

LAND SOUTH OF GREEN ROAD, WIVELSFIELD GREEN

Flood Risk Assessment and Drainage Strategy



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Wivelsfield Green
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REPORT

Quality Management

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1 INTRODUCTION

- 1.1 RPS was commissioned by Taylor Wimpey Strategic Land to prepare a Flood Risk Assessment (FRA) and conceptual Sustainable Drainage Strategy for the site located on land south of Green Road, Wivelsfield Green, East Sussex, RH17 7QL.
- 1.2 The aim of the FRA is to outline the potential for the site to be impacted by flooding, the impacts of the proposed development on flooding in the vicinity of the site, and the proposed measures which could be incorporated into the development to mitigate the identified risk. The report has been produced in accordance with the guidance detailed in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance (PPG). Reference has also been made to the CIRIA SuDS manual (C753), the East Sussex Local Flood Risk Management Strategy (LFRMS), and the Lewes District Council Strategic Flood Risk Assessment (SFRA) Level 1 and 2.
- 1.3 This report has been produced in consultation with the Environment Agency (EA) and the Lead Local Flood Authority (LLFA). The site is not located within an Internal Drainage Board (IDB) District.
- 1.4 This report is not intended to provide formal details of the final drainage design for the development. However, it provides information regarding the capabilities of the conceptual surface water drainage strategy to meet the requirements of the NPPF.
- 1.5 The desk study was undertaken by reference to information provided / published by the following bodies:
- EA;
 - East Sussex County Council;
 - Lewes District Council;
 - British Geological Survey (BGS);
 - Multi-Agency Geographic Information for the Countryside (MAGIC);
 - Ordnance Survey (OS); and
 - Southern Water.

2 PLANNING POLICY CONTEXT

National Planning Policy

- 2.1 The National Planning Policy Framework (NPPF)¹ was released in March 2012 and was updated in December 2024. The document advises of the requirements for a site-specific Flood Risk Assessment (FRA) for any of the following cases (Planning and Flood Risk paragraph 181 (footnote 63)):
- All proposals (including minor development and change of use) located within the EA designated floodplain, recognised as either Flood Zone 2 (medium probability) or Flood Zone 3 (high probability);
 - All proposals of 1 hectare (ha) or greater in an area located in Flood Zone 1 (low probability);
 - All proposals within an area which has critical drainage problems (as notified to the Local Planning Authority by the EA);
 - Land identified in a strategic flood risk assessment as being at increased flood risk in future; and
 - Where proposed development may be subject to other sources of flooding, where its development would introduce a more vulnerable use.
- 2.2 Paragraph 182 of the updated NPPF identifies that applications which could affect drainage on or around the site should incorporate sustainable drainage systems to control flow rates and reduce volumes of runoff; and which are proportionate to the nature and scale of the proposal. These should provide multifunctional benefits wherever possible, through facilitating improvements in water quality and biodiversity, as well as benefits for amenity. Sustainable drainage systems provided as part of development proposals 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.
- 2.3 Defra published their 'Non-statutory technical standards for sustainable drainage systems'² in March 2015. These are supported by the revised NPPF.

Local Planning Policy

Core Strategy – Lewes District Council

- 2.4 The Core Strategy was adopted by Lewes District Council in May 2016³, and contains the following policies relating to flood risk and drainage:

¹<https://www.gov.uk/government/publications/national-planning-policy-framework--2>

² <https://assets.publishing.service.gov.uk/media/5a815646ed915d74e6231b43/sustainable-drainage-technical-standards.pdf>

³ https://www.lewes-eastbourne.gov.uk/media/1718/Adopted-Joint-Core-Strategy-2016/pdf/Adopted_Joint_Core_Strategy_2016.pdf?m=1682440920647

Core Policy 12 – Flood Risk, Coastal Erosion, Sustainable Drainage and Slope Stability

The local planning authority will seek to reduce the impact and extent of flooding and damage from slope failure. This will be achieved by:

- 1. Steering development away from areas of flood risk (as identified in the latest Environment Agency and SFRA flood risk and climate change maps) where possible. Development in areas of flood risk will be required to meet the national Sequential and Exception tests, where relevant.*
- 2. Where site specific flood risk assessments are required, directing applicants to demonstrate that the development and its means of access will be safe from flooding without increasing the risk of flooding elsewhere. Development should seek to reduce overall flood risk where possible.*
- 3. Requiring flood protection, resilience, resistance and mitigation measures appropriate to the specific requirements of the site. Such measures will be expected to have regard to the character of the natural and built environment of the site and surroundings, to climate change implications and to biodiversity.*
- 4. Liaising closely with the Environment Agency and East Sussex County Council on development and flood risk.*
- 5. Seeking the appropriate management of surface water run-off and ensuring there is no increase in surface water run-off from new developments. This will include requiring new development to incorporate Sustainable Drainage Systems (SuDS), unless it is demonstrated that SuDS are not technically appropriate. The local planning authority will consult East Sussex County Council, the lead local flood authority, on the whole life management and maintenance of SuDS.*
- 6. Ensuring development avoids areas of undeveloped coastline unless it specifically requires a rural coastal location, meets the sequential test and does not have other adverse impacts.*
- 7. Preventing development on unstable areas of coastline and areas at risk of erosion and slope failure, such as those identified in the South Downs Shoreline Management Plan.*

The local planning authority will work with partners and applicants to implement the current Shoreline Management Plan, Catchment Flood Management Plan and other relevant flood/coastal protection strategies and plans.

Site Allocations and Development Management Policies – Lewes District Council

- 2.5 The Part 2 of the Core Strategy was adopted by Lewes District Council in February 2020⁴, and contains the following policies relating to flood risk and drainage:

Policy DM22: Water Resources and Water Quality

Development will be only permitted where it can be demonstrated that it would not result in:

- 1. unacceptable risk to the quality and quantity of surface and groundwater (including reservoirs); or*
- 2. changes to groundwater and surface water levels that would have unacceptable adverse impacts on:*
 - a. adjoining land;*

⁴ /https://www.lewes-eastbourne.gov.uk/media/1739/Local-Plan-Part-2-2020/pdf/Local_Plan_Part_2_2020.pdf?m=1682441636643

- b. the quality of groundwater resources or potential groundwater resources;*
- c. the potential yield of groundwater resources, river flows or natural habitats.*

Work beneath the water table will not be permitted unless there is a comprehensive groundwater management scheme agreed for the construction, operation, restoration and on-going management of the proposal.

Land Availability Assessment – Lewes District Council

- 2.6 The site was assessed within the Lewes District Council – Land Availability Assessment (LAA) dated November 2023. Details relevant to flood risk and drainage summarised below:

Land at Green Road – Site Reference 28WV

- The site has previous greenfield uses and is likely suitable for residential development, with a theoretical capacity of 101 homes.
- The site is located within Flood Zone 1 and around 30% of the site is at 'Low' to 'Medium' risk of surface water flooding.

Land at Eastern Road – Site Reference 29WV

- The site has previous greenfield uses and is likely suitable for residential development, with a theoretical capacity of 47 homes.
- The site is located within Flood Zone 1. It is indicated that a major overland flow route passes through the site. Approximately 80% of the site is at 'Low' to 'Medium' risk of surface water flooding.
- An ordinary watercourse is indicated to pass through the western portion of the site.

Land east and west of Green Lane, north of West Wood – Site Reference 31WV

- The site has previous greenfield uses and is likely suitable for residential development, with a theoretical capacity of 309 homes.
- The site is located within Flood Zone 1. It is indicated that a major overland flow route passes through the site. Approximately 33% of the site is at 'Low' to 'Medium' risk of surface water flooding.

An ordinary watercourse is indicated to pass through the western portion of the site.

Ditchling Streat Westmeston Neighbourhood Development Plan

- 2.7 The Neighbourhood Development Plan was adopted in April 2018⁵, and contains the following policies relating to flooding and drainage considerations:

HSG 5: Ensure infrastructure capacity

1. The capacity of infrastructure services to cope with new developments is limited, whether it be transport (See TRANS 2), telecommunications, and electricity, or water, drainage, flood alleviation and sewerage, or community services such as Ditchling village school.

⁵ <https://www.southdowns.gov.uk/wp-content/uploads/2016/05/Ditchling-Streat-and-Westmeston-NDP-Made-Version.pdf>

2. *New and improved utility infrastructure will be supported where the design minimises the impact on the natural beauty, wildlife and cultural heritage of the National Park and the amenity of local communities.*
3. *New residential and commercial development will be permitted only if sufficient infrastructure capacity is either available or can be provided in time to serve it.*

CONS 2 Set standards for design of new development

1. *New development, extensions, alterations and replacements should be to a high standard of design in harmony with the distinctive character of the area, where:*
 - a. *careful consideration has been given to the height (not normally exceeding two storeys), massing, scale, layout, appearance and landscaping of proposals;*
 - b. *natural and local landscape features are protected and sensitively incorporated; planting schemes should incorporate appropriate native species avoiding invasive non-native planting;*
 - c. *it incorporates measures to protect and enhance wildlife;*
 - d. *it is sympathetic to the character of established conservation areas and heritage assets;*
 - e. *it is accessible and links with established rights of way where practicable, and enhances access to the countryside;*
 - f. *it does not adversely intrude into important views (see CONS 8);*
 - g. *it incorporates sustainable urban drainage principles where possible and adequate flood protection and mitigation measures;*
 - h. *it adopts sustainable construction methods and measures to enhance energy efficiency;*
2. *it does not result in unacceptable levels of light, noise, air or water pollution. Development which reflects local building styles and detailing, and which uses traditional materials such as brick, tile and flint, will be given particular encouragement, especially within and adjoining conservation areas. Proposals involving the removal, replacement or unsympathetic alteration of old flint or brick and flint walls will not be supported.*
3. *Modern design of high quality and the use of contemporary materials, will also be supported where this complements and enhances the character and context of adjoining development and surrounding areas.*

Flood Risk Management Documents

East Sussex Local Flood Risk Management Strategy (LFRMS), and the Lewes District Council Strategic Flood Risk Assessment (SFRA) Level 1 and 2

- 2.8 The Lewes District Council SFRA Level 1 and 2 (2009)⁶ identifies and maps flood risk from all sources at a borough-wide scale as well as providing guidance on producing site specific FRAs. Relevant information from the SFRA has been referenced throughout this FRA report.

⁶ https://www.lewes-eastbourne.gov.uk/media/1806/Lewes-District-SFRA-Main-Report-October-2009/pdf/Lewes_District_SFRA_Main_Report_October_2009.pdf?m=1682503233137

- 2.9 The East Sussex LFRMS⁷ aims to outline approaches to limiting the impacts of local flooding across the county. Relevant information from the LFRMS has been referenced throughout this FRA report.

Climate Change Allowances

- 2.10 The NPPF and supporting planning practice guidance on Flood Risk and Coastal Change explain when and how flood risk assessments should be used. This includes demonstrating how flood risk will be managed now and over the development's lifetime, taking climate change into account.

Peak River Flow Allowances

- 2.11 In May 2022, the EA updated advice on climate change allowances to support the NPPF. Peak river flow allowances⁸ show the anticipated changes to peak flow by management catchment. Management catchments are sub-catchments of river basin districts. Peak River Flow Allowances should be considered for locations that are currently in Flood Zone 1 but might be in Flood Zone 2 or 3 in the future.
- 2.12 EA guidance on the application of climate change allowance is dependent on the proposed development vulnerability. As the development is Residential, this application is deemed as More Vulnerable. The EA require that for sites that are currently in Flood Zone 1 but might be in Flood Zone 2 or 3 in the future, the central allowance should be used to assess climate change. Residential developments have a lifetime of 100 years therefore will fall into the 2080s epoch.
- 2.13 The proposed site is located within the Adur and Ouse Management Catchment for which the following peak river flow allowances are applicable.

Table 1. Peak river flow allowances for the Adur and Ouse Management Catchment

Allowance Category	Central	Higher	Upper
2020s	16%	23%	40%
2050s	18%	28%	57%
2080s	37%	55%	107%

- 2.14 Based on the lifetime of the development and the vulnerability classification, an allowance of 37% is appropriate. Peak River Flow Allowances are considered to ensure the safety of people using the development when planning safe access, escape routes and places of refuge. Due to the nature of the flood risk at the site, it is deemed that flood risk will be managed and will not impact safe access/egress, and therefore does not require further consideration.

Peak Rainfall Allowances

- 2.15 Peak Rainfall Allowances are used to consider how increased rainfall affects surface water flood risk and the design of drainage systems to manage the increased rainfall.
- 2.16 New guidance requires that for developments with a lifetime of between 2061 and 2100, Flood Risk Assessments and Strategic Flood Risk Assessments should assess the central allowances for the 2070s epoch for both the 1% and 3.3% annual exceedance probability events. The proposed site is

⁷ <https://www.eastsussex.gov.uk/media/bgzhhybp/flood-risk-strategy-2016-26-final-edition-ebook1-1.pdf>

⁸ <https://environment.data.gov.uk/hydrology/climate-change-allowances/river-flow>

located within the Adur and Ouse Management Catchment for which the following Peak Rainfall Allowances are applicable.

Table 2. Peak rainfall flow allowances for the Adur and Ouse Management Catchment

3.3% Annual Exceedance Rainfall Event		
Epoch	Central	Upper
2050s	20%	35%
2070s	20%	40%
1% Annual Exceedance Rainfall Event		
Epoch	Central	Upper
2050s	20%	45%
2070s	25%	45%

2.17 RPS has added 45% to all attenuation / runoff calculations for the development to account for climate change and ensure surface water at the development is suitably managed.

3 CONSULTATION

Environment Agency

- 3.1 The EA has been contacted regarding flood risk information for the site. A response was received on 25th October 2024. The EA confirmed that the site is located within Flood Zone 1 and therefore fluvial modelling is unavailable. They confirmed that areas of the site are at risk from surface water flooding. The full response is provided as Appendix A.

Water Authority

- 3.2 The public sewer network within the vicinity of the site is operated by Southern Water. Southern Water Asset Location Plans were obtained to confirm existing assets at the site. Asset Location Plans are provided in Appendix B.
- 3.3 Capacity for foul flows from the development to be confirmed by Southern Water.

Lead Local Flood Authority

- 3.4 The site is within the administrative boundary of East Sussex County Council (ESCC) who are the Lead Local Flood Authority (LLFA). Pre-application advice was requested from the LLFA. A summary is provided below and the full response is included as Appendix C.
- The Site is located in an area not at risk from Fluvial Flooding and is not in the vicinity of Flood Zone 2 or 3.
 - No main rivers are located within the vicinity of the site. Ordinary watercourses are located within the site boundary, and drainage assets are located within the vicinity of the site.
 - The LLFA holds records of several historic flood events within the vicinity of the site. None are located within the site boundary and are primarily associated with surface water flooding.
 - The site is at 'Low (0.1% AEP)' to 'High (3.33% AEP)' risk from surface water flooding. Areas within the site boundary are indicated to experience depths of up to 0.9m during the 0.1% AEP event.
 - BGS Mapping indicates there is no observable groundwater flood risk to the site.
 - As defined by ESCC, the site is located within Drainage Risk Areas 2 (Infiltration is unlikely, ensure an outfall can be secured) and 3 (Infiltration techniques are likely to be inappropriate).
 - The site water table is indicated to be <3m below ground surface.
 - There is significant potential for a ground stability hazard on the site. Ground instability problems are probably present and increased infiltration may result in ground instability.
 - The site is not located in the vicinity of a land drainage investigation, SWMP hotspot or Section 19 investigation.

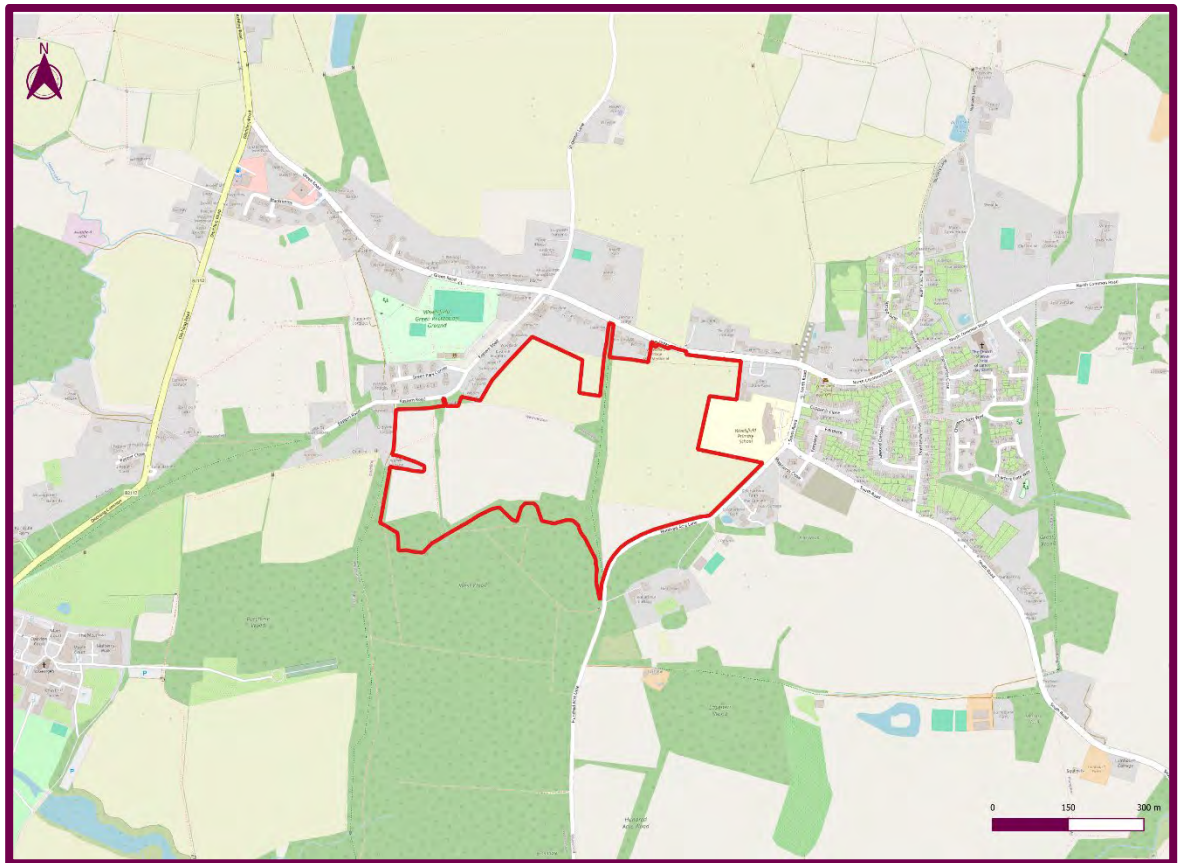
Internal Drainage Board

- 3.5 The site is not located within an IDB district.

4 SITE DESCRIPTION

Site Description

- 4.1 The site is located at National Grid Reference TQ 34853 19876, is irregular in shape and occupies an area of approximately 20.89 hectares (ha). The site location is presented in Figure 1.



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Figure 1. Site Location

- 4.2 The site is currently primarily occupied by greenfield land used for agricultural purposes. A woodland area is located within the southwestern portion.
- 4.3 Access to the Site is currently via Green Road and Eastern Road to the north and Hundred Acre Lane to the south.

Surrounding Land Uses

- 4.4 The site is located within the village of Wivelsfield Green. The area primarily comprises residential and commercial properties. Wivelsfield Primary School is located to the east of the site. Wivelsfield Village Hall is located to the west of the site. A wooded area and greenfield land is located to the south of the site.
- 4.5 The Ditchling Common SSSI is located approximately 700m west of the western portion of the site. No other designated sensitive areas (e.g. Special Area of Conservation (SAC), Special Protection Area (SPA) or Site of Special Scientific Interest (SSSI)) are within 1km of the site.

Topography

- 4.6 A topographic survey was completed by Survey Solutions in May 2023 (ref: 48525BWLS) and indicates that the western portion of the site falls to the north from approximately 48.60m Above Ordnance Datum (AOD), along the southern boundary, to approximately 39.80m AOD at the north-western corner adjacent to Eastern Road. The eastern portion of the site is indicated to fall towards the central area of the site, with levels of approximately 48.00m AOD along the northern boundary, levels of 63.40m AOD at the southernmost point, and levels of around 43.00m AOD, along the central portion. The topographic survey is located in Appendix D.

Site Visit and Observations

- 4.7 A site visit was undertaken on 12th January 2024. During the site visit, it was observed that the western portion of the site generally falls within a south to north direction. Several field drains/ditches were observed within the field boundaries, these were dry at the time of the visit.
- 4.8 A drainage channel was observed along the northern boundary, which contained water and flowed east to west. A section of this channel is shown in Figure 2.



Figure 2. Water flowing in drain adjacent to Eastern Road

- 4.9 This watercourse is culverted at the northwestern boundary, beneath Eastern Road. The inlet comprises of two pipes and a trash screen, as shown in Figure 3.



Figure 3. Culvert inlet beneath Eastern Road, two culverts with trash screen

4.10 The outlet comprises two pipes and is shown in Figure 4.



Figure 4. Culvert outlet – two culvert outlets

4.11 The watercourse then flows north, and the watercourse is culverted beneath a footbridge, as shown in Figures 5 and 6 below.



Figure 5. Culverted channel beneath footbridge (inlet)



Figure 6. Culverted channel beneath footbridge (outlet)

- 4.12 A wooded area is located to the south of the site. During the site visit, it was observed that drainage channels and ponds are present within the wooded area, which feed into the drainage ditches located on site. It was observed that leaky dams are present along these channels, and additional research indicates that they form part of the South Downs Natural Flood Management Scheme

(NFMS)⁹. Figure 7 and 8 shows ponds and channels within the wooded area. It is proposed that consultation will be undertaken, at design stage, with Lewes District Council to understand the scheme and take a holistic approach, ensuring that the proposed works and drainage fit within the existing NFMS.



Figure 7. Pond within wooded area

⁹ <https://www.southdowns.gov.uk/wp-content/uploads/2021/07/SDNPA-Natural-Flood-Management-Measures.pdf>



Figure 8. Drain from wooded area flowing northwards

- 4.13 Access to the eastern portion of the site could not be obtained during the site visit, however observations were made via the public rights of way adjacent to the site.
- 4.14 It was observed that topography of the eastern portion appears to fall towards the central area of the site from both the northern and southern extents. Topography of the eastern portion is shown in Figure 9.



Figure 9. Steep topography from north to the centre of the site (southerly direction)

- 4.15 The central portion of the site was waterlogged at the time of the visit, indicating that surface water ponds in this area, due to the topography.

5 PROPOSED DEVELOPMENT

- 5.1 The proposed development for the site incorporates:
“Outline planning application for the erection of up to 150 dwellings, with associated works, parking, landscaping, publicly accessible open space, land for education or community use, with access from Green Road and Eastern Road.”
- 5.2 Development Framework Plans are shown in Appendix E.
- 5.3 Vehicular access is proposed via Green Road to the north of the site. Pedestrian and Cycle access is proposed via Green Road and Eastern Road.
- 5.4 The proposed use of the site is classified as ‘more vulnerable’ within the PPG.
- 5.5 Surface water runoff is anticipated to pass to onsite surface watercourses.
- 5.6 The potential to provide surface water attenuation, including the use of Sustainable Drainage Systems (SuDS), has been considered as part of the preliminary design process.

6 HYDROLOGICAL SETTING

Nearby Watercourses

- 6.1 OS Mapping indicates that several ordinary watercourses are located within the site boundary. Further ponds and channels are also located within the wooded area to the south of the site, which flow into the watercourses on site.
- 6.2 A stretch of the River Adur is located approximately 600m west of the site. This is designated as an EA Main River.
- 6.3 No additional watercourses / features (e.g. canals, reservoirs) have been identified within 1km of the site.

Fluvial / Tidal Flood Risk Classification

- 6.4 The EA Flood Map for Planning¹⁰, which is available online (accessed Oct 2024), indicates that the site is located within Flood Zone 1, whereby the annual probability of flooding from fluvial or tidal sources is classified as less than 1 in 1000. The EA Flood Map for Planning is provided in Figure 10.

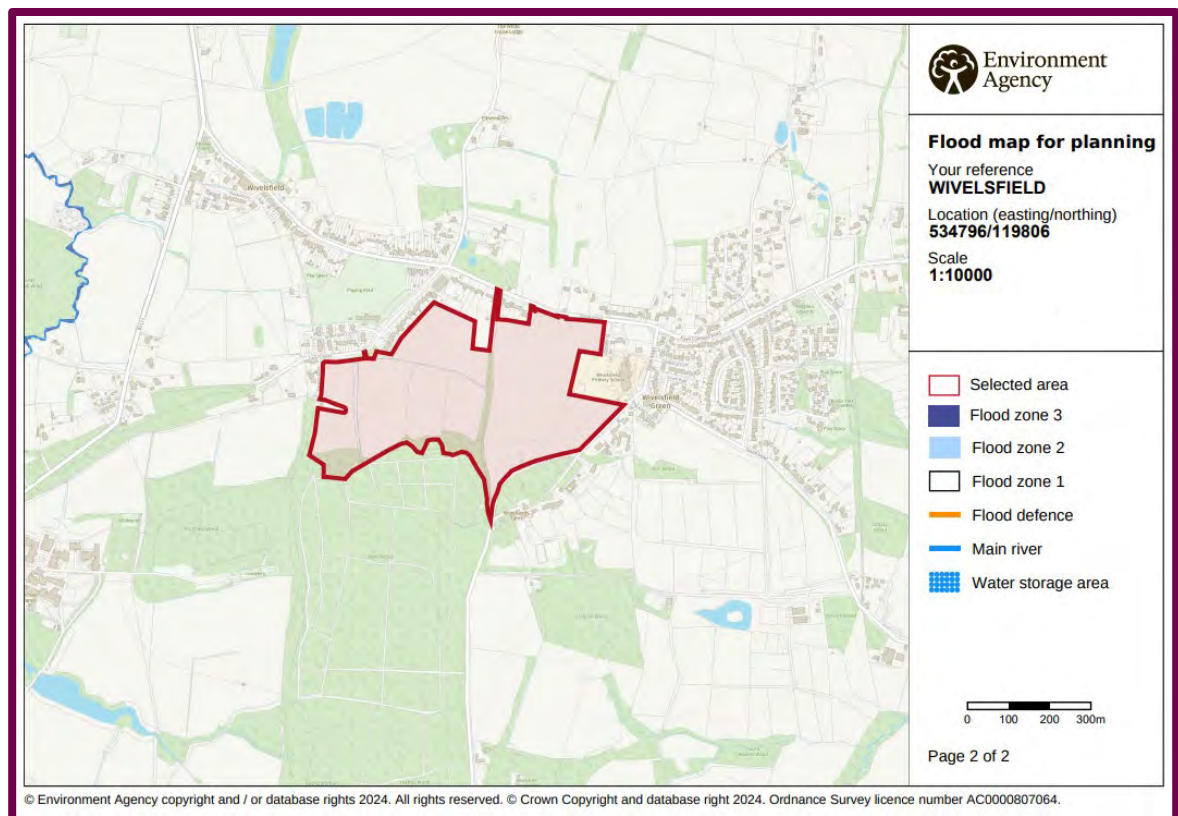


Figure 10. EA Flood Map for Planning

¹⁰ <https://flood-map-for-planning.service.gov.uk/>

EA Flood Warning Area

- 6.5 The EA defines a Flood Warning Area as “*geographical areas where we expect flooding to occur and where we provide a Flood Warning Service. They generally contain properties that are expected to flood from rivers or the sea and in some areas, from groundwater.*”
- 6.6 The site is not located in a Flood Warning Area.

Surface Water Flood Risk Classification

- 6.7 The EA's Flood Map for Surface Water¹¹, which is available online (accessed Oct 2024), identifies the areas at risk of surface water flooding. The classification of the risk is based on the following annual probability of flooding:
- High risk; area has a chance of flooding greater than 1 in 30.
 - Medium risk; area has a chance of flooding between 1 in 30 and 1 in 100.
 - Low risk; area has a chance of flooding between 1 in 100 and 1 in 1000.
 - Very low risk; has a chance of flooding less than 1 in 1000.
- 6.8 The EA surface water map indicates that large areas of the site are at a ‘Very Low’ risk of surface water flooding.
- 6.9 A number of areas across the site are shown to be at ‘Low’ to ‘High’ risk from surface water flooding. Within the western portion of the site, these areas correlate with the topography at the site and the drainage ditches that are present along the field boundaries at the site.
- 6.10 Within the eastern portion of the site, a flow path is present which originates offsite. This follows the site topography and conveys flows in a westerly direction towards the ordinary watercourse located within the western portion of the site.
- 6.11 During a low risk scenario, EA mapping indicates that the site will primarily experience depths below 300mm and velocities of over 0.25m/s. The EA mapping confirms that surface water flows at the site, flow towards the ordinary watercourse at the site, which flows in a westerly direction towards the River Adur.
- 6.12 The EA Long Term Flood Risk map for surface water risk is included as Figure 11 below.

¹¹ <https://check-long-term-flood-risk.service.gov.uk/>

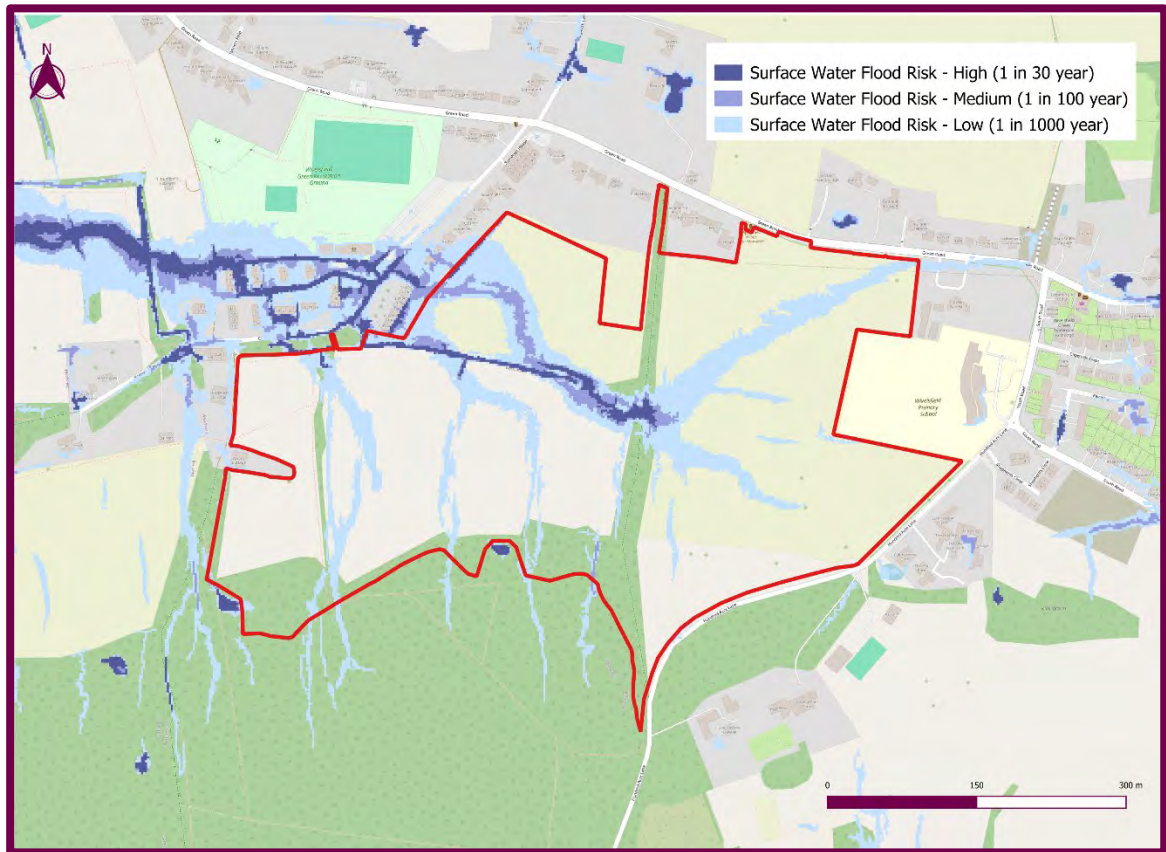


Figure 11. Flood Map for Surface Water

- 6.13 The development has been sequentially designed to ensure residential parcels are located outside of the 'High' surface water risk extents, as illustrated in Figure 12.

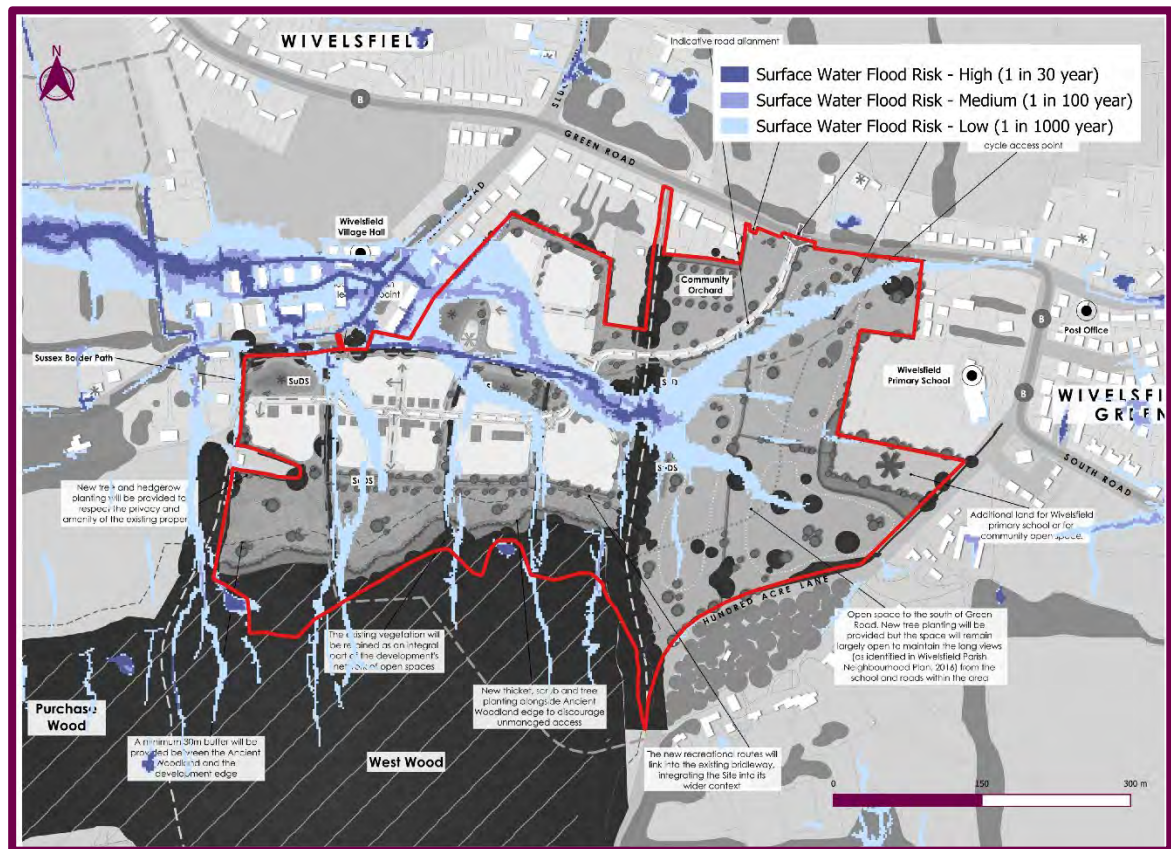


Figure 12. Surface Water Extents and Development Layout (overlay of CSA Indicative Framework Plan – Rev F December 2024)

Reservoir Flood Risk Classification

- 6.14 The EA's Flood Map for Reservoirs¹² also indicates that the site is not located within an area potentially at risk from reservoir flooding.

¹² <https://check-long-term-flood-risk.service.gov.uk/>

7 HYDROGEOLOGICAL SETTING

- 7.1 British Geological Survey (BGS) online mapping¹³ (1:50,000 scale) indicates that the site is situated on bedrock deposits of the Weald Clay Formation, comprising mudstone. No superficial deposits have been recorded for the site.
- 7.2 No BGS boreholes are located within the vicinity of the site.
- 7.3 The soils underlying the site are described as 'Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils' by Soilsclapes¹⁴.
- 7.4 MAGIC Map's¹⁵ Aquifer Designation Mapping indicates that the bedrock at the site is classified as an 'Unproductive' Aquifer. These formations have a low permeability and have negligible significance for water supply or base flow.
- 7.5 MAGIC Map's¹⁶ Source Protection Zone (SPZ) mapping indicates that the site is not located within a groundwater SPZ.
- 7.6 Groundwater monitoring was undertaken for the site, commencing October 2023. Groundwater at the site was generally shallow, at less than 1m below ground level across the site. This was attributed to the wet winter, which replenished groundwater levels. Details of monitoring locations and results are provided in Appendix E.

¹³ <https://www.bgs.ac.uk/map-viewers/bgs-geology-viewer/>

¹⁴ <https://www.landis.org.uk/soilsclapes/>

¹⁵ <https://magic.defra.gov.uk/magicmap.aspx>

¹⁶ <https://magic.defra.gov.uk/magicmap.aspx>

8 EXISTING DRAINAGE / WATER MAINS

- 8.1 Southern Water asset location plans were obtained for the site, and are included in Appendix B. The plans indicate that the site is not served by any surface water or foul water sewers. Foul water sewers are present along Eastern Road, to the west of the site, and Green Road, to the north of the site.
- 8.2 Manhole cover levels and invert levels for the nearest manholes to the site are given in Table 3.

Table 3. Manhole level details

Manhole Reference	Type Sewer	ofManhole Level (mAOD)	CoverManhole Level (mAOD)	InvertInvert Depth (m)
5903	FW	39.61	37.50	2.11
5902	FW	39.42	37.62	1.80
5901	FW	39.33	37.85	1.48
6901	FW	39.39	38.10	1.29
0001	FW	48.86	47.07	1.79
0002	FW	48.33	46.57	1.76

9 FLOOD RISK AND MITIGATION

- 9.1 The key sources of flooding that could potentially impact the site are discussed below:

Fluvial / Tidal Flooding

- 9.2 The EA Flood Map for Planning, as seen in Figure 10, indicates that the site is located within Flood Zone 1, whereby the annual probability of flooding from fluvial or tidal sources is classified as less than 1 in 1000.
- 9.3 The site is located a significant distance from the coast.
- 9.4 The PPG details the suitability of different land uses within each flood zone. The proposed land use is classified as 'more vulnerable' and such uses are generally considered appropriate within Flood Zone 1.
- 9.5 Therefore, the site can be considered to be at 'Low' risk from fluvial and tidal sources. Therefore, fluvial and tidal flooding will not be a constraint to development of the site.

Flooding from Sewers

- 9.6 Sewer flooding can occur during periods of heavy rainfall when a sewer becomes blocked or is of inadequate capacity.
- 9.7 As the site is mostly greenfield with no surface water sewers, it can be assumed sewer flood risk is low.

Surface Water Flooding (Overland Flow)

- 9.8 This can occur during intense rainfall events, when water cannot soak into the ground or enter drainage systems. Overland flow is likely to follow the local topography, ponding in valets or topographical depressions.
- 9.9 The EA's Flood Map for Surface Water, which is available online, indicates that although most of the site is at a 'Very Low' risk there are areas of 'Low' to 'High' risk of surface water flooding.
- 9.10 The majority of the areas are associated with drainage ditches that are present at the site. One at risk area appears to be associated with an overland flow route, originating off-site flowing towards the central area of the eastern portion of the site towards the existing watercourse located within the western portion of the site. It is proposed that consultation will be undertaken, at detailed design stage, with Lewes District Council to understand the scheme and take a holistic approach, ensuring that the proposed works and drainage fit within the existing NFMS.
- 9.11 The development has been sequentially designed to ensure residential parcels are located outside of the 'High' surface water risk extents. A separate Sequential Test has been undertaken for the site to address LPA wide sites with suitability for development.

Groundwater Flooding

- 9.12 This can occur in low-lying areas when groundwater levels rise above surface levels, or within underground structures.
- 9.13 The Weald Clay bedrock at the site is classified as an 'Unproductive' Aquifer. These formations have a low permeability and have negligible significance for water supply or base flow.
- 9.14 Groundwater monitoring at the site indicates that groundwater was less than 1m below ground level across the site.

- 9.15 The LLFA indicated that BGS Mapping shows there is no observable groundwater flood risk to the site.
- 9.16 Based on the information available, the risk of groundwater flooding is considered to be low.

Other Sources

- 9.17 As with any urban location, there is the risk of a break in a water main causing localised flooding at the site. A burst pipe can result in flooding of roads and property. Areas at most risk are low points in topography along open roads and tunnels. The development proposals will be designed to ensure that any overland flows are routed away from buildings and intercepted by gullies and or drainage channels, therefore potential risks posed by a break in a water main can be considered negligible.
- 9.18 The risk of flooding from reservoirs and artificial watercourses such as canals are considered to be very low due to the absence of any within close proximity to the site.

Proposed Mitigation

- 9.19 The development proposals will be designed to ensure that any overland flows are routed away from buildings and intercepted by the drainage system. Where possible, levels should fall away from buildings, and areas where water could dam up against structures should be avoided, even if drainage is provided.
- 9.20 If any permeable areas are not formally drained, it should then be demonstrated that flood flow routes and depths would not affect property, car park areas or other such infrastructure. Overland flows should be routed towards gullies where applicable and not into third party land.
- 9.21 Due to the risk from surface water flooding posed to the site, a surface water drainage strategy, suitable of conveying flows up to and including the 1 in 100 year + climate change event (45%), will be implemented for the site. This will ensure that once the site is developed, surface water will be intercepted and managed. This will provide a betterment on the existing situation and ensure flood risk does not increase for the site and surrounding areas.
- 9.22 A basic level of flood resistance and resilience can be achieved by following good building practice and complying with the requirements of the Building Regulations 2010 and the supporting 'Approved Documents'. The EA's Floodline Publication 'Damage Limitation' provides information on flood proofing measures.

Event Exceedance

- 9.23 As mentioned above, the implementation of a surface water drainage system will work to ensure that surface water flows are appropriately managed to reduce the risk to the development. The surface water drainage system will be designed to manage flows from rainfall events up to the 1 in 100 year + 45% climate change event.
- 9.24 Following the implementation of a surface water drainage strategy, a residual risk will remain for the proposed development from rainfall events greater than the 1 in 100 year + 45 % climate change design. By ensuring on-site sewers are designed in accordance with Building Regulations and the latest Sewerage Sector Guidance, this will take account of overland flood flow routes and divert any excess surface water around and away from proposed buildings to mitigate flood risk.

10 SURFACE WATER MANAGEMENT

Introduction

- 10.1 The site is 20.89 hectares (ha) and has been split into 3 surface water catchments, the impermeable areas and proposed drainage are discussed below.
- 10.2 The type of development proposed is classed as 'more vulnerable' residential development, with a design life of 100 years. Therefore, for the purposes of this assessment, taking into account the Environment Agency's climate change allowances (published in May 2022), a 45% increase in peak rainfall intensity has been included as climate change allowance, which caters up to the year 2125. No climate change guidance is available beyond 2125.
- 10.3 The Drainage Strategy has been designed in accordance with 'Guidance to Sustainable Drainage in East Sussex' and the Drainage Hierarchy.

Existing Surface Water Runoff Rates

Greenfield Runoff Rate

- 10.4 The greenfield nature of the site means that surface water will slowly soak into the ground (infiltrate), be intercepted by vegetation or run off by way of overland flow, according to the soil characteristics and following the topography of the site. The greenfield runoff rate per hectare (ha) for the proposed impermeable areas have been calculated using the FEH Method. The greenfield rates are presented in Table 4 below and provided in Appendix G.

Table 4. Equivalent greenfield runoff rates per hectare

Return Period (years)	Runoff Rate (l/sec/ha)	Design Runoff Rate (l/sec/ha)
1 in 1	7.24	7.24
Q _{BAR}	8.51	7.24
1 in 30	27.15	7.24
1 in 100	31.84	7.24

Consideration of Drainage Hierarchy

- 10.5 The PPG advises of the following hierarchy for the disposal of surface water;
1. Infiltration;
 2. To a surface water body;
 3. To a surface water sewer, highway drain or another drainage system; or
 4. To a combined sewer.
- 10.6 The drainage hierarchy has been considered as follows.

Infiltration

- 10.7 Groundwater monitoring for the site and information provided by the LLFA indicates that the site is not suitable for infiltration methods. As a result, infiltration techniques are not proposed for the disposal of surface water.

To a Surface Water Body

- 10.8 Where infiltration is not feasible, discharging to a surface water body should be considered, subject to proximity of nearby watercourses in accordance with LLFA requirements. Where drainage needs to cross third party land, relevant consent will be required. In addition, appropriate consent will be required for surface water discharge into Main Rivers / Ordinary Watercourses.
- 10.9 Several ordinary watercourses are located within the site boundary. Drainage to these watercourses is considered appropriate.

To a Surface Water Sewer, Highway Drain or Another Drainage System

- 10.10 Sewer networks within the vicinity of the site are operated by Southern Water. Asset Location Plans indicate no surface water sewers serve the site. Therefore, it is not proposed to utilise a surface water sewer connection.

To a Combined Sewer

- 10.11 No combined sewers are found surrounding the site.

Conceptual Surface Water Drainage Strategy

- 10.12 Following the Drainage Hierarchy, the potential for storage and infiltration of runoff has been considered. Storage within open features is feasible given the size of the site and presence of surface watercourses, storage will be provided within the attenuation ponds and swales for gradual release. This will ensure that runoff is managed as close to the source as possible. Discharge rates are based on the 1 in 1 year greenfield runoff rate as per the DEFRA Sustainable drainage systems: non-statutory technical standards – Standard S2. The necessary consents will be obtained from the Water Authority and the EA, with whom the final discharge rate would be agreed.
- 10.13 The site has been divided into three catchments and details of each are summarised below. The conceptual drainage strategy is provided in Appendix H and calculations are provided in Appendix I.

Table 5. Catchments Impermeable Areas, Storage and Restriction Rate

Catchment	Impermeable Area (inc. 10% allowance for urban creep)	Required Storage (1 in 100 +45%CC)	Provided Storage	Restriction Rate (1 in 1 year)
Catchment A	1.83ha	1,376m ³	1403m ³	13 l/s
Catchment B	1.40ha	1,032m ³	1,166m ³	10 l/s
Catchment C	1.59ha	1,193m ³	1,345m ³	11 l/s
Total	4.82ha	3,601 m³	3,914 m³	34 l/s

Site Specific SuDS Benefits

- 10.16 Sustainable drainage is a departure from the traditional approach to draining sites. There are some key principles that influence the planning and design process enabling SuDS to mimic natural drainage by:
- storing run-off and releasing it slowly (attenuation);
 - allowing water to soak into the ground (infiltration);
 - slowly transporting (conveying) water on the surface;
 - filtering out pollutants;
 - allowing sediments to settle out by controlling the flow of water.
- 10.17 CIRIA has produced several guidance documents covering a range of water management scenarios. A summary of the publications used as reference when the site drainage strategy was produced are listed below.
- Planning for SUDS – making it happen (C687)
 - Site handbook for the construction of SUDS (C698)
 - The SUDS Manual 2015 (C753)
 - Sustainable Drainage Systems – Hydraulic, structural and water quality advice (C609).

Attenuation Basins

- 10.1 The attenuation basins will allow peak flow rates to be reduced and enable flows to be limited to significantly below the existing run-off rate during storm events. The SuDS features are also useful in providing water treatment predominantly through the settlement of silts and suspended sediments. The basin will take the form of a depression within the application site and can be landscaped to provide aesthetic and amenity value. Planting can be used to improve biodiversity and attract wildlife.

Swales

- 10.2 Swales are shallow lined vegetated drainage channels which can be used to convey, treat, attenuate and/or store surface water runoff. They can be “wet” or “dry” depending on the level of infiltration and their position within the overall drainage strategy. They can be enhanced to provide a greater capacity or provide greater treatment, if required.

Water Quality

- 10.3 Surface water run-off should be managed by SuDS that are designed to attenuate flows and to avoid water quality impacts downstream. To demonstrate that surface water arising from the development will be appropriately treated prior to discharge, the Simple Index Approach, as outlined within the SuDS Manual (CIRIA C753) has been followed.
- 10.4 As stated in the SuDS Manual 2015 (C753), the risk posed by surface water runoff to the receiving environment is a function of:
- the pollution hazard at a particular site (i.e. the pollutant source);
 - the effectiveness of SuDS treatment components in reducing levels of pollutants to environmentally acceptable levels, groundwater (i.e. the pollutant pathway); and
 - the sensitivity of the receiving environment (i.e. the environmental receptor).
- 10.5 The most significant pollutant load within the site will arise from the local centre and roads with more than 300 traffic movements a day. These have an identified pollutant hazard level of ‘Medium’ as

per the SuDS Manual (CIRIA C753) Table 26.2, with identified pollutant hazard indices of 0.7 for Total Suspended Solids (TSS), 0.6 for Metals, and 0.7 for Liquid Hydrocarbons.

- 10.6 To deliver adequate treatment, the selected 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). In systems using two components or more in series a factor of 0.5 is used to account for the reduced performance of secondary components associated with already reduced inflow concentrations.
- 10.7 Table 6 provides the mitigation indices for the major SuDS components proposed for the site. This confirms that in line with the Simple Index Approach, sufficient surface water treatment is provided in advance of discharge from the site.

Table 6. Mitigation Indices

	TSS	Metals	Hydrocarbons
Pollution hazard indices	0.7	0.6	0.7
Component 1 - Swale	0.5	0.6	0.6
Component 2 - Attenuation Pond	(0.7*0.5 factor) 0.35	(0.7*0.5 factor) 0.35	(0.5*0.5 factor) 0.25
Total Mitigation Score	(0.5+0.25) 0.85	(0.6+0.25) 0.95	(0.6+0.3) 0.85

Event Exceedance

- 10.8 The proposed indicative surface water drainage concept provides storage up to the 1 in 100 year plus 45% climate change event. In an event exceeding this magnitude, detailed drainage design will identify mitigation measures to ensure that the resulting above-ground flooding will be confined to temporary shallow flooding of the on-site road network and will not affect the buildings on site or significantly increase flood risk to off-site locations.
- 10.9 Event exceedance planning should be undertaken as part of the final design process. Suitable mitigation measures will be incorporated into the detailed design of the development to ensure water is retained on-site should surcharging of on-site drains occur during extreme rainfall events.

Proposed Foul Water Drainage

- 10.10 As illustrated by the Conceptual Drainage Strategy in Appendix G, it is proposed that foul water will be conveyed to the existing Southern Water foul network within Eastern Road, to the west of the site. A gravity connection is proposed to MH5902. This is subject to confirmation of levels, discharge rates and capacity from Southern Water.
- 10.11 The foul water connection into the existing network will be subject to the successful submission of a Section 106 agreement under the Water Industry Act and approval from Southern Water.

Maintenance and Adoption

- 10.12 A specialist management company will be identified at the detailed design stage and appointed to maintain the SuDS features for the lifetime of the development.
- 10.13 Tables 7 to 10, below, indicate the envisaged maintenance activities associated with the proposed attenuation basin, associated headwalls, flow control manhole and swales, along with the approximate frequency within which they should be completed.

Table 7. Attenuation Basin Suggested Maintenance Schedule

Maintenance schedule	Require Action	Typical Frequency
Regular Maintenance	Remove litter and debris	As required potentially monthly
	Cut grass – public areas	Monthly (during growing season)
	Cut grass – meadow grass in and around basin	Half yearly (spring, before nesting season, and autumn)
	Inspect vegetation to pond edge and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Hand cut submerged and emergent aquatic plants (at minimum of 0.1m above pond base; include max 25% of pond surface)	Annually
	Remove 25% of bank vegetation from waters edge to a minimum of 1m above water level	Annually
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from forebay	1 – 5 years, or as required
	Remove sediment from one quadrant of the main body of ponds without sediment forebays	2 – 10 years (usually)
Occasional Maintenance	Remove sediment from the main body of big ponds, when pool volume is reduced by 20%	>25 years (usually)
Remedial Actions	Repair of erosion or other damage	As required
	Aerate pond when signs of eutrophication are detected	As required
	Realignment of rip rap or other damage	As required
	Repair/rehabilitation of inlets, outlets and overflows	As required
Monitoring	Inspect structures for evidence of poor operation	Monthly/after large storms
	Inspect banksides, structures, pipework etc. for evidence of physical damage	Monthly/after large storms
	Inspect water body for signs of eutrophication	Monthly (May - October)
	Inspect silt accumulation rates and establish appropriate removal frequencies	Half yearly
	Check penstocks and other mechanical devices	Half yearly

Table 8. Flow Control Manhole Suggested Maintenance Schedule

Maintenance schedule	Require Action	Typical Frequency
Regular Maintenance	Inspect vegetation above and around flow control chamber and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Remove sediment from flow control chambers	Annually
	Flow control devices: Check for and clear obstructions	Quarterly
Remedial Actions	Repair of Penstock and flow control device	As required
Monitoring	Inspect structures for evidence of poor operation	Monthly/after large storm
	Inspect structures, flow control and pipework etc. for evidence of physical damage	Monthly/after large storm
	Inspect silt accumulation rates and establish appropriate removal frequencies	Half yearly

Table 9. Inlet and Outlet Headwalls Suggested Maintenance Schedule

Maintenance schedule	Require Action	Typical Frequency
Regular Maintenance	Litter removal	As required
	Inspect vegetation above and around headwall and remove nuisance plants (for first 3 years)	Monthly (at start, then as required)
	Tidy all dead growth before start of growing season	Annually
	Remove sediment from aprons	Annually
	Flap valves and grilles: Check for and clear obstructions	Quarterly
Remedial Actions	Repair of erosion or other damage around headwalls	As required
Monitoring	Inspect structures for evidence of poor operation	Monthly/after large storms

Inspect structures, pipework etc. for evidence of physical damage	Monthly/after large storms
Inspect silt accumulation rates and establish appropriate removal frequencies	Half yearly
Check flap valves	Half yearly

Table 10. Swales Suggested Maintenance Schedule

Maintenance schedule	Require Action	Typical Frequency
Regular Maintenance	Remove litter and debris	Monthly, or as required
	Cut grass – to retain grass height within specified design range	Monthly (during growing season), or as required
	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 infiltration surfaces for ponding, compaction, silt accumulation, record areas where water is ponding for > 48 hours	Monthly, or when required
	Inspect vegetation coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
	Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
Occasional Maintenance	Reseed areas of poor vegetation growth; alter plant types to better suit conditions, if required	As required or if bare soil is exposed over 10% or more of the swale treatment area
Remedial Actions	Repair erosion or other damage by re-turfing or reseeding	As required
	Relevel uneven surfaces and reinstate design levels	As required
	Scarify and spike topsoil layer to improve infiltration performance, break up silt deposits and prevent compaction of the soil surface	As required
	Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip	As required
	Remove and dispose of oils or petrol residues using safe standard practices	As required

11 SEQUENTIAL TEST AND EXCEPTION TEST

Vulnerability Classification

- 11.1 In accordance with the Flood Risk Vulnerability Classification in Annex 3 of the NPPF, a mixed-use development is classified with different vulnerabilities. Residential institutions such as residential care homes and dwelling houses are classified as 'More Vulnerable' development in flood risk terms.
- 11.2 The site is located within Flood Zone 1. 'More Vulnerable' development is deemed permitted within Flood Zone 1.

Sequential Test

- 11.3 The NPPF requires the Local Authority to apply the Sequential Test in consideration of new development. The aim of the Test is to steer new development to areas at the lowest probability of flooding.

- 11.4 The revised section of the NPPF (December 2024) on "planning and flood risk" makes it clear that the flood sequential test is intended to be applied to all sources of flood risk, not just river/sea flooding. Paragraph 174 and 175 of the NPPF 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."

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

- 11.5 The approach we have taken is to look at all sources of flooding within the site, to determine whether a flood sequential test is required – i.e. we have assessed the development to establish whether it is an area within the lowest risk of flooding from any source.

- 11.6 The site is located within Flood Zone 1.

- 11.7 Large areas of the site are at 'Very Low' risk of surface water flooding. Areas of 'Low to High' surface water flood risk are present across the site. These are associated with the watercourses present and an existing surface water flow path. Residential development parcels have been steered away from areas of 'High' surface water risk.

- 11.8 The site is not considered to be at flood risk from groundwater or reservoir flood risk.

- 11.9 It should be noted that an update to the NPPF technical guidance (National flood risk standing advice for local planning authorities, dated 23rd August 2024 ("When development is exempt from the sequential test") states:

"You may not need a sequential test if development can be laid out so that only elements such as public open space, biodiversity and amenity areas are located in areas at risk of any source of current or future flooding."

- 11.10 This is now mirrored in Paragraph 175 of the updated NPPF.

- 11.11 Notwithstanding the above, a separate Sequential Test analysis has been undertaken by RPS (ref: ENV-21061 Wivelsfield Green ST v6). The Land at Wivelsfield Green site is identified as 20th preferable site within all assessed sites on flood risk grounds only due to the potential surface water flood risk flow path areas flowing across the site. However, when considering the nature and

quantum of the development and reasonably available alternative sites, this site is the 1st sequentially preferable site overall.

12 SUMMARY AND CONCLUSIONS

- 12.1 The aim of the FRA is to outline the potential for the site to be impacted by flooding, the potential impacts of the development on flooding both onsite and in the vicinity, and the proposed measures which can be incorporated into the development to mitigate the identified risks. The report has been produced in accordance with the guidance detailed in the NPPF. Reference has also been made to the CIRIA SuDS manual (C753), the SFRA and the SWMP and following consultation with the EA's Partnership and Strategic Overview Team and the LLFA.
- 12.2 The potential flood risks to the site, and the measures proposed to mitigate the identified risks, are summarised in Table 11.

Table 11. Proposed mitigation

Source of Flooding	Identified Risk			Mitigation Proposed	Residual Risk		
	L	M	H		L	M	H
Fluvial	✓			No mitigation necessary	✓		
Tidal	✓			No mitigation necessary	✓		
Sewers	✓			No mitigation necessary	✓		
Surface Water	✓			Surface water drainage to be implemented at site	✓		
Groundwater	✓			No mitigation necessary	✓		
Other Sources (e.g. reservoirs, water mains)	✓			No mitigation necessary	✓		

- 12.3 The site is located within EA Flood Zone 1 at low risk of fluvial and tidal flooding.
- 12.4 Surface water will be restricted to greenfield rates and attenuated in ponds and swales on the site, therefore not increasing surface water risk at the site.
- 12.5 The site passes the Sequential Test, undertaken to meet the requirements imposed under the NPPF.
- 12.6 It has been demonstrated that the development would be safe, without increasing flood risk elsewhere.

APPENDICES

Appendix A

EA Consultation Response

Grady, Jessica

From: Jessica.Grady@rps.tetrattech.com
Subject: FW: SSD381363 - Data Request - Land at Green Road, Wivelsfield Green, East Sussex, RH17 7QL
Attachments: Product 4 FZ1 letter - SSD381363.pdf; Risk of Flooding from Surface Water.pdf

From: PSO West Sussex <PSOWestSussex@environment-agency.gov.uk>
Sent: Friday, October 25, 2024 3:56 PM
To: Grady, Jessica <Jessica.Grady@rps.tetrattech.com>
Cc: SSD Enquiries <SSDEnquiries@environment-agency.gov.uk>
Subject: RE: SSD381363 - Data Request - Land at Green Road, Wivelsfield Green, East Sussex, RH17 7QL

You don't often get email from psowestsussex@environment-agency.gov.uk. [Learn why this is important](#)

 **CAUTION:** This email originated from an external sender. Verify the source before opening links or attachments.



Dear Jessica,

Thank you for your Flood Information Request for **Land at Green Road, Wivelsfield Green, East Sussex, RH17 7QL**.

Please be advised that your requested site is within Flood Zone 1. We are therefore unable to provide Product 4 data from our detailed fluvial or tidal models which is relevant to your site. Please see the attached letter and map that will provide further information.

This information is supplied subject to the notice which can be viewed via the following link:
<http://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>

Rights of appeal: If you are not satisfied you can contact us within 2 calendar months to ask for our decision to be reviewed. We shall review our response to your request and give you our decision in writing within 40 working days.

If you are still not satisfied following this, you can raise a concern with the Information Commissioner, who is the statutory regulator for Freedom of Information and the Environmental Information Regulations. The contact details are:

- Address: Information Commissioner's Office, Wycliffe House, Water Lane, Wilmslow, Cheshire, SK9 5AF
- Tel: 303 123 1113
- Website: <http://ico.org.uk>

If you have any further queries about this request, please do not hesitate to contact us at psowestsussex@environment-agency.gov.uk.

Kind regards,

Amy O'Donnell *(she/her)*

Partnership and Strategic Overview West Sussex, Solent and South Downs

Environment Agency | Guildbourne House, Chatsworth Road, Worthing, West Sussex, BN11 1LD

PSOWestSussex@environment-agency.gov.uk



Creating a better place
for people and wildlife



Our reference: **SSD381363**

Date: **25/10/2024**

Dear Jessica,

Thank you for your request of 21 October 2024 to use Environment Agency Product 4 data for the site at **Green Road, Wivelsfield Green, East Sussex, RH17 7QL**.

Response to your request

The Environment Agency's records indicate that the above site is located in Flood Zone 1 (land assessed as having less than 0.1% (1 in 1,000) chance of flooding in any given year from **rivers or the sea**). Therefore, the likelihood of flooding from rivers and sea in this area is estimated as 'very low'.

Proximity to Flood Zones 2 or 3

The above site is approximately 600 metres away from Flood Zone 2/3. We are therefore unable to provide data from our detailed fluvial or tidal models which is relevant to your site.

More information on Flood Zones can be found on the GOV.UK website:

<http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/flood-zone-and-flood-risk-tables/table-1-flood-zones/>

Surface water flooding

Our mapping indicates that there are areas within this site that are at **High Risk** of surface water flooding.

For information on flooding from all other sources, such as surface water, please contact the Lead Local Flood Authority, which in this case is **East Sussex County Council**. A link to their information available online is shown below:

<https://www.eastsussex.gov.uk/environment/flooding/leadlocalfloodauthority/>

Please note that the above is a link to an external website which the Environment Agency does not control or maintain. Therefore, the link may not be the most up-to-date at the date of this letter. If the link does not work, and you are unable to find the information about surface water flooding on the relevant website, please contact the authority named above directly.

Where you can find further information

- Detailed long-term flood information and maps can be found on the GOV.UK website:
<https://flood-warning-information.service.gov.uk/long-term-flood-risk/>
- Flood maps for planning can be found on the GOV.UK website:
<https://flood-map-for-planning.service.gov.uk/>
- Please be aware that in February 2016 the Environment Agency updated its guidance on climate change allowances. The standard allowance of adding 20% to peak flows – as per previous guidance in the National Planning Policy Framework, may not be applicable for the purposes of informing development proposals. It is possible that our current modelling has under estimated flood risk when taking climate change into consideration. This does not however have an effect on Flood Zones 2 or 3. For further information please visit:
<https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>
- Further details about the Environment Agency information supplied can be found on the GOV.UK website:
<https://www.gov.uk/browse/environment-countryside/flooding-extreme-weather>
- If you have requested this information to help inform a development proposal, then you should note the information on GOV.UK on the use of Environment Agency information for Flood Risk Assessments:
<https://www.gov.uk/planning-applications-assessing-flood-risk>
<https://www.gov.uk/government/publications/pre-planning-application-enquiry-form-preliminary-opinion>

If you have any queries or would like to discuss the content of this letter further please call us on 03708 506 506, or reply to the email sent to you with this letter attached.

Please get in touch if you have any further queries or contact us within two (2) months if you would like us to review the information we have sent.

For information on what you can expect from us and our full service commitment to you, please click on this link:

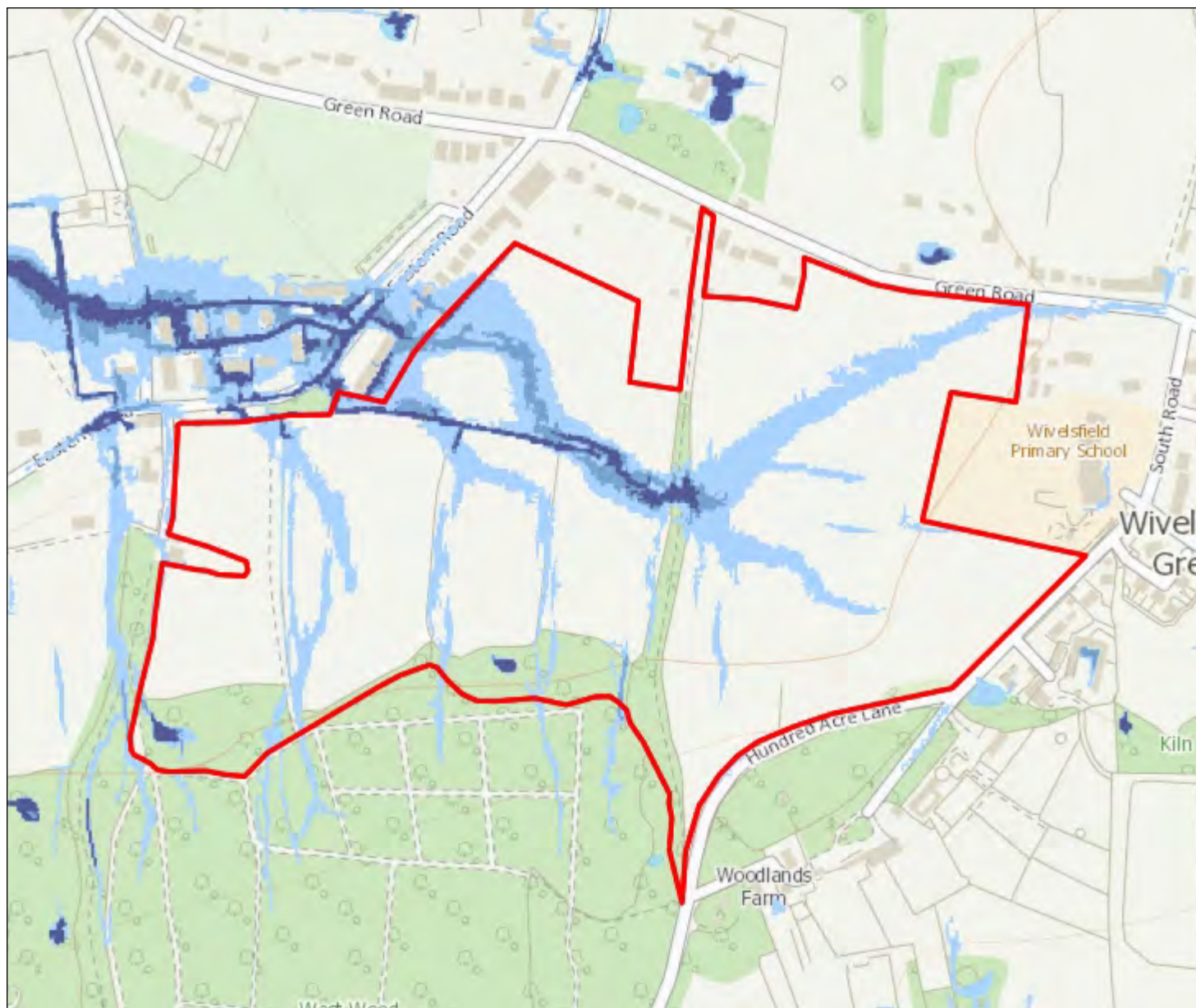
<https://www.gov.uk/government/publications/environment-agency-customer-service-commitment--2/environment-agency-customer-service-commitment>

Yours sincerely,

Amy O'Donnell

Partnership and Strategic Overview West Sussex, Solent and South Downs
Environment Agency | Guildbourne House, Chatsworth Road, Worthing, West Sussex,
BN11 1LD

Risk of flooding from Surface Water. Centred RH17 7QL. Created 25/10/2024.



1: 5,000

0 Metres 125



Likelihood of flooding from Surface Water

- High ($\geq 3.3\%$)
- Medium (3.3% - 1%)
- Low (1% - 0.1%)
- Very Low
- Flood Extent 1 in 30
- Flood Extent 1 in 100
- Flood Extent 1 in 1000

Likelihood of flooding from Surface Water

- High: Greater than or equal to 3.3% (1 in 30) chance in any given year
- Medium: Less than 3.3% (1 in 30) but greater than or equal to 1% (1 in 100) chance in any given year
- Low: Less than 1% (1 in 100) but greater than or equal to 0.1% (1 in 1,000) chance in any given year
- Very Low: Less than 0.1% (1 in 1,000) chance in any given year

This information is shown on the Risk of Flooding from Surface Water map on GOV.UK.

Appendix B

Southern Water Information

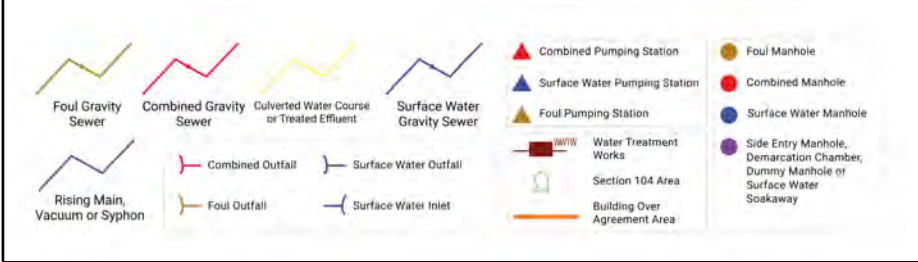


(c) Crown copyright and database rights 2024 Ordnance Survey AC0000808122 Date: 07/10/24 Scale: 1:1250 Map Centre: 534820.119880 Data updated: 24/09/24 Our Ref: 1587743 - 1 Wastewater Plan A1 Powered by digipal

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2024 Ordnance Survey AC0000808122. This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.



jessica.grady@rpsgroup.com
Wivelsfield Green



Appendix C

LLFA Response

Grady, Jessica

From: Jessica.Grady@rps.tetrattech.com
Subject: Information Request: Green Road, Wivelsfield Green, East Sussex, RH17 7QL

From: Su DS Consultations - Flood <Su.DS@eastsussex.gov.uk>
Sent: Tuesday, July 9, 2024 3:00 PM
To: Grady, Jessica <Jessica.Grady@rps.tetrattech.com>
Cc: Su DS Consultations - Flood <Su.DS@eastsussex.gov.uk>
Subject: Information Request: Green Road, Wivelsfield Green, East Sussex, RH17 7QL

 **CAUTION:** This email originated from an external sender. Verify the source before opening links or attachments.



Dear Jessica

PRE-APP Green Road, Wivelsfield Green, East Sussex, RH17 7QL-

Thank you for requesting this pre-application advice. Please find attached a site-specific report attached and information below.

Flood Risk

The site is located within Flood Zone 1. The County Council as the Lead Local Flood Authority is responsible for managing local flood risk (surface water, groundwater and ordinary watercourses), therefore our advice is centred around managing local flood risk and impacts of flood risk on surface water drainage proposals. The Environment Agency should be consulted on matters relating to fluvial flood risk.

As indicated in the attached report, a number of flooding instances have been recorded in the vicinity of the site. The Environment Agency's Flood Map for Surface Water shows several surface water flow paths crossing the site, with predicted depths of up to 600mm for the 0.1 AEP (1 in 1000 year event). The applicant should produce a drainage and levels strategy which safely conveys or attenuates existing overland surface water flows without increasing flood risk offsite. Sufficient evidence should be provided to demonstrate that the risk of flooding has been managed effectively. Depending on the proposals, this may require 2D hydraulic modelling.

Surface water attenuation features should be placed outside the surface water flood risk extents for the 1 in 100 year event.

Surface Water Drainage

The application site is shown to be underlain by Weald Clay Formation (mudstone), which is unlikely to be compatible with infiltration SuDS. Based on British Geological Survey data, the estimated water table depth for the site is less than 3m below ground level. As such, groundwater monitoring from winter to spring will be required, although this may be set as a planning condition.

Discharge rates should meet the standards within the DEFRA Non-Statutory Technical Standards on Sustainable Drainage. We also accept simplified fixed flow control with all storms including the design storm restricted to QBar. The Council would expect to see evidence that the proposed development will not increase flood risk on or off site. Therefore, the applicant should produce a drainage strategy that clearly reflects an understanding of the existing/proposed discharge rates, volumes for all rainfall events including those with an annual probability of occurring of 1 in 100 (plus an allowance for climate change).

Please note we do not accept mechanical pumping of surface water or discharge to deep bore soakaways where a gravity solution is feasible. Connections to Highway Drains will only be permissible where no other gravity solution is feasible and may involve survey and improvement of the existing infrastructure.

The applicant should refer to our East Sussex SuDS Guide and Local Flood Risk Management Strategy, both available on our website. The SuDS Guide details the design process we expect applicants to follow while designing drainage within our area. The Surface water drainage checklist, also available on our website, lists the information we expect to be submitted in support of an application: <https://www.eastsussex.gov.uk/environment/flooding/sustainable-drainage-systems>

Other information

Existing ordinary watercourses should be retained. Any proposed infilling or diversion of watercourses must be justified and will be subject to the granting of an Ordinary Watercourse Consent (OWC). Any planned works to a watercourse will require an OWC: <https://www.eastsussex.gov.uk/environment/flooding/ordinary-watercourse-consent>

A 5m buffer from buildings to the top of bank of ordinary watercourses should be maintained to ensure access for maintenance.

Kind regards,

Victoria Lander

Sustainable Drainage Advisor

Flood Risk Management - CET

SuDS@eastsussex.gov.uk



28/06/2024

Drainage Report

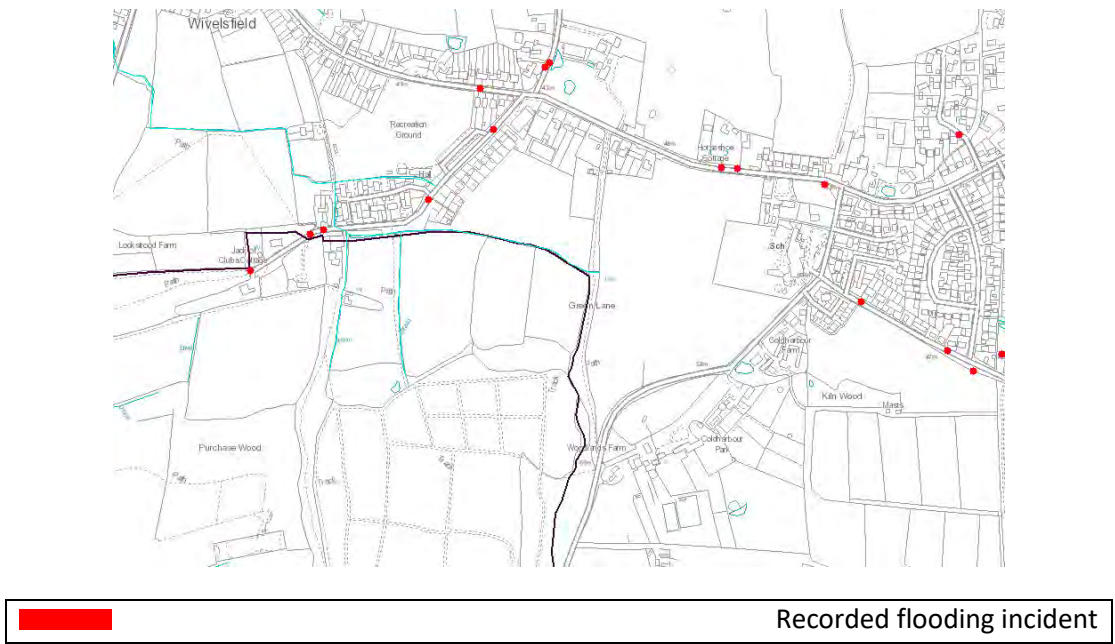
Site name: Green Road, Wivelsfield Green, East Sussex, RH17 7QL

ESCC Reference: SUD/PRE/LW/24/004

Flood Risk

Flood Risk	Is any part of the site at risk?	Where to obtain additional information
Fluvial/Coastal	No	<u>Environment Agency</u>
Surface water	Yes	<u>Environment Agency</u>
Groundwater	Yes	<u>British Geological Survey</u>

The map below shows the flood incidents recorded in our database in the vicinity of the development site.



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Figure 1: Recorded Flood Incidents

The table below provides details of the recorded flood incidents within the vicinity of the site.

Date	Source of flooding	Description
30/12/2013-08/10/2014	Surface Water	Multiple incidents of surface water flooding of residential properties on Eastern Road due to blocked drains.
18/03/2014	Surface Water	Surface water flooding along Green Road due to damaged grass verges.
03/08/2017-07/08/2020	Surface Water	Multiple incidents of surface water flooding of residential curtilage along South Road due to blocked drains.
05/01/2018	Burst Water Main	Flooding of residential curtilage along Green Road due to a burst water main.
19/01/2018	Watercourse	Watercourse Flooding of residential curtilage along South Road due to bank subsidence and water backing up in pond.

Please note that our records only provide a snapshot of the flood history in the area, as the majority of incidents were compiled after the County Council was established as the Lead Local Flood Authority in 2010. Therefore, other risk management authorities, such as the Environment Agency, the Local Planning Authority and Southern Water may hold additional records.

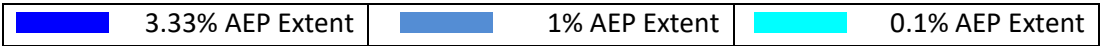
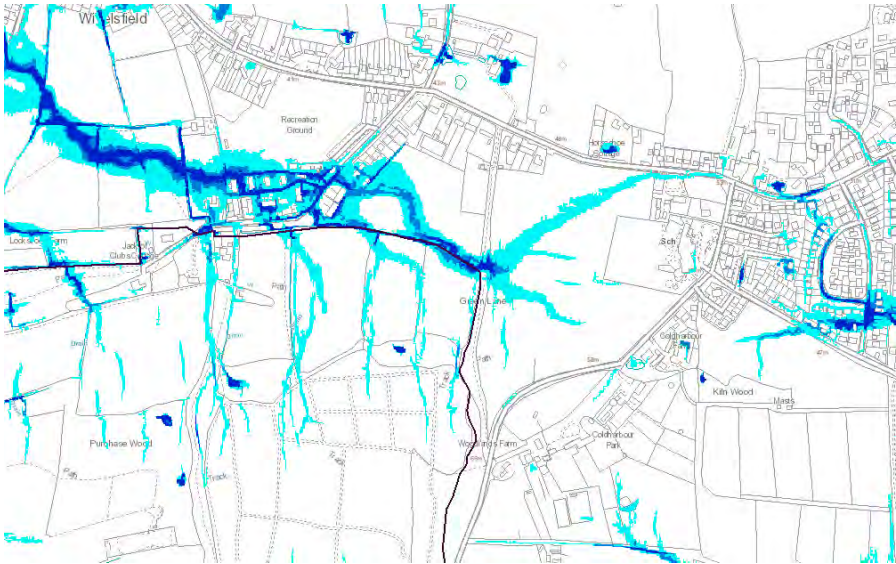
The surface water management strategy should include information on how the potential impacts of local flood risk sources on the proposed drainage arrangements have been considered and mitigated where necessary. Local flood risk sources include surface water, groundwater, sewer and ordinary watercourse flood risk.

Surface Water Flood Risk

The Environment Agency’s surface water flood mapping shows the predicted surface water flood risk at the development site, and the table below gives the corresponding maximum flood depth:

Table 1: Surface Water Flood Depths

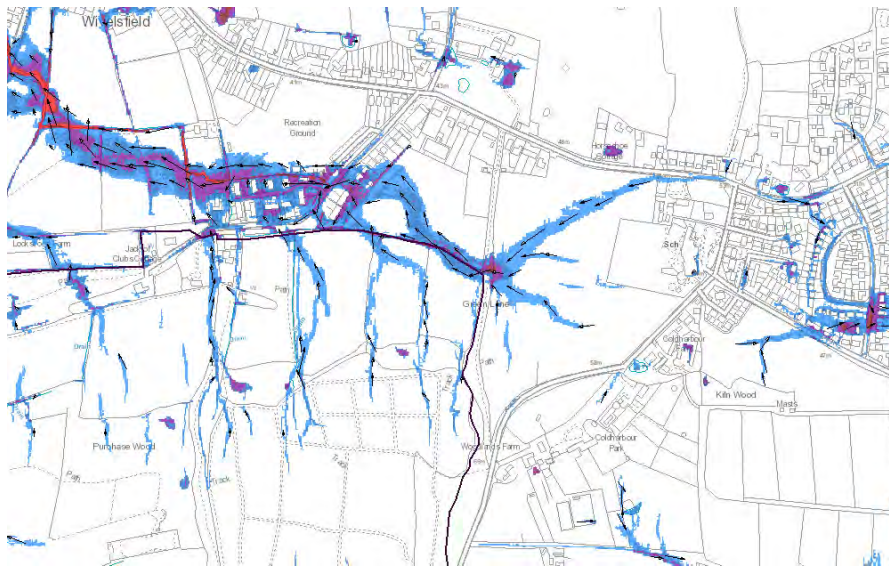
Flood Event	Maximum Depth
3.33% AEP (1 in 30 year)	0.75
1% AEP (1 in 100 year)	0.81
0.1% AEP (1 in 1000 year)	0.95



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Figure 2: Surface Water Flood Risk

The map below shows predicted depths and flow direction of surface water for the 0.1% AEP (1 in 1000) event:



	0.00 – 0.15m		0.15 – 0.30m		0.30 – 0.60m
	0.60 - 0.90m		> 0.90 m		

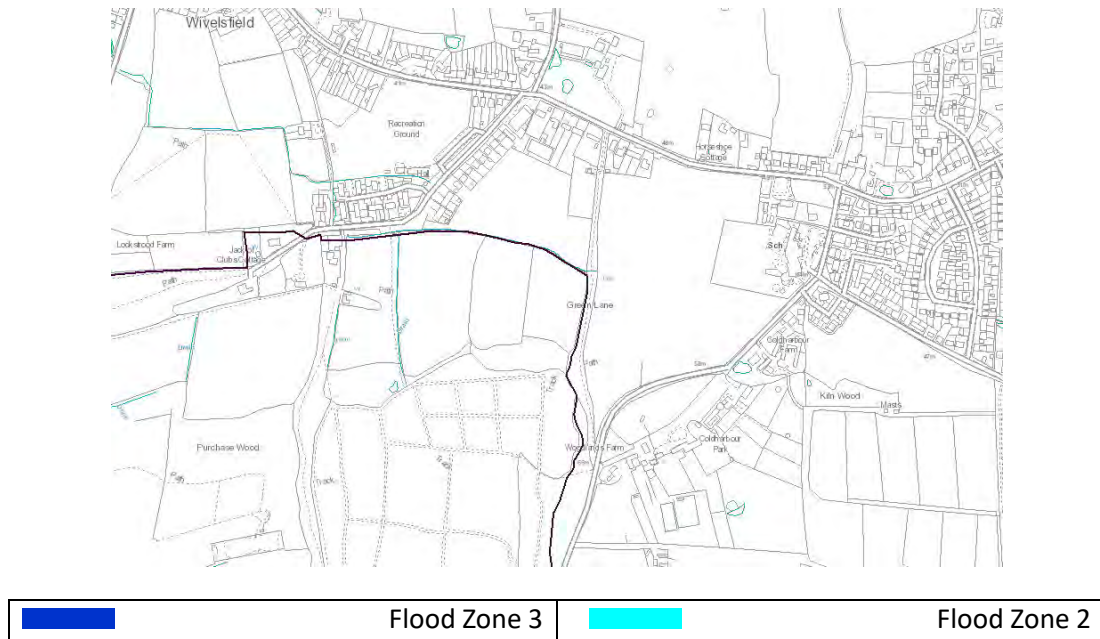
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Figure 3: 0.1% AEP depth and flow direction

Further information can be viewed online on at the Environment Agency's pages on the GOV.UK website.

Fluvial and Coastal Flood Risk

The Environment Agency's mapping shows that the property is not in the vicinity of Flood Zone 2 or Flood Zone 3.



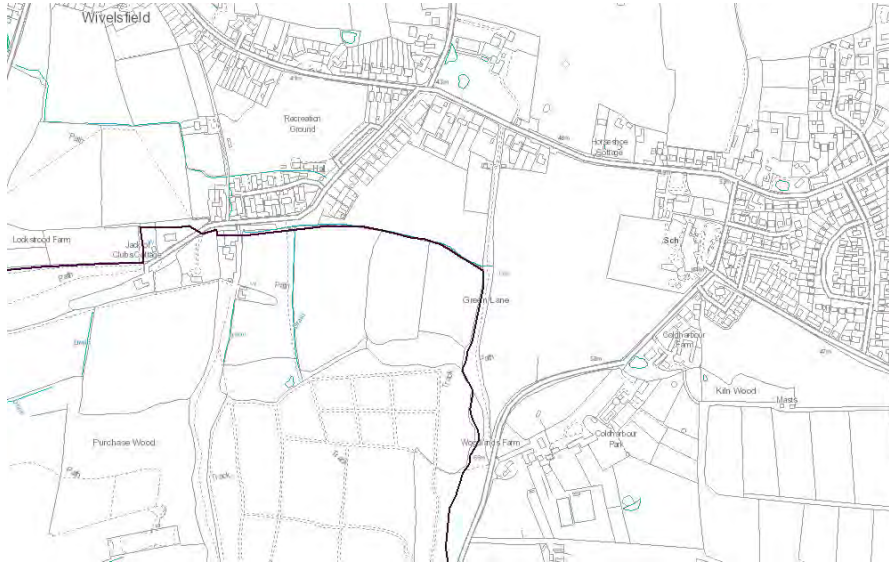
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Figure 4: Fluvial and Coastal Flood Risk

Further information can be viewed online at the Environment Agency's pages on the GOV.UK website.

Groundwater Flood Risk

Mapping from the British Geological Survey shows that there is no observable groundwater flood risk to the site.



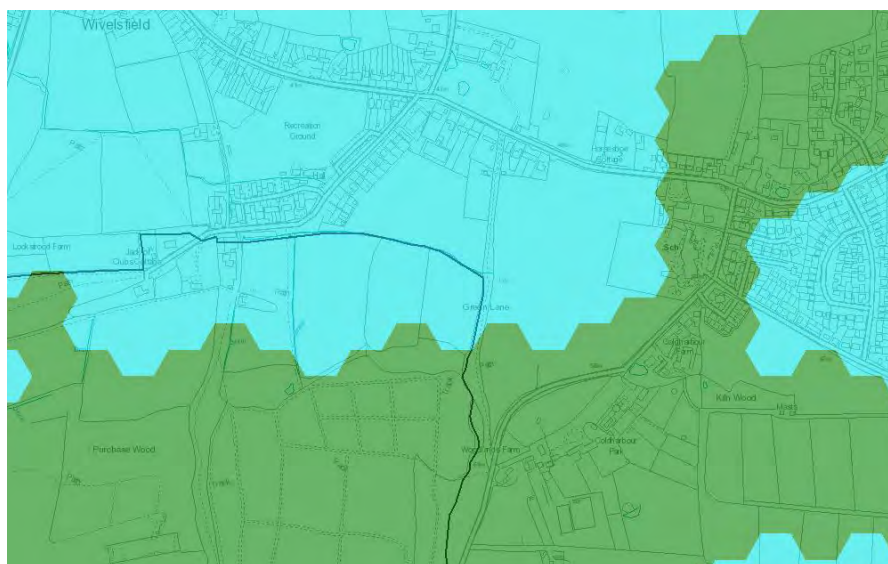
 Limited potential for groundwater flooding to occur	 Potential for groundwater flooding of property situated below ground level	 Potential for groundwater flooding to occur at surface
--	---	---

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Figure 5: Groundwater Flood Risk

Drainage Considerations

The council has carried out county wide analysis to classify East Sussex into four areas of broad drainage characteristics or Drainage Risk Areas (DRA). These spatial groupings are intended to inform the preparation of drainage strategies with development proposals, so that appropriate SuDS techniques are implemented in the county.



	Risk area 1		Risk area 2		Risk area 3		Risk area 4
---	-------------	---	-------------	---	-------------	---	-------------

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Figure 6: Drainage Risk areas

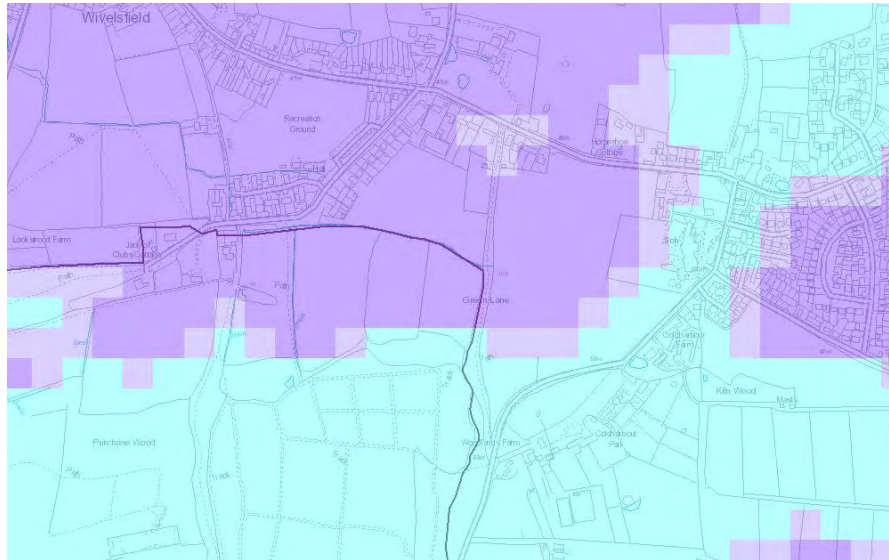
The site is shown to be within risk group 3. The site may also contain aspects of other DRA categories.

The LLFA requirements for each DRA are provided in Table 2 below.

Table 2: Drainage Risk Area Guidance

DRA Number	Colour	Guidance
1		Improvements upon greenfield runoff rates should be discussed with LLFA
2		Infiltration is unlikely, ensure an outfall can be secured
3		Infiltration techniques are likely to be inappropriate
4		Robust evidence is required to show the applicability of infiltration on site

Figure 7 below outlines the estimated water table depth for the site, based on data from the British Geological Survey. The legend contains the British Geological Survey advice for each groundwater depth band.



	>5m below surface	Observations of seasonal variations in groundwater level recommended
	3m – 5m below surface	Determine seasonal variations in groundwater level
	<3m below surface	Determine seasonal variations in groundwater level

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Figure 7: Depth to Groundwater

The map indicates that the water table is <3m below surface. Therefore, the seasonal variations in groundwater level should be determined.

Figure 8 below outlines the estimated ground stability for the site, based on data from the British Geological Survey. The legend contains the British Geological Survey advice for each ground stability band.

The BGS data indicates that there is significant potential for a ground stability hazard on the site. Therefore, infiltration SUDs should only be installed if the potential for or consequences of infiltration are considered not to be considerate.



	Potential for Geohazard	Before installing infiltration SuDS consider the potential for or consequences of infiltration or ground stability
	Significant potential for Geohazard	Only install infiltration SuDS if the potential for or consequences of infiltration are considered no to be considerate
	Very significant constraints are indicated	Only install infiltration SuDS if the potential for or consequences of infiltration are considered no to be considerate

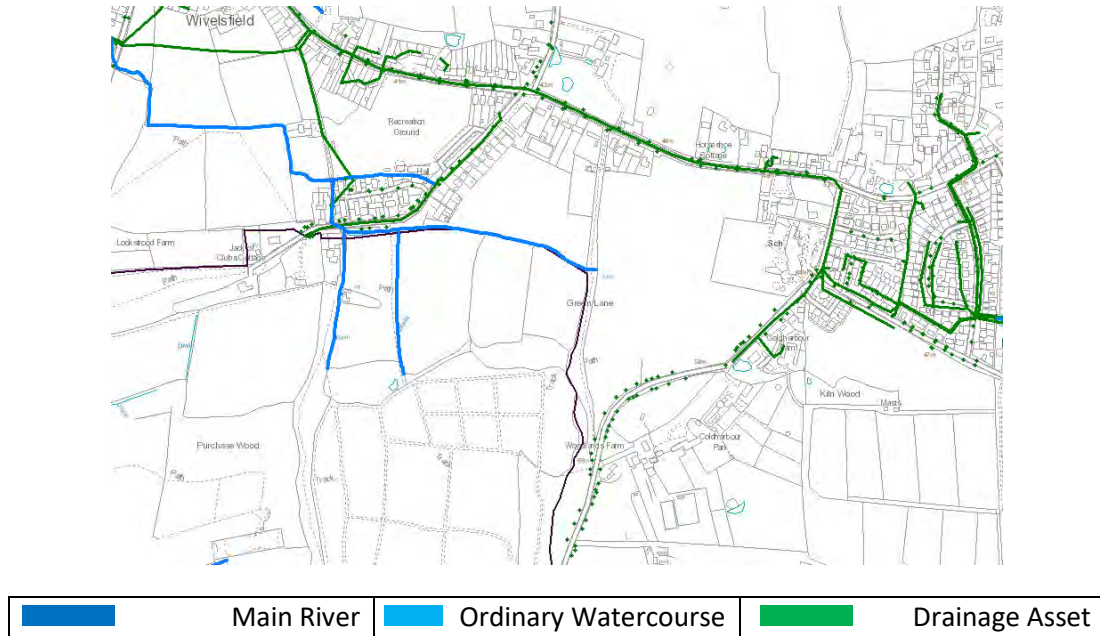
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Figure 8: Ground Stability

The information provided is guidance only. All development proposals must undertake the necessary site surveys to confirm the drainage constraints or opportunities. For further information on drainage strategy requirements, please refer to the ESCC [Guide to Sustainable Drainage Systems in East Sussex](#) and the [Local Flood Risk Management Strategy](#). The 'surface water drainage checklist' available on our website lists the information we expect to be submitted in support of a planning application

Watercourses and Drainage Assets

Watercourses and drainage assets in the vicinity of the property are shown below.



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Figure 9: Watercourses

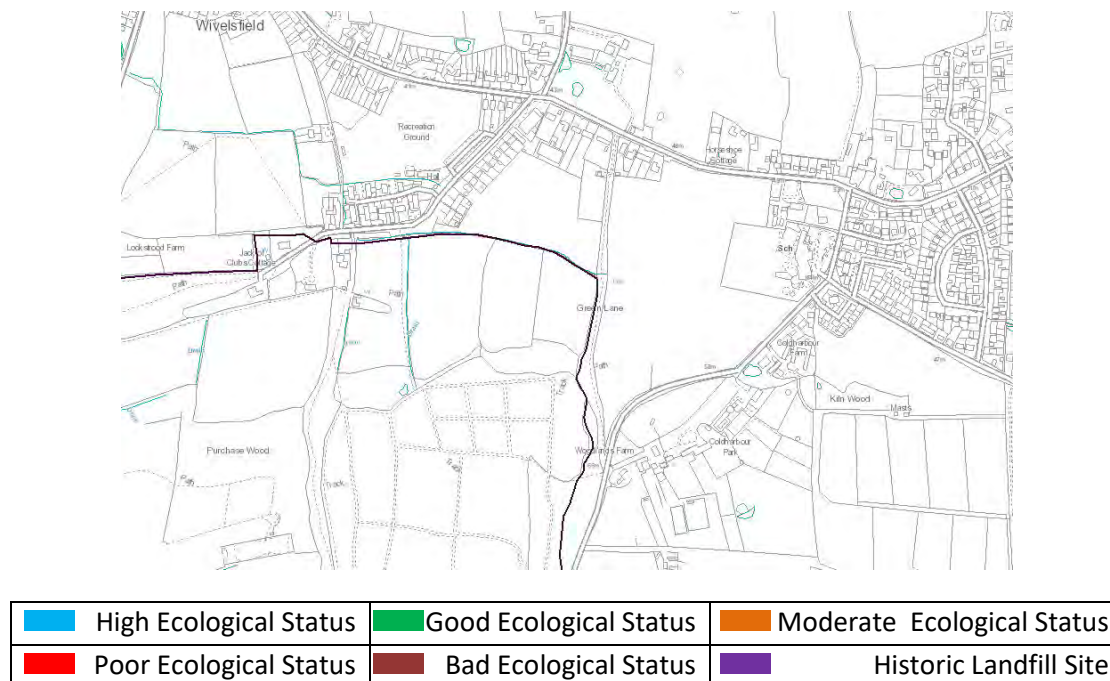
If any ordinary watercourses lie within the site boundary, any planned works to the watercourse map require a separate [Ordinary Watercourse Consent](#) from ESCC.

If a main river lies within the site boundary, any planned works to this watercourse may require an [Environmental Permit](#) (formerly Flood Defence Consent) from the Environment Agency. Contact the EA for enquiries at enquiries@environment-agency.co.uk

To connect into existing surface water and foul water systems, agreement must be obtained from Southern Water. Please refer to Southern Water for details on [the capacity of the existing sewer system](#) and applications for a [new connection](#) to the existing sewer system.

Water Quality and Landfill

Figure 10 below shows the ecological status of adjacent waterbodies, as defined by the Water Framework Directive and any historic landfill sites.



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Figure 10: Water Quality and Landfill

If the site is adjacent to a sensitive waterbody, as defined by the Water Framework Directive, the Quality of water discharged from the site is likely to be a key consideration. Contact the EA for enquiries at enquiries@environment-agency.co.uk for further information.

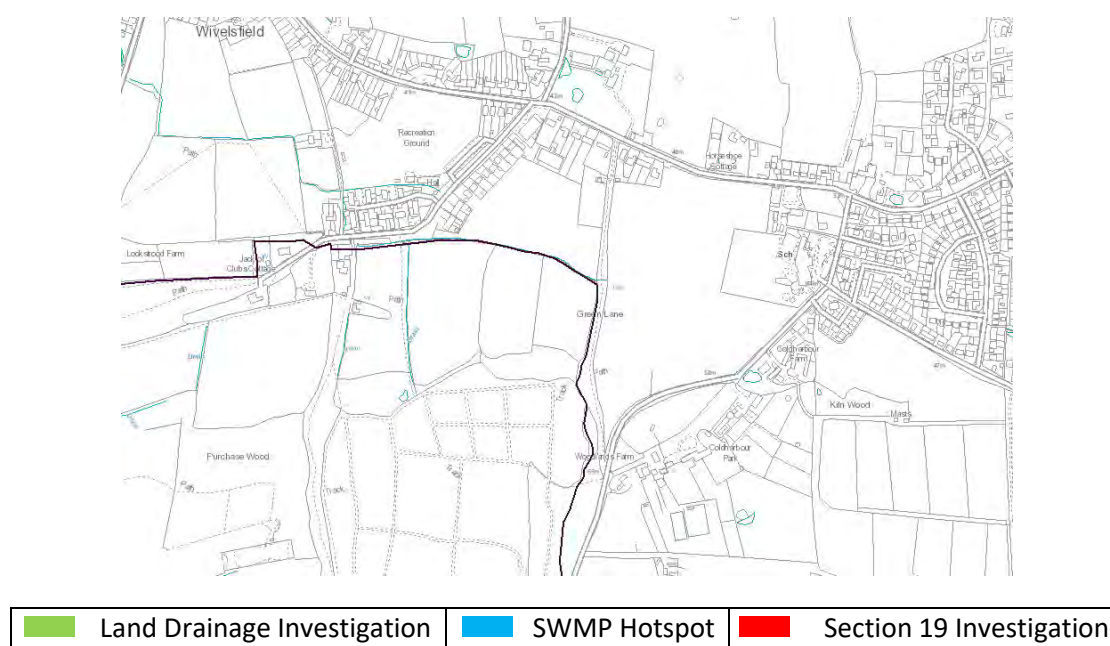
If the site is in the vicinity of a historic landfill the EA may have additional comments on the associated water quality risks.

Investigations

ESCC has undertaken a broad range of investigations into historic flooding and drainage issues including section 19 reports, Land Drainage Investigations and Surface Water Management Plans. Figure 11 below illustrates the location of these investigations.

Where a significant flood event has occurred and the responsibility for managing the risk is unclear; ESCC may undertake a formal investigation under Section 19 of the Flood and Water Management Act 2010. The published report aims to identify the responsible party and proposed response to the incident. To address less severe, localised flooding, ESCC may undertake a Land Drainage Investigation.

The [Surface Water Management Plans](#) (SWMP) in ESCC identified several risk 'hotspots'. If the site is adjacent to a hotspot, please refer to the full SWMP document for more information.



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Figure 11: Previous investigations

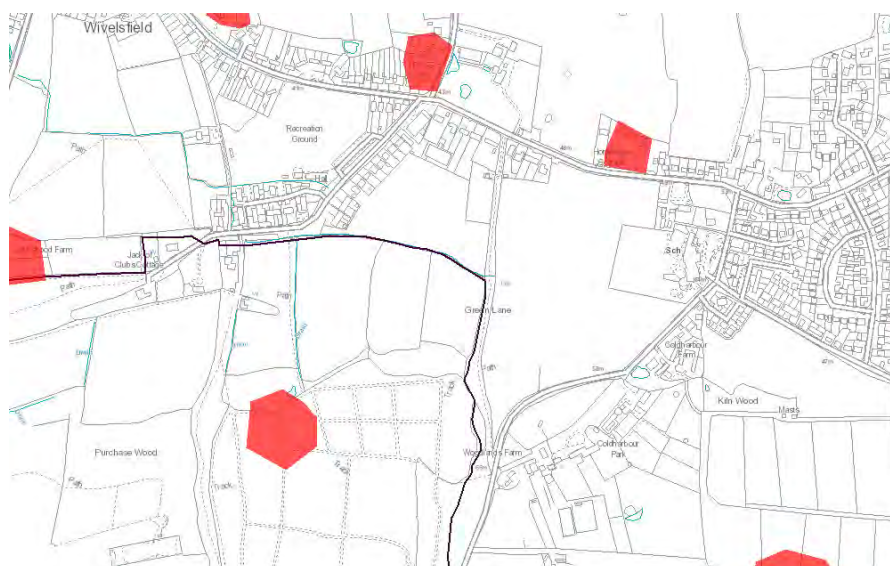
If the site is adjacent to any Section 19 Reports, Land Drainage Investigations or SWMP hotspots, please contact the Flood Risk Management Team at watercourse.consenting@eastsussex.co.uk

Other Information

The site lies with administrative area of the East Sussex County Council LLFA. Additional requirements may need to be taken into consideration. Please contact the below relevant authority for further information.

East Sussex County Council LLFA	Watercourse.consenting@eastsussex.gov.uk
---------------------------------	--

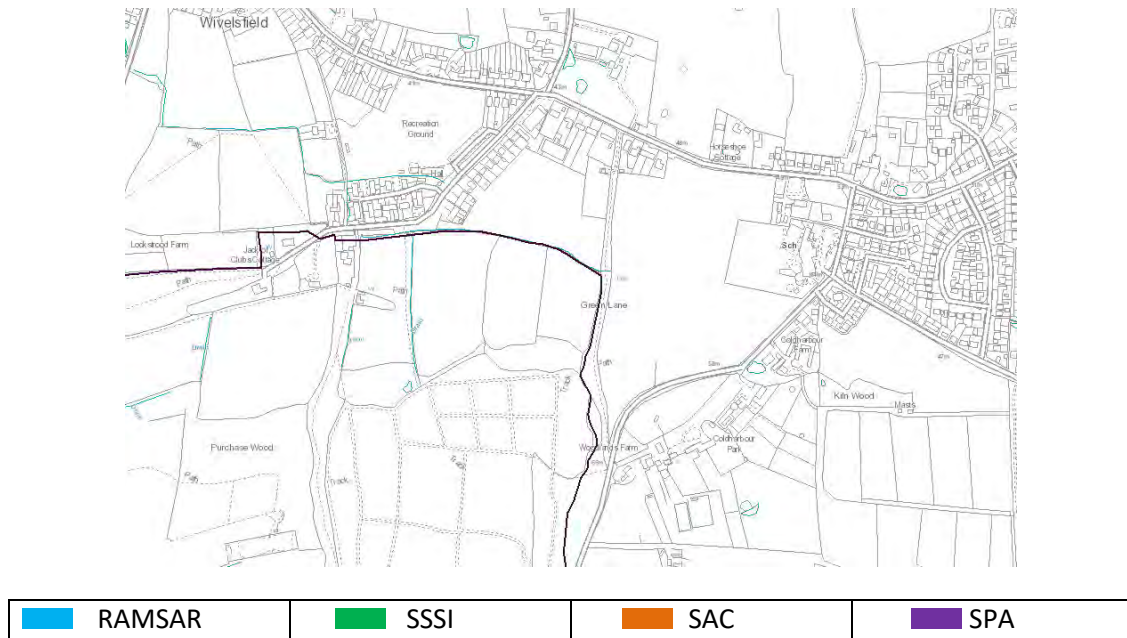
Figure 12 below shows any known archaeological sites adjacent to the site. If there is an adjacent site, it is highly likely that information on the location and extent of heritage assets will be required, as well as the archaeological potential of the area. It is recommended to investigate the level of information required by contacting East Sussex Historic Environment Record (HER) at country.HER@eastsussex.gov.uk



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Figure 12: Archaeology

East Sussex contains area of international, national and local importance for biodiversity. The below Figure 13 illustrates the location of RAMSAR sites, Sites of Specific Scientific Interest (SSSI), Special Areas of Conservation (SAC) and Special Protection Areas (SPA).



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Figure 13: Biodiversity

ESCC policy states that the development should provide net gain in biodiversity where possible. Therefore Sustainable Drainage Systems (SuDS) should be designated as multifunctional features, which ensure that biodiversity can be compensated and/or enhanced.

Further information can be found in the [Guide to Sustainable Drainage Systems in East Sussex](#).

Appendix D

Topographic Survey

[illegible]

Trees are drawn to scale showing the average canopy spread. Description heights should be used as a guide only.

All building names, descriptions, number of storeys, construction type incl roof line details are indicative only and taken externally from ground level.

All below ground details including drainage, voids and services have been identified from above ground and therefore all details relating to these features including; sizes, depth, description etc will be approximate only. All critical dimensions and connections should be checked and verified prior to start work.

Detail, services and features may not have been surveyed if obstructed or

Surveyed physical features may not necessarily represent the legal bound

Measured Building Surveys

Measurements to internal walls are taken to the wall finishes at approx 1m

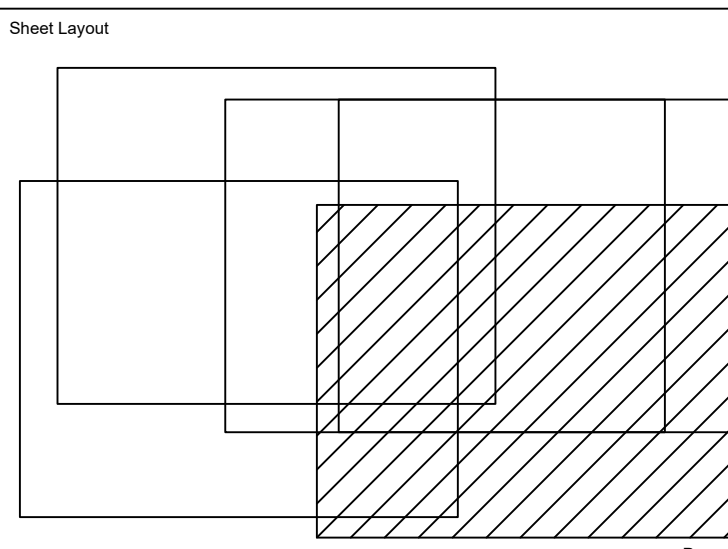
Cill heights are measured as floor to the cill and head heights are measured

from sill to the top of window.

The contractor must check and verify all site and building dimensions, level

utilities and drainage details and connections prior to commencing work. Any errors or discrepancies must be notified to Survey Solutions immediately.

The accuracy of the digital data is the same as the plotting scale implies. All dimensions are in metres unless otherwise stated.



SURVEY CONTROL CO-ORDINATES				
STATION	EASTINGS	NORTHINGS	LEVEL	DESCRIPTION
ST01	040696.76	110670.70	62.70	Flag & Nail
ST02	040722.03	110672.03	69.69	Flag & Nail
ST03	040719.12	110685.01	57.01	Flag & Nail
ST04	040722.03	110672.03	69.69	Flag & Nail
ST05	040642.48	110687.55	63.00	PK Nail
ST06	040745.42	110674.42	61.42	Flag & Nail
ST07	040630.20	110687.620	51.00	PK Nail
ST08	040630.20	110687.620	51.00	PK Nail
ST09	040630.20	110687.620	51.00	PK Nail
ST10	040630.20	110687.620	51.00	PK Nail
ST11	040645.083	1200.39	48.63	PK Nail
ST12	040645.083	1200.39	48.63	PK Nail
ST13	040645.083	1200.39	48.63	PK Nail
ST14	040645.083	1200.39	48.63	PK Nail
ST15	040645.083	1200.39	48.63	PK Nail
ST16	040645.083	1200.39	48.63	PK Nail
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ST23	040645.083	1200.39	48.63	PK Nail
ST24	040645.083	1200.39	48.63	PK Nail
ST25	040645.083	1200.39	48.63	PK Nail
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ST30	040645.083	1200.39	48.63	PK Nail
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ST32	040645.083	1200.39	48.63	PK Nail
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ST39	040645.083	1200.39	48.63	PK Nail
ST40	040645.083	1200.39	48.63	PK Nail
ST41	040645.083	1200.39	48.63	PK Nail
ST42	040645.083	1200.39	48.63	PK Nail
ST43	040645.083	1200.39	48.63	PK Nail
ST44	040645.083	1200.39	48.63	PK Nail
ST45	040645.083	1200.39	48.63	PK Nail
ST46	040645.083	1200.39	48.63	PK Nail
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ST59	040645.083	1200.39	48.63	PK Nail
ST60	040645.083	1200.39	48.63	PK Nail
ST61	040645.083	1200.39	48.63	PK Nail
ST62	040645.083	1200.39	48.63	PK Nail
ST63	040645.083	1200.39	48.63	PK Nail

SURVEY GRID AND LEVEL DATUM

The coordinate system established for this survey is related to Ordnance Survey (OS) national grid at a single point using Smartnet, then orientated to grid north with a scale factor of 1,000.

The level datum established for this survey is related to Ordnance Survey (C) using GPS Smartnet.

B	3 Junctions added onto Green Road Added Tree and footpath detail	HG/AK/EF	MB	
A	Drawing Sheet 48525BWLS-03 added.	ADK	RM	



SURVEY SOLUTIONS

LAND SURVEYING
BUILDING SURVEYING
UNDERGROUND SURVEYING
SITE ENGINEERING
MONITORING

0845 040 5969

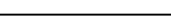
survey-solutions.co.uk

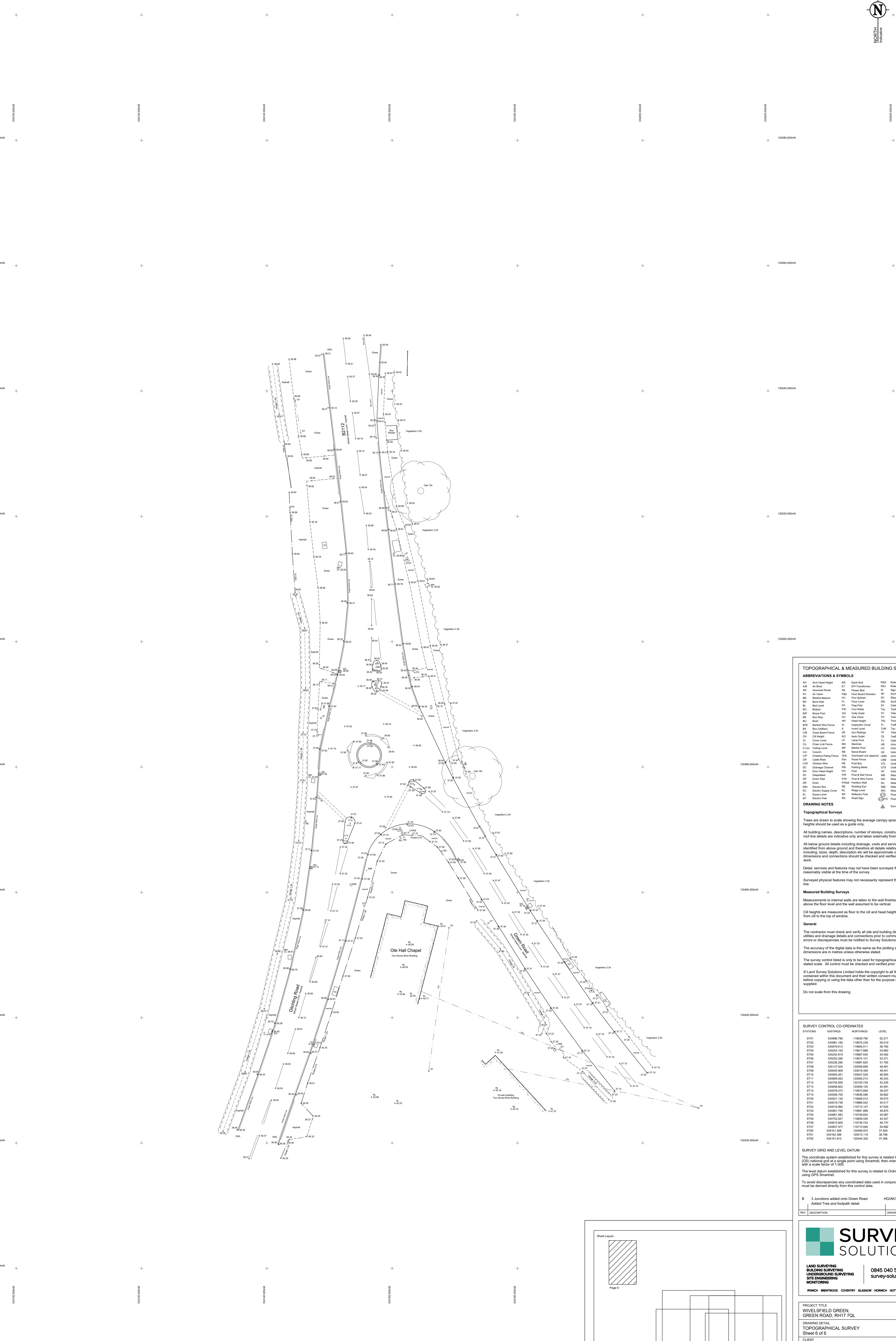
IPSWICH BEDFORD COVENTRY GLASGOW LONDON MANCHESTER NORWICH
NOTTINGHAM YORK

PROJECT TITLE WIVELSFIELD GREEN, GREEN ROAD, RH17 7QL			
DRAWING DETAIL TOPOGRAPHICAL SURVEY Sheet 2 of 6			
CLIENT TAYLOR WIMPEY STRATEGIC LAND			SCALE 1:500
SURVEYOR SB/GB	SURVEY DATE 02/05/2023	CHECKED BY RH	APPROVED BY MB DWG ST FINAL
DRAWING NUMBER 48525BWLS-02		REVISION B	ISSUE DATE 19/05/23







Appendix E

Development Framework Plan



0 50 100 metres

- Site Boundary: 20.89ha
- Proposed housing area: 4.06ha
Approx. 150 homes @ 37dph
- Additional land for Wivelsfield primary school or for community open space: 0.5ha
- Proposed vehicular access point
- Indicative tree-lined primary street alignment
- Indicative secondary streets
- Listed Buildings
- Existing bus route and bus stops
- Existing public footpath
- Existing bridleway
- Existing permissive footpath
- Ancient Woodland
- 30m buffer from Ancient Woodland
- 15m buffer from Ancient Woodland
- Existing vegetation
- Proposed formal and informal recreation areas and amenity spaces (to include new landscaping and tree planting)
- Proposed community orchard
- Potential pedestrian and cycle paths
- Potential pedestrian paths
- Potential mown paths
- Proposed pedestrian/cycle access point
- Proposed pedestrian/cycle link
- Proposed children's play area
- Proposed Sustainable Drainage (SuDS) features
- Proposed ecological ponds
- War memorial (to be excluded from the red line)
- Existing watercourse

F	11.12.24	KP	Updated to reflect the latest Illustrative Landscape Masterplan
E	06.12.24	KP	Updated to reflect Proving Layout and Illustrative Landscape Masterplan
Rev	Date	By	Description

Dixies Barns, High Street,
Ashwell, Hertfordshire SG7 5NT
t 01462 743647
e ashwell@csaenvironmental.co.uk
w csaenvironmental.co.uk

Project	Land south of Green Road, Wivelsfield Green		
Title	Development Framework Plan		
Client	Taylor Wimpey UK Ltd		
Scale	1:2500 @ A2	Drawn	KP
Date	October 2024	Checked	RR
Drawing No.	CSA/6467/104	Rev	F

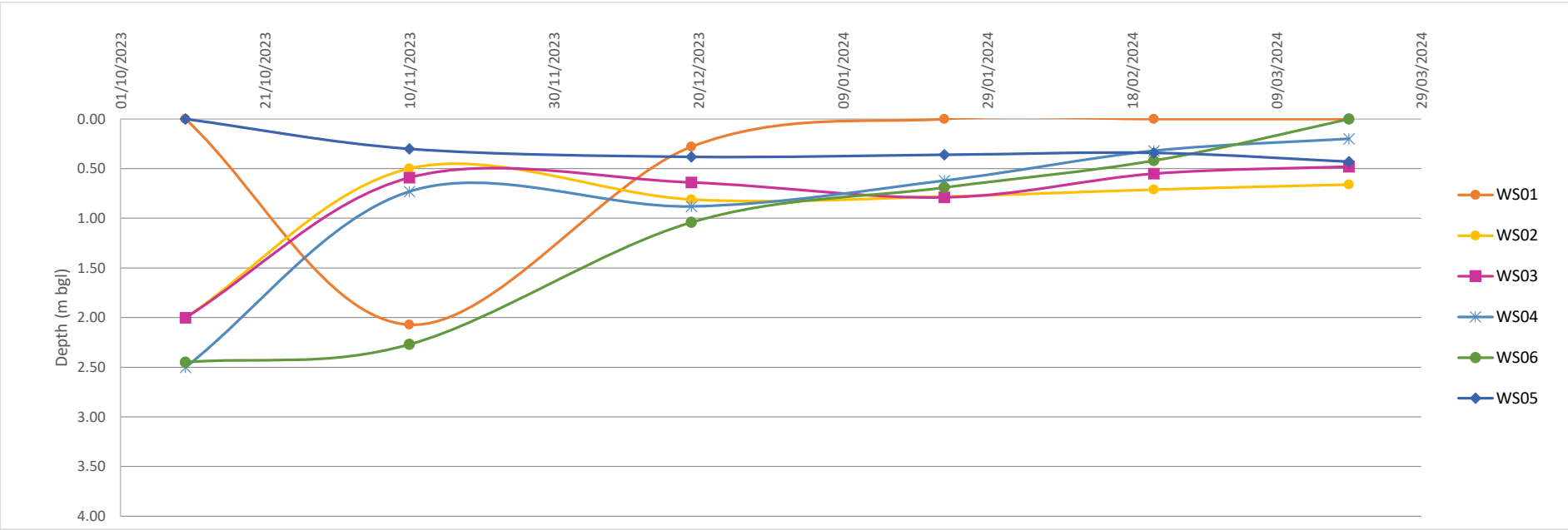
Appendix F

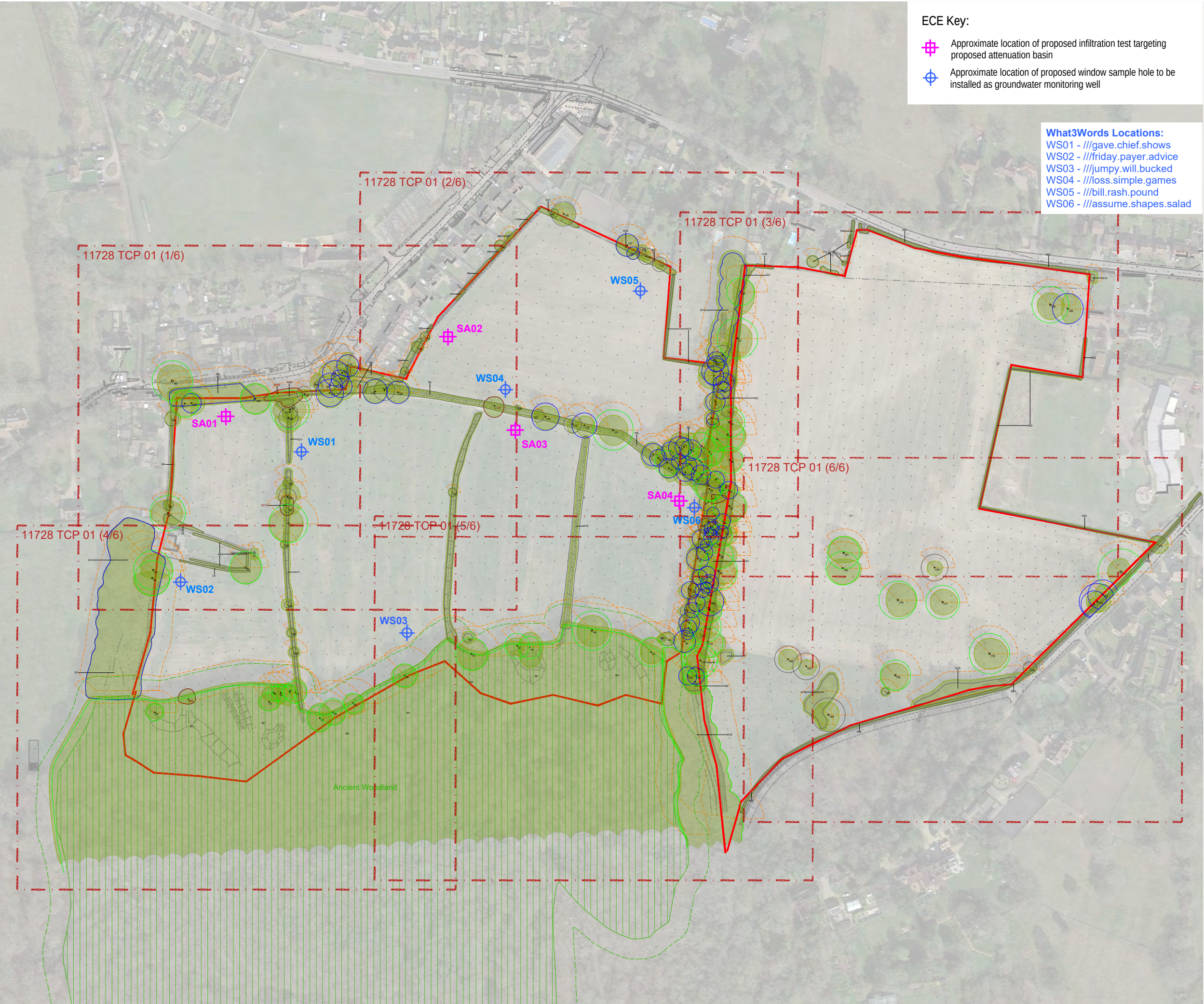
Groundwater Monitoring

Winter Groundwater Monitoring

BH	Monitoring Date						BH Depth
	10/10/2023	10/11/2023	19/12/2023	23/01/2024	21/02/2024	19/03/2024	
WS01	0.00	2.07	0.28	0.00	0.00	0.00	2.00
WS02	2.00	0.50	0.81	0.78	0.71	0.66	2.00
WS03	2.00	0.59	0.64	0.79	0.55	0.48	2.00
WS04	2.50	0.73	0.88	0.62	0.32	0.20	3.00
WS05	0.00	0.30	0.38	0.36	0.34	0.43	2.00
WS06	2.45	2.27	1.04	0.69	0.42	0.00	3.00

Shallowest

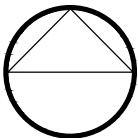




ECE Key:

- Approximate location of proposed infiltration test targeting proposed attenuation basin
- Approximate location of proposed window sample hole to be installed as groundwater monitoring well

What3Words Locations:
WS01 - ///gave.chief.shows
WS02 - ///friday.payer.advice
WS03 - ///jumpy.will.bucked
WS04 - ///loss.simple.games
WS05 - ///bill.rash.pound
WS06 - ///assume.shapes.salad



KEY:

- Site Boundary
- Tree Numbers
- Tree Canopies
- Category 'U' Trees
- Category 'A' RPA
- Category 'B' RPA
- Category 'C' RPA
- Shading Arc
- Ancient Woodland
- Ancient Woodland 15m Buffer
- Veteran Buffer

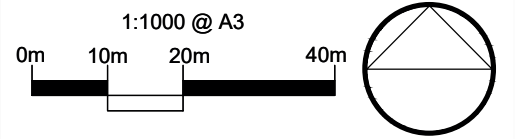
Note: Trees 4, 9, 38, 46, 75, 83, 88, 91, 93, 98, 103, 108, 129, 131, 132, 134-136, 139, 161, 175 and groups G6 and G13 have been plotted using measurements onsite in conjunction with aerial imagery. Their locations were not recorded on the topographical survey of the site (drawing ref: 48525BWLS-01_06 RevB.dwg).

Note: The RPA footprint for Trees 170-175 have been displaced to allow for the effect of the adopted highway. The surface area of the RPA has not been reduced.



Cited from Google Earth

REV	DATE	NOTE	Drawn	Chk'd
REVISIONS				
aspect arboriculture ECE Mark-up				
TITLE				
Land South of Green Road, Wivelsfield Tree Constraints Plan				
CLIENT				
Taylor Wimpey Strategic Land				
SCALE		DATE	DRAWN	
Not to scale		SEP 2023	JH	
DRAWING NUMBER			REVISION	
11728 TCP 01 (Overview)				
Based on: 48525BWLS-01_06 RevB.dwg				



- KEY:**
- Site Boundary
 - Tree Numbers
 - Tree Canopies
 - Category 'U' Trees
 - Category 'A' RPA
 - Category 'B' RPA
 - Category 'C' RPA
 - Shading Arc
 - Ancient Woodland
 - Ancient Woodland 15m Buffer
 - Veteran Buffer

Note: Trees 4, 9, 38, 46, 75, 83, 88, 91, 93, 98, 103, 108, 129, 131, 132, 134-136, 139, 161, 175 and groups G6 and G13 have been plotted using measurements onsite in conjunction with aerial imagery. Their locations were not recorded on the topographical survey of the site (drawing ref: 48525BWLS-01_06 RevB.dwg).

Note: The RPA footprint for Trees 170-175 have been displaced to allow for the effect of the adopted highway. The surface area of the RPA has not been reduced.



Cited from Google Earth

REV	DATE	NOTE	Drawn	Chk'd

REVISIONS

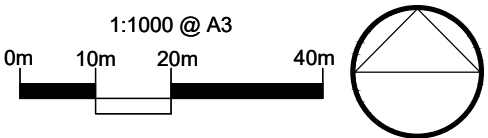
aspect arboriculture

TITLE
Land South of Green Road, Wivelsfield
Tree Constraints Plan

CLIENT
Taylor Wimpey Strategic Land

SCALE 1:1000 @ A3	DATE SEP 2023	DRAWN JH
DRAWING NUMBER 11728 TCP 01 (1/6)		REVISION

Based on: 48525BWLS-01_06 RevB.dwg



- KEY:**
- Site Boundary
 - Tree Numbers
 - Tree Canopies
 - Category 'U' Trees
 - Category 'A' RPA
 - Category 'B' RPA
 - Category 'C' RPA
 - Shading Arc
 - Ancient Woodland
 - Ancient Woodland 15m Buffer
 - Veteran Buffer

Note: Trees 4, 9, 38, 46, 75, 83, 88, 91, 93, 98, 103, 108, 129, 131, 132, 134-136, 139, 161, 175 and groups G6 and G13 have been plotted using measurements onsite in conjunction with aerial imagery. Their locations were not recorded on the topographical survey of the site (drawing ref: 48525BWLS-01_06 RevB.dwg).

Note: The RPA footprint for Trees 170-175 have been displaced to allow for the effect of the adopted highway. The surface area of the RPA has not been reduced.



Cited from Google Earth

REV	DATE	NOTE	Drawn	Chk'd

REVISIONS

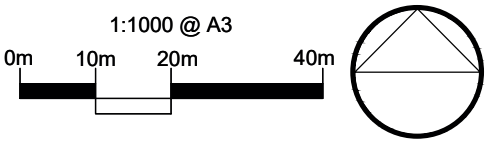
aspect arboriculture

TITLE
Land South of Green Road, Wivelsfield
Tree Constraints Plan

CLIENT
Taylor Wimpey Strategic Land

SCALE 1:1000 @ A3	DATE SEP 2023	DRAWN JH
DRAWING NUMBER 11728 TCP 01 (2/6)	REVISION	

Based on: 48525BWLS-01_06 RevB.dwg



- KEY:**
- Site Boundary
 - Tree Numbers
 - Tree Canopies
 - Category 'U' Trees
 - Category 'A' RPA
 - Category 'B' RPA
 - Category 'C' RPA
 - Shading Arc
 - Ancient Woodland
 - Ancient Woodland 15m Buffer
 - Veteran Buffer

Note: Trees 4, 9, 38, 46, 75, 83, 88, 91, 93, 98, 103, 108, 129, 131, 132, 134-136, 139, 161, 175 and groups G6 and G13 have been plotted using measurements onsite in conjunction with aerial imagery. Their locations were not recorded on the topographical survey of the site (drawing ref: 48525BWLS-01_06 RevB.dwg).

Note: The RPA footprint for Trees 170-175 have been displaced to allow for the effect of the adopted highway. The surface area of the RPA has not been reduced.



Cited from Google Earth

REV	DATE	NOTE	Drawn	Chk'd

REVISIONS

aspect arboriculture

TITLE
Land South of Green Road, Wivelsfield
Tree Constraints Plan

CLIENT
Taylor Wimpey Strategic Land

SCALE 1:1000 @ A3	DATE SEP 2023	DRAWN JH
DRAWING NUMBER 11728 TCP 01 (3/6)		REVISION

Based on: 48525BWLS-01_06 RevB.dwg



1:1000 @ A3

0m10m20m40m

KEY:

Site Boundary

⊙ 15

Tree Numbers

Tree Canopies

[8]

Category 'U' Trees

Category 'A' RPA

Category 'B' RPA

Category 'C' RPA

Shading Arc

Ancient Woodland

—AWB—

Ancient Woodland 15m Buffer

—VTB—

Veteran Buffer

Note: Trees 4, 9, 38, 46, 75, 83, 88, 91, 93, 98, 103, 108, 129, 131, 132, 134-136, 139, 161, 175 and groups G6 and G13 have been plotted using measurements onsite in conjunction with aerial imagery. Their locations were not recorded on the topographical survey of the site (drawing ref: 48525BWLS-01_06 RevB.dwg).

Note: The RPA footprint for Trees 170-175 have been displaced to allow for the effect of the adopted highway. The surface area of the RPA has not been reduced.



Cited from Google Earth

REV	DATE	NOTE	Drawn	Chk'd
REVISIONS				

TITLE

Land South of Green Road, Wivelsfield
Tree Constraints Plan

CLIENT

Taylor Wimpey Strategic Land

SCALE	DATE	DRAWN
1:1000 @ A3	SEP 2023	JH
DRAWING NUMBER		REVISION
11728 TCP 01 (4/6)		

Based on: 48525BWLS-01_06 RevB.dwg



1:1000 @ A3

0m10m20m40m

KEY:

Site Boundary

15

Tree Numbers

Tree Canopies

8

Category 'U' Trees

Category 'A' RPA

Category 'B' RPA

Category 'C' RPA

Shading Arc

Ancient Woodland

AWB

Ancient Woodland 15m Buffer

VTB

Veteran Buffer

Note: Trees 4, 9, 38, 46, 75, 83, 88, 91, 93, 98, 103, 108, 129, 131, 132, 134-136, 139, 161, 175 and groups G6 and G13 have been plotted using measurements onsite in conjunction with aerial imagery. Their locations were not recorded on the topographical survey of the site (drawing ref: 48525BWLS-01_06 RevB.dwg).

Note: The RPA footprint for Trees 170-175 have been displaced to allow for the effect of the adopted highway. The surface area of the RPA has not been reduced.



Cited from Google Earth

REV	DATE	NOTE	Drawn	Chk'd
REVISIONS				

aspect

arboriculture

TITLE

Land South of Green Road, Wivelsfield
Tree Constraints Plan

CLIENT

Taylor Wimpey Strategic Land

SCALE	DATE	DRAWN
1:1000 @ A3	SEP 2023	JH
DRAWING NUMBER	REVISION	
11728 TCP 01 (6/6)		

Based on: 48525BWLS-01_06 RevB.dwg

Appendix G

Greenfield Rates

Calculated by:

Jessica Grady

Site name:

Wivelsfield Green

Site location:

Wivelsfield

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013) , the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details

Latitude:

50.96283° N

Longitude:

0.08305° W

Reference:

961129409

Date:

Oct 23 2024 13:21

Runoff estimation
approach

FEH Statistical

Site characteristics

Total site area (ha):

1

Methodology

Q_{MED} estimation method:

Calculate from BFI and SAAR

BFI and SPR method:

Specify BFI manually

HOST class:

N/A

BFI / BFIHOST:

0.295

Q_{MED} (l/s):

Q_{BAR} / Q_{MED} factor:

1.14

Notes

(1) Is $Q_{\text{BAR}} < 2.0 \text{ l/s/ha}$?

When Q_{BAR} is $< 2.0 \text{ l/s/ha}$ then limiting discharge rates are set at 2.0 l/s/ha .

(2) Are flow rates $< 5.0 \text{ l/s}$?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

(3) Is $\text{SPR}/\text{SPRHOST} \leq 0.3$?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Hydrological
characteristics

	Default	Edited
SAAR (mm):	841	836
Hydrological region:	7	7
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.3	2.3
Growth curve factor 100 years:	3.19	3.19
Growth curve factor 200 years:	3.74	3.74

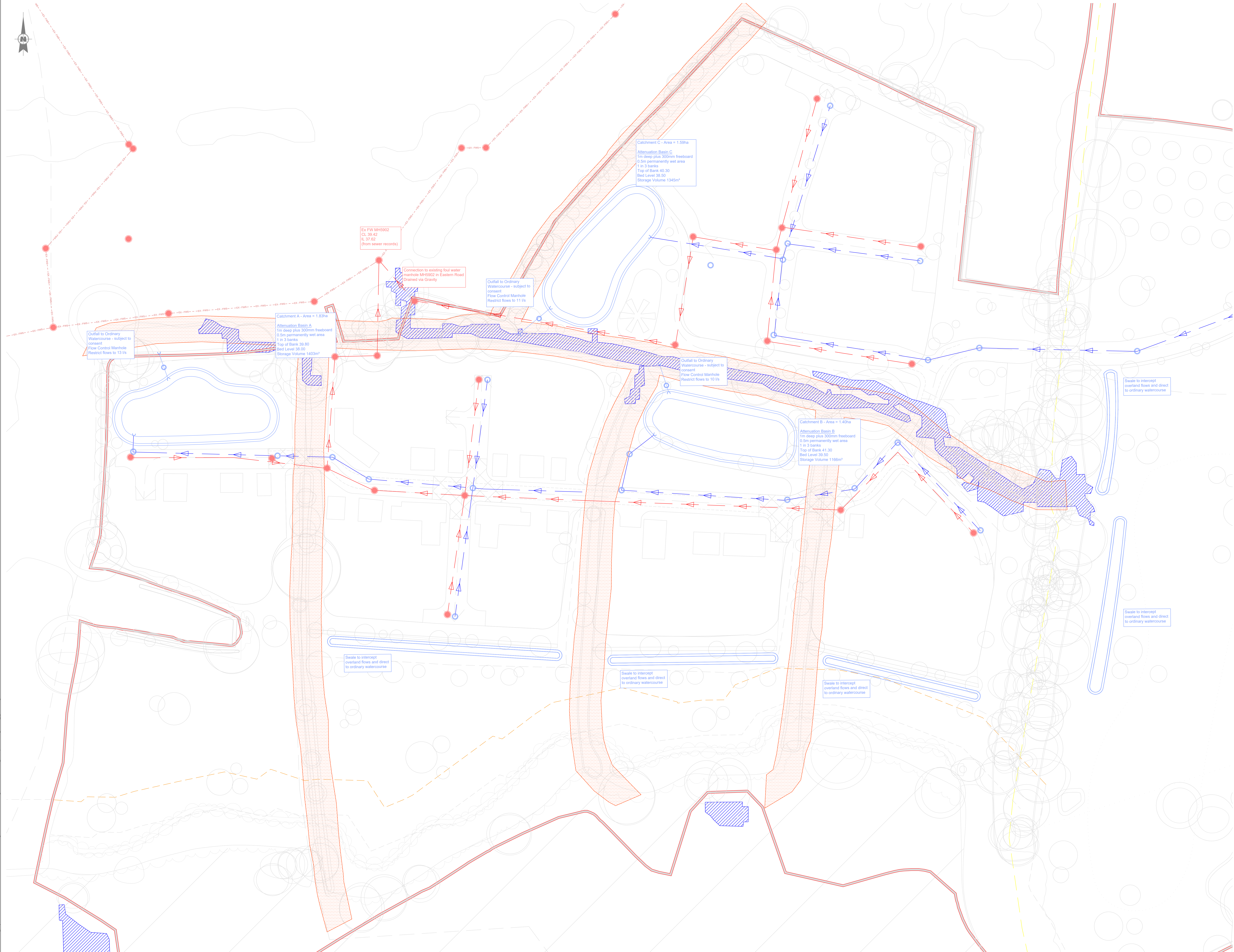
Greenfield runoff rates

	Default	Edited
Q _{BAR} (l/s):		8.51
1 in 1 year (l/s):		7.24
1 in 30 years (l/s):		19.58
1 in 100 year (l/s):		27.15
1 in 200 years (l/s):		31.84

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

Appendix H

Conceptual Drainage Strategy



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Notes

- This drawing has been prepared in accordance with the scope of RPS's appointment with its client and is subject to the terms and conditions of that appointment. RPS accepts no liability for any use of this document other than by its client and only for the purposes for which it was prepared and provided.
- If received electronically it is the recipient's responsibility to print to correct scale. Only written dimensions should be used.
- This drawing should be read in conjunction with all other relevant drawings and specifications.

PRELIMINARY SUBJECT TO DETAILED DESIGN

This drawing illustrates a sketch proposal only and as such is subject to detailed site investigation including ground conditions, contaminants, drainage, design and planning/density negotiations. The layout may be based upon an enlargement of an OS sheet or other small scale plans and its accuracy will need to be verified by Survey. Full risk analysis under the CDM Regulations has not been undertaken.

Site Area = 20.89ha
Total Impermeable Area = 4.82ha (inc. 10% urban creep allowance)
Greenfield OBAK = 41.0 ls
Greenfield 1 in 1 = 54.9 ls

Catchment A Impermeable Area = 1.83ha (inc. 10% urban creep)
Catchment A Required Storage (1 in 100 +45%CC) = 1376m³
Basin A Provided Storage = 1403m³
Basin A Restriction Rate = 13 ls

Catchment B Impermeable Area = 1.40ha (inc. 10% urban creep)
Catchment B Required Storage (1 in 100 +45%CC) = 1032m³
Basin B Provided Storage = 1166m³
Basin B Restriction Rate = 10 ls

Catchment C Impermeable Area = 1.59ha (inc. 10% urban creep)
Catchment C Required Storage (1 in 100 +45%CC) = 1193m³
Basin C Provided Storage = 1345m³
Basin C Restriction Rate = 11 ls

Surface water flows will be attenuated within three basins across the site, which will discharge to the ordinary watercourse within the site boundary

KEY	
Surface Water Manhole	○
Surface Water Pipe Line	—
Surface Water Headwall	⌋
Swale	—
Foul Water Manhole	●
Foul Water Pipe Line	- - -
Existing Foul Water Sewer	- - -
On Watercourse Discharge	—
High Surface Water Flood Risk Extents	—
Swale to intercept overland flows and direct to ordinary watercourse	—

E	Revision to Layout	JG	CP	16.12.24
D	Revision to Layout	JG	CP	10.12.24
C	Update to Layout revision	JG	CP	28.10.24
B	Update to SuDS Provisions	JG	CP	28.10.24
A	Update from Comments	JG	CP	24.10.24
	Draft Drainage Strategy	JG	JH	08.10.24

Rev	Description	By	Ckd	Date
-----	-------------	----	-----	------

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A TETRA TECH COMPANY

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West Midlands B3 3NH
T: +44 121 622 8520 E: rps@rpsgroup.com

Client **Taylor Wimpey Strategic Land**

Project **Land South of Green Road,
Wivelsfield Green**

Title **Conceptual Drainage Strategy**

Scale 1:500 @A0
Date Created 16.12.2024
Task Team Manager CP
Information Author JG
Task Information Manager CP
Document Number D01

RPS Project Number HLEF03595
Revision F
rpsgroup.com

Appendix I

Drainage Calculations

RPS Group Plc		Page 1
Noble House, Capital Drive Linford Wood Mitlton Keynes, MK14 6QP		
Date 23/10/2024 14:40 File CATCHMENT A 1.83HA.SRCX	Designed by JESSICA.GRADY Checked by	
Innovyze	Source Control 2020.1	

Source Control 2020.1

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
15 min Summer	100.263	0.263	13.0	502.7	O K
30 min Summer	100.348	0.348	13.0	670.9	O K
60 min Summer	100.435	0.435	13.0	849.2	O K
120 min Summer	100.494	0.494	13.0	970.4	O K
180 min Summer	100.526	0.526	13.0	1038.2	O K
240 min Summer	100.547	0.547	13.0	1081.6	O K
360 min Summer	100.570	0.570	13.0	1130.9	O K
480 min Summer	100.582	0.582	13.0	1156.0	O K
600 min Summer	100.588	0.588	13.0	1167.7	O K
720 min Summer	100.589	0.589	13.0	1170.8	O K
960 min Summer	100.588	0.588	13.0	1169.2	O K
1440 min Summer	100.586	0.586	13.0	1163.5	O K
2160 min Summer	100.578	0.578	13.0	1148.0	O K
2880 min Summer	100.563	0.563	13.0	1115.9	O K
4320 min Summer	100.519	0.519	13.0	1023.3	O K
5760 min Summer	100.466	0.466	13.0	913.0	O K
7200 min Summer	100.409	0.409	13.0	795.7	O K
8640 min Summer	100.355	0.355	13.0	685.4	O K
10080 min Summer	100.305	0.305	13.0	585.6	O K
15 min Winter	100.294	0.294	13.0	564.6	O K
30 min Winter	100.389	0.389	13.0	753.9	O K
60 min Winter	100.487	0.487	13.0	955.4	O K
120 min Winter	100.554	0.554	13.0	1095.8	O K
180 min Winter	100.592	0.592	13.0	1176.5	O K
240 min Winter	100.617	0.617	13.0	1230.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
15 min Summer	150.602	0.0	515.9	26
30 min Summer	101.012	0.0	692.3	41
60 min Summer	64.747	0.0	887.7	70
120 min Summer	38.063	0.0	1043.8	128
180 min Summer	27.871	0.0	1146.7	188
240 min Summer	22.335	0.0	1225.2	246
360 min Summer	16.338	0.0	1344.3	364
480 min Summer	13.113	0.0	1438.9	484
600 min Summer	11.078	0.0	1519.4	602
720 min Summer	9.666	0.0	1591.0	720
960 min Summer	7.826	0.0	1713.0	834
1440 min Summer	5.863	0.0	1848.9	1090
2160 min Summer	4.445	0.0	2195.0	1496
2880 min Summer	3.658	0.0	2408.9	1908
4320 min Summer	2.772	0.0	2737.9	2728
5760 min Summer	2.265	0.0	2983.7	3520
7200 min Summer	1.925	0.0	3169.8	4256
8640 min Summer	1.682	0.0	3323.6	5016
10080 min Summer	1.498	0.0	3454.0	5744
15 min Winter	150.602	0.0	577.8	26
30 min Winter	101.012	0.0	774.2	40
60 min Winter	64.747	0.0	994.3	70
120 min Winter	38.063	0.0	1169.2	126
180 min Winter	27.871	0.0	1284.4	184
240 min Winter	22.335	0.0	1372.3	242

RPS Group Plc		Page 2
Noble House, Capital Drive Linford Wood Mitlton Keynes, MK14 6QP		
Date 23/10/2024 14:40 File CATCHMENT A 1.83HA.SRCX	Designed by JESSICA.GRADY Checked by	
Innovyze	Source Control 2020.1	

Source Control 2020.1

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
360 min Winter	100.647	0.647	13.0	1296.0	O K
480 min Winter	100.665	0.665	13.0	1333.7	O K
600 min Winter	100.675	0.675	13.0	1355.8	O K
720 min Winter	100.681	0.681	13.0	1368.0	O K
960 min Winter	100.684	0.684	13.0	1375.5	O K
1440 min Winter	100.675	0.675	13.0	1356.2	O K
2160 min Winter	100.662	0.662	13.0	1327.2	O K
2880 min Winter	100.634	0.634	13.0	1266.8	O K
4320 min Winter	100.552	0.552	13.0	1092.8	O K
5760 min Winter	100.462	0.462	13.0	904.1	O K
7200 min Winter	100.371	0.371	13.0	718.5	O K
8640 min Winter	100.290	0.290	13.0	555.8	O K
10080 min Winter	100.224	0.224	13.0	425.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
360 min Winter	16.338	0.0	1505.9	360
480 min Winter	13.113	0.0	1611.6	474
600 min Winter	11.078	0.0	1701.9	588
720 min Winter	9.666	0.0	1770.5	700
960 min Winter	7.826	0.0	1869.4	920
1440 min Winter	5.863	0.0	1906.6	1214
2160 min Winter	4.445	0.0	2458.6	1648
2880 min Winter	3.658	0.0	2697.8	2112
4320 min Winter	2.772	0.0	3066.6	2984
5760 min Winter	2.265	0.0	3341.8	3760
7200 min Winter	1.925	0.0	3551.8	4536
8640 min Winter	1.682	0.0	3722.0	5192
10080 min Winter	1.498	0.0	3868.2	5856

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 534712 119910 TQ 34712 19910
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+45

Time Area Diagram

Total Area (ha) 1.830

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)	From: To:	(ha)
0 4	0.610	4 8	0.610	8 12	0.610

RPS Group Plc		Page 4
Noble House, Capital Drive Linford Wood Mitlton Keynes, MK14 6QP		
Date 23/10/2024 14:40 File CATCHMENT A 1.83HA.SRCX	Designed by JESSICA.GRADY Checked by	
Innovyze Source Control 2020.1		

Model Details

Storage is Online Cover Level (m) 101.000

Tank or Pond Structure

Invert Level (m) 100.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1849.9	1.000	2335.6

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0164-1300-1000-1300
Design Head (m)	1.000
Design Flow (l/s)	13.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	164
Invert Level (m)	99.950
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	13.0	Kick-Flo®	0.691	10.9
Flush-Flo™	0.312	13.0	Mean Flow over Head Range	-	11.1

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)	Depth (m)	Flow (l/s)
0.100	5.9	0.800	11.7	2.000	18.1	4.000	25.2	7.000	33.0
0.200	12.6	1.000	13.0	2.200	18.9	4.500	26.6	7.500	34.1
0.300	13.0	1.200	14.2	2.400	19.7	5.000	28.0	8.000	35.2
0.400	12.9	1.400	15.2	2.600	20.5	5.500	29.3	8.500	36.2
0.500	12.6	1.600	16.2	3.000	21.9	6.000	30.6	9.000	37.2
0.600	12.1	1.800	17.2	3.500	23.6	6.500	31.8	9.500	38.2

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Innovyze	Source Control 2020.1	

Source Control 2020.1

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
15 min Summer	39.260	0.260	9.9	384.5	O K
30 min Summer	39.343	0.343	10.0	512.8	O K
60 min Summer	39.429	0.429	10.0	648.7	O K
120 min Summer	39.486	0.486	10.0	740.4	O K
180 min Summer	39.517	0.517	10.0	791.1	O K
240 min Summer	39.537	0.537	10.0	823.2	O K
360 min Summer	39.558	0.558	10.0	858.5	O K
480 min Summer	39.568	0.568	10.0	875.0	O K
600 min Summer	39.572	0.572	10.0	881.2	O K
720 min Summer	39.572	0.572	10.0	881.1	O K
960 min Summer	39.571	0.571	10.0	879.8	O K
1440 min Summer	39.568	0.568	10.0	874.4	O K
2160 min Summer	39.560	0.560	10.0	861.6	O K
2880 min Summer	39.545	0.545	10.0	836.9	O K
4320 min Summer	39.503	0.503	10.0	767.7	O K
5760 min Summer	39.453	0.453	10.0	686.0	O K
7200 min Summer	39.399	0.399	10.0	599.8	O K
8640 min Summer	39.347	0.347	10.0	519.0	O K
10080 min Summer	39.301	0.301	10.0	446.7	O K
15 min Winter	39.291	0.291	10.0	431.7	O K
30 min Winter	39.384	0.384	10.0	576.3	O K
60 min Winter	39.480	0.480	10.0	730.0	O K
120 min Winter	39.545	0.545	10.0	836.3	O K
180 min Winter	39.581	0.581	10.0	896.7	O K
240 min Winter	39.605	0.605	10.0	936.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
15 min Summer	150.602	0.0	394.6	26
30 min Summer	101.012	0.0	529.6	41
60 min Summer	64.747	0.0	679.1	70
120 min Summer	38.063	0.0	798.5	128
180 min Summer	27.871	0.0	877.2	188
240 min Summer	22.335	0.0	937.4	246
360 min Summer	16.338	0.0	1028.6	364
480 min Summer	13.113	0.0	1100.7	482
600 min Summer	11.078	0.0	1162.4	602
720 min Summer	9.666	0.0	1217.3	696
960 min Summer	7.826	0.0	1314.1	808
1440 min Summer	5.863	0.0	1434.0	1062
2160 min Summer	4.445	0.0	1679.2	1476
2880 min Summer	3.658	0.0	1842.7	1900
4320 min Summer	2.772	0.0	2094.7	2724
5760 min Summer	2.265	0.0	2282.2	3512
7200 min Summer	1.925	0.0	2425.3	4256
8640 min Summer	1.682	0.0	2542.3	5016
10080 min Summer	1.498	0.0	2642.1	5664
15 min Winter	150.602	0.0	442.1	26
30 min Winter	101.012	0.0	593.3	40
60 min Winter	64.747	0.0	760.8	70
120 min Winter	38.063	0.0	894.6	126
180 min Winter	27.871	0.0	982.5	184
240 min Winter	22.335	0.0	1049.9	242

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Innovyze	Source Control 2020.1	

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
360 min Winter	39.633	0.633	10.0	982.8	O K
480 min Winter	39.648	0.648	10.0	1008.4	O K
600 min Winter	39.656	0.656	10.0	1022.8	O K
720 min Winter	39.660	0.660	10.0	1029.9	O K
960 min Winter	39.661	0.661	10.0	1031.6	O K
1440 min Winter	39.652	0.652	10.0	1015.1	O K
2160 min Winter	39.636	0.636	10.0	988.4	O K
2880 min Winter	39.608	0.608	10.0	941.3	O K
4320 min Winter	39.533	0.533	10.0	816.8	O K
5760 min Winter	39.449	0.449	10.0	679.8	O K
7200 min Winter	39.364	0.364	10.0	545.4	O K
8640 min Winter	39.290	0.290	10.0	429.6	O K
10080 min Winter	39.228	0.228	9.8	335.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
360 min Winter	16.338	0.0	1152.1	358
480 min Winter	13.113	0.0	1233.1	474
600 min Winter	11.078	0.0	1302.1	586
720 min Winter	9.666	0.0	1363.3	698
960 min Winter	7.826	0.0	1450.5	914
1440 min Winter	5.863	0.0	1510.7	1156
2160 min Winter	4.445	0.0	1880.7	1620
2880 min Winter	3.658	0.0	2063.8	2080
4320 min Winter	2.772	0.0	2346.1	2944
5760 min Winter	2.265	0.0	2556.4	3752
7200 min Winter	1.925	0.0	2716.0	4480
8640 min Winter	1.682	0.0	2847.6	5192
10080 min Winter	1.498	0.0	2959.2	5856

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 534712 119910 TQ 34712 19910
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+45

Time Area Diagram

Total Area (ha) 1.400

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)	From: To:	(ha)
0 4	0.467	4 8	0.467	8 12	0.467

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Innovyze Source Control 2020.1		

Model Details

Storage is Online Cover Level (m) 40.300

Tank or Pond Structure

Invert Level (m) 39.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1423.0	1.300	1992.3

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0141-1000-1300-1000
Design Head (m)	1.300
Design Flow (l/s)	10.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	141
Invert Level (m)	38.950
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.300	10.0	Kick-Flo®	0.829	8.1
Flush-Flo™	0.385	10.0	Mean Flow over Head Range	-	8.7

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 invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	5.1	0.800	8.5	2.000	12.3	4.000	17.0	7.000	22.3
0.200	9.3	1.000	8.8	2.200	12.8	4.500	18.0	7.500	23.0
0.300	9.9	1.200	9.6	2.400	13.4	5.000	19.0	8.000	23.8
0.400	10.0	1.400	10.4	2.600	13.9	5.500	19.8	8.500	24.5
0.500	9.9	1.600	11.0	3.000	14.9	6.000	20.7	9.000	25.1
0.600	9.7	1.800	11.7	3.500	16.0	6.500	21.5	9.500	25.8

RPS Group Plc		Page 1
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Innovyze	Source Control 2020.1	

Source Control 2020.1

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
15 min Summer	40.358	0.358	11.0	436.5	O K
30 min Summer	40.469	0.469	11.0	582.5	O K
60 min Summer	40.584	0.584	11.0	737.0	O K
120 min Summer	40.659	0.659	11.0	841.9	O K
180 min Summer	40.701	0.701	11.0	900.7	O K
240 min Summer	40.728	0.728	11.0	938.6	O K
360 min Summer	40.758	0.758	11.0	982.4	O K
480 min Summer	40.774	0.774	11.0	1005.6	O K
600 min Summer	40.782	0.782	11.0	1017.4	O K
720 min Summer	40.785	0.785	11.0	1021.9	O K
960 min Summer	40.783	0.783	11.0	1018.4	O K
1440 min Summer	40.775	0.775	11.0	1007.3	O K
2160 min Summer	40.763	0.763	11.0	990.3	O K
2880 min Summer	40.743	0.743	11.0	961.5	O K
4320 min Summer	40.686	0.686	11.0	879.7	O K
5760 min Summer	40.617	0.617	11.0	782.4	O K
7200 min Summer	40.542	0.542	11.0	679.3	O K
8640 min Summer	40.469	0.469	11.0	582.0	O K
10080 min Summer	40.402	0.402	11.0	494.2	O K
15 min Winter	40.399	0.399	11.0	490.2	O K
30 min Winter	40.523	0.523	11.0	654.6	O K
60 min Winter	40.651	0.651	11.0	829.7	O K
120 min Winter	40.737	0.737	11.0	951.9	O K
180 min Winter	40.786	0.786	11.0	1022.8	O K
240 min Winter	40.818	0.818	11.0	1069.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
15 min Summer	150.602	0.0	448.4	26
30 min Summer	101.012	0.0	601.7	41
60 min Summer	64.747	0.0	771.5	70
120 min Summer	38.063	0.0	907.2	130
180 min Summer	27.871	0.0	996.6	188
240 min Summer	22.335	0.0	1064.8	248
360 min Summer	16.338	0.0	1168.3	366
480 min Summer	13.113	0.0	1250.4	484
600 min Summer	11.078	0.0	1320.4	602
720 min Summer	9.666	0.0	1382.7	722
960 min Summer	7.826	0.0	1492.6	916
1440 min Summer	5.863	0.0	1597.2	1144
2160 min Summer	4.445	0.0	1907.6	1540
2880 min Summer	3.658	0.0	2093.3	1944
4320 min Summer	2.772	0.0	2379.1	2764
5760 min Summer	2.265	0.0	2592.8	3528
7200 min Summer	1.925	0.0	2754.4	4320
8640 min Summer	1.682	0.0	2887.4	5024
10080 min Summer	1.498	0.0	3000.6	5752
15 min Winter	150.602	0.0	502.3	26
30 min Winter	101.012	0.0	674.0	40
60 min Winter	64.747	0.0	864.1	70
120 min Winter	38.063	0.0	1016.1	128
180 min Winter	27.871	0.0	1116.1	186
240 min Winter	22.335	0.0	1192.6	244

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Innovyze	Source Control 2020.1	

Summary of Results for 100 year Return Period (+45%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m ³)	Status
360 min Winter	40.856	0.856	11.0	1126.1	O K
480 min Winter	40.877	0.877	11.0	1157.9	O K
600 min Winter	40.890	0.890	11.0	1176.3	O K
720 min Winter	40.897	0.897	11.0	1186.5	O K
960 min Winter	40.901	0.901	11.0	1192.7	O K
1440 min Winter	40.889	0.889	11.0	1175.4	O K
2160 min Winter	40.872	0.872	11.0	1149.2	O K
2880 min Winter	40.841	0.841	11.0	1103.7	O K
4320 min Winter	40.740	0.740	11.0	956.3	O K
5760 min Winter	40.618	0.618	11.0	784.3	O K
7200 min Winter	40.497	0.497	11.0	619.4	O K
8640 min Winter	40.388	0.388	11.0	475.5	O K
10080 min Winter	40.297	0.297	11.0	358.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Discharge Volume (m ³)	Time-Peak (mins)
360 min Winter	16.338	0.0	1308.7	360
480 min Winter	13.113	0.0	1400.5	474
600 min Winter	11.078	0.0	1479.0	588
720 min Winter	9.666	0.0	1545.2	702
960 min Winter	7.826	0.0	1626.5	922
1440 min Winter	5.863	0.0	1611.9	1316
2160 min Winter	4.445	0.0	2136.4	1660
2880 min Winter	3.658	0.0	2344.2	2136
4320 min Winter	2.772	0.0	2664.5	3028
5760 min Winter	2.265	0.0	2903.7	3808
7200 min Winter	1.925	0.0	3085.2	4544
8640 min Winter	1.682	0.0	3234.6	5272
10080 min Winter	1.498	0.0	3361.9	5944

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 534712 119910 TQ 34712 19910
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+45

Time Area Diagram

Total Area (ha) 1.590

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)	From: To:	(ha)
0 4	0.530	4 8	0.530	8 12	0.530

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Innovyze	Source Control 2020.1	

Model Details

Storage is Online Cover Level (m) 41.300

Tank or Pond Structure

Invert Level (m) 40.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1153.8	1.300	1671.2

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0148-1100-1300-1100
Design Head (m)	1.300
Design Flow (l/s)	11.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	148
Invert Level (m)	39.950
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.300	11.0	Kick-Flo®	0.836	8.9
Flush-Flo™	0.386	11.0	Mean Flow over Head Range	-	9.5

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)	Depth (m)	Flow (l/s)
0.100	5.3	0.800	9.4	2.000	13.5	4.000	18.7	7.000	24.5
0.200	10.2	1.000	9.7	2.200	14.1	4.500	19.8	7.500	25.3
0.300	10.9	1.200	10.6	2.400	14.7	5.000	20.9	8.000	26.1
0.400	11.0	1.400	11.4	2.600	15.3	5.500	21.8	8.500	26.9
0.500	10.9	1.600	12.1	3.000	16.3	6.000	22.8	9.000	27.7
0.600	10.6	1.800	12.8	3.500	17.6	6.500	23.7	9.500	28.4