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Land at Townsend Farm Flood Risk Assessment and Drainage Strategy

Bellway Homes Ltd
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1	Richard Lucas MEng (Hons) CEng MICE	27/07/2026	For client comment.

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CONTENTS

PAGE NO.

EXECUTIVE SUMMARY 1
1. INTRODUCTION 2
2. SCOPE OF THE ASSESSMENT 3
National Planning Policy 3
Flood Risk Assessment Planning Practice Guidance 5
Local Planning Policy 6
Summary of Scope 6
3. DEVELOPMENT SITE CONTEXT 7
Development Site Description 7
Site Levels 7
Onsite Watercourses and Existing Drainage Arrangements 7
Ground Conditions 7
Groundwater Source Protection 8
Ground Investigation 9
Summary of Ground Conditions 10
Development Proposals 10
Climate Change Allowances 10
Peak Rainfall Intensity Allowance 11
Standard of Protection 11
Urban Creep 11
4. FLOOD RISK ASSESSMENT 13
Sources of Information 13
Site Specific Flood Risk 13
Flooding from Watercourses 13
Flooding from Surface Water 13
Flooding from Groundwater 14
Flooding from Overwhelmed Sewers and Drainage Systems 16
Flooding from Artificial Sources 16
Summary of Pre Development Flood Risk 16
Flood Risk Mitigation Measures 17
Minimum Ground Floor Levels 17
Development and Flood Risk 17
Flooding from Surface Water 17
Flooding from Groundwater 18

Flooding from Overwhelmed Sewers and Drainage Systems 18
Flooding from Artificial Sources 18
Residual Risk 18
Safe Access and Egress 19
Off Site Impacts 20
Additional Consents 20
NPPF Planning Policy Flood Risk Tests 20
Flood Risk Vulnerability and Flood Zone 'Compatibility' 20
Sequential Test 20
5. DRAINAGE STRATEGY 22
Sustainable Drainage Systems Guidance 22
Surface Water Management 23
Runoff Destinations 24
Management of Everyday Rainfall (Interception) 26
Management of Extreme Rainfall and Flooding 27
Water Quality 30
Amenity and Biodiversity 31
Design of Drainage for construction, operation and maintenance 32
Foul Water Drainage 35
6. CONCLUSIONS 37

APPENDICES

Appendix 1 Topographical Survey by MK Surveys, Drawing Number 37483 Rev 1, dated February 2026
Appendix 2 Existing Drainage Arrangements, Drawing Number B834/02
Appendix 3 Rainfall Map, Drawing Number B834/03
Appendix 4 Phase 1 Ground Investigation Extract
Appendix 5 Development Framework, Drawing Number P25-0016_CMP-02, Rev E
Appendix 6 Surface Water Flood Constraints, Drawing Number B834/01
Appendix 7 Surface Water Flood Depths, Drawing Number B834/11
Appendix 8 Wessex Water Sewer Records
Appendix 9 Preliminary Surface Water Drainage Strategy Plan, Drawing Number B834/10
Appendix 10 MicroDrainage Network Calculations
Appendix 11 Wessex Water Pre-development Enquiry Response

EXECUTIVE SUMMARY

I. This Flood Risk Assessment has been prepared by PFA Consulting on behalf of Bellway Homes Ltd in connection with proposals for a residential development, associated infrastructure and landscaping on land at Townsend Farm, Melksham.

II. The site is currently in agricultural use, with associated agricultural buildings.

III. With reference to the Environment Agency's Flood Map for Planning, the site falls within Flood Zone 1.

IV. Areas of elevated surface water flood risk are located across the site, associated with low points and ditches. The development will provide a betterment by capturing and managing everyday rainfall within the SuDS features and reducing uncontrolled over flows.

V. A preliminary drainage strategy, involving the implementation of SuDS, is proposed for managing the disposal of surface water runoff from the proposed development on the site. Flow balancing methods are proposed, in order to attenuate surface water runoff to greenfield runoff rates with discharges to the local watercourse via a pumping station. The proposed surface water drainage measures incorporate Strategic SuDS Features, to attenuate and store surface water runoff, comprising a series of detention basins, ponds and oversized pipes.

VI. The proposed drainage strategy would ensure that surface water arising from the developed site would be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account.

VII. It is recommended that a number of elements to the scheme can be covered by suitably worded planning conditions requiring the submission of details to be submitted to and approved by the Local Planning Authority.

VIII. This Flood Risk Assessment demonstrates that the proposed development is compliant with the NPPF, DEFRA/Environment Agency guidance, and Local Plan Policies.

IX. The overall conclusions drawn from this Flood Risk Assessment are that the development would be appropriately safe for its lifetime taking account of the vulnerability of its users, the development would not increase flood risk elsewhere when the proposed mitigation measures are taken into account, and would reduce flood risk overall.

1. INTRODUCTION

1.1. This Flood Risk Assessment (FRA) has been prepared by PFA Consulting on behalf of Bellway Homes in connection with proposals for a development comprising up to 225 dwellings on land at Townsend Farm in Melksham.

1.2. The overall site comprises around 11.1 hectares, and is located to the west of Semington Road, and east of Berryfield Lane in Melksham, which lies in the unitary authority of Wiltshire Council. The nearest post code is SN12 6EH, and the approximate grid reference for the site is ST 89917 62705. The location of the site is shown edged red on **Figure 1** below.

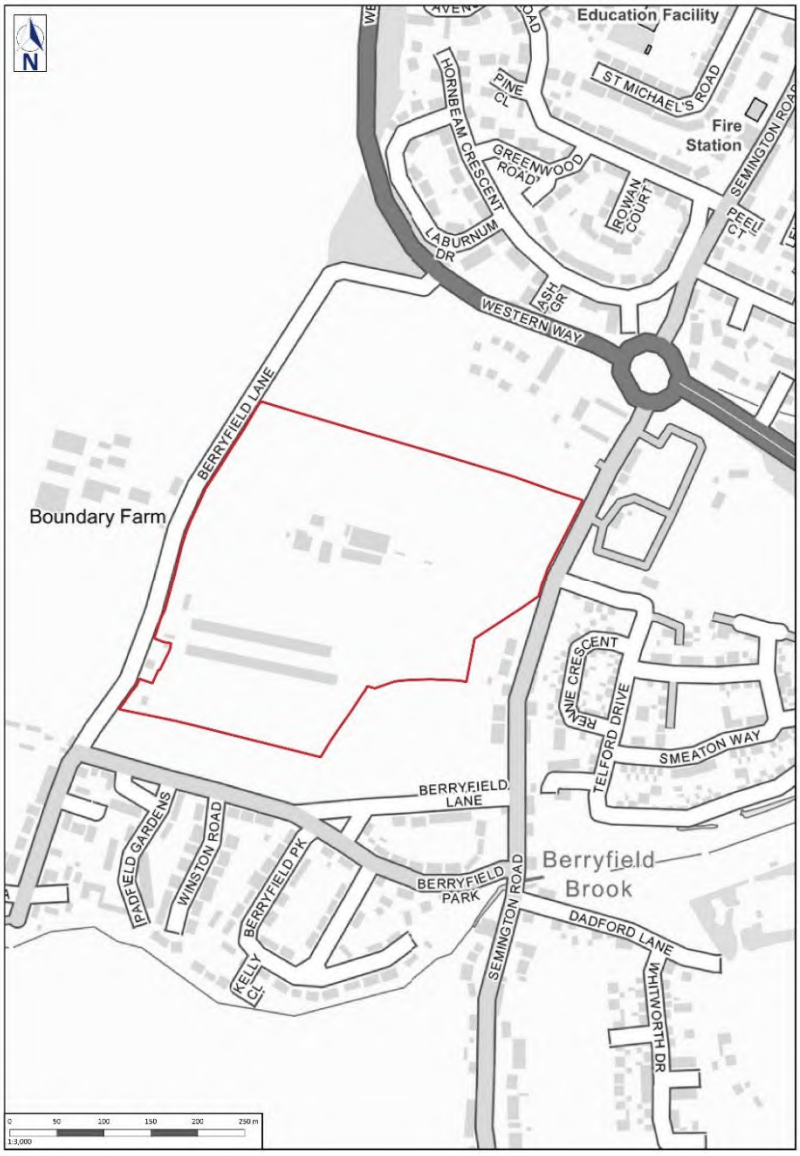

Figure 1: Site Location Plan

1.3. The main purpose of this site-specific Flood Risk Assessment and Drainage Strategy is to provide sufficient flood risk information to support a planning application for the development proposals in order to demonstrate that the development would be appropriately safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, would reduce flood risk overall.

2. SCOPE OF THE ASSESSMENT

National Planning Policy

2.1. The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these should be applied. Policy on planning and flood risk in the NPPF is dealt with at paragraphs 170-182 in chapter 14 'Meeting the challenge of climate change, flooding and coastal change'. Chapter 14 was first published on 27 March 2012 and last updated on 12 December 2024.

2.2. The Government published planning practice guidance covering flood risk and coastal change in March 2014. The guidance was last updated on 25 August 2022.

2.3. Paragraph 170 of the NPPF states that inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.

2.4. Paragraph 171 states that strategic policies should be informed by a strategic flood risk assessment (SFRA), and should manage flood risk from all sources.

2.5. A Level 1 SFRA was prepared by JBA Consulting on behalf of Wiltshire Council, in November 2024, to support the development of its Local Plan. The SFRA provides an overview of flood risk from all sources including from rivers and the sea, directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

2.6. As set out in paragraph 172 of the NPPF, all plans should apply a sequential, risk-based approach to the location of development - taking into account all sources of flood risk and the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property. They should do this, and manage any residual risk, by applying the sequential test and then, if necessary, the exception test.

2.7. Paragraph 173 of the NPPF states that a sequential risk-based approach should also be taken to individual applications in areas known to be at risk now or in future from any form of flooding.

2.8. Paragraph 174 states the aim of the sequential test is to steer new development to areas with the lowest risk of flooding from any source. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test.

2.9. A copy of the Environment Agency's Flood Map for Planning, obtained from the Government's website, which shows the Flood Zones in the vicinity of the site, is reproduced as **Figure 2.1** below.

Figure 2.1: Environment Agency's Flood Map for Planning

2.10. The Environment Agency's Flood Zones refer to the probability of river and sea flooding, ignoring the presence of defences, and show the extent of the natural floodplain and the additional extent of an extreme flood. The Environment Agency's Flood Map for Planning shows the area that could be affected by flooding, either from rivers or the sea. Areas coloured dark blue correspond to Flood Zone 3. The light blue area is Flood Zone 2 and shows the additional extent of an extreme flood from rivers or the sea. These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements. Where there is no blue shading, this shows the area where flooding from rivers and the sea is very unlikely corresponding to Flood Zone 1.

2.11. The red line site boundary has been added to the Environment Agency's Flood Map for Planning on **Figure 2.1**. From an inspection of the Flood Map it can be seen that all of the site falls within Flood Zone 1. Areas of Flood Zone 1 have a less than 1 in 1,000 annual probability of river flooding (<0.1% Annual Exceedance Probability (AEP)).

2.12. Paragraph 181 of the NPPF states:

> **'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[63]. 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; and

e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.'

2.13. Footnote 63 of the NPPF states a site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

Flood Risk Assessment Planning Practice Guidance

2.14. For the purposes of applying the NPPF, paragraph 001 in the Flood Risk and Coastal Change Planning Practice Guidance states that "flood risk" is a combination of the probability and the potential consequences of flooding. Areas at risk of flooding are those at risk of flooding from any source, now or in the future. Sources of flood risk include rivers and the sea, direct rainfall on the ground surface, rising groundwater, overwhelmed sewers and drainage systems, reservoirs, canals and lakes and other artificial sources. Flood risk also accounts for the interactions between these different sources.

2.15. Paragraph 020 advises that a site-specific flood risk assessment is carried out to assess the flood risk to and from a development site. The objectives of a site-specific flood risk assessment are to establish:

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

2.16. Paragraph 021 in the Guidance advises that the information provided in the flood risk assessment needs to be credible and fit for purpose. Site-specific flood risk assessments need to be proportionate to the anticipated degree of flood risk and make optimum use of information already available, including information in a SFRA for the area, and the Environment Agency's Flood Map and interactive long term flood risk maps.

2.17. A flood risk assessment needs to be appropriate to the scale, nature and location of the development.

2.18. Paragraph 080 of the Guidance provides a model checklist for a site-specific flood risk assessment.

2.19. With regard to what further advice is available on the preparation of a site-specific flood risk assessment, Guidance from the Environment Agency, published on the Government's website, includes guidance on when an FRA is required, how to complete one and how it is processed, entitled: 'Flood risk assessments: applying for planning permission'.

2.20. This guidance provides information on the range of factors that need to be considered when assessing flood risk and sets out when to follow the Environment Agency's 'advice for minor extensions', 'standing advice for vulnerable developments' or advice contained in 'Flood risk assessment: flood zones 1, 2, 3 and 3b'.

Local Planning Policy

2.21. The Joint Melksham Neighbourhood Plan (2020-2026) was formally adopted in 2021 and provides a planning policy framework for the Melksham Neighbourhood Area for the period up to 2026. The Neighbourhood Plan contains development control policies relevant to the proposed development.

2.22. The draft Joint Melksham Neighbourhood Plan 2 covering the period up to 2038 is currently undergoing referendum before its official adoption.

2.23. Relevant policies from the Neighbourhood Plan include Policy 3: Flood Risk and Natural Flood Management.

2.24. Policy 3: Flood Risk and Natural Flood Management states:

> **'Particularly in the South Brook catchment area, natural flood management works to conserve and enhance the ecological flood storage value of the water environment, including watercourse corridors and catchments, are supported.**
>
> **Where development proposals are in areas with known surface water flooding issues, they should include appropriate mitigation and construction methods, including where appropriate, contributions towards wider catchment projects.**
>
> **Major development should include provision of Sustainable Drainage Systems (SuDs), where appropriate, as part of the Natural Flood Management approach and wider Green Infrastructure networking.'**

2.25. The Local Plan covering Melksham is the Wiltshire Core Strategy, adopted in 2015, covering the period up to 2026.

2.26. Relevant policies from the Wiltshire Core Strategy include Core Policy 67: Flood Risk and Core Policy 68: Water Resources.

2.27. Core Policy 67: Flood Risk states:

> **'Development proposed in Flood Zones 2 and 3 as identified within the Strategic Flood Risk Assessment will need to refer to the Strategic Housing Land Availability Assessment when providing evidence to the local planning authority in order to apply the sequential test in line with the requirements of national policy and established best practice.**
>
> **All new development will include measures to reduce the rate of rainwater run-off and improve rainwater infiltration to soil and ground (sustainable urban drainage) unless site or environmental conditions make these measures unsuitable.'**

Summary of Scope

2.28. The scope of this Flood Risk Assessment is to provide sufficient information to satisfy the requirements of the NPPF and its associated guidance, Local Plan Policies, guidance published by DEFRA/Environment Agency, and the Government's 'National Standards for Sustainable Drainage Systems'.

3. DEVELOPMENT SITE CONTEXT

Development Site Description

3.1. The site is located to the west of Semington Road and east of Berryfield Lane, Melksham. The site is currently in agricultural use, arable and grassland. Existing agricultural buildings are present across the site.

3.2. The Site Location Plan and the Environment Agency's Flood Map for Planning are based on the Ordnance Survey map of the area, and show geographical features and identify watercourses and other bodies of water in the vicinity of the site.

Site Levels

3.3. A Topographical Survey was undertaken by MK Surveys in February 2026. The survey is shown on Drawing Number 37483, Rev 1, a copy of which is reproduced in **Appendix 1.**

3.4. The Topographical Survey indicates that the site is predominantly flat, with a high point of 38.5 AOD in the north of the Site and a low point of approximately 37.5 AOD towards the south east of the Site. In general, the levels undulate across the site, with no discernible overall fall direction.

Onsite Watercourses and Existing Drainage Arrangements

3.5. The nearest watercourse is Berryfield Brook which runs from east to west approximately 250m to the south of the site. This is designated as a 'main river'. A drainage ditch also runs from north to south across the site, which is culverted under Berrybrook Lane to the south of the site. Further to the east, and approximately 600m from the site, is the River Avon which is designated as a 'main river'.

3.6. Currently the site naturally drains by a combination of overland flow towards the low points across the site, drainage ditches and infiltration into the underlying ground. The existing surface water management arrangements at the site are indicated on Drawing No. B834/02, a copy of which is contained in **Appendix 2**.

3.7. There is a current planning application (reference W/12/01080/FUL), for the creation of a new waterway and towpath for the Wilts and Berks canal bisecting the site in a south-east to north-west direction, as part of a larger restoration project of the canal. The original route of the Wilts and Berks canal was further east, but subsequent development following its closure does not allow reinstatement of the original route. Whilst not currently an existing waterbody, consideration should be made of the proposed route, and its interaction with the development proposals.

Ground Conditions

3.8. The British Geological Survey (BGS) geological mapping of the area shows the majority of the site is underlain by multiple superficial and bedrock deposits. Superficial deposits underlying the site consist of River Terrace Deposits, sand and gravel. In terms of bedrock deposits, all of the site is underlain by Oxford Clay Formation-Mudstone.

3.9. Based on the Flood Studies Report Winter Rainfall Acceptance Potential (WRAP) Map, as shown reproduced on Drawing No. B834/03 in **Appendix 3**, the site is located in a 'Soil Index Class 4' area. Soil Index Class 4 has a low winter rainfall acceptance potential and high standard percentage runoff, and so suggests the underlying soil has poor permeability.

3.10. The Cranfield Soil and AgriFood Institute (CSAI), incorporating the National Soil Resources Institute (NSRI,) at Cranfield University maintains soil reports and maps for England and Wales. The

Soilscapes dataset map indicates that soils in the area are 'freely draining lime-rich loamy soils'. These soils are identified as being 'freely draining'.

Groundwater Source Protection

3.11. From an inspection of the Environment Agency's Aquifer Designation Map dataset held on Natural England's MAGIC website, the site's bedrock deposits are classified as 'Unproductive', while the site's superficial deposits are classified as 'Secondary A' Aquifers. A 'Secondary A' Aquifer is classified as permeable layers capable of supporting water supplies at a local rather than strategic scale, and in some cases forming an important source of base flow to rivers.

3.12. A copy of the Aquifer Designation (Superficial Drift) Map is reproduced in **Figure 3.1** below.

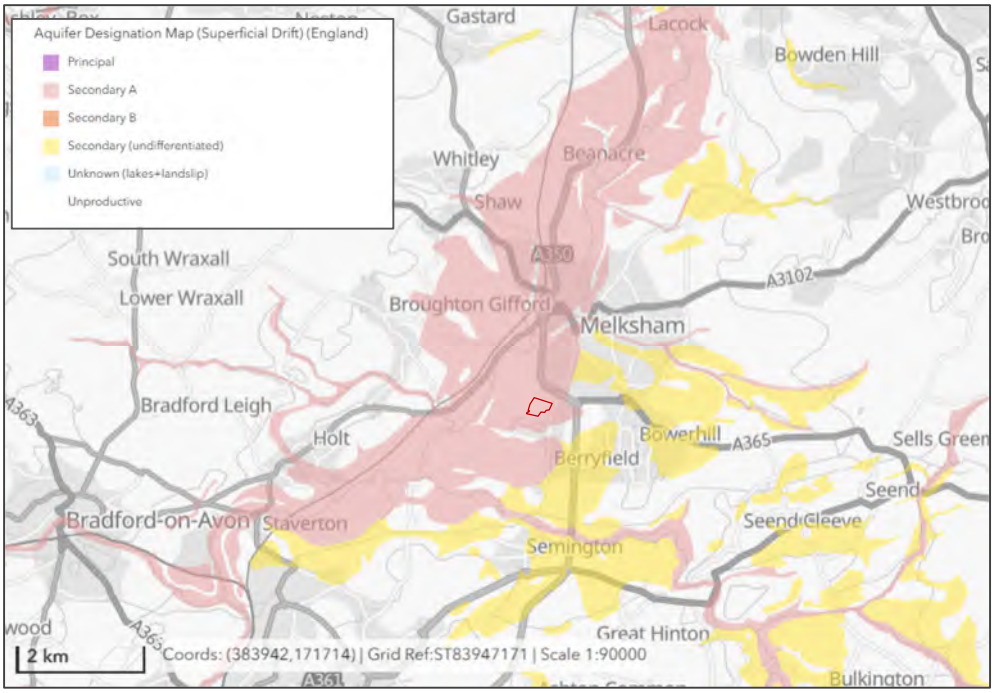

Figure 3.1: Environment Agency's Aquifer Designation Map (Superficial Deposits)

3.13. A copy of the Aquifer Designation (Bedrock) Map is reproduced in **Figure 3.2** below.

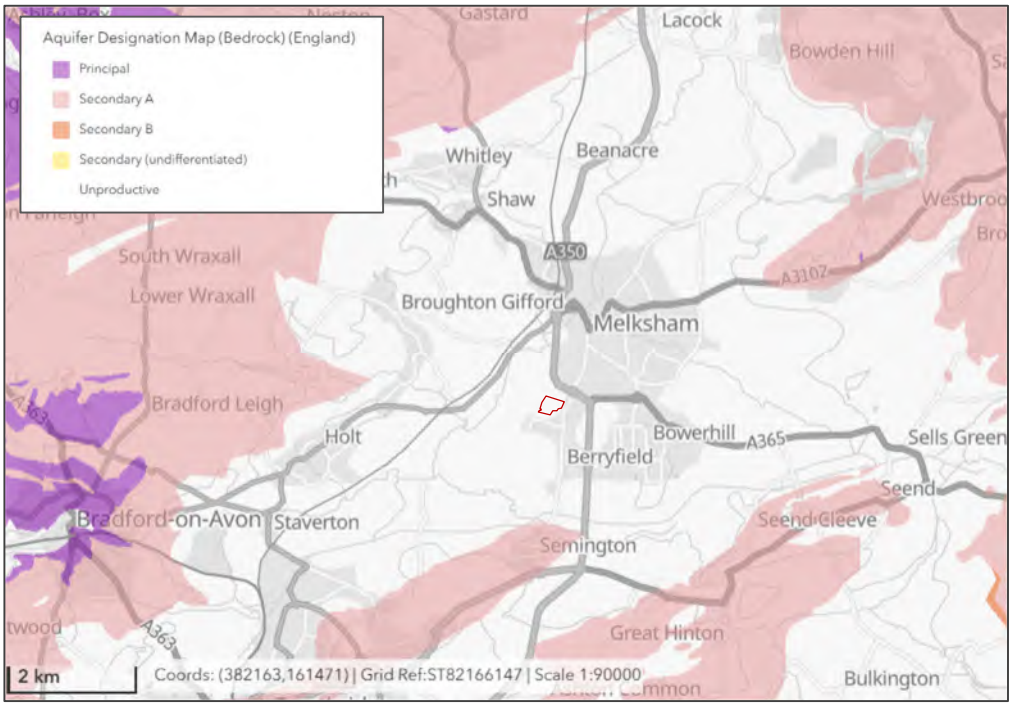

Figure 3.2: Environment Agency's Aquifer Designation Map (Bedrock Deposits)

3.14. From an inspection of the Environment Agency's Source Protection Zones dataset the site falls outside a Groundwater Source Protection Zone. A copy of the Source Protection Zone Map dataset information is reproduced in **Figure 3.3** below.

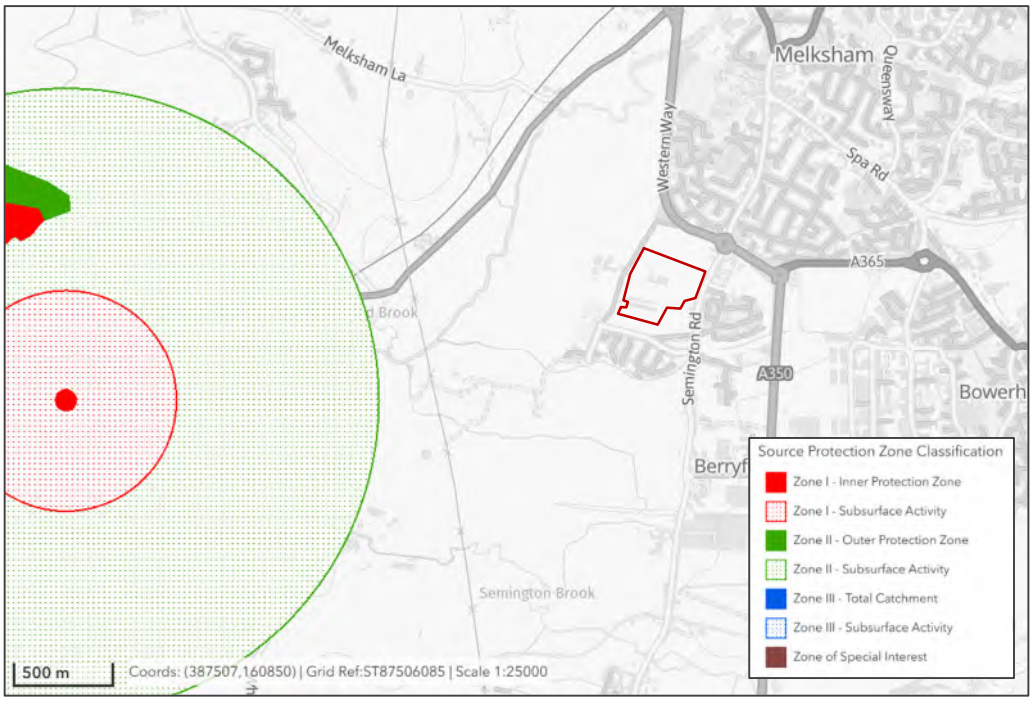

Figure 3.3: Groundwater Source Protection Zones

Ground Investigation

3.15. A Phase 1 Ground Conditions Assessment has been undertaken by Stantec, which considered published and publicly available data to inform the ground conditions of the site. Based on national scale mapping, and ground investigations for a neighbouring site, the ground conditions of the site

are likely to be topsoil/made ground, underlain by River Terrace Deposits (at a depth of 0.5m to 1.7m bgl) and Oxford Clay Formation. There is likely perched groundwater within the River Terrace Deposits at a depth of between 1.0 and 3.0m, whilst the Oxford Clay formation generally comprises an impermeable clay with no groundwater resource. An extract of the relevant sections of the ground investigation report is reproduced in **Appendix 4.**

3.16. Ground investigation undertaken on the developments bordering the north and south of the site confirms the development area is underlain by clay, therefore the disposal of surface water via infiltration is not feasible. Regarding groundwater, testing conducted at the southern development (Application Reference: PL/2025/0026) found that '*Groundwater was not encountered whilst the borehole was drilled, however standing water to 2.40m bgl was recorded the following day*'.

3.17. It is recommended that summer and winter groundwater monitoring is undertaken to establish the highest annual groundwater level to inform the detailed drainage design.

Summary of Ground Conditions

3.18. On the basis of the information available, the underlying soils are expected to have poor permeability due to the surrounding geological features, including Oxford Clay Formation-Mudstone bedrock deposits.

Development Proposals

3.19. The development proposals comprise up to 225 dwellings with associated infrastructure and landscaping.

3.20. A copy of the Development Framework, Drawing No. P25-0016_CMP-02, Rev E, prepared by Brandt Urban Design, showing the development proposals, is reproduced in **Appendix 5**.

Climate Change Allowances

3.21. The NPPF and its guidance requires development to take account of the impacts of climate change. The allowances to be made for climate change effects when assessing flood risk are related to the lifetime of the development.

3.22. Guidance on the lifetime of development is provided at paragraph 006 in the Flood Risk and Coastal Change Planning Practice Guidance. Residential development can be assumed to have a lifetime of at least 100 years, unless there is specific justification for considering a different period.

3.23. Paragraph 020 of the Guidance states site-specific flood risk assessments should demonstrate to the decision-maker how flood risk will be managed now and over the development's lifetime, taking climate change into account, and with regard to the vulnerability of its users.

3.24. Then Environment Agency's Guidance entitled 'Flood risk assessments: climate change allowances' was last updated on 27 May 2022. This sets out the climate change allowances to be used for peak river flow, peak rainfall intensity, sea level rise, offshore wind speed and extreme wave height.

3.25. There are a range of climate change allowances for each river basin district and epoch for sea level rise, peak river flow and peak rainfall intensity. The allowances are based on percentiles. A percentile describes the proportion of possible scenarios that fall below an allowance level.

3.26. The:

- Central allowance is based on the 50th percentile (half of the possible fall below it, and half fall above it).

- Higher central allowance is based on the 70th percentile (only 30% of projections would exceed this allowance).
- Upper end allowance is based on the 95th percentile (only 5% of projections would exceed this allowance).

Peak Rainfall Intensity Allowance

3.27. With respect to the peak rainfall intensity allowance, the site lies in the Avon Bristol and North Somerset Streams Management Catchment. The Guidance advises for development with a lifetime beyond 2100 assess the upper end allowance for the 2070s epoch (2061 to 2125) and design your development so that for the upper end allowance in the 1% annual exceedance probability event there is no increase in flood risk elsewhere and your development will be safe from surface water flooding. The total potential change anticipated for 2070s epoch (2061 to 2125) is +45% for the upper end allowance in the 1% AEP rainfall event.

Standard of Protection

3.28. In terms of providing an acceptable standard of protection against flooding for new development, where development is necessary in flood risk areas the development should be made safe for its lifetime without increasing flood risk elsewhere. The Site-specific flood risk assessment checklist makes reference to the assessment of the 'design flood'.

3.29. Paragraph 002 in the Flood Risk and Coastal Change Planning Practice Guidance defines a "design flood" as follows:

> **'This is a flood event of a given annual probability, which is generally taken as:**
>
> - **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 with a 1% annual probability (a 1 in 100 chance each year),**
>
> **plus an appropriate allowance for climate change.'**

3.30. Therefore, in terms of providing an acceptable standard of protection against flooding for new development, the development should be appropriately safe without increasing flood risk elsewhere in the 'design flood'.

3.31. The Government published its 'National Standards for Sustainable Drainage Systems' in July 2026. They should be used in conjunction with the NPPF and planning practice guidance. Requirement 3.35 states that the drainage system must be designed so that flooding does not occur on any part of the site for a 3.3% AEP (1 in 30 year) rainfall event, unless it is an area designated to hold or convey water as part of the design. Requirement 3.36 goes on to state that the drainage system must be designed so that flooding does not occur during a 1% AEP (1 in 100 year) rainfall event in any part of a building (including a basement); or in any utility plant susceptible to water within the development.

Urban Creep

3.32. Urban creep is defined in The SuDS Manual 2015 (CIRIA C753) as any increase in the impervious area that is drained to an existing drainage system without planning permission being required, and therefore without consideration of whether capacity of the receiving sewerage system can accommodate the increased flow. It is limited to residential development and for example covers the construction of patios, conservatories, paved driveways etc (post initial construction).

3.33. The Local Authority SuDS Officer Organisation (LASOO) document entitled 'Non-Statutory Technical Standards for Sustainable Drainage: Practice Guidance' sets out the appropriate allowances to be applied to the impermeable area within the property curtilage based on residential development densities. For a residential development with a density of 25 or less dwellings per hectare a 10% allowance is applied, reducing to 2% for a density of 50 dwellings per hectare and above, and 0% for flats and apartments.

3.34. Section 24.7.2 of the SuDS Manual states:

> **'an increase in paved surface area of 10% is often suggested if there is no specific value stipulated by the drainage approval body or planning authority'.**

3.35. The proposed residential development on the site equates to a density of 35 dwellings per hectare. Therefore, in order to ensure the capacity of the drainage system takes account of urban creep within the development over its lifetime, therefore a 10% increase should be applied to the impermeable area within property curtilages when designing the drainage system.

4. FLOOD RISK ASSESSMENT

4.1. In addition to flooding from rivers and the sea it is also necessary to consider the potential consequences of flooding from all other sources, which include directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

Sources of Information

4.2. This assessment makes reference to the Wiltshire Council Level 1 SFRA.

4.3. The Government's website contains 'Long Term Flood Risk Information' which includes interactive maps showing 'Flood risk from rivers or the sea' and 'Flood risk from surface water'. These maps show the chance of flooding in one of four risk categories:

- **High risk** means that each year this area has a chance of flooding of greater than 3.3% (1 in 30);
- **Medium risk** between 1% and 3.3% (1 in 100 and 1 in 30);
- **Low risk** between 0.1% and 1% (1 in 1000 and 1 in 100); and
- **Very low risk** less than 0.1% (1 in 1000).

4.4. The 'Flood risk from surface water' map indicates the extent, depth and velocity of water for High, Medium and Low risk scenarios. The Long Term Flood Risk Information also includes a 'Flood risk from reservoirs' map.

Site Specific Flood Risk

Flooding from Watercourses

4.5. Flooding from watercourses is caused by high flows in rivers or streams exceeding the capacity of the river channel and spilling onto the floodplain, usually after periods of heavy rainfall across the catchment.

4.6. The nearest local watercourses in the vicinity of the site are Berryfield Brook approximately 250m to the south, and the River Avon, approximately 600m to the west of the site.

Flood Zones

4.7. A definition of each Flood Zone and probability of river flooding is provided in Table 1 of the Flood Risk and Coastal Change Planning Practice Guidance.

4.8. The site lies entirely within Flood Zone 1, which is defined as the zone with the lowest probability of flooding from rivers and is defined as land having a less than a 1 in 1000 (0.1%) annual probability of river flooding.

Summary of Pre Development Flooding from Watercourses

4.9. In summary, the risk of flooding from watercourse is assessed as 'very low'.

Flooding from Surface Water

4.10. The Environment Agency's Flood risk from surface water map indicates where surface water may be expected to flood or pond. Surface water flooding happens when rainwater does not drain away through the normal drainage systems or soak into the ground, but lies on or flows over the ground instead. The Government's website advises that flooding from surface water is difficult to predict as rainfall location and volumes are difficult to forecast. In addition, local features can greatly affect the chance and severity of flooding. The information shown is a general indicator of an area's flood

risk. A copy of the Environment Agency's Flood risk from surface water map is reproduced in **Figure 4.1** below.

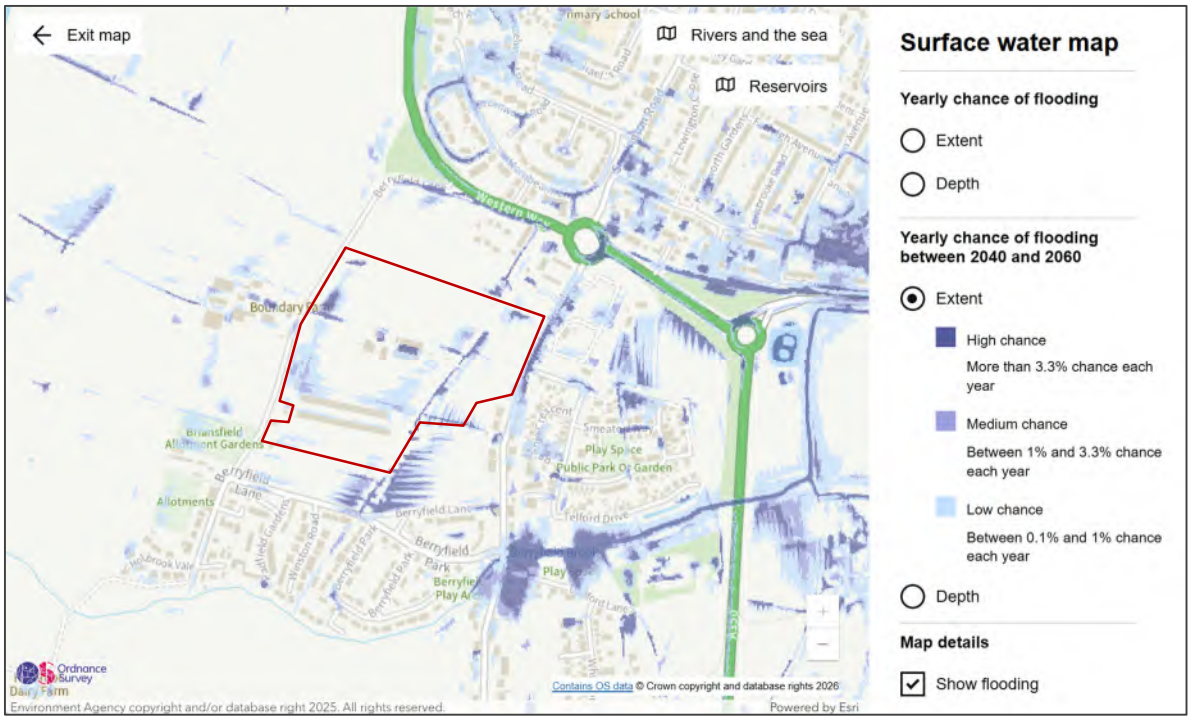

Figure 4.1: Flood Risk from Surface Water

4.11. The Environment Agency's Flood risk from surface water map shows that the site contains areas of Very Low risk (less than 0.1%), Low risk (between 0.1% and 1%), Medium risk (between 1% and 3.3%) and High risk (greater than 3.3%).

4.12. The areas of elevated surface water flooding are associated with low points on the site where surface water runoff could collect and are related to localised low points and routes of drainage ditches, including the drainage ditch running north to south across the site. In addition to Figure 4.1 above, the extent of the low – high risk surface water flood event is shown on Drawing No. B834/01 contained in **Appendix 6**.

4.13. The modelled surface water flood depths for the end of century scenario, including +45% climate change area are shown on Drawing Number B834/11, contained in **Appendix 7**. This shows that for the 1 in 100 year design event, modelled flood depths are predominantly restricted to depths of up to 300mm and associated with low points across the site, with minor areas up to 600mm associated with onsite ditches.

4.14. In terms of historic flooding, the SFRA identifies no recorded flood incidents on the site.

4.15. The risk of flooding from surface water is assessed as between 'Low' and 'High'.

Flooding from Groundwater

4.16. Groundwater flooding is most likely to occur in low-lying areas underlain by water-bearing permeable rocks termed aquifers. These may be extensive regional aquifers in chalk or sandstone, or localised sands or river gravels in valley bottoms underlain by less permeable rock. Groundwater flooding occurs as a result of water rising from the underlying rocks or from water flowing from abnormal springs. This tends to occur after long periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal

levels. In low-lying areas the water table is usually at shallower depths, so during very wet periods, all the additional groundwater flowing towards these areas can cause the water table to rise to the surface causing groundwater flooding which may follow overland flow paths or pond at local topographic depressions. The rate of groundwater emergence depends upon the pressure head on the groundwater body, and the permeability of soils and near surface geology which can be locally variable.

4.17. The SFRA references the GB Groundwater Flood Map produced by JBA. This dataset is based on a modelling exercise which involved calculating how much excess rainfall would need to be absorbed by the ground during the course of a 1 in 100 year return period groundwater flood and determining the effect of this rainfall on the location of the water table based on the underlying geology. This dataset shows that the site lies in an area with a 'medium' risk category and peak groundwater level in these areas is *'estimated between 0.025m and 0.5m below the ground surface'*, as shown in **Figure 4.2** below. The SFRA notes *'Within this zone there is a risk of groundwater flooding to surface and subsurface assets. There is the possibility of groundwater emerging at the surface locally.'.* It is noted the whole of the village of Rowde is within the same risk category.

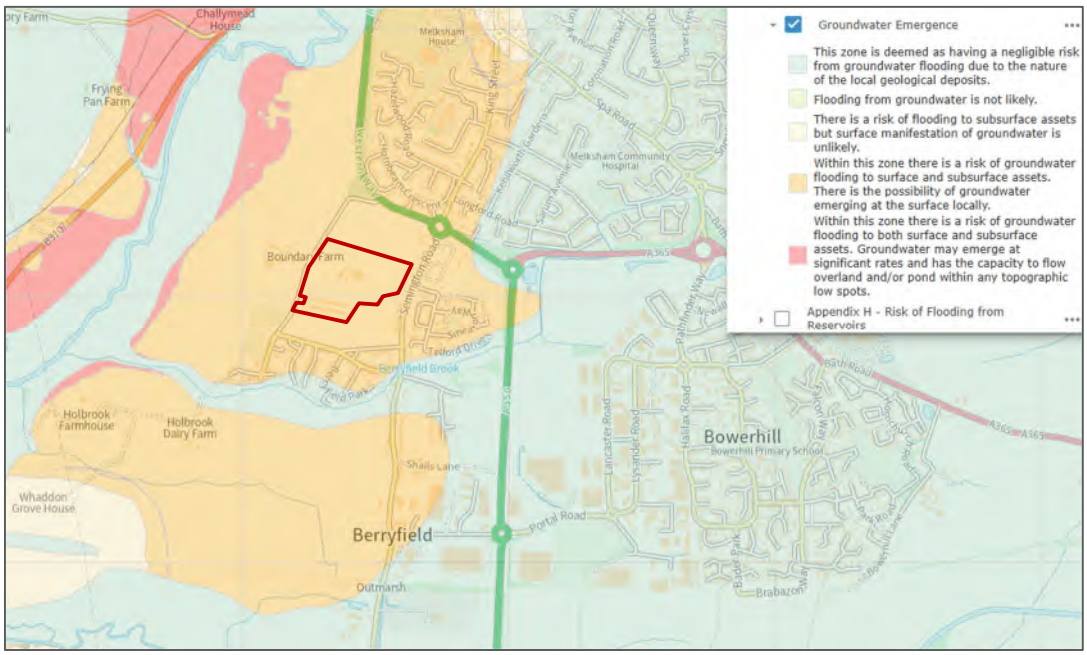

Figure 4.2: JBA Groundwater Flood Map.

4.18. The SFRA notes that the GB Groundwater Flood Map *'is suitable for general broad-scale assessment of the groundwater emergence in an area but is not explicitly designed for assessment at the scale of a single property'* and *'The dataset also shows the risk of emergence of groundwater rather than the actual flood risk from groundwater flooding*'. This dataset should be assessed in conjunction with other information to determine the risk of groundwater emergence.

4.19. The SFRA does not identify any historic incidents of groundwater flooding in the vicinity of the site.

4.20. Ground investigations conducted at the proposed development bordering the south of the site (Application Ref: PL/2025/0026) found that '*standing water to 2.40m bgl was recorded the following day*'. At this depth, ground water is unlikely to emerge, but could affect sub-surface assets.

4.21. Even if groundwater were to emerge on the site it would behave like surface water, emerging at low points. It is considered the 'Flood risk from surface water map' shown in **Figure 4.1** above would

be an indication of where emergent groundwater could collect. If groundwater were to emerge it would behave like surface water flooding and collect at low spots of the site.

4.22. In summary, the risk of flooding from groundwater is assessed as 'medium' for the site based on the available information and underlying geological deposits which are not a significant source of groundwater.

Flooding from Overwhelmed Sewers and Drainage Systems

4.23. Flooding from sewers and drainage systems occurs when the sewer or drainage system is overwhelmed as a result of a blockage or excessive flow exceeding its capacity and/or when sewers cannot discharge properly to watercourses due to high water levels.

4.24. Enquiries have been made to Wessex Water to establish the location of the existing public sewers in the vicinity of the site. A copy of the Wessex Water sewer records is contained in **Appendix 8**.

4.25. The Wessex Water sewer records show the presence of a foul sewer in Semington Road draining from north to south. A foul sewer is also located to the west of the development draining from north to south adjacent to Berryfield Lane.

4.26. Historical incidences of sewer flooding are recorded by water and sewerage companies on the DG5 register which records incidents of internal and external flooding relating to public foul, combined or surface water sewers and displays which properties suffered flooding. For confidentiality reasons this data is provided at the postcode level. This data does not identify whether flooding incidences were caused by general exceedance of the sewer system design, or by operational issues such as blockages. This dataset is a snapshot in time and may become outdated following assets improvement works by the water and sewerage company and future rainfall events.

4.27. The Level 1 SFRA summarises the number of properties on the DG5 register in a post code area. The site falls within postcode SN12 6 where 1 property is on the register.

4.28. No sewers are identified which cross the site and the SFRA does not identify any incident of flooding from overwhelmed sewers and drainage systems affecting the site.

4.29. Due to the absence of sewers crossing the site the flood risk posed by overwhelmed sewers to the site is therefore 'low'.

Flooding from Artificial Sources

4.30. Flooding from reservoirs may occur as a result of partial or complete failure of the control structure designed to retain water in the artificial storage area.

4.31. The Environment Agency's Flood risk from reservoirs map indicates the site is unaffected by flooding from any reservoirs and no significant waterbodies are identified upstream of the site which are considered to pose a risk to the site.

4.32. The SFRA does not identify any incident of flooding from Artificial Sources on the site.

4.33. In summary, the risk of flooding from artificial sources is assessed as 'very low' due to the absence of any reservoirs in the vicinity of the site.

Summary of Pre Development Flood Risk

4.34. A summary of the potential flood risk from all sources of flooding associated with existing pre-development conditions is shown in **Table A** below.

Table A: Pre-development Potential Flood Risk from All Sources of Flooding

Flood Source	Potential Risk	Description
Watercourses	Low	The site is located in Flood Zone 1, which indicates less than 1 in 1,000 annual probability of river flooding (<0.1%).
Surface Water	Low- High	The risk of flooding from surface water ranges between low – high and is associated with low points and ditches across the site. The topography of the land indicates that any overland flow would be collect in depressions and drainage ditches. Modelled surface water flood depths for the 1 in 100 year +45% climate change design event are predominantly constrained to depths of up to 300mm.
Groundwater	Medium	The underlying ground conditions suggest the risk of significant groundwater being present in the underlying geological deposits is moderate. If groundwater were to emerge it would behave like surface water flooding and collect at low spots of the site.
Overwhelmed Sewers	Low	The SFRA indicates that there is one historic record of sewer flooding in the postcode area within the vicinity of the site. In addition, no sewers are known to cross the site. The risk of the site being affected by flooding from overwhelmed sewers and drainage systems is assessed as 'low'.
Artificial Sources	Very Low	None identified.

4.35. The pre-development potential flood risk to the site from majority of sources of flooding is considered to be 'Very-Low' to 'High'. There are areas of high risk associated with surface water flooding, concentrated at low points and drainage ditches.

Flood Risk Mitigation Measures

4.36. This section of the report sets out the flood mitigation measures required to ensure the development is appropriately safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, would reduce flood risk overall.

Minimum Ground Floor Levels

4.37. In line with normal building practice, it is proposed that any on site buildings will have floor levels raised above existing ground level by a minimum of 300mm with appropriate damp proof course protection. This will ensure that the interior of any such building is kept suitably dry.

Development and Flood Risk

4.38. This section summarises the site-specific flood risk from all sources of flooding when both the proposed development and mitigation measures are taken into account.

Flooding from Surface Water

4.39. The provision of surface water drainage systems within the proposed development discussed in Section 5 below would intercept and manage any water that falls within the development areas. The surface water drainage systems would be designed to ensure that flooding would be minimal and safely managed during the 1 in 100 year event, including an allowance for climate change. The design of the site layout and levels will manage exceedance flow routes to ensure that water is directed into the Strategic SuDS Features or onsite watercourses.

4.40. The provision of surface water drainage systems and raising finished floor levels adequately mitigates the risk of surface water flooding affecting the proposed development on the site.

4.41. As such the proposed mitigation measures would ensure the sustainable management of rainwater and reduce the risk of flooding from surface water on the site so that the proposed dwellings would be appropriately safe.

4.42. Overland flows would be intercepted by the proposed surface water drainage system as discussed in Section 5 below providing a degree of betterment downstream.

4.43. The post development risk of flooding from surface water is assessed as taking into account the proposed mitigation measures, comprising raising finished floor levels a minimum of 300mm above existing and the provision of the proposed drainage strategy.

Flooding from Groundwater

4.44. On the basis of the dataset discussed above there is a risk of groundwater being close to the surface. If groundwater emergence were to occur it would likely follow the overland flow paths as indicated on the flooding from surface water map and be directed away from the development.

4.45. Raising finished floor levels a minimum of 300mm above existing ground levels would ensure that the risk of shallow groundwater emergence would not affect the proposed buildings. Elevating development above the zone of flood risk would ensures that the proposed buildings would be appropriately safe.

4.46. The post development risk of flooding from groundwater is assessed as 'low' taking into account the proposed mitigation measures.

Flooding from Overwhelmed Sewers and Drainage Systems

4.47. The proposed development would be served by new surface and foul water sewerage systems which will be designed to adoptable standards.

4.48. Compliance with those design standards would ensure that the proposed dwellings would be served by a drainage system that would not flood during the design event so that the dwellings will be appropriately safe.

4.49. The flood risk posed by overwhelmed sewers and drainage systems continues to be 'low' taking into account the mitigation measures.

Flooding from Artificial Sources

4.50. The proposed scheme would introduce new Strategic SuDS Features into the site. These would be appropriately designed to manage surface water on the development site and would not introduce a flood risk into the development site.

4.51. The risk of artificial flood hazards affecting the site is considered to be 'Low'.

Residual Risk

4.52. Residual risks are those remaining after applying the sequential approach to the location of development and after the flood risk management and mitigation measures are implemented. Examples of residual risk include:

- a breach of a raised flood defence, blockage of a surface water conveyance system or failure of a pumped drainage system;
- failure of a reservoir; and
- a flood event that exceeds a flood management design standard, such as a flood that overtops a raised flood defence, or an intense rainfall event which the drainage system cannot accommodate.

4.53. The site lies within Flood Zone 1 and so the proposed development is fully in accordance with the sequential approach to development set out in the NPPF, the aim of which is to steer new development to areas with the lowest probability of flooding.

4.54. The proposed drainage and mitigation measures would ensure that there is little or no residual risk of property flooding occurring during events well in excess of the minimum acceptable standard of protection for new property, which requires that no flooding of property should occur as a result of a 1 in 100 year storm event including an appropriate allowance for climate change.

4.55. For extreme events it is considered that the proposed development would intercept any uncontrolled overland flow and direct it into the proposed drainage system. The proposed drainage measures would ensure the proposed development would have adequate flood protection for extreme events over the lifetime of the development.

4.56. A summary of the potential risk from all sources of flooding post-development with the various development flood mitigation measures incorporated is shown in **Table B** below.

Table B: Post-development Potential Flood Risk from All Sources of Flooding

Flood Source	Potential Risk	Description
Watercourses	Low	No change compared with pre-development risk. The site lies within Flood Zone 1, which has a low probability of river flooding.
Surface Water	Low	Surface water and overland flows will be intercepted by proposed the surface water drainage system providing a degree of betterment downstream.
Groundwater	Low	Any existing risk would be mitigated by raising site and property levels.
Overwhelmed Sewers	Low	No change compared with pre-development risk. The proposed drainage system and SuDS Feature would further mitigate any potential off-site sewer flooding affecting the site.
Artificial Sources	Very Low	No change compared with pre-development risk.
Off-site Impacts	Betterment	Through provision of a surface water drainage system which reduces the rate of runoff and intercepts overland flows the proposed development would reduce flood risk overall.

4.57. Through the sequential approach to site design and incorporation of flood mitigation measures the proposed development would further reduce any risk from river, surface water, and groundwater flooding. Through provision of a surface water drainage system which reduces the rate of runoff and intercepts overland flows the proposed development would reduce flood risk overall.

Safe Access and Egress

4.58. Safe access and egress to and from the development is a route that is safe for use without the intervention of the emergency services or others.

4.59. Paragraph 047 in the Flood Risk and Coastal Change Planning Practice Guidance advises that access routes should allow occupants to safely access and exit their dwellings in design flood conditions. Wherever possible, safe access routes should be provided that are located above design flood levels and avoiding flow paths. Where this is not possible, limited depths of flooding may be acceptable.

4.60. The proposed built development is located entirely in Flood Zone 1 and so safe access and egress routes would be available for vehicles and pedestrians via the access road to the development.

Off Site Impacts

4.61. The provision of a surface water drainage system with outflow rates restricted to provide a betterment of the greenfield runoff rates for all storm events would reduce the rate of runoff into the onsite watercourse compared with the pre-development scenario (as per Table D). The provision of a surface water drainage system would also intercept and manage uncontrolled overland flows. These measures would contribute to reducing flood risk overall for the development site compared with the pre-development situation.

4.62. The proposed development would result in flood risk betterment on and off site.

Additional Consents

4.63. Additional consents would potentially be required for any works to watercourses in addition to securing planning permission.

4.64. The outline planning application seeks to establish the principles of the proposed development which can be subject to planning conditions. Details of the proposals will be developed as part of future reserved matters applications, the discharge of planning conditions, and detailed design of the proposals and any supplementary technical approvals.

NPPF Planning Policy Flood Risk Tests

Flood Risk Vulnerability and Flood Zone 'Compatibility'

4.65. Annex 3 of the NPPF sets out the Flood Risk Vulnerability Classification of development and categorises different types of development according to their vulnerability to flood risk. Paragraphs 077-078 of the Flood Risk and Coastal Change Planning Practice Guidance refer to two Flood Zone and Flood Risk Tables. Table 1: Flood Zones provides a definition of each Flood Zone. Table 2: Flood risk vulnerability and flood zone 'compatibility' maps the vulnerability classes against the flood zones to indicate where development is appropriate and where development should not be permitted.

4.66. With reference to Annex 3 of the NPPF the proposed residential development falls into the 'More Vulnerable' flood risk vulnerability classification, which includes buildings used for dwelling houses.

4.67. The Environment Agency's Flood Map for Planning indicates that the majority of the site falls within Flood Zone 1. With reference to Table 2, all uses of land are appropriate in Flood Zone 1.

4.68. Notes to Table 2 states that the table does not show the application of the Sequential Test which should be applied first to guide development to the lowest flood risk areas.

Sequential Test

4.69. Paragraph 172 of the NPPF states:

> **'All plans should apply a sequential, risk-based approach to the location of development – taking into account all sources of flood risk and the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property. They should do this, and manage any residual risk, by:**
>
> **(a) applying the sequential test and then, if necessary, the exception test as set out below;'**

4.70. Paragraph 173 of the NPPF states:

'A sequential risk-based approach should also be taken to individual applications in areas known to be at risk now or in future from any form of flooding, by following the steps set out below.'

4.71. Paragraph 174 of the NPPF goes onto state:

'Within this context the aim of the sequential test is to steer new development to areas with the lowest risk of flooding from any source. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The strategic flood risk assessment will provide the basis for applying this test.'

4.72. The site falls within Flood Zone 1 and on this basis the sequential test is passed in terms of river or sea flooding. In addition, as set out above, the proposed design and mitigation measures would ensure occupiers and users would remain safe from current and future surface water and ground water flood risk for the lifetime of the development without increasing flood risk elsewhere, then the sequential test need not be applied.

5. DRAINAGE STRATEGY

Sustainable Drainage Systems Guidance

5.1. Paragraph 182 of the NPPF states:

> **'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**
>
> **c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development.'**

5.2. 'Major development' is defined in the NPPF Annex 2: Glossary as:

> **'For housing, development where 10 or more homes will be provided, or the site has an area of 0.5 hectares or more'**

5.3. Paragraph 055 in the Flood Risk and Coastal Change planning practice guidance advises that sustainable drainage systems are designed to control surface water runoff close to where it falls and mimic natural drainage as closely as possible. Sustainable drainage systems can contribute to the causes and impacts of flooding and deliver a wider range of additional biodiversity and environmental net gains.

5.4. In terms of what sort of sustainable drainage system should be considered, paragraph 56 in the Guidance advises Where possible, preference should be given to multi-functional sustainable drainage systems, and to solutions that allow surface water to be discharged according to the following hierarchy of drainage options:

1. into the ground (infiltration);
2. to a surface water body;
3. to a surface water sewer, highway drain, or another drainage system;
4. to a combined sewer.

5.5. The drainage hierarchy is also set out in Section 3.2 of Approved Document H of the Building Regulations.

5.6. The Government published its 'National standards for sustainable drainage systems (SuDS)' in July 2025 and sets out standards intended for application in the design of surface water drainage systems for new infrastructure and development. Eleven principles are set out which underpin the standards to guide the approach to surface water management. Seven standards covering runoff destinations (S1), management of everyday and extreme rainfall (S2 and S3), water quality and amenity (S4 and S5), biodiversity (S6) and design, construction, operation, maintenance and decommissioning of drainage systems (S7). The standards contain information on minimum design criteria and provide accompanying requirements which provide detail on how to interpret, deliver and evaluate each standard. It is noted that opportunities to maximise meeting the standards should be taken but departures may be agreed in consultation with the approving body.

5.7. Guidance on the design and construction of SuDS is provided in Ciria C753 'The SuDS Manual' as well as in the Design and Construction Guidance (DCG) published by Water UK.

5.8. There are a number of potential SuDS techniques that might be used on any particular site. These include rainwater harvesting systems, pervious pavements, infiltration devices such as soakaways and infiltration trenches, bioretention systems, as well as flow balancing methods including swales, ponds/detention basins, and underground storage facilities.

5.9. The use of soakaways, pervious pavements and infiltration devices to discharge surface water runoff to ground depends upon the underlying strata having a suitable permeability. In addition, the Environment Agency will seek to control discharges into underground strata from areas subject to contamination or where groundwater is judged to be at risk from pollution caused by possible contamination.

Surface Water Management

5.10. A sustainable drainage strategy, involving the implementation of SuDS, is proposed for managing the disposal of surface water runoff from the proposed development on the site.

5.11. Based on the available information discussed above, the disposal of surface water by infiltration is not feasible. Therefore, it is necessary to use flow balancing methods in order to store and attenuate surface water runoff to greenfield runoff rates with controlled discharges to the local watercourse via a pumping station. At this outline stage, the proposed surface water drainage measures incorporate Strategic SuDS Features, to attenuate and store surface water runoff, comprising a series of ponds and basins.

5.12. The SuDS strategy has been devised to create a high quality landscaped setting, maximising the amenity and biodiversity benefits of the scheme, whilst still ensuring management of rainfall is adequately delivered. A preliminary surface water drainage strategy is shown on the Preliminary Surface Water Drainage Strategy Plan, Drawing No. B834/10, a copy of which is contained in **Appendix 9**.

5.13. The attenuation strategy comprises a mixture of permanent water bodies with a shallow attenuation capacity, traditional style dry attenuation basins, and a large central attenuation body, designed to only receive and store development runoff in higher order storm events.

5.14. It is proposed to utilise the canal route, and site SuDS features within this retained corridor. Where possible, and levels of the wider site allow, the SuDS features within the canal corridor will have a permanent water body, to reflect the future setting of the canal. Permanent water bodies are also used in other SuDS features close to development parcels to increase visual landscaping amenity and biodiversity of the scheme. To bring the water level closer to the development parcels, there is only a shallow attenuation element above the permanent water level, between 400mm and 500mm. To achieve a closer plan position of the water features and the development parcel, it is proposed that gabion retaining baskets are used to retain the development and create further variety in the visual landscaping setting.

5.15. Where levels dictate, such as when gravity connections have to be made within the road corridor, deeper traditional style attenuation basins are required on the site. At the current time, without knowledge of the detailed development proposals, allowance has been made as part of the design of the strategic features for more traditional style drainage upstream. It is recommended that the use of swales within the development parcels, both serving private areas and highways, are considered which may allow the reduction in depth of these attenuation features.

5.16. These features alone do not provide sufficient attenuation volume for the 1 in 100 year storm event. To maximise the amenity function of the site, it is proposed that is volume in contained within a large amenity area, which only receives runoff in higher order storm events (greater than the 1 in 10 year event). Overflow weirs and/or pipes would allow excessive flows from the wetted SuDS features into the central attenuation body, which would then have an outflow back into the main network. By only allowing flows to enter the area in the higher order storm events ensures that the area maintains an important amenity space of the development whilst being a functional drainage feature.

5.17. The side embankments of the SuDS features have been designed with variable side slopes, encouraging the naturalistic look of the features, ranging from 1 in 3 to 1 in 10. The large central amenity attenuation area has been designed with slide slopes primarily as 1 in 12 to facilitate access, but some areas as slack as 1 in 15. This will help to ensure that this central area does not feel like a traditional attenuation basin, but rather a thoughtfully designed amenity space.

5.18. Whilst the Wilts and Berks canal proposals are still at the planning stage, the proposed drainage strategy for the site would complement the delivery of the canal. Canals require a constant supply of water; every time a lock is opened, the water level within the pound will drop slightly. The delivery of the canal will affectively replace the SuDS features on the northern areas of public open space. By having discharge into the canal ensures that water levels are recharged. Whilst subject to detailed design, the canal will incorporate an element of freeboard above the permanent minimum water level to accommodate the lower order storm events, as is proposed with the current strategy.

5.19. In the higher order storm events, as is proposed with the current drainage strategy, an overflow would be provided from the canal into the central attenuation amenity area, ensuring flood risk is adequately managed. This is a similar arrangement to other sections of the restored route of the Wilts and Berks canal, specifically as part of the Wichelstowe development in Swindon. The exact details and arrangements of outfalls, freeboards and overflows would be included as part of the detailed design of the canal.

5.20. There are opportunities for additional Source Control measures such as swales, pervious pavement and bioretention areas to be incorporated in the detailed design of the development parcels to maximise the water quality, water quantity, amenity and biodiversity benefits of the Outline Surface Water Drainage Strategy. The full details of these SuDS measures would be provided and assessed at the detailed design and reserved matters application stage. As a precautionary approach the Strategic SuDS Features identified on Drawing No. B834/10 are sized to accommodate the proposed development on the site.

5.21. Based on the available information, it is likely the Strategic SuDS features will need to be lined with clay, butyl or geomembrane liner to prevent the ingress of groundwater, pending groundwater monitoring and detailed ground investigation.

5.22. The proposed drainage strategy would ensure that surface water arising from the developed site would be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account.

Runoff Destinations

5.23. The ‘National standards for SuDS’ follow a similar hierarchy as the Flood Risk and Coastal Change Planning Practice Guidance, with Standard 1.2 stating:

'Runoff from the development shall be discharged to the following final destinations, to the maximum extent practicable, in accordance with the below hierarchy:

- **priority 1: collected for non-potable use**
- **priority 2: infiltrated to ground**
- **priority 3: discharged to an above ground surface water body**
- **priority 4: discharged to a surface water sewer, or another piped surface water drainage system**
- **priority 5: discharged to a combined sewer**

Note 1: priority 1 is the highest priority and priority 5 is the lowest'

Collection for non-potable use

5.24. With reference to Requirement 1.11 of the National Standards for SuDS, there would be a demand for non-potable water on the development site, and roof areas would provide a suitable contributing catchment to deliver safe and efficient water savings. On this basis, the need for Rainwater Harvesting should be considered as part of the 'SuDS Approach'.

5.25. Rainwater harvesting (RWH) is the collection of rainwater runoff for use. Runoff can be collected, stored, and where necessary treated, to supply water for domestic, commercial or industrial uses. Non potable uses could include use of rainwater for flushing toilets and in washing machines (which could require adaptation) or for garden uses.

5.26. A RWH system typically comprises a storage tank, a pump and power controls and pipework to convey the rainwater to its intended use (e.g. toilet). At the other end of the scale Rainwater Butts are a simple form of RWH for the collection of rainwater for use within domestic gardens.

5.27. The practicalities of delivering RWH across on the development site of this scale and nature should be assessed to establish if the proposed development is suitable for RWH.

5.28. Practical issues that should be considered include installation cost, ownership and long-term maintenance costs and liabilities. For example, the design life of a pump is approximately 10 years putting a cost burden on future residents.

5.29. Due to the nature of the proposed development significant long-term irrigation of POS areas is not proposed (or sustainable) and as such would not warrant a RWH system for this use.

5.30. The use of more complex RWH systems is not considered appropriate for residential development of this nature and scale. At the very least, spatial requirements of any underground tanks are such that they could not be placed underneath drives constructed with a permeable subbase, and locating within front or back gardens precludes any enhanced landscaping proposals. In addition, the complexity of such systems should not be overlooked, with significant maintenance burdens placed upon future occupiers with a risk that such systems are decommissioned or left in disrepair.

5.31. The risk of shallow groundwater and potential of floatation of below ground RWH tanks would need to be considered and could increase cost of systems due to the potential increased need for concrete surround as a ballast.

5.32. Notwithstanding the above, it is considered reasonable that all plots are provided with rainwater butts within the private amenity garden areas for re-use for landscaping purposes. In an extreme rainfall event, an overflow route would be in place connected to the wider surface water drainage system to dispose of exceedance flows.

Infiltrated to ground

5.33. Based on the available desk mapping and surrounding ground investigations, the use of infiltration devices is considered unsuitable

Discharge to above ground surface water body

5.34. There are several drainage ditches and watercourses within a vicinity of the site, therefore it is therefore considered appropriate to discharge outfall from the development at a controlled rate to an existing watercourse.

5.35. There is an existing onsite ditch located in the centre of the site running in a north to south direction, heading towards the proposed development bordering the south of the site. However, this ditch is very shallow (circa 500mm), and coupled with the very flat topography of the site, would require significant ground raising of the wider development site to achieve a gravity connection.

5.36. The continuation of this ditch was considered as part of the proposed development to the south, along with the further connection under Berryfield Lane. It was concluded that the continuation of the ditch was rather a series of isolated low points/depressions that store still water. In addition, the culvert under Berryfield Lane was not draining freely. On this basis, coupled with the on-site topography, it is deemed that the on-site watercourse is not a suitable outfall location.

5.37. The next nearest watercourse is the Berryfield Brook, to which the site ultimately drains to, and is therefore deemed an appropriate outfall location. Due to the flat topography of the locality, and that a gravity connection to the brook would not be achievable, surface water flows will need to be pumped, at greenfield rates. This is an approach that has been accepted at the site bordering the north (planning ref 20/07334/OUT), and thus considered as acceptable to the Local Authority.

5.38. There are two potential connection points to the brook from the development site. Option 1 would utilise a rising main within Semington Road to the east of the site, outfall into the brook where Semington Road crosses Berryfield Brook. This is the approach agreed with the LLFA as part of the application to the south of the development. Alternatively, the outfall route could head into Berryfield Lane to the west of the site, running down the lane to where it crosses the brook west of Berryfield village. With reference to Land Registry title information, the crossing of Berryfield Lane is unregistered, thus assumed to be public highway at this point. The chosen route will be subject to confirmation of access rights and additional survey information at the detailed design stage.

Management of Everyday Rainfall (Interception)

5.39. Requirement 2.1 of the National Standards for SuDS states:

> **Apply a 'SuDS approach' so that at least the first 5mm of rainfall for the majority of rainfall events does not result in runoff from the site to surface waters or piped drainage systems.**

5.40. At this stage, the exact quantum of hard surfaced areas is unknown, although has been assumed that the residential developed areas would give rise to net impermeable areas of 60% of the respective development catchment area. Section 24.6.2 of the SuDS Manual states '*for standard developments that tend to have impermeability ratios of around 50-65%*'. A 60% allowance is therefore a proportionate and suitably conservative estimate of impermeability consistent with good practice set out in the SuDS Manual.

5.41. On the basis of a 60% impermeability factor, and a net development area of 6.3377ha, the total volume of rainfall generated in the first 5mm of a rainfall event is 316m^3.

5.42. To contain this volume generated in the very small rainfall events, it is proposed to depress the base of Basins 2 and 3 200mm below the outgoing headwall invert level. Between these two basins,

the total volume provided below the outlet level is 64m^3, or 20% of the total required interception volume.

5.43. Whilst the expected infiltration rates into the soil are poor, there will be some infiltration into the topsoil and subbase of the basins. Coupled with evapotranspiration, the basins will eventually fully drain down, providing storage volume for subsequent rainfall events.

5.44. The remaining 80% of the interception storage requirements will be dealt with by on-plot features. There are a variety of measures that this could be accommodate within the development parcels, such as permeable drives and parking areas, rain gardens and swales. In addition, the delivery of on parcel features may allow the reduction in the size of the strategic features proposes.

Management of Extreme Rainfall and Flooding

5.45. Requirement 3.3 of the National Standards for SuDS states:

> **3.3 When discharging to an above ground surface water body, sewer or other piped drainage system, the surface water runoff (rate and volume) for the 1% annual exceedance probability (AEP) event shall be controlled to ensure the runoff from the development does not increase flood risk elsewhere.**

5.46. Providing further detail with regards to runoff rates and volumes to surface waters or sewers, Requirements 3.18 and 3.19 state:

> **3.18 The peak allowable discharge rate from the development to surface waters or sewers for the 50% AEP event shall be limited to the equivalent 50% AEP greenfield runoff rate, or 3 l/s/ha, whichever is the greater.**
>
> **3.19 Where the volume of runoff discharged from the development to surface waters or sewers for the 1% AEP, 6-hour rainfall event is greater than the volume of greenfield runoff for the same rainfall event, the peak allowable discharge rate from the development for the 1% AEP event shall be limited to the 50% AEP greenfield runoff rate or 3l/s/ha, whichever is the greater.**

5.47. In addition to the National requirements, Wiltshire Council's Drainage and Betterment Strategy (June 2024) states:

> **With regards the control of surface water discharges from new development, Wiltshire Council requires post development discharges from greenfield sites to provide 30% betterment over pre-development discharges for all storm events between the 1 in 1 year and 1 in 100 year return period events.**

Greenfield Runoff Rate Assessment (FEH Statistical Method)

5.48. The FEH (Flood Estimation Handbook) Q_{MED} equation from the statistical method can be used to calculate greenfield runoff rates as updated in 2025[1]. Q_{MED} is the median of the annual maximum flow peaks and is equivalent to approximately the 1 in 2 year flow rate (50% AEP).

5.49. Section 6.2.1 in the Environment Agency's 'Rainfall runoff management for developments' Report – SC030219 sets out the revised FEH statistical method correlation formula equation for Q_{MED}, which requires the user to input:

- Area - Catchment drainage area (km^2)

[1] UK CEH (2025) The FEH 2025 statistical Method Updated Issue No. 1.3 dated 22-07-2025.

- Standard Annual Average Rainfall (SAAR). SAAR9120 are recommended to be used as extracted from the FEH Web Service[2] and updates the dataset to cover rainfall data between 1991 and 2020.
- The Flood Attenuation by Reservoirs and Lakes (FARL) index gives an indication of the degree of flood attenuation attributable to reservoirs or lakes within the catchment. Values close to 1 indicate the absence of attenuation due to lakes and reservoirs.
- BFIHOST - the base flow index is a measure of catchment responsiveness derived using the 29-class Hydrology Of Soil Types (HOST) classification. This catchment descriptor has been updated to BFIHOST19SCALED[3].

5.50. The 2025 FEH statistical method correlation formula is as follows:

$$Q_{MED} = 6.8247AREA^{0.8499} \times 0.1780(1000/SAAR_{9120}) \times FARL_{2015}^{3.0450} \times 0.0321^{BFIHOST19SCALED^2} \times 1000/50$$

$$Q_{MED} = 6.8247 \times 6.3377^{0.8499} \times 0.1780(1000/736) \times 1^{3.0450} \times 0.0321^{0.676^2} \times 1000/50 = 9.6$$

5.51. The greenfield runoff rates for the development area are set out in **Table C** below.

Table C: Greenfield Runoff Rate

Area (ha)	Q_{MED} (l/s)	Q_{BAR} (l/s)	Q_1 (l/s)	Q_{30} (l/s)	Q_{100} (l/s)	3 l/s/ha
6.3377	9.6	10.3	8.0	20.0	25.0	19.0

Notes:

a) $Q_{BAR\ Rural} = 1.07 \times Q_{MED\ Rural}$
b) $Q_1 = 0.78 \times Q_{BAR\ Rural}$
c) $Q_{30} = 1.98 \times Q_{BAR\ Rural}$
d) $Q_{100} = 2.42 \times Q_{BAR\ Rural}$
e) Scale factors based on UKSuDS Tool and growth curve factors as summarised in Table 24.2 SuDS Manual C753

5.52. As the additional runoff generated cannot be disposed of by infiltration, in the first instance it would be proposed that the outflow from the drainage system is constrained to 19 l/s (3 l/s/ha) in accordance with Requirement 3.19 of the National Standards for Sustainable Drainage Systems. However, with consideration with Wiltshire Council's local standards and 30% betterment policy, it is proposed that the outflow from the drainage system is constrained to a discharge rate of **17.5 l/s** for all rainfall events up to the 100 year return period event, including a 45% allowance for climate change, whilst also meeting the betterment requirement for all other return periods.

Surface Water Flow Balancing

5.53. The ponds/detention basins shown on the Preliminary Surface Water Drainage Strategy Plan, Drawing No. B834/10 in **Appendix 9**, indicate the location and sizes of the required storage facilities to serve the various development areas and are subject to detailed design.

5.54. It is proposed to use flow balancing methods, comprising swales, ponds/detention basins and oversized pipes, in order to attenuate surface water runoff to greenfield runoff rates with discharge to the local watercourse and ditch system.

5.55. With regard to the Wiltshire Council Drainage and Betterment Strategy (June 2024) states:

> **With regards the control of surface water discharges from new development, Wiltshire Council requires post development discharges from greenfield sites to provide 30%**

[2] UK CEH (2025) Flood Estimate Handbook Webservice. Available from: https://fehweb.ceh.ac.uk/Map
[3] Griffin et al. (2019) Revising the BFIHOST catchment descriptor to improve UK flood frequency estimates. Hydrology Research (2019) 50 (6): 1508–1519. Table 4 HOST coefficient for 'linear-equivalent' values for beta regression models.

betterment over pre-development discharges for all storm events between the 1 in 1 year and 1 in 100 year return period events.

For greenfield development, the runoff volume from the development to any highway drain, sewer or surface water body in the 1 in 100 year, 6 hour rainfall event should never exceed the greenfield runoff volume for the same event.

5.56. Detailed calculations have been undertaken to model the proposed surface water drainage system on the site using the Network module in the MicroDrainage design software, for the 1 in 2, 1 in 30 and 1 in 100 year events (plus an allowance for climate change as appropriate). Preliminary results of the surface water drainage systems are contained in **Appendix 10.**

5.57. For the preliminary storage calculations it has been assumed that the residential developed areas would give rise to net impermeable areas of 60% of the respective development catchment area. Section 24.6.2 of the SuDS Manual states '*for standard developments that tend to have impermeability ratios of around 50-65%*'. A 60% allowance is therefore a proportionate and suitably conservative estimate of impermeability consistent with good practice set out in the SuDS Manual.

5.58. The net impermeable areas for the site are measured based on an indicative layout. In accordance with the National Standards for Sustainable Drainage, permeable surfaces (excluding large POS areas) are also included within contributing areas. Contributing surfaces included based on SPR value (standard percentage runoff) of 27% based on BFI Host Data. A 10% urban creep factor has also been included for the impermeable areas.

5.59. **Table D** below shows the development catchment area, resulting impermeable area, the greenfield runoff rates and the resulting discharge rates in the post development situation.

Table D: Post Development Runoff Rates

Greenfield Runoff Rate (l/s)			30% Betterment on Greenfield Rates (l/s)			Post Development Runoff Rate (l/s)		
1 in 1 Year	1 in 30 Year	1 in 100 Year	1 in 1 Year	1 in 30 Year	1 in 100 Year	1 in 2 Year*	1 in 30 Year (+40%)	1 in 100 Year (+45%)
8.0	20.0	25.0	5.6	14.0	17.5	5.6	14.0	14.3

*used as proxy for 1 in 1 year storm event, as FEH rainfall not calibrated for 1 in 1 year rainfall

5.60. From an inspection of **Table D** it can be seen that the peak runoff rate from the development for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event never exceed the peak greenfield runoff rate for the same event, and provides a 30% betterment. In addition, the overall discharge rate is less than 3 l/s/ha, thus provide sufficient volumetric control to not increase the risk of flooding downstream in accordance with Requirement 3.19 of the National Standards for SuDS.

5.61. The above referenced plan and calculations demonstrate that a suitable means of drainage can be provided to drain the developed site in terms of surface water runoff in accordance with the guidance and standards laid down.

Overland Flood Flow Paths

5.62. Requirement 3.7 of the National Standards for SuDS requires management of the risk of flooding for exceedance events in excess of the design event (1% AEP, 1 in 100 year return period).

5.63. The design of the internal road network at the Reserved Matters stage would be such that overland flood flow paths would be directed towards the centre of the site, and ultimately the proposed detention basins. The design of the internal road network would convey flows away from proposed

properties. The proposed drainage strategy would reduce uncontrolled overland flows, and the volume of runoff will be reduced therefore providing a betterment for properties downstream.

Water Quality

5.64. The proposed Outline Surface Water Drainage Strategy incorporating Strategic SuDS Features provides treatment of surface water runoff which in turn delivers water quality benefits.

5.65. The proper implementation of a SuDS management / treatment train using a combination of upstream Source Control and Strategic SuDS Features will create greater resilience and allow the system to collect silt at various points which can then be removed as part of periodic maintenance. Creating a diverse SuDS scheme encourages sedimentation, filtration and biological uptake throughout the site.

5.66. Ensuring that the principles of the Preliminary Surface Water Drainage Strategy are taken forward into the future detailed design of the individual development parcels and ensuring that effective maintenance and management procedures are followed will be the key to ensuring the overall effectiveness of the SuDS scheme.

5.67. With reference to Chapter 26 of the CIRIA SuDS Manual 2015 a water quality assessment of the proposed Outline Surface Water Drainage Strategy has been undertaken using the simple index approach.

5.68. To deliver adequate treatment the SuDS components should have a total pollution mitigation index (for each contaminant type) that equals or exceeds the pollution hazard index (for each contaminant type):

Total SuDS mitigation index > pollution hazard index

5.69. Where the mitigation index of an individual component is insufficient, two components (or more) in series will be required, where:

Total SuDS mitigation Index = mitigation $index_1$ + 0.5(mitigation $index_2$) + etc

5.70. From Table 26.2 in the CIRIA SuDS Manual 2015 the pollution hazard indices for each contaminant type for the proposed land use comprising individual property driveways, residential car parks, and low traffic roads are shown in **Table F** below.

Table F: Pollution hazard indices

Land Use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
Residential Roofs	Very Low	0.2	0.2	0.05
Individual property driveways, residential carparks, low traffic roads and non-residential car parking with infrequent change (e.g. schools, offices) i.e. < 300 traffic movements/day	Low	0.5	0.4	0.4

5.71. From Table 26.3 in the CIRIA SuDS Manual 2015 the indicative SuDS mitigation indices for discharges to surface waters for different SuDS features which could be utilised on the development site are shown in **Table G** below.

Table G: Indicative SuDS mitigation indices for discharges to surface waters

Type of SuDS component	TSS	Metals	Hydrocarbons
Detention basin	0.5	0.5	0.6
Pond	0.7	0.7	0.5

5.72. **Table H** below summarises the catchment areas on the development site, the associated pollution hazard indices and the appropriateness of the proposed SuDS feature to deliver adequate treatment.

Table H: Total Mitigation Index

Catchment	Pollution hazard level	SuDS Feature (minimum proposed[1])	SuDS mitigation index					
			Total suspended solids (TSS)		Metals		Hydrocarbons	
			SuDS Mitigation Index *[Target]*	Pass / Fail	SuDS Mitigation Index [*Target*]	Pass / Fail	SuDS Mitigation Index [*Target*]	Pass / Fail
Residential Dwellings	Very Low	Detention basin / pond	0.85 *[0.2]*	P	0.85 *[0.2]*	P	0.85 *[0.05]*	P
Individual property driveways and residential car parks	Low	Detention basin / pond	0.85 *[0.5]*	P	0.85 *[0.4]*	P	0.85 *[0.4]*	P
Low Traffic Roads	Low	Detention basin / pond	0.85 *[0.5]*	P	0.85 *[0.4]*	P	0.85 *[0.4]*	P

5.73. With reference to **Table H** above it can be seen that the total pollution mitigation equals or exceeds the pollution hazard index (for each contaminant type) for the majority of the proposed land uses and so the proposed surface water drainage scheme delivers adequate water quality treatment.

Amenity and Biodiversity

5.74. With regards to amenity, Section 5.1 of the National Standards for SuDS states:

> **A 'SuDS approach' shall be adopted that maximises benefits for amenity through the creation of multi-functional places and landscapes.**

5.75. Turning to biodiversity, Sections 6.1 and 6.2 of the National Standards for SuDS state:

> **6.1 A 'SuDS approach' shall be adopted to ensure the surface water drainage system maximises biodiversity benefits throughout the development lifecycle.**
>
> **6.2 The surface water drainage system shall add biodiversity value by:**
> - **creating diverse, self-sustaining, resilient local ecosystems which contribute to net gains in biodiversity**
> - **supporting and promoting natural local habitat and species, for example, through local nature recovery strategies (LNRS)**
> - **contributing to the delivery of local biodiversity strategies**
> - **contributing to habitat connectivity**

5.76. The design of the SuDS features has focused on delivering a high quality strategy to maximise the amenity and biodiversity benefits of the scheme. The large attenuation/amenity area has been designed to remain dry majority of the time, ensuring public use. By proposed a variety of SuDS features, including features dry (except during and immediately after rainfall events), and features with permanent water bodies, encourage a diverse variety of habitats and ecosystems increasing the biodiversity value of the scheme.

5.77. Integrating the SuDS features within the development ensures visibility, allowing multi-functionality during dry periods, enhances the overall character of the development. The proposed planting strategy will look to maximise biodiversity value, creating habitats to support pollinators and other wildlife. By shaping the basins to mimic natural landforms and incorporating ecological features such as varied microhabitats, the scheme not only enhances ecological resilience but also contributes to the site's wider green infrastructure. These biodiversity enhancements, combined with thoughtful amenity-led design, ensure the detention basin operates as both a critical flood-risk management feature and an attractive, ecologically rich community asset.

Design of Drainage for construction, operation and maintenance

5.78. Sections 7.1 and 7.2 of the National Standards for SuDS states:

> **7.1 A 'SuDS approach' shall be adopted to ensure that surface water drainage systems are designed so they can be easily and safely constructed, operated and maintained taking account of the need to minimise negative impacts on natural resources and the environment.**
>
> **7.2 The designer shall provide a management and maintenance plan that supports the design objectives detailed in standards 1 to 6 and ensures the performance of the surface water drainage system with regards to runoff destinations, everyday and extreme rainfall, water quality, amenity and biodiversity is maintained throughout the lifetime of the development.**

Management of Runoff during Construction

5.79. The control of runoff, sediment and pollution will be managed during the construction stage in accordance with advice given in Chapter 31 of the SuDS Manual. To control runoff/erosion, it is recommended that construction is phased to minimise the total amount of soil exposed at any given time, and to establish cover as soon as possible.

5.80. During each phase of the development, any runoff from the construction phase should pass through sediment controls such as straw bale barriers or geotextile silt fences, which will prevent sediment entering offsite watercourses, drains or the proposed onsite infiltration devices. As the underground drainage systems are likely to be constructed first, care should be taken to prevent sediment entering these systems during construction. This could involve temporarily capping the road gullies and thoroughly jetting and inspecting before operation.

5.81. To control the risk of pollution, an environmental pollution protection plan will be put in place. This should include the foul and surface water drainage disposal routes, location of spillage kits, and an action plan in the event of an environmental incident. Good site practices should be encouraged to prevent oil and hydrocarbons becoming entrained in surface runoff, and sediment entering the drainage system.

5.82. Adopting best practice construction site management with adequate contingency planning, and following the principles of pollution prevention guidance would reduce the risk of water pollution during the construction phase.

5.83. Measures to be implemented to reduce the risk of water pollution include the proper supervision of construction activities using appropriately experienced and qualified staff and supervisors, and strict adherence to Health and Safety Regulations, Codes of Practice, and Consent Conditions. Other measures which could be implemented as necessary include:

- Contractors would employ best practice, good housekeeping and adopt the principles set out in the CIRIA Toolbox Talks: Environmental, CIRIA C532, CIRIA C741, and CIRIA C648;
- The contractor would provide additional street cleaning facilities as necessary to keep highways leading to the site clear of mud and prevent sediment contaminating surface water runoff. Wheel cleaning facilities, appropriate stockpiling of topsoil, suitable timing of earthwork and earthmoving operations, and dust suppression measures would be used to prevent migration of sediment and other potentially polluting substances onto the highway and into watercourses;
- Vehicle and plant washing would be carried out on designated areas at least 10m from any watercourse or surface water body (including proposed detention basin);
- Contractors would use well maintained plant, but the likelihood of spills will be reduced through adoption of pollution prevention principles;
- Effective contingency plans would be put in place to manage the risk associated with accidents and/or unforeseen circumstances. For example, information relating to the use and location of accidental spill kits would be relayed to the construction personnel;
- All HGVs will be restricted to the temporary construction compound;
- The significant storage of fuels, lubricants or chemicals on site is not expected. Any relevant materials would be stored in accordance with the appropriate pollution prevention principles to reduce the likelihood of spillage and with an impermeable base and suitable bunding or double skinned tanks; and
- A site maintenance plan would be implemented so that all construction plant is routinely checked and maintained to reduce the likelihood of leakages during the construction phase.
- The temporary construction compound would be constructed of crushed stone permeable material (such as MOT Type 3 subbase or similar approved) to retain the runoff characteristics for the site. The construction compound will be on flat ground, temporary matting will be placed to support weight bearing plant and equipment. The construction compound will be removed after construction is finished.

5.84. The Site's drainage regime may be temporarily disrupted during the construction phase by construction activities such as storage of materials, movement of vehicles and trenching associated with construction of the development. This could cause minor increases in the runoff rates, minor disruption to overland flow routes and soil compaction.

5.85. Temporary construction drainage in the form of temporary cut off ditches or detention basins could be installed to intercept runoff from the construction site.

Operation and Maintenance Requirements

5.86. Paragraph 182 of the NPPF states that for major developments the sustainable drainage systems used should have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development.

5.87. In terms of the maintenance strategy for the proposed drainage measures, the main surface and foul water drainage systems would be adopted by Wessex Water, in its role as sewerage

undertaker, under a Section 104 Agreement of the Water Industry Act 1991, or alternative suitable NAV under an inset agreement. The sewerage undertaker would therefore be responsible for the future maintenance of the adopted drainage systems.

5.88. It is proposed that the SuDS system, comprising of detention basins and ponds would be maintained by a Management Company.

5.89. Roads and footways, including highway drainage and gullies serving the public highway would be adopted under Section 38 of the Highways Act 1980, would be maintained by Wiltshire Council in its role as local highway authority.

5.90. Guidance on the operation and maintenance requirements of sustainable drainage systems is contained in The SuDS Manual 2015 (CIRIA C753). There are three categories of maintenance: regular, occasional and remedial. The Management Company would be responsible for putting in place a suitable maintenance plan in accordance with the recommendations in CIRIA C753 'The SuDS Manual'.

5.91. Regular maintenance consists of basic tasks including litter and debris removal, grass cutting, and vegetation management, and includes inspections and monitoring to identify potential system failures such as blockages, silt and sediment build-up, eroded or damaged areas, and condition of inlets and outlets.

5.92. Occasional maintenance comprises tasks that are likely to be required periodically for example sediment removal.

5.93. Remedial maintenance comprises intermittent tasks to rectify faults and would comprise inlet/outlet repairs, erosion repairs and re-aeriation of vegetated surfaces.

5.94. Maintenance inspections must be undertaken by personnel with the minimum health, experience, and where appropriate, qualification requirements for the particular inspection type. The results of the inspections shall be recorded in the Maintenance Plan Records. Any deficiencies shall be reported to the site owner for review and remediation.

5.95. In addition, remedial inspections should be undertaken as soon as possible as a result of notification of a defect by a third party. The purpose of remedial inspections is to identify obvious deficiencies which represent, or might lead to, a danger to the public and, therefore, require immediate or urgent attention.

5.96. The operation and maintenance procedures for the SuDS features including required actions are set out in **Table I** below.

Table I: Detention Basin SuDS Maintenance Procedures

Maintenance Schedule	Required Action	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
	Check any penstocks and other mechanical devices	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from inlets, outlets and forebay	Annually (or as required)
	Manage wetland plants in outlet pool – where provided	Annually (as set out in Chapter 23)
Occasional Maintenance	Reseed areas of poor vegetation growth	As required
	Prune and trim any trees and remove cuttings	Every 2 years, or as required
	Remove any 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 Actions	Repair erosion or other damage by reseeding or re-turfing	As required
	Realignment of rip-rap	As required
	Repair/rehabilitation of inlets, outlets and overflows.	As required
	Relevel uneven surfaces and reinstate design levels	As required

Foul Water Drainage

5.97. Enquiries have been made to Wessex Water to establish the location of the existing public sewers in the vicinity of the site, the available capacity at the sewage treatment works, and the adequate point of connection to the public foul water sewer system for the proposed development. A copy of their response is contained in **Appendix 11**, with the public sewer map contained in **Appendix 8**.

5.98. The public sewer map indicates there are existing public foul water sewers located to the east and west of the site.

5.99. The proposed development would require a 150mm diameter connection. In terms of the adequate point of connection for foul flows from the proposed development to the public foul water sewer

system, Wessex Water has stated they will accept flows to the public foul sewer with connections made on a size for size basis.

5.100. Wessex Water have identified that that the nearest suitable point of connection is the 225mm diameter public foul sewer to the west of the site in the south west corner of the site boundary. There is also a 150mm diameter public foul water sewer within Semington Road, which would also be a suitable connection point. It is likely that a pumping station will be required on site to lift flows to the existing sewers, and the layout will need to accommodate the spatial requirements, and odour offsets of the pumping station.

5.101. Under the provisions of the Water Industry Act 1991 (as amended), the developer will need to pay the sewerage undertaker the published sewer connection charges and infrastructure charge per dwelling, and the sewerage undertaker is responsible for any network reinforcement.

5.102. In terms of foul water drainage, it has been demonstrated that a suitable means of drainage can be provided to serve the proposed development.

6. CONCLUSIONS

6.1. This Flood Risk Assessment has been prepared in connection with proposals for a residential development compromising up to 225 dwellings on land at Townsend Farm, Melksham.

6.2. The overall site total approximately 11.1 hectares whilst the net developable area of the site comprises 6.34 hectares, and is located to the west of Semington Road and east of Berryfields Lane, Melksham.

6.3. With reference to the Environment Agency's Flood Map for Planning, the site falls within Flood Zone 1, which has the lowest probability of flooding.

6.4. In relation to Flood Risk Vulnerability and Flood Zone 'Compatibility', the planning practice guidance to the NPPF advises that all uses of land are appropriate in Flood Zone 1. On this basis the sequential test is passed.

6.5. In addition to flooding from rivers, this Flood Risk Assessment has considered the potential consequences of flooding from all other sources, which include directly from rainfall on the ground surface and rising groundwater, overwhelmed sewers and drainage systems, and from reservoirs, canals and lakes and other artificial sources.

6.6. The SFRA, and historic flood information, provides an assessment of the impact of all other sources of potential flooding. Based on the SFRA and available information, there are no historic flood incidents recorded on the site from all sources of potential flooding.

6.7. The pre-development potential flood risk to the site from all sources of flooding is considered to be very low - high. Areas of high risk are associated with surface water flooding.

6.8. Through the sequential approach to site design and incorporation of flood mitigation measures the proposed development would reduce any risk from watercourses, surface water, and groundwater flooding to the proposed development. By reducing the rate of runoff from developed areas, intercepting overland flows, the proposed development would reduce flood risk of the surrounding area.

6.9. A preliminary drainage strategy, involving the implementation of attenuation SuDS with flow controls restricted to greenfield runoff rates, is proposed for managing the disposal of surface water runoff from the proposed development on the site.

6.10. The proposed drainage strategy would ensure that surface water arising from the developed site would be managed in a sustainable manner to mimic the surface water flows arising from the site prior to the proposed development, while reducing the flood risk to the site itself and elsewhere, taking climate change into account.

6.11. The proposed drainage measures would ensure that there is little or no residual risk of property flooding occurring during events well in excess of the minimum acceptable standard of protection for new property, which requires that no flooding of property should occur as a result of a one in 100 year storm event taking account of climate change.

6.12. For extreme events it is considered that the proposed development would intercept any uncontrolled overland flow and direct it into the proposed drainage system. The proposed drainage measures would therefore ensure the proposed development would have adequate flood protection for extreme events over the lifetime of the development.

6.13. The Micro Drainage calculations contained in this Flood Risk Assessment demonstrate that a suitable means of drainage can be provided to drain the developed site in terms of surface water runoff in accordance with the guidance and standards laid down.

6.14. In terms of foul water drainage, it has been demonstrated that a suitable means of drainage can be provided to serve the proposed development.

6.15. A maintenance strategy for the proposed foul and surface water drainage measures to serve the development has been set out in this document.

6.16. This Flood Risk Assessment has demonstrated that the proposed development complies with the relevant requirements of the NPPF, the planning practice guidance checklist, Local Plan Policies, guidance published by DEFRA/Environment Agency, the Government's 'National Standards for Sustainable Drainage Systems' and Wiltshire Council's Local standards.

6.17. It is recommended that the details of the scheme can be covered by suitably worded conditions requiring the submission of details to be submitted to and approved by the Local Planning Authority.

6.18. The overall conclusions drawn from this Flood Risk Assessment are that the development would be appropriately safe for its lifetime taking account of the vulnerability of its users, the development would not increase flood risk elsewhere, and would reduce flood risk overall.

Appendix 1

Notes:

1. GRID AND LEVELS BASED ON ORDNANCE DATUM. DERIVED FROM THE NATIONAL GNSS NETWORK. LOCAL SCALE FACTOR 0.99960 APPLIED.
2. TREE AND HEDGE SPECIES HAVE BEEN IDENTIFIED AS ACCURATELY AS POSSIBLE BUT SHOULD BE CROSS CHECKED IN CRITICAL AREAS.

Coordinate Table

Station	Description	Easting	Northing	Level
S1	Road Nail	390128.343	162609.587	38.246
S2	Road Nail	390146.366	162659.187	38.059
S3	Road Nail	390197.258	162759.644	38.065
S8	Road Nail	389808.647	162749.145	38.462
S9	Road Nail	389889.293	162712.385	38.558
S10	Road Nail	389919.756	162698.357	38.458
S100	Road Nail	389748.800	162618.179	38.136
S101	Road Nail	389791.635	162598.164	38.166
S102	Road Nail	389836.008	162590.300	38.693

TOPOGRAPHICAL KEY

SURVEY STATION — 5
BANKING — TOP / BOTTOM
HEDGE SPREADS
WOODLAND CANOPY
ARROW ON STEPS / RAMPS INDICATES DIRECTION UPWARDS
TREES — SPREAD & GIRTH SHOWN TO SCALE
GATE
KERB CHANNEL
ROAD UNKERBED
FOOTPATH
CHANGE IN SURFACE
FENCE
WALL
OVERHEAD ELECTRIC
OVERHEAD TELECOM
FOUL SEWER
SURFACE SEWER
P-TRAP
BACK DROP (EXTERNAL)
BACK DROP (INTERNAL)
BUILDING
OPEN SIDED BUILDING
OVERHANG / CANOPY
GLASSHOUSE
CONTOUR — 25.50
SPOT LEVEL — + 127.13
SONAR LEVEL — ⊙ 127.13
BORE HOLE — BH
TRIAL HOLE — TH

GENERAL ABBREVIATIONS

AIR CONDITIONING UNIT	ACU
AIR VALVE	AV
ANTENNA	AN
BACK DROP	BD
BASE LEVEL	BL
BELISHA BEACON	BB
BOLLARD	BO
BOX WARD LIGHT	BOL
BRICK	BK
BUS STOP	BS
CABLE RISER	CR
CABLE TV COVER	CATV
CABLES TO GROUND	CTG
CATCH PIT	CP
CATHODIC BOX	CB
COVER LEVEL	CL
CROSSING CONTROL BUTTON	CCB
DAMP PROOF COURSE	DPC
DRAINAGE CHANNEL	DCH
DROP KERB	DK
ELECTRICITY POLE	EP
FENCE END	FE
FIRE HYDRANT	FH
FLOOR LEVEL	FL
FOOTPATH	FP
FOUL WATER	FW
GARAGE DOOR	GD
GAS VALVE	GV
GULLY	GY
HARD BED	HB
INSPECTION COVER	IC
INVERT LEVEL	IL
KERB OUTLET	KO
LAMP POST	LP
MANHOLE	MH
MARKER POST	MK
METER	MT
NO PIPES VISIBLE	NPV
OCCURANCE SURVEY BENCH MARK	OSBM
P-TRAP	PT
POST	PO
POST BOX	P.BOX
RODDING EYE	RE
ROAD SIGN	RS
RAIN WATER PIPE	RWP
RETAINING WALL	RW
SOFT WEED	SE
STEPS / DOOR	SD
STREET NAME PLATE	SNP
STOP VALVE	SV
SOIL PIPE	SP
SOIL VENT PIPE	SVP
STANDING WATER	SW
TACTILE PAVING	TAC
TELECOM POLE	TP
TELECOM INSPECTION COVER	TEL
TELEPHONE CALL BOX	TCB
TICKET MACHINE	TM
TOP OF WALL	TOW
TRAFFIC LIGHT	TL
TRAFFIC LIGHT COVER	TLC
THRESHOLD LEVEL	THL
UNABLE TO LOCATE	UTL
UNABLE TO RAISE	UTR
UNABLE TO SURVEY	UTS
VENT PIPE	VP
WATER LEVEL	WL
WATER METER	WM
WASH OUT	WO
WATER RISER	WR
WATER TAP	WT

FENCE ABBREVIATIONS

BARBED WIRE FENCE	B/W	IRON RAILINGS	I/R
CLOSE BOARD FENCE	C/B	LARCH LAP FENCE	L/L
CONCRETE FENCE	CFL	POST AND RAIL FENCE	P/R
CONCRETE POST IRON FENCE	C/I	PALISADE METAL FENCE	PMF
CHAIN LINK FENCE	C/L	WIRE MESH FENCE	W/M
CHESTNUT PALING	CNP		

Sheet Layout: (Not to Scale)

Revision	Description	Surv. by	Check by	App. by	Date
1	Topographical Survey extended to old chicken farm & Fields.	JB	AG	BP	24/05/26

0m 5 10 15 20 25 30 35 40 45 50 55

Topographical Survey

Client:

savills

Townsend Farm
Melksham
Wiltshire
SN12 6DL

Scale:	Sheet Size:	Sheet Number:	Date:
1:500	A0	1	February 2026

Project Number:	Rev:	Surveyed by:	Checked by:	Approved by:
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2. TREE AND HEDGE SPECIES HAVE BEEN IDENTIFIED AS ACCURATELY AS POSSIBLE BUT SHOULD BE CROSS CHECKED IN CRITICAL AREAS.

Coordinate Table

Station	Description	Easting	Northing	Level
S1	Road Nail	390128.343	162609.587	38.246
S2	Road Nail	390146.366	162659.187	38.059
S3	Road Nail	390197.258	162759.644	38.065
S8	Road Nail	389808.647	162749.145	38.462
S9	Road Nail	389889.293	162712.385	38.558
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S100	Road Nail	389748.800	162618.179	38.136
S101	Road Nail	389761.635	162586.164	38.166
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OVERHEAD TELECOM
FOUL SEWER
SURFACE SEWER
P-TRAP
BACK DROP (EXTERNAL)
BACK DROP (INTERNAL)
BUILDING
OPEN SIDED BUILDING
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GLASSHOUSE
CONTOUR — 25.50
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GENERAL ABBREVIATIONS

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AIR VALVE	AV	LARCH LAP FENCE	LlL
BACK DROP	BD	POST AND RAIL FENCE	P/R
BASE LEVEL	BL	PRIVACY SCREEN FENCE	PSF
BELISHA BEACON	BB	WIRE MESH FENCE	WM
BOLLARD	BO		
BOUNDARY LIGHT	BOL		
BRICK	BK		
BUS STOP	BS		
CABLE RISER	CR		
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INSPECTION COVER	IC		
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KERB OUTLET	KO		
LAMP POST	LP		
MANHOLE	MH		
MARKER POST	MK		
METER	MT		
NO PIPES VISIBLE	NPV		
ORDNANCE SURVEY BENCH MARK	OSBM		
P-TRAP	PT		
POST	PO		
POST BOX	P.BOX		
RODDING EYE	RE		
ROAD SIGN	RS		
RAIN WATER PIPE	RWP		
RETAINING WALL	RW		
SOFT WEED	SE		
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STREET NAME PLATE	SNP		
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CONCRETE BLOCK FENCE	C.B.	PRIVACY SCREEN FENCE	PSF
CHAIN LINK FENCE	C/L	WIRE MESH FENCE	WM
CHESTNUT PALING	CNP		

Sheet Layout: (Not to Scale)

Revision	Description	Surv. by	Check by	App. by	Date
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0m 5 10 15 20 25 30 35 40 45 50 55

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savills

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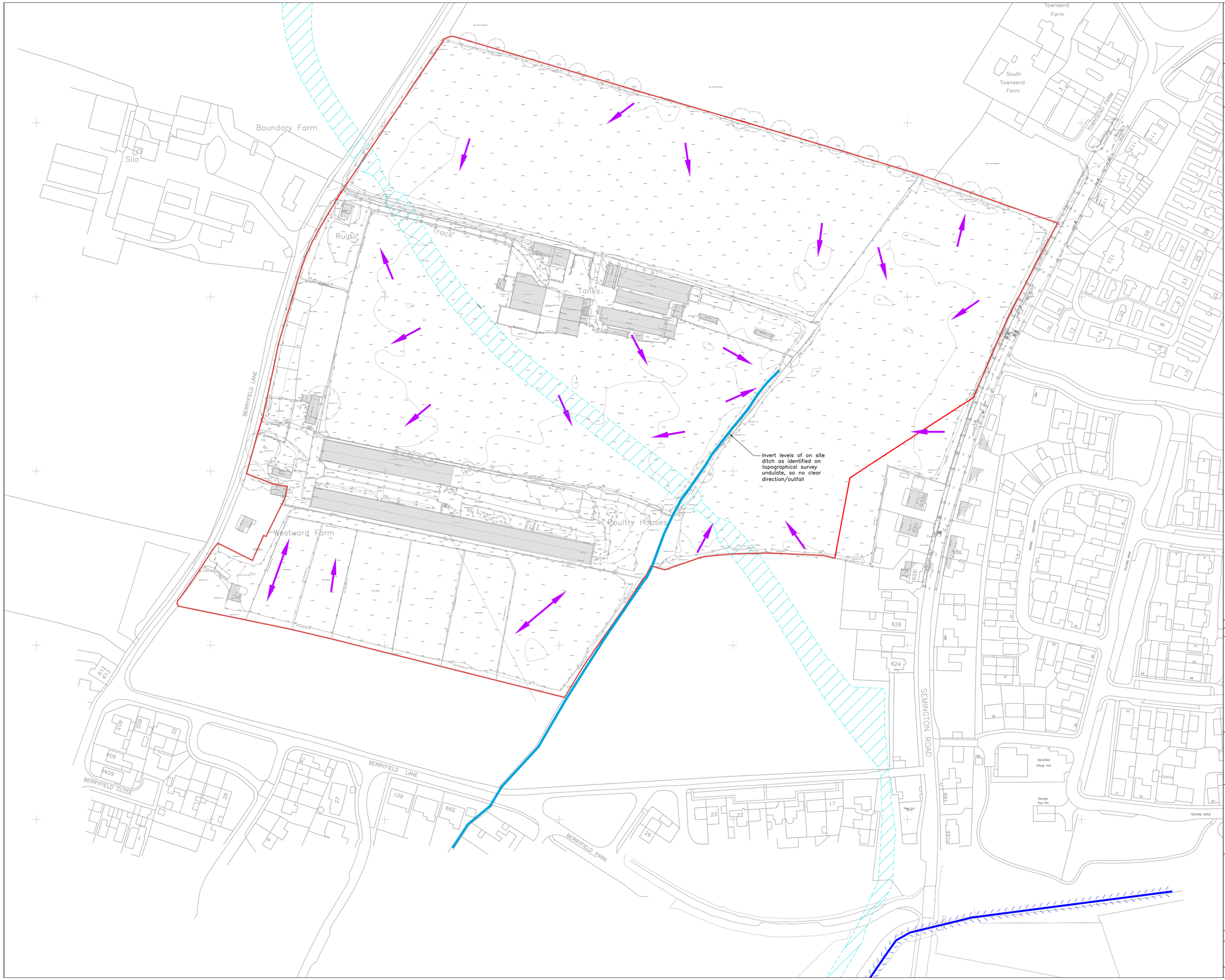
Appendix 2



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KEY

- Existing fall direction of site. Site is undulating, so no discernable overall direction
- Existing on site watercourse
- Berryfield Brook (Main River)
- Proposed route of future canal

Rev	Date	Description	Drawn	Check
#	27/07/26	First Issue	EC	RML

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Drawing Title

Existing Surface Water Drainage Arrangements

Sheet 1 of 1

Drawing No. B834/02

Rev #

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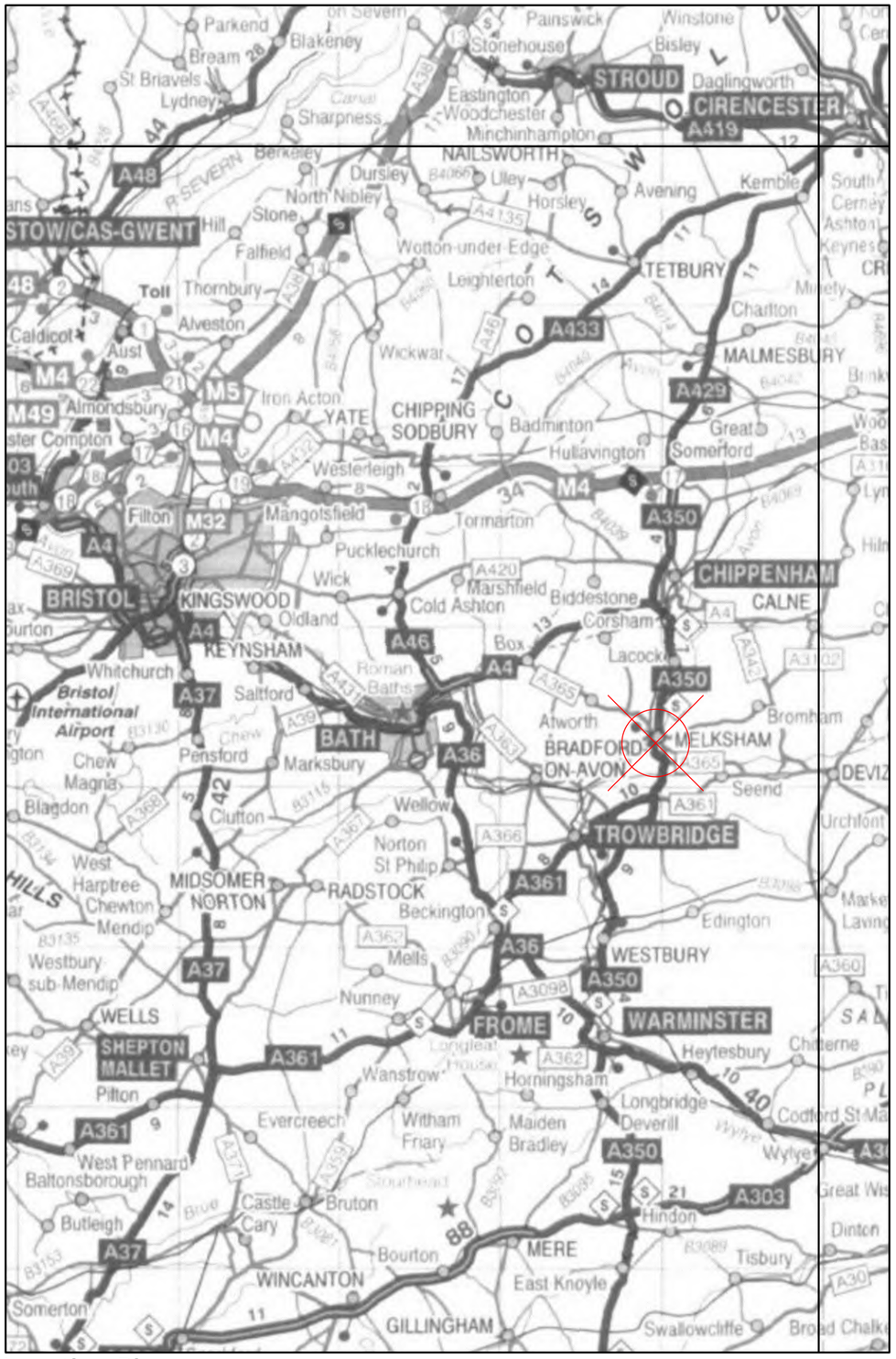
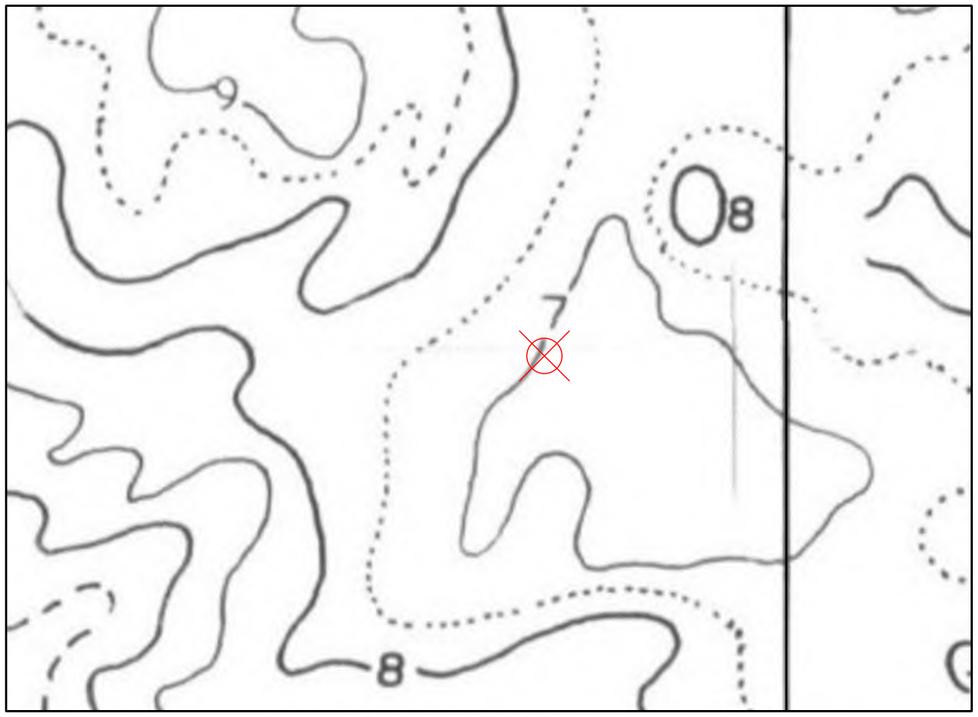
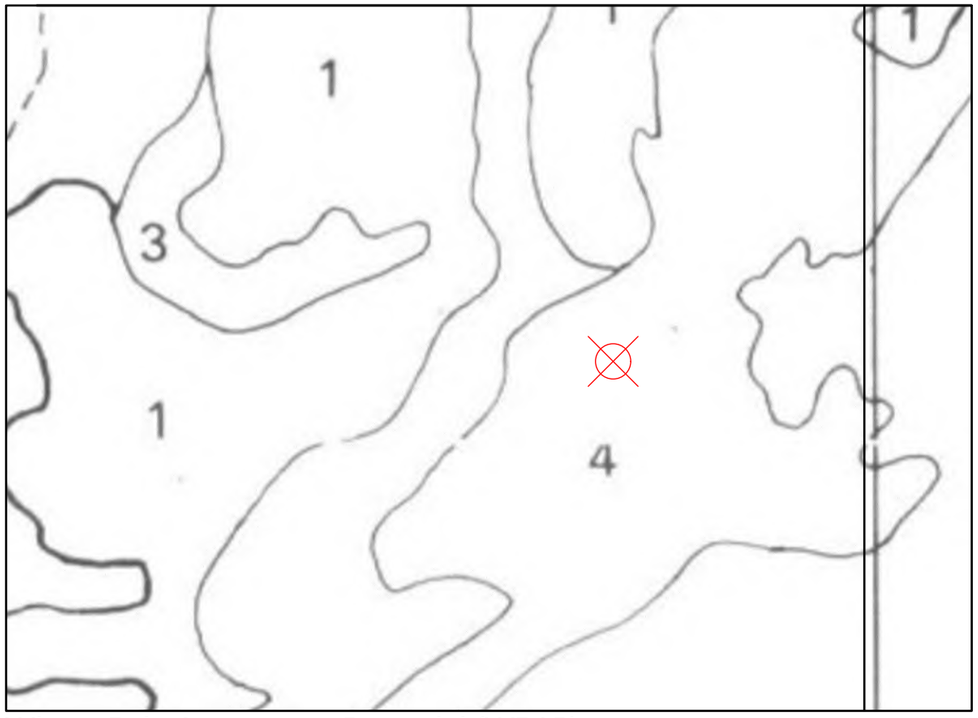
A1



Location Plan



Standard Average Annual Rainfall (SAAR) (in hundreds of mm)



Winter Rain Acceptance Potential (WRAP)

Status

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NOTES

1. Standard Average Annual Rainfall (SAAR) and Winter Rain Acceptance Potential (WRAP) map extracts shown on this drawing are reproduced from the maps contained in Volume V of the Flood Studies Report - NERC:1975.

Soil Classification

Soil Class (WRAP)	Soil Index (IoH)	SPR (FEH)	St (ADAS)
1	0.15	10	0.1
2	0.30	30	0.5
3	0.40	37	0.8
4	0.45	47	1.0
5	0.50	53	1.3

Rev	Date	Description	Drawn	Check
#	27/07/26	First Issue	EC	RML

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Project

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Drawing Title

SAAR and WRAP Maps

Sheet 1 of 1

Drawing No. B834/03

Rev #

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A3

Appendix 4

Townsend Farm, Melksham

Phase 1 Ground Conditions Assessment

Prepared for:
Bellway Strategic Land

Prepared by:
Stantec UK Limited
Cambridge

Stantec Reference:
331610315-RP-3501.1

Document Control Sheet

Project:	Error! Reference source not found.
Document:	**Phase 1 Ground Conditions Assessment**
Stantec Ref:	**331610315-RP-3501.1**
Date:	**July 2026**

	Name	Position	Signature
Prepared by:	Katherine Brightwell	Principal Engineer	
Checked by:	Lynne Llewellyn	Associate	
Approved by:	Oliver Belson	Senior Associate	
For and on behalf of Stantec UK Limited			

Issue	Date	Description	Prepared	Reviewed	Approved
V01	22/07/2026	Issued for Information	KB	LL	OB

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Contents

1 Introduction 1
1.1 Preamble 1
1.2 Objective 1
1.3 Methodology and Report Format 1
1.4 Sources of Information 2

2 Site Setting 4
2.1 Site Location 4
2.2 Site Description 4
2.3 Historical Land Use 4
2.4 Consultation with Regulators 5
2.5 Review of Database Searches 5
2.6 Review of Unexploded Bomb Risk 6

3 Environmental Setting 7
3.1 Introduction 7
3.2 Geological Setting 7
3.3 Previous Reports 7
3.4 Geodiversity 8
3.5 Hydrogeological Setting 8
3.6 Hydrological Setting 9
3.7 Ecological Setting and Property – Animal or Crop Effect 9
3.8 Ground Gases 9

4 Land Contamination – Tier 1 Preliminary Risk Assessment 11
4.1 Introduction 11
4.2 Conceptual Model 11
4.3 Hazard Identification 11
4.4 Hazard Assessment 12
4.5 Risk Estimation 13

5 Preliminary Land Stability Assessment 15
5.1 Introduction 15
5.2 Coal Mining and Mineral Safeguarding 15
5.3 Potential Ground Stability Hazards 15
5.4 Geotechnical Considerations 16
5.5 Geotechnical Investigation 16

6 Conclusions 17
6.1 General 17
6.2 Geoenvironmental 17
6.3 Geotechnical 17
6.4 Unexploded Ordnance (UXO) 18

7 Essential Guidance for Report Readers 19

References 20

Tables

Table 2.1 Summary of Historical Land Use On-Site and Off-Site 4
Table 2.2 Summary of Database Searches 5
Table 3.1 Summary of Geological Setting 7
Table 3.2 BGS Borehole Record Summary 7
Table 3.3 Summary of Hydrogeology and Groundwater Vulnerability 8
Table 3.4 Summary of Hydrological Site Data 9
Table 4.1 Hazard Classification of On-Site Potential Sources of Contamination 11
Table 4.3 Potential Sources of Contamination and Associated Potential Contaminants 12
Table 4.4 Identification of Potential Receptors 12

Table 4.5 Estimated Risks 13
Table 5.1 Summary of Potential Ground Stability Hazards 15

Figures

Figure 1 Site Location Plan
Figure 2 Site Layout Plan

Appendices

Appendix A Stantec Methodology
Appendix B Groundsure Reports
Appendix C UXO Report
Appendix D BGS Borehole Records
Appendix E Wiltshire Council Response
Appendix F Risk Estimation Tables

3 Environmental Setting

3.1 Introduction

3.1.1 The information from published and publicly available information sources is summarised below and is used to provide context for the ground stability appraisal in **Section 5** and identify potential receptors in the Tier 1 PRA presented in **Section 4**.

3.2 Geological Setting

3.2.1 The 1:50,000 series geological map (BGS, 2011) and its associated memoir (BGS, 2011) and the BGS GeoIndex (onshore) (BGS, 2026) indicate the following geological sequence underlying the Site.

Table 3.1 Summary of Geological Setting

Geology	Description
Artificial and Made Ground	None identified. Localised **Made Ground** is likely around the agricultural buildings and access tracks on Site, as well as the identified infilled ponds and historical WW2-era buildings.
Superficial Deposits	**River Terrace Deposits** are mapped beneath the Site. These are typically sand and gravel deposits, locally with lenses of silt, clay or peat.
Bedrock	The bedrock geology is mapped as **Oxford Clay Formation**, a grey slightly silty silicate-mudstone with sporadic beds of limestone nodules.

Historical BGS Boreholes

3.2.2 The BGS borehole record viewer (BGS, undated) shows one borehole record within 250m of the Site with accessible details. The location of this borehole is indicated on a plan in **Appendix C**.

3.2.3 The ground conditions recorded by the available historical boreholes are summarised in **Table 3.2** below, and the records are included in **Appendix D**.

Table 3.2 BGS Borehole Record Summary

Recorded Geology	Base Depth (m bgl) *Elevation [m OD]*	Interpretation
ST96SW19 (100m north of site) – Surface level 38.35m OD		
Topsoil	0.15 *[38.20]*	Topsoil
Brown silty sandy CLAY	0.90 *[37.45]*	River Terrace Deposits
GRAVEL and SAND	1.20 *[37.15]*	
Firm to stiff blue fissured CLAY, some hair roots near surface	>3.05 *[>35.30]*	Oxford Clay Formation
Groundwater recorded standing at 2.4mbgl *[35.95mAOD]* the day after drilling.		

3.3 Previous Reports

PBA Ltd, Land at Semington Road, Melksham Ground Investigation Report (2016)

3.3.1 Peter Brett Associates (PBA) have previously prepared a Ground Investigation Report (reference 30523/5507) for a neighbouring site, known as Land at Semington Road, Melksham (location shown on **Figure 2**).

3.3.2 The investigation (undertaken in July 2016) comprised 12no. trial pits to a maximum depth of 3.1m below ground level (bgl) and 10no. dynamic cone penetrometers (DCP).

3.3.3 Ground conditions were found to comprise Topsoil/Made Ground over River Terrace Deposits (typically to a depth of 0.5 to 1.7m bgl) over the Oxford Clay Formation (base not proven).

3.3.4 Locally, Made Ground was recorded to a depth in excess of 1.9m bgl on the alignment of the infilled canal which crosses this site. Groundwater seepages were noted in two trial pits during excavation at 1.2m bgl (in the Made Ground) and 1.4m bgl (in the River Terrace Deposits). Geoenvironmental testing undertaken on soils as part of the investigation did not identify significantly elevated concentrations of contaminants.

3.4 Geodiversity

3.4.1 Geodiversity can be defined as the natural range (diversity) of geological (rocks, minerals, fossils), geomorphological (landforms, topography, physical processes), soil and hydrological features. It includes their assemblages, structures, systems and contributions to landscapes. These protected sites include geological Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs) and Local Geology Sites (formerly known as RIGS - Regionally Important Geological and Geomorphological Sites).

3.4.2 No such features have been identified on-Site or within 100m, which is generally considered the likely extent of influence.

3.5 Hydrogeological Setting

3.5.1 The following table summarises information regarding hydrogeology and groundwater vulnerability based on available information.

Table 3.3 Summary of Hydrogeology and Groundwater Vulnerability

Item and *Source*	Details
Aquifer Classification *(Groundsure)*	**Superficial** River Terrace Deposits – Secondary A **Bedrock** Oxford Clay Formation – Unproductive
Depth to Groundwater *(BGS, Topography)*	Likely within River Terrace Deposits – between 1.0 and 3.0m bgl.
Groundwater Flow Direction	**Superficial** Groundwater within the River Terrace Deposits is likely to be in continuity with local watercourses (Berryfield Brook to the south and River Avon to the west). **Bedrock** The Oxford Clay Formation generally comprises an impermeable clay with no significant groundwater resource. Any groundwater is limited to localized fissures or thin permeable horizons and is unlikely to have a significant flow direction.
Groundwater Abstraction *(Groundsure)*	None on Site or within 250m. An environmental search undertaken by Wiltshire Council identified the nearest private water supply to be located at Holbrook Farmhouse approximately 750m southwest of the Site.
Groundwater Vulnerability *(Groundsure)*	Secondary superficial aquifer – high vulnerability Secondary bedrock aquifer – N/A
Groundwater Flood Risk* *(Groundsure)*	Highest risk on Site is Moderate, covering a small area in the west of the site. The majority of the site is mapped as Low risk.
Source Protection Zone (SPZ) *(Groundsure)*	None on-Site nor within 500m

Appendix 5

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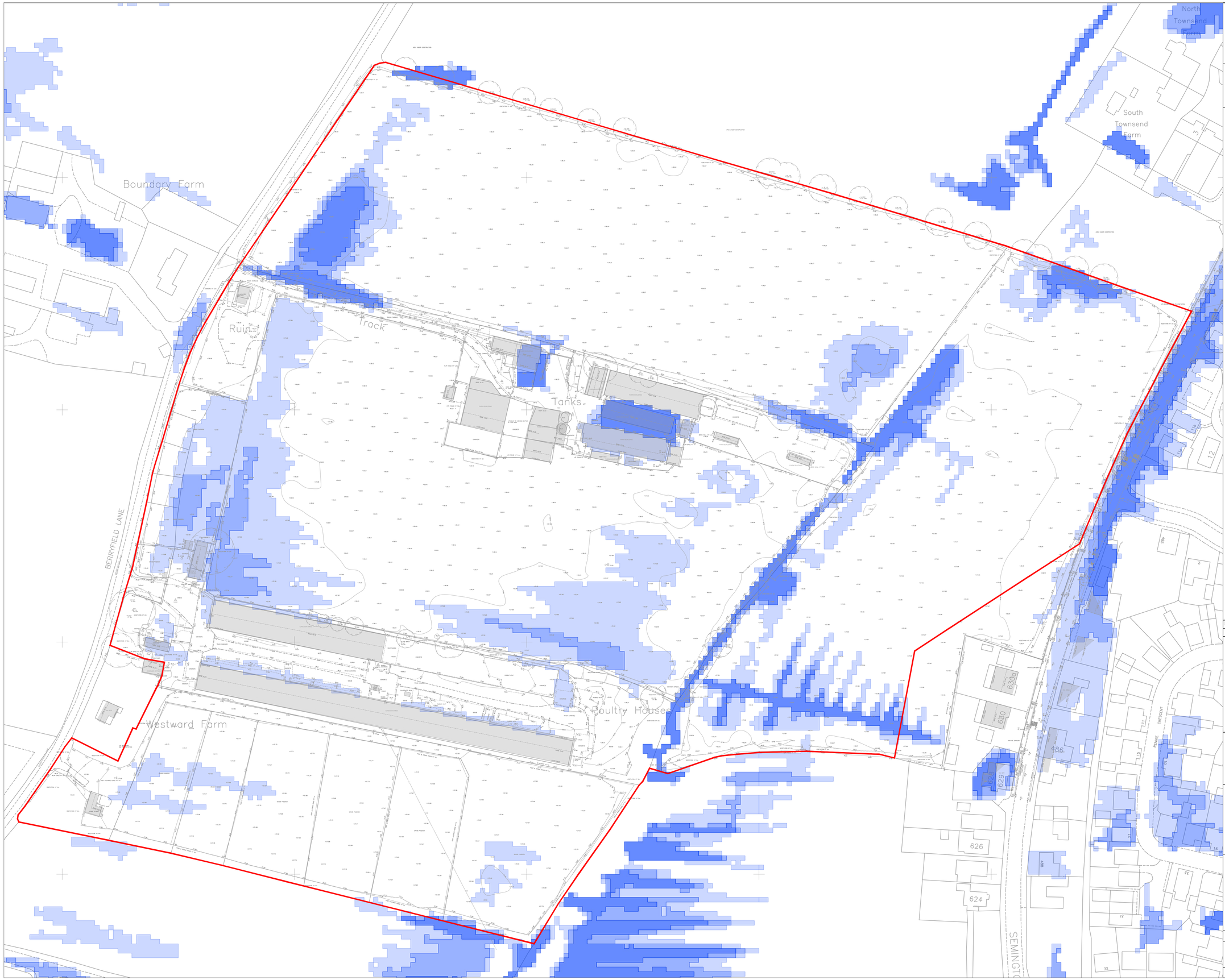
Land at Townsend Farm, Melksham | **Development Framework**

www.brandturbandesign.co.uk | Author: TB | Checked: TB | Date: 29.06.26 | Scale: 1:1,250 @ A1 | Drawing: P25-0016_CMP-02 | Revision: E | Client: Bellway Homes (Strategic Land)

Appendix 6



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NOTES

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3. Risk of Flooding from Surface Water (RoFSW) - Climate Change 1 dataset (ref: rofsw_cc01) © Environment Agency copyright and/or database right 2025. All rights reserved.

KEY

Site Boundary

Risk of Flooding from Surface Water - Climate Change 1 (RoFSW CC01)

Low
(Less than 1% (1 in 100) but greater than or equal to 0.1% (1 in 1000) in any given year)

Medium
(Less than 3.3% (1 in 30) but greater than or equal to 1% (1 in 100) in any given year)

High
(Greater than or equal to 3.3% (1 in 30) chance in any given year)

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Drawing Title

Flood Constraints

Sheet 1 of 1

Drawing No. B834/01

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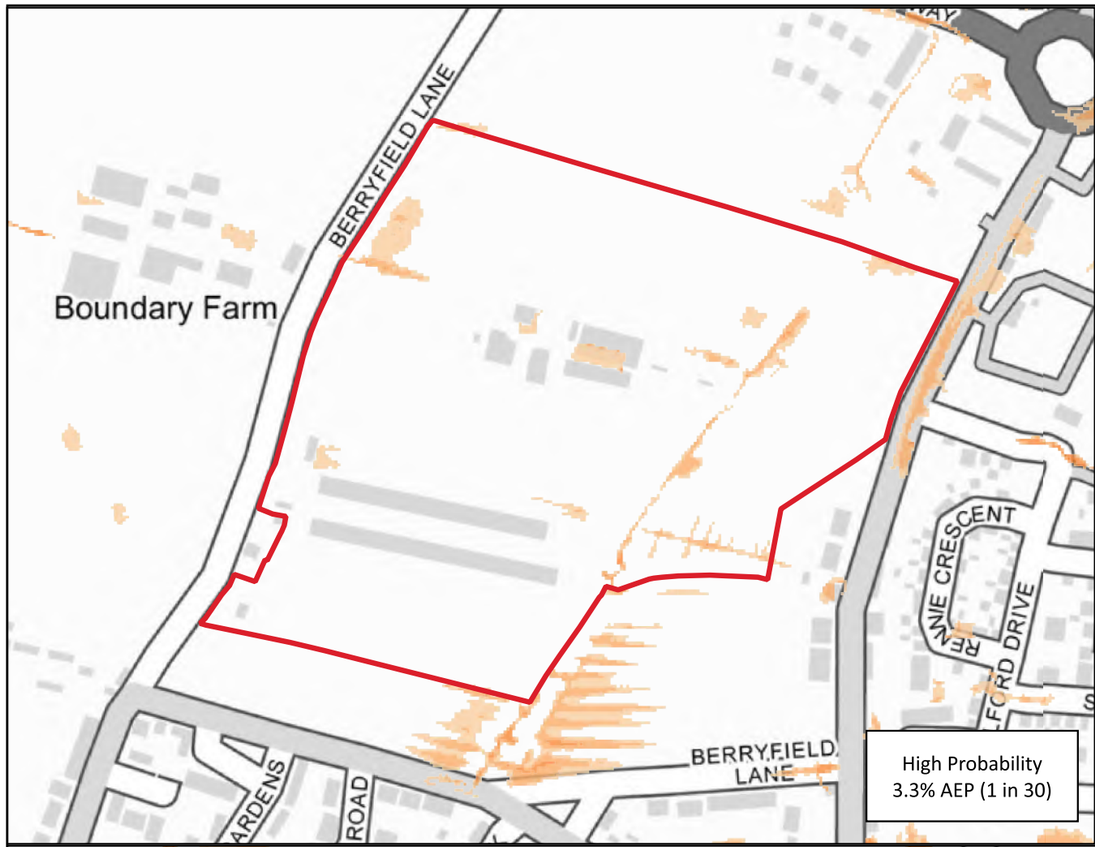
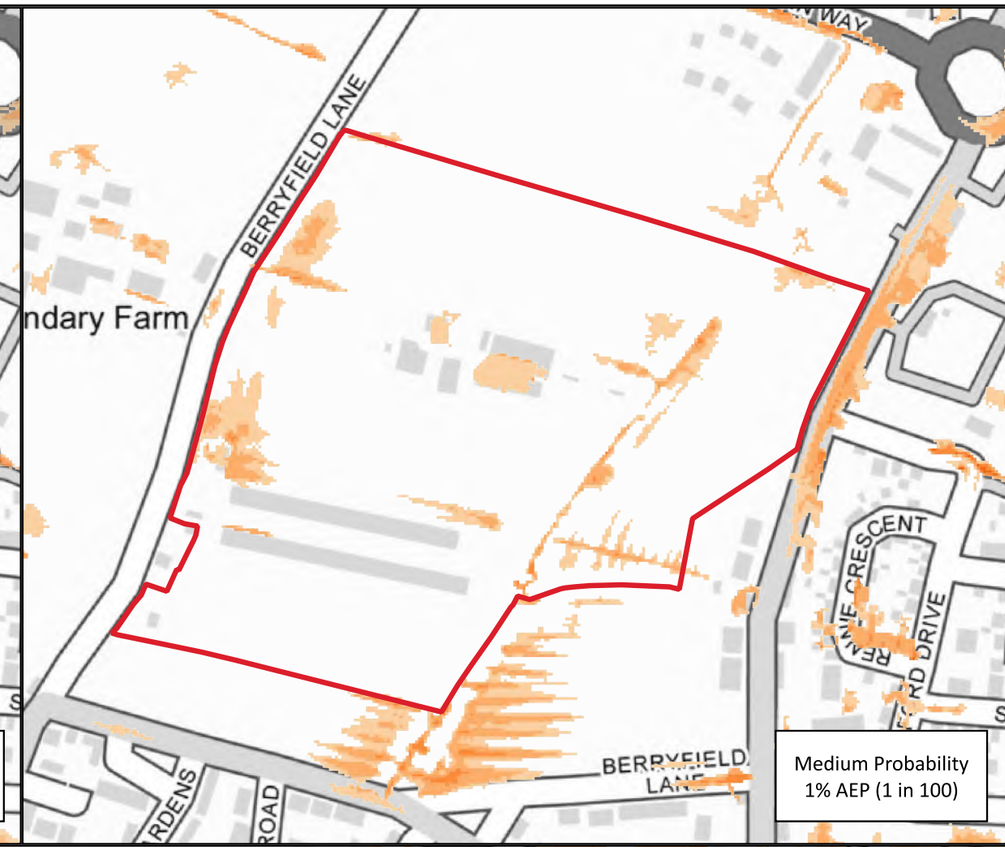
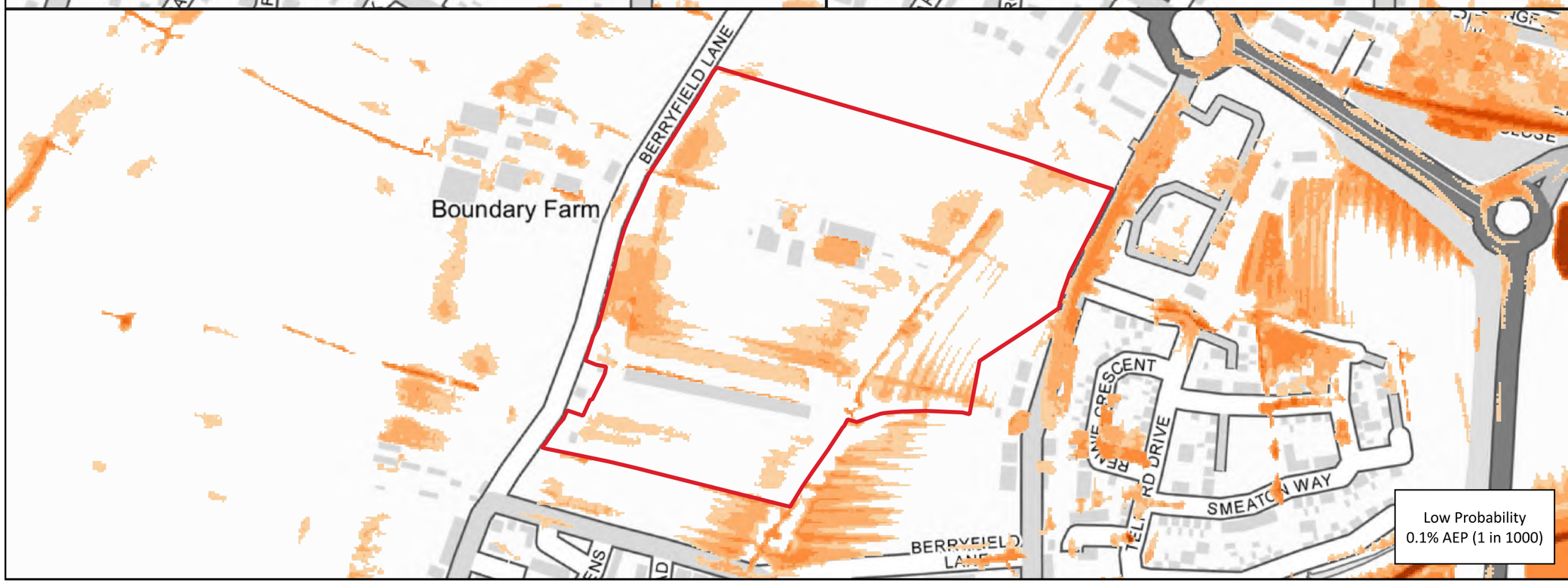
Appendix 7



High Probability
3.3% AEP (1 in 30)



Medium Probability
1% AEP (1 in 100)



Low Probability
0.1% AEP (1 in 1000)

Status

PRELIMINARY

This drawing is produced for initial discussion and illustrative purposes only, and should not be relied upon for tender or pricing purposes.

0 20 40 60 80 100 m

Scale 1:4,000

N

KEY

Site Boundary

Flood Map for Planning - Surface Water Spatial Planning Depths - 'Upper End' 2061-2125 Epoch (Including + 45% Climate Change)

- <150 mm
- 150-300 mm
- 300-600 mm
- 600 - 900 mm
- 900 - 1200 mm
- 1200 - 2300 mm
- >2300 mm

NOTES

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Rev	Date	Description	Drawn	Check
#	22/07/26	First issue.	EC	

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Stratton Park House, Wanborough Road, Swindon, SN3 4HG

Client

Bellway Homes Ltd

Project

Townsend Farm, Melksham

Drawing Title

Surface Water Flood Risk Modelled Flood Depths - End of Century Scenario

Sheet 1 of 1

Drawing No. B834/11

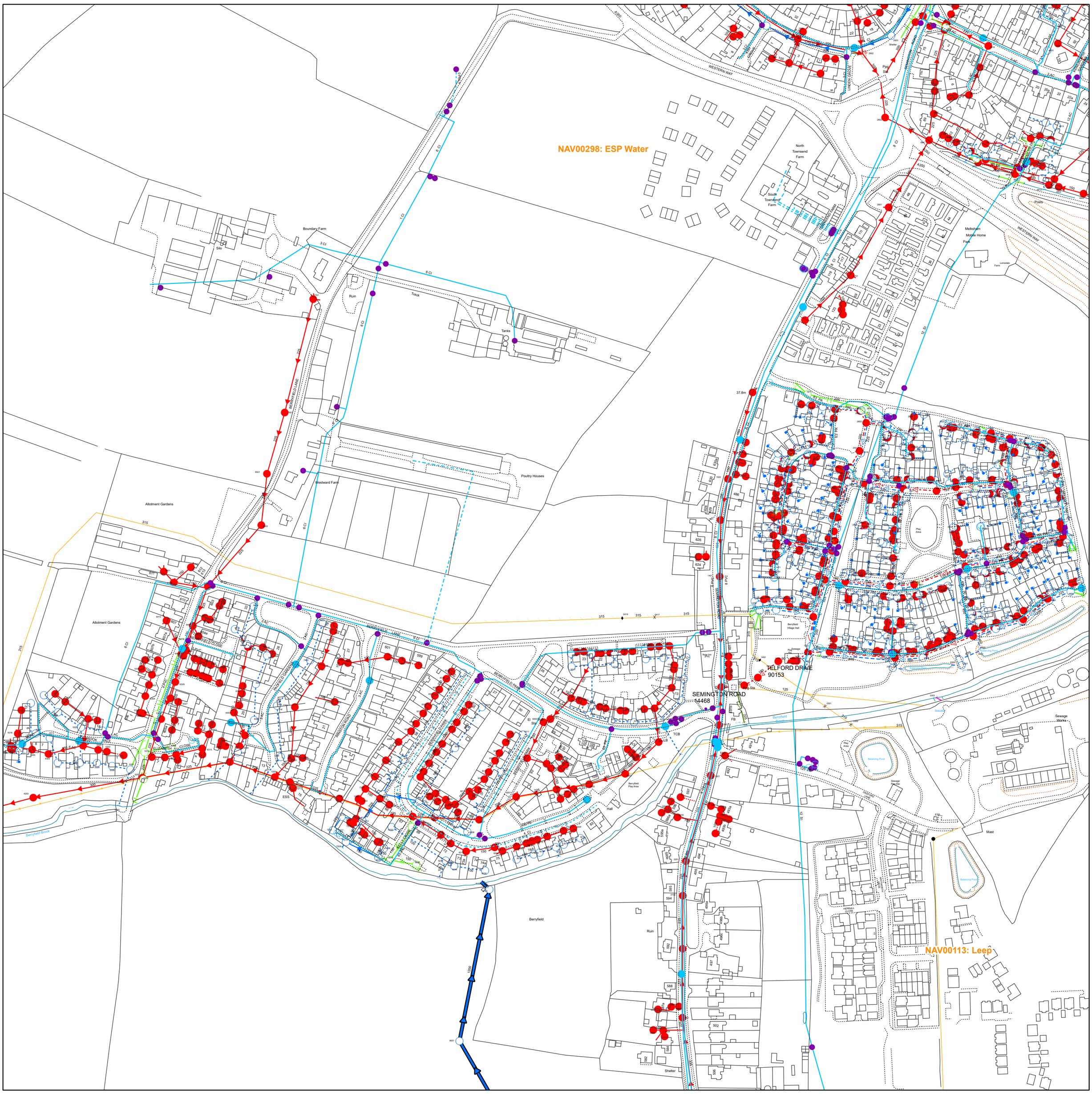
Rev #

Email: econgdon@pfaconsulting.co.uk

A3

Appendix 8

WW Map ST86SE_ 463 Townsend Farm, Melksham, SE12 6EH



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WATER MAINS

- Distribution
- Washout
- Raw Water
- Abandoned
- Private

FITTINGS

- Hydrant
- Other

SEWERS

	STRATEGIC	PUBLIC	PRIVATE	SECTION 104
Foul				
Surface				
Combined				
Abandoned				

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

STRUCTURES

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

OTHER WESSEX PIPES

- Rising Mains
- Standby Rising Mains
- Effluent Disposal
- Overflow
- Syphon

NON-WESSEX / UNKNOWN

- Private Rising Mains
- Culverted Watercourse
- Highway Drain
- Use Unknown
- Status Unknown

OTHER STRUCTURES

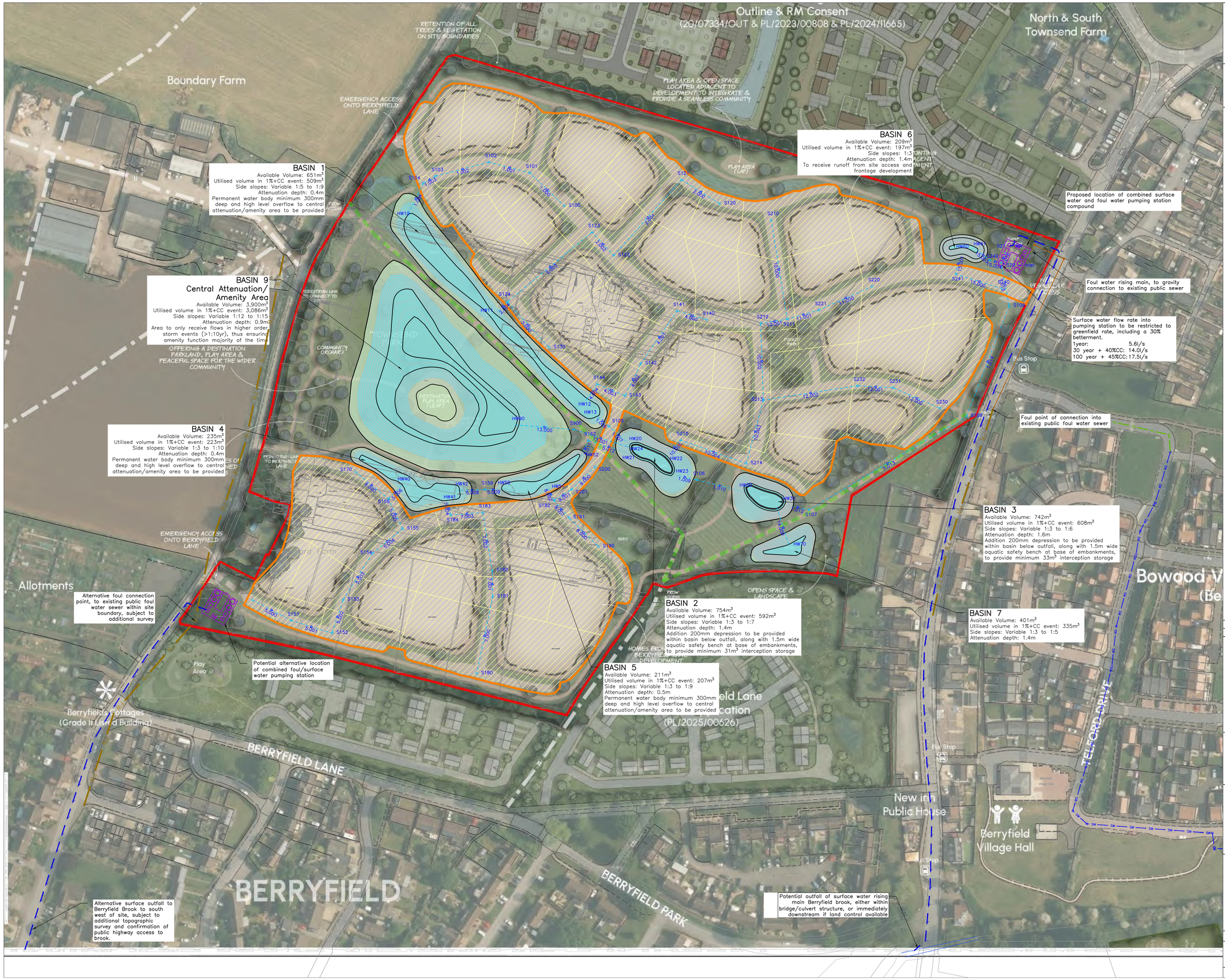
- Attenuation Tank
- Storage Tank
- Chamber
- Tunnel
- Interceptor

Wessex Water
YTL GROUP

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

Date: 03/03/2026
Centre: 389954E, 162505N
Scale: 1:2,500
(when printed at A2 size)

N W E S



Status

FOR PLANNING

This drawing is produced for the purposes of supporting a planning application and should not be relied upon for tender, pricing, or construction purposes.

0m 50m
Scale 1:1000

N

NOTES

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2. The works shown on this drawing could affect Statutory Undertaker's apparatus and the Contractor is required to verify the location and depth of all such apparatus prior to commencement of the works and to take any precautions necessary when working in the vicinity of any such apparatus.
3. All dimensions shown in metres (m) unless otherwise stated, and all levels relate to Ordnance Datum.
4. Drainage is indicative only and subject to refinement and further design and hydraulic modelling.

DESIGN ASSUMPTIONS

5. Net developable area (excluding large areas of POS) : 6.3377ha
6. Assumed impermeable area (roofs, roads and drives): 3.8026ha (60% net developable)
7. 10% urban creep allowance from private curtilages: 0.3803ha
8. In accordance with the National Standards for Sustainable Drainage, remaining permeable surfaces (excluding large POS areas) are also included within contributing areas. Contributing surfaces included based on SPR value (standard percentage runoff) of 27% based on BFI Host Data.
9. Catchment areas factored by 75% (60% x 1.1 + 34% x 0.27) to include allowance for urban creep and permeable areas.
10. Total contributing area to surface water drainage network: 4.7533ha

KEY

- Site Boundary
- Net developable area (6.3377ha)
- Contributing areas to drainage network. PIMP factor of 75% as discussed above
- Strategic SuDS Feature - Attenuation Area
- Strategic SuDS Feature - Freeboard Area
- Indicative proposed surface water sewer
- Indicative proposed foul water sewer
- Indicative proposed surface water rising main
- Indicative proposed foul water rising main
- FW — Public Foul Water Sewer (Wessex Water)
- SW — Public Surface Water Sewer (Wessex Water)
- HD — Highway Sewer (Wiltshire Council)
- Public Right of Way

Rev	Date	Description	Drawn	Check
#	27/07/26	First Issue	EC	RML

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Stratton Park House, Wanborough Road, Swindon, SN3 4HG

Client

Bellway Homes Ltd

Project

Townsend Farm

Drawing Title

Preliminary Drainage Strategy

Sheet 1 of 1

Drawing No. B834/10

Rev #

E-Mail: rlucas@pfaconsulting.co.uk

A1

Appendix 10

Existing Network Details for Surface Network 1

- Indicates pipe length does not match coordinates

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
S1.000	27.528	0.070	393.3	0.162	5.00	0.0	0.600	o	450	Pipe/Conduit
S1.001	24.173	0.060	402.9	0.111	0.00	0.0	0.600	o	450	Pipe/Conduit
S1.002	31.755	0.080	396.9	0.123	0.00	0.0	0.600	o	450	Pipe/Conduit
S1.003	8.240	0.020	412.0	0.113	0.00	0.0	0.600	o	600	Pipe/Conduit
S1.004	19.777	0.040	494.4	0.086	0.00	0.0	0.600	o	600	Pipe/Conduit
S1.005	5.000#	0.100	50.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit
S2.000	25.909	0.070	370.1	0.062	5.00	0.0	0.600	o	450	Pipe/Conduit
S2.001	58.445	0.150	389.6	0.134	0.00	0.0	0.600	o	450	Pipe/Conduit
S2.002	18.307	0.050	366.1	0.066	0.00	0.0	0.600	o	450	Pipe/Conduit
S2.003	62.963	0.165	381.6	0.079	0.00	0.0	0.600	o	450	Pipe/Conduit
S3.000	35.527	0.155	229.2	0.101	5.00	0.0	0.600	o	300	Pipe/Conduit
S2.004	7.748	0.020	387.4	0.198	0.00	0.0	0.600	o	525	Pipe/Conduit
S2.005	5.000#	0.100	50.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit
S4.000	17.832	0.050	356.6	0.099	5.00	0.0	0.600	o	450	Pipe/Conduit
S4.001	36.726	0.090	408.1	0.156	0.00	0.0	0.600	o	450	Pipe/Conduit
S4.002	20.627	0.060	343.8	0.121	0.00	0.0	0.600	o	450	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S1.000	37.620	0.162	0.0	1.02	162.1
S1.001	37.550	0.273	0.0	1.01	160.1
S1.002	37.490	0.397	0.0	1.01	161.3
S1.003	37.260	0.509	0.0	1.19	337.4
S1.004	37.240	0.595	0.0	1.09	307.7
S1.005	37.200	0.595	0.0	3.45	975.3
S2.000	37.730	0.062	0.0	1.05	167.1
S2.001	37.660	0.196	0.0	1.02	162.8
S2.002	37.510	0.263	0.0	1.06	168.0
S2.003	37.460	0.341	0.0	1.03	164.6
S3.000	37.600	0.101	0.0	1.03	73.1
S2.004	37.220	0.640	0.0	1.13	245.0
S2.005	37.200	0.640	0.0	3.17	686.9
S4.000	37.480	0.099	0.0	1.07	170.3
S4.001	37.430	0.256	0.0	1.00	159.1
S4.002	37.340	0.377	0.0	1.09	173.5

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Existing Network Details for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
S4.003	17.342	0.050	346.8	0.066	0.00	0.0	0.600	o	450	Pipe/Conduit
S4.004	11.207	0.030	373.6	0.055	0.00	0.0	0.600	o	450	Pipe/Conduit
S4.005	5.000#	0.100	50.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit
S1.006	8.917	0.100	89.2	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit
S1.007	15.593	0.700	22.3	0.015	0.00	0.0	0.600	o	375	Pipe/Conduit
S1.008	5.000#	0.100	50.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S5.000	25.233	0.070	360.5	0.060	5.00	0.0	0.600	o	450	Pipe/Conduit
S5.001	24.344	0.060	405.7	0.032	0.00	0.0	0.600	o	450	Pipe/Conduit
S5.002	20.191	0.050	403.8	0.054	0.00	0.0	0.600	o	450	Pipe/Conduit
S5.003	31.580	0.080	394.8	0.134	0.00	0.0	0.600	o	450	Pipe/Conduit
S5.004	22.289	0.060	371.5	0.112	0.00	0.0	0.600	o	450	Pipe/Conduit
S5.005	19.087	0.055	347.0	0.057	0.00	0.0	0.600	o	450	Pipe/Conduit
S6.000	24.183	0.105	230.3	0.108	5.00	0.0	0.600	o	300	Pipe/Conduit
S5.006	10.708	0.030	356.9	0.042	0.00	0.0	0.600	o	600	Pipe/Conduit
S5.007	5.000#	0.100	50.0	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit
S7.000	45.005	0.100	450.0	0.309	5.00	0.0	0.600	o	525	Pipe/Conduit
S7.001	15.118	0.035	431.9	0.116	0.00	0.0	0.600	o	525	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S4.003	37.280	0.443	0.0	1.09	172.7
S4.004	37.230	0.498	0.0	1.05	166.3
S4.005	37.200	0.498	0.0	3.45	975.3
S1.006	37.100	1.733	0.0	1.92	212.0
S1.007	37.000	1.748	0.0	3.85	425.6
S1.008	36.300	1.748	0.0	2.88	458.1
S5.000	37.680	0.060	0.0	1.06	169.4
S5.001	37.610	0.092	0.0	1.00	159.5
S5.002	37.550	0.146	0.0	1.01	159.9
S5.003	37.500	0.280	0.0	1.02	161.8
S5.004	37.420	0.392	0.0	1.05	166.8
S5.005	37.360	0.449	0.0	1.09	172.7
S6.000	37.560	0.108	0.0	1.03	72.9
S5.006	37.230	0.599	0.0	1.28	362.8
S5.007	37.200	0.599	0.0	3.71	1328.4
S7.000	37.540	0.309	0.0	1.05	227.1
S7.001	37.440	0.425	0.0	1.07	231.9

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Existing Network Details for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
S7.002	33.721	0.400	84.3	0.125	0.00	0.0	0.600	o	600	Pipe/Conduit
S7.003	18.559	0.040	464.0	0.064	0.00	0.0	0.600	o	600	Pipe/Conduit
S7.004	7.965	0.020	398.3	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit
S7.005	5.000#	0.100	50.0	0.000	0.00	0.0	0.600	o	675	Pipe/Conduit
S5.008	14.824	0.050	296.5	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S5.009	9.370	0.050	187.4	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S5.010	5.000#	0.100	50.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S8.000	23.775	0.060	396.3	0.144	5.00	0.0	0.600	o	450	Pipe/Conduit
S8.001	13.108	0.030	436.9	0.035	0.00	0.0	0.600	o	450	Pipe/Conduit
S9.000	19.033	0.080	237.9	0.015	5.00	0.0	0.600	o	300	Pipe/Conduit
S9.001	11.848	0.050	237.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit
S8.002	8.387	0.030	279.6	0.025	0.00	0.0	0.600	o	450	Pipe/Conduit
S8.003	5.000#	0.100	50.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S5.011	9.405	0.450	20.9	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit
S5.012	25.493	0.150	170.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit
S5.013	5.000#	0.100	50.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S7.002	37.660	0.550	0.0	2.65	750.3
S7.003	37.260	0.614	0.0	1.12	317.8
S7.004	37.220	0.614	0.0	1.21	343.3
S7.005	37.200	0.614	0.0	3.71	1328.4
S5.008	37.100	1.212	0.0	1.18	187.0
S5.009	37.050	1.212	0.0	1.48	235.7
S5.010	37.000	1.212	0.0	2.88	458.1
S8.000	37.120	0.144	0.0	1.02	161.5
S8.001	37.060	0.179	0.0	0.97	153.7
S9.000	37.310	0.015	0.0	1.01	71.7
S9.001	37.230	0.015	0.0	1.02	71.9
S8.002	37.030	0.219	0.0	1.21	192.6
S8.003	37.000	0.219	0.0	2.88	458.1
S5.011	36.900	1.431	0.0	4.92	1064.0
S5.012	36.450	1.431	0.0	1.72	371.3
S5.013	36.300	1.431	0.0	3.17	686.9

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Existing Network Details for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
S10.000	57.680	0.145	397.8	0.155	5.00	0.0	0.600	o	450	Pipe/Conduit
S11.000	33.460	0.100	334.6	0.111	5.00	0.0	0.600	o	450	Pipe/Conduit
S11.001	18.905	0.055	343.7	0.164	0.00	0.0	0.600	o	450	Pipe/Conduit
S10.001	15.485	0.030	516.2	0.096	0.00	0.0	0.600	o	525	Pipe/Conduit
S10.002	44.166	0.110	401.5	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit
S12.000	29.335	0.085	345.1	0.152	5.00	0.0	0.600	o	450	Pipe/Conduit
S12.001	20.616	0.050	412.3	0.162	0.00	0.0	0.600	o	525	Pipe/Conduit
S12.002	54.577	0.110	496.2	0.179	0.00	0.0	0.600	o	525	Pipe/Conduit
S10.003	37.698	0.080	471.2	0.096	0.00	0.0	0.600	o	675	Pipe/Conduit
S10.004	39.992	0.080	499.9	0.203	0.00	0.0	0.600	o	750	Pipe/Conduit
S10.005	11.557	0.030	385.2	0.054	0.00	0.0	0.600	o	900	Pipe/Conduit
S10.006	5.000#	0.050	100.0	0.000	0.00	0.0	0.600	o	900	Pipe/Conduit
S13.000	33.178	0.100	331.8	0.000	5.00	0.0	0.600	o	450	Pipe/Conduit
S13.001	32.841	0.100	328.4	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S13.002	5.000#	0.100	50.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S1.009	14.022	0.050	280.4	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S10.000	36.800	0.155	0.0	1.01	161.1
S11.000	36.810	0.111	0.0	1.11	175.9
S11.001	36.710	0.275	0.0	1.09	173.5
S10.001	36.580	0.526	0.0	0.98	211.9
S10.002	36.550	0.526	0.0	1.11	240.6
S12.000	36.910	0.152	0.0	1.09	173.1
S12.001	36.750	0.315	0.0	1.10	237.4
S12.002	36.700	0.494	0.0	1.00	216.2
S10.003	36.440	1.116	0.0	1.20	429.7
S10.004	36.360	1.319	0.0	1.24	549.9
S10.005	36.280	1.373	0.0	1.59	1011.7
S10.006	36.250	1.373	0.0	3.13	1993.5
S13.000	36.500	0.000	0.0	1.11	176.6
S13.001	36.400	0.000	0.0	1.12	177.5
S13.002	36.300	0.000	0.0	2.88	458.1
S1.009	36.200	4.552	0.0	1.21	192.3

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Existing Network Details for Surface Network 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
S1.010	27.465	0.100	274.6	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S1.011	5.000#	0.050	100.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit
S14.000	23.022	0.100	230.2	0.000	5.00	0.0	0.600	o	450	Pipe/Conduit
S1.012	12.981	0.100	129.8	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
S1.013	105.126	0.620	169.6	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
S1.014	67.887	0.400	169.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
S1.015	25.045	0.150	167.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit
S15.000	27.581	0.115	239.8	0.096	5.00	0.0	0.600	o	300	Pipe/Conduit
S15.001	12.392	0.115	107.8	0.105	0.00	0.0	0.600	o	300	Pipe/Conduit
S15.002	5.000#	0.100	50.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit
S15.003	9.126	0.100	91.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
S15.004	6.649	1.395	4.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit
S1.016	6.750	0.040	168.7	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
S1.010	36.150	4.552	0.0	1.22	194.3
S1.011	36.050	4.552	0.0	2.03	323.4
S14.000	36.200	0.000	0.0	1.34	212.4
S1.012	36.000	4.552	0.0	1.15	45.6
S1.013	35.900	4.552	0.0	1.00	39.8
S1.014	35.280	4.552	0.0	1.00	39.8
S1.015	34.880	4.552	0.0	1.01	40.1
S15.000	36.630	0.096	0.0	1.01	71.5
S15.001	36.515	0.201	0.0	1.51	107.0
S15.002	36.400	0.201	0.0	2.23	157.5
S15.003	36.300	0.201	0.0	1.05	18.6
S15.004	36.200	0.201	0.0	4.65	82.1
S1.016	34.730	4.753	0.0	1.00	39.9

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PIPELINE SCHEDULES for Surface Network 1

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	450	S100	39.074	37.620	1.004	Open Manhole	1350
S1.001	o	450	S101	38.813	37.550	0.813	Open Manhole	1350
S1.002	o	450	S102	38.775	37.490	0.835	Open Manhole	1350
S1.003	o	600	S103	38.653	37.260	0.793	Open Manhole	1350
S1.004	o	600	S104	38.531	37.240	0.691	Open Manhole	1350
S1.005	o	600	HW10	38.000	37.200	0.200	Junction	
S2.000	o	450	S120	39.289	37.730	1.109	Open Manhole	1350
S2.001	o	450	S121	39.040	37.660	0.930	Open Manhole	1350
S2.002	o	450	S122	39.223	37.510	1.263	Open Manhole	1350
S2.003	o	450	S123	39.266	37.460	1.356	Open Manhole	1350
S3.000	o	300	S130	38.510	37.600	0.610	Open Manhole	1350
S2.004	o	525	S124	38.283	37.220	0.538	Open Manhole	1350
S2.005	o	525	HW11	37.800	37.200	0.075	Junction	
S4.000	o	450	S140	39.096	37.480	1.166	Open Manhole	1350
S4.001	o	450	S141	39.129	37.430	1.249	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	27.528	393.3	S101	38.813	37.550	0.813	Open Manhole	1350
S1.001	24.173	402.9	S102	38.775	37.490	0.835	Open Manhole	1350
S1.002	31.755	396.9	S103	38.653	37.410	0.793	Open Manhole	1350
S1.003	8.240	412.0	S104	38.531	37.240	0.691	Open Manhole	1350
S1.004	19.777	494.4	HW10	38.000	37.200	0.200	Junction	
S1.005	5.000#	50.0	HW13	37.800	37.100	0.100	Open Manhole	1350
S2.000	25.909	370.1	S121	39.040	37.660	0.930	Open Manhole	1350
S2.001	58.445	389.6	S122	39.223	37.510	1.263	Open Manhole	1350
S2.002	18.307	366.1	S123	39.266	37.460	1.356	Open Manhole	1350
S2.003	62.963	381.6	S124	38.283	37.295	0.538	Open Manhole	1350
S3.000	35.527	229.2	S124	38.283	37.445	0.538	Open Manhole	1350
S2.004	7.748	387.4	HW11	37.800	37.200	0.075	Junction	
S2.005	5.000#	50.0	HW13	37.800	37.100	0.175	Open Manhole	1350
S4.000	17.832	356.6	S141	39.129	37.430	1.249	Open Manhole	1350
S4.001	36.726	408.1	S142	38.981	37.340	1.191	Open Manhole	1350

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PIPELINE SCHEDULES for Surface Network 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S4.002	o	450	S142	38.981	37.340	1.191	Open Manhole	1350
S4.003	o	450	S143	38.931	37.280	1.201	Open Manhole	1350
S4.004	o	450	S144	38.764	37.230	1.084	Open Manhole	1350
S4.005	o	600	HW12	37.800	37.200	0.000	Open Manhole	1350
S1.006	o	375	HW13	37.800	37.100	0.325	Open Manhole	1350
S1.007	o	375	S105	38.870	37.000	1.495	Open Manhole	1350
S1.008	o	450	HW20	37.938	36.300	1.188	Open Manhole	1350
S5.000	o	450	S150	38.800	37.680	0.670	Open Manhole	1350
S5.001	o	450	S151	38.800	37.610	0.740	Open Manhole	1350
S5.002	o	450	S152	38.830	37.550	0.830	Open Manhole	1350
S5.003	o	450	S153	38.800	37.500	0.850	Open Manhole	1350
S5.004	o	450	S154	38.845	37.420	0.975	Open Manhole	1350
S5.005	o	450	S155	38.921	37.360	1.111	Open Manhole	1350
S6.000	o	300	S170	38.801	37.560	0.941	Open Manhole	1350
S5.006	o	600	S156	38.845	37.230	1.015	Open Manhole	1350
S5.007	o	675	HW40	38.000	37.200	0.125	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S4.002	20.627	343.8	S143	38.931	37.280	1.201	Open Manhole	1350
S4.003	17.342	346.8	S144	38.764	37.230	1.084	Open Manhole	1350
S4.004	11.207	373.6	HW12	37.800	37.200	0.150	Open Manhole	1350
S4.005	5.000#	50.0	HW13	37.800	37.100	0.100	Open Manhole	1350
S1.006	8.917	89.2	S105	38.870	37.000	1.495	Open Manhole	1350
S1.007	15.593	22.3	HW20	37.938	36.300	1.263	Open Manhole	1350
S1.008	5.000#	50.0	HW23	37.938	36.200	1.288	Open Manhole	1350
S5.000	25.233	360.5	S151	38.800	37.610	0.740	Open Manhole	1350
S5.001	24.344	405.7	S152	38.830	37.550	0.830	Open Manhole	1350
S5.002	20.191	403.8	S153	38.800	37.500	0.850	Open Manhole	1350
S5.003	31.580	394.8	S154	38.845	37.420	0.975	Open Manhole	1350
S5.004	22.289	371.5	S155	38.921	37.360	1.111	Open Manhole	1350
S5.005	19.087	347.0	S156	38.845	37.305	1.090	Open Manhole	1350
S6.000	24.183	230.3	S156	38.845	37.455	1.090	Open Manhole	1350
S5.006	10.708	356.9	HW40	38.000	37.200	0.200	Open Manhole	1350
S5.007	5.000#	50.0	HW42	37.800	37.100	0.025	Open Manhole	1350

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PIPELINE SCHEDULES for Surface Network 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S7.000	o	525	S180	38.650	37.540	0.585	Open Manhole	1350
S7.001	o	525	S181	38.516	37.440	0.551	Open Manhole	1350
S7.002	o	600	S182	38.539	37.660	0.279	Open Manhole	1350
S7.003	o	600	S183	38.657	37.260	0.797	Open Manhole	1350
S7.004	o	600	S184	38.607	37.220	0.787	Open Manhole	1350
S7.005	o	675	HW41	38.000	37.200	0.125	Open Manhole	1350
S5.008	o	450	HW42	37.800	37.100	0.250	Open Manhole	1350
S5.009	o	450	S159	38.056	37.050	0.556	Open Manhole	1350
S5.010	o	450	HW50	37.700	37.000	0.250	Open Manhole	1350
S8.000	o	450	S190	38.471	37.120	0.901	Open Manhole	1350
S8.001	o	450	S191	38.927	37.060	1.417	Open Manhole	1350
S9.000	o	300	S200	39.216	37.310	1.606	Open Manhole	1350
S9.001	o	300	S201	39.198	37.230	1.668	Open Manhole	1350
S8.002	o	450	S182	39.150	37.030	1.670	Open Manhole	1350
S8.003	o	450	HW51	37.700	37.000	0.250	Open Manhole	1350
S5.011	o	525	HW52	37.700	36.900	0.275	Open Manhole	1350

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S7.000	45.005	450.0	S181	38.516	37.440	0.551	Open Manhole	1350
S7.001	15.118	431.9	S182	38.539	37.405	0.609	Open Manhole	1350
S7.002	33.721	84.3	S183	38.657	37.260	0.797	Open Manhole	1350
S7.003	18.559	464.0	S184	38.607	37.220	0.787	Open Manhole	1350
S7.004	7.965	398.3	HW41	38.000	37.200	0.200	Open Manhole	1350
S7.005	5.000#	50.0	HW42	37.800	37.100	0.025	Open Manhole	1350
S5.008	14.824	296.5	S159	38.056	37.050	0.556	Open Manhole	1350
S5.009	9.370	187.4	HW50	37.700	37.000	0.250	Open Manhole	1350
S5.010	5.000#	50.0	HW52	37.700	36.900	0.350	Open Manhole	1350
S8.000	23.775	396.3	S191	38.927	37.060	1.417	Open Manhole	1350
S8.001	13.108	436.9	S182	39.150	37.030	1.670	Open Manhole	1350
S9.000	19.033	237.9	S201	39.198	37.230	1.668	Open Manhole	1350
S9.001	11.848	237.0	S182	39.150	37.180	1.670	Open Manhole	1350
S8.002	8.387	279.6	HW51	37.700	37.000	0.250	Open Manhole	1350
S8.003	5.000#	50.0	HW52	37.700	36.900	0.350	Open Manhole	1350
S5.011	9.405	20.9	S162	37.947	36.450	0.972	Open Manhole	1350

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PIPELINE SCHEDULES for Surface Network 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S5.012	o	525	S162	37.947	36.450	0.972	Open Manhole	1350
S5.013	o	525	HW21	37.938	36.300	1.113	Open Manhole	1350
S10.000	o	450	S210	39.052	36.800	1.802	Open Manhole	1350
S11.000	o	450	S220	38.893	36.810	1.633	Open Manhole	1350
S11.001	o	450	S221	38.960	36.710	1.800	Open Manhole	1350
S10.001	o	525	S211	38.997	36.580	1.892	Open Manhole	1350
S10.002	o	525	S212	39.022	36.550	1.947	Open Manhole	1350
S12.000	o	450	S230	38.531	36.910	1.171	Open Manhole	1350
S12.001	o	525	S231	38.746	36.750	1.471	Open Manhole	1350
S12.002	o	525	S232	38.933	36.700	1.708	Open Manhole	1350
S10.003	o	675	S213	38.530	36.440	1.415	Open Manhole	1350
S10.004	o	750	S214	38.234	36.360	1.124	Open Manhole	1350
S10.005	o	900	S215	38.200	36.280	1.020	Open Manhole	1350
S10.006	o	900	HW22	37.938	36.250	0.788	Open Manhole	1350
S13.000	o	450	HW90	37.800	36.500	0.850	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S5.012	25.493	170.0	HW21	37.938	36.300	1.113	Open Manhole	1350
S5.013	5.000#	50.0	HW23	37.938	36.200	1.213	Open Manhole	1350
S10.000	57.680	397.8	S211	38.997	36.655	1.892	Open Manhole	1350
S11.000	33.460	334.6	S221	38.960	36.710	1.800	Open Manhole	1350
S11.001	18.905	343.7	S211	38.997	36.655	1.892	Open Manhole	1350
S10.001	15.485	516.2	S212	39.022	36.550	1.947	Open Manhole	1350
S10.002	44.166	401.5	S213	38.530	36.440	1.565	Open Manhole	1350
S12.000	29.335	345.1	S231	38.746	36.825	1.471	Open Manhole	1350
S12.001	20.616	412.3	S232	38.933	36.700	1.708	Open Manhole	1350
S12.002	54.577	496.2	S213	38.530	36.590	1.415	Open Manhole	1350
S10.003	37.698	471.2	S214	38.234	36.360	1.199	Open Manhole	1350
S10.004	39.992	499.9	S215	38.200	36.280	1.170	Open Manhole	1350
S10.005	11.557	385.2	HW22	37.938	36.250	0.788	Open Manhole	1350
S10.006	5.000#	100.0	HW23	37.938	36.200	0.838	Open Manhole	1350
S13.000	33.178	331.8	S900	37.800	36.400	0.950	Open Manhole	1200

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PIPELINE SCHEDULES for Surface Network 1

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S13.001	o	450	S900	37.800	36.400	0.950	Open Manhole	1200
S13.002	o	450	HW24	37.940	36.300	1.190	Open Manhole	1200
S1.009	o	450	HW23	37.938	36.200	1.288	Open Manhole	1350
S1.010	o	450	S106	38.016	36.150	1.416	Open Manhole	1350
S1.011	o	450	HW30	37.914	36.050	1.414	Open Manhole	1350
S14.000	o	450	HW70	37.900	36.200	1.250	Open Manhole	1200
S1.012	o	225	HW31	37.914	36.000	1.689	Open Manhole	1350
S1.013	o	225	S107	37.849	35.900	1.724	Open Manhole	1200
S1.014	o	225	S108	38.141	35.280	2.636	Open Manhole	1200
S1.015	o	225	S109	38.160	34.880	3.055	Open Manhole	1200
S15.000	o	300	S240	38.130	36.630	1.200	Open Manhole	1350
S15.001	o	300	S241	38.627	36.515	1.812	Open Manhole	1200
S15.002	o	300	HW60	38.021	36.400	1.321	Open Manhole	1350
S15.003	o	150	HW61	38.021	36.300	1.571	Open Manhole	1350
S15.004	o	150	S242	38.182	36.200	1.832	Open Manhole	1200
S1.016	o	225	S20 - Inlet	38.200	34.730	3.245	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S13.001	32.841	328.4	HW24	37.940	36.300	1.190	Open Manhole	1200
S13.002	5.000#	50.0	HW23	37.938	36.200	1.288	Open Manhole	1350
S1.009	14.022	280.4	S106	38.016	36.150	1.416	Open Manhole	1350
S1.010	27.465	274.6	HW30	37.914	36.050	1.414	Open Manhole	1350
S1.011	5.000#	100.0	HW31	37.914	36.000	1.464	Open Manhole	1350
S14.000	23.022	230.2	HW31	37.914	36.100	1.364	Open Manhole	1350
S1.012	12.981	129.8	S107	37.849	35.900	1.724	Open Manhole	1200
S1.013	105.126	169.6	S108	38.141	35.280	2.636	Open Manhole	1200
S1.014	67.887	169.7	S109	38.160	34.880	3.055	Open Manhole	1200
S1.015	25.045	167.0	S20 - Inlet	38.200	34.730	3.245	Open Manhole	1200
S15.000	27.581	239.8	S241	38.627	36.515	1.812	Open Manhole	1200
S15.001	12.392	107.8	HW60	38.021	36.400	1.321	Open Manhole	1350
S15.002	5.000#	50.0	HW61	38.021	36.300	1.421	Open Manhole	1350
S15.003	9.126	91.3	S242	38.182	36.200	1.832	Open Manhole	1200
S15.004	6.649	4.8	S20 - Inlet	38.200	34.805	3.245	Open Manhole	1200
S1.016	6.750	168.7	S21 - WW	38.150	34.690	3.235	Open Manhole	1200

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Online Controls for Surface Network 1

Non Return Valve Manhole: S900, DS/PN: S13.001, Volume (m³): 6.7

Complex Manhole: S107, DS/PN: S1.013, Volume (m³): 2.7

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0101-5000-1300-5000
Design Head (m)	1.300
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	101
Invert Level (m)	35.900
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.300	5.0
Flush-Flo™	0.384	5.0
Kick-Flo®	0.798	4.0
Mean Flow over Head Range	-	4.4

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.4	1.200	4.8	3.000	7.4	7.000	11.0
0.200	4.7	1.400	5.2	3.500	7.9	7.500	11.4
0.300	4.9	1.600	5.5	4.000	8.5	8.000	11.8
0.400	5.0	1.800	5.8	4.500	9.0	8.500	12.1
0.500	4.9	2.000	6.1	5.000	9.4	9.000	12.5
0.600	4.8	2.200	6.4	5.500	9.8	9.500	12.8
0.800	4.0	2.400	6.7	6.000	10.3		
1.000	4.4	2.600	6.9	6.500	10.7		

Hydro-Brake® Optimum

Unit Reference	MD-SFF-0141-1150-0500-7800
Design Head (m)	0.500
Design Flow (l/s)	11.5
Flush-Flo™	User Defined
Objective	Minimise upstream storage

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Hydro-Brake® Optimum

Application	Surface
Sump Available	Yes
Diameter (mm)	141
Invert Level (m)	37.200
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	**Head (m)**	**Flow (l/s)**
Design Point (Calculated)	0.500	11.5
Flush-Flo™	0.180	7.8
Kick-Flo®	0.213	7.7
Mean Flow over Head Range	-	7.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	5.1	1.200	17.4	3.000	27.1	7.000	40.8
0.200	7.8	1.400	18.8	3.500	29.2	7.500	42.3
0.300	9.0	1.600	20.0	4.000	31.1	8.000	43.7
0.400	10.4	1.800	21.2	4.500	32.9	8.500	45.0
0.500	11.5	2.000	22.3	5.000	34.7	9.000	46.3
0.600	12.5	2.200	23.3	5.500	36.1	9.500	47.6
0.800	14.4	2.400	24.3	6.000	37.8		
1.000	16.0	2.600	25.3	6.500	39.3		

Hydro-Brake® Optimum Manhole: S242, DS/PN: S15.004, Volume (m³): 2.4

Unit Reference	MD-SHE-0042-1000-1500-1000
Design Head (m)	1.500
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	42
Invert Level (m)	36.200
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	**Head (m)**	**Flow (l/s)**
Design Point (Calculated)	1.500	1.0
Flush-Flo™	0.186	0.7
Kick-Flo®	0.378	0.5
Mean Flow over Head Range	-	0.7

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be

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Hydro-Brake® Optimum Manhole: S242, DS/PN: S15.004, Volume (m³): 2.4

invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.6	1.200	0.9	3.000	1.4	7.000	2.0
0.200	0.7	1.400	1.0	3.500	1.5	7.500	2.1
0.300	0.6	1.600	1.0	4.000	1.6	8.000	2.1
0.400	0.6	1.800	1.1	4.500	1.6	8.500	2.2
0.500	0.6	2.000	1.1	5.000	1.7	9.000	2.3
0.600	0.7	2.200	1.2	5.500	1.8	9.500	2.3
0.800	0.8	2.400	1.2	6.000	1.9		
1.000	0.8	2.600	1.3	6.500	1.9		

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Offline Controls for Surface Network 1

Weir Manhole: HW13, DS/PN: S1.006, Loop to PN: S13.000

Discharge Coef 0.600 Width (m) 20.000 Invert Level (m) 37.353

Weir Manhole: HW42, DS/PN: S5.008, Loop to PN: S13.000

Discharge Coef 0.600 Width (m) 20.000 Invert Level (m) 37.400

Weir Manhole: HW52, DS/PN: S5.011, Loop to PN: S13.000

Discharge Coef 0.600 Width (m) 20.000 Invert Level (m) 37.350

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Storage Structures for Surface Network 1

Tank or Pond Manhole: HW13, DS/PN: S1.006

Invert Level (m) 37.100

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1137.5	0.200	1622.1	0.400	2133.7	0.600	2671.5
0.100	1375.3	0.300	1875.2	0.500	2398.9	0.700	2953.4

Tank or Pond Manhole: HW42, DS/PN: S5.008

Invert Level (m) 37.100

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	399.2	0.200	586.5	0.400	780.6	0.600	983.7
0.100	492.8	0.300	682.4	0.500	881.0	0.700	1089.1

Tank or Pond Manhole: HW52, DS/PN: S5.011

Invert Level (m) 36.900

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	280.3	0.300	449.3	0.600	628.2
0.100	334.3	0.400	507.9	0.700	689.3
0.200	391.3	0.500	567.1	0.800	754.0

Tank or Pond Manhole: HW90, DS/PN: S13.000

Invert Level (m) 36.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	821.9	0.400	3559.3	0.800	5459.6	1.200	7493.5
0.100	1381.7	0.500	4021.9	0.900	5955.5	1.300	8022.8
0.200	2076.9	0.600	4492.8	1.000	6459.8	1.301	8027.6
0.300	3105.1	0.700	4972.0	1.100	6972.5		

Tank or Pond Manhole: HW23, DS/PN: S1.009

Invert Level (m) 36.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	234.6	0.500	396.6	1.000	611.3	1.500	876.7
0.100	262.0	0.600	435.3	1.100	660.5	1.600	936.1
0.200	292.6	0.700	476.5	1.200	711.4	1.700	997.4
0.300	325.2	0.800	519.5	1.300	764.4	1.738	1024.2
0.400	359.8	0.900	564.6	1.400	819.4		

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Tank or Pond Manhole: HW70, DS/PN: S14.000

Invert Level (m) 36.200

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	118.5	0.500	230.2	1.000	361.4	1.500	514.6
0.100	139.1	0.600	254.9	1.100	390.2	1.600	547.7
0.200	160.5	0.700	280.5	1.200	420.2	1.700	588.7
0.300	183.0	0.800	306.9	1.300	451.0		
0.400	206.2	0.900	333.4	1.400	482.3		

Tank or Pond Manhole: HW31, DS/PN: S1.012

Invert Level (m) 36.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	236.1	0.600	374.3	1.200	543.5	1.800	741.6
0.100	256.4	0.700	400.4	1.300	574.6	1.900	777.7
0.200	278.3	0.800	427.3	1.400	606.3	1.914	785.5
0.300	301.3	0.900	455.0	1.500	638.6		
0.400	324.6	1.000	483.7	1.600	672.3		
0.500	349.1	1.100	513.2	1.700	706.5		

Tank or Pond Manhole: HW61, DS/PN: S15.003

Invert Level (m) 36.300

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	39.5	0.500	102.4	1.000	179.5	1.500	270.7
0.100	50.9	0.600	116.7	1.100	196.6	1.600	290.6
0.200	62.9	0.700	131.5	1.200	214.3	1.700	311.1
0.300	75.5	0.800	147.0	1.300	232.5	1.740	311.1
0.400	88.7	0.900	162.9	1.400	251.3		

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	8
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	3	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 390005 162661 ST 90005 62661
Data Type	Point
Cv (Summer)	1.000
Cv (Winter)	1.000

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

Profile(s)	Summer and Winter
Duration(s) (mins)	30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 40, 45

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S100	30 minute 2 year Summer I+0%	39.074	37.789	-0.281	0.000	0.20
S1.001	S101	30 minute 2 year Summer I+0%	38.813	37.748	-0.252	0.000	0.32
S1.002	S102	30 minute 2 year Summer I+0%	38.775	37.697	-0.243	0.000	0.43
S1.003	S103	30 minute 2 year Summer I+0%	38.653	37.539	-0.321	0.000	0.44
S1.004	S104	30 minute 2 year Summer I+0%	38.531	37.509	-0.331	0.000	0.41
S1.005	HW10	30 minute 2 year Summer I+0%	38.000	37.402	-0.398	0.000	0.25
S2.000	S120	30 minute 2 year Summer I+0%	39.289	37.833	-0.347	0.000	0.08
S2.001	S121	30 minute 2 year Summer I+0%	39.040	37.798	-0.312	0.000	0.20
S2.002	S122	30 minute 2 year Summer I+0%	39.223	37.682	-0.278	0.000	0.28
S2.003	S123	30 minute 2 year Summer I+0%	39.266	37.634	-0.276	0.000	0.31
S3.000	S130	30 minute 2 year Summer I+0%	38.510	37.703	-0.197	0.000	0.26
S2.004	S124	30 minute 2 year Summer I+0%	38.283	37.526	-0.219	0.000	0.64
S2.005	HW11	30 minute 2 year Summer I+0%	37.800	37.411	-0.314	0.000	0.34
S4.000	S140	30 minute 2 year Summer I+0%	39.096	37.632	-0.298	0.000	0.13
S4.001	S141	30 minute 2 year Summer I+0%	39.129	37.618	-0.262	0.000	0.28
S4.002	S142	30 minute 2 year Summer I+0%	38.981	37.567	-0.223	0.000	0.38

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Overflow Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
S1.000	S100		0.235	27.5	OK
S1.001	S101		1.487	43.0	OK
S1.002	S102		1.420	59.7	OK
S1.003	S103		1.050	74.9	OK
S1.004	S104		0.971	85.5	OK
S1.005	HW10		1.143	85.4	OK*
S2.000	S120		0.140	10.6	OK
S2.001	S121		0.782	29.4	OK
S2.002	S122		1.798	37.8	OK
S2.003	S123		0.874	46.5	OK
S3.000	S130		0.141	17.3	OK
S2.004	S124		3.295	84.2	OK
S2.005	HW11		0.583	84.5	OK*
S4.000	S140		0.211	16.9	OK
S4.001	S141		0.966	38.8	OK
S4.002	S142		2.378	53.7	OK

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S4.003	S143	30 minute 2 year Summer I+0%	38.931	37.528	-0.202	0.000	0.45
S4.004	S144	30 minute 2 year Summer I+0%	38.764	37.494	-0.186	0.000	0.64
S4.005	HW12	30 minute 2 year Summer I+0%	37.800	37.381	-0.419	0.000	0.20
S1.006	HW13	240 minute 2 year Summer I+0%	37.800	37.263	-0.212	0.000	0.39
S1.007	S105	1440 minute 2 year Winter I+0%	38.870	37.172	-0.203	0.000	0.06
S1.008	HW20	1440 minute 2 year Winter I+0%	37.938	37.171	0.421	0.000	0.10
S5.000	S150	30 minute 2 year Summer I+0%	38.800	37.777	-0.353	0.000	0.07
S5.001	S151	30 minute 2 year Summer I+0%	38.800	37.738	-0.322	0.000	0.11
S5.002	S152	30 minute 2 year Summer I+0%	38.830	37.710	-0.290	0.000	0.16
S5.003	S153	30 minute 2 year Summer I+0%	38.800	37.686	-0.264	0.000	0.28
S5.004	S154	30 minute 2 year Summer I+0%	38.845	37.627	-0.243	0.000	0.39
S5.005	S155	30 minute 2 year Summer I+0%	38.921	37.568	-0.242	0.000	0.43
S6.000	S170	30 minute 2 year Summer I+0%	38.801	37.670	-0.190	0.000	0.29
S5.006	S156	30 minute 2 year Summer I+0%	38.845	37.486	-0.344	0.000	0.38
S5.007	HW40	30 minute 2 year Summer I+0%	38.000	37.388	-0.487	0.000	0.17
S7.000	S180	30 minute 2 year Summer I+0%	38.650	37.843	-0.222	0.000	0.25
S7.001	S181	30 minute 2 year Summer I+0%	38.516	37.823	-0.142	0.000	0.47
S7.002	S182	30 minute 2 year Summer I+0%	38.539	37.807	-0.453	0.000	0.14
S7.003	S183	30 minute 2 year Summer I+0%	38.657	37.569	-0.291	0.000	0.43
S7.004	S184	30 minute 2 year Summer I+0%	38.607	37.528	-0.292	0.000	0.52
S7.005	HW41	30 minute 2 year Summer I+0%	38.000	37.402	-0.473	0.000	0.19
S5.008	HW42	120 minute 2 year Summer I+0%	37.800	37.302	-0.248	0.000	0.42
S5.009	S159	120 minute 2 year Summer I+0%	38.056	37.239	-0.261	0.000	0.37
S5.010	HW50	120 minute 2 year Summer I+0%	37.700	37.179	-0.271	0.000	0.33
S8.000	S190	30 minute 2 year Summer I+0%	38.471	37.274	-0.296	0.000	0.18
S8.001	S191	30 minute 2 year Summer I+0%	38.927	37.233	-0.277	0.000	0.31
S9.000	S200	30 minute 2 year Summer I+0%	39.216	37.349	-0.261	0.000	0.04
S9.001	S201	30 minute 2 year Summer I+0%	39.198	37.271	-0.259	0.000	0.04
S8.002	S182	30 minute 2 year Summer I+0%	39.150	37.190	-0.290	0.000	0.28
S8.003	HW51	1440 minute 2 year Winter I+0%	37.700	37.172	-0.278	0.000	0.01
S5.011	HW52	1440 minute 2 year Winter I+0%	37.700	37.172	-0.253	0.000	0.03
S5.012	S162	1440 minute 2 year Winter I+0%	37.947	37.172	0.197	0.000	0.05
S5.013	HW21	1440 minute 2 year Winter I+0%	37.938	37.171	0.346	0.000	0.06
S10.000	S210	1440 minute 2 year Winter I+0%	39.052	37.171	-0.079	0.000	0.01
S11.000	S220	1440 minute 2 year Winter I+0%	38.893	37.171	-0.089	0.000	0.01
S11.001	S221	1440 minute 2 year Winter I+0%	38.960	37.171	0.011	0.000	0.02
S10.001	S211	1440 minute 2 year Winter I+0%	38.997	37.171	0.066	0.000	0.05
S10.002	S212	1440 minute 2 year Winter I+0%	39.022	37.171	0.096	0.000	0.03
S12.000	S230	1440 minute 2 year Winter I+0%	38.531	37.171	-0.189	0.000	0.01
S12.001	S231	1440 minute 2 year Winter I+0%	38.746	37.171	-0.104	0.000	0.02
S12.002	S232	1440 minute 2 year Winter I+0%	38.933	37.171	-0.054	0.000	0.03
S10.003	S213	1440 minute 2 year Winter I+0%	38.530	37.171	0.056	0.000	0.03
S10.004	S214	1440 minute 2 year Winter I+0%	38.234	37.171	0.061	0.000	0.03
S10.005	S215	1440 minute 2 year Winter I+0%	38.200	37.171	-0.009	0.000	0.02
S10.006	HW22	1440 minute 2 year Winter I+0%	37.938	37.171	0.021	0.000	0.01
S13.000	HW90	30 minute 2 year Summer I+0%	37.800	36.500	-0.450	0.000	0.00
S13.001	S900	30 minute 2 year Summer I+0%	37.800	36.400	-0.450	0.000	0.00
S13.002	HW24	1440 minute 2 year Winter I+0%	37.940	37.171	0.421	0.000	0.00

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Overflow Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
S4.003	S143		1.655	61.8	OK
S4.004	S144		1.565	68.4	OK
S4.005	HW12		0.645	68.7	OK
S1.006	HW13	0.000	217.550	48.8	OK
S1.007	S105		0.474	18.6	OK
S1.008	HW20		2.688	18.5	SURCHARGED
S5.000	S150		0.131	10.2	OK
S5.001	S151		0.661	14.1	OK
S5.002	S152		0.961	21.2	OK
S5.003	S153		1.044	39.0	OK
S5.004	S154		1.787	53.2	OK
S5.005	S155		1.335	60.1	OK
S6.000	S170		0.150	18.8	OK
S5.006	S156		1.112	81.0	OK
S5.007	HW40		0.673	80.9	OK
S7.000	S180		0.426	50.8	OK
S7.001	S181		6.673	66.7	OK
S7.002	S182		2.633	84.3	OK
S7.003	S183		1.948	91.2	OK
S7.004	S184		2.288	90.4	OK
S7.005	HW41		0.610	90.8	OK
S5.008	HW42	0.000	100.258	59.6	OK
S5.009	S159		0.839	59.6	OK
S5.010	HW50		0.562	59.5	OK
S8.000	S190		0.213	24.5	OK
S8.001	S191		1.068	29.2	OK
S9.000	S200		0.049	2.6	OK
S9.001	S201		0.117	2.6	OK
S8.002	S182		0.618	35.4	OK
S8.003	HW51		0.495	2.5	OK
S5.011	HW52	0.000	97.397	15.9	OK
S5.012	S162		2.555	15.9	SURCHARGED
S5.013	HW21		6.466	15.9	SURCHARGED
S10.000	S210		0.524	1.8	OK
S11.000	S220		0.509	1.3	OK
S11.001	S221		5.342	3.1	SURCHARGED
S10.001	S211		12.183	5.7	SURCHARGED
S10.002	S212		3.935	5.5	SURCHARGED
S12.000	S230		0.366	1.7	OK
S12.001	S231		3.672	3.6	OK
S12.002	S232		4.146	5.5	OK
S10.003	S213		21.548	11.2	SURCHARGED
S10.004	S214		14.159	12.6	SURCHARGED
S10.005	S215		18.288	12.3	OK
S10.006	HW22		7.478	12.0	SURCHARGED
S13.000	HW90		0.000	0.0	OK
S13.001	S900		0.000	0.0	OK

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Overflow Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
S13.002	HW24		6.011	0.0	SURCHARGED

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.009	HW23	1440 minute 2 year Winter I+0%	37.938	37.171	0.521	0.000
S1.010	S106	1440 minute 2 year Winter I+0%	38.016	37.169	0.569	0.000
S1.011	HW30	1440 minute 2 year Winter I+0%	37.914	37.167	0.667	0.000
S14.000	HW70	1440 minute 2 year Winter I+0%	37.900	37.166	0.516	0.000
S1.012	HW31	1440 minute 2 year Winter I+0%	37.914	37.166	0.941	0.000
S1.013	S107	1440 minute 2 year Winter I+0%	37.849	37.158	1.033	0.000
S1.014	S108	1440 minute 2 year Winter I+0%	38.141	35.333	-0.172	0.000
S1.015	S109	1440 minute 2 year Winter I+0%	38.160	34.934	-0.171	0.000
S15.000	S240	480 minute 2 year Winter I+0%	38.130	36.822	-0.108	0.000
S15.001	S241	480 minute 2 year Winter I+0%	38.627	36.822	0.007	0.000
S15.002	HW60	480 minute 2 year Winter I+0%	38.021	36.821	0.121	0.000
S15.003	HW61	480 minute 2 year Winter I+0%	38.021	36.821	0.371	0.000
S15.004	S242	480 minute 2 year Winter I+0%	38.182	36.819	0.469	0.000
S1.016	S20 - Inlet	960 minute 2 year Winter I+0%	38.200	34.795	-0.160	0.000

PN	US/MH Name	Flow / Cap.	Overflow Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
S1.009	HW23	0.21		393.303	30.5	SURCHARGED
S1.010	S106	0.18		3.467	29.5	SURCHARGED
S1.011	HW30	0.18		5.745	29.6	SURCHARGED
S14.000	HW70	0.00		222.371	0.8	SURCHARGED
S1.012	HW31	0.13		442.737	4.9	SURCHARGED
S1.013	S107	0.13		1.883	4.9	SURCHARGED
S1.014	S108	0.13		0.112	4.9	OK
S1.015	S109	0.13		0.115	4.9	OK
S15.000	S240	0.04		0.267	2.5	OK
S15.001	S241	0.06		1.932	5.0	SURCHARGED
S15.002	HW60	0.06		1.381	4.7	SURCHARGED
S15.003	HW61	0.05		38.019	0.7	SURCHARGED
S15.004	S242	0.01		0.833	0.7	SURCHARGED
S1.016	S20 - Inlet	0.19		0.137	5.6	OK

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10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	8
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	3	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 390005 162661 ST 90005 62661
Data Type	Point
Cv (Summer)	1.000
Cv (Winter)	1.000

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

Profile(s)	Summer and Winter
Duration(s) (mins)	30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 40, 45

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S100	30 minute 10 year Summer I+0%	39.074	37.883	-0.187	0.000	0.35
S1.001	S101	30 minute 10 year Summer I+0%	38.813	37.855	-0.145	0.000	0.60
S1.002	S102	30 minute 10 year Summer I+0%	38.775	37.807	-0.133	0.000	0.82
S1.003	S103	30 minute 10 year Summer I+0%	38.653	37.679	-0.181	0.000	0.84
S1.004	S104	30 minute 10 year Summer I+0%	38.531	37.648	-0.192	0.000	0.79
S1.005	HW10	30 minute 10 year Summer I+0%	38.000	37.491	-0.309	0.000	0.47
S2.000	S120	30 minute 10 year Summer I+0%	39.289	37.889	-0.291	0.000	0.13
S2.001	S121	30 minute 10 year Summer I+0%	39.040	37.869	-0.241	0.000	0.38
S2.002	S122	30 minute 10 year Summer I+0%	39.223	37.795	-0.165	0.000	0.51
S2.003	S123	30 minute 10 year Summer I+0%	39.266	37.765	-0.145	0.000	0.55
S3.000	S130	30 minute 10 year Summer I+0%	38.510	37.752	-0.148	0.000	0.45
S2.004	S124	30 minute 10 year Summer I+0%	38.283	37.710	-0.035	0.000	1.11
S2.005	HW11	30 minute 10 year Summer I+0%	37.800	37.490	-0.235	0.000	0.59
S4.000	S140	30 minute 10 year Summer I+0%	39.096	37.808	-0.122	0.000	0.21
S4.001	S141	30 minute 10 year Summer I+0%	39.129	37.797	-0.083	0.000	0.49
S4.002	S142	30 minute 10 year Summer I+0%	38.981	37.761	-0.029	0.000	0.69

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10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Overflow Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
S1.000	S100		0.369	48.5	OK
S1.001	S101		2.855	80.2	OK
S1.002	S102		2.675	114.0	OK
S1.003	S103		2.922	143.5	OK
S1.004	S104		1.726	163.4	OK
S1.005	HW10		2.163	163.6	OK*
S2.000	S120		0.221	18.7	OK
S2.001	S121		1.530	56.7	OK
S2.002	S122		4.453	68.7	OK
S2.003	S123		2.006	83.4	OK
S3.000	S130		0.210	30.4	OK
S2.004	S124		9.745	146.0	OK
S2.005	HW11		0.941	145.7	OK*
S4.000	S140		0.462	28.1	OK
S4.001	S141		2.466	68.5	OK
S4.002	S142		5.475	97.5	OK

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10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S4.003	S143	30 minute 10 year Summer I+0%	38.931	37.722	-0.008	0.000	0.82
S4.004	S144	30 minute 10 year Summer I+0%	38.764	37.680	0.000	0.000	1.16
S4.005	HW12	30 minute 10 year Summer I+0%	37.800	37.452	-0.348	0.000	0.36
S1.006	HW13	120 minute 10 year Summer I+0%	37.800	37.327	-0.148	0.000	0.68
S1.007	S105	1440 minute 10 year Winter I+0%	38.870	37.321	-0.054	0.000	0.08
S1.008	HW20	1440 minute 10 year Winter I+0%	37.938	37.319	0.569	0.000	0.15
S5.000	S150	30 minute 10 year Summer I+0%	38.800	37.840	-0.290	0.000	0.12
S5.001	S151	30 minute 10 year Summer I+0%	38.800	37.822	-0.238	0.000	0.19
S5.002	S152	30 minute 10 year Summer I+0%	38.830	37.807	-0.193	0.000	0.31
S5.003	S153	30 minute 10 year Summer I+0%	38.800	37.791	-0.159	0.000	0.53
S5.004	S154	30 minute 10 year Summer I+0%	38.845	37.739	-0.131	0.000	0.75
S5.005	S155	30 minute 10 year Summer I+0%	38.921	37.680	-0.130	0.000	0.84
S6.000	S170	30 minute 10 year Summer I+0%	38.801	37.712	-0.148	0.000	0.51
S5.006	S156	30 minute 10 year Summer I+0%	38.845	37.617	-0.213	0.000	0.73
S5.007	HW40	30 minute 10 year Summer I+0%	38.000	37.471	-0.404	0.000	0.34
S7.000	S180	30 minute 10 year Summer I+0%	38.650	37.940	-0.125	0.000	0.45
S7.001	S181	30 minute 10 year Summer I+0%	38.516	37.907	-0.058	0.000	0.87
S7.002	S182	30 minute 10 year Summer I+0%	38.539	37.867	-0.393	0.000	0.25
S7.003	S183	30 minute 10 year Summer I+0%	38.657	37.719	-0.141	0.000	0.81
S7.004	S184	30 minute 10 year Summer I+0%	38.607	37.673	-0.147	0.000	0.98
S7.005	HW41	30 minute 10 year Summer I+0%	38.000	37.483	-0.392	0.000	0.37
S5.008	HW42	60 minute 10 year Summer I+0%	37.800	37.388	-0.162	0.000	0.74
S5.009	S159	1440 minute 10 year Winter I+0%	38.056	37.322	-0.178	0.000	0.12
S5.010	HW50	1440 minute 10 year Winter I+0%	37.700	37.321	-0.129	0.000	0.11
S8.000	S190	30 minute 10 year Summer I+0%	38.471	37.340	-0.230	0.000	0.32
S8.001	S191	1440 minute 10 year Winter I+0%	38.927	37.320	-0.190	0.000	0.03
S9.000	S200	30 minute 10 year Summer I+0%	39.216	37.364	-0.246	0.000	0.07
S9.001	S201	1440 minute 10 year Winter I+0%	39.198	37.320	-0.210	0.000	0.00
S8.002	S182	1440 minute 10 year Winter I+0%	39.150	37.321	-0.159	0.000	0.03
S8.003	HW51	1440 minute 10 year Winter I+0%	37.700	37.321	-0.129	0.000	0.02
S5.011	HW52	1440 minute 10 year Winter I+0%	37.700	37.321	-0.104	0.000	0.04
S5.012	S162	1440 minute 10 year Winter I+0%	37.947	37.320	0.345	0.000	0.07
S5.013	HW21	1440 minute 10 year Winter I+0%	37.938	37.319	0.494	0.000	0.09
S10.000	S210	1440 minute 10 year Winter I+0%	39.052	37.319	0.069	0.000	0.02
S11.000	S220	1440 minute 10 year Winter I+0%	38.893	37.319	0.059	0.000	0.01
S11.001	S221	1440 minute 10 year Winter I+0%	38.960	37.319	0.159	0.000	0.03
S10.001	S211	1440 minute 10 year Winter I+0%	38.997	37.319	0.214	0.000	0.06
S10.002	S212	1440 minute 10 year Winter I+0%	39.022	37.319	0.244	0.000	0.04
S12.000	S230	1440 minute 10 year Winter I+0%	38.531	37.319	-0.041	0.000	0.02
S12.001	S231	1440 minute 10 year Winter I+0%	38.746	37.319	0.044	0.000	0.03
S12.002	S232	1440 minute 10 year Winter I+0%	38.933	37.319	0.094	0.000	0.04
S10.003	S213	1440 minute 10 year Winter I+0%	38.530	37.319	0.204	0.000	0.05
S10.004	S214	1440 minute 10 year Winter I+0%	38.234	37.319	0.209	0.000	0.04
S10.005	S215	1440 minute 10 year Winter I+0%	38.200	37.319	0.139	0.000	0.04
S10.006	HW22	1440 minute 10 year Winter I+0%	37.938	37.319	0.169	0.000	0.02
S13.000	HW90	30 minute 10 year Summer I+0%	37.800	36.500	-0.450	0.000	0.00
S13.001	S900	30 minute 10 year Summer I+0%	37.800	36.400	-0.450	0.000	0.00
S13.002	HW24	1440 minute 10 year Winter I+0%	37.940	37.319	0.569	0.000	0.00

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10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Overflow Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
S4.003	S143		3.381	111.2	OK
S4.004	S144		2.952	123.8	OK
S4.005	HW12		1.039	124.5	OK
S1.006	HW13	0.000	320.618	84.0	OK
S1.007	S105		1.077	26.7	OK
S1.008	HW20		3.018	26.6	SURCHARGED
S5.000	S150		0.221	17.7	OK
S5.001	S151		1.533	25.8	OK
S5.002	S152		2.011	39.7	OK
S5.003	S153		2.045	74.7	OK
S5.004	S154		3.437	103.5	OK
S5.005	S155		2.529	116.5	OK
S6.000	S170		0.210	33.0	OK
S5.006	S156		2.778	156.8	OK
S5.007	HW40		1.199	157.7	OK
S7.000	S180		0.565	90.6	OK
S7.001	S181		8.468	124.4	OK
S7.002	S182		3.092	158.2	OK
S7.003	S183		4.436	170.6	OK
S7.004	S184		3.951	170.3	OK
S7.005	HW41		1.016	171.0	OK
S5.008	HW42	0.000	154.968	105.2	OK
S5.009	S159		1.435	19.3	OK
S5.010	HW50		1.250	19.3	OK
S8.000	S190		0.308	43.4	OK
S8.001	S191		2.008	2.9	OK
S9.000	S200		0.070	4.6	OK
S9.001	S201		0.281	0.2	OK
S8.002	S182		1.667	3.5	OK
S8.003	HW51		1.151	3.5	OK
S5.011	HW52	0.000	168.918	21.7	OK
S5.012	S162		2.946	21.5	SURCHARGED
S5.013	HW21		6.678	21.4	SURCHARGED
S10.000	S210		0.736	2.4	SURCHARGED
S11.000	S220		0.721	1.7	SURCHARGED
S11.001	S221		5.971	4.1	SURCHARGED
S10.001	S211		12.801	7.8	SURCHARGED
S10.002	S212		4.153	7.8	SURCHARGED
S12.000	S230		0.578	2.4	OK
S12.001	S231		5.089	4.7	SURCHARGED
S12.002	S232		5.040	7.3	SURCHARGED
S10.003	S213		22.042	16.6	SURCHARGED
S10.004	S214		14.372	19.5	SURCHARGED
S10.005	S215		18.551	20.1	SURCHARGED
S10.006	HW22		7.981	19.8	SURCHARGED
S13.000	HW90		0.000	0.0	OK
S13.001	S900		0.000	0.0	OK

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10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Overflow Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
S13.002	HW24		6.179	0.0	SURCHARGED

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10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.009	HW23	1440 minute 10 year Winter I+0%	37.938	37.319	0.669	0.000
S1.010	S106	1440 minute 10 year Winter I+0%	38.016	37.315	0.715	0.000
S1.011	HW30	1440 minute 10 year Winter I+0%	37.914	37.311	0.811	0.000
S14.000	HW70	1440 minute 10 year Winter I+0%	37.900	37.310	0.660	0.000
S1.012	HW31	1440 minute 10 year Winter I+0%	37.914	37.310	1.085	0.000
S1.013	S107	1440 minute 10 year Winter I+0%	37.849	37.293	1.168	0.000
S1.014	S108	1440 minute 10 year Winter I+0%	38.141	35.356	-0.149	0.000
S1.015	S109	1440 minute 10 year Winter I+0%	38.160	34.958	-0.147	0.000
S15.000	S240	480 minute 10 year Winter I+0%	38.130	37.032	0.102	0.000
S15.001	S241	480 minute 10 year Winter I+0%	38.627	37.032	0.217	0.000
S15.002	HW60	480 minute 10 year Winter I+0%	38.021	37.031	0.331	0.000
S15.003	HW61	480 minute 10 year Winter I+0%	38.021	37.031	0.581	0.000
S15.004	S242	480 minute 10 year Winter I+0%	38.182	37.028	0.678	0.000
S1.016	S20 - Inlet	1440 minute 10 year Winter I+0%	38.200	34.822	-0.133	0.000

PN	US/MH Name	Flow / Cap.	Overflow Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
S1.009	HW23	0.25		487.273	36.4	SURCHARGED
S1.010	S106	0.22		3.677	36.4	SURCHARGED
S1.011	HW30	0.21		5.952	36.3	SURCHARGED
S14.000	HW70	0.00		275.967	0.8	SURCHARGED
S1.012	HW31	0.25		522.641	9.7	SURCHARGED
S1.013	S107	0.25		2.036	9.7	SURCHARGED
S1.014	S108	0.25		0.167	9.7	OK
S1.015	S109	0.26		0.170	9.7	OK
S15.000	S240	0.06		0.569	3.5	SURCHARGED
S15.001	S241	0.08		2.438	7.1	SURCHARGED
S15.002	HW60	0.09		1.682	6.9	SURCHARGED
S15.003	HW61	0.05		63.624	0.8	SURCHARGED
S15.004	S242	0.01		1.070	0.8	SURCHARGED
S1.016	S20 - Inlet	0.35		0.197	10.5	OK

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	8
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	3	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 390005 162661 ST 90005 62661
Data Type	Point
Cv (Summer)	1.000
Cv (Winter)	1.000

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

Profile(s)	Summer and Winter
Duration(s) (mins)	30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 40, 45

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S100	30 minute 30 year Summer I+40%	39.074	38.218	0.148	0.000	0.66
S1.001	S101	30 minute 30 year Summer I+40%	38.813	38.178	0.178	0.000	1.13
S1.002	S102	30 minute 30 year Summer I+40%	38.775	38.097	0.157	0.000	1.55
S1.003	S103	30 minute 30 year Summer I+40%	38.653	37.891	0.031	0.000	1.60
S1.004	S104	30 minute 30 year Summer I+40%	38.531	37.851	0.011	0.000	1.54
S1.005	HW10	30 minute 30 year Summer I+40%	38.000	37.650	-0.150	0.000	0.92
S2.000	S120	30 minute 30 year Summer I+40%	39.289	38.205	0.025	0.000	0.23
S2.001	S121	30 minute 30 year Summer I+40%	39.040	38.193	0.083	0.000	0.62
S2.002	S122	30 minute 30 year Summer I+40%	39.223	38.129	0.169	0.000	0.93
S2.003	S123	30 minute 30 year Summer I+40%	39.266	38.082	0.172	0.000	1.00
S3.000	S130	30 minute 30 year Summer I+40%	38.510	37.999	0.099	0.000	0.80
S2.004	S124	30 minute 30 year Summer I+40%	38.283	37.898	0.153	0.000	2.22
S2.005	HW11	30 minute 30 year Summer I+40%	37.800	37.725	0.000	0.000	1.18
S4.000	S140	30 minute 30 year Summer I+40%	39.096	38.296	0.366	0.000	0.41
S4.001	S141	30 minute 30 year Summer I+40%	39.129	38.276	0.396	0.000	0.99
S4.002	S142	30 minute 30 year Summer I+40%	38.981	38.181	0.391	0.000	1.43

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Overflow Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
S1.000	S100		0.849	91.0	SURCHARGED
S1.001	S101		5.056	150.8	SURCHARGED
S1.002	S102		4.492	215.9	SURCHARGED
S1.003	S103		5.525	273.3	SURCHARGED
S1.004	S104		2.709	318.5	SURCHARGED
S1.005	HW10		4.083	318.6	OK*
S2.000	S120		0.672	31.8	SURCHARGED
S2.001	S121		4.639	93.2	SURCHARGED
S2.002	S122		9.959	124.4	SURCHARGED
S2.003	S123		3.580	152.9	SURCHARGED
S3.000	S130		0.565	53.8	SURCHARGED
S2.004	S124		13.067	293.0	SURCHARGED
S2.005	HW11		1.985	292.3	FLOOD RISK*
S4.000	S140		1.161	55.9	SURCHARGED
S4.001	S141		3.825	138.3	SURCHARGED
S4.002	S142		6.823	202.2	SURCHARGED

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S4.003	S143	30 minute 30 year Summer I+40%	38.931	38.044	0.314	0.000	1.74
S4.004	S144	30 minute 30 year Summer I+40%	38.764	37.859	0.179	0.000	2.49
S4.005	HW12	30 minute 30 year Summer I+40%	37.800	37.597	-0.203	0.000	0.77
S1.006	HW13	60 minute 30 year Summer I+40%	37.800	37.407	-0.068	0.000	1.00
S1.007	S105	960 minute 30 year Summer I+40%	38.870	37.398	0.023	0.000	0.20
S1.008	HW20	960 minute 30 year Summer I+40%	37.938	37.404	0.654	0.000	0.36
S5.000	S150	30 minute 30 year Summer I+40%	38.800	38.219	0.089	0.000	0.22
S5.001	S151	30 minute 30 year Summer I+40%	38.800	38.207	0.147	0.000	0.35
S5.002	S152	30 minute 30 year Summer I+40%	38.830	38.188	0.188	0.000	0.54
S5.003	S153	30 minute 30 year Summer I+40%	38.800	38.160	0.210	0.000	0.93
S5.004	S154	30 minute 30 year Summer I+40%	38.845	38.083	0.213	0.000	1.33
S5.005	S155	30 minute 30 year Summer I+40%	38.921	37.971	0.161	0.000	1.50
S6.000	S170	30 minute 30 year Summer I+40%	38.801	37.928	0.068	0.000	0.92
S5.006	S156	30 minute 30 year Winter I+40%	38.845	37.830	0.000	0.000	1.08
S5.007	HW40	30 minute 30 year Summer I+40%	38.000	37.584	-0.291	0.000	0.62
S7.000	S180	30 minute 30 year Summer I+40%	38.650	38.156	0.091	0.000	0.86
S7.001	S181	30 minute 30 year Summer I+40%	38.516	38.079	0.114	0.000	1.64
S7.002	S182	30 minute 30 year Summer I+40%	38.539	38.010	-0.250	0.000	0.48
S7.003	S183	30 minute 30 year Summer I+40%	38.657	37.910	0.050	0.000	1.59
S7.004	S184	30 minute 30 year Summer I+40%	38.607	37.826	0.006	0.000	1.92
S7.005	HW41	30 minute 30 year Summer I+40%	38.000	37.623	-0.252	0.000	0.72
S5.008	HW42	30 minute 30 year Summer I+40%	37.800	37.460	-0.090	0.000	1.00
S5.009	S159	480 minute 30 year Summer I+40%	38.056	37.403	-0.097	0.000	0.65
S5.010	HW50	480 minute 30 year Summer I+40%	37.700	37.390	-0.060	0.000	0.59
S8.000	S190	30 minute 30 year Summer I+40%	38.471	37.505	-0.065	0.000	0.60
S8.001	S191	30 minute 30 year Summer I+40%	38.927	37.474	-0.036	0.000	1.00
S9.000	S200	30 minute 30 year Summer I+40%	39.216	37.402	-0.208	0.000	0.14
S9.001	S201	480 minute 30 year Summer I+40%	39.198	37.387	-0.143	0.000	0.03
S8.002	S182	480 minute 30 year Summer I+40%	39.150	37.387	-0.093	0.000	0.17
S8.003	HW51	480 minute 30 year Summer I+40%	37.700	37.384	-0.066	0.000	0.12
S5.011	HW52	480 minute 30 year Winter I+40%	37.700	37.382	-0.043	0.000	0.13
S5.012	S162	960 minute 30 year Summer I+40%	37.947	37.391	0.416	0.000	0.12
S5.013	HW21	960 minute 30 year Summer I+40%	37.938	37.401	0.576	0.000	0.14
S10.000	S210	30 minute 30 year Summer I+40%	39.052	37.761	0.511	0.000	0.53
S11.000	S220	30 minute 30 year Summer I+40%	38.893	37.790	0.530	0.000	0.37
S11.001	S221	30 minute 30 year Summer I+40%	38.960	37.766	0.606	0.000	1.00
S10.001	S211	30 minute 30 year Summer I+40%	38.997	37.718	0.613	0.000	2.15
S10.002	S212	30 minute 30 year Summer I+40%	39.022	37.642	0.567	0.000	1.19
S12.000	S230	30 minute 30 year Summer I+40%	38.531	37.693	0.333	0.000	0.53
S12.001	S231	30 minute 30 year Summer I+40%	38.746	37.666	0.391	0.000	0.88
S12.002	S232	30 minute 30 year Summer I+40%	38.933	37.631	0.406	0.000	1.29
S10.003	S213	30 minute 30 year Summer I+40%	38.530	37.499	0.384	0.000	1.48
S10.004	S214	480 minute 30 year Winter I+40%	38.234	37.418	0.308	0.000	0.19
S10.005	S215	960 minute 30 year Summer I+40%	38.200	37.412	0.232	0.000	0.17
S10.006	HW22	960 minute 30 year Summer I+40%	37.938	37.409	0.259	0.000	0.10
S13.000	HW90	1440 minute 30 year Winter I+40%	37.800	37.069	0.119	0.000	0.10
S13.001	S900	960 minute 30 year Winter I+40%	37.800	37.395	0.545	0.000	0.03
S13.002	HW24	960 minute 30 year Summer I+40%	37.940	37.407	0.657	0.000	0.03

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Overflow Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
S4.003	S143		4.153	237.2	SURCHARGED
S4.004	S144		3.437	265.7	SURCHARGED
S4.005	HW12		1.852	266.4	FLOOD RISK
S1.006	HW13	161.752	464.578	123.8	OK
S1.007	S105		1.346	64.8	SURCHARGED
S1.008	HW20		3.143	64.7	SURCHARGED
S5.000	S150		0.765	31.5	SURCHARGED
S5.001	S151		4.643	46.1	SURCHARGED
S5.002	S152		4.563	69.9	SURCHARGED
S5.003	S153		3.935	129.9	SURCHARGED
S5.004	S154		5.750	182.3	SURCHARGED
S5.005	S155		4.197	207.7	SURCHARGED
S6.000	S170		0.520	60.0	SURCHARGED
S5.006	S156		5.244	230.8	OK
S5.007	HW40		1.971	286.7	OK
S7.000	S180		0.875	172.0	SURCHARGED
S7.001	S181		10.341	233.3	SURCHARGED
S7.002	S182		3.830	300.5	OK
S7.003	S183		7.864	335.0	SURCHARGED
S7.004	S184		5.447	335.5	SURCHARGED
S7.005	HW41		1.757	334.6	OK
S5.008	HW42	120.475	206.196	142.5	OK
S5.009	S159		2.017	105.2	OK
S5.010	HW50		1.577	104.5	OK
S8.000	S190		0.544	80.7	OK
S8.001	S191		3.639	94.7	OK
S9.000	S200		0.125	8.5	OK
S9.001	S201		0.660	1.6	OK
S8.002	S182		2.280	21.8	OK
S8.003	HW51		1.424	21.1	OK
S5.011	HW52	537.249	202.107	67.5	OK
S5.012	S162		3.077	35.6	SURCHARGED
S5.013	HW21		6.796	35.5	SURCHARGED
S10.000	S210		1.369	78.2	SURCHARGED
S11.000	S220		1.396	56.2	SURCHARGED
S11.001	S221		6.611	138.2	SURCHARGED
S10.001	S211		13.372	260.9	SURCHARGED
S10.002	S212		4.615	251.7	SURCHARGED
S12.000	S230		1.113	78.9	SURCHARGED
S12.001	S231		5.755	164.5	SURCHARGED
S12.002	S232		5.496	250.4	SURCHARGED
S10.003	S213		22.300	525.6	SURCHARGED
S10.004	S214		14.514	86.6	SURCHARGED
S10.005	S215		18.684	83.6	SURCHARGED
S10.006	HW22		8.134	83.4	SURCHARGED
S13.000	HW90		1539.714	15.0	SURCHARGED
S13.001	S900		6.205	5.0	SURCHARGED

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Overflow Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
S13.002	HW24		6.279	4.8	SURCHARGED

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.009	HW23	960 minute 30 year Summer I+40%	37.938	37.407	0.757	0.000
S1.010	S106	960 minute 30 year Summer I+40%	38.016	37.402	0.802	0.000
S1.011	HW30	960 minute 30 year Summer I+40%	37.914	37.395	0.895	0.000
S14.000	HW70	960 minute 30 year Summer I+40%	37.900	37.393	0.743	0.000
S1.012	HW31	960 minute 30 year Summer I+40%	37.914	37.393	1.168	0.000
S1.013	S107	960 minute 30 year Summer I+40%	37.849	37.371	1.246	0.000
S1.014	S108	960 minute 30 year Summer I+40%	38.141	35.370	-0.135	0.000
S1.015	S109	960 minute 30 year Summer I+40%	38.160	34.972	-0.133	0.000
S15.000	S240	960 minute 30 year Winter I+40%	38.130	37.437	0.507	0.000
S15.001	S241	960 minute 30 year Winter I+40%	38.627	37.437	0.622	0.000
S15.002	HW60	960 minute 30 year Winter I+40%	38.021	37.436	0.736	0.000
S15.003	HW61	960 minute 30 year Winter I+40%	38.021	37.436	0.986	0.000
S15.004	S242	960 minute 30 year Winter I+40%	38.182	37.433	1.083	0.000
S1.016	S20 - Inlet	480 minute 30 year Winter I+40%	38.200	34.838	-0.117	0.000

PN	US/MH Name	Flow / Cap.	Overflow Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
S1.009	HW23	0.60		548.840	86.6	SURCHARGED
S1.010	S106	0.52		3.800	86.4	SURCHARGED
S1.011	HW30	0.51		6.072	86.3	SURCHARGED
S14.000	HW70	0.01		309.680	2.1	SURCHARGED
S1.012	HW31	0.33		571.854	13.1	SURCHARGED
S1.013	S107	0.34		2.123	13.1	SURCHARGED
S1.014	S108	0.34		0.199	13.1	OK
S1.015	S109	0.35		0.203	13.1	OK
S15.000	S240	0.06		1.148	3.7	SURCHARGED
S15.001	S241	0.09		2.896	7.9	SURCHARGED
S15.002	HW60	0.10		2.262	7.8	SURCHARGED
S15.003	HW61	0.06		132.497	0.9	SURCHARGED
S15.004	S242	0.01		1.527	0.9	SURCHARGED
S1.016	S20 - Inlet	0.47		0.243	14.0	OK

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	8
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	3	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 390005 162661 ST 90005 62661
Data Type	Point
Cv (Summer)	1.000
Cv (Winter)	1.000

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

Profile(s)	Summer and Winter
Duration(s) (mins)	30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 40, 45

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S100	30 minute 100 year Summer I+45%	39.074	38.705	0.635	0.000	0.87
S1.001	S101	30 minute 100 year Summer I+45%	38.813	38.650	0.650	0.000	1.48
S1.002	S102	30 minute 100 year Summer I+45%	38.775	38.514	0.574	0.000	2.02
S1.003	S103	30 minute 100 year Summer I+45%	38.653	38.171	0.311	0.000	2.11
S1.004	S104	30 minute 100 year Summer I+45%	38.531	38.035	0.195	0.000	2.03
S1.005	HW10	30 minute 100 year Summer I+45%	38.000	37.800	0.000	0.000	1.21
S2.000	S120	30 minute 100 year Summer I+45%	39.289	38.802	0.622	0.000	0.32
S2.001	S121	30 minute 100 year Summer I+45%	39.040	38.784	0.674	0.000	0.87
S2.002	S122	30 minute 100 year Summer I+45%	39.223	38.657	0.697	0.000	1.30
S2.003	S123	30 minute 100 year Summer I+45%	39.266	38.561	0.651	0.000	1.42
S3.000	S130	30 minute 100 year Summer I+45%	38.510	38.370	0.470	0.000	1.07
S2.004	S124	30 minute 100 year Summer I+45%	38.283	38.193	0.448	0.000	3.11
S2.005	HW11	30 minute 100 year Summer I+45%	37.800	37.725	0.000	0.000	1.65
S4.000	S140	30 minute 100 year Summer I+45%	39.096	38.856	0.926	0.000	0.54
S4.001	S141	30 minute 100 year Summer I+45%	39.129	38.829	0.949	0.000	1.30
S4.002	S142	30 minute 100 year Summer I+45%	38.981	38.666	0.876	0.000	1.88

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Overflow Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
S1.000	S100		1.545	120.4	SURCHARGED
S1.001	S101		5.731	197.5	FLOOD RISK
S1.002	S102		5.089	282.2	FLOOD RISK
S1.003	S103		6.132	359.2	SURCHARGED
S1.004	S104		3.079	420.0	SURCHARGED
S1.005	HW10		5.867	420.9	FLOOD RISK*
S2.000	S120		1.527	44.7	SURCHARGED
S2.001	S121		5.508	130.6	FLOOD RISK
S2.002	S122		10.716	173.8	SURCHARGED
S2.003	S123		4.266	216.3	SURCHARGED
S3.000	S130		1.095	72.4	FLOOD RISK
S2.004	S124		13.600	411.1	FLOOD RISK
S2.005	HW11		2.217	410.7	FLOOD RISK*
S4.000	S140		1.962	73.0	FLOOD RISK
S4.001	S141		4.617	181.8	FLOOD RISK
S4.002	S142		7.518	265.7	SURCHARGED

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S4.003	S143	30 minute 100 year Summer I+45%	38.931	38.431	0.701	0.000	2.29
S4.004	S144	30 minute 100 year Summer I+45%	38.764	38.136	0.456	0.000	3.26
S4.005	HW12	30 minute 100 year Summer I+45%	37.800	37.761	-0.039	0.000	1.00
S1.006	HW13	60 minute 100 year Summer I+45%	37.800	37.430	-0.045	0.000	1.00
S1.007	S105	960 minute 100 year Summer I+45%	38.870	37.444	0.069	0.000	0.18
S1.008	HW20	960 minute 100 year Summer I+45%	37.938	37.460	0.710	0.000	0.33
S5.000	S150	30 minute 100 year Summer I+45%	38.800	38.683	0.553	0.000	0.30
S5.001	S151	30 minute 100 year Summer I+45%	38.800	38.666	0.606	0.000	0.49
S5.002	S152	30 minute 100 year Summer I+45%	38.830	38.641	0.641	0.000	0.76
S5.003	S153	30 minute 100 year Summer I+45%	38.800	38.603	0.653	0.000	1.33
S5.004	S154	30 minute 100 year Summer I+45%	38.845	38.452	0.582	0.000	1.90
S5.005	S155	30 minute 100 year Summer I+45%	38.921	38.225	0.415	0.000	2.14
S6.000	S170	30 minute 100 year Summer I+45%	38.801	38.111	0.251	0.000	1.25
S5.006	S156	30 minute 100 year Summer I+45%	38.845	37.938	0.108	0.000	1.90
S5.007	HW40	30 minute 100 year Summer I+45%	38.000	37.686	-0.189	0.000	0.87
S7.000	S180	30 minute 100 year Summer I+45%	38.650	38.618	0.553	0.000	1.13
S7.001	S181	30 minute 100 year Summer I+45%	38.516	38.485	0.520	0.000	2.14
S7.002	S182	30 minute 100 year Summer I+45%	38.539	38.321	0.061	0.000	0.63
S7.003	S183	30 minute 100 year Summer I+45%	38.657	38.154	0.294	0.000	2.06
S7.004	S184	30 minute 100 year Summer I+45%	38.607	37.958	0.138	0.000	2.49
S7.005	HW41	30 minute 100 year Summer I+45%	38.000	37.711	-0.164	0.000	0.93
S5.008	HW42	30 minute 100 year Summer I+45%	37.800	37.483	-0.067	0.000	1.00
S5.009	S159	240 minute 100 year Summer I+45%	38.056	37.419	-0.081	0.000	0.83
S5.010	HW50	240 minute 100 year Summer I+45%	37.700	37.402	-0.048	0.000	0.75
S8.000	S190	30 minute 100 year Summer I+45%	38.471	37.577	0.007	0.000	0.83
S8.001	S191	30 minute 100 year Summer I+45%	38.927	37.531	0.021	0.000	1.46
S9.000	S200	30 minute 100 year Summer I+45%	39.216	37.507	-0.103	0.000	0.18
S9.001	S201	30 minute 100 year Summer I+45%	39.198	37.495	-0.035	0.000	0.26
S8.002	S182	30 minute 100 year Summer I+45%	39.150	37.487	0.007	0.000	1.29
S8.003	HW51	240 minute 100 year Summer I+45%	37.700	37.396	-0.054	0.000	0.27
S5.011	HW52	240 minute 100 year Summer I+45%	37.700	37.390	-0.035	0.000	0.23
S5.012	S162	960 minute 100 year Summer I+45%	37.947	37.427	0.452	0.000	0.10
S5.013	HW21	960 minute 100 year Summer I+45%	37.938	37.452	0.627	0.000	0.12
S10.000	S210	30 minute 100 year Summer I+45%	39.052	38.437	1.187	0.000	0.72
S11.000	S220	30 minute 100 year Summer I+45%	38.893	38.499	1.239	0.000	0.51
S11.001	S221	30 minute 100 year Summer I+45%	38.960	38.464	1.304	0.000	1.35
S10.001	S211	30 minute 100 year Summer I+45%	38.997	38.363	1.258	0.000	2.93
S10.002	S212	30 minute 100 year Summer I+45%	39.022	38.158	1.083	0.000	1.63
S12.000	S230	30 minute 100 year Summer I+45%	38.531	38.303	0.943	0.000	0.74
S12.001	S231	30 minute 100 year Summer I+45%	38.746	38.255	0.980	0.000	1.18
S12.002	S232	30 minute 100 year Summer I+45%	38.933	38.181	0.956	0.000	1.73
S10.003	S213	30 minute 100 year Summer I+45%	38.530	37.861	0.746	0.000	2.05
S10.004	S214	30 minute 100 year Summer I+45%	38.234	37.516	0.406	0.000	1.85
S10.005	S215	960 minute 100 year Summer I+45%	38.200	37.475	0.295	0.000	0.23
S10.006	HW22	960 minute 100 year Summer I+45%	37.938	37.471	0.321	0.000	0.14
S13.000	HW90	1440 minute 100 year Winter I+45%	37.800	37.374	0.424	0.000	0.14
S13.001	S900	960 minute 100 year Summer I+45%	37.800	37.497	0.647	0.000	0.06
S13.002	HW24	960 minute 100 year Summer I+45%	37.940	37.468	0.718	0.000	0.06

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Overflow Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
S4.003	S143		4.707	311.5	SURCHARGED
S4.004	S144		3.833	347.9	SURCHARGED
S4.005	HW12		2.358	346.9	FLOOD RISK
S1.006	HW13	479.053	509.918	123.8	OK
S1.007	S105		1.442	59.6	SURCHARGED
S1.008	HW20		3.225	59.3	SURCHARGED
S5.000	S150		1.429	43.1	FLOOD RISK
S5.001	S151		5.303	65.2	FLOOD RISK
S5.002	S152		5.211	98.8	FLOOD RISK
S5.003	S153		4.569	185.8	FLOOD RISK
S5.004	S154		6.279	260.6	SURCHARGED
S5.005	S155		4.561	296.9	SURCHARGED
S6.000	S170		0.782	80.9	SURCHARGED
S5.006	S156		5.441	405.2	SURCHARGED
S5.007	HW40		2.663	403.8	OK
S7.000	S180		1.537	226.1	FLOOD RISK
S7.001	S181		10.938	304.9	FLOOD RISK
S7.002	S182		4.284	390.2	FLOOD RISK
S7.003	S183		10.272	434.5	SURCHARGED
S7.004	S184		5.913	434.0	SURCHARGED
S7.005	HW41		2.208	431.9	FLOOD RISK
S5.008	HW42	254.705	223.461	142.8	OK
S5.009	S159		2.131	134.3	OK
S5.010	HW50		1.632	133.7	FLOOD RISK
S8.000	S190		0.647	111.9	SURCHARGED
S8.001	S191		4.027	138.4	SURCHARGED
S9.000	S200		0.275	11.2	OK
S9.001	S201		1.327	15.1	OK
S8.002	S182		3.032	165.1	SURCHARGED
S8.003	HW51		1.477	48.9	OK
S5.011	HW52	542.845	206.790	120.1	OK
S5.012	S162		3.132	29.3	SURCHARGED
S5.013	HW21		6.868	29.1	SURCHARGED
S10.000	S210		2.336	106.0	SURCHARGED
S11.000	S220		2.410	77.7	SURCHARGED
S11.001	S221		7.610	187.1	SURCHARGED
S10.001	S211		14.296	355.3	SURCHARGED
S10.002	S212		5.355	345.9	SURCHARGED
S12.000	S230		1.987	109.9	FLOOD RISK
S12.001	S231		6.598	220.2	SURCHARGED
S12.002	S232		6.283	337.0	SURCHARGED
S10.003	S213		22.818	726.5	SURCHARGED
S10.004	S214		14.655	829.8	SURCHARGED
S10.005	S215		18.775	117.3	SURCHARGED
S10.006	HW22		8.233	117.2	SURCHARGED
S13.000	HW90		3086.920	21.3	SURCHARGED
S13.001	S900		6.321	10.0	SURCHARGED

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Overflow Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
S13.002	HW24		6.348	10.2	SURCHARGED

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Surface Network 1

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.009	HW23	960 minute 100 year Summer I+45%	37.938	37.468	0.818	0.000
S1.010	S106	960 minute 100 year Summer I+45%	38.016	37.461	0.861	0.000
S1.011	HW30	960 minute 100 year Summer I+45%	37.914	37.454	0.954	0.000
S14.000	HW70	960 minute 100 year Summer I+45%	37.900	37.452	0.802	0.000
S1.012	HW31	960 minute 100 year Summer I+45%	37.914	37.452	1.227	0.000
S1.013	S107	960 minute 100 year Summer I+45%	37.849	37.430	1.305	0.000
S1.014	S108	960 minute 100 year Summer I+45%	38.141	35.371	-0.134	0.000
S1.015	S109	960 minute 100 year Summer I+45%	38.160	34.973	-0.132	0.000
S15.000	S240	30 minute 100 year Summer I+45%	38.130	37.731	0.801	0.000
S15.001	S241	960 minute 100 year Winter I+45%	38.627	37.718	0.903	0.000
S15.002	HW60	960 minute 100 year Winter I+45%	38.021	37.717	1.017	0.000
S15.003	HW61	960 minute 100 year Winter I+45%	38.021	37.717	1.267	0.000
S15.004	S242	960 minute 100 year Winter I+45%	38.182	37.713	1.363	0.000
S1.016	S20 - Inlet	960 minute 100 year Summer I+45%	38.200	34.840	-0.115	0.000

PN	US/MH Name	Flow / Cap.	Overflow Vol (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
S1.009	HW23	0.55		592.963	80.1	SURCHARGED
S1.010	S106	0.48		3.885	79.9	SURCHARGED
S1.011	HW30	0.47		6.157	79.8	SURCHARGED
S14.000	HW70	0.02		335.063	3.7	SURCHARGED
S1.012	HW31	0.34		608.302	13.4	SURCHARGED
S1.013	S107	0.34		2.190	13.4	SURCHARGED
S1.014	S108	0.35		0.201	13.4	OK
S1.015	S109	0.36		0.206	13.4	OK
S15.000	S240	1.10		1.568	70.8	SURCHARGED
S15.001	S241	0.13		3.214	10.9	SURCHARGED
S15.002	HW60	0.14		2.664	10.8	SURCHARGED
S15.003	HW61	0.06		197.065	1.0	SURCHARGED
S15.004	S242	0.01		1.845	1.0	SURCHARGED
S1.016	S20 - Inlet	0.48		0.252	14.3	OK

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Appendix 11

Response to: Developer email: econgdon@pfaconsulting.co.uk				
Planning Ref:		Our Ref: ST67SE/ 488	Our Email:	planning.liaison@wessexwater.co.uk
Proposal:	Development of 250 dwellings			
Location:	Townsend Farm, Melksham, SE12 6EH		DATE	03/03/2026

Thank you for your pre-development enquiry for the above development. Extracts from our records showing the approximate location of our apparatus within the vicinity of the site are attached.

We have reviewed documents submitted in support of the enquiry. We have following comments to make:

Existing Services:
The following services/assets are located within the site boundary:

- 1" Water Main- min 3m standoff either side of the outer edge of the pipe
- 3" Water Main- min 3m standoff either side of the outer edge of the pipe
- 6" Water Main-min 3 m standoff either side of the outer edge of the pipe
- 5 water meters
- 4 sluice valves
- 2" Private Water Main

Standoff Around Water Mains
Wessex Water requires access to undertake our statutory duties as set out in the Water Industry Act 1991 to maintain and repair our assets. Therefore, there must be no buildings within a minimum of 3m either side of the outer edge of the 1",3", 6" diameter water supply main and no tree planting within a minimum of 6m. This includes no surface water attenuation features and associated earthworks in the standoff strip, changes in ground levels resulting in additional loading or excavation can lead to instability in the pressurised pipe which is carrying large volumes of water. The water main must not run through enclosed private rear gardens, it must be within a 6m (3m either side) open access strip or roads. Wessex Water require unrestricted access to maintain and repair our apparatus.

Measurements are given for a pipeline depth of between 900mm and 2000mm. The stand-off distance may increase for a strategic water main due to material, size, depth and pressure. Wessex Water reserves the right to change the requirements for specific sites or strategic mains.

Protection Measures
Developer will need to agree protection arrangements for the existing apparatus which cross the site (standoff details as given above). Any damage to our apparatus by third parties will result in a compensation claim. All existing apparatus must be accurately located on site and marked on deposited drawings. A map showing all known Wessex Water Assets within the area of the proposed site is attached Additional maps can be obtained

Diversion
You may wish to consider diverting the existing assets, diversions (at your cost) can be permitted but you must prove satisfactory hydraulic conditions and that there will be no loss in capacity within the diverted asset, public sewer/water main diversions must be undertaken wholly within land under the applicant's ownership or with consent of the third party landowner.

Please be aware, an application for a sewer / water main diversion does not imply consent will be given or that any proposed diversion route will be acceptable to Wessex Water, we may request an alternative diversion route.

For more information on sewer diversion and the process of application please see our website Waste water services (wessexwater.co.uk)

For more information on water main diversion and the process of application please see our website Building near or over water main (wessexwater.co.uk)

Odour Zone
The proposal is close to Bowerhill, Shalls Lane Sewerage Treatment Works, and the southeast corner of the site borders the consultation zone for risk of odour emissions that could affect resident's amenity.

As the site is outside of the consultation zone a full odour assessment will not be required, however, you are strongly advised to ensure that any receptors are orientated side on to the works, keeping doors and windows facing the sewage treatment works to an absolute minimum. Any air conditioning units, air source heat pumps should be faced in such a way that they ae not drawing air from the side facing the sewage treatment works.

Capacity
Capacity in the local network (at either point of discharge) is limited. Therefore, it will be necessary to undertake a full capacity appraisal to identify, what, if any network reinforcement will be required to accommodate the proposed foul flows from this development.

You should be aware, that Wessex Water don't have capacity appraisal and improvement schemes readily prepared for sites that do not have current planning permission. Upon any grant of planning permission for this site, it will be necessary to undertake a modelling assessment and, if deemed necessary, plan, design and construct a scheme of works to accommodate Capacity the proposed foul flows. It would be beneficial if you could keep us updated with the progress of any planning application you submit in relation to this development.

NOTE: We are aware that this proposal is part of a much wider development proposal for this area, Wessex Water would be, wherever possible, looking for the development of a site wide foul drainage strategy that accommodates the whole development.

Foul Sewerage – point of connection
Development of this scale requires a minimum 150mm foul sewer connection

Wessex Water will accommodate domestic type foul flows in the public foul sewer with connections made on a size for size basis, Developers fund the cost of connecting to the nearest 'size for size' sewer and Wessex Water will manage the sewer network to accommodate foul flows from granted development. We fund this through our infrastructure charging arrangements.

The nearest suitable point of connection is 225mm dia public foul sewer close to Berryfield Lane.

Please note that the point of connection to the public sewer network is subject to formal application and agreement with Wessex Water under Section 106 of the Water Industry Act.

We also remind you that Wessex Water will not accept any surface water runoff, land drainage, or groundwater into the public foul sewer network, either directly or indirectly.

Pumped solution - A pumped solution should only be considered where gravity system is not viable. Developer must avoid multiple SPS. Please note that if the developer wishes to proceed with SPS and offer it for adoption, Satisfactory compound with adequate access of public highway would be required for tanker and lorry movements (no access through private driveways or car parking areas). Wet wells must be situated 15m from housing.

Surface Water Drainage (rainwater falling onto, and running off, impermeable surfaces)
Surface water must be disposed of via the SuDS Hierarchy which is subject to Building Regulations and NPPF.

No surface water runoff, land drainage or ground water will be accepted into a public sewer that carries sewerage, either directly or indirectly.

The National Planning Policy Framework (NPPF) mandates that Sustainable Drainage Systems (SuDS) must be incorporated into new developments to manage surface water runoff, mitigate flood risks, and provide additional benefits, including enhanced water quality and green spaces.

In line with the drainage hierarchy outlined in Approved Document H of the Building Regulations, Planning Practice Guidance, and the necessity to address water scarcity, all surface water runoff should aim to be discharged as high up the following hierarchy as feasible:

- Rainwater reuse through harvesting or greywater recycling
- An adequate soakaway or other infiltration system
- A hybrid solution involving infiltration and discharge to a surface water body
- Discharge directly to a surface water body (e.g., an ordinary watercourse)
- Discharge to a surface water sewer, highway drain, or other drainage system

Wessex Water statement on surface water discharge can be accessed via the following link: : wwds-dev063p-rainwater-drainage-policy.pdf

Note: To utilise a lesser priority final destination, appropriate evidence shall be provided that demonstrates all higher priority final destinations have been utilised to the maximum extent practicable. Higher cost alone shall not be a reason to utilise lower priority final destinations.

Review of the mapping indicates that the site is located in an area of high infiltration potential. Infiltration should be considered for surface water discharge. Surface water drainage strategy based on SuDS principals to be agreed with the LLFA.

Water Supply

Wessex Water will provide a point of connection for new water mains to be laid into the development site, either through a Section 41 agreement or a self-lay arrangement.

Developers may connect to our water network on a size for size basis at their cost and Wessex Water will undertake any network reinforcement that may be required to accommodate granted development, this is funded through our infrastructure charging arrangements. Upon grant of planning Wessex Water will undertake a modelling exercise to determine the impact on our network and manage any necessary improvements.

The minimum diameter supply main at point of connection, to meet size for size principles, for a development of 250 dwellings is 125 mm. The nearest supply main of suitable diameter is the 6" that passes through the site.

Please note: On site private storage and pump systems will be required for buildings greater than 2 storeys high. No guarantee can be given on a specific pressure or to maintaining that pressure. Normally it will be no less than 10m head of water. (1 bar pressure at 9 litres a minute) on the property boundary.

New Appointments and Variations (NAVs)

The NAV Market enables developers to choose their water or sewerage undertaker for a specific geographic area. For developers wishing to consider an alternative supplier or seeking further information, a full list of appointees and further guidance can be found on the Developing a new site (wessexwater.co.uk) and Ofwat website.

If you are making a NAV enquiry, there is a Wessex Water dedicated wholesale team that deal with NAV enquiries. Full details are on our website including guidance notes, our policy and contact details https://developerservices.wessexwater.co.uk/new-appointments-and-variations

I trust that you will find the mapping and initial comments of use.

Note: These comments are based upon known circumstances prevailing at the time of writing. A review of the contents of this email is required where 18 months or more have elapsed since issue or in the light of significant changes likely to impact upon the response (e.g. changes in development numbers or phasing). Please email review requests to planning.liaison@wessexwater.co.uk