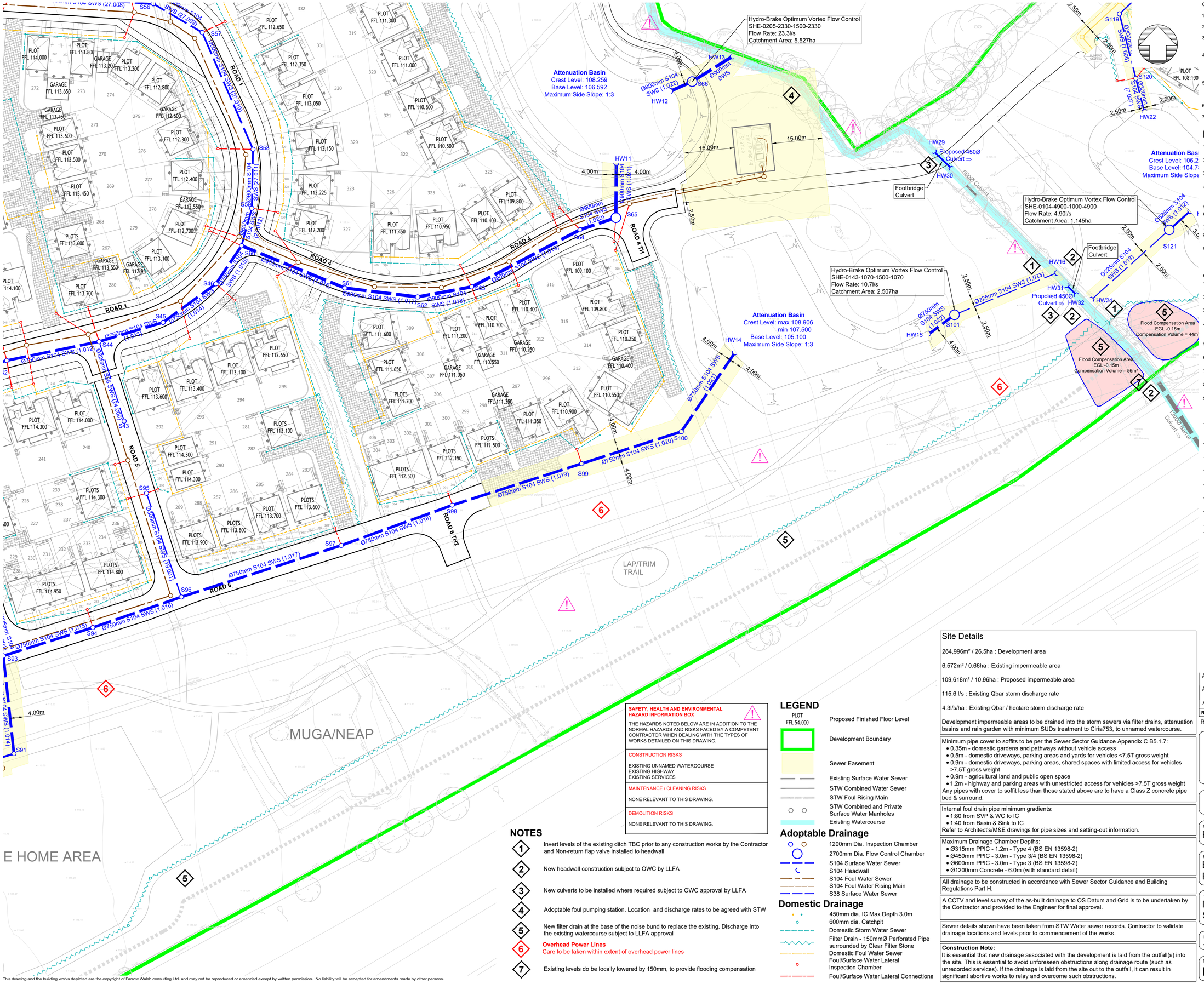
Project:
Burbage Field Farm,
Bullfurlong Lane, Hinckley

Title:
Drainage Strategy
Sheet 4 of 7

Drawn:	Checked:	Approved:	Date:	Scale:
JR	OP	JD	March 2023	1:500 @ A1

Drawing No.: **FW2285-D-400-04** Revision: **A3**

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NOTES

1. Invert levels of the existing ditch TBC prior to any construction works by the Contractor and Non-return flap valve installed to headwall
2. New headwall construction subject to OWC by LLFA
3. New culverts to be installed where required subject to OWC approval by LLFA
4. Adoptable foul pumping station. Location and discharge rates to be agreed with STW
5. New filter drain at the base of the noise bund to replace the existing. Discharge into the existing watercourse subject to LLFA approval
6. **Overhead Power Lines**
   Care to be taken within extent of overhead power lines
7. Existing levels do be locally lowered by 150mm, to provide flooding compensation

SAFETY, HEALTH AND ENVIRONMENTAL HAZARD INFORMATION BOX

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CONSTRUCTION RISKS

EXISTING UNNAMED WATERCOURSE
EXISTING HIGHWAY
EXISTING SERVICES

MAINTENANCE / CLEANING RISKS

NONE RELEVANT TO THIS DRAWING.

DEMOLITION RISKS

NONE RELEVANT TO THIS DRAWING.

LEGEND

PLOT FFL 54.000 — Proposed Finished Floor Level
Development Boundary
Sewer Easement
Existing Surface Water Sewer
STW Combined Water Sewer
STW Foul Rising Main
STW Combined and Private Surface Water Manholes
Existing Watercourse

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- 0.9m - domestic driveways, parking areas, shared spaces with limited access for vehicles >7.5T gross weight
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NOTES

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General Drainage Notes

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5. All uncovered and shallow pipework to be protected against construction traffic as part of the Contractors temporary works requirements.
6. Proposed drainage passing through new foundations to be sleeved with cast-in oversized pipework.
7. Exact location line and level of existing stubs to existing manholes in the road to be confirmed on site prior to construction.
8. See Architect's details for all setting out dimensions to buildings and boundaries etc.
9. All connections to road gullies and channels shall be 150mm nominal bore pipework. Connections to RWPs to be 100mm nominal bore pipework subject to confirmation of RWP sizes and/or design flow. No pipe work to be downsized in the direction of flow.
10. Connections to foul terminal fittings to be 100mm nominal bore pipework subject to confirmation of above ground pipe diameters and/or design flow. No pipe work to be downsized in the direction of flow.
11. All un-noted pipework to be 100mm dia. Unless subject to the notes above.
12. All pipework to be U-PVC type in accordance with WIS 4-35-01 unless otherwise noted.
13. All pipes connecting to adopted manholes up to and including 300mm dia. to be U-PVC.
14. All pipes connecting to adopted manholes greater than 300mm dia. to be Concrete.
15. All pipes under buildings without suspended floors shall have Class S bedding.
16. All pipework entering and exiting manholes to be connected with pipe soffits level.
17. Pre-formed channels to be used at all manholes.
18. High strength concrete benching to be steel trowelled to a dense smooth face neatly shaped and finished to all branch connections and laid in accordance with the specification.

NOTE: DRAWING IS FOR APPROVAL AND SUBJECT TO DETAILED DESIGN

Flow Control Chamber	Catchment Area ha	Proposed Discharge Rate 1:100+40%CC
S19	1.783	7.0 l/s
S66	5.527	23.3 l/s
S101	2.507	10.70 l/s
S121	1.145	4.90 l/s

Rev	Description of updates	Drawn	Check'd	App'd	Date
A3	Plan has been updated to suit the latest development layout.	JR	EC	DM	10.11.23
A2	Rising main outfall has been updated as per client instruction	JR	JD	JD	22.05.23
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Revision Schedule

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www.farrowwalsh.com

FOR APPROVAL

Client: Redrow Homes Limited

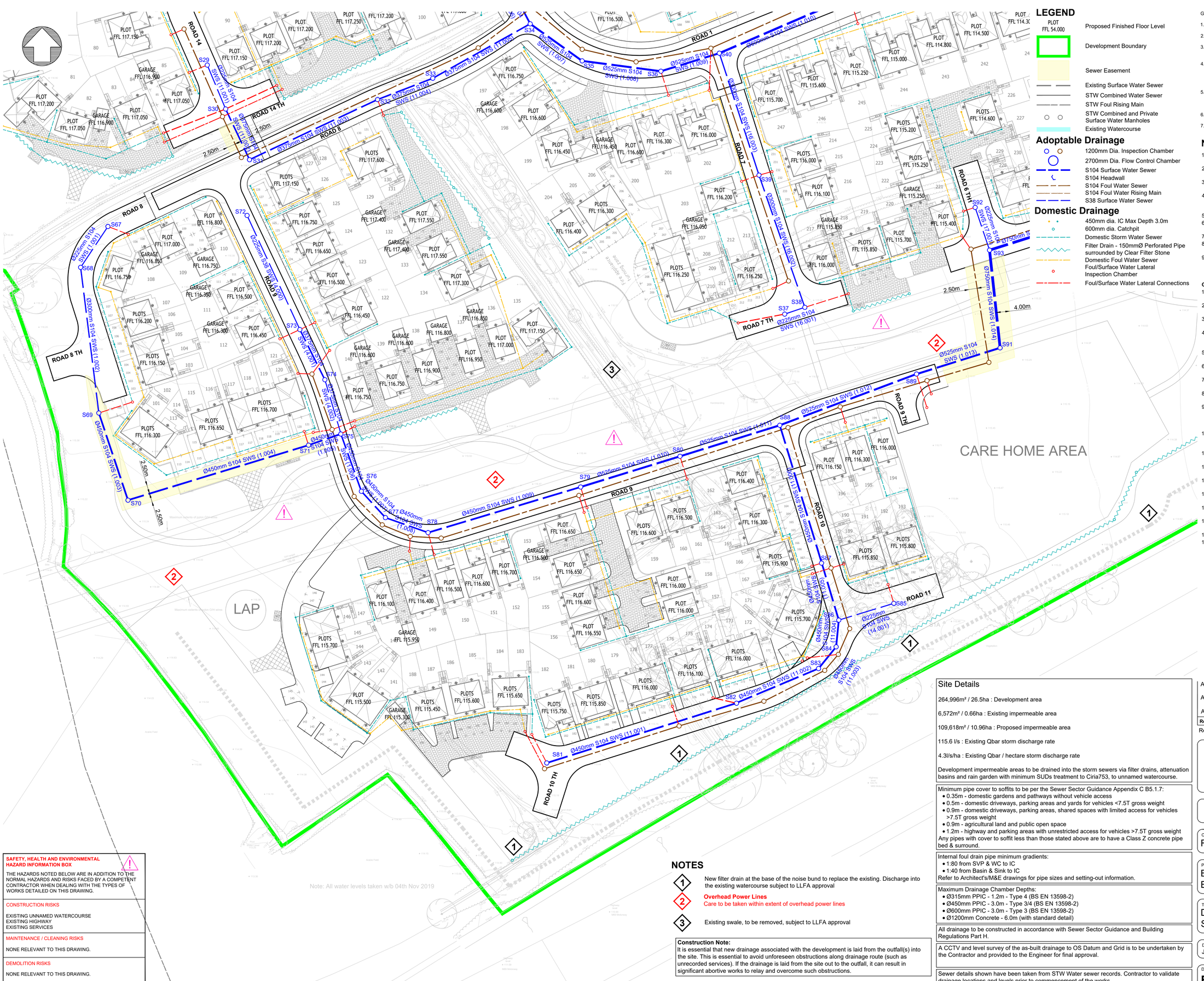
Project: Burbage Field Farm, Bullfurlong Lane, Hinckley

Title: Drainage Strategy Sheet 5 of 7

Drawn:	Checked:	Approved:	Date:	Scale:
JR	OP	JD	March 2023	1:500 @ A1

Drawing No. FW2285-D-400-05 Revision: A3

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LEGEND

- PLOT FFL 54.000 — Proposed Finished Floor Level
- Development Boundary
- Sewer Easement
- Existing Surface Water Sewer
- STW Combined Water Sewer
- STW Foul Rising Main
- STW Combined and Private Surface Water Manholes
- Existing Watercourse

Adoptable Drainage

- 1200mm Dia. Inspection Chamber
- 2700mm Dia. Flow Control Chamber
- S104 Surface Water Sewer
- S104 Headwall
- S104 Foul Water Sewer
- S104 Foul Water Rising Main
- S38 Surface Water Sewer

Domestic Drainage

- 450mm dia. IC Max Depth 3.0m
- 600mm dia. Catchpit
- Domestic Storm Water Sewer
- Filter Drain - 150mmØ Perforated Pipe surrounded by Clear Filter Stone
- Domestic Foul Water Sewer
- Foul/Surface Water Lateral Inspection Chamber
- Foul/Surface Water Lateral Connections

General Notes

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S66	5.527	23.3 l/s
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S121	1.145	4.90 l/s

NOTES

1. New filter drain at the base of the noise bund to replace the existing. Discharge into the existing watercourse subject to LLFA approval
2. **Overhead Power Lines** Care to be taken within extent of overhead power lines
3. Existing swale, to be removed, subject to LLFA approval

Construction Note:
It is essential that new drainage associated with the development is laid from the outfall(s) into the site. This is essential to avoid unforeseen obstructions along drainage route (such as unrecorded services). If the drainage is laid from the site out to the outfall, it can result in significant abortive works to relay and overcome such obstructions.

Site Details

264,996m² / 26.5ha : Development area

6,572m² / 0.66ha : Existing impermeable area

109,618m² / 10.96ha : Proposed impermeable area

115.6 l/s : Existing Qbar storm discharge rate

4.3l/s/ha : Existing Qbar / hectare storm discharge rate

Development impermeable areas to be drained into the storm sewers via filter drains, attenuation basins and rain garden with minimum SUDs treatment to Ciria753, to unnamed watercourse.

Minimum pipe cover to soffits to be per the Sewer Sector Guidance Appendix C B5.1.7:
- 0.35m - domestic gardens and pathways without vehicle access
- 0.5m - domestic driveways, parking areas and yards for vehicles <7.5T gross weight
- 0.9m - domestic driveways, parking areas, shared spaces with limited access for vehicles >7.5T gross weight
- 0.9m - agricultural land and public open space
- 1.2m - highway and parking areas with unrestricted access for vehicles >7.5T gross weight

Any pipes with cover to soffit less than those stated above are to have a Class Z concrete pipe bed & surround.

Internal foul drain pipe minimum gradients:
- 1:80 from SVP & WC to IC
- 1:40 from Basin & Sink to IC

Refer to Architect's/M&E drawings for pipe sizes and setting-out information.

Maximum Drainage Chamber Depths:
- Ø315mm PPIC - 1.2m - Type 4 (BS EN 13598-2)
- Ø450mm PPIC - 3.0m - Type 3/4 (BS EN 13598-2)
- Ø600mm PPIC - 3.0m - Type 3 (BS EN 13598-2)
- Ø1200mm Concrete - 6.0m (with standard detail)

All drainage to be constructed in accordance with Sewer Sector Guidance and Building Regulations Part H.

A CCTV and level survey of the as-built drainage to OS Datum and Grid is to be undertaken by the Contractor and provided to the Engineer for final approval.

Sewer details shown have been taken from STW Water sewer records. Contractor to validate drainage locations and levels prior to commencement of the works.

SAFETY, HEALTH AND ENVIRONMENTAL HAZARD INFORMATION BOX

THE HAZARDS NOTED BELOW ARE IN ADDITION TO THE NORMAL HAZARDS AND RISKS FACED BY A COMPETENT CONTRACTOR WHEN DEALING WITH THE TYPES OF WORKS DETAILED ON THIS DRAWING.

CONSTRUCTION RISKS

EXISTING UNNAMED WATERCOURSE
EXISTING HIGHWAY
EXISTING SERVICES

MAINTENANCE / CLEANING RISKS

NONE RELEVANT TO THIS DRAWING.

DEMOLITION RISKS

NONE RELEVANT TO THIS DRAWING.

Rev	Description of updates	Drawn	Check'd	Apprv'd	Date
A3	Plan has been updated to suit the latest development layout.	JR	EC	DM	10.11.23
A2	Rising main outfall has been updated as per client instruction	JR	JD	JD	22.05.23
A1	Issued for Approval.	JR	OP	JD	15.03.23

Revision Schedule

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321 Bradford Street, Birmingham B5 6ET
0330 100 0363
www.farrowwalsh.com

FOR APPROVAL

Client: Redrow Homes Limited

Project: Burbage Field Farm, Bullfurlong Lane, Hinckley

Title: Drainage Strategy Sheet 6 of 7

Drawn:	Checked:	Approved:	Date:	Scale:
JR	OP	JD	March 2023	1:500 @ A1

Drawing No. FW2285-D-400-06 Revision: A3

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EXISTING SERVICES

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DEMOLITION RISKS

NONE RELEVANT TO THIS DRAWING.

Britannia Recreation Ground

All vertical speed calming features to be provided in accordance with Leicestershire Highways design guide

LEGEND

- Indicative Site Ownership Boundary
- (L) (S) (R) Part M Access (Level / Stepped / Ramp)
- PLOT FFL 59.200 — Proposed Finished Floor Level
- +59.050 — Proposed level
- Fall — Fall Arrow
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- Add Bwk — Exposed brickwork below DPC (final extent to be determined by Contractor on site)
- Tanking — Tanked Brickwork (height shown is above FFL, final extent to be determined by Contractor on site)
- RET — Retaining structure (Max. retaining height shown)
- 20mph Visibility Splays (25m x 2.4m)
- Earthworks Banking (shown where banks are steeper than 1:5)
- 1 — **Existing Levels** Existing tie-in levels to be confirmed prior any construction works

General Notes

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General Road Notes

This drawing is to be read in conjunction with the local Highway Authority design guide and the general specification for roadworks current at the time of construction.

All works shall be in accordance with the local Highway Authority's approved documents and satisfaction. Any reference to the specification shall mean the general specification for roadworks.

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2. Working areas within the vicinity of existing trees are to be agreed with the engineer and chestnut fencing erected as directed.
3. Special care is to be taken when excavating in the vicinity of existing trees, it is not intended that any tree roots should be severed or damaged and specialist advice should be sought when major roots present a problem. Care is to be taken to avoid damage to branches and foliage.
4. It is the Contractor's responsibility to trace and indicate the precise location and nature of all services.
5. The Contractor is to provide a CCTV survey of any highway sewers on completion of the 12-month maintenance period. This is to be provided in accordance with the requirements of the local water and highways authorities.
6. Safe passage for pedestrians across the site is to be ensured at all times by means of approved fencing to both sides of any footpath route.
7. The Health and Safety at Work Act 1981 is to be complied with at all times. Attention is drawn to the wearing of hard hats, reflectorised clothing, and the use of any other required safety equipment.
8. The Contractor is to take account of the soils report.
9. No completion works will be authorised until a formal certificate of conformance to relevant specification is received from the relevant water authority.
10. Compaction control shall be achieved by air void testing for both roadbase and basecourse (maximum air void ratio 6%).
11. Any recycled material to be used for highway construction purposes will be allowed subject to it satisfying relevant tests as instructed by this authority.
12. The Contractor is to take CBR tests at road formation level, capping layer level, and sub-base level and the highway engineer informed before any construction works carried out on that level.
13. All levels and dimensions are to be checked on site before any work commences.
14. All private drives which fall towards a public highway and exceed two parking bays in area are to be provided with a suitable gully or drainage channel to prevent water discharging onto the highway.
15. Where a driveway falls towards a dwelling it shall be provided with a suitable gully or drainage channel to prevent water damaging the building.

All FFLs and external levels are indicative only and subject to detailed design

Rev	Description of updates	Drawn	Check'd	App'd	Date
A3	Plan has been updated to suit the latest development layout.	JR	EC	DM	10.11.23
A2	Levels added to shared drives, dimensions added to retaining walls and underbuild added to plots 79, 81, 150, 320 and 343	JR	JD	JD	22.05.23
A1	Issued for Approval	JR	OP	JD	15.03.23

Revision Schedule

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www.farrowwalsh.com

FOR APPROVAL

Client: Redrow Homes Limited

Project: Burbage Field Farm, Bullfurlong Lane, Hinckley

Title: Engineering Layout Sheet 1 of 6

Drawn:	Checked:	Approved:	Date:	Scale:
JR	OP	JD	March 2023	1:500 @ A1

Drawing No. **FW2285-E-500-01** Revision: **A3**

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EXISTING HIGHWAY
EXISTING SERVICES

MAINTENANCE / CLEANING RISKS

NONE RELEVANT TO THIS DRAWING.

DEMOLITION RISKS

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LEGEND

- Indicative Site Ownership Boundary
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FOR APPROVAL

Client: Redrow Homes Limited

Project: Burbage Field Farm, Bullfurlong Lane, Hinckley

Title: Engineering Layout Sheet 2 of 6

Drawn:	Checked:	Approved:	Date:	Scale:
JR	OP	JD	March 2023	1:500 @ A1

Drawing No. FW2285-E-500-02 Revision: A3

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- RET — Retaining structure (Max. retaining height shown)
- 20mph Visibility Splays (25m x 2.4m)
- Earthworks Banking (shown where banks are steeper than 1:5)
- 1 **Noise Bund** Noise bund to be created to the southern boundary adjacent proposed plots. Maximum slope to be 1:3
- 2 **Overhead Power Lines** Care to be taken within extent of overhead power lines

Leachmore

ETL

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A3	Plan has been updated to suit the latest development layout.	JR	EC	DM	10.11.23
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A1	Issued for Approval.	JR	OP	JD	15.03.23

Revision Schedule

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FOR APPROVAL

Client: Redrow Homes Limited

Project: Burbage Field Farm, Bullfurlong Lane, Hinckley

Title: Engineering Layout Sheet 3 of 6

Drawn:	Checked:	Approved:	Date:	Scale:
JR	OP	JD	March 2023	1:500 @ A1

Drawing No. **FW2285-E-500-03** Revision: **A3**

SAFETY, HEALTH AND ENVIRONMENTAL HAZARD INFORMATION BOX

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CONSTRUCTION RISKS

EXISTING UNNAMED WATERCOURSE
EXISTING HIGHWAY
EXISTING SERVICES

MAINTENANCE / CLEANING RISKS

NONE RELEVANT TO THIS DRAWING.

DEMOLITION RISKS

NONE RELEVANT TO THIS DRAWING.

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Revision Schedule

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LEGEND

- Indicative Site Ownership Boundary
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- Earthworks Banking (shown where banks are steeper than 1:5)

FOR APPROVAL

Client: Redrow Homes Limited

Project: Burbage Field Farm, Bullfurlong Lane, Hinckley

Title: Engineering Layout Sheet 4 of 6

Drawn:	Checked:	Approved:	Date:	Scale:
JR	OP	JD	March 2023	1:500 @ A1

Drawing No. FW2285-E-500-04 Revision: A3

SAFETY, HEALTH AND ENVIRONMENTAL HAZARD INFORMATION BOX

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EXISTING HIGHWAY
EXISTING SERVICES

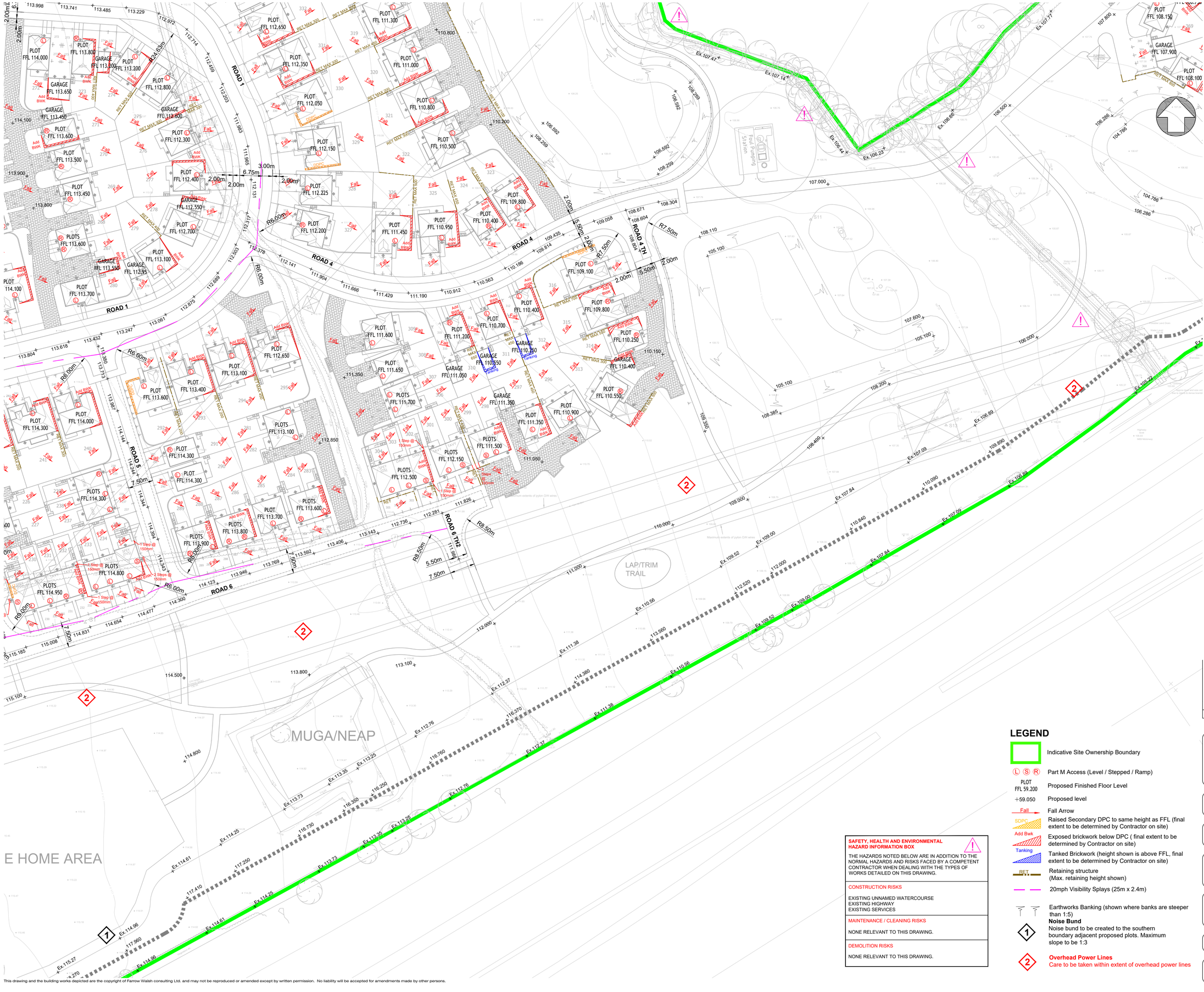
MAINTENANCE / CLEANING RISKS

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DEMOLITION RISKS

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Revision Schedule

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FOR APPROVAL

Client: Redrow Homes Limited

Project: Burbage Field Farm, Bullfurlong Lane, Hinckley

Title: Engineering Layout Sheet 5 of 6

Drawn:	Checked:	Approved:	Date:	Scale:
JR	OP	JD	March 2023	1:500 @ A1

Drawing No.: **FW2285-E-500-05** Revision: **A3**

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Note: All water levels taken w/b 04th Nov 2019

CARE HOME AREA

LAP

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FOR APPROVAL

Client: Redrow Homes Limited

Project: Burbage Field Farm, Bullfurlong Lane, Hinckley

Title: Engineering Layout Sheet 6 of 6

Drawn:	Checked:	Approved:	Date:	Scale:
JR	OP	JD	March 2023	1:500 @ A1

Drawing No. FW2285-E-500-06 Revision: A3

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APPENDIX K – SURFACE WATER DRAINAGE CALCULATIONS

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.132	5.00	126.691	Manhole	1200	443780.904	292095.645	1.425
S2	0.056	5.00	125.148	Manhole	1200	443815.090	292030.568	2.567
S3	0.081	5.00	124.103	Manhole	1200	443847.416	292015.545	2.235
S4L	0.089	5.00	122.880	Manhole	1200	443855.169	291966.354	1.313
S4	0.070	5.00	122.667	Manhole	1200	443864.955	291968.608	1.425
S5L	0.075	5.00	121.330	Manhole	1200	443866.640	291923.297	1.432
S5	0.051	5.00	121.160	Manhole	1200	443875.005	291926.155	1.575
S6	0.054	5.00	120.009	Manhole	1200	443889.076	291897.617	2.992
S7L	0.086	5.00	119.002	Manhole	1200	443890.159	291863.144	1.461
S7	0.051	5.00	118.789	Manhole	1200	443900.131	291865.333	2.454
S8L	0.051	5.00	117.863	Manhole	1200	443897.260	291833.375	1.388
S8	0.037	5.00	117.728	Manhole	1200	443906.657	291835.975	2.070
S9	0.081	5.00	116.862	Manhole	1200	443913.152	291813.172	2.901
S11	0.096	5.00	114.742	Manhole	1200	443938.369	291741.271	1.404
S12L	0.118	5.00	115.030	Manhole	1200	443926.223	291757.975	1.643
S12	0.011	5.00	114.797	Manhole	1200	443937.093	291761.530	2.125
S13	0.043	5.00	114.526	Manhole	1200	443961.060	291770.273	2.364
S14L	0.062	5.00	115.226	Manhole	1200	444009.992	291792.054	3.092
S14	0.040	5.00	115.228	Manhole	1200	444011.241	291798.692	4.219
S14AL	0.123	5.00	114.800	Manhole	1200	444062.710	291810.324	2.697
S14A			113.804	Manhole	1200	444061.337	291793.878	3.802
S15L	0.099	5.00	112.519	Manhole	1200	444098.935	291788.163	2.348
S15			112.406	Manhole	1200	444104.606	291789.708	3.273
HW1			111.000	Manhole		444110.468	291768.192	2.146
S16	0.036	5.00	113.645	Manhole	1200	444044.465	291775.704	1.425
S17L	0.121	5.00	112.450	Manhole	1200	444021.361	291738.907	1.868
S17	0.036	5.00	111.732	Manhole	1200	444041.018	291734.999	1.425
S18L	0.085	5.00	111.000	Manhole	1200	444080.688	291732.672	1.175
S18			111.000	Manhole	1200	444080.507	291730.206	1.425
HW2			110.200	Manhole		444101.211	291735.442	1.296
HW3		5.00	110.200	Manhole		444130.785	291715.646	1.346
S19			110.200	Manhole	2700	444136.861	291709.120	1.368
HW4			109.400	Manhole		444140.891	291690.812	0.700

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1	S2	73.509	0.600	125.266	122.656	2.610	28.2	225	5.50	50.0
1.001	S2	S3	35.647	0.600	122.581	121.868	0.713	50.0	300	5.76	50.0
1.002	S3	S4	50.107	0.600	121.868	121.317	0.551	90.9	300	6.27	49.3
2.000	S4L	S4	10.043	0.600	121.567	121.467	0.100	100.4	150	5.17	50.0
1.003	S4	S5	43.626	0.600	121.242	119.585	1.657	26.3	375	6.47	48.6
3.000	S5L	S5	8.841	0.600	119.898	119.810	0.088	100.5	150	5.15	50.0
1.004	S5	S6	31.818	0.600	119.585	117.017	2.568	12.4	300	6.59	48.1
1.005	S6	S7	34.125	0.600	117.017	116.335	0.682	50.0	375	6.81	47.4
4.000	S7L	S7	10.210	0.600	117.541	116.560	0.981	10.4	150	5.05	50.0
1.006	S7	S8	30.074	0.600	116.335	115.733	0.602	50.0	375	7.01	46.7
5.000	S8L	S8	9.749	0.600	116.475	115.958	0.517	18.9	150	5.07	50.0
1.007	S8	S9	23.710	0.600	115.658	113.961	1.697	14.0	450	7.08	46.5
1.008	S9	S12	56.921	0.600	113.961	112.822	1.139	50.0	450	7.41	45.4
6.000	S11	S12	20.299	0.600	113.338	112.822	0.516	39.3	450	5.10	50.0
7.000	S12L	S12	11.437	0.600	113.387	113.047	0.340	33.6	225	5.08	50.0
1.009	S12	S13	25.511	0.600	112.672	112.162	0.510	50.0	600	7.53	45.0
1.010	S13	S14	57.670	0.600	112.162	111.009	1.153	50.0	600	7.81	44.2
8.000	S14L	S14	6.755	0.600	112.134	111.459	0.675	10.0	150	5.04	50.0
1.011	S14	S14A	50.327	0.600	111.009	110.002	1.007	50.0	600	8.06	43.5
44.000	S14AL	S14A	16.503	0.600	112.103	110.452	1.651	10.0	150	5.09	50.0
1.012	S14A	S15	43.469	0.600	110.002	109.133	0.869	50.0	600	8.27	42.9
9.000	S15L	S15	5.878	0.600	110.171	109.583	0.588	10.0	150	5.03	50.0
1.013	S15	HW1	22.300	0.600	109.133	108.854	0.279	79.9	600	8.40	42.5
10.000	S16	S17	40.850	0.600	112.220	110.457	1.763	23.2	225	5.25	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	S1	S2	2.474	98.4	17.9	1.200	2.267	1.200	2.267	0.132	0.0
1.001	S2	S3	2.228	157.5	25.5	2.267	1.935	1.935	2.267	0.188	0.0
1.002	S3	S4	1.649	116.6	36.0	1.935	1.050	1.050	1.935	0.269	0.0
2.000	S4L	S4	1.002	17.7	12.1	1.163	1.050	1.050	1.163	0.089	0.0
1.003	S4	S5	3.543	391.3	56.3	1.050	1.200	1.050	1.200	0.428	0.0
3.000	S5L	S5	1.002	17.7	10.2	1.282	1.200	1.200	1.282	0.075	0.0
1.004	S5	S6	4.490	317.4	72.3	1.275	2.692	1.275	2.692	0.554	0.0
1.005	S6	S7	2.566	283.4	78.1	2.617	2.079	2.079	2.617	0.608	0.0
4.000	S7L	S7	3.141	55.5	11.7	1.311	2.079	1.311	2.079	0.086	0.0
1.006	S7	S8	2.568	283.7	94.3	2.079	1.620	1.620	2.079	0.745	0.0
5.000	S8L	S8	2.330	41.2	6.9	1.238	1.620	1.238	1.620	0.051	0.0
1.007	S8	S9	5.460	868.4	104.9	1.620	2.451	1.620	2.451	0.833	0.0
1.008	S9	S12	2.881	458.2	112.5	2.451	1.525	1.525	2.451	0.914	0.0
6.000	S11	S12	3.249	516.7	13.0	0.954	1.525	0.954	1.525	0.096	0.0
7.000	S12L	S12	2.263	90.0	16.0	1.418	1.525	1.418	1.525	0.118	0.0
1.009	S12	S13	3.448	974.9	139.0	1.525	1.764	1.525	1.764	1.139	0.0
1.010	S13	S14	3.448	975.0	141.6	1.764	3.619	1.764	3.619	1.182	0.0
8.000	S14L	S14	3.203	56.6	8.4	2.942	3.619	2.942	3.619	0.062	0.0
1.011	S14	S14A	3.450	975.4	151.4	3.619	3.202	3.202	3.619	1.284	0.0
44.000	S14AL	S14A	3.205	56.6	16.7	2.547	3.202	2.547	3.202	0.123	0.0
1.012	S14A	S15	3.448	974.9	163.7	3.202	2.673	2.673	3.202	1.407	0.0
9.000	S15L	S15	3.205	56.6	13.4	2.198	2.673	2.198	2.673	0.099	0.0
1.013	S15	HW1	2.725	770.5	173.7	2.673	1.546	1.546	2.673	1.506	0.0
10.000	S16	S17	2.729	108.5	4.9	1.200	1.050	1.050	1.200	0.036	0.0

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
11.000	S17L	S17	20.041	0.600	110.582	110.457	0.125	160.3	225	5.32	50.0
10.001	S17	S18	39.780	0.600	110.307	109.575	0.732	54.3	375	5.59	50.0
12.000	S18L	S18	2.473	0.600	109.825	109.800	0.025	98.9	150	5.04	50.0
10.002	S18	HW2	21.355	0.600	109.575	109.459	0.116	184.1	375	5.86	50.0
1.014	HW3	S19	8.916	0.600	108.854	108.832	0.022	405.3	600	5.12	50.0
1.015	S19	HW4	18.747	0.600	108.832	108.700	0.132	142.0	225	5.41	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
11.000	S17L	S17	1.030	40.9	16.4	1.643	1.050	1.050	1.643	0.121	0.0
10.001	S17	S18	2.462	271.9	26.2	1.050	1.050	1.050	1.050	0.193	0.0
12.000	S18L	S18	1.010	17.9	11.5	1.025	1.050	1.025	1.050	0.085	0.0
10.002	S18	HW2	1.332	147.1	37.7	1.050	0.366	0.366	1.050	0.278	0.0
1.014	HW3	S19	1.203	340.2	0.0	0.746	0.768	0.746	0.768	0.000	0.0
1.015	S19	HW4	1.095	43.5	0.0	1.143	0.475	0.475	1.143	0.000	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	73.509	28.2	225	126.691	125.266	1.200	125.148	122.656	2.267
1.001	35.647	50.0	300	125.148	122.581	2.267	124.103	121.868	1.935
1.002	50.107	90.9	300	124.103	121.868	1.935	122.667	121.317	1.050
2.000	10.043	100.4	150	122.880	121.567	1.163	122.667	121.467	1.050
1.003	43.626	26.3	375	122.667	121.242	1.050	121.160	119.585	1.200
3.000	8.841	100.5	150	121.330	119.898	1.282	121.160	119.810	1.200
1.004	31.818	12.4	300	121.160	119.585	1.275	120.009	117.017	2.692
1.005	34.125	50.0	375	120.009	117.017	2.617	118.789	116.335	2.079
4.000	10.210	10.4	150	119.002	117.541	1.311	118.789	116.560	2.079
1.006	30.074	50.0	375	118.789	116.335	2.079	117.728	115.733	1.620
5.000	9.749	18.9	150	117.863	116.475	1.238	117.728	115.958	1.620
1.007	23.710	14.0	450	117.728	115.658	1.620	116.862	113.961	2.451
1.008	56.921	50.0	450	116.862	113.961	2.451	114.797	112.822	1.525
6.000	20.299	39.3	450	114.742	113.338	0.954	114.797	112.822	1.525

Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
1.000	S1	1200	Manhole	S2	1200	1
1.001	S2	1200	Manhole	S3	1200	1
1.002	S3	1200	Manhole	S4	1200	1
2.000	S4L	1200	Manhole	S4	1200	1
1.003	S4	1200	Manhole	S5	1200	1
3.000	S5L	1200	Manhole	S5	1200	1
1.004	S5	1200	Manhole	S6	1200	1
1.005	S6	1200	Manhole	S7	1200	1
4.000	S7L	1200	Manhole	S7	1200	1
1.006	S7	1200	Manhole	S8	1200	1
5.000	S8L	1200	Manhole	S8	1200	1
1.007	S8	1200	Manhole	S9	1200	1
1.008	S9	1200	Manhole	S12	1200	1
6.000	S11	1200	Manhole	S12	1200	1

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
7.000	11.437	33.6	225	115.030	113.387	1.418	114.797	113.047	1.525
1.009	25.511	50.0	600	114.797	112.672	1.525	114.526	112.162	1.764
1.010	57.670	50.0	600	114.526	112.162	1.764	115.228	111.009	3.619
8.000	6.755	10.0	150	115.226	112.134	2.942	115.228	111.459	3.619
1.011	50.327	50.0	600	115.228	111.009	3.619	113.804	110.002	3.202
44.000	16.503	10.0	150	114.800	112.103	2.547	113.804	110.452	3.202
1.012	43.469	50.0	600	113.804	110.002	3.202	112.406	109.133	2.673
9.000	5.878	10.0	150	112.519	110.171	2.198	112.406	109.583	2.673
1.013	22.300	79.9	600	112.406	109.133	2.673	111.000	108.854	1.546
10.000	40.850	23.2	225	113.645	112.220	1.200	111.732	110.457	1.050
11.000	20.041	160.3	225	112.450	110.582	1.643	111.732	110.457	1.050
10.001	39.780	54.3	375	111.732	110.307	1.050	111.000	109.575	1.050
12.000	2.473	98.9	150	111.000	109.825	1.025	111.000	109.800	1.050
10.002	21.355	184.1	375	111.000	109.575	1.050	110.200	109.459	0.366
1.014	8.916	405.3	600	110.200	108.854	0.746	110.200	108.832	0.768
1.015	18.747	142.0	225	110.200	108.832	1.143	109.400	108.700	0.475

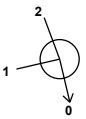
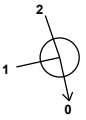
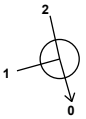
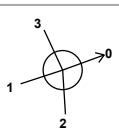
Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
7.000	S12L	1200	Manhole	S12	1200	1
1.009	S12	1200	Manhole	S13	1200	1
1.010	S13	1200	Manhole	S14	1200	1
8.000	S14L	1200	Manhole	S14	1200	1
1.011	S14	1200	Manhole	S14A	1200	1
44.000	S14AL	1200	Manhole	S14A	1200	1
1.012	S14A	1200	Manhole	S15	1200	1
9.000	S15L	1200	Manhole	S15	1200	1
1.013	S15	1200	Manhole	HW1		1
10.000	S16	1200	Manhole	S17	1200	1
11.000	S17L	1200	Manhole	S17	1200	1
10.001	S17	1200	Manhole	S18	1200	1
12.000	S18L	1200	Manhole	S18	1200	1
10.002	S18	1200	Manhole	HW2		1
1.014	HW3		Manhole	S19	2700	1
1.015	S19	2700	Manhole	HW4		1

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S1	443780.904	292095.645	126.691	1.425	1200	Manhole	 0	1.000	125.266	225
S2	443815.090	292030.568	125.148	2.567	1200	Manhole	 1	1.000	122.656	225
							0	1.001	122.581	300
S3	443847.416	292015.545	124.103	2.235	1200	Manhole	1	1.001	121.868	300
							 0	1.002	121.868	300

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S4L	443855.169	291966.354	122.880	1.313	1200	Manhole		0	2.000	121.567	150
S4	443864.955	291968.608	122.667	1.425	1200	Manhole		1	2.000	121.467	150
								2	1.002	121.317	300
								0	1.003	121.242	375
S5L	443866.640	291923.297	121.330	1.432	1200	Manhole		0	3.000	119.898	150
S5	443875.005	291926.155	121.160	1.575	1200	Manhole		1	3.000	119.810	150
								2	1.003	119.585	375
								0	1.004	119.585	300
S6	443889.076	291897.617	120.009	2.992	1200	Manhole		1	1.004	117.017	300
								0	1.005	117.017	375
S7L	443890.159	291863.144	119.002	1.461	1200	Manhole		0	4.000	117.541	150
S7	443900.131	291865.333	118.789	2.454	1200	Manhole		1	4.000	116.560	150
								2	1.005	116.335	375
								0	1.006	116.335	375
S8L	443897.260	291833.375	117.863	1.388	1200	Manhole		0	5.000	116.475	150
S8	443906.657	291835.975	117.728	2.070	1200	Manhole		1	5.000	115.958	150
								2	1.006	115.733	375
								0	1.007	115.658	450
S9	443913.152	291813.172	116.862	2.901	1200	Manhole		1	1.007	113.961	450
								0	1.008	113.961	450
S11	443938.369	291741.271	114.742	1.404	1200	Manhole		0	6.000	113.338	450
S12L	443926.223	291757.975	115.030	1.643	1200	Manhole		0	7.000	113.387	225
S12	443937.093	291761.530	114.797	2.125	1200	Manhole		1	7.000	113.047	225
								2	6.000	112.822	450
								3	1.008	112.822	450
								0	1.009	112.672	600

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S13	443961.060	291770.273	114.526	2.364	1200	Manhole	1	1.009	112.162	600
							0	1.010	112.162	600
S14L	444009.992	291792.054	115.226	3.092	1200	Manhole	0	8.000	112.134	150
S14	444011.241	291798.692	115.228	4.219	1200	Manhole	1	8.000	111.459	150
							2	1.010	111.009	600
							0	1.011	111.009	600
S14AL	444062.710	291810.324	114.800	2.697	1200	Manhole	0	44.000	112.103	150
S14A	444061.337	291793.878	113.804	3.802	1200	Manhole	1	44.000	110.452	150
							2	1.011	110.002	600
							0	1.012	110.002	600
S15L	444098.935	291788.163	112.519	2.348	1200	Manhole	0	9.000	110.171	150
S15	444104.606	291789.708	112.406	3.273	1200	Manhole	1	9.000	109.583	150
							2	1.012	109.133	600
							0	1.013	109.133	600
HW1	444110.468	291768.192	111.000	2.146		Manhole	1	1.013	108.854	600
S16	444044.465	291775.704	113.645	1.425	1200	Manhole	0	10.000	112.220	225
S17L	444021.361	291738.907	112.450	1.868	1200	Manhole	0	11.000	110.582	225
S17	444041.018	291734.999	111.732	1.425	1200	Manhole	1	11.000	110.457	225
							2	10.000	110.457	225
							0	10.001	110.307	375
S18L	444080.688	291732.672	111.000	1.175	1200	Manhole	0	12.000	109.825	150
S18	444080.507	291730.206	111.000	1.425	1200	Manhole	1	12.000	109.800	150
							2	10.001	109.575	375
							0	10.002	109.575	375

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
HW2	444101.211	291735.442	110.200	1.296		Manhole	1	10.002	109.459	375
HW3	444130.785	291715.646	110.200	1.346		Manhole	0	1.014	108.854	600
S19	444136.861	291709.120	110.200	1.368	2700	Manhole	1	1.014	108.832	600
							0	1.015	108.832	225
HW4	444140.891	291690.812	109.400	0.700		Manhole	1	1.015	108.700	225

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	0.0
Ratio-R	0.400	Check Discharge Rate(s)	x
Summer CV	0.750	Check Discharge Volume	x
Analysis Speed	Detailed		

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	40	0	0
100	40	10	0

Node S19 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	108.832	Product Number	CTL-SHE-0123-7000-1062-7000
Design Depth (m)	1.062	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	7.0	Min Node Diameter (mm)	1200

Node HW3 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	50.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	108.854	Main Channel Slope (1:X)	1000.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.020

Inlets

HW1	HW2

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Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	827.0	0.0	1.191	1315.0	0.0	1.192	0.0	0.0

Other (defaults)

Entry Loss (manhole)	0.000	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.000	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 15 minute summer	141.566	40.058
2 year 30 minute summer	91.753	25.963
2 year 60 minute summer	61.301	16.200
2 year 120 minute summer	37.449	9.897
2 year 180 minute summer	28.672	7.378
2 year 240 minute summer	22.636	5.982
2 year 360 minute summer	17.235	4.435
2 year 480 minute summer	13.550	3.581
2 year 600 minute summer	11.088	3.033
2 year 720 minute summer	9.878	2.647
2 year 960 minute summer	8.113	2.136
2 year 1440 minute summer	5.891	1.579
30 year 15 minute summer	268.706	76.035
30 year 30 minute summer	174.929	49.499
30 year 60 minute summer	116.589	30.811
30 year 120 minute summer	70.438	18.615
30 year 180 minute summer	53.298	13.715
30 year 240 minute summer	41.604	10.995
30 year 360 minute summer	31.221	8.034
30 year 480 minute summer	24.324	6.428
30 year 600 minute summer	19.756	5.404
30 year 720 minute summer	17.490	4.687
30 year 960 minute summer	14.215	3.743
30 year 1440 minute summer	10.161	2.723
100 year +40% CC 15 minute summer	488.233	138.153
100 year +40% CC 30 minute summer	320.551	90.705
100 year +40% CC 60 minute summer	214.603	56.713
100 year +40% CC 120 minute summer	129.587	34.246
100 year +40% CC 180 minute summer	97.729	25.149
100 year +40% CC 240 minute summer	75.977	20.078
100 year +40% CC 360 minute summer	56.677	14.585
100 year +40% CC 480 minute summer	43.979	11.622
100 year +40% CC 600 minute summer	35.604	9.738
100 year +40% CC 720 minute summer	31.433	8.424
100 year +40% CC 960 minute summer	25.432	6.697
100 year +40% CC 1440 minute summer	18.055	4.839
100 year +40% CC +10% A 15 minute summer	488.233	138.153
100 year +40% CC +10% A 30 minute summer	320.551	90.705
100 year +40% CC +10% A 60 minute summer	214.603	56.713
100 year +40% CC +10% A 120 minute summer	129.587	34.246
100 year +40% CC +10% A 180 minute summer	97.729	25.149
100 year +40% CC +10% A 240 minute summer	75.977	20.078
100 year +40% CC +10% A 360 minute summer	56.677	14.585

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Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +40% CC +10% A 480 minute summer	43.979	11.622
100 year +40% CC +10% A 600 minute summer	35.604	9.738
100 year +40% CC +10% A 720 minute summer	31.433	8.424
100 year +40% CC +10% A 960 minute summer	25.432	6.697
100 year +40% CC +10% A 1440 minute summer	18.055	4.839

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Results for 2 year Critical Storm Duration. Lowest mass balance: 99.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	125.339	0.073	22.9	0.0821	0.0000	OK
15 minute summer	S2	11	122.672	0.090	31.9	0.1024	0.0000	OK
15 minute summer	S3	11	121.997	0.129	45.6	0.1455	0.0000	OK
15 minute summer	S4L	10	121.674	0.107	15.4	0.1211	0.0000	OK
15 minute summer	S4	11	121.350	0.108	71.9	0.1218	0.0000	OK
15 minute summer	S5L	10	119.993	0.095	13.0	0.1072	0.0000	OK
15 minute summer	S5	11	119.695	0.110	92.9	0.1249	0.0000	OK
15 minute summer	S6	11	117.171	0.153	102.0	0.1736	0.0000	OK
15 minute summer	S7L	10	117.594	0.053	14.9	0.0601	0.0000	OK
15 minute summer	S7	11	116.507	0.172	124.8	0.1943	0.0000	OK
15 minute summer	S8L	10	116.522	0.047	8.8	0.0533	0.0000	OK
15 minute summer	S8	11	115.778	0.120	139.7	0.1361	0.0000	OK
15 minute summer	S9	11	114.137	0.176	153.1	0.1993	0.0000	OK
15 minute summer	S11	10	113.393	0.055	16.6	0.0617	0.0000	OK
15 minute summer	S12L	10	113.460	0.073	20.5	0.0821	0.0000	OK
15 minute summer	S12	11	112.848	0.176	190.1	0.1988	0.0000	OK
15 minute summer	S13	11	112.341	0.179	197.1	0.2022	0.0000	OK
15 minute summer	S14L	10	112.179	0.044	10.8	0.0503	0.0000	OK
15 minute summer	S14	11	111.195	0.186	213.2	0.2101	0.0000	OK
15 minute summer	S14AL	10	112.167	0.064	21.3	0.0721	0.0000	OK
15 minute summer	S14A	11	110.196	0.194	231.9	0.2194	0.0000	OK
15 minute summer	S15L	10	110.228	0.057	17.2	0.0642	0.0000	OK
15 minute summer	S15	11	109.362	0.229	246.2	0.2592	0.0000	OK
360 minute summer	HW1	304	109.156	0.302	51.7	0.0000	0.0000	OK
15 minute summer	S16	10	112.256	0.036	6.2	0.0409	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	22.2	2.019	0.226	0.8114	
15 minute summer	S2	1.001	S3	31.7	1.380	0.201	0.8330	
15 minute summer	S3	1.002	S4	45.5	1.575	0.390	1.4459	
15 minute summer	S4L	2.000	S4	15.2	1.135	0.860	0.1349	
15 minute summer	S4	1.003	S5	72.0	2.711	0.184	1.1591	
15 minute summer	S5L	3.000	S5	12.9	1.100	0.727	0.1035	
15 minute summer	S5	1.004	S6	93.1	3.123	0.293	0.9507	
15 minute summer	S6	1.005	S7	102.2	2.231	0.360	1.5629	
15 minute summer	S7L	4.000	S7	14.8	2.665	0.267	0.0569	
15 minute summer	S7	1.006	S8	125.1	2.544	0.441	1.4794	
15 minute summer	S8L	5.000	S8	8.8	1.855	0.213	0.0460	
15 minute summer	S8	1.007	S9	139.7	3.073	0.161	1.0845	
15 minute summer	S9	1.008	S12	152.7	2.658	0.333	3.2692	
15 minute summer	S11	6.000	S12	16.5	1.514	0.032	0.2209	
15 minute summer	S12L	7.000	S12	20.4	1.845	0.227	0.1264	
15 minute summer	S12	1.009	S13	190.0	2.734	0.195	1.7729	
15 minute summer	S13	1.010	S14	196.3	2.718	0.201	4.1658	
15 minute summer	S14L	8.000	S14	10.8	2.470	0.190	0.0294	
15 minute summer	S14	1.011	S14A	211.5	2.766	0.217	3.8482	
15 minute summer	S14AL	44.000	S14A	21.2	2.979	0.374	0.1175	
15 minute summer	S14A	1.012	S15	229.8	2.590	0.236	3.8617	
15 minute summer	S15L	9.000	S15	17.2	2.814	0.303	0.0358	
15 minute summer	S15	1.013	HW1	244.7	3.361	0.318	1.6482	
360 minute summer	HW1	Flow through pond	HW3	34.4	0.054	0.001	244.8540	
15 minute summer	S16	10.000	S17	6.1	1.485	0.056	0.1679	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 99.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S17L	10	110.695	0.113	21.0	0.1273	0.0000	OK
15 minute summer	S17	10	110.394	0.087	33.0	0.0983	0.0000	OK
15 minute summer	S18L	10	109.928	0.103	14.7	0.1164	0.0000	OK
15 minute summer	S18	11	109.719	0.144	47.4	0.1627	0.0000	OK
360 minute summer	HW2	304	109.160	0.255	9.8	0.0000	0.0000	OK
360 minute summer	HW3	304	109.156	0.302	34.4	0.0000	0.0000	OK
360 minute summer	S19	368	109.173	0.341	30.7	1.9543	0.0000	SURCHARGED
15 minute summer	HW4	1	108.700	0.000	6.8	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S17L	11.000	S17	20.7	1.046	0.506	0.3970	
15 minute summer	S17	10.001	S18	32.8	1.146	0.120	1.1556	
15 minute summer	S18L	12.000	S18	14.6	1.136	0.819	0.0318	
15 minute summer	S18	10.002	HW2	47.4	1.219	0.323	0.8312	
360 minute summer	HW2	Flow through pond	HW3	34.4	0.054	0.001	244.8540	
360 minute summer	HW3	1.014	S19	30.7	0.256	0.090	1.3622	
360 minute summer	S19	Hydro-Brake®	HW4	7.0				204.8

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	125.369	0.103	43.4	0.1165	0.0000	OK
15 minute summer	S2	10	122.709	0.128	60.9	0.1445	0.0000	OK
15 minute summer	S3	11	122.058	0.190	87.2	0.2146	0.0000	OK
15 minute summer	S4L	10	121.882	0.315	29.3	0.3562	0.0000	SURCHARGED
15 minute summer	S4	11	121.393	0.151	137.0	0.1711	0.0000	OK
15 minute summer	S5L	10	120.120	0.221	24.7	0.2505	0.0000	SURCHARGED
15 minute summer	S5	11	119.744	0.159	177.2	0.1797	0.0000	OK
15 minute summer	S6	11	117.242	0.225	194.7	0.2541	0.0000	OK
15 minute summer	S7L	10	117.617	0.076	28.3	0.0859	0.0000	OK
15 minute summer	S7	11	116.593	0.258	238.2	0.2922	0.0000	OK
15 minute summer	S8L	10	116.542	0.067	16.8	0.0754	0.0000	OK
15 minute summer	S8	11	115.826	0.168	266.8	0.1905	0.0000	OK
15 minute summer	S9	11	114.217	0.256	292.3	0.2900	0.0000	OK
15 minute summer	S11	10	113.412	0.074	31.6	0.0841	0.0000	OK
15 minute summer	S12L	10	113.490	0.103	38.8	0.1161	0.0000	OK
15 minute summer	S12	11	112.920	0.248	363.7	0.2804	0.0000	OK
15 minute summer	S13	11	112.415	0.253	377.2	0.2859	0.0000	OK
15 minute summer	S14L	10	112.196	0.062	20.4	0.0705	0.0000	OK
15 minute summer	S14	11	111.273	0.264	408.9	0.2987	0.0000	OK
15 minute summer	S14AL	10	112.197	0.094	40.5	0.1062	0.0000	OK
15 minute summer	S14A	11	110.280	0.277	446.5	0.3138	0.0000	OK
15 minute summer	S15L	10	110.253	0.082	32.6	0.0925	0.0000	OK
15 minute summer	S15	11	109.464	0.331	475.9	0.3742	0.0000	OK
480 minute summer	HW1	480	109.427	0.573	98.0	0.0000	0.0000	OK
15 minute summer	S16	10	112.270	0.050	11.8	0.0562	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	42.5	2.405	0.432	1.2995	
15 minute summer	S2	1.001	S3	60.5	1.613	0.384	1.3435	
15 minute summer	S3	1.002	S4	86.7	1.844	0.744	2.3557	
15 minute summer	S4L	2.000	S4	28.8	1.634	1.624	0.1750	
15 minute summer	S4	1.003	S5	137.3	3.193	0.351	1.8764	
15 minute summer	S5L	3.000	S5	24.3	1.378	1.369	0.1527	
15 minute summer	S5	1.004	S6	177.7	3.737	0.560	1.5031	
15 minute summer	S6	1.005	S7	195.1	2.601	0.688	2.5572	
15 minute summer	S7L	4.000	S7	28.2	3.159	0.508	0.0912	
15 minute summer	S7	1.006	S8	239.1	2.952	0.843	2.4360	
15 minute summer	S8L	5.000	S8	16.7	2.214	0.406	0.0737	
15 minute summer	S8	1.007	S9	266.9	3.627	0.307	1.7474	
15 minute summer	S9	1.008	S12	292.8	3.140	0.639	5.3071	
15 minute summer	S11	6.000	S12	31.5	1.792	0.061	0.4262	
15 minute summer	S12L	7.000	S12	38.6	2.196	0.429	0.2012	
15 minute summer	S12	1.009	S13	363.7	3.269	0.373	2.8391	
15 minute summer	S13	1.010	S14	376.8	3.246	0.386	6.6942	
15 minute summer	S14L	8.000	S14	20.3	2.945	0.359	0.0467	
15 minute summer	S14	1.011	S14A	407.7	3.304	0.418	6.2109	
15 minute summer	S14AL	44.000	S14A	40.3	3.485	0.712	0.1910	
15 minute summer	S14A	1.012	S15	444.7	3.103	0.456	6.2309	
15 minute summer	S15L	9.000	S15	32.5	3.320	0.574	0.0576	
15 minute summer	S15	1.013	HW1	473.4	4.062	0.614	2.7967	
480 minute summer	HW1	Flow through pond	HW3	99.5	0.054	0.004	514.5037	
15 minute summer	S16	10.000	S17	11.6	1.797	0.107	0.2645	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S17L	10	110.755	0.173	39.8	0.1953	0.0000	OK
15 minute summer	S17	10	110.428	0.121	62.7	0.1364	0.0000	OK
15 minute summer	S18L	10	110.009	0.184	28.0	0.2080	0.0000	SURCHARGED
15 minute summer	S18	11	109.782	0.207	90.2	0.2343	0.0000	OK
480 minute summer	HW2	480	109.432	0.528	14.0	0.0000	0.0000	OK
480 minute summer	HW3	480	109.426	0.572	99.5	0.0000	0.0000	OK
600 minute summer	S19	585	109.439	0.607	30.4	3.4752	0.0000	SURCHARGED
15 minute summer	HW4	1	108.700	0.000	7.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S17L	11.000	S17	39.3	1.225	0.960	0.6430	
15 minute summer	S17	10.001	S18	62.4	1.349	0.229	1.8492	
15 minute summer	S18L	12.000	S18	27.9	1.584	1.562	0.0431	
15 minute summer	S18	10.002	HW2	90.0	1.438	0.612	1.3358	
480 minute summer	HW2	Flow through pond	HW3	99.5	0.054	0.004	514.5037	
480 minute summer	HW3	1.014	S19	31.0	0.283	0.091	2.4909	
600 minute summer	S19	Hydro-Brake®	HW4	7.0				284.1

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	125.416	0.150	78.9	0.1693	0.0000	OK
15 minute summer	S2	11	122.809	0.228	110.9	0.2575	0.0000	OK
15 minute summer	S3	11	122.544	0.676	154.4	0.7641	0.0000	SURCHARGED
15 minute summer	S4L	11	122.483	0.915	53.2	1.0354	0.0000	SURCHARGED
15 minute summer	S4	11	121.454	0.212	244.8	0.2393	0.0000	OK
15 minute summer	S5L	12	120.790	0.892	44.9	1.0091	0.0000	SURCHARGED
15 minute summer	S5	12	120.402	0.817	310.7	0.9240	0.0000	SURCHARGED
15 minute summer	S6	12	118.093	1.076	323.2	1.2170	0.0000	SURCHARGED
15 minute summer	S7L	11	118.021	0.480	51.4	0.5432	0.0000	SURCHARGED
15 minute summer	S7	12	117.203	0.868	388.7	0.9819	0.0000	SURCHARGED
15 minute summer	S8L	10	116.571	0.096	30.5	0.1086	0.0000	OK
15 minute summer	S8	11	115.880	0.222	437.4	0.2509	0.0000	OK
15 minute summer	S9	11	114.338	0.377	483.1	0.4265	0.0000	OK
15 minute summer	S11	10	113.438	0.100	57.4	0.1128	0.0000	OK
15 minute summer	S12L	10	113.536	0.149	70.6	0.1683	0.0000	OK
15 minute summer	S12	11	113.008	0.336	613.5	0.3804	0.0000	OK
15 minute summer	S13	11	112.507	0.345	639.2	0.3907	0.0000	OK
15 minute summer	S14L	10	112.223	0.089	37.1	0.1003	0.0000	OK
15 minute summer	S14	11	111.375	0.366	699.8	0.4143	0.0000	OK
15 minute summer	S14AL	11	113.154	1.051	73.6	1.1890	0.0000	SURCHARGED
15 minute summer	S14A	11	110.395	0.393	771.8	0.4443	0.0000	OK
15 minute summer	S15L	10	110.299	0.128	59.2	0.1448	0.0000	OK
720 minute summer	S15	735	109.899	0.766	98.4	0.8666	0.0000	SURCHARGED
720 minute summer	HW1	735	109.903	1.049	212.1	0.0000	0.0000	OK
15 minute summer	S16	10	112.287	0.067	21.5	0.0761	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	77.4	2.766	0.787	2.0659	
15 minute summer	S2	1.001	S3	107.0	1.762	0.679	2.2775	
15 minute summer	S3	1.002	S4	153.3	2.177	1.315	3.4858	
15 minute summer	S4L	2.000	S4	51.6	2.934	2.915	0.1750	
15 minute summer	S4	1.003	S5	244.9	3.463	0.626	3.8034	
15 minute summer	S5L	3.000	S5	43.7	2.484	2.469	0.1556	
15 minute summer	S5	1.004	S6	292.9	4.160	0.923	2.2406	
15 minute summer	S6	1.005	S7	319.5	2.897	1.127	3.7639	
15 minute summer	S7L	4.000	S7	48.6	3.392	0.875	0.1797	
15 minute summer	S7	1.006	S8	389.3	3.530	1.372	3.2835	
15 minute summer	S8L	5.000	S8	30.4	2.553	0.738	0.1160	
15 minute summer	S8	1.007	S9	437.0	3.932	0.503	2.6043	
15 minute summer	S9	1.008	S12	484.7	3.423	1.058	8.5424	
15 minute summer	S11	6.000	S12	57.2	1.742	0.111	0.8858	
15 minute summer	S12L	7.000	S12	70.3	2.528	0.781	0.3182	
15 minute summer	S12	1.009	S13	614.7	3.721	0.631	4.2151	
15 minute summer	S13	1.010	S14	641.5	3.685	0.658	10.0386	
15 minute summer	S14L	8.000	S14	37.0	3.420	0.654	0.0731	
15 minute summer	S14	1.011	S14A	702.6	3.740	0.720	9.4538	
15 minute summer	S14AL	44.000	S14A	69.2	3.930	1.221	0.2903	
15 minute summer	S14A	1.012	S15	777.3	3.436	0.797	9.7535	
15 minute summer	S15L	9.000	S15	58.9	3.603	1.040	0.0987	
720 minute summer	S15	1.013	HW1	212.1	1.077	0.275	6.2814	
720 minute summer	HW1	Flow through pond	HW3	191.3	0.062	0.008	1055.0103	
15 minute summer	S16	10.000	S17	21.2	2.135	0.196	0.4063	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S17L	10	111.053	0.471	72.4	0.5325	0.0000	SURCHARGED
15 minute summer	S17	10	110.474	0.167	114.4	0.1886	0.0000	OK
15 minute summer	S18L	10	110.161	0.336	50.8	0.3797	0.0000	SURCHARGED
720 minute summer	S18	720	109.899	0.324	18.3	0.3662	0.0000	OK
720 minute summer	HW2	720	109.900	0.996	18.3	0.0000	0.0000	OK
720 minute summer	HW3	735	109.898	1.044	191.3	0.0000	0.0000	SURCHARGED
720 minute summer	S19	735	109.898	1.066	14.5	6.1017	0.0000	SURCHARGED
15 minute summer	HW4	1	108.700	0.000	7.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S17L	11.000	S17	71.7	1.803	1.751	0.7854	
15 minute summer	S17	10.001	S18	113.8	1.522	0.419	2.9082	
15 minute summer	S18L	12.000	S18	50.4	2.865	2.825	0.0431	
720 minute summer	S18	10.002	HW2	18.3	0.930	0.124	2.2581	
720 minute summer	HW2	Flow through pond	HW3	191.3	0.062	0.008	1055.0103	
720 minute summer	HW3	1.014	S19	14.5	0.223	0.043	2.5114	
720 minute summer	S19	Hydro-Brake®	HW4	7.0				353.3

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Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	125.427	0.161	86.8	0.1825	0.0000	OK
15 minute summer	S2	11	123.057	0.476	122.7	0.5378	0.0000	SURCHARGED
15 minute summer	S3	11	122.667	0.799	163.5	0.9036	0.0000	SURCHARGED
15 minute summer	S4L	11	122.662	1.094	58.5	1.2379	0.0000	FLOOD RISK
15 minute summer	S4	12	121.534	0.292	262.9	0.3302	0.0000	OK
15 minute summer	S5L	12	121.330	1.432	49.3	1.6196	0.2238	FLOOD
15 minute summer	S5	12	120.962	1.377	332.0	1.5570	0.0000	FLOOD RISK
15 minute summer	S6	12	118.366	1.349	338.3	1.5256	0.0000	SURCHARGED
15 minute summer	S7L	11	118.311	0.770	56.6	0.8703	0.0000	SURCHARGED
15 minute summer	S7	12	117.361	1.026	414.7	1.1606	0.0000	SURCHARGED
15 minute summer	S8L	10	116.578	0.103	33.5	0.1161	0.0000	OK
15 minute summer	S8	11	115.889	0.231	467.6	0.2611	0.0000	OK
15 minute summer	S9	12	114.612	0.651	518.1	0.7362	0.0000	SURCHARGED
15 minute summer	S11	10	113.443	0.105	63.2	0.1183	0.0000	OK
15 minute summer	S12L	10	113.547	0.160	77.6	0.1805	0.0000	OK
15 minute summer	S12	11	113.021	0.349	649.1	0.3943	0.0000	OK
15 minute summer	S13	11	112.519	0.357	676.6	0.4041	0.0000	OK
15 minute summer	S14L	10	112.229	0.094	40.8	0.1069	0.0000	OK
15 minute summer	S14	11	111.389	0.379	740.2	0.4292	0.0000	OK
15 minute summer	S14AL	11	113.633	1.530	80.9	1.7299	0.0000	SURCHARGED
15 minute summer	S14A	11	110.411	0.408	815.8	0.4620	0.0000	OK
15 minute summer	S15L	11	110.500	0.329	65.1	0.3716	0.0000	SURCHARGED
720 minute summer	S15	735	109.999	0.866	108.5	0.9797	0.0000	SURCHARGED
960 minute summer	HW1	975	110.005	1.151	147.2	0.0000	0.0000	OK
15 minute summer	S16	10	112.291	0.071	23.7	0.0801	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	85.9	2.749	0.873	2.5545	
15 minute summer	S2	1.001	S3	113.8	1.796	0.723	2.5102	
15 minute summer	S3	1.002	S4	162.4	2.306	1.393	3.4928	
15 minute summer	S4L	2.000	S4	56.7	3.220	3.200	0.1750	
15 minute summer	S4	1.003	S5	257.4	3.454	0.658	4.4146	
15 minute summer	S5L	3.000	S5	43.3	2.462	2.446	0.1556	
15 minute summer	S5	1.004	S6	310.5	4.410	0.978	2.2406	
15 minute summer	S6	1.005	S7	339.3	3.077	1.197	3.7639	
15 minute summer	S7L	4.000	S7	52.5	3.457	0.946	0.1797	
15 minute summer	S7	1.006	S8	415.8	3.770	1.466	3.2835	
15 minute summer	S8L	5.000	S8	33.4	2.600	0.810	0.1251	
15 minute summer	S8	1.007	S9	467.3	3.939	0.538	2.8403	
15 minute summer	S9	1.008	S12	507.4	3.398	1.108	8.9961	
15 minute summer	S11	6.000	S12	63.0	1.774	0.122	0.9669	
15 minute summer	S12L	7.000	S12	77.3	2.570	0.859	0.3439	
15 minute summer	S12	1.009	S13	649.6	3.769	0.666	4.3973	
15 minute summer	S13	1.010	S14	676.1	3.727	0.693	10.4610	
15 minute summer	S14L	8.000	S14	40.7	3.490	0.719	0.0788	
15 minute summer	S14	1.011	S14A	740.4	3.775	0.759	9.8694	
15 minute summer	S14AL	44.000	S14A	75.4	4.281	1.330	0.2881	
15 minute summer	S14A	1.012	S15	817.8	3.420	0.839	10.4545	
15 minute summer	S15L	9.000	S15	63.1	3.601	1.115	0.1029	
720 minute summer	S15	1.013	HW1	109.0	0.830	0.141	6.2814	
960 minute summer	HW1	Flow through pond	HW3	116.9	0.056	0.005	1180.7327	
15 minute summer	S16	10.000	S17	23.4	2.195	0.216	0.4359	

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Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S17L	10	111.135	0.553	79.6	0.6252	0.0000	SURCHARGED
15 minute summer	S17	10	110.483	0.176	125.9	0.1992	0.0000	OK
15 minute summer	S18L	10	110.206	0.381	55.9	0.4312	0.0000	SURCHARGED
720 minute summer	S18	735	109.997	0.422	20.0	0.4776	0.0000	SURCHARGED
960 minute summer	HW2	975	110.002	1.098	16.3	0.0000	0.0000	OK
960 minute summer	HW3	960	109.997	1.143	126.0	0.0000	0.0000	FLOOD RISK
960 minute summer	S19	960	109.997	1.165	32.2	6.6713	0.0000	FLOOD RISK
15 minute summer	HW4	1	108.700	0.000	7.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S17L	11.000	S17	78.8	1.981	1.924	0.7890	
15 minute summer	S17	10.001	S18	125.3	1.544	0.461	3.1200	
15 minute summer	S18L	12.000	S18	55.4	3.149	3.106	0.0431	
720 minute summer	S18	10.002	HW2	20.0	0.954	0.136	2.3554	
960 minute summer	HW2	Flow through pond	HW3	116.9	0.056	0.005	1180.7327	
960 minute summer	HW3	1.014	S19	32.2	0.227	0.095	2.5114	
960 minute summer	S19	Hydro-Brake®	HW4	7.3				456.3

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Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1	0.132	5.00	126.691	Manhole	1200	443780.904	292095.645	1.425
S2	0.056	5.00	125.148	Manhole	1200	443815.090	292030.568	2.567
S3	0.081	5.00	124.103	Manhole	1200	443847.416	292015.545	2.235
S4L	0.089	5.00	122.880	Manhole	1200	443855.169	291966.354	1.313
S4	0.070	5.00	122.667	Manhole	1200	443864.955	291968.608	1.425
S5L	0.075	5.00	121.330	Manhole	1200	443866.640	291923.297	1.432
S5	0.051	5.00	121.160	Manhole	1200	443875.005	291926.155	1.575
S6	0.054	5.00	120.009	Manhole	1200	443889.076	291897.617	2.992
S7L	0.086	5.00	119.002	Manhole	1200	443890.159	291863.144	1.461
S7	0.051	5.00	118.789	Manhole	1200	443900.131	291865.333	2.454
S8L	0.051	5.00	117.863	Manhole	1200	443897.260	291833.375	1.388
S8	0.037	5.00	117.728	Manhole	1200	443906.657	291835.975	2.070
S9	0.081	5.00	116.862	Manhole	1200	443913.152	291813.172	2.901
S11	0.096	5.00	114.742	Manhole	1200	443938.369	291741.271	1.404
S12L	0.118	5.00	115.030	Manhole	1200	443926.223	291757.975	1.643
S12	0.011	5.00	114.797	Manhole	1200	443937.093	291761.530	2.125
S13	0.043	5.00	114.526	Manhole	1200	443961.060	291770.273	2.364
S14L	0.062	5.00	115.226	Manhole	1200	444009.992	291792.054	3.092
S14	0.040	5.00	115.228	Manhole	1200	444011.241	291798.692	4.219
S14AL	0.123	5.00	114.800	Manhole	1200	444062.710	291810.324	2.697
S14A			113.804	Manhole	1200	444061.337	291793.878	3.802
S15L	0.099	5.00	112.519	Manhole	1200	444098.935	291788.163	2.348
S15			112.406	Manhole	1200	444104.606	291789.708	3.273
HW1			111.000	Manhole		444110.468	291768.192	2.146
S16	0.036	5.00	113.645	Manhole	1200	444044.465	291775.704	1.425
S17L	0.121	5.00	112.450	Manhole	1200	444021.361	291738.907	1.868
S17	0.036	5.00	111.732	Manhole	1200	444041.018	291734.999	1.425
S18L	0.085	5.00	111.000	Manhole	1200	444080.688	291732.672	1.175
S18			111.000	Manhole	1200	444080.507	291730.206	1.425
HW2			110.200	Manhole		444101.211	291735.442	1.296
HW3		5.00	110.200	Manhole		444130.785	291715.646	1.346
S19			110.200	Manhole	2700	444136.861	291709.120	1.368
HW4			109.400	Manhole		444140.891	291690.812	0.700

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S1	S2	73.509	0.600	125.266	122.656	2.610	28.2	225	5.50	50.0
1.001	S2	S3	35.647	0.600	122.581	121.868	0.713	50.0	300	5.76	50.0
1.002	S3	S4	50.107	0.600	121.868	121.317	0.551	90.9	300	6.27	49.3
2.000	S4L	S4	10.043	0.600	121.567	121.467	0.100	100.4	150	5.17	50.0
1.003	S4	S5	43.626	0.600	121.242	119.585	1.657	26.3	375	6.47	48.6
3.000	S5L	S5	8.841	0.600	119.898	119.810	0.088	100.5	150	5.15	50.0
1.004	S5	S6	31.818	0.600	119.585	117.017	2.568	12.4	300	6.59	48.1
1.005	S6	S7	34.125	0.600	117.017	116.335	0.682	50.0	375	6.81	47.4
4.000	S7L	S7	10.210	0.600	117.541	116.560	0.981	10.4	150	5.05	50.0
1.006	S7	S8	30.074	0.600	116.335	115.733	0.602	50.0	375	7.01	46.7
5.000	S8L	S8	9.749	0.600	116.475	115.958	0.517	18.9	150	5.07	50.0
1.007	S8	S9	23.710	0.600	115.658	113.961	1.697	14.0	450	7.08	46.5
1.008	S9	S12	56.921	0.600	113.961	112.822	1.139	50.0	450	7.41	45.4
6.000	S11	S12	20.299	0.600	113.338	112.822	0.516	39.3	450	5.10	50.0
7.000	S12L	S12	11.437	0.600	113.387	113.047	0.340	33.6	225	5.08	50.0
1.009	S12	S13	25.511	0.600	112.672	112.162	0.510	50.0	600	7.53	45.0
1.010	S13	S14	57.670	0.600	112.162	111.009	1.153	50.0	600	7.81	44.2
8.000	S14L	S14	6.755	0.600	112.134	111.459	0.675	10.0	150	5.04	50.0
1.011	S14	S14A	50.327	0.600	111.009	110.002	1.007	50.0	600	8.06	43.5
44.000	S14AL	S14A	16.503	0.600	112.103	110.452	1.651	10.0	150	5.09	50.0
1.012	S14A	S15	43.469	0.600	110.002	109.133	0.869	50.0	600	8.27	42.9
9.000	S15L	S15	5.878	0.600	110.171	109.583	0.588	10.0	150	5.03	50.0
1.013	S15	HW1	22.300	0.600	109.133	108.854	0.279	79.9	600	8.40	42.5
10.000	S16	S17	40.850	0.600	112.220	110.457	1.763	23.2	225	5.25	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	S1	S2	2.474	98.4	17.9	1.200	2.267	1.200	2.267	0.132	0.0
1.001	S2	S3	2.228	157.5	25.5	2.267	1.935	1.935	2.267	0.188	0.0
1.002	S3	S4	1.649	116.6	36.0	1.935	1.050	1.050	1.935	0.269	0.0
2.000	S4L	S4	1.002	17.7	12.1	1.163	1.050	1.050	1.163	0.089	0.0
1.003	S4	S5	3.543	391.3	56.3	1.050	1.200	1.050	1.200	0.428	0.0
3.000	S5L	S5	1.002	17.7	10.2	1.282	1.200	1.200	1.282	0.075	0.0
1.004	S5	S6	4.490	317.4	72.3	1.275	2.692	1.275	2.692	0.554	0.0
1.005	S6	S7	2.566	283.4	78.1	2.617	2.079	2.079	2.617	0.608	0.0
4.000	S7L	S7	3.141	55.5	11.7	1.311	2.079	1.311	2.079	0.086	0.0
1.006	S7	S8	2.568	283.7	94.3	2.079	1.620	1.620	2.079	0.745	0.0
5.000	S8L	S8	2.330	41.2	6.9	1.238	1.620	1.238	1.620	0.051	0.0
1.007	S8	S9	5.460	868.4	104.9	1.620	2.451	1.620	2.451	0.833	0.0
1.008	S9	S12	2.881	458.2	112.5	2.451	1.525	1.525	2.451	0.914	0.0
6.000	S11	S12	3.249	516.7	13.0	0.954	1.525	0.954	1.525	0.096	0.0
7.000	S12L	S12	2.263	90.0	16.0	1.418	1.525	1.418	1.525	0.118	0.0
1.009	S12	S13	3.448	974.9	139.0	1.525	1.764	1.525	1.764	1.139	0.0
1.010	S13	S14	3.448	975.0	141.6	1.764	3.619	1.764	3.619	1.182	0.0
8.000	S14L	S14	3.203	56.6	8.4	2.942	3.619	2.942	3.619	0.062	0.0
1.011	S14	S14A	3.450	975.4	151.4	3.619	3.202	3.202	3.619	1.284	0.0
44.000	S14AL	S14A	3.205	56.6	16.7	2.547	3.202	2.547	3.202	0.123	0.0
1.012	S14A	S15	3.448	974.9	163.7	3.202	2.673	2.673	3.202	1.407	0.0
9.000	S15L	S15	3.205	56.6	13.4	2.198	2.673	2.198	2.673	0.099	0.0
1.013	S15	HW1	2.725	770.5	173.7	2.673	1.546	1.546	2.673	1.506	0.0
10.000	S16	S17	2.729	108.5	4.9	1.200	1.050	1.050	1.200	0.036	0.0

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
11.000	S17L	S17	20.041	0.600	110.582	110.457	0.125	160.3	225	5.32	50.0
10.001	S17	S18	39.780	0.600	110.307	109.575	0.732	54.3	375	5.59	50.0
12.000	S18L	S18	2.473	0.600	109.825	109.800	0.025	98.9	150	5.04	50.0
10.002	S18	HW2	21.355	0.600	109.575	109.459	0.116	184.1	375	5.86	50.0
1.014	HW3	S19	8.916	0.600	108.854	108.832	0.022	405.3	600	5.12	50.0
1.015	S19	HW4	18.747	0.600	108.832	108.700	0.132	142.0	225	5.41	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
11.000	S17L	S17	1.030	40.9	16.4	1.643	1.050	1.050	1.643	0.121	0.0
10.001	S17	S18	2.462	271.9	26.2	1.050	1.050	1.050	1.050	0.193	0.0
12.000	S18L	S18	1.010	17.9	11.5	1.025	1.050	1.025	1.050	0.085	0.0
10.002	S18	HW2	1.332	147.1	37.7	1.050	0.366	0.366	1.050	0.278	0.0
1.014	HW3	S19	1.203	340.2	0.0	0.746	0.768	0.746	0.768	0.000	0.0
1.015	S19	HW4	1.095	43.5	0.0	1.143	0.475	0.475	1.143	0.000	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	73.509	28.2	225	126.691	125.266	1.200	125.148	122.656	2.267
1.001	35.647	50.0	300	125.148	122.581	2.267	124.103	121.868	1.935
1.002	50.107	90.9	300	124.103	121.868	1.935	122.667	121.317	1.050
2.000	10.043	100.4	150	122.880	121.567	1.163	122.667	121.467	1.050
1.003	43.626	26.3	375	122.667	121.242	1.050	121.160	119.585	1.200
3.000	8.841	100.5	150	121.330	119.898	1.282	121.160	119.810	1.200
1.004	31.818	12.4	300	121.160	119.585	1.275	120.009	117.017	2.692
1.005	34.125	50.0	375	120.009	117.017	2.617	118.789	116.335	2.079
4.000	10.210	10.4	150	119.002	117.541	1.311	118.789	116.560	2.079
1.006	30.074	50.0	375	118.789	116.335	2.079	117.728	115.733	1.620
5.000	9.749	18.9	150	117.863	116.475	1.238	117.728	115.958	1.620
1.007	23.710	14.0	450	117.728	115.658	1.620	116.862	113.961	2.451
1.008	56.921	50.0	450	116.862	113.961	2.451	114.797	112.822	1.525
6.000	20.299	39.3	450	114.742	113.338	0.954	114.797	112.822	1.525

Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
1.000	S1	1200	Manhole	S2	1200	1
1.001	S2	1200	Manhole	S3	1200	1
1.002	S3	1200	Manhole	S4	1200	1
2.000	S4L	1200	Manhole	S4	1200	1
1.003	S4	1200	Manhole	S5	1200	1
3.000	S5L	1200	Manhole	S5	1200	1
1.004	S5	1200	Manhole	S6	1200	1
1.005	S6	1200	Manhole	S7	1200	1
4.000	S7L	1200	Manhole	S7	1200	1
1.006	S7	1200	Manhole	S8	1200	1
5.000	S8L	1200	Manhole	S8	1200	1
1.007	S8	1200	Manhole	S9	1200	1
1.008	S9	1200	Manhole	S12	1200	1
6.000	S11	1200	Manhole	S12	1200	1

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
7.000	11.437	33.6	225	115.030	113.387	1.418	114.797	113.047	1.525
1.009	25.511	50.0	600	114.797	112.672	1.525	114.526	112.162	1.764
1.010	57.670	50.0	600	114.526	112.162	1.764	115.228	111.009	3.619
8.000	6.755	10.0	150	115.226	112.134	2.942	115.228	111.459	3.619
1.011	50.327	50.0	600	115.228	111.009	3.619	113.804	110.002	3.202
44.000	16.503	10.0	150	114.800	112.103	2.547	113.804	110.452	3.202
1.012	43.469	50.0	600	113.804	110.002	3.202	112.406	109.133	2.673
9.000	5.878	10.0	150	112.519	110.171	2.198	112.406	109.583	2.673
1.013	22.300	79.9	600	112.406	109.133	2.673	111.000	108.854	1.546
10.000	40.850	23.2	225	113.645	112.220	1.200	111.732	110.457	1.050
11.000	20.041	160.3	225	112.450	110.582	1.643	111.732	110.457	1.050
10.001	39.780	54.3	375	111.732	110.307	1.050	111.000	109.575	1.050
12.000	2.473	98.9	150	111.000	109.825	1.025	111.000	109.800	1.050
10.002	21.355	184.1	375	111.000	109.575	1.050	110.200	109.459	0.366
1.014	8.916	405.3	600	110.200	108.854	0.746	110.200	108.832	0.768
1.015	18.747	142.0	225	110.200	108.832	1.143	109.400	108.700	0.475

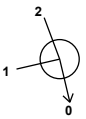
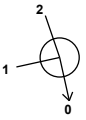
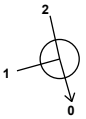
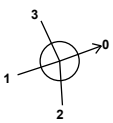
Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
7.000	S12L	1200	Manhole	S12	1200	1
1.009	S12	1200	Manhole	S13	1200	1
1.010	S13	1200	Manhole	S14	1200	1
8.000	S14L	1200	Manhole	S14	1200	1
1.011	S14	1200	Manhole	S14A	1200	1
44.000	S14AL	1200	Manhole	S14A	1200	1
1.012	S14A	1200	Manhole	S15	1200	1
9.000	S15L	1200	Manhole	S15	1200	1
1.013	S15	1200	Manhole	HW1		1
10.000	S16	1200	Manhole	S17	1200	1
11.000	S17L	1200	Manhole	S17	1200	1
10.001	S17	1200	Manhole	S18	1200	1
12.000	S18L	1200	Manhole	S18	1200	1
10.002	S18	1200	Manhole	HW2		1
1.014	HW3		Manhole	S19	2700	1
1.015	S19	2700	Manhole	HW4		1

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S1	443780.904	292095.645	126.691	1.425	1200	Manhole	 0	1.000	125.266	225
S2	443815.090	292030.568	125.148	2.567	1200	Manhole	 1	1.000	122.656	225
							0	1.001	122.581	300
S3	443847.416	292015.545	124.103	2.235	1200	Manhole	1	1.001	121.868	300
							 0	1.002	121.868	300

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S4L	443855.169	291966.354	122.880	1.313	1200	Manhole		0	2.000	121.567	150
S4	443864.955	291968.608	122.667	1.425	1200	Manhole		1	2.000	121.467	150
								2	1.002	121.317	300
								0	1.003	121.242	375
S5L	443866.640	291923.297	121.330	1.432	1200	Manhole		0	3.000	119.898	150
S5	443875.005	291926.155	121.160	1.575	1200	Manhole		1	3.000	119.810	150
								2	1.003	119.585	375
								0	1.004	119.585	300
S6	443889.076	291897.617	120.009	2.992	1200	Manhole		1	1.004	117.017	300
								0	1.005	117.017	375
S7L	443890.159	291863.144	119.002	1.461	1200	Manhole		0	4.000	117.541	150
S7	443900.131	291865.333	118.789	2.454	1200	Manhole		1	4.000	116.560	150
								2	1.005	116.335	375
								0	1.006	116.335	375
S8L	443897.260	291833.375	117.863	1.388	1200	Manhole		0	5.000	116.475	150
S8	443906.657	291835.975	117.728	2.070	1200	Manhole		1	5.000	115.958	150
								2	1.006	115.733	375
								0	1.007	115.658	450
S9	443913.152	291813.172	116.862	2.901	1200	Manhole		1	1.007	113.961	450
								0	1.008	113.961	450
S11	443938.369	291741.271	114.742	1.404	1200	Manhole		0	6.000	113.338	450
S12L	443926.223	291757.975	115.030	1.643	1200	Manhole		0	7.000	113.387	225
S12	443937.093	291761.530	114.797	2.125	1200	Manhole		1	7.000	113.047	225
								2	6.000	112.822	450
								3	1.008	112.822	450
								0	1.009	112.672	600

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S13	443961.060	291770.273	114.526	2.364	1200	Manhole	1	1.009	112.162	600
							0	1.010	112.162	600
S14L	444009.992	291792.054	115.226	3.092	1200	Manhole	0	8.000	112.134	150
S14	444011.241	291798.692	115.228	4.219	1200	Manhole	1	8.000	111.459	150
							2	1.010	111.009	600
							0	1.011	111.009	600
S14AL	444062.710	291810.324	114.800	2.697	1200	Manhole	0	44.000	112.103	150
S14A	444061.337	291793.878	113.804	3.802	1200	Manhole	1	44.000	110.452	150
							2	1.011	110.002	600
							0	1.012	110.002	600
S15L	444098.935	291788.163	112.519	2.348	1200	Manhole	0	9.000	110.171	150
S15	444104.606	291789.708	112.406	3.273	1200	Manhole	1	9.000	109.583	150
							2	1.012	109.133	600
							0	1.013	109.133	600
HW1	444110.468	291768.192	111.000	2.146		Manhole	1	1.013	108.854	600
S16	444044.465	291775.704	113.645	1.425	1200	Manhole	0	10.000	112.220	225
S17L	444021.361	291738.907	112.450	1.868	1200	Manhole	0	11.000	110.582	225
S17	444041.018	291734.999	111.732	1.425	1200	Manhole	1	11.000	110.457	225
							2	10.000	110.457	225
							0	10.001	110.307	375
S18L	444080.688	291732.672	111.000	1.175	1200	Manhole	0	12.000	109.825	150
S18	444080.507	291730.206	111.000	1.425	1200	Manhole	1	12.000	109.800	150
							2	10.001	109.575	375
							0	10.002	109.575	375

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
HW2	444101.211	291735.442	110.200	1.296		Manhole	1	10.002	109.459	375
HW3	444130.785	291715.646	110.200	1.346		Manhole	0	1.014	108.854	600
S19	444136.861	291709.120	110.200	1.368	2700	Manhole	1	1.014	108.832	600
							0	1.015	108.832	225
HW4	444140.891	291690.812	109.400	0.700		Manhole	1	1.015	108.700	225

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	0.0
Ratio-R	0.400	Check Discharge Rate(s)	x
Summer CV	0.750	Check Discharge Volume	x
Analysis Speed	Detailed		

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	40	0	0

Node HW4 Surcharged Outfall

Overrides Design Area	x	Depression Storage Area (m²)	0	Evapo-transpiration (mm/day)	0
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0		
		Applies to All storms			

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
0	0.700	135	0.700	270	0.700	405	0.700	540	0.700	675	0.700
15	0.700	150	0.700	285	0.700	420	0.700	555	0.700	690	0.700
30	0.700	165	0.700	300	0.700	435	0.700	570	0.700	705	0.700
45	0.700	180	0.700	315	0.700	450	0.700	585	0.700	720	0.700
60	0.700	195	0.700	330	0.700	465	0.700	600	0.700	735	0.700
75	0.700	210	0.700	345	0.700	480	0.700	615	0.700	750	0.700
90	0.700	225	0.700	360	0.700	495	0.700	630	0.700	765	0.700
105	0.700	240	0.700	375	0.700	510	0.700	645	0.700	780	0.700
120	0.700	255	0.700	390	0.700	525	0.700	660	0.700	795	0.700

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Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
810	0.700	930	0.700	1050	0.700	1170	0.700	1290	0.700	1410	0.700
825	0.700	945	0.700	1065	0.700	1185	0.700	1305	0.700	1425	0.700
840	0.700	960	0.700	1080	0.700	1200	0.700	1320	0.700	1440	0.700
855	0.700	975	0.700	1095	0.700	1215	0.700	1335	0.700		
870	0.700	990	0.700	1110	0.700	1230	0.700	1350	0.700		
885	0.700	1005	0.700	1125	0.700	1245	0.700	1365	0.700		
900	0.700	1020	0.700	1140	0.700	1260	0.700	1380	0.700		
915	0.700	1035	0.700	1155	0.700	1275	0.700	1395	0.700		

Node S19 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	108.832	Product Number	CTL-SHE-0123-7000-1062-7000
Design Depth (m)	1.062	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	7.0	Min Node Diameter (mm)	1200

Node HW3 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	50.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	108.854	Main Channel Slope (1:X)	1000.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.020

Inlets

HW1 | HW2

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	827.0	0.0	1.191	1315.0	0.0	1.192	0.0	0.0

Other (defaults)

Entry Loss (manhole)	0.000	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.000	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 15 minute summer	141.566	40.058	30 year 120 minute summer	70.438	18.615
2 year 30 minute summer	91.753	25.963	30 year 180 minute summer	53.298	13.715
2 year 60 minute summer	61.301	16.200	30 year 240 minute summer	41.604	10.995
2 year 120 minute summer	37.449	9.897	30 year 360 minute summer	31.221	8.034
2 year 180 minute summer	28.672	7.378	30 year 480 minute summer	24.324	6.428
2 year 240 minute summer	22.636	5.982	30 year 600 minute summer	19.756	5.404
2 year 360 minute summer	17.235	4.435	30 year 720 minute summer	17.490	4.687
2 year 480 minute summer	13.550	3.581	30 year 960 minute summer	14.215	3.743
2 year 600 minute summer	11.088	3.033	30 year 1440 minute summer	10.161	2.723
2 year 720 minute summer	9.878	2.647	100 year +40% CC 15 minute summer	488.233	138.153
2 year 960 minute summer	8.113	2.136	100 year +40% CC 30 minute summer	320.551	90.705
2 year 1440 minute summer	5.891	1.579	100 year +40% CC 60 minute summer	214.603	56.713
30 year 15 minute summer	268.706	76.035	100 year +40% CC 120 minute summer	129.587	34.246
30 year 30 minute summer	174.929	49.499	100 year +40% CC 180 minute summer	97.729	25.149
30 year 60 minute summer	116.589	30.811	100 year +40% CC 240 minute summer	75.977	20.078

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Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +40% CC 360 minute summer	56.677	14.585	100 year +40% CC 720 minute summer	31.433	8.424
100 year +40% CC 480 minute summer	43.979	11.622	100 year +40% CC 960 minute summer	25.432	6.697
100 year +40% CC 600 minute summer	35.604	9.738	100 year +40% CC 1440 minute summer	18.055	4.839

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Results for 2 year Critical Storm Duration. Lowest mass balance: 99.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	125.339	0.073	22.9	0.0821	0.0000	OK
15 minute summer	S2	11	122.672	0.090	31.9	0.1024	0.0000	OK
15 minute summer	S3	11	121.997	0.129	45.6	0.1455	0.0000	OK
15 minute summer	S4L	10	121.674	0.107	15.4	0.1211	0.0000	OK
15 minute summer	S4	11	121.350	0.108	71.9	0.1218	0.0000	OK
15 minute summer	S5L	10	119.993	0.095	13.0	0.1072	0.0000	OK
15 minute summer	S5	11	119.695	0.110	92.9	0.1249	0.0000	OK
15 minute summer	S6	11	117.171	0.153	102.0	0.1736	0.0000	OK
15 minute summer	S7L	10	117.594	0.053	14.9	0.0601	0.0000	OK
15 minute summer	S7	11	116.507	0.172	124.8	0.1943	0.0000	OK
15 minute summer	S8L	10	116.522	0.047	8.8	0.0533	0.0000	OK
15 minute summer	S8	11	115.778	0.120	139.7	0.1361	0.0000	OK
15 minute summer	S9	11	114.137	0.176	153.1	0.1993	0.0000	OK
15 minute summer	S11	10	113.393	0.055	16.6	0.0617	0.0000	OK
15 minute summer	S12L	10	113.460	0.073	20.5	0.0821	0.0000	OK
15 minute summer	S12	11	112.848	0.176	190.1	0.1988	0.0000	OK
15 minute summer	S13	11	112.341	0.179	197.1	0.2022	0.0000	OK
15 minute summer	S14L	10	112.179	0.044	10.8	0.0503	0.0000	OK
15 minute summer	S14	11	111.195	0.186	213.2	0.2101	0.0000	OK
15 minute summer	S14AL	10	112.167	0.064	21.3	0.0721	0.0000	OK
15 minute summer	S14A	11	110.196	0.194	231.9	0.2194	0.0000	OK
15 minute summer	S15L	10	110.228	0.057	17.2	0.0642	0.0000	OK
1440 minute summer	S15	1500	109.408	0.275	18.5	0.3112	0.0000	OK
1440 minute summer	HW1	1500	109.408	0.554	33.6	0.0000	0.0000	OK
15 minute summer	S16	10	112.256	0.036	6.2	0.0409	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	22.2	2.019	0.226	0.8114	
15 minute summer	S2	1.001	S3	31.7	1.380	0.201	0.8330	
15 minute summer	S3	1.002	S4	45.5	1.575	0.390	1.4459	
15 minute summer	S4L	2.000	S4	15.2	1.135	0.860	0.1349	
15 minute summer	S4	1.003	S5	72.0	2.711	0.184	1.1591	
15 minute summer	S5L	3.000	S5	12.9	1.100	0.727	0.1035	
15 minute summer	S5	1.004	S6	93.1	3.123	0.293	0.9507	
15 minute summer	S6	1.005	S7	102.2	2.231	0.360	1.5629	
15 minute summer	S7L	4.000	S7	14.8	2.665	0.267	0.0569	
15 minute summer	S7	1.006	S8	125.1	2.544	0.441	1.4794	
15 minute summer	S8L	5.000	S8	8.8	1.855	0.213	0.0460	
15 minute summer	S8	1.007	S9	139.7	3.073	0.161	1.0845	
15 minute summer	S9	1.008	S12	152.7	2.658	0.333	3.2692	
15 minute summer	S11	6.000	S12	16.5	1.514	0.032	0.2209	
15 minute summer	S12L	7.000	S12	20.4	1.845	0.227	0.1264	
15 minute summer	S12	1.009	S13	190.0	2.734	0.195	1.7729	
15 minute summer	S13	1.010	S14	196.3	2.718	0.201	4.1658	
15 minute summer	S14L	8.000	S14	10.8	2.470	0.190	0.0294	
15 minute summer	S14	1.011	S14A	211.5	2.766	0.217	3.8482	
15 minute summer	S14AL	44.000	S14A	21.2	2.979	0.374	0.1175	
15 minute summer	S14A	1.012	S15	229.8	2.590	0.236	3.8617	
15 minute summer	S15L	9.000	S15	17.2	2.814	0.303	0.0358	
1440 minute summer	S15	1.013	HW1	33.6	0.325	0.044	4.4372	
1440 minute summer	HW1	Flow through pond	HW3	33.9	0.017	0.001	495.1757	
15 minute summer	S16	10.000	S17	6.1	1.485	0.056	0.1679	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 99.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S17L	10	110.695	0.113	21.0	0.1273	0.0000	OK
15 minute summer	S17	10	110.394	0.087	33.0	0.0983	0.0000	OK
15 minute summer	S18L	10	109.928	0.103	14.7	0.1164	0.0000	OK
15 minute summer	S18	11	109.719	0.144	47.4	0.1627	0.0000	OK
1440 minute summer	HW2	1500	109.411	0.507	8.1	0.0000	0.0000	OK
1440 minute summer	HW3	1500	109.408	0.554	33.9	0.0000	0.0000	OK
1440 minute summer	S19	1500	109.408	0.576	0.6	3.2989	0.0000	SURCHARGED
15 minute summer	HW4	1	109.400	0.700	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S17L	11.000	S17	20.7	1.046	0.506	0.3970	
15 minute summer	S17	10.001	S18	32.8	1.146	0.120	1.1556	
15 minute summer	S18L	12.000	S18	14.6	1.136	0.819	0.0318	
15 minute summer	S18	10.002	HW2	47.4	1.219	0.323	0.8312	
1440 minute summer	HW2	Flow through pond	HW3	33.9	0.017	0.001	495.1757	
1440 minute summer	HW3	1.014	S19	0.6	0.136	0.002	2.4517	
1440 minute summer	S19	Hydro-Brake®	HW4	0.1				0.8

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	125.369	0.103	43.4	0.1165	0.0000	OK
15 minute summer	S2	10	122.709	0.128	60.9	0.1445	0.0000	OK
15 minute summer	S3	11	122.058	0.190	87.2	0.2146	0.0000	OK
15 minute summer	S4L	10	121.882	0.315	29.3	0.3562	0.0000	SURCHARGED
15 minute summer	S4	11	121.393	0.151	137.0	0.1711	0.0000	OK
15 minute summer	S5L	10	120.120	0.221	24.7	0.2505	0.0000	SURCHARGED
15 minute summer	S5	11	119.744	0.159	177.2	0.1797	0.0000	OK
15 minute summer	S6	11	117.242	0.225	194.7	0.2541	0.0000	OK
15 minute summer	S7L	10	117.617	0.076	28.3	0.0859	0.0000	OK
15 minute summer	S7	11	116.593	0.258	238.2	0.2922	0.0000	OK
15 minute summer	S8L	10	116.542	0.067	16.8	0.0754	0.0000	OK
15 minute summer	S8	11	115.826	0.168	266.8	0.1905	0.0000	OK
15 minute summer	S9	11	114.217	0.256	292.3	0.2900	0.0000	OK
15 minute summer	S11	10	113.412	0.074	31.6	0.0841	0.0000	OK
15 minute summer	S12L	10	113.490	0.103	38.8	0.1161	0.0000	OK
15 minute summer	S12	11	112.920	0.248	363.7	0.2804	0.0000	OK
15 minute summer	S13	11	112.415	0.253	377.2	0.2859	0.0000	OK
15 minute summer	S14L	10	112.196	0.062	20.4	0.0705	0.0000	OK
15 minute summer	S14	11	111.273	0.264	408.9	0.2987	0.0000	OK
15 minute summer	S14AL	10	112.197	0.094	40.5	0.1062	0.0000	OK
15 minute summer	S14A	11	110.280	0.277	446.5	0.3138	0.0000	OK
15 minute summer	S15L	10	110.253	0.082	32.6	0.0925	0.0000	OK
1440 minute summer	S15	1020	109.561	0.428	31.8	0.4841	0.0000	OK
1440 minute summer	HW1	1020	109.561	0.707	58.8	0.0000	0.0000	OK
15 minute summer	S16	10	112.270	0.050	11.8	0.0562	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	42.5	2.405	0.432	1.2995	
15 minute summer	S2	1.001	S3	60.5	1.613	0.384	1.3435	
15 minute summer	S3	1.002	S4	86.7	1.844	0.744	2.3557	
15 minute summer	S4L	2.000	S4	28.8	1.634	1.624	0.1750	
15 minute summer	S4	1.003	S5	137.3	3.193	0.351	1.8764	
15 minute summer	S5L	3.000	S5	24.3	1.378	1.369	0.1527	
15 minute summer	S5	1.004	S6	177.7	3.737	0.560	1.5031	
15 minute summer	S6	1.005	S7	195.1	2.601	0.688	2.5572	
15 minute summer	S7L	4.000	S7	28.2	3.159	0.508	0.0912	
15 minute summer	S7	1.006	S8	239.1	2.952	0.843	2.4360	
15 minute summer	S8L	5.000	S8	16.7	2.214	0.406	0.0737	
15 minute summer	S8	1.007	S9	266.9	3.627	0.307	1.7474	
15 minute summer	S9	1.008	S12	292.8	3.140	0.639	5.3071	
15 minute summer	S11	6.000	S12	31.5	1.792	0.061	0.4262	
15 minute summer	S12L	7.000	S12	38.6	2.196	0.429	0.2012	
15 minute summer	S12	1.009	S13	363.7	3.269	0.373	2.8391	
15 minute summer	S13	1.010	S14	376.8	3.246	0.386	6.6942	
15 minute summer	S14L	8.000	S14	20.3	2.945	0.359	0.0467	
15 minute summer	S14	1.011	S14A	407.7	3.304	0.418	6.2109	
15 minute summer	S14AL	44.000	S14A	40.3	3.485	0.712	0.1910	
15 minute summer	S14A	1.012	S15	444.7	3.103	0.456	6.2309	
15 minute summer	S15L	9.000	S15	32.5	3.320	0.574	0.0576	
1440 minute summer	S15	1.013	HW1	58.8	0.379	0.076	5.5389	
1440 minute summer	HW1	Flow through pond	HW3	51.4	0.047	0.002	659.0626	
15 minute summer	S16	10.000	S17	11.6	1.797	0.107	0.2645	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S17L	10	110.755	0.173	39.8	0.1953	0.0000	OK
15 minute summer	S17	10	110.428	0.121	62.7	0.1364	0.0000	OK
15 minute summer	S18L	10	110.009	0.184	28.0	0.2080	0.0000	SURCHARGED
15 minute summer	S18	11	109.782	0.207	90.2	0.2343	0.0000	OK
1440 minute summer	HW2	1020	109.561	0.657	6.0	0.0000	0.0000	OK
1440 minute summer	HW3	1020	109.561	0.707	51.4	0.0000	0.0000	SURCHARGED
1440 minute summer	S19	1020	109.561	0.729	6.5	4.1715	0.0000	SURCHARGED
15 minute summer	HW4	1	109.400	0.700	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S17L	11.000	S17	39.3	1.225	0.960	0.6430	
15 minute summer	S17	10.001	S18	62.4	1.349	0.229	1.8492	
15 minute summer	S18L	12.000	S18	27.9	1.584	1.562	0.0431	
15 minute summer	S18	10.002	HW2	90.0	1.438	0.612	1.3358	
1440 minute summer	HW2	Flow through pond	HW3	51.4	0.047	0.002	659.0626	
1440 minute summer	HW3	1.014	S19	6.5	0.076	0.019	2.5114	
1440 minute summer	S19	Hydro-Brake®	HW4	6.5				289.7

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S1	10	125.416	0.150	78.9	0.1693	0.0000	OK
15 minute summer	S2	11	122.809	0.228	110.9	0.2575	0.0000	OK
15 minute summer	S3	11	122.544	0.676	154.4	0.7641	0.0000	SURCHARGED
15 minute summer	S4L	11	122.483	0.915	53.2	1.0354	0.0000	SURCHARGED
15 minute summer	S4	11	121.454	0.212	244.8	0.2393	0.0000	OK
15 minute summer	S5L	12	120.790	0.892	44.9	1.0091	0.0000	SURCHARGED
15 minute summer	S5	12	120.402	0.817	310.7	0.9240	0.0000	SURCHARGED
15 minute summer	S6	12	118.093	1.076	323.2	1.2170	0.0000	SURCHARGED
15 minute summer	S7L	11	118.021	0.480	51.4	0.5432	0.0000	SURCHARGED
15 minute summer	S7	12	117.203	0.868	388.7	0.9819	0.0000	SURCHARGED
15 minute summer	S8L	10	116.571	0.096	30.5	0.1086	0.0000	OK
15 minute summer	S8	11	115.880	0.222	437.4	0.2509	0.0000	OK
15 minute summer	S9	11	114.338	0.377	483.1	0.4265	0.0000	OK
15 minute summer	S11	10	113.438	0.100	57.4	0.1128	0.0000	OK
15 minute summer	S12L	10	113.536	0.149	70.6	0.1683	0.0000	OK
15 minute summer	S12	11	113.008	0.336	613.5	0.3804	0.0000	OK
15 minute summer	S13	11	112.507	0.345	639.2	0.3907	0.0000	OK
15 minute summer	S14L	10	112.223	0.089	37.1	0.1003	0.0000	OK
15 minute summer	S14	11	111.375	0.366	699.8	0.4143	0.0000	OK
15 minute summer	S14AL	11	113.154	1.051	73.6	1.1890	0.0000	SURCHARGED
15 minute summer	S14A	11	110.395	0.393	771.8	0.4443	0.0000	OK
15 minute summer	S15L	10	110.299	0.128	59.2	0.1448	0.0000	OK
1440 minute summer	S15	1440	110.024	0.891	56.2	1.0072	0.0000	SURCHARGED
1440 minute summer	HW1	1410	110.030	1.176	101.2	0.0000	0.0000	OK
15 minute summer	S16	10	112.287	0.067	21.5	0.0761	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S1	1.000	S2	77.4	2.766	0.787	2.0659	
15 minute summer	S2	1.001	S3	107.0	1.762	0.679	2.2775	
15 minute summer	S3	1.002	S4	153.3	2.177	1.315	3.4858	
15 minute summer	S4L	2.000	S4	51.6	2.934	2.915	0.1750	
15 minute summer	S4	1.003	S5	244.9	3.463	0.626	3.8034	
15 minute summer	S5L	3.000	S5	43.7	2.484	2.469	0.1556	
15 minute summer	S5	1.004	S6	292.9	4.160	0.923	2.2406	
15 minute summer	S6	1.005	S7	319.5	2.897	1.127	3.7639	
15 minute summer	S7L	4.000	S7	48.6	3.392	0.875	0.1797	
15 minute summer	S7	1.006	S8	389.3	3.530	1.372	3.2835	
15 minute summer	S8L	5.000	S8	30.4	2.553	0.738	0.1160	
15 minute summer	S8	1.007	S9	437.0	3.932	0.503	2.6043	
15 minute summer	S9	1.008	S12	484.7	3.423	1.058	8.5424	
15 minute summer	S11	6.000	S12	57.2	1.742	0.111	0.8858	
15 minute summer	S12L	7.000	S12	70.3	2.528	0.781	0.3182	
15 minute summer	S12	1.009	S13	614.7	3.721	0.631	4.2151	
15 minute summer	S13	1.010	S14	641.5	3.685	0.658	10.0386	
15 minute summer	S14L	8.000	S14	37.0	3.420	0.654	0.0731	
15 minute summer	S14	1.011	S14A	702.6	3.740	0.720	9.4538	
15 minute summer	S14AL	44.000	S14A	69.2	3.930	1.221	0.2903	
15 minute summer	S14A	1.012	S15	777.3	3.436	0.797	9.7535	
15 minute summer	S15L	9.000	S15	58.9	3.603	1.040	0.0987	
1440 minute summer	S15	1.013	HW1	101.2	0.599	0.131	6.2814	
1440 minute summer	HW1	Flow through pond	HW3	100.5	0.036	0.004	1211.7701	
15 minute summer	S16	10.000	S17	21.2	2.135	0.196	0.4063	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.62%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S17L	10	111.053	0.471	72.4	0.5325	0.0000	SURCHARGED
15 minute summer	S17	10	110.474	0.167	114.4	0.1886	0.0000	OK
15 minute summer	S18L	10	110.161	0.336	50.8	0.3797	0.0000	SURCHARGED
1440 minute summer	S18	1410	110.023	0.448	10.6	0.5069	0.0000	SURCHARGED
1440 minute summer	HW2	1260	110.026	1.122	10.9	0.0000	0.0000	OK
1440 minute summer	HW3	1350	110.021	1.167	100.5	0.0000	0.0000	FLOOD RISK
1440 minute summer	S19	1350	110.021	1.189	7.2	6.8088	0.0000	FLOOD RISK
15 minute summer	HW4	1	109.400	0.700	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S17L	11.000	S17	71.7	1.803	1.751	0.7854	
15 minute summer	S17	10.001	S18	113.8	1.522	0.419	2.9082	
15 minute summer	S18L	12.000	S18	50.4	2.865	2.825	0.0431	
1440 minute summer	S18	10.002	HW2	10.5	0.745	0.072	2.3554	
1440 minute summer	HW2	Flow through pond	HW3	100.5	0.036	0.004	1211.7701	
1440 minute summer	HW3	1.014	S19	7.2	0.206	0.021	2.5114	
1440 minute summer	S19	Hydro-Brake®	HW4	7.0				384.0

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Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S20L	0.126	5.00	118.050	Manhole	1200	443726.598	291580.939	1.942
S20	0.097	5.00	117.871	Manhole	1500	443724.514	291563.783	2.627
S21La	0.065	5.00	117.280	Manhole	1200	443770.314	291520.942	1.644
S21Lb	0.051	5.00	117.262	Manhole	1200	443779.109	291519.517	1.646
S21	0.033	5.00	117.286	Manhole	1500	443775.700	291520.069	2.005
S22Lb	0.049	5.00	117.400	Manhole	1200	443772.393	291550.929	2.070
S22La	0.091	5.00	117.490	Manhole	1200	443782.530	291561.498	2.185
S22	0.020	5.00	117.331	Manhole	1500	443781.376	291554.374	2.398
S23L	0.124	5.00	117.642	Manhole	1200	443816.813	291610.966	1.659
S23	0.043	5.00	117.763	Manhole	1200	443824.030	291605.549	2.306
S24L	0.046	5.00	117.800	Manhole	1200	443820.618	291580.704	2.317
S24	0.023	5.00	117.836	Manhole	1200	443816.344	291579.478	2.726
S25	0.025	5.00	117.627	Manhole	1500	443812.026	291549.404	2.895
S26L	0.052	5.00	117.490	Manhole	1200	443835.771	291540.759	2.373
S26	0.031	5.00	117.358	Manhole	1500	443837.046	291545.359	2.943
S27L	0.066	5.00	117.100	Manhole	1200	443865.956	291545.642	1.828
S27	0.053	5.00	116.932	Manhole	1500	443870.449	291536.970	2.862
S28L	0.048	5.00	116.896	Manhole	1200	443866.251	291511.974	2.206
S28	0.021	5.00	116.646	Manhole	1500	443873.473	291514.657	2.951
S29L	0.036	5.00	116.950	Manhole	1200	443778.867	291486.594	1.774
S29	0.030	5.00	116.911	Manhole	1200	443784.225	291488.769	1.868
S30La	0.194	5.00	117.200	Manhole	1200	443775.409	291470.169	1.457
S30Lb	0.107	5.00	116.880	Manhole	1200	443804.951	291482.717	1.064
S30	0.027	5.00	117.074	Manhole	1500	443789.713	291475.676	2.248
S31	0.028	5.00	117.088	Manhole	1500	443796.831	291460.570	2.429
S32L	0.110	5.00	117.485	Manhole	1200	443836.785	291473.804	2.702
S32	0.018	5.00	117.368	Manhole	1500	443835.019	291478.489	3.311
S33	0.025	5.00	117.038	Manhole	1500	443851.486	291484.829	3.202
S34	0.037	5.00	116.415	Manhole	1800	443880.545	291501.065	2.986
S35	0.041	5.00	116.157	Manhole	1500	443896.046	291490.017	2.966
S36L	0.126	5.00	116.035	Manhole	1200	443920.666	291479.743	2.345
S36	0.021	5.00	115.816	Manhole	1500	443919.537	291486.928	3.490
S37L	0.126	5.00	116.270	Manhole	1200	443942.586	291411.897	2.281
S37	0.032	5.00	116.002	Manhole	1500	443956.457	291414.527	2.229
S38L	0.060	5.00	116.000	Manhole	1200	443975.427	291420.600	2.046
S38	0.014	5.00	115.939	Manhole	1500	443962.456	291416.547	2.305
S39La	0.035	5.00	116.060	Manhole	1200	443943.622	291454.130	2.144
S39Lb	0.032	5.00	116.085	Manhole	1200	443952.661	291457.010	2.317
S39	0.032	5.00	116.079	Manhole	1500	443948.799	291455.955	2.862
S40	0.076	5.00	115.528	Manhole	1800	443936.967	291492.313	3.885
S41La	0.112	5.00	115.040	Manhole	1200	443968.311	291516.294	2.372

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Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S41Lb	0.057	5.00	115.044	Manhole	1200	443975.273	291499.962	2.524
S41	0.067	5.00	114.833	Manhole	1800	443972.824	291507.759	3.731
S42La	0.211	5.00	114.136	Manhole	1200	444016.029	291530.797	1.956
S42Lb	0.103	5.00	114.155	Manhole	1200	444020.020	291513.499	2.109
S42	0.042	5.00	113.942	Manhole	1800	444018.565	291521.581	3.318
S43	0.021	5.00	114.031	Manhole	1200	444053.518	291503.522	2.862
S44L	0.194	5.00	113.620	Manhole	1800	444042.718	291537.421	2.753
S44	0.031	5.00	113.380	Manhole	1800	444046.213	291526.845	3.225
S45	0.029	5.00	113.033	Manhole	1800	444065.128	291532.942	3.077
S46L	0.124	5.00	112.900	Manhole	1200	444086.341	291539.566	2.381
S46	0.030	5.00	112.686	Manhole	1800	444080.870	291544.415	2.973
S47L	0.085	5.00	117.070	Manhole	1200	443884.230	291600.704	2.611
S47	0.074	5.00	116.846	Manhole	1800	443894.371	291597.505	2.568
S48L	0.117	5.00	116.240	Manhole	1200	443895.036	291634.825	1.720
S48	0.025	5.00	115.969	Manhole	1200	443905.812	291633.399	2.068
S49L	0.074	5.00	115.795	Manhole	1200	443908.595	291654.145	1.889
S49	0.013	5.00	115.553	Manhole	1200	443916.433	291647.285	1.827
S50	0.068	5.00	115.179	Manhole	1500	443924.387	291692.392	1.292
S51	0.045	5.00	115.200	Manhole	1500	443925.446	291676.490	1.472
S52	0.018	5.00	115.288	Manhole	1500	443929.752	291659.028	1.816
S53	0.027	5.00	115.655	Manhole	1500	443950.409	291640.307	2.462
S54L	0.100	5.00	115.742	Manhole	1200	443967.124	291639.883	2.083
S54	0.080	5.00	115.655	Manhole	1500	443966.632	291634.596	2.634
S54AL	0.079	5.00	113.962	Manhole	1200	443987.797	291682.193	1.355
S54A	0.069	5.00	113.831	Manhole	1500	443993.191	291681.835	1.714
S54B	0.020	5.00	114.791	Manhole	1500	443991.065	291632.693	3.145
S55La	0.077	5.00	114.400	Manhole	1200	444015.384	291638.573	2.896
S55Lb	0.082	5.00	114.400	Manhole	1200	444014.478	291620.844	2.722
S55	0.070	5.00	114.066	Manhole	1500	444019.822	291630.453	3.862
S56L	0.088	5.00	113.400	Manhole	1200	444057.898	291635.750	2.347
S56	0.035	5.00	112.973	Manhole	1500	444062.200	291627.854	3.194
S57L	0.097	5.00	112.800	Manhole	1200	444083.653	291622.557	2.781
S57	0.035	5.00	112.566	Manhole	1500	444076.774	291619.291	3.073
S58L	0.080	5.00	112.110	Manhole	1200	444081.447	291584.691	2.326
S58	0.035	5.00	111.935	Manhole	1500	444091.916	291584.485	2.917
S59L	0.088	5.00	112.400	Manhole	1200	444099.362	291565.725	3.072
S59			112.248	Manhole	1500	444091.570	291566.932	3.449
S60L	0.049	5.00	112.600	Manhole	1200	444078.895	291560.325	2.433
S60	0.034	5.00	112.440	Manhole	1800	444088.501	291555.769	4.086
S61	0.021	5.00	111.587	Manhole	1800	444119.267	291543.174	3.898
S62	0.016	5.00	111.074	Manhole	1800	444140.948	291540.513	3.658
S63La	0.069	5.00	110.756	Manhole	1200	444153.628	291549.997	2.721
S63Lb	0.118	5.00	110.670	Manhole	1200	444158.283	291539.860	2.670
S63	0.027	5.00	110.556	Manhole	1800	444157.041	291543.522	3.345
S64L	0.187	5.00	109.400	Manhole	1200	444183.206	291567.153	1.713
S64	0.014	5.00	109.193	Manhole	1800	444189.306	291560.527	2.346
S65L	0.098	5.00	108.900	Manhole	1200	444198.591	291557.594	0.648
S65	0.041	5.00	108.753	Manhole	1800	444199.987	291564.120	1.919
HW11			108.259	Manhole		444200.122	291579.769	1.442
HW12		5.00	108.259	Manhole		444214.527	291601.442	1.442
S66			108.300	Manhole	2700	444222.278	291604.489	1.492
hw13			107.769	Manhole		444234.306	291611.790	1.044

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Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S20L	S20	17.282	0.600	116.108	115.469	0.639	27.0	225	5.11	50.0
1.001	S20	S22	57.384	0.600	115.244	114.933	0.311	184.5	450	5.75	50.0
2.000	S21La	S21	5.244	0.600	115.636	115.581	0.055	95.3	150	5.08	50.0
3.000	S21Lb	S21	3.665	0.600	115.616	115.581	0.035	104.7	150	5.06	50.0
2.001	S21	S22	34.771	0.600	115.281	114.933	0.348	99.9	450	5.37	50.0
4.000	S22Lb	S22	9.405	0.600	115.330	115.233	0.097	97.0	150	5.15	50.0
5.000	S22La	S22	7.221	0.600	115.305	115.233	0.072	100.3	150	5.12	50.0
1.002	S22	S25	30.661	0.600	114.933	114.732	0.201	152.5	450	6.07	50.0
6.000	S23L	S23	9.024	0.600	115.983	115.532	0.451	20.0	225	5.05	50.0
6.001	S23	S24	31.671	0.600	115.457	115.185	0.272	116.4	300	5.41	50.0
7.000	S24L	S24	7.833	0.600	115.483	115.335	0.148	52.9	150	5.09	50.0
6.002	S24	S25	25.853	0.600	115.110	114.806	0.304	85.0	375	5.63	50.0
1.003	S25	S26	25.986	0.600	114.732	114.415	0.317	82.0	450	6.26	49.4
8.000	S26L	S26	4.774	0.600	115.117	114.715	0.402	11.9	150	5.03	50.0
1.004	S26	S27	34.440	0.600	114.415	114.071	0.344	100.1	450	6.54	48.3
9.000	S27L	S27	9.766	0.600	115.272	114.370	0.902	10.8	150	5.05	50.0
1.005	S27	S28	22.518	0.600	114.070	113.695	0.375	60.0	450	6.68	47.8
10.000	S28L	S28	7.704	0.600	114.690	113.995	0.695	11.1	150	5.04	50.0
1.006	S28	S34	15.321	0.600	113.695	113.503	0.192	79.8	450	6.80	47.4
11.000	S29L	S29	5.783	0.600	115.176	115.118	0.058	99.7	150	5.10	50.0
11.001	S29	S30	14.197	0.600	115.043	114.976	0.067	211.9	225	5.36	50.0
12.000	S30La	S30	15.328	0.600	115.743	114.977	0.766	20.0	225	5.09	50.0
13.000	S30Lb	S30	16.786	0.600	115.816	114.977	0.839	20.0	225	5.10	50.0
11.002	S30	S31	16.699	0.600	114.826	114.659	0.167	100.0	375	5.51	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	S20L	S20	2.525	100.4	17.1	1.717	2.177	1.717	2.177	0.126	0.0
1.001	S20	S22	1.493	237.5	30.2	2.177	1.948	1.948	2.177	0.223	0.0
2.000	S21La	S21	1.029	18.2	8.8	1.494	1.555	1.494	1.555	0.065	0.0
3.000	S21Lb	S21	0.981	17.3	6.9	1.496	1.555	1.496	1.555	0.051	0.0
2.001	S21	S22	2.034	323.4	20.2	1.555	1.948	1.555	1.948	0.149	0.0
4.000	S22Lb	S22	1.020	18.0	6.6	1.920	1.948	1.920	1.948	0.049	0.0
5.000	S22La	S22	1.003	17.7	12.3	2.035	1.948	1.948	2.035	0.091	0.0
1.002	S22	S25	1.643	261.4	72.1	1.948	2.445	1.948	2.445	0.532	0.0
6.000	S23L	S23	2.938	116.8	16.8	1.434	2.006	1.434	2.006	0.124	0.0
6.001	S23	S24	1.456	102.9	22.6	2.006	2.351	2.006	2.351	0.167	0.0
7.000	S24L	S24	1.386	24.5	6.2	2.167	2.351	2.167	2.351	0.046	0.0
6.002	S24	S25	1.965	217.1	32.0	2.351	2.446	2.351	2.446	0.236	0.0
1.003	S25	S26	2.246	357.3	106.1	2.445	2.493	2.445	2.493	0.793	0.0
8.000	S26L	S26	2.939	51.9	7.0	2.223	2.493	2.223	2.493	0.052	0.0
1.004	S26	S27	2.032	323.1	114.7	2.493	2.411	2.411	2.493	0.876	0.0
9.000	S27L	S27	3.079	54.4	8.9	1.678	2.412	1.678	2.412	0.066	0.0
1.005	S27	S28	2.627	417.8	129.0	2.412	2.501	2.412	2.501	0.995	0.0
10.000	S28L	S28	3.043	53.8	6.5	2.056	2.501	2.056	2.501	0.048	0.0
1.006	S28	S34	2.277	362.2	136.8	2.501	2.462	2.462	2.501	1.064	0.0
11.000	S29L	S29	1.006	17.8	4.9	1.624	1.643	1.624	1.643	0.036	0.0
11.001	S29	S30	0.894	35.6	8.9	1.643	1.873	1.643	1.873	0.066	0.0
12.000	S30La	S30	2.938	116.8	26.3	1.232	1.872	1.232	1.872	0.194	0.0
13.000	S30Lb	S30	2.938	116.8	14.5	0.839	1.872	0.839	1.872	0.107	0.0
11.002	S30	S31	1.812	200.1	53.4	1.873	2.054	1.873	2.054	0.394	0.0

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Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
11.003	S31	S32	42.183	0.600	114.659	114.057	0.602	70.1	375	5.84	50.0
14.000	S32L	S32	5.007	0.600	114.783	114.282	0.501	10.0	150	5.03	50.0
11.004	S32	S33	17.646	0.600	114.057	113.836	0.221	79.8	375	5.98	50.0
11.005	S33	S34	33.286	0.600	113.836	113.503	0.333	100.0	375	6.29	49.2
1.007	S34	S35	19.035	0.600	113.429	113.191	0.238	80.0	525	6.92	47.0
1.008	S35	S36	23.693	0.600	113.191	112.326	0.865	27.4	525	7.01	46.7
15.000	S36L	S36	7.274	0.600	113.690	112.701	0.989	7.4	150	5.03	50.0
1.009	S36	S40	18.243	0.600	112.326	111.718	0.608	30.0	525	7.09	46.4
16.000	S37L	S37	14.118	0.600	113.989	113.773	0.216	65.4	225	5.15	50.0
16.001	S37	S38	6.329	0.600	113.773	113.710	0.063	100.5	225	5.23	50.0
17.000	S38L	S38	13.590	0.600	113.954	113.784	0.170	79.9	150	5.20	50.0
16.002	S38	S39	41.708	0.600	113.634	113.217	0.417	100.0	300	5.67	50.0
18.000	S39La	S39	5.490	0.600	113.916	113.367	0.549	10.0	150	5.03	50.0
19.000	S39Lb	S39	4.003	0.600	113.768	113.368	0.400	10.0	150	5.02	50.0
16.003	S39	S40	38.235	0.600	113.217	111.942	1.275	30.0	300	5.89	50.0
1.010	S40	S41	42.418	0.600	111.643	111.253	0.390	108.8	600	7.39	45.5
20.000	S41La	S41	10.478	0.600	112.668	111.702	0.966	10.8	150	5.06	50.0
21.000	S41Lb	S41	9.155	0.600	112.520	111.703	0.817	11.2	150	5.05	50.0
1.011	S41	S42	44.432	0.600	111.102	110.624	0.478	93.0	750	7.65	44.7
22.000	S42La	S42	9.559	0.600	112.180	111.149	1.031	9.3	225	5.04	50.0
23.000	S42Lb	S42	8.212	0.600	112.046	111.149	0.897	9.2	225	5.03	50.0
1.012	S42	S44	28.044	0.600	110.624	110.155	0.469	59.8	750	7.78	44.3
24.000	S43	S44	24.836	0.600	111.169	110.680	0.489	50.8	225	5.23	50.0
25.000	S44L	S44	10.741	0.600	110.867	110.680	0.187	57.4	225	5.10	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
11.003	S31	S32	2.167	239.3	57.2	2.054	2.936	2.054	2.936	0.422	0.0
14.000	S32L	S32	3.205	56.6	14.9	2.552	2.936	2.552	2.936	0.110	0.0
11.004	S32	S33	2.029	224.1	74.5	2.936	2.827	2.827	2.936	0.550	0.0
11.005	S33	S34	1.812	200.1	76.8	2.827	2.537	2.537	2.827	0.575	0.0
1.007	S34	S35	2.506	542.4	213.5	2.461	2.441	2.441	2.461	1.676	0.0
1.008	S35	S36	4.291	928.9	217.3	2.441	2.965	2.441	2.965	1.717	0.0
15.000	S36L	S36	3.739	66.1	17.1	2.195	2.965	2.195	2.965	0.126	0.0
1.009	S36	S40	4.099	887.4	234.6	2.965	3.285	2.965	3.285	1.864	0.0
16.000	S37L	S37	1.620	64.4	17.1	2.056	2.004	2.004	2.056	0.126	0.0
16.001	S37	S38	1.304	51.9	21.4	2.004	2.004	2.004	2.004	0.158	0.0
17.000	S38L	S38	1.125	19.9	8.1	1.896	2.005	1.896	2.005	0.060	0.0
16.002	S38	S39	1.572	111.1	31.4	2.005	2.562	2.005	2.562	0.232	0.0
18.000	S39La	S39	3.204	56.6	4.7	1.994	2.562	1.994	2.562	0.035	0.0
19.000	S39Lb	S39	3.203	56.6	4.3	2.167	2.561	2.167	2.561	0.032	0.0
16.003	S39	S40	2.881	203.7	44.9	2.562	3.286	2.562	3.286	0.331	0.0
1.010	S40	S41	2.334	660.0	279.9	3.285	2.980	2.980	3.285	2.271	0.0
20.000	S41La	S41	3.076	54.4	15.2	2.222	2.981	2.222	2.981	0.112	0.0
21.000	S41Lb	S41	3.026	53.5	7.7	2.374	2.980	2.374	2.980	0.057	0.0
1.011	S41	S42	2.903	1282.4	303.7	2.981	2.568	2.568	2.981	2.507	0.0
22.000	S42La	S42	4.322	171.9	28.6	1.731	2.568	1.731	2.568	0.211	0.0
23.000	S42Lb	S42	4.350	173.0	14.0	1.884	2.568	1.884	2.568	0.103	0.0
1.012	S42	S44	3.622	1600.3	343.8	2.568	2.475	2.475	2.568	2.863	0.0
24.000	S43	S44	1.839	73.1	2.8	2.637	2.475	2.475	2.637	0.021	0.0
25.000	S44L	S44	1.729	68.7	26.3	2.528	2.475	2.475	2.528	0.194	0.0

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Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.013	S44	S45	19.933	0.600	110.155	109.956	0.199	100.2	750	7.89	44.0
1.014	S45	S46	19.479	0.600	109.957	109.713	0.244	79.8	750	8.00	43.7
26.000	S46L	S46	7.311	0.600	110.519	109.788	0.731	10.0	150	5.04	50.0
1.015	S46	S60	13.680	0.600	109.713	108.504	1.209	11.3	750	8.03	43.6
27.000	S47L	S47	10.634	0.600	114.459	114.353	0.106	100.3	225	5.14	50.0
27.001	S47	S48	37.674	0.600	114.278	113.976	0.302	124.7	300	5.58	50.0
28.000	S48L	S48	10.870	0.600	114.520	114.051	0.469	23.2	225	5.07	50.0
27.002	S48	S49	17.482	0.600	113.901	113.726	0.175	99.9	375	5.74	50.0
29.000	S49L	S49	10.416	0.600	113.906	113.876	0.030	347.2	225	5.25	50.0
27.003	S49	S52	17.756	0.600	113.726	113.547	0.179	99.2	375	5.91	50.0
30.000	S50	S51	15.937	0.600	113.887	113.728	0.159	100.2	450	5.13	50.0
30.001	S51	S52	17.986	0.600	113.728	113.472	0.256	70.3	450	5.25	50.0
27.004	S52	S53	27.878	0.600	113.472	113.193	0.279	99.9	450	6.13	49.8
27.005	S53	S54	17.199	0.600	113.268	113.021	0.247	69.6	450	6.25	49.4
31.000	S54L	S54	5.310	0.600	113.659	113.321	0.338	15.7	150	5.03	50.0
27.006	S54	S54B	24.507	0.600	113.021	111.796	1.225	20.0	450	6.34	49.1
43.000	S54AL	S54A	5.406	0.600	112.607	112.417	0.190	28.5	150	5.05	50.0
43.001	S54A	S54B	49.188	0.600	112.117	111.796	0.321	153.2	450	5.55	50.0
27.007	S54B	S55	28.844	0.600	111.646	110.204	1.442	20.0	600	6.43	48.7
32.000	S55La	S55	9.253	0.600	111.504	110.654	0.850	10.9	150	5.05	50.0
33.000	S55Lb	S55	10.996	0.600	111.678	110.654	1.024	10.7	150	5.06	50.0
27.008	S55	S56	42.458	0.600	110.204	109.779	0.425	99.9	600	6.72	47.7
34.000	S56L	S56	8.992	0.600	111.053	110.154	0.899	10.0	225	5.04	50.0
27.009	S56	S57	16.903	0.600	109.779	109.493	0.286	59.1	600	6.81	47.4

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.013	S44	S45	2.796	1235.2	370.4	2.475	2.327	2.327	2.475	3.109	0.0
1.014	S45	S46	3.133	1384.2	371.4	2.326	2.223	2.223	2.326	3.138	0.0
26.000	S46L	S46	3.204	56.6	16.8	2.231	2.748	2.231	2.748	0.124	0.0
1.015	S46	S60	8.344	3686.5	388.9	2.223	3.186	2.223	3.186	3.292	0.0
27.000	S47L	S47	1.305	51.9	11.5	2.386	2.268	2.268	2.386	0.085	0.0
27.001	S47	S48	1.406	99.4	21.5	2.268	1.693	1.693	2.268	0.159	0.0
28.000	S48L	S48	2.729	108.5	15.9	1.495	1.693	1.495	1.693	0.117	0.0
27.002	S48	S49	1.812	200.2	40.8	1.693	1.452	1.452	1.693	0.301	0.0
29.000	S49L	S49	0.696	27.7	10.0	1.664	1.452	1.452	1.664	0.074	0.0
27.003	S49	S52	1.819	200.9	52.6	1.452	1.366	1.366	1.452	0.388	0.0
30.000	S50	S51	2.030	322.9	9.2	0.842	1.022	0.842	1.022	0.068	0.0
30.001	S51	S52	2.428	386.1	15.3	1.022	1.366	1.022	1.366	0.113	0.0
27.004	S52	S53	2.034	323.4	70.1	1.366	2.012	1.366	2.012	0.519	0.0
27.005	S53	S54	2.439	387.8	73.1	1.937	2.184	1.937	2.184	0.546	0.0
31.000	S54L	S54	2.554	45.1	13.6	1.933	2.184	1.933	2.184	0.100	0.0
27.006	S54	S54B	4.561	725.4	96.5	2.184	2.545	2.184	2.545	0.726	0.0
43.000	S54AL	S54A	1.894	33.5	10.7	1.205	1.264	1.205	1.264	0.079	0.0
43.001	S54A	S54B	1.640	260.8	20.1	1.264	2.545	1.264	2.545	0.148	0.0
27.007	S54B	S55	5.460	1543.9	118.1	2.545	3.262	2.545	3.262	0.894	0.0
32.000	S55La	S55	3.071	54.3	10.4	2.746	3.262	2.746	3.262	0.077	0.0
33.000	S55Lb	S55	3.092	54.6	11.1	2.572	3.262	2.572	3.262	0.082	0.0
27.008	S55	S56	2.436	688.8	145.2	3.262	2.594	2.594	3.262	1.123	0.0
34.000	S56L	S56	4.161	165.4	11.9	2.122	2.594	2.122	2.594	0.088	0.0
27.009	S56	S57	3.171	896.6	160.0	2.594	2.473	2.473	2.594	1.246	0.0

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
35.000	S57L	S57	7.615	0.600	110.019	109.868	0.151	50.4	225	5.07	50.0
27.010	S57	S58	37.958	0.600	109.493	109.018	0.475	79.9	600	7.04	46.6
36.000	S58L	S58	10.471	0.600	109.784	109.468	0.316	33.1	150	5.10	50.0
27.011	S58	S59	17.556	0.600	109.018	108.799	0.219	80.2	600	7.15	46.2
37.000	S59L	S59	7.885	0.600	109.328	109.249	0.079	99.8	150	5.13	50.0
27.012	S59	S60	11.577	0.600	108.799	108.654	0.145	79.8	600	7.22	46.0
38.000	S60L	S60	10.632	0.600	110.167	109.104	1.063	10.0	150	5.06	50.0
1.016	S60	S61	33.244	0.600	108.354	107.689	0.665	50.0	900	8.15	43.2
1.017	S61	S62	21.844	0.600	107.689	107.416	0.273	80.0	900	8.25	42.9
1.018	S62	S63	16.372	0.600	107.416	107.211	0.205	79.9	900	8.33	42.7
39.000	S63La	S63	7.319	0.600	108.035	107.962	0.073	100.3	150	5.12	50.0
40.000	S63Lb	S63	3.867	0.600	108.000	107.961	0.039	99.2	150	5.06	50.0
1.019	S63	S64	36.472	0.600	107.212	106.847	0.365	99.9	900	8.53	42.2
41.000	S64L	S64	9.006	0.600	107.687	107.522	0.165	54.6	225	5.08	50.0
1.020	S64	S65	11.270	0.600	106.847	106.834	0.013	866.9	900	8.70	41.7
42.000	S65L	S65	6.674	0.600	108.252	107.585	0.667	10.0	150	5.03	50.0
1.021	S65	HW11	15.649	0.600	106.834	106.817	0.017	920.5	900	8.96	41.1
1.022	HW12	S66	8.328	0.600	106.817	106.808	0.009	925.3	900	5.14	50.0
1.023	S66	hw13	14.071	0.600	106.808	106.725	0.083	169.5	900	5.23	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
35.000	S57L	S57	1.846	73.4	13.1	2.556	2.473	2.473	2.556	0.097	0.0
27.010	S57	S58	2.725	770.6	174.1	2.473	2.317	2.317	2.473	1.378	0.0
36.000	S58L	S58	1.754	31.0	10.8	2.176	2.317	2.176	2.317	0.080	0.0
27.011	S58	S59	2.721	769.4	187.2	2.317	2.849	2.317	2.849	1.493	0.0
37.000	S59L	S59	1.006	17.8	11.9	2.922	2.849	2.849	2.922	0.088	0.0
27.012	S59	S60	2.727	770.9	197.2	2.849	3.186	2.849	3.186	1.581	0.0
38.000	S60L	S60	3.204	56.6	6.6	2.283	3.186	2.283	3.186	0.049	0.0
1.016	S60	S61	4.437	2822.4	580.7	3.186	2.998	2.998	3.186	4.956	0.0
1.017	S61	S62	3.504	2229.2	579.3	2.998	2.758	2.758	2.998	4.977	0.0
1.018	S62	S63	3.507	2231.3	578.3	2.758	2.445	2.445	2.758	4.993	0.0
39.000	S63La	S63	1.003	17.7	9.4	2.571	2.444	2.444	2.571	0.069	0.0
40.000	S63Lb	S63	1.009	17.8	16.0	2.520	2.445	2.445	2.520	0.118	0.0
1.019	S63	S64	3.134	1993.9	595.8	2.444	1.446	1.446	2.444	5.207	0.0
41.000	S64L	S64	1.774	70.5	25.3	1.488	1.446	1.446	1.488	0.187	0.0
1.020	S64	S65	1.056	671.6	612.0	1.446	1.019	1.019	1.446	5.408	0.0
42.000	S65L	S65	3.203	56.6	13.3	0.498	1.018	0.498	1.018	0.098	0.0
1.021	S65	HW11	1.024	651.6	618.3	1.019	0.542	0.542	1.019	5.547	0.0
1.022	HW12	S66	1.022	649.9	0.0	0.542	0.592	0.542	0.592	0.000	0.0
1.023	S66	hw13	2.403	1528.9	0.0	0.592	0.144	0.144	0.592	0.000	0.0

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	17.282	27.0	225	118.050	116.108	1.717	117.871	115.469	2.177
1.001	57.384	184.5	450	117.871	115.244	2.177	117.331	114.933	1.948
2.000	5.244	95.3	150	117.280	115.636	1.494	117.286	115.581	1.555
3.000	3.665	104.7	150	117.262	115.616	1.496	117.286	115.581	1.555
2.001	34.771	99.9	450	117.286	115.281	1.555	117.331	114.933	1.948
4.000	9.405	97.0	150	117.400	115.330	1.920	117.331	115.233	1.948
5.000	7.221	100.3	150	117.490	115.305	2.035	117.331	115.233	1.948
1.002	30.661	152.5	450	117.331	114.933	1.948	117.627	114.732	2.445
6.000	9.024	20.0	225	117.642	115.983	1.434	117.763	115.532	2.006
6.001	31.671	116.4	300	117.763	115.457	2.006	117.836	115.185	2.351
7.000	7.833	52.9	150	117.800	115.483	2.167	117.836	115.335	2.351
6.002	25.853	85.0	375	117.836	115.110	2.351	117.627	114.806	2.446
1.003	25.986	82.0	450	117.627	114.732	2.445	117.358	114.415	2.493
8.000	4.774	11.9	150	117.490	115.117	2.223	117.358	114.715	2.493
1.004	34.440	100.1	450	117.358	114.415	2.493	116.932	114.071	2.411
9.000	9.766	10.8	150	117.100	115.272	1.678	116.932	114.370	2.412
1.005	22.518	60.0	450	116.932	114.070	2.412	116.646	113.695	2.501
10.000	7.704	11.1	150	116.896	114.690	2.056	116.646	113.995	2.501
1.006	15.321	79.8	450	116.646	113.695	2.501	116.415	113.503	2.462
11.000	5.783	99.7	150	116.950	115.176	1.624	116.911	115.118	1.643
11.001	14.197	211.9	225	116.911	115.043	1.643	117.074	114.976	1.873
12.000	15.328	20.0	225	117.200	115.743	1.232	117.074	114.977	1.872
13.000	16.786	20.0	225	116.880	115.816	0.839	117.074	114.977	1.872
11.002	16.699	100.0	375	117.074	114.826	1.873	117.088	114.659	2.054
11.003	42.183	70.1	375	117.088	114.659	2.054	117.368	114.057	2.936

Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
1.000	S20L	1200	Manhole	S20	1500	1
1.001	S20	1500	Manhole	S22	1500	1
2.000	S21La	1200	Manhole	S21	1500	1
3.000	S21Lb	1200	Manhole	S21	1500	1
2.001	S21	1500	Manhole	S22	1500	1
4.000	S22Lb	1200	Manhole	S22	1500	1
5.000	S22La	1200	Manhole	S22	1500	1
1.002	S22	1500	Manhole	S25	1500	1
6.000	S23L	1200	Manhole	S23	1200	1
6.001	S23	1200	Manhole	S24	1200	1
7.000	S24L	1200	Manhole	S24	1200	1
6.002	S24	1200	Manhole	S25	1500	1
1.003	S25	1500	Manhole	S26	1500	1
8.000	S26L	1200	Manhole	S26	1500	1
1.004	S26	1500	Manhole	S27	1500	1
9.000	S27L	1200	Manhole	S27	1500	1
1.005	S27	1500	Manhole	S28	1500	1
10.000	S28L	1200	Manhole	S28	1500	1
1.006	S28	1500	Manhole	S34	1800	1
11.000	S29L	1200	Manhole	S29	1200	1
11.001	S29	1200	Manhole	S30	1500	1
12.000	S30La	1200	Manhole	S30	1500	1
13.000	S30Lb	1200	Manhole	S30	1500	1
11.002	S30	1500	Manhole	S31	1500	1
11.003	S31	1500	Manhole	S32	1500	1

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
14.000	5.007	10.0	150	117.485	114.783	2.552	117.368	114.282	2.936
11.004	17.646	79.8	375	117.368	114.057	2.936	117.038	113.836	2.827
11.005	33.286	100.0	375	117.038	113.836	2.827	116.415	113.503	2.537
1.007	19.035	80.0	525	116.415	113.429	2.461	116.157	113.191	2.441
1.008	23.693	27.4	525	116.157	113.191	2.441	115.816	112.326	2.965
15.000	7.274	7.4	150	116.035	113.690	2.195	115.816	112.701	2.965
1.009	18.243	30.0	525	115.816	112.326	2.965	115.528	111.718	3.285
16.000	14.118	65.4	225	116.270	113.989	2.056	116.002	113.773	2.004
16.001	6.329	100.5	225	116.002	113.773	2.004	115.939	113.710	2.004
17.000	13.590	79.9	150	116.000	113.954	1.896	115.939	113.784	2.005
16.002	41.708	100.0	300	115.939	113.634	2.005	116.079	113.217	2.562
18.000	5.490	10.0	150	116.060	113.916	1.994	116.079	113.367	2.562
19.000	4.003	10.0	150	116.085	113.768	2.167	116.079	113.368	2.561
16.003	38.235	30.0	300	116.079	113.217	2.562	115.528	111.942	3.286
1.010	42.418	108.8	600	115.528	111.643	3.285	114.833	111.253	2.980
20.000	10.478	10.8	150	115.040	112.668	2.222	114.833	111.702	2.981
21.000	9.155	11.2	150	115.044	112.520	2.374	114.833	111.703	2.980
1.011	44.432	93.0	750	114.833	111.102	2.981	113.942	110.624	2.568
22.000	9.559	9.3	225	114.136	112.180	1.731	113.942	111.149	2.568
23.000	8.212	9.2	225	114.155	112.046	1.884	113.942	111.149	2.568
1.012	28.044	59.8	750	113.942	110.624	2.568	113.380	110.155	2.475
24.000	24.836	50.8	225	114.031	111.169	2.637	113.380	110.680	2.475
25.000	10.741	57.4	225	113.620	110.867	2.528	113.380	110.680	2.475
1.013	19.933	100.2	750	113.380	110.155	2.475	113.033	109.956	2.327
1.014	19.479	79.8	750	113.033	109.957	2.326	112.686	109.713	2.223

Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
14.000	S32L	1200	Manhole	S32	1500	1
11.004	S32	1500	Manhole	S33	1500	1
11.005	S33	1500	Manhole	S34	1800	1
1.007	S34	1800	Manhole	S35	1500	1
1.008	S35	1500	Manhole	S36	1500	1
15.000	S36L	1200	Manhole	S36	1500	1
1.009	S36	1500	Manhole	S40	1800	1
16.000	S37L	1200	Manhole	S37	1500	1
16.001	S37	1500	Manhole	S38	1500	1
17.000	S38L	1200	Manhole	S38	1500	1
16.002	S38	1500	Manhole	S39	1500	1
18.000	S39La	1200	Manhole	S39	1500	1
19.000	S39Lb	1200	Manhole	S39	1500	1
16.003	S39	1500	Manhole	S40	1800	1
1.010	S40	1800	Manhole	S41	1800	1
20.000	S41La	1200	Manhole	S41	1800	1
21.000	S41Lb	1200	Manhole	S41	1800	1
1.011	S41	1800	Manhole	S42	1800	1
22.000	S42La	1200	Manhole	S42	1800	1
23.000	S42Lb	1200	Manhole	S42	1800	1
1.012	S42	1800	Manhole	S44	1800	1
24.000	S43	1200	Manhole	S44	1800	1
25.000	S44L	1800	Manhole	S44	1800	1
1.013	S44	1800	Manhole	S45	1800	1
1.014	S45	1800	Manhole	S46	1800	1

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
26.000	7.311	10.0	150	112.900	110.519	2.231	112.686	109.788	2.748
1.015	13.680	11.3	750	112.686	109.713	2.223	112.440	108.504	3.186
27.000	10.634	100.3	225	117.070	114.459	2.386	116.846	114.353	2.268
27.001	37.674	124.7	300	116.846	114.278	2.268	115.969	113.976	1.693
28.000	10.870	23.2	225	116.240	114.520	1.495	115.969	114.051	1.693
27.002	17.482	99.9	375	115.969	113.901	1.693	115.553	113.726	1.452
29.000	10.416	347.2	225	115.795	113.906	1.664	115.553	113.876	1.452
27.003	17.756	99.2	375	115.553	113.726	1.452	115.288	113.547	1.366
30.000	15.937	100.2	450	115.179	113.887	0.842	115.200	113.728	1.022
30.001	17.986	70.3	450	115.200	113.728	1.022	115.288	113.472	1.366
27.004	27.878	99.9	450	115.288	113.472	1.366	115.655	113.193	2.012
27.005	17.199	69.6	450	115.655	113.268	1.937	115.655	113.021	2.184
31.000	5.310	15.7	150	115.742	113.659	1.933	115.655	113.321	2.184
27.006	24.507	20.0	450	115.655	113.021	2.184	114.791	111.796	2.545
43.000	5.406	28.5	150	113.962	112.607	1.205	113.831	112.417	1.264
43.001	49.188	153.2	450	113.831	112.117	1.264	114.791	111.796	2.545
27.007	28.844	20.0	600	114.791	111.646	2.545	114.066	110.204	3.262
32.000	9.253	10.9	150	114.400	111.504	2.746	114.066	110.654	3.262
33.000	10.996	10.7	150	114.400	111.678	2.572	114.066	110.654	3.262
27.008	42.458	99.9	600	114.066	110.204	3.262	112.973	109.779	2.594
34.000	8.992	10.0	225	113.400	111.053	2.122	112.973	110.154	2.594
27.009	16.903	59.1	600	112.973	109.779	2.594	112.566	109.493	2.473
35.000	7.615	50.4	225	112.800	110.019	2.556	112.566	109.868	2.473
27.010	37.958	79.9	600	112.566	109.493	2.473	111.935	109.018	2.317
36.000	10.471	33.1	150	112.110	109.784	2.176	111.935	109.468	2.317

Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
26.000	S46L	1200	Manhole	S46	1800	1
1.015	S46	1800	Manhole	S60	1800	1
27.000	S47L	1200	Manhole	S47	1800	1
27.001	S47	1800	Manhole	S48	1200	1
28.000	S48L	1200	Manhole	S48	1200	1
27.002	S48	1200	Manhole	S49	1200	1
29.000	S49L	1200	Manhole	S49	1200	1
27.003	S49	1200	Manhole	S52	1500	1
30.000	S50	1500	Manhole	S51	1500	1
30.001	S51	1500	Manhole	S52	1500	1
27.004	S52	1500	Manhole	S53	1500	1
27.005	S53	1500	Manhole	S54	1500	1
31.000	S54L	1200	Manhole	S54	1500	1
27.006	S54	1500	Manhole	S54B	1500	1
43.000	S54AL	1200	Manhole	S54A	1500	1
43.001	S54A	1500	Manhole	S54B	1500	1
27.007	S54B	1500	Manhole	S55	1500	1
32.000	S55La	1200	Manhole	S55	1500	1
33.000	S55Lb	1200	Manhole	S55	1500	1
27.008	S55	1500	Manhole	S56	1500	1
34.000	S56L	1200	Manhole	S56	1500	1
27.009	S56	1500	Manhole	S57	1500	1
35.000	S57L	1200	Manhole	S57	1500	1
27.010	S57	1500	Manhole	S58	1500	1
36.000	S58L	1200	Manhole	S58	1500	1

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
27.011	17.556	80.2	600	111.935	109.018	2.317	112.248	108.799	2.849
37.000	7.885	99.8	150	112.400	109.328	2.922	112.248	109.249	2.849
27.012	11.577	79.8	600	112.248	108.799	2.849	112.440	108.654	3.186
38.000	10.632	10.0	150	112.600	110.167	2.283	112.440	109.104	3.186
1.016	33.244	50.0	900	112.440	108.354	3.186	111.587	107.689	2.998
1.017	21.844	80.0	900	111.587	107.689	2.998	111.074	107.416	2.758
1.018	16.372	79.9	900	111.074	107.416	2.758	110.556	107.211	2.445
39.000	7.319	100.3	150	110.756	108.035	2.571	110.556	107.962	2.444
40.000	3.867	99.2	150	110.670	108.000	2.520	110.556	107.961	2.445
1.019	36.472	99.9	900	110.556	107.212	2.444	109.193	106.847	1.446
41.000	9.006	54.6	225	109.400	107.687	1.488	109.193	107.522	1.446
1.020	11.270	866.9	900	109.193	106.847	1.446	108.753	106.834	1.019
42.000	6.674	10.0	150	108.900	108.252	0.498	108.753	107.585	1.018
1.021	15.649	920.5	900	108.753	106.834	1.019	108.259	106.817	0.542
1.022	8.328	925.3	900	108.259	106.817	0.542	108.300	106.808	0.592
1.023	14.071	169.5	900	108.300	106.808	0.592	107.769	106.725	0.144

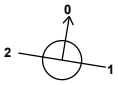
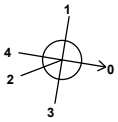
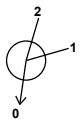
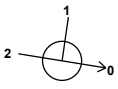
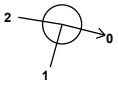
Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
27.011	S58	1500	Manhole	S59	1500	1
37.000	S59L	1200	Manhole	S59	1500	1
27.012	S59	1500	Manhole	S60	1800	1
38.000	S60L	1200	Manhole	S60	1800	1
1.016	S60	1800	Manhole	S61	1800	1
1.017	S61	1800	Manhole	S62	1800	1
1.018	S62	1800	Manhole	S63	1800	1
39.000	S63La	1200	Manhole	S63	1800	1
40.000	S63Lb	1200	Manhole	S63	1800	1
1.019	S63	1800	Manhole	S64	1800	1
41.000	S64L	1200	Manhole	S64	1800	1
1.020	S64	1800	Manhole	S65	1800	1
42.000	S65L	1200	Manhole	S65	1800	1
1.021	S65	1800	Manhole	HW11		1
1.022	HW12		Manhole	S66	2700	1
1.023	S66	2700	Manhole	hw13		1

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S20L	443726.598	291580.939	118.050	1.942	1200	Manhole	 0	1.000	116.108	225
S20	443724.514	291563.783	117.871	2.627	1500	Manhole	 1	1.000	115.469	225
							0	1.001	115.244	450
S21La	443770.314	291520.942	117.280	1.644	1200	Manhole	 0	2.000	115.636	150

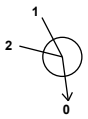
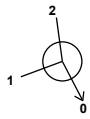
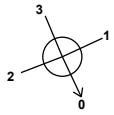
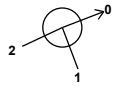
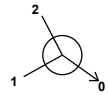
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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S21Lb	443779.109	291519.517	117.262	1.646	1200	Manhole		0	3.000	115.616	150
S21	443775.700	291520.069	117.286	2.005	1500	Manhole		1	3.000	115.581	150
								2	2.000	115.581	150
								0	2.001	115.281	450
S22Lb	443772.393	291550.929	117.400	2.070	1200	Manhole		0	4.000	115.330	150
S22La	443782.530	291561.498	117.490	2.185	1200	Manhole		0	5.000	115.305	150
S22	443781.376	291554.374	117.331	2.398	1500	Manhole		1	5.000	115.233	150
								2	4.000	115.233	150
								3	2.001	114.933	450
								4	1.001	114.933	450
								0	1.002	114.933	450
S23L	443816.813	291610.966	117.642	1.659	1200	Manhole		0	6.000	115.983	225
S23	443824.030	291605.549	117.763	2.306	1200	Manhole		1	6.000	115.532	225
								0	6.001	115.457	300
S24L	443820.618	291580.704	117.800	2.317	1200	Manhole		0	7.000	115.483	150
S24	443816.344	291579.478	117.836	2.726	1200	Manhole		1	7.000	115.335	150
								2	6.001	115.185	300
								0	6.002	115.110	375
S25	443812.026	291549.404	117.627	2.895	1500	Manhole		1	6.002	114.806	375
								2	1.002	114.732	450
								0	1.003	114.732	450
S26L	443835.771	291540.759	117.490	2.373	1200	Manhole		0	8.000	115.117	150
S26	443837.046	291545.359	117.358	2.943	1500	Manhole		1	8.000	114.715	150
								2	1.003	114.415	450
								0	1.004	114.415	450
S27L	443865.956	291545.642	117.100	1.828	1200	Manhole		0	9.000	115.272	150

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S27	443870.449	291536.970	116.932	2.862	1500	Manhole		1	9.000	114.370	150
								2	1.004	114.071	450
								0	1.005	114.070	450
S28L	443866.251	291511.974	116.896	2.206	1200	Manhole					
								0	10.000	114.690	150
S28	443873.473	291514.657	116.646	2.951	1500	Manhole		1	10.000	113.995	150
								2	1.005	113.695	450
								0	1.006	113.695	450
S29L	443778.867	291486.594	116.950	1.774	1200	Manhole					
								0	11.000	115.176	150
S29	443784.225	291488.769	116.911	1.868	1200	Manhole		1	11.000	115.118	150
								0	11.001	115.043	225
S30La	443775.409	291470.169	117.200	1.457	1200	Manhole					
								0	12.000	115.743	225
S30Lb	443804.951	291482.717	116.880	1.064	1200	Manhole					
								0	13.000	115.816	225
S30	443789.713	291475.676	117.074	2.248	1500	Manhole		1	13.000	114.977	225
								2	12.000	114.977	225
								3	11.001	114.976	225
								0	11.002	114.826	375
S31	443796.831	291460.570	117.088	2.429	1500	Manhole		1	11.002	114.659	375
								0	11.003	114.659	375
S32L	443836.785	291473.804	117.485	2.702	1200	Manhole					
								0	14.000	114.783	150
S32	443835.019	291478.489	117.368	3.311	1500	Manhole		1	14.000	114.282	150
								2	11.003	114.057	375
								0	11.004	114.057	375
S33	443851.486	291484.829	117.038	3.202	1500	Manhole		1	11.004	113.836	375
								0	11.005	113.836	375
S34	443880.545	291501.065	116.415	2.986	1800	Manhole		1	11.005	113.503	375
								2	1.006	113.503	450
								0	1.007	113.429	525

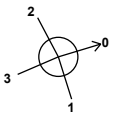
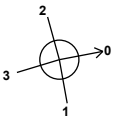
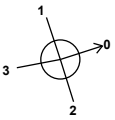
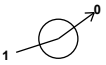
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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S35	443896.046	291490.017	116.157	2.966	1500	Manhole	1	1.007	113.191	525
							0	1.008	113.191	525
S36L	443920.666	291479.743	116.035	2.345	1200	Manhole	0	15.000	113.690	150
S36	443919.537	291486.928	115.816	3.490	1500	Manhole	1	15.000	112.701	150
							2	1.008	112.326	525
							0	1.009	112.326	525
S37L	443942.586	291411.897	116.270	2.281	1200	Manhole	0	16.000	113.989	225
S37	443956.457	291414.527	116.002	2.229	1500	Manhole	1	16.000	113.773	225
							0	16.001	113.773	225
S38L	443975.427	291420.600	116.000	2.046	1200	Manhole	0	17.000	113.954	150
S38	443962.456	291416.547	115.939	2.305	1500	Manhole	1	17.000	113.784	150
							2	16.001	113.710	225
							0	16.002	113.634	300
S39La	443943.622	291454.130	116.060	2.144	1200	Manhole	0	18.000	113.916	150
S39Lb	443952.661	291457.010	116.085	2.317	1200	Manhole	0	19.000	113.768	150
S39	443948.799	291455.955	116.079	2.862	1500	Manhole	1	19.000	113.368	150
							2	18.000	113.367	150
							3	16.002	113.217	300
							0	16.003	113.217	300
S40	443936.967	291492.313	115.528	3.885	1800	Manhole	1	16.003	111.942	300
							2	1.009	111.718	525
							0	1.010	111.643	600
S41La	443968.311	291516.294	115.040	2.372	1200	Manhole	0	20.000	112.668	150
S41Lb	443975.273	291499.962	115.044	2.524	1200	Manhole	0	21.000	112.520	150

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S41	443972.824	291507.759	114.833	3.731	1800	Manhole		1	21.000	111.703	150
								2	20.000	111.702	150
								3	1.010	111.253	600
								0	1.011	111.102	750
S42La	444016.029	291530.797	114.136	1.956	1200	Manhole		0	22.000	112.180	225
S42Lb	444020.020	291513.499	114.155	2.109	1200	Manhole		0	23.000	112.046	225
S42	444018.565	291521.581	113.942	3.318	1800	Manhole		1	23.000	111.149	225
								2	22.000	111.149	225
								3	1.011	110.624	750
								0	1.012	110.624	750
S43	444053.518	291503.522	114.031	2.862	1200	Manhole		0	24.000	111.169	225
S44L	444042.718	291537.421	113.620	2.753	1800	Manhole		0	25.000	110.867	225
S44	444046.213	291526.845	113.380	3.225	1800	Manhole		1	25.000	110.680	225
								2	24.000	110.680	225
								3	1.012	110.155	750
								0	1.013	110.155	750
S45	444065.128	291532.942	113.033	3.077	1800	Manhole		1	1.013	109.956	750
								0	1.014	109.957	750
S46L	444086.341	291539.566	112.900	2.381	1200	Manhole		0	26.000	110.519	150
S46	444080.870	291544.415	112.686	2.973	1800	Manhole		1	26.000	109.788	150
								2	1.014	109.713	750
								0	1.015	109.713	750
S47L	443884.230	291600.704	117.070	2.611	1200	Manhole		0	27.000	114.459	225
S47	443894.371	291597.505	116.846	2.568	1800	Manhole		1	27.000	114.353	225
								0	27.001	114.278	300
S48L	443895.036	291634.825	116.240	1.720	1200	Manhole		0	28.000	114.520	225

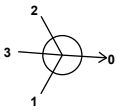
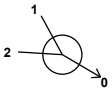
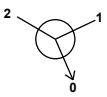
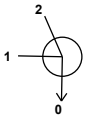
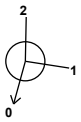
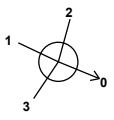
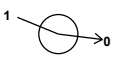
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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S48	443905.812	291633.399	115.969	2.068	1200	Manhole	1 2 0	28.000 27.001 27.002	114.051 113.976 113.901	225 300 375
S49L	443908.595	291654.145	115.795	1.889	1200	Manhole	0	29.000	113.906	225
S49	443916.433	291647.285	115.553	1.827	1200	Manhole	1 2 0	29.000 27.002 27.003	113.876 113.726 113.726	225 375 375
S50	443924.387	291692.392	115.179	1.292	1500	Manhole	0	30.000	113.887	450
S51	443925.446	291676.490	115.200	1.472	1500	Manhole	1 0	30.000 30.001	113.728 113.728	450 450
S52	443929.752	291659.028	115.288	1.816	1500	Manhole	1 2 0	30.001 27.003 27.004	113.472 113.547 113.472	450 375 450
S53	443950.409	291640.307	115.655	2.462	1500	Manhole	1 0	27.004 27.005	113.193 113.268	450 450
S54L	443967.124	291639.883	115.742	2.083	1200	Manhole	0	31.000	113.659	150
S54	443966.632	291634.596	115.655	2.634	1500	Manhole	1 2 0	31.000 27.005 27.006	113.321 113.021 113.021	150 450 450
S54AL	443987.797	291682.193	113.962	1.355	1200	Manhole	0	43.000	112.607	150
S54A	443993.191	291681.835	113.831	1.714	1500	Manhole	1 0	43.000 43.001	112.417 112.117	150 450
S54B	443991.065	291632.693	114.791	3.145	1500	Manhole	1 2 0	43.001 27.006 27.007	111.796 111.796 111.646	450 450 600
S55La	444015.384	291638.573	114.400	2.896	1200	Manhole	0	32.000	111.504	150

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S55Lb	444014.478	291620.844	114.400	2.722	1200	Manhole		0	33.000	111.678	150
S55	444019.822	291630.453	114.066	3.862	1500	Manhole		1	33.000	110.654	150
								2	32.000	110.654	150
								3	27.007	110.204	600
								0	27.008	110.204	600
S56L	444057.898	291635.750	113.400	2.347	1200	Manhole		0	34.000	111.053	225
S56	444062.200	291627.854	112.973	3.194	1500	Manhole		1	34.000	110.154	225
								2	27.008	109.779	600
								0	27.009	109.779	600
S57L	444083.653	291622.557	112.800	2.781	1200	Manhole		0	35.000	110.019	225
S57	444076.774	291619.291	112.566	3.073	1500	Manhole		1	35.000	109.868	225
								2	27.009	109.493	600
								0	27.010	109.493	600
S58L	444081.447	291584.691	112.110	2.326	1200	Manhole		0	36.000	109.784	150
S58	444091.916	291584.485	111.935	2.917	1500	Manhole		1	36.000	109.468	150
								2	27.010	109.018	600
								0	27.011	109.018	600
S59L	444099.362	291565.725	112.400	3.072	1200	Manhole		0	37.000	109.328	150
S59	444091.570	291566.932	112.248	3.449	1500	Manhole		1	37.000	109.249	150
								2	27.011	108.799	600
								0	27.012	108.799	600
S60L	444078.895	291560.325	112.600	2.433	1200	Manhole		0	38.000	110.167	150
S60	444088.501	291555.769	112.440	4.086	1800	Manhole		1	38.000	109.104	150
								2	27.012	108.654	600
								3	1.015	108.504	750
								0	1.016	108.354	900
S61	444119.267	291543.174	111.587	3.898	1800	Manhole		1	1.016	107.689	900
								0	1.017	107.689	900

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S62	444140.948	291540.513	111.074	3.658	1800	Manhole	1	1.017	107.416	900
							0	1.018	107.416	900
S63La	444153.628	291549.997	110.756	2.721	1200	Manhole	0	39.000	108.035	150
S63Lb	444158.283	291539.860	110.670	2.670	1200	Manhole	0	40.000	108.000	150
S63	444157.041	291543.522	110.556	3.345	1800	Manhole	1	40.000	107.961	150
							2	39.000	107.962	150
							3	1.018	107.211	900
							0	1.019	107.212	900
S64L	444183.206	291567.153	109.400	1.713	1200	Manhole	0	41.000	107.687	225
S64	444189.306	291560.527	109.193	2.346	1800	Manhole	1	41.000	107.522	225
							2	1.019	106.847	900
							0	1.020	106.847	900
S65L	444198.591	291557.594	108.900	0.648	1200	Manhole	0	42.000	108.252	150
S65	444199.987	291564.120	108.753	1.919	1800	Manhole	1	42.000	107.585	150
							2	1.020	106.834	900
							0	1.021	106.834	900
HW11	444200.122	291579.769	108.259	1.442		Manhole	1	1.021	106.817	900
HW12	444214.527	291601.442	108.259	1.442		Manhole	0	1.022	106.817	900
S66	444222.278	291604.489	108.300	1.492	2700	Manhole	1	1.022	106.808	900
							0	1.023	106.808	900
hw13	444234.306	291611.790	107.769	1.044		Manhole	1	1.023	106.725	900

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Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	0.0
Ratio-R	0.400	Check Discharge Rate(s)	x
Summer CV	0.750	Check Discharge Volume	x
Analysis Speed	Detailed		

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	40	0	0
100	40	10	0

Node S66 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	106.808	Product Number	CTL-SHE-0205-2330-1500-2330
Design Depth (m)	1.500	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	23.3	Min Node Diameter (mm)	1800

Node HW12 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	50.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	106.817	Main Channel Slope (1:X)	100000.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.020

Inlets

HW11

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	2225.0	0.0	1.666	3580.3	0.0	1.667	0.0	0.0

Other (defaults)

Entry Loss (manhole)	0.000	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.000	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 15 minute summer	141.566	40.058
2 year 30 minute summer	91.753	25.963
2 year 60 minute summer	61.301	16.200
2 year 120 minute summer	37.449	9.897
2 year 180 minute summer	28.672	7.378
2 year 240 minute summer	22.636	5.982
2 year 360 minute summer	17.235	4.435

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Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 480 minute summer	13.550	3.581
2 year 600 minute summer	11.088	3.033
2 year 720 minute summer	9.878	2.647
2 year 960 minute summer	8.113	2.136
2 year 1440 minute summer	5.891	1.579
30 year 15 minute summer	268.706	76.035
30 year 30 minute summer	174.929	49.499
30 year 60 minute summer	116.589	30.811
30 year 120 minute summer	70.438	18.615
30 year 180 minute summer	53.298	13.715
30 year 240 minute summer	41.604	10.995
30 year 360 minute summer	31.221	8.034
30 year 480 minute summer	24.324	6.428
30 year 600 minute summer	19.756	5.404
30 year 720 minute summer	17.490	4.687
30 year 960 minute summer	14.215	3.743
30 year 1440 minute summer	10.161	2.723
100 year +40% CC 15 minute summer	488.233	138.153
100 year +40% CC 30 minute summer	320.551	90.705
100 year +40% CC 60 minute summer	214.603	56.713
100 year +40% CC 120 minute summer	129.587	34.246
100 year +40% CC 180 minute summer	97.729	25.149
100 year +40% CC 240 minute summer	75.977	20.078
100 year +40% CC 360 minute summer	56.677	14.585
100 year +40% CC 480 minute summer	43.979	11.622
100 year +40% CC 600 minute summer	35.604	9.738
100 year +40% CC 720 minute summer	31.433	8.424
100 year +40% CC 960 minute summer	25.432	6.697
100 year +40% CC 1440 minute summer	18.055	4.839
100 year +40% CC +10% A 15 minute summer	488.233	138.153
100 year +40% CC +10% A 30 minute summer	320.551	90.705
100 year +40% CC +10% A 60 minute summer	214.603	56.713
100 year +40% CC +10% A 120 minute summer	129.587	34.246
100 year +40% CC +10% A 180 minute summer	97.729	25.149
100 year +40% CC +10% A 240 minute summer	75.977	20.078
100 year +40% CC +10% A 360 minute summer	56.677	14.585
100 year +40% CC +10% A 480 minute summer	43.979	11.622
100 year +40% CC +10% A 600 minute summer	35.604	9.738
100 year +40% CC +10% A 720 minute summer	31.433	8.424
100 year +40% CC +10% A 960 minute summer	25.432	6.697
100 year +40% CC +10% A 1440 minute summer	18.055	4.839

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Results for 2 year Critical Storm Duration. Lowest mass balance: 98.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S20L	10	116.179	0.071	21.8	0.0801	0.0000	OK
15 minute summer	S20	10	115.363	0.119	38.5	0.2106	0.0000	OK
15 minute summer	S21La	10	115.721	0.085	11.3	0.0963	0.0000	OK
15 minute summer	S21Lb	10	115.691	0.075	8.8	0.0851	0.0000	OK
15 minute summer	S21	10	115.365	0.084	25.7	0.1486	0.0000	OK
15 minute summer	S22Lb	10	115.402	0.072	8.5	0.0814	0.0000	OK
15 minute summer	S22La	10	115.414	0.109	15.8	0.1236	0.0000	OK
15 minute summer	S22	11	115.113	0.180	90.7	0.3178	0.0000	OK
15 minute summer	S23L	10	116.048	0.065	21.5	0.0736	0.0000	OK
15 minute summer	S23	10	115.564	0.107	28.9	0.1212	0.0000	OK
15 minute summer	S24L	10	115.542	0.059	8.0	0.0665	0.0000	OK
15 minute summer	S24	10	115.218	0.108	40.4	0.1223	0.0000	OK
15 minute summer	S25	11	114.921	0.189	134.7	0.3331	0.0000	OK
15 minute summer	S26L	10	115.159	0.042	9.0	0.0479	0.0000	OK
15 minute summer	S26	11	114.626	0.211	149.0	0.3731	0.0000	OK
15 minute summer	S27L	10	115.319	0.047	11.4	0.0528	0.0000	OK
15 minute summer	S27	11	114.266	0.196	169.0	0.3456	0.0000	OK
15 minute summer	S28L	10	114.730	0.040	8.3	0.0451	0.0000	OK
15 minute summer	S28	11	113.915	0.220	180.2	0.3893	0.0000	OK
15 minute summer	S29L	10	115.237	0.061	6.2	0.0688	0.0000	OK
15 minute summer	S29	10	115.129	0.086	11.4	0.0977	0.0000	OK
15 minute summer	S30La	10	115.825	0.082	33.6	0.0929	0.0000	OK
15 minute summer	S30Lb	10	115.876	0.060	18.6	0.0683	0.0000	OK
15 minute summer	S30	10	114.974	0.148	67.9	0.2616	0.0000	OK
15 minute summer	S31	10	114.798	0.139	72.5	0.2453	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S20L	1.000	S20	21.7	2.031	0.216	0.1844	
15 minute summer	S20	1.001	S22	37.7	0.825	0.159	2.6543	
15 minute summer	S21La	2.000	S21	11.2	1.090	0.617	0.0540	
15 minute summer	S21Lb	3.000	S21	8.7	0.990	0.504	0.0324	
15 minute summer	S21	2.001	S22	25.4	0.668	0.079	1.3793	
15 minute summer	S22Lb	4.000	S22	8.4	1.009	0.467	0.0784	
15 minute summer	S22La	5.000	S22	15.7	1.141	0.884	0.0992	
15 minute summer	S22	1.002	S25	90.8	1.488	0.347	1.8709	
15 minute summer	S23L	6.000	S23	21.4	2.257	0.183	0.0857	
15 minute summer	S23	6.001	S24	28.5	1.268	0.277	0.7131	
15 minute summer	S24L	7.000	S24	7.9	1.242	0.324	0.0501	
15 minute summer	S24	6.002	S25	40.3	1.507	0.186	0.7040	
15 minute summer	S25	1.003	S26	135.3	1.990	0.379	1.7664	
15 minute summer	S26L	8.000	S26	9.0	2.206	0.173	0.0194	
15 minute summer	S26	1.004	S27	149.3	2.047	0.462	2.5120	
15 minute summer	S27L	9.000	S27	11.4	2.437	0.209	0.0455	
15 minute summer	S27	1.005	S28	168.8	2.358	0.404	1.6123	
15 minute summer	S28L	10.000	S28	8.3	2.208	0.154	0.0288	
15 minute summer	S28	1.006	S34	179.8	2.335	0.497	1.1802	
15 minute summer	S29L	11.000	S29	6.2	0.921	0.347	0.0387	
15 minute summer	S29	11.001	S30	11.3	0.805	0.317	0.1987	
15 minute summer	S30La	12.000	S30	33.5	2.556	0.286	0.2006	
15 minute summer	S30Lb	13.000	S30	18.5	2.163	0.158	0.1435	
15 minute summer	S30	11.002	S31	67.6	1.746	0.338	0.6469	
15 minute summer	S31	11.003	S32	71.7	1.700	0.300	1.7823	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 98.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S32L	10	114.843	0.060	19.1	0.0680	0.0000	OK
15 minute summer	S32	10	114.224	0.167	93.9	0.2952	0.0000	OK
15 minute summer	S33	11	114.018	0.182	97.6	0.3223	0.0000	OK
15 minute summer	S34	11	113.692	0.263	284.1	0.6704	0.0000	OK
15 minute summer	S35	11	113.389	0.198	290.5	0.3490	0.0000	OK
15 minute summer	S36L	10	113.749	0.059	21.8	0.0672	0.0000	OK
15 minute summer	S36	11	112.537	0.211	314.5	0.3735	0.0000	OK
15 minute summer	S37L	10	114.078	0.089	21.8	0.1011	0.0000	OK
15 minute summer	S37	10	113.887	0.114	27.2	0.2021	0.0000	OK
15 minute summer	S38L	10	114.031	0.077	10.4	0.0865	0.0000	OK
15 minute summer	S38	10	113.758	0.124	39.6	0.2196	0.0000	OK
15 minute summer	S39La	10	113.949	0.033	6.1	0.0377	0.0000	OK
15 minute summer	S39Lb	10	113.800	0.032	5.5	0.0358	0.0000	OK
15 minute summer	S39	11	113.324	0.107	56.4	0.1887	0.0000	OK
15 minute summer	S40	11	111.963	0.320	382.8	0.8142	0.0000	OK
15 minute summer	S41La	10	112.730	0.062	19.4	0.0701	0.0000	OK
15 minute summer	S41Lb	10	112.564	0.044	9.9	0.0495	0.0000	OK
15 minute summer	S41	11	111.390	0.288	420.1	0.7332	0.0000	OK
15 minute summer	S42La	10	112.250	0.070	36.6	0.0795	0.0000	OK
15 minute summer	S42Lb	10	112.095	0.049	17.9	0.0551	0.0000	OK
15 minute summer	S42	11	110.897	0.273	477.9	0.6957	0.0000	OK
15 minute summer	S43	10	111.203	0.034	3.6	0.0381	0.0000	OK
15 minute summer	S44L	10	110.977	0.110	33.6	0.2800	0.0000	OK
15 minute summer	S44	11	110.483	0.328	518.0	0.8347	0.0000	OK
15 minute summer	S45	11	110.266	0.310	520.8	0.7886	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S32L	14.000	S32	19.1	2.895	0.336	0.0329	
15 minute summer	S32	11.004	S33	93.5	1.863	0.417	0.8854	
15 minute summer	S33	11.005	S34	98.2	1.821	0.491	1.8133	
15 minute summer	S34	1.007	S35	283.7	3.112	0.523	1.7380	
15 minute summer	S35	1.008	S36	290.1	3.732	0.312	1.8422	
15 minute summer	S36L	15.000	S36	21.7	3.359	0.329	0.0471	
15 minute summer	S36	1.009	S40	314.0	3.490	0.354	1.6418	
15 minute summer	S37L	16.000	S37	21.7	1.243	0.337	0.2467	
15 minute summer	S37	16.001	S38	27.0	1.333	0.520	0.1281	
15 minute summer	S38L	17.000	S38	10.3	1.141	0.517	0.1225	
15 minute summer	S38	16.002	S39	39.3	1.580	0.354	1.0404	
15 minute summer	S39La	18.000	S39	6.1	2.097	0.107	0.0159	
15 minute summer	S39Lb	19.000	S39	5.5	2.034	0.097	0.0108	
15 minute summer	S39	16.003	S40	56.3	2.503	0.276	0.8599	
15 minute summer	S40	1.010	S41	381.0	2.516	0.577	6.4591	
15 minute summer	S41La	20.000	S41	19.3	2.820	0.356	0.0718	
15 minute summer	S41Lb	21.000	S41	9.9	2.313	0.184	0.0390	
15 minute summer	S41	1.011	S42	419.0	2.791	0.327	6.6801	
15 minute summer	S42La	22.000	S42	36.5	3.460	0.212	0.1009	
15 minute summer	S42Lb	23.000	S42	17.8	2.831	0.103	0.0518	
15 minute summer	S42	1.012	S44	477.1	2.894	0.298	4.6277	
15 minute summer	S43	24.000	S44	3.5	0.959	0.049	0.0919	
15 minute summer	S44L	25.000	S44	33.4	1.733	0.485	0.2068	
15 minute summer	S44	1.013	S45	516.0	2.894	0.418	3.5545	
15 minute summer	S45	1.014	S46	518.7	4.052	0.375	2.5181	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 98.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S46L	10	110.583	0.064	21.5	0.0724	0.0000	OK
15 minute summer	S46	11	109.903	0.190	544.2	0.4840	0.0000	OK
15 minute summer	S47L	10	114.540	0.081	14.7	0.0919	0.0000	OK
15 minute summer	S47	10	114.384	0.106	27.4	0.2691	0.0000	OK
15 minute summer	S48L	10	114.586	0.066	20.3	0.0742	0.0000	OK
15 minute summer	S48	10	114.029	0.128	51.3	0.1453	0.0000	OK
15 minute summer	S49L	10	114.007	0.101	12.8	0.1146	0.0000	OK
15 minute summer	S49	10	113.872	0.146	66.0	0.1646	0.0000	OK
15 minute summer	S50	10	113.945	0.058	11.8	0.1023	0.0000	OK
15 minute summer	S51	10	113.796	0.068	19.5	0.1193	0.0000	OK
15 minute summer	S52	10	113.630	0.158	87.8	0.2798	0.0000	OK
15 minute summer	S53	11	113.417	0.224	93.2	0.3958	0.0000	OK
15 minute summer	S54L	10	113.724	0.064	17.3	0.0729	0.0000	OK
15 minute summer	S54	11	113.145	0.124	123.4	0.2189	0.0000	OK
15 minute summer	S54AL	10	112.674	0.067	13.7	0.0755	0.0000	OK
15 minute summer	S54A	11	112.210	0.093	25.6	0.1637	0.0000	OK
15 minute summer	S54B	11	111.771	0.125	152.1	0.2205	0.0000	OK
15 minute summer	S55La	10	111.555	0.051	13.4	0.0575	0.0000	OK
15 minute summer	S55Lb	10	111.730	0.052	14.2	0.0591	0.0000	OK
15 minute summer	S55	11	110.416	0.212	190.2	0.3743	0.0000	OK
15 minute summer	S56L	10	111.099	0.046	15.3	0.0521	0.0000	OK
15 minute summer	S56	11	109.974	0.195	211.6	0.3440	0.0000	OK
15 minute summer	S57L	10	110.092	0.073	16.8	0.0823	0.0000	OK
15 minute summer	S57	11	109.715	0.222	234.3	0.3918	0.0000	OK
15 minute summer	S58L	10	109.854	0.070	13.9	0.0794	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S46L	26.000	S46	21.5	2.768	0.379	0.0784	
15 minute summer	S46	1.015	S60	543.0	6.209	0.147	1.1965	
15 minute summer	S47L	27.000	S47	14.6	1.134	0.281	0.1369	
15 minute summer	S47	27.001	S48	26.9	1.220	0.271	0.8324	
15 minute summer	S48L	28.000	S48	20.2	2.106	0.186	0.1044	
15 minute summer	S48	27.002	S49	51.1	1.406	0.255	0.6366	
15 minute summer	S49L	29.000	S49	12.7	0.776	0.458	0.1701	
15 minute summer	S49	27.003	S52	65.9	1.671	0.328	0.7004	
15 minute summer	S50	30.000	S51	11.7	0.877	0.036	0.2129	
15 minute summer	S51	30.001	S52	19.3	0.620	0.050	0.5811	
15 minute summer	S52	27.004	S53	88.7	1.383	0.274	1.7917	
15 minute summer	S53	27.005	S54	93.6	2.310	0.241	0.6983	
15 minute summer	S54L	31.000	S54	17.2	2.387	0.382	0.0384	
15 minute summer	S54	27.006	S54B	123.7	3.491	0.171	0.8684	
15 minute summer	S54AL	43.000	S54A	13.6	1.803	0.408	0.0409	
15 minute summer	S54A	43.001	S54B	25.1	1.069	0.096	1.1560	
15 minute summer	S54B	27.007	S55	152.2	2.355	0.099	1.8920	
15 minute summer	S55La	32.000	S55	13.3	2.544	0.246	0.0485	
15 minute summer	S55Lb	33.000	S55	14.1	2.600	0.259	0.0598	
15 minute summer	S55	27.008	S56	191.2	2.277	0.278	3.5666	
15 minute summer	S56L	34.000	S56	15.3	2.620	0.092	0.0524	
15 minute summer	S56	27.009	S57	212.4	2.447	0.237	1.4680	
15 minute summer	S57L	35.000	S57	16.7	1.509	0.228	0.0844	
15 minute summer	S57	27.010	S58	234.3	2.400	0.304	3.7064	
15 minute summer	S58L	36.000	S58	13.8	1.709	0.445	0.0846	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 98.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S58	11	109.250	0.232	253.4	0.4106	0.0000	OK
15 minute summer	S59L	10	109.434	0.106	15.3	0.1203	0.0000	OK
15 minute summer	S59	11	109.038	0.239	268.4	0.4216	0.0000	OK
15 minute summer	S60L	10	110.206	0.039	8.5	0.0445	0.0000	OK
15 minute summer	S60	11	108.676	0.322	825.2	0.8204	0.0000	OK
15 minute summer	S61	11	108.063	0.374	827.1	0.9529	0.0000	OK
15 minute summer	S62	11	107.815	0.399	831.6	1.0157	0.0000	OK
15 minute summer	S63La	10	108.125	0.090	12.0	0.1016	0.0000	OK
15 minute summer	S63Lb	10	108.137	0.137	20.5	0.1546	0.0000	OK
15 minute summer	S63	11	107.670	0.459	866.4	1.1680	0.0000	OK
15 minute summer	S64L	10	107.793	0.106	32.4	0.1202	0.0000	OK
15 minute summer	S64	12	107.549	0.702	892.1	1.7876	0.0000	OK
15 minute summer	S65L	10	108.308	0.056	17.0	0.0638	0.0000	OK
15 minute summer	S65	12	107.524	0.690	917.2	1.7558	0.0000	OK
600 minute summer	HW11	435	107.165	0.348	127.0	0.0000	0.0000	OK
600 minute summer	HW12	435	107.165	0.348	74.6	0.0000	0.0000	OK
600 minute summer	S66	465	107.226	0.418	117.1	2.3909	0.0000	OK
15 minute summer	hw13	1	106.725	0.000	17.6	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S58	27.011	S59	253.6	2.473	0.330	1.8005	
15 minute summer	S59L	37.000	S59	15.2	1.137	0.853	0.1051	
15 minute summer	S59	27.012	S60	268.5	2.572	0.348	1.2084	
15 minute summer	S60L	38.000	S60	8.5	2.306	0.149	0.0390	
15 minute summer	S60	1.016	S61	823.6	3.644	0.292	7.5358	
15 minute summer	S61	1.017	S62	829.0	3.243	0.372	5.6878	
15 minute summer	S62	1.018	S63	830.8	2.852	0.372	4.8813	
15 minute summer	S63La	39.000	S63	11.9	1.083	0.671	0.0804	
15 minute summer	S63Lb	40.000	S63	20.3	1.229	1.141	0.0639	
15 minute summer	S63	1.019	S64	864.0	2.027	0.433	15.4513	
15 minute summer	S64L	41.000	S64	32.3	1.751	0.457	0.1659	
15 minute summer	S64	1.020	S65	898.1	1.707	1.337	5.9308	
15 minute summer	S65L	42.000	S65	17.0	2.804	0.299	0.0403	
15 minute summer	S65	1.021	HW11	739.4	2.934	1.135	4.3527	
600 minute summer	HW11	Flow through pond	HW12	74.6	0.023	0.005	822.9943	
600 minute summer	HW12	1.022	S66	117.1	0.500	0.180	2.1331	
600 minute summer	S66	Hydro-Brake®	hw13	23.3				807.3

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Results for 30 year Critical Storm Duration. Lowest mass balance: 98.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S20L	10	116.208	0.100	41.5	0.1133	0.0000	OK
15 minute summer	S20	10	115.411	0.167	73.2	0.2950	0.0000	OK
15 minute summer	S21La	10	115.781	0.145	21.4	0.1640	0.0000	OK
15 minute summer	S21Lb	10	115.734	0.118	16.8	0.1329	0.0000	OK
15 minute summer	S21	10	115.397	0.116	48.6	0.2044	0.0000	OK
15 minute summer	S22Lb	10	115.439	0.109	16.1	0.1238	0.0000	OK
15 minute summer	S22La	10	115.585	0.280	30.0	0.3163	0.0000	SURCHARGED
15 minute summer	S22	11	115.198	0.265	172.5	0.4674	0.0000	OK
15 minute summer	S23L	10	116.074	0.091	40.8	0.1033	0.0000	OK
15 minute summer	S23	10	115.610	0.153	54.9	0.1735	0.0000	OK
15 minute summer	S24L	10	115.568	0.085	15.1	0.0960	0.0000	OK
15 minute summer	S24	10	115.261	0.151	76.8	0.1713	0.0000	OK
15 minute summer	S25	11	115.013	0.281	256.0	0.4971	0.0000	OK
15 minute summer	S26L	10	115.176	0.059	17.1	0.0671	0.0000	OK
15 minute summer	S26	11	114.734	0.319	283.8	0.5641	0.0000	OK
15 minute summer	S27L	10	115.338	0.066	21.7	0.0746	0.0000	OK
15 minute summer	S27	11	114.364	0.294	321.4	0.5201	0.0000	OK
15 minute summer	S28L	10	114.746	0.056	15.8	0.0631	0.0000	OK
15 minute summer	S28	11	114.034	0.339	343.2	0.5992	0.0000	OK
15 minute summer	S29L	10	115.265	0.089	11.8	0.1004	0.0000	OK
15 minute summer	S29	10	115.167	0.124	21.6	0.1403	0.0000	OK
15 minute summer	S30La	10	115.861	0.118	63.9	0.1334	0.0000	OK
15 minute summer	S30Lb	10	115.900	0.084	35.2	0.0953	0.0000	OK
15 minute summer	S30	10	115.041	0.215	129.0	0.3793	0.0000	OK
15 minute summer	S31	10	114.859	0.200	137.7	0.3527	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S20L	1.000	S20	41.3	2.423	0.411	0.2945	
15 minute summer	S20	1.001	S22	72.1	0.964	0.304	4.2996	
15 minute summer	S21La	2.000	S21	21.1	1.241	1.159	0.0888	
15 minute summer	S21Lb	3.000	S21	16.7	1.127	0.961	0.0542	
15 minute summer	S21	2.001	S22	48.3	0.771	0.149	2.2384	
15 minute summer	S22Lb	4.000	S22	15.9	1.160	0.884	0.1293	
15 minute summer	S22La	5.000	S22	29.6	1.683	1.671	0.1258	
15 minute summer	S22	1.002	S25	172.7	1.717	0.661	3.0833	
15 minute summer	S23L	6.000	S23	40.7	2.696	0.348	0.1362	
15 minute summer	S23	6.001	S24	54.2	1.502	0.527	1.1447	
15 minute summer	S24L	7.000	S24	15.0	1.462	0.613	0.0804	
15 minute summer	S24	6.002	S25	76.4	1.563	0.352	1.3408	
15 minute summer	S25	1.003	S26	257.7	2.294	0.721	2.9171	
15 minute summer	S26L	8.000	S26	17.1	2.638	0.328	0.0309	
15 minute summer	S26	1.004	S27	284.1	2.368	0.879	4.1386	
15 minute summer	S27L	9.000	S27	21.6	2.908	0.397	0.0726	
15 minute summer	S27	1.005	S28	321.5	2.701	0.769	2.6798	
15 minute summer	S28L	10.000	S28	15.8	2.648	0.293	0.0458	
15 minute summer	S28	1.006	S34	342.7	2.677	0.946	1.9621	
15 minute summer	S29L	11.000	S29	11.7	1.082	0.659	0.0627	
15 minute summer	S29	11.001	S30	21.4	0.967	0.602	0.3143	
15 minute summer	S30La	12.000	S30	63.6	3.026	0.545	0.3224	
15 minute summer	S30Lb	13.000	S30	35.0	2.590	0.300	0.2271	
15 minute summer	S30	11.002	S31	128.5	2.059	0.642	1.0420	
15 minute summer	S31	11.003	S32	136.4	1.958	0.570	2.9335	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 98.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S32L	10	114.870	0.087	36.2	0.0987	0.0000	OK
15 minute summer	S32	10	114.311	0.254	178.5	0.4490	0.0000	OK
15 minute summer	S33	11	114.124	0.288	184.8	0.5089	0.0000	OK
15 minute summer	S34	11	113.840	0.411	540.4	1.0462	0.0000	OK
15 minute summer	S35	11	113.476	0.285	552.7	0.5032	0.0000	OK
15 minute summer	S36L	10	113.776	0.086	41.5	0.0977	0.0000	OK
15 minute summer	S36	11	112.639	0.313	598.5	0.5527	0.0000	OK
15 minute summer	S37L	10	114.122	0.133	41.5	0.1501	0.0000	OK
15 minute summer	S37	10	113.954	0.181	51.8	0.3192	0.0000	OK
15 minute summer	S38L	10	114.075	0.121	19.7	0.1365	0.0000	OK
15 minute summer	S38	10	113.814	0.180	74.6	0.3173	0.0000	OK
15 minute summer	S39La	10	113.962	0.046	11.5	0.0520	0.0000	OK
15 minute summer	S39Lb	10	113.812	0.044	10.5	0.0496	0.0000	OK
15 minute summer	S39	11	113.369	0.152	106.9	0.2693	0.0000	OK
15 minute summer	S40	11	112.183	0.540	728.6	1.3749	0.0000	OK
15 minute summer	S41La	10	112.759	0.091	36.9	0.1026	0.0000	OK
15 minute summer	S41Lb	10	112.582	0.061	18.8	0.0695	0.0000	OK
15 minute summer	S41	11	111.521	0.419	801.5	1.0661	0.0000	OK
15 minute summer	S42La	10	112.279	0.099	69.4	0.1121	0.0000	OK
15 minute summer	S42Lb	10	112.113	0.067	33.9	0.0762	0.0000	OK
15 minute summer	S42	11	111.027	0.403	912.7	1.0256	0.0000	OK
15 minute summer	S43	10	111.215	0.046	6.9	0.0523	0.0000	OK
15 minute summer	S44L	10	111.036	0.169	63.9	0.4299	0.0000	OK
15 minute summer	S44	11	110.636	0.481	976.1	1.2253	0.0000	OK
15 minute summer	S45	11	110.405	0.449	977.6	1.1416	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S32L	14.000	S32	36.1	3.403	0.638	0.0532	
15 minute summer	S32	11.004	S33	177.0	2.089	0.790	1.5018	
15 minute summer	S33	11.005	S34	186.2	2.000	0.930	3.2498	
15 minute summer	S34	1.007	S35	539.8	3.555	0.995	2.8646	
15 minute summer	S35	1.008	S36	552.2	4.368	0.594	3.0052	
15 minute summer	S36L	15.000	S36	41.4	3.955	0.627	0.0762	
15 minute summer	S36	1.009	S40	598.3	3.612	0.674	3.0693	
15 minute summer	S37L	16.000	S37	41.3	1.407	0.641	0.4132	
15 minute summer	S37	16.001	S38	50.8	1.502	0.980	0.2200	
15 minute summer	S38L	17.000	S38	19.4	1.292	0.974	0.2116	
15 minute summer	S38	16.002	S39	74.7	1.872	0.672	1.6659	
15 minute summer	S39La	18.000	S39	11.5	2.515	0.203	0.0250	
15 minute summer	S39Lb	19.000	S39	10.5	2.451	0.185	0.0171	
15 minute summer	S39	16.003	S40	106.3	2.837	0.522	1.8474	
15 minute summer	S40	1.010	S41	727.2	2.839	1.102	11.3354	
15 minute summer	S41La	20.000	S41	36.8	3.309	0.677	0.1165	
15 minute summer	S41Lb	21.000	S41	18.7	2.763	0.350	0.0621	
15 minute summer	S41	1.011	S42	800.8	3.277	0.624	10.9713	
15 minute summer	S42La	22.000	S42	69.3	4.123	0.403	0.1606	
15 minute summer	S42Lb	23.000	S42	33.8	3.402	0.196	0.0817	
15 minute summer	S42	1.012	S44	898.3	3.349	0.561	7.5664	
15 minute summer	S43	24.000	S44	6.8	1.163	0.093	0.1453	
15 minute summer	S44L	25.000	S44	63.4	1.986	0.922	0.3429	
15 minute summer	S44	1.013	S45	968.5	3.378	0.784	5.7145	
15 minute summer	S45	1.014	S46	973.1	4.752	0.703	4.0045	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 98.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S46L	10	110.613	0.094	40.8	0.1066	0.0000	OK
15 minute summer	S46	11	109.975	0.262	1021.5	0.6677	0.0000	OK
15 minute summer	S47L	10	114.576	0.117	28.0	0.1318	0.0000	OK
15 minute summer	S47	10	114.430	0.152	52.2	0.3860	0.0000	OK
15 minute summer	S48L	10	114.612	0.092	38.5	0.1042	0.0000	OK
15 minute summer	S48	10	114.088	0.186	97.9	0.2109	0.0000	OK
15 minute summer	S49L	10	114.051	0.145	24.4	0.1642	0.0000	OK
15 minute summer	S49	10	113.937	0.211	126.0	0.2389	0.0000	OK
15 minute summer	S50	10	113.966	0.079	22.4	0.1395	0.0000	OK
15 minute summer	S51	10	113.820	0.092	37.1	0.1633	0.0000	OK
15 minute summer	S52	10	113.703	0.231	167.4	0.4082	0.0000	OK
15 minute summer	S53	11	113.478	0.285	176.7	0.5031	0.0000	OK
15 minute summer	S54L	10	113.754	0.095	32.9	0.1076	0.0000	OK
15 minute summer	S54	11	113.194	0.173	234.1	0.3060	0.0000	OK
15 minute summer	S54AL	10	112.706	0.099	26.0	0.1122	0.0000	OK
15 minute summer	S54A	10	112.246	0.129	48.6	0.2271	0.0000	OK
15 minute summer	S54B	11	111.818	0.172	288.9	0.3045	0.0000	OK
15 minute summer	S55La	10	111.576	0.072	25.3	0.0815	0.0000	OK
15 minute summer	S55Lb	10	111.753	0.075	27.0	0.0843	0.0000	OK
15 minute summer	S55	11	110.505	0.301	361.4	0.5323	0.0000	OK
15 minute summer	S56L	10	111.117	0.064	29.0	0.0719	0.0000	OK
15 minute summer	S56	11	110.058	0.279	401.4	0.4933	0.0000	OK
15 minute summer	S57L	10	110.122	0.103	31.9	0.1165	0.0000	OK
15 minute summer	S57	11	109.812	0.319	444.7	0.5642	0.0000	OK
15 minute summer	S58L	10	109.890	0.106	26.3	0.1196	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S46L	26.000	S46	40.7	2.835	0.719	0.1069	
15 minute summer	S46	1.015	S60	1020.0	6.700	0.277	2.1555	
15 minute summer	S47L	27.000	S47	27.8	1.343	0.536	0.2202	
15 minute summer	S47	27.001	S48	51.3	1.448	0.516	1.3415	
15 minute summer	S48L	28.000	S48	38.4	2.515	0.354	0.1658	
15 minute summer	S48	27.002	S49	97.5	1.648	0.487	1.0367	
15 minute summer	S49L	29.000	S49	24.2	0.952	0.873	0.2641	
15 minute summer	S49	27.003	S52	125.0	1.970	0.622	1.1317	
15 minute summer	S50	30.000	S51	22.3	1.061	0.069	0.3348	
15 minute summer	S51	30.001	S52	36.7	0.718	0.095	0.9471	
15 minute summer	S52	27.004	S53	168.2	1.796	0.520	2.6080	
15 minute summer	S53	27.005	S54	177.5	2.763	0.458	1.1057	
15 minute summer	S54L	31.000	S54	32.8	2.790	0.727	0.0625	
15 minute summer	S54	27.006	S54B	235.0	4.180	0.324	1.3778	
15 minute summer	S54AL	43.000	S54A	25.9	2.098	0.774	0.0668	
15 minute summer	S54A	43.001	S54B	47.7	1.288	0.183	1.8272	
15 minute summer	S54B	27.007	S55	289.3	2.800	0.187	3.0058	
15 minute summer	S55La	32.000	S55	25.2	3.020	0.465	0.0773	
15 minute summer	S55Lb	33.000	S55	26.9	3.085	0.492	0.0959	
15 minute summer	S55	27.008	S56	362.7	2.687	0.527	5.7324	
15 minute summer	S56L	34.000	S56	28.9	3.152	0.175	0.0825	
15 minute summer	S56	27.009	S57	403.0	2.871	0.450	2.3734	
15 minute summer	S57L	35.000	S57	31.8	1.797	0.433	0.1347	
15 minute summer	S57	27.010	S58	447.1	2.825	0.580	6.0080	
15 minute summer	S58L	36.000	S58	26.1	1.972	0.843	0.1388	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 98.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S58	11	109.357	0.339	483.3	0.5991	0.0000	OK
15 minute summer	S59L	10	109.604	0.276	29.0	0.3121	0.0000	SURCHARGED
15 minute summer	S59	11	109.147	0.348	513.3	0.6152	0.0000	OK
15 minute summer	S60L	10	110.222	0.055	16.1	0.0620	0.0000	OK
15 minute summer	S60	11	108.823	0.468	1559.2	1.1923	0.0000	OK
15 minute summer	S61	11	108.283	0.594	1563.6	1.5123	0.0000	OK
15 minute summer	S62	11	108.114	0.698	1577.4	1.7753	0.0000	OK
15 minute summer	S63La	10	108.216	0.181	22.7	0.2051	0.0000	SURCHARGED
15 minute summer	S63Lb	10	108.297	0.297	38.8	0.3354	0.0000	SURCHARGED
15 minute summer	S63	11	108.027	0.815	1647.1	2.0754	0.0000	OK
15 minute summer	S64L	11	107.939	0.252	61.5	0.2853	0.0000	SURCHARGED
15 minute summer	S64	10	107.894	1.047	1738.5	2.6656	0.0000	SURCHARGED
15 minute summer	S65L	10	108.333	0.081	32.3	0.0919	0.0000	OK
30 minute summer	S65	19	107.826	0.992	1829.9	2.5235	0.0000	SURCHARGED
480 minute summer	HW11	480	107.474	0.657	315.2	0.0000	0.0000	OK
480 minute summer	HW12	464	107.474	0.657	243.4	0.0000	0.0000	OK
600 minute summer	S66	495	107.551	0.743	202.3	4.2522	0.0000	OK
15 minute summer	hw13	1	106.725	0.000	23.1	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S58	27.011	S59	485.3	2.909	0.631	2.9292	
15 minute summer	S59L	37.000	S59	28.6	1.625	1.610	0.1374	
15 minute summer	S59	27.012	S60	513.0	3.028	0.665	1.9616	
15 minute summer	S60L	38.000	S60	16.0	2.762	0.283	0.0618	
15 minute summer	S60	1.016	S61	1557.0	4.154	0.552	12.9262	
15 minute summer	S61	1.017	S62	1573.3	3.607	0.706	10.6106	
15 minute summer	S62	1.018	S63	1589.2	3.180	0.712	9.2612	
15 minute summer	S63La	39.000	S63	22.4	1.274	1.264	0.1253	
15 minute summer	S63Lb	40.000	S63	38.5	2.185	2.157	0.0674	
15 minute summer	S63	1.019	S64	1682.8	2.797	0.844	22.5340	
15 minute summer	S64L	41.000	S64	74.7	1.991	1.060	0.3545	
15 minute summer	S64	1.020	S65	1720.2	2.763	2.561	7.0561	
15 minute summer	S65L	42.000	S65	32.2	3.310	0.568	0.0648	
30 minute summer	S65	1.021	HW11	1907.8	4.654	2.928	5.8424	
480 minute summer	HW11	Flow through pond	HW12	150.9	0.036	0.009	1635.7102	
480 minute summer	HW12	1.022	S66	203.6	0.433	0.313	4.3791	
600 minute summer	S66	Hydro-Brake®	hw13	23.3				884.2

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S20L	12	116.525	0.417	75.4	0.4714	0.0000	SURCHARGED
15 minute summer	S20	12	116.294	1.050	133.0	1.8550	0.0000	SURCHARGED
15 minute summer	S21La	12	116.406	0.770	38.9	0.8710	0.0000	SURCHARGED
15 minute summer	S21Lb	12	116.318	0.702	30.5	0.7937	0.0000	SURCHARGED
15 minute summer	S21	12	116.257	0.976	88.4	1.7237	0.0000	SURCHARGED
15 minute summer	S22Lb	12	116.388	1.058	29.3	1.1961	0.0000	SURCHARGED
15 minute summer	S22La	12	116.683	1.378	54.4	1.5580	0.0000	SURCHARGED
15 minute summer	S22	12	116.241	1.308	286.0	2.3104	0.0000	SURCHARGED
15 minute summer	S23L	12	116.416	0.433	74.2	0.4894	0.0000	SURCHARGED
15 minute summer	S23	12	116.301	0.844	99.8	0.9548	0.0000	SURCHARGED
15 minute summer	S24L	12	116.254	0.771	27.5	0.8720	0.0000	SURCHARGED
15 minute summer	S24	12	116.146	1.036	127.8	1.1720	0.0000	SURCHARGED
15 minute summer	S25	12	116.072	1.340	394.9	2.3674	0.0000	SURCHARGED
15 minute summer	S26L	12	115.840	0.723	31.1	0.8178	0.0000	SURCHARGED
15 minute summer	S26	12	115.754	1.339	403.2	2.3659	0.0000	SURCHARGED
15 minute summer	S27L	12	115.553	0.281	39.5	0.3178	0.0000	SURCHARGED
15 minute summer	S27	12	115.244	1.174	444.4	2.0738	0.0000	SURCHARGED
15 minute summer	S28L	12	114.937	0.247	28.7	0.2794	0.0000	SURCHARGED
15 minute summer	S28	12	114.812	1.117	474.5	1.9740	0.0000	SURCHARGED
15 minute summer	S29L	12	116.161	0.985	21.5	1.1137	0.0000	SURCHARGED
15 minute summer	S29	12	116.103	1.060	36.9	1.1985	0.0000	SURCHARGED
15 minute summer	S30La	11	116.596	0.853	116.0	0.9644	0.0000	SURCHARGED
15 minute summer	S30Lb	12	116.213	0.397	64.0	0.4489	0.0000	SURCHARGED
15 minute summer	S30	12	116.045	1.219	220.2	2.1545	0.0000	SURCHARGED
15 minute summer	S31	12	115.893	1.234	226.1	2.1799	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S20L	1.000	S20	75.0	2.795	0.747	0.6873	
15 minute summer	S20	1.001	S22	121.4	1.076	0.511	9.0921	
15 minute summer	S21La	2.000	S21	38.4	2.184	2.114	0.0923	
15 minute summer	S21Lb	3.000	S21	30.3	1.721	1.747	0.0645	
15 minute summer	S21	2.001	S22	84.6	0.854	0.262	5.5092	
15 minute summer	S22Lb	4.000	S22	26.3	1.493	1.457	0.1656	
15 minute summer	S22La	5.000	S22	49.8	2.829	2.809	0.1271	
15 minute summer	S22	1.002	S25	265.3	1.817	1.015	4.8580	
15 minute summer	S23L	6.000	S23	74.1	2.919	0.634	0.3589	
15 minute summer	S23	6.001	S24	91.1	1.655	0.885	2.2303	
15 minute summer	S24L	7.000	S24	25.3	1.542	1.031	0.1379	
15 minute summer	S24	6.002	S25	126.7	1.606	0.583	2.8515	
15 minute summer	S25	1.003	S26	356.0	2.267	0.997	4.1173	
15 minute summer	S26L	8.000	S26	29.4	2.870	0.567	0.0840	
15 minute summer	S26	1.004	S27	389.0	2.513	1.204	5.4568	
15 minute summer	S27L	9.000	S27	38.6	3.146	0.709	0.1719	
15 minute summer	S27	1.005	S28	442.8	2.795	1.060	3.5678	
15 minute summer	S28L	10.000	S28	28.1	2.880	0.523	0.1356	
15 minute summer	S28	1.006	S34	476.1	3.005	1.315	2.4275	
15 minute summer	S29L	11.000	S29	21.1	1.236	1.185	0.1018	
15 minute summer	S29	11.001	S30	40.4	1.109	1.136	0.5646	
15 minute summer	S30La	12.000	S30	108.9	3.342	0.933	0.6096	
15 minute summer	S30Lb	13.000	S30	61.1	2.672	0.523	0.6676	
15 minute summer	S30	11.002	S31	210.1	2.163	1.050	1.8419	
15 minute summer	S31	11.003	S32	204.1	2.000	0.853	4.6527	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S32L	12	115.933	1.150	65.8	1.3001	0.0000	SURCHARGED
15 minute summer	S32	12	115.446	1.389	272.2	2.4539	0.0000	SURCHARGED
15 minute summer	S33	12	115.128	1.292	279.4	2.2836	0.0000	SURCHARGED
15 minute summer	S34	12	114.476	1.047	767.5	2.6657	0.0000	SURCHARGED
15 minute summer	S35	12	113.999	0.808	785.4	1.4273	0.0000	SURCHARGED
15 minute summer	S36L	11	114.565	0.875	75.4	0.9898	0.0000	SURCHARGED
15 minute summer	S36	12	113.375	1.049	859.5	1.8530	0.0000	SURCHARGED
15 minute summer	S37L	11	114.659	0.670	75.4	0.7579	0.0000	SURCHARGED
15 minute summer	S37	12	114.409	0.636	91.3	1.1241	0.0000	SURCHARGED
15 minute summer	S38L	12	114.684	0.730	35.9	0.8255	0.0000	SURCHARGED
15 minute summer	S38	12	114.251	0.617	126.9	1.0895	0.0000	SURCHARGED
15 minute summer	S39La	10	113.979	0.063	20.9	0.0713	0.0000	OK
15 minute summer	S39Lb	11	113.838	0.070	19.1	0.0788	0.0000	OK
15 minute summer	S39	12	113.737	0.520	179.3	0.9195	0.0000	SURCHARGED
15 minute summer	S40	12	112.800	1.157	1066.0	2.9440	0.0000	SURCHARGED
15 minute summer	S41La	11	113.270	0.602	67.0	0.6804	0.0000	SURCHARGED
15 minute summer	S41Lb	10	112.607	0.087	34.1	0.0985	0.0000	OK
15 minute summer	S41	11	111.655	0.553	1184.3	1.4073	0.0000	OK
15 minute summer	S42La	10	112.323	0.143	126.2	0.1612	0.0000	OK
15 minute summer	S42Lb	10	112.138	0.092	61.6	0.1045	0.0000	OK
15 minute summer	S42	11	111.199	0.575	1385.4	1.4643	0.0000	OK
15 minute summer	S43	10	111.232	0.063	12.6	0.0709	0.0000	OK
15 minute summer	S44L	10	111.420	0.552	116.0	1.4061	0.0000	SURCHARGED
15 minute summer	S44	11	110.867	0.712	1518.9	1.8125	0.0000	OK
15 minute summer	S45	11	110.615	0.659	1528.5	1.6782	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S32L	14.000	S32	58.8	3.607	1.039	0.0881	
15 minute summer	S32	11.004	S33	265.9	2.411	1.187	1.9463	
15 minute summer	S33	11.005	S34	277.0	2.512	1.384	3.6713	
15 minute summer	S34	1.007	S35	767.1	3.668	1.414	4.1122	
15 minute summer	S35	1.008	S36	785.6	4.514	0.846	5.1185	
15 minute summer	S36L	15.000	S36	70.7	4.200	1.071	0.1281	
15 minute summer	S36	1.009	S40	859.6	3.980	0.969	3.9411	
15 minute summer	S37L	16.000	S37	72.2	1.816	1.121	0.5615	
15 minute summer	S37	16.001	S38	86.0	2.163	1.659	0.2517	
15 minute summer	S38L	17.000	S38	32.5	1.848	1.636	0.2392	
15 minute summer	S38	16.002	S39	120.8	1.965	1.087	2.9370	
15 minute summer	S39La	18.000	S39	20.9	2.920	0.368	0.0676	
15 minute summer	S39Lb	19.000	S39	19.1	2.851	0.337	0.0513	
15 minute summer	S39	16.003	S40	171.1	2.898	0.840	2.6925	
15 minute summer	S40	1.010	S41	1066.5	3.787	1.616	11.8273	
15 minute summer	S41La	20.000	S41	64.6	3.669	1.188	0.1844	
15 minute summer	S41Lb	21.000	S41	34.0	3.210	0.636	0.0969	
15 minute summer	S41	1.011	S42	1188.4	3.507	0.927	15.7854	
15 minute summer	S42La	22.000	S42	126.0	4.762	0.733	0.2529	
15 minute summer	S42Lb	23.000	S42	61.5	4.013	0.356	0.1258	
15 minute summer	S42	1.012	S44	1376.6	3.519	0.860	11.1371	
15 minute summer	S43	24.000	S44	12.5	1.345	0.171	0.5493	
15 minute summer	S44L	25.000	S44	113.8	2.861	1.655	0.4229	
15 minute summer	S44	1.013	S45	1514.9	3.614	1.226	8.3945	
15 minute summer	S45	1.014	S46	1540.6	5.039	1.113	6.2206	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S46L	11	111.361	0.842	74.2	0.9522	0.0000	SURCHARGED
15 minute summer	S46	12	110.109	0.395	1628.9	1.0064	0.0000	OK
15 minute summer	S47L	10	114.636	0.177	50.8	0.1999	0.0000	OK
15 minute summer	S47	10	114.505	0.227	94.7	0.5785	0.0000	OK
15 minute summer	S48L	10	114.651	0.130	70.0	0.1476	0.0000	OK
15 minute summer	S48	10	114.196	0.295	177.8	0.3332	0.0000	OK
15 minute summer	S49L	10	114.147	0.241	44.3	0.2730	0.0000	SURCHARGED
15 minute summer	S49	10	114.076	0.350	228.5	0.3959	0.0000	OK
15 minute summer	S50	10	113.994	0.107	40.7	0.1882	0.0000	OK
15 minute summer	S51	10	113.853	0.125	67.4	0.2207	0.0000	OK
15 minute summer	S52	10	113.821	0.349	303.8	0.6163	0.0000	OK
15 minute summer	S53	11	113.573	0.380	320.3	0.6711	0.0000	OK
15 minute summer	S54L	10	114.071	0.412	59.8	0.4656	0.0000	SURCHARGED
15 minute summer	S54	11	113.264	0.243	424.7	0.4295	0.0000	OK
15 minute summer	S54AL	10	112.949	0.342	47.2	0.3866	0.0000	SURCHARGED
15 minute summer	S54A	10	112.293	0.176	87.8	0.3110	0.0000	OK
15 minute summer	S54B	11	111.882	0.236	524.1	0.4164	0.0000	OK
15 minute summer	S55La	10	111.610	0.106	46.0	0.1200	0.0000	OK
15 minute summer	S55Lb	10	111.789	0.111	49.0	0.1256	0.0000	OK
15 minute summer	S55	12	111.038	0.833	655.4	1.4727	0.0000	SURCHARGED
15 minute summer	S56L	10	111.140	0.087	52.6	0.0982	0.0000	OK
15 minute summer	S56	12	110.726	0.947	711.9	1.6727	0.0000	SURCHARGED
15 minute summer	S57L	12	110.620	0.601	58.0	0.6802	0.0000	SURCHARGED
15 minute summer	S57	12	110.553	1.060	771.6	1.8727	0.0000	SURCHARGED
15 minute summer	S58L	12	110.688	0.904	47.8	1.0226	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S46L	26.000	S46	71.2	4.046	1.258	0.1287	
15 minute summer	S46	1.015	S60	1622.0	7.176	0.440	4.6204	
15 minute summer	S47L	27.000	S47	50.4	1.511	0.971	0.3553	
15 minute summer	S47	27.001	S48	93.0	1.640	0.936	2.1502	
15 minute summer	S48L	28.000	S48	69.8	2.875	0.644	0.2762	
15 minute summer	S48	27.002	S49	176.9	1.771	0.883	1.7481	
15 minute summer	S49L	29.000	S49	43.8	1.140	1.583	0.4015	
15 minute summer	S49	27.003	S52	227.8	2.152	1.134	1.8805	
15 minute summer	S50	30.000	S51	40.5	1.259	0.125	0.5135	
15 minute summer	S51	30.001	S52	66.9	0.807	0.173	1.5078	
15 minute summer	S52	27.004	S53	304.9	2.221	0.943	3.8219	
15 minute summer	S53	27.005	S54	321.2	3.180	0.828	1.7338	
15 minute summer	S54L	31.000	S54	58.6	3.328	1.298	0.0925	
15 minute summer	S54	27.006	S54B	425.9	4.874	0.587	2.1414	
15 minute summer	S54AL	43.000	S54A	46.5	2.642	1.389	0.0942	
15 minute summer	S54A	43.001	S54B	86.8	1.522	0.333	2.8109	
15 minute summer	S54B	27.007	S55	524.6	3.142	0.340	5.5427	
15 minute summer	S55La	32.000	S55	45.8	3.448	0.845	0.1408	
15 minute summer	S55Lb	33.000	S55	48.8	3.500	0.894	0.1708	
15 minute summer	S55	27.008	S56	638.5	2.924	0.927	11.9595	
15 minute summer	S56L	34.000	S56	52.5	3.723	0.317	0.2401	
15 minute summer	S56	27.009	S57	693.1	2.964	0.773	4.7612	
15 minute summer	S57L	35.000	S57	66.5	2.034	0.906	0.3029	
15 minute summer	S57	27.010	S58	748.9	2.935	0.972	10.6919	
15 minute summer	S58L	36.000	S58	42.4	2.406	1.366	0.1843	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S58	12	110.076	1.058	806.4	1.8691	0.0000	SURCHARGED
15 minute summer	S59L	11	110.433	1.105	52.6	1.2494	0.0000	SURCHARGED
15 minute summer	S59	12	109.868	1.069	850.5	1.8888	0.0000	SURCHARGED
15 minute summer	S60L	10	110.244	0.076	29.3	0.0865	0.0000	OK
15 minute summer	S60	12	109.699	1.345	2509.9	3.4239	0.0000	SURCHARGED
15 minute summer	S61	12	109.163	1.474	2549.5	3.7512	0.0000	SURCHARGED
15 minute summer	S62	12	108.839	1.423	2546.9	3.6206	0.0000	SURCHARGED
15 minute summer	S63La	11	108.941	0.906	41.3	1.0243	0.0000	SURCHARGED
15 minute summer	S63Lb	11	109.157	1.157	70.6	1.3091	0.0000	SURCHARGED
15 minute summer	S63	12	108.652	1.441	2646.0	3.6678	0.0000	SURCHARGED
15 minute summer	S64L	10	108.402	0.715	111.8	0.8083	0.0000	SURCHARGED
30 minute summer	S64	16	108.210	1.363	2625.9	3.4696	0.0000	SURCHARGED
15 minute summer	S65L	11	108.468	0.216	58.6	0.2443	0.0000	SURCHARGED
960 minute summer	S65	930	108.068	1.234	287.3	3.1394	0.0000	SURCHARGED
960 minute summer	HW11	960	108.064	1.247	758.9	0.0000	0.0000	OK
960 minute summer	HW12	960	108.064	1.247	504.7	0.0000	0.0000	FLOOD RISK
960 minute summer	S66	960	108.064	1.256	136.9	7.1926	0.0000	FLOOD RISK
15 minute summer	hw13	1	106.725	0.000	23.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S58	27.011	S59	805.8	3.030	1.047	4.9451	
15 minute summer	S59L	37.000	S59	48.4	2.748	2.722	0.1388	
15 minute summer	S59	27.012	S60	848.7	3.465	1.101	3.2610	
15 minute summer	S60L	38.000	S60	29.2	3.185	0.516	0.1416	
15 minute summer	S60	1.016	S61	2539.7	4.104	0.900	21.0692	
15 minute summer	S61	1.017	S62	2539.4	4.007	1.139	13.8442	
15 minute summer	S62	1.018	S63	2541.3	4.010	1.139	10.3761	
15 minute summer	S63La	39.000	S63	39.1	2.222	2.206	0.1288	
15 minute summer	S63Lb	40.000	S63	67.3	3.825	3.777	0.0681	
15 minute summer	S63	1.019	S64	2619.2	4.133	1.314	23.1150	
15 minute summer	S64L	41.000	S64	106.1	2.668	1.504	0.3582	
30 minute summer	S64	1.020	S65	2650.0	4.182	3.946	7.1426	
15 minute summer	S65L	42.000	S65	56.2	3.540	0.992	0.1175	
960 minute summer	S65	1.021	HW11	285.4	1.735	0.438	9.9179	
960 minute summer	HW11	Flow through pond	HW12	-518.2	0.035	-0.031	3404.8943	
960 minute summer	HW12	1.022	S66	-153.4	-0.304	-0.236	5.2781	
960 minute summer	S66	Hydro-Brake®	hw13	23.3				1277.3

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Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 98.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S20L	12	117.084	0.976	82.9	1.1043	0.0000	SURCHARGED
15 minute summer	S20	12	116.818	1.574	139.1	2.7820	0.0000	SURCHARGED
15 minute summer	S21La	12	116.946	1.310	42.8	1.4820	0.0000	SURCHARGED
15 minute summer	S21Lb	12	116.844	1.228	33.5	1.3893	0.0000	SURCHARGED
15 minute summer	S21	12	116.774	1.493	90.9	2.6386	0.0000	SURCHARGED
15 minute summer	S22Lb	12	116.919	1.589	32.2	1.7967	0.0000	SURCHARGED
15 minute summer	S22La	12	117.270	1.965	59.9	2.2220	0.0000	FLOOD RISK
15 minute summer	S22	12	116.757	1.824	314.6	3.2223	0.0000	SURCHARGED
15 minute summer	S23L	12	116.963	0.980	81.6	1.1080	0.0000	SURCHARGED
15 minute summer	S23	12	116.829	1.372	107.0	1.5514	0.0000	SURCHARGED
15 minute summer	S24L	12	116.769	1.286	30.3	1.4540	0.0000	SURCHARGED
15 minute summer	S24	12	116.650	1.540	138.7	1.7422	0.0000	SURCHARGED
15 minute summer	S25	12	116.567	1.835	378.1	3.2419	0.0000	SURCHARGED
15 minute summer	S26L	12	116.308	1.191	34.2	1.3470	0.0000	SURCHARGED
15 minute summer	S26	12	116.212	1.797	414.3	3.1747	0.0000	SURCHARGED
15 minute summer	S27L	12	116.002	0.730	43.4	0.8259	0.0000	SURCHARGED
15 minute summer	S27	12	115.643	1.573	470.7	2.7799	0.0000	SURCHARGED
15 minute summer	S28L	12	115.303	0.613	31.6	0.6935	0.0000	SURCHARGED
15 minute summer	S28	12	115.162	1.467	501.6	2.5919	0.0000	SURCHARGED
15 minute summer	S29L	12	116.667	1.491	23.7	1.6864	0.0000	FLOOD RISK
15 minute summer	S29	12	116.606	1.563	35.7	1.7680	0.0000	SURCHARGED
15 minute summer	S30La	12	117.166	1.423	127.6	1.6099	0.0000	FLOOD RISK
15 minute summer	S30Lb	12	116.741	0.925	70.4	1.0466	0.0000	FLOOD RISK
15 minute summer	S30	12	116.547	1.721	218.9	3.0406	0.0000	SURCHARGED
15 minute summer	S31	12	116.373	1.714	225.3	3.0288	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S20L	1.000	S20	77.6	2.802	0.773	0.6873	
15 minute summer	S20	1.001	S22	132.1	1.091	0.556	9.0921	
15 minute summer	S21La	2.000	S21	39.0	2.216	2.145	0.0923	
15 minute summer	S21Lb	3.000	S21	31.2	1.772	1.798	0.0645	
15 minute summer	S21	2.001	S22	88.5	0.868	0.274	5.5092	
15 minute summer	S22Lb	4.000	S22	28.9	1.640	1.601	0.1656	
15 minute summer	S22La	5.000	S22	52.5	2.985	2.964	0.1271	
15 minute summer	S22	1.002	S25	252.0	1.820	0.964	4.8580	
15 minute summer	S23L	6.000	S23	78.7	2.944	0.674	0.3589	
15 minute summer	S23	6.001	S24	98.5	1.675	0.957	2.2303	
15 minute summer	S24L	7.000	S24	26.1	1.562	1.067	0.1379	
15 minute summer	S24	6.002	S25	123.0	1.597	0.566	2.8515	
15 minute summer	S25	1.003	S26	374.0	2.360	1.047	4.1173	
15 minute summer	S26L	8.000	S26	29.5	2.939	0.567	0.0840	
15 minute summer	S26	1.004	S27	412.9	2.606	1.278	5.4568	
15 minute summer	S27L	9.000	S27	41.1	3.218	0.755	0.1719	
15 minute summer	S27	1.005	S28	467.6	2.951	1.119	3.5678	
15 minute summer	S28L	10.000	S28	29.9	2.951	0.556	0.1356	
15 minute summer	S28	1.006	S34	502.5	3.172	1.388	2.4275	
15 minute summer	S29L	11.000	S29	20.2	1.148	1.136	0.1018	
15 minute summer	S29	11.001	S30	38.8	1.205	1.092	0.5646	
15 minute summer	S30La	12.000	S30	115.8	3.282	0.991	0.6096	
15 minute summer	S30Lb	13.000	S30	66.5	2.528	0.569	0.6676	
15 minute summer	S30	11.002	S31	207.7	2.200	1.038	1.8419	
15 minute summer	S31	11.003	S32	216.1	2.008	0.903	4.6527	

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Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 98.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S32L	12	116.440	1.657	72.4	1.8745	0.0000	SURCHARGED
15 minute summer	S32	12	115.871	1.814	288.3	3.2060	0.0000	SURCHARGED
15 minute summer	S33	12	115.515	1.679	294.3	2.9669	0.0000	SURCHARGED
15 minute summer	S34	12	114.788	1.359	810.2	3.4596	0.0000	SURCHARGED
15 minute summer	S35	12	114.257	1.066	828.4	1.8842	0.0000	SURCHARGED
15 minute summer	S36L	11	114.949	1.259	82.9	1.4244	0.0000	SURCHARGED
15 minute summer	S36	12	113.564	1.238	908.9	2.1871	0.0000	SURCHARGED
15 minute summer	S37L	11	115.021	1.031	82.9	1.1666	0.0000	SURCHARGED
15 minute summer	S37	12	114.758	0.985	96.1	1.7412	0.0000	SURCHARGED
15 minute summer	S38L	12	115.076	1.122	39.5	1.2692	0.0000	SURCHARGED
15 minute summer	S38	12	114.575	0.941	134.5	1.6619	0.0000	SURCHARGED
15 minute summer	S39La	12	114.032	0.116	23.0	0.1315	0.0000	OK
15 minute summer	S39Lb	12	114.031	0.263	21.1	0.2974	0.0000	SURCHARGED
15 minute summer	S39	12	113.991	0.774	185.6	1.3680	0.0000	SURCHARGED
15 minute summer	S40	12	112.921	1.278	1129.7	3.2532	0.0000	SURCHARGED
15 minute summer	S41La	11	113.561	0.893	73.7	1.0097	0.0000	SURCHARGED
15 minute summer	S41Lb	10	112.613	0.093	37.5	0.1048	0.0000	OK
15 minute summer	S41	11	111.694	0.592	1259.5	1.5069	0.0000	OK
15 minute summer	S42La	10	112.332	0.152	138.8	0.1723	0.0000	OK
15 minute summer	S42Lb	10	112.144	0.097	67.8	0.1103	0.0000	OK
15 minute summer	S42	11	111.267	0.643	1467.7	1.6353	0.0000	OK
15 minute summer	S43	10	111.235	0.066	13.8	0.0743	0.0000	OK
15 minute summer	S44L	11	111.616	0.749	127.6	1.9064	0.0000	SURCHARGED
15 minute summer	S44	11	111.015	0.860	1615.6	2.1888	0.0000	SURCHARGED
15 minute summer	S45	11	110.679	0.723	1626.2	1.8394	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S32L	14.000	S32	62.9	3.573	1.110	0.0881	
15 minute summer	S32	11.004	S33	281.4	2.552	1.256	1.9463	
15 minute summer	S33	11.005	S34	292.1	2.649	1.460	3.6713	
15 minute summer	S34	1.007	S35	812.5	3.761	1.498	4.1122	
15 minute summer	S35	1.008	S36	832.1	4.550	0.896	5.1185	
15 minute summer	S36L	15.000	S36	76.9	4.371	1.165	0.1281	
15 minute summer	S36	1.009	S40	908.4	4.205	1.024	3.9411	
15 minute summer	S37L	16.000	S37	75.7	1.903	1.175	0.5615	
15 minute summer	S37	16.001	S38	92.3	2.320	1.779	0.2517	
15 minute summer	S38L	17.000	S38	33.7	1.913	1.694	0.2392	
15 minute summer	S38	16.002	S39	128.9	1.893	1.160	2.9370	
15 minute summer	S39La	18.000	S39	22.3	2.823	0.394	0.0885	
15 minute summer	S39Lb	19.000	S39	20.0	2.758	0.353	0.0705	
15 minute summer	S39	16.003	S40	182.1	2.798	0.894	2.6925	
15 minute summer	S40	1.010	S41	1129.7	4.011	1.712	11.8273	
15 minute summer	S41La	20.000	S41	70.9	4.026	1.304	0.1826	
15 minute summer	S41Lb	21.000	S41	37.4	3.278	0.699	0.1044	
15 minute summer	S41	1.011	S42	1265.1	3.529	0.987	17.2063	
15 minute summer	S42La	22.000	S42	138.5	4.853	0.806	0.2729	
15 minute summer	S42Lb	23.000	S42	67.7	4.117	0.391	0.1513	
15 minute summer	S42	1.012	S44	1463.5	3.519	0.915	11.8027	
15 minute summer	S43	24.000	S44	13.7	1.272	0.187	0.6133	
15 minute summer	S44L	25.000	S44	124.4	3.129	1.810	0.4272	
15 minute summer	S44	1.013	S45	1608.0	3.654	1.302	8.7234	
15 minute summer	S45	1.014	S46	1612.1	5.025	1.165	7.6074	

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Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 98.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S46L	11	111.681	1.161	81.6	1.3136	0.0000	SURCHARGED
15 minute summer	S46	12	110.263	0.550	1708.0	1.3995	0.0000	OK
15 minute summer	S47L	11	114.729	0.270	55.9	0.3054	0.0000	SURCHARGED
15 minute summer	S47	11	114.609	0.331	104.2	0.8423	0.0000	SURCHARGED
15 minute summer	S48L	10	114.659	0.139	77.0	0.1570	0.0000	OK
15 minute summer	S48	10	114.306	0.405	196.2	0.4583	0.0000	SURCHARGED
15 minute summer	S49L	11	114.240	0.334	48.7	0.3775	0.0000	SURCHARGED
15 minute summer	S49	11	114.152	0.426	240.7	0.4820	0.0000	SURCHARGED
15 minute summer	S50	10	113.999	0.112	44.7	0.1977	0.0000	OK
15 minute summer	S51	10	113.859	0.131	74.1	0.2317	0.0000	OK
15 minute summer	S52	11	113.840	0.368	323.7	0.6506	0.0000	OK
15 minute summer	S53	11	113.589	0.396	342.1	0.7001	0.0000	OK
15 minute summer	S54L	10	114.196	0.536	65.8	0.6068	0.0000	SURCHARGED
15 minute summer	S54	11	113.276	0.255	458.1	0.4503	0.0000	OK
15 minute summer	S54AL	10	113.030	0.423	52.0	0.4783	0.0000	SURCHARGED
15 minute summer	S54A	10	112.302	0.185	96.5	0.3275	0.0000	OK
15 minute summer	S54B	12	111.937	0.291	568.9	0.5136	0.0000	OK
15 minute summer	S55La	12	112.107	0.603	50.7	0.6816	0.0000	SURCHARGED
15 minute summer	S55Lb	12	112.297	0.619	53.9	0.7002	0.0000	SURCHARGED
15 minute summer	S55	12	111.565	1.361	710.9	2.4043	0.0000	SURCHARGED
15 minute summer	S56L	12	111.229	0.176	57.9	0.1993	0.0000	OK
15 minute summer	S56	12	111.168	1.389	730.3	2.4544	0.0000	SURCHARGED
15 minute summer	S57L	12	111.071	1.052	63.8	1.1893	0.0000	SURCHARGED
15 minute summer	S57	12	110.990	1.497	804.2	2.6448	0.0000	SURCHARGED
15 minute summer	S58L	12	111.154	1.370	52.6	1.5495	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S46L	26.000	S46	77.1	4.382	1.362	0.1287	
15 minute summer	S46	1.015	S60	1695.1	7.292	0.460	5.3843	
15 minute summer	S47L	27.000	S47	55.5	1.515	1.069	0.4229	
15 minute summer	S47	27.001	S48	103.0	1.609	1.036	2.6530	
15 minute summer	S48L	28.000	S48	76.8	2.794	0.708	0.3559	
15 minute summer	S48	27.002	S49	188.8	1.751	0.943	1.9282	
15 minute summer	S49L	29.000	S49	48.8	1.227	1.764	0.4143	
15 minute summer	S49	27.003	S52	240.8	2.184	1.199	1.9218	
15 minute summer	S50	30.000	S51	44.5	1.291	0.138	0.5500	
15 minute summer	S51	30.001	S52	73.6	0.828	0.191	1.5891	
15 minute summer	S52	27.004	S53	325.3	2.267	1.006	3.9956	
15 minute summer	S53	27.005	S54	344.1	3.212	0.887	1.8371	
15 minute summer	S54L	31.000	S54	64.3	3.654	1.425	0.0928	
15 minute summer	S54	27.006	S54B	460.8	4.970	0.635	2.2722	
15 minute summer	S54AL	43.000	S54A	51.1	2.904	1.527	0.0950	
15 minute summer	S54A	43.001	S54B	95.5	1.562	0.366	3.0125	
15 minute summer	S54B	27.007	S55	560.8	3.059	0.363	6.0132	
15 minute summer	S55La	32.000	S55	50.5	3.491	0.931	0.1629	
15 minute summer	S55Lb	33.000	S55	53.6	3.505	0.982	0.1936	
15 minute summer	S55	27.008	S56	659.8	2.860	0.958	11.9595	
15 minute summer	S56L	34.000	S56	57.8	3.759	0.349	0.3288	
15 minute summer	S56	27.009	S57	728.2	2.988	0.812	4.7612	
15 minute summer	S57L	35.000	S57	60.5	2.072	0.825	0.3029	
15 minute summer	S57	27.010	S58	796.6	2.965	1.034	10.6919	
15 minute summer	S58L	36.000	S58	45.2	2.565	1.456	0.1843	

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Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 98.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S58	12	110.524	1.506	857.4	2.6608	0.0000	SURCHARGED
15 minute summer	S59L	12	110.831	1.503	57.9	1.7000	0.0000	SURCHARGED
15 minute summer	S59	12	110.246	1.447	894.9	2.5563	0.0000	SURCHARGED
15 minute summer	S60L	12	110.273	0.106	32.2	0.1198	0.0000	OK
15 minute summer	S60	12	110.021	1.667	2633.6	4.2434	0.0000	SURCHARGED
15 minute summer	S61	12	109.371	1.682	2683.6	4.2816	0.0000	SURCHARGED
15 minute summer	S62	12	109.051	1.635	2725.0	4.1612	0.0000	SURCHARGED
15 minute summer	S63La	12	109.124	1.089	45.4	1.2314	0.0000	SURCHARGED
15 minute summer	S63Lb	11	109.378	1.378	77.6	1.5584	0.0000	SURCHARGED
15 minute summer	S63	12	108.737	1.526	2851.5	3.8832	0.0000	SURCHARGED
15 minute summer	S64L	10	108.465	0.778	123.0	0.8802	0.0000	SURCHARGED
480 minute summer	S64	360	108.260	1.413	541.2	3.5952	0.0000	SURCHARGED
15 minute summer	S65L	11	108.641	0.389	64.5	0.4404	0.0000	FLOOD RISK
480 minute summer	S65	360	108.234	1.400	551.2	3.5622	0.0000	SURCHARGED
960 minute summer	HW11	960	108.186	1.369	657.2	0.0000	0.0000	OK
960 minute summer	HW12	960	108.187	1.370	452.1	0.0000	0.0000	FLOOD RISK
960 minute summer	S66	960	108.187	1.379	148.8	7.8952	0.0000	FLOOD RISK
15 minute summer	hw13	1	106.725	0.000	23.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S58	27.011	S59	849.0	3.063	1.103	4.9451	
15 minute summer	S59L	37.000	S59	50.6	2.874	2.847	0.1388	
15 minute summer	S59	27.012	S60	896.4	3.191	1.163	3.2610	
15 minute summer	S60L	38.000	S60	31.4	3.258	0.554	0.1643	
15 minute summer	S60	1.016	S61	2672.8	4.218	0.947	21.0692	
15 minute summer	S61	1.017	S62	2716.8	4.287	1.219	13.8442	
15 minute summer	S62	1.018	S63	2732.6	4.312	1.225	10.3761	
15 minute summer	S63La	39.000	S63	42.4	2.411	2.394	0.1288	
15 minute summer	S63Lb	40.000	S63	73.7	4.188	4.134	0.0681	
15 minute summer	S63	1.019	S64	2856.4	4.507	1.433	23.1150	
15 minute summer	S64L	41.000	S64	122.9	3.090	1.742	0.3582	
480 minute summer	S64	1.020	S65	537.2	1.055	0.800	7.1426	
15 minute summer	S65L	42.000	S65	61.5	3.613	1.087	0.1175	
480 minute summer	S65	1.021	HW11	549.1	2.053	0.843	9.9179	
960 minute summer	HW11	Flow through pond	HW12	-462.2	0.035	-0.028	3807.7458	
960 minute summer	HW12	1.022	S66	148.8	-0.264	0.229	5.2781	
960 minute summer	S66	Hydro-Brake®	hw13	23.3				1332.0

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Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S20L	0.126	5.00	118.050	Manhole	1200	443726.598	291580.939	1.942
S20	0.097	5.00	117.871	Manhole	1500	443724.514	291563.783	2.627
S21La	0.065	5.00	117.280	Manhole	1200	443770.314	291520.942	1.644
S21Lb	0.051	5.00	117.262	Manhole	1200	443779.109	291519.517	1.646
S21	0.033	5.00	117.286	Manhole	1500	443775.700	291520.069	2.005
S22Lb	0.049	5.00	117.400	Manhole	1200	443772.393	291550.929	2.070
S22La	0.091	5.00	117.490	Manhole	1200	443782.530	291561.498	2.185
S22	0.020	5.00	117.331	Manhole	1500	443781.376	291554.374	2.398
S23L	0.124	5.00	117.642	Manhole	1200	443816.813	291610.966	1.659
S23	0.043	5.00	117.763	Manhole	1200	443824.030	291605.549	2.306
S24L	0.046	5.00	117.800	Manhole	1200	443820.618	291580.704	2.317
S24	0.023	5.00	117.836	Manhole	1200	443816.344	291579.478	2.726
S25	0.025	5.00	117.627	Manhole	1500	443812.026	291549.404	2.895
S26L	0.052	5.00	117.490	Manhole	1200	443835.771	291540.759	2.373
S26	0.031	5.00	117.358	Manhole	1500	443837.046	291545.359	2.943
S27L	0.066	5.00	117.100	Manhole	1200	443865.956	291545.642	1.828
S27	0.053	5.00	116.932	Manhole	1500	443870.449	291536.970	2.862
S28L	0.048	5.00	116.896	Manhole	1200	443866.251	291511.974	2.206
S28	0.021	5.00	116.646	Manhole	1500	443873.473	291514.657	2.951
S29L	0.036	5.00	116.950	Manhole	1200	443778.867	291486.594	1.774
S29	0.030	5.00	116.911	Manhole	1200	443784.225	291488.769	1.868
S30La	0.194	5.00	117.200	Manhole	1200	443775.409	291470.169	1.457
S30Lb	0.107	5.00	116.880	Manhole	1200	443804.951	291482.717	1.064
S30	0.027	5.00	117.074	Manhole	1500	443789.713	291475.676	2.248
S31	0.028	5.00	117.088	Manhole	1500	443796.831	291460.570	2.429
S32L	0.110	5.00	117.485	Manhole	1200	443836.785	291473.804	2.702
S32	0.018	5.00	117.368	Manhole	1500	443835.019	291478.489	3.311
S33	0.025	5.00	117.038	Manhole	1500	443851.486	291484.829	3.202
S34	0.037	5.00	116.415	Manhole	1800	443880.545	291501.065	2.986
S35	0.041	5.00	116.157	Manhole	1500	443896.046	291490.017	2.966
S36L	0.126	5.00	116.035	Manhole	1200	443920.666	291479.743	2.345
S36	0.021	5.00	115.816	Manhole	1500	443919.537	291486.928	3.490
S37L	0.126	5.00	116.270	Manhole	1200	443942.586	291411.897	2.281
S37	0.032	5.00	116.002	Manhole	1500	443956.457	291414.527	2.229
S38L	0.060	5.00	116.000	Manhole	1200	443975.427	291420.600	2.046
S38	0.014	5.00	115.939	Manhole	1500	443962.456	291416.547	2.305
S39La	0.035	5.00	116.060	Manhole	1200	443943.622	291454.130	2.144
S39Lb	0.032	5.00	116.085	Manhole	1200	443952.661	291457.010	2.317
S39	0.032	5.00	116.079	Manhole	1500	443948.799	291455.955	2.862
S40	0.076	5.00	115.528	Manhole	1800	443936.967	291492.313	3.885
S41La	0.112	5.00	115.040	Manhole	1200	443968.311	291516.294	2.372

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Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S41Lb	0.057	5.00	115.044	Manhole	1200	443975.273	291499.962	2.524
S41	0.067	5.00	114.833	Manhole	1800	443972.824	291507.759	3.731
S42La	0.211	5.00	114.136	Manhole	1200	444016.029	291530.797	1.956
S42Lb	0.103	5.00	114.155	Manhole	1200	444020.020	291513.499	2.109
S42	0.042	5.00	113.942	Manhole	1800	444018.565	291521.581	3.318
S43	0.021	5.00	114.031	Manhole	1200	444053.518	291503.522	2.862
S44L	0.194	5.00	113.620	Manhole	1800	444042.718	291537.421	2.753
S44	0.031	5.00	113.380	Manhole	1800	444046.213	291526.845	3.225
S45	0.029	5.00	113.033	Manhole	1800	444065.128	291532.942	3.077
S46L	0.124	5.00	112.900	Manhole	1200	444086.341	291539.566	2.381
S46	0.030	5.00	112.686	Manhole	1800	444080.870	291544.415	2.973
S47L	0.085	5.00	117.070	Manhole	1200	443884.230	291600.704	2.611
S47	0.074	5.00	116.846	Manhole	1800	443894.371	291597.505	2.568
S48L	0.117	5.00	116.240	Manhole	1200	443895.036	291634.825	1.720
S48	0.025	5.00	115.969	Manhole	1200	443905.812	291633.399	2.068
S49L	0.074	5.00	115.795	Manhole	1200	443908.595	291654.145	1.889
S49	0.013	5.00	115.553	Manhole	1200	443916.433	291647.285	1.827
S50	0.068	5.00	115.179	Manhole	1500	443924.387	291692.392	1.292
S51	0.045	5.00	115.200	Manhole	1500	443925.446	291676.490	1.472
S52	0.018	5.00	115.288	Manhole	1500	443929.752	291659.028	1.816
S53	0.027	5.00	115.655	Manhole	1500	443950.409	291640.307	2.462
S54L	0.100	5.00	115.742	Manhole	1200	443967.124	291639.883	2.083
S54	0.080	5.00	115.655	Manhole	1500	443966.632	291634.596	2.634
S54AL	0.079	5.00	113.962	Manhole	1200	443987.797	291682.193	1.355
S54A	0.069	5.00	113.831	Manhole	1500	443993.191	291681.835	1.714
S54B	0.020	5.00	114.791	Manhole	1500	443991.065	291632.693	3.145
S55La	0.077	5.00	114.400	Manhole	1200	444015.384	291638.573	2.896
S55Lb	0.082	5.00	114.400	Manhole	1200	444014.478	291620.844	2.722
S55	0.070	5.00	114.066	Manhole	1500	444019.822	291630.453	3.862
S56L	0.088	5.00	113.400	Manhole	1200	444057.898	291635.750	2.347
S56	0.035	5.00	112.973	Manhole	1500	444062.200	291627.854	3.194
S57L	0.097	5.00	112.800	Manhole	1200	444083.653	291622.557	2.781
S57	0.035	5.00	112.566	Manhole	1500	444076.774	291619.291	3.073
S58L	0.080	5.00	112.110	Manhole	1200	444081.447	291584.691	2.326
S58	0.035	5.00	111.935	Manhole	1500	444091.916	291584.485	2.917
S59L	0.088	5.00	112.400	Manhole	1200	444099.362	291565.725	3.072
S59			112.248	Manhole	1500	444091.570	291566.932	3.449
S60L	0.049	5.00	112.600	Manhole	1200	444078.895	291560.325	2.433
S60	0.034	5.00	112.440	Manhole	1800	444088.501	291555.769	4.086
S61	0.021	5.00	111.587	Manhole	1800	444119.267	291543.174	3.898
S62	0.016	5.00	111.074	Manhole	1800	444140.948	291540.513	3.658
S63La	0.069	5.00	110.756	Manhole	1200	444153.628	291549.997	2.721
S63Lb	0.118	5.00	110.670	Manhole	1200	444158.283	291539.860	2.670
S63	0.027	5.00	110.556	Manhole	1800	444157.041	291543.522	3.345
S64L	0.187	5.00	109.400	Manhole	1200	444183.206	291567.153	1.713
S64	0.014	5.00	109.193	Manhole	1800	444189.306	291560.527	2.346
S65L	0.098	5.00	108.900	Manhole	1200	444198.591	291557.594	0.648
S65	0.041	5.00	108.753	Manhole	1800	444199.987	291564.120	1.919
HW11			108.259	Manhole		444200.122	291579.769	1.442
HW12		5.00	108.259	Manhole		444214.527	291601.442	1.442
S66			108.300	Manhole	2700	444222.278	291604.489	1.492
hw13			107.769	Manhole		444234.306	291611.790	1.044

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Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S20L	S20	17.282	0.600	116.108	115.469	0.639	27.0	225	5.11	50.0
1.001	S20	S22	57.384	0.600	115.244	114.933	0.311	184.5	450	5.75	50.0
2.000	S21La	S21	5.244	0.600	115.636	115.581	0.055	95.3	150	5.08	50.0
3.000	S21Lb	S21	3.665	0.600	115.616	115.581	0.035	104.7	150	5.06	50.0
2.001	S21	S22	34.771	0.600	115.281	114.933	0.348	99.9	450	5.37	50.0
4.000	S22Lb	S22	9.405	0.600	115.330	115.233	0.097	97.0	150	5.15	50.0
5.000	S22La	S22	7.221	0.600	115.305	115.233	0.072	100.3	150	5.12	50.0
1.002	S22	S25	30.661	0.600	114.933	114.732	0.201	152.5	450	6.07	50.0
6.000	S23L	S23	9.024	0.600	115.983	115.532	0.451	20.0	225	5.05	50.0
6.001	S23	S24	31.671	0.600	115.457	115.185	0.272	116.4	300	5.41	50.0
7.000	S24L	S24	7.833	0.600	115.483	115.335	0.148	52.9	150	5.09	50.0
6.002	S24	S25	25.853	0.600	115.110	114.806	0.304	85.0	375	5.63	50.0
1.003	S25	S26	25.986	0.600	114.732	114.415	0.317	82.0	450	6.26	49.4
8.000	S26L	S26	4.774	0.600	115.117	114.715	0.402	11.9	150	5.03	50.0
1.004	S26	S27	34.440	0.600	114.415	114.071	0.344	100.1	450	6.54	48.3
9.000	S27L	S27	9.766	0.600	115.272	114.370	0.902	10.8	150	5.05	50.0
1.005	S27	S28	22.518	0.600	114.070	113.695	0.375	60.0	450	6.68	47.8
10.000	S28L	S28	7.704	0.600	114.690	113.995	0.695	11.1	150	5.04	50.0
1.006	S28	S34	15.321	0.600	113.695	113.503	0.192	79.8	450	6.80	47.4
11.000	S29L	S29	5.783	0.600	115.176	115.118	0.058	99.7	150	5.10	50.0
11.001	S29	S30	14.197	0.600	115.043	114.976	0.067	211.9	225	5.36	50.0
12.000	S30La	S30	15.328	0.600	115.743	114.977	0.766	20.0	225	5.09	50.0
13.000	S30Lb	S30	16.786	0.600	115.816	114.977	0.839	20.0	225	5.10	50.0
11.002	S30	S31	16.699	0.600	114.826	114.659	0.167	100.0	375	5.51	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	S20L	S20	2.525	100.4	17.1	1.717	2.177	1.717	2.177	0.126	0.0
1.001	S20	S22	1.493	237.5	30.2	2.177	1.948	1.948	2.177	0.223	0.0
2.000	S21La	S21	1.029	18.2	8.8	1.494	1.555	1.494	1.555	0.065	0.0
3.000	S21Lb	S21	0.981	17.3	6.9	1.496	1.555	1.496	1.555	0.051	0.0
2.001	S21	S22	2.034	323.4	20.2	1.555	1.948	1.555	1.948	0.149	0.0
4.000	S22Lb	S22	1.020	18.0	6.6	1.920	1.948	1.920	1.948	0.049	0.0
5.000	S22La	S22	1.003	17.7	12.3	2.035	1.948	1.948	2.035	0.091	0.0
1.002	S22	S25	1.643	261.4	72.1	1.948	2.445	1.948	2.445	0.532	0.0
6.000	S23L	S23	2.938	116.8	16.8	1.434	2.006	1.434	2.006	0.124	0.0
6.001	S23	S24	1.456	102.9	22.6	2.006	2.351	2.006	2.351	0.167	0.0
7.000	S24L	S24	1.386	24.5	6.2	2.167	2.351	2.167	2.351	0.046	0.0
6.002	S24	S25	1.965	217.1	32.0	2.351	2.446	2.351	2.446	0.236	0.0
1.003	S25	S26	2.246	357.3	106.1	2.445	2.493	2.445	2.493	0.793	0.0
8.000	S26L	S26	2.939	51.9	7.0	2.223	2.493	2.223	2.493	0.052	0.0
1.004	S26	S27	2.032	323.1	114.7	2.493	2.411	2.411	2.493	0.876	0.0
9.000	S27L	S27	3.079	54.4	8.9	1.678	2.412	1.678	2.412	0.066	0.0
1.005	S27	S28	2.627	417.8	129.0	2.412	2.501	2.412	2.501	0.995	0.0
10.000	S28L	S28	3.043	53.8	6.5	2.056	2.501	2.056	2.501	0.048	0.0
1.006	S28	S34	2.277	362.2	136.8	2.501	2.462	2.462	2.501	1.064	0.0
11.000	S29L	S29	1.006	17.8	4.9	1.624	1.643	1.624	1.643	0.036	0.0
11.001	S29	S30	0.894	35.6	8.9	1.643	1.873	1.643	1.873	0.066	0.0
12.000	S30La	S30	2.938	116.8	26.3	1.232	1.872	1.232	1.872	0.194	0.0
13.000	S30Lb	S30	2.938	116.8	14.5	0.839	1.872	0.839	1.872	0.107	0.0
11.002	S30	S31	1.812	200.1	53.4	1.873	2.054	1.873	2.054	0.394	0.0

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Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
11.003	S31	S32	42.183	0.600	114.659	114.057	0.602	70.1	375	5.84	50.0
14.000	S32L	S32	5.007	0.600	114.783	114.282	0.501	10.0	150	5.03	50.0
11.004	S32	S33	17.646	0.600	114.057	113.836	0.221	79.8	375	5.98	50.0
11.005	S33	S34	33.286	0.600	113.836	113.503	0.333	100.0	375	6.29	49.2
1.007	S34	S35	19.035	0.600	113.429	113.191	0.238	80.0	525	6.92	47.0
1.008	S35	S36	23.693	0.600	113.191	112.326	0.865	27.4	525	7.01	46.7
15.000	S36L	S36	7.274	0.600	113.690	112.701	0.989	7.4	150	5.03	50.0
1.009	S36	S40	18.243	0.600	112.326	111.718	0.608	30.0	525	7.09	46.4
16.000	S37L	S37	14.118	0.600	113.989	113.773	0.216	65.4	225	5.15	50.0
16.001	S37	S38	6.329	0.600	113.773	113.710	0.063	100.5	225	5.23	50.0
17.000	S38L	S38	13.590	0.600	113.954	113.784	0.170	79.9	150	5.20	50.0
16.002	S38	S39	41.708	0.600	113.634	113.217	0.417	100.0	300	5.67	50.0
18.000	S39La	S39	5.490	0.600	113.916	113.367	0.549	10.0	150	5.03	50.0
19.000	S39Lb	S39	4.003	0.600	113.768	113.368	0.400	10.0	150	5.02	50.0
16.003	S39	S40	38.235	0.600	113.217	111.942	1.275	30.0	300	5.89	50.0
1.010	S40	S41	42.418	0.600	111.643	111.253	0.390	108.8	600	7.39	45.5
20.000	S41La	S41	10.478	0.600	112.668	111.702	0.966	10.8	150	5.06	50.0
21.000	S41Lb	S41	9.155	0.600	112.520	111.703	0.817	11.2	150	5.05	50.0
1.011	S41	S42	44.432	0.600	111.102	110.624	0.478	93.0	750	7.65	44.7
22.000	S42La	S42	9.559	0.600	112.180	111.149	1.031	9.3	225	5.04	50.0
23.000	S42Lb	S42	8.212	0.600	112.046	111.149	0.897	9.2	225	5.03	50.0
1.012	S42	S44	28.044	0.600	110.624	110.155	0.469	59.8	750	7.78	44.3
24.000	S43	S44	24.836	0.600	111.169	110.680	0.489	50.8	225	5.23	50.0
25.000	S44L	S44	10.741	0.600	110.867	110.680	0.187	57.4	225	5.10	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
11.003	S31	S32	2.167	239.3	57.2	2.054	2.936	2.054	2.936	0.422	0.0
14.000	S32L	S32	3.205	56.6	14.9	2.552	2.936	2.552	2.936	0.110	0.0
11.004	S32	S33	2.029	224.1	74.5	2.936	2.827	2.827	2.936	0.550	0.0
11.005	S33	S34	1.812	200.1	76.8	2.827	2.537	2.537	2.827	0.575	0.0
1.007	S34	S35	2.506	542.4	213.5	2.461	2.441	2.441	2.461	1.676	0.0
1.008	S35	S36	4.291	928.9	217.3	2.441	2.965	2.441	2.965	1.717	0.0
15.000	S36L	S36	3.739	66.1	17.1	2.195	2.965	2.195	2.965	0.126	0.0
1.009	S36	S40	4.099	887.4	234.6	2.965	3.285	2.965	3.285	1.864	0.0
16.000	S37L	S37	1.620	64.4	17.1	2.056	2.004	2.004	2.056	0.126	0.0
16.001	S37	S38	1.304	51.9	21.4	2.004	2.004	2.004	2.004	0.158	0.0
17.000	S38L	S38	1.125	19.9	8.1	1.896	2.005	1.896	2.005	0.060	0.0
16.002	S38	S39	1.572	111.1	31.4	2.005	2.562	2.005	2.562	0.232	0.0
18.000	S39La	S39	3.204	56.6	4.7	1.994	2.562	1.994	2.562	0.035	0.0
19.000	S39Lb	S39	3.203	56.6	4.3	2.167	2.561	2.167	2.561	0.032	0.0
16.003	S39	S40	2.881	203.7	44.9	2.562	3.286	2.562	3.286	0.331	0.0
1.010	S40	S41	2.334	660.0	279.9	3.285	2.980	2.980	3.285	2.271	0.0
20.000	S41La	S41	3.076	54.4	15.2	2.222	2.981	2.222	2.981	0.112	0.0
21.000	S41Lb	S41	3.026	53.5	7.7	2.374	2.980	2.374	2.980	0.057	0.0
1.011	S41	S42	2.903	1282.4	303.7	2.981	2.568	2.568	2.981	2.507	0.0
22.000	S42La	S42	4.322	171.9	28.6	1.731	2.568	1.731	2.568	0.211	0.0
23.000	S42Lb	S42	4.350	173.0	14.0	1.884	2.568	1.884	2.568	0.103	0.0
1.012	S42	S44	3.622	1600.3	343.8	2.568	2.475	2.475	2.568	2.863	0.0
24.000	S43	S44	1.839	73.1	2.8	2.637	2.475	2.475	2.637	0.021	0.0
25.000	S44L	S44	1.729	68.7	26.3	2.528	2.475	2.475	2.528	0.194	0.0

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Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.013	S44	S45	19.933	0.600	110.155	109.956	0.199	100.2	750	7.89	44.0
1.014	S45	S46	19.479	0.600	109.957	109.713	0.244	79.8	750	8.00	43.7
26.000	S46L	S46	7.311	0.600	110.519	109.788	0.731	10.0	150	5.04	50.0
1.015	S46	S60	13.680	0.600	109.713	108.504	1.209	11.3	750	8.03	43.6
27.000	S47L	S47	10.634	0.600	114.459	114.353	0.106	100.3	225	5.14	50.0
27.001	S47	S48	37.674	0.600	114.278	113.976	0.302	124.7	300	5.58	50.0
28.000	S48L	S48	10.870	0.600	114.520	114.051	0.469	23.2	225	5.07	50.0
27.002	S48	S49	17.482	0.600	113.901	113.726	0.175	99.9	375	5.74	50.0
29.000	S49L	S49	10.416	0.600	113.906	113.876	0.030	347.2	225	5.25	50.0
27.003	S49	S52	17.756	0.600	113.726	113.547	0.179	99.2	375	5.91	50.0
30.000	S50	S51	15.937	0.600	113.887	113.728	0.159	100.2	450	5.13	50.0
30.001	S51	S52	17.986	0.600	113.728	113.472	0.256	70.3	450	5.25	50.0
27.004	S52	S53	27.878	0.600	113.472	113.193	0.279	99.9	450	6.13	49.8
27.005	S53	S54	17.199	0.600	113.268	113.021	0.247	69.6	450	6.25	49.4
31.000	S54L	S54	5.310	0.600	113.659	113.321	0.338	15.7	150	5.03	50.0
27.006	S54	S54B	24.507	0.600	113.021	111.796	1.225	20.0	450	6.34	49.1
43.000	S54AL	S54A	5.406	0.600	112.607	112.417	0.190	28.5	150	5.05	50.0
43.001	S54A	S54B	49.188	0.600	112.117	111.796	0.321	153.2	450	5.55	50.0
27.007	S54B	S55	28.844	0.600	111.646	110.204	1.442	20.0	600	6.43	48.7
32.000	S55La	S55	9.253	0.600	111.504	110.654	0.850	10.9	150	5.05	50.0
33.000	S55Lb	S55	10.996	0.600	111.678	110.654	1.024	10.7	150	5.06	50.0
27.008	S55	S56	42.458	0.600	110.204	109.779	0.425	99.9	600	6.72	47.7
34.000	S56L	S56	8.992	0.600	111.053	110.154	0.899	10.0	225	5.04	50.0
27.009	S56	S57	16.903	0.600	109.779	109.493	0.286	59.1	600	6.81	47.4

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.013	S44	S45	2.796	1235.2	370.4	2.475	2.327	2.327	2.475	3.109	0.0
1.014	S45	S46	3.133	1384.2	371.4	2.326	2.223	2.223	2.326	3.138	0.0
26.000	S46L	S46	3.204	56.6	16.8	2.231	2.748	2.231	2.748	0.124	0.0
1.015	S46	S60	8.344	3686.5	388.9	2.223	3.186	2.223	3.186	3.292	0.0
27.000	S47L	S47	1.305	51.9	11.5	2.386	2.268	2.268	2.386	0.085	0.0
27.001	S47	S48	1.406	99.4	21.5	2.268	1.693	1.693	2.268	0.159	0.0
28.000	S48L	S48	2.729	108.5	15.9	1.495	1.693	1.495	1.693	0.117	0.0
27.002	S48	S49	1.812	200.2	40.8	1.693	1.452	1.452	1.693	0.301	0.0
29.000	S49L	S49	0.696	27.7	10.0	1.664	1.452	1.452	1.664	0.074	0.0
27.003	S49	S52	1.819	200.9	52.6	1.452	1.366	1.366	1.452	0.388	0.0
30.000	S50	S51	2.030	322.9	9.2	0.842	1.022	0.842	1.022	0.068	0.0
30.001	S51	S52	2.428	386.1	15.3	1.022	1.366	1.022	1.366	0.113	0.0
27.004	S52	S53	2.034	323.4	70.1	1.366	2.012	1.366	2.012	0.519	0.0
27.005	S53	S54	2.439	387.8	73.1	1.937	2.184	1.937	2.184	0.546	0.0
31.000	S54L	S54	2.554	45.1	13.6	1.933	2.184	1.933	2.184	0.100	0.0
27.006	S54	S54B	4.561	725.4	96.5	2.184	2.545	2.184	2.545	0.726	0.0
43.000	S54AL	S54A	1.894	33.5	10.7	1.205	1.264	1.205	1.264	0.079	0.0
43.001	S54A	S54B	1.640	260.8	20.1	1.264	2.545	1.264	2.545	0.148	0.0
27.007	S54B	S55	5.460	1543.9	118.1	2.545	3.262	2.545	3.262	0.894	0.0
32.000	S55La	S55	3.071	54.3	10.4	2.746	3.262	2.746	3.262	0.077	0.0
33.000	S55Lb	S55	3.092	54.6	11.1	2.572	3.262	2.572	3.262	0.082	0.0
27.008	S55	S56	2.436	688.8	145.2	3.262	2.594	2.594	3.262	1.123	0.0
34.000	S56L	S56	4.161	165.4	11.9	2.122	2.594	2.122	2.594	0.088	0.0
27.009	S56	S57	3.171	896.6	160.0	2.594	2.473	2.473	2.594	1.246	0.0

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
35.000	S57L	S57	7.615	0.600	110.019	109.868	0.151	50.4	225	5.07	50.0
27.010	S57	S58	37.958	0.600	109.493	109.018	0.475	79.9	600	7.04	46.6
36.000	S58L	S58	10.471	0.600	109.784	109.468	0.316	33.1	150	5.10	50.0
27.011	S58	S59	17.556	0.600	109.018	108.799	0.219	80.2	600	7.15	46.2
37.000	S59L	S59	7.885	0.600	109.328	109.249	0.079	99.8	150	5.13	50.0
27.012	S59	S60	11.577	0.600	108.799	108.654	0.145	79.8	600	7.22	46.0
38.000	S60L	S60	10.632	0.600	110.167	109.104	1.063	10.0	150	5.06	50.0
1.016	S60	S61	33.244	0.600	108.354	107.689	0.665	50.0	900	8.15	43.2
1.017	S61	S62	21.844	0.600	107.689	107.416	0.273	80.0	900	8.25	42.9
1.018	S62	S63	16.372	0.600	107.416	107.211	0.205	79.9	900	8.33	42.7
39.000	S63La	S63	7.319	0.600	108.035	107.962	0.073	100.3	150	5.12	50.0
40.000	S63Lb	S63	3.867	0.600	108.000	107.961	0.039	99.2	150	5.06	50.0
1.019	S63	S64	36.472	0.600	107.212	106.847	0.365	99.9	900	8.53	42.2
41.000	S64L	S64	9.006	0.600	107.687	107.522	0.165	54.6	225	5.08	50.0
1.020	S64	S65	11.270	0.600	106.847	106.834	0.013	866.9	900	8.70	41.7
42.000	S65L	S65	6.674	0.600	108.252	107.585	0.667	10.0	150	5.03	50.0
1.021	S65	HW11	15.649	0.600	106.834	106.817	0.017	920.5	900	8.96	41.1
1.022	HW12	S66	8.328	0.600	106.817	106.808	0.009	925.3	900	5.14	50.0
1.023	S66	hw13	14.071	0.600	106.808	106.725	0.083	169.5	900	5.23	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
35.000	S57L	S57	1.846	73.4	13.1	2.556	2.473	2.473	2.556	0.097	0.0
27.010	S57	S58	2.725	770.6	174.1	2.473	2.317	2.317	2.473	1.378	0.0
36.000	S58L	S58	1.754	31.0	10.8	2.176	2.317	2.176	2.317	0.080	0.0
27.011	S58	S59	2.721	769.4	187.2	2.317	2.849	2.317	2.849	1.493	0.0
37.000	S59L	S59	1.006	17.8	11.9	2.922	2.849	2.849	2.922	0.088	0.0
27.012	S59	S60	2.727	770.9	197.2	2.849	3.186	2.849	3.186	1.581	0.0
38.000	S60L	S60	3.204	56.6	6.6	2.283	3.186	2.283	3.186	0.049	0.0
1.016	S60	S61	4.437	2822.4	580.7	3.186	2.998	2.998	3.186	4.956	0.0
1.017	S61	S62	3.504	2229.2	579.3	2.998	2.758	2.758	2.998	4.977	0.0
1.018	S62	S63	3.507	2231.3	578.3	2.758	2.445	2.445	2.758	4.993	0.0
39.000	S63La	S63	1.003	17.7	9.4	2.571	2.444	2.444	2.571	0.069	0.0
40.000	S63Lb	S63	1.009	17.8	16.0	2.520	2.445	2.445	2.520	0.118	0.0
1.019	S63	S64	3.134	1993.9	595.8	2.444	1.446	1.446	2.444	5.207	0.0
41.000	S64L	S64	1.774	70.5	25.3	1.488	1.446	1.446	1.488	0.187	0.0
1.020	S64	S65	1.056	671.6	612.0	1.446	1.019	1.019	1.446	5.408	0.0
42.000	S65L	S65	3.203	56.6	13.3	0.498	1.018	0.498	1.018	0.098	0.0
1.021	S65	HW11	1.024	651.6	618.3	1.019	0.542	0.542	1.019	5.547	0.0
1.022	HW12	S66	1.022	649.9	0.0	0.542	0.592	0.542	0.592	0.000	0.0
1.023	S66	hw13	2.403	1528.9	0.0	0.592	0.144	0.144	0.592	0.000	0.0

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	17.282	27.0	225	118.050	116.108	1.717	117.871	115.469	2.177
1.001	57.384	184.5	450	117.871	115.244	2.177	117.331	114.933	1.948
2.000	5.244	95.3	150	117.280	115.636	1.494	117.286	115.581	1.555
3.000	3.665	104.7	150	117.262	115.616	1.496	117.286	115.581	1.555
2.001	34.771	99.9	450	117.286	115.281	1.555	117.331	114.933	1.948
4.000	9.405	97.0	150	117.400	115.330	1.920	117.331	115.233	1.948
5.000	7.221	100.3	150	117.490	115.305	2.035	117.331	115.233	1.948
1.002	30.661	152.5	450	117.331	114.933	1.948	117.627	114.732	2.445
6.000	9.024	20.0	225	117.642	115.983	1.434	117.763	115.532	2.006
6.001	31.671	116.4	300	117.763	115.457	2.006	117.836	115.185	2.351
7.000	7.833	52.9	150	117.800	115.483	2.167	117.836	115.335	2.351
6.002	25.853	85.0	375	117.836	115.110	2.351	117.627	114.806	2.446
1.003	25.986	82.0	450	117.627	114.732	2.445	117.358	114.415	2.493
8.000	4.774	11.9	150	117.490	115.117	2.223	117.358	114.715	2.493
1.004	34.440	100.1	450	117.358	114.415	2.493	116.932	114.071	2.411
9.000	9.766	10.8	150	117.100	115.272	1.678	116.932	114.370	2.412
1.005	22.518	60.0	450	116.932	114.070	2.412	116.646	113.695	2.501
10.000	7.704	11.1	150	116.896	114.690	2.056	116.646	113.995	2.501
1.006	15.321	79.8	450	116.646	113.695	2.501	116.415	113.503	2.462
11.000	5.783	99.7	150	116.950	115.176	1.624	116.911	115.118	1.643
11.001	14.197	211.9	225	116.911	115.043	1.643	117.074	114.976	1.873
12.000	15.328	20.0	225	117.200	115.743	1.232	117.074	114.977	1.872
13.000	16.786	20.0	225	116.880	115.816	0.839	117.074	114.977	1.872
11.002	16.699	100.0	375	117.074	114.826	1.873	117.088	114.659	2.054
11.003	42.183	70.1	375	117.088	114.659	2.054	117.368	114.057	2.936

Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
1.000	S20L	1200	Manhole	S20	1500	1
1.001	S20	1500	Manhole	S22	1500	1
2.000	S21La	1200	Manhole	S21	1500	1
3.000	S21Lb	1200	Manhole	S21	1500	1
2.001	S21	1500	Manhole	S22	1500	1
4.000	S22Lb	1200	Manhole	S22	1500	1
5.000	S22La	1200	Manhole	S22	1500	1
1.002	S22	1500	Manhole	S25	1500	1
6.000	S23L	1200	Manhole	S23	1200	1
6.001	S23	1200	Manhole	S24	1200	1
7.000	S24L	1200	Manhole	S24	1200	1
6.002	S24	1200	Manhole	S25	1500	1
1.003	S25	1500	Manhole	S26	1500	1
8.000	S26L	1200	Manhole	S26	1500	1
1.004	S26	1500	Manhole	S27	1500	1
9.000	S27L	1200	Manhole	S27	1500	1
1.005	S27	1500	Manhole	S28	1500	1
10.000	S28L	1200	Manhole	S28	1500	1
1.006	S28	1500	Manhole	S34	1800	1
11.000	S29L	1200	Manhole	S29	1200	1
11.001	S29	1200	Manhole	S30	1500	1
12.000	S30La	1200	Manhole	S30	1500	1
13.000	S30Lb	1200	Manhole	S30	1500	1
11.002	S30	1500	Manhole	S31	1500	1
11.003	S31	1500	Manhole	S32	1500	1

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
14.000	5.007	10.0	150	117.485	114.783	2.552	117.368	114.282	2.936
11.004	17.646	79.8	375	117.368	114.057	2.936	117.038	113.836	2.827
11.005	33.286	100.0	375	117.038	113.836	2.827	116.415	113.503	2.537
1.007	19.035	80.0	525	116.415	113.429	2.461	116.157	113.191	2.441
1.008	23.693	27.4	525	116.157	113.191	2.441	115.816	112.326	2.965
15.000	7.274	7.4	150	116.035	113.690	2.195	115.816	112.701	2.965
1.009	18.243	30.0	525	115.816	112.326	2.965	115.528	111.718	3.285
16.000	14.118	65.4	225	116.270	113.989	2.056	116.002	113.773	2.004
16.001	6.329	100.5	225	116.002	113.773	2.004	115.939	113.710	2.004
17.000	13.590	79.9	150	116.000	113.954	1.896	115.939	113.784	2.005
16.002	41.708	100.0	300	115.939	113.634	2.005	116.079	113.217	2.562
18.000	5.490	10.0	150	116.060	113.916	1.994	116.079	113.367	2.562
19.000	4.003	10.0	150	116.085	113.768	2.167	116.079	113.368	2.561
16.003	38.235	30.0	300	116.079	113.217	2.562	115.528	111.942	3.286
1.010	42.418	108.8	600	115.528	111.643	3.285	114.833	111.253	2.980
20.000	10.478	10.8	150	115.040	112.668	2.222	114.833	111.702	2.981
21.000	9.155	11.2	150	115.044	112.520	2.374	114.833	111.703	2.980
1.011	44.432	93.0	750	114.833	111.102	2.981	113.942	110.624	2.568
22.000	9.559	9.3	225	114.136	112.180	1.731	113.942	111.149	2.568
23.000	8.212	9.2	225	114.155	112.046	1.884	113.942	111.149	2.568
1.012	28.044	59.8	750	113.942	110.624	2.568	113.380	110.155	2.475
24.000	24.836	50.8	225	114.031	111.169	2.637	113.380	110.680	2.475
25.000	10.741	57.4	225	113.620	110.867	2.528	113.380	110.680	2.475
1.013	19.933	100.2	750	113.380	110.155	2.475	113.033	109.956	2.327
1.014	19.479	79.8	750	113.033	109.957	2.326	112.686	109.713	2.223

Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
14.000	S32L	1200	Manhole	S32	1500	1
11.004	S32	1500	Manhole	S33	1500	1
11.005	S33	1500	Manhole	S34	1800	1
1.007	S34	1800	Manhole	S35	1500	1
1.008	S35	1500	Manhole	S36	1500	1
15.000	S36L	1200	Manhole	S36	1500	1
1.009	S36	1500	Manhole	S40	1800	1
16.000	S37L	1200	Manhole	S37	1500	1
16.001	S37	1500	Manhole	S38	1500	1
17.000	S38L	1200	Manhole	S38	1500	1
16.002	S38	1500	Manhole	S39	1500	1
18.000	S39La	1200	Manhole	S39	1500	1
19.000	S39Lb	1200	Manhole	S39	1500	1
16.003	S39	1500	Manhole	S40	1800	1
1.010	S40	1800	Manhole	S41	1800	1
20.000	S41La	1200	Manhole	S41	1800	1
21.000	S41Lb	1200	Manhole	S41	1800	1
1.011	S41	1800	Manhole	S42	1800	1
22.000	S42La	1200	Manhole	S42	1800	1
23.000	S42Lb	1200	Manhole	S42	1800	1
1.012	S42	1800	Manhole	S44	1800	1
24.000	S43	1200	Manhole	S44	1800	1
25.000	S44L	1800	Manhole	S44	1800	1
1.013	S44	1800	Manhole	S45	1800	1
1.014	S45	1800	Manhole	S46	1800	1

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
26.000	7.311	10.0	150	112.900	110.519	2.231	112.686	109.788	2.748
1.015	13.680	11.3	750	112.686	109.713	2.223	112.440	108.504	3.186
27.000	10.634	100.3	225	117.070	114.459	2.386	116.846	114.353	2.268
27.001	37.674	124.7	300	116.846	114.278	2.268	115.969	113.976	1.693
28.000	10.870	23.2	225	116.240	114.520	1.495	115.969	114.051	1.693
27.002	17.482	99.9	375	115.969	113.901	1.693	115.553	113.726	1.452
29.000	10.416	347.2	225	115.795	113.906	1.664	115.553	113.876	1.452
27.003	17.756	99.2	375	115.553	113.726	1.452	115.288	113.547	1.366
30.000	15.937	100.2	450	115.179	113.887	0.842	115.200	113.728	1.022
30.001	17.986	70.3	450	115.200	113.728	1.022	115.288	113.472	1.366
27.004	27.878	99.9	450	115.288	113.472	1.366	115.655	113.193	2.012
27.005	17.199	69.6	450	115.655	113.268	1.937	115.655	113.021	2.184
31.000	5.310	15.7	150	115.742	113.659	1.933	115.655	113.321	2.184
27.006	24.507	20.0	450	115.655	113.021	2.184	114.791	111.796	2.545
43.000	5.406	28.5	150	113.962	112.607	1.205	113.831	112.417	1.264
43.001	49.188	153.2	450	113.831	112.117	1.264	114.791	111.796	2.545
27.007	28.844	20.0	600	114.791	111.646	2.545	114.066	110.204	3.262
32.000	9.253	10.9	150	114.400	111.504	2.746	114.066	110.654	3.262
33.000	10.996	10.7	150	114.400	111.678	2.572	114.066	110.654	3.262
27.008	42.458	99.9	600	114.066	110.204	3.262	112.973	109.779	2.594
34.000	8.992	10.0	225	113.400	111.053	2.122	112.973	110.154	2.594
27.009	16.903	59.1	600	112.973	109.779	2.594	112.566	109.493	2.473
35.000	7.615	50.4	225	112.800	110.019	2.556	112.566	109.868	2.473
27.010	37.958	79.9	600	112.566	109.493	2.473	111.935	109.018	2.317
36.000	10.471	33.1	150	112.110	109.784	2.176	111.935	109.468	2.317

Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
26.000	S46L	1200	Manhole	S46	1800	1
1.015	S46	1800	Manhole	S60	1800	1
27.000	S47L	1200	Manhole	S47	1800	1
27.001	S47	1800	Manhole	S48	1200	1
28.000	S48L	1200	Manhole	S48	1200	1
27.002	S48	1200	Manhole	S49	1200	1
29.000	S49L	1200	Manhole	S49	1200	1
27.003	S49	1200	Manhole	S52	1500	1
30.000	S50	1500	Manhole	S51	1500	1
30.001	S51	1500	Manhole	S52	1500	1
27.004	S52	1500	Manhole	S53	1500	1
27.005	S53	1500	Manhole	S54	1500	1
31.000	S54L	1200	Manhole	S54	1500	1
27.006	S54	1500	Manhole	S54B	1500	1
43.000	S54AL	1200	Manhole	S54A	1500	1
43.001	S54A	1500	Manhole	S54B	1500	1
27.007	S54B	1500	Manhole	S55	1500	1
32.000	S55La	1200	Manhole	S55	1500	1
33.000	S55Lb	1200	Manhole	S55	1500	1
27.008	S55	1500	Manhole	S56	1500	1
34.000	S56L	1200	Manhole	S56	1500	1
27.009	S56	1500	Manhole	S57	1500	1
35.000	S57L	1200	Manhole	S57	1500	1
27.010	S57	1500	Manhole	S58	1500	1
36.000	S58L	1200	Manhole	S58	1500	1

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
27.011	17.556	80.2	600	111.935	109.018	2.317	112.248	108.799	2.849
37.000	7.885	99.8	150	112.400	109.328	2.922	112.248	109.249	2.849
27.012	11.577	79.8	600	112.248	108.799	2.849	112.440	108.654	3.186
38.000	10.632	10.0	150	112.600	110.167	2.283	112.440	109.104	3.186
1.016	33.244	50.0	900	112.440	108.354	3.186	111.587	107.689	2.998
1.017	21.844	80.0	900	111.587	107.689	2.998	111.074	107.416	2.758
1.018	16.372	79.9	900	111.074	107.416	2.758	110.556	107.211	2.445
39.000	7.319	100.3	150	110.756	108.035	2.571	110.556	107.962	2.444
40.000	3.867	99.2	150	110.670	108.000	2.520	110.556	107.961	2.445
1.019	36.472	99.9	900	110.556	107.212	2.444	109.193	106.847	1.446
41.000	9.006	54.6	225	109.400	107.687	1.488	109.193	107.522	1.446
1.020	11.270	866.9	900	109.193	106.847	1.446	108.753	106.834	1.019
42.000	6.674	10.0	150	108.900	108.252	0.498	108.753	107.585	1.018
1.021	15.649	920.5	900	108.753	106.834	1.019	108.259	106.817	0.542
1.022	8.328	925.3	900	108.259	106.817	0.542	108.300	106.808	0.592
1.023	14.071	169.5	900	108.300	106.808	0.592	107.769	106.725	0.144

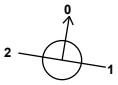
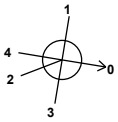
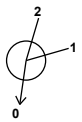
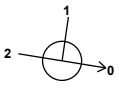
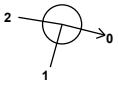
Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
27.011	S58	1500	Manhole	S59	1500	1
37.000	S59L	1200	Manhole	S59	1500	1
27.012	S59	1500	Manhole	S60	1800	1
38.000	S60L	1200	Manhole	S60	1800	1
1.016	S60	1800	Manhole	S61	1800	1
1.017	S61	1800	Manhole	S62	1800	1
1.018	S62	1800	Manhole	S63	1800	1
39.000	S63La	1200	Manhole	S63	1800	1
40.000	S63Lb	1200	Manhole	S63	1800	1
1.019	S63	1800	Manhole	S64	1800	1
41.000	S64L	1200	Manhole	S64	1800	1
1.020	S64	1800	Manhole	S65	1800	1
42.000	S65L	1200	Manhole	S65	1800	1
1.021	S65	1800	Manhole	HW11		1
1.022	HW12		Manhole	S66	2700	1
1.023	S66	2700	Manhole	hw13		1

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections		Link	IL (m)	Dia (mm)
S20L	443726.598	291580.939	118.050	1.942	1200	Manhole		0	1.000	116.108	225
S20	443724.514	291563.783	117.871	2.627	1500	Manhole		1	1.000	115.469	225
								0	1.001	115.244	450
S21La	443770.314	291520.942	117.280	1.644	1200	Manhole		0	2.000	115.636	150

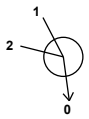
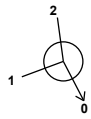
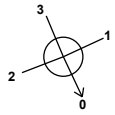
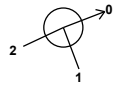
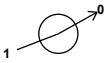
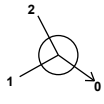
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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S21Lb	443779.109	291519.517	117.262	1.646	1200	Manhole		0	3.000	115.616	150
S21	443775.700	291520.069	117.286	2.005	1500	Manhole		1	3.000	115.581	150
								2	2.000	115.581	150
								0	2.001	115.281	450
S22Lb	443772.393	291550.929	117.400	2.070	1200	Manhole		0	4.000	115.330	150
S22La	443782.530	291561.498	117.490	2.185	1200	Manhole		0	5.000	115.305	150
S22	443781.376	291554.374	117.331	2.398	1500	Manhole		1	5.000	115.233	150
								2	4.000	115.233	150
								3	2.001	114.933	450
								4	1.001	114.933	450
								0	1.002	114.933	450
S23L	443816.813	291610.966	117.642	1.659	1200	Manhole		0	6.000	115.983	225
S23	443824.030	291605.549	117.763	2.306	1200	Manhole		1	6.000	115.532	225
								0	6.001	115.457	300
S24L	443820.618	291580.704	117.800	2.317	1200	Manhole		0	7.000	115.483	150
S24	443816.344	291579.478	117.836	2.726	1200	Manhole		1	7.000	115.335	150
								2	6.001	115.185	300
								0	6.002	115.110	375
S25	443812.026	291549.404	117.627	2.895	1500	Manhole		1	6.002	114.806	375
								2	1.002	114.732	450
								0	1.003	114.732	450
S26L	443835.771	291540.759	117.490	2.373	1200	Manhole		0	8.000	115.117	150
S26	443837.046	291545.359	117.358	2.943	1500	Manhole		1	8.000	114.715	150
								2	1.003	114.415	450
								0	1.004	114.415	450
S27L	443865.956	291545.642	117.100	1.828	1200	Manhole		0	9.000	115.272	150

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S27	443870.449	291536.970	116.932	2.862	1500	Manhole		1	9.000	114.370	150
								2	1.004	114.071	450
								0	1.005	114.070	450
S28L	443866.251	291511.974	116.896	2.206	1200	Manhole					
								0	10.000	114.690	150
S28	443873.473	291514.657	116.646	2.951	1500	Manhole		1	10.000	113.995	150
								2	1.005	113.695	450
								0	1.006	113.695	450
S29L	443778.867	291486.594	116.950	1.774	1200	Manhole					
								0	11.000	115.176	150
S29	443784.225	291488.769	116.911	1.868	1200	Manhole		1	11.000	115.118	150
								0	11.001	115.043	225
S30La	443775.409	291470.169	117.200	1.457	1200	Manhole					
								0	12.000	115.743	225
S30Lb	443804.951	291482.717	116.880	1.064	1200	Manhole					
								0	13.000	115.816	225
S30	443789.713	291475.676	117.074	2.248	1500	Manhole		1	13.000	114.977	225
								2	12.000	114.977	225
								3	11.001	114.976	225
								0	11.002	114.826	375
S31	443796.831	291460.570	117.088	2.429	1500	Manhole		1	11.002	114.659	375
								0	11.003	114.659	375
S32L	443836.785	291473.804	117.485	2.702	1200	Manhole					
								0	14.000	114.783	150
S32	443835.019	291478.489	117.368	3.311	1500	Manhole		1	14.000	114.282	150
								2	11.003	114.057	375
								0	11.004	114.057	375
S33	443851.486	291484.829	117.038	3.202	1500	Manhole		1	11.004	113.836	375
								0	11.005	113.836	375
S34	443880.545	291501.065	116.415	2.986	1800	Manhole		1	11.005	113.503	375
								2	1.006	113.503	450
								0	1.007	113.429	525

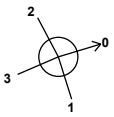
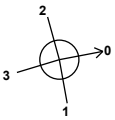
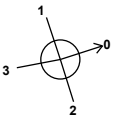
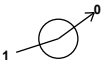
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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S35	443896.046	291490.017	116.157	2.966	1500	Manhole	1	1.007	113.191	525
							0	1.008	113.191	525
S36L	443920.666	291479.743	116.035	2.345	1200	Manhole	0	15.000	113.690	150
S36	443919.537	291486.928	115.816	3.490	1500	Manhole	1	15.000	112.701	150
							2	1.008	112.326	525
							0	1.009	112.326	525
S37L	443942.586	291411.897	116.270	2.281	1200	Manhole	0	16.000	113.989	225
S37	443956.457	291414.527	116.002	2.229	1500	Manhole	1	16.000	113.773	225
							0	16.001	113.773	225
S38L	443975.427	291420.600	116.000	2.046	1200	Manhole	0	17.000	113.954	150
S38	443962.456	291416.547	115.939	2.305	1500	Manhole	1	17.000	113.784	150
							2	16.001	113.710	225
							0	16.002	113.634	300
S39La	443943.622	291454.130	116.060	2.144	1200	Manhole	0	18.000	113.916	150
S39Lb	443952.661	291457.010	116.085	2.317	1200	Manhole	0	19.000	113.768	150
S39	443948.799	291455.955	116.079	2.862	1500	Manhole	1	19.000	113.368	150
							2	18.000	113.367	150
							3	16.002	113.217	300
							0	16.003	113.217	300
S40	443936.967	291492.313	115.528	3.885	1800	Manhole	1	16.003	111.942	300
							2	1.009	111.718	525
							0	1.010	111.643	600
S41La	443968.311	291516.294	115.040	2.372	1200	Manhole	0	20.000	112.668	150
S41Lb	443975.273	291499.962	115.044	2.524	1200	Manhole	0	21.000	112.520	150

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S41	443972.824	291507.759	114.833	3.731	1800	Manhole		1	21.000	111.703	150
								2	20.000	111.702	150
								3	1.010	111.253	600
								0	1.011	111.102	750
S42La	444016.029	291530.797	114.136	1.956	1200	Manhole		0	22.000	112.180	225
S42Lb	444020.020	291513.499	114.155	2.109	1200	Manhole		0	23.000	112.046	225
S42	444018.565	291521.581	113.942	3.318	1800	Manhole		1	23.000	111.149	225
								2	22.000	111.149	225
								3	1.011	110.624	750
								0	1.012	110.624	750
S43	444053.518	291503.522	114.031	2.862	1200	Manhole		0	24.000	111.169	225
S44L	444042.718	291537.421	113.620	2.753	1800	Manhole		0	25.000	110.867	225
S44	444046.213	291526.845	113.380	3.225	1800	Manhole		1	25.000	110.680	225
								2	24.000	110.680	225
								3	1.012	110.155	750
								0	1.013	110.155	750
S45	444065.128	291532.942	113.033	3.077	1800	Manhole		1	1.013	109.956	750
								0	1.014	109.957	750
S46L	444086.341	291539.566	112.900	2.381	1200	Manhole		0	26.000	110.519	150
S46	444080.870	291544.415	112.686	2.973	1800	Manhole		1	26.000	109.788	150
								2	1.014	109.713	750
								0	1.015	109.713	750
S47L	443884.230	291600.704	117.070	2.611	1200	Manhole		0	27.000	114.459	225
S47	443894.371	291597.505	116.846	2.568	1800	Manhole		1	27.000	114.353	225
								0	27.001	114.278	300
S48L	443895.036	291634.825	116.240	1.720	1200	Manhole		0	28.000	114.520	225

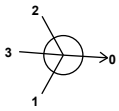
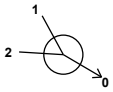
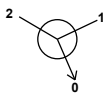
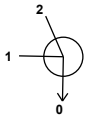
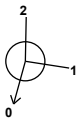
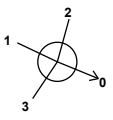
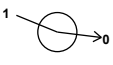
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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S48	443905.812	291633.399	115.969	2.068	1200	Manhole	1 2 0	28.000 27.001 27.002	114.051 113.976 113.901	225 300 375
S49L	443908.595	291654.145	115.795	1.889	1200	Manhole	0	29.000	113.906	225
S49	443916.433	291647.285	115.553	1.827	1200	Manhole	1 2 0	29.000 27.002 27.003	113.876 113.726 113.726	225 375 375
S50	443924.387	291692.392	115.179	1.292	1500	Manhole	0	30.000	113.887	450
S51	443925.446	291676.490	115.200	1.472	1500	Manhole	1 0	30.000 30.001	113.728 113.728	450 450
S52	443929.752	291659.028	115.288	1.816	1500	Manhole	1 2 0	30.001 27.003 27.004	113.472 113.547 113.472	450 375 450
S53	443950.409	291640.307	115.655	2.462	1500	Manhole	1 0	27.004 27.005	113.193 113.268	450 450
S54L	443967.124	291639.883	115.742	2.083	1200	Manhole	0	31.000	113.659	150
S54	443966.632	291634.596	115.655	2.634	1500	Manhole	1 2 0	31.000 27.005 27.006	113.321 113.021 113.021	150 450 450
S54AL	443987.797	291682.193	113.962	1.355	1200	Manhole	0	43.000	112.607	150
S54A	443993.191	291681.835	113.831	1.714	1500	Manhole	1 0	43.000 43.001	112.417 112.117	150 450
S54B	443991.065	291632.693	114.791	3.145	1500	Manhole	1 2 0	43.001 27.006 27.007	111.796 111.796 111.646	450 450 600
S55La	444015.384	291638.573	114.400	2.896	1200	Manhole	0	32.000	111.504	150

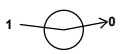
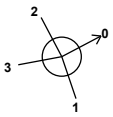
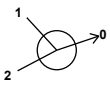
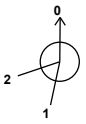
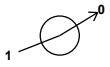
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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S55Lb	444014.478	291620.844	114.400	2.722	1200	Manhole		0	33.000	111.678	150
S55	444019.822	291630.453	114.066	3.862	1500	Manhole		1	33.000	110.654	150
								2	32.000	110.654	150
								3	27.007	110.204	600
								0	27.008	110.204	600
S56L	444057.898	291635.750	113.400	2.347	1200	Manhole		0	34.000	111.053	225
S56	444062.200	291627.854	112.973	3.194	1500	Manhole		1	34.000	110.154	225
								2	27.008	109.779	600
								0	27.009	109.779	600
S57L	444083.653	291622.557	112.800	2.781	1200	Manhole		0	35.000	110.019	225
S57	444076.774	291619.291	112.566	3.073	1500	Manhole		1	35.000	109.868	225
								2	27.009	109.493	600
								0	27.010	109.493	600
S58L	444081.447	291584.691	112.110	2.326	1200	Manhole		0	36.000	109.784	150
S58	444091.916	291584.485	111.935	2.917	1500	Manhole		1	36.000	109.468	150
								2	27.010	109.018	600
								0	27.011	109.018	600
S59L	444099.362	291565.725	112.400	3.072	1200	Manhole		0	37.000	109.328	150
S59	444091.570	291566.932	112.248	3.449	1500	Manhole		1	37.000	109.249	150
								2	27.011	108.799	600
								0	27.012	108.799	600
S60L	444078.895	291560.325	112.600	2.433	1200	Manhole		0	38.000	110.167	150
S60	444088.501	291555.769	112.440	4.086	1800	Manhole		1	38.000	109.104	150
								2	27.012	108.654	600
								3	1.015	108.504	750
								0	1.016	108.354	900
S61	444119.267	291543.174	111.587	3.898	1800	Manhole		1	1.016	107.689	900
								0	1.017	107.689	900

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S62	444140.948	291540.513	111.074	3.658	1800	Manhole		1	1.017	107.416	900
								0	1.018	107.416	900
S63La	444153.628	291549.997	110.756	2.721	1200	Manhole		0	39.000	108.035	150
S63Lb	444158.283	291539.860	110.670	2.670	1200	Manhole		0	40.000	108.000	150
S63	444157.041	291543.522	110.556	3.345	1800	Manhole		1	40.000	107.961	150
								2	39.000	107.962	150
								3	1.018	107.211	900
								0	1.019	107.212	900
S64L	444183.206	291567.153	109.400	1.713	1200	Manhole		0	41.000	107.687	225
S64	444189.306	291560.527	109.193	2.346	1800	Manhole		1	41.000	107.522	225
								2	1.019	106.847	900
								0	1.020	106.847	900
S65L	444198.591	291557.594	108.900	0.648	1200	Manhole		0	42.000	108.252	150
S65	444199.987	291564.120	108.753	1.919	1800	Manhole		1	42.000	107.585	150
								2	1.020	106.834	900
								0	1.021	106.834	900
HW11	444200.122	291579.769	108.259	1.442		Manhole		1	1.021	106.817	900
HW12	444214.527	291601.442	108.259	1.442		Manhole		0	1.022	106.817	900
S66	444222.278	291604.489	108.300	1.492	2700	Manhole		1	1.022	106.808	900
								0	1.023	106.808	900
hw13	444234.306	291611.790	107.769	1.044		Manhole		1	1.023	106.725	900

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Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	0.0
Ratio-R	0.400	Check Discharge Rate(s)	x
Summer CV	0.750	Check Discharge Volume	x
Analysis Speed	Detailed		

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	40	0	0

Node hw13 Surcharged Outfall

Overrides Design Area	x	Depression Storage Area (m²)	0	Evapo-transpiration (mm/day)	0
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0		

Applies to All storms

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
0	1.040	255	1.040	510	1.040	765	1.040	1020	1.040	1275	1.040
15	1.040	270	1.040	525	1.040	780	1.040	1035	1.040	1290	1.040
30	1.040	285	1.040	540	1.040	795	1.040	1050	1.040	1305	1.040
45	1.040	300	1.040	555	1.040	810	1.040	1065	1.040	1320	1.040
60	1.040	315	1.040	570	1.040	825	1.040	1080	1.040	1335	1.040
75	1.040	330	1.040	585	1.040	840	1.040	1095	1.040	1350	1.040
90	1.040	345	1.040	600	1.040	855	1.040	1110	1.040	1365	1.040
105	1.040	360	1.040	615	1.040	870	1.040	1125	1.040	1380	1.040
120	1.040	375	1.040	630	1.040	885	1.040	1140	1.040	1395	1.040
135	1.040	390	1.040	645	1.040	900	1.040	1155	1.040	1410	1.040
150	1.040	405	1.040	660	1.040	915	1.040	1170	1.040	1425	1.040
165	1.040	420	1.040	675	1.040	930	1.040	1185	1.040	1440	1.040
180	1.040	435	1.040	690	1.040	945	1.040	1200	1.040		
195	1.040	450	1.040	705	1.040	960	1.040	1215	1.040		
210	1.040	465	1.040	720	1.040	975	1.040	1230	1.040		
225	1.040	480	1.040	735	1.040	990	1.040	1245	1.040		
240	1.040	495	1.040	750	1.040	1005	1.040	1260	1.040		

Node S66 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	106.808	Product Number	CTL-SHE-0205-2330-1500-2330
Design Depth (m)	1.500	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	23.3	Min Node Diameter (mm)	1800

Node HW12 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	50.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	106.817	Main Channel Slope (1:X)	100000.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.020

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Inlets

HW11

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	2225.0	0.0	1.666	3580.3	0.0	1.667	0.0	0.0

Other (defaults)

Entry Loss (manhole)	0.000	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.000	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 15 minute summer	141.566	40.058	30 year 360 minute summer	31.221	8.034
2 year 30 minute summer	91.753	25.963	30 year 480 minute summer	24.324	6.428
2 year 60 minute summer	61.301	16.200	30 year 600 minute summer	19.756	5.404
2 year 120 minute summer	37.449	9.897	30 year 720 minute summer	17.490	4.687
2 year 180 minute summer	28.672	7.378	30 year 960 minute summer	14.215	3.743
2 year 240 minute summer	22.636	5.982	30 year 1440 minute summer	10.161	2.723
2 year 360 minute summer	17.235	4.435	100 year +40% CC 15 minute summer	488.233	138.153
2 year 480 minute summer	13.550	3.581	100 year +40% CC 30 minute summer	320.551	90.705
2 year 600 minute summer	11.088	3.033	100 year +40% CC 60 minute summer	214.603	56.713
2 year 720 minute summer	9.878	2.647	100 year +40% CC 120 minute summer	129.587	34.246
2 year 960 minute summer	8.113	2.136	100 year +40% CC 180 minute summer	97.729	25.149
2 year 1440 minute summer	5.891	1.579	100 year +40% CC 240 minute summer	75.977	20.078
30 year 15 minute summer	268.706	76.035	100 year +40% CC 360 minute summer	56.677	14.585
30 year 30 minute summer	174.929	49.499	100 year +40% CC 480 minute summer	43.979	11.622
30 year 60 minute summer	116.589	30.811	100 year +40% CC 600 minute summer	35.604	9.738
30 year 120 minute summer	70.438	18.615	100 year +40% CC 720 minute summer	31.433	8.424
30 year 180 minute summer	53.298	13.715	100 year +40% CC 960 minute summer	25.432	6.697
30 year 240 minute summer	41.604	10.995	100 year +40% CC 1440 minute summer	18.055	4.839

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Results for 2 year Critical Storm Duration. Lowest mass balance: 98.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S20L	10	116.179	0.071	21.8	0.0801	0.0000	OK
15 minute summer	S20	10	115.363	0.119	38.5	0.2106	0.0000	OK
15 minute summer	S21La	10	115.721	0.085	11.3	0.0963	0.0000	OK
15 minute summer	S21Lb	10	115.691	0.075	8.8	0.0851	0.0000	OK
15 minute summer	S21	10	115.365	0.084	25.7	0.1486	0.0000	OK
15 minute summer	S22Lb	10	115.402	0.072	8.5	0.0814	0.0000	OK
15 minute summer	S22La	10	115.414	0.109	15.8	0.1236	0.0000	OK
15 minute summer	S22	11	115.113	0.180	90.7	0.3178	0.0000	OK
15 minute summer	S23L	10	116.048	0.065	21.5	0.0736	0.0000	OK
15 minute summer	S23	10	115.564	0.107	28.9	0.1212	0.0000	OK
15 minute summer	S24L	10	115.542	0.059	8.0	0.0665	0.0000	OK
15 minute summer	S24	10	115.218	0.108	40.4	0.1223	0.0000	OK
15 minute summer	S25	11	114.921	0.189	134.7	0.3331	0.0000	OK
15 minute summer	S26L	10	115.159	0.042	9.0	0.0479	0.0000	OK
15 minute summer	S26	11	114.626	0.211	149.0	0.3731	0.0000	OK
15 minute summer	S27L	10	115.319	0.047	11.4	0.0528	0.0000	OK
15 minute summer	S27	11	114.266	0.196	169.0	0.3456	0.0000	OK
15 minute summer	S28L	10	114.730	0.040	8.3	0.0451	0.0000	OK
15 minute summer	S28	11	113.915	0.220	180.2	0.3893	0.0000	OK
15 minute summer	S29L	10	115.237	0.061	6.2	0.0688	0.0000	OK
15 minute summer	S29	10	115.129	0.086	11.4	0.0977	0.0000	OK
15 minute summer	S30La	10	115.825	0.082	33.6	0.0929	0.0000	OK
15 minute summer	S30Lb	10	115.876	0.060	18.6	0.0683	0.0000	OK
15 minute summer	S30	10	114.974	0.148	67.9	0.2616	0.0000	OK
15 minute summer	S31	10	114.798	0.139	72.5	0.2453	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S20L	1.000	S20	21.7	2.031	0.216	0.1844	
15 minute summer	S20	1.001	S22	37.7	0.825	0.159	2.6543	
15 minute summer	S21La	2.000	S21	11.2	1.090	0.617	0.0540	
15 minute summer	S21Lb	3.000	S21	8.7	0.990	0.504	0.0324	
15 minute summer	S21	2.001	S22	25.4	0.668	0.079	1.3793	
15 minute summer	S22Lb	4.000	S22	8.4	1.009	0.467	0.0784	
15 minute summer	S22La	5.000	S22	15.7	1.141	0.884	0.0992	
15 minute summer	S22	1.002	S25	90.8	1.488	0.347	1.8709	
15 minute summer	S23L	6.000	S23	21.4	2.257	0.183	0.0857	
15 minute summer	S23	6.001	S24	28.5	1.268	0.277	0.7131	
15 minute summer	S24L	7.000	S24	7.9	1.242	0.324	0.0501	
15 minute summer	S24	6.002	S25	40.3	1.507	0.186	0.7040	
15 minute summer	S25	1.003	S26	135.3	1.990	0.379	1.7664	
15 minute summer	S26L	8.000	S26	9.0	2.206	0.173	0.0194	
15 minute summer	S26	1.004	S27	149.3	2.047	0.462	2.5120	
15 minute summer	S27L	9.000	S27	11.4	2.437	0.209	0.0455	
15 minute summer	S27	1.005	S28	168.8	2.358	0.404	1.6123	
15 minute summer	S28L	10.000	S28	8.3	2.208	0.154	0.0288	
15 minute summer	S28	1.006	S34	179.8	2.335	0.497	1.1802	
15 minute summer	S29L	11.000	S29	6.2	0.921	0.347	0.0387	
15 minute summer	S29	11.001	S30	11.3	0.805	0.317	0.1987	
15 minute summer	S30La	12.000	S30	33.5	2.556	0.286	0.2006	
15 minute summer	S30Lb	13.000	S30	18.5	2.163	0.158	0.1435	
15 minute summer	S30	11.002	S31	67.6	1.746	0.338	0.6469	
15 minute summer	S31	11.003	S32	71.7	1.700	0.300	1.7823	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 98.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S32L	10	114.843	0.060	19.1	0.0680	0.0000	OK
15 minute summer	S32	10	114.224	0.167	93.9	0.2952	0.0000	OK
15 minute summer	S33	11	114.018	0.182	97.6	0.3223	0.0000	OK
15 minute summer	S34	11	113.692	0.263	284.1	0.6704	0.0000	OK
15 minute summer	S35	11	113.389	0.198	290.5	0.3490	0.0000	OK
15 minute summer	S36L	10	113.749	0.059	21.8	0.0672	0.0000	OK
15 minute summer	S36	11	112.537	0.211	314.5	0.3735	0.0000	OK
15 minute summer	S37L	10	114.078	0.089	21.8	0.1011	0.0000	OK
15 minute summer	S37	10	113.887	0.114	27.2	0.2021	0.0000	OK
15 minute summer	S38L	10	114.031	0.077	10.4	0.0865	0.0000	OK
15 minute summer	S38	10	113.758	0.124	39.6	0.2196	0.0000	OK
15 minute summer	S39La	10	113.949	0.033	6.1	0.0377	0.0000	OK
15 minute summer	S39Lb	10	113.800	0.032	5.5	0.0358	0.0000	OK
15 minute summer	S39	11	113.324	0.107	56.4	0.1887	0.0000	OK
15 minute summer	S40	11	111.963	0.320	382.8	0.8142	0.0000	OK
15 minute summer	S41La	10	112.730	0.062	19.4	0.0701	0.0000	OK
15 minute summer	S41Lb	10	112.564	0.044	9.9	0.0495	0.0000	OK
15 minute summer	S41	11	111.390	0.288	420.1	0.7332	0.0000	OK
15 minute summer	S42La	10	112.250	0.070	36.6	0.0795	0.0000	OK
15 minute summer	S42Lb	10	112.095	0.049	17.9	0.0551	0.0000	OK
15 minute summer	S42	11	110.897	0.273	477.9	0.6957	0.0000	OK
15 minute summer	S43	10	111.203	0.034	3.6	0.0381	0.0000	OK
15 minute summer	S44L	10	110.977	0.110	33.6	0.2800	0.0000	OK
15 minute summer	S44	11	110.483	0.328	518.0	0.8347	0.0000	OK
15 minute summer	S45	11	110.266	0.310	520.8	0.7886	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S32L	14.000	S32	19.1	2.895	0.336	0.0329	
15 minute summer	S32	11.004	S33	93.5	1.863	0.417	0.8854	
15 minute summer	S33	11.005	S34	98.2	1.821	0.491	1.8133	
15 minute summer	S34	1.007	S35	283.7	3.112	0.523	1.7380	
15 minute summer	S35	1.008	S36	290.1	3.732	0.312	1.8422	
15 minute summer	S36L	15.000	S36	21.7	3.359	0.329	0.0471	
15 minute summer	S36	1.009	S40	314.0	3.490	0.354	1.6418	
15 minute summer	S37L	16.000	S37	21.7	1.243	0.337	0.2467	
15 minute summer	S37	16.001	S38	27.0	1.333	0.520	0.1281	
15 minute summer	S38L	17.000	S38	10.3	1.141	0.517	0.1225	
15 minute summer	S38	16.002	S39	39.3	1.580	0.354	1.0404	
15 minute summer	S39La	18.000	S39	6.1	2.097	0.107	0.0159	
15 minute summer	S39Lb	19.000	S39	5.5	2.034	0.097	0.0108	
15 minute summer	S39	16.003	S40	56.3	2.503	0.276	0.8599	
15 minute summer	S40	1.010	S41	381.0	2.516	0.577	6.4591	
15 minute summer	S41La	20.000	S41	19.3	2.820	0.356	0.0718	
15 minute summer	S41Lb	21.000	S41	9.9	2.313	0.184	0.0390	
15 minute summer	S41	1.011	S42	419.0	2.791	0.327	6.6801	
15 minute summer	S42La	22.000	S42	36.5	3.460	0.212	0.1009	
15 minute summer	S42Lb	23.000	S42	17.8	2.831	0.103	0.0518	
15 minute summer	S42	1.012	S44	477.1	2.894	0.298	4.6277	
15 minute summer	S43	24.000	S44	3.5	0.959	0.049	0.0919	
15 minute summer	S44L	25.000	S44	33.4	1.733	0.485	0.2068	
15 minute summer	S44	1.013	S45	516.0	2.894	0.418	3.5545	
15 minute summer	S45	1.014	S46	518.7	4.052	0.375	2.5181	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 98.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S46L	10	110.583	0.064	21.5	0.0724	0.0000	OK
15 minute summer	S46	11	109.903	0.190	544.2	0.4840	0.0000	OK
15 minute summer	S47L	10	114.540	0.081	14.7	0.0919	0.0000	OK
15 minute summer	S47	10	114.384	0.106	27.4	0.2691	0.0000	OK
15 minute summer	S48L	10	114.586	0.066	20.3	0.0742	0.0000	OK
15 minute summer	S48	10	114.029	0.128	51.3	0.1453	0.0000	OK
15 minute summer	S49L	10	114.007	0.101	12.8	0.1146	0.0000	OK
15 minute summer	S49	10	113.872	0.146	66.0	0.1646	0.0000	OK
15 minute summer	S50	10	113.945	0.058	11.8	0.1023	0.0000	OK
15 minute summer	S51	10	113.796	0.068	19.5	0.1193	0.0000	OK
15 minute summer	S52	10	113.630	0.158	87.8	0.2798	0.0000	OK
15 minute summer	S53	11	113.417	0.224	93.2	0.3958	0.0000	OK
15 minute summer	S54L	10	113.724	0.064	17.3	0.0729	0.0000	OK
15 minute summer	S54	11	113.145	0.124	123.4	0.2189	0.0000	OK
15 minute summer	S54AL	10	112.674	0.067	13.7	0.0755	0.0000	OK
15 minute summer	S54A	11	112.210	0.093	25.6	0.1637	0.0000	OK
15 minute summer	S54B	11	111.771	0.125	152.1	0.2205	0.0000	OK
15 minute summer	S55La	10	111.555	0.051	13.4	0.0575	0.0000	OK
15 minute summer	S55Lb	10	111.730	0.052	14.2	0.0591	0.0000	OK
15 minute summer	S55	11	110.416	0.212	190.2	0.3743	0.0000	OK
15 minute summer	S56L	10	111.099	0.046	15.3	0.0521	0.0000	OK
15 minute summer	S56	11	109.974	0.195	211.6	0.3440	0.0000	OK
15 minute summer	S57L	10	110.092	0.073	16.8	0.0823	0.0000	OK
15 minute summer	S57	11	109.715	0.222	234.3	0.3918	0.0000	OK
15 minute summer	S58L	10	109.854	0.070	13.9	0.0794	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S46L	26.000	S46	21.5	2.768	0.379	0.0784	
15 minute summer	S46	1.015	S60	543.0	6.209	0.147	1.1965	
15 minute summer	S47L	27.000	S47	14.6	1.134	0.281	0.1369	
15 minute summer	S47	27.001	S48	26.9	1.220	0.271	0.8324	
15 minute summer	S48L	28.000	S48	20.2	2.106	0.186	0.1044	
15 minute summer	S48	27.002	S49	51.1	1.406	0.255	0.6366	
15 minute summer	S49L	29.000	S49	12.7	0.776	0.458	0.1701	
15 minute summer	S49	27.003	S52	65.9	1.671	0.328	0.7004	
15 minute summer	S50	30.000	S51	11.7	0.877	0.036	0.2129	
15 minute summer	S51	30.001	S52	19.3	0.620	0.050	0.5811	
15 minute summer	S52	27.004	S53	88.7	1.383	0.274	1.7917	
15 minute summer	S53	27.005	S54	93.6	2.310	0.241	0.6983	
15 minute summer	S54L	31.000	S54	17.2	2.387	0.382	0.0384	
15 minute summer	S54	27.006	S54B	123.7	3.491	0.171	0.8684	
15 minute summer	S54AL	43.000	S54A	13.6	1.803	0.408	0.0409	
15 minute summer	S54A	43.001	S54B	25.1	1.069	0.096	1.1560	
15 minute summer	S54B	27.007	S55	152.2	2.355	0.099	1.8920	
15 minute summer	S55La	32.000	S55	13.3	2.544	0.246	0.0485	
15 minute summer	S55Lb	33.000	S55	14.1	2.600	0.259	0.0598	
15 minute summer	S55	27.008	S56	191.2	2.277	0.278	3.5666	
15 minute summer	S56L	34.000	S56	15.3	2.620	0.092	0.0524	
15 minute summer	S56	27.009	S57	212.4	2.447	0.237	1.4680	
15 minute summer	S57L	35.000	S57	16.7	1.509	0.228	0.0844	
15 minute summer	S57	27.010	S58	234.3	2.400	0.304	3.7064	
15 minute summer	S58L	36.000	S58	13.8	1.709	0.445	0.0846	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 98.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S58	11	109.250	0.232	253.4	0.4106	0.0000	OK
15 minute summer	S59L	10	109.434	0.106	15.3	0.1203	0.0000	OK
15 minute summer	S59	11	109.038	0.239	268.4	0.4216	0.0000	OK
15 minute summer	S60L	10	110.206	0.039	8.5	0.0445	0.0000	OK
15 minute summer	S60	11	108.676	0.322	825.2	0.8204	0.0000	OK
15 minute summer	S61	11	108.063	0.374	827.1	0.9529	0.0000	OK
15 minute summer	S62	11	107.815	0.399	831.6	1.0157	0.0000	OK
15 minute summer	S63La	10	108.125	0.090	12.0	0.1016	0.0000	OK
15 minute summer	S63Lb	10	108.137	0.137	20.5	0.1546	0.0000	OK
15 minute summer	S63	11	107.670	0.459	866.4	1.1680	0.0000	OK
15 minute summer	S64L	10	107.793	0.106	32.4	0.1202	0.0000	OK
15 minute summer	S64	12	107.549	0.702	892.1	1.7876	0.0000	OK
15 minute summer	S65L	10	108.308	0.056	17.0	0.0638	0.0000	OK
15 minute summer	S65	12	107.524	0.690	917.2	1.7558	0.0000	OK
1440 minute summer	HW11	1560	107.429	0.612	142.3	0.0000	0.0000	OK
1440 minute summer	HW12	1500	107.429	0.612	168.2	0.0000	0.0000	OK
1440 minute summer	S66	1500	107.429	0.621	1.4	3.5582	0.0000	OK
15 minute summer	hw13	1	107.765	1.040	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S58	27.011	S59	253.6	2.473	0.330	1.8005	
15 minute summer	S59L	37.000	S59	15.2	1.137	0.853	0.1051	
15 minute summer	S59	27.012	S60	268.5	2.572	0.348	1.2084	
15 minute summer	S60L	38.000	S60	8.5	2.306	0.149	0.0390	
15 minute summer	S60	1.016	S61	823.6	3.644	0.292	7.5358	
15 minute summer	S61	1.017	S62	829.0	3.243	0.372	5.6878	
15 minute summer	S62	1.018	S63	830.8	2.852	0.372	4.8813	
15 minute summer	S63La	39.000	S63	11.9	1.083	0.671	0.0804	
15 minute summer	S63Lb	40.000	S63	20.3	1.229	1.141	0.0639	
15 minute summer	S63	1.019	S64	864.0	2.027	0.433	15.4513	
15 minute summer	S64L	41.000	S64	32.3	1.751	0.457	0.1659	
15 minute summer	S64	1.020	S65	898.1	1.707	1.337	5.9308	
15 minute summer	S65L	42.000	S65	17.0	2.804	0.299	0.0403	
15 minute summer	S65	1.021	HW11	739.4	2.932	1.135	4.3527	
1440 minute summer	HW11	Flow through pond	HW12	168.2	0.016	0.010	1511.4182	
1440 minute summer	HW12	1.022	S66	1.4	0.058	0.002	3.8576	
1440 minute summer	S66	Hydro-Brake®	hw13	0.0				0.0

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Results for 30 year Critical Storm Duration. Lowest mass balance: 98.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S20L	10	116.208	0.100	41.5	0.1133	0.0000	OK
15 minute summer	S20	10	115.411	0.167	73.2	0.2950	0.0000	OK
15 minute summer	S21La	10	115.781	0.145	21.4	0.1640	0.0000	OK
15 minute summer	S21Lb	10	115.734	0.118	16.8	0.1329	0.0000	OK
15 minute summer	S21	10	115.397	0.116	48.6	0.2044	0.0000	OK
15 minute summer	S22Lb	10	115.439	0.109	16.1	0.1238	0.0000	OK
15 minute summer	S22La	10	115.585	0.280	30.0	0.3163	0.0000	SURCHARGED
15 minute summer	S22	11	115.198	0.265	172.5	0.4674	0.0000	OK
15 minute summer	S23L	10	116.074	0.091	40.8	0.1033	0.0000	OK
15 minute summer	S23	10	115.610	0.153	54.9	0.1735	0.0000	OK
15 minute summer	S24L	10	115.568	0.085	15.1	0.0960	0.0000	OK
15 minute summer	S24	10	115.261	0.151	76.8	0.1713	0.0000	OK
15 minute summer	S25	11	115.013	0.281	256.0	0.4971	0.0000	OK
15 minute summer	S26L	10	115.176	0.059	17.1	0.0671	0.0000	OK
15 minute summer	S26	11	114.734	0.319	283.8	0.5641	0.0000	OK
15 minute summer	S27L	10	115.338	0.066	21.7	0.0746	0.0000	OK
15 minute summer	S27	11	114.364	0.294	321.4	0.5201	0.0000	OK
15 minute summer	S28L	10	114.746	0.056	15.8	0.0631	0.0000	OK
15 minute summer	S28	11	114.034	0.339	343.2	0.5992	0.0000	OK
15 minute summer	S29L	10	115.265	0.089	11.8	0.1004	0.0000	OK
15 minute summer	S29	10	115.167	0.124	21.6	0.1403	0.0000	OK
15 minute summer	S30La	10	115.861	0.118	63.9	0.1334	0.0000	OK
15 minute summer	S30Lb	10	115.900	0.084	35.2	0.0953	0.0000	OK
15 minute summer	S30	10	115.041	0.215	129.0	0.3793	0.0000	OK
15 minute summer	S31	10	114.859	0.200	137.7	0.3527	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S20L	1.000	S20	41.3	2.423	0.411	0.2945	
15 minute summer	S20	1.001	S22	72.1	0.964	0.304	4.2996	
15 minute summer	S21La	2.000	S21	21.1	1.241	1.159	0.0888	
15 minute summer	S21Lb	3.000	S21	16.7	1.127	0.961	0.0542	
15 minute summer	S21	2.001	S22	48.3	0.771	0.149	2.2384	
15 minute summer	S22Lb	4.000	S22	15.9	1.160	0.884	0.1293	
15 minute summer	S22La	5.000	S22	29.6	1.683	1.671	0.1258	
15 minute summer	S22	1.002	S25	172.7	1.717	0.661	3.0833	
15 minute summer	S23L	6.000	S23	40.7	2.696	0.348	0.1362	
15 minute summer	S23	6.001	S24	54.2	1.502	0.527	1.1447	
15 minute summer	S24L	7.000	S24	15.0	1.462	0.613	0.0804	
15 minute summer	S24	6.002	S25	76.4	1.563	0.352	1.3408	
15 minute summer	S25	1.003	S26	257.7	2.294	0.721	2.9171	
15 minute summer	S26L	8.000	S26	17.1	2.638	0.328	0.0309	
15 minute summer	S26	1.004	S27	284.1	2.368	0.879	4.1386	
15 minute summer	S27L	9.000	S27	21.6	2.908	0.397	0.0726	
15 minute summer	S27	1.005	S28	321.5	2.701	0.769	2.6798	
15 minute summer	S28L	10.000	S28	15.8	2.648	0.293	0.0458	
15 minute summer	S28	1.006	S34	342.7	2.677	0.946	1.9621	
15 minute summer	S29L	11.000	S29	11.7	1.082	0.659	0.0627	
15 minute summer	S29	11.001	S30	21.4	0.967	0.602	0.3143	
15 minute summer	S30La	12.000	S30	63.6	3.026	0.545	0.3224	
15 minute summer	S30Lb	13.000	S30	35.0	2.590	0.300	0.2271	
15 minute summer	S30	11.002	S31	128.5	2.059	0.642	1.0420	
15 minute summer	S31	11.003	S32	136.4	1.958	0.570	2.9335	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 98.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S32L	10	114.870	0.087	36.2	0.0987	0.0000	OK
15 minute summer	S32	10	114.311	0.254	178.5	0.4490	0.0000	OK
15 minute summer	S33	11	114.124	0.288	184.8	0.5089	0.0000	OK
15 minute summer	S34	11	113.840	0.411	540.4	1.0462	0.0000	OK
15 minute summer	S35	11	113.476	0.285	552.7	0.5032	0.0000	OK
15 minute summer	S36L	10	113.776	0.086	41.5	0.0977	0.0000	OK
15 minute summer	S36	11	112.639	0.313	598.5	0.5527	0.0000	OK
15 minute summer	S37L	10	114.122	0.133	41.5	0.1501	0.0000	OK
15 minute summer	S37	10	113.954	0.181	51.8	0.3192	0.0000	OK
15 minute summer	S38L	10	114.075	0.121	19.7	0.1365	0.0000	OK
15 minute summer	S38	10	113.814	0.180	74.6	0.3173	0.0000	OK
15 minute summer	S39La	10	113.962	0.046	11.5	0.0520	0.0000	OK
15 minute summer	S39Lb	10	113.812	0.044	10.5	0.0496	0.0000	OK
15 minute summer	S39	11	113.369	0.152	106.9	0.2693	0.0000	OK
15 minute summer	S40	11	112.183	0.540	728.6	1.3749	0.0000	OK
15 minute summer	S41La	10	112.759	0.091	36.9	0.1026	0.0000	OK
15 minute summer	S41Lb	10	112.582	0.061	18.8	0.0695	0.0000	OK
15 minute summer	S41	11	111.521	0.419	801.5	1.0661	0.0000	OK
15 minute summer	S42La	10	112.279	0.099	69.4	0.1121	0.0000	OK
15 minute summer	S42Lb	10	112.113	0.067	33.9	0.0762	0.0000	OK
15 minute summer	S42	11	111.027	0.403	912.7	1.0256	0.0000	OK
15 minute summer	S43	10	111.215	0.046	6.9	0.0523	0.0000	OK
15 minute summer	S44L	10	111.036	0.169	63.9	0.4299	0.0000	OK
15 minute summer	S44	11	110.636	0.481	976.1	1.2253	0.0000	OK
15 minute summer	S45	11	110.405	0.449	977.6	1.1416	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S32L	14.000	S32	36.1	3.403	0.638	0.0532	
15 minute summer	S32	11.004	S33	177.0	2.089	0.790	1.5018	
15 minute summer	S33	11.005	S34	186.2	2.000	0.930	3.2498	
15 minute summer	S34	1.007	S35	539.8	3.555	0.995	2.8646	
15 minute summer	S35	1.008	S36	552.2	4.368	0.594	3.0052	
15 minute summer	S36L	15.000	S36	41.4	3.955	0.627	0.0762	
15 minute summer	S36	1.009	S40	598.3	3.612	0.674	3.0693	
15 minute summer	S37L	16.000	S37	41.3	1.407	0.641	0.4132	
15 minute summer	S37	16.001	S38	50.8	1.502	0.980	0.2200	
15 minute summer	S38L	17.000	S38	19.4	1.292	0.974	0.2116	
15 minute summer	S38	16.002	S39	74.7	1.872	0.672	1.6659	
15 minute summer	S39La	18.000	S39	11.5	2.515	0.203	0.0250	
15 minute summer	S39Lb	19.000	S39	10.5	2.451	0.185	0.0171	
15 minute summer	S39	16.003	S40	106.3	2.837	0.522	1.8474	
15 minute summer	S40	1.010	S41	727.2	2.839	1.102	11.3354	
15 minute summer	S41La	20.000	S41	36.8	3.309	0.677	0.1165	
15 minute summer	S41Lb	21.000	S41	18.7	2.763	0.350	0.0621	
15 minute summer	S41	1.011	S42	800.8	3.277	0.624	10.9713	
15 minute summer	S42La	22.000	S42	69.3	4.123	0.403	0.1606	
15 minute summer	S42Lb	23.000	S42	33.8	3.402	0.196	0.0817	
15 minute summer	S42	1.012	S44	898.3	3.349	0.561	7.5664	
15 minute summer	S43	24.000	S44	6.8	1.163	0.093	0.1453	
15 minute summer	S44L	25.000	S44	63.4	1.986	0.922	0.3429	
15 minute summer	S44	1.013	S45	968.5	3.378	0.784	5.7145	
15 minute summer	S45	1.014	S46	973.1	4.752	0.703	4.0045	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 98.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S46L	10	110.613	0.094	40.8	0.1066	0.0000	OK
15 minute summer	S46	11	109.975	0.262	1021.5	0.6677	0.0000	OK
15 minute summer	S47L	10	114.576	0.117	28.0	0.1318	0.0000	OK
15 minute summer	S47	10	114.430	0.152	52.2	0.3860	0.0000	OK
15 minute summer	S48L	10	114.612	0.092	38.5	0.1042	0.0000	OK
15 minute summer	S48	10	114.088	0.186	97.9	0.2109	0.0000	OK
15 minute summer	S49L	10	114.051	0.145	24.4	0.1642	0.0000	OK
15 minute summer	S49	10	113.937	0.211	126.0	0.2389	0.0000	OK
15 minute summer	S50	10	113.966	0.079	22.4	0.1395	0.0000	OK
15 minute summer	S51	10	113.820	0.092	37.1	0.1633	0.0000	OK
15 minute summer	S52	10	113.703	0.231	167.4	0.4082	0.0000	OK
15 minute summer	S53	11	113.478	0.285	176.7	0.5031	0.0000	OK
15 minute summer	S54L	10	113.754	0.095	32.9	0.1076	0.0000	OK
15 minute summer	S54	11	113.194	0.173	234.1	0.3060	0.0000	OK
15 minute summer	S54AL	10	112.706	0.099	26.0	0.1122	0.0000	OK
15 minute summer	S54A	10	112.246	0.129	48.6	0.2271	0.0000	OK
15 minute summer	S54B	11	111.818	0.172	288.9	0.3045	0.0000	OK
15 minute summer	S55La	10	111.576	0.072	25.3	0.0815	0.0000	OK
15 minute summer	S55Lb	10	111.753	0.075	27.0	0.0843	0.0000	OK
15 minute summer	S55	11	110.505	0.301	361.4	0.5323	0.0000	OK
15 minute summer	S56L	10	111.117	0.064	29.0	0.0719	0.0000	OK
15 minute summer	S56	11	110.058	0.279	401.4	0.4933	0.0000	OK
15 minute summer	S57L	10	110.122	0.103	31.9	0.1165	0.0000	OK
15 minute summer	S57	11	109.812	0.319	444.7	0.5642	0.0000	OK
15 minute summer	S58L	10	109.890	0.106	26.3	0.1196	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S46L	26.000	S46	40.7	2.835	0.719	0.1069	
15 minute summer	S46	1.015	S60	1020.0	6.699	0.277	2.1555	
15 minute summer	S47L	27.000	S47	27.8	1.343	0.536	0.2202	
15 minute summer	S47	27.001	S48	51.3	1.448	0.516	1.3415	
15 minute summer	S48L	28.000	S48	38.4	2.515	0.354	0.1658	
15 minute summer	S48	27.002	S49	97.5	1.648	0.487	1.0367	
15 minute summer	S49L	29.000	S49	24.2	0.952	0.873	0.2641	
15 minute summer	S49	27.003	S52	125.0	1.970	0.622	1.1317	
15 minute summer	S50	30.000	S51	22.3	1.061	0.069	0.3348	
15 minute summer	S51	30.001	S52	36.7	0.718	0.095	0.9471	
15 minute summer	S52	27.004	S53	168.2	1.796	0.520	2.6080	
15 minute summer	S53	27.005	S54	177.5	2.763	0.458	1.1057	
15 minute summer	S54L	31.000	S54	32.8	2.790	0.727	0.0625	
15 minute summer	S54	27.006	S54B	235.0	4.180	0.324	1.3778	
15 minute summer	S54AL	43.000	S54A	25.9	2.098	0.774	0.0668	
15 minute summer	S54A	43.001	S54B	47.7	1.288	0.183	1.8272	
15 minute summer	S54B	27.007	S55	289.3	2.800	0.187	3.0058	
15 minute summer	S55La	32.000	S55	25.2	3.020	0.465	0.0773	
15 minute summer	S55Lb	33.000	S55	26.9	3.085	0.492	0.0959	
15 minute summer	S55	27.008	S56	362.7	2.687	0.527	5.7324	
15 minute summer	S56L	34.000	S56	28.9	3.152	0.175	0.0825	
15 minute summer	S56	27.009	S57	403.0	2.871	0.450	2.3734	
15 minute summer	S57L	35.000	S57	31.8	1.797	0.433	0.1347	
15 minute summer	S57	27.010	S58	447.1	2.825	0.580	6.0080	
15 minute summer	S58L	36.000	S58	26.1	1.972	0.843	0.1388	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 98.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S58	11	109.357	0.339	483.3	0.5991	0.0000	OK
15 minute summer	S59L	10	109.604	0.276	29.0	0.3121	0.0000	SURCHARGED
15 minute summer	S59	11	109.147	0.348	513.3	0.6152	0.0000	OK
15 minute summer	S60L	10	110.222	0.055	16.1	0.0620	0.0000	OK
15 minute summer	S60	11	108.823	0.468	1559.2	1.1923	0.0000	OK
15 minute summer	S61	11	108.283	0.594	1563.6	1.5123	0.0000	OK
15 minute summer	S62	11	108.114	0.698	1577.2	1.7753	0.0000	OK
15 minute summer	S63La	10	108.216	0.181	22.7	0.2051	0.0000	SURCHARGED
15 minute summer	S63Lb	10	108.297	0.297	38.8	0.3354	0.0000	SURCHARGED
15 minute summer	S63	11	108.027	0.815	1652.4	2.0754	0.0000	OK
30 minute summer	S64L	18	107.971	0.284	55.0	0.3211	0.0000	SURCHARGED
30 minute summer	S64	20	107.905	1.058	1598.7	2.6931	0.0000	SURCHARGED
15 minute summer	S65L	10	108.333	0.081	32.3	0.0919	0.0000	OK
1440 minute summer	S65	1500	107.822	0.988	275.0	2.5134	0.0000	SURCHARGED
1440 minute summer	HW11	1470	107.820	1.003	974.4	0.0000	0.0000	OK
1440 minute summer	HW12	1470	107.819	1.002	1843.3	0.0000	0.0000	SURCHARGED
1440 minute summer	S66	1470	107.819	1.011	10.1	5.7912	0.0000	SURCHARGED
15 minute summer	hw13	1	107.765	1.040	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S58	27.011	S59	485.3	2.909	0.631	2.9292	
15 minute summer	S59L	37.000	S59	28.6	1.625	1.610	0.1374	
15 minute summer	S59	27.012	S60	513.0	3.028	0.665	1.9616	
15 minute summer	S60L	38.000	S60	16.0	2.762	0.283	0.0618	
15 minute summer	S60	1.016	S61	1557.0	4.153	0.552	12.9262	
15 minute summer	S61	1.017	S62	1573.1	3.609	0.706	10.6106	
15 minute summer	S62	1.018	S63	1594.5	3.190	0.715	9.2612	
15 minute summer	S63La	39.000	S63	22.4	1.274	1.264	0.1253	
15 minute summer	S63Lb	40.000	S63	38.5	2.185	2.157	0.0674	
15 minute summer	S63	1.019	S64	1636.7	2.636	0.821	22.5340	
30 minute summer	S64L	41.000	S64	54.0	1.926	0.766	0.3582	
30 minute summer	S64	1.020	S65	1760.1	2.780	2.621	7.0694	
15 minute summer	S65L	42.000	S65	32.2	3.310	0.568	0.0648	
1440 minute summer	S65	1.021	HW11	-273.9	1.171	-0.420	9.9179	
1440 minute summer	HW11	Flow through pond	HW12	1843.3	0.042	0.111	2637.3328	
1440 minute summer	HW12	1.022	S66	10.1	0.102	0.015	5.2781	
1440 minute summer	S66	Hydro-Brake®	hw13	2.3				41.5

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S20L	12	116.524	0.416	75.4	0.4709	0.0000	SURCHARGED
15 minute summer	S20	12	116.293	1.049	133.0	1.8542	0.0000	SURCHARGED
15 minute summer	S21La	12	116.406	0.770	38.9	0.8704	0.0000	SURCHARGED
15 minute summer	S21Lb	12	116.317	0.701	30.5	0.7931	0.0000	SURCHARGED
15 minute summer	S21	12	116.256	0.975	88.4	1.7229	0.0000	SURCHARGED
15 minute summer	S22Lb	12	116.387	1.057	29.3	1.1956	0.0000	SURCHARGED
15 minute summer	S22La	12	116.682	1.377	54.4	1.5574	0.0000	SURCHARGED
15 minute summer	S22	12	116.240	1.307	286.0	2.3095	0.0000	SURCHARGED
15 minute summer	S23L	12	116.415	0.432	74.2	0.4888	0.0000	SURCHARGED
15 minute summer	S23	12	116.301	0.844	99.8	0.9543	0.0000	SURCHARGED
15 minute summer	S24L	12	116.254	0.770	27.5	0.8714	0.0000	SURCHARGED
15 minute summer	S24	12	116.146	1.036	127.8	1.1715	0.0000	SURCHARGED
15 minute summer	S25	12	116.071	1.339	394.9	2.3665	0.0000	SURCHARGED
15 minute summer	S26L	12	115.840	0.723	31.1	0.8173	0.0000	SURCHARGED
15 minute summer	S26	12	115.754	1.339	403.2	2.3651	0.0000	SURCHARGED
15 minute summer	S27L	12	115.553	0.281	39.5	0.3173	0.0000	SURCHARGED
15 minute summer	S27	12	115.243	1.173	444.4	2.0732	0.0000	SURCHARGED
15 minute summer	S28L	12	114.937	0.247	28.7	0.2791	0.0000	SURCHARGED
15 minute summer	S28	12	114.812	1.117	474.5	1.9735	0.0000	SURCHARGED
15 minute summer	S29L	12	116.161	0.985	21.5	1.1136	0.0000	SURCHARGED
15 minute summer	S29	12	116.103	1.060	36.9	1.1984	0.0000	SURCHARGED
15 minute summer	S30La	11	116.596	0.853	116.0	0.9644	0.0000	SURCHARGED
15 minute summer	S30Lb	12	116.213	0.397	64.0	0.4488	0.0000	SURCHARGED
15 minute summer	S30	12	116.045	1.219	220.2	2.1543	0.0000	SURCHARGED
15 minute summer	S31	12	115.893	1.234	226.1	2.1797	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S20L	1.000	S20	75.0	2.795	0.747	0.6873	
15 minute summer	S20	1.001	S22	121.5	1.076	0.512	9.0921	
15 minute summer	S21La	2.000	S21	38.4	2.184	2.114	0.0923	
15 minute summer	S21Lb	3.000	S21	30.3	1.721	1.747	0.0645	
15 minute summer	S21	2.001	S22	84.7	0.854	0.262	5.5092	
15 minute summer	S22Lb	4.000	S22	26.3	1.493	1.457	0.1656	
15 minute summer	S22La	5.000	S22	49.8	2.829	2.809	0.1271	
15 minute summer	S22	1.002	S25	265.6	1.820	1.016	4.8580	
15 minute summer	S23L	6.000	S23	74.1	2.919	0.634	0.3589	
15 minute summer	S23	6.001	S24	91.1	1.655	0.885	2.2303	
15 minute summer	S24L	7.000	S24	25.3	1.542	1.031	0.1379	
15 minute summer	S24	6.002	S25	126.7	1.606	0.583	2.8515	
15 minute summer	S25	1.003	S26	356.0	2.266	0.997	4.1173	
15 minute summer	S26L	8.000	S26	29.4	2.870	0.567	0.0840	
15 minute summer	S26	1.004	S27	389.0	2.513	1.204	5.4568	
15 minute summer	S27L	9.000	S27	38.6	3.146	0.709	0.1719	
15 minute summer	S27	1.005	S28	442.8	2.795	1.060	3.5678	
15 minute summer	S28L	10.000	S28	28.1	2.880	0.523	0.1356	
15 minute summer	S28	1.006	S34	476.1	3.005	1.315	2.4275	
15 minute summer	S29L	11.000	S29	21.1	1.236	1.185	0.1018	
15 minute summer	S29	11.001	S30	40.3	1.106	1.134	0.5646	
15 minute summer	S30La	12.000	S30	108.9	3.342	0.933	0.6096	
15 minute summer	S30Lb	13.000	S30	61.1	2.672	0.523	0.6676	
15 minute summer	S30	11.002	S31	210.1	2.163	1.050	1.8419	
15 minute summer	S31	11.003	S32	204.1	2.000	0.853	4.6527	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S32L	12	115.932	1.149	65.8	1.3000	0.0000	SURCHARGED
15 minute summer	S32	12	115.446	1.389	272.2	2.4537	0.0000	SURCHARGED
15 minute summer	S33	12	115.128	1.292	279.4	2.2833	0.0000	SURCHARGED
15 minute summer	S34	12	114.476	1.047	767.5	2.6652	0.0000	SURCHARGED
15 minute summer	S35	12	113.999	0.808	785.4	1.4270	0.0000	SURCHARGED
15 minute summer	S36L	11	114.565	0.875	75.4	0.9898	0.0000	SURCHARGED
15 minute summer	S36	12	113.375	1.049	859.5	1.8528	0.0000	SURCHARGED
15 minute summer	S37L	11	114.659	0.670	75.4	0.7579	0.0000	SURCHARGED
15 minute summer	S37	12	114.409	0.636	91.3	1.1241	0.0000	SURCHARGED
15 minute summer	S38L	12	114.684	0.730	35.9	0.8255	0.0000	SURCHARGED
15 minute summer	S38	12	114.251	0.617	126.9	1.0894	0.0000	SURCHARGED
15 minute summer	S39La	10	113.979	0.063	20.9	0.0713	0.0000	OK
15 minute summer	S39Lb	11	113.838	0.070	19.1	0.0788	0.0000	OK
15 minute summer	S39	12	113.737	0.520	179.3	0.9194	0.0000	SURCHARGED
15 minute summer	S40	12	112.800	1.157	1066.0	2.9439	0.0000	SURCHARGED
15 minute summer	S41La	11	113.270	0.602	67.0	0.6804	0.0000	SURCHARGED
15 minute summer	S41Lb	10	112.607	0.087	34.1	0.0985	0.0000	OK
15 minute summer	S41	11	111.655	0.553	1184.3	1.4072	0.0000	OK
15 minute summer	S42La	10	112.323	0.143	126.2	0.1612	0.0000	OK
15 minute summer	S42Lb	10	112.138	0.092	61.6	0.1045	0.0000	OK
15 minute summer	S42	11	111.199	0.575	1385.4	1.4645	0.0000	OK
15 minute summer	S43	10	111.232	0.063	12.6	0.0709	0.0000	OK
15 minute summer	S44L	10	111.420	0.552	116.0	1.4061	0.0000	SURCHARGED
15 minute summer	S44	11	110.868	0.713	1518.9	1.8135	0.0000	OK
15 minute summer	S45	11	110.615	0.659	1527.7	1.6769	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S32L	14.000	S32	58.8	3.607	1.039	0.0881	
15 minute summer	S32	11.004	S33	265.9	2.411	1.187	1.9463	
15 minute summer	S33	11.005	S34	277.0	2.512	1.384	3.6713	
15 minute summer	S34	1.007	S35	767.0	3.668	1.414	4.1122	
15 minute summer	S35	1.008	S36	785.5	4.520	0.846	5.1185	
15 minute summer	S36L	15.000	S36	70.7	4.200	1.071	0.1281	
15 minute summer	S36	1.009	S40	859.6	3.979	0.969	3.9411	
15 minute summer	S37L	16.000	S37	72.2	1.816	1.121	0.5615	
15 minute summer	S37	16.001	S38	86.0	2.163	1.659	0.2517	
15 minute summer	S38L	17.000	S38	32.5	1.848	1.636	0.2392	
15 minute summer	S38	16.002	S39	120.8	1.965	1.087	2.9370	
15 minute summer	S39La	18.000	S39	20.9	2.920	0.368	0.0676	
15 minute summer	S39Lb	19.000	S39	19.1	2.851	0.337	0.0513	
15 minute summer	S39	16.003	S40	171.1	2.898	0.840	2.6925	
15 minute summer	S40	1.010	S41	1066.5	3.787	1.616	11.8273	
15 minute summer	S41La	20.000	S41	64.6	3.669	1.188	0.1844	
15 minute summer	S41Lb	21.000	S41	34.0	3.210	0.636	0.0969	
15 minute summer	S41	1.011	S42	1188.4	3.507	0.927	15.7862	
15 minute summer	S42La	22.000	S42	126.0	4.762	0.733	0.2529	
15 minute summer	S42Lb	23.000	S42	61.5	4.013	0.356	0.1258	
15 minute summer	S42	1.012	S44	1376.5	3.519	0.860	11.1378	
15 minute summer	S43	24.000	S44	12.5	1.345	0.171	0.5493	
15 minute summer	S44L	25.000	S44	113.8	2.861	1.655	0.4229	
15 minute summer	S44	1.013	S45	1514.1	3.613	1.226	8.3941	
15 minute summer	S45	1.014	S46	1540.4	5.039	1.113	6.2171	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S46L	11	111.358	0.839	74.2	0.9486	0.0000	SURCHARGED
15 minute summer	S46	12	110.103	0.390	1628.7	0.9929	0.0000	OK
15 minute summer	S47L	10	114.636	0.177	50.8	0.1999	0.0000	OK
15 minute summer	S47	10	114.505	0.227	94.7	0.5785	0.0000	OK
15 minute summer	S48L	10	114.651	0.130	70.0	0.1476	0.0000	OK
15 minute summer	S48	10	114.196	0.295	177.8	0.3332	0.0000	OK
15 minute summer	S49L	10	114.147	0.241	44.3	0.2730	0.0000	SURCHARGED
15 minute summer	S49	10	114.076	0.350	228.5	0.3959	0.0000	OK
15 minute summer	S50	10	113.994	0.107	40.7	0.1882	0.0000	OK
15 minute summer	S51	10	113.853	0.125	67.4	0.2207	0.0000	OK
15 minute summer	S52	10	113.821	0.349	303.8	0.6163	0.0000	OK
15 minute summer	S53	11	113.573	0.380	320.3	0.6711	0.0000	OK
15 minute summer	S54L	10	114.071	0.412	59.8	0.4656	0.0000	SURCHARGED
15 minute summer	S54	11	113.264	0.243	424.7	0.4295	0.0000	OK
15 minute summer	S54AL	10	112.949	0.342	47.2	0.3866	0.0000	SURCHARGED
15 minute summer	S54A	10	112.293	0.176	87.8	0.3110	0.0000	OK
15 minute summer	S54B	11	111.882	0.236	524.1	0.4164	0.0000	OK
15 minute summer	S55La	10	111.610	0.106	46.0	0.1200	0.0000	OK
15 minute summer	S55Lb	10	111.789	0.111	49.0	0.1256	0.0000	OK
15 minute summer	S55	12	111.027	0.823	655.4	1.4537	0.0000	SURCHARGED
15 minute summer	S56L	10	111.140	0.087	52.6	0.0982	0.0000	OK
15 minute summer	S56	12	110.691	0.912	711.9	1.6113	0.0000	SURCHARGED
15 minute summer	S57L	12	110.608	0.589	58.0	0.6657	0.0000	SURCHARGED
15 minute summer	S57	12	110.542	1.049	771.6	1.8530	0.0000	SURCHARGED
15 minute summer	S58L	11	110.675	0.891	47.8	1.0081	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S46L	26.000	S46	71.1	4.041	1.256	0.1287	
15 minute summer	S46	1.015	S60	1614.9	7.173	0.438	4.5932	
15 minute summer	S47L	27.000	S47	50.4	1.511	0.971	0.3553	
15 minute summer	S47	27.001	S48	93.0	1.640	0.936	2.1502	
15 minute summer	S48L	28.000	S48	69.8	2.875	0.644	0.2762	
15 minute summer	S48	27.002	S49	176.9	1.771	0.883	1.7481	
15 minute summer	S49L	29.000	S49	43.8	1.140	1.583	0.4015	
15 minute summer	S49	27.003	S52	227.8	2.152	1.134	1.8805	
15 minute summer	S50	30.000	S51	40.5	1.259	0.125	0.5135	
15 minute summer	S51	30.001	S52	66.9	0.807	0.173	1.5078	
15 minute summer	S52	27.004	S53	304.9	2.221	0.943	3.8219	
15 minute summer	S53	27.005	S54	321.2	3.180	0.828	1.7338	
15 minute summer	S54L	31.000	S54	58.6	3.328	1.298	0.0925	
15 minute summer	S54	27.006	S54B	425.9	4.874	0.587	2.1414	
15 minute summer	S54AL	43.000	S54A	46.5	2.642	1.389	0.0942	
15 minute summer	S54A	43.001	S54B	86.8	1.522	0.333	2.8109	
15 minute summer	S54B	27.007	S55	524.6	3.142	0.340	5.5427	
15 minute summer	S55La	32.000	S55	45.8	3.448	0.845	0.1408	
15 minute summer	S55Lb	33.000	S55	48.8	3.500	0.894	0.1708	
15 minute summer	S55	27.008	S56	638.5	2.924	0.927	11.9595	
15 minute summer	S56L	34.000	S56	52.5	3.723	0.317	0.2401	
15 minute summer	S56	27.009	S57	693.1	2.964	0.773	4.7612	
15 minute summer	S57L	35.000	S57	65.3	2.034	0.890	0.3029	
15 minute summer	S57	27.010	S58	744.5	2.935	0.966	10.6919	
15 minute summer	S58L	36.000	S58	42.6	2.418	1.373	0.1843	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 98.85%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S58	12	110.107	1.089	800.8	1.9243	0.0000	SURCHARGED
15 minute summer	S59L	11	110.420	1.092	52.6	1.2348	0.0000	SURCHARGED
15 minute summer	S59	12	109.852	1.053	854.8	1.8606	0.0000	SURCHARGED
15 minute summer	S60L	10	110.244	0.076	29.3	0.0865	0.0000	OK
15 minute summer	S60	12	109.671	1.317	2507.5	3.3517	0.0000	SURCHARGED
15 minute summer	S61	12	109.175	1.486	2530.8	3.7814	0.0000	SURCHARGED
15 minute summer	S62	12	108.843	1.427	2548.0	3.6324	0.0000	SURCHARGED
15 minute summer	S63La	11	108.931	0.896	41.3	1.0129	0.0000	SURCHARGED
15 minute summer	S63Lb	11	109.148	1.148	70.6	1.2980	0.0000	SURCHARGED
15 minute summer	S63	10	108.572	1.361	2669.8	3.4632	0.0000	SURCHARGED
15 minute summer	S64L	10	108.402	0.715	111.8	0.8083	0.0000	SURCHARGED
720 minute summer	S64	495	108.231	1.384	355.5	3.5221	0.0000	SURCHARGED
15 minute summer	S65L	11	108.461	0.209	58.6	0.2360	0.0000	SURCHARGED
1440 minute summer	S65	1200	108.207	1.373	254.7	3.4940	0.0000	SURCHARGED
1440 minute summer	HW11	1230	108.207	1.390	692.1	0.0000	0.0000	OK
1440 minute summer	HW12	1230	108.207	1.390	690.5	0.0000	0.0000	FLOOD RISK
1440 minute summer	S66	1230	108.207	1.399	23.4	8.0096	0.0000	FLOOD RISK
15 minute summer	hw13	1	107.765	1.040	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S58	27.011	S59	810.3	3.040	1.053	4.9451	
15 minute summer	S59L	37.000	S59	48.0	2.729	2.703	0.1388	
15 minute summer	S59	27.012	S60	855.9	3.454	1.110	3.2610	
15 minute summer	S60L	38.000	S60	29.2	3.185	0.516	0.1416	
15 minute summer	S60	1.016	S61	2521.0	4.159	0.893	21.0692	
15 minute summer	S61	1.017	S62	2540.5	4.009	1.140	13.8442	
15 minute summer	S62	1.018	S63	2562.7	4.044	1.149	10.3761	
15 minute summer	S63La	39.000	S63	39.0	2.217	2.201	0.1288	
15 minute summer	S63Lb	40.000	S63	67.2	3.818	3.770	0.0681	
15 minute summer	S63	1.019	S64	2662.6	4.202	1.335	23.1150	
15 minute summer	S64L	41.000	S64	106.9	2.689	1.516	0.3582	
720 minute summer	S64	1.020	S65	350.5	0.739	0.522	7.1426	
15 minute summer	S65L	42.000	S65	56.7	3.540	1.001	0.1175	
1440 minute summer	S65	1.021	HW11	259.2	1.392	0.398	9.9179	
1440 minute summer	HW11	Flow through pond	HW12	690.5	0.032	0.042	3875.7510	
1440 minute summer	HW12	1.022	S66	23.4	0.057	0.036	5.2781	
1440 minute summer	S66	Hydro-Brake®	hw13	23.3				1242.9

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Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S67L	0.038	5.00	116.640	Manhole	1200	443759.776	291437.274	1.642
S67	0.036	5.00	116.626	Manhole	1200	443754.601	291440.646	1.760
S68	0.043	5.00	116.483	Manhole	1200	443746.454	291428.477	1.779
S69L	0.054	5.00	116.100	Manhole	1200	443761.907	291388.316	1.247
S69			116.000	Manhole	1500	443751.879	291385.041	1.676
S70			116.000	Manhole	1500	443760.577	291359.063	1.743
S71L	0.118	5.00	116.500	Manhole	1200	443813.132	291379.558	2.000
S71			116.000	Manhole	1500	443814.426	291375.457	1.880
S72	0.050	5.00	116.498	Manhole	1500	443796.103	291443.938	1.671
S73La	0.033	5.00	116.320	Manhole	1200	443805.881	291407.158	1.573
S73Lb	0.081	5.00	116.346	Manhole	1200	443816.318	291411.988	1.616
S73	0.016	5.00	116.446	Manhole	1500	443811.848	291409.919	1.990
S74	0.026	5.00	116.569	Manhole	1500	443819.303	291394.976	2.256
S75L	0.135	5.00	116.650	Manhole	1200	443828.243	291381.036	1.881
S75	0.016	5.00	116.499	Manhole	1500	443824.059	291378.789	2.430
S76	0.009	5.00	116.313	Manhole	1500	443830.286	291361.590	2.336
S77	0.010	5.00	116.252	Manhole	1500	443837.366	291353.859	2.334
S78L	0.080	5.00	116.481	Manhole	1200	443851.912	291342.796	2.329
S78	0.028	5.00	116.345	Manhole	1500	443850.095	291349.382	2.562
S79L	0.108	5.00	116.530	Manhole	1200	443897.490	291356.796	2.254
S79	0.025	5.00	116.401	Manhole	1500	443895.594	291362.985	2.828
S80L	0.033	5.00	116.600	Manhole	1200	443927.311	291365.336	1.898
S80	0.059	5.00	116.458	Manhole	1800	443925.227	291372.140	3.060
S81L	0.188	5.00	115.641	Manhole	1500	443881.050	291289.223	2.205
S81	0.054	5.00	115.632	Manhole	1500	443885.480	291280.718	2.644
S82L	0.083	5.00	116.100	Manhole	1200	443924.760	291297.037	2.394
S82	0.032	5.00	116.063	Manhole	1500	443925.865	291293.768	3.178
S83L	0.045	5.00	115.800	Manhole	1200	443960.932	291308.973	2.310
S83	0.009	5.00	115.829	Manhole	1500	443965.988	291306.734	3.047
S84	0.027	5.00	115.717	Manhole	1500	443971.953	291315.549	2.961
S85L	0.081	5.00	115.800	Manhole	1200	443987.286	291333.917	2.286
S85	0.013	5.00	115.754	Manhole	1200	443989.010	291328.289	2.433
S86			115.683	Manhole	1500	443972.588	291323.314	2.946
S87L	0.061	5.00	115.769	Manhole	1200	443964.547	291339.409	2.209
S87	0.025	5.00	115.755	Manhole	1500	443967.391	291340.280	3.061
S88	0.029	5.00	116.258	Manhole	1500	443954.993	291381.389	3.744
S89L	0.241	5.00	115.800	Manhole	1200	444004.820	291392.210	2.516
S89	0.012	5.00	115.739	Manhole	1500	444004.060	291398.006	3.340
S91			115.513	Manhole	1800	444020.925	291402.553	3.397
S92L	0.100	5.00	115.313	Manhole	1200	444009.789	291445.245	1.765
S92	0.013	5.00	115.286	Manhole	1200	444013.272	291446.339	2.178

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Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S93	0.036	5.00	115.287	Manhole	1800	444017.554	291433.597	3.215
S94L	0.063	5.00	114.788	Manhole	1200	444042.544	291447.402	1.591
S94	0.015	5.00	114.794	Manhole	1800	444044.192	291442.029	2.759
S95La	0.026	5.00	114.300	Manhole	1200	444054.557	291480.418	1.386
S95Lb	0.026	5.00	114.250	Manhole	1200	444063.621	291483.265	1.556
S95	0.026	5.00	114.279	Manhole	1200	444060.181	291482.048	2.100
S96	0.050	5.00	114.304	Manhole	1800	444070.570	291451.147	3.665
S97L	0.077	5.00	113.400	Manhole	1200	444116.288	291471.699	2.579
S97	0.018	5.00	113.420	Manhole	1800	444118.166	291466.495	3.769
S98L	0.062	5.00	112.010	Manhole	1200	444150.009	291482.356	2.491
S98	0.030	5.00	112.082	Manhole	1800	444151.269	291478.489	3.638
S99L	0.065	5.00	110.750	Manhole	1200	444188.412	291495.138	1.416
S99			110.700	Manhole	1800	444189.788	291490.853	2.799
S100			110.700	Manhole	1800	444219.480	291500.384	3.797
HW14			107.500	Manhole	1	444232.144	291519.066	1.230
HW15		5.00	107.500	Manhole	1	444293.606	291529.740	1.230
S101			107.500	Manhole	2700	444300.866	291535.204	1.247
HW16			106.000	Manhole	1	444330.832	291547.472	0.900

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S67L	S67	6.176	0.600	114.998	114.940	0.058	106.5	150	5.11	50.0
1.001	S67	S68	14.645	0.600	114.866	114.780	0.086	170.3	225	5.35	50.0
1.002	S68	S69	43.773	0.600	114.704	114.522	0.182	240.5	300	6.07	50.0
2.000	S69L	S69	10.549	0.600	114.853	114.624	0.229	46.1	150	5.12	50.0
1.003	S69	S70	27.396	0.600	114.324	114.257	0.067	408.9	450	6.53	48.4
1.004	S70	S71	56.289	0.600	114.257	114.120	0.137	410.9	450	7.47	45.2
3.000	S71L	S71	4.300	0.600	114.500	114.345	0.155	27.7	225	5.03	50.0
1.005	S71	S75	10.193	0.600	114.120	114.069	0.051	199.9	450	7.59	44.9
4.000	S72	S73	37.486	0.600	114.827	114.606	0.221	169.6	225	5.62	50.0
5.000	S73La	S73	6.575	0.600	114.747	114.681	0.066	99.6	150	5.11	50.0
6.000	S73Lb	S73	4.926	0.600	114.730	114.681	0.049	100.5	150	5.08	50.0
4.001	S73	S74	16.700	0.600	114.456	114.313	0.143	116.8	375	5.79	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	S67L	S67	0.973	17.2	5.1	1.492	1.536	1.492	1.536	0.038	0.0
1.001	S67	S68	0.999	39.7	10.0	1.535	1.478	1.478	1.535	0.074	0.0
1.002	S68	S69	1.009	71.3	15.9	1.479	1.178	1.178	1.479	0.117	0.0
2.000	S69L	S69	1.486	26.3	7.3	1.097	1.226	1.097	1.226	0.054	0.0
1.003	S69	S70	0.999	158.9	22.4	1.226	1.293	1.226	1.293	0.171	0.0
1.004	S70	S71	0.996	158.5	21.0	1.293	1.430	1.293	1.430	0.171	0.0
3.000	S71L	S71	2.493	99.1	16.0	1.775	1.430	1.430	1.775	0.118	0.0
1.005	S71	S75	1.434	228.1	35.1	1.430	1.980	1.430	1.980	0.289	0.0
4.000	S72	S73	1.001	39.8	6.8	1.446	1.615	1.446	1.615	0.050	0.0
5.000	S73La	S73	1.007	17.8	4.5	1.423	1.615	1.423	1.615	0.033	0.0
6.000	S73Lb	S73	1.002	17.7	11.0	1.466	1.615	1.466	1.615	0.081	0.0
4.001	S73	S74	1.675	185.0	24.4	1.615	1.881	1.615	1.881	0.180	0.0

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
4.002	S74	S75	16.871	0.600	114.313	114.144	0.169	99.8	375	5.95	50.0
7.000	S75L	S75	4.749	0.600	114.769	114.294	0.475	10.0	225	5.02	50.0
1.006	S75	S76	18.292	0.600	114.069	113.977	0.092	198.8	450	7.80	44.2
1.007	S76	S77	10.483	0.600	113.978	113.919	0.059	177.7	450	7.92	43.9
1.008	S77	S78	13.494	0.600	113.918	113.783	0.135	100.0	450	8.03	43.6
8.000	S78L	S78	6.832	0.600	114.152	114.083	0.069	99.0	150	5.11	50.0
1.009	S78	S79	47.489	0.600	113.784	113.648	0.136	349.2	450	8.76	41.6
9.000	S79L	S79	6.473	0.600	114.276	113.947	0.329	19.7	150	5.05	50.0
1.010	S79	S80	31.015	0.600	113.573	113.398	0.175	177.2	525	9.07	40.9
10.000	S80L	S80	7.116	0.600	114.702	113.773	0.929	7.7	150	5.03	50.0
1.011	S80	S88	31.170	0.600	113.398	112.514	0.884	35.3	525	9.20	40.6
11.000	S81L	S81	9.590	0.600	113.436	113.138	0.298	32.2	300	5.06	50.0
11.001	S81	S82	42.441	0.600	112.988	112.885	0.103	412.0	450	5.77	50.0
12.000	S82L	S82	3.450	0.600	113.706	113.185	0.521	6.6	150	5.01	50.0
11.002	S82	S83	42.166	0.600	112.885	112.782	0.103	409.4	450	6.47	48.6
13.000	S83L	S83	5.530	0.600	113.490	113.082	0.408	13.6	150	5.03	50.0
11.003	S83	S84	10.644	0.600	112.782	112.756	0.026	409.4	450	6.65	47.9
11.004	S84	S86	7.791	0.600	112.756	112.737	0.019	410.1	450	6.78	47.5
14.000	S85L	S85	5.886	0.600	113.514	113.396	0.118	49.9	150	5.07	50.0
14.001	S85	S86	17.160	0.600	113.321	112.962	0.359	47.8	225	5.22	50.0
11.005	S86	S87	17.744	0.600	112.737	112.694	0.043	412.7	450	7.08	46.5
15.000	S87L	S87	2.974	0.600	113.560	112.994	0.566	5.3	150	5.01	50.0
11.006	S87	S88	42.938	0.600	112.694	112.589	0.105	408.9	450	7.79	44.3
1.012	S88	S89	51.805	0.600	112.514	112.399	0.115	450.5	525	10.03	38.8

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
4.002	S74	S75	1.813	200.3	27.9	1.881	1.980	1.881	1.980	0.206	0.0
7.000	S75L	S75	4.162	165.5	18.3	1.656	1.980	1.656	1.980	0.135	0.0
1.006	S75	S76	1.438	228.7	77.4	1.980	1.886	1.886	1.980	0.646	0.0
1.007	S76	S77	1.522	242.0	77.9	1.885	1.883	1.883	1.885	0.655	0.0
1.008	S77	S78	2.033	323.4	78.5	1.884	2.112	1.884	2.112	0.665	0.0
8.000	S78L	S78	1.010	17.8	10.8	2.179	2.112	2.112	2.179	0.080	0.0
1.009	S78	S79	1.082	172.1	87.2	2.111	2.303	2.111	2.303	0.773	0.0
9.000	S79L	S79	2.281	40.3	14.6	2.104	2.304	2.104	2.304	0.108	0.0
1.010	S79	S80	1.679	363.5	100.4	2.303	2.535	2.303	2.535	0.906	0.0
10.000	S80L	S80	3.663	64.7	4.5	1.748	2.535	1.748	2.535	0.033	0.0
1.011	S80	S88	3.781	818.4	109.7	2.535	3.219	2.535	3.219	0.998	0.0
11.000	S81L	S81	2.781	196.6	25.5	1.905	2.194	1.905	2.194	0.188	0.0
11.001	S81	S82	0.995	158.3	32.8	2.194	2.728	2.194	2.728	0.242	0.0
12.000	S82L	S82	3.941	69.6	11.2	2.244	2.728	2.244	2.728	0.083	0.0
11.002	S82	S83	0.998	158.8	47.0	2.728	2.597	2.597	2.728	0.357	0.0
13.000	S83L	S83	2.751	48.6	6.1	2.160	2.597	2.160	2.597	0.045	0.0
11.003	S83	S84	0.998	158.8	53.4	2.597	2.511	2.511	2.597	0.411	0.0
11.004	S84	S86	0.997	158.6	56.4	2.511	2.496	2.496	2.511	0.438	0.0
14.000	S85L	S85	1.428	25.2	11.0	2.136	2.208	2.136	2.208	0.081	0.0
14.001	S85	S86	1.896	75.4	12.7	2.208	2.496	2.208	2.496	0.094	0.0
11.005	S86	S87	0.994	158.1	67.0	2.496	2.611	2.496	2.611	0.532	0.0
15.000	S87L	S87	4.426	78.2	8.3	2.059	2.611	2.059	2.611	0.061	0.0
11.006	S87	S88	0.999	158.9	74.1	2.611	3.219	2.611	3.219	0.618	0.0
1.012	S88	S89	1.049	227.0	172.9	3.219	2.815	2.815	3.219	1.645	0.0

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
16.000	S89L	S89	5.846	0.600	113.284	112.699	0.585	10.0	225	5.02	50.0
1.013	S89	S91	17.467	0.600	112.399	112.341	0.058	301.2	525	10.25	38.3
1.014	S91	S93	31.226	0.600	112.116	112.072	0.044	709.7	750	10.75	37.4
18.000	S92L	S92	3.651	0.600	113.548	113.183	0.365	10.0	150	5.02	50.0
18.001	S92	S93	13.443	0.600	113.108	112.597	0.511	26.3	225	5.11	50.0
1.015	S93	S94	27.940	0.600	112.072	112.035	0.037	755.1	750	11.21	36.5
19.000	S94L	S94	5.620	0.600	113.197	112.635	0.562	10.0	150	5.03	50.0
1.016	S94	S96	27.910	0.600	112.035	110.640	1.395	20.0	750	11.29	36.4
20.000	S95La	S95	5.856	0.600	112.914	112.328	0.586	10.0	150	5.03	50.0
21.000	S95Lb	S95	3.648	0.600	112.694	112.329	0.365	10.0	150	5.02	50.0
20.001	S95	S96	32.600	0.600	112.179	111.089	1.090	29.9	300	5.22	50.0
1.017	S96	S97	50.010	0.600	110.639	109.651	0.988	50.6	750	11.50	36.0
22.000	S97L	S97	5.532	0.600	110.821	110.251	0.570	9.7	150	5.03	50.0
1.018	S97	S98	35.209	0.600	109.651	108.444	1.207	29.2	750	11.61	35.8
23.000	S98L	S98	4.067	0.600	109.519	109.044	0.475	8.6	150	5.02	50.0
1.019	S98	S99	40.454	0.600	108.444	107.901	0.543	74.5	750	11.82	35.5
24.000	S99L	S99	4.500	0.600	109.334	108.501	0.833	5.4	150	5.02	50.0
1.020	S99	S100	31.185	0.600	107.901	106.903	0.998	31.2	750	11.92	35.3
1.021	S100	HW14	22.569	0.600	106.903	106.270	0.633	35.7	750	12.00	35.2
1.022	HW15	S101	9.087	0.600	106.270	106.253	0.017	534.5	750	5.13	50.0
1.023	S101	HW16	32.380	0.600	106.253	105.100	1.153	28.1	225	5.34	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
16.000	S89L	S89	4.163	165.5	32.7	2.291	2.815	2.291	2.815	0.241	0.0
1.013	S89	S91	1.285	278.2	197.2	2.815	2.647	2.647	2.815	1.898	0.0
1.014	S91	S93	1.043	460.6	192.2	2.647	2.465	2.465	2.647	1.898	0.0
18.000	S92L	S92	3.204	56.6	13.6	1.615	1.953	1.615	1.953	0.100	0.0
18.001	S92	S93	2.561	101.8	15.3	1.953	2.465	1.953	2.465	0.113	0.0
1.015	S93	S94	1.010	446.3	202.7	2.465	2.009	2.009	2.465	2.047	0.0
19.000	S94L	S94	3.204	56.6	8.5	1.441	2.009	1.441	2.009	0.063	0.0
1.016	S94	S96	6.272	2770.9	209.6	2.009	2.914	2.009	2.914	2.125	0.0
20.000	S95La	S95	3.205	56.6	3.5	1.236	1.801	1.236	1.801	0.026	0.0
21.000	S95Lb	S95	3.205	56.6	3.5	1.406	1.800	1.406	1.800	0.026	0.0
20.001	S95	S96	2.885	203.9	10.6	1.800	2.915	1.800	2.915	0.078	0.0
1.017	S96	S97	3.938	1739.9	220.0	2.915	3.019	2.915	3.019	2.253	0.0
22.000	S97L	S97	3.253	57.5	10.4	2.429	3.019	2.429	3.019	0.077	0.0
1.018	S97	S98	5.192	2293.8	228.1	3.019	2.888	2.888	3.019	2.348	0.0
23.000	S98L	S98	3.464	61.2	8.4	2.341	2.888	2.341	2.888	0.062	0.0
1.019	S98	S99	3.244	1433.1	234.7	2.888	2.049	2.049	2.888	2.440	0.0
24.000	S99L	S99	4.364	77.1	8.8	1.266	2.049	1.266	2.049	0.065	0.0
1.020	S99	S100	5.016	2216.0	239.8	2.049	3.047	2.049	3.047	2.505	0.0
1.021	S100	HW14	4.695	2074.2	238.9	3.047	0.480	0.480	3.047	2.505	0.0
1.022	HW15	S101	1.203	531.5	0.0	0.480	0.497	0.480	0.497	0.000	0.0
1.023	S101	HW16	2.478	98.5	0.0	1.022	0.675	0.675	1.022	0.000	0.0

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	6.176	106.5	150	116.640	114.998	1.492	116.626	114.940	1.536
1.001	14.645	170.3	225	116.626	114.866	1.535	116.483	114.780	1.478
1.002	43.773	240.5	300	116.483	114.704	1.479	116.000	114.522	1.178
2.000	10.549	46.1	150	116.100	114.853	1.097	116.000	114.624	1.226
1.003	27.396	408.9	450	116.000	114.324	1.226	116.000	114.257	1.293
1.004	56.289	410.9	450	116.000	114.257	1.293	116.000	114.120	1.430
3.000	4.300	27.7	225	116.500	114.500	1.775	116.000	114.345	1.430
1.005	10.193	199.9	450	116.000	114.120	1.430	116.499	114.069	1.980
4.000	37.486	169.6	225	116.498	114.827	1.446	116.446	114.606	1.615
5.000	6.575	99.6	150	116.320	114.747	1.423	116.446	114.681	1.615
6.000	4.926	100.5	150	116.346	114.730	1.466	116.446	114.681	1.615
4.001	16.700	116.8	375	116.446	114.456	1.615	116.569	114.313	1.881
4.002	16.871	99.8	375	116.569	114.313	1.881	116.499	114.144	1.980
7.000	4.749	10.0	225	116.650	114.769	1.656	116.499	114.294	1.980
1.006	18.292	198.8	450	116.499	114.069	1.980	116.313	113.977	1.886
1.007	10.483	177.7	450	116.313	113.978	1.885	116.252	113.919	1.883
1.008	13.494	100.0	450	116.252	113.918	1.884	116.345	113.783	2.112
8.000	6.832	99.0	150	116.481	114.152	2.179	116.345	114.083	2.112
1.009	47.489	349.2	450	116.345	113.784	2.111	116.401	113.648	2.303
9.000	6.473	19.7	150	116.530	114.276	2.104	116.401	113.947	2.304
1.010	31.015	177.2	525	116.401	113.573	2.303	116.458	113.398	2.535
10.000	7.116	7.7	150	116.600	114.702	1.748	116.458	113.773	2.535
1.011	31.170	35.3	525	116.458	113.398	2.535	116.258	112.514	3.219
11.000	9.590	32.2	300	115.641	113.436	1.905	115.632	113.138	2.194
11.001	42.441	412.0	450	115.632	112.988	2.194	116.063	112.885	2.728

Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
1.000	S67L	1200	Manhole	S67	1200	1
1.001	S67	1200	Manhole	S68	1200	1
1.002	S68	1200	Manhole	S69	1500	1
2.000	S69L	1200	Manhole	S69	1500	1
1.003	S69	1500	Manhole	S70	1500	1
1.004	S70	1500	Manhole	S71	1500	1
3.000	S71L	1200	Manhole	S71	1500	1
1.005	S71	1500	Manhole	S75	1500	1
4.000	S72	1500	Manhole	S73	1500	1
5.000	S73La	1200	Manhole	S73	1500	1
6.000	S73Lb	1200	Manhole	S73	1500	1
4.001	S73	1500	Manhole	S74	1500	1
4.002	S74	1500	Manhole	S75	1500	1
7.000	S75L	1200	Manhole	S75	1500	1
1.006	S75	1500	Manhole	S76	1500	1
1.007	S76	1500	Manhole	S77	1500	1
1.008	S77	1500	Manhole	S78	1500	1
8.000	S78L	1200	Manhole	S78	1500	1
1.009	S78	1500	Manhole	S79	1500	1
9.000	S79L	1200	Manhole	S79	1500	1
1.010	S79	1500	Manhole	S80	1800	1
10.000	S80L	1200	Manhole	S80	1800	1
1.011	S80	1800	Manhole	S88	1500	1
11.000	S81L	1500	Manhole	S81	1500	1
11.001	S81	1500	Manhole	S82	1500	1

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
12.000	3.450	6.6	150	116.100	113.706	2.244	116.063	113.185	2.728
11.002	42.166	409.4	450	116.063	112.885	2.728	115.829	112.782	2.597
13.000	5.530	13.6	150	115.800	113.490	2.160	115.829	113.082	2.597
11.003	10.644	409.4	450	115.829	112.782	2.597	115.717	112.756	2.511
11.004	7.791	410.1	450	115.717	112.756	2.511	115.683	112.737	2.496
14.000	5.886	49.9	150	115.800	113.514	2.136	115.754	113.396	2.208
14.001	17.160	47.8	225	115.754	113.321	2.208	115.683	112.962	2.496
11.005	17.744	412.7	450	115.683	112.737	2.496	115.755	112.694	2.611
15.000	2.974	5.3	150	115.769	113.560	2.059	115.755	112.994	2.611
11.006	42.938	408.9	450	115.755	112.694	2.611	116.258	112.589	3.219
1.012	51.805	450.5	525	116.258	112.514	3.219	115.739	112.399	2.815
16.000	5.846	10.0	225	115.800	113.284	2.291	115.739	112.699	2.815
1.013	17.467	301.2	525	115.739	112.399	2.815	115.513	112.341	2.647
1.014	31.226	709.7	750	115.513	112.116	2.647	115.287	112.072	2.465
18.000	3.651	10.0	150	115.313	113.548	1.615	115.286	113.183	1.953
18.001	13.443	26.3	225	115.286	113.108	1.953	115.287	112.597	2.465
1.015	27.940	755.1	750	115.287	112.072	2.465	114.794	112.035	2.009
19.000	5.620	10.0	150	114.788	113.197	1.441	114.794	112.635	2.009
1.016	27.910	20.0	750	114.794	112.035	2.009	114.304	110.640	2.914
20.000	5.856	10.0	150	114.300	112.914	1.236	114.279	112.328	1.801
21.000	3.648	10.0	150	114.250	112.694	1.406	114.279	112.329	1.800
20.001	32.600	29.9	300	114.279	112.179	1.800	114.304	111.089	2.915
1.017	50.010	50.6	750	114.304	110.639	2.915	113.420	109.651	3.019
22.000	5.532	9.7	150	113.400	110.821	2.429	113.420	110.251	3.019
1.018	35.209	29.2	750	113.420	109.651	3.019	112.082	108.444	2.888

Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
12.000	S82L	1200	Manhole	S82	1500	1
11.002	S82	1500	Manhole	S83	1500	1
13.000	S83L	1200	Manhole	S83	1500	1
11.003	S83	1500	Manhole	S84	1500	1
11.004	S84	1500	Manhole	S86	1500	1
14.000	S85L	1200	Manhole	S85	1200	1
14.001	S85	1200	Manhole	S86	1500	1
11.005	S86	1500	Manhole	S87	1500	1
15.000	S87L	1200	Manhole	S87	1500	1
11.006	S87	1500	Manhole	S88	1500	1
1.012	S88	1500	Manhole	S89	1500	1
16.000	S89L	1200	Manhole	S89	1500	1
1.013	S89	1500	Manhole	S91	1800	1
1.014	S91	1800	Manhole	S93	1800	1
18.000	S92L	1200	Manhole	S92	1200	1
18.001	S92	1200	Manhole	S93	1800	1
1.015	S93	1800	Manhole	S94	1800	1
19.000	S94L	1200	Manhole	S94	1800	1
1.016	S94	1800	Manhole	S96	1800	1
20.000	S95La	1200	Manhole	S95	1200	1
21.000	S95Lb	1200	Manhole	S95	1200	1
20.001	S95	1200	Manhole	S96	1800	1
1.017	S96	1800	Manhole	S97	1800	1
22.000	S97L	1200	Manhole	S97	1800	1
1.018	S97	1800	Manhole	S98	1800	1

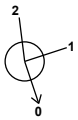
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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
23.000	4.067	8.6	150	112.010	109.519	2.341	112.082	109.044	2.888
1.019	40.454	74.5	750	112.082	108.444	2.888	110.700	107.901	2.049
24.000	4.500	5.4	150	110.750	109.334	1.266	110.700	108.501	2.049
1.020	31.185	31.2	750	110.700	107.901	2.049	110.700	106.903	3.047
1.021	22.569	35.7	750	110.700	106.903	3.047	107.500	106.270	0.480
1.022	9.087	534.5	750	107.500	106.270	0.480	107.500	106.253	0.497
1.023	32.380	28.1	225	107.500	106.253	1.022	106.000	105.100	0.675

Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
23.000	S98L	1200	Manhole	S98	1800	1
1.019	S98	1800	Manhole	S99	1800	1
24.000	S99L	1200	Manhole	S99	1800	1
1.020	S99	1800	Manhole	S100	1800	1
1.021	S100	1800	Manhole	HW14	1	1
1.022	HW15	1	Manhole	S101	2700	1
1.023	S101	2700	Manhole	HW16	1	1

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S67L	443759.776	291437.274	116.640	1.642	1200	Manhole		0	1.000	114.998	150
S67	443754.601	291440.646	116.626	1.760	1200	Manhole		1 0	1.000 1.001	114.940 114.866	150 225
S68	443746.454	291428.477	116.483	1.779	1200	Manhole		1 0	1.001 1.002	114.780 114.704	225 300
S69L	443761.907	291388.316	116.100	1.247	1200	Manhole		0	2.000	114.853	150
S69	443751.879	291385.041	116.000	1.676	1500	Manhole		1 2 0	2.000 1.002 1.003	114.624 114.522 114.324	150 300 450
S70	443760.577	291359.063	116.000	1.743	1500	Manhole		1 0	1.003 1.004	114.257 114.257	450 450
S71L	443813.132	291379.558	116.500	2.000	1200	Manhole		0	3.000	114.500	225

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S71	443814.426	291375.457	116.000	1.880	1500	Manhole	1	3.000	114.345	225
							2	1.004	114.120	450
							0	1.005	114.120	450
S72	443796.103	291443.938	116.498	1.671	1500	Manhole	0	4.000	114.827	225
S73La	443805.881	291407.158	116.320	1.573	1200	Manhole	0	5.000	114.747	150
S73Lb	443816.318	291411.988	116.346	1.616	1200	Manhole	0	6.000	114.730	150
S73	443811.848	291409.919	116.446	1.990	1500	Manhole	1	6.000	114.681	150
							2	5.000	114.681	150
							3	4.000	114.606	225
							0	4.001	114.456	375
S74	443819.303	291394.976	116.569	2.256	1500	Manhole	1	4.001	114.313	375
							0	4.002	114.313	375
S75L	443828.243	291381.036	116.650	1.881	1200	Manhole	0	7.000	114.769	225
S75	443824.059	291378.789	116.499	2.430	1500	Manhole	1	7.000	114.294	225
							2	4.002	114.144	375
							3	1.005	114.069	450
							0	1.006	114.069	450
S76	443830.286	291361.590	116.313	2.336	1500	Manhole	1	1.006	113.977	450
							0	1.007	113.978	450
S77	443837.366	291353.859	116.252	2.334	1500	Manhole	1	1.007	113.919	450
							0	1.008	113.918	450
S78L	443851.912	291342.796	116.481	2.329	1200	Manhole	0	8.000	114.152	150
S78	443850.095	291349.382	116.345	2.562	1500	Manhole	1	8.000	114.083	150
							2	1.008	113.783	450
							0	1.009	113.784	450
S79L	443897.490	291356.796	116.530	2.254	1200	Manhole	0	9.000	114.276	150

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S79	443895.594	291362.985	116.401	2.828	1500	Manhole	1	9.000	113.947	150
							2	1.009	113.648	450
							0	1.010	113.573	525
S80L	443927.311	291365.336	116.600	1.898	1200	Manhole	0	10.000	114.702	150
S80	443925.227	291372.140	116.458	3.060	1800	Manhole	1	10.000	113.773	150
							2	1.010	113.398	525
							0	1.011	113.398	525
S81L	443881.050	291289.223	115.641	2.205	1500	Manhole	0	11.000	113.436	300
S81	443885.480	291280.718	115.632	2.644	1500	Manhole	1	11.000	113.138	300
							0	11.001	112.988	450
S82L	443924.760	291297.037	116.100	2.394	1200	Manhole	0	12.000	113.706	150
S82	443925.865	291293.768	116.063	3.178	1500	Manhole	1	12.000	113.185	150
							2	11.001	112.885	450
							0	11.002	112.885	450
S83L	443960.932	291308.973	115.800	2.310	1200	Manhole	0	13.000	113.490	150
S83	443965.988	291306.734	115.829	3.047	1500	Manhole	1	13.000	113.082	150
							2	11.002	112.782	450
							0	11.003	112.782	450
S84	443971.953	291315.549	115.717	2.961	1500	Manhole	1	11.003	112.756	450
							0	11.004	112.756	450
S85L	443987.286	291333.917	115.800	2.286	1200	Manhole	0	14.000	113.514	150
S85	443989.010	291328.289	115.754	2.433	1200	Manhole	1	14.000	113.396	150
							0	14.001	113.321	225
S86	443972.588	291323.314	115.683	2.946	1500	Manhole	1	14.001	112.962	225
							2	11.004	112.737	450
							0	11.005	112.737	450

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S87L	443964.547	291339.409	115.769	2.209	1200	Manhole	0	15.000	113.560	150
S87	443967.391	291340.280	115.755	3.061	1500	Manhole	1	15.000	112.994	150
							2	11.005	112.694	450
							0	11.006	112.694	450
S88	443954.993	291381.389	116.258	3.744	1500	Manhole	1	11.006	112.589	450
							2	1.011	112.514	525
							0	1.012	112.514	525
S89L	444004.820	291392.210	115.800	2.516	1200	Manhole	0	16.000	113.284	225
S89	444004.060	291398.006	115.739	3.340	1500	Manhole	1	16.000	112.699	225
							2	1.012	112.399	525
							0	1.013	112.399	525
S91	444020.925	291402.553	115.513	3.397	1800	Manhole	1	1.013	112.341	525
							0	1.014	112.116	750
S92L	444009.789	291445.245	115.313	1.765	1200	Manhole	0	18.000	113.548	150
S92	444013.272	291446.339	115.286	2.178	1200	Manhole	1	18.000	113.183	150
							0	18.001	113.108	225
S93	444017.554	291433.597	115.287	3.215	1800	Manhole	1	18.001	112.597	225
							2	1.014	112.072	750
							0	1.015	112.072	750
S94L	444042.544	291447.402	114.788	1.591	1200	Manhole	0	19.000	113.197	150
S94	444044.192	291442.029	114.794	2.759	1800	Manhole	1	19.000	112.635	150
							2	1.015	112.035	750
							0	1.016	112.035	750
S95La	444054.557	291480.418	114.300	1.386	1200	Manhole	0	20.000	112.914	150
S95Lb	444063.621	291483.265	114.250	1.556	1200	Manhole	0	21.000	112.694	150

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S95	444060.181	291482.048	114.279	2.100	1200	Manhole	1	21.000	112.329	150
							2	20.000	112.328	150
							0	20.001	112.179	300
S96	444070.570	291451.147	114.304	3.665	1800	Manhole	1	20.001	111.089	300
							2	1.016	110.640	750
							0	1.017	110.639	750
S97L	444116.288	291471.699	113.400	2.579	1200	Manhole	0	22.000	110.821	150
S97	444118.166	291466.495	113.420	3.769	1800	Manhole	1	22.000	110.251	150
							2	1.017	109.651	750
							0	1.018	109.651	750
S98L	444150.009	291482.356	112.010	2.491	1200	Manhole	0	23.000	109.519	150
S98	444151.269	291478.489	112.082	3.638	1800	Manhole	1	23.000	109.044	150
							2	1.018	108.444	750
							0	1.019	108.444	750
S99L	444188.412	291495.138	110.750	1.416	1200	Manhole	0	24.000	109.334	150
S99	444189.788	291490.853	110.700	2.799	1800	Manhole	1	24.000	108.501	150
							2	1.019	107.901	750
							0	1.020	107.901	750
S100	444219.480	291500.384	110.700	3.797	1800	Manhole	1	1.020	106.903	750
							0	1.021	106.903	750
HW14	444232.144	291519.066	107.500	1.230	1	Manhole	1	1.021	106.270	750
HW15	444293.606	291529.740	107.500	1.230	1	Manhole	0	1.022	106.270	750
S101	444300.866	291535.204	107.500	1.247	2700	Manhole	1	1.022	106.253	750
							0	1.023	106.253	225
HW16	444330.832	291547.472	106.000	0.900	1	Manhole	1	1.023	105.100	225

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Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	0.0
Ratio-R	0.400	Check Discharge Rate(s)	x
Summer CV	0.750	Check Discharge Volume	x
Analysis Speed	Detailed		

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	40	0	0
100	40	10	0

Node S101 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	106.253	Product Number	CTL-SHE-0143-1070-1500-1070
Design Depth (m)	1.500	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	10.7	Min Node Diameter (mm)	1200

Node HW15 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	100.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	106.270	Main Channel Slope (1:X)	1000.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.020

Inlets

HW14

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	1306.0	0.0	1.455	2488.0	0.0	1.456	0.0	0.0

Other (defaults)

Entry Loss (manhole)	0.000	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.000	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 15 minute summer	141.566	40.058
2 year 30 minute summer	91.753	25.963
2 year 60 minute summer	61.301	16.200
2 year 120 minute summer	37.449	9.897
2 year 180 minute summer	28.672	7.378
2 year 240 minute summer	22.636	5.982
2 year 360 minute summer	17.235	4.435

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Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 480 minute summer	13.550	3.581
2 year 600 minute summer	11.088	3.033
2 year 720 minute summer	9.878	2.647
2 year 960 minute summer	8.113	2.136
2 year 1440 minute summer	5.891	1.579
30 year 15 minute summer	268.706	76.035
30 year 30 minute summer	174.929	49.499
30 year 60 minute summer	116.589	30.811
30 year 120 minute summer	70.438	18.615
30 year 180 minute summer	53.298	13.715
30 year 240 minute summer	41.604	10.995
30 year 360 minute summer	31.221	8.034
30 year 480 minute summer	24.324	6.428
30 year 600 minute summer	19.756	5.404
30 year 720 minute summer	17.490	4.687
30 year 960 minute summer	14.215	3.743
30 year 1440 minute summer	10.161	2.723
100 year +40% CC 15 minute summer	488.233	138.153
100 year +40% CC 30 minute summer	320.551	90.705
100 year +40% CC 60 minute summer	214.603	56.713
100 year +40% CC 120 minute summer	129.587	34.246
100 year +40% CC 180 minute summer	97.729	25.149
100 year +40% CC 240 minute summer	75.977	20.078
100 year +40% CC 360 minute summer	56.677	14.585
100 year +40% CC 480 minute summer	43.979	11.622
100 year +40% CC 600 minute summer	35.604	9.738
100 year +40% CC 720 minute summer	31.433	8.424
100 year +40% CC 960 minute summer	25.432	6.697
100 year +40% CC 1440 minute summer	18.055	4.839
100 year +40% CC +10% A 15 minute summer	488.233	138.153
100 year +40% CC +10% A 30 minute summer	320.551	90.705
100 year +40% CC +10% A 60 minute summer	214.603	56.713
100 year +40% CC +10% A 120 minute summer	129.587	34.246
100 year +40% CC +10% A 180 minute summer	97.729	25.149
100 year +40% CC +10% A 240 minute summer	75.977	20.078
100 year +40% CC +10% A 360 minute summer	56.677	14.585
100 year +40% CC +10% A 480 minute summer	43.979	11.622
100 year +40% CC +10% A 600 minute summer	35.604	9.738
100 year +40% CC +10% A 720 minute summer	31.433	8.424
100 year +40% CC +10% A 960 minute summer	25.432	6.697
100 year +40% CC +10% A 1440 minute summer	18.055	4.839

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Results for 2 year Critical Storm Duration. Lowest mass balance: 99.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S67L	10	115.062	0.064	6.6	0.0725	0.0000	OK
15 minute summer	S67	10	114.953	0.087	12.7	0.0979	0.0000	OK
15 minute summer	S68	11	114.811	0.107	20.1	0.1209	0.0000	OK
15 minute summer	S69L	10	114.915	0.062	9.4	0.0699	0.0000	OK
15 minute summer	S69	11	114.451	0.127	28.9	0.2245	0.0000	OK
15 minute summer	S70	12	114.382	0.125	29.0	0.2211	0.0000	OK
15 minute summer	S71L	10	114.569	0.069	20.5	0.0782	0.0000	OK
15 minute summer	S71	11	114.281	0.161	46.7	0.2851	0.0000	OK
15 minute summer	S72	11	114.897	0.070	8.7	0.1233	0.0000	OK
15 minute summer	S73La	10	114.805	0.058	5.7	0.0657	0.0000	OK
15 minute summer	S73Lb	10	114.830	0.100	14.0	0.1130	0.0000	OK
15 minute summer	S73	10	114.558	0.102	30.6	0.1799	0.0000	OK
15 minute summer	S74	11	114.417	0.104	34.9	0.1844	0.0000	OK
15 minute summer	S75L	10	114.826	0.057	23.4	0.0645	0.0000	OK
15 minute summer	S75	11	114.279	0.210	105.6	0.3709	0.0000	OK
15 minute summer	S76	11	114.183	0.206	106.6	0.3640	0.0000	OK
15 minute summer	S77	11	114.116	0.198	107.9	0.3497	0.0000	OK
15 minute summer	S78L	10	114.251	0.099	13.9	0.1117	0.0000	OK
15 minute summer	S78	12	114.054	0.271	125.6	0.4787	0.0000	OK
15 minute summer	S79L	10	114.348	0.072	18.7	0.0812	0.0000	OK
15 minute summer	S79	12	113.798	0.225	143.7	0.3971	0.0000	OK
15 minute summer	S80L	10	114.732	0.030	5.7	0.0341	0.0000	OK
15 minute summer	S80	12	113.551	0.153	157.0	0.3904	0.0000	OK
15 minute summer	S81L	10	113.518	0.082	32.6	0.1449	0.0000	OK
15 minute summer	S81	10	113.141	0.153	41.9	0.2708	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S67L	1.000	S67	6.5	0.913	0.381	0.0443	
15 minute summer	S67	1.001	S68	12.6	0.900	0.318	0.2057	
15 minute summer	S68	1.002	S69	19.9	0.884	0.279	0.9859	
15 minute summer	S69L	2.000	S69	9.3	1.364	0.355	0.0721	
15 minute summer	S69	1.003	S70	29.0	0.824	0.182	0.9863	
15 minute summer	S70	1.004	S71	27.8	0.663	0.175	2.4308	
15 minute summer	S71L	3.000	S71	20.4	1.980	0.206	0.0444	
15 minute summer	S71	1.005	S75	46.5	0.804	0.204	0.6294	
15 minute summer	S72	4.000	S73	8.5	0.808	0.213	0.3928	
15 minute summer	S73La	5.000	S73	5.7	0.900	0.318	0.0413	
15 minute summer	S73Lb	6.000	S73	13.9	1.118	0.785	0.0613	
15 minute summer	S73	4.001	S74	30.4	1.237	0.164	0.4103	
15 minute summer	S74	4.002	S75	34.8	1.254	0.174	0.5115	
15 minute summer	S75L	7.000	S75	23.4	2.964	0.141	0.0374	
15 minute summer	S75	1.006	S76	105.1	1.469	0.460	1.3094	
15 minute summer	S76	1.007	S77	106.2	1.514	0.439	0.7353	
15 minute summer	S77	1.008	S78	107.7	1.291	0.333	1.1244	
15 minute summer	S78L	8.000	S78	13.8	1.122	0.772	0.0839	
15 minute summer	S78	1.009	S79	125.3	1.329	0.728	4.4776	
15 minute summer	S79L	9.000	S79	18.6	2.241	0.462	0.0538	
15 minute summer	S79	1.010	S80	144.4	2.065	0.397	2.1806	
15 minute summer	S80L	10.000	S80	5.7	2.261	0.088	0.0179	
15 minute summer	S80	1.011	S88	157.8	1.306	0.193	3.7706	
15 minute summer	S81L	11.000	S81	32.5	2.086	0.165	0.1493	
15 minute summer	S81	11.001	S82	41.1	0.750	0.259	2.3453	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 99.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S82L	10	113.752	0.046	14.4	0.0525	0.0000	OK
15 minute summer	S82	11	113.074	0.189	60.9	0.3342	0.0000	OK
15 minute summer	S83L	10	113.531	0.041	7.8	0.0460	0.0000	OK
15 minute summer	S83	11	113.005	0.222	69.5	0.3931	0.0000	OK
15 minute summer	S84	12	112.994	0.238	72.7	0.4209	0.0000	OK
15 minute summer	S85L	10	113.594	0.080	14.0	0.0900	0.0000	OK
15 minute summer	S85	10	113.391	0.070	16.2	0.0796	0.0000	OK
15 minute summer	S86	12	112.989	0.252	87.6	0.4446	0.0000	OK
15 minute summer	S87L	10	113.597	0.037	10.6	0.0423	0.0000	OK
15 minute summer	S87	12	112.973	0.279	100.3	0.4932	0.0000	OK
15 minute summer	S88	12	112.945	0.430	255.4	0.7607	0.0000	OK
15 minute summer	S89L	10	113.361	0.077	41.8	0.0869	0.0000	OK
15 minute summer	S89	12	112.784	0.385	290.1	0.6806	0.0000	OK
15 minute summer	S91	12	112.506	0.390	289.3	0.9931	0.0000	OK
15 minute summer	S92L	10	113.605	0.057	17.3	0.0645	0.0000	OK
15 minute summer	S92	10	113.175	0.066	19.6	0.0752	0.0000	OK
15 minute summer	S93	13	112.447	0.375	307.4	0.9535	0.0000	OK
15 minute summer	S94L	10	113.242	0.045	10.9	0.0505	0.0000	OK
15 minute summer	S94	12	112.204	0.169	327.0	0.4295	0.0000	OK
15 minute summer	S95La	10	112.943	0.029	4.5	0.0324	0.0000	OK
15 minute summer	S95Lb	10	112.723	0.029	4.5	0.0324	0.0000	OK
15 minute summer	S95	10	112.231	0.052	13.5	0.0585	0.0000	OK
15 minute summer	S96	12	110.864	0.225	341.4	0.5722	0.0000	OK
15 minute summer	S97L	10	110.870	0.049	13.4	0.0558	0.0000	OK
15 minute summer	S97	13	109.842	0.190	342.4	0.4847	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S82L	12.000	S82	14.4	3.111	0.206	0.0159	
15 minute summer	S82	11.002	S83	60.6	0.864	0.382	2.9791	
15 minute summer	S83L	13.000	S83	7.8	2.018	0.160	0.0213	
15 minute summer	S83	11.003	S84	68.2	0.841	0.429	0.8667	
15 minute summer	S84	11.004	S86	71.8	0.831	0.452	0.6868	
15 minute summer	S85L	14.000	S85	13.9	1.469	0.552	0.0558	
15 minute summer	S85	14.001	S86	16.1	1.522	0.214	0.1816	
15 minute summer	S86	11.005	S87	86.1	0.944	0.544	1.7249	
15 minute summer	S87L	15.000	S87	10.6	3.099	0.135	0.0102	
15 minute summer	S87	11.006	S88	94.6	0.893	0.596	5.1010	
15 minute summer	S88	1.012	S89	255.5	1.439	1.126	9.3070	
15 minute summer	S89L	16.000	S89	41.7	3.495	0.252	0.0698	
15 minute summer	S89	1.013	S91	289.3	1.753	1.040	2.8818	
15 minute summer	S91	1.014	S93	286.6	1.299	0.622	6.9428	
15 minute summer	S92L	18.000	S92	17.3	2.818	0.305	0.0224	
15 minute summer	S92	18.001	S93	19.5	1.990	0.191	0.1314	
15 minute summer	S93	1.015	S94	316.3	2.275	0.709	4.0401	
15 minute summer	S94L	19.000	S94	10.9	2.477	0.192	0.0247	
15 minute summer	S94	1.016	S96	323.3	3.605	0.117	2.5694	
15 minute summer	S95La	20.000	S95	4.5	1.917	0.079	0.0137	
15 minute summer	S95Lb	21.000	S95	4.5	1.917	0.079	0.0085	
15 minute summer	S95	20.001	S96	13.3	1.649	0.065	0.2628	
15 minute summer	S96	1.017	S97	329.4	3.396	0.189	4.9338	
15 minute summer	S97L	22.000	S97	13.4	2.653	0.232	0.0279	
15 minute summer	S97	1.018	S98	341.0	3.169	0.149	3.8041	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 99.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S98L	10	109.562	0.043	10.8	0.0483	0.0000	OK
15 minute summer	S98	13	108.694	0.250	348.9	0.6359	0.0000	OK
15 minute summer	S99L	10	109.373	0.039	11.3	0.0440	0.0000	OK
15 minute summer	S99	13	108.100	0.199	357.0	0.5058	0.0000	OK
15 minute summer	S100	13	107.111	0.208	358.1	0.5296	0.0000	OK
480 minute summer	HW14	368	106.576	0.306	70.5	0.0000	0.0000	OK
480 minute summer	HW15	368	106.576	0.306	40.5	0.0000	0.0000	OK
480 minute summer	S101	464	106.580	0.327	38.8	1.8698	0.0000	SURCHARGED
480 minute summer	HW16	368	105.149	0.049	10.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S98L	23.000	S98	10.8	2.614	0.176	0.0168	
15 minute summer	S98	1.019	S99	351.3	3.180	0.245	4.4802	
15 minute summer	S99L	24.000	S99	11.3	3.125	0.146	0.0162	
15 minute summer	S99	1.020	S100	358.1	3.716	0.162	3.0052	
15 minute summer	S100	1.021	HW14	361.1	4.068	0.174	2.0645	
480 minute summer	HW14	Flow through pond	HW15	40.5	0.070	0.001	361.7393	
480 minute summer	HW15	1.022	S101	38.8	0.260	0.073	1.5893	
480 minute summer	S101	1.023	HW16	10.3	1.620	0.104	0.2056	320.5

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S67L	10	115.092	0.094	12.5	0.1065	0.0000	OK
15 minute summer	S67	10	114.991	0.125	24.2	0.1414	0.0000	OK
15 minute summer	S68	11	114.857	0.153	38.2	0.1727	0.0000	OK
15 minute summer	S69L	10	114.943	0.090	17.8	0.1020	0.0000	OK
15 minute summer	S69	11	114.502	0.178	55.0	0.3146	0.0000	OK
15 minute summer	S70	11	114.433	0.176	55.2	0.3117	0.0000	OK
15 minute summer	S71L	10	114.597	0.097	38.8	0.1100	0.0000	OK
15 minute summer	S71	11	114.389	0.268	90.6	0.4744	0.0000	OK
15 minute summer	S72	10	114.926	0.099	16.5	0.1742	0.0000	OK
15 minute summer	S73La	10	114.831	0.084	10.9	0.0954	0.0000	OK
15 minute summer	S73Lb	10	114.938	0.208	26.7	0.2355	0.0000	SURCHARGED
15 minute summer	S73	10	114.600	0.144	58.5	0.2548	0.0000	OK
15 minute summer	S74	10	114.468	0.155	66.8	0.2745	0.0000	OK
15 minute summer	S75L	10	114.848	0.079	44.4	0.0897	0.0000	OK
15 minute summer	S75	11	114.388	0.319	203.9	0.5644	0.0000	OK
15 minute summer	S76	12	114.297	0.320	204.9	0.5652	0.0000	OK
15 minute summer	S77	12	114.251	0.333	206.4	0.5888	0.0000	OK
15 minute summer	S78L	10	114.377	0.225	26.3	0.2549	0.0000	SURCHARGED
15 minute summer	S78	12	114.239	0.456	237.4	0.8054	0.0000	SURCHARGED
15 minute summer	S79L	10	114.385	0.109	35.5	0.1236	0.0000	OK
15 minute summer	S79	11	113.900	0.327	271.5	0.5781	0.0000	OK
15 minute summer	S80L	10	114.744	0.042	10.9	0.0472	0.0000	OK
15 minute summer	S80	11	113.612	0.214	298.5	0.5450	0.0000	OK
15 minute summer	S81L	12	113.601	0.165	61.9	0.2916	0.0000	OK
15 minute summer	S81	12	113.699	0.711	125.6	1.2562	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S67L	1.000	S67	12.4	1.067	0.721	0.0718	
15 minute summer	S67	1.001	S68	24.0	1.060	0.603	0.3311	
15 minute summer	S68	1.002	S69	37.9	1.064	0.531	1.5590	
15 minute summer	S69L	2.000	S69	17.7	1.600	0.673	0.1165	
15 minute summer	S69	1.003	S70	55.2	0.974	0.347	1.5873	
15 minute summer	S70	1.004	S71	53.5	0.719	0.338	4.3963	
15 minute summer	S71L	3.000	S71	38.7	2.360	0.391	0.0705	
15 minute summer	S71	1.005	S75	89.7	0.912	0.393	1.1159	
15 minute summer	S72	4.000	S73	16.1	0.964	0.404	0.6254	
15 minute summer	S73La	5.000	S73	10.8	1.062	0.608	0.0669	
15 minute summer	S73Lb	6.000	S73	26.5	1.504	1.496	0.0856	
15 minute summer	S73	4.001	S74	58.2	1.445	0.314	0.6855	
15 minute summer	S74	4.002	S75	66.7	1.240	0.333	0.9916	
15 minute summer	S75L	7.000	S75	44.3	3.546	0.268	0.0662	
15 minute summer	S75	1.006	S76	202.1	1.691	0.884	2.1989	
15 minute summer	S76	1.007	S77	203.3	1.724	0.840	1.2872	
15 minute summer	S77	1.008	S78	203.5	1.444	0.629	1.9182	
15 minute summer	S78L	8.000	S78	26.0	1.478	1.459	0.1203	
15 minute summer	S78	1.009	S79	233.4	1.589	1.356	6.8191	
15 minute summer	S79L	9.000	S79	35.4	2.577	0.878	0.0888	
15 minute summer	S79	1.010	S80	269.6	2.406	0.742	3.4766	
15 minute summer	S80L	10.000	S80	10.9	2.727	0.168	0.0284	
15 minute summer	S80	1.011	S88	296.6	1.697	0.362	4.6562	
15 minute summer	S81L	11.000	S81	61.7	2.497	0.314	0.5280	
15 minute summer	S81	11.001	S82	77.9	0.857	0.492	6.7245	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S82L	12	113.776	0.070	27.3	0.0793	0.0000	OK
15 minute summer	S82	12	113.654	0.769	115.5	1.3585	0.0000	SURCHARGED
15 minute summer	S83L	12	113.590	0.100	14.8	0.1128	0.0000	OK
15 minute summer	S83	12	113.600	0.818	128.7	1.4462	0.0000	SURCHARGED
15 minute summer	S84	12	113.585	0.829	120.1	1.4652	0.0000	SURCHARGED
15 minute summer	S85L	10	113.649	0.135	26.7	0.1530	0.0000	OK
15 minute summer	S85	12	113.672	0.350	30.8	0.3964	0.0000	SURCHARGED
15 minute summer	S86	12	113.547	0.810	136.1	1.4304	0.0000	SURCHARGED
15 minute summer	S87L	10	113.612	0.052	20.1	0.0585	0.0000	OK
15 minute summer	S87	12	113.500	0.806	157.3	1.4250	0.0000	SURCHARGED
15 minute summer	S88	12	113.452	0.938	439.7	1.6573	0.0000	SURCHARGED
15 minute summer	S89L	10	113.393	0.109	79.3	0.1233	0.0000	OK
15 minute summer	S89	12	113.010	0.611	499.4	1.0794	0.0000	SURCHARGED
15 minute summer	S91	12	112.658	0.542	492.7	1.3782	0.0000	OK
15 minute summer	S92L	10	113.630	0.082	32.9	0.0930	0.0000	OK
15 minute summer	S92	10	113.202	0.093	37.1	0.1057	0.0000	OK
15 minute summer	S93	13	112.588	0.516	523.7	1.3138	0.0000	OK
15 minute summer	S94L	10	113.260	0.063	20.7	0.0711	0.0000	OK
15 minute summer	S94	12	112.265	0.230	578.3	0.5849	0.0000	OK
15 minute summer	S95La	10	112.954	0.040	8.6	0.0448	0.0000	OK
15 minute summer	S95Lb	10	112.734	0.040	8.6	0.0448	0.0000	OK
15 minute summer	S95	10	112.250	0.071	25.7	0.0806	0.0000	OK
15 minute summer	S96	12	110.933	0.293	621.7	0.7469	0.0000	OK
15 minute summer	S97L	10	110.891	0.070	25.3	0.0789	0.0000	OK
15 minute summer	S97	12	109.906	0.255	596.9	0.6489	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S82L	12.000	S82	27.3	3.709	0.391	0.0443	
15 minute summer	S82	11.002	S83	110.9	0.952	0.698	6.6809	
15 minute summer	S83L	13.000	S83	14.8	2.375	0.304	0.0831	
15 minute summer	S83	11.003	S84	113.8	0.897	0.717	1.6865	
15 minute summer	S84	11.004	S86	124.0	0.871	0.782	1.2344	
15 minute summer	S85L	14.000	S85	26.5	1.576	1.049	0.0997	
15 minute summer	S85	14.001	S86	30.6	1.768	0.406	0.6825	
15 minute summer	S86	11.005	S87	138.7	0.997	0.877	2.8114	
15 minute summer	S87L	15.000	S87	20.1	3.660	0.257	0.0342	
15 minute summer	S87	11.006	S88	156.2	1.046	0.983	6.8032	
15 minute summer	S88	1.012	S89	440.1	2.037	1.939	11.1916	
15 minute summer	S89L	16.000	S89	79.2	4.089	0.479	0.1709	
15 minute summer	S89	1.013	S91	492.7	2.284	1.771	3.6529	
15 minute summer	S91	1.014	S93	493.7	1.506	1.072	10.2397	
15 minute summer	S92L	18.000	S92	32.8	3.328	0.580	0.0360	
15 minute summer	S92	18.001	S93	37.0	2.377	0.363	0.2091	
15 minute summer	S93	1.015	S94	558.0	2.727	1.250	5.9699	
15 minute summer	S94L	19.000	S94	20.7	2.958	0.365	0.0392	
15 minute summer	S94	1.016	S96	587.4	4.311	0.212	3.8110	
15 minute summer	S95La	20.000	S95	8.6	2.316	0.151	0.0217	
15 minute summer	S95Lb	21.000	S95	8.6	2.316	0.151	0.0135	
15 minute summer	S95	20.001	S96	25.5	1.997	0.125	0.4161	
15 minute summer	S96	1.017	S97	572.2	3.975	0.329	7.2879	
15 minute summer	S97L	22.000	S97	25.2	3.153	0.439	0.0443	
15 minute summer	S97	1.018	S98	600.9	3.727	0.262	5.7350	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S98L	10	109.579	0.060	20.4	0.0676	0.0000	OK
15 minute summer	S98	12	108.784	0.340	624.8	0.8651	0.0000	OK
15 minute summer	S99L	10	109.388	0.054	21.4	0.0613	0.0000	OK
15 minute summer	S99	12	108.171	0.270	649.3	0.6882	0.0000	OK
15 minute summer	S100	12	107.188	0.285	648.9	0.7261	0.0000	OK
480 minute summer	HW14	480	106.806	0.536	126.0	0.0000	0.0000	OK
480 minute summer	HW15	488	106.806	0.536	72.9	0.0000	0.0000	OK
600 minute summer	S101	585	106.833	0.580	68.4	3.3214	0.0000	SURCHARGED
120 minute summer	HW16	126	105.150	0.050	10.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S98L	23.000	S98	20.4	3.120	0.333	0.0265	
15 minute summer	S98	1.019	S99	632.3	3.760	0.441	6.8127	
15 minute summer	S99L	24.000	S99	21.4	3.743	0.277	0.0257	
15 minute summer	S99	1.020	S100	648.9	4.377	0.293	4.6244	
15 minute summer	S100	1.021	HW14	648.7	5.049	0.313	2.9792	
480 minute summer	HW14	Flow through pond	HW15	72.9	0.078	0.002	731.1046	
480 minute summer	HW15	1.022	S101	67.6	0.221	0.127	3.1635	
600 minute summer	S101	1.023	HW16	10.7	1.639	0.109	0.2114	418.0

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S67L	13	115.588	0.590	22.7	0.6670	0.0000	SURCHARGED
15 minute summer	S67	13	115.546	0.680	44.0	0.7690	0.0000	SURCHARGED
15 minute summer	S68	13	115.504	0.800	69.2	0.9044	0.0000	SURCHARGED
15 minute summer	S69L	12	115.579	0.726	32.3	0.8206	0.0000	SURCHARGED
15 minute summer	S69	13	115.431	1.107	98.2	1.9560	0.0000	SURCHARGED
15 minute summer	S70	13	115.422	1.165	81.0	2.0578	0.0000	SURCHARGED
15 minute summer	S71L	12	115.422	0.922	70.6	1.0426	0.0000	SURCHARGED
15 minute summer	S71	13	115.381	1.261	120.4	2.2287	0.0000	SURCHARGED
15 minute summer	S72	12	115.484	0.657	29.9	1.1615	0.0000	SURCHARGED
15 minute summer	S73La	12	115.468	0.721	19.7	0.8159	0.0000	SURCHARGED
15 minute summer	S73Lb	12	115.633	0.903	48.4	1.0215	0.0000	SURCHARGED
15 minute summer	S73	12	115.425	0.969	106.0	1.7121	0.0000	SURCHARGED
15 minute summer	S74	12	115.402	1.089	111.5	1.9234	0.0000	SURCHARGED
15 minute summer	S75L	12	115.432	0.663	80.7	0.7499	0.0000	SURCHARGED
15 minute summer	S75	12	115.369	1.300	273.0	2.2969	0.0000	SURCHARGED
15 minute summer	S76	12	115.260	1.282	249.4	2.2661	0.0000	SURCHARGED
15 minute summer	S77	12	115.197	1.279	261.3	2.2593	0.0000	SURCHARGED
15 minute summer	S78L	12	115.417	1.264	47.8	1.4301	0.0000	SURCHARGED
15 minute summer	S78	12	115.116	1.333	313.3	2.3548	0.0000	SURCHARGED
15 minute summer	S79L	12	115.322	1.046	64.6	1.1830	0.0000	SURCHARGED
15 minute summer	S79	12	114.722	1.149	378.4	2.0306	0.0000	SURCHARGED
15 minute summer	S80L	12	114.763	0.061	19.7	0.0691	0.0000	OK
15 minute summer	S80	12	114.557	1.159	390.5	2.9491	0.0000	SURCHARGED
15 minute summer	S81L	12	115.073	1.637	112.4	2.8920	0.0000	SURCHARGED
15 minute summer	S81	12	115.013	2.025	147.9	3.5783	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S67L	1.000	S67	22.5	1.277	1.306	0.1087	
15 minute summer	S67	1.001	S68	43.5	1.261	1.095	0.5824	
15 minute summer	S68	1.002	S69	66.7	1.245	0.935	3.0825	
15 minute summer	S69L	2.000	S69	31.5	1.789	1.199	0.1857	
15 minute summer	S69	1.003	S70	81.0	1.036	0.510	4.3407	
15 minute summer	S70	1.004	S71	109.0	0.825	0.688	8.9186	
15 minute summer	S71L	3.000	S71	66.5	2.553	0.671	0.1710	
15 minute summer	S71	1.005	S75	161.2	1.129	0.707	1.6150	
15 minute summer	S72	4.000	S73	29.2	1.065	0.734	1.4909	
15 minute summer	S73La	5.000	S73	19.5	1.197	1.096	0.1158	
15 minute summer	S73Lb	6.000	S73	47.7	2.712	2.696	0.0867	
15 minute summer	S73	4.001	S74	96.0	1.587	0.519	1.8420	
15 minute summer	S74	4.002	S75	108.3	1.237	0.541	1.8608	
15 minute summer	S75L	7.000	S75	79.4	3.882	0.480	0.1889	
15 minute summer	S75	1.006	S76	247.5	1.686	1.082	2.8982	
15 minute summer	S76	1.007	S77	259.5	1.691	1.072	1.6610	
15 minute summer	S77	1.008	S78	271.6	1.714	0.840	2.1380	
15 minute summer	S78L	8.000	S78	45.4	2.576	2.542	0.1203	
15 minute summer	S78	1.009	S79	308.8	1.949	1.795	7.5243	
15 minute summer	S79L	9.000	S79	62.7	3.564	1.557	0.1140	
15 minute summer	S79	1.010	S80	360.4	2.409	0.992	6.7003	
15 minute summer	S80L	10.000	S80	19.7	3.167	0.304	0.0866	
15 minute summer	S80	1.011	S88	396.4	1.866	0.484	6.7337	
15 minute summer	S81L	11.000	S81	105.4	2.697	0.536	0.6753	
15 minute summer	S81	11.001	S82	117.7	0.919	0.744	6.7245	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S82L	12	115.144	1.438	49.6	1.6262	0.0000	SURCHARGED
15 minute summer	S82	12	114.966	2.081	177.0	3.6773	0.0000	SURCHARGED
15 minute summer	S83L	12	114.937	1.447	26.9	1.6368	0.0000	SURCHARGED
15 minute summer	S83	12	114.859	2.077	194.9	3.6696	0.0000	SURCHARGED
15 minute summer	S84	12	114.822	2.066	201.8	3.6498	0.0000	SURCHARGED
15 minute summer	S85L	12	115.202	1.688	48.4	1.9094	0.0000	SURCHARGED
15 minute summer	S85	12	114.917	1.595	47.3	1.8045	0.0000	SURCHARGED
15 minute summer	S86	12	114.792	2.055	243.9	3.6305	0.0000	SURCHARGED
15 minute summer	S87L	12	114.768	1.208	36.5	1.3657	0.0000	SURCHARGED
15 minute summer	S87	12	114.689	1.995	282.4	3.5248	0.0000	SURCHARGED
15 minute summer	S88	12	114.358	1.844	681.6	3.2581	0.0000	SURCHARGED
15 minute summer	S89L	11	113.725	0.441	144.1	0.4986	0.0000	SURCHARGED
15 minute summer	S89	12	113.342	0.943	797.7	1.6670	0.0000	SURCHARGED
15 minute summer	S91	12	112.876	0.760	797.0	1.9348	0.0000	SURCHARGED
15 minute summer	S92L	10	113.681	0.133	59.8	0.1501	0.0000	OK
15 minute summer	S92	10	113.241	0.133	67.3	0.1501	0.0000	OK
15 minute summer	S93	12	112.796	0.724	867.0	1.8434	0.0000	OK
15 minute summer	S94L	10	113.287	0.090	37.7	0.1014	0.0000	OK
30 minute summer	S94	18	112.349	0.313	1028.0	0.7978	0.0000	OK
15 minute summer	S95La	10	112.968	0.054	15.5	0.0607	0.0000	OK
15 minute summer	S95Lb	10	112.748	0.054	15.5	0.0608	0.0000	OK
15 minute summer	S95	10	112.275	0.096	46.4	0.1089	0.0000	OK
15 minute summer	S96	11	111.033	0.393	968.0	1.0014	0.0000	OK
15 minute summer	S97L	10	110.923	0.102	46.0	0.1150	0.0000	OK
15 minute summer	S97	11	109.991	0.340	1023.8	0.8654	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S82L	12.000	S82	41.0	4.031	0.589	0.0607	
15 minute summer	S82	11.002	S83	169.3	1.069	1.066	6.6809	
15 minute summer	S83L	13.000	S83	20.6	2.629	0.424	0.0974	
15 minute summer	S83	11.003	S84	189.2	1.194	1.192	1.6865	
15 minute summer	S84	11.004	S86	200.7	1.267	1.265	1.2344	
15 minute summer	S85L	14.000	S85	39.9	2.266	1.581	0.1036	
15 minute summer	S85	14.001	S86	43.2	1.752	0.572	0.6825	
15 minute summer	S86	11.005	S87	242.6	1.531	1.534	2.8114	
15 minute summer	S87L	15.000	S87	43.2	3.565	0.552	0.0524	
15 minute summer	S87	11.006	S88	280.8	1.773	1.768	6.8032	
15 minute summer	S88	1.012	S89	685.2	3.172	3.019	11.1916	
15 minute summer	S89L	16.000	S89	140.3	3.983	0.847	0.2325	
15 minute summer	S89	1.013	S91	797.0	3.690	2.865	3.7734	
15 minute summer	S91	1.014	S93	796.0	1.830	1.728	13.6728	
15 minute summer	S92L	18.000	S92	59.5	3.606	1.051	0.0621	
15 minute summer	S92	18.001	S93	67.1	2.759	0.659	0.3885	
15 minute summer	S93	1.015	S94	858.7	2.754	1.924	8.1340	
15 minute summer	S94L	19.000	S94	37.6	3.433	0.664	0.0616	
30 minute summer	S94	1.016	S96	940.1	4.755	0.339	5.5209	
15 minute summer	S95La	20.000	S95	15.5	2.735	0.273	0.0331	
15 minute summer	S95Lb	21.000	S95	15.5	2.735	0.273	0.0206	
15 minute summer	S95	20.001	S96	46.0	2.363	0.226	0.6350	
15 minute summer	S96	1.017	S97	969.5	4.535	0.557	10.7002	
15 minute summer	S97L	22.000	S97	45.9	3.618	0.798	0.0702	
15 minute summer	S97	1.018	S98	1019.8	4.204	0.445	8.5305	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S98L	10	109.604	0.084	37.1	0.0955	0.0000	OK
15 minute summer	S98	11	108.914	0.470	1072.4	1.1969	0.0000	OK
15 minute summer	S99L	10	109.410	0.076	38.9	0.0855	0.0000	OK
15 minute summer	S99	11	108.266	0.365	1100.6	0.9291	0.0000	OK
15 minute summer	S100	12	107.289	0.386	1109.3	0.9825	0.0000	OK
720 minute summer	HW14	720	107.230	0.960	195.3	0.0000	0.0000	OK
720 minute summer	HW15	735	107.230	0.960	99.0	0.0000	0.0000	FLOOD RISK
720 minute summer	S101	735	107.256	1.003	60.0	5.7408	0.0000	FLOOD RISK
60 minute summer	HW16	39	105.150	0.050	10.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S98L	23.000	S98	37.0	3.634	0.605	0.0415	
15 minute summer	S98	1.019	S99	1066.4	4.278	0.744	10.1790	
15 minute summer	S99L	24.000	S99	38.8	4.385	0.504	0.0399	
15 minute summer	S99	1.020	S100	1109.3	5.042	0.501	6.8619	
15 minute summer	S100	1.021	HW14	1112.6	5.991	0.536	4.2010	
720 minute summer	HW14	Flow through pond	HW15	99.0	0.088	0.002	1525.6292	
720 minute summer	HW15	1.022	S101	60.0	0.136	0.113	3.9994	
720 minute summer	S101	1.023	HW16	10.7	1.639	0.109	0.2113	465.4

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Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S67L	13	116.007	1.009	25.0	1.1416	0.0000	SURCHARGED
15 minute summer	S67	13	115.958	1.092	48.4	1.2346	0.0000	SURCHARGED
15 minute summer	S68	13	115.909	1.205	72.0	1.3630	0.0000	SURCHARGED
15 minute summer	S69L	12	115.991	1.138	35.5	1.2866	0.0000	FLOOD RISK
15 minute summer	S69	13	115.827	1.503	93.7	2.6557	0.0000	FLOOD RISK
15 minute summer	S70	13	115.819	1.562	88.1	2.7595	0.0000	FLOOD RISK
15 minute summer	S71L	12	115.802	1.302	77.6	1.4729	0.0000	SURCHARGED
15 minute summer	S71	13	115.775	1.655	117.0	2.9237	0.0000	FLOOD RISK
15 minute summer	S72	13	115.877	1.050	32.9	1.8556	0.0000	SURCHARGED
15 minute summer	S73La	13	115.856	1.109	21.7	1.2538	0.0000	SURCHARGED
15 minute summer	S73Lb	12	116.040	1.310	53.3	1.4820	0.0000	SURCHARGED
15 minute summer	S73	13	115.816	1.360	106.3	2.4035	0.0000	SURCHARGED
15 minute summer	S74	13	115.793	1.480	118.4	2.6145	0.0000	SURCHARGED
15 minute summer	S75L	12	115.814	1.045	88.8	1.1816	0.0000	SURCHARGED
15 minute summer	S75	13	115.759	1.690	263.6	2.9861	0.0000	SURCHARGED
15 minute summer	S76	13	115.634	1.657	267.1	2.9287	0.0000	SURCHARGED
15 minute summer	S77	13	115.558	1.640	279.5	2.8983	0.0000	SURCHARGED
15 minute summer	S78L	12	115.816	1.664	52.6	1.8816	0.0000	SURCHARGED
15 minute summer	S78	12	115.456	1.673	320.2	2.9557	0.0000	SURCHARGED
15 minute summer	S79L	12	115.727	1.451	71.0	1.6411	0.0000	SURCHARGED
15 minute summer	S79	12	115.011	1.438	376.6	2.5403	0.0000	SURCHARGED
15 minute summer	S80L	12	114.858	0.156	21.7	0.1763	0.0000	SURCHARGED
15 minute summer	S80	12	114.820	1.422	416.3	3.6192	0.0000	SURCHARGED
15 minute summer	S81L	12	115.431	1.995	123.7	3.5252	0.0000	FLOOD RISK
15 minute summer	S81	12	115.359	2.371	141.7	4.1891	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S67L	1.000	S67	24.7	1.403	1.436	0.1087	
15 minute summer	S67	1.001	S68	43.7	1.249	1.100	0.5824	
15 minute summer	S68	1.002	S69	62.8	1.208	0.880	3.0825	
15 minute summer	S69L	2.000	S69	30.9	1.757	1.178	0.1857	
15 minute summer	S69	1.003	S70	88.1	1.061	0.554	4.3407	
15 minute summer	S70	1.004	S71	104.0	0.837	0.656	8.9186	
15 minute summer	S71L	3.000	S71	66.5	2.612	0.671	0.1710	
15 minute summer	S71	1.005	S75	167.2	1.190	0.733	1.6150	
15 minute summer	S72	4.000	S73	31.3	1.088	0.787	1.4909	
15 minute summer	S73La	5.000	S73	19.9	1.200	1.118	0.1158	
15 minute summer	S73Lb	6.000	S73	48.2	2.739	2.723	0.0867	
15 minute summer	S73	4.001	S74	102.1	1.485	0.552	1.8420	
15 minute summer	S74	4.002	S75	106.3	1.238	0.531	1.8608	
15 minute summer	S75L	7.000	S75	85.6	3.641	0.517	0.1889	
15 minute summer	S75	1.006	S76	264.8	1.731	1.158	2.8982	
15 minute summer	S76	1.007	S77	277.5	1.752	1.147	1.6610	
15 minute summer	S77	1.008	S78	290.5	1.833	0.898	2.1380	
15 minute summer	S78L	8.000	S78	43.6	2.475	2.442	0.1203	
15 minute summer	S78	1.009	S79	331.1	2.090	1.924	7.5243	
15 minute summer	S79L	9.000	S79	62.0	3.522	1.538	0.1140	
15 minute summer	S79	1.010	S80	381.8	2.381	1.050	6.7003	
15 minute summer	S80L	10.000	S80	21.4	3.252	0.330	0.1253	
15 minute summer	S80	1.011	S88	424.6	1.965	0.519	6.7337	
15 minute summer	S81L	11.000	S81	107.8	2.763	0.549	0.6753	
15 minute summer	S81	11.001	S82	131.7	0.932	0.832	6.7245	

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Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S82L	12	115.515	1.809	54.6	2.0461	0.0000	SURCHARGED
15 minute summer	S82	12	115.301	2.416	196.9	4.2699	0.0000	SURCHARGED
15 minute summer	S83L	12	115.263	1.773	29.6	2.0056	0.0000	SURCHARGED
15 minute summer	S83	12	115.173	2.391	213.4	4.2242	0.0000	SURCHARGED
15 minute summer	S84	12	115.130	2.374	219.7	4.1945	0.0000	SURCHARGED
15 minute summer	S85L	12	115.584	2.070	53.3	2.3408	0.0000	FLOOD RISK
15 minute summer	S85	12	115.240	1.919	51.9	2.1705	0.0000	SURCHARGED
15 minute summer	S86	12	115.095	2.358	264.0	4.1658	0.0000	SURCHARGED
15 minute summer	S87L	12	115.067	1.507	40.1	1.7048	0.0000	SURCHARGED
15 minute summer	S87	12	114.976	2.282	304.9	4.0316	0.0000	SURCHARGED
15 minute summer	S88	12	114.589	2.075	731.1	3.6659	0.0000	SURCHARGED
15 minute summer	S89L	11	113.886	0.602	158.5	0.6810	0.0000	SURCHARGED
15 minute summer	S89	12	113.411	1.012	862.0	1.7889	0.0000	SURCHARGED
15 minute summer	S91	12	112.880	0.764	859.0	1.9451	0.0000	SURCHARGED
15 minute summer	S92L	10	113.843	0.295	65.8	0.3338	0.0000	SURCHARGED
15 minute summer	S92	10	113.248	0.140	73.3	0.1587	0.0000	OK
30 minute summer	S93	21	112.742	0.670	917.5	1.7056	0.0000	OK
15 minute summer	S94L	10	113.292	0.095	41.4	0.1079	0.0000	OK
15 minute summer	S94	12	112.340	0.305	1000.4	0.7762	0.0000	OK
15 minute summer	S95La	10	112.971	0.057	17.1	0.0640	0.0000	OK
15 minute summer	S95Lb	10	112.751	0.057	17.1	0.0640	0.0000	OK
15 minute summer	S95	10	112.280	0.101	51.2	0.1147	0.0000	OK
30 minute summer	S96	19	111.058	0.418	999.9	1.0650	0.0000	OK
15 minute summer	S97L	10	110.931	0.110	50.7	0.1240	0.0000	OK
15 minute summer	S97	11	110.020	0.369	1151.9	0.9392	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S82L	12.000	S82	45.1	4.123	0.648	0.0607	
15 minute summer	S82	11.002	S83	186.5	1.177	1.175	6.6809	
15 minute summer	S83L	13.000	S83	22.7	2.694	0.466	0.0974	
15 minute summer	S83	11.003	S84	205.8	1.299	1.296	1.6865	
15 minute summer	S84	11.004	S86	217.2	1.371	1.369	1.2344	
15 minute summer	S85L	14.000	S85	43.7	2.483	1.732	0.1036	
15 minute summer	S85	14.001	S86	46.8	1.734	0.621	0.6825	
15 minute summer	S86	11.005	S87	261.9	1.653	1.656	2.8114	
15 minute summer	S87L	15.000	S87	31.9	3.657	0.407	0.0524	
15 minute summer	S87	11.006	S88	302.9	1.912	1.907	6.8032	
15 minute summer	S88	1.012	S89	736.9	3.412	3.247	11.1916	
15 minute summer	S89L	16.000	S89	155.7	4.082	0.941	0.2325	
15 minute summer	S89	1.013	S91	859.0	3.977	3.088	3.7734	
15 minute summer	S91	1.014	S93	859.9	1.995	1.867	13.2295	
15 minute summer	S92L	18.000	S92	64.7	3.675	1.143	0.0638	
15 minute summer	S92	18.001	S93	72.9	2.810	0.716	0.3492	
30 minute summer	S93	1.015	S94	982.7	3.362	2.202	7.9796	
15 minute summer	S94L	19.000	S94	41.3	3.502	0.729	0.0663	
15 minute summer	S94	1.016	S96	1015.3	4.874	0.366	5.8188	
15 minute summer	S95La	20.000	S95	17.1	2.810	0.301	0.0355	
15 minute summer	S95Lb	21.000	S95	17.1	2.810	0.301	0.0221	
15 minute summer	S95	20.001	S96	50.8	2.429	0.249	0.6816	
30 minute summer	S96	1.017	S97	1045.0	4.598	0.601	11.3728	
15 minute summer	S97L	22.000	S97	50.6	3.674	0.880	0.0761	
15 minute summer	S97	1.018	S98	1177.1	4.364	0.513	9.4640	

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Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.65%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S98L	10	109.609	0.090	40.8	0.1015	0.0000	OK
15 minute summer	S98	11	108.959	0.514	1234.8	1.3093	0.0000	OK
15 minute summer	S99L	10	109.414	0.080	42.8	0.0906	0.0000	OK
15 minute summer	S99	12	108.282	0.381	1205.0	0.9686	0.0000	OK
720 minute summer	S100	510	107.353	0.450	246.2	1.1446	0.0000	OK
960 minute summer	HW14	975	107.324	1.054	269.3	0.0000	0.0000	OK
960 minute summer	HW15	975	107.324	1.054	103.4	0.0000	0.0000	FLOOD RISK
960 minute summer	S101	975	107.324	1.071	17.1	6.1345	0.0000	FLOOD RISK
1440 minute summer	HW16	690	105.150	0.050	10.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S98L	23.000	S98	40.7	3.713	0.665	0.0446	
15 minute summer	S98	1.019	S99	1164.1	4.357	0.812	11.0306	
15 minute summer	S99L	24.000	S99	42.7	4.489	0.554	0.0428	
15 minute summer	S99	1.020	S100	1197.6	5.166	0.540	7.2294	
720 minute summer	S100	1.021	HW14	218.5	0.874	0.105	8.0766	
960 minute summer	HW14	Flow through pond	HW15	103.4	0.075	0.003	1722.6573	
960 minute summer	HW15	1.022	S101	17.1	0.179	0.032	3.9994	
960 minute summer	S101	1.023	HW16	10.7	1.639	0.109	0.2113	576.7

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Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S67L	0.038	5.00	116.640	Manhole	1200	443759.776	291437.274	1.642
S67	0.036	5.00	116.626	Manhole	1200	443754.601	291440.646	1.760
S68	0.043	5.00	116.483	Manhole	1200	443746.454	291428.477	1.779
S69L	0.054	5.00	116.100	Manhole	1200	443761.907	291388.316	1.247
S69			116.000	Manhole	1500	443751.879	291385.041	1.676
S70			116.000	Manhole	1500	443760.577	291359.063	1.743
S71L	0.118	5.00	116.500	Manhole	1200	443813.132	291379.558	2.000
S71			116.000	Manhole	1500	443814.426	291375.457	1.880
S72	0.050	5.00	116.498	Manhole	1500	443796.103	291443.938	1.671
S73La	0.033	5.00	116.320	Manhole	1200	443805.881	291407.158	1.573
S73Lb	0.081	5.00	116.346	Manhole	1200	443816.318	291411.988	1.616
S73	0.016	5.00	116.446	Manhole	1500	443811.848	291409.919	1.990
S74	0.026	5.00	116.569	Manhole	1500	443819.303	291394.976	2.256
S75L	0.135	5.00	116.650	Manhole	1200	443828.243	291381.036	1.881
S75	0.016	5.00	116.499	Manhole	1500	443824.059	291378.789	2.430
S76	0.009	5.00	116.313	Manhole	1500	443830.286	291361.590	2.336
S77	0.010	5.00	116.252	Manhole	1500	443837.366	291353.859	2.334
S78L	0.080	5.00	116.481	Manhole	1200	443851.912	291342.796	2.329
S78	0.028	5.00	116.345	Manhole	1500	443850.095	291349.382	2.562
S79L	0.108	5.00	116.530	Manhole	1200	443897.490	291356.796	2.254
S79	0.025	5.00	116.401	Manhole	1500	443895.594	291362.985	2.828
S80L	0.033	5.00	116.600	Manhole	1200	443927.311	291365.336	1.898
S80	0.059	5.00	116.458	Manhole	1800	443925.227	291372.140	3.060
S81L	0.188	5.00	115.641	Manhole	1500	443881.050	291289.223	2.205
S81	0.054	5.00	115.632	Manhole	1500	443885.480	291280.718	2.644
S82L	0.083	5.00	116.100	Manhole	1200	443924.760	291297.037	2.394
S82	0.032	5.00	116.063	Manhole	1500	443925.865	291293.768	3.178
S83L	0.045	5.00	115.800	Manhole	1200	443960.932	291308.973	2.310
S83	0.009	5.00	115.829	Manhole	1500	443965.988	291306.734	3.047
S84	0.027	5.00	115.717	Manhole	1500	443971.953	291315.549	2.961
S85L	0.081	5.00	115.800	Manhole	1200	443987.286	291333.917	2.286
S85	0.013	5.00	115.754	Manhole	1200	443989.010	291328.289	2.433
S86			115.683	Manhole	1500	443972.588	291323.314	2.946
S87L	0.061	5.00	115.769	Manhole	1200	443964.547	291339.409	2.209
S87	0.025	5.00	115.755	Manhole	1500	443967.391	291340.280	3.061
S88	0.029	5.00	116.258	Manhole	1500	443954.993	291381.389	3.744
S89L	0.241	5.00	115.800	Manhole	1200	444004.820	291392.210	2.516
S89	0.012	5.00	115.739	Manhole	1500	444004.060	291398.006	3.340
S91			115.513	Manhole	1800	444020.925	291402.553	3.397
S92L	0.100	5.00	115.313	Manhole	1200	444009.789	291445.245	1.765
S92	0.013	5.00	115.286	Manhole	1200	444013.272	291446.339	2.178

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Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S93	0.036	5.00	115.287	Manhole	1800	444017.554	291433.597	3.215
S94L	0.063	5.00	114.788	Manhole	1200	444042.544	291447.402	1.591
S94	0.015	5.00	114.794	Manhole	1800	444044.192	291442.029	2.759
S95La	0.026	5.00	114.300	Manhole	1200	444054.557	291480.418	1.386
S95Lb	0.026	5.00	114.250	Manhole	1200	444063.621	291483.265	1.556
S95	0.026	5.00	114.279	Manhole	1200	444060.181	291482.048	2.100
S96	0.050	5.00	114.304	Manhole	1800	444070.570	291451.147	3.665
S97L	0.077	5.00	113.400	Manhole	1200	444116.288	291471.699	2.579
S97	0.018	5.00	113.420	Manhole	1800	444118.166	291466.495	3.769
S98L	0.062	5.00	112.010	Manhole	1200	444150.009	291482.356	2.491
S98	0.030	5.00	112.082	Manhole	1800	444151.269	291478.489	3.638
S99L	0.065	5.00	110.750	Manhole	1200	444188.412	291495.138	1.416
S99			110.700	Manhole	1800	444189.788	291490.853	2.799
S100			110.700	Manhole	1800	444219.480	291500.384	3.797
HW14			107.500	Manhole	1	444232.144	291519.066	1.230
HW15		5.00	107.500	Manhole	1	444293.606	291529.740	1.230
S101			107.500	Manhole	2700	444300.866	291535.204	1.247
HW16			106.000	Manhole	1	444330.832	291547.472	0.900

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S67L	S67	6.176	0.600	114.998	114.940	0.058	106.5	150	5.11	50.0
1.001	S67	S68	14.645	0.600	114.866	114.780	0.086	170.3	225	5.35	50.0
1.002	S68	S69	43.773	0.600	114.704	114.522	0.182	240.5	300	6.07	50.0
2.000	S69L	S69	10.549	0.600	114.853	114.624	0.229	46.1	150	5.12	50.0
1.003	S69	S70	27.396	0.600	114.324	114.257	0.067	408.9	450	6.53	48.4
1.004	S70	S71	56.289	0.600	114.257	114.120	0.137	410.9	450	7.47	45.2
3.000	S71L	S71	4.300	0.600	114.500	114.345	0.155	27.7	225	5.03	50.0
1.005	S71	S75	10.193	0.600	114.120	114.069	0.051	199.9	450	7.59	44.9
4.000	S72	S73	37.486	0.600	114.827	114.606	0.221	169.6	225	5.62	50.0
5.000	S73La	S73	6.575	0.600	114.747	114.681	0.066	99.6	150	5.11	50.0
6.000	S73Lb	S73	4.926	0.600	114.730	114.681	0.049	100.5	150	5.08	50.0
4.001	S73	S74	16.700	0.600	114.456	114.313	0.143	116.8	375	5.79	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	S67L	S67	0.973	17.2	5.1	1.492	1.536	1.492	1.536	0.038	0.0
1.001	S67	S68	0.999	39.7	10.0	1.535	1.478	1.478	1.535	0.074	0.0
1.002	S68	S69	1.009	71.3	15.9	1.479	1.178	1.178	1.479	0.117	0.0
2.000	S69L	S69	1.486	26.3	7.3	1.097	1.226	1.097	1.226	0.054	0.0
1.003	S69	S70	0.999	158.9	22.4	1.226	1.293	1.226	1.293	0.171	0.0
1.004	S70	S71	0.996	158.5	21.0	1.293	1.430	1.293	1.430	0.171	0.0
3.000	S71L	S71	2.493	99.1	16.0	1.775	1.430	1.430	1.775	0.118	0.0
1.005	S71	S75	1.434	228.1	35.1	1.430	1.980	1.430	1.980	0.289	0.0
4.000	S72	S73	1.001	39.8	6.8	1.446	1.615	1.446	1.615	0.050	0.0
5.000	S73La	S73	1.007	17.8	4.5	1.423	1.615	1.423	1.615	0.033	0.0
6.000	S73Lb	S73	1.002	17.7	11.0	1.466	1.615	1.466	1.615	0.081	0.0
4.001	S73	S74	1.675	185.0	24.4	1.615	1.881	1.615	1.881	0.180	0.0

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
4.002	S74	S75	16.871	0.600	114.313	114.144	0.169	99.8	375	5.95	50.0
7.000	S75L	S75	4.749	0.600	114.769	114.294	0.475	10.0	225	5.02	50.0
1.006	S75	S76	18.292	0.600	114.069	113.977	0.092	198.8	450	7.80	44.2
1.007	S76	S77	10.483	0.600	113.978	113.919	0.059	177.7	450	7.92	43.9
1.008	S77	S78	13.494	0.600	113.918	113.783	0.135	100.0	450	8.03	43.6
8.000	S78L	S78	6.832	0.600	114.152	114.083	0.069	99.0	150	5.11	50.0
1.009	S78	S79	47.489	0.600	113.784	113.648	0.136	349.2	450	8.76	41.6
9.000	S79L	S79	6.473	0.600	114.276	113.947	0.329	19.7	150	5.05	50.0
1.010	S79	S80	31.015	0.600	113.573	113.398	0.175	177.2	525	9.07	40.9
10.000	S80L	S80	7.116	0.600	114.702	113.773	0.929	7.7	150	5.03	50.0
1.011	S80	S88	31.170	0.600	113.398	112.514	0.884	35.3	525	9.20	40.6
11.000	S81L	S81	9.590	0.600	113.436	113.138	0.298	32.2	300	5.06	50.0
11.001	S81	S82	42.441	0.600	112.988	112.885	0.103	412.0	450	5.77	50.0
12.000	S82L	S82	3.450	0.600	113.706	113.185	0.521	6.6	150	5.01	50.0
11.002	S82	S83	42.166	0.600	112.885	112.782	0.103	409.4	450	6.47	48.6
13.000	S83L	S83	5.530	0.600	113.490	113.082	0.408	13.6	150	5.03	50.0
11.003	S83	S84	10.644	0.600	112.782	112.756	0.026	409.4	450	6.65	47.9
11.004	S84	S86	7.791	0.600	112.756	112.737	0.019	410.1	450	6.78	47.5
14.000	S85L	S85	5.886	0.600	113.514	113.396	0.118	49.9	150	5.07	50.0
14.001	S85	S86	17.160	0.600	113.321	112.962	0.359	47.8	225	5.22	50.0
11.005	S86	S87	17.744	0.600	112.737	112.694	0.043	412.7	450	7.08	46.5
15.000	S87L	S87	2.974	0.600	113.560	112.994	0.566	5.3	150	5.01	50.0
11.006	S87	S88	42.938	0.600	112.694	112.589	0.105	408.9	450	7.79	44.3
1.012	S88	S89	51.805	0.600	112.514	112.399	0.115	450.5	525	10.03	38.8

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
4.002	S74	S75	1.813	200.3	27.9	1.881	1.980	1.881	1.980	0.206	0.0
7.000	S75L	S75	4.162	165.5	18.3	1.656	1.980	1.656	1.980	0.135	0.0
1.006	S75	S76	1.438	228.7	77.4	1.980	1.886	1.886	1.980	0.646	0.0
1.007	S76	S77	1.522	242.0	77.9	1.885	1.883	1.883	1.885	0.655	0.0
1.008	S77	S78	2.033	323.4	78.5	1.884	2.112	1.884	2.112	0.665	0.0
8.000	S78L	S78	1.010	17.8	10.8	2.179	2.112	2.112	2.179	0.080	0.0
1.009	S78	S79	1.082	172.1	87.2	2.111	2.303	2.111	2.303	0.773	0.0
9.000	S79L	S79	2.281	40.3	14.6	2.104	2.304	2.104	2.304	0.108	0.0
1.010	S79	S80	1.679	363.5	100.4	2.303	2.535	2.303	2.535	0.906	0.0
10.000	S80L	S80	3.663	64.7	4.5	1.748	2.535	1.748	2.535	0.033	0.0
1.011	S80	S88	3.781	818.4	109.7	2.535	3.219	2.535	3.219	0.998	0.0
11.000	S81L	S81	2.781	196.6	25.5	1.905	2.194	1.905	2.194	0.188	0.0
11.001	S81	S82	0.995	158.3	32.8	2.194	2.728	2.194	2.728	0.242	0.0
12.000	S82L	S82	3.941	69.6	11.2	2.244	2.728	2.244	2.728	0.083	0.0
11.002	S82	S83	0.998	158.8	47.0	2.728	2.597	2.597	2.728	0.357	0.0
13.000	S83L	S83	2.751	48.6	6.1	2.160	2.597	2.160	2.597	0.045	0.0
11.003	S83	S84	0.998	158.8	53.4	2.597	2.511	2.511	2.597	0.411	0.0
11.004	S84	S86	0.997	158.6	56.4	2.511	2.496	2.496	2.511	0.438	0.0
14.000	S85L	S85	1.428	25.2	11.0	2.136	2.208	2.136	2.208	0.081	0.0
14.001	S85	S86	1.896	75.4	12.7	2.208	2.496	2.208	2.496	0.094	0.0
11.005	S86	S87	0.994	158.1	67.0	2.496	2.611	2.496	2.611	0.532	0.0
15.000	S87L	S87	4.426	78.2	8.3	2.059	2.611	2.059	2.611	0.061	0.0
11.006	S87	S88	0.999	158.9	74.1	2.611	3.219	2.611	3.219	0.618	0.0
1.012	S88	S89	1.049	227.0	172.9	3.219	2.815	2.815	3.219	1.645	0.0

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
16.000	S89L	S89	5.846	0.600	113.284	112.699	0.585	10.0	225	5.02	50.0
1.013	S89	S91	17.467	0.600	112.399	112.341	0.058	301.2	525	10.25	38.3
1.014	S91	S93	31.226	0.600	112.116	112.072	0.044	709.7	750	10.75	37.4
18.000	S92L	S92	3.651	0.600	113.548	113.183	0.365	10.0	150	5.02	50.0
18.001	S92	S93	13.443	0.600	113.108	112.597	0.511	26.3	225	5.11	50.0
1.015	S93	S94	27.940	0.600	112.072	112.035	0.037	755.1	750	11.21	36.5
19.000	S94L	S94	5.620	0.600	113.197	112.635	0.562	10.0	150	5.03	50.0
1.016	S94	S96	27.910	0.600	112.035	110.640	1.395	20.0	750	11.29	36.4
20.000	S95La	S95	5.856	0.600	112.914	112.328	0.586	10.0	150	5.03	50.0
21.000	S95Lb	S95	3.648	0.600	112.694	112.329	0.365	10.0	150	5.02	50.0
20.001	S95	S96	32.600	0.600	112.179	111.089	1.090	29.9	300	5.22	50.0
1.017	S96	S97	50.010	0.600	110.639	109.651	0.988	50.6	750	11.50	36.0
22.000	S97L	S97	5.532	0.600	110.821	110.251	0.570	9.7	150	5.03	50.0
1.018	S97	S98	35.209	0.600	109.651	108.444	1.207	29.2	750	11.61	35.8
23.000	S98L	S98	4.067	0.600	109.519	109.044	0.475	8.6	150	5.02	50.0
1.019	S98	S99	40.454	0.600	108.444	107.901	0.543	74.5	750	11.82	35.5
24.000	S99L	S99	4.500	0.600	109.334	108.501	0.833	5.4	150	5.02	50.0
1.020	S99	S100	31.185	0.600	107.901	106.903	0.998	31.2	750	11.92	35.3
1.021	S100	HW14	22.569	0.600	106.903	106.270	0.633	35.7	750	12.00	35.2
1.022	HW15	S101	9.087	0.600	106.270	106.253	0.017	534.5	750	5.13	50.0
1.023	S101	HW16	32.380	0.600	106.253	105.100	1.153	28.1	225	5.34	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
16.000	S89L	S89	4.163	165.5	32.7	2.291	2.815	2.291	2.815	0.241	0.0
1.013	S89	S91	1.285	278.2	197.2	2.815	2.647	2.647	2.815	1.898	0.0
1.014	S91	S93	1.043	460.6	192.2	2.647	2.465	2.465	2.647	1.898	0.0
18.000	S92L	S92	3.204	56.6	13.6	1.615	1.953	1.615	1.953	0.100	0.0
18.001	S92	S93	2.561	101.8	15.3	1.953	2.465	1.953	2.465	0.113	0.0
1.015	S93	S94	1.010	446.3	202.7	2.465	2.009	2.009	2.465	2.047	0.0
19.000	S94L	S94	3.204	56.6	8.5	1.441	2.009	1.441	2.009	0.063	0.0
1.016	S94	S96	6.272	2770.9	209.6	2.009	2.914	2.009	2.914	2.125	0.0
20.000	S95La	S95	3.205	56.6	3.5	1.236	1.801	1.236	1.801	0.026	0.0
21.000	S95Lb	S95	3.205	56.6	3.5	1.406	1.800	1.406	1.800	0.026	0.0
20.001	S95	S96	2.885	203.9	10.6	1.800	2.915	1.800	2.915	0.078	0.0
1.017	S96	S97	3.938	1739.9	220.0	2.915	3.019	2.915	3.019	2.253	0.0
22.000	S97L	S97	3.253	57.5	10.4	2.429	3.019	2.429	3.019	0.077	0.0
1.018	S97	S98	5.192	2293.8	228.1	3.019	2.888	2.888	3.019	2.348	0.0
23.000	S98L	S98	3.464	61.2	8.4	2.341	2.888	2.341	2.888	0.062	0.0
1.019	S98	S99	3.244	1433.1	234.7	2.888	2.049	2.049	2.888	2.440	0.0
24.000	S99L	S99	4.364	77.1	8.8	1.266	2.049	1.266	2.049	0.065	0.0
1.020	S99	S100	5.016	2216.0	239.8	2.049	3.047	2.049	3.047	2.505	0.0
1.021	S100	HW14	4.695	2074.2	238.9	3.047	0.480	0.480	3.047	2.505	0.0
1.022	HW15	S101	1.203	531.5	0.0	0.480	0.497	0.480	0.497	0.000	0.0
1.023	S101	HW16	2.478	98.5	0.0	1.022	0.675	0.675	1.022	0.000	0.0

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	6.176	106.5	150	116.640	114.998	1.492	116.626	114.940	1.536
1.001	14.645	170.3	225	116.626	114.866	1.535	116.483	114.780	1.478
1.002	43.773	240.5	300	116.483	114.704	1.479	116.000	114.522	1.178
2.000	10.549	46.1	150	116.100	114.853	1.097	116.000	114.624	1.226
1.003	27.396	408.9	450	116.000	114.324	1.226	116.000	114.257	1.293
1.004	56.289	410.9	450	116.000	114.257	1.293	116.000	114.120	1.430
3.000	4.300	27.7	225	116.500	114.500	1.775	116.000	114.345	1.430
1.005	10.193	199.9	450	116.000	114.120	1.430	116.499	114.069	1.980
4.000	37.486	169.6	225	116.498	114.827	1.446	116.446	114.606	1.615
5.000	6.575	99.6	150	116.320	114.747	1.423	116.446	114.681	1.615
6.000	4.926	100.5	150	116.346	114.730	1.466	116.446	114.681	1.615
4.001	16.700	116.8	375	116.446	114.456	1.615	116.569	114.313	1.881
4.002	16.871	99.8	375	116.569	114.313	1.881	116.499	114.144	1.980
7.000	4.749	10.0	225	116.650	114.769	1.656	116.499	114.294	1.980
1.006	18.292	198.8	450	116.499	114.069	1.980	116.313	113.977	1.886
1.007	10.483	177.7	450	116.313	113.978	1.885	116.252	113.919	1.883
1.008	13.494	100.0	450	116.252	113.918	1.884	116.345	113.783	2.112
8.000	6.832	99.0	150	116.481	114.152	2.179	116.345	114.083	2.112
1.009	47.489	349.2	450	116.345	113.784	2.111	116.401	113.648	2.303
9.000	6.473	19.7	150	116.530	114.276	2.104	116.401	113.947	2.304
1.010	31.015	177.2	525	116.401	113.573	2.303	116.458	113.398	2.535
10.000	7.116	7.7	150	116.600	114.702	1.748	116.458	113.773	2.535
1.011	31.170	35.3	525	116.458	113.398	2.535	116.258	112.514	3.219
11.000	9.590	32.2	300	115.641	113.436	1.905	115.632	113.138	2.194
11.001	42.441	412.0	450	115.632	112.988	2.194	116.063	112.885	2.728

Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
1.000	S67L	1200	Manhole	S67	1200	1
1.001	S67	1200	Manhole	S68	1200	1
1.002	S68	1200	Manhole	S69	1500	1
2.000	S69L	1200	Manhole	S69	1500	1
1.003	S69	1500	Manhole	S70	1500	1
1.004	S70	1500	Manhole	S71	1500	1
3.000	S71L	1200	Manhole	S71	1500	1
1.005	S71	1500	Manhole	S75	1500	1
4.000	S72	1500	Manhole	S73	1500	1
5.000	S73La	1200	Manhole	S73	1500	1
6.000	S73Lb	1200	Manhole	S73	1500	1
4.001	S73	1500	Manhole	S74	1500	1
4.002	S74	1500	Manhole	S75	1500	1
7.000	S75L	1200	Manhole	S75	1500	1
1.006	S75	1500	Manhole	S76	1500	1
1.007	S76	1500	Manhole	S77	1500	1
1.008	S77	1500	Manhole	S78	1500	1
8.000	S78L	1200	Manhole	S78	1500	1
1.009	S78	1500	Manhole	S79	1500	1
9.000	S79L	1200	Manhole	S79	1500	1
1.010	S79	1500	Manhole	S80	1800	1
10.000	S80L	1200	Manhole	S80	1800	1
1.011	S80	1800	Manhole	S88	1500	1
11.000	S81L	1500	Manhole	S81	1500	1
11.001	S81	1500	Manhole	S82	1500	1

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
12.000	3.450	6.6	150	116.100	113.706	2.244	116.063	113.185	2.728
11.002	42.166	409.4	450	116.063	112.885	2.728	115.829	112.782	2.597
13.000	5.530	13.6	150	115.800	113.490	2.160	115.829	113.082	2.597
11.003	10.644	409.4	450	115.829	112.782	2.597	115.717	112.756	2.511
11.004	7.791	410.1	450	115.717	112.756	2.511	115.683	112.737	2.496
14.000	5.886	49.9	150	115.800	113.514	2.136	115.754	113.396	2.208
14.001	17.160	47.8	225	115.754	113.321	2.208	115.683	112.962	2.496
11.005	17.744	412.7	450	115.683	112.737	2.496	115.755	112.694	2.611
15.000	2.974	5.3	150	115.769	113.560	2.059	115.755	112.994	2.611
11.006	42.938	408.9	450	115.755	112.694	2.611	116.258	112.589	3.219
1.012	51.805	450.5	525	116.258	112.514	3.219	115.739	112.399	2.815
16.000	5.846	10.0	225	115.800	113.284	2.291	115.739	112.699	2.815
1.013	17.467	301.2	525	115.739	112.399	2.815	115.513	112.341	2.647
1.014	31.226	709.7	750	115.513	112.116	2.647	115.287	112.072	2.465
18.000	3.651	10.0	150	115.313	113.548	1.615	115.286	113.183	1.953
18.001	13.443	26.3	225	115.286	113.108	1.953	115.287	112.597	2.465
1.015	27.940	755.1	750	115.287	112.072	2.465	114.794	112.035	2.009
19.000	5.620	10.0	150	114.788	113.197	1.441	114.794	112.635	2.009
1.016	27.910	20.0	750	114.794	112.035	2.009	114.304	110.640	2.914
20.000	5.856	10.0	150	114.300	112.914	1.236	114.279	112.328	1.801
21.000	3.648	10.0	150	114.250	112.694	1.406	114.279	112.329	1.800
20.001	32.600	29.9	300	114.279	112.179	1.800	114.304	111.089	2.915
1.017	50.010	50.6	750	114.304	110.639	2.915	113.420	109.651	3.019
22.000	5.532	9.7	150	113.400	110.821	2.429	113.420	110.251	3.019
1.018	35.209	29.2	750	113.420	109.651	3.019	112.082	108.444	2.888

Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
12.000	S82L	1200	Manhole	S82	1500	1
11.002	S82	1500	Manhole	S83	1500	1
13.000	S83L	1200	Manhole	S83	1500	1
11.003	S83	1500	Manhole	S84	1500	1
11.004	S84	1500	Manhole	S86	1500	1
14.000	S85L	1200	Manhole	S85	1200	1
14.001	S85	1200	Manhole	S86	1500	1
11.005	S86	1500	Manhole	S87	1500	1
15.000	S87L	1200	Manhole	S87	1500	1
11.006	S87	1500	Manhole	S88	1500	1
1.012	S88	1500	Manhole	S89	1500	1
16.000	S89L	1200	Manhole	S89	1500	1
1.013	S89	1500	Manhole	S91	1800	1
1.014	S91	1800	Manhole	S93	1800	1
18.000	S92L	1200	Manhole	S92	1200	1
18.001	S92	1200	Manhole	S93	1800	1
1.015	S93	1800	Manhole	S94	1800	1
19.000	S94L	1200	Manhole	S94	1800	1
1.016	S94	1800	Manhole	S96	1800	1
20.000	S95La	1200	Manhole	S95	1200	1
21.000	S95Lb	1200	Manhole	S95	1200	1
20.001	S95	1200	Manhole	S96	1800	1
1.017	S96	1800	Manhole	S97	1800	1
22.000	S97L	1200	Manhole	S97	1800	1
1.018	S97	1800	Manhole	S98	1800	1

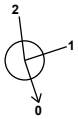
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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
23.000	4.067	8.6	150	112.010	109.519	2.341	112.082	109.044	2.888
1.019	40.454	74.5	750	112.082	108.444	2.888	110.700	107.901	2.049
24.000	4.500	5.4	150	110.750	109.334	1.266	110.700	108.501	2.049
1.020	31.185	31.2	750	110.700	107.901	2.049	110.700	106.903	3.047
1.021	22.569	35.7	750	110.700	106.903	3.047	107.500	106.270	0.480
1.022	9.087	534.5	750	107.500	106.270	0.480	107.500	106.253	0.497
1.023	32.380	28.1	225	107.500	106.253	1.022	106.000	105.100	0.675

Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
23.000	S98L	1200	Manhole	S98	1800	1
1.019	S98	1800	Manhole	S99	1800	1
24.000	S99L	1200	Manhole	S99	1800	1
1.020	S99	1800	Manhole	S100	1800	1
1.021	S100	1800	Manhole	HW14	1	1
1.022	HW15	1	Manhole	S101	2700	1
1.023	S101	2700	Manhole	HW16	1	1

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S67L	443759.776	291437.274	116.640	1.642	1200	Manhole		0	1.000	114.998	150
S67	443754.601	291440.646	116.626	1.760	1200	Manhole	1  0	1.000 1.001	114.940 114.866	150 225
S68	443746.454	291428.477	116.483	1.779	1200	Manhole	1  0	1.001 1.002	114.780 114.704	225 300
S69L	443761.907	291388.316	116.100	1.247	1200	Manhole		0	2.000	114.853	150
S69	443751.879	291385.041	116.000	1.676	1500	Manhole	1  2 0	2.000 1.002 1.003	114.624 114.522 114.324	150 300 450
S70	443760.577	291359.063	116.000	1.743	1500	Manhole	1  0	1.003 1.004	114.257 114.257	450 450
S71L	443813.132	291379.558	116.500	2.000	1200	Manhole		0	3.000	114.500	225

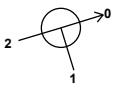
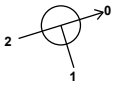
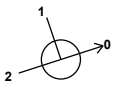
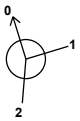
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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S71	443814.426	291375.457	116.000	1.880	1500	Manhole	1	3.000	114.345	225
							2	1.004	114.120	450
							0	1.005	114.120	450
S72	443796.103	291443.938	116.498	1.671	1500	Manhole	0	4.000	114.827	225
S73La	443805.881	291407.158	116.320	1.573	1200	Manhole	0	5.000	114.747	150
S73Lb	443816.318	291411.988	116.346	1.616	1200	Manhole	0	6.000	114.730	150
S73	443811.848	291409.919	116.446	1.990	1500	Manhole	1	6.000	114.681	150
							2	5.000	114.681	150
							3	4.000	114.606	225
							0	4.001	114.456	375
S74	443819.303	291394.976	116.569	2.256	1500	Manhole	1	4.001	114.313	375
							0	4.002	114.313	375
S75L	443828.243	291381.036	116.650	1.881	1200	Manhole	0	7.000	114.769	225
S75	443824.059	291378.789	116.499	2.430	1500	Manhole	1	7.000	114.294	225
							2	4.002	114.144	375
							3	1.005	114.069	450
							0	1.006	114.069	450
S76	443830.286	291361.590	116.313	2.336	1500	Manhole	1	1.006	113.977	450
							0	1.007	113.978	450
S77	443837.366	291353.859	116.252	2.334	1500	Manhole	1	1.007	113.919	450
							0	1.008	113.918	450
S78L	443851.912	291342.796	116.481	2.329	1200	Manhole	0	8.000	114.152	150
S78	443850.095	291349.382	116.345	2.562	1500	Manhole	1	8.000	114.083	150
							2	1.008	113.783	450
							0	1.009	113.784	450
S79L	443897.490	291356.796	116.530	2.254	1200	Manhole	0	9.000	114.276	150

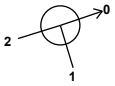
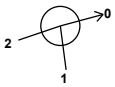
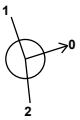
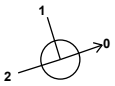
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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S79	443895.594	291362.985	116.401	2.828	1500	Manhole	1 2  0	9.000 1.009 1.010	113.947 113.648 113.573	150 450 525
S80L	443927.311	291365.336	116.600	1.898	1200	Manhole	 0	10.000	114.702	150
S80	443925.227	291372.140	116.458	3.060	1800	Manhole	1 2  0	10.000 1.010 1.011	113.773 113.398 113.398	150 525 525
S81L	443881.050	291289.223	115.641	2.205	1500	Manhole	 0	11.000	113.436	300
S81	443885.480	291280.718	115.632	2.644	1500	Manhole	1  0	11.000 11.001	113.138 112.988	300 450
S82L	443924.760	291297.037	116.100	2.394	1200	Manhole	 0	12.000	113.706	150
S82	443925.865	291293.768	116.063	3.178	1500	Manhole	1 2  0	12.000 11.001 11.002	113.185 112.885 112.885	150 450 450
S83L	443960.932	291308.973	115.800	2.310	1200	Manhole	 0	13.000	113.490	150
S83	443965.988	291306.734	115.829	3.047	1500	Manhole	1 2  0	13.000 11.002 11.003	113.082 112.782 112.782	150 450 450
S84	443971.953	291315.549	115.717	2.961	1500	Manhole	1  0	11.003 11.004	112.756 112.756	450 450
S85L	443987.286	291333.917	115.800	2.286	1200	Manhole	 0	14.000	113.514	150
S85	443989.010	291328.289	115.754	2.433	1200	Manhole	1  0	14.000 14.001	113.396 113.321	150 225
S86	443972.588	291323.314	115.683	2.946	1500	Manhole	1 2  0	14.001 11.004 11.005	112.962 112.737 112.737	225 450 450

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S87L	443964.547	291339.409	115.769	2.209	1200	Manhole		0	15.000	113.560	150
S87	443967.391	291340.280	115.755	3.061	1500	Manhole		1	15.000	112.994	150
								2	11.005	112.694	450
								0	11.006	112.694	450
S88	443954.993	291381.389	116.258	3.744	1500	Manhole		1	11.006	112.589	450
								2	1.011	112.514	525
								0	1.012	112.514	525
S89L	444004.820	291392.210	115.800	2.516	1200	Manhole		0	16.000	113.284	225
S89	444004.060	291398.006	115.739	3.340	1500	Manhole		1	16.000	112.699	225
								2	1.012	112.399	525
								0	1.013	112.399	525
S91	444020.925	291402.553	115.513	3.397	1800	Manhole		1	1.013	112.341	525
								0	1.014	112.116	750
S92L	444009.789	291445.245	115.313	1.765	1200	Manhole		0	18.000	113.548	150
S92	444013.272	291446.339	115.286	2.178	1200	Manhole		1	18.000	113.183	150
								0	18.001	113.108	225
S93	444017.554	291433.597	115.287	3.215	1800	Manhole		1	18.001	112.597	225
								2	1.014	112.072	750
								0	1.015	112.072	750
S94L	444042.544	291447.402	114.788	1.591	1200	Manhole		0	19.000	113.197	150
S94	444044.192	291442.029	114.794	2.759	1800	Manhole		1	19.000	112.635	150
								2	1.015	112.035	750
								0	1.016	112.035	750
S95La	444054.557	291480.418	114.300	1.386	1200	Manhole		0	20.000	112.914	150
S95Lb	444063.621	291483.265	114.250	1.556	1200	Manhole		0	21.000	112.694	150

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S95	444060.181	291482.048	114.279	2.100	1200	Manhole	1	21.000	112.329	150
							2	20.000	112.328	150
							0	20.001	112.179	300
S96	444070.570	291451.147	114.304	3.665	1800	Manhole	1	20.001	111.089	300
							2	1.016	110.640	750
							0	1.017	110.639	750
S97L	444116.288	291471.699	113.400	2.579	1200	Manhole	0	22.000	110.821	150
S97	444118.166	291466.495	113.420	3.769	1800	Manhole	1	22.000	110.251	150
							2	1.017	109.651	750
							0	1.018	109.651	750
S98L	444150.009	291482.356	112.010	2.491	1200	Manhole	0	23.000	109.519	150
S98	444151.269	291478.489	112.082	3.638	1800	Manhole	1	23.000	109.044	150
							2	1.018	108.444	750
							0	1.019	108.444	750
S99L	444188.412	291495.138	110.750	1.416	1200	Manhole	0	24.000	109.334	150
S99	444189.788	291490.853	110.700	2.799	1800	Manhole	1	24.000	108.501	150
							2	1.019	107.901	750
							0	1.020	107.901	750
S100	444219.480	291500.384	110.700	3.797	1800	Manhole	1	1.020	106.903	750
							0	1.021	106.903	750
HW14	444232.144	291519.066	107.500	1.230	1	Manhole	1	1.021	106.270	750
HW15	444293.606	291529.740	107.500	1.230	1	Manhole	0	1.022	106.270	750
S101	444300.866	291535.204	107.500	1.247	2700	Manhole	1	1.022	106.253	750
							0	1.023	106.253	225
HW16	444330.832	291547.472	106.000	0.900	1	Manhole	1	1.023	105.100	225

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Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	0.0
Ratio-R	0.400	Check Discharge Rate(s)	x
Summer CV	0.750	Check Discharge Volume	x
Analysis Speed	Detailed		

Storm Durations

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

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	40	0	0
100	40	10	0

Node HW16 Surcharged Outfall

Overrides Design Area	x	Depression Storage Area (m²)	0	Evapo-transpiration (mm/day)	0
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0		

Applies to All storms

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
0	0.900	255	0.900	510	0.900	765	0.900	1020	0.900	1275	0.900
15	0.900	270	0.900	525	0.900	780	0.900	1035	0.900	1290	0.900
30	0.900	285	0.900	540	0.900	795	0.900	1050	0.900	1305	0.900
45	0.900	300	0.900	555	0.900	810	0.900	1065	0.900	1320	0.900
60	0.900	315	0.900	570	0.900	825	0.900	1080	0.900	1335	0.900
75	0.900	330	0.900	585	0.900	840	0.900	1095	0.900	1350	0.900
90	0.900	345	0.900	600	0.900	855	0.900	1110	0.900	1365	0.900
105	0.900	360	0.900	615	0.900	870	0.900	1125	0.900	1380	0.900
120	0.900	375	0.900	630	0.900	885	0.900	1140	0.900	1395	0.900
135	0.900	390	0.900	645	0.900	900	0.900	1155	0.900	1410	0.900
150	0.900	405	0.900	660	0.900	915	0.900	1170	0.900	1425	0.900
165	0.900	420	0.900	675	0.900	930	0.900	1185	0.900	1440	0.900
180	0.900	435	0.900	690	0.900	945	0.900	1200	0.900		
195	0.900	450	0.900	705	0.900	960	0.900	1215	0.900		
210	0.900	465	0.900	720	0.900	975	0.900	1230	0.900		
225	0.900	480	0.900	735	0.900	990	0.900	1245	0.900		
240	0.900	495	0.900	750	0.900	1005	0.900	1260	0.900		

Node S101 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	x	Sump Available	✓
Invert Level (m)	106.253	Product Number	CTL-SHE-0143-1070-1500-1070
Design Depth (m)	1.500	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	10.7	Min Node Diameter (mm)	1200

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Node HW15 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	100.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	106.270	Main Channel Slope (1:X)	1000.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.020

Inlets

HW14

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	1306.0	0.0	1.455	2488.0	0.0	1.456	0.0	0.0

Other (defaults)

Entry Loss (manhole)	0.000	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.000	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 15 minute summer	141.566	40.058
2 year 30 minute summer	91.753	25.963
2 year 60 minute summer	61.301	16.200
2 year 120 minute summer	37.449	9.897
2 year 180 minute summer	28.672	7.378
2 year 240 minute summer	22.636	5.982
2 year 360 minute summer	17.235	4.435
2 year 480 minute summer	13.550	3.581
2 year 600 minute summer	11.088	3.033
2 year 720 minute summer	9.878	2.647
2 year 960 minute summer	8.113	2.136
2 year 1440 minute summer	5.891	1.579
30 year 15 minute summer	268.706	76.035
30 year 30 minute summer	174.929	49.499
30 year 60 minute summer	116.589	30.811
30 year 120 minute summer	70.438	18.615
30 year 180 minute summer	53.298	13.715
30 year 240 minute summer	41.604	10.995
30 year 360 minute summer	31.221	8.034
30 year 480 minute summer	24.324	6.428
30 year 600 minute summer	19.756	5.404
30 year 720 minute summer	17.490	4.687
30 year 960 minute summer	14.215	3.743
30 year 1440 minute summer	10.161	2.723
100 year +40% CC 15 minute summer	488.233	138.153
100 year +40% CC 30 minute summer	320.551	90.705
100 year +40% CC 60 minute summer	214.603	56.713
100 year +40% CC 120 minute summer	129.587	34.246
100 year +40% CC 180 minute summer	97.729	25.149
100 year +40% CC 240 minute summer	75.977	20.078
100 year +40% CC 360 minute summer	56.677	14.585
100 year +40% CC 480 minute summer	43.979	11.622
100 year +40% CC 600 minute summer	35.604	9.738
100 year +40% CC 720 minute summer	31.433	8.424

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Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
100 year +40% CC 960 minute summer	25.432	6.697
100 year +40% CC 1440 minute summer	18.055	4.839
100 year +40% CC +10% A 15 minute summer	488.233	138.153
100 year +40% CC +10% A 30 minute summer	320.551	90.705
100 year +40% CC +10% A 60 minute summer	214.603	56.713
100 year +40% CC +10% A 120 minute summer	129.587	34.246
100 year +40% CC +10% A 180 minute summer	97.729	25.149
100 year +40% CC +10% A 240 minute summer	75.977	20.078
100 year +40% CC +10% A 360 minute summer	56.677	14.585
100 year +40% CC +10% A 480 minute summer	43.979	11.622
100 year +40% CC +10% A 600 minute summer	35.604	9.738
100 year +40% CC +10% A 720 minute summer	31.433	8.424
100 year +40% CC +10% A 960 minute summer	25.432	6.697
100 year +40% CC +10% A 1440 minute summer	18.055	4.839

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Results for 2 year Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S67L	10	115.062	0.064	6.6	0.0725	0.0000	OK
15 minute summer	S67	10	114.953	0.087	12.7	0.0979	0.0000	OK
15 minute summer	S68	11	114.811	0.107	20.1	0.1209	0.0000	OK
15 minute summer	S69L	10	114.915	0.062	9.4	0.0699	0.0000	OK
15 minute summer	S69	11	114.451	0.127	28.9	0.2245	0.0000	OK
15 minute summer	S70	12	114.382	0.125	29.0	0.2211	0.0000	OK
15 minute summer	S71L	10	114.569	0.069	20.5	0.0782	0.0000	OK
15 minute summer	S71	11	114.281	0.161	46.7	0.2851	0.0000	OK
15 minute summer	S72	11	114.897	0.070	8.7	0.1233	0.0000	OK
15 minute summer	S73La	10	114.805	0.058	5.7	0.0657	0.0000	OK
15 minute summer	S73Lb	10	114.830	0.100	14.0	0.1130	0.0000	OK
15 minute summer	S73	10	114.558	0.102	30.6	0.1799	0.0000	OK
15 minute summer	S74	11	114.417	0.104	34.9	0.1844	0.0000	OK
15 minute summer	S75L	10	114.826	0.057	23.4	0.0645	0.0000	OK
15 minute summer	S75	11	114.279	0.210	105.6	0.3709	0.0000	OK
15 minute summer	S76	11	114.183	0.206	106.6	0.3640	0.0000	OK
15 minute summer	S77	11	114.116	0.198	107.9	0.3497	0.0000	OK
15 minute summer	S78L	10	114.251	0.099	13.9	0.1117	0.0000	OK
15 minute summer	S78	12	114.054	0.271	125.6	0.4787	0.0000	OK
15 minute summer	S79L	10	114.348	0.072	18.7	0.0812	0.0000	OK
15 minute summer	S79	12	113.798	0.225	143.7	0.3971	0.0000	OK
15 minute summer	S80L	10	114.732	0.030	5.7	0.0341	0.0000	OK
15 minute summer	S80	12	113.551	0.153	157.0	0.3904	0.0000	OK
15 minute summer	S81L	10	113.518	0.082	32.6	0.1449	0.0000	OK
15 minute summer	S81	10	113.141	0.153	41.9	0.2708	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S67L	1.000	S67	6.5	0.913	0.381	0.0443	
15 minute summer	S67	1.001	S68	12.6	0.900	0.318	0.2057	
15 minute summer	S68	1.002	S69	19.9	0.884	0.279	0.9859	
15 minute summer	S69L	2.000	S69	9.3	1.364	0.355	0.0721	
15 minute summer	S69	1.003	S70	29.0	0.824	0.182	0.9863	
15 minute summer	S70	1.004	S71	27.8	0.663	0.175	2.4308	
15 minute summer	S71L	3.000	S71	20.4	1.980	0.206	0.0444	
15 minute summer	S71	1.005	S75	46.5	0.804	0.204	0.6294	
15 minute summer	S72	4.000	S73	8.5	0.808	0.213	0.3928	
15 minute summer	S73La	5.000	S73	5.7	0.900	0.318	0.0413	
15 minute summer	S73Lb	6.000	S73	13.9	1.118	0.785	0.0613	
15 minute summer	S73	4.001	S74	30.4	1.237	0.164	0.4103	
15 minute summer	S74	4.002	S75	34.8	1.254	0.174	0.5115	
15 minute summer	S75L	7.000	S75	23.4	2.964	0.141	0.0374	
15 minute summer	S75	1.006	S76	105.1	1.469	0.460	1.3094	
15 minute summer	S76	1.007	S77	106.2	1.514	0.439	0.7353	
15 minute summer	S77	1.008	S78	107.7	1.291	0.333	1.1244	
15 minute summer	S78L	8.000	S78	13.8	1.122	0.772	0.0839	
15 minute summer	S78	1.009	S79	125.3	1.329	0.728	4.4776	
15 minute summer	S79L	9.000	S79	18.6	2.241	0.462	0.0538	
15 minute summer	S79	1.010	S80	144.4	2.065	0.397	2.1806	
15 minute summer	S80L	10.000	S80	5.7	2.261	0.088	0.0179	
15 minute summer	S80	1.011	S88	157.8	1.306	0.193	3.7706	
15 minute summer	S81L	11.000	S81	32.5	2.086	0.165	0.1493	
15 minute summer	S81	11.001	S82	41.1	0.750	0.259	2.3453	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S82L	10	113.752	0.046	14.4	0.0525	0.0000	OK
15 minute summer	S82	11	113.074	0.189	60.9	0.3342	0.0000	OK
15 minute summer	S83L	10	113.531	0.041	7.8	0.0460	0.0000	OK
15 minute summer	S83	11	113.005	0.222	69.5	0.3931	0.0000	OK
15 minute summer	S84	12	112.994	0.238	72.7	0.4209	0.0000	OK
15 minute summer	S85L	10	113.594	0.080	14.0	0.0900	0.0000	OK
15 minute summer	S85	10	113.391	0.070	16.2	0.0796	0.0000	OK
15 minute summer	S86	12	112.989	0.252	87.6	0.4446	0.0000	OK
15 minute summer	S87L	10	113.597	0.037	10.6	0.0423	0.0000	OK
15 minute summer	S87	12	112.973	0.279	100.3	0.4932	0.0000	OK
15 minute summer	S88	12	112.945	0.430	255.4	0.7607	0.0000	OK
15 minute summer	S89L	10	113.361	0.077	41.8	0.0869	0.0000	OK
15 minute summer	S89	12	112.784	0.385	290.1	0.6806	0.0000	OK
15 minute summer	S91	12	112.506	0.390	289.3	0.9931	0.0000	OK
15 minute summer	S92L	10	113.605	0.057	17.3	0.0645	0.0000	OK
15 minute summer	S92	10	113.175	0.066	19.6	0.0752	0.0000	OK
15 minute summer	S93	13	112.447	0.375	307.4	0.9535	0.0000	OK
15 minute summer	S94L	10	113.242	0.045	10.9	0.0505	0.0000	OK
15 minute summer	S94	12	112.204	0.169	327.0	0.4295	0.0000	OK
15 minute summer	S95La	10	112.943	0.029	4.5	0.0324	0.0000	OK
15 minute summer	S95Lb	10	112.723	0.029	4.5	0.0324	0.0000	OK
15 minute summer	S95	10	112.231	0.052	13.5	0.0585	0.0000	OK
15 minute summer	S96	12	110.864	0.225	341.4	0.5722	0.0000	OK
15 minute summer	S97L	10	110.870	0.049	13.4	0.0558	0.0000	OK
15 minute summer	S97	13	109.842	0.190	342.4	0.4847	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S82L	12.000	S82	14.4	3.111	0.206	0.0159	
15 minute summer	S82	11.002	S83	60.6	0.864	0.382	2.9791	
15 minute summer	S83L	13.000	S83	7.8	2.018	0.160	0.0213	
15 minute summer	S83	11.003	S84	68.2	0.841	0.429	0.8667	
15 minute summer	S84	11.004	S86	71.8	0.831	0.452	0.6868	
15 minute summer	S85L	14.000	S85	13.9	1.469	0.552	0.0558	
15 minute summer	S85	14.001	S86	16.1	1.522	0.214	0.1816	
15 minute summer	S86	11.005	S87	86.1	0.944	0.544	1.7249	
15 minute summer	S87L	15.000	S87	10.6	3.099	0.135	0.0102	
15 minute summer	S87	11.006	S88	94.6	0.893	0.596	5.1010	
15 minute summer	S88	1.012	S89	255.5	1.439	1.126	9.3070	
15 minute summer	S89L	16.000	S89	41.7	3.495	0.252	0.0698	
15 minute summer	S89	1.013	S91	289.3	1.753	1.040	2.8818	
15 minute summer	S91	1.014	S93	286.6	1.299	0.622	6.9428	
15 minute summer	S92L	18.000	S92	17.3	2.818	0.305	0.0224	
15 minute summer	S92	18.001	S93	19.5	1.990	0.191	0.1314	
15 minute summer	S93	1.015	S94	316.3	2.275	0.709	4.0401	
15 minute summer	S94L	19.000	S94	10.9	2.477	0.192	0.0247	
15 minute summer	S94	1.016	S96	323.3	3.605	0.117	2.5694	
15 minute summer	S95La	20.000	S95	4.5	1.917	0.079	0.0137	
15 minute summer	S95Lb	21.000	S95	4.5	1.917	0.079	0.0085	
15 minute summer	S95	20.001	S96	13.3	1.649	0.065	0.2628	
15 minute summer	S96	1.017	S97	329.4	3.396	0.189	4.9338	
15 minute summer	S97L	22.000	S97	13.4	2.653	0.232	0.0279	
15 minute summer	S97	1.018	S98	341.0	3.169	0.149	3.8041	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S98L	10	109.562	0.043	10.8	0.0483	0.0000	OK
15 minute summer	S98	13	108.694	0.250	348.9	0.6359	0.0000	OK
15 minute summer	S99L	10	109.373	0.039	11.3	0.0440	0.0000	OK
15 minute summer	S99	13	108.100	0.199	357.0	0.5058	0.0000	OK
15 minute summer	S100	13	107.111	0.208	358.1	0.5296	0.0000	OK
480 minute summer	HW14	368	106.576	0.306	70.5	0.0000	0.0000	OK
480 minute summer	HW15	368	106.576	0.306	40.5	0.0000	0.0000	OK
480 minute summer	S101	464	106.580	0.327	38.6	1.8705	0.0000	SURCHARGED
15 minute summer	HW16	1	106.000	0.900	8.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S98L	23.000	S98	10.8	2.614	0.176	0.0168	
15 minute summer	S98	1.019	S99	351.3	3.180	0.245	4.4802	
15 minute summer	S99L	24.000	S99	11.3	3.125	0.146	0.0162	
15 minute summer	S99	1.020	S100	358.1	3.716	0.162	3.0052	
15 minute summer	S100	1.021	HW14	361.1	4.068	0.174	2.0645	
480 minute summer	HW14	Flow through pond	HW15	40.5	0.070	0.001	361.7314	
480 minute summer	HW15	1.022	S101	38.6	0.261	0.073	1.5892	
480 minute summer	S101	1.023	HW16	10.3	0.370	0.104	0.7466	320.5

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S67L	10	115.092	0.094	12.5	0.1065	0.0000	OK
15 minute summer	S67	10	114.991	0.125	24.2	0.1414	0.0000	OK
15 minute summer	S68	11	114.857	0.153	38.2	0.1727	0.0000	OK
15 minute summer	S69L	10	114.943	0.090	17.8	0.1020	0.0000	OK
15 minute summer	S69	11	114.502	0.178	55.0	0.3146	0.0000	OK
15 minute summer	S70	11	114.433	0.176	55.2	0.3117	0.0000	OK
15 minute summer	S71L	10	114.597	0.097	38.8	0.1100	0.0000	OK
15 minute summer	S71	11	114.389	0.268	90.6	0.4744	0.0000	OK
15 minute summer	S72	10	114.926	0.099	16.5	0.1742	0.0000	OK
15 minute summer	S73La	10	114.831	0.084	10.9	0.0954	0.0000	OK
15 minute summer	S73Lb	10	114.938	0.208	26.7	0.2355	0.0000	SURCHARGED
15 minute summer	S73	10	114.600	0.144	58.5	0.2548	0.0000	OK
15 minute summer	S74	10	114.468	0.155	66.8	0.2745	0.0000	OK
15 minute summer	S75L	10	114.848	0.079	44.4	0.0897	0.0000	OK
15 minute summer	S75	11	114.388	0.319	203.9	0.5644	0.0000	OK
15 minute summer	S76	12	114.297	0.320	204.9	0.5652	0.0000	OK
15 minute summer	S77	12	114.251	0.333	206.4	0.5888	0.0000	OK
15 minute summer	S78L	10	114.377	0.225	26.3	0.2549	0.0000	SURCHARGED
15 minute summer	S78	12	114.239	0.456	237.4	0.8054	0.0000	SURCHARGED
15 minute summer	S79L	10	114.385	0.109	35.5	0.1236	0.0000	OK
15 minute summer	S79	11	113.900	0.327	271.5	0.5781	0.0000	OK
15 minute summer	S80L	10	114.744	0.042	10.9	0.0472	0.0000	OK
15 minute summer	S80	11	113.612	0.214	298.5	0.5450	0.0000	OK
15 minute summer	S81L	12	113.601	0.165	61.9	0.2916	0.0000	OK
15 minute summer	S81	12	113.699	0.711	125.6	1.2562	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S67L	1.000	S67	12.4	1.067	0.721	0.0718	
15 minute summer	S67	1.001	S68	24.0	1.060	0.603	0.3311	
15 minute summer	S68	1.002	S69	37.9	1.064	0.531	1.5590	
15 minute summer	S69L	2.000	S69	17.7	1.600	0.673	0.1165	
15 minute summer	S69	1.003	S70	55.2	0.974	0.347	1.5873	
15 minute summer	S70	1.004	S71	53.5	0.719	0.338	4.3963	
15 minute summer	S71L	3.000	S71	38.7	2.360	0.391	0.0705	
15 minute summer	S71	1.005	S75	89.7	0.912	0.393	1.1159	
15 minute summer	S72	4.000	S73	16.1	0.964	0.404	0.6254	
15 minute summer	S73La	5.000	S73	10.8	1.062	0.608	0.0669	
15 minute summer	S73Lb	6.000	S73	26.5	1.504	1.496	0.0856	
15 minute summer	S73	4.001	S74	58.2	1.445	0.314	0.6855	
15 minute summer	S74	4.002	S75	66.7	1.240	0.333	0.9916	
15 minute summer	S75L	7.000	S75	44.3	3.546	0.268	0.0662	
15 minute summer	S75	1.006	S76	202.1	1.691	0.884	2.1989	
15 minute summer	S76	1.007	S77	203.3	1.724	0.840	1.2872	
15 minute summer	S77	1.008	S78	203.5	1.444	0.629	1.9182	
15 minute summer	S78L	8.000	S78	26.0	1.478	1.459	0.1203	
15 minute summer	S78	1.009	S79	233.4	1.589	1.356	6.8191	
15 minute summer	S79L	9.000	S79	35.4	2.577	0.878	0.0888	
15 minute summer	S79	1.010	S80	269.6	2.406	0.742	3.4766	
15 minute summer	S80L	10.000	S80	10.9	2.727	0.168	0.0284	
15 minute summer	S80	1.011	S88	296.6	1.697	0.362	4.6562	
15 minute summer	S81L	11.000	S81	61.7	2.497	0.314	0.5280	
15 minute summer	S81	11.001	S82	77.9	0.857	0.492	6.7245	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S82L	12	113.776	0.070	27.3	0.0793	0.0000	OK
15 minute summer	S82	12	113.654	0.769	115.5	1.3585	0.0000	SURCHARGED
15 minute summer	S83L	12	113.590	0.100	14.8	0.1128	0.0000	OK
15 minute summer	S83	12	113.600	0.818	128.7	1.4462	0.0000	SURCHARGED
15 minute summer	S84	12	113.585	0.829	120.1	1.4652	0.0000	SURCHARGED
15 minute summer	S85L	10	113.649	0.135	26.7	0.1530	0.0000	OK
15 minute summer	S85	12	113.672	0.350	30.8	0.3964	0.0000	SURCHARGED
15 minute summer	S86	12	113.547	0.810	136.1	1.4304	0.0000	SURCHARGED
15 minute summer	S87L	10	113.612	0.052	20.1	0.0585	0.0000	OK
15 minute summer	S87	12	113.500	0.806	157.3	1.4250	0.0000	SURCHARGED
15 minute summer	S88	12	113.452	0.938	439.7	1.6573	0.0000	SURCHARGED
15 minute summer	S89L	10	113.393	0.109	79.3	0.1233	0.0000	OK
15 minute summer	S89	12	113.010	0.611	499.4	1.0794	0.0000	SURCHARGED
15 minute summer	S91	12	112.658	0.542	492.7	1.3782	0.0000	OK
15 minute summer	S92L	10	113.630	0.082	32.9	0.0930	0.0000	OK
15 minute summer	S92	10	113.202	0.093	37.1	0.1057	0.0000	OK
15 minute summer	S93	13	112.588	0.516	523.7	1.3138	0.0000	OK
15 minute summer	S94L	10	113.260	0.063	20.7	0.0711	0.0000	OK
15 minute summer	S94	12	112.265	0.230	578.3	0.5849	0.0000	OK
15 minute summer	S95La	10	112.954	0.040	8.6	0.0448	0.0000	OK
15 minute summer	S95Lb	10	112.734	0.040	8.6	0.0448	0.0000	OK
15 minute summer	S95	10	112.250	0.071	25.7	0.0806	0.0000	OK
15 minute summer	S96	12	110.933	0.293	621.7	0.7469	0.0000	OK
15 minute summer	S97L	10	110.891	0.070	25.3	0.0789	0.0000	OK
15 minute summer	S97	12	109.906	0.255	596.9	0.6489	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S82L	12.000	S82	27.3	3.709	0.391	0.0443	
15 minute summer	S82	11.002	S83	110.9	0.952	0.698	6.6809	
15 minute summer	S83L	13.000	S83	14.8	2.375	0.304	0.0831	
15 minute summer	S83	11.003	S84	113.8	0.897	0.717	1.6865	
15 minute summer	S84	11.004	S86	124.0	0.871	0.782	1.2344	
15 minute summer	S85L	14.000	S85	26.5	1.576	1.049	0.0997	
15 minute summer	S85	14.001	S86	30.6	1.768	0.406	0.6825	
15 minute summer	S86	11.005	S87	138.7	0.997	0.877	2.8114	
15 minute summer	S87L	15.000	S87	20.1	3.660	0.257	0.0342	
15 minute summer	S87	11.006	S88	156.2	1.046	0.983	6.8032	
15 minute summer	S88	1.012	S89	440.1	2.037	1.939	11.1916	
15 minute summer	S89L	16.000	S89	79.2	4.089	0.479	0.1709	
15 minute summer	S89	1.013	S91	492.7	2.284	1.771	3.6529	
15 minute summer	S91	1.014	S93	493.7	1.506	1.072	10.2397	
15 minute summer	S92L	18.000	S92	32.8	3.328	0.580	0.0360	
15 minute summer	S92	18.001	S93	37.0	2.377	0.363	0.2091	
15 minute summer	S93	1.015	S94	558.0	2.727	1.250	5.9699	
15 minute summer	S94L	19.000	S94	20.7	2.958	0.365	0.0392	
15 minute summer	S94	1.016	S96	587.4	4.311	0.212	3.8110	
15 minute summer	S95La	20.000	S95	8.6	2.316	0.151	0.0217	
15 minute summer	S95Lb	21.000	S95	8.6	2.316	0.151	0.0135	
15 minute summer	S95	20.001	S96	25.5	1.997	0.125	0.4161	
15 minute summer	S96	1.017	S97	572.2	3.975	0.329	7.2879	
15 minute summer	S97L	22.000	S97	25.2	3.153	0.439	0.0443	
15 minute summer	S97	1.018	S98	600.9	3.727	0.262	5.7350	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S98L	10	109.579	0.060	20.4	0.0676	0.0000	OK
15 minute summer	S98	12	108.784	0.340	624.8	0.8651	0.0000	OK
15 minute summer	S99L	10	109.388	0.054	21.4	0.0613	0.0000	OK
15 minute summer	S99	12	108.171	0.270	649.3	0.6882	0.0000	OK
15 minute summer	S100	12	107.188	0.285	648.9	0.7261	0.0000	OK
480 minute summer	HW14	480	106.806	0.536	126.0	0.0000	0.0000	OK
480 minute summer	HW15	488	106.806	0.536	72.9	0.0000	0.0000	OK
600 minute summer	S101	585	106.833	0.580	68.4	3.3207	0.0000	SURCHARGED
15 minute summer	HW16	1	106.000	0.900	10.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S98L	23.000	S98	20.4	3.120	0.333	0.0265	
15 minute summer	S98	1.019	S99	632.3	3.760	0.441	6.8127	
15 minute summer	S99L	24.000	S99	21.4	3.743	0.277	0.0257	
15 minute summer	S99	1.020	S100	648.9	4.377	0.293	4.6244	
15 minute summer	S100	1.021	HW14	648.7	5.049	0.313	2.9792	
480 minute summer	HW14	Flow through pond	HW15	72.9	0.078	0.002	731.0864	
480 minute summer	HW15	1.022	S101	67.4	0.227	0.127	3.1614	
600 minute summer	S101	1.023	HW16	10.7	0.384	0.109	0.7496	418.0

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S67L	13	115.588	0.590	22.7	0.6670	0.0000	SURCHARGED
15 minute summer	S67	13	115.546	0.680	44.0	0.7690	0.0000	SURCHARGED
15 minute summer	S68	13	115.504	0.800	69.2	0.9044	0.0000	SURCHARGED
15 minute summer	S69L	12	115.579	0.726	32.3	0.8206	0.0000	SURCHARGED
15 minute summer	S69	13	115.431	1.107	98.2	1.9560	0.0000	SURCHARGED
15 minute summer	S70	13	115.422	1.165	81.0	2.0578	0.0000	SURCHARGED
15 minute summer	S71L	12	115.422	0.922	70.6	1.0426	0.0000	SURCHARGED
15 minute summer	S71	13	115.381	1.261	120.4	2.2287	0.0000	SURCHARGED
15 minute summer	S72	12	115.484	0.657	29.9	1.1615	0.0000	SURCHARGED
15 minute summer	S73La	12	115.468	0.721	19.7	0.8159	0.0000	SURCHARGED
15 minute summer	S73Lb	12	115.633	0.903	48.4	1.0215	0.0000	SURCHARGED
15 minute summer	S73	12	115.425	0.969	106.0	1.7121	0.0000	SURCHARGED
15 minute summer	S74	12	115.402	1.089	111.5	1.9234	0.0000	SURCHARGED
15 minute summer	S75L	12	115.432	0.663	80.7	0.7499	0.0000	SURCHARGED
15 minute summer	S75	12	115.369	1.300	273.0	2.2969	0.0000	SURCHARGED
15 minute summer	S76	12	115.260	1.282	249.4	2.2661	0.0000	SURCHARGED
15 minute summer	S77	12	115.197	1.279	261.3	2.2593	0.0000	SURCHARGED
15 minute summer	S78L	12	115.417	1.264	47.8	1.4301	0.0000	SURCHARGED
15 minute summer	S78	12	115.116	1.333	313.3	2.3548	0.0000	SURCHARGED
15 minute summer	S79L	12	115.322	1.046	64.6	1.1830	0.0000	SURCHARGED
15 minute summer	S79	12	114.722	1.149	378.4	2.0306	0.0000	SURCHARGED
15 minute summer	S80L	12	114.763	0.061	19.7	0.0691	0.0000	OK
15 minute summer	S80	12	114.557	1.159	390.5	2.9491	0.0000	SURCHARGED
15 minute summer	S81L	12	115.073	1.637	112.4	2.8920	0.0000	SURCHARGED
15 minute summer	S81	12	115.013	2.025	147.9	3.5783	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S67L	1.000	S67	22.5	1.277	1.306	0.1087	
15 minute summer	S67	1.001	S68	43.5	1.261	1.095	0.5824	
15 minute summer	S68	1.002	S69	66.7	1.245	0.935	3.0825	
15 minute summer	S69L	2.000	S69	31.5	1.789	1.199	0.1857	
15 minute summer	S69	1.003	S70	81.0	1.036	0.510	4.3407	
15 minute summer	S70	1.004	S71	109.0	0.825	0.688	8.9186	
15 minute summer	S71L	3.000	S71	66.5	2.553	0.671	0.1710	
15 minute summer	S71	1.005	S75	161.2	1.129	0.707	1.6150	
15 minute summer	S72	4.000	S73	29.2	1.065	0.734	1.4909	
15 minute summer	S73La	5.000	S73	19.5	1.197	1.096	0.1158	
15 minute summer	S73Lb	6.000	S73	47.7	2.712	2.696	0.0867	
15 minute summer	S73	4.001	S74	96.0	1.587	0.519	1.8420	
15 minute summer	S74	4.002	S75	108.3	1.237	0.541	1.8608	
15 minute summer	S75L	7.000	S75	79.4	3.882	0.480	0.1889	
15 minute summer	S75	1.006	S76	247.5	1.686	1.082	2.8982	
15 minute summer	S76	1.007	S77	259.5	1.691	1.072	1.6610	
15 minute summer	S77	1.008	S78	271.6	1.714	0.840	2.1380	
15 minute summer	S78L	8.000	S78	45.4	2.576	2.542	0.1203	
15 minute summer	S78	1.009	S79	308.8	1.949	1.795	7.5243	
15 minute summer	S79L	9.000	S79	62.7	3.564	1.557	0.1140	
15 minute summer	S79	1.010	S80	360.4	2.409	0.992	6.7003	
15 minute summer	S80L	10.000	S80	19.7	3.167	0.304	0.0866	
15 minute summer	S80	1.011	S88	396.4	1.866	0.484	6.7337	
15 minute summer	S81L	11.000	S81	105.4	2.697	0.536	0.6753	
15 minute summer	S81	11.001	S82	117.7	0.919	0.744	6.7245	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S82L	12	115.144	1.438	49.6	1.6262	0.0000	SURCHARGED
15 minute summer	S82	12	114.966	2.081	177.0	3.6773	0.0000	SURCHARGED
15 minute summer	S83L	12	114.937	1.447	26.9	1.6368	0.0000	SURCHARGED
15 minute summer	S83	12	114.859	2.077	194.9	3.6696	0.0000	SURCHARGED
15 minute summer	S84	12	114.822	2.066	201.8	3.6498	0.0000	SURCHARGED
15 minute summer	S85L	12	115.202	1.688	48.4	1.9094	0.0000	SURCHARGED
15 minute summer	S85	12	114.917	1.595	47.3	1.8045	0.0000	SURCHARGED
15 minute summer	S86	12	114.792	2.055	243.9	3.6305	0.0000	SURCHARGED
15 minute summer	S87L	12	114.768	1.208	36.5	1.3657	0.0000	SURCHARGED
15 minute summer	S87	12	114.689	1.995	282.4	3.5248	0.0000	SURCHARGED
15 minute summer	S88	12	114.358	1.844	681.6	3.2581	0.0000	SURCHARGED
15 minute summer	S89L	11	113.725	0.441	144.1	0.4986	0.0000	SURCHARGED
15 minute summer	S89	12	113.342	0.943	797.7	1.6670	0.0000	SURCHARGED
15 minute summer	S91	12	112.876	0.760	797.0	1.9348	0.0000	SURCHARGED
15 minute summer	S92L	10	113.681	0.133	59.8	0.1501	0.0000	OK
15 minute summer	S92	10	113.241	0.133	67.3	0.1501	0.0000	OK
15 minute summer	S93	12	112.796	0.724	867.0	1.8434	0.0000	OK
15 minute summer	S94L	10	113.287	0.090	37.7	0.1014	0.0000	OK
30 minute summer	S94	18	112.349	0.313	1028.0	0.7978	0.0000	OK
15 minute summer	S95La	10	112.968	0.054	15.5	0.0607	0.0000	OK
15 minute summer	S95Lb	10	112.748	0.054	15.5	0.0608	0.0000	OK
15 minute summer	S95	10	112.275	0.096	46.4	0.1089	0.0000	OK
15 minute summer	S96	11	111.033	0.393	968.0	1.0014	0.0000	OK
15 minute summer	S97L	10	110.923	0.102	46.0	0.1150	0.0000	OK
15 minute summer	S97	11	109.991	0.340	1023.8	0.8654	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S82L	12.000	S82	41.0	4.031	0.589	0.0607	
15 minute summer	S82	11.002	S83	169.3	1.069	1.066	6.6809	
15 minute summer	S83L	13.000	S83	20.6	2.629	0.424	0.0974	
15 minute summer	S83	11.003	S84	189.2	1.194	1.192	1.6865	
15 minute summer	S84	11.004	S86	200.7	1.267	1.265	1.2344	
15 minute summer	S85L	14.000	S85	39.9	2.266	1.581	0.1036	
15 minute summer	S85	14.001	S86	43.2	1.752	0.572	0.6825	
15 minute summer	S86	11.005	S87	242.6	1.531	1.534	2.8114	
15 minute summer	S87L	15.000	S87	43.2	3.565	0.552	0.0524	
15 minute summer	S87	11.006	S88	280.8	1.773	1.768	6.8032	
15 minute summer	S88	1.012	S89	685.2	3.172	3.019	11.1916	
15 minute summer	S89L	16.000	S89	140.3	3.983	0.847	0.2325	
15 minute summer	S89	1.013	S91	797.0	3.690	2.865	3.7734	
15 minute summer	S91	1.014	S93	796.0	1.830	1.728	13.6728	
15 minute summer	S92L	18.000	S92	59.5	3.606	1.051	0.0621	
15 minute summer	S92	18.001	S93	67.1	2.759	0.659	0.3885	
15 minute summer	S93	1.015	S94	858.7	2.754	1.924	8.1340	
15 minute summer	S94L	19.000	S94	37.6	3.433	0.664	0.0616	
30 minute summer	S94	1.016	S96	940.1	4.755	0.339	5.5209	
15 minute summer	S95La	20.000	S95	15.5	2.735	0.273	0.0331	
15 minute summer	S95Lb	21.000	S95	15.5	2.735	0.273	0.0206	
15 minute summer	S95	20.001	S96	46.0	2.363	0.226	0.6350	
15 minute summer	S96	1.017	S97	969.5	4.535	0.557	10.7002	
15 minute summer	S97L	22.000	S97	45.9	3.618	0.798	0.0702	
15 minute summer	S97	1.018	S98	1019.8	4.204	0.445	8.5305	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S98L	10	109.604	0.084	37.1	0.0955	0.0000	OK
15 minute summer	S98	11	108.914	0.470	1072.4	1.1969	0.0000	OK
15 minute summer	S99L	10	109.410	0.076	38.9	0.0855	0.0000	OK
15 minute summer	S99	11	108.266	0.365	1100.6	0.9291	0.0000	OK
15 minute summer	S100	12	107.289	0.386	1109.3	0.9825	0.0000	OK
720 minute summer	HW14	720	107.230	0.960	195.1	0.0000	0.0000	OK
720 minute summer	HW15	735	107.230	0.960	99.1	0.0000	0.0000	FLOOD RISK
720 minute summer	S101	735	107.255	1.002	60.7	5.7374	0.0000	FLOOD RISK
15 minute summer	HW16	1	106.000	0.900	10.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S98L	23.000	S98	37.0	3.634	0.605	0.0415	
15 minute summer	S98	1.019	S99	1066.4	4.278	0.744	10.1790	
15 minute summer	S99L	24.000	S99	38.8	4.385	0.504	0.0399	
15 minute summer	S99	1.020	S100	1109.3	5.042	0.501	6.8619	
15 minute summer	S100	1.021	HW14	1112.6	5.991	0.536	4.2010	
720 minute summer	HW14	Flow through pond	HW15	99.1	0.088	0.002	1525.6255	
720 minute summer	HW15	1.022	S101	60.7	0.138	0.114	3.9994	
720 minute summer	S101	1.023	HW16	10.7	0.384	0.109	0.7496	465.4

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Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S67L	13	116.007	1.009	25.0	1.1416	0.0000	SURCHARGED
15 minute summer	S67	13	115.958	1.092	48.4	1.2346	0.0000	SURCHARGED
15 minute summer	S68	13	115.909	1.205	72.0	1.3630	0.0000	SURCHARGED
15 minute summer	S69L	12	115.991	1.138	35.5	1.2866	0.0000	FLOOD RISK
15 minute summer	S69	13	115.827	1.503	93.7	2.6557	0.0000	FLOOD RISK
15 minute summer	S70	13	115.819	1.562	88.1	2.7595	0.0000	FLOOD RISK
15 minute summer	S71L	12	115.802	1.302	77.6	1.4729	0.0000	SURCHARGED
15 minute summer	S71	13	115.775	1.655	117.0	2.9237	0.0000	FLOOD RISK
15 minute summer	S72	13	115.877	1.050	32.9	1.8556	0.0000	SURCHARGED
15 minute summer	S73La	13	115.856	1.109	21.7	1.2538	0.0000	SURCHARGED
15 minute summer	S73Lb	12	116.040	1.310	53.3	1.4820	0.0000	SURCHARGED
15 minute summer	S73	13	115.816	1.360	106.3	2.4035	0.0000	SURCHARGED
15 minute summer	S74	13	115.793	1.480	118.4	2.6145	0.0000	SURCHARGED
15 minute summer	S75L	12	115.814	1.045	88.8	1.1816	0.0000	SURCHARGED
15 minute summer	S75	13	115.759	1.690	263.6	2.9861	0.0000	SURCHARGED
15 minute summer	S76	13	115.634	1.657	267.1	2.9287	0.0000	SURCHARGED
15 minute summer	S77	13	115.558	1.640	279.5	2.8983	0.0000	SURCHARGED
15 minute summer	S78L	12	115.816	1.664	52.6	1.8816	0.0000	SURCHARGED
15 minute summer	S78	12	115.456	1.673	320.2	2.9557	0.0000	SURCHARGED
15 minute summer	S79L	12	115.727	1.451	71.0	1.6411	0.0000	SURCHARGED
15 minute summer	S79	12	115.011	1.438	376.6	2.5403	0.0000	SURCHARGED
15 minute summer	S80L	12	114.858	0.156	21.7	0.1763	0.0000	SURCHARGED
15 minute summer	S80	12	114.820	1.422	416.3	3.6192	0.0000	SURCHARGED
15 minute summer	S81L	12	115.431	1.995	123.7	3.5252	0.0000	FLOOD RISK
15 minute summer	S81	12	115.359	2.371	141.7	4.1891	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S67L	1.000	S67	24.7	1.403	1.436	0.1087	
15 minute summer	S67	1.001	S68	43.7	1.249	1.100	0.5824	
15 minute summer	S68	1.002	S69	62.8	1.208	0.880	3.0825	
15 minute summer	S69L	2.000	S69	30.9	1.757	1.178	0.1857	
15 minute summer	S69	1.003	S70	88.1	1.061	0.554	4.3407	
15 minute summer	S70	1.004	S71	104.0	0.837	0.656	8.9186	
15 minute summer	S71L	3.000	S71	66.5	2.612	0.671	0.1710	
15 minute summer	S71	1.005	S75	167.2	1.190	0.733	1.6150	
15 minute summer	S72	4.000	S73	31.3	1.088	0.787	1.4909	
15 minute summer	S73La	5.000	S73	19.9	1.200	1.118	0.1158	
15 minute summer	S73Lb	6.000	S73	48.2	2.739	2.723	0.0867	
15 minute summer	S73	4.001	S74	102.1	1.485	0.552	1.8420	
15 minute summer	S74	4.002	S75	106.3	1.238	0.531	1.8608	
15 minute summer	S75L	7.000	S75	85.6	3.641	0.517	0.1889	
15 minute summer	S75	1.006	S76	264.8	1.731	1.158	2.8982	
15 minute summer	S76	1.007	S77	277.5	1.752	1.147	1.6610	
15 minute summer	S77	1.008	S78	290.5	1.833	0.898	2.1380	
15 minute summer	S78L	8.000	S78	43.6	2.475	2.442	0.1203	
15 minute summer	S78	1.009	S79	331.1	2.090	1.924	7.5243	
15 minute summer	S79L	9.000	S79	62.0	3.522	1.538	0.1140	
15 minute summer	S79	1.010	S80	381.8	2.381	1.050	6.7003	
15 minute summer	S80L	10.000	S80	21.4	3.252	0.330	0.1253	
15 minute summer	S80	1.011	S88	424.6	1.965	0.519	6.7337	
15 minute summer	S81L	11.000	S81	107.8	2.763	0.549	0.6753	
15 minute summer	S81	11.001	S82	131.7	0.932	0.832	6.7245	

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Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S82L	12	115.515	1.809	54.6	2.0461	0.0000	SURCHARGED
15 minute summer	S82	12	115.301	2.416	196.9	4.2699	0.0000	SURCHARGED
15 minute summer	S83L	12	115.263	1.773	29.6	2.0056	0.0000	SURCHARGED
15 minute summer	S83	12	115.173	2.391	213.4	4.2242	0.0000	SURCHARGED
15 minute summer	S84	12	115.130	2.374	219.7	4.1945	0.0000	SURCHARGED
15 minute summer	S85L	12	115.584	2.070	53.3	2.3408	0.0000	FLOOD RISK
15 minute summer	S85	12	115.240	1.919	51.9	2.1705	0.0000	SURCHARGED
15 minute summer	S86	12	115.095	2.358	264.0	4.1658	0.0000	SURCHARGED
15 minute summer	S87L	12	115.067	1.507	40.1	1.7048	0.0000	SURCHARGED
15 minute summer	S87	12	114.976	2.282	304.9	4.0316	0.0000	SURCHARGED
15 minute summer	S88	12	114.589	2.075	731.1	3.6659	0.0000	SURCHARGED
15 minute summer	S89L	11	113.886	0.602	158.5	0.6810	0.0000	SURCHARGED
15 minute summer	S89	12	113.411	1.012	862.0	1.7889	0.0000	SURCHARGED
15 minute summer	S91	12	112.880	0.764	859.0	1.9451	0.0000	SURCHARGED
15 minute summer	S92L	10	113.843	0.295	65.8	0.3338	0.0000	SURCHARGED
15 minute summer	S92	10	113.248	0.140	73.3	0.1587	0.0000	OK
30 minute summer	S93	21	112.742	0.670	917.5	1.7056	0.0000	OK
15 minute summer	S94L	10	113.292	0.095	41.4	0.1079	0.0000	OK
15 minute summer	S94	12	112.340	0.305	1000.4	0.7762	0.0000	OK
15 minute summer	S95La	10	112.971	0.057	17.1	0.0640	0.0000	OK
15 minute summer	S95Lb	10	112.751	0.057	17.1	0.0640	0.0000	OK
15 minute summer	S95	10	112.280	0.101	51.2	0.1147	0.0000	OK
30 minute summer	S96	19	111.058	0.418	999.9	1.0650	0.0000	OK
15 minute summer	S97L	10	110.931	0.110	50.7	0.1240	0.0000	OK
15 minute summer	S97	11	110.020	0.369	1151.9	0.9392	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S82L	12.000	S82	45.1	4.123	0.648	0.0607	
15 minute summer	S82	11.002	S83	186.5	1.177	1.175	6.6809	
15 minute summer	S83L	13.000	S83	22.7	2.694	0.466	0.0974	
15 minute summer	S83	11.003	S84	205.8	1.299	1.296	1.6865	
15 minute summer	S84	11.004	S86	217.2	1.371	1.369	1.2344	
15 minute summer	S85L	14.000	S85	43.7	2.483	1.732	0.1036	
15 minute summer	S85	14.001	S86	46.8	1.734	0.621	0.6825	
15 minute summer	S86	11.005	S87	261.9	1.653	1.656	2.8114	
15 minute summer	S87L	15.000	S87	31.9	3.657	0.407	0.0524	
15 minute summer	S87	11.006	S88	302.9	1.912	1.907	6.8032	
15 minute summer	S88	1.012	S89	736.9	3.412	3.247	11.1916	
15 minute summer	S89L	16.000	S89	155.7	4.082	0.941	0.2325	
15 minute summer	S89	1.013	S91	859.0	3.977	3.088	3.7734	
15 minute summer	S91	1.014	S93	859.9	1.995	1.867	13.2295	
15 minute summer	S92L	18.000	S92	64.7	3.675	1.143	0.0638	
15 minute summer	S92	18.001	S93	72.9	2.810	0.716	0.3492	
30 minute summer	S93	1.015	S94	982.7	3.362	2.202	7.9796	
15 minute summer	S94L	19.000	S94	41.3	3.502	0.729	0.0663	
15 minute summer	S94	1.016	S96	1015.3	4.874	0.366	5.8188	
15 minute summer	S95La	20.000	S95	17.1	2.810	0.301	0.0355	
15 minute summer	S95Lb	21.000	S95	17.1	2.810	0.301	0.0221	
15 minute summer	S95	20.001	S96	50.8	2.429	0.249	0.6816	
30 minute summer	S96	1.017	S97	1045.0	4.598	0.601	11.3728	
15 minute summer	S97L	22.000	S97	50.6	3.674	0.880	0.0761	
15 minute summer	S97	1.018	S98	1177.1	4.364	0.513	9.4640	

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Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 99.61%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S98L	10	109.609	0.090	40.8	0.1015	0.0000	OK
15 minute summer	S98	11	108.959	0.514	1234.8	1.3093	0.0000	OK
15 minute summer	S99L	10	109.414	0.080	42.8	0.0906	0.0000	OK
15 minute summer	S99	12	108.282	0.381	1205.0	0.9686	0.0000	OK
720 minute summer	S100	510	107.353	0.450	246.2	1.1445	0.0000	OK
960 minute summer	HW14	975	107.324	1.054	269.5	0.0000	0.0000	OK
960 minute summer	HW15	975	107.324	1.054	103.5	0.0000	0.0000	FLOOD RISK
960 minute summer	S101	975	107.324	1.071	16.2	6.1345	0.0000	FLOOD RISK
15 minute summer	HW16	1	106.000	0.900	10.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S98L	23.000	S98	40.7	3.713	0.665	0.0446	
15 minute summer	S98	1.019	S99	1164.1	4.357	0.812	11.0306	
15 minute summer	S99L	24.000	S99	42.7	4.489	0.554	0.0428	
15 minute summer	S99	1.020	S100	1197.6	5.166	0.540	7.2294	
720 minute summer	S100	1.021	HW14	218.6	0.874	0.105	8.0763	
960 minute summer	HW14	Flow through pond	HW15	103.5	0.075	0.003	1722.6510	
960 minute summer	HW15	1.022	S101	16.2	0.181	0.030	3.9994	
960 minute summer	S101	1.023	HW16	10.7	0.384	0.109	0.7496	576.7

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Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S102	0.047	5.00	113.330	Manhole	1200	444479.431	291754.803	2.265
S103	0.029	5.00	112.628	Manhole	1200	444472.108	291734.898	2.624
S104L	0.068	5.00	112.267	Manhole	1200	444472.650	291718.227	2.264
S104	0.019	5.00	111.735	Manhole	1200	444483.601	291711.432	3.079
S105	0.018	5.00	111.072	Manhole	1200	444481.686	291691.630	3.464
S106	0.020	5.00	110.748	Manhole	1200	444497.965	291672.775	3.389
S107	0.010	5.00	110.593	Manhole	1200	444501.855	291658.744	3.294
S108	0.012	5.00	110.213	Manhole	1200	444499.035	291644.546	2.973
S109L	0.053	5.00	109.640	Manhole	1200	444485.970	291638.442	2.150
S109	0.030	5.00	109.648	Manhole	1200	444490.094	291633.112	2.467
S110L	0.060	5.00	108.250	Manhole	1200	444459.015	291612.253	1.144
S110	0.027	5.00	108.270	Manhole	1200	444462.690	291608.295	1.518
S111L	0.050	5.00	107.600	Manhole	1200	444434.035	291590.102	1.712
S111	0.010	5.00	107.562	Manhole	1200	444435.285	291583.479	2.042
S112	0.033	5.00	107.313	Manhole	1200	444421.127	291579.546	1.940
S113L	0.088	5.00	107.370	Manhole	1200	444399.148	291588.949	1.882
S113			107.389	Manhole	1200	444398.098	291584.164	2.325
HW21			106.300	Manhole		444392.865	291574.374	1.269
S114L	0.053	5.00	110.300	Manhole	1200	444454.757	291676.928	2.878
S114	0.037	5.00	110.153	Manhole	1200	444459.264	291672.153	3.488
S115La	0.129	5.00	108.990	Manhole	1200	444427.447	291651.484	2.439
S115Lb	0.044	5.00	109.000	Manhole	1200	444433.123	291641.030	2.550
S115	0.021	5.00	108.785	Manhole	1200	444430.189	291644.190	2.598
S116	0.056	5.00	108.467	Manhole	1200	444416.379	291637.767	2.344
S117La	0.061	5.00	108.900	Manhole	1200	444384.406	291638.524	2.989
S117Lb	0.061	5.00	109.000	Manhole	1200	444387.944	291649.243	2.725
S117			108.819	Manhole	1200	444385.327	291643.147	3.212
S118	0.022	5.00	108.654	Manhole	1200	444375.733	291648.800	3.117
S119			107.717	Manhole	1200	444349.998	291624.828	2.323
S120L	0.086	5.00	108.000	Manhole	1200	444358.999	291610.511	2.472
S120			107.000	Manhole	1200	444354.732	291606.222	1.758
HW22			106.286	Manhole		444355.507	291596.120	1.205
HW23		5.00	106.286	Manhole		444370.615	291565.689	1.255
S121			106.300	Manhole	2700	444364.822	291560.491	1.289
HW24			105.600	Manhole		444342.087	291539.997	0.895

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S102	S103	21.209	0.600	111.065	110.005	1.060	20.0	225	5.12	50.0
1.001	S103	S104	26.130	0.600	110.004	108.731	1.273	20.5	225	5.27	50.0
2.000	S104L	S104	12.888	0.600	110.003	108.806	1.197	10.8	150	5.07	50.0
1.002	S104	S105	19.894	0.600	108.656	107.608	1.048	19.0	300	5.36	50.0
1.003	S105	S106	24.911	0.600	107.608	107.359	0.249	100.0	300	5.63	50.0
1.004	S106	S107	14.560	0.600	107.359	107.299	0.060	242.7	300	5.87	50.0
1.005	S107	S108	14.475	0.600	107.299	107.240	0.059	245.3	300	6.11	49.9
1.006	S108	S109	14.515	0.600	107.240	107.181	0.059	246.0	300	6.35	49.0
3.000	S109L	S109	6.740	0.600	107.490	107.331	0.159	42.4	150	5.07	50.0
1.007	S109	S110	36.971	0.600	107.181	106.811	0.370	99.9	300	6.74	47.6
4.000	S110L	S110	5.401	0.600	107.106	107.052	0.054	100.0	150	5.09	50.0
1.008	S110	S111	36.971	0.600	106.752	105.520	1.232	30.0	450	6.91	47.0
5.000	S111L	S111	6.740	0.600	105.888	105.821	0.067	100.6	150	5.11	50.0
1.009	S111	S112	14.694	0.600	105.520	105.373	0.147	100.0	450	7.03	46.6
1.010	S112	S113	23.488	0.600	105.373	105.139	0.234	100.4	450	7.22	46.0
6.000	S113L	S113	4.898	0.600	105.488	105.439	0.049	100.0	150	5.08	50.0
1.011	S113	HW21	11.102	0.600	105.064	105.031	0.033	336.4	525	7.37	45.5
7.000	S114L	S114	6.566	0.600	107.422	106.815	0.607	10.8	150	5.04	50.0
7.001	S114	S115	40.340	0.600	106.665	106.262	0.403	100.1	300	5.46	50.0
8.000	S115La	S115	7.793	0.600	106.551	106.337	0.214	36.4	225	5.06	50.0
9.000	S115Lb	S115	4.312	0.600	106.450	106.412	0.038	113.5	150	5.08	50.0
7.002	S115	S116	15.230	0.600	106.187	106.123	0.064	238.0	375	5.68	50.0
7.003	S116	S117	43.003	0.600	106.123	105.607	0.516	83.3	375	6.04	50.0
10.000	S117La	S117	4.714	0.600	105.911	105.832	0.079	59.7	150	5.06	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	S102	S103	2.938	116.8	6.4	2.040	2.398	2.040	2.398	0.047	0.0
1.001	S103	S104	2.901	115.3	10.3	2.399	2.779	2.399	2.779	0.076	0.0
2.000	S104L	S104	3.088	54.6	9.2	2.114	2.779	2.114	2.779	0.068	0.0
1.002	S104	S105	3.625	256.2	22.1	2.779	3.164	2.779	3.164	0.163	0.0
1.003	S105	S106	1.572	111.1	24.5	3.164	3.089	3.089	3.164	0.181	0.0
1.004	S106	S107	1.005	71.0	27.2	3.089	2.994	2.994	3.089	0.201	0.0
1.005	S107	S108	0.999	70.6	28.6	2.994	2.673	2.673	2.994	0.211	0.0
1.006	S108	S109	0.998	70.5	29.6	2.673	2.167	2.167	2.673	0.223	0.0
3.000	S109L	S109	1.550	27.4	7.2	2.000	2.167	2.000	2.167	0.053	0.0
1.007	S109	S110	1.573	111.2	39.5	2.167	1.159	1.159	2.167	0.306	0.0
4.000	S110L	S110	1.005	17.8	8.1	0.994	1.068	0.994	1.068	0.060	0.0
1.008	S110	S111	3.721	591.9	50.1	1.068	1.592	1.068	1.592	0.393	0.0
5.000	S111L	S111	1.002	17.7	6.8	1.562	1.591	1.562	1.591	0.050	0.0
1.009	S111	S112	2.033	323.4	57.3	1.592	1.490	1.490	1.592	0.453	0.0
1.010	S112	S113	2.029	322.7	60.6	1.490	1.800	1.490	1.800	0.486	0.0
6.000	S113L	S113	1.005	17.8	11.9	1.732	1.800	1.732	1.800	0.088	0.0
1.011	S113	HW21	1.215	263.1	70.8	1.800	0.744	0.744	1.800	0.574	0.0
7.000	S114L	S114	3.080	54.4	7.2	2.728	3.188	2.728	3.188	0.053	0.0
7.001	S114	S115	1.571	111.1	12.2	3.188	2.223	2.223	3.188	0.090	0.0
8.000	S115La	S115	2.175	86.5	17.5	2.214	2.223	2.214	2.223	0.129	0.0
9.000	S115Lb	S115	0.942	16.7	6.0	2.400	2.223	2.223	2.400	0.044	0.0
7.002	S115	S116	1.170	129.2	38.5	2.223	1.969	1.969	2.223	0.284	0.0
7.003	S116	S117	1.986	219.3	46.1	1.969	2.837	1.969	2.837	0.340	0.0
10.000	S117La	S117	1.304	23.0	8.3	2.839	2.837	2.837	2.839	0.061	0.0

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
11.000	S117Lb	S117	6.634	0.600	106.275	105.832	0.443	15.0	150	5.04	50.0
7.004	S117	S118	11.136	0.600	105.607	105.537	0.070	159.1	375	6.17	49.7
7.005	S118	S119	35.170	0.600	105.537	105.394	0.143	245.9	375	6.68	47.8
7.006	S119	S120	19.199	0.600	105.394	105.242	0.152	126.3	375	6.88	47.1
12.000	S120L	S120	6.050	0.600	105.528	105.467	0.061	99.2	150	5.10	50.0
7.007	S120	HW22	10.132	0.600	105.242	105.181	0.061	166.1	375	7.00	46.7
1.012	HW23	S121	7.783	0.600	105.031	105.011	0.020	389.2	525	5.11	50.0
1.013	S121	HW24	30.609	0.600	105.011	104.705	0.306	100.0	225	5.51	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
11.000	S117Lb	S117	2.616	46.2	8.3	2.575	2.837	2.575	2.837	0.061	0.0
7.004	S117	S118	1.434	158.3	62.2	2.837	2.742	2.742	2.837	0.462	0.0
7.005	S118	S119	1.151	127.1	62.7	2.742	1.948	1.948	2.742	0.484	0.0
7.006	S119	S120	1.610	177.9	61.8	1.948	1.383	1.383	1.948	0.484	0.0
12.000	S120L	S120	1.009	17.8	11.7	2.322	1.383	1.383	2.322	0.086	0.0
7.007	S120	HW22	1.403	154.9	72.2	1.383	0.730	0.730	1.383	0.570	0.0
1.012	HW23	S121	1.129	244.4	0.0	0.730	0.764	0.730	0.764	0.000	0.0
1.013	S121	HW24	1.307	52.0	0.0	1.064	0.670	0.670	1.064	0.000	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	21.209	20.0	225	113.330	111.065	2.040	112.628	110.005	2.398
1.001	26.130	20.5	225	112.628	110.004	2.399	111.735	108.731	2.779
2.000	12.888	10.8	150	112.267	110.003	2.114	111.735	108.806	2.779
1.002	19.894	19.0	300	111.735	108.656	2.779	111.072	107.608	3.164
1.003	24.911	100.0	300	111.072	107.608	3.164	110.748	107.359	3.089
1.004	14.560	242.7	300	110.748	107.359	3.089	110.593	107.299	2.994
1.005	14.475	245.3	300	110.593	107.299	2.994	110.213	107.240	2.673
1.006	14.515	246.0	300	110.213	107.240	2.673	109.648	107.181	2.167
3.000	6.740	42.4	150	109.640	107.490	2.000	109.648	107.331	2.167
1.007	36.971	99.9	300	109.648	107.181	2.167	108.270	106.811	1.159
4.000	5.401	100.0	150	108.250	107.106	0.994	108.270	107.052	1.068
1.008	36.971	30.0	450	108.270	106.752	1.068	107.562	105.520	1.592

Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
1.000	S102	1200	Manhole	S103	1200	1
1.001	S103	1200	Manhole	S104	1200	1
2.000	S104L	1200	Manhole	S104	1200	1
1.002	S104	1200	Manhole	S105	1200	1
1.003	S105	1200	Manhole	S106	1200	1
1.004	S106	1200	Manhole	S107	1200	1
1.005	S107	1200	Manhole	S108	1200	1
1.006	S108	1200	Manhole	S109	1200	1
3.000	S109L	1200	Manhole	S109	1200	1
1.007	S109	1200	Manhole	S110	1200	1
4.000	S110L	1200	Manhole	S110	1200	1
1.008	S110	1200	Manhole	S111	1200	1

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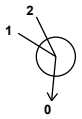
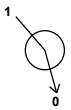
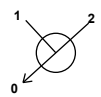
Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
5.000	6.740	100.6	150	107.600	105.888	1.562	107.562	105.821	1.591
1.009	14.694	100.0	450	107.562	105.520	1.592	107.313	105.373	1.490
1.010	23.488	100.4	450	107.313	105.373	1.490	107.389	105.139	1.800
6.000	4.898	100.0	150	107.370	105.488	1.732	107.389	105.439	1.800
1.011	11.102	336.4	525	107.389	105.064	1.800	106.300	105.031	0.744
7.000	6.566	10.8	150	110.300	107.422	2.728	110.153	106.815	3.188
7.001	40.340	100.1	300	110.153	106.665	3.188	108.785	106.262	2.223
8.000	7.793	36.4	225	108.990	106.551	2.214	108.785	106.337	2.223
9.000	4.312	113.5	150	109.000	106.450	2.400	108.785	106.412	2.223
7.002	15.230	238.0	375	108.785	106.187	2.223	108.467	106.123	1.969
7.003	43.003	83.3	375	108.467	106.123	1.969	108.819	105.607	2.837
10.000	4.714	59.7	150	108.900	105.911	2.839	108.819	105.832	2.837
11.000	6.634	15.0	150	109.000	106.275	2.575	108.819	105.832	2.837
7.004	11.136	159.1	375	108.819	105.607	2.837	108.654	105.537	2.742
7.005	35.170	245.9	375	108.654	105.537	2.742	107.717	105.394	1.948
7.006	19.199	126.3	375	107.717	105.394	1.948	107.000	105.242	1.383
12.000	6.050	99.2	150	108.000	105.528	2.322	107.000	105.467	1.383
7.007	10.132	166.1	375	107.000	105.242	1.383	106.286	105.181	0.730
1.012	7.783	389.2	525	106.286	105.031	0.730	106.300	105.011	0.764
1.013	30.609	100.0	225	106.300	105.011	1.064	105.600	104.705	0.670

Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
5.000	S111L	1200	Manhole	S111	1200	1
1.009	S111	1200	Manhole	S112	1200	1
1.010	S112	1200	Manhole	S113	1200	1
6.000	S113L	1200	Manhole	S113	1200	1
1.011	S113	1200	Manhole	HW21		1
7.000	S114L	1200	Manhole	S114	1200	1
7.001	S114	1200	Manhole	S115	1200	1
8.000	S115La	1200	Manhole	S115	1200	1
9.000	S115Lb	1200	Manhole	S115	1200	1
7.002	S115	1200	Manhole	S116	1200	1
7.003	S116	1200	Manhole	S117	1200	1
10.000	S117La	1200	Manhole	S117	1200	1
11.000	S117Lb	1200	Manhole	S117	1200	1
7.004	S117	1200	Manhole	S118	1200	1
7.005	S118	1200	Manhole	S119	1200	1
7.006	S119	1200	Manhole	S120	1200	1
12.000	S120L	1200	Manhole	S120	1200	1
7.007	S120	1200	Manhole	HW22		1
1.012	HW23		Manhole	S121	2700	1
1.013	S121	2700	Manhole	HW24		1

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S102	444479.431	291754.803	113.330	2.265	1200	Manhole		0	1.000	111.065	225
S103	444472.108	291734.898	112.628	2.624	1200	Manhole		1 0	1.000 1.001	110.005 110.004	225 225
S104L	444472.650	291718.227	112.267	2.264	1200	Manhole		0	2.000	110.003	150
S104	444483.601	291711.432	111.735	3.079	1200	Manhole		1 2 0	2.000 1.001 1.002	108.806 108.731 108.656	150 225 300
S105	444481.686	291691.630	111.072	3.464	1200	Manhole		1 0	1.002 1.003	107.608 107.608	300 300
S106	444497.965	291672.775	110.748	3.389	1200	Manhole		1 0	1.003 1.004	107.359 107.359	300 300
S107	444501.855	291658.744	110.593	3.294	1200	Manhole		1 0	1.004 1.005	107.299 107.299	300 300
S108	444499.035	291644.546	110.213	2.973	1200	Manhole		1 0	1.005 1.006	107.240 107.240	300 300
S109L	444485.970	291638.442	109.640	2.150	1200	Manhole		0	3.000	107.490	150
S109	444490.094	291633.112	109.648	2.467	1200	Manhole		1 2 0	3.000 1.006 1.007	107.331 107.181 107.181	150 300 300
S110L	444459.015	291612.253	108.250	1.144	1200	Manhole		0	4.000	107.106	150
S110	444462.690	291608.295	108.270	1.518	1200	Manhole		1 2 0	4.000 1.007 1.008	107.052 106.811 106.752	150 300 450
S111L	444434.035	291590.102	107.600	1.712	1200	Manhole		0	5.000	105.888	150

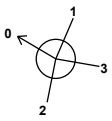
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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S111	444435.285	291583.479	107.562	2.042	1200	Manhole	1	5.000	105.821	150
							2	1.008	105.520	450
							0	1.009	105.520	450
S112	444421.127	291579.546	107.313	1.940	1200	Manhole	1	1.009	105.373	450
							0	1.010	105.373	450
S113L	444399.148	291588.949	107.370	1.882	1200	Manhole	0	6.000	105.488	150
S113	444398.098	291584.164	107.389	2.325	1200	Manhole	1	6.000	105.439	150
							2	1.010	105.139	450
							0	1.011	105.064	525
HW21	444392.865	291574.374	106.300	1.269		Manhole	1	1.011	105.031	525
S114L	444454.757	291676.928	110.300	2.878	1200	Manhole	0	7.000	107.422	150
S114	444459.264	291672.153	110.153	3.488	1200	Manhole	1	7.000	106.815	150
							0	7.001	106.665	300
S115La	444427.447	291651.484	108.990	2.439	1200	Manhole	0	8.000	106.551	225
S115Lb	444433.123	291641.030	109.000	2.550	1200	Manhole	0	9.000	106.450	150
S115	444430.189	291644.190	108.785	2.598	1200	Manhole	1	9.000	106.412	150
							2	8.000	106.337	225
							3	7.001	106.262	300
							0	7.002	106.187	375
S116	444416.379	291637.767	108.467	2.344	1200	Manhole	1	7.002	106.123	375
							0	7.003	106.123	375
S117La	444384.406	291638.524	108.900	2.989	1200	Manhole	0	10.000	105.911	150
S117Lb	444387.944	291649.243	109.000	2.725	1200	Manhole	0	11.000	106.275	150

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S117	444385.327	291643.147	108.819	3.212	1200	Manhole		1	11.000	105.832	150
								2	10.000	105.832	150
								3	7.003	105.607	375
								0	7.004	105.607	375
S118	444375.733	291648.800	108.654	3.117	1200	Manhole		1	7.004	105.537	375
								0	7.005	105.537	375
S119	444349.998	291624.828	107.717	2.323	1200	Manhole		1	7.005	105.394	375
								0	7.006	105.394	375
S120L	444358.999	291610.511	108.000	2.472	1200	Manhole		0	12.000	105.528	150
S120	444354.732	291606.222	107.000	1.758	1200	Manhole		1	12.000	105.467	150
								2	7.006	105.242	375
								0	7.007	105.242	375
HW22	444355.507	291596.120	106.286	1.205		Manhole		1	7.007	105.181	375
HW23	444370.615	291565.689	106.286	1.255		Manhole		0	1.012	105.031	525
S121	444364.822	291560.491	106.300	1.289	2700	Manhole		1	1.012	105.011	525
								0	1.013	105.011	225
HW24	444342.087	291539.997	105.600	0.895		Manhole		1	1.013	104.705	225

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.400	Check Discharge Rate(s)	x
Summer CV	0.750	Check Discharge Volume	x
Analysis Speed	Normal		

Storm Durations

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

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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	40	0	0
100	40	10	0

Node S121 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	105.011	Product Number	CTL-SHE-0104-4900-1000-4900
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	4.9	Min Node Diameter (mm)	1200

Node HW23 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	50.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	105.031	Main Channel Slope (1:X)	1000.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.020

Inlets

HW22 | HW21

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	1114.0	0.0	1.500	1842.0	0.0	1.501	0.0	0.0

Other (defaults)

Entry Loss (manhole)	0.000	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.000	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 15 minute summer	141.566	40.058
2 year 30 minute summer	91.753	25.963
2 year 60 minute summer	61.301	16.200
2 year 120 minute summer	37.449	9.897
2 year 180 minute summer	28.672	7.378
2 year 240 minute summer	22.636	5.982
2 year 360 minute summer	17.235	4.435
2 year 480 minute summer	13.550	3.581
2 year 600 minute summer	11.088	3.033
2 year 720 minute summer	9.878	2.647
2 year 960 minute summer	8.113	2.136
2 year 1440 minute summer	5.891	1.579
30 year 15 minute summer	268.706	76.035
30 year 30 minute summer	174.929	49.499
30 year 60 minute summer	116.589	30.811
30 year 120 minute summer	70.438	18.615
30 year 180 minute summer	53.298	13.715
30 year 240 minute summer	41.604	10.995
30 year 360 minute summer	31.221	8.034

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Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
30 year 480 minute summer	24.324	6.428
30 year 600 minute summer	19.756	5.404
30 year 720 minute summer	17.490	4.687
30 year 960 minute summer	14.215	3.743
30 year 1440 minute summer	10.161	2.723
100 year +40% CC 15 minute summer	488.233	138.153
100 year +40% CC 30 minute summer	320.551	90.705
100 year +40% CC 60 minute summer	214.603	56.713
100 year +40% CC 120 minute summer	129.587	34.246
100 year +40% CC 180 minute summer	97.729	25.149
100 year +40% CC 240 minute summer	75.977	20.078
100 year +40% CC 360 minute summer	56.677	14.585
100 year +40% CC 480 minute summer	43.979	11.622
100 year +40% CC 600 minute summer	35.604	9.738
100 year +40% CC 720 minute summer	31.433	8.424
100 year +40% CC 960 minute summer	25.432	6.697
100 year +40% CC 1440 minute summer	18.055	4.839
100 year +40% CC +10% A 15 minute summer	488.233	138.153
100 year +40% CC +10% A 30 minute summer	320.551	90.705
100 year +40% CC +10% A 60 minute summer	214.603	56.713
100 year +40% CC +10% A 120 minute summer	129.587	34.246
100 year +40% CC +10% A 180 minute summer	97.729	25.149
100 year +40% CC +10% A 240 minute summer	75.977	20.078
100 year +40% CC +10% A 360 minute summer	56.677	14.585
100 year +40% CC +10% A 480 minute summer	43.979	11.622
100 year +40% CC +10% A 600 minute summer	35.604	9.738
100 year +40% CC +10% A 720 minute summer	31.433	8.424
100 year +40% CC +10% A 960 minute summer	25.432	6.697
100 year +40% CC +10% A 1440 minute summer	18.055	4.839

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Results for 2 year Critical Storm Duration. Lowest mass balance: 92.71%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S102	10	111.105	0.040	8.1	0.0618	0.0000	OK
15 minute summer	S103	10	110.055	0.051	13.1	0.0686	0.0000	OK
15 minute summer	S104L	10	110.050	0.047	11.8	0.0821	0.0000	OK
15 minute summer	S104	10	108.722	0.066	28.0	0.0832	0.0000	OK
15 minute summer	S105	10	107.715	0.106	31.0	0.1315	0.0000	OK
15 minute summer	S106	11	107.505	0.146	34.1	0.1821	0.0000	OK
15 minute summer	S107	11	107.449	0.150	35.9	0.1787	0.0000	OK
15 minute summer	S108	11	107.391	0.151	38.1	0.1826	0.0000	OK
15 minute summer	S109L	10	107.550	0.060	9.2	0.0970	0.0000	OK
15 minute summer	S109	11	107.324	0.142	52.0	0.1958	0.0000	OK
15 minute summer	S110L	10	107.188	0.082	10.4	0.1784	0.0000	OK
15 minute summer	S110	11	106.852	0.100	66.2	0.1489	0.0000	OK
15 minute summer	S111L	10	105.962	0.074	8.7	0.1264	0.0000	OK
15 minute summer	S111	11	105.667	0.147	76.2	0.1804	0.0000	OK
15 minute summer	S112	11	105.525	0.152	81.5	0.2234	0.0000	OK
15 minute summer	S113L	10	105.594	0.106	15.3	0.2193	0.0000	OK
15 minute summer	S113	11	105.306	0.242	96.0	0.2741	0.0000	OK
15 minute summer	HW21	11	105.294	0.263	94.9	0.0000	0.0000	OK
15 minute summer	S114L	10	107.464	0.042	9.2	0.0626	0.0000	OK
15 minute summer	S114	10	106.740	0.075	15.6	0.1004	0.0000	OK
15 minute summer	S115La	10	106.629	0.078	22.4	0.1700	0.0000	OK
15 minute summer	S115Lb	10	106.521	0.071	7.6	0.1043	0.0000	OK
15 minute summer	S115	10	106.343	0.156	48.8	0.2017	0.0000	OK
15 minute summer	S116	11	106.252	0.129	57.9	0.2081	0.0000	OK
15 minute summer	S117La	10	105.982	0.071	10.6	0.1095	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S102	1.000	S103	8.1	1.437	0.069	0.1193	
15 minute summer	S103	1.001	S104	12.9	1.934	0.112	0.1747	
15 minute summer	S104L	2.000	S104	11.7	2.464	0.215	0.0613	
15 minute summer	S104	1.002	S105	27.9	1.661	0.109	0.3376	
15 minute summer	S105	1.003	S106	30.6	1.092	0.275	0.7013	
15 minute summer	S106	1.004	S107	34.2	0.989	0.481	0.5034	
15 minute summer	S107	1.005	S108	36.1	1.022	0.511	0.5110	
15 minute summer	S108	1.006	S109	38.1	1.114	0.540	0.4963	
15 minute summer	S109L	3.000	S109	9.1	1.400	0.334	0.0440	
15 minute summer	S109	1.007	S110	51.7	1.571	0.465	1.2168	
15 minute summer	S110L	4.000	S110	10.3	1.048	0.579	0.0530	
15 minute summer	S110	1.008	S111	66.1	1.875	0.112	1.3134	
15 minute summer	S111L	5.000	S111	8.6	1.001	0.486	0.0580	
15 minute summer	S111	1.009	S112	76.0	1.655	0.235	0.6748	
15 minute summer	S112	1.010	S113	81.3	1.634	0.252	1.1821	
15 minute summer	S113L	6.000	S113	15.1	1.136	0.852	0.0652	
15 minute summer	S113	1.011	HW21	94.9	0.924	0.361	1.1404	
15 minute summer	HW21	Flow through pond	HW23	200.6	0.204	0.003	80.7451	
15 minute summer	S114L	7.000	S114	9.2	2.295	0.168	0.0262	
15 minute summer	S114	7.001	S115	15.4	1.068	0.138	0.5852	
15 minute summer	S115La	8.000	S115	22.3	1.838	0.258	0.0944	
15 minute summer	S115Lb	9.000	S115	7.5	0.926	0.453	0.0351	
15 minute summer	S115	7.002	S116	48.2	1.258	0.373	0.5847	
15 minute summer	S116	7.003	S117	57.6	1.267	0.263	1.9651	
15 minute summer	S117La	10.000	S117	10.5	1.281	0.457	0.0388	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 92.71%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S117Lb	10	106.324	0.049	10.6	0.0772	0.0000	OK
15 minute summer	S117	11	105.802	0.195	78.1	0.2201	0.0000	OK
15 minute summer	S118	11	105.749	0.212	81.9	0.2692	0.0000	OK
15 minute summer	S119	11	105.576	0.182	80.5	0.2055	0.0000	OK
15 minute summer	S120L	10	105.632	0.104	14.9	0.1896	0.0000	OK
15 minute summer	S120	11	105.452	0.210	96.5	0.2380	0.0000	OK
15 minute summer	HW22	11	105.355	0.274	96.3	0.0000	0.0000	OK
480 minute summer	HW23	360	105.197	0.166	18.4	0.0000	0.0000	OK
480 minute summer	S121	360	105.197	0.186	4.7	1.0664	0.0000	OK
15 minute summer	HW24	1	104.705	0.000	4.2	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S117Lb	11.000	S117	10.5	2.123	0.228	0.0330	
15 minute summer	S117	7.004	S118	78.3	1.286	0.495	0.6782	
15 minute summer	S118	7.005	S119	80.5	1.390	0.633	2.0566	
15 minute summer	S119	7.006	S120	82.1	1.416	0.462	1.1183	
15 minute summer	S120L	12.000	S120	14.7	1.135	0.827	0.0785	
15 minute summer	S120	7.007	HW22	96.3	1.516	0.622	0.6440	
15 minute summer	HW22	Flow through pond	HW23	200.6	0.204	0.003	80.7451	
480 minute summer	HW23	1.012	S121	4.7	0.175	0.019	0.4949	
480 minute summer	S121	Hydro-Brake®	HW24	4.7				152.5

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Results for 30 year Critical Storm Duration. Lowest mass balance: 92.71%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S102	10	111.120	0.055	15.5	0.0851	0.0000	OK
15 minute summer	S103	10	110.075	0.071	24.9	0.0954	0.0000	OK
15 minute summer	S104L	10	110.070	0.067	22.4	0.1160	0.0000	OK
15 minute summer	S104	10	108.748	0.092	53.3	0.1154	0.0000	OK
15 minute summer	S105	10	107.765	0.157	59.0	0.1934	0.0000	OK
15 minute summer	S106	11	107.584	0.225	65.2	0.2815	0.0000	OK
15 minute summer	S107	11	107.530	0.231	68.3	0.2757	0.0000	OK
15 minute summer	S108	11	107.470	0.230	72.4	0.2791	0.0000	OK
15 minute summer	S109L	10	107.577	0.087	17.4	0.1406	0.0000	OK
15 minute summer	S109	11	107.397	0.216	98.6	0.2970	0.0000	OK
15 minute summer	S110L	10	107.239	0.133	19.7	0.2893	0.0000	OK
15 minute summer	S110	11	106.891	0.139	125.8	0.2062	0.0000	OK
15 minute summer	S111L	10	106.001	0.113	16.5	0.1941	0.0000	OK
15 minute summer	S111	11	105.732	0.212	144.7	0.2600	0.0000	OK
15 minute summer	S112	11	105.602	0.229	154.9	0.3363	0.0000	OK
15 minute summer	S113L	10	105.715	0.227	29.0	0.4684	0.0000	SURCHARGED
15 minute summer	S113	11	105.442	0.378	182.6	0.4274	0.0000	OK
15 minute summer	HW21	11	105.430	0.399	181.1	0.0000	0.0000	OK
15 minute summer	S114L	10	107.480	0.058	17.4	0.0875	0.0000	OK
15 minute summer	S114	10	106.769	0.104	29.5	0.1397	0.0000	OK
15 minute summer	S115La	10	106.662	0.111	42.5	0.2421	0.0000	OK
15 minute summer	S115Lb	10	106.557	0.107	14.5	0.1581	0.0000	OK
15 minute summer	S115	10	106.412	0.225	92.8	0.2912	0.0000	OK
15 minute summer	S116	11	106.307	0.184	109.5	0.2963	0.0000	OK
15 minute summer	S117La	10	106.019	0.108	20.1	0.1659	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S102	1.000	S103	15.4	1.726	0.132	0.1901	
15 minute summer	S103	1.001	S104	24.7	2.327	0.214	0.2773	
15 minute summer	S104L	2.000	S104	22.3	2.937	0.408	0.0978	
15 minute summer	S104	1.002	S105	53.1	1.927	0.207	0.5522	
15 minute summer	S105	1.003	S106	58.6	1.251	0.527	1.1597	
15 minute summer	S106	1.004	S107	65.2	1.134	0.918	0.8378	
15 minute summer	S107	1.005	S108	68.6	1.179	0.971	0.8420	
15 minute summer	S108	1.006	S109	72.5	1.292	1.028	0.8156	
15 minute summer	S109L	3.000	S109	17.3	1.645	0.631	0.0708	
15 minute summer	S109	1.007	S110	98.2	1.813	0.884	2.0064	
15 minute summer	S110L	4.000	S110	19.4	1.198	1.095	0.0877	
15 minute summer	S110	1.008	S111	125.7	2.204	0.212	2.1192	
15 minute summer	S111L	5.000	S111	16.3	1.145	0.921	0.0959	
15 minute summer	S111	1.009	S112	144.5	1.882	0.447	1.1319	
15 minute summer	S112	1.010	S113	154.5	1.603	0.479	2.2826	
15 minute summer	S113L	6.000	S113	28.5	1.621	1.607	0.0854	
15 minute summer	S113	1.011	HW21	181.1	1.058	0.688	1.9002	
15 minute summer	HW21	Flow through pond	HW23	362.8	0.257	0.005	155.5647	
15 minute summer	S114L	7.000	S114	17.3	2.742	0.319	0.0415	
15 minute summer	S114	7.001	S115	29.2	1.049	0.263	1.1489	
15 minute summer	S115La	8.000	S115	42.3	2.182	0.489	0.1511	
15 minute summer	S115Lb	9.000	S115	14.4	1.068	0.862	0.0580	
15 minute summer	S115	7.002	S116	91.2	1.490	0.706	0.9349	
15 minute summer	S116	7.003	S117	109.3	1.433	0.498	3.2919	
15 minute summer	S117La	10.000	S117	20.0	1.475	0.866	0.0638	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 92.71%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S117Lb	10	106.344	0.069	20.1	0.1091	0.0000	OK
15 minute summer	S117	11	105.924	0.317	148.8	0.3581	0.0000	OK
15 minute summer	S118	11	105.879	0.342	155.1	0.4351	0.0000	OK
15 minute summer	S119	11	105.679	0.285	155.0	0.3224	0.0000	OK
15 minute summer	S120L	10	105.765	0.237	28.3	0.4324	0.0000	SURCHARGED
15 minute summer	S120	11	105.573	0.331	181.8	0.3741	0.0000	OK
15 minute summer	HW22	11	105.499	0.418	181.2	0.0000	0.0000	OK
480 minute summer	HW23	480	105.334	0.303	31.5	0.0000	0.0000	OK
480 minute summer	S121	480	105.334	0.323	5.1	1.8508	0.0000	SURCHARGED
15 minute summer	HW24	1	104.705	0.000	4.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S117Lb	11.000	S117	20.0	2.484	0.433	0.0629	
15 minute summer	S117	7.004	S118	148.2	1.461	0.936	1.1403	
15 minute summer	S118	7.005	S119	155.0	1.581	1.220	3.4361	
15 minute summer	S119	7.006	S120	154.4	1.607	0.868	1.8510	
15 minute summer	S120L	12.000	S120	27.8	1.580	1.560	0.1054	
15 minute summer	S120	7.007	HW22	181.2	1.789	1.169	1.0260	
15 minute summer	HW22	Flow through pond	HW23	362.8	0.257	0.005	155.5647	
480 minute summer	HW23	1.012	S121	5.1	0.201	0.021	1.0452	
480 minute summer	S121	Hydro-Brake®	HW24	4.9				171.4

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 92.71%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S102	10	111.140	0.075	28.1	0.1155	0.0000	OK
15 minute summer	S103	10	110.101	0.097	45.3	0.1314	0.0000	OK
15 minute summer	S104L	10	110.100	0.097	40.7	0.1673	0.0000	OK
15 minute summer	S104	11	108.803	0.147	96.8	0.1848	0.0000	OK
15 minute summer	S105	12	108.502	0.894	107.2	1.1035	0.0000	SURCHARGED
15 minute summer	S106	12	108.317	0.958	109.0	1.1967	0.0000	SURCHARGED
15 minute summer	S107	12	108.181	0.882	112.0	1.0514	0.0000	SURCHARGED
15 minute summer	S108	12	108.029	0.789	117.6	0.9562	0.0000	SURCHARGED
15 minute summer	S109L	12	108.018	0.528	31.7	0.8574	0.0000	SURCHARGED
15 minute summer	S109	12	107.857	0.676	159.3	0.9285	0.0000	SURCHARGED
15 minute summer	S110L	10	107.415	0.309	35.9	0.6739	0.0000	SURCHARGED
15 minute summer	S110	11	106.933	0.180	207.1	0.2684	0.0000	OK
15 minute summer	S111L	10	106.155	0.267	29.9	0.4585	0.0000	SURCHARGED
15 minute summer	S111	11	105.824	0.304	241.2	0.3731	0.0000	OK
15 minute summer	S112	12	105.713	0.340	257.0	0.4999	0.0000	OK
15 minute summer	S113L	11	106.036	0.548	52.6	1.1318	0.0000	SURCHARGED
15 minute summer	S113	12	105.625	0.561	303.7	0.6341	0.0000	SURCHARGED
600 minute summer	HW21	615	105.639	0.608	46.3	0.0000	0.0000	OK
15 minute summer	S114L	11	107.510	0.087	31.7	0.1311	0.0000	OK
15 minute summer	S114	12	107.242	0.577	53.7	0.7750	0.0000	SURCHARGED
15 minute summer	S115La	12	107.287	0.736	77.1	1.6120	0.0000	SURCHARGED
15 minute summer	S115Lb	12	107.239	0.789	26.3	1.1647	0.0000	SURCHARGED
15 minute summer	S115	12	107.173	0.986	157.4	1.2752	0.0000	SURCHARGED
15 minute summer	S116	12	107.100	0.977	174.1	1.5712	0.0000	SURCHARGED
15 minute summer	S117La	12	106.940	1.029	36.5	1.5829	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S102	1.000	S103	28.0	2.026	0.240	0.2935	
15 minute summer	S103	1.001	S104	44.9	2.742	0.389	0.4281	
15 minute summer	S104L	2.000	S104	40.5	3.386	0.743	0.1542	
15 minute summer	S104	1.002	S105	96.4	2.062	0.376	1.0430	
15 minute summer	S105	1.003	S106	97.6	1.386	0.878	1.7542	
15 minute summer	S106	1.004	S107	106.3	1.510	1.497	1.0253	
15 minute summer	S107	1.005	S108	112.0	1.590	1.585	1.0193	
15 minute summer	S108	1.006	S109	118.6	1.685	1.682	1.0221	
15 minute summer	S109L	3.000	S109	27.5	1.731	1.003	0.1187	
15 minute summer	S109	1.007	S110	160.3	2.277	1.442	2.5771	
15 minute summer	S110L	4.000	S110	35.0	1.989	1.973	0.0941	
15 minute summer	S110	1.008	S111	206.5	2.395	0.349	3.2012	
15 minute summer	S111L	5.000	S111	29.3	1.667	1.658	0.1175	
15 minute summer	S111	1.009	S112	238.3	2.051	0.737	1.7744	
15 minute summer	S112	1.010	S113	256.7	1.693	0.795	3.3692	
15 minute summer	S113L	6.000	S113	50.9	2.889	2.864	0.0862	
15 minute summer	S113	1.011	HW21	303.4	1.404	1.153	2.3984	
600 minute summer	HW21	Flow through pond	HW23	88.1	0.041	0.001	661.1555	
15 minute summer	S114L	7.000	S114	31.6	3.200	0.581	0.0928	
15 minute summer	S114	7.001	S115	52.4	1.098	0.472	2.8407	
15 minute summer	S115La	8.000	S115	72.2	2.449	0.836	0.3099	
15 minute summer	S115Lb	9.000	S115	24.1	1.367	1.445	0.0759	
15 minute summer	S115	7.002	S116	142.2	1.632	1.100	1.6798	
15 minute summer	S116	7.003	S117	164.9	1.501	0.752	4.7431	
15 minute summer	S117La	10.000	S117	31.2	1.772	1.354	0.0830	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 92.71%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S117Lb	12	106.996	0.721	36.5	1.1387	0.0000	SURCHARGED
15 minute summer	S117	12	106.802	1.195	223.6	1.3513	0.0000	SURCHARGED
15 minute summer	S118	12	106.659	1.122	234.2	1.4275	0.0000	SURCHARGED
15 minute summer	S119	12	106.165	0.771	234.4	0.8722	0.0000	SURCHARGED
15 minute summer	S120L	11	106.331	0.803	51.4	1.4666	0.0000	SURCHARGED
15 minute summer	S120	12	105.895	0.653	278.3	0.7381	0.0000	SURCHARGED
15 minute summer	HW22	12	105.694	0.613	278.5	0.0000	0.0000	OK
720 minute summer	HW23	720	105.591	0.560	51.3	0.0000	0.0000	SURCHARGED
720 minute summer	S121	720	105.591	0.579	5.3	3.3181	0.0000	SURCHARGED
15 minute summer	HW24	1	104.705	0.000	4.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S117Lb	11.000	S117	31.1	2.413	0.672	0.1168	
15 minute summer	S117	7.004	S118	223.9	2.030	1.414	1.2283	
15 minute summer	S118	7.005	S119	234.4	2.126	1.845	3.8791	
15 minute summer	S119	7.006	S120	234.6	2.127	1.319	2.1176	
15 minute summer	S120L	12.000	S120	47.8	2.716	2.682	0.1065	
15 minute summer	S120	7.007	HW22	278.5	2.525	1.797	1.1175	
15 minute summer	HW22	Flow through pond	HW23	496.6	0.286	0.007	284.7273	
720 minute summer	HW23	1.012	S121	5.3	0.258	0.022	1.6814	
720 minute summer	S121	Hydro-Brake®	HW24	4.9				226.5

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Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 92.71%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S102	10	111.144	0.078	30.9	0.1246	0.0000	OK
15 minute summer	S103	10	110.107	0.103	49.9	0.1410	0.0000	OK
15 minute summer	S104L	10	110.106	0.103	44.7	0.1851	0.0000	OK
15 minute summer	S104	11	108.856	0.200	106.5	0.2530	0.0000	OK
15 minute summer	S105	12	108.754	1.146	114.4	1.4264	0.0000	SURCHARGED
15 minute summer	S106	12	108.531	1.172	117.6	1.4781	0.0000	SURCHARGED
15 minute summer	S107	12	108.370	1.071	121.1	1.2829	0.0000	SURCHARGED
15 minute summer	S108	12	108.191	0.951	127.1	1.1605	0.0000	SURCHARGED
15 minute summer	S109L	12	108.185	0.695	34.9	1.1634	0.0000	SURCHARGED
15 minute summer	S109	12	107.990	0.809	172.8	1.1319	0.0000	SURCHARGED
15 minute summer	S110L	10	107.459	0.353	39.5	0.8068	0.0000	SURCHARGED
15 minute summer	S110	11	106.941	0.189	225.5	0.2878	0.0000	OK
15 minute summer	S111L	10	106.195	0.307	32.9	0.5435	0.0000	SURCHARGED
15 minute summer	S111	12	105.904	0.384	263.0	0.4755	0.0000	OK
15 minute summer	S112	12	105.852	0.479	277.2	0.7213	0.0000	SURCHARGED
15 minute summer	S113L	11	106.163	0.675	57.9	1.4581	0.0000	SURCHARGED
600 minute summer	S113	630	105.694	0.630	46.8	0.7121	0.0000	SURCHARGED
600 minute summer	HW21	705	105.756	0.725	108.5	0.0000	0.0000	OK
15 minute summer	S114L	12	107.709	0.287	34.9	0.4408	0.0000	SURCHARGED
15 minute summer	S114	12	107.542	0.877	59.1	1.1964	0.0000	SURCHARGED
15 minute summer	S115La	12	107.603	1.052	84.9	2.4133	0.0000	SURCHARGED
15 minute summer	S115Lb	12	107.543	1.093	28.9	1.6511	0.0000	SURCHARGED
15 minute summer	S115	12	107.466	1.279	171.9	1.6747	0.0000	SURCHARGED
15 minute summer	S116	12	107.381	1.258	181.0	2.0850	0.0000	SURCHARGED
15 minute summer	S117La	12	107.200	1.289	40.1	2.0365	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S102	1.000	S103	30.8	2.076	0.263	0.3150	
15 minute summer	S103	1.001	S104	49.5	2.813	0.429	0.5195	
15 minute summer	S104L	2.000	S104	44.5	3.447	0.815	0.1664	
15 minute summer	S104	1.002	S105	102.6	2.104	0.401	1.1958	
15 minute summer	S105	1.003	S106	105.0	1.491	0.945	1.7542	
15 minute summer	S106	1.004	S107	114.8	1.631	1.617	1.0253	
15 minute summer	S107	1.005	S108	121.0	1.718	1.713	1.0193	
15 minute summer	S108	1.006	S109	128.0	1.818	1.815	1.0221	
15 minute summer	S109L	3.000	S109	29.9	1.751	1.093	0.1187	
15 minute summer	S109	1.007	S110	173.7	2.467	1.563	2.5771	
15 minute summer	S110L	4.000	S110	38.4	2.180	2.162	0.0941	
15 minute summer	S110	1.008	S111	224.8	2.382	0.380	3.8198	
15 minute summer	S111L	5.000	S111	32.2	1.829	1.819	0.1175	
15 minute summer	S111	1.009	S112	259.1	2.035	0.801	2.2221	
15 minute summer	S112	1.010	S113	275.7	1.740	0.854	3.7215	
15 minute summer	S113L	6.000	S113	55.1	3.129	3.102	0.0862	
600 minute summer	S113	1.011	HW21	46.2	0.417	0.176	2.3984	
600 minute summer	HW21	Flow through pond	HW23	-63.2	0.044	-0.001	752.1755	
15 minute summer	S114L	7.000	S114	34.9	3.224	0.640	0.1156	
15 minute summer	S114	7.001	S115	54.2	1.104	0.488	2.8407	
15 minute summer	S115La	8.000	S115	78.0	2.377	0.902	0.3099	
15 minute summer	S115Lb	9.000	S115	26.6	1.510	1.596	0.0759	
15 minute summer	S115	7.002	S116	147.8	1.678	1.144	1.6798	
15 minute summer	S116	7.003	S117	176.9	1.604	0.807	4.7431	
15 minute summer	S117La	10.000	S117	32.0	1.815	1.387	0.0830	

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Results for 100 year +40% CC +10% A Critical Storm Duration. Lowest mass balance: 92.71%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S117Lb	12	107.267	0.992	40.1	1.6099	0.0000	SURCHARGED
15 minute summer	S117	12	107.038	1.431	240.7	1.6179	0.0000	SURCHARGED
15 minute summer	S118	12	106.873	1.336	252.0	1.7176	0.0000	SURCHARGED
15 minute summer	S119	12	106.301	0.907	252.0	1.0259	0.0000	SURCHARGED
15 minute summer	S120L	11	106.494	0.966	56.6	1.8322	0.0000	SURCHARGED
15 minute summer	S120	12	105.988	0.746	300.0	0.8442	0.0000	SURCHARGED
15 minute summer	HW22	12	105.755	0.674	300.1	0.0000	0.0000	OK
960 minute summer	HW23	960	105.659	0.628	61.4	0.0000	0.0000	SURCHARGED
960 minute summer	S121	960	105.659	0.648	5.3	3.7103	0.0000	SURCHARGED
15 minute summer	HW24	1	104.705	0.000	4.9	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S117Lb	11.000	S117	31.9	2.472	0.690	0.1168	
15 minute summer	S117	7.004	S118	240.7	2.183	1.520	1.2283	
15 minute summer	S118	7.005	S119	252.0	2.285	1.983	3.8791	
15 minute summer	S119	7.006	S120	252.0	2.285	1.417	2.1176	
15 minute summer	S120L	12.000	S120	51.6	2.930	2.893	0.1065	
15 minute summer	S120	7.007	HW22	300.1	2.721	1.937	1.1175	
15 minute summer	HW22	Flow through pond	HW23	514.6	0.272	0.007	313.7360	
960 minute summer	HW23	1.012	S121	5.3	0.186	0.022	1.6814	
960 minute summer	S121	Hydro-Brake®	HW24	4.9				272.0

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Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	1	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	✓

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S102	0.047	5.00	113.330	Manhole	1200	444479.431	291754.803	2.265
S103	0.029	5.00	112.628	Manhole	1200	444472.108	291734.898	2.624
S104L	0.068	5.00	112.267	Manhole	1200	444472.650	291718.227	2.264
S104	0.019	5.00	111.735	Manhole	1200	444483.601	291711.432	3.079
S105	0.018	5.00	111.072	Manhole	1200	444481.686	291691.630	3.464
S106	0.020	5.00	110.748	Manhole	1200	444497.965	291672.775	3.389
S107	0.010	5.00	110.593	Manhole	1200	444501.855	291658.744	3.294
S108	0.012	5.00	110.213	Manhole	1200	444499.035	291644.546	2.973
S109L	0.053	5.00	109.640	Manhole	1200	444485.970	291638.442	2.150
S109	0.030	5.00	109.648	Manhole	1200	444490.094	291633.112	2.467
S110L	0.060	5.00	108.250	Manhole	1200	444459.015	291612.253	1.144
S110	0.027	5.00	108.270	Manhole	1200	444462.690	291608.295	1.518
S111L	0.050	5.00	107.600	Manhole	1200	444434.035	291590.102	1.712
S111	0.010	5.00	107.562	Manhole	1200	444435.285	291583.479	2.042
S112	0.033	5.00	107.313	Manhole	1200	444421.127	291579.546	1.940
S113L	0.088	5.00	107.370	Manhole	1200	444399.148	291588.949	1.882
S113			107.389	Manhole	1200	444398.098	291584.164	2.325
HW21			106.300	Manhole		444392.865	291574.374	1.269
S114L	0.053	5.00	110.300	Manhole	1200	444454.757	291676.928	2.878
S114	0.037	5.00	110.153	Manhole	1200	444459.264	291672.153	3.488
S115La	0.129	5.00	108.990	Manhole	1200	444427.447	291651.484	2.439
S115Lb	0.044	5.00	109.000	Manhole	1200	444433.123	291641.030	2.550
S115	0.021	5.00	108.785	Manhole	1200	444430.189	291644.190	2.598
S116	0.056	5.00	108.467	Manhole	1200	444416.379	291637.767	2.344
S117La	0.061	5.00	108.900	Manhole	1200	444384.406	291638.524	2.989
S117Lb	0.061	5.00	109.000	Manhole	1200	444387.944	291649.243	2.725
S117			108.819	Manhole	1200	444385.327	291643.147	3.212
S118	0.022	5.00	108.654	Manhole	1200	444375.733	291648.800	3.117
S119			107.717	Manhole	1200	444349.998	291624.828	2.323
S120L	0.086	5.00	108.000	Manhole	1200	444358.999	291610.511	2.472
S120			107.000	Manhole	1200	444354.732	291606.222	1.758
HW22			106.286	Manhole		444355.507	291596.120	1.205
HW23		5.00	106.286	Manhole		444370.615	291565.689	1.255
S121			106.300	Manhole	2700	444364.822	291560.491	1.289
HW24			105.600	Manhole		444342.087	291539.997	0.895

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	S102	S103	21.209	0.600	111.065	110.005	1.060	20.0	225	5.12	50.0
1.001	S103	S104	26.130	0.600	110.004	108.731	1.273	20.5	225	5.27	50.0
2.000	S104L	S104	12.888	0.600	110.003	108.806	1.197	10.8	150	5.07	50.0
1.002	S104	S105	19.894	0.600	108.656	107.608	1.048	19.0	300	5.36	50.0
1.003	S105	S106	24.911	0.600	107.608	107.359	0.249	100.0	300	5.63	50.0
1.004	S106	S107	14.560	0.600	107.359	107.299	0.060	242.7	300	5.87	50.0
1.005	S107	S108	14.475	0.600	107.299	107.240	0.059	245.3	300	6.11	49.9
1.006	S108	S109	14.515	0.600	107.240	107.181	0.059	246.0	300	6.35	49.0
3.000	S109L	S109	6.740	0.600	107.490	107.331	0.159	42.4	150	5.07	50.0
1.007	S109	S110	36.971	0.600	107.181	106.811	0.370	99.9	300	6.74	47.6
4.000	S110L	S110	5.401	0.600	107.106	107.052	0.054	100.0	150	5.09	50.0
1.008	S110	S111	36.971	0.600	106.752	105.520	1.232	30.0	450	6.91	47.0
5.000	S111L	S111	6.740	0.600	105.888	105.821	0.067	100.6	150	5.11	50.0
1.009	S111	S112	14.694	0.600	105.520	105.373	0.147	100.0	450	7.03	46.6
1.010	S112	S113	23.488	0.600	105.373	105.139	0.234	100.4	450	7.22	46.0
6.000	S113L	S113	4.898	0.600	105.488	105.439	0.049	100.0	150	5.08	50.0
1.011	S113	HW21	11.102	0.600	105.064	105.031	0.033	336.4	525	7.37	45.5
7.000	S114L	S114	6.566	0.600	107.422	106.815	0.607	10.8	150	5.04	50.0
7.001	S114	S115	40.340	0.600	106.665	106.262	0.403	100.1	300	5.46	50.0
8.000	S115La	S115	7.793	0.600	106.551	106.337	0.214	36.4	225	5.06	50.0
9.000	S115Lb	S115	4.312	0.600	106.450	106.412	0.038	113.5	150	5.08	50.0
7.002	S115	S116	15.230	0.600	106.187	106.123	0.064	238.0	375	5.68	50.0
7.003	S116	S117	43.003	0.600	106.123	105.607	0.516	83.3	375	6.04	50.0
10.000	S117La	S117	4.714	0.600	105.911	105.832	0.079	59.7	150	5.06	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	S102	S103	2.938	116.8	6.4	2.040	2.398	2.040	2.398	0.047	0.0
1.001	S103	S104	2.901	115.3	10.3	2.399	2.779	2.399	2.779	0.076	0.0
2.000	S104L	S104	3.088	54.6	9.2	2.114	2.779	2.114	2.779	0.068	0.0
1.002	S104	S105	3.625	256.2	22.1	2.779	3.164	2.779	3.164	0.163	0.0
1.003	S105	S106	1.572	111.1	24.5	3.164	3.089	3.089	3.164	0.181	0.0
1.004	S106	S107	1.005	71.0	27.2	3.089	2.994	2.994	3.089	0.201	0.0
1.005	S107	S108	0.999	70.6	28.6	2.994	2.673	2.673	2.994	0.211	0.0
1.006	S108	S109	0.998	70.5	29.6	2.673	2.167	2.167	2.673	0.223	0.0
3.000	S109L	S109	1.550	27.4	7.2	2.000	2.167	2.000	2.167	0.053	0.0
1.007	S109	S110	1.573	111.2	39.5	2.167	1.159	1.159	2.167	0.306	0.0
4.000	S110L	S110	1.005	17.8	8.1	0.994	1.068	0.994	1.068	0.060	0.0
1.008	S110	S111	3.721	591.9	50.1	1.068	1.592	1.068	1.592	0.393	0.0
5.000	S111L	S111	1.002	17.7	6.8	1.562	1.591	1.562	1.591	0.050	0.0
1.009	S111	S112	2.033	323.4	57.3	1.592	1.490	1.490	1.592	0.453	0.0
1.010	S112	S113	2.029	322.7	60.6	1.490	1.800	1.490	1.800	0.486	0.0
6.000	S113L	S113	1.005	17.8	11.9	1.732	1.800	1.732	1.800	0.088	0.0
1.011	S113	HW21	1.215	263.1	70.8	1.800	0.744	0.744	1.800	0.574	0.0
7.000	S114L	S114	3.080	54.4	7.2	2.728	3.188	2.728	3.188	0.053	0.0
7.001	S114	S115	1.571	111.1	12.2	3.188	2.223	2.223	3.188	0.090	0.0
8.000	S115La	S115	2.175	86.5	17.5	2.214	2.223	2.214	2.223	0.129	0.0
9.000	S115Lb	S115	0.942	16.7	6.0	2.400	2.223	2.223	2.400	0.044	0.0
7.002	S115	S116	1.170	129.2	38.5	2.223	1.969	1.969	2.223	0.284	0.0
7.003	S116	S117	1.986	219.3	46.1	1.969	2.837	1.969	2.837	0.340	0.0
10.000	S117La	S117	1.304	23.0	8.3	2.839	2.837	2.837	2.839	0.061	0.0

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Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
11.000	S117Lb	S117	6.634	0.600	106.275	105.832	0.443	15.0	150	5.04	50.0
7.004	S117	S118	11.136	0.600	105.607	105.537	0.070	159.1	375	6.17	49.7
7.005	S118	S119	35.170	0.600	105.537	105.394	0.143	245.9	375	6.68	47.8
7.006	S119	S120	19.199	0.600	105.394	105.242	0.152	126.3	375	6.88	47.1
12.000	S120L	S120	6.050	0.600	105.528	105.467	0.061	99.2	150	5.10	50.0
7.007	S120	HW22	10.132	0.600	105.242	105.181	0.061	166.1	375	7.00	46.7
1.012	HW23	S121	7.783	0.600	105.031	105.011	0.020	389.2	525	5.11	50.0
1.013	S121	HW24	30.609	0.600	105.011	104.705	0.306	100.0	225	5.51	50.0

Name	US Node	DS Node	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Minimum Depth (m)	Maximum Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
11.000	S117Lb	S117	2.616	46.2	8.3	2.575	2.837	2.575	2.837	0.061	0.0
7.004	S117	S118	1.434	158.3	62.2	2.837	2.742	2.742	2.837	0.462	0.0
7.005	S118	S119	1.151	127.1	62.7	2.742	1.948	1.948	2.742	0.484	0.0
7.006	S119	S120	1.610	177.9	61.8	1.948	1.383	1.383	1.948	0.484	0.0
12.000	S120L	S120	1.009	17.8	11.7	2.322	1.383	1.383	2.322	0.086	0.0
7.007	S120	HW22	1.403	154.9	72.2	1.383	0.730	0.730	1.383	0.570	0.0
1.012	HW23	S121	1.129	244.4	0.0	0.730	0.764	0.730	0.764	0.000	0.0
1.013	S121	HW24	1.307	52.0	0.0	1.064	0.670	0.670	1.064	0.000	0.0

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	21.209	20.0	225	113.330	111.065	2.040	112.628	110.005	2.398
1.001	26.130	20.5	225	112.628	110.004	2.399	111.735	108.731	2.779
2.000	12.888	10.8	150	112.267	110.003	2.114	111.735	108.806	2.779
1.002	19.894	19.0	300	111.735	108.656	2.779	111.072	107.608	3.164
1.003	24.911	100.0	300	111.072	107.608	3.164	110.748	107.359	3.089
1.004	14.560	242.7	300	110.748	107.359	3.089	110.593	107.299	2.994
1.005	14.475	245.3	300	110.593	107.299	2.994	110.213	107.240	2.673
1.006	14.515	246.0	300	110.213	107.240	2.673	109.648	107.181	2.167
3.000	6.740	42.4	150	109.640	107.490	2.000	109.648	107.331	2.167
1.007	36.971	99.9	300	109.648	107.181	2.167	108.270	106.811	1.159
4.000	5.401	100.0	150	108.250	107.106	0.994	108.270	107.052	1.068
1.008	36.971	30.0	450	108.270	106.752	1.068	107.562	105.520	1.592

Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
1.000	S102	1200	Manhole	S103	1200	1
1.001	S103	1200	Manhole	S104	1200	1
2.000	S104L	1200	Manhole	S104	1200	1
1.002	S104	1200	Manhole	S105	1200	1
1.003	S105	1200	Manhole	S106	1200	1
1.004	S106	1200	Manhole	S107	1200	1
1.005	S107	1200	Manhole	S108	1200	1
1.006	S108	1200	Manhole	S109	1200	1
3.000	S109L	1200	Manhole	S109	1200	1
1.007	S109	1200	Manhole	S110	1200	1
4.000	S110L	1200	Manhole	S110	1200	1
1.008	S110	1200	Manhole	S111	1200	1

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Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
5.000	6.740	100.6	150	107.600	105.888	1.562	107.562	105.821	1.591
1.009	14.694	100.0	450	107.562	105.520	1.592	107.313	105.373	1.490
1.010	23.488	100.4	450	107.313	105.373	1.490	107.389	105.139	1.800
6.000	4.898	100.0	150	107.370	105.488	1.732	107.389	105.439	1.800
1.011	11.102	336.4	525	107.389	105.064	1.800	106.300	105.031	0.744
7.000	6.566	10.8	150	110.300	107.422	2.728	110.153	106.815	3.188
7.001	40.340	100.1	300	110.153	106.665	3.188	108.785	106.262	2.223
8.000	7.793	36.4	225	108.990	106.551	2.214	108.785	106.337	2.223
9.000	4.312	113.5	150	109.000	106.450	2.400	108.785	106.412	2.223
7.002	15.230	238.0	375	108.785	106.187	2.223	108.467	106.123	1.969
7.003	43.003	83.3	375	108.467	106.123	1.969	108.819	105.607	2.837
10.000	4.714	59.7	150	108.900	105.911	2.839	108.819	105.832	2.837
11.000	6.634	15.0	150	109.000	106.275	2.575	108.819	105.832	2.837
7.004	11.136	159.1	375	108.819	105.607	2.837	108.654	105.537	2.742
7.005	35.170	245.9	375	108.654	105.537	2.742	107.717	105.394	1.948
7.006	19.199	126.3	375	107.717	105.394	1.948	107.000	105.242	1.383
12.000	6.050	99.2	150	108.000	105.528	2.322	107.000	105.467	1.383
7.007	10.132	166.1	375	107.000	105.242	1.383	106.286	105.181	0.730
1.012	7.783	389.2	525	106.286	105.031	0.730	106.300	105.011	0.764
1.013	30.609	100.0	225	106.300	105.011	1.064	105.600	104.705	0.670

Link	US Node	Dia (mm)	Node Type	DS Node	Dia (mm)	MH Type
5.000	S111L	1200	Manhole	S111	1200	1
1.009	S111	1200	Manhole	S112	1200	1
1.010	S112	1200	Manhole	S113	1200	1
6.000	S113L	1200	Manhole	S113	1200	1
1.011	S113	1200	Manhole	HW21		1
7.000	S114L	1200	Manhole	S114	1200	1
7.001	S114	1200	Manhole	S115	1200	1
8.000	S115La	1200	Manhole	S115	1200	1
9.000	S115Lb	1200	Manhole	S115	1200	1
7.002	S115	1200	Manhole	S116	1200	1
7.003	S116	1200	Manhole	S117	1200	1
10.000	S117La	1200	Manhole	S117	1200	1
11.000	S117Lb	1200	Manhole	S117	1200	1
7.004	S117	1200	Manhole	S118	1200	1
7.005	S118	1200	Manhole	S119	1200	1
7.006	S119	1200	Manhole	S120	1200	1
12.000	S120L	1200	Manhole	S120	1200	1
7.007	S120	1200	Manhole	HW22		1
1.012	HW23		Manhole	S121	2700	1
1.013	S121	2700	Manhole	HW24		1

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S102	444479.431	291754.803	113.330	2.265	1200	Manhole	0	1.000	111.065	225
S103	444472.108	291734.898	112.628	2.624	1200	Manhole	1 0	1.000 1.001	110.005 110.004	225 225
S104L	444472.650	291718.227	112.267	2.264	1200	Manhole	0	2.000	110.003	150
S104	444483.601	291711.432	111.735	3.079	1200	Manhole	1 2 0	2.000 1.001 1.002	108.806 108.731 108.656	150 225 300
S105	444481.686	291691.630	111.072	3.464	1200	Manhole	1 0	1.002 1.003	107.608 107.608	300 300
S106	444497.965	291672.775	110.748	3.389	1200	Manhole	1 0	1.003 1.004	107.359 107.359	300 300
S107	444501.855	291658.744	110.593	3.294	1200	Manhole	1 0	1.004 1.005	107.299 107.299	300 300
S108	444499.035	291644.546	110.213	2.973	1200	Manhole	1 0	1.005 1.006	107.240 107.240	300 300
S109L	444485.970	291638.442	109.640	2.150	1200	Manhole	0	3.000	107.490	150
S109	444490.094	291633.112	109.648	2.467	1200	Manhole	1 2 0	3.000 1.006 1.007	107.331 107.181 107.181	150 300 300
S110L	444459.015	291612.253	108.250	1.144	1200	Manhole	0	4.000	107.106	150
S110	444462.690	291608.295	108.270	1.518	1200	Manhole	1 2 0	4.000 1.007 1.008	107.052 106.811 106.752	150 300 450
S111L	444434.035	291590.102	107.600	1.712	1200	Manhole	0	5.000	105.888	150

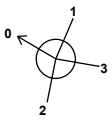
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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S111	444435.285	291583.479	107.562	2.042	1200	Manhole	1	5.000	105.821	150
							2	1.008	105.520	450
							0	1.009	105.520	450
S112	444421.127	291579.546	107.313	1.940	1200	Manhole	1	1.009	105.373	450
							0	1.010	105.373	450
S113L	444399.148	291588.949	107.370	1.882	1200	Manhole	0	6.000	105.488	150
S113	444398.098	291584.164	107.389	2.325	1200	Manhole	1	6.000	105.439	150
							2	1.010	105.139	450
							0	1.011	105.064	525
HW21	444392.865	291574.374	106.300	1.269		Manhole	1	1.011	105.031	525
S114L	444454.757	291676.928	110.300	2.878	1200	Manhole	0	7.000	107.422	150
S114	444459.264	291672.153	110.153	3.488	1200	Manhole	1	7.000	106.815	150
							0	7.001	106.665	300
S115La	444427.447	291651.484	108.990	2.439	1200	Manhole	0	8.000	106.551	225
S115Lb	444433.123	291641.030	109.000	2.550	1200	Manhole	0	9.000	106.450	150
S115	444430.189	291644.190	108.785	2.598	1200	Manhole	1	9.000	106.412	150
							2	8.000	106.337	225
							3	7.001	106.262	300
							0	7.002	106.187	375
S116	444416.379	291637.767	108.467	2.344	1200	Manhole	1	7.002	106.123	375
							0	7.003	106.123	375
S117La	444384.406	291638.524	108.900	2.989	1200	Manhole	0	10.000	105.911	150
S117Lb	444387.944	291649.243	109.000	2.725	1200	Manhole	0	11.000	106.275	150

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Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Node Type	Connections	Link	IL (m)	Dia (mm)
S117	444385.327	291643.147	108.819	3.212	1200	Manhole		1	11.000	105.832	150
								2	10.000	105.832	150
								3	7.003	105.607	375
								0	7.004	105.607	375
S118	444375.733	291648.800	108.654	3.117	1200	Manhole		1	7.004	105.537	375
								0	7.005	105.537	375
S119	444349.998	291624.828	107.717	2.323	1200	Manhole		1	7.005	105.394	375
								0	7.006	105.394	375
S120L	444358.999	291610.511	108.000	2.472	1200	Manhole		0	12.000	105.528	150
S120	444354.732	291606.222	107.000	1.758	1200	Manhole		1	12.000	105.467	150
								2	7.006	105.242	375
								0	7.007	105.242	375
HW22	444355.507	291596.120	106.286	1.205		Manhole		1	7.007	105.181	375
HW23	444370.615	291565.689	106.286	1.255		Manhole		0	1.012	105.031	525
S121	444364.822	291560.491	106.300	1.289	2700	Manhole		1	1.012	105.011	525
								0	1.013	105.011	225
HW24	444342.087	291539.997	105.600	0.895		Manhole		1	1.013	104.705	225

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.400	Check Discharge Rate(s)	x
Summer CV	0.750	Check Discharge Volume	x
Analysis Speed	Normal		

Storm Durations

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

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Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	40	0	0

Node HW24 Surcharged Outfall

Overrides Design Area	x	Depression Storage Area (m²)	0	Evapo-transpiration (mm/day)	0
Overrides Design Additional Inflow	x	Depression Storage Depth (mm)	0		

Applies to All storms

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
0	0.895	255	0.895	510	0.895	765	0.895	1020	0.895	1275	0.895
15	0.895	270	0.895	525	0.895	780	0.895	1035	0.895	1290	0.895
30	0.895	285	0.895	540	0.895	795	0.895	1050	0.895	1305	0.895
45	0.895	300	0.895	555	0.895	810	0.895	1065	0.895	1320	0.895
60	0.895	315	0.895	570	0.895	825	0.895	1080	0.895	1335	0.895
75	0.895	330	0.895	585	0.895	840	0.895	1095	0.895	1350	0.895
90	0.895	345	0.895	600	0.895	855	0.895	1110	0.895	1365	0.895
105	0.895	360	0.895	615	0.895	870	0.895	1125	0.895	1380	0.895
120	0.895	375	0.895	630	0.895	885	0.895	1140	0.895	1395	0.895
135	0.895	390	0.895	645	0.895	900	0.895	1155	0.895	1410	0.895
150	0.895	405	0.895	660	0.895	915	0.895	1170	0.895	1425	0.895
165	0.895	420	0.895	675	0.895	930	0.895	1185	0.895	1440	0.895
180	0.895	435	0.895	690	0.895	945	0.895	1200	0.895		
195	0.895	450	0.895	705	0.895	960	0.895	1215	0.895		
210	0.895	465	0.895	720	0.895	975	0.895	1230	0.895		
225	0.895	480	0.895	735	0.895	990	0.895	1245	0.895		
240	0.895	495	0.895	750	0.895	1005	0.895	1260	0.895		

Node S121 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	105.011	Product Number	CTL-SHE-0104-4900-1000-4900
Design Depth (m)	1.000	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	4.9	Min Node Diameter (mm)	1200

Node HW23 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	50.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	105.031	Main Channel Slope (1:X)	1000.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.020

Inlets

HW22 | HW21

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	1114.0	0.0	1.500	1842.0	0.0	1.501	0.0	0.0

Other (defaults)

Entry Loss (manhole)	0.000	Entry Loss (junction)	0.000	Apply Recommended Losses	x
Exit Loss (manhole)	0.000	Exit Loss (junction)	0.000	Flood Risk (m)	0.300

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Rainfall

Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)	Event	Peak Intensity (mm/hr)	Average Intensity (mm/hr)
2 year 15 minute summer	141.566	40.058	30 year 360 minute summer	31.221	8.034
2 year 30 minute summer	91.753	25.963	30 year 480 minute summer	24.324	6.428
2 year 60 minute summer	61.301	16.200	30 year 600 minute summer	19.756	5.404
2 year 120 minute summer	37.449	9.897	30 year 720 minute summer	17.490	4.687
2 year 180 minute summer	28.672	7.378	30 year 960 minute summer	14.215	3.743
2 year 240 minute summer	22.636	5.982	30 year 1440 minute summer	10.161	2.723
2 year 360 minute summer	17.235	4.435	100 year +40% CC 15 minute summer	488.233	138.153
2 year 480 minute summer	13.550	3.581	100 year +40% CC 30 minute summer	320.551	90.705
2 year 600 minute summer	11.088	3.033	100 year +40% CC 60 minute summer	214.603	56.713
2 year 720 minute summer	9.878	2.647	100 year +40% CC 120 minute summer	129.587	34.246
2 year 960 minute summer	8.113	2.136	100 year +40% CC 180 minute summer	97.729	25.149
2 year 1440 minute summer	5.891	1.579	100 year +40% CC 240 minute summer	75.977	20.078
30 year 15 minute summer	268.706	76.035	100 year +40% CC 360 minute summer	56.677	14.585
30 year 30 minute summer	174.929	49.499	100 year +40% CC 480 minute summer	43.979	11.622
30 year 60 minute summer	116.589	30.811	100 year +40% CC 600 minute summer	35.604	9.738
30 year 120 minute summer	70.438	18.615	100 year +40% CC 720 minute summer	31.433	8.424
30 year 180 minute summer	53.298	13.715	100 year +40% CC 960 minute summer	25.432	6.697
30 year 240 minute summer	41.604	10.995	100 year +40% CC 1440 minute summer	18.055	4.839

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Results for 2 year Critical Storm Duration. Lowest mass balance: 95.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S102	10	111.105	0.040	8.1	0.0618	0.0000	OK
15 minute summer	S103	10	110.055	0.051	13.1	0.0686	0.0000	OK
15 minute summer	S104L	10	110.050	0.047	11.8	0.0821	0.0000	OK
15 minute summer	S104	10	108.722	0.066	28.0	0.0832	0.0000	OK
15 minute summer	S105	10	107.715	0.106	31.0	0.1315	0.0000	OK
15 minute summer	S106	11	107.505	0.146	34.1	0.1821	0.0000	OK
15 minute summer	S107	11	107.449	0.150	35.9	0.1787	0.0000	OK
15 minute summer	S108	11	107.391	0.151	38.1	0.1826	0.0000	OK
15 minute summer	S109L	10	107.550	0.060	9.2	0.0970	0.0000	OK
15 minute summer	S109	11	107.324	0.142	52.0	0.1958	0.0000	OK
15 minute summer	S110L	10	107.188	0.082	10.4	0.1784	0.0000	OK
15 minute summer	S110	11	106.852	0.100	66.2	0.1489	0.0000	OK
15 minute summer	S111L	10	105.962	0.074	8.7	0.1264	0.0000	OK
15 minute summer	S111	11	105.667	0.147	76.2	0.1804	0.0000	OK
15 minute summer	S112	11	105.525	0.152	81.5	0.2234	0.0000	OK
15 minute summer	S113L	10	105.594	0.106	15.3	0.2193	0.0000	OK
1440 minute summer	S113	1440	105.324	0.260	6.9	0.2936	0.0000	OK
1440 minute summer	HW21	1440	105.328	0.297	12.6	0.0000	0.0000	OK
15 minute summer	S114L	10	107.464	0.042	9.2	0.0626	0.0000	OK
15 minute summer	S114	10	106.740	0.075	15.6	0.1004	0.0000	OK
15 minute summer	S115La	10	106.629	0.078	22.4	0.1700	0.0000	OK
15 minute summer	S115Lb	10	106.521	0.071	7.6	0.1043	0.0000	OK
15 minute summer	S115	10	106.343	0.156	48.8	0.2017	0.0000	OK
15 minute summer	S116	11	106.252	0.129	57.9	0.2081	0.0000	OK
15 minute summer	S117La	10	105.982	0.071	10.6	0.1095	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S102	1.000	S103	8.1	1.437	0.069	0.1193	
15 minute summer	S103	1.001	S104	12.9	1.934	0.112	0.1747	
15 minute summer	S104L	2.000	S104	11.7	2.464	0.215	0.0613	
15 minute summer	S104	1.002	S105	27.9	1.661	0.109	0.3376	
15 minute summer	S105	1.003	S106	30.6	1.092	0.275	0.7013	
15 minute summer	S106	1.004	S107	34.2	0.989	0.481	0.5034	
15 minute summer	S107	1.005	S108	36.1	1.022	0.511	0.5110	
15 minute summer	S108	1.006	S109	38.1	1.114	0.540	0.4963	
15 minute summer	S109L	3.000	S109	9.1	1.400	0.334	0.0440	
15 minute summer	S109	1.007	S110	51.7	1.571	0.465	1.2168	
15 minute summer	S110L	4.000	S110	10.3	1.048	0.579	0.0530	
15 minute summer	S110	1.008	S111	66.1	1.875	0.112	1.3134	
15 minute summer	S111L	5.000	S111	8.6	1.001	0.486	0.0580	
15 minute summer	S111	1.009	S112	76.0	1.655	0.235	0.6748	
15 minute summer	S112	1.010	S113	81.3	1.634	0.252	1.1821	
15 minute summer	S113L	6.000	S113	15.1	1.136	0.852	0.0652	
1440 minute summer	S113	1.011	HW21	7.4	0.184	0.028	1.2866	
1440 minute summer	HW21	Flow through pond	HW23	11.5	0.020	0.000	313.3247	
15 minute summer	S114L	7.000	S114	9.2	2.295	0.168	0.0262	
15 minute summer	S114	7.001	S115	15.4	1.068	0.138	0.5852	
15 minute summer	S115La	8.000	S115	22.3	1.838	0.258	0.0944	
15 minute summer	S115Lb	9.000	S115	7.5	0.926	0.453	0.0351	
15 minute summer	S115	7.002	S116	48.2	1.258	0.373	0.5847	
15 minute summer	S116	7.003	S117	57.6	1.267	0.263	1.9651	
15 minute summer	S117La	10.000	S117	10.5	1.281	0.457	0.0388	

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Results for 2 year Critical Storm Duration. Lowest mass balance: 95.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S117Lb	10	106.324	0.049	10.6	0.0772	0.0000	OK
15 minute summer	S117	11	105.802	0.195	78.1	0.2201	0.0000	OK
15 minute summer	S118	11	105.749	0.212	81.9	0.2692	0.0000	OK
15 minute summer	S119	11	105.576	0.182	80.5	0.2055	0.0000	OK
15 minute summer	S120L	10	105.632	0.104	14.9	0.1896	0.0000	OK
15 minute summer	S120	11	105.452	0.210	96.5	0.2380	0.0000	OK
15 minute summer	HW22	11	105.355	0.274	96.3	0.0000	0.0000	OK
1440 minute summer	HW23	1680	105.322	0.290	11.5	0.0000	0.0000	OK
1440 minute summer	S121	1650	105.322	0.310	0.2	1.7777	0.0000	SURCHARGED
15 minute summer	HW24	1	105.600	0.895	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S117Lb	11.000	S117	10.5	2.123	0.228	0.0330	
15 minute summer	S117	7.004	S118	78.3	1.286	0.495	0.6782	
15 minute summer	S118	7.005	S119	80.5	1.390	0.633	2.0566	
15 minute summer	S119	7.006	S120	82.1	1.416	0.462	1.1183	
15 minute summer	S120L	12.000	S120	14.7	1.135	0.827	0.0785	
15 minute summer	S120	7.007	HW22	96.3	1.516	0.622	0.6440	
15 minute summer	HW22	Flow through pond	HW23	200.6	0.204	0.003	84.2271	
1440 minute summer	HW23	1.012	S121	0.2	0.096	0.001	0.9941	
1440 minute summer	S121	Hydro-Brake®	HW24	0.0				0.0

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Results for 30 year Critical Storm Duration. Lowest mass balance: 95.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S102	10	111.120	0.055	15.5	0.0851	0.0000	OK
15 minute summer	S103	10	110.075	0.071	24.9	0.0954	0.0000	OK
15 minute summer	S104L	10	110.070	0.067	22.4	0.1160	0.0000	OK
15 minute summer	S104	10	108.748	0.092	53.3	0.1154	0.0000	OK
15 minute summer	S105	10	107.765	0.157	59.0	0.1934	0.0000	OK
15 minute summer	S106	11	107.584	0.225	65.2	0.2815	0.0000	OK
15 minute summer	S107	11	107.530	0.231	68.3	0.2757	0.0000	OK
15 minute summer	S108	11	107.470	0.230	72.4	0.2791	0.0000	OK
15 minute summer	S109L	10	107.577	0.087	17.4	0.1406	0.0000	OK
15 minute summer	S109	11	107.397	0.216	98.6	0.2970	0.0000	OK
15 minute summer	S110L	10	107.239	0.133	19.7	0.2893	0.0000	OK
15 minute summer	S110	11	106.891	0.139	125.8	0.2062	0.0000	OK
15 minute summer	S111L	10	106.001	0.113	16.5	0.1941	0.0000	OK
15 minute summer	S111	11	105.732	0.212	144.7	0.2600	0.0000	OK
15 minute summer	S112	11	105.602	0.229	154.9	0.3363	0.0000	OK
15 minute summer	S113L	10	105.715	0.227	29.0	0.4684	0.0000	SURCHARGED
1440 minute summer	S113	1440	105.495	0.431	12.2	0.4877	0.0000	OK
1440 minute summer	HW21	1440	105.511	0.480	40.4	0.0000	0.0000	OK
15 minute summer	S114L	10	107.480	0.058	17.4	0.0875	0.0000	OK
15 minute summer	S114	10	106.769	0.104	29.5	0.1397	0.0000	OK
15 minute summer	S115La	10	106.662	0.111	42.5	0.2421	0.0000	OK
15 minute summer	S115Lb	10	106.557	0.107	14.5	0.1581	0.0000	OK
15 minute summer	S115	10	106.412	0.225	92.8	0.2912	0.0000	OK
15 minute summer	S116	11	106.307	0.184	109.5	0.2963	0.0000	OK
15 minute summer	S117La	10	106.019	0.108	20.1	0.1659	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S102	1.000	S103	15.4	1.726	0.132	0.1901	
15 minute summer	S103	1.001	S104	24.7	2.327	0.214	0.2773	
15 minute summer	S104L	2.000	S104	22.3	2.937	0.408	0.0978	
15 minute summer	S104	1.002	S105	53.1	1.927	0.207	0.5522	
15 minute summer	S105	1.003	S106	58.6	1.251	0.527	1.1597	
15 minute summer	S106	1.004	S107	65.2	1.134	0.918	0.8378	
15 minute summer	S107	1.005	S108	68.6	1.179	0.971	0.8420	
15 minute summer	S108	1.006	S109	72.5	1.292	1.028	0.8156	
15 minute summer	S109L	3.000	S109	17.3	1.645	0.631	0.0708	
15 minute summer	S109	1.007	S110	98.2	1.813	0.884	2.0064	
15 minute summer	S110L	4.000	S110	19.4	1.198	1.095	0.0877	
15 minute summer	S110	1.008	S111	125.7	2.204	0.212	2.1192	
15 minute summer	S111L	5.000	S111	16.3	1.145	0.921	0.0959	
15 minute summer	S111	1.009	S112	144.5	1.882	0.447	1.1319	
15 minute summer	S112	1.010	S113	154.5	1.603	0.479	2.2826	
15 minute summer	S113L	6.000	S113	28.5	1.621	1.607	0.0854	
1440 minute summer	S113	1.011	HW21	12.0	0.172	0.046	2.2013	
1440 minute summer	HW21	Flow through pond	HW23	14.5	0.017	0.000	528.7038	
15 minute summer	S114L	7.000	S114	17.3	2.742	0.319	0.0415	
15 minute summer	S114	7.001	S115	29.2	1.049	0.263	1.1489	
15 minute summer	S115La	8.000	S115	42.3	2.182	0.489	0.1511	
15 minute summer	S115Lb	9.000	S115	14.4	1.068	0.862	0.0580	
15 minute summer	S115	7.002	S116	91.2	1.490	0.706	0.9349	
15 minute summer	S116	7.003	S117	109.3	1.433	0.498	3.2919	
15 minute summer	S117La	10.000	S117	20.0	1.475	0.866	0.0638	

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Results for 30 year Critical Storm Duration. Lowest mass balance: 95.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S117Lb	10	106.344	0.069	20.1	0.1091	0.0000	OK
15 minute summer	S117	11	105.924	0.317	148.8	0.3581	0.0000	OK
15 minute summer	S118	11	105.879	0.342	155.1	0.4351	0.0000	OK
15 minute summer	S119	11	105.679	0.285	155.0	0.3224	0.0000	OK
15 minute summer	S120L	10	105.765	0.237	28.3	0.4324	0.0000	SURCHARGED
15 minute summer	S120	11	105.573	0.331	181.8	0.3741	0.0000	OK
1440 minute summer	HW22	1440	105.510	0.428	21.8	0.0000	0.0000	OK
1440 minute summer	HW23	1470	105.489	0.458	14.5	0.0000	0.0000	OK
1440 minute summer	S121	1470	105.489	0.478	0.2	2.7377	0.0000	SURCHARGED
15 minute summer	HW24	1	105.600	0.895	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S117Lb	11.000	S117	20.0	2.484	0.433	0.0629	
15 minute summer	S117	7.004	S118	148.2	1.461	0.936	1.1403	
15 minute summer	S118	7.005	S119	155.0	1.581	1.220	3.4361	
15 minute summer	S119	7.006	S120	154.4	1.607	0.868	1.8510	
15 minute summer	S120L	12.000	S120	27.8	1.580	1.560	0.1054	
15 minute summer	S120	7.007	HW22	181.2	1.789	1.169	1.0260	
1440 minute summer	HW22	Flow through pond	HW23	14.5	0.017	0.000	528.7038	
1440 minute summer	HW23	1.012	S121	-0.2	0.132	-0.001	1.5816	
1440 minute summer	S121	Hydro-Brake®	HW24	0.0				0.0

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 95.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S102	10	111.140	0.075	28.1	0.1155	0.0000	OK
15 minute summer	S103	10	110.101	0.097	45.3	0.1314	0.0000	OK
15 minute summer	S104L	10	110.100	0.097	40.7	0.1673	0.0000	OK
15 minute summer	S104	11	108.803	0.147	96.8	0.1848	0.0000	OK
15 minute summer	S105	12	108.502	0.894	107.2	1.1035	0.0000	SURCHARGED
15 minute summer	S106	12	108.317	0.958	109.0	1.1967	0.0000	SURCHARGED
15 minute summer	S107	12	108.181	0.882	112.0	1.0514	0.0000	SURCHARGED
15 minute summer	S108	12	108.029	0.789	117.6	0.9562	0.0000	SURCHARGED
15 minute summer	S109L	12	108.018	0.528	31.7	0.8574	0.0000	SURCHARGED
15 minute summer	S109	12	107.857	0.676	159.3	0.9285	0.0000	SURCHARGED
15 minute summer	S110L	10	107.415	0.309	35.9	0.6739	0.0000	SURCHARGED
15 minute summer	S110	11	106.933	0.180	207.1	0.2684	0.0000	OK
15 minute summer	S111L	10	106.155	0.267	29.9	0.4585	0.0000	SURCHARGED
15 minute summer	S111	11	105.824	0.304	241.2	0.3731	0.0000	OK
1440 minute summer	S112	1110	105.737	0.364	18.5	0.5349	0.0000	OK
15 minute summer	S113L	11	106.036	0.548	52.6	1.1318	0.0000	SURCHARGED
1440 minute summer	S113	1110	105.737	0.673	45.7	0.7615	0.0000	SURCHARGED
1440 minute summer	HW21	1200	105.782	0.751	138.0	0.0000	0.0000	OK
15 minute summer	S114L	11	107.510	0.087	31.7	0.1311	0.0000	OK
15 minute summer	S114	12	107.242	0.577	53.7	0.7750	0.0000	SURCHARGED
15 minute summer	S115La	12	107.287	0.736	77.1	1.6120	0.0000	SURCHARGED
15 minute summer	S115Lb	12	107.239	0.789	26.3	1.1647	0.0000	SURCHARGED
15 minute summer	S115	12	107.173	0.986	157.4	1.2752	0.0000	SURCHARGED
15 minute summer	S116	12	107.100	0.977	174.1	1.5712	0.0000	SURCHARGED
15 minute summer	S117La	12	106.940	1.029	36.5	1.5829	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S102	1.000	S103	28.0	2.026	0.240	0.2935	
15 minute summer	S103	1.001	S104	44.9	2.742	0.389	0.4281	
15 minute summer	S104L	2.000	S104	40.5	3.386	0.743	0.1542	
15 minute summer	S104	1.002	S105	96.4	2.062	0.376	1.0430	
15 minute summer	S105	1.003	S106	97.6	1.386	0.878	1.7542	
15 minute summer	S106	1.004	S107	106.3	1.510	1.497	1.0253	
15 minute summer	S107	1.005	S108	112.0	1.590	1.585	1.0193	
15 minute summer	S108	1.006	S109	118.6	1.685	1.682	1.0221	
15 minute summer	S109L	3.000	S109	27.5	1.731	1.003	0.1187	
15 minute summer	S109	1.007	S110	160.3	2.277	1.442	2.5771	
15 minute summer	S110L	4.000	S110	35.0	1.989	1.973	0.0941	
15 minute summer	S110	1.008	S111	206.5	2.395	0.349	3.2012	
15 minute summer	S111L	5.000	S111	29.3	1.667	1.658	0.1175	
15 minute summer	S111	1.009	S112	238.3	2.051	0.737	1.7744	
1440 minute summer	S112	1.010	S113	22.6	0.668	0.070	3.4738	
15 minute summer	S113L	6.000	S113	50.9	2.889	2.864	0.0862	
1440 minute summer	S113	1.011	HW21	-35.4	0.242	-0.135	2.3984	
1440 minute summer	HW21	Flow through pond	HW23	44.3	0.045	0.001	827.4185	
15 minute summer	S114L	7.000	S114	31.6	3.200	0.581	0.0928	
15 minute summer	S114	7.001	S115	52.4	1.098	0.472	2.8407	
15 minute summer	S115La	8.000	S115	72.2	2.449	0.836	0.3099	
15 minute summer	S115Lb	9.000	S115	24.1	1.367	1.445	0.0759	
15 minute summer	S115	7.002	S116	142.2	1.632	1.100	1.6798	
15 minute summer	S116	7.003	S117	164.9	1.501	0.752	4.7431	
15 minute summer	S117La	10.000	S117	31.2	1.772	1.354	0.0830	

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Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 95.27%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	S117Lb	12	106.996	0.721	36.5	1.1387	0.0000	SURCHARGED
15 minute summer	S117	12	106.802	1.195	223.6	1.3513	0.0000	SURCHARGED
15 minute summer	S118	12	106.659	1.122	234.2	1.4275	0.0000	SURCHARGED
15 minute summer	S119	12	106.165	0.771	234.4	0.8722	0.0000	SURCHARGED
15 minute summer	S120L	11	106.331	0.803	51.4	1.4666	0.0000	SURCHARGED
15 minute summer	S120	12	105.895	0.653	278.3	0.7381	0.0000	SURCHARGED
1440 minute summer	HW22	1260	105.743	0.662	30.8	0.0000	0.0000	OK
1440 minute summer	HW23	1230	105.706	0.675	44.3	0.0000	0.0000	SURCHARGED
1440 minute summer	S121	1230	105.706	0.695	4.1	3.9819	0.0000	SURCHARGED
15 minute summer	HW24	1	105.600	0.895	0.0	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	S117Lb	11.000	S117	31.1	2.413	0.672	0.1168	
15 minute summer	S117	7.004	S118	223.9	2.030	1.414	1.2283	
15 minute summer	S118	7.005	S119	234.4	2.126	1.845	3.8791	
15 minute summer	S119	7.006	S120	234.6	2.127	1.319	2.1176	
15 minute summer	S120L	12.000	S120	47.8	2.716	2.682	0.1065	
15 minute summer	S120	7.007	HW22	278.5	2.525	1.797	1.1175	
1440 minute summer	HW22	Flow through pond	HW23	44.3	0.045	0.001	827.4185	
1440 minute summer	HW23	1.012	S121	4.1	0.031	0.017	1.6814	
1440 minute summer	S121	Hydro-Brake®	HW24	3.8				155.4

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APPENDIX L – DRAINAGE MAINTENANCE SCHEDULE

Drainage Maintenance Schedule - Burbage Field Farm

Schedule	Feature	Location	Inspection Type	Inspection Frequency	Required Action	Maintenance Works	Maintenance Intervals	Comments
Regular Maintenance	Foul Water Pump	Southern Boundary	Visual	3 Months	Inspection of outlet and cover grate, remove debris and litter and ensure outlet is clear	Silt / Debris removal	6 Months (or as required)	Maintenance interval subject to specilaist maintenace agreement with supplier
	Rain Garden	Southern Parcel	Visual	3 Months	Removal of debris and weeding	Debris removal / Weeding	Monthly (or as required).	Maintenance interval subject to Visual Inspection findings
	Attenuation Basin	South Eastern Boundary	Visual	3 Months	Removal of litter and debris	Litter removal	Monthly (or as required).	Maintenance interval subject to Visual Inspection findings
	Attenuation Basin	South Eastern Boundary	Visual	3 Months	Inspect Outlets, Inlets and Overflows for Blockages and Clear if Required.	Repairs as required	Monthly (or as required).	Maintenance interval subject to Visual Inspection findings
	Attenuation Basin	South Eastern Boundary	Visual	3 Times per year (see comments)	Manage Other Vegetation and Remove Nuisance Plants.	Weed Removal	3 Times per year (see comments)	Maintenance interval subject to Visual Inspection findings
	Flow Control Chamber	S19, S66, S106, S122	Visual	3 Months	Removal of litter and debris	Silt / Debris removal	6 Months (or as required)	Maintenance interval subject to Visual Inspection findings
Occasional Maintenance	Foul & Surface Water Chambers	Entire site	Visual	6 Months	Remove silt and leaf build up from gullies, chambers, gutters etc.	Silt / Debris removal	As required (debris max. 60% of capacity)	Maintenance interval subject to Visual Inspection findings
	Foul Water Pump	Southern Boundary	Visual	6 Months	Mechanical silt removal from sump	Silt / Debris removal	As required (debris max. 60% of capacity)	Maintenance interval subject to Visual Inspection findings
	Flow Control Chamber	S19, S66, S106, S122	Visual	6 Months	Mechanical silt removal from sump	Silt / Debris removal	As required (debris max. 60% of capacity)	Maintenance interval subject to Visual Inspection findings
	Perforated Carrier Drains	Parking bays/area, southern boundary	Visual	6 Months	CCTV / Jetting	Silt / Debris removal	As required (debris max. 60% of capacity)	Maintenance interval subject to Visual Inspection findings
	Attenuation Basin	South Eastern Boundary	Visual	6 Months	Removal from debris	Silt / Debris removal	6 Months (or as required)	Maintenance interval subject to Visual Inspection findings
	Catchpit Chambers	Entire Site	Visual	6 Months	Mechanical silt removal from sump	Silt / Debris removal	As required (debris max. 60% of capacity)	Maintenance interval subject to Visual Inspection findings

Remedial Actions	Foul & Surface Water Drainage	Entire site	Visual	12 Months	Remove and dispose of oils or fuel (diesel & petrol) residues using safe standard practices.	Safe removal or contaminant residues	As required.	As required.
Monitoring	Foul & Surface Water Drainage	Entire site	Visual	12 Months	Walk over inspection for condition (breaks, lifting & missing) of chamber covers and grates.	Replace broken or cracked inspection chamber covers	As required.	Maintenance interval subject to Visual Inspection findings
	Attenuation Basin	South Eastern Boundary	Visual	12 Months	Survey inside of pond for sediment build-up and remove if necessary	Remove sediment as required	5 Years or as required.	Maintenance interval subject to Visual Inspection findings

* If weeds are persitent, weed killer may be used to reduce the requirement for manual weed removal.

** Any block which is to be replaced should be bedded on anew layer of grit / sand.

*** If re-construction is necessary, the following procedure should be followed: 1. Lift surface layer and laying course, 2. Remove and geotextile filter layer, 3. inspect sub-base and wash/replace if required, 4. Renew any geotextile layer as required, 5. Renew laying course, jointing material and block paviours. Note: this is deemed unlikely to occur and thus unlikely to be implemented

Maintenance procedures to be undertaken in accordance with Ciria 753. This schedule should be read in conjunction with all engineering drawings

APPENDIX M – EXISTING DITCH AND CULVERT ASSESSMENT

Burbage Fields Farm, Burbage

Hydraulic Modelling Study

Draft report

October 2020

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S03-P01 / October 2020	Draft	Nick Fenton (Rodgers Leask)
S03-P02 / October 2020	Draft	Nick Fenton and Lance Hammond (Rodgers Leask)

Contract

JBA was contacted on 25/06/2020 by Nick Fenton (Rodgers Leask) on behalf of Redrow Homes. James Hookham of JBA Consulting carried out this work.

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Technical Director

Purpose

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Executive summary

JBA Consulting (JBA) were commissioned by Rodgers Leask Ltd to undertake a hydraulic modelling study of an unnamed watercourse in relation to a proposed development sites at Burbage Fields Farm, Burbage.

The watercourse was modelled using the Flood Modeller – TUFLOW hydraulic modelling package. LiDAR and topographic survey datum was used to provide ground levels throughout the floodplain. No historical flood risk records associated with the watercourse could be found. As a result, the hydraulic model is uncalibrated.

The baseline model results indicate that:

- Overtopping of the channel will occur within the 20-year, 100 year, 100-year plus 30% climate change, 100-year plus 50% climate change and 1000-year fluvial flood extent.
- The M69 culvert does have sufficient capacity to accommodate the 20-year, 100-year, 100-year plus 30% climate change and the 100-year plus 50% climate change peak flows however, the culvert is surcharged during the 1000-year flood scenario.
- The peak water levels within the site will range:
    - Between 101.38m AOD and 118.5m AOD during the 20-year (5% AEP) fluvial flood event;
    - Between 101.48m AOD and 118.62m AOD during the 100-year (1% AEP) fluvial flood event;
    - Between 101.52m AOD and 118.7m AOD during the 100-year (1% AEP) with 30% climate change fluvial flood event;
    - Between 101.53m AOD and 118.76m AOD during the 100-year (1% AEP) with 50% climate change fluvial flood event;
    - Between 101.56m AOD and 118.79m AOD during the 1,000-year (0.1% AEP) fluvial flood event.

A blockage analysis was carried out at the M69 culvert. Due to the nature of the surrounding environment (i.e. branches hanging over the channel), a 75% blockage was modelled at the culvert inlet. The results from this analysis show an increase in water depth of up to 1.6m for up to 120m upstream of the culvert.

The hydraulic model's sensitivity to changes in flow, downstream boundary and roughness values were also tested to improve confidence in the model results within the development site boundary. Results from the sensitivity analysis indicate that an increase of 20% to both the flow and roughness values increase the peak water level by 80mm and 70mm respectively, this suggests the model is moderately sensitive to changes in flow and roughness. An increase of +250mm at the downstream boundary increase the peak water level by 20mm so this the model results are relatively insensitive to changes at the downstream boundary site.

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Abbreviations

1D	One Dimensional
2D	Two Dimensional
CC	Climate Change
DTM	Digital Terrain Model
EA	Environment Agency
Flood Modeller	Primary 1D engine used by TUFLOW
FEH	Flood Estimation Handbook
FFL	Finished Floor Levels
GCS	Grantham Coates Surveyors
Ha	Hectares
HT	Head-Time
HQ	Head Flow
JBA	Jeremy Benn Associates
LiDAR	Light Detection and Ranging
m AOD	Metres Above Ordnance Datum
QMED	Median annual flow
QT	Flow-Time
ReFH	Revitalised Flood Hydrograph
RoFSW	Risk of Flooding from Surface Water
TUFLOW	2D Hydraulic Modelling Software

1 Introduction

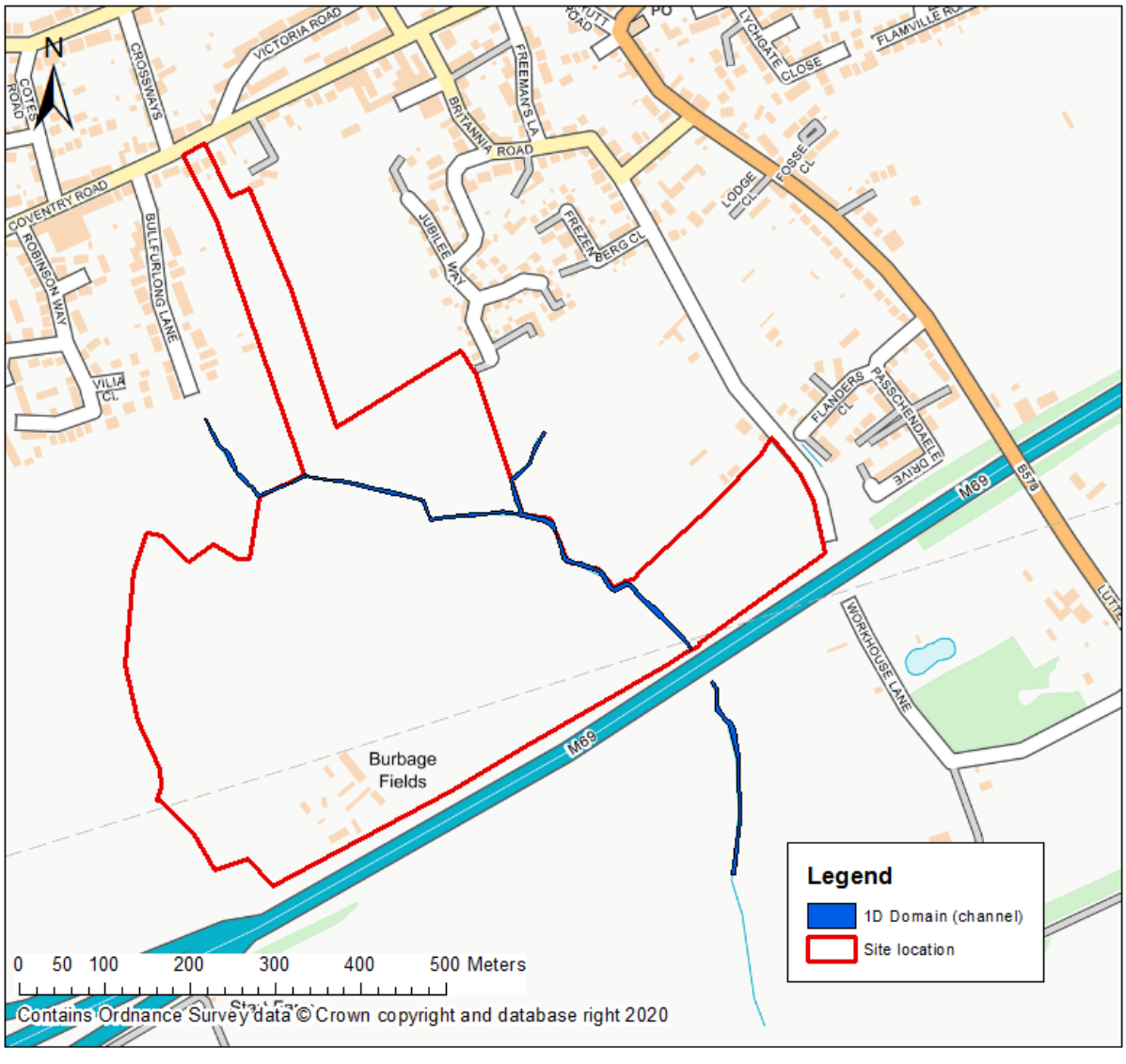
1.1 Terms of reference

JBA Consulting (JBA) were commissioned by Rodgers Leask to undertake a hydraulic modelling study of an unnamed watercourse in relation to a proposed development sites at Burbage Fields Farm, Burbage.

To support this assessment, a 1D-2D Flood Modeller – TUFLOW hydraulic model was produced to allow accurate representation of the flood levels, extents and hazards within the site boundary.

1.2 Site details

Table 1-1: Site details	
Site name	Burbage Fields Farm, Burbage
Existing land-use	Predominantly greenfield
OS NGR	SP 44171 918652
County	Leicestershire
Country	England



1.3 Context

Redrow Homes wish to submit a planning application for a residential development at Burbage Fields Farm, Burbage.

The site is crossed by an unnamed watercourse and its tributary, for which no detailed (fluvial) hydraulic modelling results are available.

The EA's RoFSW maps show surface water ponding along the watercourse immediately upstream of the M69 culvert.

As a way forward, Redrow Homes wishes to refine the flood extents associated with the unnamed watercourse in order to inform their Masterplan, confirm whether the M69 culvert has sufficient capacity and .determine the size of the new culverts required to support their development proposal.

1.4 General Approach

New survey of the unnamed watercourse was commissioned in order to accurately represent the watercourse within the vicinity of the sites. A total of 21 cross-sections were surveyed across the channel of the unnamed watercourse.

A hydrological assessment was carried out following the Environment Agency's FEH guidelines to derive fluvial flow estimates and a new 1D-2D linked Flood Modeller-TUFLOW hydraulic model has been developed to allow a more accurate understanding of flood levels, depths and extents within the site boundary. The model extends from the surface water sewer outfall off Bullfurlong Lane down to approximately 300m downstream of the site.

The model has been run for the baseline scenario for the 20-year, 100-year, 100-year with 30% and 50% climate change and 1000-year flood events in order to determine the existing flood risk to the site.

The hydraulic model's sensitivity to changes in flow, downstream boundary and roughness values was also tested to improve confidence in the model results within the development site boundary.

2 Model Approach

2.1 Model Geometry

2.1.1 Data availability

Grantham Coates Survey (GCS) were commissioned to collect channel survey data in August 2020. The survey consisted of 21 cross sections at regular intervals along the unnamed watercourses within the vicinity of the site. Key hydraulic structures along the watercourse are included within the survey. Typically, cross section survey was gathered from the upstream face of any structure (see Appendix B).

2m resolution LiDAR data flown in 2003 and 1m resolution LiDAR data flows in 2019 were obtained from the Open Data website and combined with site-specific topographic survey data (see Appendix A) to represent ground levels within the floodplain.

2.1.2 Model extent and development

The hydraulic model represents the unnamed watercourse with tributary and its corresponding floodplain in the vicinity of the proposed sites. The extent of the hydraulic model developed for this study is shown in Figure 2-1.

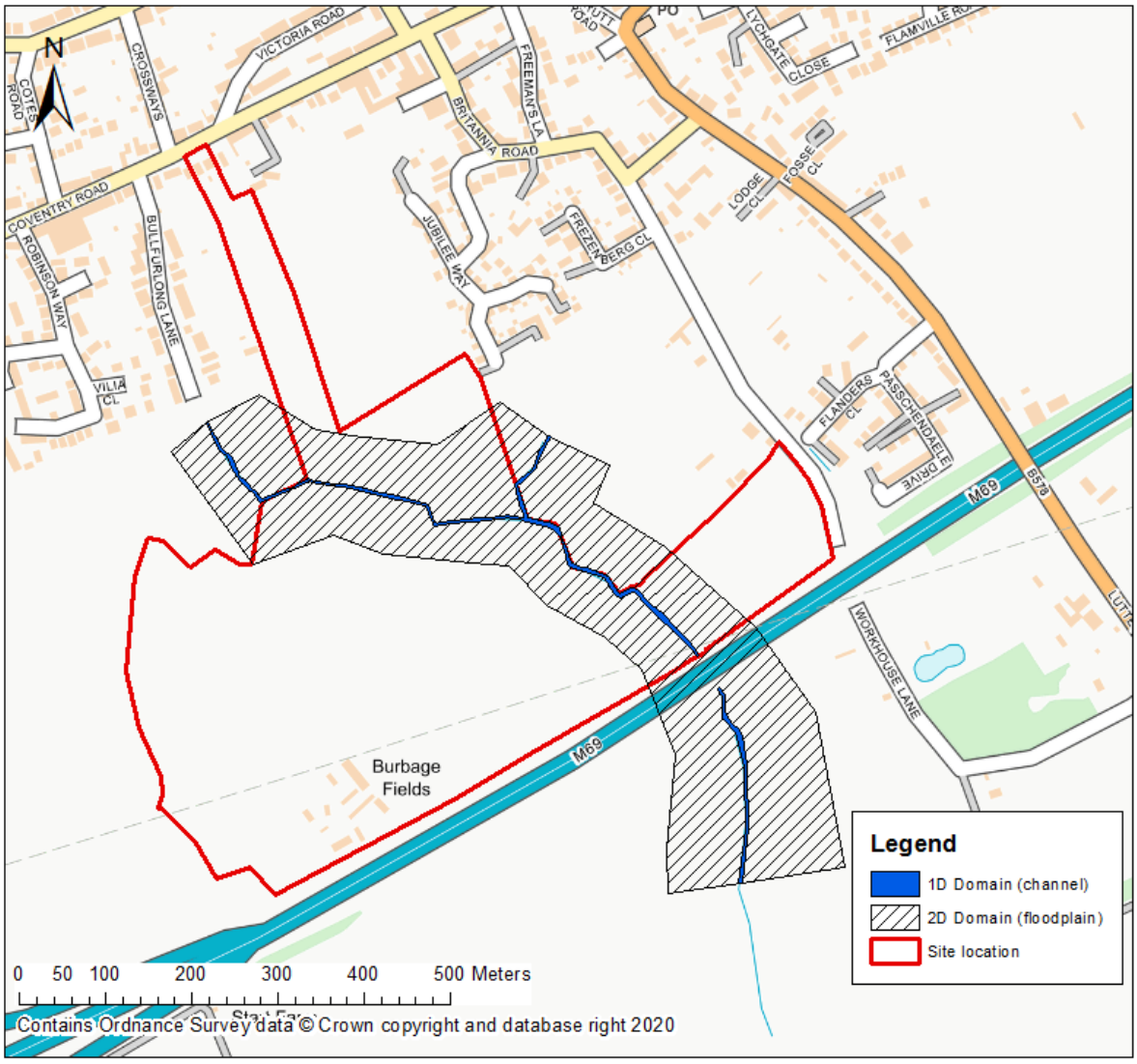


Figure 2-1 Model extent

The channels were represented as 1-dimentional (1D) features using Flood Modeller (version 4.3.0.290). The 1D model begins at the start of the unnamed watercourse and lateral tributary and ends approximately 0.4km downstream of the site. In total, the 1D domain covers approximately 1km of watercourse.

The 2D domain was represented using TUFLOW (2020-01-AA-iDP-W64) with floodplain topography represented using LiDAR data. The 2D domain has an area of 0.14km^2 and a 1m grid resolution. The orientation of the grid is southwest to northeast, representing the main direction of floodplain flows. The 1D and 2D domains can be seen in Figure 2-1.

2.1.3 Model roughness parameters

Manning's *n* was used to represent roughness values for the channel and floodplain. The values for channel roughness were based on photographs gathered by Grantham Coates Surveys during the site survey in August 2020. Manning's *n* values in the floodplain were based on different land uses in the 2D domain. Land uses were defined using OS mapping and satellite imagery. Table 2-1 gives the range of Manning's *n* values used in the 1D and 2D domains.

Table 2-1: Manning's *n* range within the hydraulic model

1D Channel	0.040 (in channel) and between 0.060 and 0.065 (banks)
General Surface	0.060
Woodland	0.065
Roads and tracks	0.015
Buildings	0.300
Water	0.035
Rail	0.045

2.1.4 Model structures

Key hydraulic structures located along the unnamed watercourse were represented in the 1D domain using Flood Modeller 1D network units. Details of how these structures were modelled can be found in Appendix C.

2.2 Bank levels

Bank levels in the model were generated using surveyed bank levels and, where unavailable, LiDAR data.

2.3 Model boundary Conditions

2.3.1 Model inflows

A hydrological assessment was carried out on the unnamed watercourse and the lateral tributary to derive flow estimates at the upstream end and downstream end of the modelled watercourse (UNN_01 and TRB_01, respectively). The full hydrological assessment is documented in Appendix D.

The table below shows the peak flows for each of the inflow points.

Table 2-2: Peak flows

Site code	Flood peak (m^3/s) for the following events		
	20-year	100-year	1000-year
UNN_01	0.38	0.56	1.03
TRIB1	0.18	0.27	0.50

In line with the guidance on Climate Change issued by the Environment Agency in February 2016[1], the effect of climate change was assessed by increasing peak flows by 30% and 50% (higher central and upper end allowances respectively for more vulnerable developments within the Humber river basin).

2.3.2 Downstream boundary conditions

A normal depth boundary condition based on the average bed slope between the last two channel sections in the model was used to represent the downstream boundary conditions in the channel.

In the 2D domain, two TUFLOW 'HQ lines' (i.e. normal depth downstream boundary conditions based on the average slope in the floodplain at the downstream end of the model) were used to represent the downstream boundary conditions in the floodplain/2D domain.

2.4 Calibration

No specific flood levels or flow data could be found over the modelled extent. As a result, the model is uncalibrated. However, sensitivity testing has been conducted to provide confidence in model parameters.

1 https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances

2.5 Model Runs

2.5.1 Modelled Scenarios

The following flood scenarios were simulated by the model:

- **[Baseline scenario]** 20-year (5% AEP) flood event - existing condition scenario;
- **[Baseline scenario]** 100-year (1% AEP) flood event - existing condition scenario;
- **[Baseline scenario]** 100-year (1% AEP) plus Climate Change (30%) flood event - existing condition scenario;
- **[Baseline scenario]** 100-year (1% AEP) plus Climate Change (50%) flood event - existing condition scenario;
- **[Baseline scenario]** 1000-year (0.1% AEP) flood event - existing condition scenario;
- **[Blockage scenario]** 100-year (1% AEP) plus Climate Change (30%) flood event – 75% blockage of the M69 Culvert (UNN_591)
- **[Sensitivity analysis]** 100-year (1% AEP) flood event with +20% increase in peak flows;
- **[Sensitivity analysis]** 100-year (1% AEP) flood event with +20% increase in roughness value;
- **[Sensitivity analysis]** 100-year (1% AEP) flood event with +250mm increase in water levels at the downstream model boundary;

The results of the baseline scenarios are discussed in the following section with sensitivity analysis included in Appendix E of this report.

3 Hydraulic Model Results

3.1 Baseline Flood extents

Flood extents for the 20-year, 100-year and 1,000-year fluvial flood events are shown in Figure 3-1.

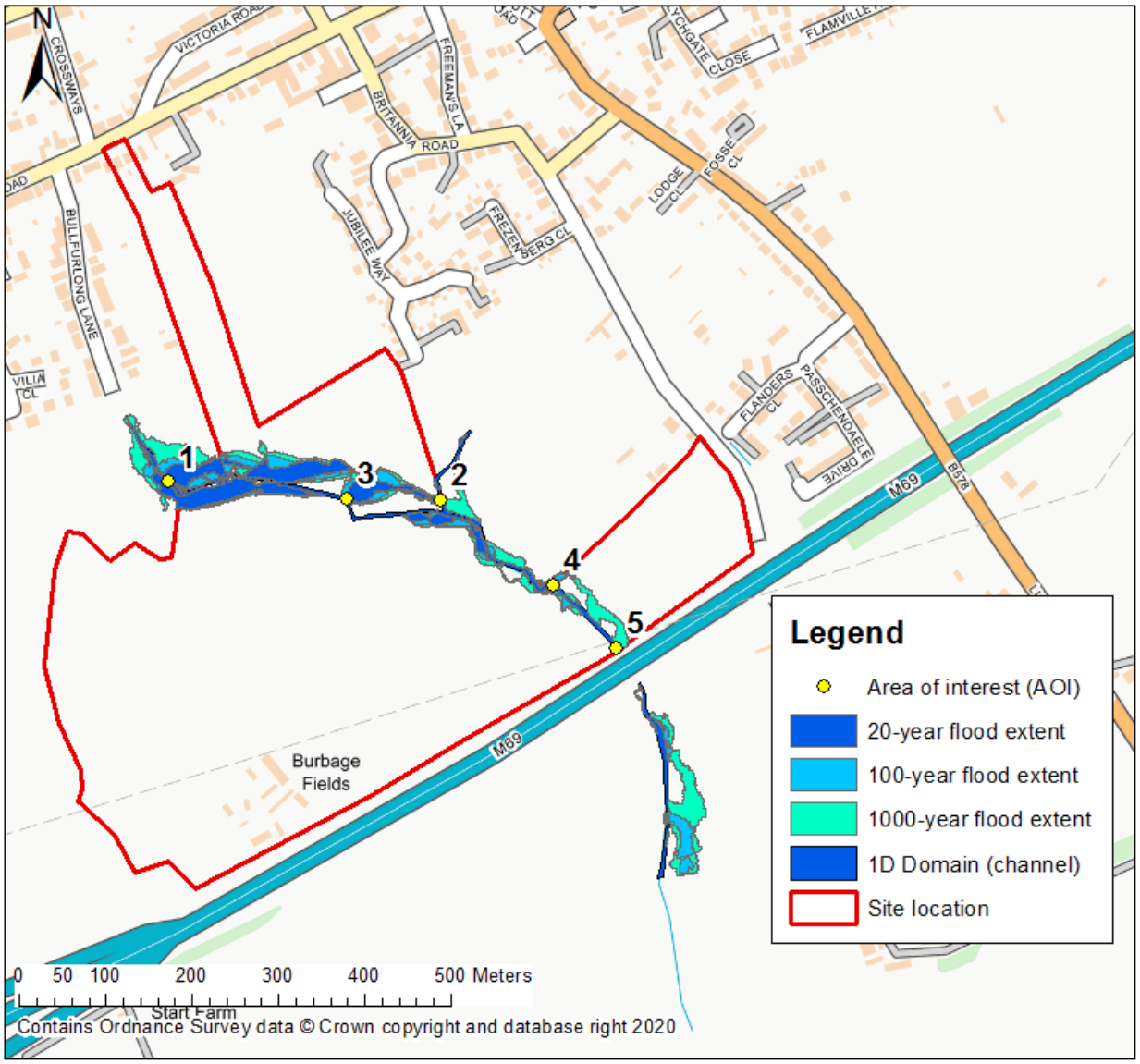


Figure 3-1: Baseline flood extents (20yr, 100yr and 1,000yr)

Figure 3-1: shows that flooding does not generally remained confined to or along the river channel during all modelled fluvial flood event. Overtopping of the channel occurs at Area of Interest (AOI) 1 during each simulation. A site walkover carried on the 23/09/2020 confirmed the bank elevations were relatively low (i.e. less than 0.5m high) at this location.

Following overtopping of the bank, overland flows run eastwards, met exceedance flows from another overtopping location (see AOI 3 in Figure 3-1) before re-turning into the channel at AOI 2.

A similar flood mechanism occurs downstream during the 1,000-year simulation whereby overtopping of the bank occurs at AOI 4 before returning back into the channel at AOI 5 (next to the M69 culvert inlet).

Flood extents for the 100-year with (+30%) climate change and 100-year with (+50%) climate change fluvial flood events are represented in Figure 3-2.

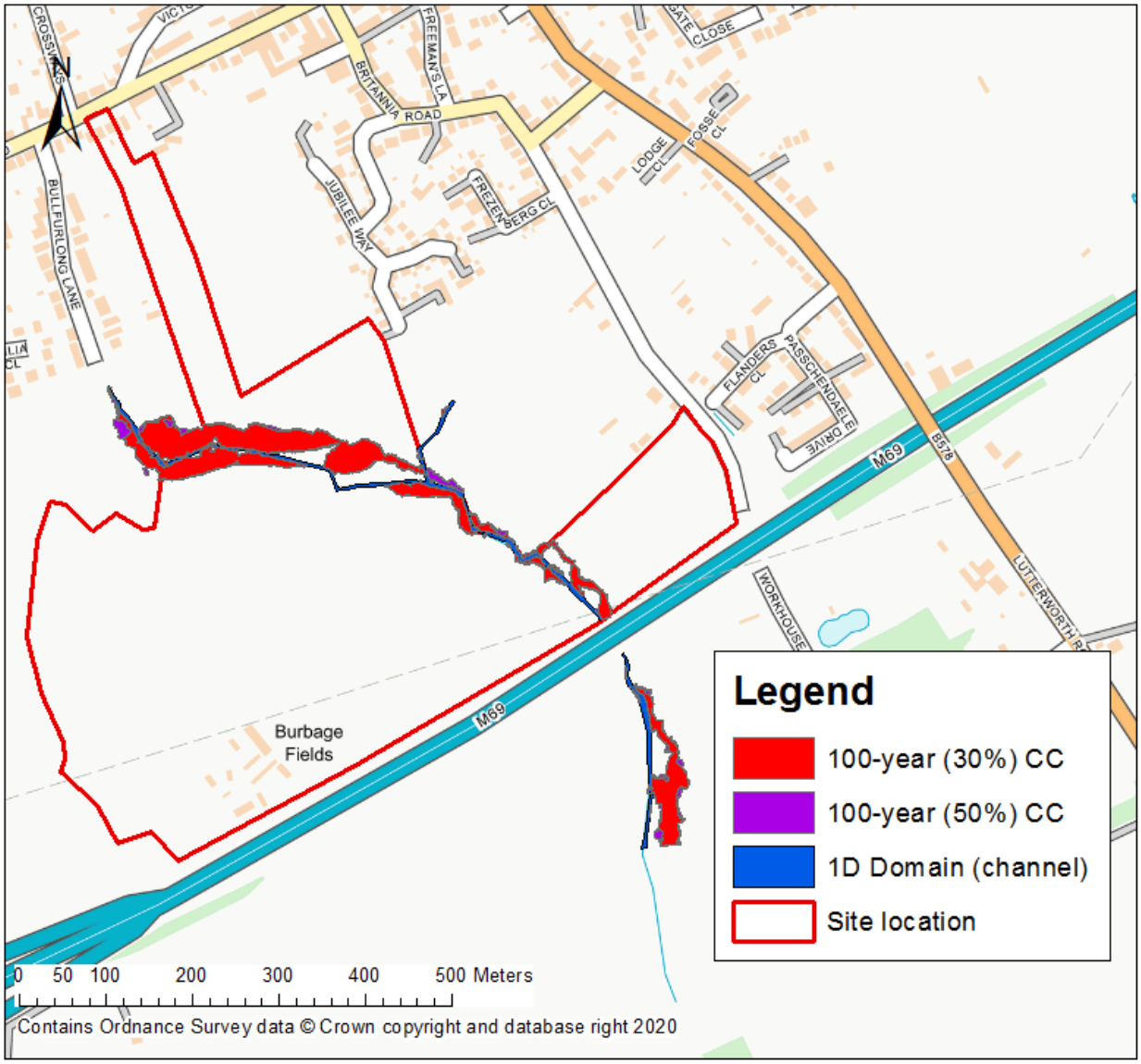


Figure 3-2: Baseline 100-Year flood extents with climate change

Figure 3-2 shows the 100-year with (+30%) climate change and the 100-year with (+50%) climate change similar fluvial flood event generate a similar extent. Their flooding mechanisms are similar to those observed during the 1,000-year flood event (see Figure 3-1).

3.2 Baseline Flood depths

The baseline flood depths during the 100-year with 30% climate change and 100-year with 50% climate change year events are shown in Figure 3-1 and Figure 3-2, respectively.

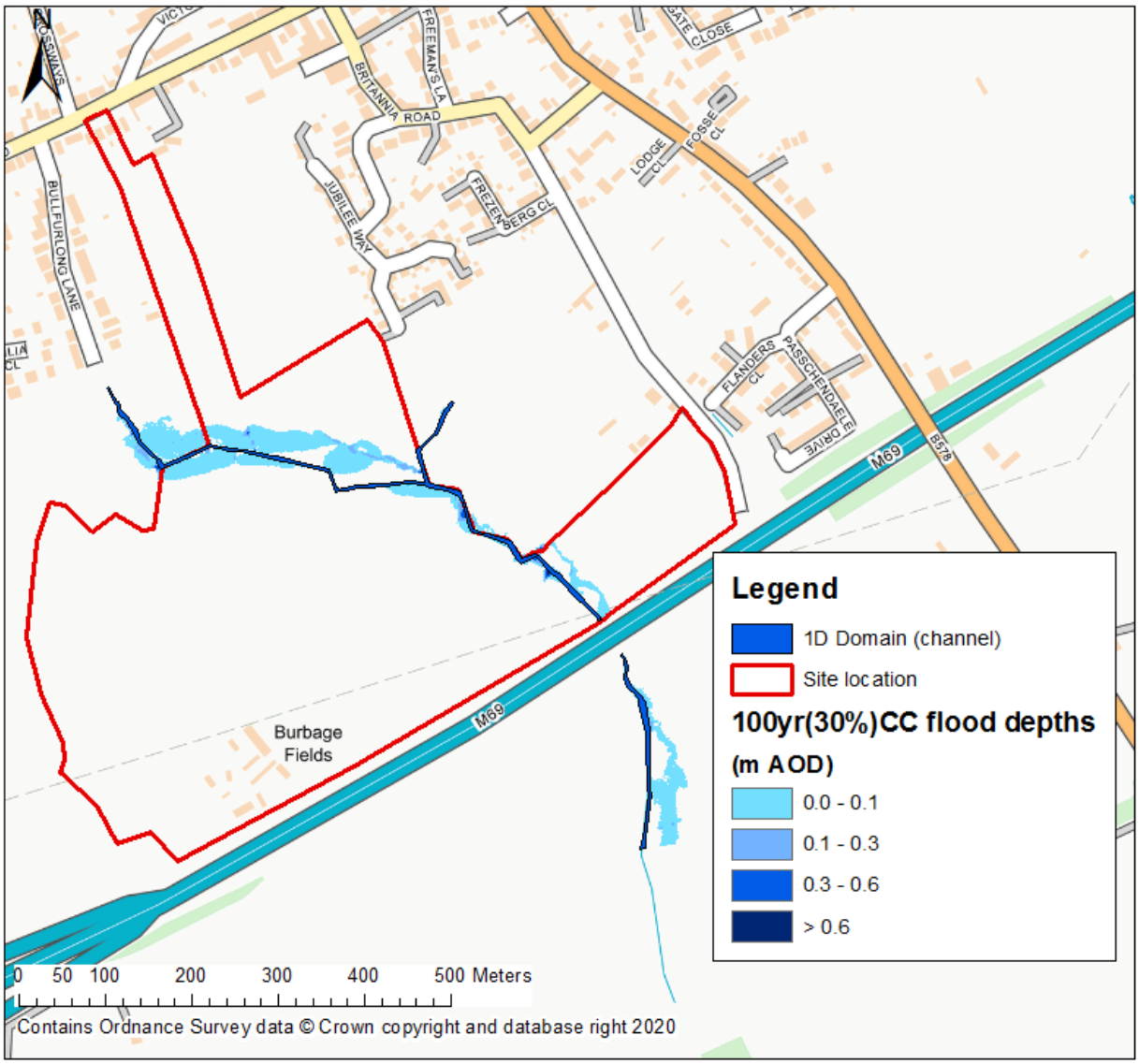


Figure 3-3: Baseline 100-year flood depths with 30% climate change

Figure 3-3 shows that the maximum flood depth outside of the river channel during the 100-year with 30% climate change event does not exceed 0.1m.

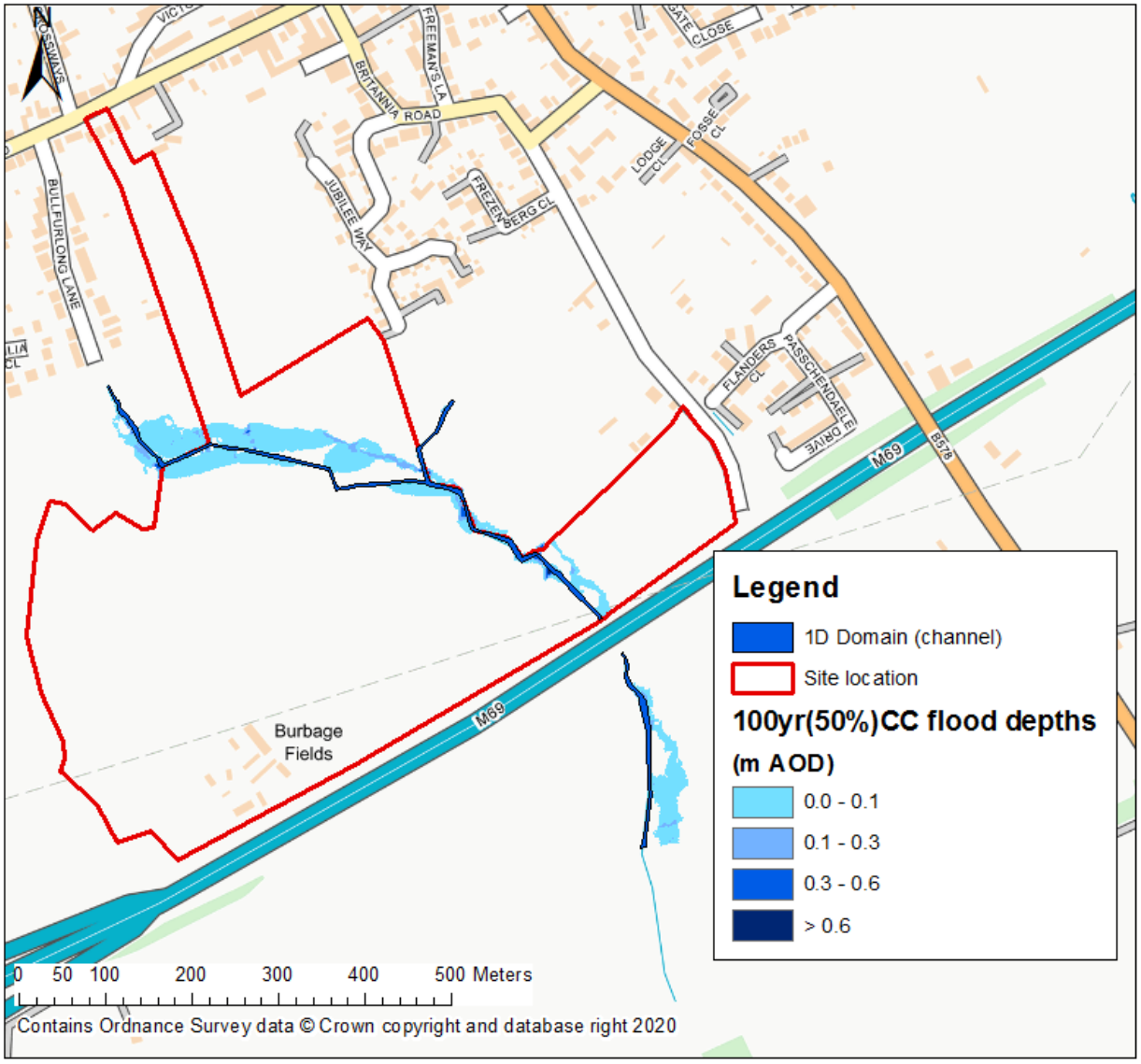


Figure 3-4: Baseline 100-year flood depths with 50% climate change

Figure 3-4 shows that the maximum flood depth outside of the river channel during the 100-year with 50% climate change event is approximately 0.1m.

Given the relatively shallow flood depths generated within the site boundary during the 100-year with 30% climate change and 100-year with 50% climate change scenarios, flood mitigation options aiming to capture overland flows and to store flood water should be explored in order to maximise the development potential of the site.

3.3 Baseline Flood levels

Flood levels for all baseline scenarios are shown in Appendix E.

Appendix E shows that the peak water level within the site will range:

- Between 101.38m AOD and 118.5m AOD during the 20-year (5% AEP) fluvial flood event;
- Between 101.48m AOD and 118.62m AOD during the 100-year (1% AEP) fluvial flood event;
- Between 101.52m AOD and 118.7m AOD during the 100-year (1% AEP) with 30% climate change fluvial flood event;
- Between 101.53m AOD and 118.76m AOD during the 100-year (1% AEP) with 50% climate change fluvial flood event;
- Between 101.56m AOD and 118.79m AOD during the 1,000-year (0.1% AEP) fluvial flood event.

3.4 Culvert capacity

Figure 3-6 shows a longitudinal section plot of peak water levels at the approach of the M69 culvert during the 100-year with 30% climate change, 100-year with 50% climate change and 1000-year flood events.

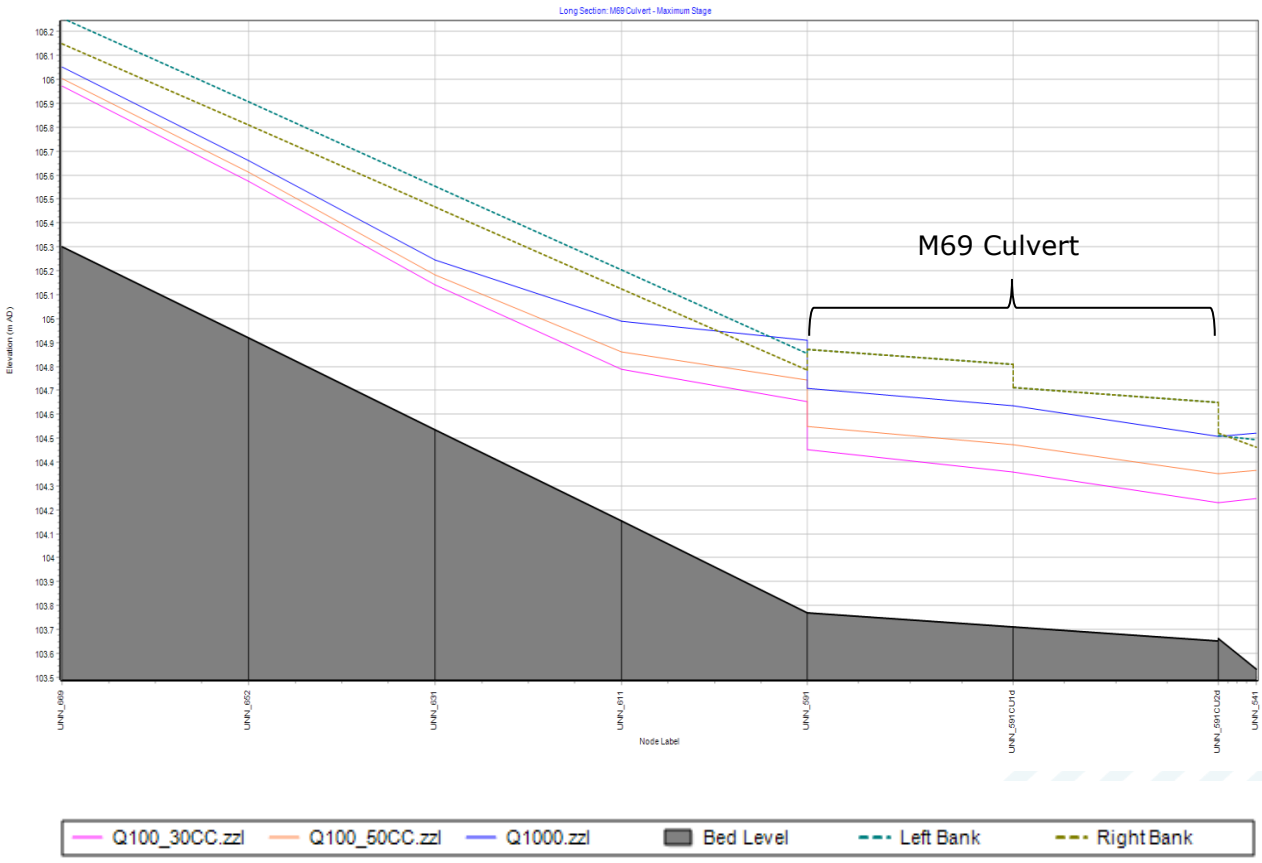


Figure 3-7: M69 Culvert capacity

Figure 3-7 shows that the M69 culvert (UNN_591) has sufficient capacity to convey the 100-year with 30% climate change and 100-year with 50% climate change flows although it will surcharge during the 1000-year flood event.

3.5 Blockage risk analysis

The impact of a 75% blockage at the M69 culvert (UNN_591) was modelled during the 100-year plus 30% climate change baseline scenario. Results indicate an increase in flood depths when compared to the 100-year plus 30% climate change base scenario which back up at this culvert.

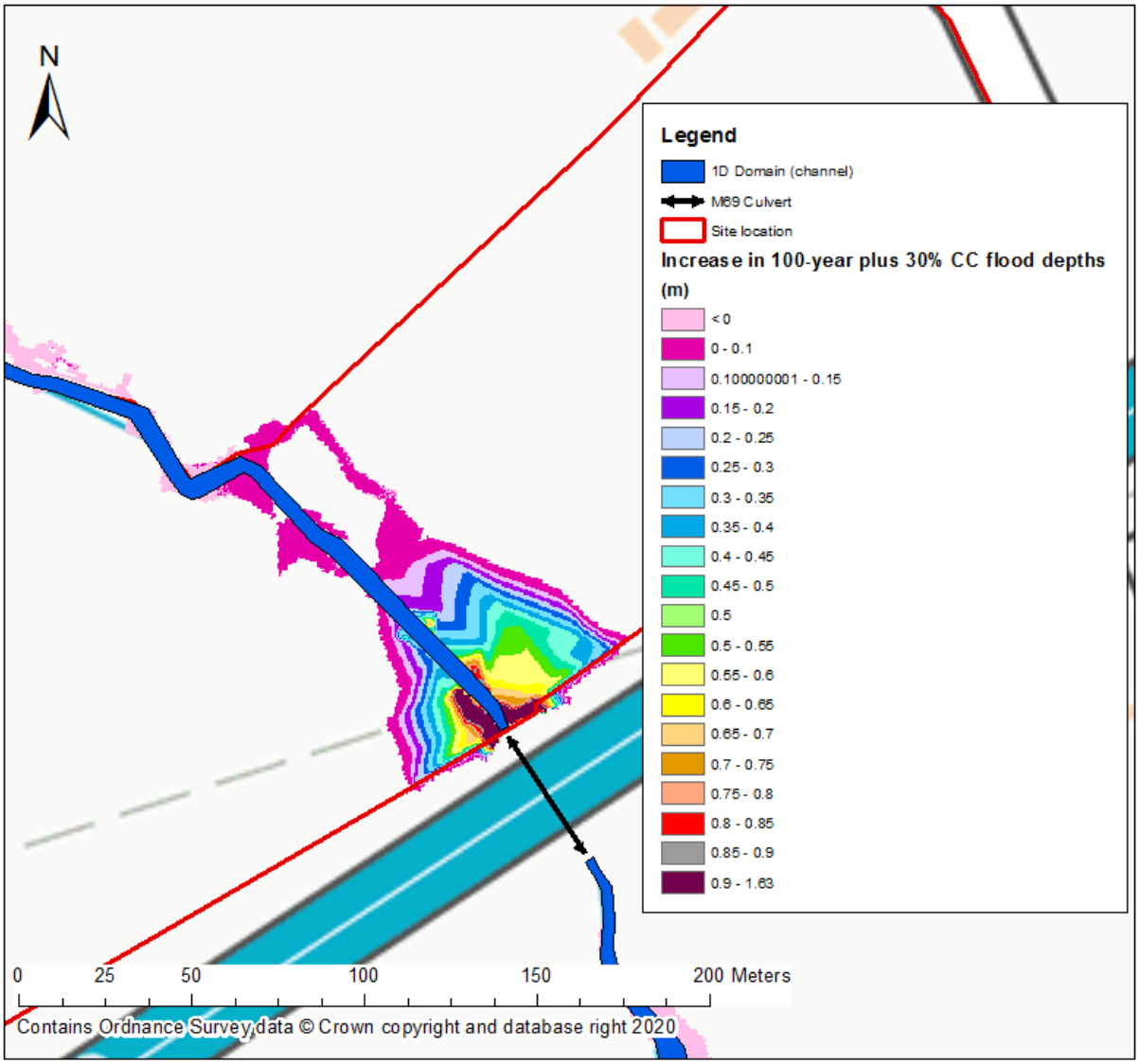


Figure 3-8 Baseline Blockage Analysis (100-year plus 30% climate change)

Due to the nature of the surrounding environment (i.e. branches hanging over the channel) a 75% blockage was put on the culvert running underneath the M69. During this scenario, flood levels at the upstream face of the culvert increase by up to a 1.6m for 120m upstream. 1D model results indicate that the 100-year 30% climate peak water level at the inlet of the blocked culvert reaches 105.95m AOD.

3.6 Sensitivity analysis

The model's sensitivity to changes in flow value, roughness parameters and downstream boundary condition was checked (see Appendix F).

Appendix F shows that, at the proposed development site, the model results are moderately sensitive to changes in flow and roughness values and relatively insensitive to changes in downstream boundary conditions.

4 Conclusions and Recommendations

4.1 Conclusions

- JBA Consulting (JBA) were commissioned by Rodgers Leask Ltd on behalf of Redrow Homes to undertake a hydraulic modelling study of an unnamed watercourse in relation to a proposed development sites at the Land South West of Lutterworth Road in Burbage.
- The model was run for the 20-year, 100-year, 100-year with (+30%) climate change, 100-year with (+50%) climate change and 1,000-year fluvial flood event. The model results' sensitivity to changes in flows, roughness values and downstream boundary conditions was tested.
- The results of the modelling show that:
    - Model results at the site are moderately sensitive to changes in roughness values, flows and downstream boundary conditions.
    - Overtopping occurs in all modelled flood scenarios at AOI 1 which can be seen in Figure 3-1.
    - Overtopping occurs at many locations along the river bank particularly during the 1000-year, 100-year with (+30%) and 100-year (+50%) climate change fluvial flood events. Given the relatively shallow flood depths generated within the site boundary during the 100-year with 30% climate change and 100-year with 50% climate change scenarios, flood mitigation options aiming to capture overland flows and to store flood water should be explored in order to maximise the development potential of the site.
    - The M69 culvert has sufficient capacity to convey the 100-year with 30% climate change and 100-year with 50% climate change flows although it will surcharge during the 1000-year flood event.
    - There are increases of up to 1.6m at the M69 culvert when a 75% blockage is applied at the culvert inlet, however this is within the close proximity to the channel. The water levels return to normal heights 120m upstream of the culvert inlet.
    - The peak water level within the site will range:
        - Between 101.38m AOD and 118.5m AOD during the 20-year (5% AEP) fluvial flood event;
        - Between 101.48m AOD and 118.62m AOD during the 100-year (1% AEP) fluvial flood event;
        - Between 101.52m AOD and 118.7m AOD during the 100-year (1% AEP) with 30% climate change fluvial flood event;
        - Between 101.53m AOD and 118.76m AOD during the 100-year (1% AEP) with 50% climate change fluvial flood event;
        - Between 101.56m AOD and 118.79m AOD during the 1,000-year (0.1% AEP) fluvial flood event.

4.2 Recommendations

- The blockage risk analysis was only carried out on the M69 culvert. It is recommended that remaining undersized culverts on site are replaced to prevent the risk of blockage in the future.
- It is recommended that flood mitigation strategies are explored for this site in order to mitigate flood risk on site while ensuring third-party lands are not affected by the development proposal.

Appendices

A Topographic Survey

A.1 Topographic survey data

A0 SHEET SIZE
1189 x 841 mm

STANDARD ABBREVIATIONS

AV	AIR VALVE	PMB	PERMANENT BENCH MARKER
BCH	BACK CHAINAGE	PF	PLASTIC FENCE
BCO	BACK OF KERB OR IC	PG	PLOUGH, GUIDE
BF	BARGE BOARD	PO	PLOUGH, OVER
BW	BARBED WIRE FENCE	PT	PLOUGH, TO
CAT	CATCH PIT	PU	PLOUGH, UNDER
CBF	CLOSE BOARDED FENCE	PV	PRIVATE VISIT
CC	CABLE COVER	PVC	PVC COATED WIRE
CH	CHAIN LINK FENCE	RE	RAILWAY SIGNAL POST
CO	CLEANING OUT	RP	REFLECTOR POST
CON	CONCRETE	SAP	SAPLING
CP	CONCRETE POST	SC	SOIL CAP
CPF	CONCRETE POST AND PANEL FENCE	SCL	SOIL CAP LEVEL
CPW	CONCRETE POST AND WIRE FENCE	SD	SOAKAWAY
CRT	CRATEFENCE	SDP	STREET NAME PLATE
DF	DEER FENCE	SF	SHEET PILE
DP	DROP PIPE	SH	SHRUB
DPF	DRAIN PIPE CENTRE	STN	STANDING
DPL	DRAIN PIPE LEVEL	TF	TIMBER POST
EP	ELECTRICITY POLE	TFL	TIMBER POST AND RAIL
FCL	FENCE CORNER	TP	TELEPHONE POLE
FFL	FINISHED FLOOR LEVEL	TPO	TELEPHONE CALL BOX
FH	FIRE HYDRANT	TR	TRENCH
FL	FLOOR LEVEL	TRO	TRENCH, OVER
FP	FLOOR POLE	TS	TELEPHONE STILE
GAT	GATE	TSP	TELEPHONE SUB-POST
GM	GAS MAIN	UP	UNDERGROUND PIPE
GP	GAS POST	VC	VARIATION CUT
GPO	GAS POST, OTHER	VF	VARIATION FILL
GV	GAS VALVE	WB	WATER BOARD
HF	HEDGE AND FENCE	WC	WATER COCK
HH	HEDGE AND TREE	WCH	WATER COCK, HIGH
HT	HEDGE TO	WCL	WATER COCK, LOW
LP	LAMP POST	WF	WATER FLOW
MH	MANHOLE	WL	WATER LEVEL
MHF	MANHOLE FLUSH	WM	WATER MAIN
PAL	PALISADE FENCE	WP	WATER POST
PF	PANEL FENCE	WPO	WATER POST, OTHER
PFL	PANEL FENCE AND WIRE	WV	WATER VALVE
PGL	PLAT FORM LEVEL	WVO	WATER VALVE, OTHER
PM	PEG/MARKER	STN 2	SURVEY STATION
+12.34	SPOT LEVEL	+12.34	CONTOUR VALUE

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Any suspect or fluid ground, contaminates on or within the ground, should be further investigated by a suitable expert. Any earthwork constructions shown indicate typical slopes for guidance only & should be further investigated by a suitable expert.
Where existing trees are to be retained they should be subject to a full Arboricultural Inspection for safety. All trees are to be planted so as to ensure they are a minimum of 5 metres from buildings and 3 metres from drains. Root barriers are to be installed to a depth of 1 metre from foundation is to be provided to accommodate the proposed tree planting.
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A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN15 & OSGM15 Geoid transformation models. The survey has been correlated to this point and a further one or more OSGB36 points established to create a true O.S. bearing for angle orientation.
No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.
Please refer to Survey Station Table to enable establishment of the on-site grid.
Physical features present in the vicinity of boundaries may not represent legally conveyed ownership. It should be noted that some features may have been obscured at time of survey. (Parted cars ECT.).
3D information is thrown off on layer 3D_TRIANGLES.

Rev:	Description:	Initials:	Date:
XXX	XXX	XXX	XX/XX/XXXX

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SURVEYING

Client:
Redrow Homes Ltd

Project:
Coventry Road
Burbage

Title:
Site Survey
Sheet 1 of 4

Date: Nov 2019 | Scale: 1:500 @ A0
Drawn by: ICP | Checked by: XXX

Job No.	Drg No.	Rev.
S 219	1067	

Scale Check:

A0 SHEET SIZE
1189 x 841 mm



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Where existing trees are to be retained they should be subject to a full Arboricultural Inspection for safety. All trees are to be planted so as to ensure they are a minimum of 5 metres from buildings and 3 metres from services and where this is not possible root barrier or pit foundation is to be provided to accommodate the proposed tree planting.
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Project:
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Burbage

Title:
Site Survey
Sheet 2 of 4

Date: Nov 2019 Scale: 1:500 @ A0
Drawn by: ICP Checked by: XXX

Job No.	Drg No.	Rev.
S 219	1067	

Scale Check:
1:2500 0 10m 20m 30m 40m 50m 60m 70m 80m
1:100 0 1m 2m 3m 4m 5m 6m 7m
1:50 0 5m 10m 15m 20m 25m

A0 SHEET SIZE
1189 x 841 mm

Arable Field

Public Footpath

Pasture

Maximum extents of pylon O/H wires

Note: All water levels taken w/b 04th Nov 2019

M 69

291400 N
291350 N
291300 N
291250 N
445700 E
445750 E
445800 E
445850 E
445900 E
445950 E
446000 E
446050 E
446100 E
446150 E

S1 S1.1 S1.2 S1.3 S1A S1B S1C S2 S3 S4 S4.1 S4.2 S5 S6 S100 C1 S14

STANDARD ABBREVIATIONS

AV	AIR VALVE	PMB	PERMANENT BENCH MARKER
BH	BOREHOLE	PO	POST OFFICE
BS	BUS STOP	PS	PUSH'S SIGN
BT	BRITISH TELECOM IC	PW	PUSH'S WIRE FENCE
BW	BARBED WIRE	RE	RODDING EYE
CH	CHAIN LINK FENCE	RP	REFLECTOR
CHP	CHAIN LINK FENCE TO PUSH'S	RSJ	ROLLED STEEL JOIST
CHW	CHAIN LINK FENCE TO WOOD	RWP	RAIN WATER PIPE
CON	CONCRETE	SC	SCREW COVER
CP	CAR PARK	SIGN	SIGNPOST
CPW	CHAIN LINK PANEL FENCE	SL	SLOT
CT	CABLE TELEVISION LEVEL	SLC	SLC LIGHT
DB	DRAIN BOX	SLP	SLC LIGHT LAMPPOST
DP	DRAIN PIPE	SNP	STREET NAME PLATE
DW	DRAIN WELL	SP	SPOT
EAP	EARTH ANCHOR POINT	SPR	SPRINKLER
EC	ELECTRICITY CABLE	STN	STANDPIPE
EP	ELECTRICITY POLE	TC	TOP OF CURB
FL	FLOOR LEVEL (GROUND FLOOR LEVEL)	TEL	TELEPHONE CABLE
FP	FLOOR PLAN	TP	TELEPHONE POLE
FPL	FLOOR LEVEL	TS	TELEGRAPH POST
GAT	GATE	UP	UNDERGROUND PIPE
GV	GAS VALVE	VP	VENTILATION PIPE
GVC	GAS VALVE COVER	WC	WATER COURSE
HC	HEDGE CENTRE	WM	WATER METER
HH	HEDGE HEIGHT	WP	WOOD POST
HR	HEDGE RECORD	WV	WATER VALVE
HS	HEDGE SIDE	WVC	WATER VALVE COVER
LP	LAMP POST	XH	XXXXX HEIGHT
MH	MANHOLE	XR	XXXXX RECORD
MP	MATERIALS	XS	XXXXX SIDE
PF	PANEL FENCE	YW	YELL 'G' WINDING
PFL	PANEL FENCE TO FLAT ROOF LEVEL	YWH	YELL 'G' WINDING HEIGHT
PEG	PEG/MARKER	STN 2	SURVEY STATION
12.34	SPOT LEVEL	1.00	CONTOUR VALUE

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3D information is known off on layer 3D_TRIANGLES.

Rev:	Description:	Initials:	Date:
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Project:
Coventry Road
Burbage

Title:
Site Survey
Sheet 4 of 4

Date: Nov 2019 Scale: 1:500 @ A0
Drawn by: ICP Checked by: XXX

Job No.	Drg No.	Rev.
S 219	1067	

Scale Check:

1:1250 0 10m 20m 30m 40m 50m 60m 70m 80m
1:500 0 1m 2m 3m 4m 5m 6m 7m
1:200 0 1m 2m 3m 4m 5m
1:100 0 10m 20m 30m

A0 SHEET SIZE
1189 x 841 mm

Note: All water levels taken w/b 04th Nov 2019

Spring

Leachmore

Pasture

Track

Pond

Maximum extents of pylon O/H wires

STANDARD ABBREVIATIONS

AV	AIR VALVE	PMM	PERMANENT GROUND MARKER
BH	BOREHOLE	PO	POST OFFICE BOX
BS	BUS STOP	PS	PUSH'S SLAB
BSW	BRICK SCREEN WALL	PTF	PUSH'S TYPE FENCE
BW	BRICK WALL	RE	RODDING EYE
CAB	CABLE TV BOX	RP	REFLECTOR POST
CBF	CLOSE BOARDED FENCE	RWP	RAIN WATER PIPE
CH	CATCH PIT	SC	SERVICE COVER
CJ	CABLE JOINT BOX	SF	SHED FLOOR LEVEL
CL	CONCRETE LAMP POST	SL	SIGN POST
CONC	CONCRETE	SP	SOFFIT
CP	CAR PARK	SPL	SPOT LEVEL
CWF	CONCRETE WALL FENCE	STL	SILT TRAP
DL	DRAINAGE LEVEL	STS	SILT TRAP SUMPLID
DP	DUMPSTER	SW	STREET NAME PLATE
EB	ELECTRIC BOX	TC	TOP OF CURB
EP	ELECTRIC POLE	TF	TRAFFIC LIGHTS
FF	FINISHED FLOOR LEVEL	TL	TOP OF LEDGE
FL	FLOOR LEVEL	TP	TELEGRAPH POLE
FP	FLAG POLE	TR	TRENCH DRAIN
GF	GAS FLUE	UP	UNDERPASS
GV	GAS VALVE	VP	VENT PIPE
HF	HEDGE FENCE	WC	WATER COCK
HY	HARD STONE COVER	WF	WOOD FENCE
IC	INSPECTION CHAMBER	WG	WATER GULLY
IL	INVERT LEVEL	WM	WATER METER
LP	LAMP POST	WV	WATER VALVE
MH	MANHOLE		
PAV	PAVING		
PC	PAVING CONC		
PF	PANEL FENCE		
PL	PLANTER		
PSF	PUSH SUP. LEVEL		

PEG/MARKER
252.24 SPOT LEVEL
STN 2 SURVEY STATION
1.00m CONTOUR VALUE

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Burbage

Title:
Site Survey
Sheet 3 of 4

Date: Nov 2019 Scale: 1:500 @ A0
Drawn by: ICP Checked by: XXX

Job No.	Drg No.	Rev.
S 219	1067	

Scale Check:

A.2 Quality assessment

The topographic survey data for the site was compared with 1m LiDAR data flown in 2011 and 2m LiDAR data flown in 2003 (where 1m LiDAR data were not available) downloaded on 17 August 2020 from Defra's data service website[2]. Results are shown in Figure A-1.

Figure A-1: Quality assessment (topographic survey minus LiDAR)

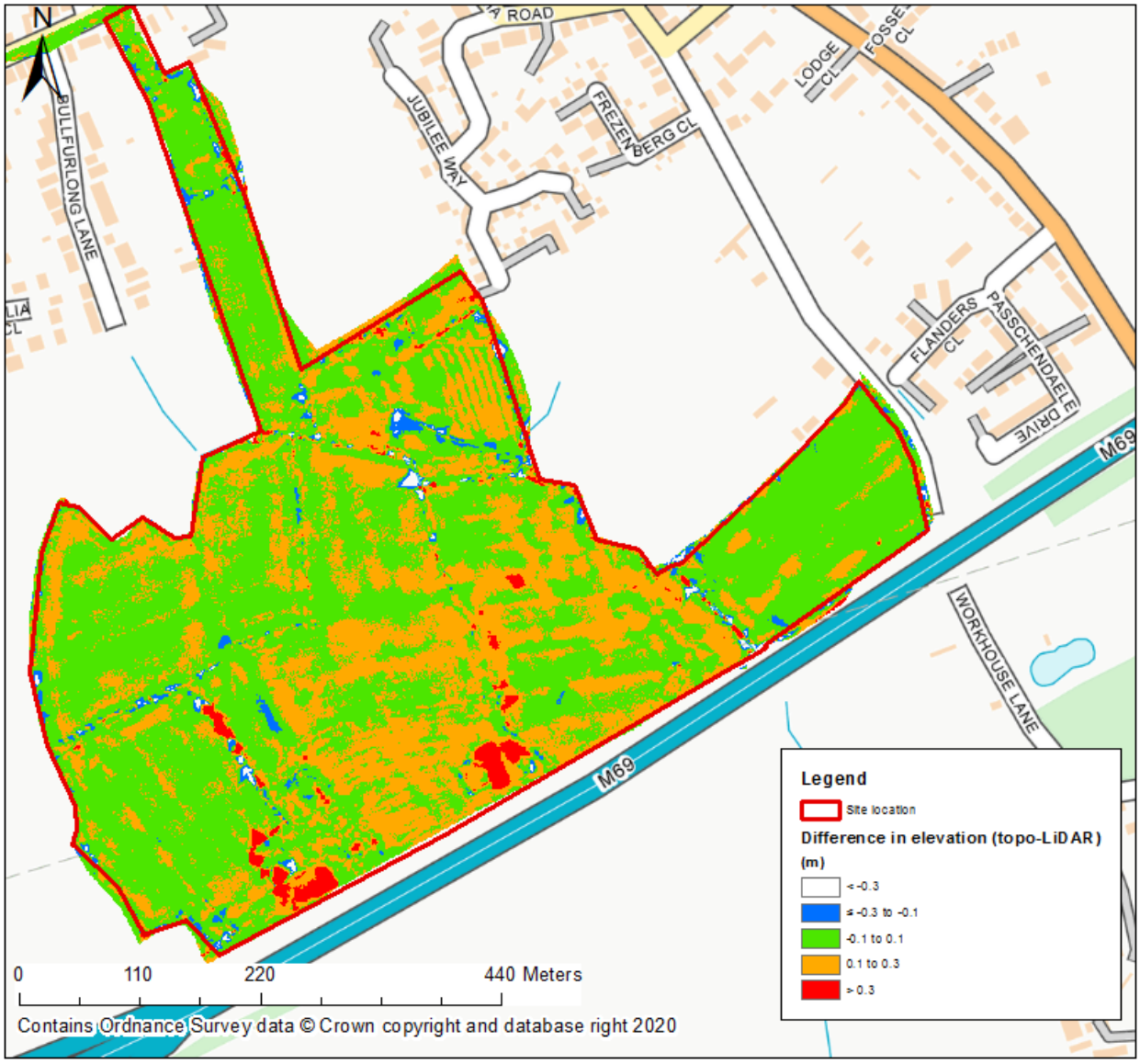
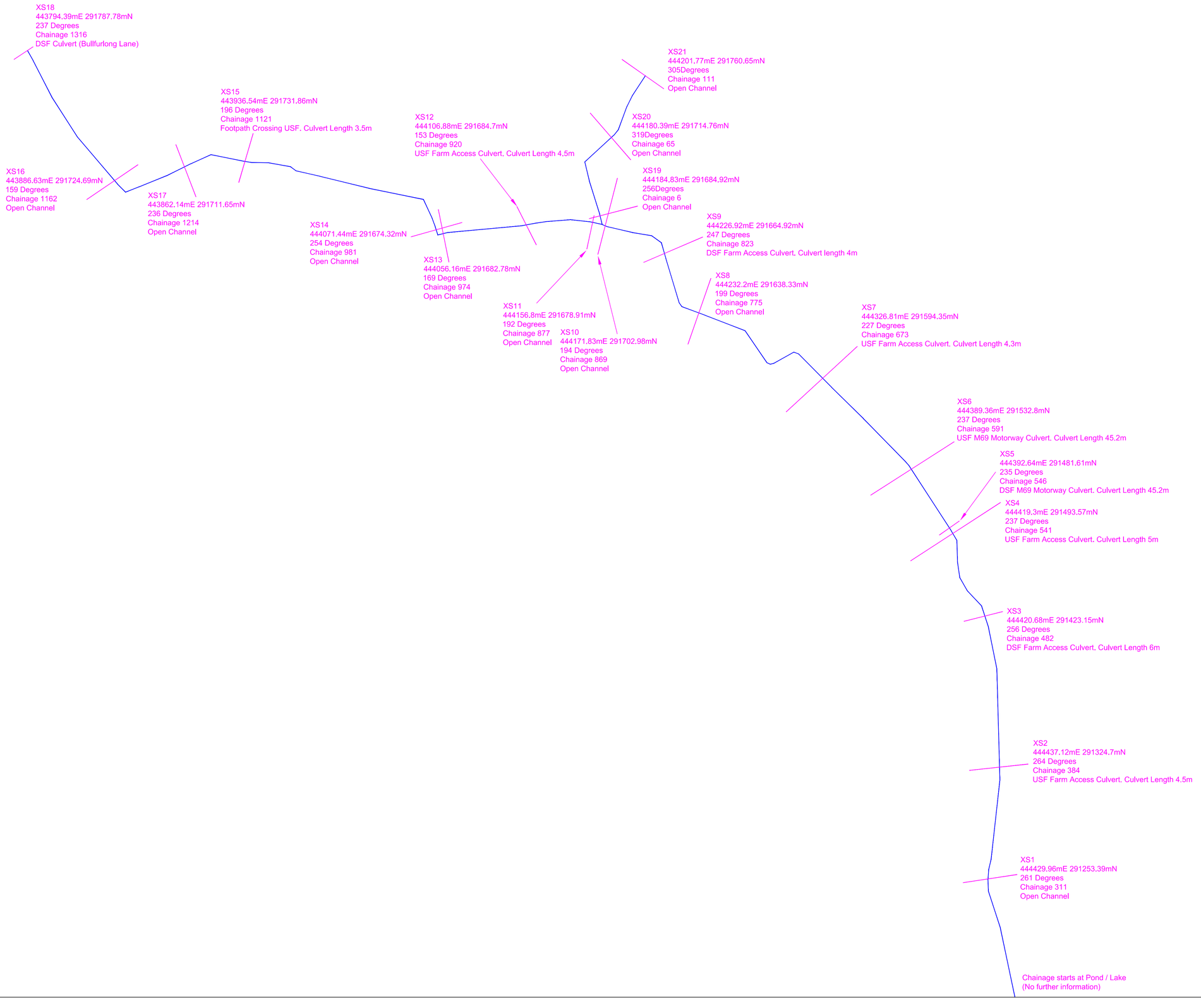


Figure A-1 shows a good match between the topographic survey levels and LiDAR data. Differences in elevation exceeding 0.3m can be observed however these are areas which contain a lot of dense vegetation which affect LiDAR readings.

As a result, both datasets were used in the model.

[2] https://environment.data.gov.uk/

B Channel Survey Data



Notes

This survey should only be relied upon for its original purpose. Grantham Coates Surveys Limited accepts no responsibility for use of this plan outside of the original remit, or by use of any party other than the original client.

Whilst every effort has been made to identify all above ground details, it should be noted that some items may have been obscured at time of survey.

Below ground drainage information as been visually inspected from the surface and should therefore be treated as approximate only.

Where this survey has been carried out for the purpose of enabling trackside drainage design. The position of any running rail has been surveyed in line with a general topographic survey and should not be used for the purpose of track design.

All dimensions to be checked on site prior to design and construction.

Legend

AIR VALVE	AV	WATER TAP	TAP
BOLLARD	BD	TEMPORARY BENCH MARK	TBM
BORE HOLE	BHL	TELEPHONE CALL BOX	TCB
BUS STOP	BS	TELEPHONE POST	TEL
BT INSPECTION COVER	BT	THRESHOLD LEVEL	THL
BT BOX	BTB	TRAFFIC LIGHT	TL
CABLE TV INSPECTION COVER	CTV	TOP OF WALL	TOW
COVER LEVEL	CL	TELEGRAPH POLE	TP
DOWN PIPE	DP	UNABLE TO LIFT	UTL
DROPPED KERB	DK	VENT PIPE	VP
ELECTRICITY CONTROL BOX	ECB	RAIL WELD	WE
EAVES HEIGHT	EH	WATER METER	WM
ELECTRICITY MANHOLE	EM	WASHOUT	WO
ELECTRICITY POLE	EP		
EARTH ROD	ER		
FINISHED FLOOR LEVEL	FFL		
FIRE HYDRANT	FH	SURVEY STATION	GCS1
FOUL WATER	FW		
GULLY	GY	BUSHES	
GATE POST	GP		
GAS VALVE	GV		
INSULATED BLOCK JOINT	IBJ		
INSPECTION COVER	IC	HEDGES	
INVERT LEVEL	IL		
KERB OUTLET	KO		
LAMPPOST	LP		
LITTER BIN	LB	TREES	Height Species (Spread to scale)
MARKER POST	MK		
MILE POST	MP		
POST	PO		
RODDING EYE	RE	GATE	
RIDGE HEIGHT	RH		
ROAD NAMEPLATE	RN		
ROAD SIGN	RS	SECURITY FENCE	X—X
STUMP	SP	FENCE	/ — /
SOFFIT LEVEL	SF	OVERHEAD CABLES	OH — OH
SIGNAL POST	SIG	FOUL WATER	FW — FW
RAIL SLEEPER LEVEL	SLP	GAS MAIN	GM — GM
SIGNALS AND TELECOMS BOX	STB	U/G POWER LINE	PL — PL
SIGNALS AND TELECOMS CABLE	STC	STORM WATER	SW — SW
SIGNALS AND TELECOMS POST	STP	U/G TELEPHONE	TEL — TEL
SIGN POST	SN	WATER MAIN	WM — WM
STOP TAP	ST		
STOP VALVE	SV		
STAY	SY		
STORM WATER	SW		

Control Table

Station	Description	Eastings	Northings	Height

Grid and Datum

Grid: ***OS National Grid*** **Datum:** ***Ordnance Datum Newlyn***

Survey related to Ordnance Survey National Grid (OSGB36) via GPS and the OS Active Network.
A National Grid (OSGB36) coordinate has been established on site via Transformation OSTN15 and Geoid Model OSGM15, a further OS coordinate was used to orientate the survey to Ordnance Grid.
No scale factor has been applied to the survey

Title:

WATERCOURSE SURVEY AT BURBAGE FIELDS FARM (Key Plan)

Client:

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St. Philip's Courtyard
Coleshill
Warwickshire B46 3AD

Grantham Coates Surveys Ltd

Land - Engineering - Building Surveyors

2 Arden Court, Arden Road, Alcester
Warwickshire, B49 6HN

Tel: 01789 764420

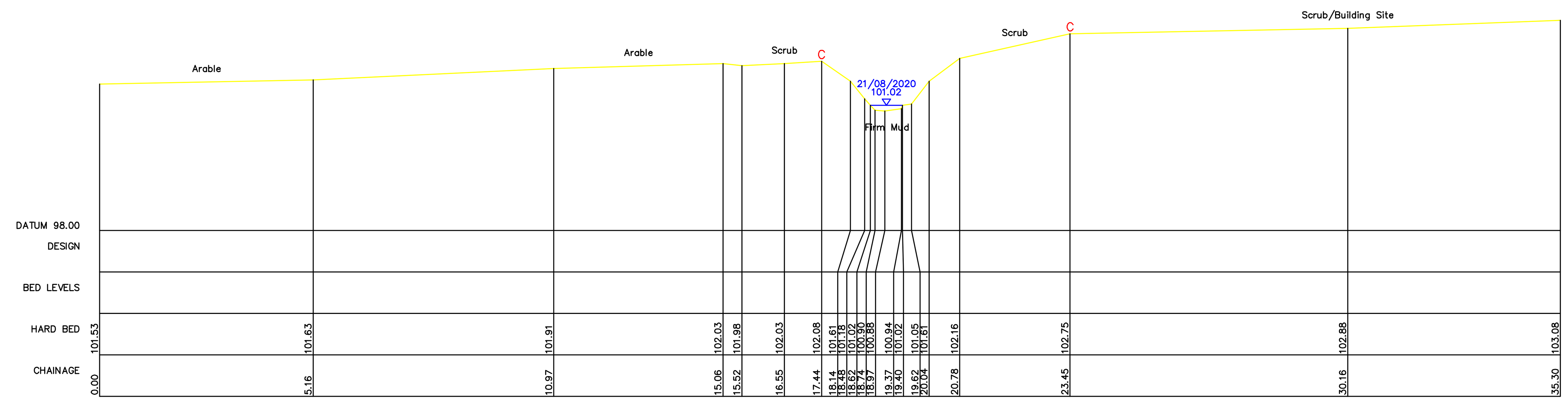
E-Mail: info@gcsurveys.co.uk
Web Site: www.gcsurveys.co.uk

Drawing No:	Rev:
GCS/JBA/0859/1	-

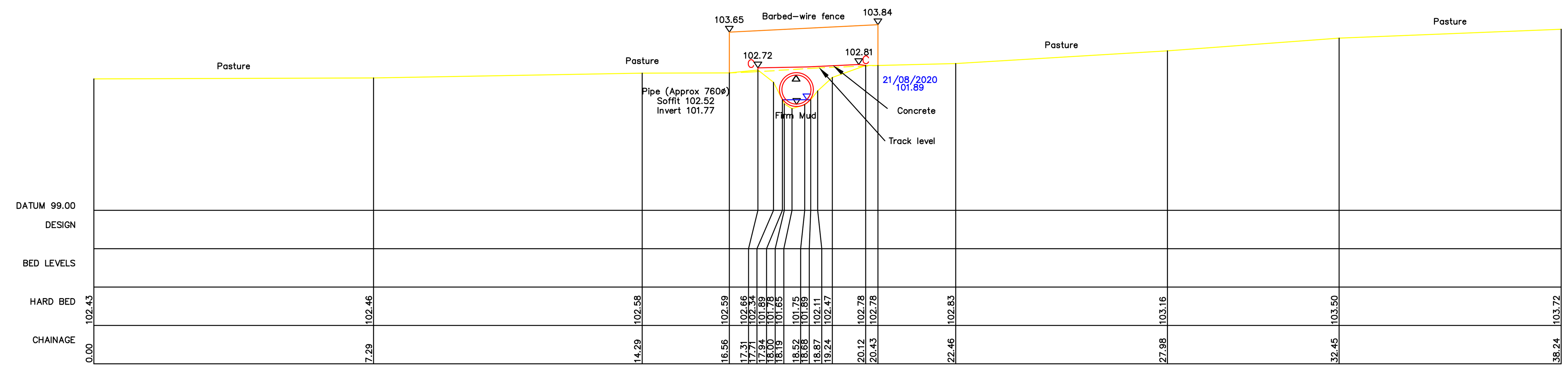
Date:	Notes:	Name:	Rev:

Drawn:	Checked:	Scale:	Date:
MH	CC	1:1250	25/08/20

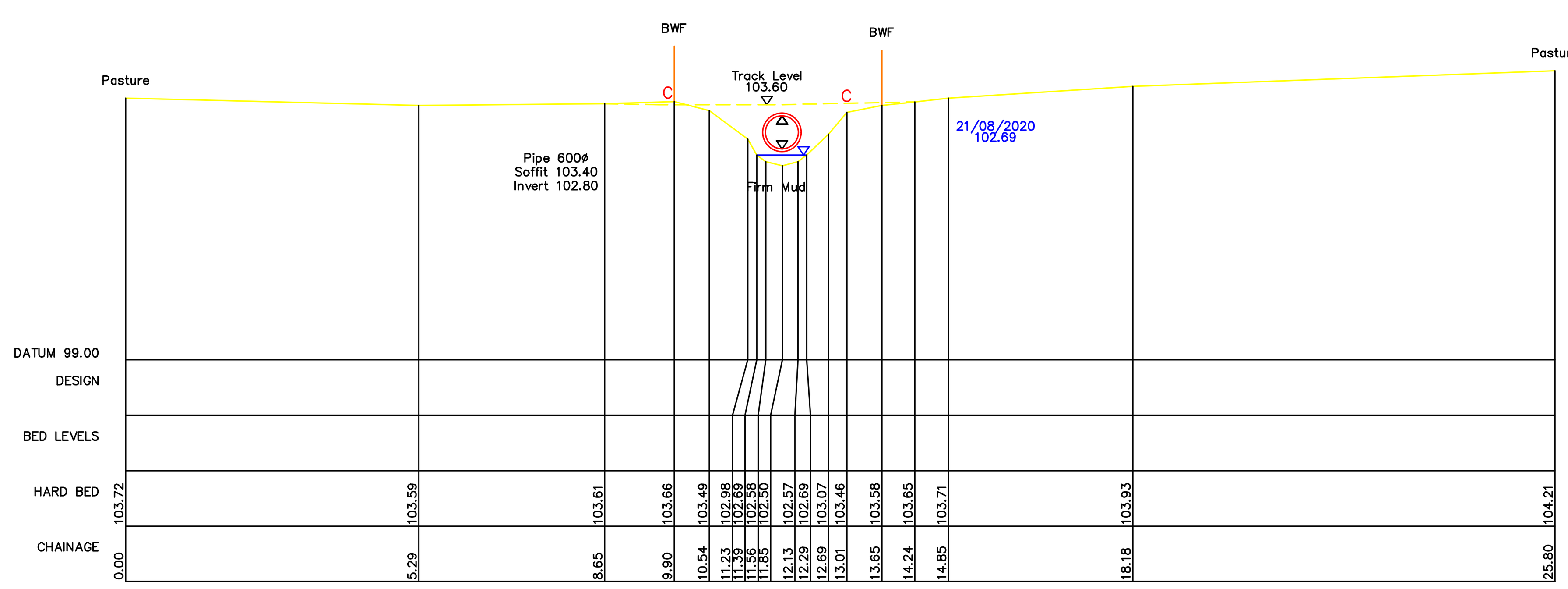
File Name:	Sheet size:	Sheet:
GCS-JBA-0859-1	A1	1 of 7



XS1
444429.96mE 291253.39mN Brg 261
Chainge 310.9
Open Channel



XS2
444437.12mE 291324.7mN Brg 264
Chainge 383.5
USF Farm Access Culvert. Culvert Length 4.5m



XS3
444420.68mE 291423.15mN Brg 256
Chainge 482
DSF Farm Access Culvert. Culvert Length 6m

Notes

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Legend

AIR VALVE	AV	WATER TAP	TAP
BOLLARD	BD	TEMPORARY BENCH MARK	TBM
BORE HOLE	BHL	TELEPHONE CALL BOX	TCB
BUS STOP	BS	TELEPHONE POST	TEL
BT INSPECTION COVER	BT	THRESHOLD LEVEL	THL
BT BOX	BTB	TRAFFIC LIGHT	TL
CABLE TV INSPECTION COVER	CTV	TOP OF WALL	TOW
COVER LEVEL	CL	TELEGRAPH POLE	TP
DOWN PIPE	DP	UNABLE TO LIFT	UTL
DROPPED KERB	DK	VENT PIPE	VP
ELECTRICITY CONTROL BOX	ECB	RAIL WELD	WE
EAVES HEIGHT	EH	WATER METER	WM
ELECTRICITY MANHOLE	EM	WASHOUT	WO
ELECTRICITY POLE	EP		
EARTH ROD	ER		
FINISHED FLOOR LEVEL	FFL		
FIRE HYDRANT	FH	SURVEY STATION	GCS1
FOUL WATER	FW		
GULLY	GY		
GATE POST	GP	BUSHES	BH
GAS VALVE	GV		
INSULATED BLOCK JOINT	IBJ		
INSPECTION COVER	IC	HEDGES	
INVERT LEVEL	IL		
KERB OUTLET	KO		
LAMPPOST	LP		
LITTER BIN	LB	TREES	Height Species (Spread to scale)
MARKER POST	MK		
MILE POST	MP		
POST	PO		
RODDING EYE	RE	GATE	
RIDGE HEIGHT	RH		
ROAD NAMEPLATE	RN		
ROAD SIGN	RS	SECURITY FENCE	—×—×—
STUMP	SP	FENCE	—/—/—
SOFFIT LEVEL	SF	OVERHEAD CABLES	—OH—OH—
SIGNAL POST	SIG	FOUL WATER	—FW—FW—
RAIL SLEEPER LEVEL	SLP	GAS MAIN	—GM—GM—
SIGNALS AND TELECOMS BOX	STB	U/G POWER LINE	—PL—PL—
SIGNALS AND TELECOMS CABLE	STC	STORM WATER	—SW—SW—
SIGNALS AND TELECOMS POST	STP	U/G TELEPHONE	—TEL—TEL—
SIGN POST	SN	WATER MAIN	—WM—WM—
STOP TAP	ST		
STOP VALVE	SV		
STAY	SY		
STORM WATER	SW		

Control Table

Station	Description	Eastings	Northings	Height

Grid and Datum

Grid: ***OS National Grid*** **Datum:** ***Ordnance Datum Newlyn***
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No scale factor has been applied to the survey

Title:

WATERCOURSE SURVEY AT
BURBAGE FIELDS FARM
(Cross Sections)

Client:

JBA CONSULTING
The Library
St. Philip's Courtyard
Coleshill
Warwickshire B46 3AD

Grantham Coates Surveys Ltd

Land - Engineering - Building Surveyors

2 Arden Court, Arden Road, Alcester
Warwickshire, B49 6HN

Tel: 01789 764420

E-Mail: info@gcsurveys.co.uk
Web Site: www.gcsurveys.co.uk

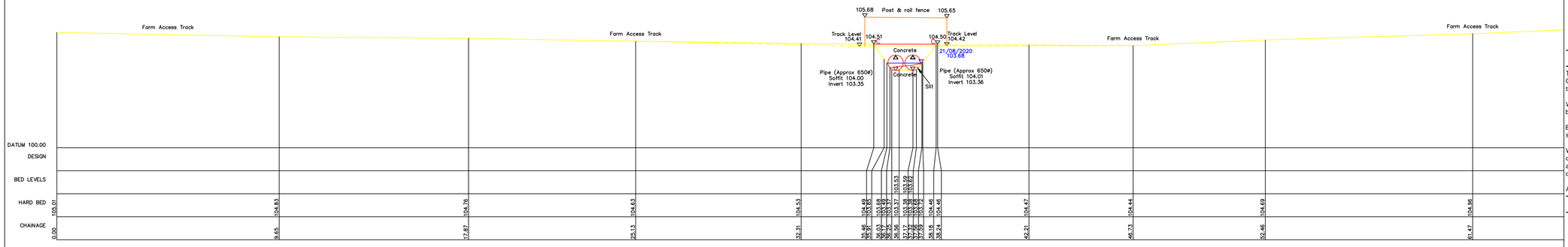
THE SURVEY ASSOCIATION FULL MEMBER

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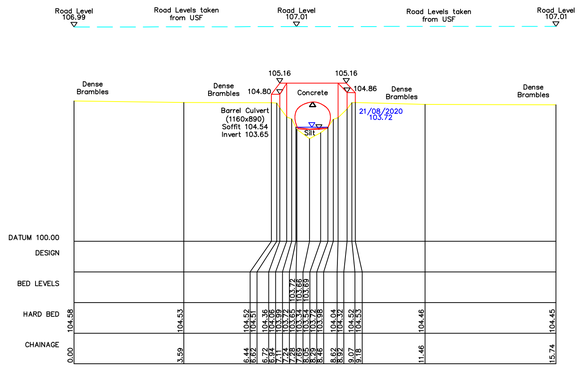
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Date:	Notes:	Name:	Rev:

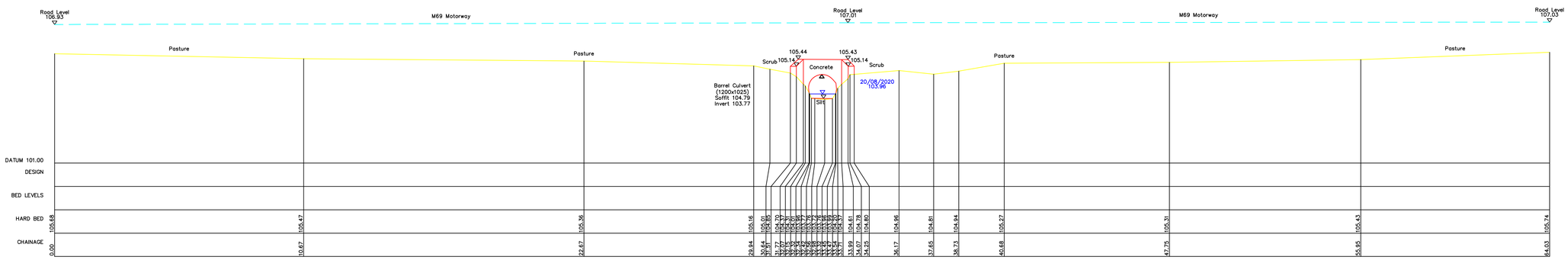
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MH	CC	1:100	25/08/20
File Name: GCS-JBA-0859-1		Sheet size: A1	Sheet: 2 of 7



XS4
444419.3mE 291493.57mN Brg 237
Chainge 541.4
USF Farm Access Culvert. Culvert Length 5m



XS5
444392.64mE 291481.61mN Brg 235
Chainge 545.6
DSF M69 Motorway Culvert. Culvert Length 45.2m



XS6
444389.36mE 291532.8mN Brg 237
Chainge 590.8
USF M69 Motorway Culvert. Culvert Length 45.2m

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Legend

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BOLLARD	BD	TEMPORARY BENCH MARK	TBM		
BORE HOLE	BHL	TELEPHONE CALL BOX	TCB		
BUS STOP	BS	TELEPHONE POST	TEL		
BT INSPECTION COVER	BT	THRESHOLD LEVEL	THL		
BT BOX	BTB	TRAFFIC LIGHT	TL		
CABLE TV INSPECTION COVER	CTV	TOP OF WALL	TOW		
COVER LEVEL	CL	TELEGRAPH POLE	TP		
DOWN PIPE	DP	UNABLE TO LIFT	UTL		
DROPPED KERB	DK	VENT PIPE	VP		
ELECTRICITY CONTROL BOX	ECB	RAIL WELD	WE		
EAVES HEIGHT	EH	WATER METER	WM		
ELECTRICITY MANHOLE	EM	WASHOUT	WO		
ELECTRICITY POLE	EP				
EARTH ROD	ER				
FINISHED FLOOR LEVEL	FFL				
FIRE HYDRANT	FH	SURVEY STATION	GCS1		
FOUL WATER	FW				
GULLY	GY				
GATE POST	GP	BUSHES			
GAS VALVE	GV				
INSULATED BLOCK JOINT	IBJ				
INSPECTION COVER	IC	HEDGES			
INVERT LEVEL	IL				
KERB OUTLET	KO				
LAMPPOST	LP				
LITTER BIN	LB	TREES	Height / Species (Spread to scale)		
MARKER POST	MK				
MILE POST	MP				
POST	PO				
RODDING EYE	RE	GATE			
RIDGE HEIGHT	RH				
ROAD NAMEPLATE	RN				
ROAD SIGN	RS	SECURITY FENCE	X—X		
STUMP	SP	FENCE	/ — /		
SOFFIT LEVEL	SF	OVERHEAD CABLES	OH — OH		
SIGNAL POST	SIG	FOUL WATER	FW — FW		
RAIL SLEEPER LEVEL	SLP	GAS MAIN	GM — GM		
SIGNALS AND TELECOMS BOX	STB	U/G POWER LINE	PL — PL		
SIGNALS AND TELECOMS CABLE	STC	STORM WATER	SW — SW		
SIGNALS AND TELECOMS POST	STP	U/G TELEPHONE	TEL — TEL		
SIGN POST	SN	WATER MAIN	WM — WM		
STOP TAP	ST				
STOP VALVE	SV				
STAY	SY				
STORM WATER	SW				

Control Table

Station	Description	Eastings	Northings	Height

Grid and Datum

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No scale factor has been applied to the survey

Title:

WATERCOURSE SURVEY AT BURBAGE FIELDS FARM (Cross Sections)

Client:

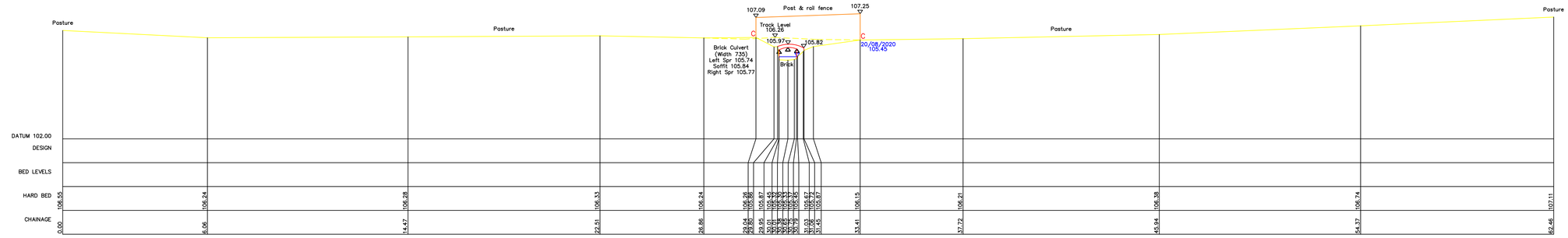
JBA CONSULTING
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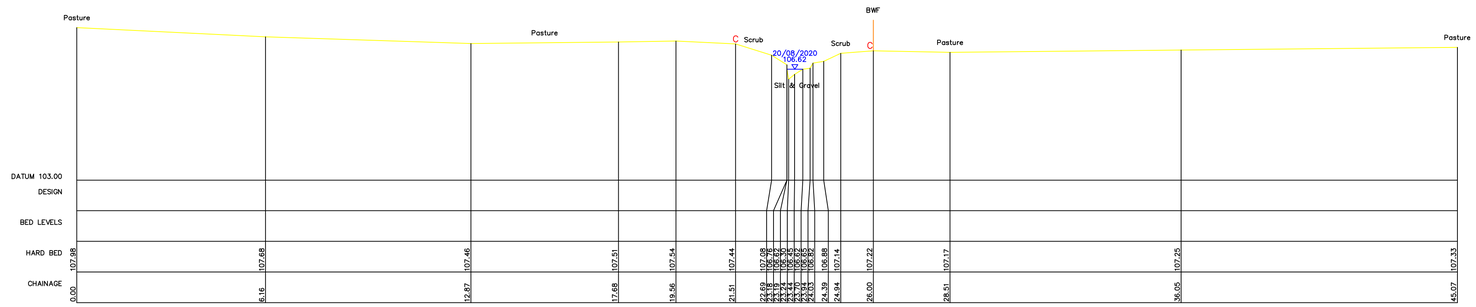
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Date:	Notes:	Name:	Rev:

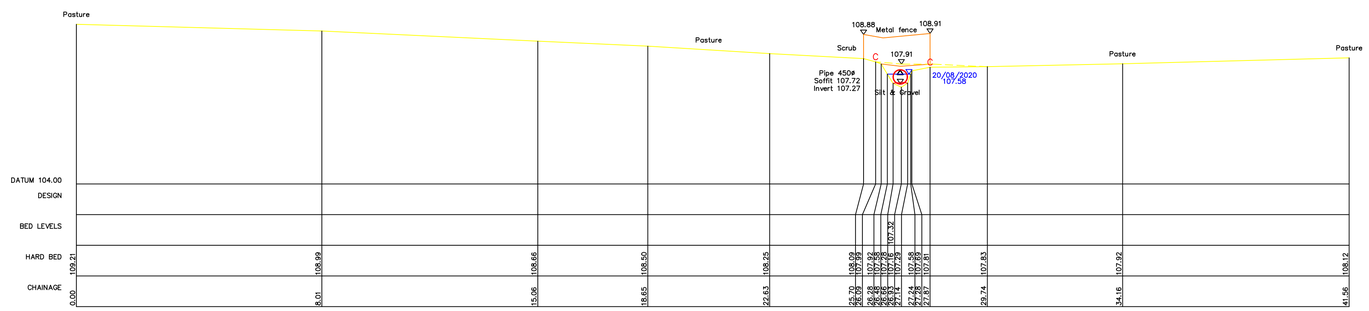
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MH	CC	1:100	25/08/20
File Name: GCS-JBA-0859-1		Sheet size: A1	Sheet: 3 of 7



XS7
444326.81mE 291594.35mN Brg 227
Chainge 672.9
USF Farm Access Culvert. Culvert Length 4.3m



XS8
444232.2mE 291638.33mN Brg 199
Chainge 774.9
Open Channel



XS9
444226.92mE 291664.92mN Brg 247
Chainge 822.8
DSF Farm Access Culvert. Culvert length 4m

Notes

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Legend

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BOLLARD	BD	TEMPORARY BENCH MARK	TBM		
BORE HOLE	BHL	TELEPHONE CALL BOX	TCB		
BUS STOP	BS	TELEPHONE POST	TEL		
BT INSPECTION COVER	BT	THRESHOLD LEVEL	THL		
BT BOX	BTB	TRAFFIC LIGHT	TL		
CABLE TV INSPECTION COVER	CTV	TOP OF WALL	TOW		
COVER LEVEL	CL	TELEGRAPH POLE	TP		
DOWN PIPE	DP	UNABLE TO LIFT	UTL		
DROPPED KERB	DK	VENT PIPE	VP		
ELECTRICITY CONTROL BOX	ECB	RAIL WELD	WE		
EAVES HEIGHT	EH	WATER METER	WM		
ELECTRICITY MANHOLE	EM	WASHOUT	WO		
ELECTRICITY POLE	EP				
EARTH ROD	ER				
FINISHED FLOOR LEVEL	FFL				
FIRE HYDRANT	FH	SURVEY STATION	GCS1		
FOUL WATER	FW				
GULLY	GY				
GATE POST	GP	BUSHES			
GAS VALVE	GV				
INSULATED BLOCK JOINT	IBJ				
INSPECTION COVER	IC	HEDGES			
INVERT LEVEL	IL				
KERB OUTLET	KO				
LAMPPOST	LP				
LITTER BIN	LB	TREES	Height / Species (Spread to scale)		
MARKER POST	MK				
MILE POST	MP				
POST	PO				
RODDING EYE	RE	GATE			
RIDGE HEIGHT	RH				
ROAD NAMEPLATE	RN				
ROAD SIGN	RS	SECURITY FENCE	X X		
STUMP	SP	FENCE	/ /		
SOFFIT LEVEL	SF	OVERHEAD CABLES	OH OH		
SIGNAL POST	SIG	FOUL WATER	FW FW		
RAIL SLEEPER LEVEL	SLP	GAS MAIN	GM GM		
SIGNALS AND TELECOMS BOX	STB	U/G POWER LINE	PL PL		
SIGNALS AND TELECOMS CABLE	STC	STORM WATER	SW SW		
SIGNALS AND TELECOMS POST	STP	U/G TELEPHONE	TEL TEL		
SIGN POST	SN	WATER MAIN	WM WM		
STOP TAP	ST				
STOP VALVE	SV				
STAY	SY				
STORM WATER	SW				

Control Table

Station	Description	Eastings	Northings	Height

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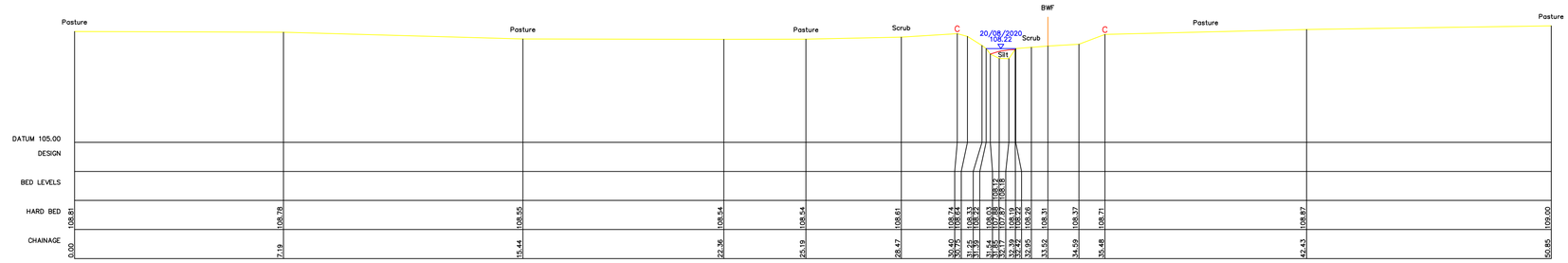
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Web Site: www.gcsurveys.co.uk

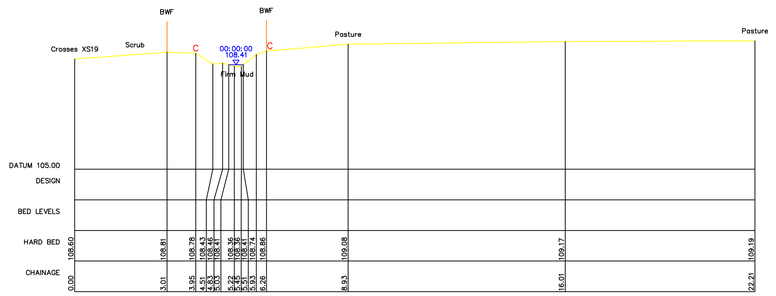
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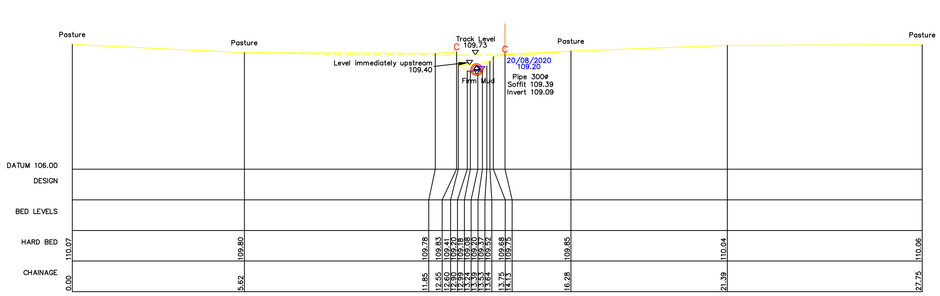
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MH	CC	1:100	25/08/20
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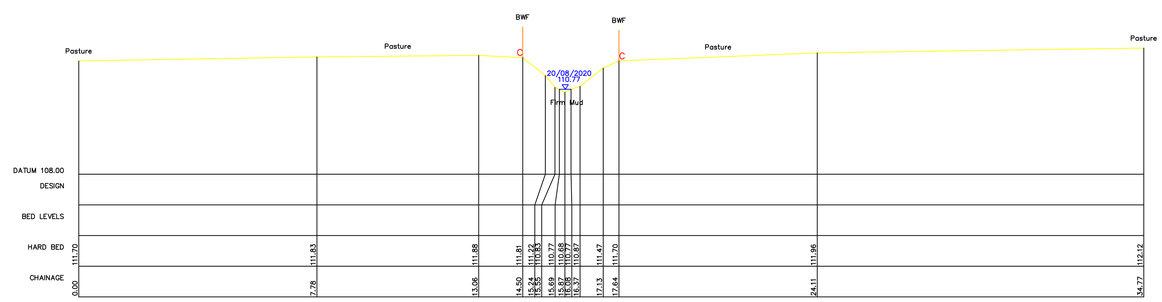
XS10
444171.83mE 291702.98mN Brg 194
Chainge 868.5
Open Channel



XS11
444156.8mE 291678.91mN Brg 192
Chainge 876.9
Open Channel



XS12
444106.88mE 291684.7mN Brg 153
Chainge 920.2
USF Farm Access Culvert. Culvert Length 4.5m



XS13
444056.16mE 291682.78mN Brg 169
Chainge 974.1
Open Channel

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BUS STOP	BS	TELEPHONE POST	TEL
BT INSPECTION COVER	BT	THRESHOLD LEVEL	THL
BT BOX	BTB	TRAFFIC LIGHT	TL
CABLE TV INSPECTION COVER	CTV	TOP OF WALL	TOW
COVER LEVEL	CL	TELEGRAPH POLE	TP
DOWN PIPE	DP	UNABLE TO LIFT	UTL
DROPPED KERB	DK	VENT PIPE	VP
ELECTRICITY CONTROL BOX	ECB	RAIL WELD	WE
EAVES HEIGHT	EH	WATER METER	WM
ELECTRICITY MANHOLE	EM	WASHOUT	WO
ELECTRICITY POLE	EP		
EARTH ROD	ER		
FINISHED FLOOR LEVEL	FFL		
FIRE HYDRANT	FH	SURVEY STATION	GCS1
FOUL WATER	FW		
GULLY	GY		
GATE POST	GP	BUSHES	
GAS VALVE	GV		
INSULATED BLOCK JOINT	IBJ		
INSPECTION COVER	IC	HEDGES	
INVERT LEVEL	IL		
KERB OUTLET	KO		
LAMPPOST	LP		
LITTER BIN	LB	TREES	Height / Species / (Spread to scale)
MARKER POST	MK		
MILE POST	MP		
POST	PO		
RODDING EYE	RE	GATE	
RIDGE HEIGHT	RH		
ROAD NAMEPLATE	RN		
ROAD SIGN	RS	SECURITY FENCE	X—X
STUMP	SP	FENCE	/ — /
SOFFIT LEVEL	SF	OVERHEAD CABLES	OH—OH
SIGNAL POST	SIG	FOUL WATER	FW—FW
RAIL SLEEPER LEVEL	SLP	GAS MAIN	GM—GM
SIGNALS AND TELECOMS BOX	STB	U/G POWER LINE	PL—PL
SIGNALS AND TELECOMS CABLE	STC	STORM WATER	SW—SW
SIGNALS AND TELECOMS POST	STP	U/G TELEPHONE	TEL—TEL
SIGN POST	SN	WATER MAIN	WM—WM
STOP TAP	ST		
STOP VALVE	SV		
STAY	SY		
STORM WATER	SW		

Control Table

Station	Description	Eastings	Northings	Height

Grid and Datum

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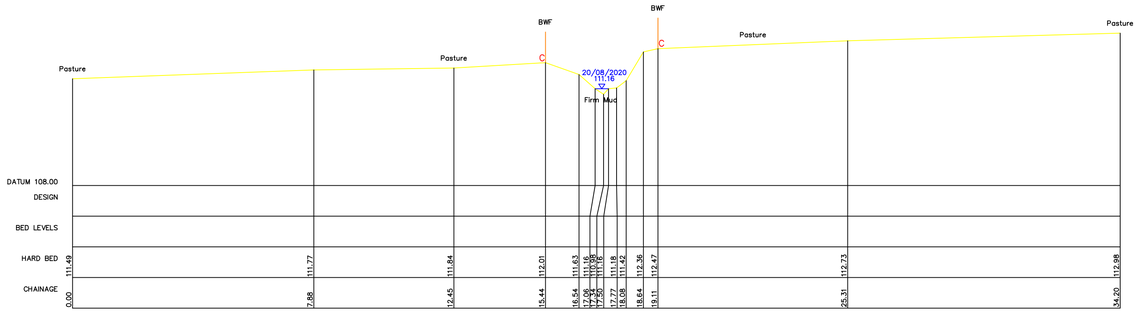
E-Mail: info@gcsurveys.co.uk
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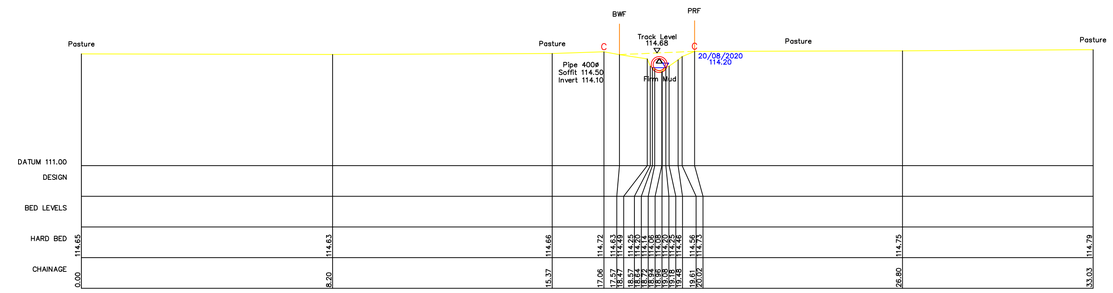
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Drawn:	Checked:	Scale:	Date:
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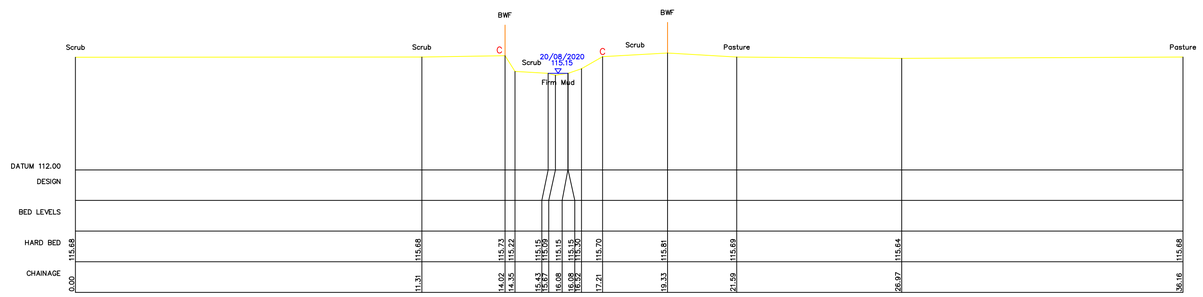
File Name:	Sheet size:	Sheet:
GCS-JBA-0859-1	A1	5 of 7



XS14
444071.44mE 291674.32mN Brg 254
Chainge 981.2
Open Channel



XS15
443936.54mE 291731.86mN Brg 196
Chainge 1121
Footpath Crossing USF. Culvert Length 3.5m



XS16
443886.63mE 291724.69mN Brg 159
Chainge 1162.3
Open Channel

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MILE POST	MP				
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RIDGE HEIGHT	RH				
ROAD NAMEPLATE	RN				
ROAD SIGN	RS	SECURITY FENCE	X X		
STUMP	SP	FENCE	/ /		
SOFFIT LEVEL	SF	OVERHEAD CABLES	OH OH		
SIGNAL POST	SIG	FOUL WATER	FW FW		
RAIL SLEEPER LEVEL	SLP	GAS MAIN	GM GM		
SIGNALS AND TELECOMS BOX	STB	U/G POWER LINE	PL PL		
SIGNALS AND TELECOMS CABLE	STC	STORM WATER	SW SW		
SIGNALS AND TELECOMS POST	STP	U/G TELEPHONE	TEL TEL		
SIGN POST	SN	WATER MAIN	WM WM		
STOP TAP	ST				
STOP VALVE	SV				
STAY	SY				
STORM WATER	SW				

Control Table

Station	Description	Eastings	Northings	Height

Grid and Datum

Grid: ***OS National Grid*** **Datum:** ***Ordnance Datum Newlyn***
Survey related to Ordnance Survey National Grid (OSGB36) via GPS and the OS Active Network.
A National Grid (OSGB36) coordinate has been established on site via Transformation OSTN15 and Geoid Model OSGM15, a further OS coordinate was used to orientate the survey to Ordnance Grid.
No scale factor has been applied to the survey

Title:

WATERCOURSE SURVEY AT BURBAGE FIELDS FARM (Cross Sections)

Client:

JBA CONSULTING
The Library
St. Philip's Courtyard
Coleshill
Warwickshire B46 3AD

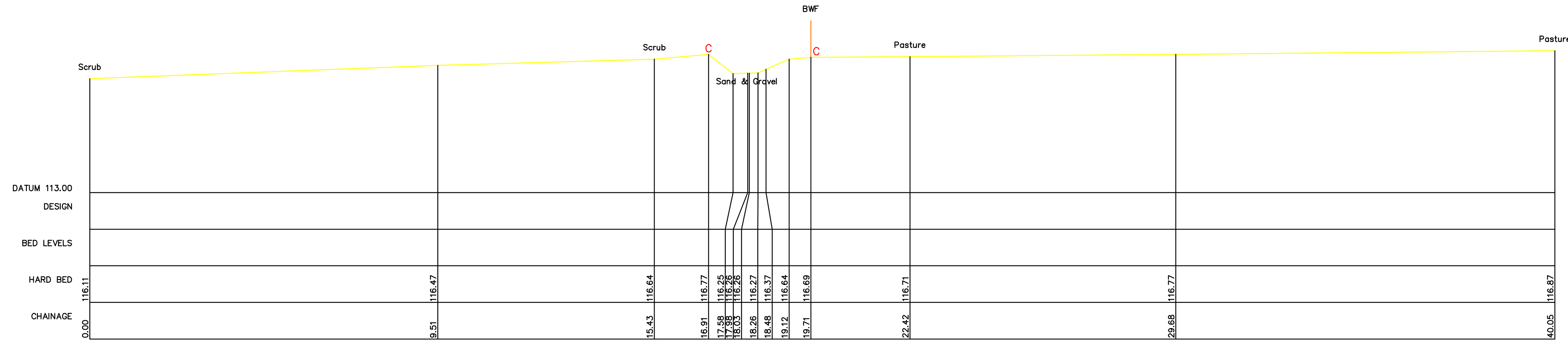
Grantham Coates Surveys Ltd
Land - Engineering - Building Surveyors
2 Arden Court, Arden Road, Alcester
Warwickshire, B49 6HN
Tel: 01789 764420
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Web Site: www.gcsurveys.co.uk

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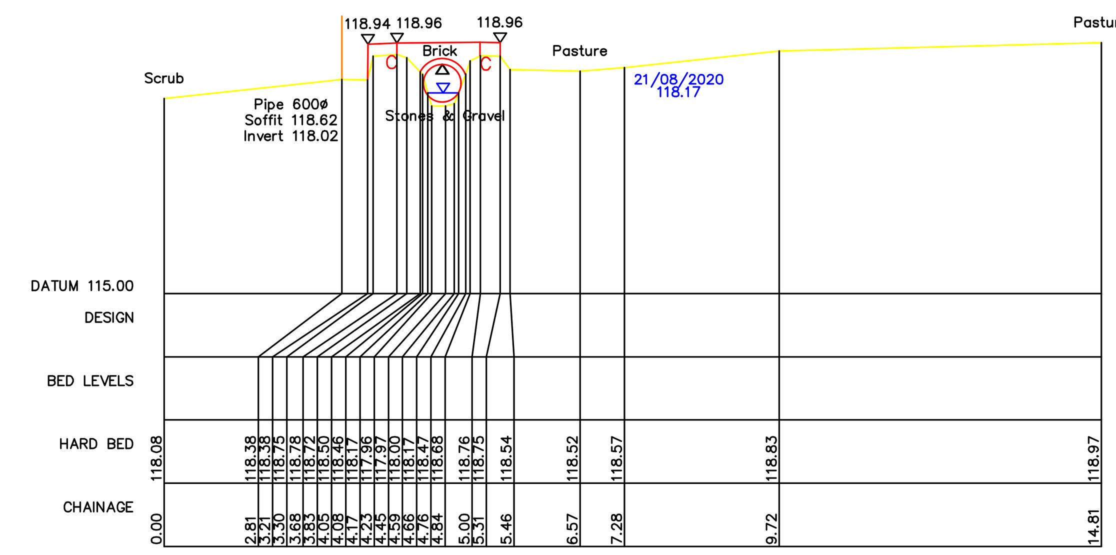
Date:	Notes:	Name:	Rev:

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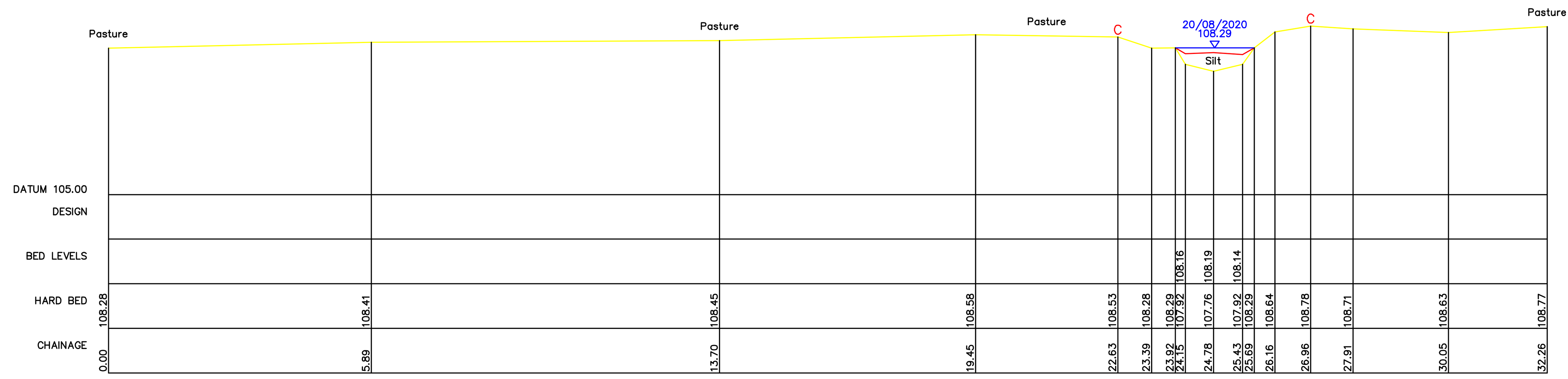
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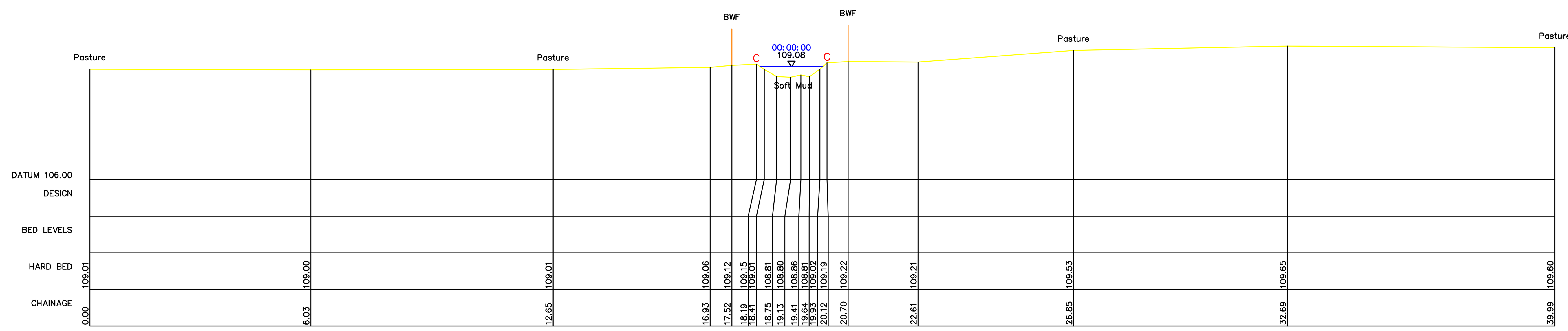
XS17
443862.14mE 291711.65mN Brg 236
Chainge 1214
Open Channel



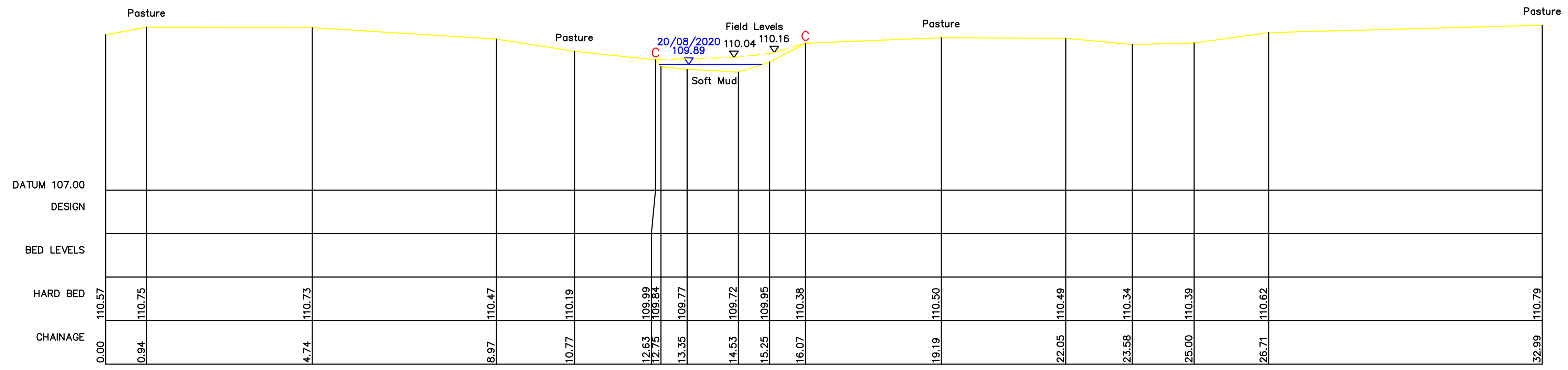
XS18
443794.39mE 291787.78mN Brg 237
Chainge 1315.5
DSF Culvert (Bullfurlong Lane)



XS19
444184.83mE 291684.92mN Brg 256
Chainage 5.7
Open Channel



XS20
444180.39mE 291714.76mN Brg 319
Chainage 65.2
Open Channel



XS21
444201.77mE 291760.65mN Brg 305
Chainage 111.1
Open Channel

Notes

This survey should only be relied upon for its original purpose. Grantham Coates Surveys Limited accepts no responsibility for use of this plan outside of the original remit, or by use of any party other than the original client.

Whilst every effort has been made to identify all above ground details, it should be noted that some items may have been obscured at time of survey.

Below ground drainage information has been visually inspected from the surface and should therefore be treated as approximate only.

Where this survey has been carried out for the purpose of enabling trackside drainage design. The position of any running rail has been surveyed in line with a general topographic survey and should not be used for the purpose of track design.

All dimensions to be checked on site prior to design and construction.

Legend

AIR VALVE	AV	WATER TAP	TAP
BOLLARD	BD	TEMPORARY BENCH MARK	TBM
BORE HOLE	BHL	TELEPHONE CALL BOX	TCB
BUS STOP	BS	TELEPHONE POST	TEL
BT INSPECTION COVER	BT	THRESHOLD LEVEL	THL
BT BOX	BTB	TRAFFIC LIGHT	TL
CABLE TV INSPECTION COVER	CTV	TOP OF WALL	TOW
COVER LEVEL	CL	TELEGRAPH POLE	TP
DOWN PIPE	DP	UNABLE TO LIFT	UTL
DROPPED KERB	DK	VENT PIPE	VP
ELECTRICITY CONTROL BOX	ECB	RAIL WELD	WE
EAVES HEIGHT	EH	WATER METER	WM
ELECTRICITY MANHOLE	EM	WASHOUT	WO
ELECTRICITY POLE	EP		
EARTH ROD	ER		
FINISHED FLOOR LEVEL	FFL		
FIRE HYDRANT	FH	SURVEY STATION	GCS1
FOUL WATER	FW		
GULLY	GY		
GATE POST	GP	BUSHES	BH
GAS VALVE	GV		
INSULATED BLOCK JOINT	IBJ		
INSPECTION COVER	IC	HEDGES	
INVERT LEVEL	IL		
KERB OUTLET	KO		
LAMPPOST	LP	TREES	Height Species (Spread to scale)
LITTER BIN	LB		
MARKER POST	MK		
MILE POST	MP		
POST	PO		
RODDING EYE	RE	GATE	
RIDGE HEIGHT	RH		
ROAD NAMEPLATE	RN		
ROAD SIGN	RS	SECURITY FENCE	—x—x—
STUMP	SP	FENCE	—/—/—
SOFFIT LEVEL	SF	OVERHEAD CABLES	—OH—OH—
SIGNAL POST	SIG	FOUL WATER	—FW—FW—
RAIL SLEEPER LEVEL	SLP	GAS MAIN	—GM—GM—
SIGNALS AND TELECOMS BOX	STB	U/G POWER LINE	—PL—PL—
SIGNALS AND TELECOMS CABLE	STC	STORM WATER	—SW—SW—
SIGNALS AND TELECOMS POST	STP	U/G TELEPHONE	—TEL—TEL—
SIGN POST	SN	WATER MAIN	—WM—WM—
STOP TAP	ST		
STOP VALVE	SV		
STAY	SY		
STORM WATER	SW		

Control Table

Station	Description	Eastings	Northings	Height

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THE SURVEY ASSOCIATION FULL MEMBER
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Drawing No:	Rev:
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Date:	Notes:	Name:	Rev:

Drawn:	Checked:	Scale:	Date:
MH	CC	1:100	25/08/20
File Name: GCS-JBA-0859-1		Sheet size: A1	Sheet: 7 of 7

C Key Modelled Structures

C.1 Bullfurlong Lane Culvert

Included in model? (state reason if not):	No (upstream end of model)
Model label:	UNN_1316
Type:	Circular concrete culvert
How has structure been modelled?	The structure was not represented in the model .

Culvert outlet, looking upstream.



C.2 Footpath Crossing, Culvert

Included in model? (state reason if not):	Yes
Model label:	UNN_1121
Type:	Concrete pipes
How has structure been modelled?	These pipes were modelled as a circular conduit units using Flood Modeller. Overtopping of the weir was represented within the 1D domain using a spill unit.

	UNN_1121	RIVER	SECTION			
	UNN_1121	JUNCTION	OPEN	UNN_1121CUi	UNN_1121Su	
	UNN_1121CUi	CULVERT	INLET	UNN_1121CUu	UNN_1121	
	UNN_1121CUu	CONDUIT	CIRCULAR			
	UNN_1121CUd	CONDUIT	CIRCULAR			
	UNN_1121CUd	CULVERT	OUTLET	UNN_1121CUo		UNN_1118
	UNN_1121Su	SPILL		UNN_1121Sd		
	UNN_1121CUo	JUNCTION	OPEN	UNN_1118	UNN_1121Sd	
	UNN_1118	RIVER	SECTION			

Upstream face, looking downstream.



Downstream face, looking upstream.



C.3 Farm Access Culvert

Included in model? (state reason if not):	Yes
Model label:	UNN_920
Type:	Concrete culvert
How has structure been modelled?	The pipe was modelled as a circular conduit unit using Flood Modeller. Overtopping of the pipe was represented within the 1D domain using a spill unit.

UNN_920	RIVER	SECTION				
UNN_920	JUNCTION	OPEN	UNN_920CUi	UNN_920Su		
UNN_920CUi	CULVERT	INLET	UNN_920CUu	UNN_920		
UNN_920CUu	CONDUIT	CIRCULAR				
UNN_920CUd	CONDUIT	CIRCULAR				
UNN_920CUd	CULVERT	OUTLET	UNN_920CUo		UNN_916	
UNN_920Su	SPILL		UNN_920Sd			
UNN_920CUo	JUNCTION	OPEN	UNN_916	UNN_920Sd		
UNN_916	RIVER	SECTION				

Upstream face, looking downstream



C.4 Farm Access Culvert

Included in model? (state reason if not):	Yes
Model label:	UNN_823
Type:	Concrete culvert
How has structure been modelled?	The pipe was modelled as a circular culvert using Flood Modeller. Overtopping of the bridge was represented within the 1D domain using a spill unit.

UNN_823	RIVER	SECTION				
UNN_823	JUNCTION	OPEN	UNN_823CUi	UNN_823Su		
UNN_823CUi	CULVERT	INLET	UNN_823CUu	UNN_823		
UNN_823CUu	CONDUIT	CIRCULAR				
UNN_823CUd	CONDUIT	CIRCULAR				
UNN_823CUd	CULVERT	OUTLET	UNN_823CUo		UNN_819	
UNN_823Su	SPILL		UNN_823Sd			
UNN_823CUo	JUNCTION	OPEN	UNN_819	UNN_823Sd		
UNN_819	RIVER	SECTION				

Upstream face, looking downstream



C.5 Farm access bridge

Included in model? (state reason if not):	Yes
Model label:	UNN_673
Type:	Arch Bridge
How has structure been modelled?	The bridge was modelled as an arch bridge using Flood Modeller. Overtopping of the bridge was represented within the 1D domain using a spill unit.

UNN_673	RIVER	SECTION			
UNN_673	JUNCTION	OPEN	UNN_673BRu	UNN_673Su	
UNN_673BRu	BRIDGE	ARCH	UNN_673BRd	UNN_673	UNN_669
UNN_673Su	SPILL		UNN_673Sd		
UNN_673BRd	JUNCTION	OPEN	UNN_669	UNN_673Sd	
UNN_669	RIVER	SECTION			

Upstream face, looking downstream.



C.6 Motorway Culvert

Included in model? (state reason if not):	Yes
Model label:	UNN_591
Type:	Concrete culvert
How has structure been modelled?	The culvert was modelled as a circular conduit unit, two conduit units were connected to represent the upstream and downstream section of the culvert using Flood Modeller. Overtopping of the bridge was not represented using a spill unit as the height of the culvert means there was no requirement.

	UNN_591	RIVER	SECTION			
	UNN_591	JUNCTION	OPEN	UNN_591CUi		
	UNN_591CUi	CULVERT	INLET	UNN_591CU1u	UNN_591	
	UNN_591CU1u	CONDUIT	CIRCULAR			
	UNN_591CU1d	CONDUIT	CIRCULAR			
	UNN_591CU1d	JUNCTION	OPEN	UNN_591CU2u		
	UNN_591CU2u	CONDUIT	CIRCULAR			
	UNN_591CU2d	CONDUIT	CIRCULAR			
	UNN_591CU2d	CULVERT	OUTLET	UNN_591CUo		UNN_546
	UNN_591CUo	JUNCTION	OPEN	UNN_546		
	UNN_546	RIVER	SECTION			

Upstream face, looking downstream



Downstream face, looking upstream.



C.7 Farm Access Culvert

Included in model? (state reason if not):	Yes
Model label:	UNN_541
Type:	Two circular culverts.
How has structure been modelled?	The culverts were modelled as an two separate conduit units using Flood Modeller. Overtopping of the bridge was represented within the 1D domain using a spill unit.

UNN_541	RIVER	SECTION				
UNN_541	JUNCTION	OPEN	UNN_541CU1i	UNN_541CU2i	UNN_541Su	
UNN_541CU1i	CULVERT	INLET	UNN_541CU1u	UNN_541		
UNN_541CU1u	CONDUIT	CIRCULAR				
UNN_541CU1d	CONDUIT	CIRCULAR				
UNN_541CU1d	CULVERT	OUTLET	UNN_541CU1o		UNN_536	
UNN_541CU2i	CULVERT	INLET	UNN_541CU2u	UNN_541		
UNN_541CU2u	CONDUIT	CIRCULAR				
UNN_541CU2d	CONDUIT	CIRCULAR				
UNN_541CU2d	CULVERT	OUTLET	UNN_541CU2o		UNN_536	
UNN_541Su	SPILL		UNN_541Sd			
UNN_541CU1o	JUNCTION	OPEN	UNN_541CU2o	UNN_536	UNN_541Sd	
UNN_536	RIVER	SECTION				

Upstream face, looking downstream.



C.8 Farm Access Culvert

Included in model? (state reason if not):	Yes
Model label:	UNN_488
Type:	Circular culvert.
How has structure been modelled?	The pipe was modelled as a circular culvert using Flood Modeller. Overtopping of the bridge was represented within the 1D domain using a spill unit.

	UNN_488	RIVER	SECTION			
	UNN_488	JUNCTION	OPEN	UNN_482CUi	UNN_482Su	
	UNN_482CUi	CULVERT	INLET	UNN_482CUu	UNN_488	
	UNN_482CUu	CONDUIT	CIRCULAR			
	UNN_482CUd	CONDUIT	CIRCULAR			
	UNN_482CUd	CULVERT	OUTLET	UNN_482CUo		UNN_482
	UNN_482Su	SPILL		UNN_482Sd		
	UNN_482CUo	JUNCTION	OPEN	UNN_482	UNN_482Sd	
	UNN_482	RIVER	SECTION			

Downstream face, looking upstream.



C.9 Farm Access Culvert

Included in model? (state reason if not):	Yes
Model label:	UNN_384
Type:	Circular culvert.
How has structure been modelled?	The pipe was modelled as a circular culvert using Flood Modeller. Overtopping of the bridge was represented within the 1D domain using a spill unit.

UNN_384	RIVER	SECTION				
UNN_384	JUNCTION	OPEN	UNN_384CUi	UNN_384Su		
UNN_384CUi	CULVERT	INLET	UNN_384CUu	UNN_384		
UNN_384CUu	CONDUIT	CIRCULAR				
UNN_384CUd	CONDUIT	CIRCULAR				
UNN_384CUd	CULVERT	OUTLET	UNN_384CUo		UNN_380	
UNN_384Su	SPILL		UNN_384Sd			
UNN_384CUo	JUNCTION	OPEN	UNN_380	UNN_384Sd		
UNN_380	RIVER	SECTION				

Upstream face, looking downstream.



D Hydrological Assessment

Flood estimation report: 2020s1151 - Rodgers Leask - Hydraulic Modelling at Burbage

Introduction

This report template is based on a supporting document to the Environment Agency's flood estimation guidelines. It provides a record of the hydrological context, the method statement, the calculations and decisions made during flood estimation and the results.

Contents

1	**Method statement**	2
2	**Locations where flood estimates required**	8
3	**Statistical method**	10
5	**Revitalised flood hydrograph 2 (ReFH2) method**	13
6	**Discussion and summary of results**	14
7	**Annex**	17

Approval

	Name and qualifications	Date
Method statement prepared by:	Rozy Shepherd BSc	09/09/2020
Method statement reviewed by:	Eva Kordomenidi	02/10/2020
Calculations prepared by:	Rozy Shepherd BSc	09/09/2020
Calculations reviewed by:	Eva Kordomenidi	02/10/2020

Revision History

Revision reference	Date issued	Amendments	Issued to
P01	October 2020	Draft	Nick Fenton, Rodgers Leask

Abbreviations

AM	Annual Maximum
AREA	Catchment area (km^2)
BFI	Base Flow Index
BFIHOST	Base Flow Index derived using the HOST soil classification
CFMP	Catchment Flood Management Plan
CPRE	Council for the Protection of Rural England
FARL	FEH index of flood attenuation due to reservoirs and lakes
FEH	Flood Estimation Handbook
FSR	Flood Studies Report
HOST	Hydrology of Soil Types
NRFA	National River Flow Archive
POT	Peaks Over a Threshold
QMED	Median Annual Flood (with return period 2 years)
ReFH	Revitalised Flood Hydrograph method
SAAR	Standard Average Annual Rainfall (mm)
SPR	Standard percentage runoff
SPRHOST	Standard percentage runoff derived using the HOST soil classification
Tp(0)	Time to peak of the instantaneous unit hydrograph
URBAN	Flood Studies Report index of fractional urban extent
URBEXT1990	FEH index of fractional urban extent
URBEXT2000	Revised index of urban extent, measured differently from URBEXT1990
WINFAP-FEH	Windows Frequency Analysis Package – used for FEH statistical method

1 Method statement

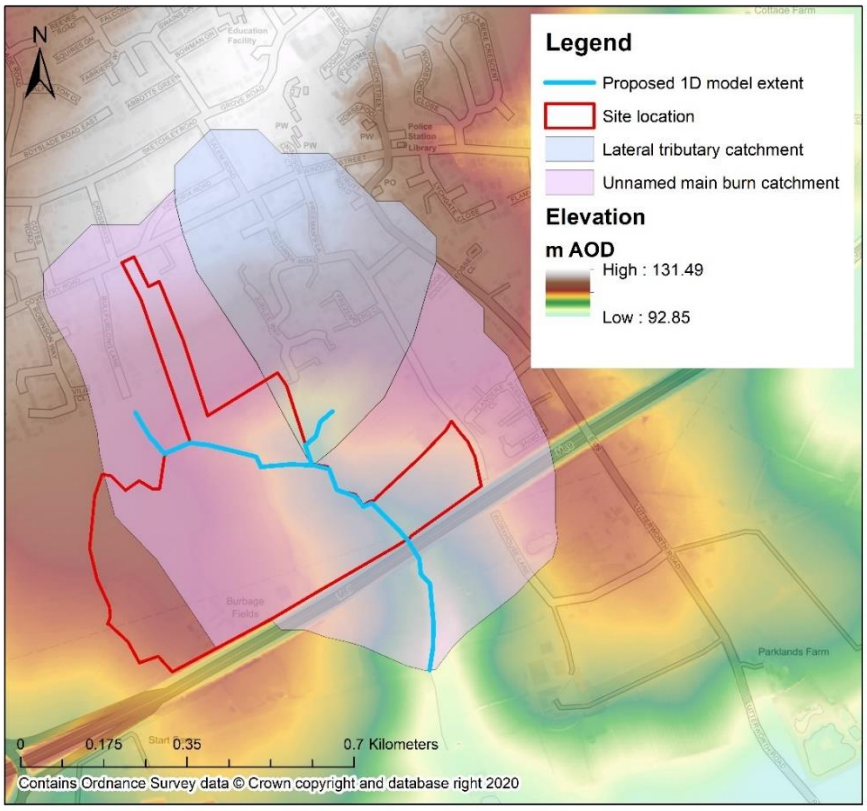
1.1 Requirements for flood estimates

Overview • Purpose of study • Peak flows or hydrographs? • Range of return periods and locations	This calculation record documents the approach used for obtaining peak flows and design hydrographs for use in a fluvial hydraulic model of a small, unnamed burn near Burbage, Leicestershire. This unnamed burn is a small tributary of the River Soar. The aim of the hydraulic model is to investigate flood risk to a proposed housing development (across one parcel of land) at Burbage fields, between Burbage and the M69. The return periods of interest are the 20-year, 100-year and 1000-year events, as well as the 100 year event with a 30% and 50% allowance for climate change[1].
Project scope • Rating reviews? • Flood history? • ReFH parameter estimation? • Joint probability?	The hydraulic model study is being carried out for the client, Rodgers Leask, for their use in their FRA at the site. The catchment is ungauged, and as such no rating reviews are required. The site is inland, and therefore joint probability will also not be required. The sewer and surface water asset maps for the catchment were purchased from Severn Trent. These were reviewed to understand their impact on the hydrology and potential flood risk in the catchment, in particular at the site.

1.2 The catchment

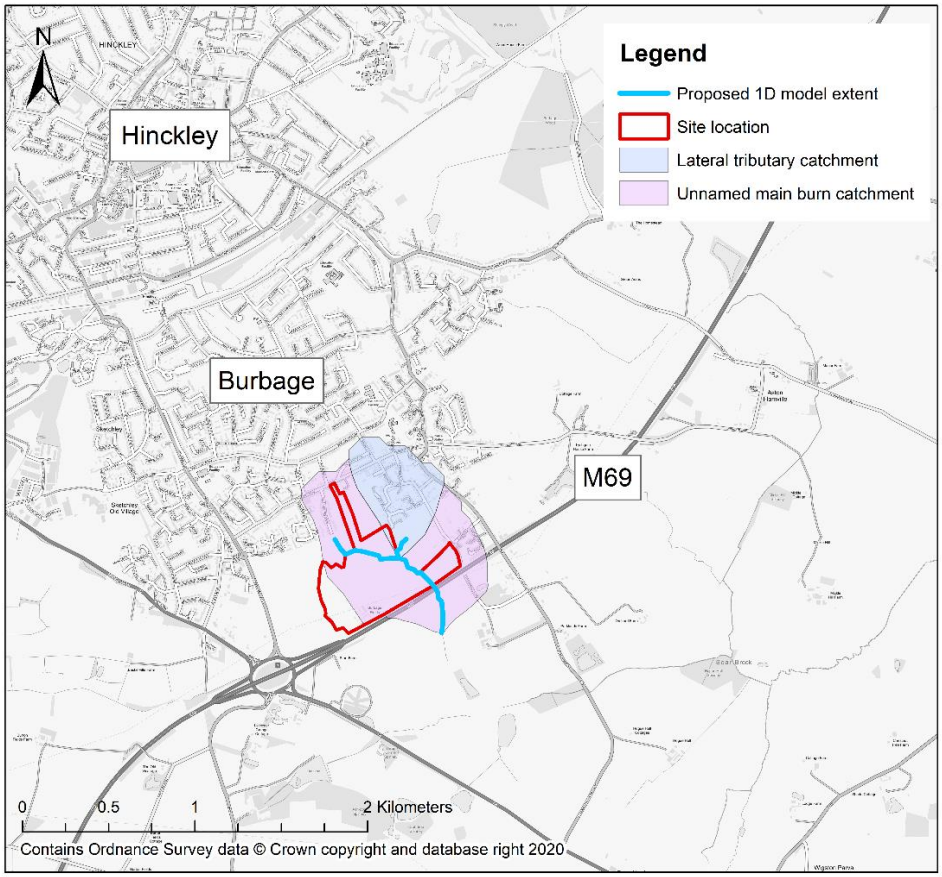
Map (Include river network, catchment boundary and gauging stations)

Figure 1 – Site location, large scale



[1] Environment Agency – Flood Risk Assessments, climate change allowances. February 2016. Upper end allowances for the Humber River Basin District, for the '2050s' and '2080s' as outlined in Table 1 (https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances).

Figure 2 – site location, small scale



Description Include topography, climate, geology, soils, land use and any unusual features that may affect the flood hydrology.	The catchment is small, ungauged, mixed urban / rural and gently slopes to the southern boundary. With reference to Environment Agency open source LiDAR data, the topology of the catchment ranges from elevations of circa. 130 mAOD in the northern area of the catchment, to circa. 100 mAOD in the southern section of the catchment (downstream extent of the hydraulic model). The proposed parcel of land considered for housing development is in the middle to south-western section of the catchment and is situated at circa. 105 mAOD to 127 mAOD (with reference to available LiDAR data). There is a road bridge (M69) over the unnamed burn, just downstream of the site boundary. There are two inflows in to the hydraulic model – one at the upstream extent of the model (western inflow – unnamed main burn) and the other at a smaller tributary, which joins about half way down the model's reach. The unnamed burn flows in a south-easterly direction and has a total catchment area of 0.72 km² at the downstream extent of the model (grid reference 444500 291300, as downloaded from the UK CEH FEH web service). The catchment area for the small tributary to this burn (which flows in a south-westerly direction) is encompassed within the overall catchment area of the unnamed burn. The location used to calculate peak flows for the small tributary was also taken from the downstream extent of the model, as the drainage network on the FEH web service did not go upstream of this location (i.e. it did not cover the location of the confluence between the main burn and the tributary).

	The catchment area for the small tributary was adjusted to not include the catchment area already accounted for the inflow to the main burn. The land use in the catchment is mainly agricultural with the southern outskirts of Burbage being urbanised areas within the catchment (URBEXT2000: 0.018). The underlying geology includes a sedimentary bedrock completely overlain by superficial deposits of diamicton, sand and gravel[2]. The unnamed burn joins the Soar Brook at a confluence about 500 m to the south of the catchment, which in itself is a tributary of the River Soar. The unnamed burn's catchment is within NRFA hydrometric region 28 - Trent. <u>Review of Severn Trent asset data (last revision August 2020)</u> The sewer and surface water asset maps for the catchment were purchased from Severn Trent. These show that there are three surface water drains within the urbanised area adjacently to the north of the site: 1. One drain covers the small residential area of Robinsons way, to the south of Coventry road. This area is to the north of the site, and adjacent to the north-western boundary of the catchment area, as used for the fluvial modelling. This surface water drain is discharged at the upstream extent of the unnamed main burn. 2. A second drain also runs down Bullfurlong lane, starting to the south of Coventry road. This lane is within the catchment boundary, to the north of the site. The surface water drain also discharges to the upstream extent of the unnamed main burn. 3. A third drain runs down a short section of Britannia road, within the catchment area for the small tributary. Discharge is at a manhole near Frezenberg close, also within the catchment. As with the other surface water drains above, this drain is outwith the site boundary. Given that the drain outlined in point 1 is a small network and mostly within the catchment area, and also drains directly to the unnamed main burn, then this network is anticipated to have negligible affect on the hydrology of the catchment. The catchment area of the drain outlined in point 2 and 3 above are completely within the catchment area. All drains are anticipated to be low risk with regard to flooding on site. All combined and foul drains route and discharge to the west or east of the catchment and site boundary area, either along Coventry road and Canberra way (to the west) or Britannia road and Lutterworth road to the east, and the risk of flooding from these drainage networks are therefore considered to be low. There are no drainage networks that currently route through the site's boundary. The asset maps are included in the appendix.

[2] BGS open geoscience. 2020. http://mapapps.bgs.ac.uk/geologyofbritain/home.html

1.3 Source of flood peak data

Source	NRFA peak flows dataset, Version 8, released September 2019. This contains data up to water year 2017-18.

1.4 Gauging stations (flow or level)

(at or very near to the sites of flood estimates)

Water-course	Station name	Gauging authority number	NRFA number	Catchment area (km²)	Type (rated / ultrasonic / level…)	Start of record and end if station closed
N/A – no NRFA river gauges in the vicinity of the catchment						

1.5 Other data available and how it has been obtained

Type of data	Data relevant to this study?	Data available ?	Source of data	Details
Check flow gaugings (if planned to review ratings)	N/A - ungauged	No		
Historic flood data Include chronology and interpretation of flood history in Annex or separate report.	No historic flood review undertaken			
Flow or river level data for events	N/A - ungauged	No		
Rainfall data for events	N/A			
Potential evaporation data	N/A			
Results from previous studies	None undertaken in area			
Other data or information (e.g. groundwater, tides, channel widths, low flow statistics)	Severn Trent asset maps	Yes – purchased from Severn Trent		Sewer and surface water asset maps for the catchment were reviewed.

1.6 Hydrological understanding of catchment

Hydrological interpretation Catchment processes, response time, propagation of flood, contributions from tributaries	Flood water has been known to collect at the upstream face of the M69 road bridge. This area is within the site boundary. It is hoped that this study will inform of the extents, depths and levels of flooding in this area.
Plots of flood peak	N/A

data i.e. AMAX or POT series	
Hydrological interpretation Discuss outliers, non-stationarity.	N/A

Outline the conceptual model, addressing questions such as: • Where are the main sites of interest? • What is likely to cause flooding at those locations? (peak flows, flood volumes, combinations of peaks, groundwater, snowmelt, tides…) • Might those locations flood from runoff generated on part of the catchment only, e.g. downstream of a reservoir? • Is there a need to consider temporary debris dams that could collapse?	The main area of interest is the lowest topographic area within the site's boundary, which is at the upstream face of the M69 road bridge, over the unnamed burn (flood water has been known to collect here during storm events, potentially due to restriction of the road bridge on the watercourse at this location).
Any unusual catchment features to take into account? e.g. • highly permeable – avoid ReFH if BFIHOST>0.65, consider permeable catchment adjustment for statistical method if SPRHOST<20% • highly urbanised – seek local flow data; consider method that can account for differing sewer and topographic catchments • pumped watercourse – consider lowland catchment version of rainfall-runoff method • major reservoir influence (FARL<0.90) – consider flood routing, extensive floodplain storage – consider choice of method carefully	Key catchment descriptors indicate that the catchment has fairly low rainfall (over 644 mm per year) and fairly high runoff (SPRHOST values of over 46.23%) with moderate/high permeability (BFIHOST19 value of 0.47). The land use in the catchment is a mix of urban and rural (URBEXT2000: 0.018). The catchment has a high FARL value (1), suggesting it is not affected by attenuation effects of reservoir storage.

1.7 Initial choice of approach

Is FEH appropriate? (it may not be for extremely heavily urbanised or complex catchments) If not, describe other methods to be used.	Yes
Initial choice of method(s) and reasons How will hydrograph shapes be derived if needed? Will the catchment be split into sub-catchments? If so, how?	Initial method: ReFH2.3 Reason: Small, semi-urban catchments are generally more suited to having peak flows calculated by a rainfall-run-off method, and the ReFH2 method (using FEH13 rainfall) is considered an accepted rainfall-runoff method by the EA. In addition, ReFH2.3 (an updated version of ReFH2) incorporates the BFIHOST19 catchment descriptor values as downloaded from the UK CEH FEH web service. In addition, there are no gauges at or near the catchment which could be used for single site or enhanced single site statistical method. However, the FEH Statistical method (with pooling group) has been undertaken for comparison purposes. The catchment has been split in to two sub

	catchments, as there are two inflows required for the hydraulic model. This is described in section 1.2.
Software to be used (with version numbers)	FEH Web Service[3] / WINFAP-FEH v3.0.003[4] / ReFH2.3

[3] CEH 2015. The Flood Estimation Handbook (FEH) Online Service, Centre for Ecology & Hydrology, Wallingford, Oxon, UK.

[4] WINFAP-FEH v3 © Wallingford HydroSolutions Limited and NERC (CEH) 2009.

2 Locations where flood estimates required

The table below lists the locations of subject sites. The site codes listed below are used in all subsequent tables to save space.

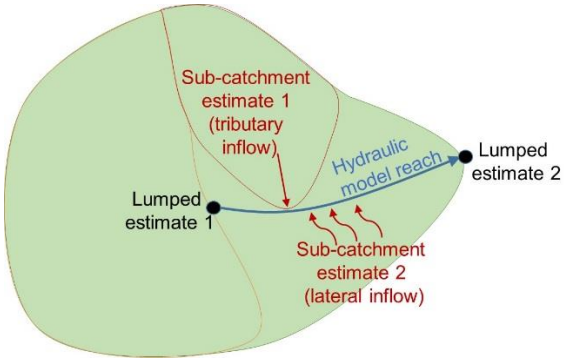
2.1 Summary of subject sites

Site code	Type of estimate L: lumped catchment S: Sub-catchment	Watercourse	Name or description of site	Easting	Northing	AREA on FEH CD-ROM (km^2)	Revised AREA if altered
Ungauged_01	flow	Unnamed main burn	Downstream extent of hydraulic model (downstream of M69 road bridge)	444500	291300	0.72	0.59 (inflow for 'unnamed main burn')
Ungauged_02	flow	Small tributary	Downstream extent of hydraulic model (downstream of M69 road bridge)	444500	291300	0.72	0.23 (inflow for 'lateral tributary')

Note: Lumped catchments (L) are complete catchments draining to points at which design flows are required.

Sub-catchments (S) are catchments or intervening areas that are being used as inputs to a semi-distributed model of the river system. There is no need to report any design flows for sub-catchments, as they are not relevant: the relevant result is the hydrograph that the sub-catchment is expected to contribute to a design flood event at a point further downstream in the river system. This will be recorded within the hydraulic model output files. However, catchment descriptors and ReFH model parameters should be recorded for sub-catchments so that the results can be reproduced.

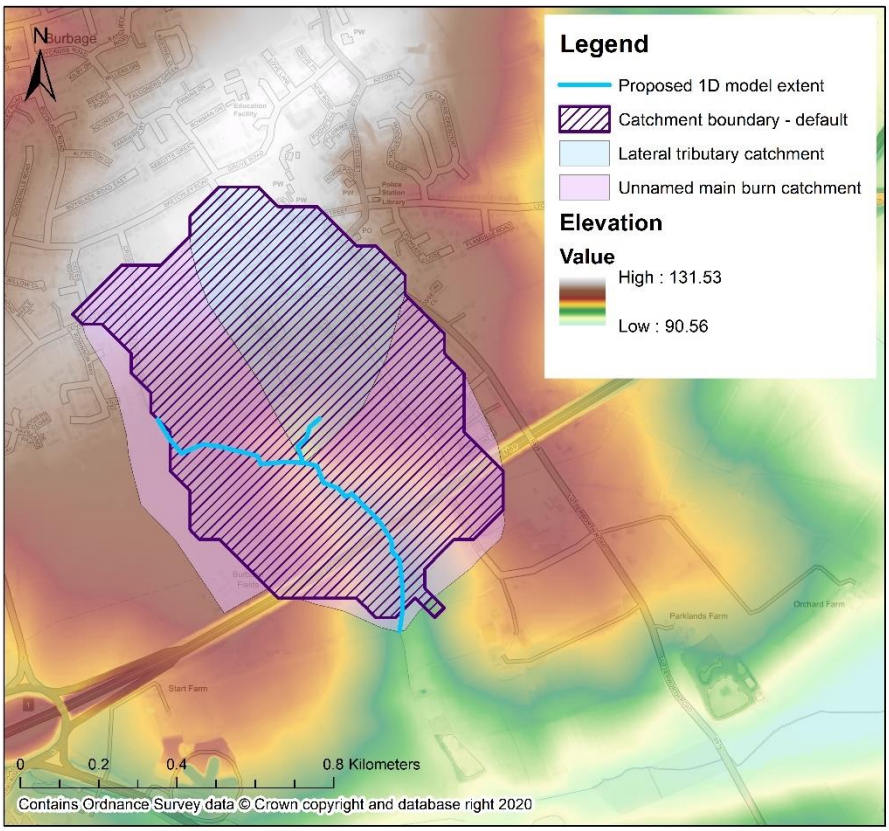
The schematic diagram illustrates the distinction between lumped and sub-catchment estimates.



2.2 Important catchment descriptors at each subject site (incorporating any changes made)

Site code	FARL	PROPWET	BFIHOST	DPLBAR (km)	DPSBAR (m/km)	SAAR (mm)	URBEXT 2000	FPEXT
Ungauged_01	1	0.3	0.491 (BFIHOST 19 = 0.47)	0.75	24.1	664	0.18	0.049
Ungauged_02	1	0.3	0.491 (BFIHOST 19 = 0.47)	0.75	24.1	664	0.18	0.049

2.3 Checking catchment descriptors

Record how catchment boundary was checked and describe any changes (add maps if needed)	The catchment boundaries were checked against Ordnance Survey (OS) mapped information and LiDAR data (open source, available from the Environment Agency) and slight adjustments were made with reference to this. The catchment boundary was taken from the downstream extent for both inflows, and adjusted for both inflows so that the catchment areas used for each inflow do not overlap. Consideration to the topography of the small tributary catchment has been considered when adjusting the catchment, to try and consider the area of the small tributary as realistically as possible. Figure 3 - Default catchment boundary 
Record how other catchment descriptors were checked and describe any changes. Include before/after table if necessary.	DPLBAR recalculated with regard to FEH equation DPLBAR = AREA ^ 0.548[5]. All other catchment descriptors were obtained from the UK CEH FEH Web Service and are deemed appropriate.
Source of URBEXT	URBEXT2000
Method for updating of URBEXT	CPRE formula from 2006 CEH report on URBEXT2000

[5] CEH. (1999). Flood Estimation Handbook Volume 5: Catchment Descriptors.

3 Statistical method

3.1 Overview of estimation of QMED at each subject site

Site code	Initial QMED rural (m^3/s) (from catchment descriptors)	Final method	Data transfer					Urban adjust-ment factor (UAF)	Final QMED estimate (m^3/s)
			NRFA numbers for donor sites used (see 3.3)	Distance between centroids d_{ij} (km)	Moderated QMED adjustment factor, $(A/B)^a$	If more than one donor			
						Weight	Weighted ave. adjustment		
Unguaged_01	0.15	CDs	-	-	-	-	-	1.254	0.18
Unguaged_02	0.07	CDs	-	-	-	-	-	1.254	0.08

Are the values of QMED spatially consistent?	N/A – only downloaded at one location
Method used for urban adjustment for subject and donor sites	Kjeldsen (2010)[6]

Parameters used for WINFAP v4 urban adjustment if applicable		
Impervious fraction for built-up areas, IF	Percentage runoff for impervious surfaces, PR_{imp}	Method for calculating fractional urban cover, URBAN
N/A	N/A	N/A

Notes

Methods: AM – Annual maxima; POT – Peaks over threshold; DT – Data transfer (with urban adjustment); CD – Catchment descriptors alone (with urban adjustment); BCW – Catchment descriptors and bankfull channel width (add details); LF – Low flow statistics (add details).

The QMED adjustment factor A/B for each donor site is given in Table 3.2. This is moderated using the power term, a, which is a function of the distance between the centroids of the subject catchment and the donor catchment. The final estimate of QMED is: $(A/B)^a \times QMED_{initial} \times UAF$

Important note on urban adjustment

The method used to adjust QMED for urbanisation published in Kjeldsen (2010)[7] in which PRUAF is calculated from BFIHOST is not correctly applied in WINFAP-FEH v3.0.003. Significant differences occur only on urban catchments that are highly permeable.

[6] Kjeldsen, T. R. (2010). Modelling the impact of urbanization on flood frequency relationships in the UK. Hydrol. Res. **41**. 391-405.

[7] Kjeldsen, T. R. (2010). Modelling the impact of urbanization on flood frequency relationships in the UK. Hydrol. Res. **41**. 391-405.

3.2 Search for donor sites for QMED (if applicable)

Comment on potential donor sites Include a map if necessary. Note that donor catchments should usually be rural.	The suggested donors from WinFAP v3 did not appear to be suitable, mainly due to the very small size of the catchment and the fact that there are no known river gauges in close proximity to the site (the closest is Soar at Littlethorpe, NRFA number 28082, about 12 km to the east of the catchment). It was decided that using CDs to calculate QMED would give less uncertainty in the peak flow estimates.

3.3 Donor sites chosen and QMED adjustment factors

NRFA no.	Reasons for choosing	Method (AM or POT)	Adjust-ment for climatic variation ?	QMED from flow data (A)	QMED from catchment descriptor s (B)	Adjust -ment ratio (A/B)
No donor sites chosen for QMED donor transfer						

3.4 Derivation of pooling groups

Several subject sites may use the same pooling group.

Name of group	Site code from whose descriptor s group was derived	Subject site treated as gauged? (enhanced single site analysis)	Changes made to default pooling group, with reasons .	Weighted average L-moments, L-CV and L-skew, (before urban adjustment)
FinalPool ingGrou p_Burba geFields	Ungauged_ 01 (and Ungauged_ 02)	No	See appendix.	L-CV: 0.256 L-skew: 0.280

Note: Pooling groups were derived using the procedures from Science Report SC050050 (2008).

3.5 Derivation of flood growth curves at subject sites

Site code	Metho d (SS, P, ESS, J)	If P, ESS or J, name of pooling group (Error! Reference source not found.)	Distribution used and reason for choice	Note any urban adjustment or permeable adjustment	Parameters of distribution (location, scale and shape after adjustments)	Growth factor for 100-year return period
Unga uged_ 01	P	FinalPooli ngGroup_ BurbageFi elds	GL (marked as appropriate to use in Winfap)	Urban adjustment - Kjeldsen (2010).	Location: 1.000 Scale: 0.218 Shape: -0.315	3.25

Site code	Method (SS, P, ESS, J)	If P, ESS or J, name of pooling group (Error! Reference source not found.)	Distribution used and reason for choice	Note any urban adjustment or permeable adjustment	Parameters of distribution (location, scale and shape after adjustments)	Growth factor for 100-year return period
Ungauged_02	P	FinalPoolingGroup_BurbageFields	GL (marked as appropriate to use in Winfap)	Urban adjustment - Kjeldsen (2010).	Location: 1.000 Scale: 0.218 Shape: -0.315	3.25

Notes

Methods: SS – Single site; P – Pooled; ESS – Enhanced single site; J – Joint analysis

A pooling group (or ESS analysis) derived at one gauge can be applied to estimate growth curves at a number of ungauged sites. Each site may have a different urban adjustment, and therefore different growth curve parameters.

Urban adjustments are all carried out using the method of Kjeldsen (2010).

Growth curves were derived using the procedures from Science Report SC050050 (2008).

3.6 Flood estimates from the statistical method

Site code	Flood peak (m^3/s) for the following return periods (in years)										
	50	20	10	5	3.3	2	1.3	1	0.5	0.2	0.1
Ungauged_01	0.18	0.25	0.31	0.38	0.42	0.49	0.55	0.60	0.73	0.96	1.18
Ungauged_02	0.08	0.11	0.14	0.17	0.19	0.22	0.25	0.27	0.33	0.43	0.53

5 Revitalised flood hydrograph 2 (ReFH2) method

5.1 Parameters for ReFH2 model

Site code	Method	Tp_{rural} (hours)	C_{max} (mm)	PR_{imp} % runoff for impermeable surfaces	BL (hours)	BR
Ungauged_01	CD	2.33	387.95	0.7	31.94	2.34
Ungauged_02	CD	1.74	387.95	0.7	28.57	2.52

Brief description of any flood event analysis carried out (further details should be given in the annex)	N/A

Methods: OPT: Optimisation, BR: Baseflow recession fitting, CD: Catchment descriptors, DT: Data transfer (give details)

5.2 Design events for ReFH2 method: Lumped catchments

Site code	Urban or rural	Season of design event (summer or winter)	Storm duration (hours)
Ungauged_01	urban	Winter	3.5 h
Ungauged_02	urban	Winter	2.75 h (adjusted to 3.5 h)

5.3 Design events for ReFH2 method: Sub-catchments and intervening areas

Site code	Season of design event	Storm duration (hours)	Storm area for ARF (if not catchment area)
No sub catchments or intervening areas.			
Are the storm durations likely to be changed in the next stage of the study, e.g. by optimisation within a hydraulic model?			No

5.4 Flood estimates from the ReFH2 method

Note: This table is for recording results for lumped catchments. There is no need to record peak flows from sub-catchments or intervening areas that are being used as inputs to a semi-distributed model of the river system.

Site code	Flood peak (m^3/s) for the following return periods (in years)										
	50	20	10	5	3.3	2	1.3	1	0.5	0.2	0.1
Ungauged_01	0.19	0.27	0.32	0.38	0.42	0.47	0.52	0.56	0.68	0.87	1.03
Ungauged_02	0.09	0.13	0.15	0.18	0.20	0.23	0.25	0.27	0.33	0.42	0.50

6 Discussion and summary of results

6.1 Comparison of results from different methods

This table compares peak flows from various methods with those from the FEH Statistical method at example sites for two key return periods. Blank cells indicate that results for a particular site were not calculated using that method.

Site code	Ratio of peak flow to FEH Statistical peak					
	Return period 2 years			Return period 100 years		
	ReFH	ReFH2	Other method	ReFH	ReFH2	Other method
Ungauged_01		1.06			0.93	
Ungauged_02		1.12			1.0	

6.2 Final choice of method

Choice of method and reasons Include reference to type of study, nature of catchment and type of data available.	Final method: ReFH2.3 Reason: There is appreciable uncertainty associated with both methods. Small, semi-urban catchments are generally more suited to having peak flows calculated by a rainfall-run-off method, and ReFH2 (using FEH13 rainfall) is a recommended method by Environment Agency. ReFH2.3 (an updated version of ReFH2) was used, which incorporates the BFIHOST19 catchment descriptor values as downloaded from the UK CEH FEH web service. On comparison with the statistical method, the ReFH2.3 peak flows were generally slightly higher for the lower return periods, but lower than the statistical method for the higher return periods. However, the statistical method has a relatively high 100-year growth curve factor, that is just outside of the range recommended from the Environment Agency (section 6.4). Hence, the ReFH2.3 method was deemed more appropriate to use.
How will the flows be applied to a hydraulic model? If relevant. Will model inflows be adjusted to achieve a match with lumped flow estimates, or will the model be allowed to route inflows?	Unnamed main burn – peak flows derived from the DS model extent, with the adjusted catchment area, will be applied as the inflow. The default storm duration of 3.5 hours with timestep of 0.5 hours will be used, and ReFH2.3 urban hydrographs will be used in the hydraulic model (if the model is 1D unsteady). Small tributary – peak flows derived from DS model extent, with the catchment area adjusted to include that of the tributary but not include that already accounted for at the US model extent. The storm duration was adjusted to that derived for the upstream model extent. This gave slightly more conservative peak flows for the small tributaries catchment. ReFH2.3 urban hydrographs will also be used in the hydraulic model (if the model is 1D unsteady).

6.3 Assumptions, limitations and uncertainty

List the main assumptions made (specific to this study)	The pooling group used in the statistical method for Ungauged_01 and Ungauged_02 is representative of the catchment as a whole.
Discuss any particular	The small tributary is not included in the drainage network

limitations, e.g. applying methods outside the range of catchment types or return periods for which they were developed.	on the UK CEH FEH webservice, so the exact catchment descriptors for this catchment area could not be downloaded from the website. The catchment descriptors used for the small tributaries catchment were therefore downloaded from the DS extent of the model, and the catchment area adjusted. The catchment is ungauged and so there is no flow data for the catchments that could be used for peak flow estimation.
Give what information you can on uncertainty in the results, e.g. confidence limits from Kjeldsen (2014).	For the FEH Statistical method, the uncertainty will depend on a variety of factors, for example, how unusual the catchment is relative to the pooling group, and the uncertainty in flow measurement at these gauges. Recent guidance on the reliability of design flood estimates in the UK (Kjeldsen, 2014) quotes average UK measures of uncertainty. The 95% confidence limits for a 1% AEP event flood estimate are: • Without donor adjustment of QMED (CDs): 0.42 - 2.37 times the best estimate. • With donor adjustment of QMED (DT): 0.45 - 2.25 times the best estimate.
Comment on the suitability of the results for future studies, e.g. at nearby locations or for different purposes.	The results should be refined before being used for any other purpose or at any other location within the catchment.
Give any other comments on the study, e.g. suggestions for additional work.	The sewer and surface water asset maps for the catchment have been purchased from Severn Trent (DigDat website), and have been reviewed to understand their impact on hydrology and potential flood risk in the catchment, in particular at the site.

6.4 Checks

Are the results consistent, for example at confluences?	N/A
What do the results imply regarding the return periods of floods during the period of record?	N/A – ungauged catchment
What is the range of 100-year growth factors? Is this realistic?	Ungauged_01 – US model extent (FEH Stat method) = 3.25 Ungauged_02 – small tributary (FEH Stat method) = 3.25 These are both slightly outside of the Environment Agency's recommended range of 1.8 to 3.0
If 1000-year flows have been derived, what is the range of ratios for 1000-year flow over 100-year flow?	Ungauged_01 – US model extent (Refh2.3) = 1.82 Ungauged_02 – small tributary (Refh2.3) = 1.85
How do the results compare with those of other studies? Explain any differences and conclude which results should be preferred.	No other studies were known to have been undertaken in the area.
Are the results compatible with the longer-term flood history?	History of flood events in the area not known. However, flood water has been seen to collect at the upstream face of

	the M69 road bridge, although it is uncertain how often this occurs, and the extent of flooding in this area.
Describe any other checks on the results	The statistical method and ReFH2.3 method both gave very similar peak flows at each return period.

6.5 Final results

Site code	Flood peak (m^3/s) for the following return periods (in years)										
	50	20	10	5	3.3	2	1.3	1	0.5	0.2	0.1
Ungauged_01	0.19	0.27	0.32	0.38	0.42	0.47	0.52	0.56	0.68	0.87	1.03
Ungauged_02	0.09	0.13	0.15	0.18	0.20	0.23	0.25	0.27	0.33	0.42	0.50

If flood hydrographs are needed for the next stage of the study, where are they provided? (e.g. give filename of spreadsheet, hydraulic model, or reference to table below)	Saved at this location: N:\2020\Projects\2020s1151 - Rodgers Leask - HYdraulic Modelling at Burbage\1_WIP\HO\Non_Graphical Spreadsheet titled 'EDS-JBAU-XX-XX-CA-HO-0002-Hydrology_Summary.xlsx'

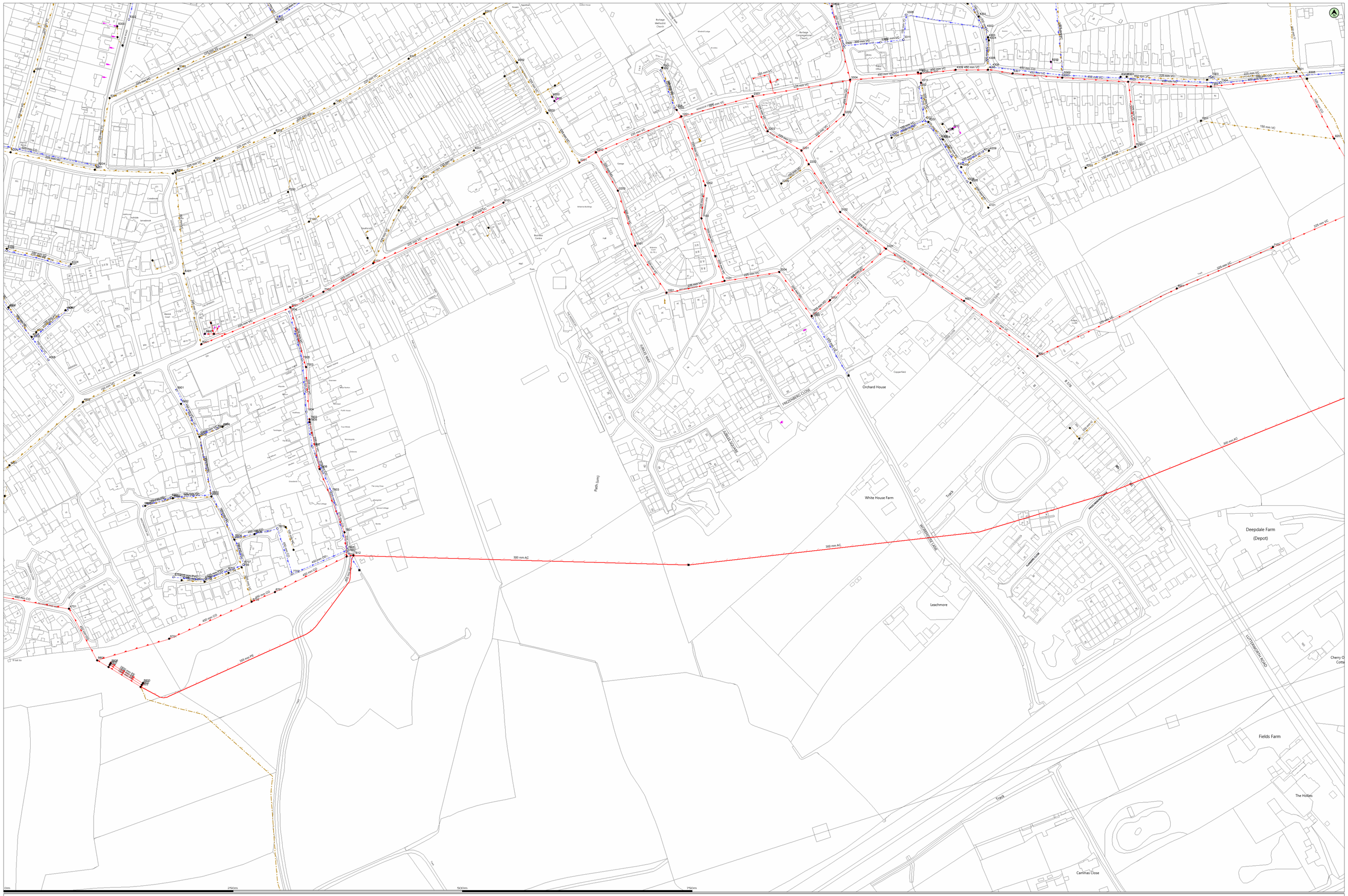
A Annex

A.1 Changes made to default pooling group – FEH statistical method

Adjustment/ Changes made to Default Pooling Group. Also note sites that were investigated but retained in the group (i.e. for discordancy)			
Station number	**Name**	**Addition/ Deletion/ Move/ Investigate**	**Reason**
27073	Brompton Beck @ Snainton Ings	Deletion	High FPEXT of 0.237
91802	Allt Leachdach @ Intake	Deletion	High SAAR of 2555 and High PROPWET of 0.83
49006	Camel @ Camelford	Deletion	marked as discordant (value 3.072)
54022	Severn @ Plynlimon Flume	Deletion	High SAAR of 2483 and High PROPWET of 0.66
206006	Annalong @ Recorder	Deletion	High SAAR of 1720 and High PROPWET of 0.59
203046	Rathmore Burn @ Rathmore Bridge	Addition	increase record length
51002	Horner Water @ West Luccombe	Addition	increase record length
27032	Hebden Beck @ Hebden	Addition	increase record length
49003	de Lank @ de Lank	Addition	increase record length

Page 1

A.2 Severn Trent Asset maps (last revised August 2020)



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Date: 02/09/20

Scale: 1:1250

Map Centre: 444132,291922

Data updated: 14/08/20

Our Ref: 432456 - 1

Wastewater Plan A0

Do not scale off this Map. This plan and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. In particular this plan and any information shown on it must not be relied upon in the event of any development or works being carried out in the vicinity of Severn Trent Water's pipes. This plan does not show the presence of any private sewers or drains or connection to the sewerage or distribution systems. On 1 October 2011 most private sewers and private lateral drains in Severn Trent Water's sewerage area, which were connected to a public sewer as at 1 July 2011, Transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 October 2012. Private pumping stations, which form part of these sewers or lateral drains, will transfer to ownership of Severn Trent Water on or before 1 October 2016. Severn Trent Water does not ossess complete records of these assets. These assets may not be displayed on the map. Reproduction by permission of Ordnance Survey on behalf of HMSO. © Crown Copyright and database right 2004. All rights reserved. Ordnance Survey licence number: 100031673. Document users other than SEVERN TRENT WATER business users are advised that this document is provided for reference purpose only and is subject to copyright, therefore, no further copies should be made from it.

rory.shepherd@jbaconsulting.com

Burbage fields north

2020s1511

SEVERN TRENT



SEVERN TRENT

GENERAL CONDITIONS AND PRECAUTIONS TO BE TAKEN WHEN CARRYING OUT WORK ADJACENT TO SEVERN TRENT WATER'S APPARATUS

Please ensure that a copy of these conditions is passed to your representative and/or your contractor on site. If any damage is caused to Severn Trent Water Limited (STW) apparatus (defined below), the person, contractor or subcontractor responsible must inform STW immediately on:
0800 783 4444 (24 hours)

a) These general conditions and precautions apply to the public sewerage, water distribution and cables in ducts including (but not limited to) sewers which are the subject of an Agreement under Section 104 of the Water Industry Act 1991(a legal agreement between a developer and STW, where a developer agrees to build sewers to an agreed standard, which STW will then adopt); mains installed in accordance with an agreement for the self-construction of water mains entered into with STW and the assets described at condition b) of these general conditions and precautions. Such apparatus is referred to as "STW Apparatus" in these general conditions and precautions.

b) Please be aware that due to The Private Sewers Transfer Regulations June 2011, the number of public sewers has increased, but many of these are not shown on the public sewer record. However, some idea of their positions may be obtained from the position of inspection covers and their existence must be anticipated.

c) On request, STW will issue a copy of the plan showing the approximate locations of STW Apparatus although in certain instances a charge will be made. The position of private drains, private sewers and water service pipes to properties are not normally shown but their presence must be anticipated. This plan and the information supplied with it is furnished as a general guide only and STW does not guarantee its accuracy.

d) STW does not update these plans on a regular basis. Therefore the position and depth of STW Apparatus may change and this plan is issued subject to any such change. Before any works are carried out, you should confirm whether any changes to the plan have been made since it was issued.

e) The plan must not be relied upon in the event of excavations or other works in the vicinity of STW Apparatus. It is your responsibility to ascertain the precise location of any STW Apparatus prior to undertaking any development or other works (including but not limited to excavations).

f) No person or company shall be relieved from liability for loss and/or damage caused to STW Apparatus by reason of the actual position and/or depths of STW Apparatus being different from those shown on the plan.

In order to achieve safe working conditions adjacent to any STW Apparatus the following should be observed:

1. All STW Apparatus should be located by hand digging prior to the use of mechanical excavators.

2. All information set out in any plans received from us, or given by our staff at the site of the works, about the position and depth of the mains, is approximate. Every possible precaution should be taken to avoid damage to STW Apparatus. You or your contractor must ensure the safety of STW Apparatus and will be responsible for the cost of repairing any loss and/or damage caused (including without limitation replacement parts).

3. Water mains are normally laid at a depth of 900mm. No records are kept of customer service pipes which are normally laid at a depth of 750mm; but some idea of their positions may be obtained from the position of stop tap covers and their existence must be anticipated.

4. During construction work, where heavy plant will cross the line of STW Apparatus, specific crossing points must be agreed with STW and suitably reinforced where required. These crossing points should be clearly marked and crossing of the line of STW Apparatus at other locations must be prevented.

5. Where it is proposed to carry out piling or boring within 20 metres of any STW Apparatus, STW should be consulted to enable any affected STW Apparatus to be surveyed prior to the works commencing.

6. Where excavation of trenches adjacent to any STW Apparatus affects its support, the STW Apparatus must be supported to the satisfaction of STW. Water mains and some sewers are pressurised and can fail if excavation removes support to thrust blocks to bends and other fittings.

7. Where a trench is excavated crossing or parallel to the line of any STW Apparatus, the backfill should be adequately compacted to prevent any settlement which could subsequently cause damage to the STW Apparatus. In special cases, it may be necessary to provide permanent support to STW Apparatus which has been exposed over a length of the excavation before backfilling and reinstatement is carried out. There should be no concrete backfill in contact with the STW Apparatus.

8. No other apparatus should be laid along the line of STW Apparatus irrespective of clearance. Above ground apparatus must not be located within a minimum of 3 metres either side of the centre line of STW Apparatus for smaller sized pipes and 6 metres either side for larger sized pipes without prior approval. No manhole or chamber shall be built over or around any STW Apparatus.

9. A minimum radial clearance of 300 millimetres should be allowed between any plant or equipment being installed and existing STW Apparatus. We reserve the right to increase this distance where strategic assets are affected.

10. Where any STW Apparatus coated with a special wrapping is damaged, even to a minor extent, STW must be notified and the trench left open until the damage has been inspected and the necessary repairs have been carried out. In the case of any material damage to any STW Apparatus causing leakage, weakening of the mechanical strength of the pipe or corrosion-protection damage, the necessary remedial work will be recharged to you.

11. It may be necessary to adjust the finished level of any surface boxes which may fall within your proposed construction. Please ensure that these are not damaged, buried or otherwise rendered inaccessible as a result of the works and that all stop taps, valves, hydrants, etc. remain accessible and operable. Minor reduction in existing levels may result in conflict with STW Apparatus such as valve spindles or tops of hydrants housed under the surface boxes. Checks should be made during site investigations to ascertain the level of such STW Apparatus in order to determine any necessary alterations in advance of the works.

12. With regard to any proposed resurfacing works, you are required to contact STW on the number given above to arrange a site inspection to establish the condition of any STW Apparatus in the nature of surface boxes or manhole covers and frames affected by the works. STW will then advise on any measures to be taken, in the event of this a proportionate charge will be made.

13. You are advised that STW will not agree to either the erection of posts, directly over or within 1.0 metre of valves and hydrants,

14. No explosives are to be used in the vicinity of any STW Apparatus without prior consultation with STW.

TREE PLANTING RESTRICTIONS

There are many problems with the location of trees adjacent to sewers, water mains and other STW Apparatus and these can lead to the loss of trees and hence amenity to the area which many people may have become used to. It is best if the problem is not created in the first place. Set out below are the recommendations for tree planting in close proximity to public sewers, water mains and other STW Apparatus.

15. Please ensure that, in relation to STW Apparatus, the mature root systems and canopies of any tree planted do not and will not encroach within the recommended distances specified in the notes below.


16. Both Poplar and Willow trees have extensive root systems and should not be planted within 12 metres of a sewer, water main or other STW Apparatus.

17. The following trees and those of similar size, be they deciduous or evergreen, should not be planted within 6 metres of a sewer, water main or other STW Apparatus. E.g. Ash, Beech, Birch, most Conifers, Elm, Horse Chestnut, Lime, Oak, Sycamore, Apple and Pear. Asset Protection Statements Updated May 2014

18. STW personnel require a clear path to conduct surveys etc. No shrubs or bushes should be planted within 2 metre of the centre line of a sewer, water main or other STW Apparatus.

19. In certain circumstances, both STW and landowners may wish to plant shrubs/bushes in close proximity to a sewer, water main of other STW Apparatus for screening purposes. The following are shallow rooting and are suitable for this purpose: Blackthorn, Broom, Cotoneaster, Elder, Hazel, Laurel, Privet, Quickthorn, Snowberry, and most ornamental flowering shrubs.

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
	C		0	0
	C		0	0
0101	C	125.75	123.92	1.83
0201	C	128.57	126.07	2.5
0202	C	128.28	126.29	1.99
0203	C	127.42	125.46	1.96
1001	C	123.42	119.99	3.43
1101	C	123.25	119.65	3.6
1103	C	124.27	122.65	1.62
1201	C	127.29	125.56	1.73
1202	C	125.11	123.38	1.73
2001	C	120.64	118.87	1.77
2004	C	0	0	0
2201	C	123.69	121.43	2.26
2202	C	123.42	121.12	2.3
2203	C	124.43	122.49	1.94
2301	C	125.24	123.21	2.03
3001	C	120.82	118.64	2.18
3101	C	120.7	117.66	3.04
3102	C	0	121.12	0
3203	C	122.06	120.15	1.91
3301	C	116.75	114.71	2.04
3304	C	121.15	118.15	3
3402	C	121.61	118.73	2.88
4001	C	119.15	116.68	2.47
4306	C	113.92	111.46	2.46
4309	C	114.89	112.96	1.93
4310	C	116.65	114.66	1.99
4311	C	117.15	115.11	2.04
4701	C	122.08	117.01	5.07
5001	C	117.92	115.56	2.36
5301	C	113.55	111.11	2.44
5303	C	112.92	110.44	2.48
5600	C	119.92	116.69	3.23
5601	C	121.26	117.11	4.15
5602	C	119.97	116.65	3.33
5603	C	119.86	116.6	3.26
5604	C	120.51	116.39	4.12
5605	C	120.49	0	0
5606	C	120.57	0	0
5701	C		0	0
6000	C		0	0
6001	C	125.04	122.82	2.22
6001	C	115.26	113.17	2.09
6201	C	113.87	111.63	2.24
6303	C	111.94	109.47	2.47
6701	C	116.27	112.81	3.46
6702	C	115.98	112.79	3.19
7001	C	126.14	122.42	3.72
7002	C	126.66	124.45	2.21
7003	C	124.56	122.06	2.5
7101	C	111.49	110.08	1.41
7302	C	110.19	0	0
7801	C	115.42	114.16	1.26
7806	C	117.03	114.92	2.11
7811	C	0	113.25	0
7812	C		0	0
7903	C	118.95	117.81	1.14
7905	C	118.88	117.22	1.66
8101	C	127.22	125.12	2.1
8103	C	128.46	126.11	2.35
8201	C	107.58	106.23	1.35
9101	C	128.65	126.78	1.87
	F		0	0
	F		0	0
	F		0	0
	F		0	0
	F		0	0
	F		0	0
	F		0	0
	F		0	0
	F		0	0
	F		0	0
	F		0	0
0300	F		0	0
1203	F	127.31	125.92	1.39
1301	F	129.02	127.36	1.66
2204	F	124.53	122.87	1.66
3202	F	120.73	118.55	2.18
4002	F	121.97	119.76	2.21
4004	F	122.81	120.6	2.21
4006	F	123.32	121.04	2.28
4008	F	122.86	120.76	2.1
4101	F	119.26	117.05	2.21
4102	F	121.23	118.86	2.37
4104	F	122.93	120.95	1.98
4200	F		0	0
4201	F	119.92	118.14	1.78
4201	F	118.92	115.77	3.15
4204	F	119.09	116.07	3.02
4205	F	119.06	117.05	2.01
4208	F	118.94	116.37	2.57
4209	F		0	0
4211	F		0	0
4301	F	119.64	118.53	1.11
4301	F	116.59	115.09	1.5
4303	F	115.2	113.85	1.35
4304	F	115.04	113.4	1.64
4405	F	117.47	115.85	1.62
4901	F	124.19	119.85	4.34
4902	F	124.57	0	0
5001	F	124.39	122.71	1.68
5101	F	125.31	123.25	2.06
5201	F	122.15	120.32	1.83
5202	F	124.77	0	0
5203	F	124.8	123.75	1.05
5203	F	116.04	113.13	2.91
5300	F		0	0
5300	F		0	0
5301	F	122.3	121.02	1.28
5303	F	123.98	122.34	1.64
5703	F	121.71	119.59	2.11
5802	F	122.74	120.76	1.98
5804	F	122.93	121.06	1.87
5902	F	124.13	122	2.13
6201	F	125.83	124.04	1.79
6202	F	126.92	124.56	2.36
6301	F	125.23	123.41	1.82
6301	F	111.87	109.58	2.29
6302	F	111.99	109.72	2.27
6303	F	125.84	123.55	2.29
6704	F	120.96	118.56	2.4
6706	F	121.38	119.09	2.29
6708	F	120.83	118.25	2.58
6802	F	122.44	120.14	2.3
6803	F	121.39	118.6	2.79
6806	F	120.92	119.37	1.55
6902	F	123.58	121.18	2.4
6904	F	123.74	121.54	2.19
7100	F		0	0
7200	F		0	0
7201	F	127.97	125.39	2.58
7201	F	111.31	110.66	0.65
7301	F	110.18	108.37	1.81
8102	F	128.27	126.29	1.98
8201	F	129.18	127.19	1.99
8301	F	129.03	126.59	2.44
8301	F	107.63	107.66	0
9201	F	129.72	127.59	2.13
9202	F	129.78	126.75	3.03
9300	F		0	0
9301	F	129.87	0	0
9302	F	130.01	0	0
1204	S	127.38	126.09	1.29
1302	S	129.02	127.6	1.42
2002	S	120.56	119.23	1.33
3201	S	120.71	118.63	2.08
3302	S	117.29	115.32	1.97
3303	S	119.98	118.45	1.53
3305	S	121.82	0	0
3306	S	119.37	0	0
3311	S	119.23	117.84	1.39
4001	S	121.97	120.15	1.82
4003	S	122.81	121.02	1.79
4005	S	123.28	121.53	1.75
4007	S	123.34	121.51	1.83
4101	S	122.92	121.09	1.83
4103	S	121.27	119.14	2.13
4202	S	118.94	116.02	2.92
4203	S	119.09	116.31	2.78
4206	S	119.07	117.32	1.75
4207	S	118.94	116.63	2.31
4210	S		0	0
4302	S	115.69	113.42	2.27
4305	S	114.21	112.97	1.24
4308	S	113.92	111.37	2.55
5204	S	122.28	120.97	1.31
5302	S	121.45	120.07	1.38
5302	S	112.69	110.19	2.5
5702	S	121.91	120.19	1.72
5801	S	122.76	121.21	1.55
5803	S	122.97	121.41	1.56
5901	S	124.36	122.84	1.52
6302	S	125.81	0	0
6703	S	120.99	119.62	1.36
6705	S	121.4	119.86	1.54
6707	S	120.84	119.54	1.3
6801	S	122.49	120.57	1.92
6804	S	121.37	118.99	2.38
6901	S	123.6	121.62	1.97
6903	S	123.71	121.79	1.92
7004	S	125.97	124.01	1.96
7005	S	124.76	122.71	2.05
7303	S	110.05	109.14	0.91
7304	S	109.84	107.64	2.2
7702	S	120.06	118.56	1.5
7802	S	115.36	114.15	1.21
7803	S	116.15	115.02	1.13
7805	S	119.44	118.37	1.07
7810	S	120.72	118.73	1.99
7902	S	118.14	116.52	1.62
7904	S	119.25	117.34	1.91
8305	S	107.6	105.38	2.22



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rozy.shepherd@jbaconsulting.com

Burbage fields south

2020s1511

SEVERN TRENT



SEVERN TRENT

GENERAL CONDITIONS AND PRECAUTIONS TO BE TAKEN WHEN CARRYING OUT WORK ADJACENT TO SEVERN TRENT WATER'S APPARATUS

Please ensure that a copy of these conditions is passed to your representative and/or your contractor on site. If any damage is caused to Severn Trent Water Limited (STW) apparatus (defined below), the person, contractor or subcontractor responsible must inform STW immediately on:
0800 783 4444 (24 hours)

a) These general conditions and precautions apply to the public sewerage, water distribution and cables in ducts including (but not limited to) sewers which are the subject of an Agreement under Section 104 of the Water Industry Act 1991(a legal agreement between a developer and STW, where a developer agrees to build sewers to an agreed standard, which STW will then adopt); mains installed in accordance with an agreement for the self-construction of water mains entered into with STW and the assets described at condition b) of these general conditions and precautions. Such apparatus is referred to as "STW Apparatus" in these general conditions and precautions.

b) Please be aware that due to The Private Sewers Transfer Regulations June 2011, the number of public sewers has increased, but many of these are not shown on the public sewer record. However, some idea of their positions may be obtained from the position of inspection covers and their existence must be anticipated.

c) On request, STW will issue a copy of the plan showing the approximate locations of STW Apparatus although in certain instances a charge will be made. The position of private drains, private sewers and water service pipes to properties are not normally shown but their presence must be anticipated. This plan and the information supplied with it is furnished as a general guide only and STW does not guarantee its accuracy.

d) STW does not update these plans on a regular basis. Therefore the position and depth of STW Apparatus may change and this plan is issued subject to any such change. Before any works are carried out, you should confirm whether any changes to the plan have been made since it was issued.

e) The plan must not be relied upon in the event of excavations or other works in the vicinity of STW Apparatus. It is your responsibility to ascertain the precise location of any STW Apparatus prior to undertaking any development or other works (including but not limited to excavations).

f) No person or company shall be relieved from liability for loss and/or damage caused to STW Apparatus by reason of the actual position and/or depths of STW Apparatus being different from those shown on the plan.

In order to achieve safe working conditions adjacent to any STW Apparatus the following should be observed:

1. All STW Apparatus should be located by hand digging prior to the use of mechanical excavators.

2. All information set out in any plans received from us, or given by our staff at the site of the works, about the position and depth of the mains, is approximate. Every possible precaution should be taken to avoid damage to STW Apparatus. You or your contractor must ensure the safety of STW Apparatus and will be responsible for the cost of repairing any loss and/or damage caused (including without limitation replacement parts).

3. Water mains are normally laid at a depth of 900mm. No records are kept of customer service pipes which are normally laid at a depth of 750mm; but some idea of their positions may be obtained from the position of stop tap covers and their existence must be anticipated.

4. During construction work, where heavy plant will cross the line of STW Apparatus, specific crossing points must be agreed with STW and suitably reinforced where required. These crossing points should be clearly marked and crossing of the line of STW Apparatus at other locations must be prevented.

5. Where it is proposed to carry out piling or boring within 20 metres of any STW Apparatus, STW should be consulted to enable any affected STW Apparatus to be surveyed prior to the works commencing.

6. Where excavation of trenches adjacent to any STW Apparatus affects its support, the STW Apparatus must be supported to the satisfaction of STW. Water mains and some sewers are pressurised and can fail if excavation removes support to thrust blocks to bends and other fittings.

7. Where a trench is excavated crossing or parallel to the line of any STW Apparatus, the backfill should be adequately compacted to prevent any settlement which could subsequently cause damage to the STW Apparatus. In special cases, it may be necessary to provide permanent support to STW Apparatus which has been exposed over a length of the excavation before backfilling and reinstatement is carried out. There should be no concrete backfill in contact with the STW Apparatus.

8. No other apparatus should be laid along the line of STW Apparatus irrespective of clearance. Above ground apparatus must not be located within a minimum of 3 metres either side of the centre line of STW Apparatus for smaller sized pipes and 6 metres either side for larger sized pipes without prior approval. No manhole or chamber shall be built over or around any STW Apparatus.

9. A minimum radial clearance of 300 millimetres should be allowed between any plant or equipment being installed and existing STW Apparatus. We reserve the right to increase this distance where strategic assets are affected.

10. Where any STW Apparatus coated with a special wrapping is damaged, even to a minor extent, STW must be notified and the trench left open until the damage has been inspected and the necessary repairs have been carried out. In the case of any material damage to any STW Apparatus causing leakage, weakening of the mechanical strength of the pipe or corrosion-protection damage, the necessary remedial work will be recharged to you.

11. It may be necessary to adjust the finished level of any surface boxes which may fall within your proposed construction. Please ensure that these are not damaged, buried or otherwise rendered inaccessible as a result of the works and that all stop taps, valves, hydrants, etc. remain accessible and operable. Minor reduction in existing levels may result in conflict with STW Apparatus such as valve spindles or tops of hydrants housed under the surface boxes. Checks should be made during site investigations to ascertain the level of such STW Apparatus in order to determine any necessary alterations in advance of the works.

12. With regard to any proposed resurfacing works, you are required to contact STW on the number given above to arrange a site inspection to establish the condition of any STW Apparatus in the nature of surface boxes or manhole covers and frames affected by the works. STW will then advise on any measures to be taken, in the event of this a proportionate charge will be made.

13. You are advised that STW will not agree to either the erection of posts, directly over or within 1.0 metre of valves and hydrants,

14. No explosives are to be used in the vicinity of any STW Apparatus without prior consultation with STW.

TREE PLANTING RESTRICTIONS

There are many problems with the location of trees adjacent to sewers, water mains and other STW Apparatus and these can lead to the loss of trees and hence amenity to the area which many people may have become used to. It is best if the problem is not created in the first place. Set out below are the recommendations for tree planting in close proximity to public sewers, water mains and other STW Apparatus.

15. Please ensure that, in relation to STW Apparatus, the mature root systems and canopies of any tree planted do not and will not encroach within the recommended distances specified in the notes below.

16. Both Poplar and Willow trees have extensive root systems and should not be planted within 12 metres of a sewer, water main or other STW Apparatus.

17. The following trees and those of similar size, be they deciduous or evergreen, should not be planted within 6 metres of a sewer, water main or other STW Apparatus. E.g. Ash, Beech, Birch, most Conifers, Elm, Horse Chestnut, Lime, Oak, Sycamore, Apple and Pear. Asset Protection Statements Updated May 2014

18. STW personnel require a clear path to conduct surveys etc. No shrubs or bushes should be planted within 2 metre of the centre line of a sewer, water main or other STW Apparatus.

19. In certain circumstances, both STW and landowners may wish to plant shrubs/bushes in close proximity to a sewer, water main of other STW Apparatus for screening purposes. The following are shallow rooting and are suitable for this purpose: Blackthorn, Broom, Cotoneaster, Elder, Hazel, Laurel, Privet, Quickthorn, Snowberry, and most ornamental flowering shrubs.

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert
4701	C	122.08	117.01	5.07
5600	C	119.92	116.69	3.23
5601	C	121.26	117.11	4.15
5602	C	119.97	116.65	3.33
5603	C	119.86	116.6	3.26
5604	C	120.51	116.39	4.12
5605	C	120.49	0	0
5606	C	120.57	0	0
5701	C		0	0
6701	C	116.27	112.81	3.46
6702	C	115.98	112.79	3.19
7801	C	115.42	114.16	1.26
7806	C	117.03	114.92	2.11
7811	C	0	113.25	0
7812	C		0	0
7903	C	118.95	117.81	1.14
7905	C	118.88	117.22	1.66
	F		0	0
	F		0	0
	F		0	0
	F		0	0
	F		0	0
4901	F	124.19	119.85	4.34
4902	F	124.57	0	0
5703	F	121.71	119.59	2.11
5802	F	122.74	120.76	1.98
5804	F	122.93	121.06	1.87
5902	F	124.13	122	2.13
6704	F	120.96	118.56	2.4
6706	F	121.38	119.09	2.29
6708	F	120.83	118.25	2.58
6802	F	122.44	120.14	2.3
6803	F	121.39	118.6	2.79
6806	F	120.92	119.37	1.55
6902	F	123.58	121.18	2.4
6904	F	123.74	121.54	2.19
5702	S	121.91	120.19	1.72
5801	S	122.76	121.21	1.55
5803	S	122.97	121.41	1.56
6703	S	120.99	119.62	1.36
6705	S	121.4	119.86	1.54
6707	S	120.84	119.54	1.3
6801	S	122.49	120.57	1.92
6804	S	121.37	118.99	2.38
6901	S	123.6	121.62	1.97
6903	S	123.71	121.79	1.92
7702	S	120.06	118.56	1.5
7802	S	115.36	114.15	1.21
7803	S	116.15	115.02	1.13
7805	S	119.44	118.37	1.07
7810	S	120.72	118.73	1.99
7902	S	118.14	116.52	1.62
7904	S	119.25	117.34	1.91

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Manhole Reference	Liquid Type	Cover Level	Invert Level	Depth to Invert

Offices at
Coleshill
Doncaster
Dublin
Edinburgh
Exeter
Glasgow
Haywards Heath
Isle of Man
Limerick
Newcastle upon Tyne
Newport
Peterborough
Saltaire
Skipton
Tadcaster
Thirsk
Wallingford
Warrington

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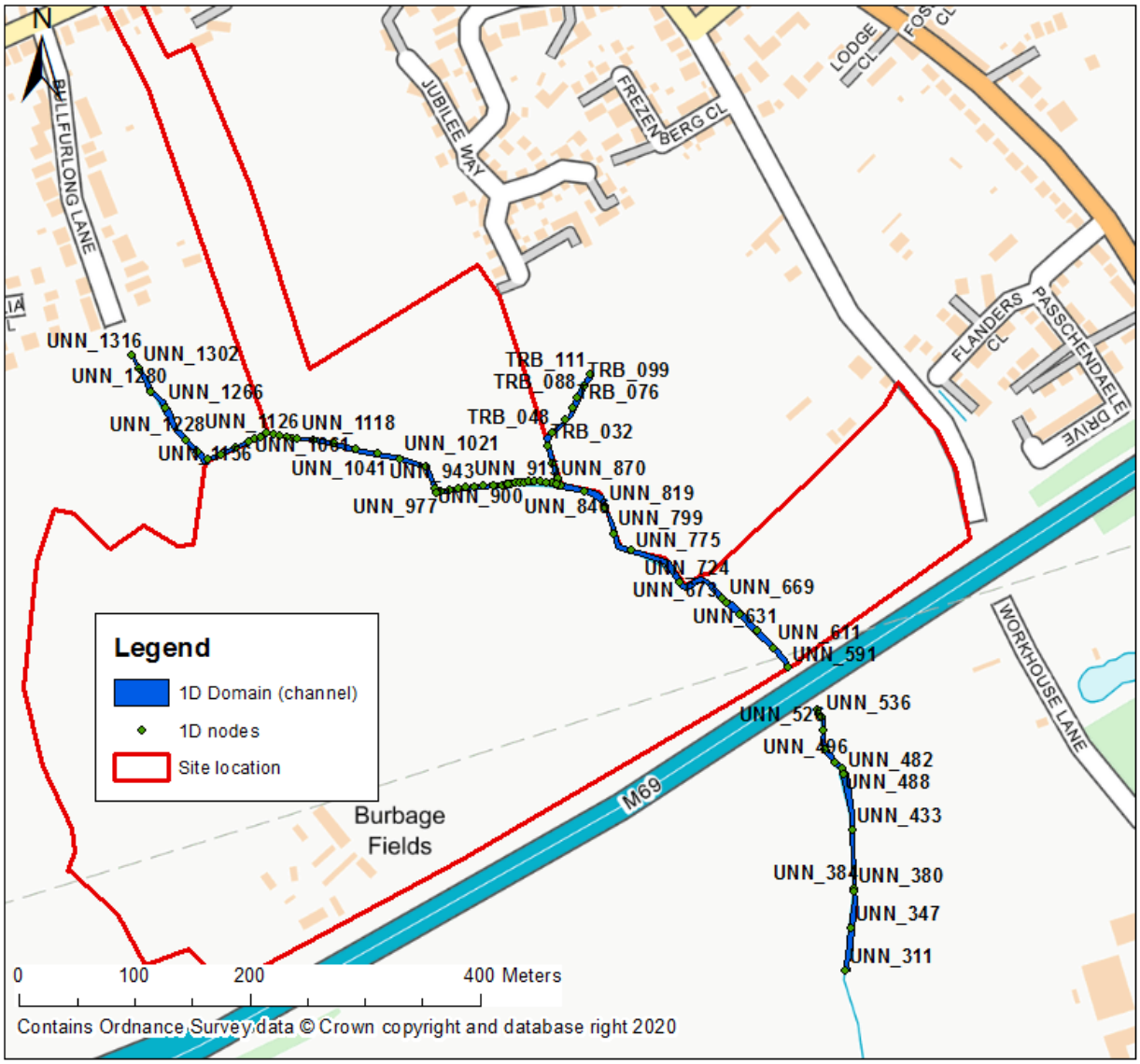
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JBA Group Ltd is certified to:
ISO 9001:2015
ISO 14001:2015
OHSAS 18001:2007

E Modelled water levels

E.1 Node location

Figure E-1: Node locations

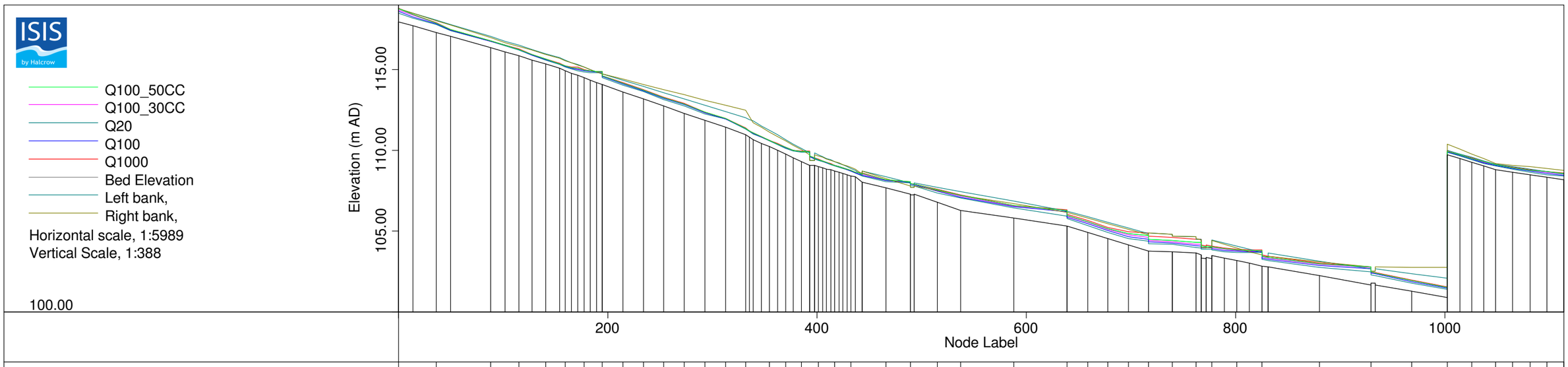


E.2 Long-section plot

Burbage Hydraulic Modelling

Long Section: UNN_1316 - TRB_006 - Maximum Stage; 0.25 - 8 h.

Node,: UNN_1316



Chainage,	0	36	88	115	141	160	177	195	214	234	254	273	293	312	332	354	370	385	401	417	433	466	489	515	537	588	639	659	678	698	717	740	762	777	801	825	880	929	968	1003	1026	1049	1065	1081	1098	1114
Q100_50CC	118.76	117.88	116.78	116.25	115.65	115.22	114.96	114.90	114.16	113.74	113.27	112.88	112.36	111.98	111.38	110.63	110.18	109.94	109.44	109.08	108.75	108.17	108.05	107.56	107.20	106.58	106.30	105.60	105.17	104.84	104.72	104.42	104.30	104.03	103.82	103.79	102.97	102.79	101.93	101.53	101.51	109.13	108.91	108.77	108.67	108.56
Q100_30CC	118.70	117.87	116.77	116.24	115.64	115.21	114.95	114.89	114.16	113.73	113.27	112.87	112.35	111.98	111.38	110.63	110.18	109.94	109.43	109.08	108.75	108.15	108.04	107.53	107.17	106.55	106.28	105.56	105.12	104.76	104.63	104.33	104.18	103.98	103.80	103.77	102.94	102.76	101.92	101.52	101.49	109.11	108.90	108.75	108.63	108.53
Q20	118.51	117.81	116.74	116.20	115.60	115.18	114.86	114.80	114.05	113.63	113.16	112.76	112.26	111.93	111.34	110.57	110.12	109.90	109.38	109.04	108.71	108.08	107.97	107.38	107.04	106.42	105.95	105.35	104.94	104.55	104.37	104.17	103.99	103.89	103.69	103.67	102.74	102.48	101.77	101.38	109.43	109.07	108.83	108.66	108.50	108.41
Q100	118.62	117.85	116.76	116.23	115.62	115.20	114.91	114.86	114.12	113.69	113.23	112.82	112.32	111.96	111.37	110.61	110.16	109.93	109.42	109.07	108.74	108.13	108.01	107.47	107.11	106.50	106.21	105.46	105.04	104.67	104.51	104.25	104.10	103.99	103.76	103.73	102.88	102.69	101.88	101.48	109.46	109.07	108.87	108.71	108.56	108.47
Q1000	118.79	117.90	116.78	116.27	115.66	115.24	114.99	114.90	114.18	113.76	113.30	112.90	112.38	111.99	111.39	110.64	110.19	109.95	109.45	109.09	108.76	108.19	108.07	107.60	107.24	106.61	106.33	105.65	105.23	104.96	104.88	104.61	104.48	104.08	103.86	103.83	103.01	102.81	101.96	101.56	109.54	109.16	108.94	108.81	108.70	108.59
Bed Elevation	117.96	117.31	116.36	115.85	115.34	114.94	114.50	114.06	113.62	113.18	112.74	112.30	111.86	111.42	110.98	110.22	109.76	109.31	109.00	108.72	108.43	107.66	107.28	106.79	106.30	105.80	105.30	104.92	104.54	104.15	103.77	103.71	103.65	103.31	103.17	102.85	102.23	101.65	101.27	100.88	109.26	108.80	108.64	108.49	108.34	108.19
Left bank,	118.78	118.07	117.05	116.51	115.99	115.58	115.15	114.72	114.33	113.94	113.56	113.17	112.79	112.40	112.01	111.24	110.67	110.11	109.72	109.30	108.89	108.36	107.99	107.71	107.44	106.85	106.26	105.91	105.55	105.20	104.85	104.81	104.65	103.96	104.07	103.70	103.16	102.66	102.37	102.08	109.57	109.15	109.00	108.84	108.69	108.53
Right bank,	118.76	118.03	116.97	116.44	115.95	115.56	115.15	114.73	114.41	114.09	113.76	113.44	113.12	112.79	112.47	111.14	110.58	110.03	109.66	109.30	108.94	108.26	107.81	107.52	107.22	106.69	106.15	105.81	105.47	105.13	104.78	104.81	104.65	103.96	103.96	103.51	103.12	102.78	102.77	102.75	109.78	109.19	109.09	108.98	108.88	108.78
Label,	UNN_1316	UNN_1280	UNN_1228	UNN_1201	UNN_1174	UNN_1156	UNN_1138	UNN_1121	UNN_1101	UNN_1081	UNN_1061	UNN_1041	UNN_1021	UNN_1001	UNN_981	UNN_958	UNN_943	UNN_927	UNN_915	UNN_900	UNN_881	UNN_846	UNN_823	UNN_799	UNN_775	UNN_724	UNN_673	UNN_652	UNN_631	UNN_611	UNN_591	UNN_591CU1d	UNN_591CU2d	UNN_541CU2d	UNN_511	UNN_488	UNN_433	UNN_384	UNN_347	UNN_311	TRB_088	TRB_065	TRB_048	TRB_032	TRB_015	TRB_006

F Sensitivity analysis

F.1 Sensitivity to flow

Figure E-1 shows the changes in peak water level compared to the baseline 100-year event when an increase of 20% is applied to all inflows.

Figure E-1: Sensitivity to changes in increase in flow

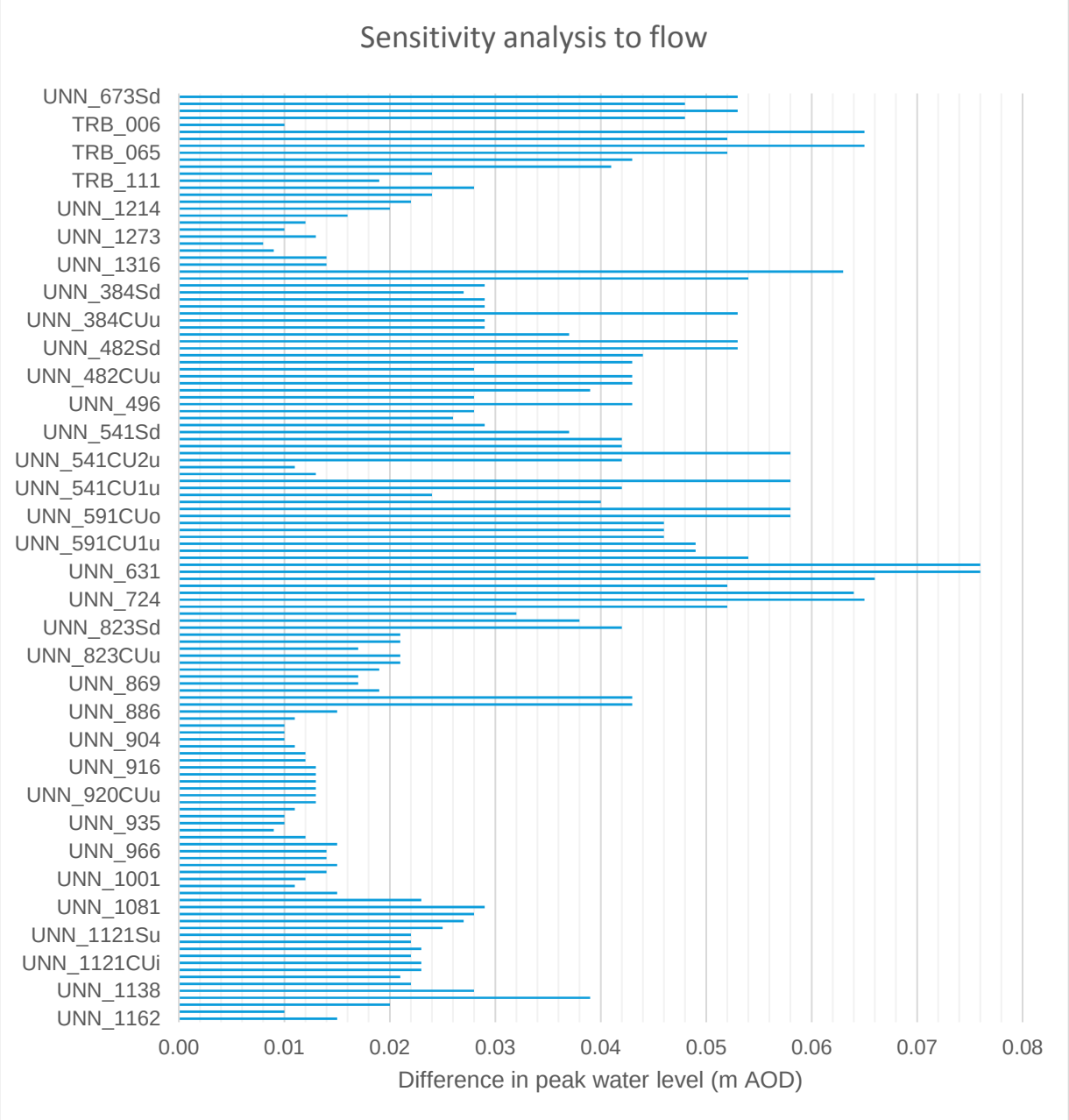


Figure E-1 shows that model results at the site increase by up to 80mm (approximately) when the model inflows are increased by 20%. As a result, the model results at the site are considered to be moderately sensitive to changes in flows.

F.2 Sensitivity to roughness

Figure E-2 shows the changes in peak water level compared to the baseline 100-year event when a change of +20% is applied Manning's 'n' in both the 1D and 2D domains.

Figure E-2: Sensitivity to changes in increase in roughness

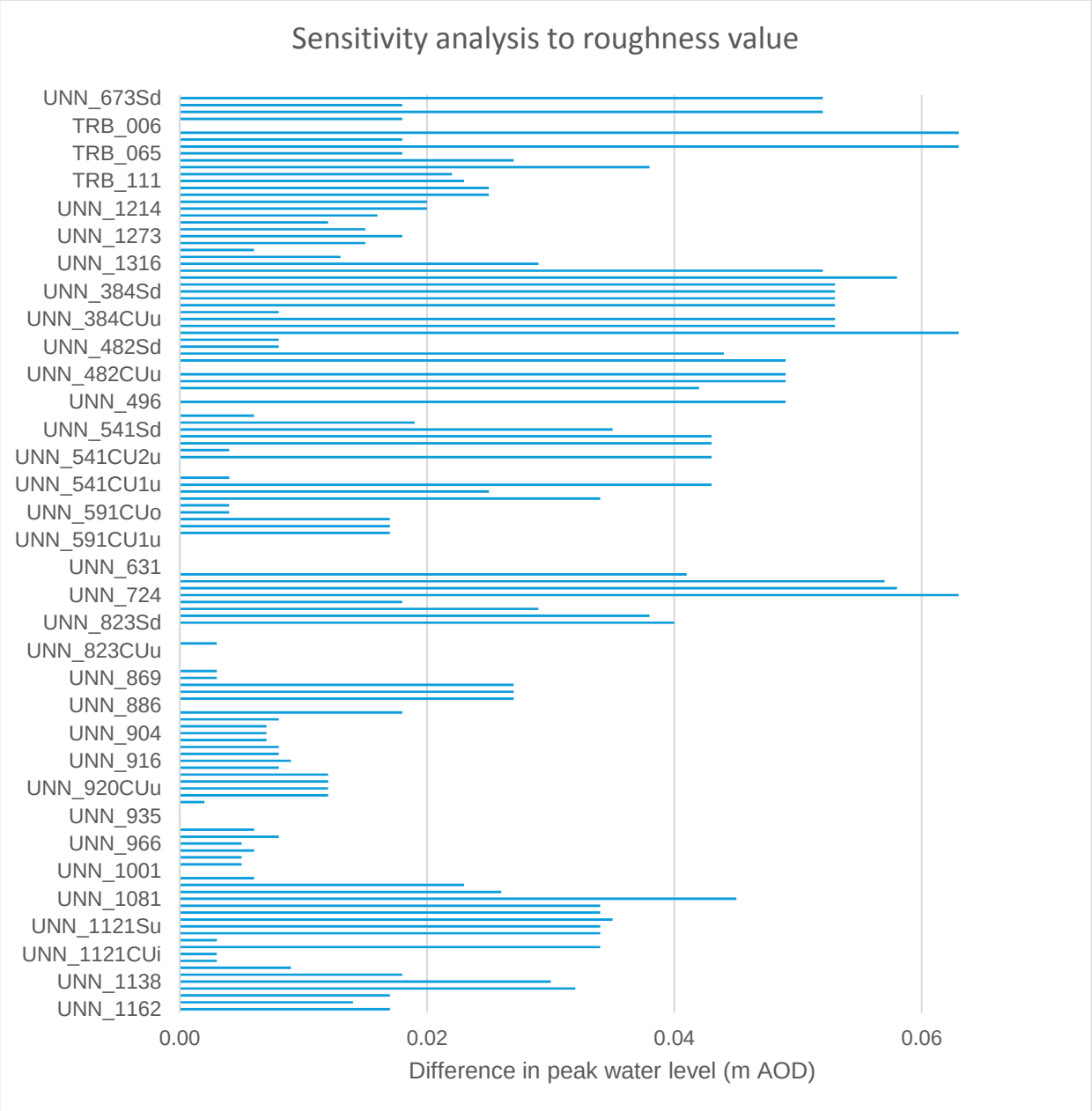


Figure D-2 shows that, when roughness values are increased by 20%, the maximum increase in peak water level at the site is approximately 70mm. As a result, the model results at the site are considered to be moderately sensitive to changes in roughness values.

F.3 Sensitivity to changes in downstream boundary conditions

Figure E-2 shows the changes in peak water level compared to the baseline 100-year event when a change of +250mm is applied to the downstream boundary conditions.

Figure E-3: Sensitivity to changes in downstream boundary conditions

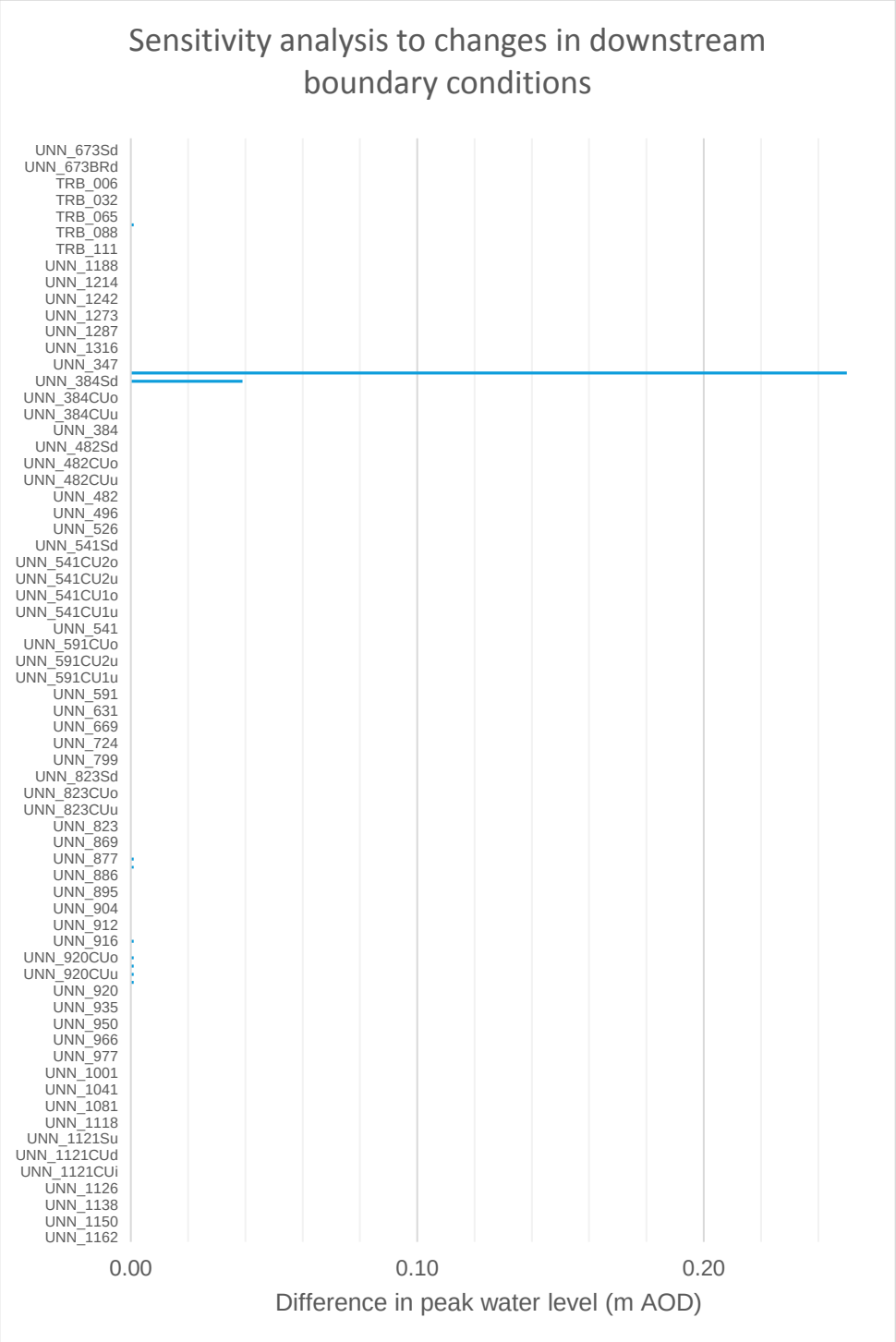


Figure E-3 shows that a 250mm increase in downstream boundary condition generates an increase of approximately 20mm at the downstream end of the site (node: UNN_347). This suggests that the model results at the site are relatively insensitive to changes in downstream boundary conditions.

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