



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
A	New site layout	JL	KK	KK	12.11.2025
B	New site layout	JL	KK	KK	03.12.2025

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.

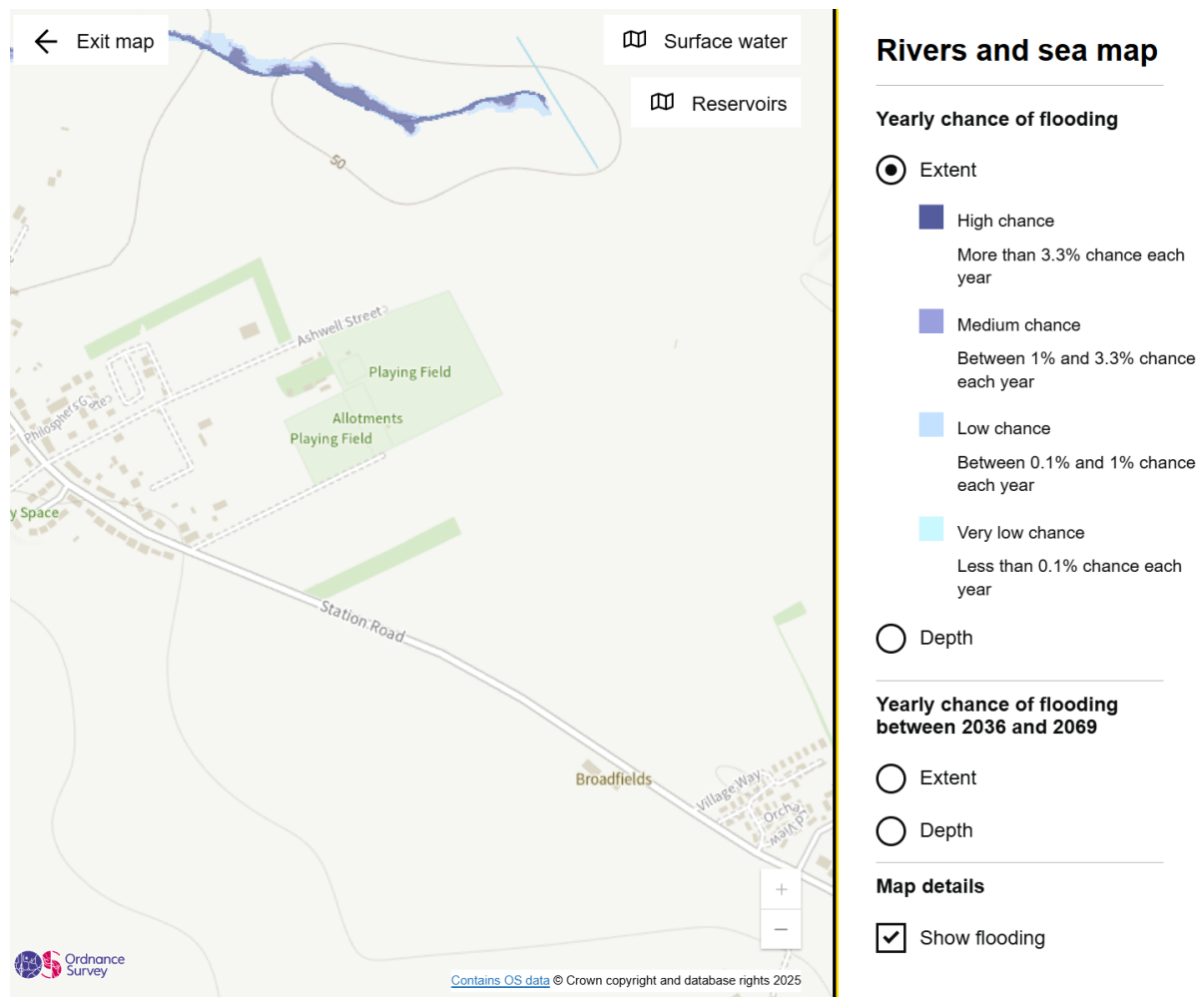
The site is bound by Station Road to the south and a new housing development by Matthew Homes to the west and fields to the north and east. There are no watercourses near the site, and the site has a tree belt around 30m wide running through the centre, which will be retained as part of the development,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



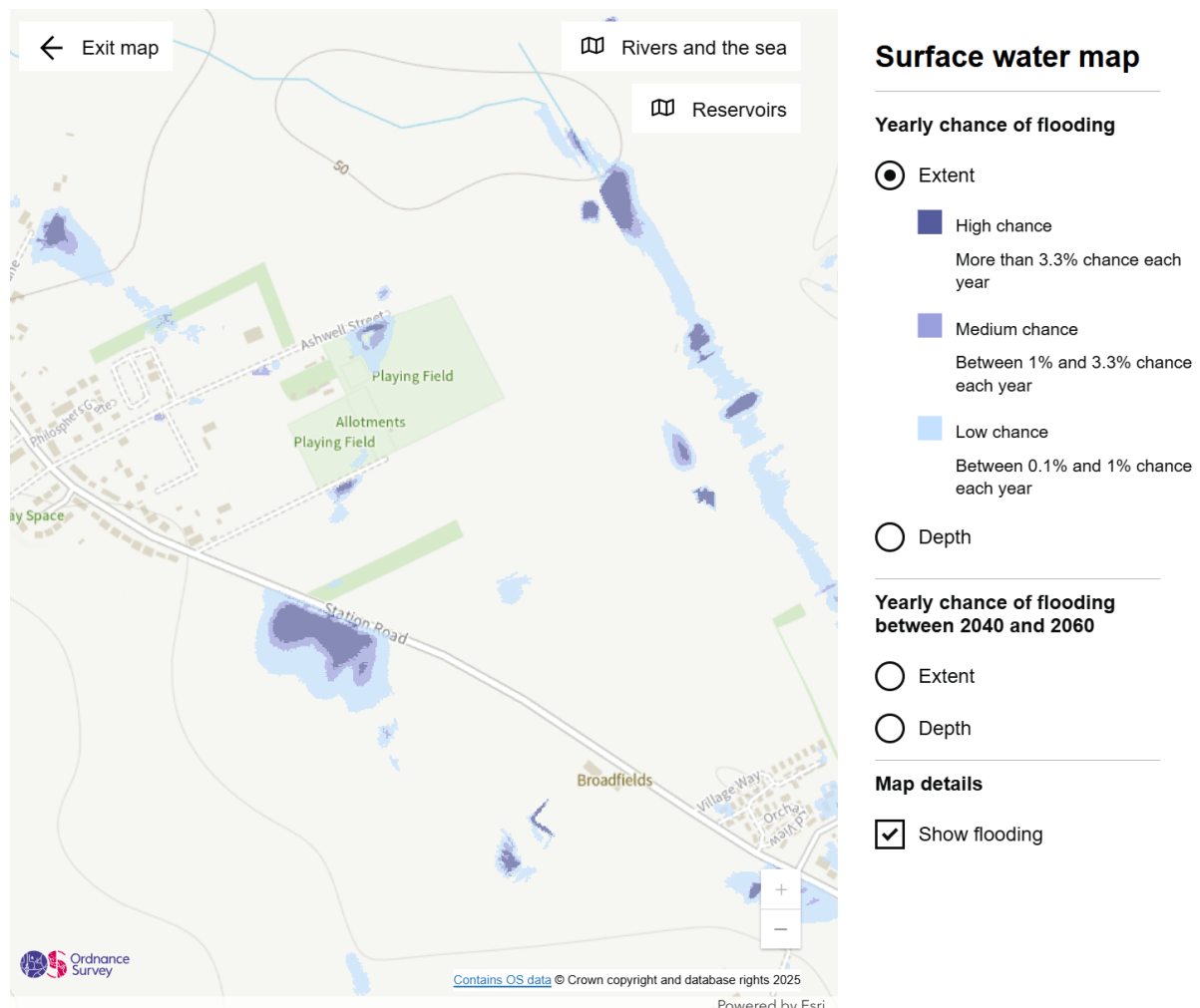
Flood Protection

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.

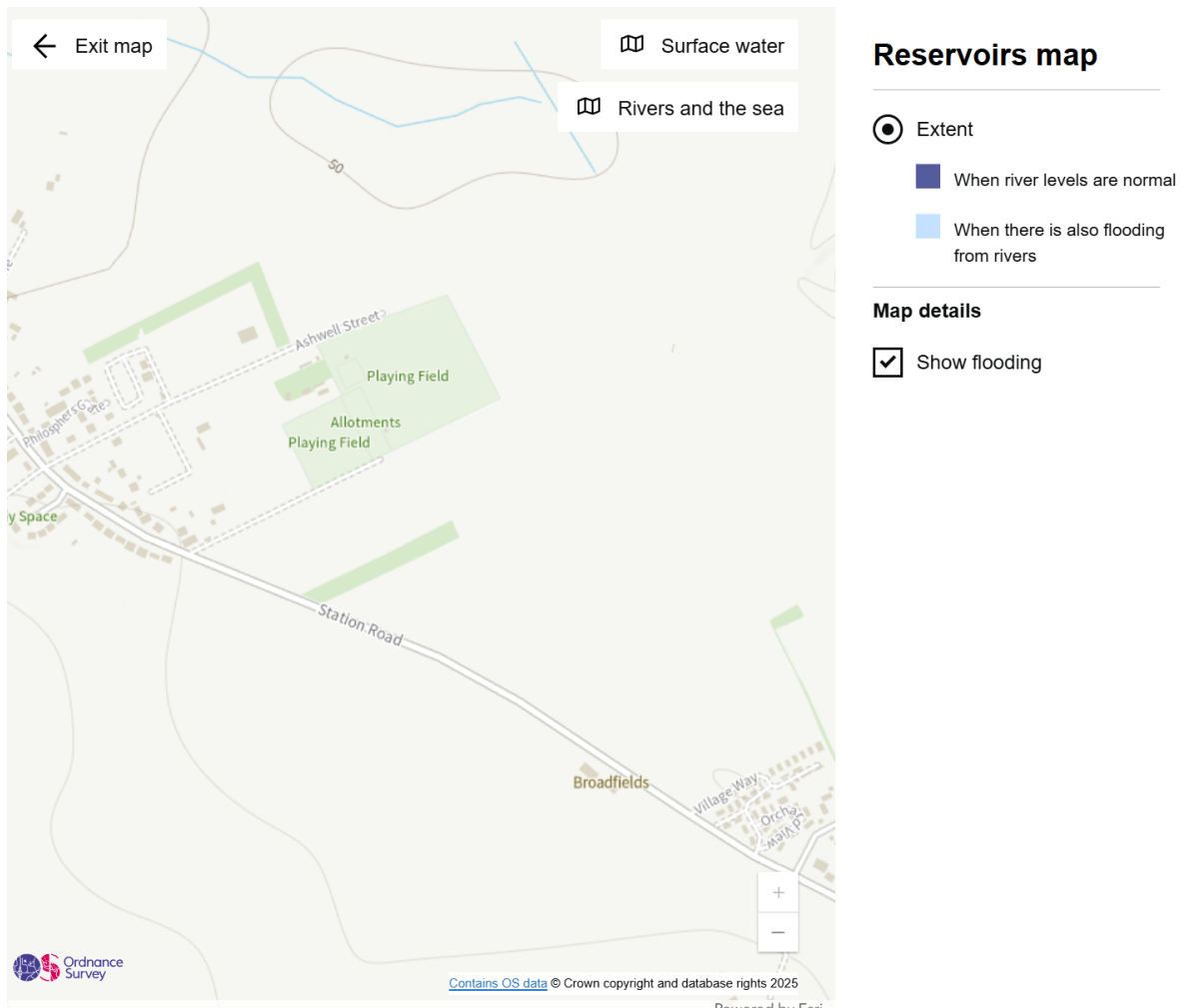
Sewers and highway drains: Combined, foul or surface water sewers and highway drains that are temporarily over-loaded due to excessive rainfall or due to blockage: Should the proposed onsite sewers become blocked the proposed road levels and garden levels surrounding the buildings will be set lower than 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, 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 was conducted to confirm the viability of discharge via permeable paving however one or more of the tests did not reach the 25% water level therefore failed under BRE-365 guidance. The permeable paving is used to filter pollutants and storage to discharge into the infiltration basin.

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 1m³ 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 reseeding 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.

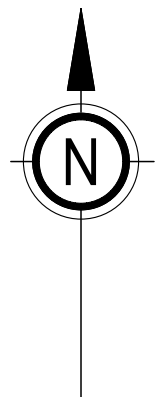
Emergency spill kit located near refuelling area.

Regular emptying of bunds.

Tanks located in secure areas to stop vandalism.

Booms installed on watercourses.

7. APPENDIX A – DRAINAGE STRATEGY DRAWINGS



- GENERAL
- DO NOT SCALE THIS DRAWING. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED. ANY DISCREPANCIES ARE TO BE RECORDED AND REPORTED TO THE ENGINEERS IMMEDIATELY.
 - THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERS AND ARCHITECTS DRAWINGS AND THE SPECIFICATION.
 - ANY EXISTING DETAILS WHICH ARE SHOWN ON THIS DRAWING ARE FOR GUIDANCE ONLY AND ARE TO BE CHECKED ON SITE BY THE CONTRACTOR. ANY VARIATIONS ARE TO BE RECORDED AND REPORTED TO THE ENGINEER IMMEDIATELY.
- NOTES
- AN ALLOWANCE OF 10% HAS BEEN ADDED TO IMPERMEABLE ROOF AREAS FOR THE CONSIDERATION OF URBAN CREEP.
 - THE SURFACE WATER NETWORK HAS BEEN DESIGNED TO ACCOMMODATE A 1IN100YR STORM EVENT TO INCLUDE 40% CLIMATE CHANGE.
 - ALL ADAPTABLE SURFACE WATER SEWERS WITHIN ADAPTABLE HIGHWAYS ARE TO BE A MINIMUM OF 225MM.
 - ALL SEWER WORKS FOR THE WATER AUTHORITY ARE TO BE IN ACCORDANCE WITH 'SEWERAGE SECTOR GUIDANCE APPENDIX C' DESIGN AND CONSTRUCTION GUIDANCE VERSION 1.0 25TH OCTOBER 2019 AND ANY ADDENDUM THEREAFTER.
 - ALL PRIVATE CONNECTIONS TO ADAPTABLE SEWERS SHOULD BE A MINIMUM OF 100MM DIAMETER (FOUL) & 150MM DIAMETER (SURFACE) MADE IN VITRIFIED CLAY CONNECTING SOFFIT TO SOFFIT.
 - THIS DRAWING IS FOR INTENDED FOR STRATEGY PURPOSES ONLY TO ASSIST AND INFORM IN OUTLINING THE INITIAL CONCEPTS AND FEASIBILITY OF THE SCHEME, ANY DETAILS OR INFORMATION ON THIS DRAWING ARE SUBJECT TO CHANGE.

DRAINAGE STRATEGY KEY	
SITE BOUNDARY	
PRIVATE ROOFS AREA 2971m ²	
PRIVATE INFILTRATION PERMEABLE PAVING AREA 3340m ²	
ADAPTABLE STANDARD ROADS & FOOTWAYS AREA 2257m ²	
DRAINAGE EASEMENT	
ADAPTABLE SURFACE WATER - BLUE	
ADAPTABLE FOUL WATER - BROWN	

Rev	A	REVISED TO NEW ARCHITECT LAYOUT 2025.11.25	JL	KK	03.12.25
Rev		Revision Notes	Dwn	Appr	Date

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STRATEGY

Project: STATION ROAD, ASHWELL, PHASE 2
HERTFORDSHIRE

Drawing Title:
DRAINAGE STRATEGY

Client:
BECK HOMES

Date:
OCT 25

Drawn:
JL

Designed:
JL

Checked:
KK

Approved:
KK

Scale:
1:500

Project No:
2506-1025

Drawing No & Revision:
ST001

Size:
A1

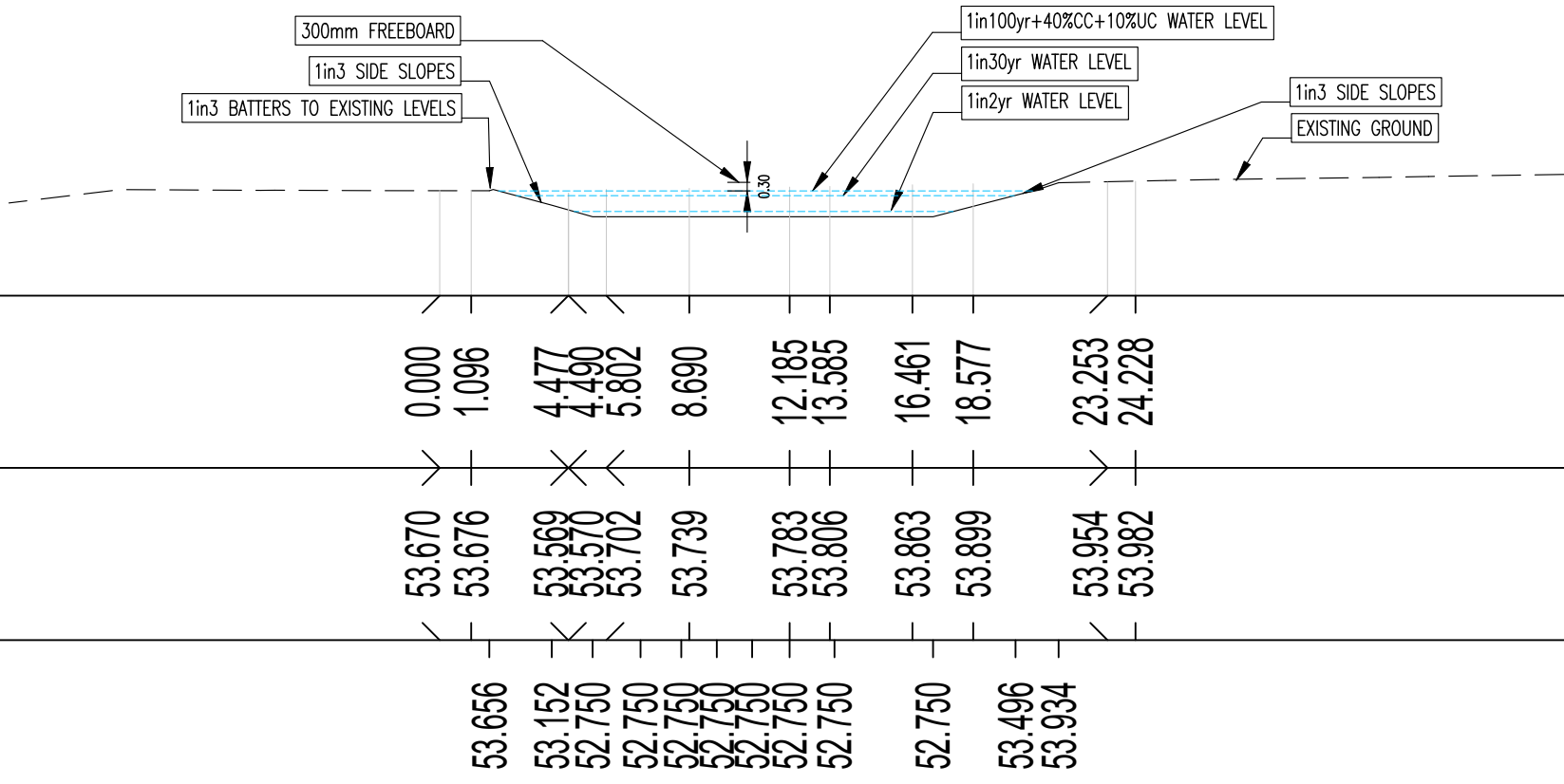
A-A

Datum: 50.000M AOD

EXISTING CHAINAGE (m)

EXISTING LEVELS (m)

EARTHWORK LEVELS (m)



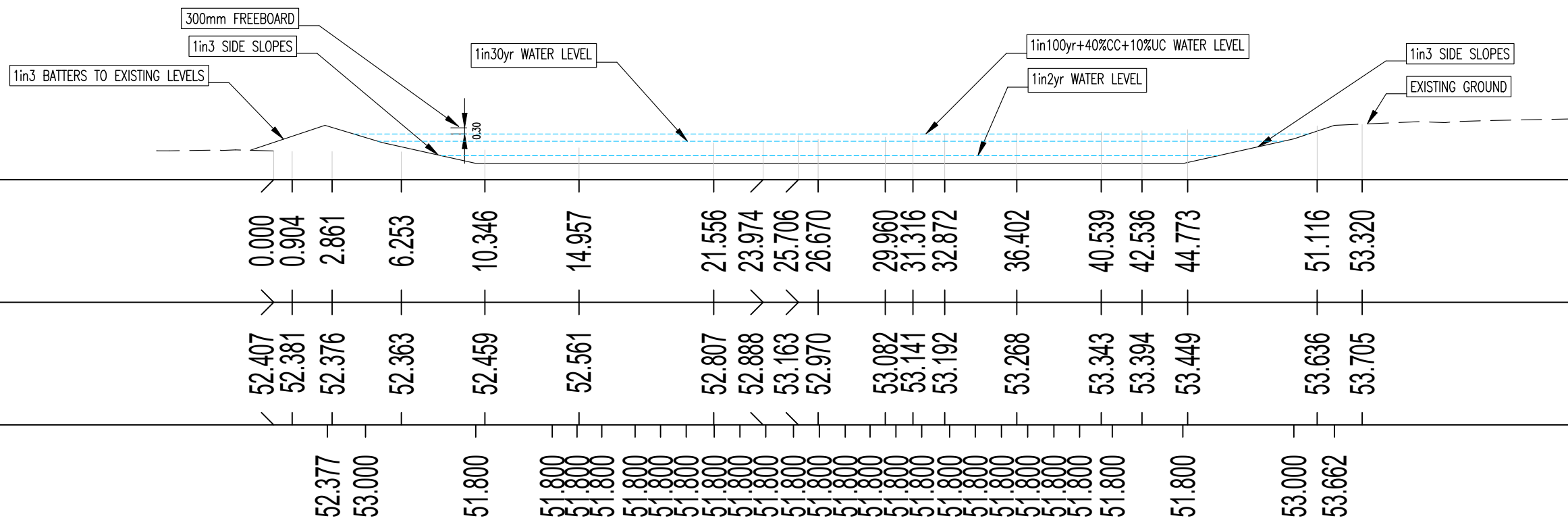
B-B

Datum: 51.000M AOD

EXISTING CHAINAGE (m)

EXISTING LEVELS (m)

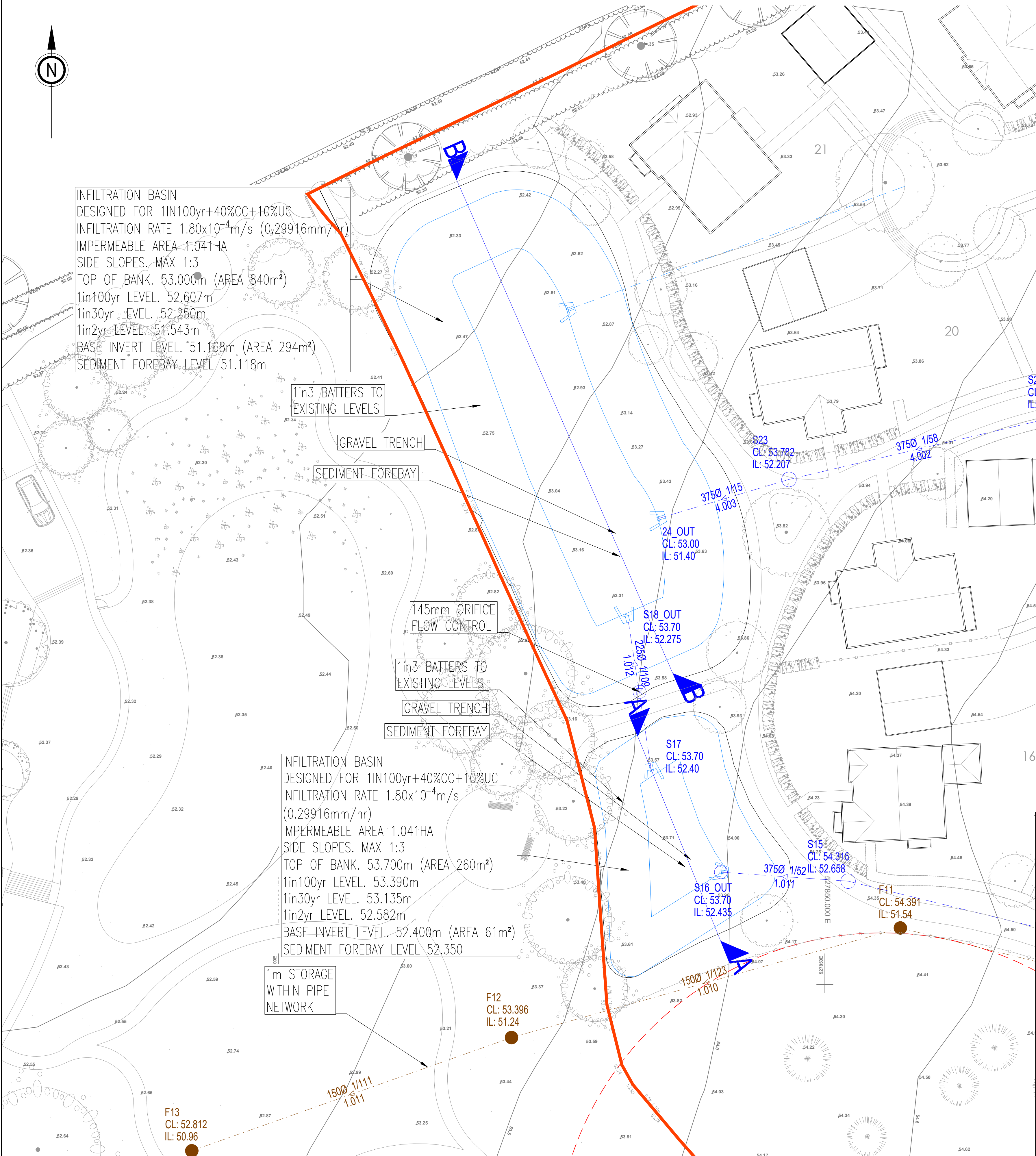
EARTHWORK LEVELS (m)



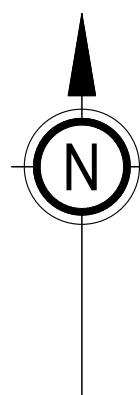
- GENERAL
- DO NOT SCALE THIS DRAWING. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED. ANY DISCREPANCIES ARE TO BE RECORDED AND REPORTED TO THE ENGINEERS IMMEDIATELY.
 - THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERS AND ARCHITECTS DRAWINGS AND THE SPECIFICATION.
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 - THIS DRAWING IS FOR INTENDED FOR STRATEGY PURPOSES ONLY TO ASSIST AND INFORM IN OUTLINING THE INITIAL CONCEPTS AND FEASIBILITY OF THE SCHEME, ANY DETAILS OR INFORMATION ON THIS DRAWING ARE SUBJECT TO CHANGE.

LONG SECTION KEY

EXISTING GROUND PROFILE	---
BASIN PROFILE	---



A REVISED TO NEW ARCHITECT LAYOUT 2025.11.25		JL	KK	03.12.25
Rev	Revision Notes	Des	Appd	Date
INGENT CONSULTING ENGINEERS Unit 1a Greenwood Court, Skyliner Way, Bury St Edmunds, IP32 7GY. Tel: 01284 245024 --- www.ingent.co.uk --- email: info@ingent.co.uk				
worksafe consultant www.smasltd.com				
SSIP SAFETY SCHEMES IN PROCUREMENT				
COMS Safety Scheme				
STRATEGY				
Project: STATION ROAD, ASHWELL HERTFORDSHIRE				
Drawing Title: BASIN SECTIONS SHEET 1 OF 1				
Client: BECK HOMES		Date: OCT 25		
Drawn: JL	Designed: JL	Checked: KK	Approved: KK	
Scale: 1:200				
Project No: 2506-1025		Drawing No & Revision: ST005		Size: A1



GENERAL

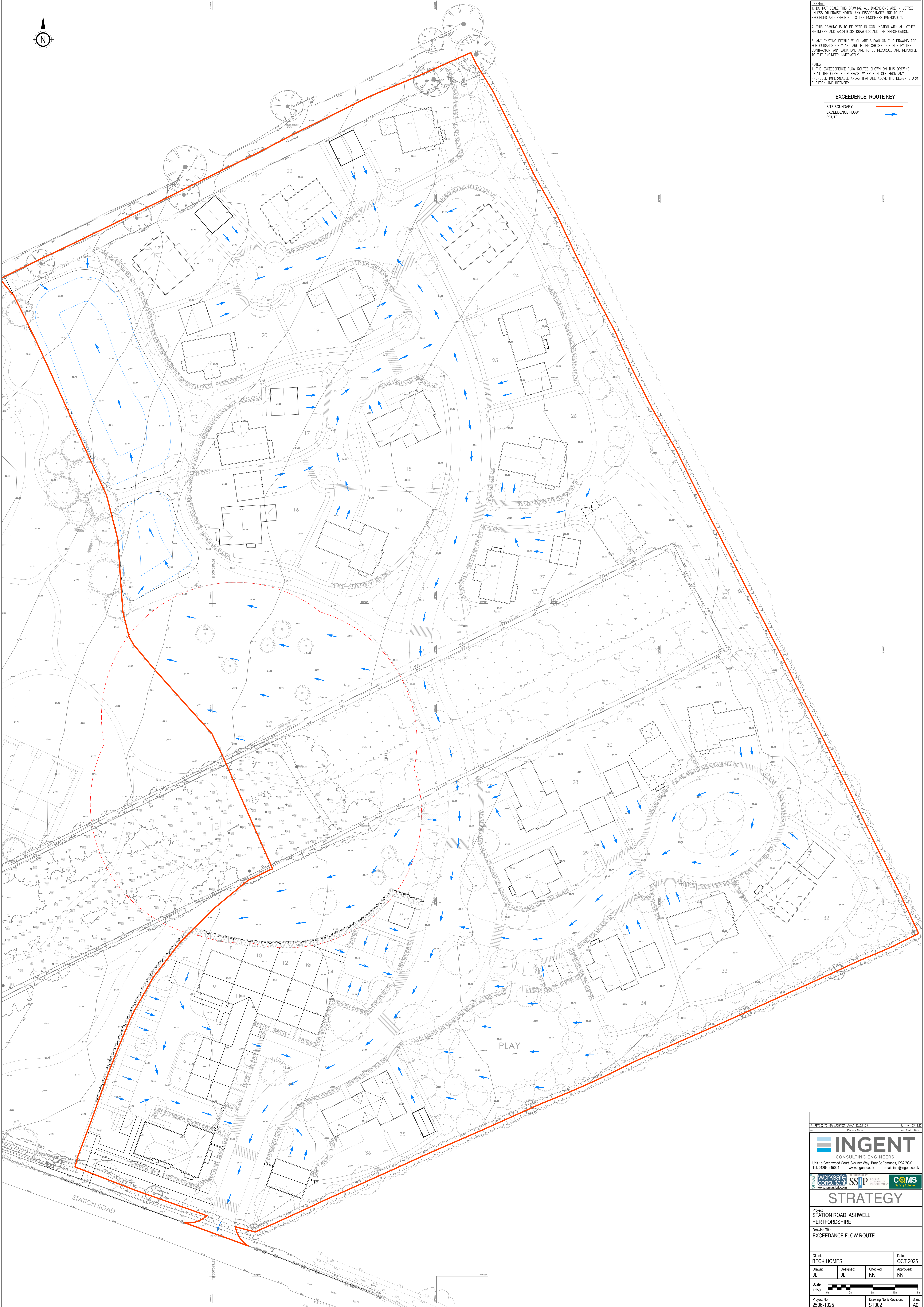
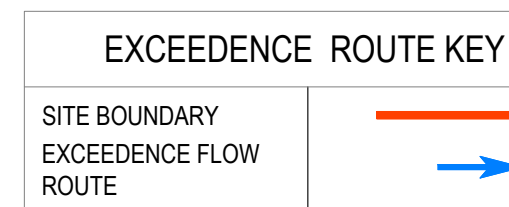
1. DO NOT SCALE THIS DRAWING. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED. ANY DISCREPANCIES ARE TO BE RECORDED AND REPORTED TO THE ENGINEERS IMMEDIATELY.

2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERS AND ARCHITECTS DRAWINGS AND THE SPECIFICATION.

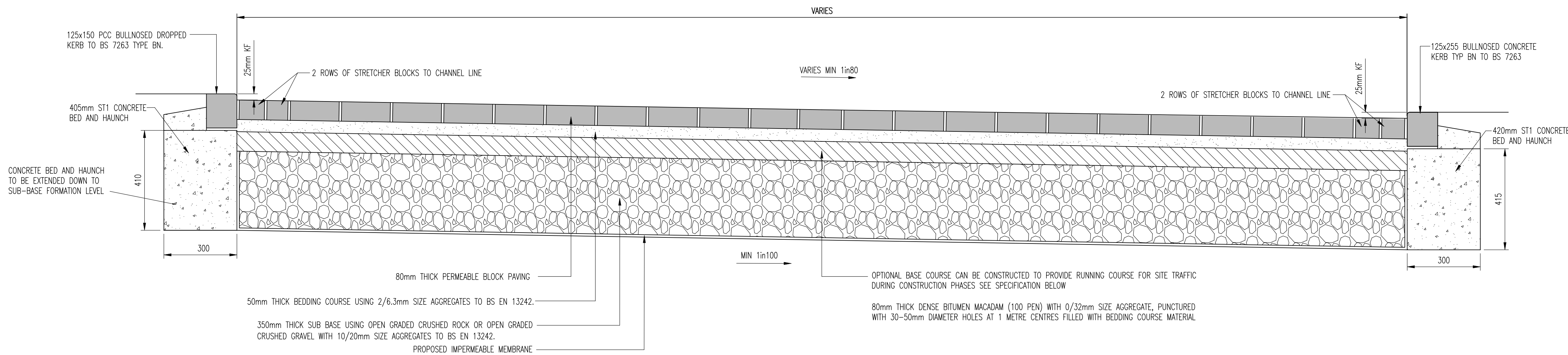
3. ANY EXISTING DETAILS WHICH ARE SHOWN ON THIS DRAWING ARE FOR GUIDANCE ONLY AND ARE TO BE CHECKED ON SITE BY THE CONTRACTOR. ANY VARIATIONS ARE TO BE RECORDED AND REPORTED TO THE ENGINEER IMMEDIATELY.

NOTES

1. THE EXCEEDENCE FLOW ROUTES SHOWN ON THIS DRAWING DETAIL THE EXPECTED SURFACE WATER RUN-OFF FROM ANY PROPOSED IMPERMEABLE AREAS THAT ARE ABOVE THE DESIGN STORM DURATION AND INTENSITY.



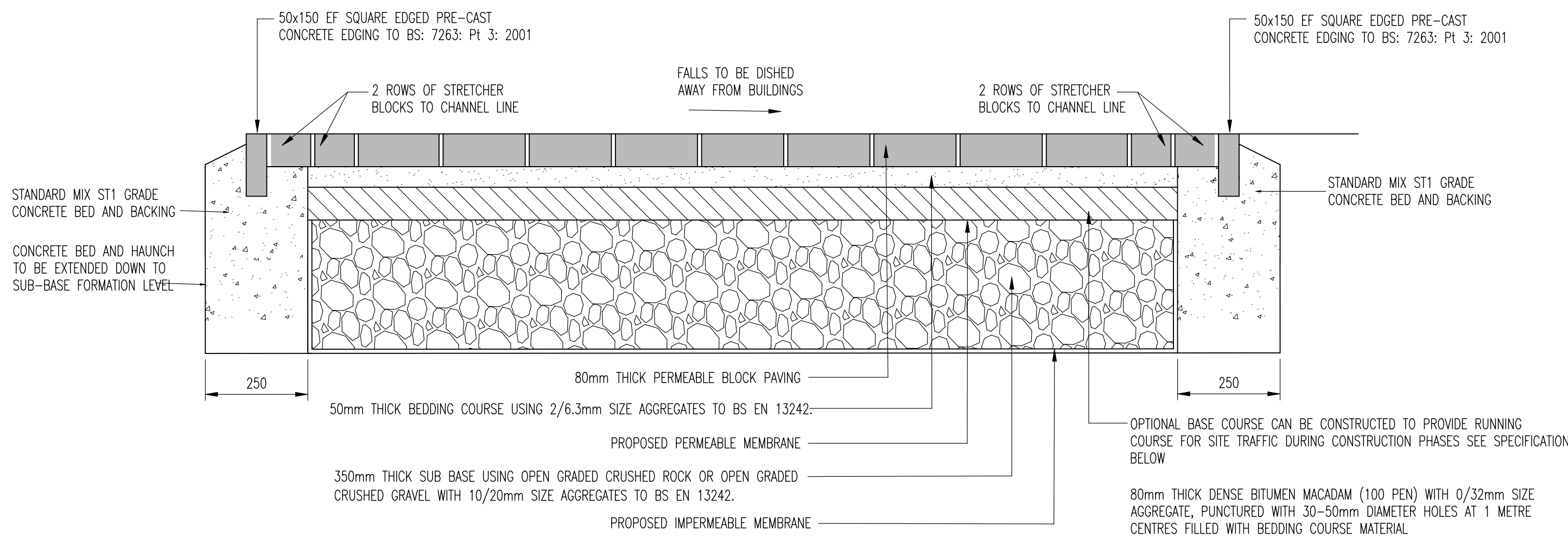
2. REVISION TO NEW ARCHITECT LAYOUT 2025.11.25		3. REV 03.12.25	
Rev	Revision Notes	Rev	Level
 Unit 1a Greenwood Court, Skinner Way, Bury St Edmunds, IP22 7DY Tel: 01284 245924 — www.ingent.co.uk — email: info@ingent.co.uk			
 www.worxsafe.co.uk			
 SAFETY SUSTAINABLE INTEGRITY			
 COMMS Safety Partner			
STRATEGY			
Project: STATION ROAD, ASHWELL HERTFORDSHIRE			
Drawing Title: EXCEEDANCE FLOW ROUTE			
Client: BECK HOMES		Date: OCT 2025	
Drawn: JL	Designed: JL	Checked: KK	Approved: KK
Scale: 1:250 			
Project No: 2506-1025		Drawing No & Revision: ST002	
		Sheet: A0	



PERMEABLE PAVING PRIVATE SHARED DRIVE/CARPAKING CONSTRUCTION DETAIL

SCALE 1:10

NOTE:
SUB-BASE FORMATION LEVEL OF PERMEABLE PAVING TO HAVE
NOMINAL FALL (1in100)



PERMEABLE PAVING INDIVIDUAL PRIVATE DRIVE CONSTRUCTION DETAIL

SCALE 1:10

- GENERAL
1. DO NOT SCALE THIS DRAWING. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE NOTED. ANY DISCREPANCIES ARE TO BE RECORDED AND REPORTED TO THE ENGINEERS IMMEDIATELY.
 2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER ENGINEERS AND ARCHITECTS DRAWINGS AND THE SPECIFICATION.
 3. ALL WORK IS TO BE TO THE SATISFACTION OF THE ENGINEER AND LOCAL AUTHORITY BUILDING CONTROL.
 4. THE CONTRACTOR IS RESPONSIBLE FOR AND MUST TAKE ALL NECESSARY PRECAUTIONS TO ENSURE THE STABILITY OF THE WORKS AT ALL TIMES DURING CONSTRUCTION.
 5. ALL WORKMANSHIP AND MATERIALS ARE TO BE TO CURRENT BRITISH STANDARDS.
 6. ALL SERVICES ARE TO BE LOCATED AND PROTECTED AS NECESSARY BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF THE WORKS.
 7. ANY EXISTING DETAILS WHICH ARE SHOWN ON THIS DRAWING ARE FOR GUIDANCE ONLY AND ARE TO BE CHECKED ON SITE BY THE CONTRACTOR. ANY VARIATIONS ARE TO BE RECORDED AND REPORTED TO THE ENGINEER IMMEDIATELY.
 8. ALL HIGHWAY WORKS ARE TO BE IN ACCORDANCE WITH THE LOCAL AUTHORITIES DESIGN GUIDE AND SPECIFICATION.
 9. PRIOR TO THE OCCUPATION OF THE FIRST DWELLING, STREET NAMEPLATES SHALL BE ERECTED IN ACCORDANCE WITH THE HIGHWAY AUTHORITY AND TO THE WORDING AGREED WITH THE PLANNING AUTHORITY.
 10. DURING CONSTRUCTION WORKS ON SITE, ALL ROADS AND FOOTPATHS ARE TO BE SWEEPED AND KEPT CLEAR OF OBSTRUCTIONS, THIS IS TO INCLUDE EXISTING HIGHWAYS AS APPROPRIATE TO ENSURE SAFE PASSAGE OF ALL ROAD USERS.
 11. PROVISION SHALL BE MADE FOR THE INSTALLATION OF ALL MAINS SERVICES INCLUDING DUCTING PRIOR TO THE LAYING OF THE ROAD BASE-COURSE.
 12. ALL ROAD MARKINGS AND SIGNS ARE TO BE IN ACCORDANCE WITH 'THE TRAFFIC SIGNS REGULATIONS AND DIRECTIONS' 2016.

FOR DETAILS AND SPECIFICATION FOR SOFT LANDSCAPING, GRAVEL, TIMBER EDGINGS, COBBLES, KNEE RAILS ETC. - REFER TO LANDSCAPE ARCHITECT

Rev	Revision Notes	Dwn (Appr)	Date

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Unit 1a Greenwood Court, Skyliner Way, Bury St Edmunds, IP32 7GY.
Tel: 01284 245024 --- www.ingent.co.uk --- email: info@ingent.co.uk

STRATEGY

Project:
**STATION ROAD, ASHWELL
HERTFORDSHIRE**

Drawing Title:
**PRIVATE PERMEABLE PAVING COLLECT & CLEAN
SHEET 1 OF 1**

Client:
BECK HOMES

Date:
OCT 25

Drawn:
JL

Designed:
JL

Checked:
KK

Approved:
KK

Scale:
As Shown

Project No:
2506-1025

Drawing No & Revision:
ST050

Size:
A1

8. APPENDIX B – HYDRALIC CALCULATIONS

Design Settings

Rainfall Methodology	FEH-13	Time of Entry (mins)	5.00	Connection Type	Level Soffits	Enforce best practice design rules x
Return Period (years)	2	Maximum Time of Concentration (mins)	30.00	Minimum Backdrop Height (m)	9.999	
Additional Flow (%)	0	Maximum Rainfall (mm/hr)	50.0	Preferred Cover Depth (m)	1.200	
CV	1.000	Minimum Velocity (m/s)	1.00	Include Intermediate Ground	✓	

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
Plots 1-10	0.043	5.00	54.950	600			1.401	53.549
1	0.012	5.00	54.950	1350	527857.712	239582.766	1.726	53.224
Plots 36	0.009	5.00	54.875	600			1.357	53.518
2			54.875	1350	527863.016	239591.063	1.682	53.193
3			54.966	1350	527871.224	239596.426	1.804	53.162
Plots 35	0.004	5.00	55.110	600			1.663	53.447
4	0.036	5.00	55.110	1350	527882.780	239602.145	1.988	53.122
Plots 11-14	0.016	5.00	55.341	600			1.947	53.394
5	0.048	5.00	55.341	1350	527894.217	239614.797	2.272	53.069
Plots 29-34	0.201	5.00	55.552	600			1.350	54.202
6			55.552	1200	527911.616	239627.596	1.525	54.027
Substation	0.002	5.00	55.419	600			2.081	53.338
7	0.041	5.00	55.419	1350	527900.248	239631.933	2.406	53.013
8	0.040	5.00	55.414	1350	527903.551	239645.910	2.446	52.968
Plots 28	0.006	5.00	55.341	600			1.519	53.822
9	0.045	5.00	55.341	1350	527903.107	239662.029	2.423	52.918
10	0.025	5.00	55.211	1350	527896.677	239680.430	2.354	52.857
11	0.032	5.00	55.134	1350	527895.087	239691.704	2.313	52.821
Plots 26-27	0.024	5.00	55.078	600			1.250	53.828
12	0.000	5.00	55.078	1200	527905.378	239724.023	1.425	53.653
13	0.020	5.00	55.112	1200	527901.846	239711.425	1.537	53.575
14	0.000		55.115	1350	527896.313	239698.666	2.316	52.799
15			54.316	1350	527852.128	239709.467	1.658	52.658
16			53.700		527840.490	239710.288	1.265	52.435
17			53.700		527834.111	239719.671	1.300	52.400
18			53.700		527832.024	239733.168	1.425	52.275
Plots 25	0.005	5.00	55.199	600			1.350	53.849
19	0.089	5.00	55.199	1200	527905.387	239747.179	1.450	53.749
20	0.080	5.00	54.680	1200	527895.223	239769.870	1.425	53.255
21	0.036	5.00	54.883	1200	527898.524	239760.625	1.761	53.122
Plots 15-18	0.088	5.00	54.264	600			1.425	52.839
22			54.264	1350	527870.477	239751.810	1.634	52.630
23			53.782	1350	527846.717	239746.240	1.575	52.207
24			53.000		527834.774	239742.663	1.600	51.400
Plots 19-24	0.139	5.00	54.875	600			1.425	53.450
25			53.000		527828.084	239748.414	1.800	51.200
25_OUT			53.000		527823.145	239758.232	1.827	51.173

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	Plots 1-10	1	10.000	0.600	53.549	53.449	0.100	100.0	150	5.17	50.0
1.001	1	2	9.847	0.600	53.224	53.193	0.031	317.7	375	5.33	50.0
2.000	Plots 36	2	10.000	0.600	53.518	53.418	0.100	100.0	150	5.17	50.0
1.002	2	3	9.805	0.600	53.193	53.162	0.031	316.3	375	5.49	50.0
1.003	3	4	12.894	0.600	53.162	53.122	0.040	322.3	375	5.70	50.0
3.000	Plots 35	4	10.000	0.600	53.447	53.347	0.100	100.0	150	5.17	50.0
1.004	4	5	17.055	0.600	53.122	53.069	0.053	321.8	375	5.99	50.0
4.000	Plots 11-14	5	10.000	0.600	53.394	53.294	0.100	100.0	150	5.17	50.0
1.005	5	7	18.166	0.600	53.069	53.013	0.056	324.4	375	6.29	50.0
5.000	Plots 29-34	6	10.000	0.600	54.202	54.102	0.100	100.0	150	5.17	50.0
5.001	6	7	12.167	0.600	54.027	53.163	0.864	14.1	225	5.22	50.0
6.000	Substation	7	10.000	0.600	53.338	53.238	0.100	100.0	150	5.17	50.0
1.006	7	8	14.362	0.600	53.013	52.968	0.045	319.2	375	6.53	49.7
1.007	8	9	16.125	0.600	52.968	52.918	0.050	322.5	375	6.79	48.7
7.000	Plots 28	9	10.000	0.600	53.822	53.143	0.679	14.7	150	5.06	50.0
1.008	9	10	19.492	0.600	52.918	52.857	0.061	319.5	375	7.12	47.6
1.009	10	11	11.386	0.600	52.857	52.821	0.036	316.3	375	7.30	47.0
1.010	11	14	7.069	0.600	52.821	52.799	0.022	321.3	375	7.42	46.6
8.000	Plots 26-27	12	10.000	0.600	53.828	53.728	0.100	100.0	150	5.17	50.0
8.001	12	13	13.084	0.600	53.653	53.575	0.078	167.7	225	5.38	50.0
8.002	13	14	13.907	0.600	53.575	52.949	0.626	22.2	225	5.47	50.0
1.011	14	15	45.486	0.600	52.799	52.658	0.141	322.6	375	8.18	44.2
1.012	15	16	11.667	0.600	52.658	52.435	0.223	52.3	375	8.25	44.0
1.013	16	17	11.346	0.600	52.435	52.400	0.035	324.2	375	8.44	43.5

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.000	1.005	17.8	7.8	1.251	1.351	0.043	0.0	69	0.972
1.001	1.011	111.7	9.9	1.351	1.307	0.055	0.0	75	0.632
2.000	1.005	17.8	1.6	1.207	1.307	0.009	0.0	31	0.628
1.002	1.013	111.9	11.6	1.307	1.429	0.064	0.0	81	0.661
1.003	1.003	110.8	11.6	1.429	1.613	0.064	0.0	81	0.655
3.000	1.005	17.8	0.7	1.513	1.613	0.004	0.0	21	0.492
1.004	1.004	110.9	18.8	1.613	1.897	0.104	0.0	104	0.753
4.000	1.005	17.8	2.9	1.797	1.897	0.016	0.0	41	0.740
1.005	1.000	110.5	30.4	1.897	2.031	0.168	0.0	134	0.857
5.000	1.005	17.8	36.3	1.200	1.300	0.201	0.0	150	1.023
5.001	3.505	139.3	36.3	1.300	2.031	0.201	0.0	78	2.954
6.000	1.005	17.8	0.4	1.931	2.031	0.002	0.0	15	0.397
1.006	1.009	111.4	74.1	2.031	2.071	0.412	0.0	224	1.076
1.007	1.003	110.8	79.6	2.071	2.048	0.452	0.0	236	1.088
7.000	2.638	46.6	1.1	1.369	2.048	0.006	0.0	16	1.079
1.008	1.008	111.3	86.5	2.048	1.979	0.503	0.0	249	1.110
1.009	1.013	111.9	89.6	1.979	1.938	0.528	0.0	255	1.122
1.010	1.005	111.0	94.3	1.938	1.941	0.560	0.0	267	1.123
8.000	1.005	17.8	4.3	1.100	1.200	0.024	0.0	51	0.833
8.001	1.006	40.0	4.3	1.200	1.312	0.024	0.0	50	0.661
8.002	2.788	110.8	8.0	1.312	1.941	0.044	0.0	41	1.640
1.011	1.003	110.8	96.5	1.941	1.283	0.604	0.0	272	1.125
1.012	2.509	277.2	96.1	1.283	0.890	0.604	0.0	152	2.289
1.013	1.001	110.5	94.9	0.890	0.925	0.604	0.0	269	1.120

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.014	17	18	13.657	0.600	52.400	52.275	0.081	168.6	225	8.63	43.0
1.015	18	25	15.747	0.600	52.275	51.425	0.850	18.5	225	8.71	42.7
9.000	Plots 25	19	10.000	0.600	53.849	53.749	0.100	100.0	150	5.17	50.0
9.001	19	21	15.096	0.600	53.774	53.197	0.577	26.2	225	5.26	50.0
10.000	20	21	9.817	0.600	53.255	53.197	0.058	169.3	225	5.16	50.0
9.002	21	22	29.400	0.600	53.122	52.705	0.417	70.5	300	5.53	50.0
11.000	Plots 15-18	22	10.000	0.600	52.839	52.780	0.059	169.5	225	5.17	50.0
9.003	22	23	24.404	0.600	52.630	52.207	0.423	57.7	375	5.70	50.0
9.004	23	24	12.467	0.600	52.207	51.400	0.807	15.4	375	5.74	50.0
9.005	24	25	8.822	0.600	51.400	51.350	0.050	176.4	375	5.85	50.0
12.000	Plots 19-24	25	10.000	0.600	53.450	51.500	1.950	5.1	150	5.04	50.0
1.016	25	25_OUT	10.990	0.600	51.200	51.173	0.027	407.0	450	8.89	42.2

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
1.014	1.250	49.7	93.8	1.075	1.200	0.604	0.0	225	1.273
1.015	3.054	121.4	93.2	1.200	1.350	0.604	0.0	148	3.355
9.000	1.005	17.8	0.9	1.200	1.300	0.005	0.0	23	0.527
9.001	2.568	102.1	17.0	1.200	1.461	0.094	0.0	62	1.918
10.000	1.002	39.8	14.5	1.200	1.461	0.080	0.0	94	0.924
9.002	1.875	132.5	37.9	1.461	1.259	0.210	0.0	109	1.623
11.000	1.001	39.8	15.9	1.200	1.259	0.088	0.0	99	0.947
9.003	2.389	263.9	53.8	1.259	1.200	0.298	0.0	115	1.894
9.004	4.629	511.3	53.8	1.200	1.225	0.298	0.0	82	3.052
9.005	1.361	150.3	53.8	1.225	1.275	0.298	0.0	155	1.252
12.000	4.480	79.2	25.1	1.275	1.350	0.139	0.0	58	3.976
1.016	1.001	159.2	158.8	1.350	1.377	1.041	0.0	370	1.133

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	10.000	100.0	150	Circular	54.950	53.549	1.251	54.950	53.449	1.351
1.001	9.847	317.7	375	Circular	54.950	53.224	1.351	54.875	53.193	1.307
2.000	10.000	100.0	150	Circular	54.875	53.518	1.207	54.875	53.418	1.307
1.002	9.805	316.3	375	Circular	54.875	53.193	1.307	54.966	53.162	1.429
1.003	12.894	322.3	375	Circular	54.966	53.162	1.429	55.110	53.122	1.613
3.000	10.000	100.0	150	Circular	55.110	53.447	1.513	55.110	53.347	1.613
1.004	17.055	321.8	375	Circular	55.110	53.122	1.613	55.341	53.069	1.897
4.000	10.000	100.0	150	Circular	55.341	53.394	1.797	55.341	53.294	1.897

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	Plots 1-10	600	Manhole	Adoptable	1	1350	Manhole	Adoptable
1.001	1	1350	Manhole	Adoptable	2	1350	Manhole	Adoptable
2.000	Plots 36	600	Manhole	Adoptable	2	1350	Manhole	Adoptable
1.002	2	1350	Manhole	Adoptable	3	1350	Manhole	Adoptable
1.003	3	1350	Manhole	Adoptable	4	1350	Manhole	Adoptable
3.000	Plots 35	600	Manhole	Adoptable	4	1350	Manhole	Adoptable
1.004	4	1350	Manhole	Adoptable	5	1350	Manhole	Adoptable
4.000	Plots 11-14	600	Manhole	Adoptable	5	1350	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.005	18.166	324.4	375	Circular	55.341	53.069	1.897	55.419	53.013	2.031
5.000	10.000	100.0	150	Circular	55.552	54.202	1.200	55.552	54.102	1.300
5.001	12.167	14.1	225	Circular	55.552	54.027	1.300	55.419	53.163	2.031
6.000	10.000	100.0	150	Circular	55.419	53.338	1.931	55.419	53.238	2.031
1.006	14.362	319.2	375	Circular	55.419	53.013	2.031	55.414	52.968	2.071
1.007	16.125	322.5	375	Circular	55.414	52.968	2.071	55.341	52.918	2.048
7.000	10.000	14.7	150	Circular	55.341	53.822	1.369	55.341	53.143	2.048
1.008	19.492	319.5	375	Circular	55.341	52.918	2.048	55.211	52.857	1.979
1.009	11.386	316.3	375	Circular	55.211	52.857	1.979	55.134	52.821	1.938
1.010	7.069	321.3	375	Circular	55.134	52.821	1.938	55.115	52.799	1.941
8.000	10.000	100.0	150	Circular	55.078	53.828	1.100	55.078	53.728	1.200
8.001	13.084	167.7	225	Circular	55.078	53.653	1.200	55.112	53.575	1.312
8.002	13.907	22.2	225	Circular	55.112	53.575	1.312	55.115	52.949	1.941
1.011	45.486	322.6	375	Circular	55.115	52.799	1.941	54.316	52.658	1.283
1.012	11.667	52.3	375	Circular	54.316	52.658	1.283	53.700	52.435	0.890
1.013	11.346	324.2	375	Circular	53.700	52.435	0.890	53.700	52.400	0.925
1.014	13.657	168.6	225	Circular	53.700	52.400	1.075	53.700	52.275	1.200
1.015	15.747	18.5	225	Circular	53.700	52.275	1.200	53.000	51.425	1.350
9.000	10.000	100.0	150	Circular	55.199	53.849	1.200	55.199	53.749	1.300
9.001	15.096	26.2	225	Circular	55.199	53.774	1.200	54.883	53.197	1.461
10.000	9.817	169.3	225	Circular	54.680	53.255	1.200	54.883	53.197	1.461
9.002	29.400	70.5	300	Circular	54.883	53.122	1.461	54.264	52.705	1.259
11.000	10.000	169.5	225	Circular	54.264	52.839	1.200	54.264	52.780	1.259
9.003	24.404	57.7	375	Circular	54.264	52.630	1.259	53.782	52.207	1.200
9.004	12.467	15.4	375	Circular	53.782	52.207	1.200	53.000	51.400	1.225

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.005	5	1350	Manhole	Adoptable	7	1350	Manhole	Adoptable
5.000	Plots 29-34	600	Manhole	Adoptable	6	1200	Manhole	Adoptable
5.001	6	1200	Manhole	Adoptable	7	1350	Manhole	Adoptable
6.000	Substation	600	Manhole	Adoptable	7	1350	Manhole	Adoptable
1.006	7	1350	Manhole	Adoptable	8	1350	Manhole	Adoptable
1.007	8	1350	Manhole	Adoptable	9	1350	Manhole	Adoptable
7.000	Plots 28	600	Manhole	Adoptable	9	1350	Manhole	Adoptable
1.008	9	1350	Manhole	Adoptable	10	1350	Manhole	Adoptable
1.009	10	1350	Manhole	Adoptable	11	1350	Manhole	Adoptable
1.010	11	1350	Manhole	Adoptable	14	1350	Manhole	Adoptable
8.000	Plots 26-27	600	Manhole	Adoptable	12	1200	Manhole	Adoptable
8.001	12	1200	Manhole	Adoptable	13	1200	Manhole	Adoptable
8.002	13	1200	Manhole	Adoptable	14	1350	Manhole	Adoptable
1.011	14	1350	Manhole	Adoptable	15	1350	Manhole	Adoptable
1.012	15	1350	Manhole	Adoptable	16		Junction	
1.013	16		Junction		17		Junction	
1.014	17		Junction		18		Junction	
1.015	18		Junction		25		Junction	
9.000	Plots 25	600	Manhole	Adoptable	19	1200	Manhole	Adoptable
9.001	19	1200	Manhole	Adoptable	21	1200	Manhole	Adoptable
10.000	20	1200	Manhole	Adoptable	21	1200	Manhole	Adoptable
9.002	21	1200	Manhole	Adoptable	22	1350	Manhole	Adoptable
11.000	Plots 15-18	600	Manhole	Adoptable	22	1350	Manhole	Adoptable
9.003	22	1350	Manhole	Adoptable	23	1350	Manhole	Adoptable
9.004	23	1350	Manhole	Adoptable	24		Junction	

Pipeline Schedule

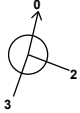
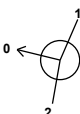
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
9.005	8.822	176.4	375	Circular	53.000	51.400	1.225	53.000	51.350	1.275
12.000	10.000	5.1	150	Circular	54.875	53.450	1.275	53.000	51.500	1.350
1.016	10.990	407.0	450	Circular	53.000	51.200	1.350	53.000	51.173	1.377

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
9.005	24		Junction		25		Junction	
12.000	Plots 19-24	600	Manhole	Adoptable	25		Junction	
1.016	25		Junction		25_OUT		Junction	

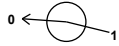
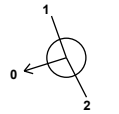
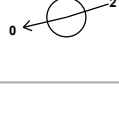
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
Plots 1-10			54.950	1.401	600		0	1.000	53.549	150
1	527857.712	239582.766	54.950	1.726	1350		1	1.000	53.449	150
							0	1.001	53.224	375
Plots 36			54.875	1.357	600		0	2.000	53.518	150
2	527863.016	239591.063	54.875	1.682	1350		1	2.000	53.418	150
							2	1.001	53.193	375
							0	1.002	53.193	375
3	527871.224	239596.426	54.966	1.804	1350		1	1.002	53.162	375
							0	1.003	53.162	375
Plots 35			55.110	1.663	600		0	3.000	53.447	150
4	527882.780	239602.145	55.110	1.988	1350		1	3.000	53.347	150
							2	1.003	53.122	375
							0	1.004	53.122	375
Plots 11-14			55.341	1.947	600		0	4.000	53.394	150
5	527894.217	239614.797	55.341	2.272	1350		1	4.000	53.294	150
							2	1.004	53.069	375
							0	1.005	53.069	375

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
Plots 29-34			55.552	1.350	600				
						0	5.000	54.202	150
6	527911.616	239627.596	55.552	1.525	1200		1	5.000	54.102
						0	5.001	54.027	225
Substation			55.419	2.081	600				
						0	6.000	53.338	150
7	527900.248	239631.933	55.419	2.406	1350		1	6.000	53.238
						2	5.001	53.163	225
						3	1.005	53.013	375
						0	1.006	53.013	375
8	527903.551	239645.910	55.414	2.446	1350		1	1.006	52.968
						0	1.007	52.968	375
Plots 28			55.341	1.519	600				
						0	7.000	53.822	150
9	527903.107	239662.029	55.341	2.423	1350		1	7.000	53.143
						2	1.007	52.918	375
						0	1.008	52.918	375
10	527896.677	239680.430	55.211	2.354	1350		1	1.008	52.857
						0	1.009	52.857	375
11	527895.087	239691.704	55.134	2.313	1350		1	1.009	52.821
						0	1.010	52.821	375
Plots 26-27			55.078	1.250	600				
						0	8.000	53.828	150
12	527905.378	239724.023	55.078	1.425	1200		1	8.000	53.728
						0	8.001	53.653	225
13	527901.846	239711.425	55.112	1.537	1200		1	8.001	53.575
						0	8.002	53.575	225
14	527896.313	239698.666	55.115	2.316	1350		1	8.002	52.949
						2	1.010	52.799	375
						0	1.011	52.799	375

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
15	527852.128	239709.467	54.316	1.658	1350	 0 1	1 1.011	52.658	375
16	527840.490	239710.288	53.700	1.265		 0 1	1 1.012	52.435	375
17	527834.111	239719.671	53.700	1.300		 0 1	1 1.013	52.435	375
18	527832.024	239733.168	53.700	1.425		 0 1	1 1.014	52.400	375
Plots 25			55.199	1.350	600	 0 1	1 1.015	52.275	225
19	527905.387	239747.179	55.199	1.450	1200	 0 1	1 9.000	53.849	150
20	527895.223	239769.870	54.680	1.425	1200	 0 1	1 9.001	53.749	150
21	527898.524	239760.625	54.883	1.761	1200	 0 1 2	1 10.000	53.255	225
Plots 15-18			54.264	1.425	600	 0 1	1 9.001	53.197	225
22	527870.477	239751.810	54.264	1.634	1350	 0 1 2	1 9.002	53.122	300
23	527846.717	239746.240	53.782	1.575	1350	 0 1	1 9.003	52.839	225
24	527834.774	239742.663	53.000	1.600		 0 1	1 9.004	52.705	300
Plots 19-24			54.875	1.425	600	 0 1	1 9.005	52.630	375
						 0 1	1 12.000	52.207	375

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
25	527828.084	239748.414	53.000	1.800		1	12.000	51.500	150
						2	9.005	51.350	375
						3	1.015	51.425	225
						0	1.016	51.200	450
25_OUT	527823.145	239758.232	53.000	1.827		1	1.016	51.173	450

Simulation Settings

Rainfall Methodology	FEH-13	Summer CV	1.000	Analysis Speed	Normal	Drain Down Time (mins)	10080	Starting Level (m)		Check Discharge Volume	x
Rainfall Events	Singular	Winter CV	1.000	Skip Steady State	x	Additional Storage (m³/ha)	0.0	Check Discharge Rate(s)	x		

Storm Durations

				15	30	60	120	180	240	360	480	600	720	960	1440
Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)	Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0	30	35	0	0	100	40	4	0				

Node 18 Online Orifice Control

Flap Valve	x	Replaces Downstream Link	✓	Invert Level (m)	52.275	Diameter (m)	0.145	Discharge Coefficient	0.600
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Node 25_OUT Online Weir Control

Flap Valve	x	Replaces Downstream Link	✓	Invert Level (m)	52.995	Width (m)	1.000	Discharge Coefficient	0.590
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Node Substation Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	53.338	Width (m)	2.500	Slope (1:X)	1000.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	6	Length (m)	10.000	Depth (m)	0.350	

Node Plots 1-10 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	53.549	Width (m)	35.000	Slope (1:X)	1000.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	17	Length (m)	12.500	Depth (m)	0.350	

Node Plots 11-14 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	53.394	Width (m)	16.000	Slope (1:X)	1000.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	11	Length (m)	10.000	Depth (m)	0.350	

Node Plots 29-34 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	54.202	Width (m)	65.000	Slope (1:X)	1000.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	60	Length (m)	20.000	Depth (m)	0.350	

Node Plots 28 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	53.822	Width (m)	6.300	Slope (1:X)	1000.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	6	Length (m)	10.000	Depth (m)	0.350	

Node Plots 26-27 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	53.828	Width (m)	24.000	Slope (1:X)	1000.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	15	Length (m)	10.000	Depth (m)	0.350	

Node Plots 15-18 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	52.839	Width (m)	39.000	Slope (1:X)	1000.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	14	Length (m)	10.000	Depth (m)	0.350	

Node Plots 19-24 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	53.450	Width (m)	11.500	Slope (1:X)	100.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	3	Length (m)	55.000	Depth (m)	0.350	

Node Plots 25 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	53.849	Width (m)	6.000	Slope (1:X)	1000.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	2	Length (m)	8.500	Depth (m)	0.350	

Node Plots 35 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	53.447	Width (m)	10.000	Slope (1:X)	1000.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	4	Length (m)	4.000	Depth (m)	0.350	

Node Plots 36 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	53.518	Width (m)	10.000	Slope (1:X)	1000.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)	6	Length (m)	9.000	Depth (m)	0.350	

Node 17 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.29916	Side Inf Coefficient (m/hr)	0.29916	Safety Factor	5.0	Porosity	1.00	Invert Level (m)	52.400	Time to half empty (mins)	72
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Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	61.0	61.0	1.300	260.0	260.0

Node 25 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.29916	Side Inf Coefficient (m/hr)	0.29916	Safety Factor	5.0	Porosity	1.00	Invert Level (m)	51.200	Time to half empty (mins)	624
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Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	263.0	294.0	1.800	793.0	822.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	Plots 1-10	74	53.582	0.033	3.7	3.4816	0.0000	OK
15 minute summer	1	11	53.265	0.041	2.7	0.0588	0.0000	OK
30 minute summer	Plots 36	21	53.539	0.021	1.4	0.4425	0.0000	OK
15 minute summer	2	12	53.239	0.046	3.3	0.0651	0.0000	OK
30 minute summer	3	20	53.206	0.044	3.3	0.0624	0.0000	OK
15 minute summer	Plots 35	13	53.463	0.016	0.7	0.1687	0.0000	OK
15 minute summer	4	11	53.195	0.073	9.3	0.1043	0.0000	OK
30 minute summer	Plots 11-14	22	53.418	0.024	2.4	0.9153	0.0000	OK
15 minute summer	5	11	53.177	0.108	17.8	0.1544	0.0000	OK
180 minute summer	Plots 29-34	112	54.265	0.063	13.5	20.5385	0.0000	OK
180 minute summer	6	112	54.059	0.032	5.9	0.0365	0.0000	OK
15 minute summer	Substation	13	53.350	0.012	0.4	0.0598	0.0000	OK
15 minute summer	7	11	53.152	0.139	26.5	0.1995	0.0000	OK
15 minute summer	8	11	53.124	0.156	32.8	0.2235	0.0000	OK
15 minute summer	Plots 28	12	53.836	0.014	1.1	0.1674	0.0000	OK
15 minute summer	9	12	53.091	0.173	40.5	0.2474	0.0000	OK
15 minute summer	10	12	53.050	0.193	43.8	0.2759	0.0000	OK
15 minute summer	11	12	53.019	0.198	48.3	0.2826	0.0000	OK
120 minute summer	Plots 26-27	72	53.855	0.027	2.0	1.6150	0.0000	OK
120 minute summer	12	72	53.681	0.028	1.2	0.0316	0.0000	OK
15 minute summer	13	11	53.605	0.030	3.9	0.0334	0.0000	OK
15 minute summer	14	12	52.981	0.182	52.2	0.2601	0.0000	OK
15 minute summer	15	12	52.775	0.117	52.5	0.1675	0.0000	OK
15 minute summer	16	12	52.608	0.173	52.2	0.0000	0.0000	OK
120 minute summer	17	78	52.581	0.181	32.2	13.5755	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	Plots 1-10	1.000	1	1.8	0.635	0.100	0.0280	
15 minute summer	1	1.001	2	2.7	0.394	0.024	0.0687	
30 minute summer	Plots 36	2.000	2	0.7	0.485	0.039	0.0144	
15 minute summer	2	1.002	3	3.3	0.449	0.029	0.0717	
30 minute summer	3	1.003	4	3.2	0.354	0.029	0.1332	
15 minute summer	Plots 35	3.000	4	0.4	0.409	0.022	0.0096	
15 minute summer	4	1.004	5	9.1	0.450	0.082	0.3512	
30 minute summer	Plots 11-14	4.000	5	0.9	0.529	0.053	0.0178	
15 minute summer	5	1.005	7	17.5	0.556	0.159	0.5762	
180 minute summer	Plots 29-34	5.000	6	5.9	0.875	0.331	0.0671	
180 minute summer	6	5.001	7	5.9	1.716	0.042	0.0416	
15 minute summer	Substation	6.000	7	0.2	0.354	0.014	0.0069	
15 minute summer	7	1.006	8	26.0	0.647	0.234	0.5794	
15 minute summer	8	1.007	9	32.2	0.694	0.291	0.7486	
15 minute summer	Plots 28	7.000	9	0.8	0.978	0.016	0.0078	
15 minute summer	9	1.008	10	39.9	0.750	0.358	1.0394	
15 minute summer	10	1.009	11	43.8	0.756	0.392	0.6597	
15 minute summer	11	1.010	14	48.6	0.869	0.437	0.3950	
120 minute summer	Plots 26-27	8.000	12	1.2	0.571	0.069	0.0215	
120 minute summer	12	8.001	13	1.2	0.517	0.031	0.0320	
15 minute summer	13	8.002	14	3.9	1.302	0.035	0.0431	
15 minute summer	14	1.011	15	52.5	1.283	0.474	1.8707	
15 minute summer	15	1.012	16	52.2	1.328	0.188	0.4609	
15 minute summer	16	1.013	17	51.0	1.651	0.461	0.4764	
120 minute summer	17	1.014	18	20.6	0.634	0.414	0.5057	

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	18	78	52.567	0.292	20.6	0.0000	0.0000	SURCHARGED
30 minute summer	Plots 25	20	53.866	0.017	0.8	0.1995	0.0000	OK
15 minute summer	19	10	53.837	0.088	16.1	0.0993	0.0000	OK
15 minute summer	20	10	53.354	0.099	14.2	0.1119	0.0000	OK
15 minute summer	21	10	53.233	0.111	36.4	0.1257	0.0000	OK
120 minute summer	Plots 15-18	70	52.894	0.055	7.5	5.8407	0.0000	OK
15 minute summer	22	11	52.735	0.105	38.2	0.1504	0.0000	OK
15 minute summer	23	11	52.276	0.069	38.4	0.0985	0.0000	OK
240 minute winter	24	236	51.602	0.202	10.9	0.0000	0.0000	OK
15 minute summer	Plots 19-24	10	53.509	0.059	24.7	0.4061	0.0000	OK
240 minute winter	25	236	51.603	0.403	32.9	129.7183	0.0000	OK
240 minute winter	25_OUT	236	51.603	0.430	0.4	0.0000	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	17	Infiltration		1.4				
120 minute summer	18	Orifice	25	20.6				
30 minute summer	Plots 25	9.000	19	0.5	0.125	0.029	0.0552	
15 minute summer	19	9.001	21	16.0	1.824	0.156	0.1321	
15 minute summer	20	10.000	21	14.1	0.881	0.353	0.1568	
15 minute summer	21	9.002	22	36.0	1.572	0.272	0.6750	
120 minute summer	Plots 15-18	11.000	22	4.8	0.663	0.120	0.0722	
15 minute summer	22	9.003	23	38.4	1.984	0.145	0.4770	
15 minute summer	23	9.004	24	38.4	1.675	0.075	0.2920	
240 minute winter	24	9.005	25	10.9	0.811	0.073	0.6158	
15 minute summer	Plots 19-24	12.000	25	24.3	3.868	0.307	0.0628	
240 minute winter	25	1.016	25_OUT	0.4	0.102	0.003	1.6787	
240 minute winter	25	Infiltration		6.7				
240 minute winter	25_OUT	Weir		0.0				0.0

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	Plots 1-10	22	53.624	0.075	22.5	8.9503	0.0000	OK
15 minute summer	1	12	53.526	0.301	11.4	0.4314	0.0000	OK
30 minute summer	Plots 36	20	53.564	0.046	4.7	1.1217	0.0000	OK
15 minute summer	2	12	53.530	0.337	16.1	0.4829	0.0000	OK
15 minute summer	3	12	53.531	0.369	19.6	0.5278	0.0000	OK
15 minute summer	Plots 35	13	53.518	0.071	6.9	0.8426	0.0000	OK
15 minute summer	4	12	53.527	0.405	33.9	0.5790	0.0000	SURCHARGED
15 minute summer	Plots 11-14	14	53.481	0.087	15.7	3.9731	0.0000	OK
15 minute summer	5	12	53.521	0.452	51.3	0.6475	0.0000	SURCHARGED
120 minute summer	Plots 29-34	78	54.354	0.152	51.6	55.6088	0.0000	SURCHARGED
120 minute summer	6	84	54.084	0.057	17.8	0.0643	0.0000	OK
15 minute summer	Substation	13	53.505	0.167	10.7	1.2611	0.0000	SURCHARGED
15 minute summer	7	12	53.503	0.490	83.6	0.7012	0.0000	SURCHARGED
15 minute summer	8	12	53.475	0.507	91.8	0.7252	0.0000	SURCHARGED
15 minute summer	Plots 28	11	53.848	0.026	3.6	0.4125	0.0000	OK
15 minute summer	9	12	53.430	0.512	104.2	0.7331	0.0000	SURCHARGED
15 minute summer	10	12	53.354	0.497	115.2	0.7110	0.0000	SURCHARGED
15 minute summer	11	12	53.289	0.468	130.3	0.6691	0.0000	SURCHARGED
30 minute summer	Plots 26-27	21	53.892	0.064	12.5	4.2761	0.0000	OK
30 minute summer	12	22	53.715	0.062	6.1	0.0698	0.0000	OK
15 minute summer	13	11	53.631	0.056	15.1	0.0631	0.0000	OK
15 minute summer	14	12	53.223	0.424	144.9	0.6071	0.0000	SURCHARGED
120 minute summer	15	88	53.144	0.486	101.1	0.6960	0.0000	SURCHARGED
120 minute summer	16	90	53.138	0.703	94.8	0.0000	0.0000	SURCHARGED
120 minute summer	17	90	53.133	0.733	94.4	85.8926	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	Plots 1-10	1.000	1	7.9	0.941	0.444	0.0838	
15 minute summer	1	1.001	2	12.6	0.509	0.113	0.9821	
30 minute summer	Plots 36	2.000	2	3.6	0.713	0.201	0.0719	
15 minute summer	2	1.002	3	19.6	0.518	0.176	1.0509	
15 minute summer	3	1.003	4	22.8	0.518	0.205	1.4193	
15 minute summer	Plots 35	3.000	4	-5.0	0.625	-0.283	0.1287	
15 minute summer	4	1.004	5	36.9	0.451	0.332	1.8811	
15 minute summer	Plots 11-14	4.000	5	9.1	0.935	0.513	0.1412	
15 minute summer	5	1.005	7	55.4	0.576	0.502	2.0037	
120 minute summer	Plots 29-34	5.000	6	17.8	1.086	1.001	0.1652	
120 minute summer	6	5.001	7	17.8	2.337	0.127	0.1611	
15 minute summer	Substation	6.000	7	-9.8	-0.559	-0.552	0.1760	
15 minute summer	7	1.006	8	86.5	0.784	0.776	1.5841	
15 minute summer	8	1.007	9	92.9	0.842	0.838	1.7785	
15 minute summer	Plots 28	7.000	9	3.1	0.946	0.067	0.0984	
15 minute summer	9	1.008	10	104.9	0.951	0.942	2.1499	
15 minute summer	10	1.009	11	115.4	1.046	1.031	1.2558	
15 minute summer	11	1.010	14	130.6	1.184	1.176	0.7797	
30 minute summer	Plots 26-27	8.000	12	6.1	0.884	0.344	0.0692	
30 minute summer	12	8.001	13	6.1	0.852	0.153	0.1014	
15 minute summer	13	8.002	14	15.0	1.434	0.135	0.3297	
15 minute summer	14	1.011	15	145.3	1.487	1.311	4.4899	
120 minute summer	15	1.012	16	94.8	1.253	0.342	1.2868	
120 minute summer	16	1.013	17	94.4	1.239	0.854	1.2514	
120 minute summer	17	1.014	18	37.1	0.932	0.746	0.5432	

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.82%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	18	90	53.061	0.786	37.1	0.0000	0.0000	SURCHARGED
15 minute summer	Plots 25	11	53.900	0.051	4.1	0.6992	0.0000	OK
15 minute summer	19	11	53.896	0.147	54.7	0.1661	0.0000	OK
15 minute summer	20	10	53.507	0.252	47.8	0.2855	0.0000	SURCHARGED
15 minute summer	21	11	53.373	0.251	122.2	0.2844	0.0000	OK
30 minute summer	Plots 15-18	21	52.974	0.135	46.0	15.3019	0.0000	OK
15 minute summer	22	11	52.849	0.219	138.3	0.3138	0.0000	OK
360 minute winter	23	352	52.341	0.134	23.0	0.1923	0.0000	OK
360 minute winter	24	352	52.341	0.941	23.0	0.0000	0.0000	SURCHARGED
15 minute summer	Plots 19-24	11	53.589	0.139	83.0	2.1744	0.0000	OK
360 minute winter	25	352	52.341	1.141	61.5	491.8782	0.0000	SURCHARGED
360 minute winter	25_OUT	352	52.341	1.168	0.4	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	17	Infiltration		2.8				
120 minute summer	18	Orifice	25	37.1				
15 minute summer	Plots 25	9.000	19	4.0	0.329	0.225	0.1142	
15 minute summer	19	9.001	21	54.7	2.109	0.536	0.4178	
15 minute summer	20	10.000	21	47.4	1.213	1.191	0.3638	
15 minute summer	21	9.002	22	122.0	2.041	0.921	1.7535	
30 minute summer	Plots 15-18	11.000	22	23.6	0.998	0.592	0.2360	
15 minute summer	22	9.003	23	138.1	2.734	0.523	1.2359	
360 minute winter	23	9.004	24	23.0	1.190	0.045	0.9086	
360 minute winter	24	9.005	25	22.6	0.806	0.151	0.9730	
15 minute summer	Plots 19-24	12.000	25	79.2	4.840	1.000	0.1732	
360 minute winter	25	1.016	25_OUT	0.4	0.106	0.003	1.7413	
360 minute winter	25	Infiltration		10.4				
360 minute winter	25_OUT	Weir		0.0				0.0

Results for 100 year +40% CC +4% A Critical Storm Duration. Lowest mass balance: 99.84%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	Plots 1-10	23	53.682	0.133	36.6	16.6125	0.0000	OK
15 minute summer	1	12	53.706	0.482	15.9	0.6896	0.0000	SURCHARGED
30 minute summer	Plots 36	22	53.684	0.166	16.8	4.4158	0.0000	SURCHARGED
15 minute summer	2	12	53.699	0.506	29.2	0.7241	0.0000	SURCHARGED
15 minute summer	3	12	53.704	0.542	30.3	0.7760	0.0000	SURCHARGED
15 minute summer	Plots 35	13	53.703	0.256	19.6	3.1206	0.0000	SURCHARGED
15 minute summer	4	12	53.708	0.586	56.1	0.8391	0.0000	SURCHARGED
30 minute summer	Plots 11-14	24	53.628	0.234	31.8	11.0650	0.0000	SURCHARGED
15 minute summer	5	12	53.705	0.636	57.8	0.9100	0.0000	SURCHARGED
120 minute summer	Plots 29-34	80	54.423	0.221	73.8	82.2665	0.0000	SURCHARGED
120 minute summer	6	80	54.087	0.060	21.7	0.0676	0.0000	OK
15 minute summer	Substation	12	53.756	0.418	19.7	2.7101	0.0000	SURCHARGED
15 minute summer	7	12	53.714	0.701	85.9	1.0031	0.0000	SURCHARGED
15 minute summer	8	11	53.688	0.720	93.4	1.0307	0.0000	SURCHARGED
15 minute summer	Plots 28	11	53.854	0.032	5.0	0.5155	0.0000	OK
15 minute summer	9	11	53.652	0.734	114.6	1.0503	0.0000	SURCHARGED
15 minute summer	10	11	53.566	0.709	131.4	1.0152	0.0000	SURCHARGED
15 minute summer	11	11	53.480	0.659	156.9	0.9436	0.0000	SURCHARGED
30 minute summer	Plots 26-27	21	53.912	0.084	17.7	5.6833	0.0000	OK
30 minute summer	12	21	53.731	0.078	9.5	0.0877	0.0000	OK
15 minute summer	13	11	53.643	0.068	22.2	0.0768	0.0000	OK
120 minute summer	14	84	53.442	0.643	122.1	0.9199	0.0000	SURCHARGED
120 minute summer	15	98	53.404	0.746	117.8	1.0674	0.0000	SURCHARGED
120 minute summer	16	98	53.395	0.960	116.6	0.0000	0.0000	SURCHARGED
120 minute summer	17	100	53.389	0.989	116.2	135.1644	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	Plots 1-10	1.000	1	14.8	1.060	0.836	0.1705	
15 minute summer	1	1.001	2	17.0	0.531	0.152	1.0861	
30 minute summer	Plots 36	2.000	2	-10.8	0.699	-0.606	0.1760	
15 minute summer	2	1.002	3	30.3	0.525	0.271	1.0815	
15 minute summer	3	1.003	4	31.2	0.472	0.281	1.4222	
15 minute summer	Plots 35	3.000	4	-16.4	-0.977	-0.921	0.1760	
15 minute summer	4	1.004	5	43.5	0.438	0.392	1.8811	
30 minute summer	Plots 11-14	4.000	5	-20.0	-1.241	-1.129	0.1760	
15 minute summer	5	1.005	7	58.6	0.579	0.530	2.0037	
120 minute summer	Plots 29-34	5.000	6	21.7	1.233	1.221	0.1706	
120 minute summer	6	5.001	7	21.7	2.024	0.156	0.2933	
15 minute summer	Substation	6.000	7	-18.0	-1.034	-1.014	0.1760	
15 minute summer	7	1.006	8	86.9	0.788	0.780	1.5841	
15 minute summer	8	1.007	9	94.1	0.853	0.849	1.7785	
15 minute summer	Plots 28	7.000	9	4.6	1.064	0.098	0.1016	
15 minute summer	9	1.008	10	115.0	1.043	1.033	2.1499	
15 minute summer	10	1.009	11	132.0	1.197	1.180	1.2558	
15 minute summer	11	1.010	14	157.0	1.424	1.414	0.7797	
30 minute summer	Plots 26-27	8.000	12	9.5	0.982	0.534	0.0965	
30 minute summer	12	8.001	13	9.5	0.966	0.236	0.1386	
15 minute summer	13	8.002	14	22.1	1.385	0.200	0.3467	
120 minute summer	14	1.011	15	117.8	1.481	1.063	5.0170	
120 minute summer	15	1.012	16	116.6	1.187	0.421	1.2868	
120 minute summer	16	1.013	17	116.2	1.325	1.051	1.2514	
120 minute summer	17	1.014	18	42.7	1.073	0.859	0.5432	

Results for 100 year +40% CC +4% A Critical Storm Duration. Lowest mass balance: 99.84%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
120 minute summer	18	100	53.292	1.017	42.7	0.0000	0.0000	SURCHARGED
15 minute summer	Plots 25	12	54.012	0.163	11.9	2.3688	0.0000	SURCHARGED
15 minute summer	19	11	54.014	0.265	74.6	0.2996	0.0000	SURCHARGED
15 minute summer	20	10	53.960	0.705	67.1	0.7971	0.0000	SURCHARGED
15 minute summer	21	10	53.722	0.600	158.6	0.6782	0.0000	SURCHARGED
30 minute summer	Plots 15-18	21	53.019	0.180	65.0	20.5201	0.0000	OK
15 minute summer	22	11	52.895	0.265	183.9	0.3795	0.0000	OK
480 minute winter	23	472	52.710	0.503	26.8	0.7193	0.0000	SURCHARGED
480 minute winter	24	472	52.710	1.310	26.8	0.0000	0.0000	FLOOD RISK
15 minute summer	Plots 19-24	13	53.748	0.298	116.5	9.8821	0.0000	SURCHARGED
480 minute winter	25	472	52.710	1.510	71.8	732.5341	0.0000	FLOOD RISK
480 minute winter	25_OUT	472	52.710	1.537	0.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
120 minute summer	17	Infiltration		3.5				
120 minute summer	18	Orifice	25	42.7				
15 minute summer	Plots 25	9.000	19	15.1	0.924	0.850	0.1760	
15 minute summer	19	9.001	21	71.5	2.199	0.700	0.6004	
15 minute summer	20	10.000	21	65.7	1.651	1.648	0.3904	
15 minute summer	21	9.002	22	158.9	2.256	1.199	2.0494	
30 minute summer	Plots 15-18	11.000	22	34.6	1.090	0.870	0.3171	
15 minute summer	22	9.003	23	183.5	2.864	0.696	1.5570	
480 minute winter	23	9.004	24	26.8	1.131	0.052	1.3751	
480 minute winter	24	9.005	25	26.5	0.725	0.177	0.9730	
15 minute summer	Plots 19-24	12.000	25	73.7	4.837	0.931	0.1605	
480 minute winter	25	1.016	25_OUT	0.3	0.100	0.002	1.7413	
480 minute winter	25	Infiltration		12.2				
480 minute winter	25_OUT	Weir		0.0				0.0

Design Settings

Rainfall Methodology	FEH-13	Time of Entry (mins)	5.00	Connection Type	Level Soffits	Enforce best practice design rules	x
Return Period (years)	2	Maximum Time of Concentration (mins)	30.00	Minimum Backdrop Height (m)	9.999		
Additional Flow (%)	0	Maximum Rainfall (mm/hr)	150.0	Preferred Cover Depth (m)	1.200		
CV	1.000	Minimum Velocity (m/s)	1.00	Include Intermediate Ground	✓		

Nodes

Name	Area (ha)	Cover Level (m)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
Plots 1-10	0.043	54.400	527840.627	239603.018	1.000	53.400
Plots 11-14	0.016	54.000	527840.627	239603.018	1.000	53.000
Substation	0.002	54.000	527840.627	239603.018	1.000	53.000
Plots 15-18	0.039	54.700	527877.448	239733.349	0.500	54.200
Plots 19-24	0.063	54.400	527888.587	239781.496	1.000	53.400
Plots 25	0.005	55.400	527919.693	239719.981	0.900	54.500
Plots 26-27	0.024	55.400	527919.693	239719.981	0.900	54.500
Plots 28	0.006	55.800	527961.807	239650.525	1.000	54.800
Plots 29-34	0.126	55.800	527961.807	239650.525	1.000	54.800
Plots 35	0.004	55.000	527870.455	239579.401	0.500	54.500
Plots 36	0.009	55.000	527870.455	239579.401	1.000	54.000

Simulation Settings

Rainfall Methodology	FEH-13	Summer CV	1.000	Analysis Speed	Normal	Drain Down Time (mins)	240	Starting Level (m)		Check Discharge Volume	x
Rainfall Events	Singular	Winter CV	1.000	Skip Steady State	x	Additional Storage (m³/ha)	0.0	Check Discharge Rate(s)	x		

Storm Durations

15	30	60	120	180	240	360	480	600	720	960	1440
----	----	----	-----	-----	-----	-----	-----	-----	-----	-----	------

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
100	40	0	0

Node Plots 1-10 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	53.400	Width (m)	35.000	Slope (1:X)	1000.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)		Length (m)	12.500	Depth (m)	0.350	

Node Plots 11-14 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	53.000	Width (m)	16.000	Slope (1:X)	100.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)		Length (m)	10.000	Depth (m)	0.350	

Node Substation Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	53.000	Width (m)	2.500	Slope (1:X)	1000.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)		Length (m)	10.000	Depth (m)	0.350	

Node Plots 15-18 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	54.200	Width (m)	39.000	Slope (1:X)	1000.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)		Length (m)	10.000	Depth (m)	0.350	

Node Plots 19-24 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	53.400	Width (m)	11.500	Slope (1:X)	100.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)		Length (m)	55.000	Depth (m)	0.350	

Node Plots 25 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	54.500	Width (m)	6.000	Slope (1:X)	1000.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)		Length (m)	8.500	Depth (m)	0.350	

Node Plots 26-27 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	54.500	Width (m)	24.000	Slope (1:X)	1000.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)		Length (m)	10.000	Depth (m)	0.350	

Node Plots 28 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	54.800	Width (m)	6.300	Slope (1:X)	1000.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)		Length (m)	10.000	Depth (m)	0.350	

Node Plots 29-34 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	54.800	Width (m)	65.000	Slope (1:X)	1000.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)		Length (m)	20.000	Depth (m)	0.350	

Node Plots 35 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	54.500	Width (m)	10.000	Slope (1:X)	1000.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)		Length (m)	4.000	Depth (m)	0.350	

Node Plots 36 Carpark Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	54.000	Width (m)	10.000	Slope (1:X)	1000.0	Inf Depth (m)
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.30	Time to half empty (mins)		Length (m)	9.000	Depth (m)	0.350	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	Plots 1-10	1	53.400	0.000	34.6	0.0000	0.0000	OK
15 minute summer	Plots 11-14	1	53.000	0.000	12.9	0.0000	0.0000	OK
15 minute summer	Substation	1	53.000	0.000	1.6	0.0000	0.0000	OK
15 minute summer	Plots 15-18	1	54.200	0.000	31.3	0.0000	0.0000	OK
15 minute summer	Plots 19-24	1	53.400	0.000	50.6	0.0000	0.0000	OK
15 minute summer	Plots 25	1	54.500	0.000	4.0	0.0000	0.0000	OK
15 minute summer	Plots 26-27	1	54.500	0.000	19.2	0.0000	0.0000	OK
15 minute summer	Plots 28	1	54.800	0.000	4.8	0.0000	0.0000	OK
15 minute summer	Plots 29-34	1	54.800	0.000	101.2	0.0000	0.0000	OK
15 minute summer	Plots 35	1	54.500	0.000	3.2	0.0000	0.0000	OK
15 minute summer	Plots 36	1	54.000	0.000	7.3	0.0000	0.0000	OK

9. APPENDIX C – GEOTECHNICAL DATA



Trial Pit

TP1
Sheet 1 of 1

Hole Type TP	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name Station Road, Ashwell	Project No. J25249	Start Date 2025-09-02	End Date 2025-09-04	

Client	Consultant Lauren Highland	Contractor
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Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m)	Strata		
		Depth (m)	Type/ Ref	Results			Legend	Description	
						(0.35)		TOPSOIL (Brown slightly silty gravelly sand with frequent fine to coarse flint gravel and chalk nodules).	
						0.35 (0.30)		Brownish-orange silty slightly gravelly SAND with fine-medium angular flint gravel	0.5
						0.65		Structureless CHALK recovered as greyish-white silty gravelly sand with fine to coarse subrounded to angular flint gravel	1.0
						(1.65)		Chalk appears drier and harder, with regular small voids (1.20 - 2.30m)	1.5
						2.30		End of Trial Pit at 2.30m	2.5
									3.0
									3.5
									4.0
									4.5
									5.0

Remarks Terminated at 2.30 m. Groundwater not encountered. Backfilled with arisings.	Method, Plant, Stability, Dimensions 0.00 - 2.30m JCB 3CX Stable L = 3.20m W = 0.80m	Logger LH
---	--	--------------



Trial Pit

TP2
Sheet 1 of 1

Hole Type TP	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name Station Road, Ashwell	Project No. J25249	Start Date 2025-09-02	End Date 2025-09-04	

Client	Consultant Lauren Highland	Contractor
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Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata		
		Depth (m)	Type/ Ref	Results			Legend	Description	
						(0.30)		TOPSOIL (Brown slightly silty gravelly sand with frequent fine to coarse flint gravel and chalk nodules).	0.5
						0.30		Brownish-orange silty slightly gravelly SAND with fine-medium angular flint gravel	
						(0.30)			
						0.60		Structureless CHALK recovered as greyish-white silty gravelly sand with fine to coarse subrounded to angular flint gravel	1.0
						(0.60)			
						1.20			End of Trial Pit at 1.20m
									1.5
									2.0
									2.5
									3.0
									3.5
									4.0
									4.5
									5.0

Remarks Terminated at 1.20 m. Groundwater not encountered. Backfilled with arisings.	Method, Plant, Stability, Dimensions 0.00 - 1.20m JCB 3CX Stable L = 2.20m W = 0.90m	Logger LH
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Trial Pit

TP3
Sheet 1 of 1

Hole Type TP	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name Station Road, Ashwell	Project No. J25249	Start Date 2025-09-02	End Date 2025-09-04	

Client	Consultant Lauren Highland	Contractor
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Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata		
		Depth (m)	Type/ Ref	Results			Legend	Description	
						(0.30)		TOPSOIL (Brown slightly silty gravelly sand with frequent fine to coarse flint gravel and chalk nodules).	0.5
						0.30 (0.10) 0.40		Brownish-orange silty slightly gravelly SAND with fine-medium angular flint gravel	
						(0.60)		Structureless CHALK recovered as dry greyish-white gravelly sand with fine to coarse subrounded to angular flint gravel and chalk nodules	
						1.00			
								End of Trial Pit at 1.00m	
									1.0
									1.5
									2.0
									2.5
									3.0
									3.5
									4.0
									4.5
									5.0

Remarks Terminated at 1.00 m. Groundwater not encountered. Backfilled with arisings.	Method, Plant, Stability, Dimensions 0.00 - 1.00m JCB 3CX Stable L = 1.70m W = 0.90m	Logger LH
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Trial Pit

TP4
Sheet 1 of 1

Hole Type TP	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name Station Road, Ashwell	Project No. J25249	Start Date 2025-09-02	End Date 2025-09-04	

Client	Consultant Lauren Highland	Contractor
--------	-------------------------------	------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata		
		Depth (m)	Type/ Ref	Results			Legend	Description	
						(0.40)		TOPSOIL (Brown slightly silty gravelly sand with frequent fine to coarse flint gravel and chalk nodules).	
						0.40 (0.10) 0.50		Brownish-orange silty slightly gravelly SAND with fine-medium angular flint gravel	0.5
						(0.60)		Structureless CHALK recovered as greyish-white gravelly sand with fine to coarse subrounded to angular flint gravel	1.0
						1.10		End of Trial Pit at 1.10m	
									1.5
									2.0
									2.5
									3.0
									3.5
									4.0
									4.5
									5.0

Remarks Terminated at 1.10 m. Groundwater not encountered. Backfilled with arisings.	Method, Plant, Stability, Dimensions 0.00 - 1.10m JCB 3CX Stable L = 1.60m W = 0.70m	Logger LH
---	--	--------------



Trial Pit

TP5
Sheet 1 of 1

Hole Type TP	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name Station Road, Ashwell	Project No. J25249	Start Date 2025-09-02	End Date 2025-09-04	

Client	Consultant Lauren Highland	Contractor
--------	-------------------------------	------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata		
		Depth (m)	Type/ Ref	Results			Legend	Description	
						(0.35)		TOPSOIL (Brown slightly silty gravelly sand with frequent fine to coarse flint gravel and chalk nodules).	
						0.35 (0.20)		Brownish-orange slightly silty slightly gravelly SAND with medium flint gravel	0.5
						0.55		Structureless CHALK recovered as greyish-white slightly gravelly silty sand with fine to medium rounded flint gravel	
						(1.45)			1.0
						2.00			1.5
								End of Trial Pit at 2.00m	2.0
									2.5
									3.0
									3.5
									4.0
									4.5
									5.0

Remarks Terminated at 2.00 m. Groundwater not encountered. Backfilled with arisings.	Method, Plant, Stability, Dimensions 0.00 - 2.00m JCB 3CX Stable L = 2.30m W = 0.80m	Logger LH
---	--	--------------



GEA

Trial Pit

TP6
Sheet 1 of 1

Hole Type TP	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name Station Road, Ashwell	Project No. J25249	Start Date 2025-09-02	End Date 2025-09-04	

Client	Consultant Lauren Highland	Contractor
--------	-------------------------------	------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata		
		Depth (m)	Type/ Ref	Results			Legend	Description	
						(0.40)		TOPSOIL (Brown slightly silty gravelly sand with frequent fine to coarse flint gravel and chalk nodules).	
						0.40 (0.30)		Brownish-orange silty slightly gravelly SAND with medium-coarse grained sand with medium-coarse angular flint gravel	0.5
						0.70		Structureless CHALK recovered as greyish-white slightly gravelly silty sand with fine to medium flint gravel	
						(1.80)			1.0 1.5 2.0 2.5
						2.50	End of Trial Pit at 2.50m		
									3.0 3.5 4.0 4.5 5.0

Remarks Terminated at 2.50 m. Groundwater not encountered. Backfilled with arisings.	Method, Plant, Stability, Dimensions 0.00 - 2.50m JCB 3CX Stable L = 2.00m W = 0.80m	Logger LH
---	--	--------------



Trial Pit

TP7
Sheet 1 of 1

Hole Type TP	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name Station Road, Ashwell	Project No. J25249		Start Date 2025-10-15	End Date 2025-10-17

Client	Consultant Lauren Highland	Contractor
--------	-------------------------------	------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata		
		Depth (m)	Type/ Ref	Results			Legend	Description	
						(0.30)		TOPSOIL (Brown slightly gravelly medium grained sand with medium rounded-subangular flint gravel)	0.5
						0.30 (0.20)		Orangish-brown silty gravelly coarse-grained SAND with fine-coarse flint gravel	
						0.50 (0.10) 0.60		Whiteish-orange silty gravelly coarse-grained SAND with fine-coarse flint gravel	
								End of Trial Pit at 0.60m	
									1.0

Remarks Terminated at 0.60 m. Groundwater not encountered. Backfilled with arisings.	Method, Plant, Stability, Dimensions 0.00 - 0.60m JCB 3CX Stable L = 1.10m W = 0.70m	Logger LH
---	--	--------------



Trial Pit

TP8
Sheet 1 of 1

Hole Type TP	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name Station Road, Ashwell	Project No. J25249	Start Date 2025-10-15	End Date 2025-10-17	

Client	Consultant Lauren Highland	Contractor
--------	-------------------------------	------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata					
		Depth (m)	Type/ Ref	Results			Legend	Description				
						(0.35)		TOPSOIL (Dark brown slightly silty slightly gravelly coarse grained sand with occasional subrounded-angular flint gravel)	0.5			
						0.35 (0.20)		Orangish-brown slightly clayey gravelly fine grained SAND with fine-coarse subrounded-subangular flint gravel				
						0.55 (0.05) 0.60		Whiteish-orange silty coarse-grained SAND				
						End of Trial Pit at 0.60m						
							1.0					
							1.5					
							2.0					
							2.5					
							3.0					
							3.5					
							4.0					
							4.5					
							5.0					

Remarks Terminated at 0.60 m. Groundwater not encountered. Backfilled with arisings.	Method, Plant, Stability, Dimensions 0.00 - 0.60m JCB 3CX Stable L = 1.10m W = 0.70m	Logger LH
---	--	--------------



Trial Pit

TP10
Sheet 1 of 1

Hole Type TP	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name Station Road, Ashwell	Project No. J25249	Start Date 2025-10-15	End Date 2025-10-17	

Client	Consultant Lauren Highland	Contractor
--------	-------------------------------	------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (m) (thickness)	Strata		
		Depth (m)	Type/ Ref	Results			Legend	Description	
						(0.30)		TOPSOIL (Dark brown slightly slightly gravelly coarse grained sand with rootlets and occasional fine subangular flint gravel)	0.5
						0.30 (0.20)		Orangish-brown silty gravelly fine-medium grained SAND with fine-coarse subrounded-angular flint gravel	
						0.50 (0.10) 0.60		Whiteish-orange silty medium-grained gravelly SAND with hard chalk lumps and fine-coarse rounded-subangular flint gravel	
								End of Trial Pit at 0.60m	
									1.0

Remarks Terminated at 0.60 m. Groundwater not encountered. Backfilled with arisings.	Method, Plant, Stability, Dimensions 0.00 - 0.60m JCB 3CX Stable L = 1.10m W = 0.60m	Logger LH
---	--	--------------



Trial Pit

TP11
Sheet 1 of 1

Hole Type TP	Easting	Northing	Ground Level (m)	Scale 1:25
Project Name Station Road, Ashwell	Project No. J25249	Start Date 2025-10-15	End Date 2025-10-17	

Client	Consultant Lauren Highland	Contractor
--------	-------------------------------	------------

Inst/ Backfill	Water Levels	Samples and Tests			Level (m)	Depth (thickness) (m)	Strata							
		Depth (m)	Type/ Ref	Results			Legend	Description						
						(0.30)		TOPSOIL (Dark brown slightly slightly gravelly coarse grained sand with rootlets and occasional fine subangular flint gravel)	0.5					
						0.30		Orangish-white slightly clayey gravelly SAND with lumps of hard chalk and fine-coarse subrounded-angular flint gravel						
						(0.30)								
						0.60								
End of Trial Pit at 0.60m														
									1.0					
									1.5					
									2.0					
									2.5					
									3.0					
									3.5					
									4.0					
									4.5					
									5.0					

Remarks Terminated at 0.60 m. Groundwater not encountered. Backfilled with arisings.	Method, Plant, Stability, Dimensions 0.00 - 0.60m JCB 3CX Stable L = 1.10m W = 0.60m	Logger LH
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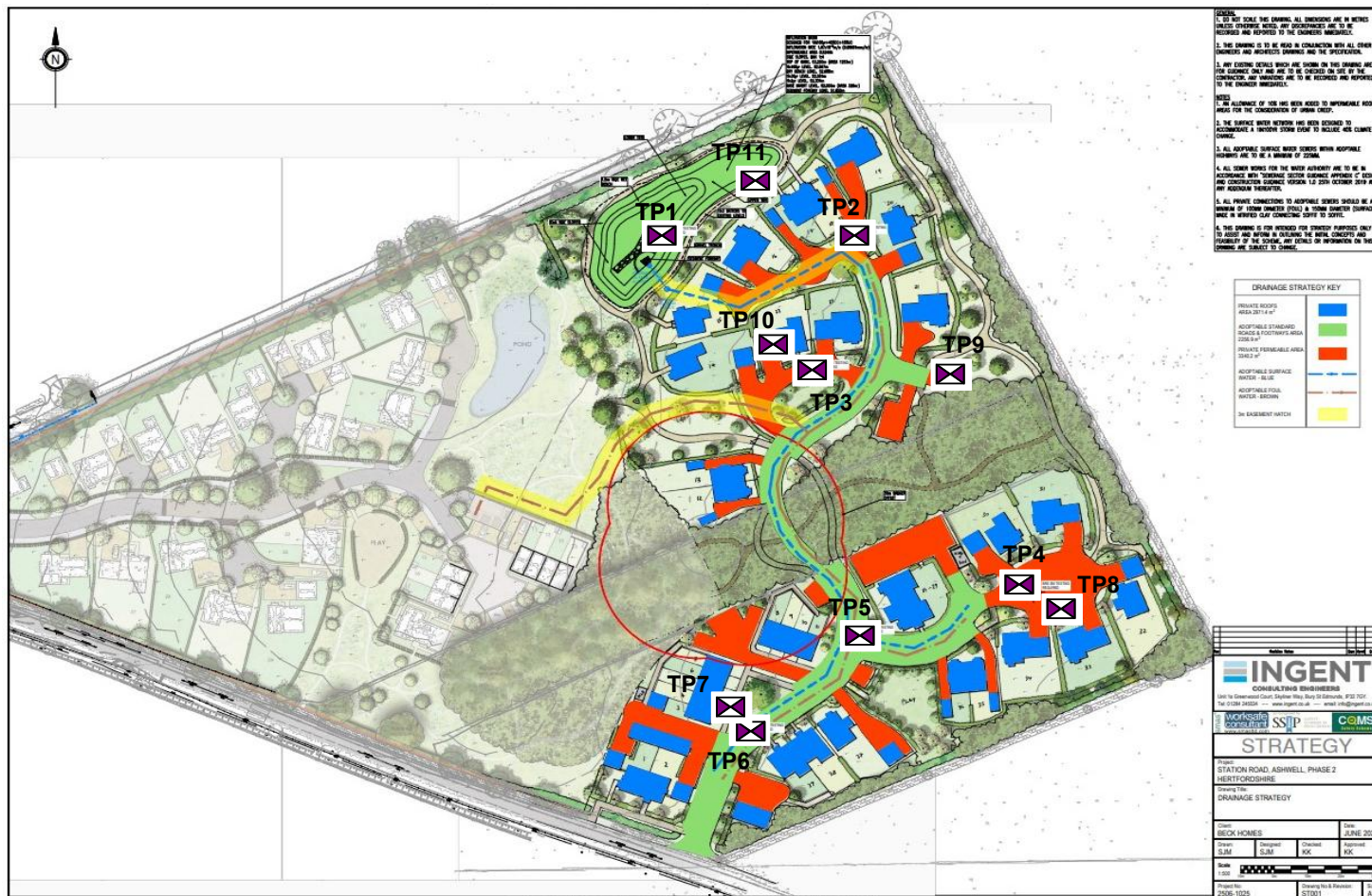
Site Station Road, Ashwell, Hertfordshire, SG7 5QF

Client Beck Homes

Engineer Lauren Highland

Job Number
J25249

Sheet
1 / 1





Site	Station Road, Ashwell, Hertfordshire, SG7 5QF
Client	Beck Homes
Engineer	Beck Homes

Job Number
J25249

Sheet
1 / 2

Date of test:	15/10/2025	Pit Width:	0.70 m
Trial Pit No:	TP7	Pit Length:	1.10 m
Test No:	1	Pit Depth:	0.60 m
Depth to water at start:	0.15 m	Max storage depth:	0.45 m
Depth of water at start:	0.15 m	75% full =	0.34 m
		25% full =	0.11 m

[illegible]



BRE365 Soakage Test Results

Site Station Road, Ashwell, Hertfordshire, SG7 5QF

Client Beck Homes

Engineer Lauren Highland

Job Number
J25249

Sheet
2 / 2

Date of test: 15/10/2025

Trial Pit No: TP7

Test No: 1

Water depth at start: 0.15 m

Width: 0.70 m

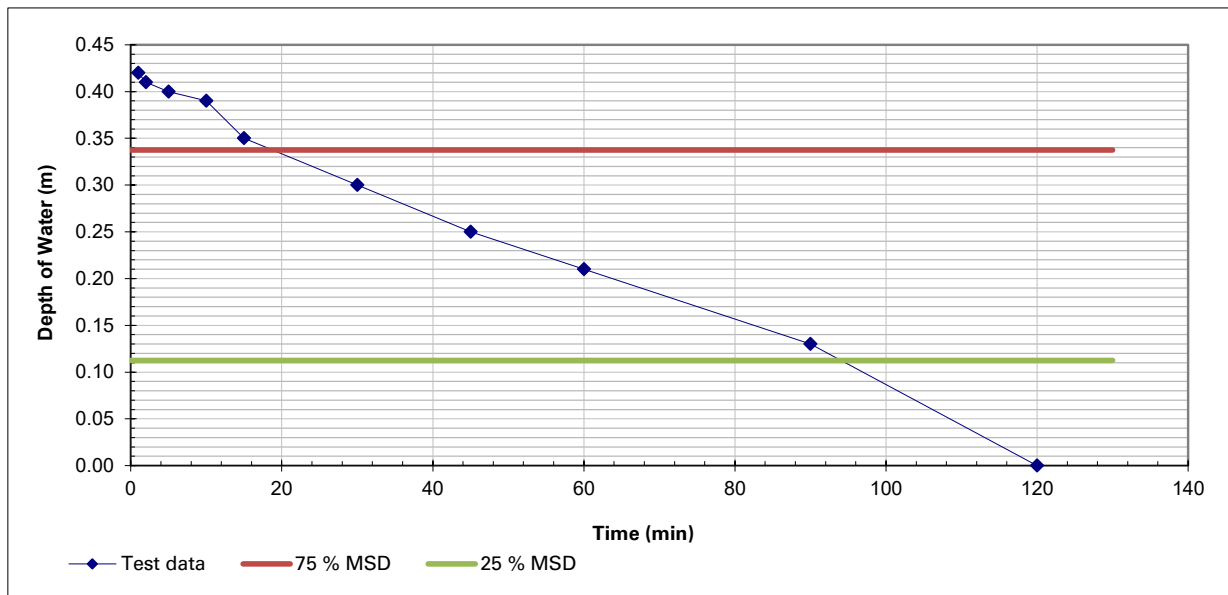
Length: 1.10 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m



Time at which MSD occurred (t_{p100}):

Time at which MSD 75% was reached (t_{p75}):

Time at which MSD 25% was reached (t_{p25}):

0	Minutes
15	Minutes after t_{p100}
95	Minutes after t_{p100}

Soil infiltration rate (f):

2.28E-05 m/s

1.97 m/day



Job Number
J25249

Engineer Beck Homes

Sheet
1 / 2

Date of test:	15/10/2025	Pit Width:	0.70 m
Trial Pit No:	TP7	Pit Length:	1.10 m
Test No:	2	Pit Depth:	0.60 m
Depth to water at start:	0.15 m	Max storage depth:	0.45 m
Depth of water at start:	0.15 m	75% full =	0.34 m
		25% full =	0.11 m

[illegible]

**BRE365 Soakage Test Results****Site** Station Road, Ashwell, Hertfordshire, SG7 5QF**Client** Beck Homes**Engineer** Lauren Highland**Job Number**
J25249**Sheet**
2 / 2

Date of test: 15/10/2025

Trial Pit No: TP7

Test No: 2

Water depth at start: 0.15 m

Width: 0.70 m

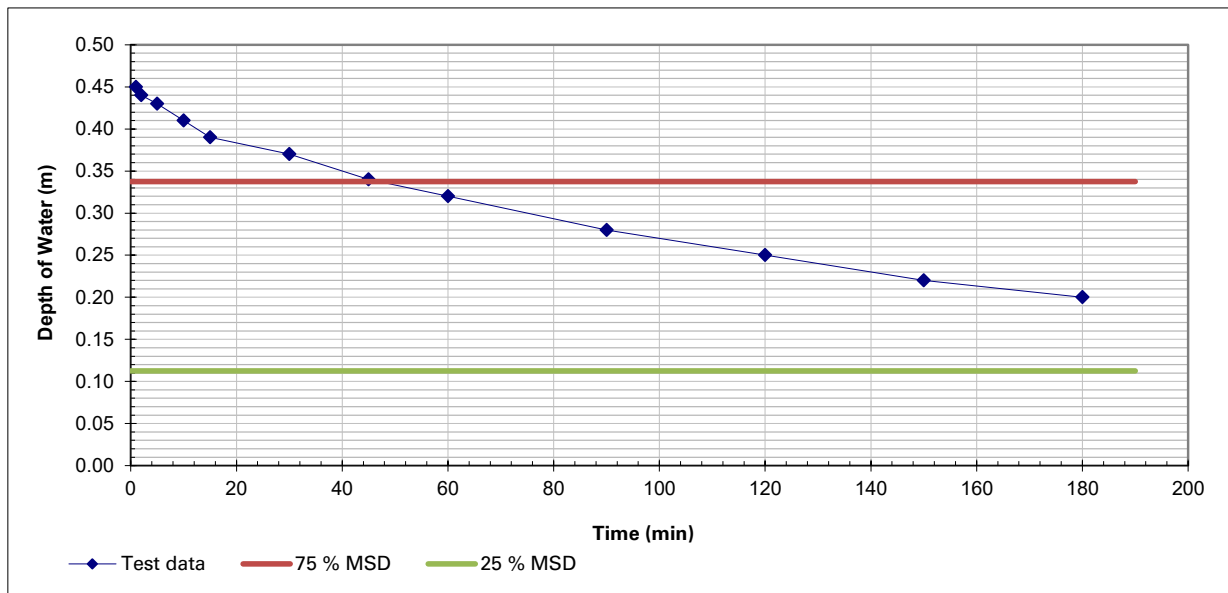
Length: 1.10 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m

Time at which MSD occurred (t_{p100}):Time at which MSD 75% was reached (t_{p75}):Time at which MSD 25% was reached (t_{p25}):

0	Minutes
45	Minutes after t_{p100}
N/A	Minutes after t_{p100}

Soil infiltration rate (f):**m/s**
m/day



Job Number
J25249

Engineer Beck Homes

Sheet
1 / 2

Date of test:	16/10/2025	Pit Width:	0.70 m
Trial Pit No:	TP7	Pit Length:	1.10 m
Test No:	3	Pit Depth:	0.60 m
Depth to water at start:	0.15 m	Max storage depth:	0.45 m
Depth of water at start:	0.15 m	75% full =	0.34 m
		25% full =	0.11 m

[illegible]



Site Station Road, Ashwell, Hertfordshire, SG7 5QF

Client Beck Homes

Engineer Lauren Highland

Job Number
J25249

Sheet
2 / 2

Date of test: 16/10/2025

Trial Pit No: TP7

Test No: 3

Water depth at start: 0.15 m

Width: 0.70 m

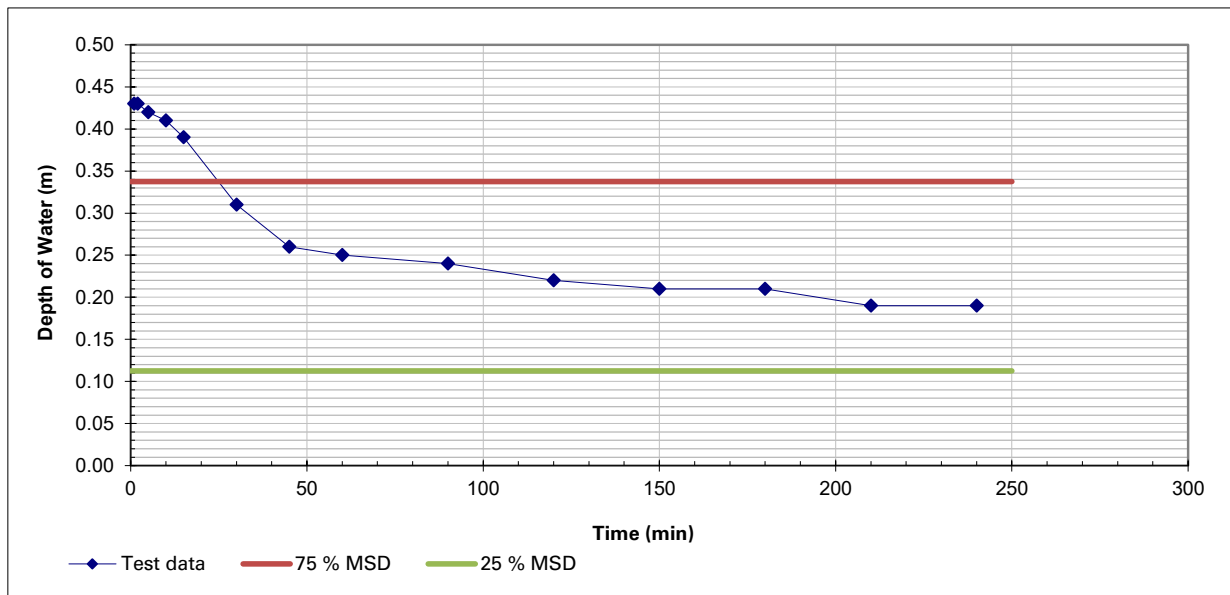
Length: 1.10 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m



Time at which MSD occurred (t_{p100}):

Time at which MSD 75% was reached (t_{p75}):

Time at which MSD 25% was reached (t_{p25}):

0	Minutes
25	Minutes after t_{p100}
N/A	Minutes after t_{p100}

Soil infiltration rate (f):

m/s
m/day



Job Number
J25249

Engineer Beck Homes

Sheet
1 / 2

Date of test:	17/10/2025	Pit Width:	0.70 m
Trial Pit No:	TP7	Pit Length:	1.10 m
Test No:	4	Pit Depth:	0.60 m
Depth to water at start:	0.15 m	Max storage depth:	0.45 m
Depth of water at start:	0.15 m	75% full =	0.34 m
		25% full =	0.11 m

[illegible]



BRE365 Soakage Test Results

Site Station Road, Ashwell, Hertfordshire, SG7 5QF

Client Beck Homes

Engineer Lauren Highland

Job Number
J25249

Sheet
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Date of test: 17/10/2025

Trial Pit No: TP7

Test No: 4

Water depth at start: 0.15 m

Width: 0.70 m

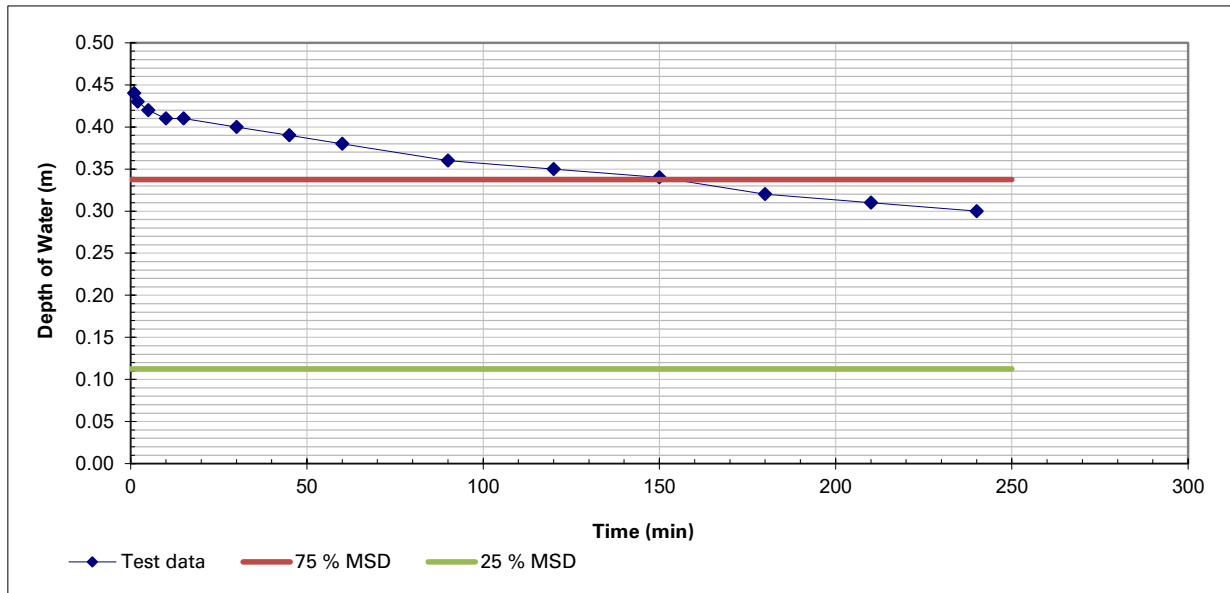
Length: 1.10 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m



Time at which MSD occurred (t_{p100}):

Time at which MSD 75% was reached (t_{p75}):

Time at which MSD 25% was reached (t_{p25}):

0	Minutes
150	Minutes after t_{p100}
	Minutes after t_{p100}

Soil infiltration rate (f):

m/s
m/day



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Depth of water at start: 0.15 m

25% full = 0.11 m

[illegible]

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Date of test: 15/10/2025

Trial Pit No: TP8

Test No: 1

Water depth at start: 0.15 m

Width: 0.70 m

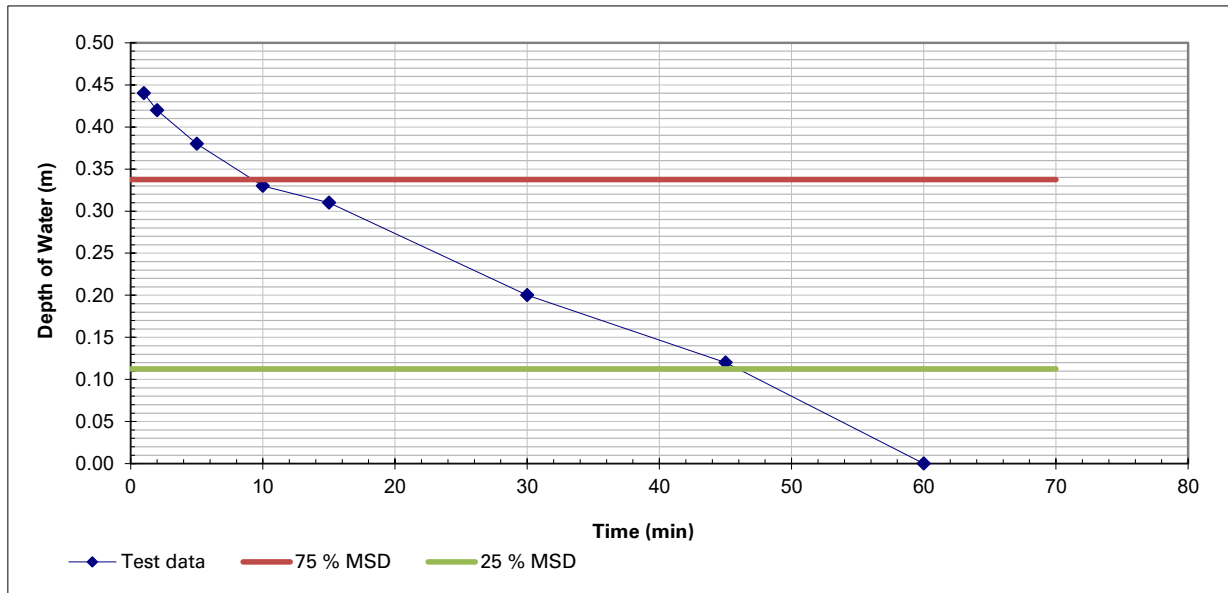
Length: 1.10 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m

Time at which MSD occurred (t_{p100}):Time at which MSD 75% was reached (t_{p75}):Time at which MSD 25% was reached (t_{p25}):

0	Minutes
10	Minutes after t_{p100}
45	Minutes after t_{p100}

Soil infiltration rate (f):**5.22E-05 m/s****4.51 m/day**



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Date of test:	15/10/2025	Pit Width:	0.70 m
Trial Pit No:	TP8	Pit Length:	1.10 m
Test No:	2	Pit Depth:	0.60 m
Depth to water at start:	0.15 m	Max storage depth:	0.45 m
Depth of water at start:	0.15 m	75% full =	0.34 m
		25% full =	0.11 m

[illegible]

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Date of test: 15/10/2025

Trial Pit No: TP8

Test No: 2

Water depth at start: 0.15 m

Width: 0.70 m

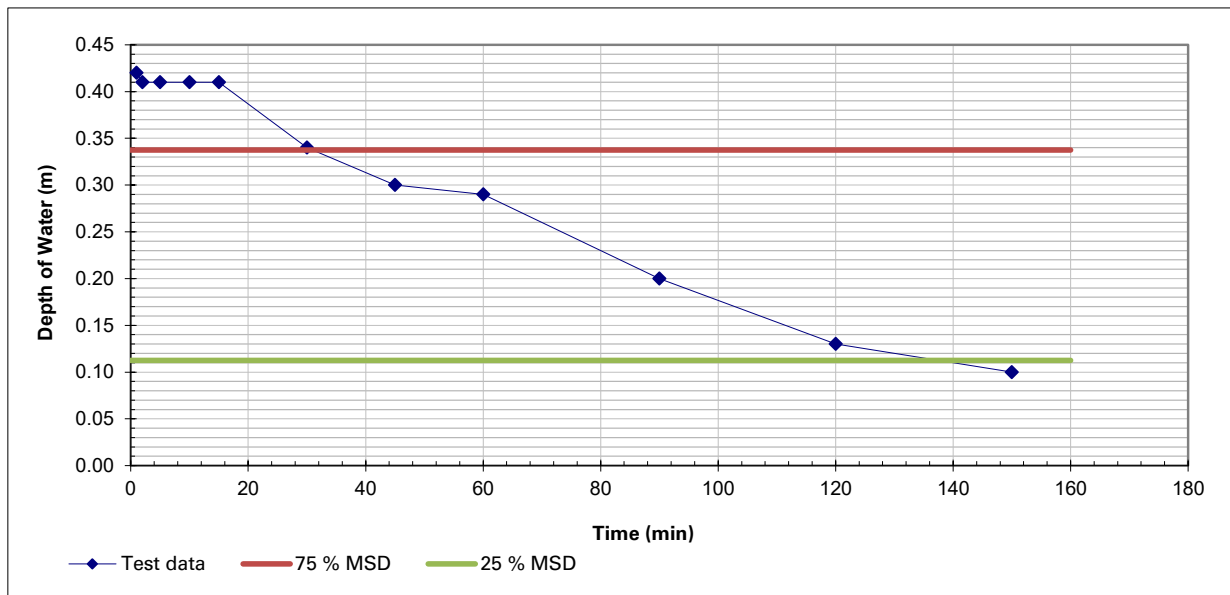
Length: 1.10 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m

Time at which MSD occurred (t_{p100}):Time at which MSD 75% was reached (t_{p75}):Time at which MSD 25% was reached (t_{p25}):

0	Minutes
30	Minutes after t_{p100}
150	Minutes after t_{p100}

Soil infiltration rate (f):**1.52E-05 m/s****1.32 m/day**



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Date of test:	16/10/2025	Pit Width:	0.70 m
Trial Pit No:	TP8	Pit Length:	1.10 m
Test No:	3	Pit Depth:	0.60 m
Depth to water at start:	0.15 m	Max storage depth:	0.45 m
Depth of water at start:	0.15 m	75% full =	0.34 m
		25% full =	0.11 m

[illegible]

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Date of test: 16/10/2025

Trial Pit No: TP8

Test No: 3

Water depth at start: 0.15 m

Width: 0.70 m

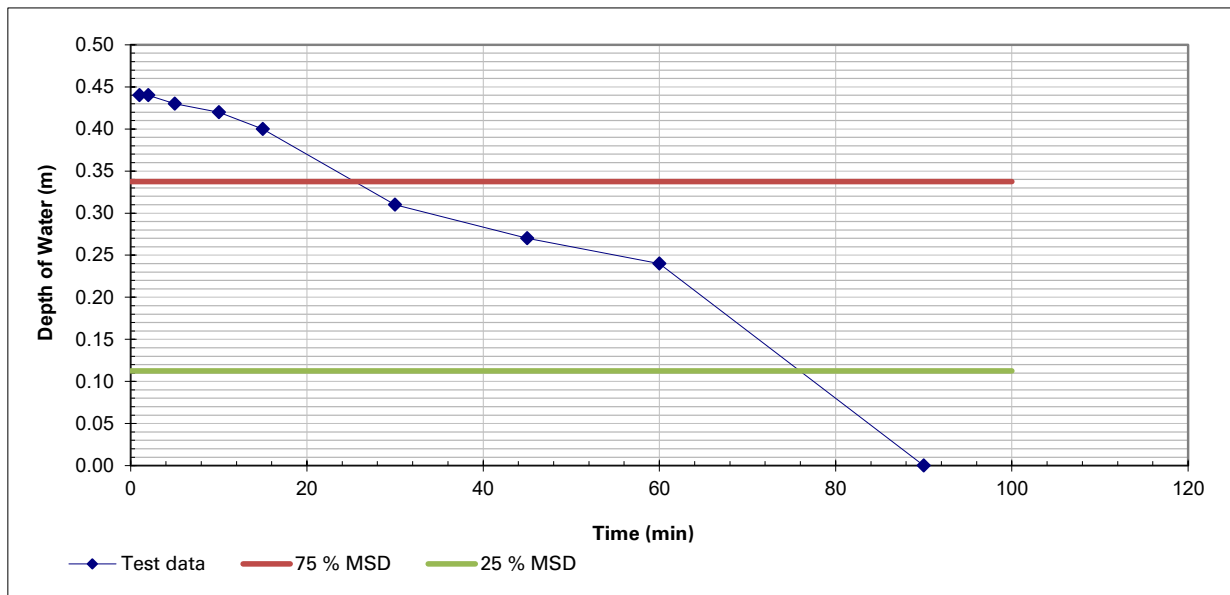
Length: 1.10 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m

Time at which MSD occurred (t_{p100}):Time at which MSD 75% was reached (t_{p75}):Time at which MSD 25% was reached (t_{p25}):

0	Minutes
25	Minutes after t_{p100}
75	Minutes after t_{p100}

Soil infiltration rate (f):**3.66E-05 m/s****3.16 m/day**



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Date of test:	16/10/2025	Pit Width:	0.70 m
Trial Pit No:	TP8	Pit Length:	1.10 m
Test No:	4	Pit Depth:	0.60 m
Depth to water at start:	0.15 m	Max storage depth:	0.45 m
Depth of water at start:	0.15 m	75% full =	0.34 m
		25% full =	0.11 m

[illegible]

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Date of test: 16/10/2025

Trial Pit No: TP8

Test No: 4

Water depth at start: 0.15 m

Width: 0.70 m

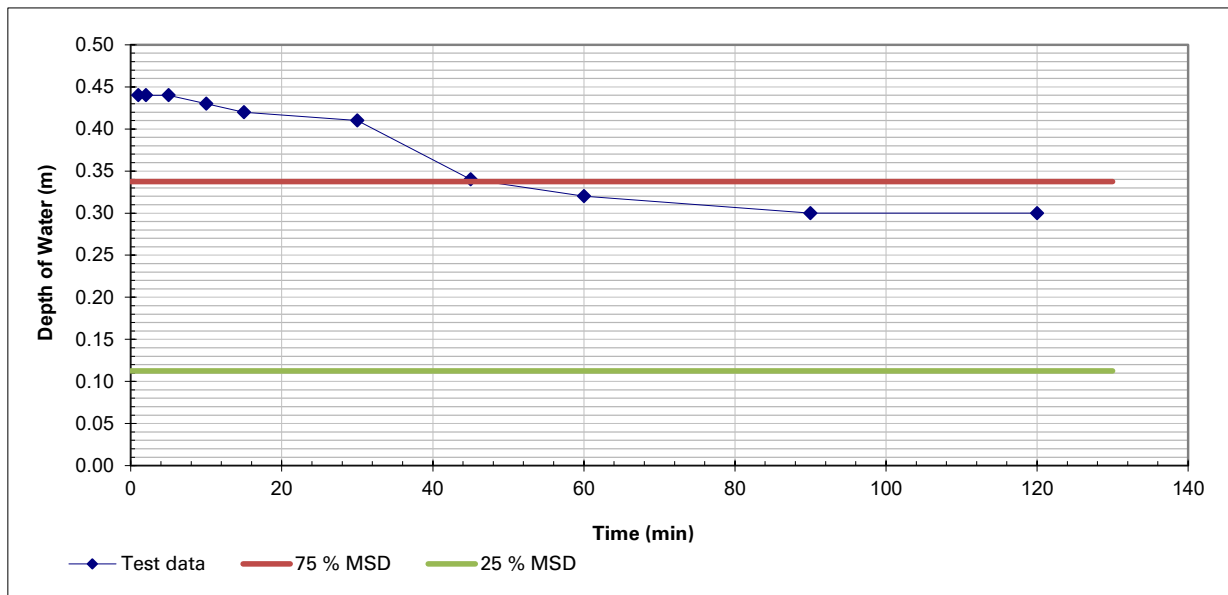
Length: 1.10 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m

Time at which MSD occurred (t_{p100}):Time at which MSD 75% was reached (t_{p75}):Time at which MSD 25% was reached (t_{p25}):

0 Minutes

45 Minutes after t_{p100} Minutes after t_{p100} **Soil infiltration rate (f):****m/s****m/day**



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Date of test:	17/10/2025	Pit Width:	0.70 m
Trial Pit No:	TP8	Pit Length:	1.10 m
Test No:	5	Pit Depth:	0.60 m
Depth to water at start:	0.15 m	Max storage depth:	0.45 m
Depth of water at start:	0.15 m	75% full =	0.34 m
		25% full =	0.11 m

[illegible]

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Date of test: 17/10/2025

Trial Pit No: TP8

Test No: 5

Water depth at start: 0.15 m

Width: 0.70 m

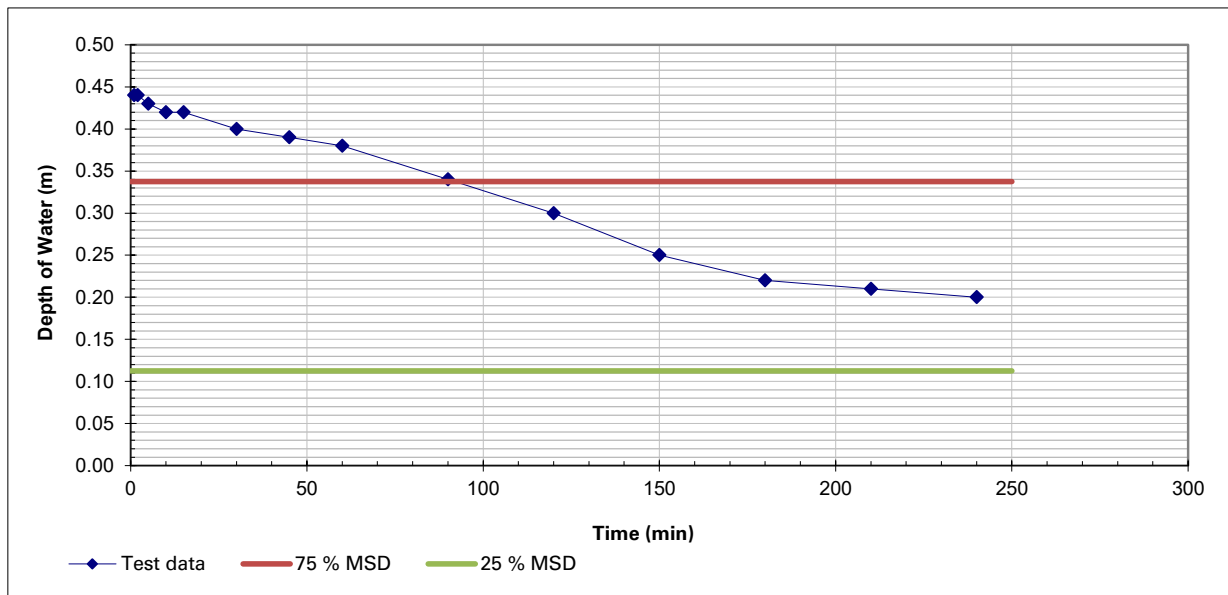
Length: 1.10 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m

Time at which MSD occurred (t_{p100}):Time at which MSD 75% was reached (t_{p75}):Time at which MSD 25% was reached (t_{p25}):

0 Minutes

90 Minutes after t_{p100} Minutes after t_{p100} **Soil infiltration rate (f):****m/s****m/day**



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Depth of water at start: 0.15 m

25% full = 0.11 m

[illegible]

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Date of test: 15/10/2025

Trial Pit No: TP9

Test No: 1

Water depth at start: 0.15 m

Width: 0.60 m

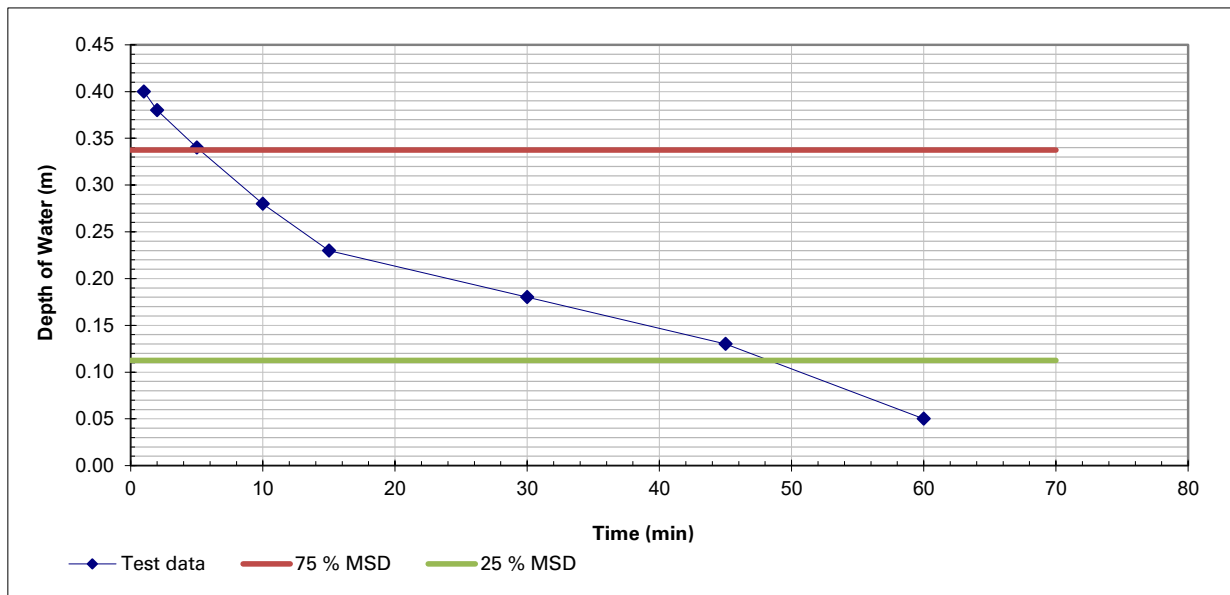
Length: 1.00 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m

Time at which MSD occurred (t_{p100}):Time at which MSD 75% was reached (t_{p75}):Time at which MSD 25% was reached (t_{p25}):

0	Minutes
5	Minutes after t_{p100}
45	Minutes after t_{p100}

Soil infiltration rate (f):**4.26E-05 m/s****3.68 m/day**



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Date of test:	15/10/2025	Pit Width:	0.60 m
Trial Pit No:	TP9	Pit Length:	1.00 m
Test No:	2	Pit Depth:	0.60 m
Depth to water at start:	0.15 m	Max storage depth:	0.45 m
Depth of water at start:	0.15 m	75% full =	0.34 m
		25% full =	0.11 m

[illegible]



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Date of test: 15/10/2025

Trial Pit No: TP9

Test No: 2

Water depth at start: 0.15 m

Width: 0.60 m

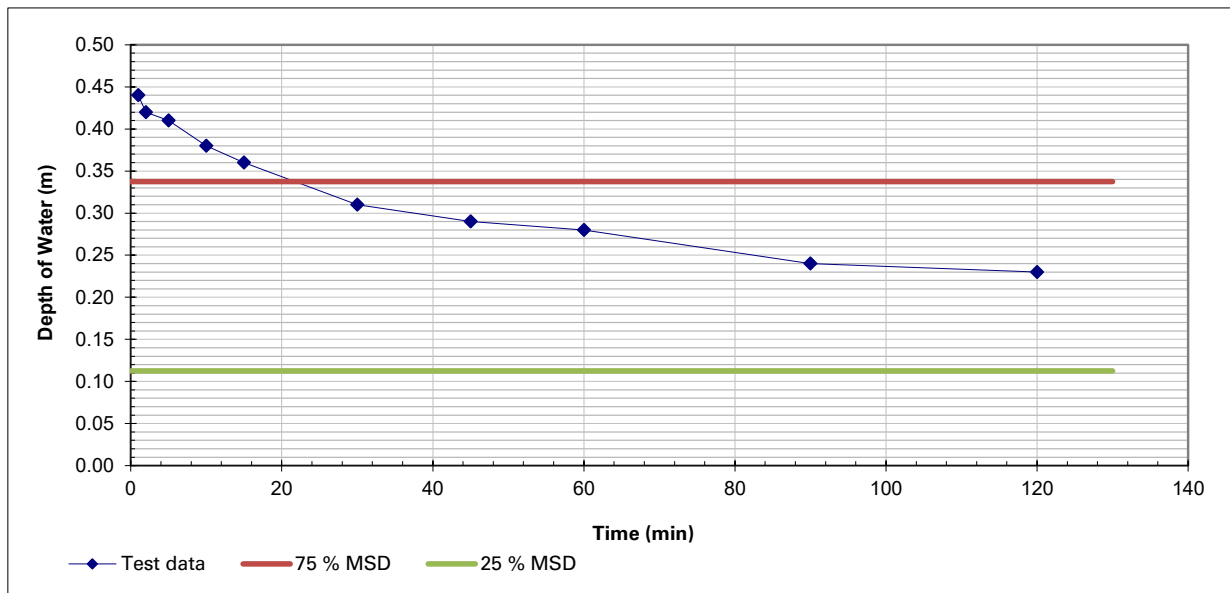
Length: 1.00 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m



Time at which MSD occurred (t_{p100}):

Time at which MSD 75% was reached (t_{p75}):

Time at which MSD 25% was reached (t_{p25}):

0	Minutes
15	Minutes after t_{p100}
	Minutes after t_{p100}

Soil infiltration rate (f):

m/s
m/day



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Depth of water at start: 0.15 m

25% full = 0.11 m

[illegible]

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Date of test: 16/10/2025

Trial Pit No: TP9

Test No: 3

Water depth at start: 0.15 m

Width: 0.60 m

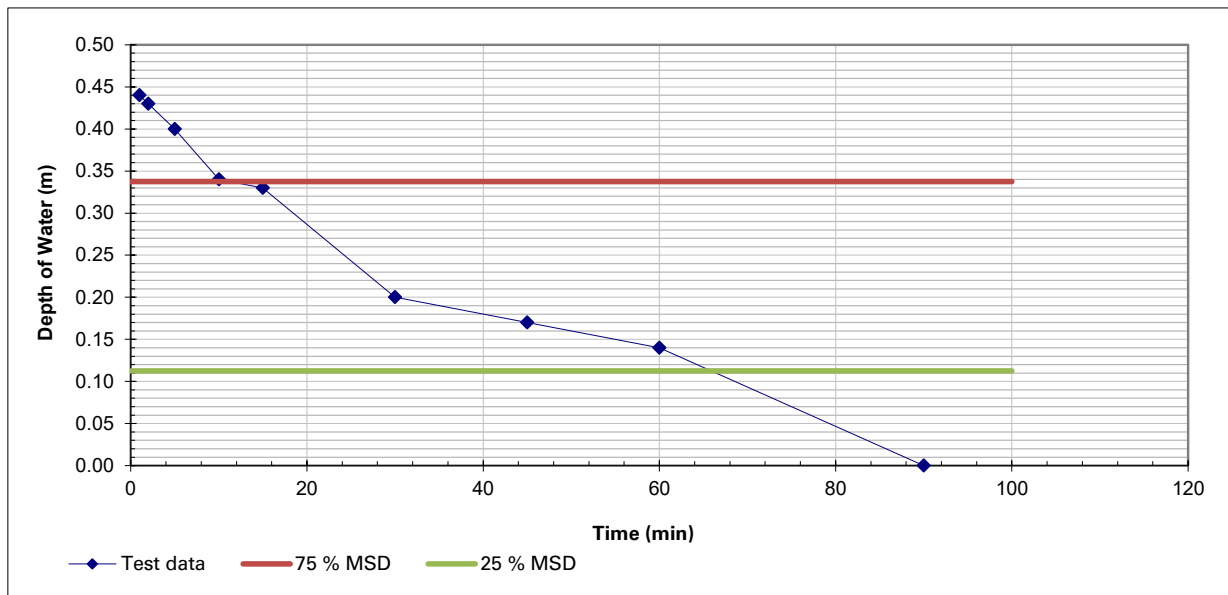
Length: 1.00 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m

Time at which MSD occurred (t_{p100}):Time at which MSD 75% was reached (t_{p75}):Time at which MSD 25% was reached (t_{p25}):

0	Minutes
10	Minutes after t_{p100}
65	Minutes after t_{p100}

Soil infiltration rate (f):**3.10E-05 m/s****2.68 m/day**



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Date of test:	16/10/2025	Pit Width:	0.60 m
Trial Pit No:	TP9	Pit Length:	1.00 m
Test No:	4	Pit Depth:	0.60 m
Depth to water at start:	0.15 m	Max storage depth:	0.45 m
Depth of water at start:	0.15 m	75% full =	0.34 m
		25% full =	0.11 m

[illegible]



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Date of test: 16/10/2025

Trial Pit No: TP9

Test No: 4

Water depth at start: 0.15 m

Width: 0.60 m

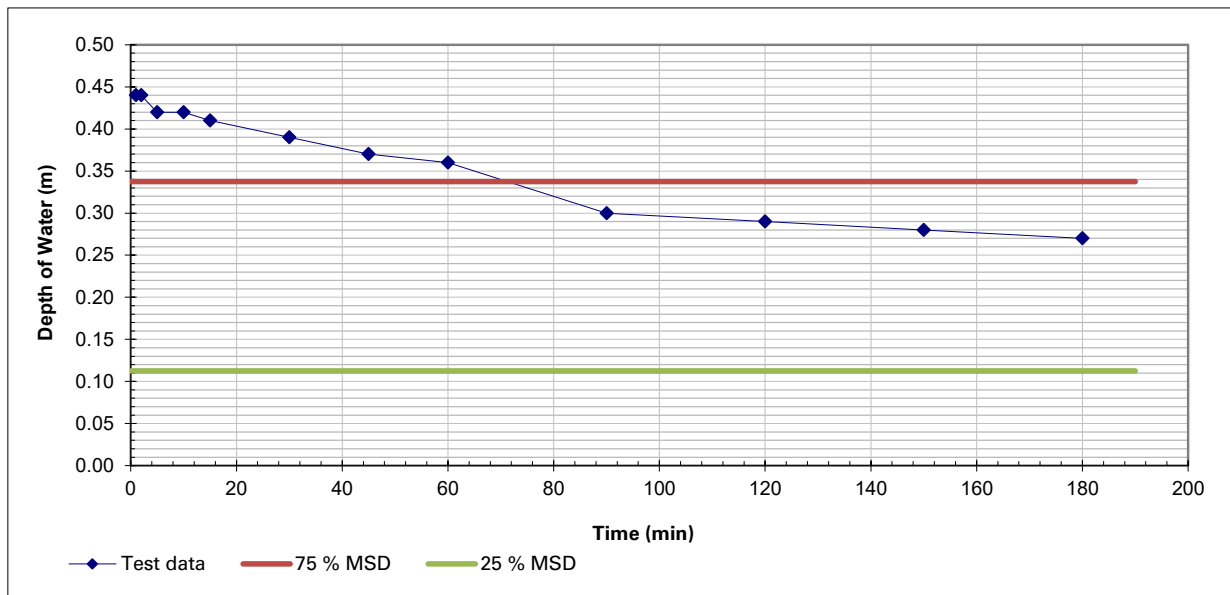
Length: 1.00 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m



Time at which MSD occurred (t_{p100}):

Time at which MSD 75% was reached (t_{p75}):

Time at which MSD 25% was reached (t_{p25}):

0	Minutes
70	Minutes after t_{p100}
	Minutes after t_{p100}

Soil infiltration rate (f):

m/s
m/day



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Date of test:	17/10/2025	Pit Width:	0.60 m
Trial Pit No:	TP9	Pit Length:	1.00 m
Test No:	5	Pit Depth:	0.60 m
Depth to water at start:	0.15 m	Max storage depth:	0.45 m
Depth of water at start:	0.15 m	75% full =	0.34 m
		25% full =	0.11 m

[illegible]

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Date of test: 17/10/2025

Trial Pit No: TP9

Test No: 5

Water depth at start: 0.15 m

Width: 0.60 m

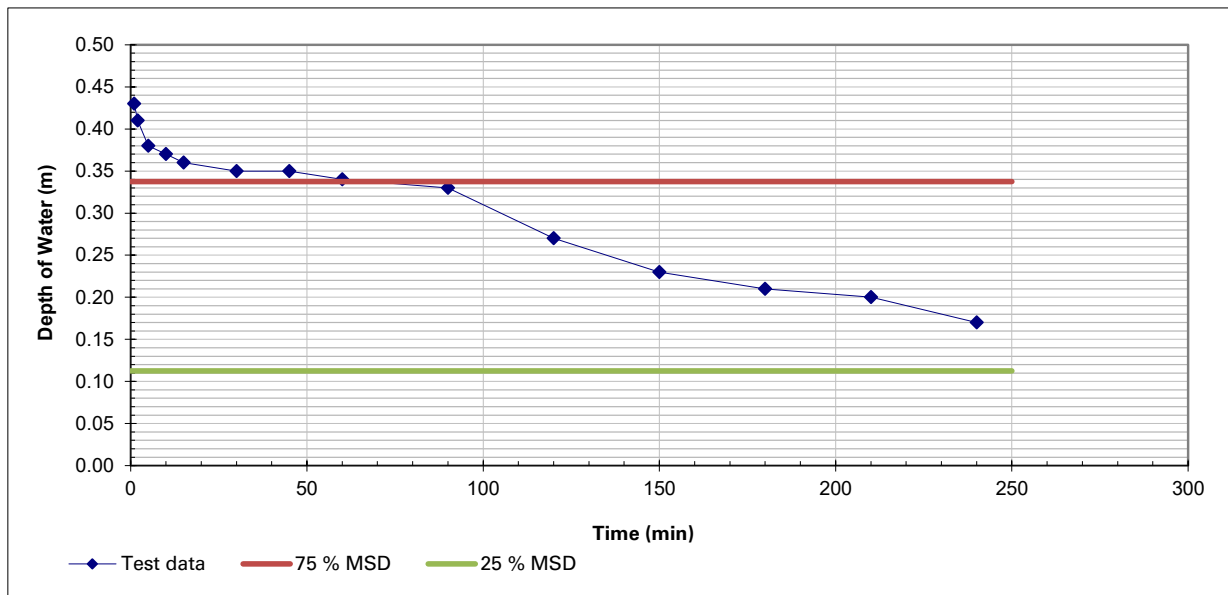
Length: 1.00 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m

Time at which MSD occurred (t_{p100}):Time at which MSD 75% was reached (t_{p75}):Time at which MSD 25% was reached (t_{p25}):

0 Minutes

60 Minutes after t_{p100} Minutes after t_{p100} **Soil infiltration rate (f):****m/s****m/day**



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Date of test:	15/10/2025	Pit Width:	0.60 m
Trial Pit No:	TP10	Pit Length:	1.10 m
Test No:	1	Pit Depth:	0.60 m
Depth to water at start:	0.15 m	Max storage depth:	0.45 m
Depth of water at start:	0.15 m	75% full =	0.34 m
		25% full =	0.11 m

[illegible]

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Date of test: 15/10/2025

Trial Pit No: TP10

Test No: 1

Water depth at start: 0.15 m

Width: 0.60 m

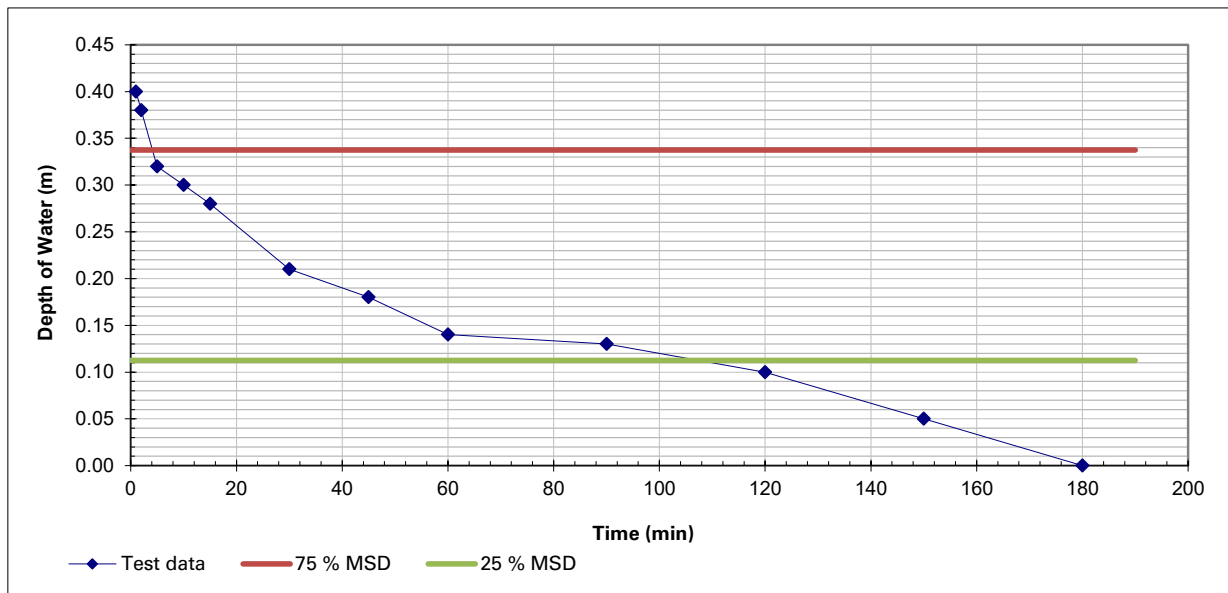
Length: 1.10 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m

Time at which MSD occurred (t_{p100}):Time at which MSD 75% was reached (t_{p75}):Time at which MSD 25% was reached (t_{p25}):

0	Minutes
5	Minutes after t_{p100}
120	Minutes after t_{p100}

Soil infiltration rate (f):**1.51E-05 m/s****1.30 m/day**



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Date of test:	15/10/2025	Pit Width:	0.60 m
Trial Pit No:	TP10	Pit Length:	1.10 m
Test No:	2	Pit Depth:	0.60 m
Depth to water at start:	0.15 m	Max storage depth:	0.45 m
Depth of water at start:	0.15 m	75% full =	0.34 m
		25% full =	0.11 m

[illegible]

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Date of test: 15/10/2025

Trial Pit No: TP10

Test No: 2

Water depth at start: 0.15 m

Width: 0.60 m

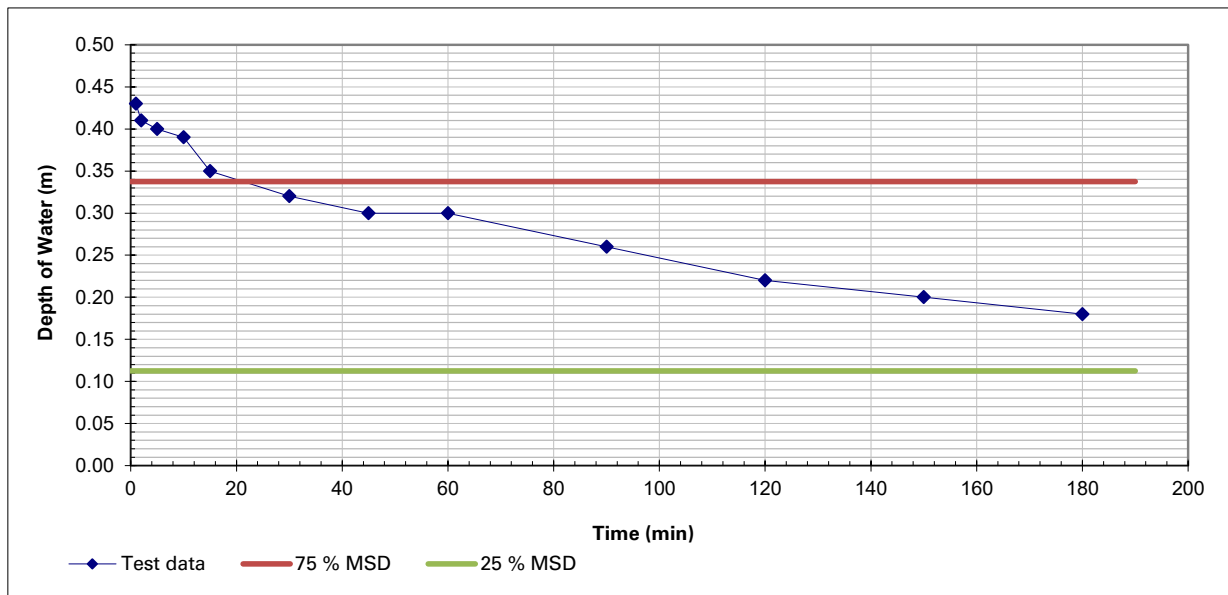
Length: 1.10 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m

Time at which MSD occurred (t_{p100}):Time at which MSD 75% was reached (t_{p75}):Time at which MSD 25% was reached (t_{p25}):

0 Minutes

15 Minutes after t_{p100} Minutes after t_{p100} **Soil infiltration rate (f):****m/s****m/day**

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Client	Beck Homes
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Date of test:	16/10/2025	Pit Width:	0.60 m
Trial Pit No:	TP10	Pit Length:	1.10 m
Test No:	3	Pit Depth:	0.60 m
Depth to water at start:	0.15 m	Max storage depth:	0.45 m
Depth of water at start:	0.15 m	75% full =	0.34 m
		25% full =	0.11 m

[illegible]

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Date of test: 16/10/2025

Trial Pit No: TP10

Test No: 3

Water depth at start: 0.15 m

Width: 0.60 m

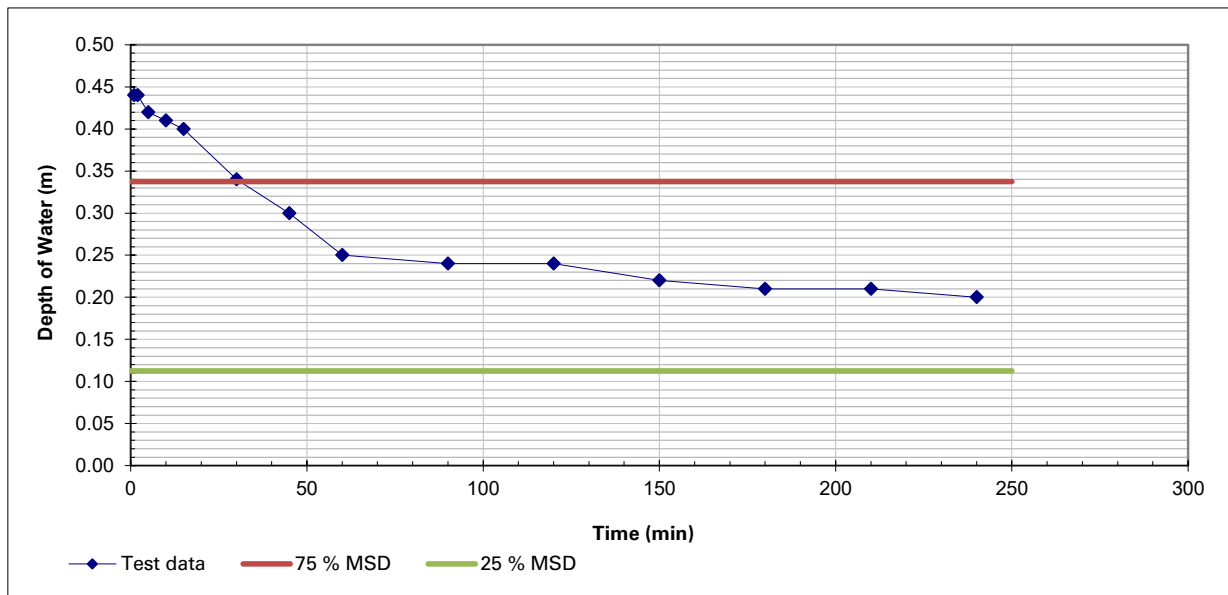
Length: 1.10 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m

Time at which MSD occurred (t_{p100}):Time at which MSD 75% was reached (t_{p75}):Time at which MSD 25% was reached (t_{p25}):

0 Minutes

30 Minutes after t_{p100} Minutes after t_{p100} **Soil infiltration rate (f):****m/s****m/day**



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Date of test:	17/10/2025	Pit Width:	0.60 m
Trial Pit No:	TP10	Pit Length:	1.10 m
Test No:	4	Pit Depth:	0.60 m
Depth to water at start:	0.15 m	Max storage depth:	0.45 m
Depth of water at start:	0.15 m	75% full =	0.34 m
		25% full =	0.11 m

[illegible]

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Date of test: 17/10/2025

Trial Pit No: TP10

Test No: 4

Water depth at start: 0.15 m

Width: 0.60 m

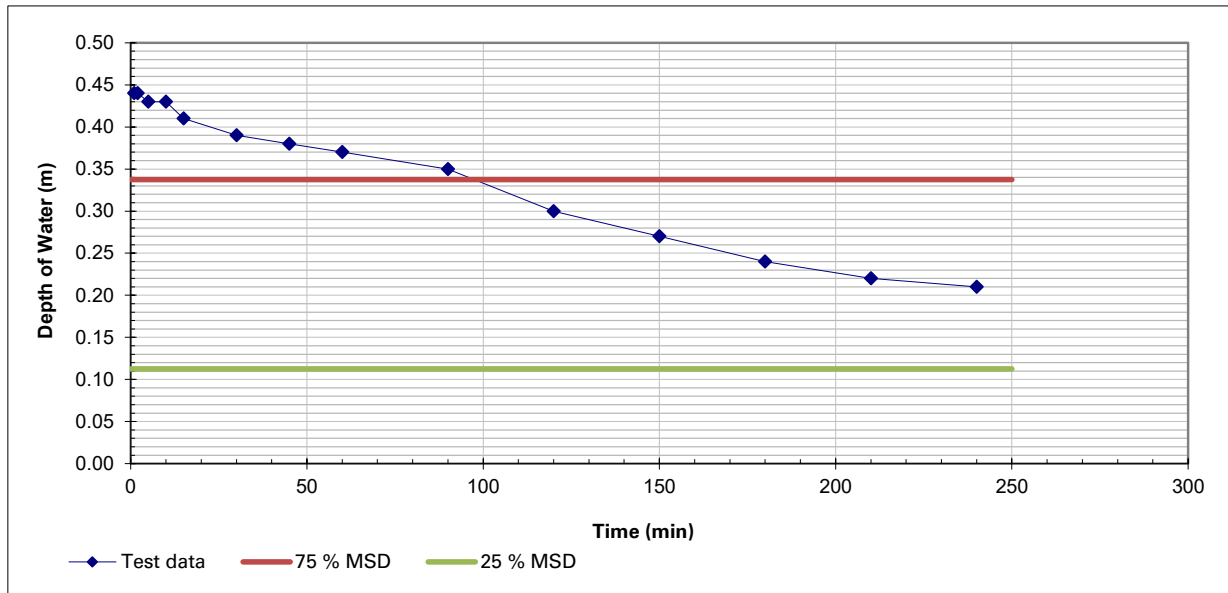
Length: 1.10 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m

Time at which MSD occurred (t_{p100}):Time at which MSD 75% was reached (t_{p75}):Time at which MSD 25% was reached (t_{p25}):

0 Minutes

15 Minutes after t_{p100} Minutes after t_{p100} **Soil infiltration rate (f):****m/s****m/day**



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Date of test:	15/10/2025	Pit Width:	0.60 m
Trial Pit No:	TP11	Pit Length:	1.10 m
Test No:	1	Pit Depth:	0.60 m
Depth to water at start:	0.15 m	Max storage depth:	0.45 m
Depth of water at start:	0.15 m	75% full =	0.34 m
		25% full =	0.11 m

[illegible]



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Date of test: 15/10/2025

Trial Pit No: TP11

Test No: 1

Water depth at start: 0.15 m

Width: 0.60 m

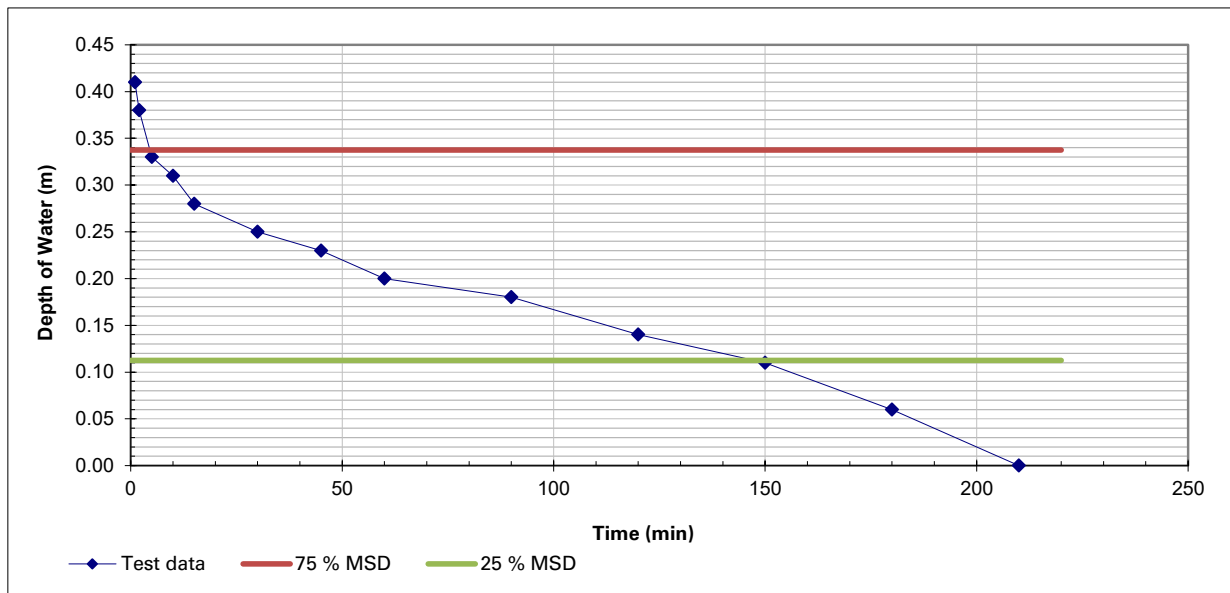
Length: 1.10 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m



Time at which MSD occurred (t_{p100}):

Time at which MSD 75% was reached (t_{p75}):

Time at which MSD 25% was reached (t_{p25}):

0	Minutes
5	Minutes after t_{p100}
150	Minutes after t_{p100}

Soil infiltration rate (f):

1.20E-05 m/s

1.03 m/day



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Date of test:	16/10/2025	Pit Width:	0.60 m
Trial Pit No:	TP11	Pit Length:	1.10 m
Test No:	2	Pit Depth:	0.60 m
Depth to water at start:	0.15 m	Max storage depth:	0.45 m
Depth of water at start:	0.15 m	75% full =	0.34 m
		25% full =	0.11 m

[illegible]



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Date of test: 16/10/2025

Trial Pit No: TP11

Test No: 2

Water depth at start: 0.15 m

Width: 0.60 m

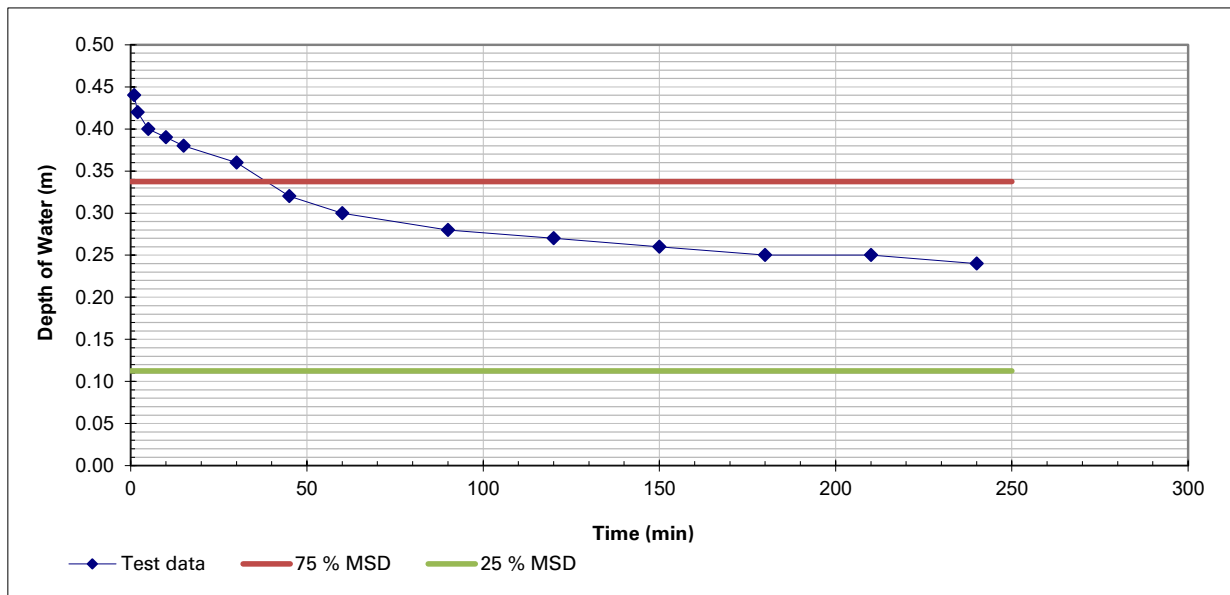
Length: 1.10 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m



Time at which MSD occurred (t_{p100}):

Time at which MSD 75% was reached (t_{p75}):

Time at which MSD 25% was reached (t_{p25}):

0	Minutes
45	Minutes after t_{p100}
	Minutes after t_{p100}

Soil infiltration rate (f):

m/s
m/day

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Date of test: 17/10/2025

Trial Pit No: TP11

Test No: 3

Water depth at start: 0.15 m

Width: 0.60 m

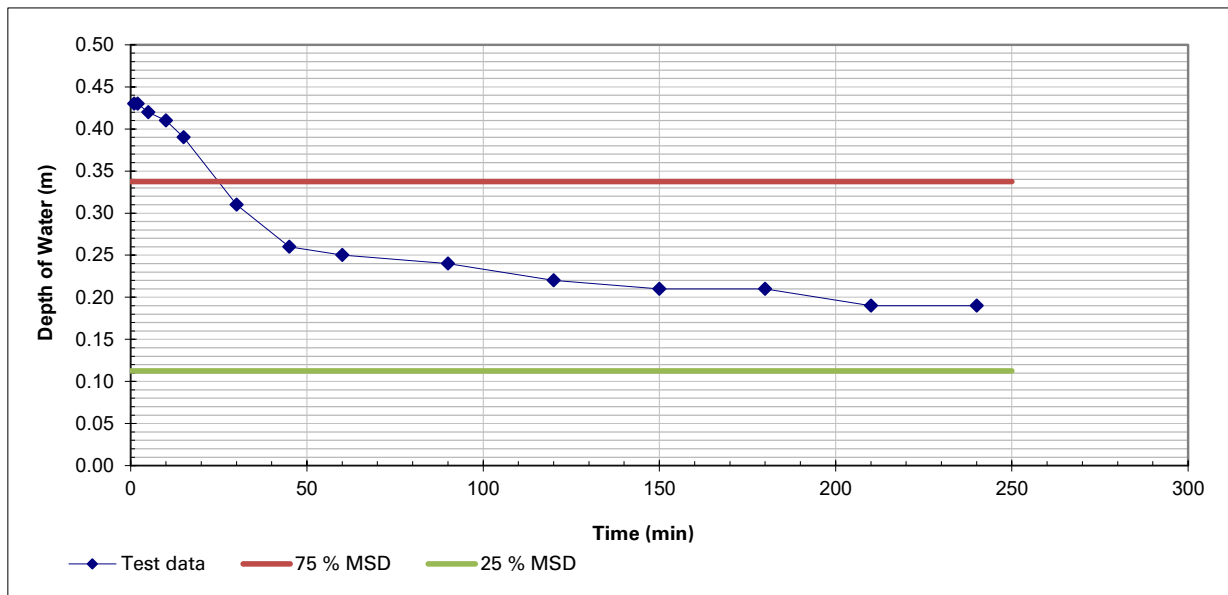
Length: 1.10 m

Depth: 0.60 m

Max storage depth (MSD): 0.45 m

75% full = 0.34 m

25% full = 0.11 m

Time at which MSD occurred (t_{p100}):Time at which MSD 75% was reached (t_{p75}):Time at which MSD 25% was reached (t_{p25}):

0 Minutes

25 Minutes after t_{p100} Minutes after t_{p100} **Soil infiltration rate (f):****m/s****m/day**