ARDENT
CONSULTING ENGINEERS
AN EMPLOYEE OWNED COMPANY

BELLWAY HOMES LTD (STRATEGIC LAND)

FORMER THAKEHAM MUSHROOM SITE, THAKEHAM

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

REPORT REF.
2505500-ACE-XX-XX-RP-C-0301

February 2026

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Contents

Page

Appendices

Figures

Tables

Document Control Sheet

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-	DRAFT	NC	JH	DRAFT	22/01/26
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1. Introduction

1.1. Ardent Consulting Engineers (hereafter referred to as Ardent) has been appointed by Bellway Homes Ltd (Strategic Land) to undertake a Flood Risk Assessment (FRA) & Drainage Strategy for the proposed residential development on land west of Storrington Road, Monaghan Mushroom, Thakeham, RH20 3QT (hereafter referred to as 'the site'). The Lead Local Flood Authority is West Sussex County Council (hereafter referred to as 'the LLFA') and the Local Planning Authority is Horsham District Council (hereafter referred to as 'the LPA').

1.2. The application area is 13.21ha, with the primary development within an area of approximately 6.6ha. The Environment Agency (EA) flood map shows that the site is located within Flood Zone 1, however as the site area exceeds 1ha an FRA is required to support the development planning application.

1.3. This FRA has been prepared with specific reference to the requirements of the National Planning Policy Framework (NPPF) updated in December 2024, and the Planning Practice Guidance (PPG) updated in September 2025. This report also takes into consideration the requirements of non-statutory technical standards by DEFRA, National Standards for Sustainable Drainage Systems (SuDS) of June 2025.

Site Location

1.4. The site is located to the west of the B2139 Storrington Road, within Thakeham Village and north of Storrington, West Sussex (**Figure 1-1**).

1.5. The site is centred on National grid reference 510287mE, 117160mN (TQ 10287 17160) and is bound by Storrington Road to the east; residential dwellings and High Bar Lane to the south; South Hill Farm and Barn to the North; and open land to the West.

1.6. The proposed development site consists of outbuildings, offices, welfare facilities and land associated with a former mushroom site.

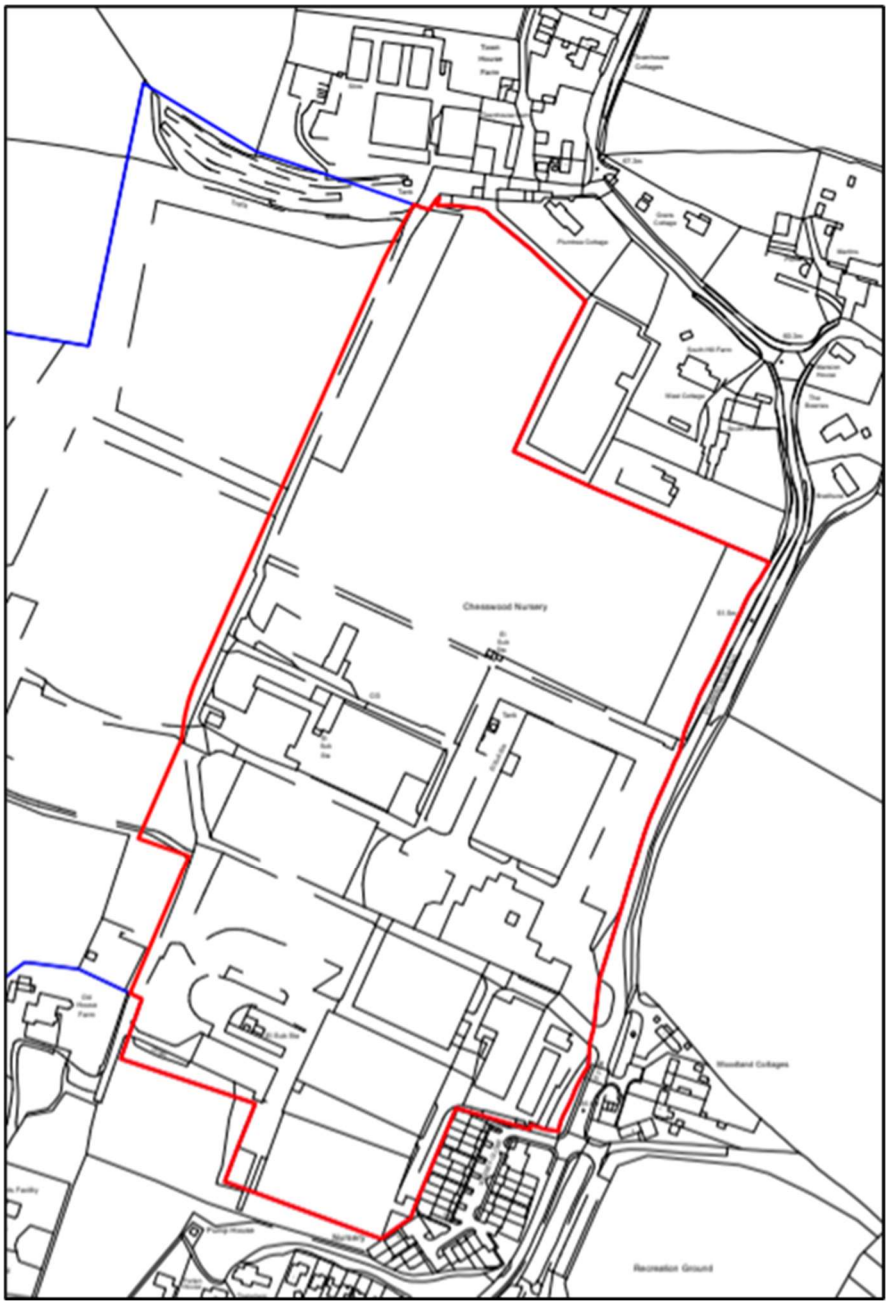

Figure 1-1: Site Location Plan (Source: Pegasus)

Development Proposals

1.7. The proposals comprise demolition of existing buildings and the redevelopment of the site as a residential led development comprising 150 No. dwellings including affordable housing, land for the community land trust, works to public right of way and associated landscaping, open space and infrastructure (hereafter referred to as 'the development').

1.8. For the purposes of the drainage strategy, a primary developable area of 6.6ha will be assumed, which is within the lower two-thirds of the application area encompassed by the red boundary.

1.9. The development layout is included in **Appendix A** and an extract shown in **Figure 1-2** below.

Figure 1-2: Extract of Development Masterplan Layout (Source: Pegasus)

2. Policy Context

National Planning Policy Framework (December 2024)

2.1. The National Planning Policy Framework (NPPF) paragraphs 170 to 182 inclusive, establish the Planning policy relating to flood risk management. The Technical Guide to the NPPF was superseded by the Planning Practice Guidance (PPG), with the flood risk management element of the publication updated in September 2025.

2.2. The focus of the policy is to direct development towards areas of the lowest practicable flood risk and to ensure that all development is safe, without increasing flood risk elsewhere. The main considerations are:

- Applying the Sequential Test, and if necessary, apply the Exception Test to appropriately locate development.
- Safeguarding land from development that is required for current and future flood management.
- Using opportunities offered by new development to reduce the causes and impacts of flooding.
- Where climate change is expected to increase flood risk so that some existing development may not be sustainable in the long-term, seeking opportunities to facilitate the relocation of development, including housing, to more sustainable locations.

2.3. The *NPPF* states that a Flood Risk Assessment is required for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving:

- Sites of 1 hectare or more.
- Land which has been identified by the Environment Agency as having critical drainage problems.
- Land identified in a strategic flood risk assessment as being at increased flood risk in future.
- Land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

Planning Practice Guidance

2.4. The accompanying planning practice guidance to the NPPF provides additional guidance to local planning authorities to ensure the effective implementation of the planning policy set out in the National Planning Policy Framework on development in areas at risk of flooding.

2.5. The PPG provides supporting information on:

- The application of the sequential approach, Sequential and Exception Tests.
- Measures to reduce flood risk to acceptable levels.
- How to manage residual risks.
- Guidance on how to take climate change into account.
- Guidance relating to SuDS drainage principles.

Best practise guidance for the design of drainage

2.6. Various non-statutory publications offer guidance on the design, implementation, maintenance and operation of drainage, with these including for:

- National Standards for Sustainable Drainage Systems (SuDS) – the current version published in June 2025, which sets-out a prescriptive approach to the delivery of surface water drainage and SuDS.
- Practise guidance to the previous (2015) version of the National standards for drainage systems (SuDS) – whilst relating to the replaced version of guidance, this publication of 2016 by LASOO retains relevant advice.
- CIRIA 753 SuDS Manual – the current version published in 2015, provides detailed guidance on the appropriate provision of SuDS features.
- SSG Appendix C - the current version published in 2023, provides detailed guidance for compliant delivery of adoptable foul and surface water drainage, including for limited SuDS components.

Sequential and Exception Test

2.7. According to Annex 3 of the NPPF, the proposed residential development for the Site is classified as 'More Vulnerable.' As the site is located within Flood Zone 1, the development is considered appropriate without application of the Sequential or Exception Test with respect of fluvial/tidal flooding (**Figure 2-1**).

2.8. As detailed within the following, whilst there are instances of pluvial flooding within areas of proposed development, the Sequential Test need not be applied as these risk areas would be reasonably removed through the works.

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✔	✔	✔	✔	✔
Zone 2	✔	Exception Test required	✔	✔	✔
Zone 3a †	Exception Test required †	X	Exception Test required	✔	✔
Zone 3b *	Exception Test required *	X	X	X	✔ *

Key:

✔ Exception test is not required

X Development should not be permitted

Figure 2-1: Extract of Flood Risk and Costal Change Guidance Table 2, Flood Risk Vulnerability

3. Baseline

Hydrology

3.1. The EA online main river mapping shows there are no main rivers within the site, with the River Chilt the closest around 1km to the west and flowing east to west into the River Stour (**Figure 3-1**).

3.2. Mapping shows no surface water features (e.g. ordinary watercourses, open channels, canals, ponds, lakes or reservoirs) to be located within the site, with the nearest features an unnamed open channel around 10m to the south, along with areas of open water around 330m to the south and another around 800m to the west (**Figure 3-1**).

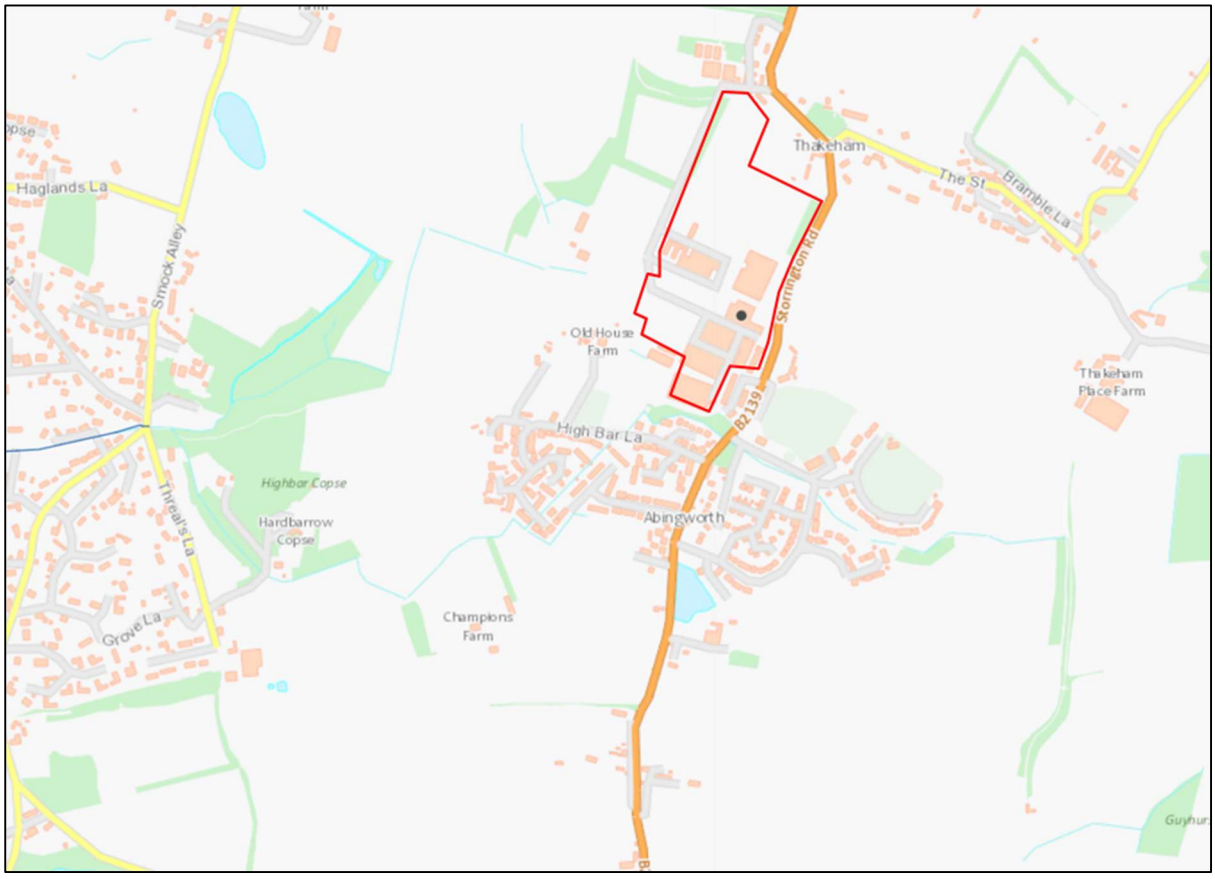

Figure 3-1: Main River Map Extract (Source: EA Statutory Main River Map)

Topography

3.3. The topographical survey drawing (**Appendix B**), prepared by MK Surveys in May 2023, indicates the site falls in a southerly direction. The ground level for most of the site ranges between circa 41.50 and 69.00mAOD with approximate gradient of 1:20 fall to the south.

Ground Conditions

3.4. With reference to soil mapping provided by the Soilscapes of the Cranfield Soil and AgriFood Institute (**Figure 3-2**), the site and adjacent area is shown as underlain with 'Freely draining slightly acid loamy soils.'

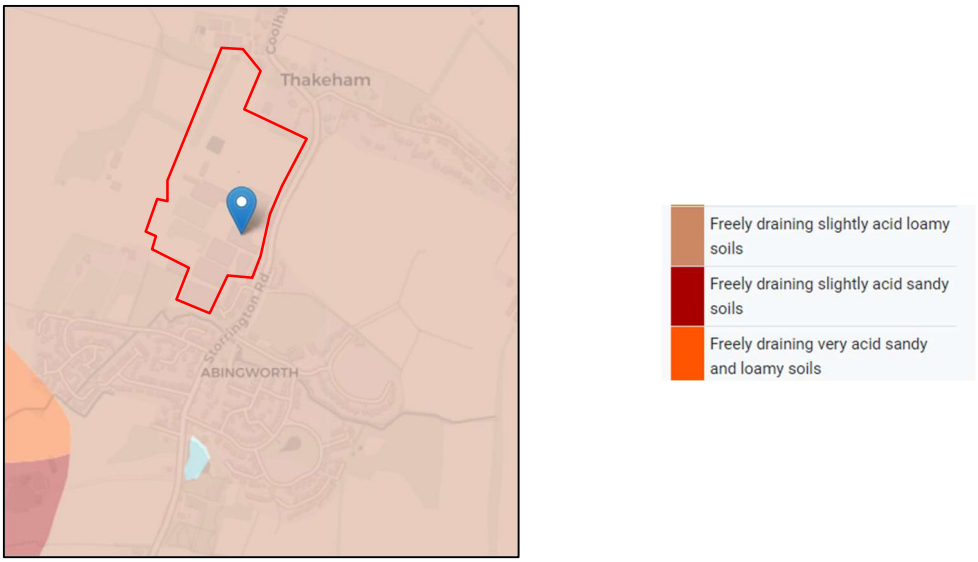

Figure 3-2: Soil Classification (Source: Cranfield Environment Centre)

3.5. The British Geological Survey (BGS) online mapping indicates that the bedrock geology (**Figure 3-3**) of the Site consists of Sandstone and Mudstone, of the Fittleworth and Selham Ironshot Sands Member. No superficial deposits have been recorded in this area.

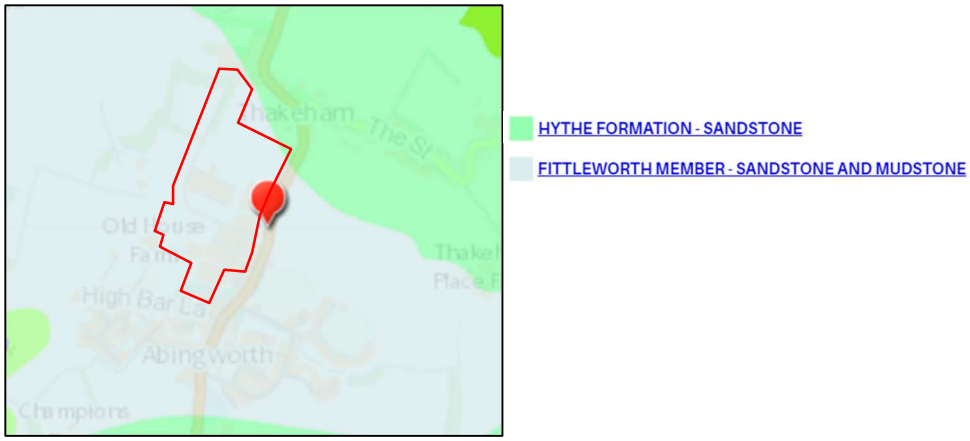

Figure 3-3: Bedrock Geology (Source: British Geological Society)

3.6. Initial ground investigations have been completed on the site (**Figure 3-4**).

Figure 3-4: Exploratory Hole Location Plan (Source: RSK Geosciences)

3.7. Trial pits and bores were taken by RSL Geosciences during November 2022 **(Appendix C**). Reviewing the 10 locations of ground investigation results located within the primary development area (WS3-9 & WS11-13), it has been noted that there were encounters of strata sequence comprising topsoil and/or made ground over yellow and brown sandy silty clay (Fittleworth Member). These validate the bedrock geology (where encountered) on the site to be generally consistent with the BGS mapping.

3.8. Included within the investigation works, groundwater levels were monitored and recorded (**Appendix D**). The results of these findings showed groundwater levels to range between 3.17m and 4.45m below ground level.

3.9. The site is partially located within Groundwater Source Protection Zone 2, with the remainder within Zone 3.

Existing Sewer Infrastructure

3.10. An extract from Southern Water sewer asset plans shows there is a 150mm dia. foul water sewer passing the site in a southerly direction within Storrington Road (**Figure 3-5** with full plans in **Appendix E**). The site is also served by a network of existing private foul and surface water assets, which respectively connect with the sewer and outfall to perimeter open channels.

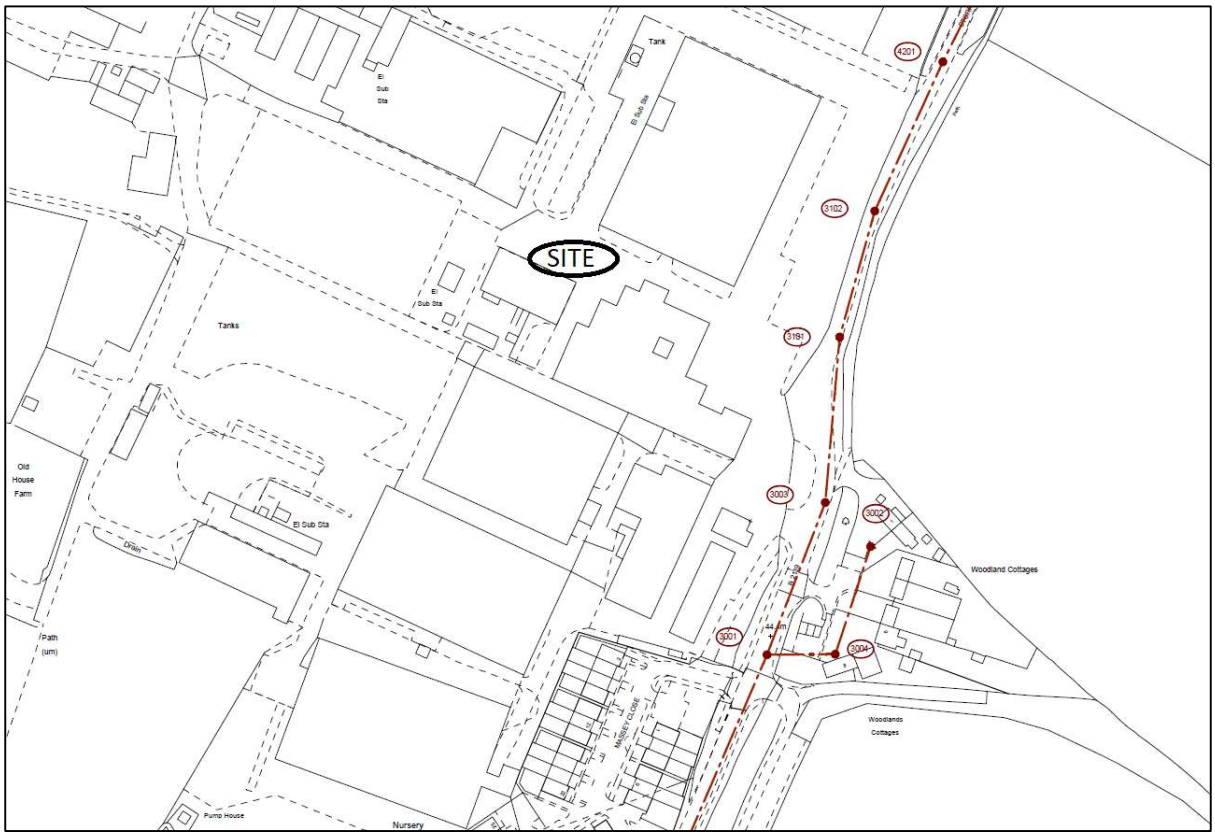

Figure 3-5: Sewer Asset Plan Extract (Source: Southern Water asset records)

4. Sources of Flooding

4.1. The NPPF requires flood risk from the following sources to be assessed, each of which are assessed separately below:

- Tidal sources (flooding from the sea);
- Fluvial sources (river flooding);
- Pluvial sources (flooding resulting from overland flows);
- Groundwater sources;
- Sewer surcharge; and
- Artificial sources, canals, reservoirs etc;
- It also requires the risk from increases in surface water discharge to be assessed (surface water management).

Tidal/Fluvial Flooding

4.2. The EA distinguish between three different flood zones as described below:

- **Flood Zone 1** is land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%);
- **Flood Zone 2** is land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5% – 0.1%) in any year;
- **Flood Zone 3** is land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

4.3. The EA flood map for planning shows the site is located within Flood Zone 1 (**Figure 4-1**). The site is therefore considered to have a very low annual probability of tidal/fluvial flooding, at less than 0.1%.

Figure 4-1: Fluvial Flooding Extents (Source: EA mapping)

Surface Water Flooding

4.4. The EA distinguishes between three levels surface water (pluvial) flood risk as defined below:

- **Low risk** is defined as an area of land which has an AEP between 0.1% and 1%;
- **Medium risk** is defined as an area of land which has an AEP between 1% and 3.3%; and
- **High risk** is defined as an area of land which has an AEP greater than 3.3%.

4.5. EA flood risk from surface water mapping **(Figure 4-2 to 4-4)** shows accumulations of pluvial flooding originating from within and around the site, which appear to align with localised low points within prevailing topography.

4.6. With consideration of the proposals, it would be noted that the flooding extents for all risk profiles encroach into areas of the site, however it would be considered that the flooding is generated by current site run-off with no flooding shown as entering from offsite areas.

4.7. Based upon site run-off generating the pluvial flooding, this would be reasonably mitigated through the positive draining of the site that would be provided as part of the development and as is proposed within the drainage strategy.

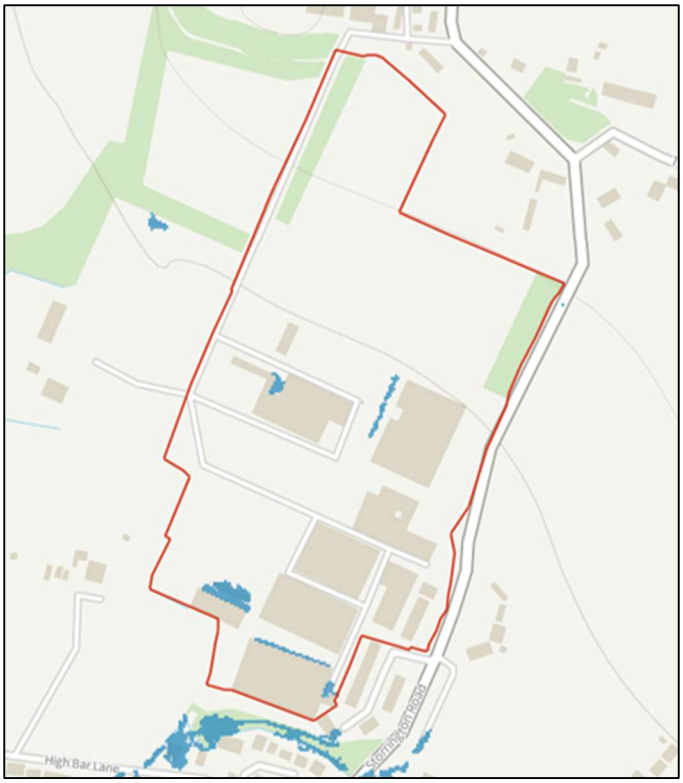

Figure 4-2: High Risk Pluvial Flooding Extents (Source: EA mapping)

Figure 4-3: Medium Risk Pluvial Flooding Extents (Source: EA mapping)

Figure 4-4: Low Risk Pluvial Flooding Extents (Source: EA mapping)

Groundwater Flooding

4.8. The West Sussex County Council (WSCC) Strategic Flood Risk Assessment (SFRA) ***Map G*** ranks the potential of groundwater flooding across the county from high to low. With reference to this, the site would be judged to be in an area of low risk of groundwater flooding.

4.9. As shown through site investigation works, groundwater was not recorded at shallow depths and surface soils would generally be considered to have relatively low permeability, further supporting the low risk of groundwater flooding across the site.

Sewer Flooding

4.10. The WSCC SFRA ***Map S*** would indicate that the site is not in an area prone to sewer flooding.

Artificial Sources

4.11. Risk of flooding from artificial sources has been checked with reference to long term flood risk mapping (**Figure 4-5**), which indicates that the site and wider surroundings are not located in a risk area.

Figure 4-5: Artificial Flooding Extents (Source: EA flood mapping)

Flood Risk Summary

4.12. The risk of flooding pre and post development by varying sources is summarised below (**Table 4-1**). Based upon current mapping and future drainage provision, the site in the end condition would be concluded to be at low risk of flooding.

FLOODING TYPE	PRE-DEVELOPMENT	POST-DEVELOPMENT	COMMENTS
Tidal/Fluvial	Very Low Risk	Very Low Risk	No risk to the site.
Surface Water (Pluvial) Flooding	Low to High Risk	Low Risk	Risk considered as brought by on-site sources only, and therefore managed through appropriate drainage provision.
Groundwater Flooding	Low Risk	Low Risk	Existing risk level maintained or reduced with a standard freeboard to proposed units.
Sewer Flooding	Low Risk	Low Risk	Existing risk level maintained or reduced with a standard freeboard to proposed units.
Artificial Sources	Low Risk	Low Risk	No risk anticipated to either the site or general surrounding area.
Overall assessment of site risk = Low and suitable for residential development			

Table 4-1: Summary of Flood Risk Pre and Post Development

Flood Resistance

4.13. Notwithstanding the Site being at a reasonably low risk of flooding, resilience would be provided by setting of unit floor levels as noted below, to provide a freeboard from fluvial risk and offer protection from overland flows.

- Finished floor levels should be set with a freeboard of 150mm to external ground, with levels falling locally away from units where practicable.

5. Surface Water Disposal and Rates of Discharge

Surface Water Disposal

5.1. The means of discharging surface water will require to be reviewed against the drainage hierarchy as contained within *Standard 1* of the current national SuDS standards, as replicated below.

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

5.2. Notwithstanding that the non-potable water demands of the development as a residential use could not provide a primary means for disposing of all the potential run-off generated by the catchment, rainwater harvesting could be locally provided to deliver water savings.

5.3. As rainwater harvesting would not fully dispose of surface water run-off generated by the catchment, disposal through infiltration to ground shall next be considered as a primary means for disposal of run-off.

5.4. As discussed in **Section 3**, shallow soil deposits are expected to be of low infiltration potential, with primary discharge of development run-off to the permeable bedrock ruled out based upon the groundwater protection status of the area.

5.5. With sole infiltration to ground considered unfeasible, it would be proposed to drain development run-off at a restricted rate to adjacent open channels via established outfall(s) from the site, which is considered the highest relevant standard for the site in accordance with the National Standards for SuDS

5.6. There may also be nominal deep bore infiltration to ground to assist groundwater recharge, however the benefits with respect to rate of surface water disposal achievable will not be allowed for at this time.

Existing and Proposed Discharge Rates

5.7. The application boundary for the site equates to an area of 13.04ha, comprising of brownfield land. Approximately 6.6ha of the application area would be considered as proposed for development, with the remainder retained as common open space.

5.8. As the site omprises an impermeable area expected to exceed that which is proposed, a reduction in volume of run-off from the proposed development would be expected.

5.9. With the volume of run-off from the site to decrease following development, and in accordance with *Standard 3* of the current national SuDS standards, the discharge from the development will be flow matched by return period, up to the 100-year return period storm with climate change allowance.

5.10. With consideration of the current national SuDS standards, the allowable rate of run-off will be calculated based upon the development area (application area less public open space), which is considered to equate to 6.6ha.

5.11. Pro-rata greenfield run-off rates utilising FEH22 rainfall data for key return periods are presented within **Table 5-1** (calculation and FEH data within **Appendix F)**.

Return Period	Per Hectare (l/s)	Application Area of 13.21ha (l/s)	Developable Area of 6.6ha (l/s)
Qbar	3.0	39.6	19.8
Q1	2.6	34.3	17.2
Q30	6.9	91.1	45.5
Q100	9.6	126.8	63.4

Table 5-1: Greenfield Run-off Rates

5.12. From **Table 5-1**, the development discharge will be restricted to maximum rates as follows: to 19.8l/s under the 2-year event and 63.4l/s under the 100-year event with 45% allowance for climate change.

5.13. As the site is currently formally drained and for a further means of comparison, run-off rates from impermeable catchments within the development area are presented within **Table 5-2**, based upon FEH rainfall intensity for a 60-minute duration storm for respective return period events.

Return Period	Rainfall Intensity (mm/hr)	Impermeable Area (ha)	Run-off Rate (l/s)
Q1	11.5	5.04	161.12
Q2	16.6	5.04	232.59
Q30	38.2	5.04	535.23
Q100	48.8	5.04	683.75

Table 5-2: Existing Run-off Rates

5.14. Based upon the comparison of proposed restriction and anticipated rates of run-off from the site in the current form, it is evident that the proposed development will pass forward flows at a much-reduced rate.

6. Surface Water Drainage Strategy

Sustainable Drainage Systems (SuDS)

6.1. The current national standards for SuDS and CIRIA SuDS manual have been used to determine an appropriate SuDS strategy, which considers the spatial and environmental constraints of the site.

6.2. Based upon the above guidance, constraints, and opportunities for the use of SuDS techniques are outlined in **Table 6-1**, appraised using the Management Train approach outlined in CIRIA C753.

Green Roofs (Source Control)	
Constraints:	Subject to Architect's design.
Opportunities:	Deemed incompatible with type of development, with low density housing and likely preference for pitched roofs.
Lined Permeable Paving (Source Control)	
Constraints:	It is considered unfeasible to provide widespread infiltrating permeable paving due to site characteristics (see infiltration devices below).
Opportunities:	Permeable paving with a drained outfall to provide a stage of at-source treatment would be considered reasonable (see infiltration devices below).
Rainwater Harvesting (Source Control)	
Constraints:	The benefits of rainwater harvesting on a specific design storm event cannot be quantified, due to the seasonal availability of storage within the structure.
Opportunities:	Opportunities to provide local/nominal harvesting features exist, for re-use in irrigation and for grey water uses to reduce development water demand.
Infiltration Devices (Source Control)	
Constraints:	Based upon anticipated clay soils and the sensitive groundwater, widespread discharge to ground would be considered unsuitable.
Opportunities:	As a minimum subject to BRE 365 testing.
Tree Pits/Bio-retention (Source Control)	
Constraints:	Subject to Landscape Architect's design.
Opportunities:	Opportunities to use landscaped space to incorporate tree pits and bio-retention areas.
Swales (Conveyance and Storage)	
Constraints:	To provide practicable attenuation benefits, 1:3 side-slope swales tend to require a significant land requirement.
Opportunities:	Opportunities to provide as at source conveyance features, which will provide treatment to run-off and allow drainage to be kept at a shallower depth.

Filter trenches (Conveyance and Storage)	
Constraints:	At c30% void, filter trenches do not provide a significant volume of storage and are therefore not feasible as primary attenuation.
Opportunities:	Opportunities to provide as conveyance features which will provide treatment to run-off and potentially nominal volumes of attenuation.
Detention/Retention Basins (Storage)	
Constraints:	Subject to Architect's site layout.
Opportunities:	It would be anticipated that current areas of open space would offer ample area for provision of basins.
Attenuation Tanks (Storage)	
Constraints:	None
Opportunities:	Potential to locate below ground within private parking courts and areas of public open space, providing efficient attenuation with void ratios typically of 95% or greater.

Table 6-1: SuDS Features Appraisal

6.3. With consideration of the above and need for SuDS to offer interception of run-off, removal of pollutants and balancing of flows; a combination of the following forms is proposed:

- Water butts to offer partial interception and re-use of clean roof water run-off for garden irrigation.
- Drained permeable paving to private and shared driveways to offer interception and at-source treatment to the given pavement area, and nominal adjacent impermeable finishes.
- Drained swales and bioretention features to offer interception and at-source treatment to adjacent roads.
- Detention basins for balancing of run-off, along with residual interception and treatment of run-off where at-source features cannot be reasonably allowed for.

Climate Change Allowance

6.4. The National Planning Policy Framework (NPPF) of December 2024, paragraphs 162 to 164(a) inclusive, establish the Planning policy relating to climate change in the context of flood risk and drainage.

6.5. The focus of the policy is to direct development towards areas of the lowest practicable flood risk and to ensure that all development is safe, without increasing flood risk elsewhere. As part of this, it is noted that proposals should take a proactive approach to mitigating and adapting to climate change, considering the long-term implications for flood risk.

6.6. Guidance on how climate change is predicted to alter peak rainfall intensity has been considered, and for this site the upper requirements are noted as below.

- **30-year** return period storms – **40%** allowance for climate change
- **100-year** return period storms – **45%** allowance for climate change

Surface Water Drainage Network

6.7. Refer to **Appendix G** for drawing no. 2505500-ACE-XX-XX-DR-C-0101, showing the preliminary surface water drainage layout and provision of SuDS.

6.8. Based upon the prevailing levels of the site against anticipated levels of the downstream open channel and surface water drainage within the site, connection of the development surface water by gravity would be considered achievable.

6.9. Point of connection for the surface water drainage will be toward the south-west corner of the site, with private drainage asset plans indicating 525-dia. pipework passing through this area and discharging to the open channel south of the site.

6.10. Prior to commencing site works, the following survey works downstream of the proposed network should be completed:

- Survey of the existing pipework to which a connection is to be made to validate level and condition over the length from the point of connection to outfall into the ditch.
- Survey of the existing ditch invert and top of bank level at (as a minimum) the point of connection, to ascertain if any surcharging of the upstream network would occur whilst the channel is running full.

6.11. To achieve the restrictions in discharge rate without undue flood risk to the development or surrounding area, a total storage volume of approximately 3,200m^3 is to be provided. This is based upon balancing of the 100-year return period event with 45% climate change allowance, and the following parameters:

- Catchment area (north and to intermediate basin) - impermeable area of 7,231m^2 from roads/driveways and 3,476m^2 from roofs. Applying a 10% urban creep allowance to the current roof area, a connecting impermeable area of 11,055m^2 is generated.

- Catchment area (south and unrestricted to end-of-line basin) - impermeable area of 17,892m^2 from roads/driveways and 9,989m^2 from roofs. Applying a 10% urban creep allowance to the current roof area, a connecting impermeable area of 28,880m^2 is generated.

- Cv values – based upon 'default' values and when considering interception by at-source SuDS, it would be considered appropriate to design based upon values of 0.75 for summer and 0.84 for winter storm events. Notwithstanding this, a sensitivity check has been completed to understand the extent of flooding and to ensure balancing of flows within the freeboard of basins with use of a Cv value of 0.95.

6.12. The calculated balancing volume will be allowed for within detention basins provided toward the west of the site within the village green, and toward the end-of-line within a further area of proposed public open space.

6.13. The wider surface water drainage network will be designed to ensure conveyance of the 1 in 2-year event without exceedance of pipe capacity, with appropriate conveyance and containment of run-off for storm events up to the 1 in 30-year with 40% allowance for climate change.

6.14. Any flooding from the drainage network beyond the 30-year event and up to the 100-year event with 45% allowance for climate change will be reasonably contained within the site, with routing of any exceedance flows via roads and open space, to ensure overland run-off is directed in a manner that reasonably minimises the risk to person and property, on and off the site.

6.15. Full network modelling results from Causeway Flow are provided within **Appendix H1** and **H2** for the varying Cv values. Anticipated means of containing any

exceedance flows is as presented within **Table 6-2** for the design Cv, and **Table 6-3** for a Cv of 0.95.

Pipe Reference	Volume of Flooding (m^3)	Means of Containment	Area at 100mm Depth (m^2)
1.007	2.9	Within area of public open space to south of run	29
3.005	1.6	Within area of public open space to south of run	16

Table 6-2: Network Flooding for 100-year Design Event at Design Cv

Pipe Reference	Volume of Flooding (m^3)	Means of Containment	Area at 100mm Depth (m^2)
1.007	24.1	Within area of public open space to south of run	241
1.008	2.1	Within area of public open space to south of run	21
3.003	4.9	Within road corridor and directed toward public open space to south	49
3.004	1.7	Within road corridor and directed toward public open space to south	17
3.005	14.2	Within area of public open space to south of run	142
5.000	2.7	Within area of public open space to west of run	27
6.000	15.8	Within road corridor	158
8.001	4.7	Within road corridor	47
9.000	4.5	Within area of public open space to east of run	45
10.003	17.8	Within area of public open space to north-east of run	178

Table 6-3: Network Flooding for 100-year Event at Cv of 0.95

Surface Water Quality

6.16. A combination of SuDS are proposed to treat surface water run-off, with features by area drained as below and respective pollution mitigation indices provided within **Appendix I:**

- **Higher traffic roads** (including adjacent footways and parking bays) – drained at or near source by swales or bio-retention features; further site wide treatment provided through the retention and/or detention basin.
- **Low traffic roads** (including adjacent footways and parking bays) – with potentially reduced opportunity to provide at source SuDS for these areas with lesser or no verge areas, treatment will be provided through the retention and/or detention basin only.
- **Shared driveways and plot run-off** – drained at or near source by permeable paving; further site wide treatment provided through the retention and/or detention basin only.

Future Maintenance

6.17. A management company will be appointed to maintain communal areas, landscaping and shared SuDS throughout the development.

6.18. All maintenance will be in accordance with the best practices and the CIRIA Manual C753. Refer to **Appendix J** for an overview of the maintenance tasks required.

6.19. To ensure reasonable access for future maintenance activities, in-particular for SuDS, the following measures by form are proposed and as appropriate detailed upon drawing no. 2505500-ACE-XX-XX-DR-C-0101 (**Appendix G**)

- SuDS basins – 3.5m wide route to inlet and outlet points kept clear of planting or structures. Reinforced grass area to be provided adjacent to basins for authorised maintenance vehicles.
- Linear roadside features – access to be reasonably achievable from road or footway side, with no long lengths of planting or significant street furniture/structures placed along the sides.
- Permeable paving – no additional or particular access requirements considered necessary.

7. Foul Water Drainage Strategy

7.1. Refer to **Appendix G** for the drawing no. 2505500-ACE-XX-XX-DR-C-0101, showing the preliminary foul water drainage layout.

7.2. As the site has an existing connection to the sewer within Storrington Road, it would be considered to have a historic demand on the downstream wastewater network.

7.3. The flow generated by the historic site use would be estimated as 2.0l/s, based upon Southern Water rates for commercial use at 3l/sqm/day over a buildings footprint of 5.15ha, with 10% allowance for infiltration but no peaking factor applied.

7.4. The preferred point of connection to the Southern Water sewer would be adjacent to Massey Close, with as appropriate any length of drain within the root protection zone of boundary trees to be installed through trenchless techniques to a new chamber formed on the existing sewer.

7.5. Based upon invert levels denoted upon Southern Water record plans around the point of the proposed connection, a gravity discharge would be anticipated as achieved from 116 of the 150 No. residential units. The remaining 34 No. would broadly follow the prevailing topography of the site to the south-east corner by gravity, with a rising main then provided back up to the gravity connection within the development.

7.6. In accordance with Part H of Building Regulations, emergency storage should be provided at the pump station to offer reasonable protection from flooding in the event of pump failure. As more than 30 No. properties would be connecting to the pump, storage requirements of SSG Appendix C would be considered more appropriate at 160 litres per unit, opposed to the 150 litres per person of Part H.

7.7. With 34 No. units connected via the pump, the volume of emergency storage to be provided within the wet well and supplemented by an appropriate below ground tank or similar would be 5.4m^3.

7.8. With 150 No. dwellings proposed, a peak foul flow from the development of 1.4l/s would be estimated. This is based upon Southern Water advised demand of 300l/dwelling/day (residential), with 10% allowance for infiltration into the network and 2.5 peak factor.

7.9. As the development will be split between a direct gravity connection and pumped discharge, the final peak discharge will be adjusted, assuming an outgoing flow from the pump at 50% of incoming, giving a total peak of 1.2l/s for the development.

7.10. Currently, no discharge from the community land trust allocation is allowed for, but by inspection the development foul water drainage could be expected to accept a connection from the residential use and this land via a 150mm-dia. connection at minimum grade.

7.11. Under a previous development application for the site and in a response dated 20th February 2024, Southern Water advised there may be a need for reinforcement works to the existing drainage network to allow for the connection of 247 No. units. As stated within the response, reinforcement works would be provided for by Southern Water, typically within 24-months of planning consent being granted.

7.12. Based upon this previous consultation response for a greater quantum of development, it would be considered reasonable for the development to discharge to the existing foul sewer. In-particular as the proposed development discharge rate would be less than that anticipated from the historic site use.

8. Conclusions

8.1. According to the EA flood maps, the site is in Flood Zone 1 and is therefore at very low risk of fluvial or tidal flooding.

8.2. The potential risk of flooding from other sources at the site including surface water, groundwater, sewers and artificial sources are considered low under the end condition. This risk level would be achieved through the development by implementing the proposed surface water drainage and finished levels to dwellings.

8.3. As the end draining of the development would be considered to reasonably mitigate current high and medium risk pluvial flooding, application of the Sequential Test would not be considered necessary.

8.4. The surface water drainage strategy will manage flood risk by restricting surface water to equivalent greenfield rates for all return period events, up to and including the 1 in 100-year critical event (with 45% allowance for climate change). The surface water from the development will connect to an existing open channel to the south of the site, via an established outfall.

8.5. The surface water from the development will primarily be attenuated within basins, with a total volume of approx. 3,100m^3 required to balance run-off. In addition, at-source SuDS will be provided throughout the development to treat, partially intercept, and locally balance run-off.

8.6. A management company will be appointed to maintain the SuDS within the development, in accordance with best practice of the CIRIA Manual C753.

8.7. It is proposed that foul flows from the development will discharge into a Southern Water sewer adjacent to the site.

8.8. In conclusion, the proposals are consistent with the aims of NPPF, PPG, the latest National Standards for SuDS, Local Plan and other relevant local guidance. The proposed drainage strategy will not increase flood risk for the development site or the surrounding area.