



Flood Risk Assessment



2506-1025 Station
Road, Ashwell,
Hertfordshire

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DOCUMENT CONTROL SHEET

REV	ISSUE PURPOSE	AUTHOR	CHECKED	APPROVED	DATE
-	Initial submission	KK	RGW	RGW	29.08.2025

1. INTRODUCTION

Project

This Flood Risk Assessment has been undertaken for Beck Homes Ltd to inform and support a planning application for a residential development of up to 36 dwellings. The development is to comprise of a mixture of detached, semidetached houses and flats, the proposals will include the new housing, parking, private and adoptable hardstanding on a site area of approximately 3.01Ha with the development to be accessed via a new bellmouth junction off Station Road.

Aims and Objectives

The purpose of this assessment is to review the proposed development and to consider the risk to it of flooding, assessing the affect it may have on any existing flood flows and flood storage within adjacent floodplains.

The risks of flooding and potential impact of alterations to the existing flood flow and storage regime and surface run-off characteristics are considered within the scope and parameters set out in the National Planning Policy Framework (NPPF). Consideration is also given to the ODPM document "Preparing for Floods".

The Environment Agency website, flood mapping was consulted during this assessment. (Please refer to the Chapter 2 for flood mapping data).

Site Location/Description

The site is located to the north side of Station Road in Ashwell, a village and civil parish in the North Hertfordshire district of Hertfordshire, England. It lies 4 miles north-east of Baldock. The site is approximately 3.01 ha in size with a grid reference of 527900E, 239700N.

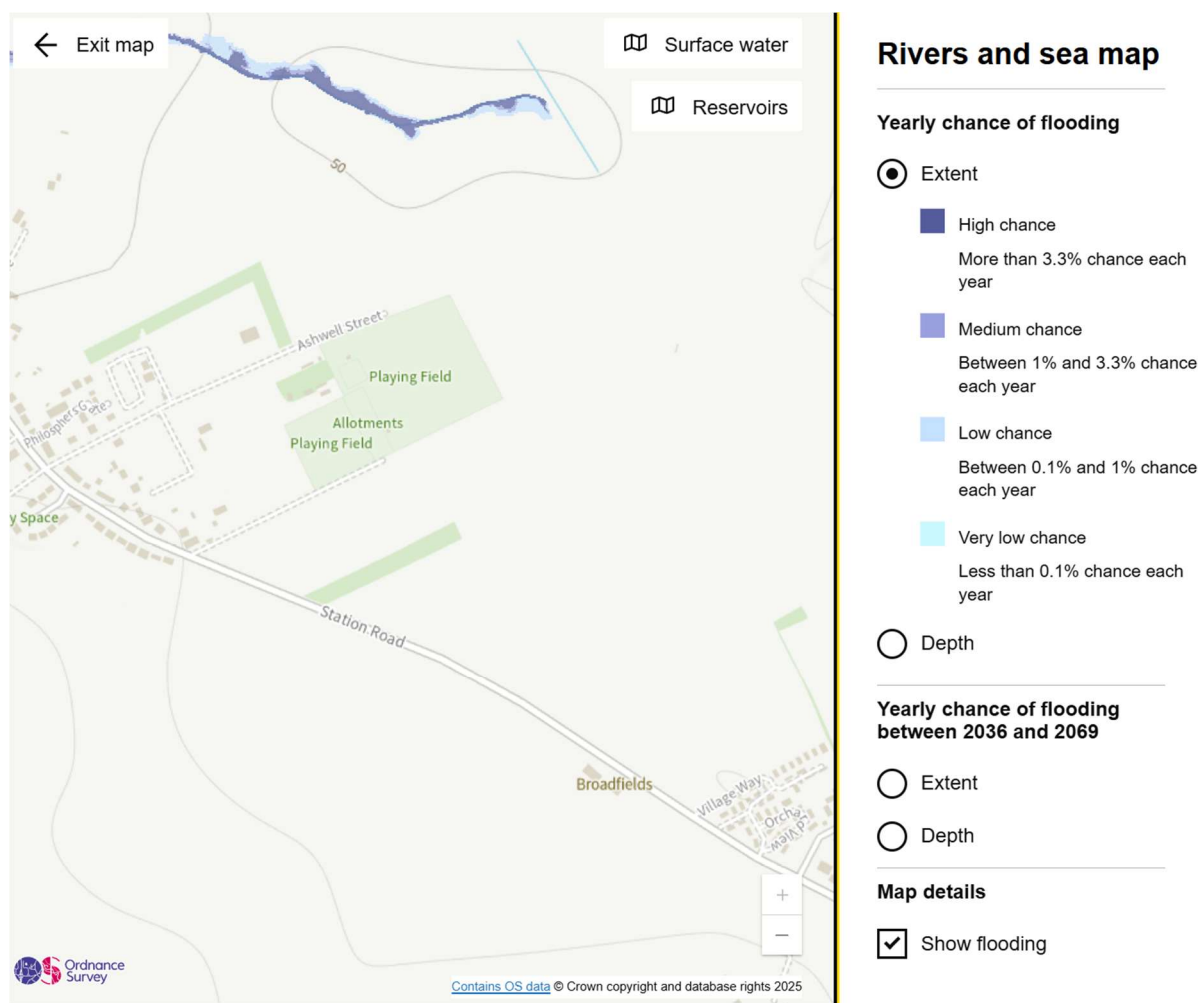
The site is bound by Station Road to the south and a new housing development by Matthew Homes to the west and fields to the north and east. There are no watercourses near the site, and the site has a tree belt around 30m wide running through the centre, which will be retained as part of the development, except for the connecting road linking the north and south areas.

The site is relative flat with gradients of 1in60 (1.7%) increasing to 1in20 (5%) falling in a westerly direction, the low point located in the northwest corner, levels ranging from approximately 56.31m AOD to 52.27m AOD. (Please refer to the Appendix for the Topographical Survey shown on the drainage strategy).

2. FLOOD ANALYSIS

Flood Level

The Environment Agency flood mapping detailed below indicates that the site lies in Zone 1, outside any floodplain with <1in1000yr probability of river or sea flooding.



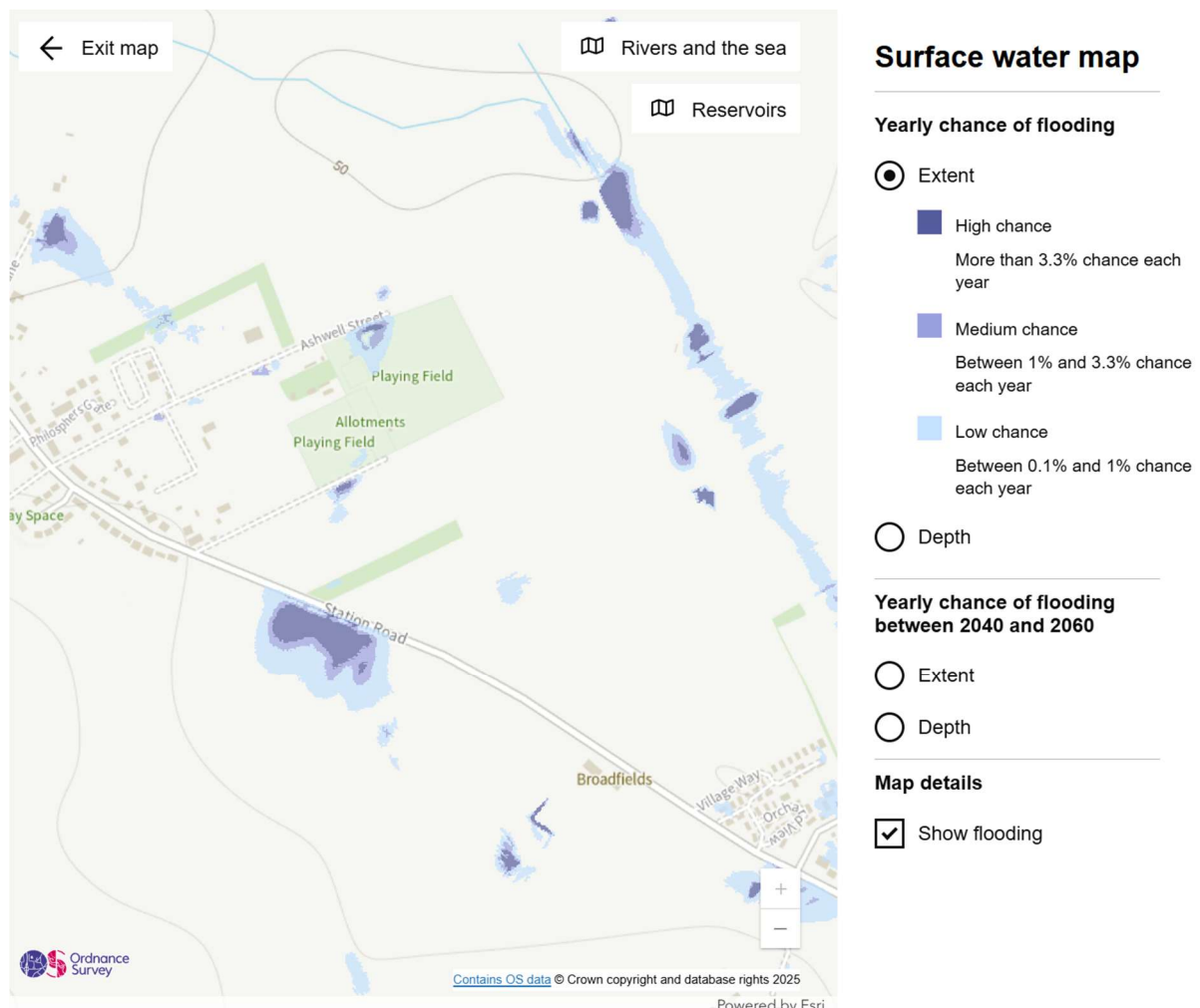
Flood Protection

Although within flood-zone 1, consideration is also required of the flood risk presented from other potential sources such as overland water, groundwater, sewers and retained water features. The site has been assessed for these threats and the proposed levels and existing topography of the site, such that in the event of large storm events, surface water flows would not threaten life or property. A detailed list of the flood risks considered is as follows:

Groundwater: Where the water table rises to such a height where flooding occurs. Most common in low-lying areas underlain by permeable ground (aquifers), usually due to extended periods of wet weather: Ground Water flooding is not considered to be significant for this development due local BGS archives suggest groundwater to be 13.2m below ground level.

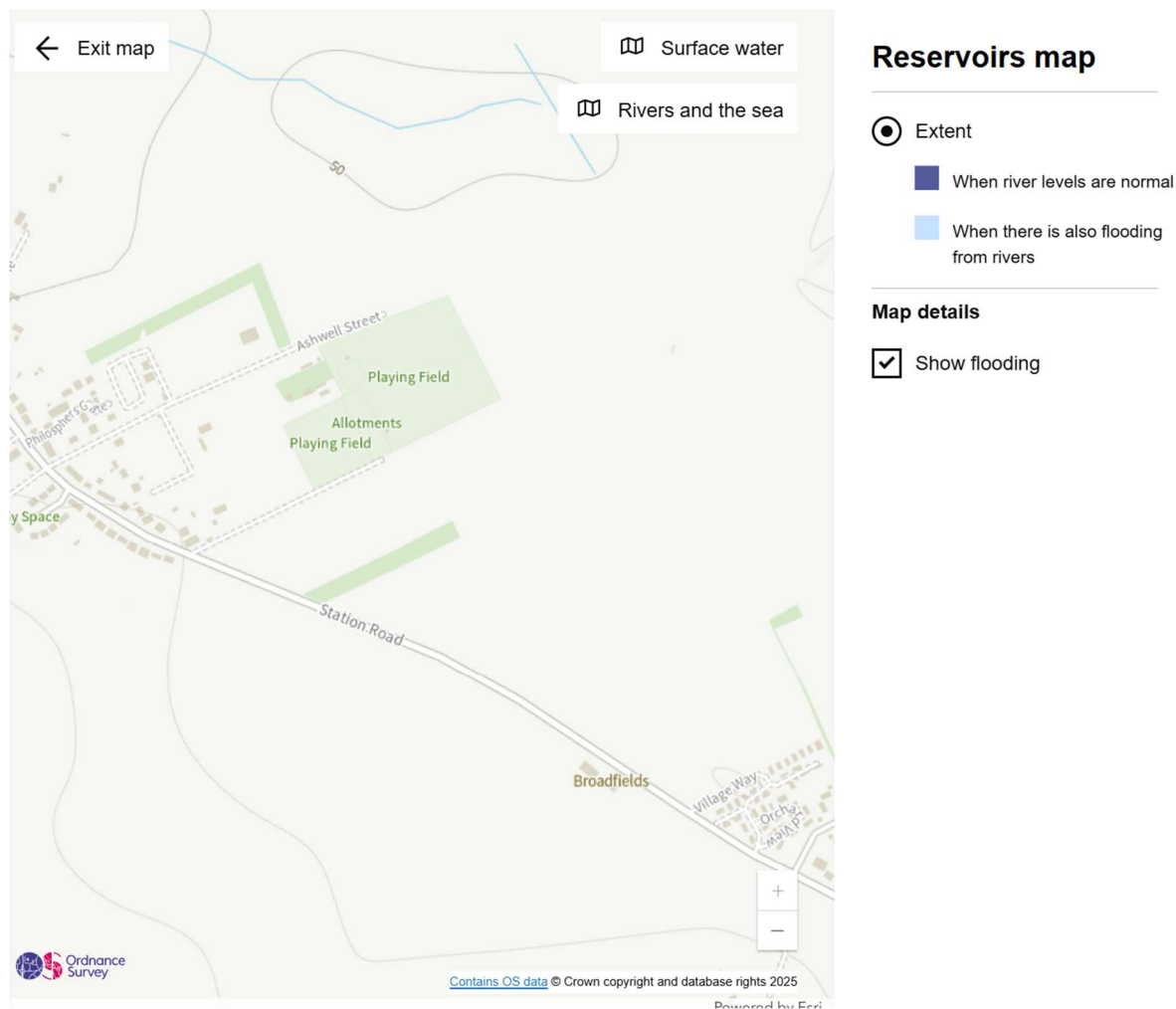
Sewers and highway drains: Combined, foul or surface water sewers and highway drains that are temporarily over-loaded due to excessive rainfall or due to blockage: Should the proposed onsite sewers become blocked the proposed road levels and garden levels surrounding the buildings will be set lower than the proposed finished floor levels therefore ensuring that no threat to adjacent property.

Surface water: The net rainfall falling on a surface (on or off the site) which acts as runoff which has not infiltrated into the ground or entered a drainage system: The below surface water mapping shows no yearly chance of flooding.



It is considered that the proposed development will manage and intercept the overland flows by attenuating up to 1in100year + 40% climate change and infiltrating at source via, permeable paving sub-base and infiltration basin, in addition the basin will be located at the low point and 300mm freeboard will provide an extra measure in capturing exceedance flows of over land flows therefore no risk from surface water flooding.

Infrastructure failure: canals, reservoirs, industrial processes, burst water mains or failed pumping stations': No infrastructure present to pose a threat as indicated on the mapping below.



Flood Storage

As above the 1% flood level, the proposed redevelopment is not considered to have any impact on existing floodplain storage.

Extreme Flood Events

Consideration is given to flood events over and above the 1in100yr event and exceedance flow routes detailed on exceedance flow route drawing (see Appendix) all flows will be directed away from properties

with finished floor levels set to a minimum of 150mm above ground level, low spots will be design in the hard standing directed away from buildings, ponding will give prior warning if failure of the drainage system occurred.

The drainage strategy will detail all surface water run-off up to 1in100year storm plus 40% climate change will be contained in infiltration devices whilst it infiltrates the ground and although not used in design calculations there will be additional storage volume in the piped network, freeboard in the basins and permeable paving, which can accommodate further run-off above the 1in100year storm plus 40% climate change.

3. SURFACE AND FOUL WATER STRATEGY

Drainage and Site Analysis

From local BGS borehole data the underlying geology is chalk to a depth of 32m where the borehole terminated and no ground water was encountered until a depth of 13.2m in addition the trial pit testing supplied by Geotechnical and Environmental Associates (see Appendix) confirms the presence of chalk.

In addition, Infiltration testing has been conducted by GEA with soakage rates achieved for the proposed site basin achieving rates of 1.28×10^{-4} to 8.31×10^{-5} m/s this shows the ground conditions exhibit good drainage characteristics with no ground water encountered. Further testing is being conducted to confirm the viability of discharge via permeable paving.

Following the hierarchy set out in the NPPF the drainage strategy will be able to drain all surface water via infiltration mimicking the existing drainage regime for the site.

The NPPF states the hierarchy for discharge of surface water to be: -

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

As a current greenfield site there is presently 0m² of impermeable area, which post development will increase to approximately 9200m² with the existing drainage regime at present that surface water run-off infiltrates the ground, in line with the NPPF it is proposed to mimic this regime via the introduction of multiple SuDS infiltration devices.

There are no foul sewers on site however the adjacent site (Matthew Homes) has a foul pump station and there is an agreement between Matthew Homes and Beck Homes to enable connection of the subject site for foul water.

Surface Water Strategy

The greenfield site is understood to presently drain entirely by infiltration. There is no evidence of any other form of surface water drainage near the site and the British Geological Society mapping and the ground investigation report indicates that the site is underlain by Chalk Formation.

In accordance with BRE 365, infiltration testing has been undertaken on site by Geotechnical and Environmental Associates. Results of the testing (see appendix) indicate that infiltration is reasonable to depths of 2m where a design rate for the site wide basin to be 8.31×10^{-5} m/s (see appendix for trial pit locations). Further testing is being conducted to confirm permeable paving rates.

The surface water strategy will be to drain all private hard standing via permeable paving for infiltration, roof areas will drain to an adoptable surface water network that in turn will collect run off from adoptable standard roads and subsequently conveyed to an infiltration basin in the low-lying area of the site.

All storage/infiltration devices will accommodate run off up to and including a 1in100 year event plus 40% climate change plus 10% urban creep (for roof area), these features will also half drain within 24 hours to allow capacity for a subsequent storm.

The appended preliminary drainage strategy drawings (see appendix) illustrate how the required attenuation may be located within the development, and an evaluation of the types of SuDS features to be used is detailed in the following table.

SuDS Evaluation

Type of SuDS	Description	Assessment
Rainwater Harvesting	Rain gardens and water butts are considered a suitable type of harvesting system	Not required as above ground SuDS provide sufficient storage
Green Roofs	Due to the roof pitches and greater loading, it is not considered a viable option for residential dwellings on this development. There is also a high maintenance requirement that would fall to the individual homeowners and therefore not sustainable.	Not appropriate in this instance.
Blue Roofs	Due to the higher structural loading and roof pitches, it is not considered a viable option for residential dwellings on this development. There is also a high maintenance requirement that would fall to the individual homeowners and therefore not sustainable.	Not appropriate in this instance.
Infiltration Basins	Due to the high permeability of the geology and that basins are an above ground SuDS feature these are a preferred method of discharge of surface water and will be incorporated into the development.	Appropriate in this instance and included in the strategy
Swales & Filter Strips	Swales and filter striped are both considered viable, however due to the small size of the development and that infiltration basins and permeable paving are proposed	Not required
Permeable paving	Permeable paving is considered one of the most appropriate methods for the development enabling source control.	Appropriate in this instance and to be used across the site except for adoptable standard roads.
Infiltration Tanks	Below ground SuDS are not a preferred option, chalks may also require increased offsets of 10m limiting their viability	Not required as above ground SuDS provide sufficient storage
Proprietary Treatment Systems	Not expected to be required for the development.	Not required as above ground SuDS provide sufficient treatment.

The strategy is therefore considered to provide a robust solution to surface water drainage for the proposed development with all water contained in such a way as to pose no threat to life or property. The proposed system can accommodate surface water from events up to and including the 1 in 100-year event plus a 40%, as per appended example calculations.

Foul Water Strategy

The foul water will drain via a new adoptable gravity sewer network with final connection to an existing Anglia Water foul water pump station located within Senuna Park development (Matthew Homes), it is estimated up to 0.71m³ of storage will be required on site to ensure the existing pump and rising main are unaffected and that the required storage can be attained within the proposed new sewers, connection will be subject to a section 106 agreement with the water authority.

4. CONCLUSIONS AND RECOMMENDATIONS

The proposed new residential development has been assessed for the risk to the site from fluvial flooding in accordance with the guidelines of the NPPF. Assessment has also been made of the impact of the proposed development on the existing floodplain storage at this location, and of the risk of pluvial flooding from storm water contribution from the development exacerbating downstream flooding, as directed by the guidance.

The site has been found to lie within Flood Zone 1 and is therefore not considered to be at risk from fluvial flooding. Other sources of flooding have similarly been assessed and found to pose no threat to development on the site.

The proposals do not affect flood storage within the floodplain and the peak surface water runoff rate leaving the site will be captured via infiltration and attenuation system and therefore surface water drainage from the site will mimic the existing drainage regime.

The discharge of future surface water runoff from the site will not be increased as a result of the development but will provide a betterment in peak flows discharging from site, by attenuating and slowing the rate at which it infiltrates the ground by the use of infiltration devices.

It is considered from this assessment that the level of risk of flooding to and from the proposed development is of an acceptable level and in keeping with current policy.

5. SUDS DESIGN AND MANAGEMENT

Water Quality, Amenity and Biodiversity

The approach to Sustainable Drainage Systems (SuDS) is to control water quantity, water quality, amenity, and biodiversity by incorporating multiple SuDS features into a drainage design and producing a management train it is possible to achieve enhancements in all areas.

All private hard standing is to be permeable paving to collect and clean surface run-off, adoptable standard roads and roof areas will drain to an onsite infiltration basin with the addition of Catch pit manholes and trapped gullies to provide a pre-treatment stage for surface water run-off.

These combined measures produce a management train, which facilitates the capture, conveyance, and storage of surface water run-off, while delivering interception and pollution risk management.

The use of SUDS is proposed within the surface water drainage strategy for the proposed development of 36 new residential dwellings by Beck Homes, in order to serve several functions:

- Control of runoff water rates and volumes, thereby reducing downstream flood risk
- Reducing pollutant concentrations and act as a buffer for accidental spills to improve runoff water quality.

The range of SUDs is described in this document and the recommended maintenance regimes to be applied to each feature and who it is envisaged will be responsible for implementing the maintenance.

SuDS Features and Maintenance Responsibilities

The proposed SuDS are as follows:

- **Permeable Paving** will be provided to the majority of private hardstanding where swales and filter strips are not viable, maintenance will be carried out by the onsite management company.
- **Infiltration Basins** – will be located in the low lying open space area and maintenance will be by the adopting water authority.

Maintenance of SuDS

Infiltration Basins

Infiltration Basins are flat bottomed, shallow landscaped depressions that store runoff allowing pollutants to settle and filter out before infiltration into the subsurface soils

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter, debris and trash	Monthly
	Cut grass – for landscaped areas and access routes	Monthly (during growing season) or as required
	Cut grass – meadow grass in and around basin	Half yearly: spring (before nesting season) and autumn
	Manage other vegetation and remove nuisance plants	Monthly at start, then as required
Occasional maintenance	Reseed areas of poor vegetation growth	Annually, or as required
	Prune and trim trees and remove cuttings	As required
	Remove sediment from pre-treatment system when 50% full	As required
Remedial actions	Repair erosion or other damage by reseedling or re-turfing	As required
	Realign the rip-rap	As required
	Repair or rehabilitate inlets, outlets and overflows	As required
	Rehabilitate infiltration surface using scarifying and spiking techniques if performance deteriorates	As required
	Relevel uneven surfaces and reinstate design levels	As required
Monitoring	Inspect inlets, outlets and overflows for blockages, and clear if required	Monthly
	Inspect banksides, structures, pipework etc for evidence of physical damage	Monthly
	Inspect inlets and pre-treatment systems for silt accumulation; establish appropriate silt removal frequencies	Half yearly
	Inspect infiltration surfaces for compaction and ponding	Monthly

Pervious Pavements

Pervious pavements including permeable block paving, porous asphalt or gravel and allow rain to percolate through the surface into underlying drainage layers. They should be protected from silt, sand, compost, mulch etc. Permeable block paving and porous asphalt can be cleaned by suction brushing

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent impermeable areas as this area is most likely to collect the most sediment
Occasional maintenance	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator rather than spraying	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within 50 mm of the level of the paving	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitoring	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if required, take remedial action	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing frequencies	Annually
	Monitor inspection chambers	Annually

SuDS Mitigation

To deliver adequate treatment, SuDS components should have a total pollution mitigation index for each contamination type that is greater than or equal to the pollution hazard index as detailed in the following tables from CIRIA SuDS Manual (C753) 2016

As the proposed development is for residential properties with associated roads and infrastructure the pollution hazard indices are taken from the below table from with the areas relevant highlighted.

TABLE 26.2 Pollution hazard indices for different land use classifications				
Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

These index figures are compared to the SuDS mitigation for discharge to surface water, as detailed earlier in this report the surface water strategy is to have an infiltration basin, swale, filter strips and permeable paving, therefore the SuDS mitigation is as highlighted below. A factor of 0.5 is used for subsequent features for the reduced performance of secondary components.

TABLE 26.4 Indicative SuDS mitigation indices for discharges to groundwater

Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates ¹	TSS	Metals	Hydrocarbons
A layer of dense vegetation underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.6 ⁴	0.5	0.6
A soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.4 ⁴	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment, ie graded gravel with sufficient smaller particles but not single size coarse aggregate such as 20 mm gravel) underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.4 ⁴	0.4	0.4
Constructed permeable pavement (where a suitable filtration layer is included that provides treatment, and including a geotextile at the base separating the foundation from the subgrade) underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.7	0.6	0.7
Bioretention underlain by a soil with good contaminant attenuation potential ² of at least 300 mm in depth ³	0.8 ⁴	0.8	0.8
Proprietary treatment systems ^{5, 6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for inflow concentrations relevant to the contributing drainage area.		

As the Total SuDS mitigation index is greater the pollution hazard index for each component the SuDS mitigation is met inline with CIRIA SuDS Manual (C753) 2016

Management of surface water during construction

The requirement for management of surface water during construction will be highlighted to contractors at all stages of construction. Specific issues to be addressed and the methods that might be used are all detailed in the following chapter **Construction Surface Water Management Plan**.

The following chapter should be used as guidance for contractors at tender stage and they will be expected to produce method statements responding to their Plan and include allowance within their pricing to implement the agreed method statements.

6. CONSTRUCTION SURFACE WATER MANAGEMENT PLAN

The construction of SuDS usually only requires the use of standard civil engineering and landscaping operations such as excavation, filling, grading, pipe-laying, chamber construction, topsoiling, seeding and planting. There are some specific process and programming considerations required for their application to SuDS construction, and these will be considered when programming the residential development.

The intention is to issue this Construction Surface Water Management Plan to the appointed builder with the requirement for method statements (MS) addressing the issues raised to be submitted for review by the Engineer. Only once the Engineer is satisfied that all related items have been satisfied by the MS will works commence.

The construction surface water will therefore be managed in this way by this plan.

General construction issues relating to SuDS.

Programming

The programming of SuDS construction needs to be considered at all stages of the site construction process. Subsurface piped drainage networks are usually one of the first facilities to be constructed on a site. For SuDS, although the form of the drainage will be constructed during the earthworks phase, the final construction should not take place until the end of the development programme, unless adequate provision is made to remove any silt that is deposited during construction operations and to refurbish any areas that have been subject to over-compaction.

Method statements and pre-construction site planning operations will form an essential part of pre-construction activities to ensure successful completion of the SuDS.

The construction of swales, basins and ponds at an early stage in the construction can assist in managing runoff and help settle out the high volumes of sediments created during construction. However, complete reinstatement of these components will be required once construction is finished. The contract is likely to stipulate establishment of vegetation and sediment removal sometime after site works have been completed and before the start of the maintenance period.

Pollution and sediment control

Runoff from a construction site should not be allowed to enter SuDS or flow off site unless it has been allowed for in the design and specification. Construction runoff is heavily laden with sediment, which can build up in storage systems and pollute receiving waters.

Skills

The contractor and all relevant operatives should have a general understanding of how SuDS work, and the purpose of the specific SuDS components being used on a site, to ensure that appropriate construction practice and component protection is used. “Toolbox Talks” for workers are a particularly effective way of increasing awareness of appropriate construction of SuDS.

Landscaping

Good landscape construction practices are fundamental to SuDS construction. As SuDS are normally surface systems, attention to detail and aesthetics should be given a high priority. The seasonal and physical requirements of planting and the requirements for establishing vegetation and preventing soil erosion should be given careful consideration. Appropriately skilled and experienced operatives are required with an understanding of all aspects of vegetation establishment. Adjacent ground levels to components should be designed to prevent any overland sediment wash-off during high intensity rainfall events, or groundwater seepage during particularly wet periods. Settlement of soils should be taken into consideration.

At Newmarket Road, Royston, the earthworks will be carried out with awareness of the final planned landscaping and be sensitive to it.

Erosion control

Before runoff is allowed to flow through vegetated SuDs, they should be fully stabilised by planting or temporary erosion protection. This will prevent erosion of the sides and base or the clogging of downstream components.

Construction programming for SuDS

Effective construction programming for SuDS is very important to:

Protect the receiving environment from runoff during construction.

Protect each SuDS component from damage during construction.

Protect the natural infiltration characteristics of the site soils and subsoils.

Deliver a surface water management system where runoff is conveyed and stored, as designed, without causing unacceptable erosion, channelling or sedimentation.

Promote the healthy establishment of required vegetation and habitats.

The following issues will be considered in developing the construction programme:

Sediment basins and traps should be installed before any major site earthworks/groundworks take place. Further sediment traps and silt fences should be installed as earthworks/groundworks progress, to keep sediment contained on site at appropriate locations.

Runoff control measures should be used in conjunction with sediment traps to divert water around planned earthworks areas and to remove silt. Surface water runoff from upstream should be diverted around areas to be disturbed before any earthworks/groundwork's operations. Any perimeter drains

should be installed with stable outfalls before opening major areas up for development. Any additional facilities needed for runoff control should be installed as earthworks/groundworks take place.

The main runoff conveyance system with inlet and outlet protection measures is often installed early and used to convey surface water runoff through the development site without creating gullies or channels. Inlet protection for surface water drains should be installed as soon as the drain is functional, to trap sediment on site in shallow pools and to allow flood flows to safely enter the surface water drainage system. Outlet protection should be installed at the same time as the conveyance system to prevent damage to the receiving water body.

Clearing and earthworks/groundworks should only be started when adequate erosion and sediment control measures are in place. Once a development area is cleared, earthworks should follow immediately, so that protective ground cover can be re-established quickly. Areas should not be left bare and exposed for extended periods. Adjoining areas planned for development or those that are to be used for borrowing and disposal should be left undisturbed as long as possible, to serve as natural buffer zones. Runoff control is essential during the earthworks/groundwork's periods. Temporary diversions, slope drains, and inlet and outlet protection installed in a timely manner can be very effective in controlling erosion during this critical period of development.

Surface stabilisation measures should be applied to completed areas, channels, ditches and other disturbed areas after the land is cleared and profiled. Any disturbed area where active construction will not take place for more than 60 working days should be stabilised by temporary seeding and/or mulching or by other suitable means. Permanent stabilisation measures should be installed as soon as possible after final profiling. Temporary seeding and/or mulching may be necessary during extreme weather conditions, with permanent vegetation measures delayed until a more suitable installation time.

Sediment Control

Principles of sediment control

During a rainfall event, runoff normally builds up rapidly to a peak and then diminishes. Because the amount of sediment conveyed in runoff is dependent upon the velocity and volume of that runoff, sediment tends to be deposited as runoff rates decrease. The deposited sediments may be re-suspended with subsequent runoff – in this way, sediments are moved progressively downstream.

Sediment control techniques

Sediment controls used during construction include straw bale barriers, geotextile silt fences and sediment basins. All runoff leaving a disturbed area should pass through a sediment control system before it exists the site and is conveyed downstream.

Straw bales can be placed at the base of a slope to act as a sediment barrier. Straw bales are temporary in nature and may only perform for a period of weeks or months. Proper installation and maintenance is necessary to ensure their performance.

Pollution Control

Pollution prevention

The main requirements are to control pollution loads from surface water runoff and pumped water from construction sites to ensure that risks to the environment are minimised. The safe storage of materials and fuels is also important so that if spills occur, they are contained (using berms, check ditches or other containment techniques) and do not cause mix with runoff and thus increase pollution risks.

Before mobilisation, the construction site layout should be planned to fully consider issues such as the location of stockpiles, fuel stores, storage areas, waste disposal, refuelling points and wash down areas. These should be in areas where they are least likely to affect receiving water bodies (including groundwater). Planning should also address subjects such as the diversion of watercourses, prevention of upstream runoff entering the site and the design of haul roads, including the use of road bridges over watercourses to stop vehicles fording streams and rivers.

An environmental pollution protection plan should also be put in place. The plan should include:

Location of foul drainage disposal routes

Location of surface water systems that discharge into watercourses.

Requirements for discharge and abstraction licences

Location of spillage kits

An action plan in the event of an environmental incident (including a list of relevant telephone contact numbers)

Construction pollution sources and controls

Sediment

Sediment is one of the major sources of construction site pollution. The following list indicates several sources and the measures that can be taken to help prevent pollution:

Excavated ground and exposed ground – The effect of having no vegetation and being recently disturbed allows for relatively low velocity runoff to erode the surface. To help prevent the pollution from entering a watercourse, silt fences, hay bales or stilling ponds should be placed downstream. To limit the volume of runoff reaching the exposed ground, runoff diversion or interception devices should be placed upstream.

Stockpiles – The effects of erosion on a stockpile will depend on the type of material being stored. Fine sand and topsoil stockpiles will be eroded far more readily than heavy granular materials. Stockpiles should be located away from a watercourse on site drainage system. Protective coverings will help prevent runoff stripping the stockpile.

Plant and wheel washing – Plant and wheel washing should take place in designated locations. The area should be tanked and should not be allowed to discharge into a watercourse or infiltrate groundwater, as the wastewater from these devices is highly contaminated with silts, sands and hydrocarbons. Some proprietary vehicle washing systems offer a recycling facility, which filters and settles solids, with the effluent being pumped back into the system. The solid waste materials from this process needs to be treated as contaminated waste due to the high hydrocarbon content.

Haul roads – the runoff from haul roads can contain many suspended solids as well as hydrocarbons. Haul roads should be designed so that the length is kept to a minimum, while still serving its purpose. The gradient should be shallow to prevent increasing runoff velocity and, if possible, bunds and/or discrete ditches should be constructed to intercept the runoff. Haul roads should be sprayed regularly to keep down dust. If any section of a haul road is hard surfaced, then it should be swept on a regular basis to prevent the accumulation of dust and mud.

Disturbance of riverbeds or banks – Excavation of riverbanks or beds can generate silty water, as the excavated and exposed material is washed downstream. The amount of such excavation needs to be limited and, if undertaken, the water area downstream needs to be protected by booms.

De-watering operations – Groundwater discharge due to excavation activity is likely to be heavily polluted with suspended solids and should not be discharged directly into a watercourse. To help reduce the number of suspended solids within the runoff several techniques can be adopted:

Passing the discharge water over a grass area, but the discharge velocity must be monitored and kept sufficiently low to promote settlement.

Passing the discharge water through a temporary gravel strip.

Controlled use of skips and/or tanks to act as stilling basins.

Controlled use of stilling ponds.

Oils and hydrocarbons

The use of oils and hydrocarbons on construction sites creates an inherent risk of leakages and spillages, which could potentially lead to pollution incidents.

Simple measures can be taken to prevent oil and hydrocarbons becoming entrained in surface runoff, such as:

Appropriate maintenance of machinery and plant.

Drip trays.

Regular checking of machinery and plant for oil leaks.

Correct storage facilities.

Checking for signs of wear and tear on tanks.

Care with specific procedures when refuelling.

Designated areas for refuelling.

Emergency spill kit located near refuelling area.

Regular emptying of bunds.

Tanks located in secure areas to stop vandalism.

Booms installed on watercourses.

7. APPENDIX A – DRAINAGE STRATEGY DRAWINGS

8. APPENDIX B – HYDRALIC CALCULATIONS

9. APPENDIX C – GEOTECHNICAL DATA
