FLOOD RISK ASSESSMENT AND DRAINAGE STRATEGY

LAND EAST OF ASHBY ROAD
HINCKLEY

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CONTENTS

APPENDICES

1.0 INTRODUCTION

1.1 Davidsons Developments have commissioned ADC Infrastructure Limited to produce a joint Flood Risk Assessment (FRA) and Drainage Strategy report in support of an outline planning application for up to 103 dwellings with all matters reserved apart from the access from Ashby Road at land east of Ashby Road, Hinckley.

1.2 This report assesses the flood risk to the site and proposes a preliminary foul and surface water drainage strategy for the proposed development. It has been carried out in accordance with the requirements of the National Planning Policy Framework (NPPF) and associated Planning Practice Guidance (PPG). It investigates the flood risk posed to the site from fluvial, pluvial, sewer and groundwater-based sources. A section in this report provides recommendations for mitigation and an analysis of any likely residual risks.

1.3 A preliminary drainage strategy for both foul and surface water seeks to identify the potential constraints that need to be considered as the development proposals progress. Leicestershire County Council as the Lead Local Flood Authority (LLFA), and Severn Trent Water (STW) as the relevant sewerage undertaker have been consulted as the relevant statutory authorities to inform the drainage strategy for the site.

2.0 SITE DESCRIPTION

2.1 The site is located off Ashby Road, Hinckley, and currently comprises greenfield land. The site is bound by agricultural land to the north and east, existing dwellings to the south, and Ashby Road to the west.

2.2 The location of the site is included in Figure 1 and is centred upon OS grid reference 443160,296055.

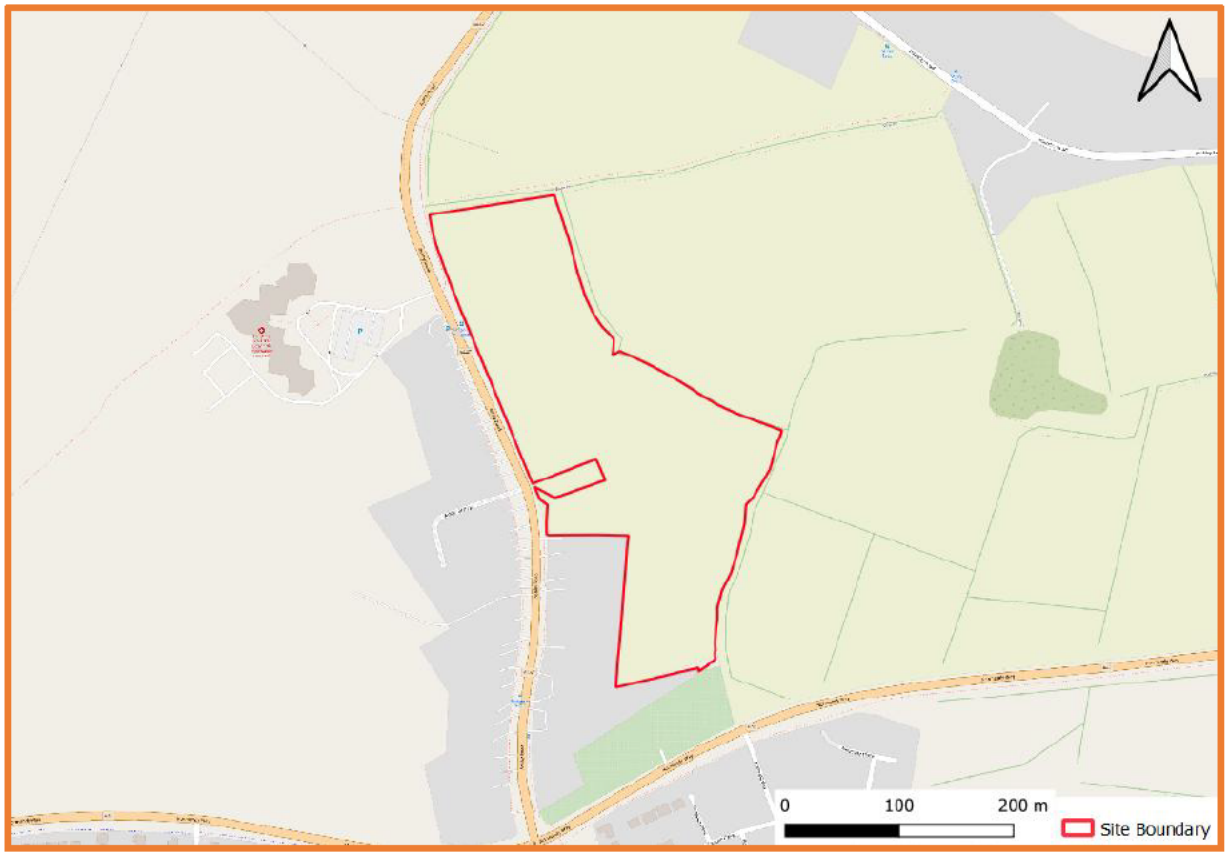

Figure 1: Site location

Topography

2.3 A topographical survey shown in **Appendix A** has been undertaken, the site is shown to comprise of two field parcels, ground levels within both field parcels are shown to decline in a north-easterly direction.

2.4 The topographical survey also highlights the presence of a series of existing ditches adjacent to the existing field boundaries within the site.

2.5 Publicly available LiDAR datasets have been obtained and reviewed to gain a better appreciation of the general topography of the site and the surrounding area.

2.6 Contour lines have been extracted from the LiDAR data to form a digital elevation model, an extract of which is presented within Figure 2.

Figure 2: LiDAR map showing the elevation (m AOD) for the site and surrounding area.

2.7 The LiDAR mapping demonstrates ground levels within the wider catchment to decline to the east towards an unnamed minor watercourse which flows adjacent to the urban perimeter of Barwell, and to the west towards Ashby de la Zouch canal.

2.8 There is a variation of approximately 5m between the site's high point in the south-west and the site's low point within north-east.

Existing drainage

2.9 The site is greenfield in nature and as such there is no known formal piped drainage infrastructure currently serving the site.

2.10 Given the topography of the site and the presence of existing field ditches it is believed that existing runoff drains via a combination of slow infiltration into the surrounding soils and overland flow into the localised ditch network.

Geology

2.11 The British Geological Survey (BGS) online mapping was reviewed to give an indication of the underlying ground conditions on site. The online mapping shows that the bedrock geology and superficial deposits were as follows:

- **Bedrock Geology:** Mercia Mudstone Group - Mudstone. Sedimentary bedrock formed between 252.2 and 201.3 million years ago during the Triassic period.

- **Superficial Deposits:** Oadby Member - Diamicton. Sedimentary superficial deposit formed between 480 and 423 thousand years ago during the Quaternary period.

Soils

2.12 The Cranfield Soil and Agrifood Institute Soilscapes mapping for the site was also reviewed. The mapping defined the underlying soil classification as:

- **Soilscape 8**: Slightly acid loamy and clayey soils with impeded drainage

2.13 Land Research Associates Ltd conducted an agricultural land quality survey of the site and produced report 2498/1 dated 10/02/25. The report states:

"The soils were found to comprise fine loamy topsoil over dense slowly permeable clay or sandy clay. The subsoils show evidence of seasonal waterlogging (pale/greyish colouration and ochreous mottles) to shallow depth. In places a moderately permeable sandy clay loam upper subsoil occurs, although the slowly permeable clay mainly directly underlies the topsoil. In places the clay becomes chalky at depth. The soils are mainly judged to be poorly-draining (Soil Wetness Class IV)."

Onsite drainage implications

2.14 Based upon the available data on the nature of the underlying soils and geology, it appears as through the site will possess low infiltration rates.

2.15 However, further investigation into ground conditions is required to make an informed judgement upon the true nature of onsite infiltration capacities. It is advised that any infiltration testing should be undertaken following BRE365 guidance.

Flood warnings/flood alert

2.16 Publicly available mapping demonstrates that the site is not located within a catchment that receives the EA flooding warning service.

3.0 PROPOSED DEVELOPMENT

3.1 The development proposals are for up to 103 dwellings with all matters reserved apart from the access from Ashby Road.

3.2 Figure 3 below demonstrates the proposed illustrative layout.

Figure 3: Illustrative layout.

4.0 PLANNING CONTEXT

Flood and Water Management Act

4.1 In combination with the Flood Risk Regulations, 2010 (which enact the EU Floods Directive in England and Wales), the Flood and Water Management Act places significantly greater responsibility on Local Authorities to manage and lead on local flooding issues. The Act and Regulations together raise the requirements and targets that Local Authorities need to meet; this includes:

- to plan an active role in leading flood risk management in an area,
- the development of a Local Flood Risk Management Strategy,
- to prepare preliminary flood risk assessments (PFRAs), flood hazard and risk maps, and flood risk management plans (FRMPs),
- to develop and implement drainage and flood risk management strategies,
- to be responsible for the approval, adoption, and subsequent maintenance of Sustainable Urban Drainage Systems (SuDS)[1].

4.2 The Lead Local Flood Authority (LLFA) for the site are Leicestershire County Council (LCC), who have the responsibility for the management of flood risk for the local area. Their standard guidance has been consulted in the preparation of this flood risk assessment and drainage strategy, and a copy of their formal response can be found in **Appendix B**.

The National Planning Policy Framework (NPPF)

4.3 The NPPF sets out the government's planning policies for England and the expectations of how these policies should be applied. It acts as guidance for local planning authorities and decision-makers, both in drawing up plans and making decisions about individual planning applications.

4.4 Chapter 14 of the NPPF sets out how the government intends decision-making authorities to meet the challenge of climate change plus flooding and coastal change. Paragraph 170 sets out how inappropriate development in areas at risk of flooding should be avoided by directing development away from these areas, but where development is necessary, making it safe for its lifetime without increasing the flood risk elsewhere[2]

4.5 Paragraph 175 advises:

"The sequential test should be used in areas known to be at risk now or in the future from any form of flooding, except in situations where a site-specific flood risk assessment demonstrates that no built development within the site boundary, including access or escape routes, land raising or other potentially vulnerable elements, would be located on an area that would be at risk of flooding from any source, now and in the future (having regard to potential changes in flood risk)."[3]

4.6 Paragraph 177 advises:

"Having applied the sequential test, if it is not possible for development to be located in areas with a lower risk of flooding (taking into account wider sustainable development objectives), the exception

[1] GOV.UK (2010). Flood and Water Management Act. Chapter 2. Section 9.
[2] (Ministry of Housing, Communities and Local Government, 2024). National Planning Policy Framework. Chapter 14. Pg 49. Paragraph 170.
[3] (Ministry of Housing, Communities and Local Government, 2024). National Planning Policy Framework. Chapter 14. Pg 50. Paragraph 175

test may have to be applied. The need for the exception test will depend on the potential vulnerability of the site and of the development proposed, in line with the Flood Risk Vulnerability Classification set out in Annex 3."[4]

4.7 Paragraph 178 advises that:

"The application of the exception test should be informed by a strategic or site-specific flood risk assessment, depending on whether it is being applied during plan production or at the application stage. To pass the exception test it should be demonstrated that:

a) the development would provide wider sustainability benefits to the community that outweigh the flood risk; and
b) the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall."[5]

4.8 Paragraph 181 continues to advise that:

"When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk assessment. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location.
b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment.
c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate.
d) any residual risk can be safely managed;
e) and safe access and escape routes are included where appropriate, as part of an agreed emergency plan"[6]

4.9 Paragraph 182 further advises that:

"Applications which could affect drainage on or around the site should incorporate sustainable drainage systems to control flow rates and reduce volumes of runoff, and which are proportionate to the nature and scale of the proposal. These should provide multifunctional benefits wherever possible, through facilitating improvements in water quality and biodiversity, as well as benefits for amenity. Sustainable drainage systems provided as part of proposals for major development should:

a) take account of advice from the lead local flood authority;
b) have appropriate proposed minimum operational standards; and,

[4] (Ministry of Housing, Communities and Local Government, 2024). National Planning Policy Framework. Chapter 14. Pg 51. Paragraph 177.
[5] (Ministry of Housing, Communities and Local Government, 2024). National Planning Policy Framework. Chapter 14. Pg 51. Paragraph 178.
[6] (Ministry of Housing, Communities and Local Government, 2024). National Planning Policy Framework. Chapter 14. Pg 51. Paragraph 181.

c) *have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development;"*[7]

4.10 Annex 3 of the NPPF defines development type by its associated vulnerability to flooding, this is reproduced within the table below.

Vulnerability Classification	Definition
Essential Infrastructure	Essential transport infrastructure (including mass evacuation routes) which must cross the area at risk. Essential utility infrastructure which must be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. Wind turbines. Solar farms
Highly Vulnerable	Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding. Emergency dispersal points. Basement dwellings. Caravans, mobile homes, and park homes intended for permanent residential use. Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'Essential Infrastructure').
More Vulnerable	Hospitals Residential institutions such as residential care homes, children's homes, social services homes, prisons, and hostels. Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs, and hotels. Non–residential uses for health services, nurseries, and educational establishments. Landfill* and sites used for waste management facilities for hazardous waste. Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.
Less Vulnerable	Police, ambulance, and fire stations which are not required to be operational during flooding. Buildings used for shops; financial, professional, and other services; restaurants, cafes, and hot food takeaways; offices; general industry, storage, and distribution; non-residential institutions not included in the 'More Vulnerable' class; and assembly and leisure. Land and buildings used for agriculture and forestry. Waste treatment (except landfill* and hazardous waste facilities). Minerals working and processing (except for sand and gravel working).

[7] (Ministry of Housing, Communities and Local Government, 2024). National Planning Policy Framework. Chapter 14. Pg.52. Paragraph 182.

	Water treatment works which do not need to remain operational during times of flood. Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place. Car parks.
Water Compatible Development	Flood control infrastructure. Water transmission infrastructure and pumping stations. Sewage transmission infrastructure and pumping stations. Sand and gravel working. Docks, marinas, and wharves. Navigation facilities. Ministry of Defence installations. Ship building, repairing, and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location. Water-based recreation (excluding sleeping accommodation). Lifeguard and coastguard stations. Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms. Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

Planning Practice Guidance (PPG)

4.11 The PPG associated with the NPPF provides more detailed guidance on how the requirements of the NPPF can be met in practice. It includes recommendations on the allowances for climate change and for the application the sequential and exception tests. Critically important tables are included within the PPG that set the framework for discussion and analysis of site-specific flood risk.

4.12 Table 1 of the Planning Practice Guidance defines flood zones based upon event return probability and is used to steer development and classify land for development. The table is produced below.

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 1 in 1,000 annual probability of river or sea flooding. (shown as 'clear' on the Flood Map – all land outside Zones 2, 3a and 3b)
Zone 2 Medium Probability	Land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding; or Land having between a 1 in 200 and 1 in 1,000 annual probability of sea flooding. (shown in light blue on the Flood Map)
Zone 3a High Probability	Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding. (shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water has to flow or be stored in times of flood. Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (not separately distinguished from Zone 3a on the Flood Map)

4.13 It is important to note that land in Flood Zone 3b is categorized as;[8]

- Land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or
- Land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding)

4.14 Areas within the functional floodplain should be identified by local planning authorities within their Strategic Flood Risk Assessments.

4.15 Table 2 of the Planning Practice Guidance (Flood Risk Vulnerability and flood zone 'compatibility') outlines the circumstances in which development may or may not be appropriate and when an Exception Test will be required. The table is reproduced below.

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*	×	×	×	✓*

† In Flood Zone 3a – essential infrastructure should be designed and constructed to remain operational and safe in times of flood.
** In Flood Zone 3b (functional flood plain) essential infrastructure that must be there and has passed the Exception Test, and water- compatible uses, should be designed to:*
remain operational and safe for users in times of flood,
result in no net loss of flood plain storage
not impede water flows and not increase flood risk elsewhere.

Development lifespan

4.16 The NPPF states that proposed development should remain safe throughout its lifetime without increasing flood risk elsewhere.

4.17 The PPG states that;

"Residential development can be assumed to have a lifetime of at least 100 years, unless there is a specific justification for considering a different period… the lifetime of a non-residential development depends on the characteristics of that development but a period of at least 75 years is likely to form a starting point for assessment".

4.18 Given the above the proposed development is anticipated to possess a design lifetime of 100 years.

[8] (Ministry of Housing, Communities and Local Government, 2024). Planning Practice Guidance. Flood risk and coastal change. Chapter: Flood Zone and flood risk tables. Table 1.

4.19 To assess whether the proposed development would remain safe throughout its lifetime the proposals are to be assessed, where appropriate, against the following design flood events, plus a forecasted allowance for climate change.

- river flooding likely to occur with a 1% annual probability (a 1 in 100 chance each year); or
- tidal flooding with a 0.5% annual probability (1 in 200 chance each year); or
- surface water flooding likely to occur within a 1% annual probability (a 1 in 100 chance each year).

Climate change

4.20 Climate change allowances are predictions of anticipated change for:

- peak river flow,
- peak rainfall intensity,
- sea level rise, or
- offshore wind speed and extreme wave height

4.21 The most appropriate climate change allowance for use in assessing the proposed development is peak rainfall intensity.

Peak rainfall intensity[9]

4.22 Peak rainfall intensity allowances should be utilised in small catchments (less than 5km2), or urbanised drainage catchments.

4.23 The site is situated within the Tame Anker and Mease catchment, the table below, outlines the peak rainfall intensity allowances for a range of periods. For flood risk assessments the upper end allowance should be used.

Tame Anker and Mease Management catchment	3.3% annual exceedance rainfall epoch (2050s)	3.3% annual exceedance rainfall epoch (2070s onwards)	1% annual exceedance rainfall epoch (2050s)	1% annual exceedance rainfall epoch (2070s onwards)
Upper end	35%	35%	40%	40%

4.24 Given the anticipated life span of the development the site should be assessed via the 2070s epoch allowances; this is up to a 1 in 100-year+40% event.

Local planning context

Hinckley & Bosworth Borough Council Borough Plan 2006-2026

4.25 The site falls within the jurisdiction of Hinckley and Bosworth Borough Council (HBBC) and is subject to the policies and guidance specified within the Local Plan. The Core Strategy was adopted in December 2009 and covers the period up to 2026. The LPA has recently commenced a fresh review of its Local Plan in relation to the December 2024 NPPF such that the emerging plan is now at an early stage.

[9] EA (2021). Flood Risk Assessments: climate change allowances.

4.26 The existing Core Strategy does not contain any specific policies on flood risk or surface water management, but these are covered more broadly under Strategic Objective 20, which seeks to improve resource management across the Borough. Objective 10 notes that flooding is not a major issue for the Borough but does specify that sustainable urban drainage needs to be incorporated into the design of the new development to mitigate against any increase in flood risk.

4.27 The Site Allocations and Development Management Policies DPD is one of the documents that makes up the local plan. The relevant policy from this document in terms of flood risk is policy DM7 Preventing Pollution and Flooding which states:

Adverse impacts from pollution and flooding will be prevented by ensuring that development proposals demonstrate that:

a) It will not adversely impact the water quality, ecological value or drainage function of water bodies in the borough;
b) Appropriate containment solutions for oils, fuels and chemicals are provided;
c) All reasonable steps are taken through design, siting and technological solutions to ensure the abatement of obtrusive light to avoid sky glow, glare and light intrusion;
d) It would not cause noise or vibrations of a level which would disturb areas that are valued for their tranquillity in terms of recreation or amenity;
e) Appropriate remediation of contaminated land in line with minimum national standards is undertaken;
f) It will not contribute to poor air quality;
g) It will not result in land instability or further intensify existing unstable land; and
h) The development doesn't create or exacerbate flooding by being located away from areas of flood risk unless adequately mitigated against in line with National Policy.

Hinckley & Bosworth Level 1 SFRA (2019)

4.28 HBBC commissioned JBA Consulting to undertake a Level 1 Strategic Flood Risk Assessment (SFRA), to inform and support the production of the updated Local Plan up to 2036. In addition to providing an update to the joint 2014 SFRA that covered Hinckley & Bosworth, Blaby, and Oadby & Wigston Councils, as well as the later Leicestershire and Leicester City 2017 SFRA.

4.29 As part of the SFRA, there is guidance on flood risk for new development across the Borough area, that also sets out the requirements that a site-specific FRA should look to adhere to. These are as follows:

- whether a proposed development is likely to be affected by current or future flooding from any source,
- whether a proposed flood development will increase flood risk elsewhere,
- whether the measures proposed to deal with the effects and risk are appropriate,
- the evidence, if necessary, for the local planning authority to apply the Sequential Test; and
- whether, if applicable, the development will be safe and pass the Exception Test.

4.30 The SFRA goes onto provide further advice on the mitigation measures that could be incorporated into a development design, such as modifying ground levels, finished floor levels, as well as general resistance/resilience measures that can be applied by future site users. These measures have been referenced in this report, to provide appropriate mitigation for the development and to reduce any increase in the offsite flood risk.

Flood Risk Status

4.31 The Environment Agency online flood mapping shoes that the site lies within Flood Zone 1 (see Figure 4 below).

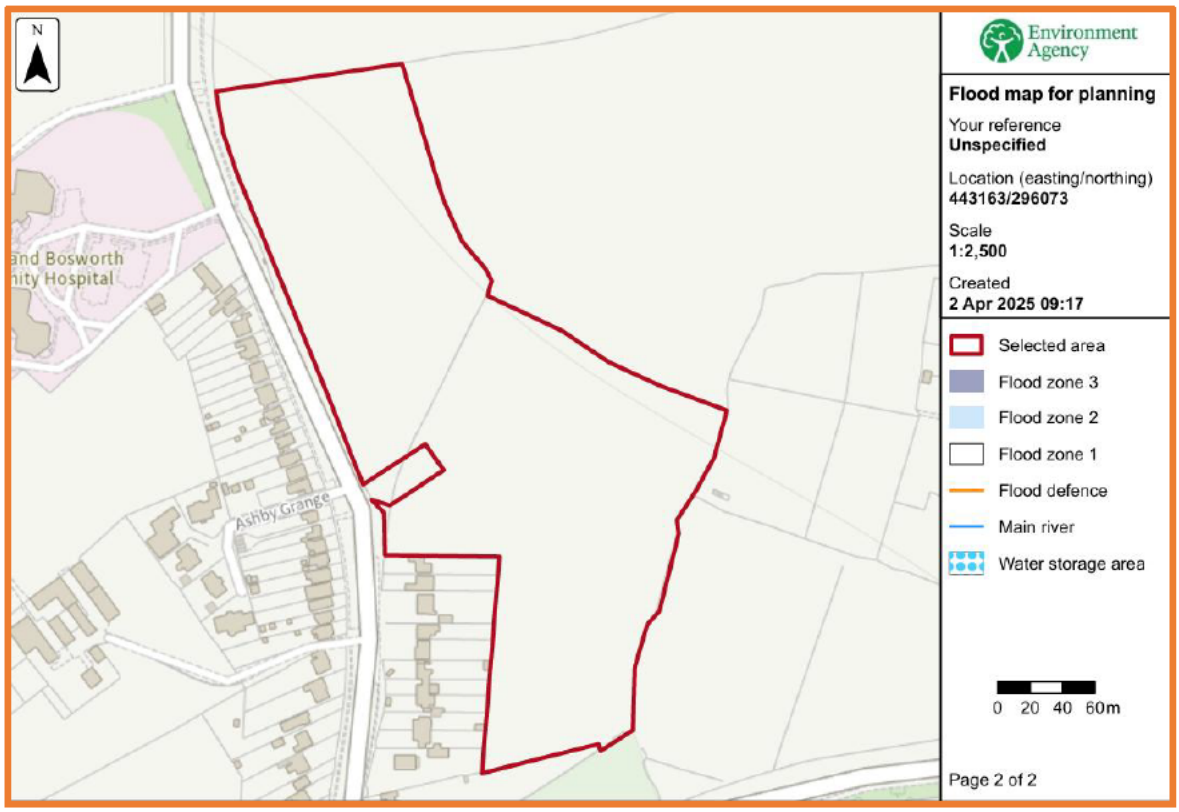

Figure 4: EA Flood Map for Planning Extract

Flood risk and development compatibility

4.32 The development is categorised as residential development. In Annex 3 of the NPPF, residential development is categorised as a 'More vulnerable' development type.

4.33 The development is located within Flood Zone 1.

4.34 In accordance with Table 2 of the PPG, the development is deemed appropriate and is located sequentially in a low flood risk area from a fluvial flood risk perspective.

4.35 Given the above, an Exceptions Test is not required as per table 2 of the PPG (as reproduced on Page 13 of this FRA).

5.0 FLOOD RISK ASSESSMENT

5.1 In accordance with the NPPF and local planning guidance, this Flood Risk Assessment considers the risk posed to the development from a range of flooding sources. This section of the report details the investigation of flood risk from all pertinent sources; a subsequent section provides recommended mitigation where the risk is deemed significant.

5.2 The flood risks that may be posed to any site are summarised within the table below. The degree of risk to the site is also indicated within the table below and site-specific factors are outlined and described in greater detail within the forthcoming sections.

Flooding Source	Degree of Risk	Source of Risk
Fluvial	Low	EA mapping demonstrates that the site lies in Flood Zone 1 and therefore possesses a low risk of fluvial flooding.
Tidal	None	There are no tidal influences in the area.
Canals	Low	The site is over 3km away from the nearest canal and so canal flooding is considered to be low.
Groundwater	Low	A desktop review of the underlying geology infers that the lack of bedrock permeability onsite would render groundwater flooding to be unlikely. The Areas Susceptible to Groundwater Flooding map demonstrates the site to be located within an area with low (<25%) susceptibility to flooding from groundwater sources.
Sewers	Low	There are no records of sewer flooding within the vicinity of the site.
Pluvial (Surface Water) runoff	Very Low - Low	The EA mapping demonstrates that the majority of the site has a very low chance of pluvial flooding, however in the northernmost corner, along the northern boundary and along the eastern boundary of the site there is minor surface water flooding shown to have a 1 in 1000 annual likelihood of flooding (low chance).
Reservoirs and Waterbodies	None	The EA mapping demonstrates that the site is at minimal risk of reservoir flooding.

Fluvial flooding

5.3 The Flood Map for Planning has been reviewed and shows that the site lies within Flood Zone 1 and is deemed to possess a low probability of fluvial flooding.

5.4 A series of minor watercourses flow within the site and along its perimeter, these form a network of minor watercourses and field drains which generally flow in a north-easterly direction towards an ordinary watercourse which flows along the western perimeter of Barwell, approximately 550m north-east of the site. The ordinary watercourse discharges into the River Tweed, which is a tributary of the River Sence.

5.5 Intuitively the site and the surrounding area decline towards the aforementioned waterbodies, as such the proposed development areas will be sufficiently elevated above any areas of flood risk. Clear margins associated with the drainage ditches within the site are to be respected as part of the development, this will ensure that all built development is appropriately offset from the existing watercourse network.

Previous flood history

5.6 As the site is located within Flood Zone 1, and there are no main rivers within the immediate vicinity, there are limited records of historical flooding incidents.

5.7 The Environment Agency's Recorded Flood Outlines dataset was reviewed, and it confirmed that the site has not been directly affected by previous flooding.

5.8 LCC as the LLFA for the local area are required under Section 19 of the Flood Risk and Water Management Act to investigate all flooding incidents that occur within Leicestershire. A review of the publicly available Section 19 reports shows that there have been no formal flood investigations within the vicinity of the site.

Tidal flooding

5.9 The site is not located within an area that is tidally influenced. Therefore, it is deemed that there is no risk from tidal or coastal flooding.

Canal flooding

5.10 Ashby Canal is located approximately 3.5km to the west of the site, the canal length is sited at a substantially lower elevation than the site, as such any exceedance flows from Ashby Canal are unlikely to impact the site.

5.11 There are no other canal lengths within proximity to the site. The risk of flooding from this source is therefore deemed to be low.

Groundwater flooding

5.12 Groundwater flooding occurs when the water table rises following a period of prolonged rainfall and emerges on the ground surface. It is most likely to occur in low-lying areas that are underlain by permeable bedrock and superficial deposits.

5.13 The Hinckley and Bosworth SFRA, updated in July 2019, includes Areas Susceptible to Groundwater Flooding mapping that covers the whole Borough. The relevant part of the mapping which covers the site is presented within **Appendix C**. The mapping demonstrates the site to be located within an area with low (<25%) susceptibility to flooding from groundwater sources.

5.14 A desk-based review of onsite geology reveals that the promotion of groundwater movement may be impeded by the presence of a mudstone bedrock and slowly permeable soils.

5.15 It is recommended that a ground investigation is undertaken to confirm the underlying ground conditions on site. Should infiltration measurements be undertaken they should be conducted in accordance with BRE365 guidance. This would provide more detailed information on the ground conditions and henceforth provide further enlightenment on the site's vulnerability to groundwater flooding, but the risk is considered to be low.

Pluvial risk

5.16 The EA publish pluvial (surface water) flood maps which show the route of surface water runoff across the ground. Typically, these flood maps identify overland drainage paths that are often part

of a historic natural land drainage system. An overview of the surface water flood risk to the site is shown in Figure 5 below.

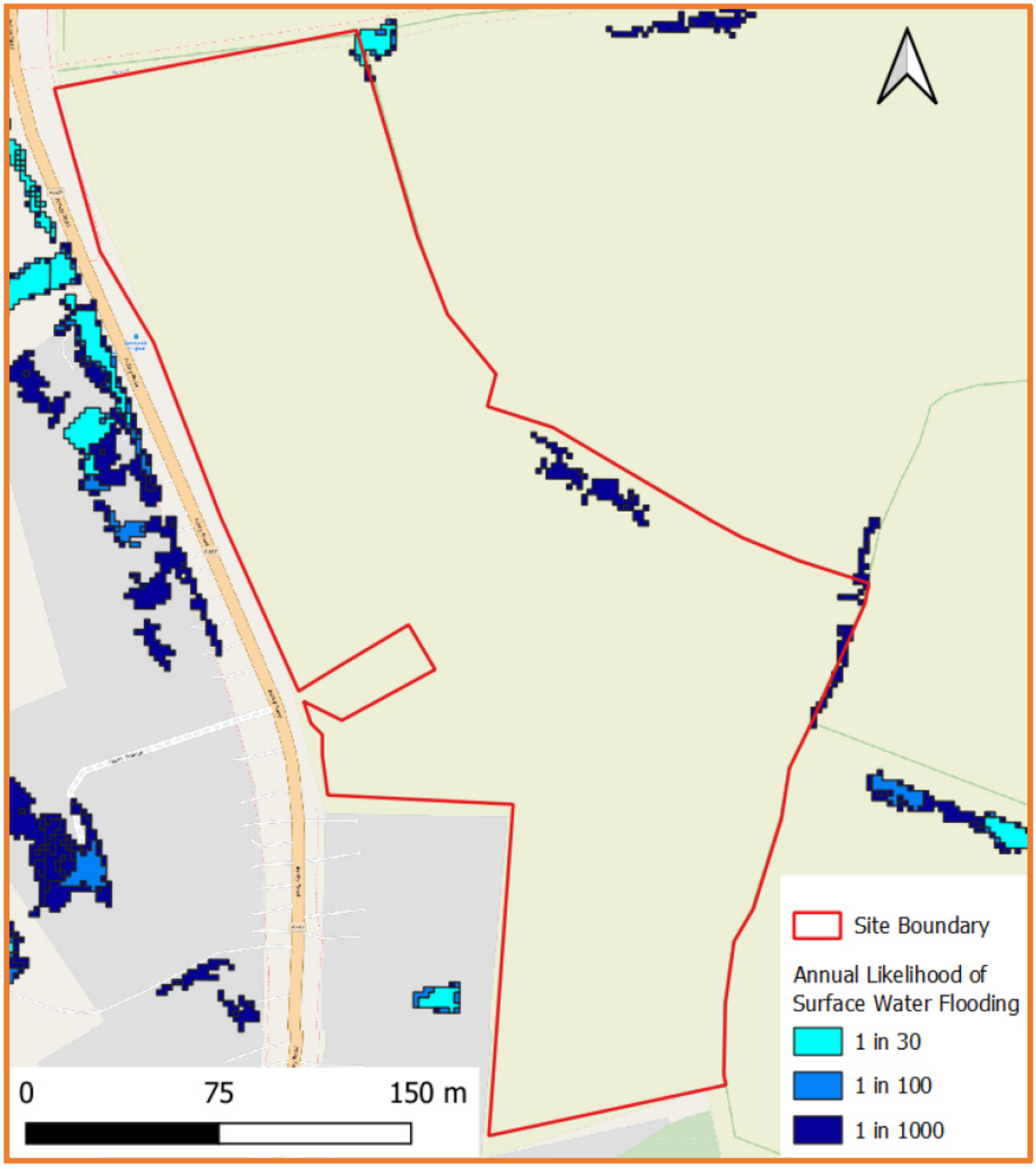

Figure 5: The pluvial flood risk extents for the site and the surrounding area.

5.17 The mapping shows the majority of the site to have a very low chance of surface water flooding.

5.18 There are minor areas of surface water flooding associated with the 1 in 1000 annual likelihood (low chance) storm event in the north of the site and on the eastern boundary of the site. This surface water flooding is associated with the drainage ditch network in these locations.

5.19 There is also a patch of pluvial ponding that is shown to have an extremely minor encroachment into the northernmost corner of the site, associated with all mapped annual likelihoods of flooding (1 in 30, 1 in 100 and 1 in 1000). Again, this is associated with the drainage ditch network in this location.

5.20 All built development is to be located outside of the mapped surface water flooding extents and the flow paths are directed in off-site directions to the north and east, therefore they are not considered to pose a flood risk to the development

5.21 As discussed previously, the minor surface water flooding areas shown on the site are not located in any areas proposed for development, as such, in accordance with paragraph 175 of the NPPF, the development is sequentially appropriate in regard to surface water flood risk and a sequential test is not required.

Sewer flooding

5.22 Sewer flooding occurs when the conveyed flows exceed the available capacity of the system. This may be due to intense rainfall events, restricted discharges to watercourses with high water levels, blockages, collapses, or equipment failure.

5.23 Sewer plans, shown in **Appendix D**, obtained from Severn Trent Water show a 225mm foul sewer network in Ashby Road to the west of the site. The cover levels of this sewer network are above the general ground levels of the site and therefore if the sewer were to flood it could pose a potential risk to the site. However, the sewer is small diameter therefore any flooding would be limited in volume and is unlikely to affect the site, but instead would flow along Ashby Road.

5.24 No historic records of sewer flooding within the vicinity of the site were found. Further, LCC as the LLFA for the local area are required under Section 19 of the Flood Risk and Water Management Act to investigate all flooding incidents that occur within Leicestershire. A review of the publicly available Section 19 reports shows that there have been no formal flood investigations within the vicinity of the site.

5.25 Given the above, the risk of sewer flooding is deemed to be low.

Reservoirs and artificial waterbodies

5.26 The EA has prepared reservoir failure flood risk mapping to show the largest area that might be flooded if a reservoir were to fail. The mapping displays a worst-case scenario and is only intended as a guide. The site is shown to be outside areas considered at potential risk of reservoir flooding, see Figure 6.

Figure 6: The flood risk from reservoir sources to the site.

5.27 It should be noted that these maps are indicative and the probability of the flood event from reservoir failure occurring is extremely low.

Proposed mitigation

5.28 The risk of flooding to the site from a variety of sources has been investigated. The evidence expressed above demonstrates the site to be at low risk of flooding from all sources.

5.29 There are minor areas of surface water flooding within the site. All built development has been sequentially located away from these areas. Further, the risk of surface water flooding will be reduced by the introduction of a formal drainage system across the site.

5.30 A preliminary surface water drainage strategy for the site is proposed in further detail in Section 7 of this report.

5.31 Flood risk as a result of tidal, canal, sewer and reservoir influences have all been deemed as low or negligible, so no further mitigation is recommended.

5.32 Although the flood risk to the site from the variety of sources investigated has been deemed to be low; to alleviate any residual flood risk to the site the following should be analysed.

Access and egress

5.33 The PPG states that to ensure a development is safe for its lifetime the ability of residents and users to safely access and exit a building during a design flood and to evacuate before an extreme flood (0.1% annual probability of flooding plus climate change) must be considered[10].

[10] GOV UK (2022). Planning Practice Guidance. Flood risk and coastal change.

5.34 The access and egress route from the development is shown to be in Flood Zone 1 and possess a very low risk of pluvial flooding.

Drainage system design

5.35 The Non-statutory Technical Standard for SuDS has a series of recommendations in relation to the design of prospective drainage systems for new developments. These are to ensure that drainage systems on new developments are designed to a standard to negate the additional flood risk that may arise from the development. The recommendations to be implemented for the site are as follows:

- *"The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur on any part of the site for a 1 in 30-year (3.3% AEP) event."11*
- *"The drainage system must be designed so that, unless an area is designated to hold and/or convey water as part of the design, flooding does not occur during a 1 in 100-year (1% AEP) rainfall event in any part of: a building (including basement); or in any utility plant susceptible to water (e.g., pumping station or electricity substation) within the development."12*

Exceedance routes

5.36 The Non-statutory Technical Standard for SuDS guidance also specifies that:

"The design of the site must ensure that, so far as is reasonably practicable, flows resulting from the rainfall in excess of a 1 in 100-year rainfall event are managed in exceedance routes that minimise the risks to people and property."[13]

5.37 Exceedance routes within the proposed development are shown to route towards the proposed SuDS features and away from proposed development areas.

Finished floor levels

5.38 The site is not located within an area where there is a residual flood risk, however finished floor levels according to the gov.uk website should be a minimum of whichever is higher of; 300mm above the general ground level of the site or 600mm above the estimated river or sea flood level[14].

5.39 Since the site is in Flood Zone 1 and is at a low risk of flooding it is recommended that on site finished floor levels are set to a minimum of 300mm above general ground level.

External site levels

5.40 External site levels should be designed to route any excess runoff away from buildings, and into landscaped areas or drainage outlets. Any raising of levels onsite should be designed to ensure that there is no increase in surface water runoff onto neighbouring third-party land.

5.41 Likewise, similar design considerations to minimise any potential risk from sewer flooding arising from the onsite drainage network should be considered.

[11] DEFRA (2015). Non-statutory technical standards for sustainable drainage systems. Pp.2. Clause S7.
[12] DEFRA (2015). Non-statutory technical standards for sustainable drainage systems. Pp.2. Clause S8.
[13] DEFRA (2015). Non-statutory technical standards for sustainable drainage systems. Pp.2. Clause S9.
[14] GOV UK (2019). Flood risk assessment standing advice.

Flood compensatory storage

5.42 The cumulative impacts of development have the potential to reduce floodplain storage, where flood storage from any source of flooding is to be lost as a result of development, on-site level-for-level compensatory storage, accounting for the predicted impacts of climate change over the lifetime of a development, should be provided. Where it is not possible to provide compensatory storage onsite, it may be acceptable to provide it off-site if it is hydraulically and hydrologically linked[15].

5.43 The development proposals do not reduce any floodplain storage and therefore no further mitigation is required.

[15] GOV UK (2022). Planning Practice Guidance. Flood risk and coastal change.

6.0 SURFACE WATER DRAINAGE STRATEGY

Existing discharge rate

6.1 Current proposals comprise of plans for development upon greenfield land.

6.2 The greenfield runoff was calculated using UK SuDS Greenfield runoff tool. For the purpose of these calculations the developable area was used.

6.3 The full outputs are included within **Appendix E** and a summary of the results is provided in the table below.

Return Period	Developable Area (ha)	Runoff Rate (l/s)
QBar	3.7	16.1
1 in 1 Year	3.7	13.3
1 in 30 Year	3.7	32.1
1 in 100 Year	3.7	41.3

Discharge options

6.4 In accordance with the Building Regulations Part H, the newly published Non-Statutory Technical Standards for SuDS and prevailing best practice, surface water should look to be discharged according to the following preferential hierarchy:

- Infiltration drainage techniques, such as swales and soakaways
- An open watercourse, river, or ditch
- A surface water sewer
- A combined sewer

6.5 The British Geological Survey (BGS) mapping and Soilscapes mapping were reviewed to give an indication of the underlying ground conditions. These suggest that the site is underlain by loamy and clayey soils and mudstone bedrock, which may limit the viability of the use of infiltration onsite. As such it is advised that a ground investigation that includes infiltration testing is undertaken to determine whether there is any soakage potential across the site.

6.6 LCC, as the LLFA, require that sufficient evidence is provided to prove whether infiltration is a viable option to dispose of surface water runoff or not. Should the use of infiltration features be found not to be suitable, then an alternative outfall such as a watercourse or surface water sewer needs to be confirmed.

6.7 The use of infiltration drainage techniques appears unfeasible; therefore, preference should be given to the disposal of surface water runoff into the nearest watercourse or ditch. A series of minor watercourses flow within the site and its perimeter, providing a suitable outfall location.

6.8 It is recommended that each dwelling will have individual water butts to allow for a means of onsite rainwater harvesting. Since water butts are dependent upon the user emptying the device prior to a storm event, the attenuation provided by the water butts have not been included within the site storage calculations.

Preliminary onsite surface water strategy

6.9 It is proposed that a short stretch of the minor ditch course through the centre of the site is to be culverted underneath the proposed internal highway.

6.10 The surface water runoff generated by impermeable surfaces on site shall be drained via a below ground gravity conveyed surface water sewer network which will outfall, via a sediment forebay, into a wet detention basin, providing attenuation and treatment, before ultimately out falling into the ditch network in the north east at a restricted rate equivalent to QBar. The ditch that will receive the surface water outfall is within the same land ownership as the site.

6.11 The attenuation basin is to be located in the north of the development and, therefore, the surface water sewer network onsite will have a crossing with the proposed section of culverted watercourse.

6.12 The proposed detention basin has been sized using InfoDrainage. The proposed size of the detention basin is shown below, and the full calculations are shown in **Appendix F**.

Attenuation Basin:
Depth (inc. 300mm freeboard) – 1 m
Approximate storage volume – 2070 m^3
Restricted discharge rate – 16.1 l/s

Preliminary drainage layout

6.13 A preliminary drainage strategy, drawing 3280-ADC-HDG-XX-DR-CD-0501, has been prepared (see **Appendix G)**.

7.0 FOUL WATER DRAINAGE STRATEGY

Proposed discharge rate

7.1 Based on the current development proposals, it is anticipated that there will be up to 103 residential dwellings to be constructed on the site.

7.2 In line with Section B3.1 of the guidance within the Design and Construction Guidance for foul and surface water sewers[16], the peak design foul flow rate is 4000 litres per dwelling per day. This is a design peak foul water flow rate and not a daily average water usage.

7.3 The peak foul flow rate has been calculated as follows:

103 x 4000 = 412000 l/day
412000/ (24 x 60 x 60) = 4.77l/s

Proposed discharge strategy

7.4 In accordance with the guidance specified within the Building Regulations Part H, foul water effluent should look to be discharged according to the following preferential hierarchy:

- a foul water sewer
- a combined sewer
- a septic tank
- a cesspool

7.5 Sewer record plans obtained from Severn Trent Water show a 225mm foul sewer network within Ashby Road to the west of the site. The developer enquiry response from Severn Trent Water (**Appendix D**) states a connection to the foul sewer in Ashby Road at manhole SP42969201 would be the most suitable connection point for the development, however invert levels for the manhole are not currently available to confirm whether a gravity connection would be feasible at that point on the network.

7.6 Further north along Ashby Road, and also downstream on the 225mm sewer, manhole 0401 has an invert level of 116.92m AOD. It has been assessed that a gravity connection to manhole 0401 from the lowest development point on the site would not be feasible. Therefore, it is likely that pumping of foul flows from the development would be required to achieve a foul connection to the 225mm sewer in Ashby Road. Further investigation of sewer levels at other manholes along Ashby Road would be required to confirm that a pumped solution is definitely required. Further consultation with Severn Trent Water should be undertaken to determine whether a requisitioned connection for a gravity sewer in an easterly direction towards Barwell would be a suitable option.

7.7 The preliminary drainage strategy for the site demonstrates a gravity foul water sewer network discharging to a pumping station in the north, with a rising main connection to the 225mm sewer in Ashby Road. This solution can be delivered without any sewers needing to cross third party land.

7.8 The proposed foul connection is shown on the preliminary drainage strategy, drawing 3280-ADC-HDG-XX-DR-CD-0501, (see **Appendix G**).

[16] Sewer Sector Guidance (2020). Design and construction guidance for foul and surface water sewers. Section B3.1.

8.0 SUSTAINABLE DRAINAGE ASSESSMENT

8.1 Sustainable Drainage Systems (SuDS) remove, store, re-use, and intercept surface water by mimicking the natural water cycle. In turn this not only alleviates flood risk but also promotes benefits for water quality, amenity, recreation, health, and the local ecology[17].

8.2 A variety of SuDS options are available to reduce or temporarily hold back the discharge of surface water runoff. The proposed development will see an increase in flows and therefore will require a drainage strategy which incorporates SuDS to ensure that flows are balanced, and that flood risk is not increased elsewhere.

8.3 The table below outlines the applicability of the use of a range of SuDS devices in relation to the proposals detailed in this report, this is in accordance with the hierarchical approach outlined in The SuDS Manual (CIRIA C753).

[17] CIRIA (2015). The SuDS Manual C753. Part B. Chapter 1.

SuDS type	Device	Description	Reason for use	Applicability (✖ /✓)
Source control	Living roofs	Provide soft landscaping at roof level, intercepting and reducing surface water runoff.	The structural design of the proposed buildings are not conducive for the use of living roofs.	✖
	Infiltration devices	Store runoff and allow water to percolate into the ground via natural infiltration.	A desktop review of the underlying ground conditions demonstrate that the site is not suitable for the use of infiltration features. This is subject to further testing.	✖
	Pervious surfaces	Storm water is allowed to infiltrate through the surface into a storage layer, from which it can either infiltrate and/or slowly release to sewers.	The nature and layout of the proposed development would not be conducive with permeable paving.	✖
	Rainwater harvesting	Reduces the annual average rate of runoff from the site by reusing water for non-potable uses e.g., toilet flushing.	Rainwater harvesting is not deemed feasible on the scheme.	✖
	Street trees	Storm water is conveyed to trees located adjacent to the internal roads, the tree pits attenuate and treat runoff	The use of street trees in a SuDS capacity on the streets within the site is not feasible.	✖

SuDS type	Device	Description	Reason for use	Applicability (✖ /✓)
Permeable conveyance	Swales	Broad shallow channels that convey /store runoff and allow infiltration when ground conditions are permitting.	Due to the topography of the site combined with the site's spatial layout swales are not suitable for use within the site's drainage design.	✖
	Bioretention area/ Rain garden	Shallow landscaped depression which are under drained and rely on engineered soils and enhanced vegetation and filtration to remove pollution and reduce runoff downstream.	The spatial layout of the site is not conducive with the use of bioretention areas within the surface water drainage strategy.	✖
	Filter strips	Wide gently sloping areas of grass or dense vegetation that remove pollutants from run-off from adjacent areas.	A desktop review of the underlying ground conditions and spatial layout of the proposed development demonstrates that the site is not suitable for the use of filter strips. This is subject to further testing.	✖

SuDS type	Device	Description	Reason for use	Applicability (✖ /✓)
	Filter drains and perforated pipes	Trenches filled with granular materials (which are designed to take flows from adjacent impermeable areas) that convey runoff while allowing infiltration.	A desktop review of the underlying ground conditions and spatial layout of the proposed development demonstrates that the site is not conducive for the use of filter drains and perforated pipes. This is subject to further testing.	✖
End of pipe treatment	Infiltration basins	Depressions in the surface designed to store runoff and allow infiltration.	A desktop review of the underlying ground conditions demonstrates that the site is not suitable for the use of infiltration basins. This is subject to further testing.	✖
	Wet ponds	Provide water quality treatment &temporary storage above the permanent water level.	The site layout means that the use of wet ponds is conducive for use within the site's surface water drainage strategy.	✓
	Attenuation tanks	Oversized pipes or geo-cellular tanks designed to store water below ground level.	An attenuation tank within the proposed development could provide the necessary surface water storage required onsite. However, preference should be given to other forms of surface water treatment where possible.	✓

8.4 Given the table above the proposed drainage combination will incorporate the following components:

- Wet Ponds/Detention basins

8.5 The site's proposed drainage combination has been selected due to spatial and topographical aspects of the site and its proposed layout, and the need to attenuate and convey onsite surface water runoff.

Water quality assessment

8.6 Any such development can give rise to pollution during both the construction and occupation phases in relation to hydrocarbons, suspended soils, and general waste. Careful consideration of the treatment of surface water runoff should provide confidence that the proposed development will not result in any detriment to the receiving waters.

8.7 The proposed impermeable areas on the site are currently divided into residential roofs, private driveways and low traffic roads. In accordance with the CIRIA SuDS Manual C753 (2015), the attributed pollution 'hazard' levels associated with these classifications of hardstanding are between very low and low risk.

Land Use	Pollution Hazard Level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential roofs	Very low	0.2	0.2	0.05
Private driveways, residential car parks and low traffic roads.	Low	0.5	0.4	0.4
source: CIRIA SuDs Manual (C753) (2015) Part E. Chapter 26, Table 26.3, pg. 568				

8.8 As the pollution hazard risk from the development is deemed to be low, then the simple index approach (SIA) is applicable. SIA uses a source to receptor pathway approach which considers three pollutants: total suspended solids (TSS), heavy metals and hydrocarbons. For the selected SuDs components, total pollution indices based on the reduction in pollution, are assigned.

8.9 The selected SuDS components and the associated total pollution mitigation indexes are outlined in the table below (CIRIA SuDS Manual Table 26.3 extract). The proposed SuDS treatment train has been designed to exceed the pollution values/risk occurring from proposed land uses highlighted in the table above.

Type of SuDS component	TSS	Metals	Hydrocarbons
Wet detention basin/pond	0.7	0.7	0.5
source: CIRIA SuDS Manual (C753) (2015) Part E. Chapter 26, Table 26.3, pg. 569			

8.10 Based on the pollution mitigation indices highlighted in the table above, it is anticipated that the proposed SuDS treatment train will provide more than enough mitigation for the anticipated pollutants that will be generated by the development.

Alternative benefits of SuDS

8.11 In addition to water quality and biodiversity benefits, the proposed SuDS combination can offer a range of benefits, these include aesthetic enhancements, a platform for education, recreational opportunities, and health benefits.

8.12 The design of the SuDS incorporated within the drainage design will develop as the planning proposals progress, to boost the multifunctionality of the proposed components it is advised that the proposed SuDS are constructed in accordance with the CIRIA SuDS Manual (C753).

9.0 MAINTENANCE AND ADOPTION

9.1 The proposed drainage network will require consistent maintenance to ensure that the efficiency of the systems is sustained.

9.2 The proposed detention basins will be entirely contained within the site and will be constructed to adoptable standards. It is expected that the proposed basins will be adopted by Severn Trent Water, from the point of adoption the maintenance of the proposed SuDS and associated pipework will be the responsibility of Severn Trent Water.

9.3 Prior to adoption the pond and associated pipework will be maintained by the developer.

9.4 The onsite drainage system including the detention basins and associated inlets/outlets, headwalls and pipework will be subject to routine monitoring and maintenance, a record of this should be upheld.

Maintenance schedules

9.5 The sections below express the minimum standards for the onsite maintenance regime and have been prepared from recommendations contained within the CIRIA SuDS Manual (C753).

9.6 It should be noted that any invasive maintenance work such as silt or vegetation removal is only required intermittently but it should be planned to be sympathetic to the requirements of the ecosystem. The window for carrying out maintenance to achieve this is usually towards the end of the growing season (September/October) although this varies with species[18].

Storage and attenuation

9.7 Surface water runoff from the site is to be attenuated by a detention basin. The proposed maintenance regime for the detention basin is expressed in the table below.

Operation and maintenance requirements for detention basins		
Maintenance schedule	**Required action**	**Typical frequency**
Regular maintenance	Remove litter and debris	Monthly
	Cut grass – for spillways and access routes	Monthly (during growing season), or as required
	Cut grass – meadow grass in and around basin.	Half yearly (spring before nesting season, and autumn)
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)
	Inspect inlets, outlets, and overflows for blockages, and clear if required	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and facility surface for silt accumulation. Establish appropriate silt removal frequencies	Monthly (for first year), then annually or as required

[18] CIRIA SuDS Manual (C753) (2015). Part D. Chapter 23. Pg 500.

	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlet and forebay	Annually (or as required)
	Manage wetland plants in outlet pool –where provided	Annually (as set out in CIRIA SuDs guidance)
Occasional maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim ant trees and remove cuttings	Every 2 years, or as required
	Remove sediment from inlets, outlets, forebay and main basin when required	Every 5 years, or as required (likely to be minimal requirements where effective upstream source control is provided)
Remedial action	Repair erosion or other damage by reseeding or re-turfing	As required
	Realignment of riprap	As required
	Repair/ rehabilitation of inlets, outlets, and overflows	As required
	Relevel uneven surfaces and reinstate design levels	As required
source: CIRIA SuDs Manual (C753) (2015) Part D. Chapter 22, pg. 483		

Conveyance, pipework, and flow control

9.8 Surface water runoff is to drain from impermeable surfaces onsite via a gravity conveyed surface water sewer.

9.9 A flow control device is to restrict flows to the greenfield runoff rate via the proposed surface water outfall into the minor watercourse.

9.10 The associated maintenance regime required to sustain the aforementioned drainage features are expressed within the table below.

Drainage Component	Maintenance Task	Frequency
Drainage Network	Inspect for blockages to ensure network is free running	Every 3 months and after any significant storm event
Surface water gullies/ Linear drainage features	Inspect for blockages and ensure that the drainage feature is free running. Jet or vacuum as appropriate.	Every 3 months and after any significant storm event
Catchpits	Inspect for and remove silt	Every 6 months and after any significant storm event
Discharge Control	Inspect for blockage and correct operation	Every 3 months and after any significant storm event
source: CIRIA SuDs Manual (C753) (2015) Part D. Chapter 28		

Connections

9.11 Surface water is to discharge into the minor watercourse via a detention basin and flow control chamber. The proposed maintenance regime for these components is expressed in the table below.

Drainage Component	Maintenance Task	Frequency
Outfall pipe	Regular maintenance and monitoring to ensure sufficient operation.	Annually or as required
Minor watercourse/ Drainage ditch	Monitoring of watercourse levels	Frequently post development then as required/after any storm event
source: CIRIA SuDs Manual (C753) (2015) Part D. Chapter 28		

Design life

9.12 The design life of the development may exceed the design life of certain components of the surface water network, this however is based upon numerous unpredictable variables.

9.13 During the maintenance regime it should be assessed whether any repairs are required and whether drainage components have reached the end of their functional lifetime. The proposed drainage network is to be built to adoptable standards, and it is anticipated that the network will be adopted by Severn Trent Water, thus the responsibility to replace/repair any unfunctional components of the drainage network will lie with Severn Trent Water. Should any components fail prior to adoption the responsibility would lie with the landowner.

10.0 CONCLUSIONS AND RECOMMENDATIONS

10.1 This Flood Risk Assessment and Drainage Strategy has been carried out on behalf of Davidsons Developments Ltd. and regards an outline application for up to 103 dwellings with all matters reserved apart from the access from Ashby Road. The assessment has been conducted in accordance with the requirements of the NPPF and the associated Planning Practice guidance.

10.2 The site has been found to not be at any direct flood risk from flooding associated with fluvial, sewer or groundwater sources. The development site is entirely within Flood Zone 1 and there are no significant established sources of flood risk.

10.3 The EA mapping highlights that there are areas of minor surface water flooding in the northernmost corner, along the northern boundary and along the eastern boundary of the site. The minor surface water flood areas are at the low points of the site and will remain undeveloped and lie outside all development areas, therefore a sequential test is not required. Any residual risk will be mitigated by the proposed surface water strategy as well as general design considerations such as the raising of floor levels above existing ground levels and the arrangement of external levels to preferentially divert any exceedance flows away from building thresholds.

10.4 The surface water drainage strategy has been considered, and a calculation of the anticipated discharge rate and attenuation volume has been carried out. The proposed development will discharge surface water runoff at a restricted rate into the network of minor watercourses on site and along its perimeter.

10.5 Attenuation is proposed via the use of a wet detention basin that will be sited in the north of the development to suit the onsite topography and development proposals. The basin has been designed to attenuate surface water runoff for all storm events up to and including the 1 in 100-year plus 40% climate change storm event, in line with local planning guidance.

10.6 Foul effluent shall be conveyed via a gravity sewer network within the site that will discharge via a new pumped connection into the existing foul water sewer within Ashby Road. A gravity sewer connection appears unfeasible therefore a pumping station is required on site, subject to further consultation with Severn Trent Water.

10.7 The proposed onsite foul and surface water drainage networks shall be put forward for adoption by Severn Trent Water under a Section 104 agreement to maintain on an ongoing basis.

10.8 Provided that the recommendations of this report are followed, then the development can proceed without being at any significant flood risk and without increasing flood risk elsewhere. The development proposals are considered sustainable from a flood risk and drainage perspective.

11.0 REFERENCES

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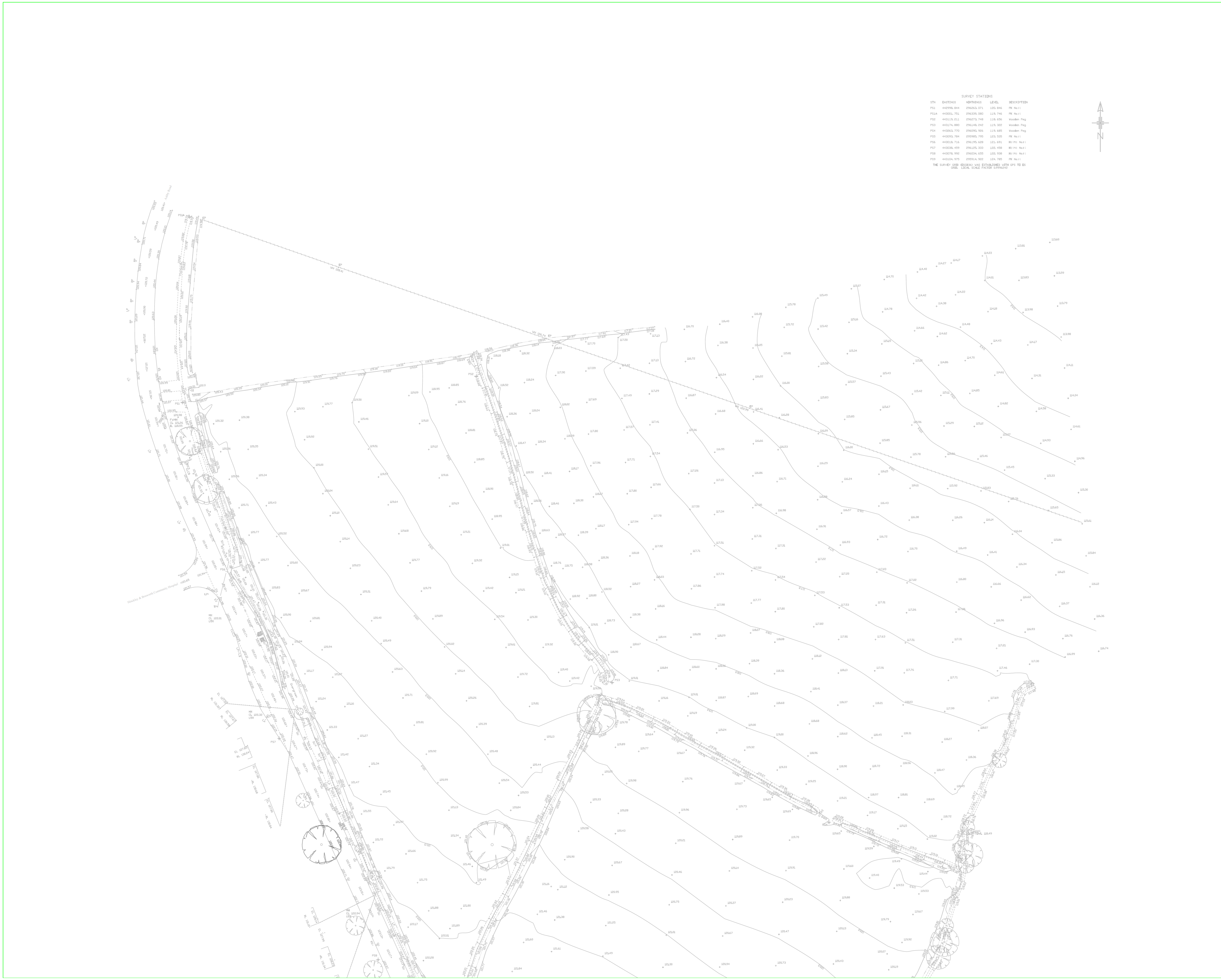
APPENDIX A

TOPOGRAPHICAL SURVEY



SURVEY STATIONS

STN	EASTINGS	NORTHINGS	LEVEL	DESCRIPTION
PS1	442998.844	296263.071	120.846	PK Nail
PS1A	443001.751	296339.080	119.746	PK Nail
PS2	443119.211	296273.748	118.656	Wooden Peg
PS3	443174.880	296148.242	119.322	Wooden Peg
PS4	443263.770	296090.926	119.685	Wooden Peg
PS5	443093.784	295985.795	123.535	PK Nail
PS6	443018.716	296195.628	121.691	Hilti Nail
PS7	443038.459	296125.333	122.458	Hilti Nail
PS8	443078.992	296034.655	122.938	Hilti Nail
PS9	443104.975	295914.922	124.785	PK Nail

THE SURVEY GRID (OSGB36) WAS ESTABLISHED WITH GPS TO OS GRID. LOCAL SCALE FACTOR 0.9996242

SURVEY NOTES

1. THE SURVEY GRID (OSGB36) WAS ESTABLISHED WITH GPS TO OS GRID. LOCAL SCALE FACTOR 0.9996242
2. SURVEY LEVELS ESTABLISHED BY GPS TO OS DATUM

SURVEY KEY

House — Building; Survey Control Station
Wall — Wall; Hedge; Kerbline
R/Wall — Retaining Wall; Verge/Edge of Track etc
P/W — Fence (with description)

Chestnut Paling — C/P
Close Boarded — C/B
Corrugated Iron — C/I
Chain Link — C/L
Crash Barrier — CBr
Concrete Panel — Con/P
Hit and Miss — H/M
Interwoven — Iwn
Paling — Pal
Post & Wire — P/W
Post & Rail — P/R
Post & Chain — P/C
Overlap — O/L
Iron Railings — I/R
Post & Barbed Wire — P/Bw
Electric — Elc
Hoarding — Hrd
Post & Wire Mesh — P/M
Picket (Wooden) — P/K
Trip Rail — T/R
Trellis Fence — T/F
Pallisade Fence — P/F
Floor Level — FL
Eaves Level — EL
Ridge Level — RL
Tarmac Surface — Tarmac
Grass/Lawn — Grass
Paving Slabs — Paving
Tactile Paving — T/Pav

Overhead Line
Footpath
Sewer Line
Water/Ditch etc
Gate
Stile
Individual Tree

Unable To Raise — UTR
Fire Escape — F/Esc
Drop Kerb — DK
Stone Surface — Stone
Gravel Surface — Gravel
Concrete Surface — Conc
Rough Ground — R/Grnd
Granite Setts/Cobbles — Cobbles

STREET FURNITURE

Belisha Beacon	BB	Marker Post	Mkr
Borehole	BH	Mile Post	MP
Bollard	BL	Pillar Box	PB
Bus Stop	BS	Pipe	PI
Drain	Dr	Parking Meter	PM
Electric Pole	EP	Post	PO
Flood Light	FL	Rodding Eye	RE
Flagstaff	FS	Reflector Post	RP
Gate Post	GP	Road Sign	RS
Gully	GU	Stop Cock	SC
Gas Valve	GV	Stop Tap	ST
Inspection Cover	IC	Sign	SI
Litter Bin	LB	Stump	SU
Lamp Post	LP	Stop Valve	SV
Traffic Light	TL	Telegraph Pole	TP
Manhole	MH	Vent Pipe	VP
Name Plate	NP	Telecommunication	TC
Fire Hydrant	FH	Water Tap	Tap
Wash Out	WO	Kerb Outlet	KO
Water Meter	WM	Air Valve	AV
Cable Television	TV	Tel Call Box	TCB
Earth Rod	ER	Trial Pit	T/P
Speed Camera	SPD	Closed Circuit TV	CT
Cellar Light	Ce/L	Multi Utility Pole (EP,LP,&TP)	MUP

TECHNICAL NOTES

INFORMATION SHOWN ON THIS DRAWING IS SURVEYED TO THE ACCURACY OF THE BASE SCALE SHOWN IN THE LEGEND.

MAN ENTRY TO SEWERS HAS NOT BEEN UNDERTAKEN. DEPTHS, PIPE SIZES ARE MEASURED/ESTIMATED FROM THE GROUND. ALL SEWER DETAILS TO BE CHECKED WITH LOCAL AUTHORITY RECORDS OR ON SITE PRIOR TO COMMENCEMENT OF WORKS.

BOUNDARIES SHOWN ARE PHYSICAL FEATURES AND MAY NOT REPRESENT LEGALLY CONVEYED OWNERSHIP

ALL TREE HEIGHTS AND SPREADS ARE APPROXIMATE. TREE TYPES WHICH HAVE BEEN IDENTIFIED SHOULD BE CHECKED BY A TREE SPECIALIST.

WHERE ADJACENT BUILDINGS HAVE BEEN SURVEYED REMOTELY NOT ALL EXTERNAL WALLS MAYBE SHOWN DUE TO OBSTRUCTIONS ALONG LINE OF SIGHT

SHEET LAYOUT

REV	DATE	DESCRIPTION	BY	APP.

Phoenix Survey Services Ltd.
49 William Road, Long Buckby, Northampton NN6 7YS
Tel 07876 658389 or 07810 752133
Email info@phoenixsurveyservices.co.uk

Client: DAVIDSONS

Project Title: Ashby Road Hinckley

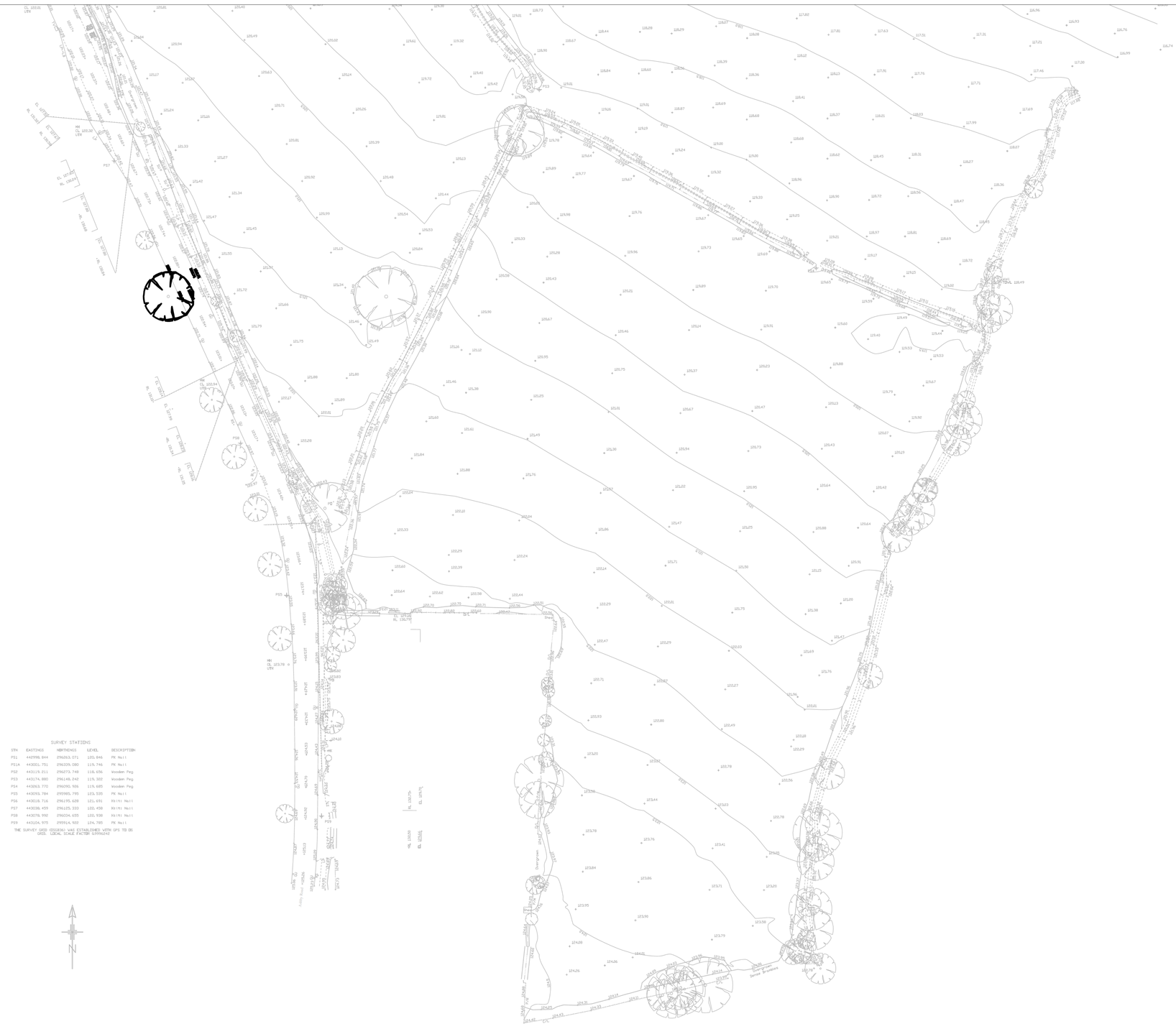
Drawing Title: Topographical Survey Sheet 1 of 2

Drawn	Checked	Approved
JS	ALB	GRA

Date	Scale	Sheet Size
14/11/2022	1/500	A0

Drg. No. S3051–01

Rev



SURVEY STATIONS

STN	EASTINGS	NORTHINGS	LEVEL	DESCRIPTION
PS1	442998.844	296263.071	120.846	PK Nail
PS1A	443001.751	296339.080	119.746	PK Nail
PS2	443119.211	296273.748	118.656	Wooden Peg
PS3	443174.880	296148.242	119.302	Wooden Peg
PS4	443263.770	296090.926	119.685	Wooden Peg
PS5	443093.784	295985.795	123.535	PK Nail
PS6	443018.716	296195.628	121.491	Hilti Nail
PS7	443036.459	296125.332	120.458	Hilti Nail
PS8	443078.992	296034.655	120.938	Hilti Nail
PS9	443104.975	295914.922	124.795	PK Nail

THE SURVEY GRID (OSGB36) WAS ESTABLISHED WITH GPS TO OS GRID. LOCAL SCALE FACTOR 0.9996242

SURVEY NOTES

1. THE SURVEY GRID (OSGB36) WAS ESTABLISHED WITH GPS TO OS GRID. LOCAL SCALE FACTOR 0.9996242
2. SURVEY LEVELS ESTABLISHED BY GPS TO OS DATUM

SURVEY KEY

Building — Survey Control Station
Wall — Hedge — Kerbline
R/Wall — Retaining Wall — Verge/Edge of Track etc
P/V — Fence (with description)

Chestnut Paling — C/P
Close Boarded — C/B
Corrugated Iron — C/I
Chain Link — C/L
Crash Barrier — CB
Concrete Panel — Con/P
MR and Rail — M/R
Interwoven — Int
Paling — Pal
Post & Wire — P/W
Post & Rail — P/R
Post & Chain — P/C
Post & Board — P/B
Iron Railings — I/R
Post & Barbed Wire — P/Bw
Electric — El
Hoarding — Hrd
Post & Wire Mesh — P/M
Picket (Wooden) — P/K
Trip Rail — T/R
Trellis Fence — T/F
Padlock Fence — P/P
Floor Level — FL
Eaves Level — EL
Ridge Level — RL
Tarmac Surface — Tarma
Grass/Lawn — Grass
Paving Slabs — Paving
Tactile Paving — T/Pav

Overhead Line
Footpath
Sewer Line
Water/Ditch etc
Gate
Stile
Individual Tree

Unable To Raise — UTR
Fire Escape — F/Esc
Drop Kerb — DK
Stone Surface — Stone
Gravel Surface — Gravel
Concrete Surface — Conc
Rough Ground — R/Gand
Granite Setts/Cobbles — Cobbles

STREET FURNITURE

Bollards, Bronze — BB
Borehole — BH
Bollard — BL
Bus Stop — BS
Drain — DR
Electric Pole — EP
Flood Light — FL
Flagstaff — FS
Gate Post — GP
Gully — G/D
Gas Valve — GV
Inspection Cover — IC
Lamp Post — LP
Lamp Post — LP
Traffic Light — TL
Manhole — MH
Name Plate — NP
Fire Hydrant — FH
Wash Out — WO
Water Meter — WM
Cable Television — TV
Earth Rod — ER
Speed Camera — SPD
Cellar Light — CeVL

Marker Post — MP
Mile Post — MP
Mail Box — PB
Pipe — PI
Parking Meter — PM
Post — PO
Reading Eye — RE
Reflector Post — RP
Road Sign — RS
Stop Cock — SC
Stop Tap — ST
Sign — SI
Stop Valve — SV
Stop Valve — SV
Telegraph Pole — TP
Vent Pipe — VP
Telecommunication — TC
Water Tap — Tap
Kerb Outlet — KO
Air Valve — AV
Tel. Call Box — TCB
Tribu Pit — T/Pit
Closed Circuit TV — CT
Multi Utility Pole (DPLA187) — MUP

TECHNICAL NOTES

INFORMATION SHOWN ON THIS DRAWING IS SURVEYED TO THE ACCURACY OF THE BASE SCALE SHOWN IN THE LEGEND.

MAN ENTRY TO SEWERS WAS NOT BEEN UNDERTAKEN, DEPTHS, PIPE SIZES ARE MEASURED/ESTIMATED FROM THE GROUND. ALL SEWER DETAILS TO BE CHECKED WITH LOCAL AUTHORITY RECORDS OR ON SITE PRIOR TO COMMENCEMENT OF WORKS.

BOUNDARIES SHOWN ARE PHYSICAL FEATURES AND MAY NOT REPRESENT LEGALLY CONVEYED OWNERSHIP.

ALL TREE HEIGHTS AND SPREADS ARE APPROXIMATE. TREE TYPES WHICH HAVE BEEN IDENTIFIED SHOULD BE CHECKED BY A TREE SPECIALIST.

WHERE ADJACENT BUILDINGS HAVE BEEN SURVEYED REMOTELY NOT ALL EXTERNAL WALLS MAYBE SHOWN DUE TO OBSTRUCTIONS ALONG LINE OF SIGHT.

SHEET LAYOUT

REV	DATE	DESCRIPTION	BY	APP.

Phoenix Survey Services Ltd.
49 William Road, Long Buckby, Northampton NN6 7YB
Tel 07874 656358 or 07810 752133
Email info@phoenixsurveyservices.co.uk

Client: DAVIDSONS

Project Title: Ashby Road Hinckley

Drawing Title: Topographical Survey Sheet 2 of 2

Drawn	Checked	Approved
JS	ALB	GRA
Date: 14/11/2022	Scale: 1/500	Sheet Size: A0
Dwg. No.: S3051-02		Rev:

APPENDIX B

LLFA CORRESPONDENCE

[redacted]

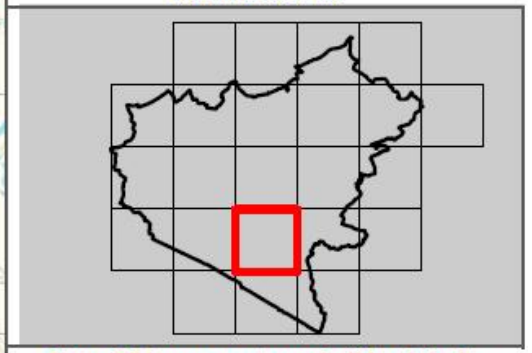
APPENDIX C

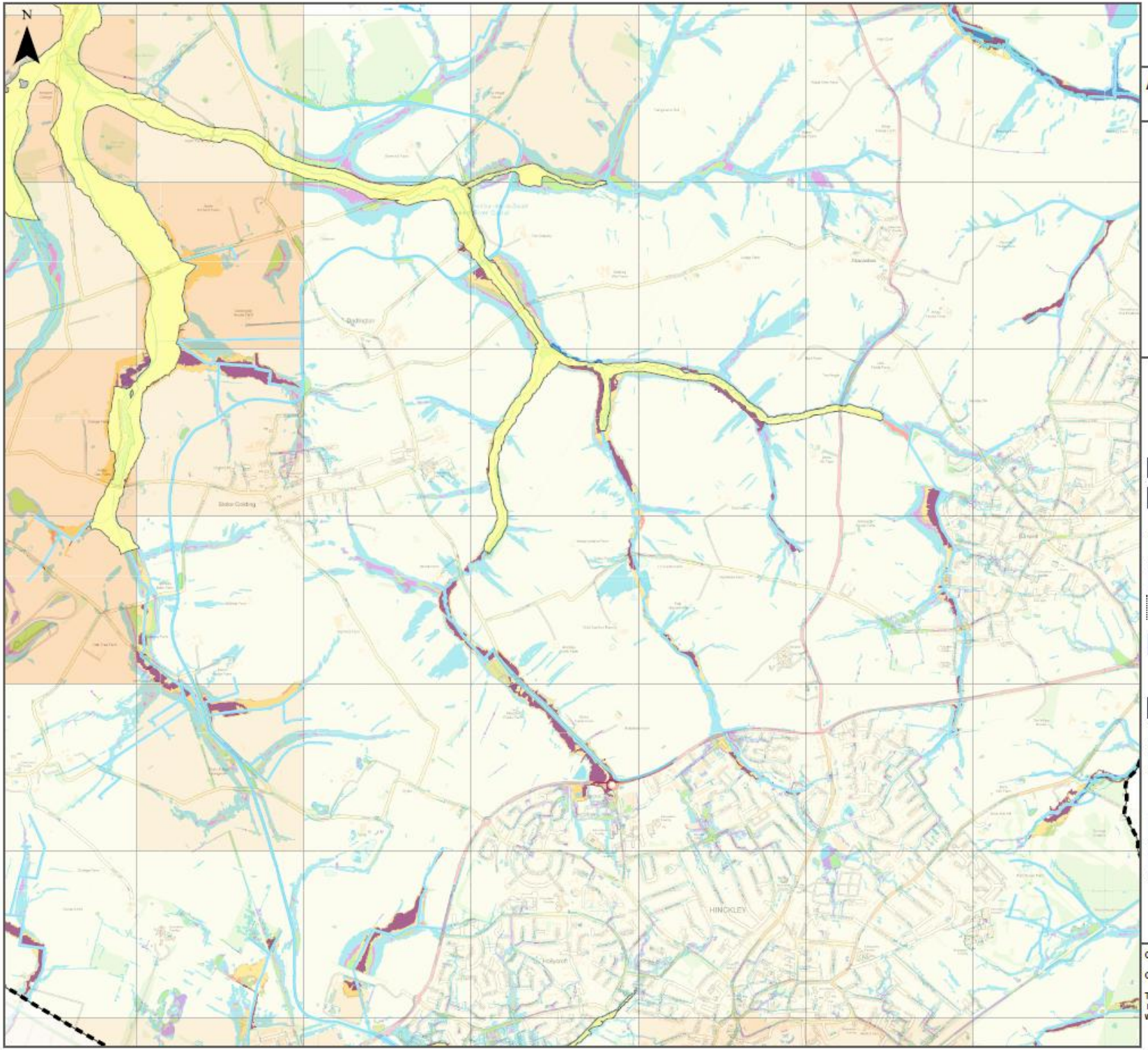
SUCSEPTIBILITY TO GROUNDWATER FLOODING

HINCKLEY AND BOSWORTH BOROUGH LEVEL 1 STRATEGIC FLOOD RISK ASSESSMENT

APPENDIX A: GEOPDF FLOOD RISK MAPPING

INDEX GRID: D3





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%

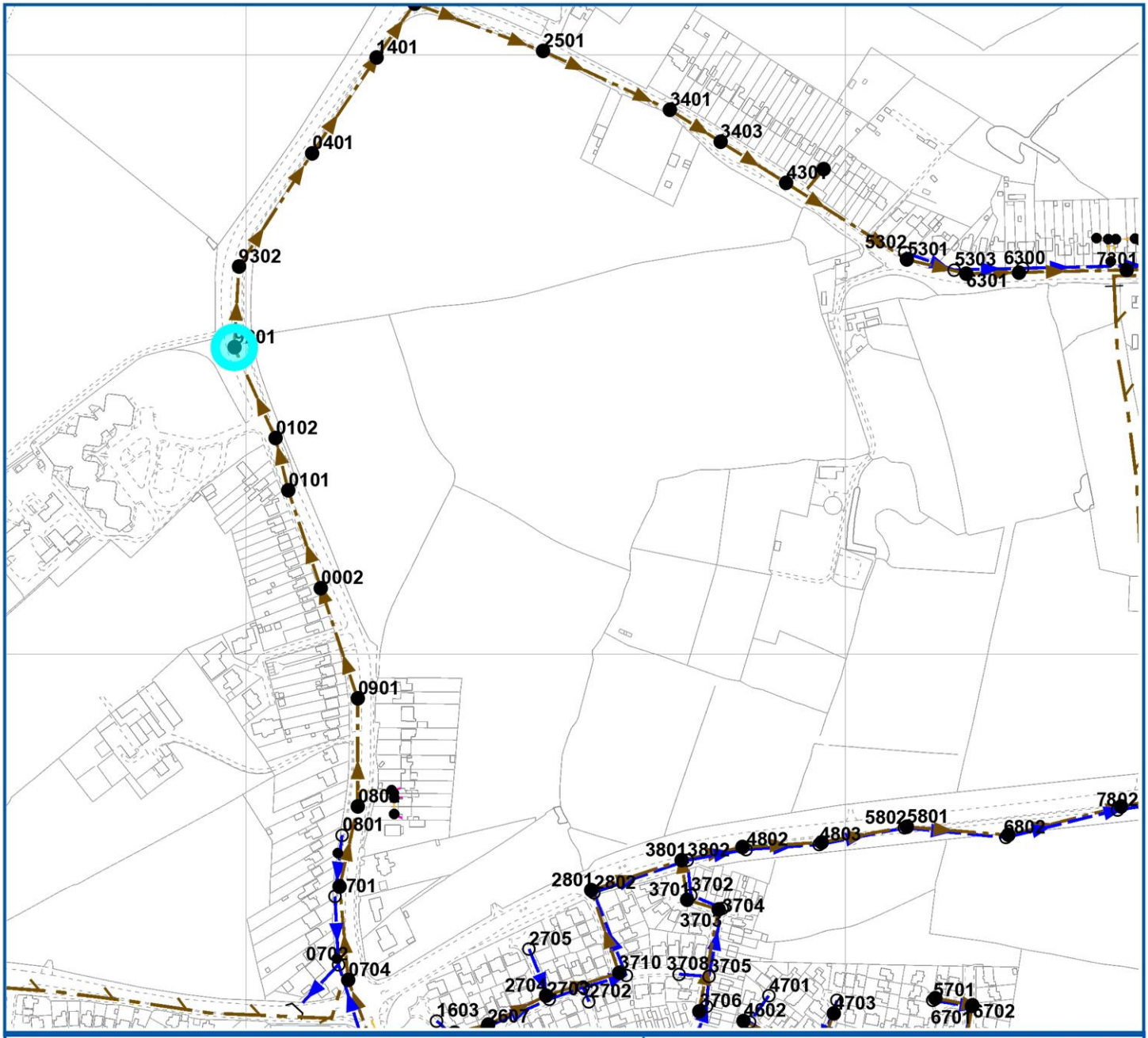
Historical Flooding
- Historic Flooding

Defences
- demountable defence
- embankment
- wall

0 0.35 0.7 1.4 Km

APPENDIX D

SEWER RECORD PLANS



LEGEND

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
- Sludge Treatment Point
- Sludge Treatment Structure

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

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 Sewe
- 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

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

Print500mLine

Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0345 601 6616

SEWER RECORD

O/S Map Scale: 1:5,000

This map is centred upon:

Date of Issue: 19-06-24

X: 443272.08 **Y:** 296114.53

Disclaimer Statement:

1 Do not scale off this Map.

2 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 (including but not limited to excavations) in the vicinity of SEVERN TRENT WATER assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems.

3 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 possess complete records of these assets. These assets may not be displayed on the map.

5 Ordnance Survey licence number: **100031673**

6 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.

Sewer Node Sewer Pipe Data

Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SP43955604	122.12	119.71	119.63	S	CO	C	375	<UNK>	499.5	31/12/1899 00:00:00
SP42957617	115.1399	112.7	112.08	F	VC	C	225	<UNK>	124.35	31/12/1899 00:00:00
SP42958623	<UNK>	<UNK>	<UNK>	F	U	U	150	<UNK>	<UNK>	05/07/2007 00:00:00
SP43955802	120.0899	118.1	117.14	S	CO	C	450	<UNK>	88.94	31/12/1899 00:00:00
SP43952507	125.5199	123.63	123.49	F	VC	C	225	<UNK>	149.14	31/12/1899 00:00:00
SP43954605	123.7099	122.36	122.1	S	VC	C	225	<UNK>	86	31/12/1899 00:00:00
SP43951605	126.2399	123.76	123.57	F	VC	C	<UNK>	<UNK>	579.68	31/12/1899 00:00:00
SP43952802	124.18	122.31	120.94	S	CO	C	375	<UNK>	60.25	31/12/1899 00:00:00
SP43962501	116.8	113.65	<UNK>	F	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP43954508	123.2799	120.41	120.37	S	CO	C	525	<UNK>	790.5	31/12/1899 00:00:00
SP42958617	0	<UNK>	<UNK>	S	U	U	150	<UNK>	<UNK>	05/07/2007 00:00:00
SP43954504	124.5	121.42	120.94	S	CO	C	450	<UNK>	120.79	31/12/1899 00:00:00
SP43953501	125.48	122.67	122.11	F	VC	C	225	<UNK>	90.14	31/12/1899 00:00:00
SP43966300	<UNK>	<UNK>	109.49	S	CO	C	300	<UNK>	<UNK>	31/12/1899 00:00:00
SP43954410	124.26	122.49	121.18	S	VC	C	225	<UNK>	38.78	31/12/1899 00:00:00
SP43955607	121.65	119.62	119.54	S	CO	C	375	<UNK>	275	31/12/1899 00:00:00
SP43965302	111.75	110.44	110.22	S	VC	C	300	<UNK>	192.64	31/12/1899 00:00:00
SP43953509	125.69	123.24	123.02	S	VC	C	225	<UNK>	91.36	31/12/1899 00:00:00
SP43953516	125.5699	121.84	121.65	F	VC	C	225	<UNK>	109.89	31/12/1899 00:00:00
SP43955516	122.3799	120.6	120.3	S	VC	C	225	<UNK>	100.77	31/12/1899 00:00:00
SP43952508	125.7399	123.65	123.28	S	VC	C	225	<UNK>	68.38	31/12/1899 00:00:00
SP43956504	121.23	118.58	118.18	F	VC	C	225	<UNK>	72.55	31/12/1899 00:00:00
SP43954510	122.9199	121.31	120.6	S	VC	C	225	<UNK>	40.94	31/12/1899 00:00:00
SP43952503	125.3899	123.47	122.71	F	VC	C	225	<UNK>	37.97	31/12/1899 00:00:00
SP43956507	121.0199	118.17	118.04	F	VC	C	225	<UNK>	55.46	31/12/1899 00:00:00
SP43953504	125.5299	121.9	121.76	S	CO	C	450	<UNK>	133.43	31/12/1899 00:00:00
SP43955517	122.76	120.5	119.9	F	VC	C	225	<UNK>	75	31/12/1899 00:00:00
SP42958404	115.4	113.93	112.73	S	VC	C	150	<UNK>	27.42	31/12/1899 00:00:00
SP43955613	121.1699	119.61	119.43	S	CO	C	375	<UNK>	128.83	31/12/1899 00:00:00
SP43961603	117.732	111.63	111.114	C	CO	C	<UNK>	<UNK>	299.22	01/06/2010 00:00:00
SP43955509	121.5	119.15	119.02	F	VC	C	225	<UNK>	168	31/12/1899 00:00:00
SP43955515	122.1299	119.89	119.7	F	VC	C	225	<UNK>	83.21	31/12/1899 00:00:00
SP43957400	<UNK>	120.04	119.81	F	CO	C	225	<UNK>	129.27	31/12/1899 00:00:00
SP42958618	<UNK>	<UNK>	<UNK>	S	U	U	150	<UNK>	<UNK>	05/07/2007 00:00:00
SP42958608	116.51	114.58	112.91	F	VC	C	150	<UNK>	26.57	31/12/1899 00:00:00
SP42957507	115.16	112.19	111.55	S	VC	C	225	<UNK>	26.61	31/12/1899 00:00:00
SP43952501	125.04	123.46	123.21	S	VC	C	225	<UNK>	97.4	31/12/1899 00:00:00
SP43953511	125.8	122.23	121.91	S	CO	C	450	<UNK>	87.56	31/12/1899 00:00:00
SP43961602	118.194	112.056	111.63	C	CO	C	<UNK>	<UNK>	98.22	01/06/2010 00:00:00
SP43960102	121.91	119.45	118.51	F	VC	C	<UNK>	<UNK>	89.54	31/12/1899 00:00:00
SP43954405	123.55	122.54	122.21	S	VC	C	225	<UNK>	47.91	31/12/1899 00:00:00

Sewer Node Sewer Pipe Data

Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SP43960002	<UNK>	63.659	119.88	F	VC	C	<UNK>	<UNK>	<UNK>	28/04/2019 00:00:00
SP43955502	123.05	120.28	120.15	S	CO	C	675	<UNK>	306.23	31/12/1899 00:00:00
SP43953703	123	120.58	120.44	F	VC	C	<UNK>	<UNK>	194.29	31/12/1899 00:00:00
SP43954801	121.86	119.68	118.69	F	VC	C	225	<UNK>	66.79	31/12/1899 00:00:00
SP42958503	119.6399	117.76	115.23	S	VC	C	225	<UNK>	25.14	31/12/1899 00:00:00
SP43956506	121.3899	119.65	119.46	S	CO	C	750	<UNK>	374.74	31/12/1899 00:00:00
SP43955614	121.4199	119.54	119.49	S	CO	C	375	<UNK>	367.6	31/12/1899 00:00:00
SP43956701	120.87	119.89	119.68	S	CO	C	300	<UNK>	271.76	31/12/1899 00:00:00
SP43950801	124.76	124.24	124.13	S	VC	C	225	<UNK>	466.82	31/12/1899 00:00:00
SP43963401	115.0599	<UNK>	<UNK>	F	VC	C	<UNK>	<UNK>	<UNK>	28/04/2019 00:00:00
SP43956404	122.26	120.34	120.11	S	CO	C	375	<UNK>	169.35	31/12/1899 00:00:00
SP43953405	125.33	123.52	123.08	S	VC	C	225	<UNK>	70.02	31/12/1899 00:00:00
SP43954607	122.8199	120.17	120.07	S	VC	C	225	<UNK>	342.3	31/12/1899 00:00:00
SP43955602	122.6299	120.95	120.4	S	VC	C	225	<UNK>	58.75	31/12/1899 00:00:00
SP43955510	121.5	120.02	119.98	S	CO	C	375	<UNK>	546	31/12/1899 00:00:00
SP43960600	116.939	112.272	112.056	C	CO	C	<UNK>	<UNK>	480.88	01/06/2010 00:00:00
SP42958402	115.36	112.53	111.48	S	VC	C	300	<UNK>	55.22	31/12/1899 00:00:00
SP42958619	<UNK>	<UNK>	<UNK>	F	U	U	150	<UNK>	<UNK>	05/07/2007 00:00:00
SP43954409	124.3799	122.35	120.73	F	VC	C	225	<UNK>	37.17	31/12/1899 00:00:00
SP43951603	125.4899	124.1	124.01	S	VC	C	225	<UNK>	196.56	31/12/1899 00:00:00
SP43953517	125.2799	121.63	121.4	F	VC	C	225	<UNK>	135.91	31/12/1899 00:00:00
SP43955513	122.01	119.67	119.48	F	VC	C	225	<UNK>	105.89	31/12/1899 00:00:00
SP43952602	126.08	124.83	124.1	S	VC	C	225	<UNK>	68.25	31/12/1899 00:00:00
SP43956402	122.36	120.62	120.36	S	CO	C	375	<UNK>	136.42	31/12/1899 00:00:00
SP43954502	123.6699	120.67	120.46	F	VC	C	225	<UNK>	159.71	31/12/1899 00 00 00
SP42959601	120.54	118.56	116.99	S	VC	C	150	<UNK>	26.18	31/12/1899 00:00:00
SP42969302	<UNK>	<UNK>	<UNK>	F	VC	C	<UNK>	<UNK>	<UNK>	28/04/2019 00:00:00
SP43952603	125.8	123.28	122.97	F	VC	C	<UNK>	<UNK>	173.13	31/12/1899 00:00:00
SP43952705	125.7099	124.13	123.63	S	VC	C	225	<UNK>	90.62	31/12/1899 00:00:00
SP43954407	123.44	121.98	120.66	S	CO	C	300	<UNK>	43.33	31/12/1899 00:00:00
SP42958602	119.05	116.95	113.53	S	VC	C	225	<UNK>	26.32	31/12/1899 00:00:00
SP43957802	117.7099	116.37	114.31	S	CO	C	450	<UNK>	46.62	31/12/1899 00:00:00
SP43955404	123.0899	121.71	121.12	F	VC	C	225	<UNK>	46.76	31/12/1899 00:00:00
SP43955507	121.4199	119.25	118.92	F	VC	C	225	<UNK>	101.82	31/12/1899 00:00:00
SP43956503	120.65	119.44	119.08	S	CO	C	750	<UNK>	30.06	31/12/1899 00:00:00
SP43952601	126.0899	124.53	123.77	F	VC	C	225	<UNK>	71.22	31/12/1899 00:00:00
SP43953603	124.48	122.85	122.73	S	VC	C	225	<UNK>	297.83	31/12/1899 00:00:00
SP43953508	125.75	123.18	123.04	F	VC	C	225	<UNK>	93.14	31/12/1899 00:00:00
SP42957602	115.29	113.11	112.73	F	VC	C	225	<UNK>	184.84	31/12/1899 00:00:00
SP43966302	111.3	109.26	108.88	F	VC	C	<UNK>	<UNK>	236.89	31/12/1899 00:00:00
SP43962600	116.428	111.114	110.372	C	CO	C	<UNK>	<UNK>	211.99	01/06/2010 00:00:00
SP43951607	0	0	0	F	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00

Sewer Node Sewer Pipe Data

Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SP43956407	121.0899	120.04	119.81	F	CO	C	225	<UNK>	129.27	31/12/1899 00:00:00
SP43953709	125.1299	123.19	122.41	S	VC	C	300	<UNK>	94.99	31/12/1899 00:00:00
SP43951606	126.4499	<UNK>	122.23	C	<UNK>	<UNK>	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP43954608	123.33	120.37	120.2	S	VC	C	225	<UNK>	174.59	31/12/1899 00:00:00
SP42958510	117.16	115.11	112.24	S	VC	C	225	<UNK>	16.9	31/12/1899 00:00:00
SP43956502	120.61	118.98	117.68	S	CO	C	825	<UNK>	10.46	31/12/1899 00:00:00
SP43951601	125.65	123.67	123.549	F	VC	C	<UNK>	<UNK>	76.28	31/12/1899 00:00:00
SP43960401	119.23	116.92	115.96	F	VC	C	<UNK>	<UNK>	99.68	31/12/1899 00:00:00
SP43956406	121.12	120.25	120.14	S	VC	C	225	<UNK>	277.09	31/12/1899 00:00:00
SP43957404	120.9899	119.78	118.69	F	CO	C	225	<UNK>	99.26	31/12/1899 00:00:00
SP42957618	115.1699	112.74	111.45	S	CO	C	375	<UNK>	60.67	31/12/1899 00:00:00
SP43952703	126.0599	123.62	123.44	S	VC	C	300	<UNK>	165.17	31/12/1899 00:00:00
SP43957405	121.0299	120.11	119.54	S	CO	C	300	<UNK>	106.58	31/12/1899 00:00:00
SP43954603	123.93	121.75	121.5	F	VC	C	225	<UNK>	82.48	31/12/1899 00:00:00
SP43954606	122.54	120.01	119.76	S	CO	C	300	<UNK>	220.88	31/12/1899 00:00:00
SP43953801	123.1399	120.13	119.7	F	VC	C	225	<UNK>	121.33	31/12/1899 00:00:00
SP43954701	122.7399	120.83	120.38	S	VC	C	225	<UNK>	60.44	31/12/1899 00:00:00
SP43953602	125.7799	123.44	123.21	F	VC	C	225	<UNK>	140.48	31/12/1899 00:00:00
SP43954609	122.5299	119.95	119.27	F	VC	C	225	<UNK>	89.75	31/12/1899 00:00:00
SP43952604	125.58	123.74	123.47	F	VC	C	225	<UNK>	114.11	31/12/1899 00:00:00
SP43953802	123.12	120.71	120.15	S	CO	C	450	<UNK>	88.96	31/12/1899 00:00:00
SP43955501	123.0599	120.22	119.91	F	VC	C	225	<UNK>	129.84	31/12/1899 00:00:00
SP42958405	116.69	115.03	114.11	S	VC	C	150	<UNK>	60.45	31/12/1899 00:00:00
SP43953707	124.3899	122.7	122.58	S	VC	C	225	<UNK>	209	31/12/1899 00:00:00
SP43953506	125.83	122.09	121.86	F	VC	C	225	<UNK>	102.61	31/12/1899 00 00 00
SP43965301	111.61	109.73	109.51	F	VC	C	<UNK>	<UNK>	223.82	31/12/1899 00:00:00
SP43950802	125.2799	122.11	<UNK>	F	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP43953503	125.2799	121.74	121.44	S	CO	C	450	<UNK>	107.13	31/12/1899 00:00:00
SP43955512	121.75	120.09	120.02	S	CO	C	375	<UNK>	420.43	31/12/1899 00:00:00
SP43951604	125.8899	124.45	<UNK>	S	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SP43956801	118.7399	116.76	115.45	F	VC	C	<UNK>	<UNK>	74.06	31/12/1899 00:00:00
SP43954406	123.36	121.69	121.23	F	VC	C	225	<UNK>	103.91	31/12/1899 00:00:00
SP43952509	125.7699	123.94	123.67	F	VC	C	225	<UNK>	86.7	31/12/1899 00:00:00
SP43967301	111.0599	108.9	108.57	F	VC	C	<UNK>	<UNK>	218.27	31/12/1899 00:00:00
SP43956501	120.7699	119.46	119.44	S	CO	C	750	<UNK>	283	31/12/1899 00:00:00
SP43955405	122.68	120.14	119.98	S	CO	C	675	<UNK>	215.06	31/12/1899 00:00:00
SP43954804	120.9899	118.66	117.55	F	VC	C	225	<UNK>	65.03	31/12/1899 00:00:00
SP42958601	119.05	116.6	113.14	F	VC	C	150	<UNK>	26.01	31/12/1899 00:00:00
SP43955605	122	119.25	118.85	F	VC	C	225	<UNK>	93	31/12/1899 00:00:00
SP42958504	119.6699	117.27	114.67	F	VC	C	150	<UNK>	24.46	31/12/1899 00:00:00
SP43955508	121.4	119.86	119.71	S	CO	C	675	<UNK>	237.4	31/12/1899 00:00:00
SP43954604	123.8799	122.1	121.89	S	VC	C	225	<UNK>	84.38	31/12/1899 00:00:00

Sewer Node Sewer Pipe Data

Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SP42958614	<UNK>	<UNK>	<UNK>	S	U	U	225	<UNK>	<UNK>	05/07/2007 00:00:00
SP43966301	111.4899	109.51	109.26	F	VC	C	<UNK>	<UNK>	176.04	31/12/1899 00:00:00
SP43953502	125.5199	123.06	122.44	S	VC	C	225	<UNK>	55.9	31/12/1899 00:00:00
SP43953507	125.6999	122.96	122.74	F	VC	C	225	<UNK>	96.41	31/12/1899 00:00:00
SP42958621	49.075	47.09	<UNK>	F	U	U	150	<UNK>	<UNK>	05/07/2007 00:00:00
SP43967602	109.651	107.279	105.92	C	CO	C	<UNK>	<UNK>	93.86	01/06/2010 00:00:00
SP43965600	111.7149	108.617	107.279	C	CO	C	<UNK>	<UNK>	97.32	01/06/2010 00:00:00
SP43952704	126.08	122.95	122.52	F	VC	C	150	<UNK>	148.58	31/12/1899 00:00:00
SP43955608	121.61	118.82	118.69	F	VC	C	225	<UNK>	169.38	31/12/1899 00:00:00
SP43963403	<UNK>	<UNK>	<UNK>	F	VC	C	<UNK>	<UNK>	<UNK>	28/04/2019 00:00:00
SP43955402	123.3499	121.44	120.36	S	VC	C	225	<UNK>	40.37	31/12/1899 00:00:00
SP43950702	124.8899	123.77	<UNK>	S	VC	C	225	<UNK>	0	31/12/1899 00:00:00
SP43956602	120.8099	119.25	119.1	S	CO	C	525	<UNK>	413.4	31/12/1899 00:00:00
SP43955612	121.1699	118.72	118.46	F	VC	C	225	<UNK>	89.19	31/12/1899 00:00:00
SP43954703	122.0199	120.31	120.09	F	VC	C	225	<UNK>	125.05	31/12/1899 00:00:00
SP43953514	125.47	122.99	122.13	F	VC	C	225	<UNK>	40.36	31/12/1899 00:00:00
SP43964301	<UNK>	<UNK>	109.73	F	VC	C	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP43954702	121.9	120.74	120.33	S	VC	C	225	<UNK>	98.78	31/12/1899 00:00:00
SP43951602	125.5899	123.98	123.89	S	VC	C	225	<UNK>	331.44	31/12/1899 00:00:00
SP43953704	122.9899	121.25	121.11	S	VC	C	300	<UNK>	201.64	31/12/1899 00:00:00
SP43953513	125.3499	123.32	123.04	F	VC	C	225	<UNK>	65.86	31/12/1899 00:00:00
SP43957801	117.73	115.43	113.69	F	VC	C	225	<UNK>	54.9	31/12/1899 00:00:00
SP43952607	125.83	123.82	123.65	S	VC	C	300	<UNK>	334.47	31/12/1899 00:00:00
SP43960101	122.2099	119.85	119.45	F	VC	C	<UNK>	<UNK>	110.95	31/12/1899 00:00:00
SP42958403	115.3899	113.22	111.92	F	VC	C	150	<UNK>	47.2	31/12/1899 00 00 00
SP43950704	126.2699	123.54	122.71	F	VC	C	<UNK>	<UNK>	94.35	31/12/1899 00:00:00
SP43956702	120.7699	119.33	118.95	F	VC	C	225	<UNK>	157.95	31/12/1899 00:00:00
SP43955403	122.5599	119.87	118.59	C	VC	C	225	<UNK>	75.59	31/12/1899 00:00:00
SP43952605	125.58	124.08	123.78	S	VC	C	225	<UNK>	101.97	31/12/1899 00:00:00
SP43953505	125.68	122.93	122.54	S	VC	C	225	<UNK>	14.51	31/12/1899 00:00:00
SP43954803	120.9899	119.24	118.16	S	CO	C	450	<UNK>	67.01	31/12/1899 00:00:00
SP42958609	46.27	44.6	112.98	S	VC	C	225	<UNK>	<UNK>	31/12/1899 00:00:00
SP43954503	123.69	120.84	120.45	S	CO	C	525	<UNK>	84.92	31/12/1899 00:00:00
SP42958616	<UNK>	<UNK>	<UNK>	S	U	U	150	<UNK>	<UNK>	05/07/2007 00:00:00
SP43955603	122.1299	120.23	120.19	S	CO	C	375	<UNK>	404	31/12/1899 00:00:00
SP43963600	115.151	110.372	108.617	C	CO	C	<UNK>	<UNK>	113.11	01/06/2010 00:00:00
SP42958620	49.075	47.875	<UNK>	F	U	U	150	<UNK>	<UNK>	05/07/2007 00:00:00
SP43955610	121.33	118.4	118.09	F	VC	C	225	<UNK>	167.39	31/12/1899 00:00:00
SP43953708	124.54	122.98	122.56	S	VC	C	150	<UNK>	59.71	31/12/1899 00:00:00
SP43954507	123.26	120.44	120.25	F	VC	C	225	<UNK>	166.42	31/12/1899 00:00:00
SP43955609	121.36	118.69	118.47	F	VC	C	225	<UNK>	75.23	31/12/1899 00:00:00
SP42958615	<UNK>	<UNK>	<UNK>	S	U	U	600	<UNK>	<UNK>	05/07/2007 00:00:00

Sewer Node Sewer Pipe Data

Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SP42958615	<UNK>	<UNK>	<UNK>	S	U	U	600	<UNK>	<UNK>	05/07/2007 00:00:00
SP43952606	126.04	124.88	124.69	F	VC	C	150	<UNK>	79.11	31/12/1899 00:00:00
SP43954506	123.2699	121.11	120.56	F	VC	C	225	<UNK>	79.87	31/12/1899 00:00:00
SP43953519	125.51	122.77	122.25	S	CO	C	450	<UNK>	93.9	31/12/1899 00:00:00
SP43965303	111.47	110.18	<UNK>	S	CO	C	300	<UNK>	<UNK>	31/12/1899 00:00:00
SP43955514	121.97	120.18	120.13	S	CO	C	375	<UNK>	295.2	31/12/1899 00:00:00
SP43956508	121.73	120.1	119.47	S	CO	C	375	<UNK>	91.75	31/12/1899 00:00:00
SP43953701	123.3499	120.41	120.24	F	VC	C	150	<UNK>	196.35	31/12/1899 00:00:00
SP43955505	121.9499	119.97	119.87	S	CO	C	675	<UNK>	376.4	31/12/1899 00:00:00
SP43952801	124.1699	121.89	120.18	F	VC	C	225	<UNK>	46.23	31/12/1899 00:00:00
SP42958612	115.3199	113.36	112.75	S	CO	C	375	<UNK>	120.26	31/12/1899 00:00:00
SP43952701	125.5999	123.42	123.23	S	VC	C	300	<UNK>	196.63	31/12/1899 00:00:00
SP43953601	125.7399	123.75	123.52	S	VC	C	225	<UNK>	130.78	31/12/1899 00:00:00
SP43950803	125.36	122.68	122.12	F	VC	C	<UNK>	<UNK>	122.61	31/12/1899 00:00:00
SP43950601	<UNK>	<UNK>	123.77	S	VC	<UNK>	<UNK>	<UNK>	0	31/12/1899 00:00:00
SP43954509	124.54	121.36	120.71	F	VC	C	225	<UNK>	90.03	31/12/1899 00:00:00
SP43950701	125.05	124.13	123.77	S	VC	C	225	<UNK>	158.56	31/12/1899 00:00:00
SP43954611	123.47	121.88	121.4	S	VC	C	225	<UNK>	73.98	31/12/1899 00:00:00
SP43957601	117.91	115.87	114.27	F	VC	C	225	<UNK>	66.22	31/12/1899 00:00:00
SP43954602	123.47	120.92	120.48	F	VC	C	225	<UNK>	73.18	31/12/1899 00:00:00
SP42958622	<UNK>	<UNK>	<UNK>	F	U	U	150	<UNK>	<UNK>	05/07/2007 00:00:00
SP43954610	123.4599	121.48	121.12	F	VC	C	225	<UNK>	96.31	31/12/1899 00:00:00
SP43950901	<UNK>	<UNK>	63.659	F	VC	C	<UNK>	<UNK>	<UNK>	28/04/2019 00:00:00
SP43953710	125.19	122.5	122.01	F	VC	C	150	<UNK>	148.43	31/12/1899 00:00:00
SP43953706	124.5	122.25	120.61	F	VC	C	<UNK>	<UNK>	52.74	31/12/1899 00 00 00
SP43953705	124.08	122.46	121.31	S	VC	C	225	<UNK>	50.48	31/12/1899 00:00:00
SP43954601	122.83	120.48	119.98	F	VC	C	225	<UNK>	74.96	31/12/1899 00:00:00
SP43955506	122.01	119.52	119.25	F	VC	C	225	<UNK>	147.48	31/12/1899 00:00:00
SP43956601	120.9199	118.02	115.89	F	VC	C	225	<UNK>	45.17	31/12/1899 00:00:00
SP43955406	122.69	119.85	119.57	F	VC	C	225	<UNK>	125.82	31/12/1899 00:00:00
SP43955702	121.11	119.86	119.33	F	VC	C	225	<UNK>	59.58	31/12/1899 00:00:00
SP43954802	121.8799	120.12	119.28	S	CO	C	450	<UNK>	72.77	31/12/1899 00:00:00
SP43951501	125.8499	122.23	121.29	C	VC	C	225	<UNK>	143.03	31/12/1899 00:00:00
SP43955701	121.1299	120.2	119.94	S	VC	C	225	<UNK>	124.58	31/12/1899 00:00:00
SP43953702	123.33	121.01	120.85	S	CO	C	375	<UNK>	182.19	31/12/1899 00:00:00
SP43961401	118.8199	<UNK>	<UNK>	F	VC	C	<UNK>	<UNK>	<UNK>	28/04/2019 00:00:00
SP42958613	49.5	<UNK>	<UNK>	S	U	U	150	<UNK>	<UNK>	05/07/2007 00:00:00
SP43954505	123.23	121.4	120.98	S	VC	C	225	<UNK>	101.07	31/12/1899 00:00:00
SP43952506	125.47	123.26	123.19	S	VC	C	225	<UNK>	235.57	31/12/1899 00:00:00
SP43953510	125.75	123.48	123.28	S	VC	C	225	<UNK>	80	31/12/1899 00:00:00
SP42957506	115.19	112.93	112.14	F	VC	C	150	<UNK>	22.82	31/12/1899 00:00:00
SP42959501	120.58	118.95	117.94	S	VC	C	150	<UNK>	40.63	31/12/1899 00:00:00

Sewer Node Sewer Pipe Data

Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
SP42969201	121.15	<UNK>	<UNK>	F	VC	C	<UNK>	<UNK>	<UNK>	28/04/2019 00:00:00
SP43955606	121.8	120.13	119.8	S	VC	C	225	<UNK>	54.21	31/12/1899 00:00:00
SP43955611	121.36	119.34	119.29	S	CO	C	525	<UNK>	1234.8	31/12/1899 00:00:00
SP43961502	<UNK>	<UNK>	<UNK>	F	VC	C	<UNK>	<UNK>	<UNK>	28/04/2019 00:00:00
SP43953515	125.73	122.72	122.57	F	VC	C	225	<UNK>	37.73	31/12/1899 00:00:00
SP43955601	122.62	120.53	119.92	F	VC	C	225	<UNK>	46.95	31/12/1899 00:00:00
SP43952502	125.0199	123.71	123.49	F	VC	C	225	<UNK>	96.41	31/12/1899 00:00:00
SP43952702	125.3799	123.72	123.5	S	VC	C	225	<UNK>	59.09	31/12/1899 00:00:00
SP43955801	120.08	117.54	116.77	F	VC	C	225	<UNK>	110.77	31/12/1899 00:00:00
SP42958509	117.19	114.62	112.94	F	VC	C	150	<UNK>	27.61	31/12/1899 00:00:00
SP43955511	121.7399	119.47	119.17	F	VC	C	225	<UNK>	90.97	31/12/1899 00:00:00
SP42968602	115.1429	112.633	112.272	C	CO	C	<UNK>	<UNK>	326.29	01/06/2010 00:00:00
SP43952505	125.3899	123.19	123.03	S	VC	C	225	<UNK>	164.06	31/12/1899 00:00:00
SP43956802	118.8499	117.1	116.38	S	CO	C	450	<UNK>	133.06	31/12/1899 00:00:00
SP43956505	121.43	118.89	118.74	F	VC	C	225	<UNK>	156.93	31/12/1899 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	04/04/2022 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	19/03/2019 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	27/12/2020 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	30/04/2019 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	04/06/2020 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	31/12/1899 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	28/12/2023 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	26/06/2020 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	31/12/1899 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	HDPE	<UNK>	<UNK>	<UNK>	<UNK>	22/09/2019 00 00 00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	31/12/1899 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	27/12/2020 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	19/03/2019 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	25/11/2021 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	29/07/2023 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	31/12/1899 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	HDPE	<UNK>	<UNK>	<UNK>	<UNK>	22/09/2019 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	04/06/2020 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	31/12/1899 00:00:00
<UNK>	<UNK>	<UNK>	<UNK>	F	VC	<UNK>	<UNK>	<UNK>	<UNK>	19/03/2019 00:00:00
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Sewer Node Sewer Pipe Data

Reference	Cover Level	Invert Level Upstream	Invert Level Downstream	Purpose	Material	Pipe Shape	Max Size	Min Size	Gradient	Year Laid
<UNK>	<UNK>	<UNK>	<UNK>	F	P	<UNK>	<UNK>	<UNK>	<UNK>	25/05/2019 00:00:00
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WONDERFUL ON TAP

SEVERN TRENT

ADC Infrastructure,
34-36 Carrington Street,
Nottingham,
NG1 7FG
F.A.O: Alice Grace Kirsz

Severn Trent Water Ltd
Leicester Water Centre
Gorse Hill
Anstey
Leicester
LE7 7GU

www.stwater.co.uk

Email:
Network.Solutions@SevernTrent.co.uk
Page Barot
Tel:
Our ref: 1118665

19/06/2024

Dear Sir/Madam,

Proposed Development: (150 Dwellings – 2.34 l/s) Ashby Road, Hinckley, Leicestershire, LE10 1SW, 443214, 296029

I refer to your 'Development Enquiry Request' in respect of the above named site. Please find enclosed the sewer records that are included in the fee together with the Supplementary Guidance Notes (SGN) which refer to surface water disposal from development sites.

Protective Strip

A 12inch watermain is touching the west side of the site boundary. Please contact our Asset Protection team (asset.protection@severntrent.co.uk) to confirm the easement for the asset.

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 require protective strips of 3 metres either side of the sewer's centreline 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.

Please note: there is no guarantee that you will be able to build over or close to any Severn Trent sewers, and where a diversion is required there is no guarantee that you will be able to undertake those works on a self-lay basis. Every approach to build near to or divert our assets has to be assessed on its own merit and the decision of what is or isn't permissible is taken based on the risk to the asset and the wider catchment it serves. It is vital therefore that you contact us at the earliest opportunity to discuss the implications of our assets crossing your site. Failure to do so could significantly

affect the costs and timescales of your project if it transpires diversionary works need to be carried out by Severn Trent.

Foul Water Drainage

The 225mm foul sewer, MH SP42969201 along Ashby Road would be the most suitable connection point for your development due this connection point being able to be reached via gravity. However, there are several flooding events recorded on the downstream network. Previous modelling for a nearby site has suggested that there may be capacity issues within the network and receiving SPS. Additional modelling may be required to confirm if this proposed development and additional flows will have an adverse impact on the receiving network. I am currently liaising with our Asset Protection and Tap team to confirm if there is another suitable connection point or if there are any schemes taking place in this area.

We are undergoing a prioritisation process of all investment requirements and emerging risks from growth on our network and treatment works as we build our plan for the coming Asset Management Plan period (2025-2030) and beyond. We will pass details of your site over for consideration and feedback if anything arises which is of concern. We will let you know as soon as possible if anything will affect your connection point or timescales, should we need to make representation to the Planning Authority to apply conditions relating to phasing or occupation of the site.

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 be either percolation test results or by the submission of a statement from the SI consultant (extract or a supplementary letter).

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.

Note, STW will have to be satisfied that all sustainable option have been exhausted before allowing discharge to the public network.

From reviewing our ordinance survey, I can see there is a small watercourse south of the site. It is advised to pursue a connection to this if feasible, with flow rates to be agreed by the LLFA.

Once all sustainable options have been exhausted, investigations into a connection to the surface water sewer 375mm running across the Normandy Way can be considered with flows restricted with accordance to greenfield conditions 5l/s/h and would be subject to formal 106 approval.

Connections

For any new connections (including the re-use of existing connections) to the public sewerage system, the developer will need to submit a Section 106 application form. Our Developer Services department are responsible for handling all new connections enquiries and applications. To contact them for an application form and associated guidance notes please call 0800 7076600 or download from www.stwater.co.uk.

Please quote the above reference in any future correspondence (including e-mails) with STW Limited. Please note that Developer Enquiry responses are only valid for 6 months from the date of this letter.

Yours sincerely

Page Barot
Network Solutions
Developer Services

APPENDIX E

GREENFIELD RUNOFF RATE

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	James Tuck
Site name:	Ashby Road
Site location:	Hinckley

Site Details

Latitude:	52.56079° N
Longitude:	1.36478° W
Reference:	1224534916
Date:	Feb 25 2025 09:54

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.

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 3.7

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):	639	639
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):	16.06	16.06
1 in 1 year (l/s):	13.33	13.33
1 in 30 years (l/s):	32.11	32.11
1 in 100 year (l/s):	41.26	41.26
1 in 200 years (l/s):	48.81	48.81

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 F

SURFACE WATER CALCULATIONS

Project:	Date:		
Ashby Road Hinckley	25/02/2025		
	Designed by: JT	Checked by:	Approved By:
Report Details: Type: Inflows Storm Phase: Phase	ADC Infrastructure: 34-36 Carrington Street Nottingham NG1 7FG		

Catchment Area

Type : Catchment Area

Area (ha)	3.70

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	1.000
Winter Volumetric Runoff	1.000
Time of Concentration (mins)	5
Percentage Impervious (%)	60

Project:	Date:		
Ashby Road Hinckley	25/02/2025		
	Designed by: JT	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	ADC Infrastructure: 34-36 Carrington Street Nottingham NG1 7FG		

Pond

Type : Pond

Dimensions

Exceedance Level (m)	120.000
Depth (m)	1.000
Base Level (m)	119.000
Freeboard (mm)	300
Initial Depth (m)	0.000
Porosity (%)	100
Average Slope (1:X)	3.00
Total Volume (m³)	2074.105

Depth (m)	Area (m²)	Volume (m³)
0.000	2762.75	0.000
0.100	2818.93	279.079
0.200	2875.67	563.804
0.300	2932.98	854.232
0.400	2990.86	1150.420
0.500	3049.30	1452.423
0.600	3108.31	1760.299
0.700	3167.89	2074.105
0.800	3228.03	2393.895
0.900	3288.73	2719.728
1.000	3350.00	3051.660

Inlets

Inlet

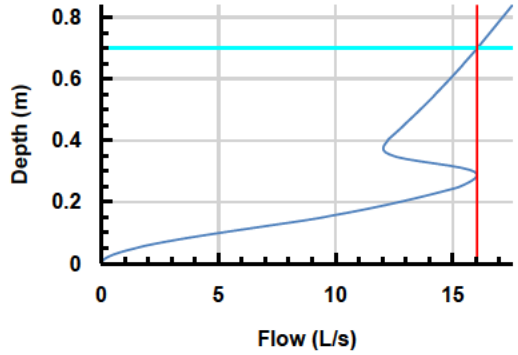
Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area
Bypass Destination	(None)
Capacity Type	No Restriction

Project:	Date:		
Ashby Road Hinckley	25/02/2025		
	Designed by: JT	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: Phase	ADC Infrastructure: 34-36 Carrington Street Nottingham NG1 7FG		

Outlets

Outlet

Outgoing Connection	Pipe
Outlet Type	Hydro-Brake®
Invert Level (m)	119.000
Design Depth (m)	0.700
Design Flow (L/s)	16.06
Objective	Minimise Upstream Storage Requirements
Application	Surface Water Only
Sump Available	☐
Unit Reference	CHE-0177-1606-0700-1606



Advanced

Perimeter	Circular
Length (m)	40.505
Friction Scheme	Manning's n
n	0.022

Project:	Date:		
Ashby Road Hinckley	25/02/2025		
	Designed by: JT	Checked by:	Approved By:
Report Title: Rainfall Analysis Criteria	ADC Infrastructure: 34-36 Carrington Street Nottingham NG1 7FG		

Runoff Type	Dynamic
Output Interval (mins)	15
Time Step	Reduced
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	10
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

FEH

Type: FEH

Site Location	GB 443158 296099 SP 43158 96099
Rainfall Version	2022
Summer	☑
Winter	☑

Return Period

Return Period (years)	Increase Rainfall (%)
100.0	40.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
180	360
240	480
360	720
480	960
600	1200
720	1440
960	1920
1440	2880
2160	4320
2880	5760
4320	8640
5760	11520

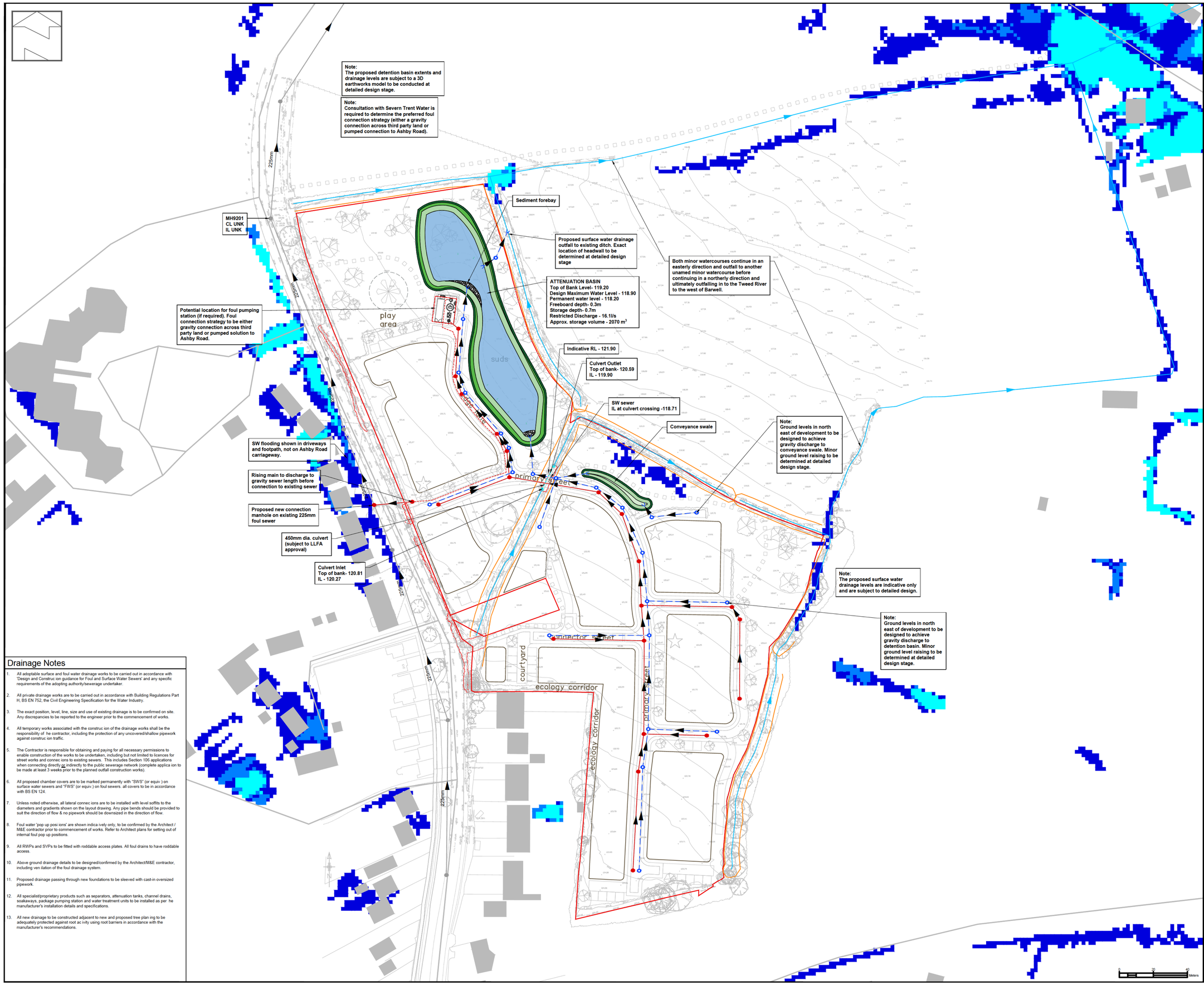
Project:	Date:		
Ashby Road Hinckley	25/02/2025		
	Designed by: JT	Checked by:	Approved By:
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	ADC Infrastructure: 34-36 Carrington Street Nottingham NG1 7FG		

Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Percentage Available (%)	Status
Pond	FEH: 100 years: +40 %: 720 mins: Summer	119.678	119.678	0.678	0.678	217.0	2003.914	0.000	0.000	16.0	970.844	3.384	OK

APPENDIX G

PRELIMINARY DRAINAGE STRATEGY



Drainage Notes

1. All adoptable surface and foul water drainage works to be carried out in accordance with 'Design and Construc ion guidance for Foul and Surface Water Sewers' and any specific requirements of the adopting authority/sewerage undertaker.
2. All private drainage works are to be carried out in accordance with Building Regulations Part H, BS EN 752, the Civil Engineering Specification for the Water Industry.
3. The exact position, level, line, size and use of existing drainage is to be confirmed on site. Any discrepancies to be reported to the engineer prior to the commencement of works.
4. All temporary works associated with the construc ion of the drainage works shall be the responsibility of he contractor, including the protection of any uncovered/shallow pipework against construc ion traffic.
5. The Contractor is responsible for obtaining and paying for all necessary permissions to enable construction of the works to be undertaken, including but not limited to licences for street works and connec ions to existing sewers. This includes Section 106 applications when connecting directly or indirectly to the public sewerage network (complete applica ion to be made at least 3 weeks prior to the planned outfall construction works).
6. All proposed chamber covers are to be marked permanently with 'SWS' (or equiv) on surface water sewers and 'FWS' (or equiv.) on foul sewers. all covers to be in accordance with BS EN 124.
7. Unless noted otherwise, all lateral connec ions are to be installed with level soffits to the diameters and gradients shown on the layout drawing. Any pipe bends should be provided to suit the direction of flow & no pipework should be downsized in the direction of flow.
8. Foul water 'pop up posi ions' are shown indica ively only, to be confirmed by the Architect / M&E contractor prior to commencement of works. Refer to Architect plans for setting out of internal foul pop up positions.
9. All RWPs and SVPs to be fitted with roddable access plates. All foul drains to have roddable access.
10. Above ground drainage details to be designed/confirmed by the Architect/M&E contractor, including ven ilation of the foul drainage system.
11. Proposed drainage passing through new foundations to be sleeved with cast-in oversized pipework.
12. All specialist/proprietary products such as separators, attenuation tanks, channel drains, soakaways, package pumping station and water treatment units to be installed as per he manufacturer's installation details and specifications.
13. All new drainage to be constructed adjacent to new and proposed tree plan ing to be adequately protected against root ac ivity using root barriers in accordance with the manufacturer's recommendations.

This drawing references the data noted below

Data	Source	Reference	Rev.	Dated
Topographical survey	Phoenix Survey Services ltd.	S3051	-	22.11.22
Mapping	RoFSW	-	-	-
Illustrative Layout	nineteen47	n2452_005	J	25.07.25

General Notes

1. Do not scale this drawing. All dimensions must be checked/verified on site.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions are in metres unless noted otherwise. All levels are in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.

Key

- Proposed surface water sewer
- Proposed surface water manhole
- Proposed culvert
- Proposed detention basin
- Existing minor watercourse
- Minor watercourse clear margins
- 1 in 30 annual likelihood of surface water flooding
- 1 in 100 annual likelihood of surface water flooding
- 1 in 1000 annual likelihood of surface water flooding
- Proposed Foul Sewer
- Proposed Foul Manhole
- Proposed Foul Pumping Station and Rising Main

Rev	Date	Description	Dr	Ch
P10	05.08.25	Amended to updated illustrative layout	JT	RW
P09	19.05.25	Amended to updated illustrative layout and red line	JT	RW
P08	30.04.25	Amended to comments	JT	RW
P07	02.04.25	Amended to latest masterplan	JT	RW
P06	28.03.25	Updated to revised surface water mapping	JT	RW
P05	18.03.25	Amended to latest masterplan	JT	RW
P04	29.11.24	Foul network added	JT	RW
P03	01.11.24	Amended to latest masterplan	JT	RW
P02	15.10.24	Amended to comments	JT	RW
P01	08.10.24	First issue	JT	RW

Client:
Davidsons Developments ltd.

Project:
Ashby Road, Hinckley

Title:
Preliminary Drainage Strategy

ADC INFRASTRUCTURE

Size: A1
Scale: 1:1000

Status: PRELIMINARY

Project	Originator	Volume	Level	Type	Role	Number	Status	Revision
3280	ADC	HDG	XX	DR	CD	0501	S1	P10