

TORSION HINCKLEY

DRAINAGE STRATEGY AND CALCULATIONS



CLIENT:	Torsion Care
ARCHITECT:	G4 Architects
SITE ADDRESS:	Coventry Road, Hinckley, LE10 0JR
REFERENCE (REV):	25202-DCE-XX-XX-T-C-001-P06
DATE:	10/07/2026

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REVISION	DATE	AUTHOR	CHECKER	COMMENTS
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P02	13/02/2026	Oliver Bastain	Seb Reid	Drainage Strategy Revised
P03	12/03/2026	Oliver Bastain	Seb Reid	Attenuation Updated
P04	30/04/2026	Oliver Bastain	Seb Reid	Drainage Strategy Revised
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EXISTING SITE

The existing site is a brownfield site which housed a former leisure centre which has since been demolished and the site remediated. The site has approval under planning applications 18/01237/FUL for a care home, apartment block and several privately owned dwellings. The subject of this drainage strategy is the care home which is approved under planning application 25/00354/FUL. The remainder of the site is to be covered in other drainage designs.

Under this planning application, the site is bound to discharge planning conditions 23 to 25 which require the surface water drainage scheme to be approved the LLFA with ongoing maintenance and temporary surface water management, prior to any development occurring on site. This document is written to discharge these conditions, and to also meet the client and BREEAM requirements.

Confirmation from the LLFA has been established that under the 18/01237/FUL Planning Permission, Condition discharge of condition 17 regarding drainage was achieved by the previous design team, Millward Consulting Engineers. Their approved drainage drawing is MA11495-200 Rev C, and this is included in the appendices to this document. The previous consultant also produced a Flood Risk Assessment for the development MA12204-FRA-R01, and this document is relied upon to inform the flood risk issues on the site.

Under this permission, the site has permission to discharge surface water at a rate of 50% better than the existing runoff rate.

The remediated site has a reasonable fall from the northwest to the southeast from 117m AOD to 111.5m AOD.

The existing site has existing flowing and operational drainage connections. There is an existing surface water sewer to the west within Marchant Road. There is a smaller surface water drain located on the eastern site boundary with three manholes within the site boundary, all linked and proved by CCTV survey. This 150mm drain has an unknown discharge point and is currently dry.

There is an existing combined drain which carried foul from the leisure centre and this runs along the western boundary with Marchant Road, along the southern boundary and connects to an existing manhole at the far southern boundary of the site, which is the approved drainage connection to the Severn Trent Water sewer.

The existing site, as agreed in the 18/01237/FUL application, is 100% impermeable and has an area of 9,190m². Assuming 50mm rainfall and 140l/s/ha, the existing runoff from the site is 130l/s. This needs to be reduced by a minimum of 50% to 64.8l/s. The care home is a small parcel within this development and 25.3l/s is the agreed upon discharge rate.

PROPOSED DEVELOPMENT

The proposals are shown on plan 260120 G40003 A003 Proposed Site Ground Floor Plan REV M, which is appended to this document.

The proposed development is for a new 72-bedroom, three-storey care home with associated car parking and landscaping and access road.

The total site area is 4,725m² of which 2,468m² is impermeable (52% impermeable) and the remaining is permeable falling away from the proposed building and towards trees and landscaped areas.

SURFACE WATER DRAINAGE STRATEGY

DESIGN STANDARDS

Drainage systems on this site have been designed in accordance with the following standards as required:

- CIRIA C753 – The SuDS Manual (2015)
- British Standard 8582:2013 – Code of Practice for Surface Water Management for Development Sites
- British Standard 752:2017 – Drain and Sewer Systems Outside Building – Sewer System Management
- British Standard 8533:2017 - Assessing and managing flood risk in development - code of practice.
- Building Regulations Part H
- Sewerage Sector Guidance – Codes for Adoption
- National Standards for Sustainable Drainage Systems – July 2025



SURFACE WATER DRAINAGE HEIRARCHY

Re-use of Surface Water In-Situ

While re-use of water on site has been considered, the use of rainwater harvesting has been discounted due to a limited use of the water within the scheme.

Irrigation is not being provided from the SW drainage system to the landscaped areas and it is expected that these areas will be watered from the mains or from informal rainwater harvesting which may be implemented at the operational phase.

The site is also a secure site and gardening facilities are not being offered to residents and there is no use for water by use of residents.

Reduction of Runoff

Green roofs are not proposed as the building roof is to be used for solar generation and other uses.

Due to the site having a raised plateau around 70% or more of the building, and access around the perimeter being constrained, additional measures such as SUDS planters on rainwater downpipes, are not proposed as there is limited scope for access and ongoing maintenance.

Infiltration

A full phase 1 and 2 SI has been undertaken and BRE365 soakaway tests undertaken at multiple locations by the contractor a summary of which is included at the rear of this document. Soakaway Tests were submitted to the planning authority as they were a pre-development condition, 26. This has been accepted.

The findings of the soakaway tests were summarised in 25202-260123 Torsion Hinckley Soakaway Testing Letter which is summarised below.

The trial pits were undertaken at the proposed base level of the new drainage systems. In all cases, the drainage systems will sit within firm clays which are topped with made ground. It is evident from the lack of the movement in the groundwater that these clays are not permeable and no change in water level was noted over a period of up to 24 hours. Following these observations, full BRE365 soakaway tests were not undertaken as from these observations the tests would have been unsuccessful in establishing an infiltration rate.

On this basis, infiltration is discounted as the principal method of water disposal on the site.

Watercourse

The site is remote from any existing watercourses.

Surface Water Sewer

The site has a surface water sewer on Marchant Road at an invert level of 114.64 reducing to 113.2mAOD. Unfortunately, this sewer is not accessible by the development due to third party land, and the size of the pipework is not sufficient for the site flows.

An existing 150mm surface water drain has been located on the eastern boundary of the site, however this is too shallow and in too poor a condition for a surface water drainage connection. It is understood that it connects to a 150mm drain within the highway, but this is not known at the time due to the poor condition of the pipe and manholes within the middle of the highway.

Combined Sewer

The approved planning condition and STW correspondence has the site utilising an existing 300mm combined sewer connection located at the southern boundary of the site. The outlet level is approximately 110.1mAOD and is deep enough to allow for attenuation at a suitable location.

Approval has been granted by STW 12/01/2022 (Ref No 1029907) for a 50% betterment of existing runoff to this sewer at manhole SP42933701 for the entire development. STW advise that, where possible, sites should seek to discharge at greenfield rates where possible (5l/s/ha).



RUNOFF DESTINATIONS AND SOURCE CONTROL

Existing Site Runoff Destination

The greenfield runoff rates have been calculated using the HR Wallingford UKSuds Greenfield Runoff Calculator, FEH 22 Rainfall data, and using the total site area.

The existing site falls towards the low spot of the site, which is the existing combined sewer chamber at the southern boundary of the site. As water does not pond in this area, it is reasonable to assume that this manhole allows limited drainage from the site into the sewer.

Table 1: Existing and Proposed Greenfield Runoff Rates

Scenario	Red Line Boundary	Existing Imp Area	Proposed Imp Area
	4,725m ²	3,600m ²	2,468m ²
Brownfield Runoff	66 l/s	50 l/s	35l/s
QBAR	1.9	1.4	1.0
1 in 1 year	1.6	1.2	0.8
1 in 2 year	1.7	1.3	0.9
1 in 30 year	3.8	2.9	2.0
1 in 100 year	4.9	3.7	2.5
1 in 200 year	5.8	4.4	3.0

Proposed Site Runoff Destination

The approval under planning app 18/01237/FUL is for a site which has an existing impermeable area of 9,190m², an existing runoff of 128.66l/s and a 50% betterment of this, 64.33l/s. 64.8l/s was the approved discharge rate for the entire site. Millward have approval for 25.3l/s discharge for an area of approximately 2,520m² impermeable area.

The care home development cannot be assessed in isolation and ensuring that the rest of the development can benefit from the discharge, an assessment has been undertaken of the proportional discharge of the care home against the rest of the development.

Table 2 - Whole Development Discharge Rate Split

Area	Ext Imp Area	Ext Discharge Rte	Prop Imp Area	Prop Rate	Betterment
HIGHWAY	400	5.6	400	5.60	0%
G4 APARTMENTS	1900	26.6	1000	13.30	50%
G4 HOUSES	1200	16.8	800	6.00	64%
HIGHWAY 2	470	6.58	470	6.50	1%
TORSION CARE HOME	4725	60.55	2473	24.00	60%
G4 AREA 2	400	5.6	400	5.60	0%
	8695	121.73	5515	61	50%

Allowing for minimum discharge rates for the rest of the site and taking into account the proposed impermeable area of the proposed care home development, it is appropriate for the Torsion Care development to have a proportional discharge rate of 12.5l/s. This figure is a result of a 5X factor being applied to the 1 in 100 year storm event after utilising the online UK Suds greenfield calculator.

A comparative assessment of the existing runoff rates for the development compared to the proposed is shown below. The existing rates are calculated using the modified rational method with a rainfall of 50mm/hr (140l/s/ha) and the proposed rates are taken from the Causeway Flow hydraulic modelling.



Table 3: Existing and Proposed Discharge Rates

Care Home				
Scenario	Greenfield Runoff Rate (l/s)	Existing Runoff Rate (l/s)	Proposed Discharge Rate (l/s)	Betterment (%) (Proposed vs Existing)
Contributing Area (m²)	4725 m ²	3600 m ²	2445 m ²	48%
1 in 1 year	1.6	25	13.6	46%
1 in 2 year	1.7		13.6	
1 in 30 year	3.8	50	23.7	53%
1 in 30 year + 35% cc			24	
1 in 100 year	5.8	64.25	24	63%
1 in 100 year + 40% cc			24	
1 in 100 year + 50% cc			24	

In general, the site achieves a 50% betterment from the existing situation in all scenarios within a nominal tolerance and is therefore in compliance with the STW requirements

PEAK FLOW CONTROL FROM SITE

In accordance with national standards, as the site is brownfield and currently developed, a “Relaxation factor” under Standard 3.21 is applicable. This allows the site to discharge at a restricted rate of up to 5 times the greenfield runoff rate to the target 50% AEP (1 in 2) and 1% AEP (1:100) events. To achieve the required BREEAM level for the care development, the rate needs to be reduced to meet the national standards.

For simplicity's sake, only the 1:100 rate is considered as the site will have a single flow control unit. The proposed discharge rate is 12.5l/s.

Surface water around the building is directed away from the thresholds towards the car park, patios and landscaped areas. Water is collected in gullies and drainage channels before being conveyed into a surface water drainage system.

Due to existing tree root protection areas and the made ground within the site there is limited opportunity for excavations to take place for the construction of water retaining SUDS features of a larger magnitude within the site boundary.

The car park is to be used for construction traffic and is not suitable for permeable paving. The attenuation tank and flow control are to be located at the existing and proposed low spot of the site at the southern boundary.

While the site uses flat roofs, the roof space is used for plant decks, solar panels and is to be man-accessible, and green roofs are not proposed.

The flow controls for the site is a vortex unit with a minimum orifice size above 90mm to minimise the risk of blockages. Further blockage protection is provided within the site with both developments using vortex separators or treatment bypass separators to remove and filter out blockage risks and to manage sedimentation.

The development uses geocellular attenuation tanks designed to accommodate the 1:100 + 50% CC storm event and these are designed outside of areas where HGV and construction traffic are expected to operate.

The hydraulic calculations show that there is no surcharging of the surface water system in the 1 in 2 year event, and no surface water flooding in the 1 in 30, 1 in 30 + 35% climate change, 1 in 100, and the 1 in 100 year + 50% climate change storm events, in line with local and national policies.

The climate change allowances that have been used are the Tame Anker and Mease Management Catchment peak upper end peak rainfall allowances for the 2070s epoch, in line with the Flood Risk and Coastal Change planning practice guidance.



WATER QUALITY AND POLLUTION CONTROL

The site has been assessed for pollution risk in accordance with Table 26.2 of the CIRIA SuDS Manual 2015 using the Simple Index Approach. It is split into the following areas according to their level of risk:

- Residential Roof (Very Low Risk)
- Car Park (Low Risk) (Care Home)

Table 4 - Simple Index Approach Assessments

Residential Roof (Very Low Risk)				
Proposed Pollution Risk				
	Hazard Level	TSS	Metals	Hydrocarbons
Residential Roof	Very Low	0.2	0.2	0.05
Proposed Pollution Mitigation				
Vortex Separator	X 1.0	0.5	0.5	0.8
Mitigation Index Achieved		0.5	0.5	0.8
		OK	OK	OK

Car Park (Low Risk) (Care Home)				
Proposed Pollution Risk				
	Hazard Level	TSS	Metals	Hydrocarbons
Residential / Infrequent Use Car Park	Low	0.5	0.4	0.4
Proposed Pollution Mitigation				
Vortex Separator	X 1.0	0.5	0.5	0.8
Mitigation Index Achieved		0.5	0.5	0.8
		OK	OK	OK

For the care home, the car parking will be predominantly used by small vehicles except for twice weekly deliveries to the site and refuse vehicles. This puts the development into a lower risk category as the car park will be more lightly used with a service case like a residential apartment block as the vehicle movements are under 300 vehicles per day. During the construction phase the car park will be used by more commercial vehicles, and this increases the risk of siltation, and it is suggested that during the construction phase, more frequent maintenance of the separator and monitoring is undertaken to manage water quality in accordance with the construction phase plan.

Table 4 above shows the amount of treatment is suitable for the proposed usage of the site and for the designated outfall point.



FOUL WATER DRAINAGE STRATEGY

The site is serviced by mains sewerage via an existing Severn Trent combined sewer located within the red line boundary on the southern extents of the site. This manhole is privately owned. A new foul connection from the care home is proposed onto this manhole and Severn Trent Water have confirmed that they are happy to accept the connection in their original consultation response.

DRAINAGE DESIGN

Using the above information, the drainage design has been developed and is shown on drawing 25202-DCE-XX-XX-D-C-100-P01 Drainage Strategy.



FLOOD RISK AND FLOOD EXCEEDANCE

A Flood Risk Assessment by AAH Planning Consultants, Ref A3907 Rev A 28/11/18, has been submitted and approved under the 18/01237/FUL Planning Permission. This satisfies the need for a Flood Risk Assessment at the Stage 2 phase of the project. However, since this original permission, the flood risk models for the country have been updated, and so this document will include the current flood modelling and mapping information.

The site is in Flood Zone 1, shown on the flood map for planning below. The DEFRA website for historical flood data shows that there is no record of historical flooding on the site.

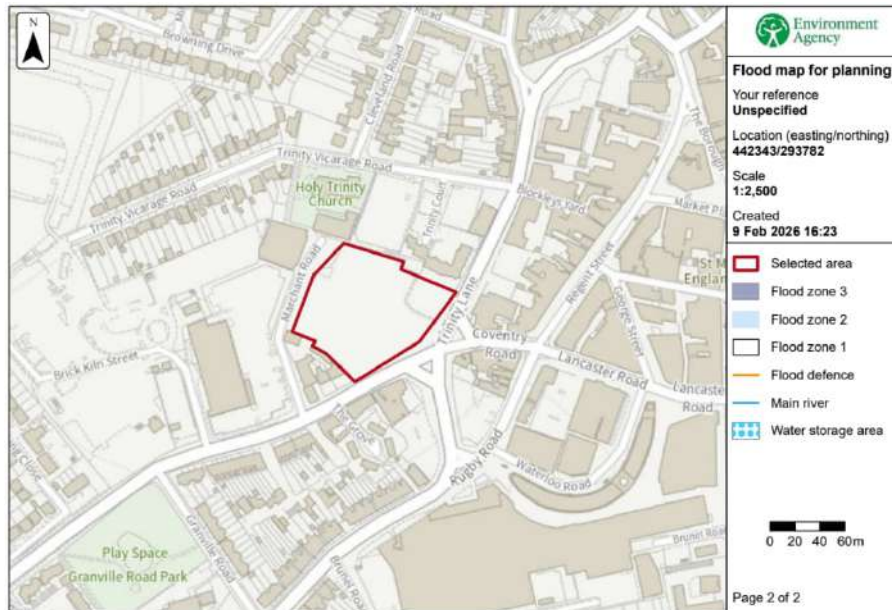


Figure 1 - Flood Map for Planning (EA)

Fluvial Flooding (Flooding from Rivers or the Sea)

Figure 1 shows that there is no risk of flooding from Rivers or the Sea and this is confirmed in Figure 2.

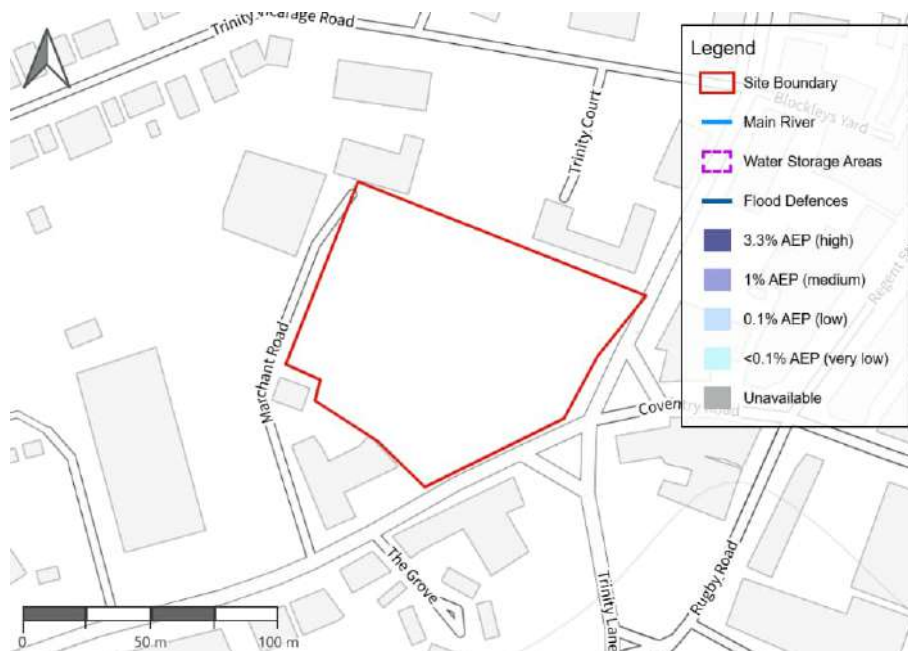


Figure 2 - Fluvial Flooding (EA)



Pluvial (Surface Water) Flooding

The map below shows that there is an area of low to high surface water flood risk within the site due to the level survey showing various low spots which will not exist in the final scheme. This area of flooding is significantly below the proposed floor level, and is located at the outfall so any water buildup will be routed into the drainage system and attenuated before release into the sewerage system.

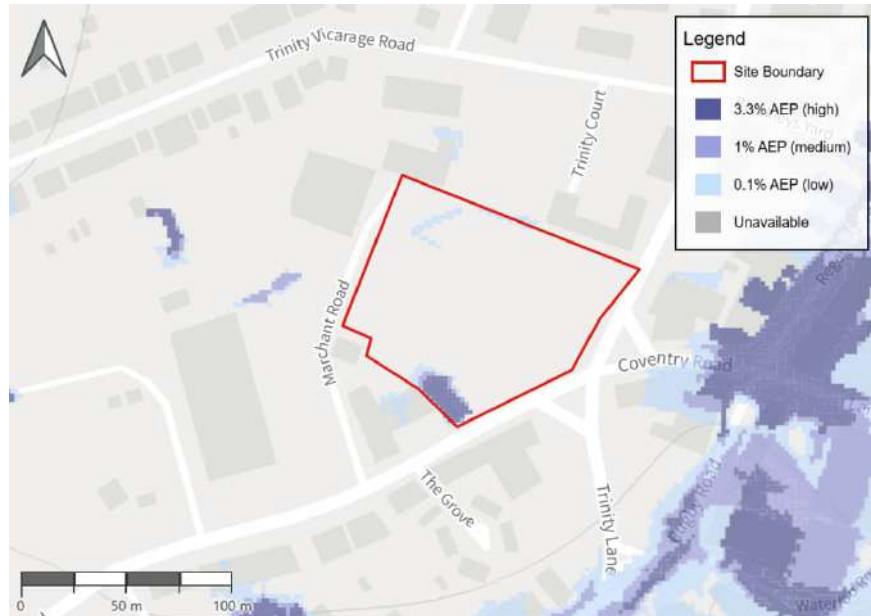


Figure 3 – Pluvial Flooding Extents (EA)

Groundwater Flooding

The EA flood risk summary indicates that the risk of groundwater flooding is low in this area.

Sewer Flooding

There is no record of sewer flooding in the immediate vicinity.

Reservoir and Other Artificial Sources of Flooding

The map below shows that there is no risk of flooding from reservoirs or other artificial sources. Therefore, the risk of reservoir flooding is considered to be low.



Figure 4 – Reservoir Flooding (EA)

Flood Exceedance

While the system is designed to attenuate flows within the site and manage extreme events up to 1:100 + 50% climate change underground, it is envisaged that in a more extreme storm scenario water may exceed the capacity of this system and water will leave the drainage system causing flooding. In an event beyond the design, water would be directed towards the southern boundary and will then re-enter the drainage system via the flow control chamber.



TEMPORARY, CONSTRUCTION PHASE AND LAND DRAINAGE STRATEGY

The construction phase plan, developed by the Principal Contractor, will detail temporary management of water on the site. It is expected that water will be intercepted locally on the site, with silt and other runoff filtered and pumped from the site to an acceptable discharge point. This will be detailed within the Principal Contractor's Construction Phase Plan.

It is expected that early during the construction programme the attenuation tank and main manholes, flow control and separators will be constructed, and this will allow for the ongoing management of surface water from the site during the construction phase.

MAINTENANCE OF DRAINAGE SYSTEMS

The private systems will be managed by the landowner for the site. The system has been designed so that the drainage system is fully accessible and maintainable with flooding easily visible if it occurs. The maintenance schedule for the elements of the scheme is as per manufacturer's recommendations and as follows.

Pipe Network	
Operation	Frequency
Inspect and identify any areas that are not operating correctly, if required, take remedial actions.	Monthly for 3 months as a part of normal post completion monitoring, then biannually. If flooding is identified, take immediate action.
Debris removal from manholes (where may cause risk performance)	As required, but at least twice a year
Where rainfall into network from above, check surface or filter for blockage or silt, algae or other matter by jetting	As required, but at least twice a year
Remove sediment from pipework by jetting.	Annually or as required
Inspect/check all inlets, outlets, and overflow pipes to ensure that they are in good condition and operating as designed	Annually, or as required and after large storms.

Vortex Separator	
Operation	Frequency
Desludging and removal of debris	Every 3 months or as recommended by the Manufacturer
Inspect and identify any areas that are not operating correctly, if required, take remedial actions	Monthly for first half year of operation, then every six months, or as required by the Manufacturer.
Repair/check all inlets, outlets and overflow pipes	As required
Replace malfunctioning parts or structures	As required
Inspect filter media and establish appropriate replacement frequencies	Six monthly or as required by the Manufacturer.
Note – All Vortex Interceptors should be maintained and monitored under a Service Plan which is compatible with the Manufacturer's warranty and suited to the plant used.	



Flow Control	
Operation	Frequency
Inspect and identify any areas that are not operating correctly, if required, take remedial actions.	Monthly for 3 months as a part of normal post completion monitoring, then biannually
Debris removal from manholes (where may cause risk performance)	Monthly
Where rainfall into network from above, check surface or filter for blockage or silt, algae or other matter by jetting	As required, but at least twice a year
Remove sediment from pipework by jetting.	Annually or as required
Repair/check all inlets, outlets and overflow pipes	As required
Inspect/check all inlets, outlets, and overflow pipes to ensure that they are in good condition and operating as designed	Annually and after large storms

Attenuation Tank	
Operation	Frequency
Inspect and identify any areas that are not operating correctly, if required, take remedial actions	Monthly for 3 months, then six monthly
Debris removal from attenuation tank (where may cause risk performance)	As required, but at least twice a year
Where rainfall into attenuation tank from above, check surface or filter for blockage or silt, algae or other matter by jetting	As required, but at least twice a year
Remove sediment from upstream surface water network by jetting.	Annually or as required
Inspect/check all inlets, outlets, and overflow pipes to ensure that they are in good condition and operating as designed.	Annually and after large storms with remedials as required.
Survey inside of tank for sediment build up and remove if necessary.	Every 5 years.



Filter and Land Drainage	
Operation	Frequency
Remove litter and debris from filter drain surface, access chambers	Monthly or as required.
Manage Vegetation and remove nuisance plants	Twice during growing season.
Inspect filter drain surface, pipework and other systems for clogging, ponding, erosion, contamination or damage	Monthly at start, then six monthly.
Inspect chambers and perforated pipework for silt accumulation. Establish silt removal process.	Six Monthly
Remove sediment treatment devices and pipework and chambers.	Six Monthly or as required.
Remove tree roots where they are encroaching the sides of the filter drain.	As required
Repair erosion and damage to drainage	As required
Scarify surface and break up silt deposits and compacted materials. Remove build up of sediment on filter trench.	As required.
Clear pipework of blockages.	As required
Replace filter media	Every 10 – 20 years, or if identified by inspector. Higher if located in areas of very high pollution loads.

The maintenance of the drainage network and SuDS features are to be linked with the wider site maintenance. A log of all maintenance activities is to be kept and made available to the local planning authority (LPA) and / or the Lead Local Flood Authority (LLFA) on request.



BREEAM COMPLIANCE

This section outlines how the proposals meet the criteria in Pol 03 Flood and Surface Water Management under the BREEAM guidance.

Flood Risk

The “Flood Risk and Flood Exceedance” section above confirms the site is in Flood Zone 1 and assesses the flood risk from the following sources:

- i) Fluvial – Figure 1/2
- ii) Tidal – Figure 1/2
- iii) Surface Water – Figure 3
- iv) Groundwater – Page 10
- v) Sewers – Page 10
- vi) Reservoirs, canals and other artificial sources – Page 10

Page 9 confirms that there are no historical reports of flooding at the site, and the “Surface Water Drainage Strategy” section indicates appropriate climate change allowances to be used in the surface water drainage design to account for future sources of flooding.

Surface Water Run-off Destination

The surface water drainage system has been designed to consider the specific site requirements, based on the existing site and proposed development. Pages 3 to 5 demonstrate how the priority levels detailed in the methodology have been followed with suitable justification for discharging surface water to the combined sewer.

Infiltration has been discounted following detailed testing which is evidenced in the rear of this document.

Surface Water Run-off Rate

The site is a brownfield development. The revised National Standards for Sustainable Drainage Systems requires that all existing development comply with a maximum “relaxation” of 5 times the greenfield runoff rate for the 50% AEP and 1% AEP events.

The site has been designed to these standards, and achieves a 50% reduction from existing runoff, with peak flows restricted to 24l/s during the 1% AEP (5x QBAR). This therefore meets the requirement under POL03 for reduction of runoff.

The “Maintenance of Drainage Systems” section details the recommended maintenance requirements for the drainage and SuDS systems, which the developer of the site will need to include within any maintenance agreements for the drainage facilities.

Surface Water Run-off Volume

As confirmed in the “Flood Risk and Exceedance” section, the buildings are raised above the surrounding areas, and surface water will flow to the existing exceedance route to the south of the site.

The post-development runoff volume has been assessed against the pre-development runoff volume in the 1 in 100 year +50% climate change 6-hour rainfall event.

The hydraulic calculations show a pre-development discharge volume of 320m³ in the 1 in 100 year 6-hour winter scenario based on 3,600m² Existing Impermeable Area which covers the whole site. The hydraulic calculations for the proposed drainage system show a discharge volume of 221m³ in the same scenario for a drained area of 2445m². The greenfield runoff volume for the same scenario is 148m³ for the same area (60.61mm rainfall for 1 in 100 6 hr period over 3,600m² drained area for the car park and care home)

The site reduces the runoff volume to below the existing level and therefore meets the requirement for this credit.

Minimising Watercourse Pollution

The proposed drainage system should prevent the first 5mm of rainfall from discharging to the watercourse, known as Interception in the SuDS Manual. The following table has been adapted from Table 24.6 of the SuDS Manual to list potential Interception mechanisms that could be incorporated into the design.



Interception Mechanism	Reasoning
Green roofs	The building is to have solar panels and plant located on the roof and a green roof is not proposed due to the loading on the structure.
Soakaway or other infiltration system	Infiltration is not possible on the site.
Permeable Pavements	This is not possible on the site as the only area which could be permeable is being used for construction.
Swales	These features are not suitable due to the vulnerable patients using the site and the fall / trip hazards they generate. There are also significant constraints in the non-secure area of the site with root protection areas which prevents the use of these types of features.
Filter Drains	Filter drainage is used for land drainage only.
Detention Basins	These features are not suitable due to the vulnerable patients using the site and the fall / trip hazards they generate.
Bioretention planter units	These are not proposed due to the limited space available to maintain these units around the building.
Rain Gardens	Not proposed as the rear gardens have limited space outside of existing RPA to accommodate these features.
Ponds	These features are not suitable due to the vulnerable patients using the site and the fall / trip hazards they generate.

The 5mm runoff is unlikely to be intercepted on the site as there are no proposed infiltration or bioretention systems proposed.

Areas of the site with a low pollution risk use appropriate SuDS techniques to provide the required level of pollution prevention, using treatment and separation systems as detailed within this document.

All SuDS features and pollution prevention systems will need to be designed in accordance with the SuDS Manual, the pollution prevention for business guidance, and the building regulations, as confirmed in the "Surface Water Drainage Design" section above.

Copies of the as-built drainage plans, following construction of the building, should be made available on site for the building occupier and owner.

BREEAM Summary

The information contained within this Drainage Strategy report demonstrates the development could be awarded four credits under the BREEAM Assessment for Flood and Surface Water Management: two for Flood Resilience, one for Surface Water Volume and one for Minimising Watercourse Pollution.

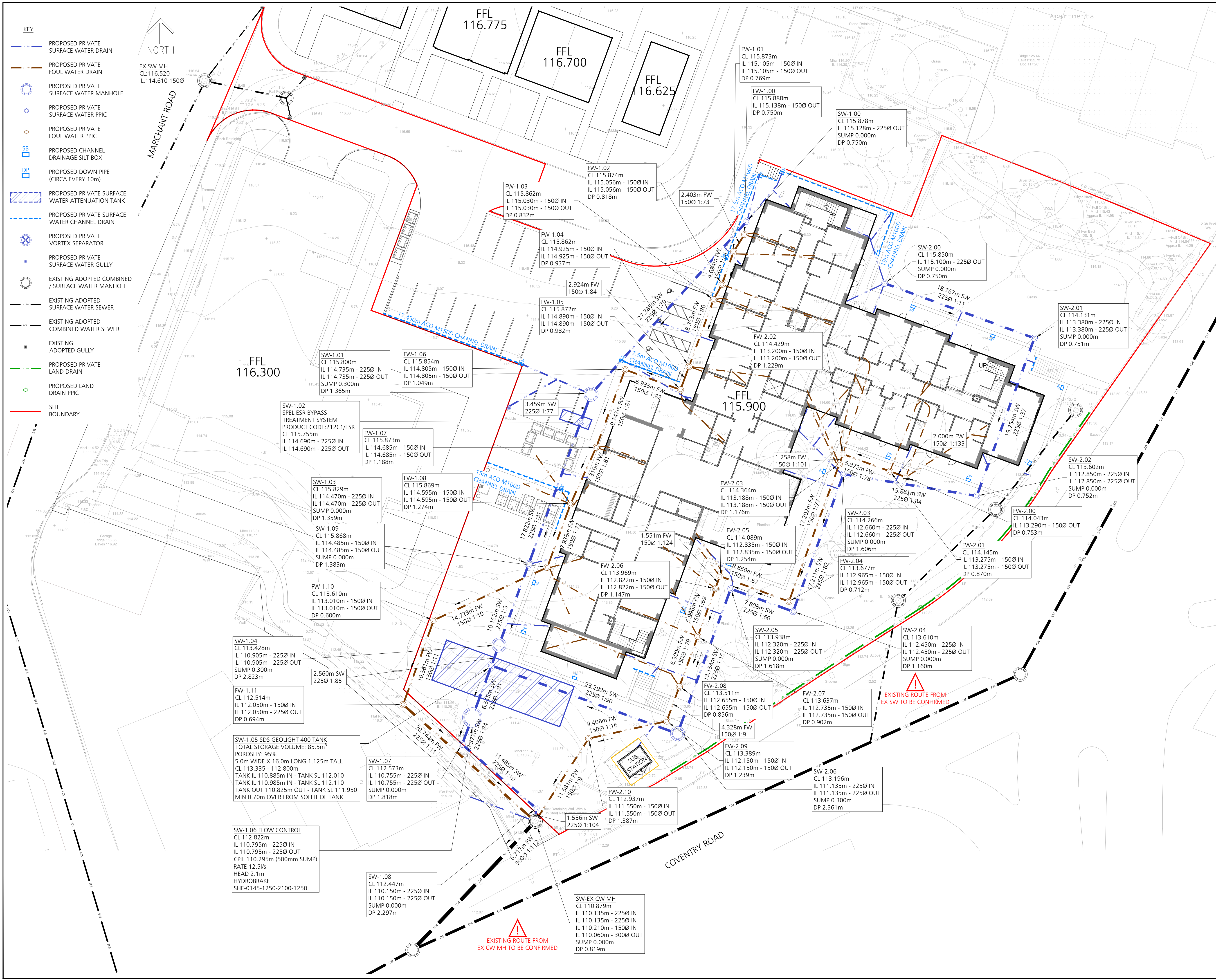


DRAINAGE DESIGN PARAMETERS

Drainage Outfalls	Consultation with LLFA/IDB/EA/Water Auth	Undertaken and Drainage Conditions discharged under application 18-01237-FUL. STW Consulted on runoff location and rate.
	Rainwater Reuse	Not viable
	Soakaway Viable / Rate	Not viable as tests failed.
	Groundwater Level	Generally quite low and now found during soakaway tests.
	Watercourse	None.
	Surface Water Sewer	Not accessible from the site
	Foul / Combined Sewer	Combined sewer 300mm on site boundary. Used for Foul and Surface discharge
	Other Outfall	N/A
	Agreed Discharge Outfall Points	SW + FW: Existing Connection to Combined Sewer in London Road via EX CW MH SP42933701
	Invert Level of Outfalls	SW: 110.135mAOD FW: 110.135mAOD
Surface Water Drainage Assessment Constants	Scenarios to be Tested	1:2, 1:30, 1:30+35%CC, 1:100, 1:100+40%CC, 1:100+50%CC
	Agreed discharge rate	12.5l/s for Care Home
	Proposed Impermeable Area	2,468m ² / 0.247 ha
	Attenuation Storage Method	SDS Geolight 400 Tank 5 x 16 x 1.125m, 85.5m ³
	Soakaway Half Drain Down Time	N/A
	Proposed Attenuation Volume	As above
	Flow Control Unit	Hydrobrake Optimum, Curved Plate, 2.1m head, 12.5l/s. SHE-0145-1250-2100-1250 500mm sump required
	Surcharged Outfall	N/A
Surface Water Hydraulic Modelling Parameters	Rainfall Model Parameters (FEH/FSR)	FEH-22 data used
	Modelling Parameters assume MADD of 0, Default Time of Entry of 5 Mins and Summer and Winter Coefficients of 1.0. Default Rainfall of 50mm used with 960min drain down.	
Foul Water Drainage	Assessment Method and Assumptions (DU, F&L4, BR Part H2, SSG)	F&L4 and BR Part H2
	Foul Discharge Quantity	Not assessed
SUDS	Water Quality – Primary Treatment	Vortex Separator
	Water Quality – Secondary Treatment	Varies
	Water Quality – Tertiary Treatment	Varies
	Pollution Control Risk Level	Low
	Silt Capture Method Spec	Catchpits, Vortex Separator
	Green SUDS Method Spec	N/A



	Ponds / Swales Spec	N/A
	Permeable Pavement Spec	N/A
Appendices	<u>DCE Drawings:</u> 25202-DCE-XX-XX-D-C-100-P07 Drainage Strategy 25202-DCE-XX-XX-D-C-102-P01 Existing Impermeable Areas 25202-DCE-XX-XX-D-C-103-P02 Proposed Impermeable Areas 25202-DCE-XX-XX-D-C-155-C02 Levels Strategy <u>Documents:</u> 1104-1C Topographic Survey CCTV Drainage Survey by Torsion Projects 260120 G40003 A003_Proposed Site Ground Floor Plan_J Drainage and Water Search Result – 12/01/2022 Hydraulic Calculations Soakaway Testing Letter Greenfield Runoff Rate Calculations Hydrobrake Flow Control Details SDS Geolight Geocellular Tank Details Vortex Separator Specification	



- KEY**
- PROPOSED PRIVATE SURFACE WATER DRAIN
 - PROPOSED PRIVATE FOUL WATER DRAIN
 - PROPOSED PRIVATE SURFACE WATER MANHOLE
 - PROPOSED PRIVATE SURFACE WATER PPIC
 - PROPOSED PRIVATE FOUL WATER PPIC
 - PROPOSED CHANNEL DRAINAGE SILT BOX
 - PROPOSED DOWN PIPE (CIRCA EVERY 10m)
 - PROPOSED PRIVATE SURFACE WATER ATTENUATION TANK
 - PROPOSED PRIVATE SURFACE WATER CHANNEL DRAIN
 - PROPOSED PRIVATE VORTEX SEPARATOR
 - PROPOSED PRIVATE SURFACE WATER GULLY
 - EXISTING ADOPTED COMBINED / SURFACE WATER MANHOLE
 - EXISTING ADOPTED SURFACE WATER SEWER
 - EXISTING ADOPTED COMBINED WATER SEWER
 - EXISTING ADOPTED GULLY
 - PROPOSED PRIVATE LAND DRAIN
 - PROPOSED LAND DRAIN PPIC
 - SITE BOUNDARY

DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

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ABNORMAL HAZARD REFERENCE

!

NOTES

1. DO NOT SCALE FROM THIS DRAWING.

2. THIS DRAWING IS TO BE REPRODUCED IN COLOUR.

3. IF ANY DISCREPANCIES ARE FOUND IN THIS DRAWING, PLEASE REPORT TO DUDLEYS CONSULTING ENGINEERS.

4. THIS DRAWING HAS BEEN ORIENTATED TO OS BRITISH NATIONAL GRID (EPSG:27700 OSGB36). EXISTING SURVEY STATIONS ARE SHOWN ON THE TOPOGRAPHICAL SURVEY.

5. THIS DRAWING IS BASED ON THE FOLLOWING INFORMATION:

5.1. 1104-1C - REV C - TOPOGRAPHICAL SURVEY BY CLB SURVEYS LTD DATED MAY 2017

5.2. 640003-02-A003-REV M - SITE LAYOUT PLAN BY GREEN 4 ARCHITECTS DATED MAY 2026

6. ALL WORK TO BE UNDERTAKEN IN ACCORDANCE WITH THE CURRENT EDITION OF THE BUILDING REGULATIONS, SEWERAGE SECTOR CODES OF PRACTICE, AND THE RELEVANT LOCAL HIGHWAY AUTHORITY STANDARDS.

7. THE POSITIONS OF EXISTING UTILITIES SHOWN ON THIS DRAWING HAVE BEEN BASED ON INFORMATION EXTRACTED FROM RECORDS OBTAINED FROM UTILITY PROVIDERS. THESE MUST BE REGARDED AS APPROXIMATE ONLY. THE ACCURACY OR COMPLETENESS OF THE INFORMATION OR THE LOCATION OF SUCH APPARATUS IS NOT GUARANTEED AND NO WARRANTY IS GIVEN OR IMPLIED REGARDING THE POSITION, DEPTH, SIZE OR GRADIENT THEREOF. THE CONTRACTOR MUST MAKE THEIR OWN ENQUIRIES OF THE UTILITY PROVIDERS AND PUBLIC AUTHORITIES AND SATISFY THEMSELVES AS TO THE EXACT POSITION, DEPTH, SIZE AND GRADIENT OF SERVICES. IN THE INTEREST OF SAFETY, THE APPROXIMATE POSITION OF UNDERGROUND CABLES SHOULD BE OBTAINED BY USE OF ELECTRONIC CABLE LOCATORS AND THIS POSITION CONFIRMED BY CAREFUL TRIAL-HOLING USING HAND-DUG METHODS.

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9. SOIL VENTILATION PIPES AND RAIN WATER PIPES SHOWN ON THE PLAN ARE INDICATIVE. FINAL LOCATIONS TO BE CONFIRMED BY ARCHITECTS.

10. LAND DRAINAGE TO BE PROVIDED TO LOWER GARDEN AREAS TO PREVENT WATERLOGGING.

11. OVER EDGE DRAINAGE AND GUTTERS TO BE PROVIDED BY THIRD PARTY SUPPLIER.

10.07.26	ATTENUATION TANK INCREASED & DISCHARGE RATE REDUCED TO SUIT LLFA COMMENTS	OB	SDR	P07
15.06.26	UPDATES TO SUIT ARCHITECTS REVISED SITE LAYOUT RECEIVED 02.06.26	OB	SDR	P06
30.04.26	DRAINAGE OFFSET FROM MASONRY WALL TO PREVENT DISRUPTION TO FOUNDATIONS	OB	SDR	P05
16.03.26	FOUL WATER RUNS ADJACENT TO BUILDING MADE SHALLOWER	OB	SDR	P04
12.03.26	VOLUME AND AREA OF ATTENUATION TANK HAS BEEN REDUCED	OB	SDR	P03
02.03.26	FW REMOVED NORTHEAST OF THE BUILDING AND FW AMENDED EAST OF THE BUILDING MANHOLE SW 1.04 ADDED BEFORE THE TANK	OB	GD	P02
10.02.26	PRELIMINARY ISSUE	OB	SDR	P01
DATE	REVISION DESCRIPTION	BY	CHK.	REV.

DUDLEYS

CONSULTING ENGINEERS

PROJECT

COVENTRY ROAD, HINCKLEY, LE10 0JR

TITLE

DRAINAGE STRATEGY

SCALE

1:200

PAPER

A1

STAGE

PRELIMINARY

STATUS

DRAWING NO.

25202-DCE-XX-XX-D-C-100

REV.

P07

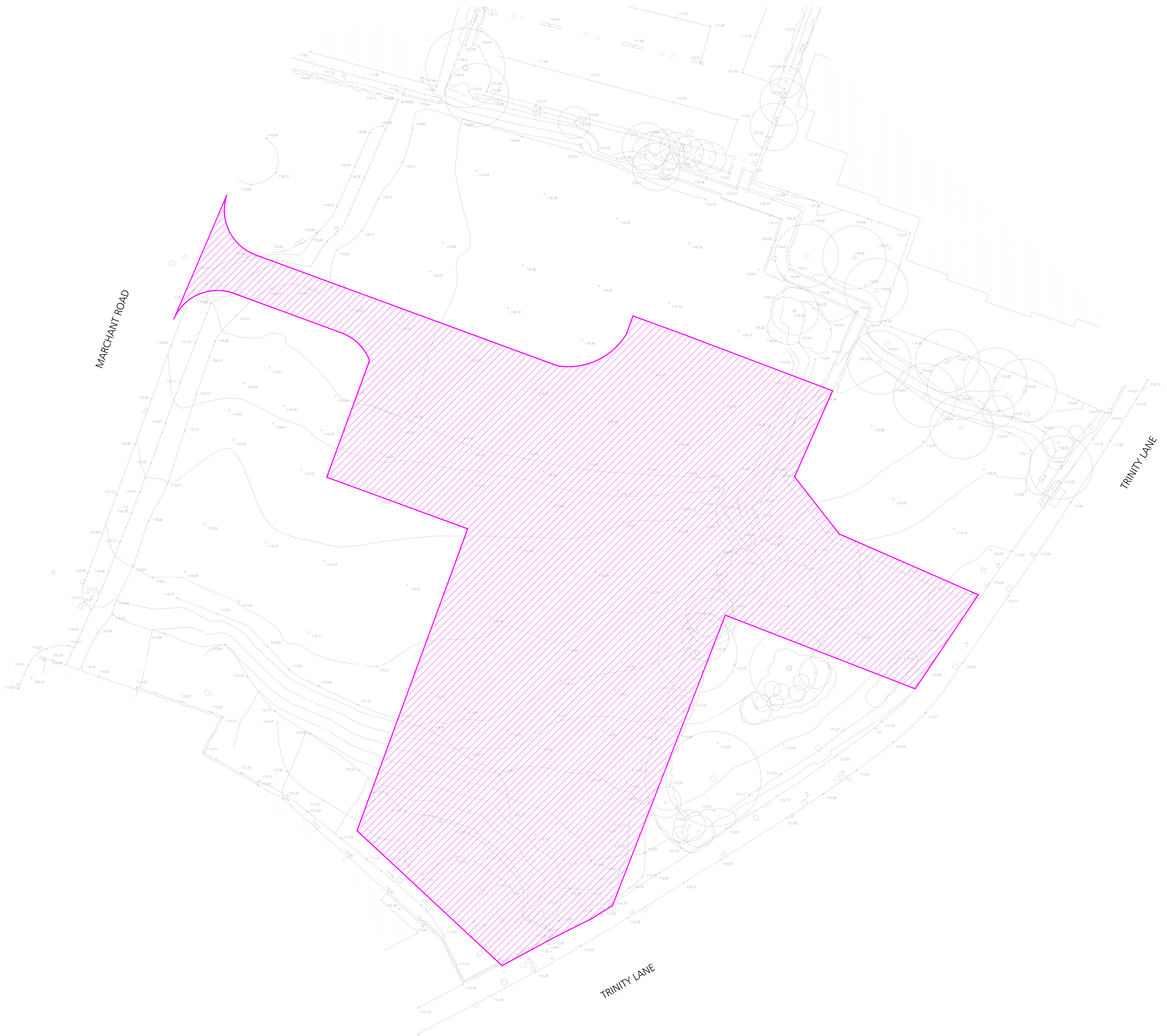
Tithe House

35 Town Street

Leeds, LS18 5UJ

0113 258 3611

info@dudleys.co.uk



DO NOT SCALE

DESIGNERS HAZARD IDENTIFICATION

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ABNORMAL
HAZARD
REFERENCE

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- THIS DRAWING IS BASED ON THE FOLLOWING INFORMATION:
5.1. 1104-1C - REV C - TOPOGRAPHICAL SURVEY BY CLB SURVEYS LTD DATED MAY 2017

KEY

-  EXISTING IMPERMEABLE AREA: 3600m² / 0.360ha
-  TOTAL SITE AREA: 4725m² / 0.473ha

10.02.26	PRELIMINARY ISSUE	OB	SDR	P01
DATE	REVISION DESCRIPTION	BY	CHK.	REV.



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PROJECT
**COVENTRY ROAD,
HINCKLEY,
LE10 0JR**

TITLE
EXISTING IMPERMEABLE AREA

SCALE 1:200	PAPER A1	STAGE PRELIMINARY	STATUS
DRAWING NO. 25202-DCE-XX-XX-D-C-102			REV. P01



MARCHANT ROAD

COVENTRY ROAD

Mc Cartneys Funeral Services

Apartments

TRINITY LANE

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 - 1104-1C - REV C - TOPOGRAPHICAL SURVEY BY CLB SURVEYS LTD DATED MAY 2017
 - G40003-02-A003-REV M - SITE LAYOUT PLAN BY GREEN 4 ARCHITECTS DATED MAY 2026

KEY

- PROPOSED BUILDING & FOOTPATH
AREA: 1775m² / 0.178Ha
- PROPOSED ACCESS ROAD &
CAR PARK AREA: 575m² / 0.058Ha
- PROPOSED BIN STORE, ASHP
& BIKE STORE AREA: 115m² / 0.012Ha
- PROPOSED SUB-STATION
AREA: 8m² / 0.0008Ha
- TOTAL PROPOSED
IMPERMEABLE AREA: 2473m² / 0.247Ha
- SITE
BOUNDARY

08.06.26	UPDATES TO SUIT ARCHITECTS REVISED SITE LAYOUT RECEIVED 02.06.26	OB	SDR	P02
10.02.26	PRELIMINARY ISSUE	OB	SDR	P01
DATE	REVISION DESCRIPTION	BY	CHK.	REV.



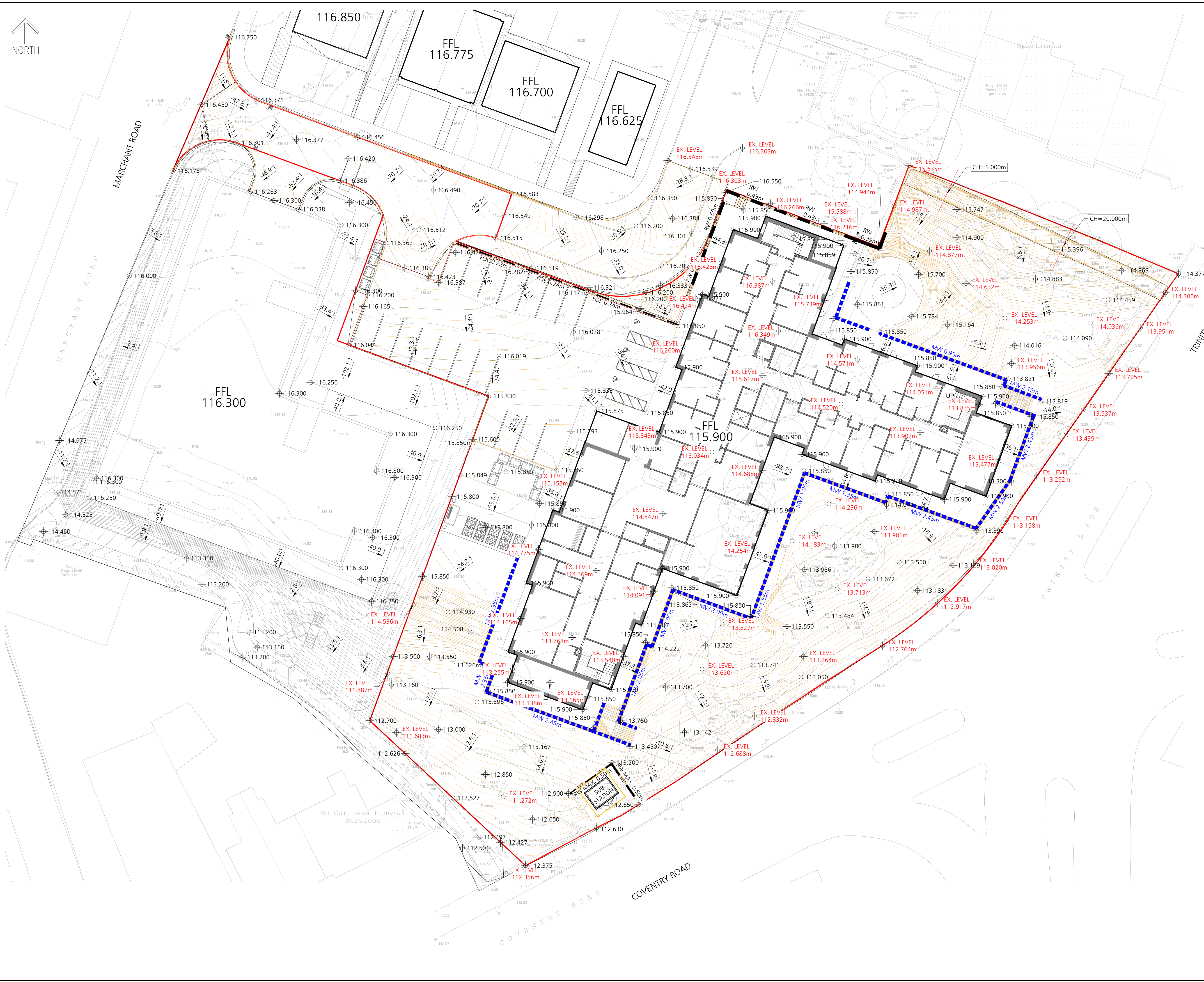
DUDLEYS
CONSULTING ENGINEERS

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PROJECT
**COVENTRY ROAD,
HINCKLEY,
LE10 0JR**

TITLE
PROPOSED IMPERMEABLE AREAS

SCALE	PAPER	STAGE	STATUS
1:200	A1	PRELIMINARY	
DRAWING NO.			REV.
25202-DCE-XX-XX-D-C-103			P02



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KEY

- 114.130 PROPOSED SPOT LEVELS
- F.F.L. 115.900 PROPOSED FINISHED FLOOR LEVELS
- EX. LEVEL 113.430 EXISTING SPOT LEVELS
- RW 2.0m PROPOSED RETAINING WALL
- 1:6.3 PROPOSED GRADIENT
- MW 1.42m PROPOSED MASONRY WALL
- FOE 1.20m PROPOSED FLAG ON EDGE
- SITE BOUNDARY

08.06.26	UPDATES TO SUIT ARCHITECT'S REVISED SITE LAYOUT RECEIVED 02.06.26	OB	SDR	CO2
02.03.26	CONSTRUCTION ISSUE	OB	SDR	CO1
DATE	REVISION DESCRIPTION	BY	CHK.	REV.



DUDLEYS
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PROJECT
**COVENTRY ROAD,
HINCKLEY,
LE10 0JR**

TITLE
LEVELS STRATEGY

SCALE	PAPER	STAGE	STATUS
1:200	A1	CONSTRUCTION	
DRAWING NO.			REV.
25202-DCE-XX-XX-D-C-155			CO2



NO DIMENSIONS TO BE SCALED FROM THIS DRAWING

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THIS DRAWING IS TO BE READ IN COLOUR PRINT

CDM - RESIDUAL RISKS

The following are considered to be significant risks relevant to this drawing, which could not be fully mitigated or removed through design. Further possible control measures have been identified within the Design Risk Assessments which may help to mitigate these and other identified risks further during the construction / maintenance process.

GENERAL

All dimensions to be checked on site. No responsibility is accepted for works by building contractor and sub-contractors. All works to be carried out in accordance with current Codes of Practice and British Standards.

STRUCTURAL

All Structural Design and Calculations to be provided by Structural Engineer

NOTES:

Application Boundary Line

REVISION NOTES

Rev	Date	Description
A	04/06/2025	Fire safety redesign
B	17/07/2025	Proposed footpath relocation
C	22/07/2025	Widened Carpark access
D	23/07/2025	Note regarding Footpath
E	23/07/2025	Marchant Road Footpath Widening
F	12/12/2025	Bin store moved to allow turning circle Proposed Footpath access to Building ASHP Compound added Sub-station Location Ramp to North Elevation.
G	07/01/2026	Revision as per Torsion comments received on 17/12/2025
H	15/01/2026	Revision as per Torsion comments received on 12/01/2026
I	20/01/2026	Revision as per Torsion comments received on 15/01/2026
J	21/01/2026	Footpath corner and front site access ramp revision
K	19/03/2026	Revision as per NMA comments received on 12/03/2026
L	02/04/2026	Revision after TEAMS meeting with planning on 02/04/2026. Moved stairs Dark brick string course on RW. Substation in brown. 1.2m Ballustrades
M	07/05/2026	Footpath removal

The Barn
Hopwell Hall
Ockbrook
Derbyshire
DE72 3RW



PROJECT NAME

G40003 Hinkley

TYPOLOGY

PROJECT ADDRESS

Coventry Road
Hinckley
LE10 0JR

CLIENT / USER NAME

Torsion Projects Ltd.

DRAWING NAME

Proposed Site Ground Floor Plan

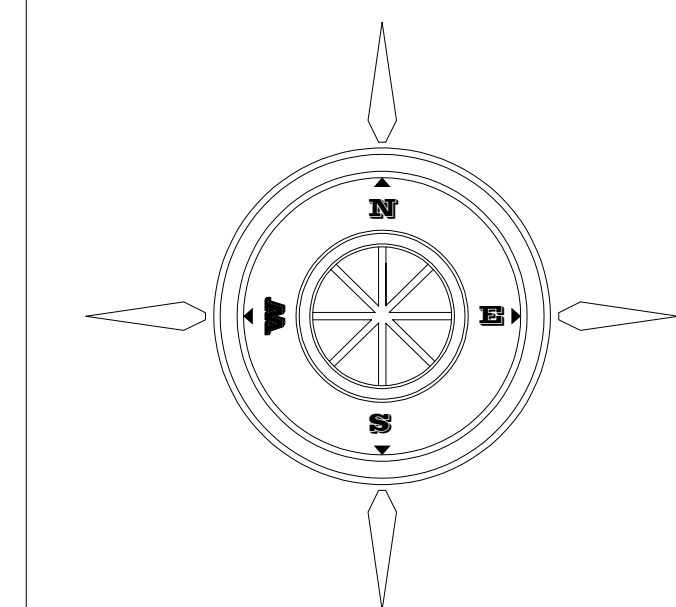
FULL DOCUMENT REFERENCE

Originator Project Number	Series	Drawing No	Sheet Issue Date
G40003	02	A003	07/05/2026

STATUS

CONSTRUCTION

Sheet size	Scale	Revision
A1L	As indicated	M



ALL LEVELS ARE RELATED TO ODSM SITUATED ON THE ROYAL MAIL BUILDING ON THE CORNER OF STATION ROAD AND LANCASTER ROAD WITH A VALUE OF 113.364M

Station	Easting	Northing	Levels	Description
S001	1039.609	1023.553	112.743	Pk Nail
S002	1000.000	1000.000	112.435	Pk Nail
S003	972.331	1023.043	112.356	Pk Nail
S004	944.923	1045.680	114.687	Pk Nail
S005	959.321	1085.162	116.526	Pk Nail

Legend

XXXX	rock face	XXXXXX	conifer screen
XXXX	service cover	XXXX	pine
XXXX	bank line	XXXX	irregular marsh
XXXX	fence	XXXX	spreadbump
XXXX	cutting or bank	XXXX	willow
XXXX	grass channel	XXXX	fence
XXXX	gate	XXXX	fence
XXXX	ledge	XXXX	fence
XXXX	road	XXXX	edge of surface
XXXX	vegetation line	XXXX	edge of surface
XXXX	tree	XXXX	station Name and Level
XXXX	stop back	XXXX	50.00 ground level
XXXX	manhole	XXXX	
XXXX	well	XXXX	
XXXX	water pipe	XXXX	
XXXX	road sign	XXXX	
XXXX	bus stop	XXXX	
XXXX	lamp post	XXXX	
XXXX	electric pole	XXXX	
XXXX	telegraph pole	XXXX	
XXXX	stop back	XXXX	
XXXX	manhole	XXXX	
XXXX	well	XXXX	
XXXX	water pipe	XXXX	
XXXX	road sign	XXXX	
XXXX	bus stop	XXXX	
XXXX	lamp post	XXXX	
XXXX	electric pole	XXXX	
XXXX	telegraph pole	XXXX	
XXXX	stop back	XXXX	
XXXX	manhole	XXXX	
XXXX	well	XXXX	
XXXX	water pipe	XXXX	
XXXX	road sign	XXXX	
XXXX	bus stop	XXXX	
XXXX	lamp post	XXXX	
XXXX	electric pole	XXXX	
XXXX	telegraph pole	XXXX	

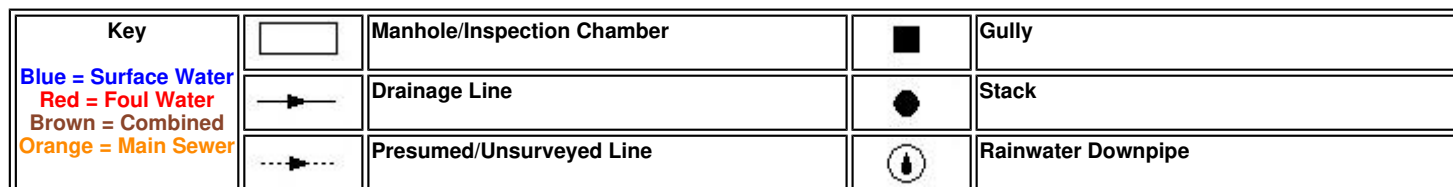


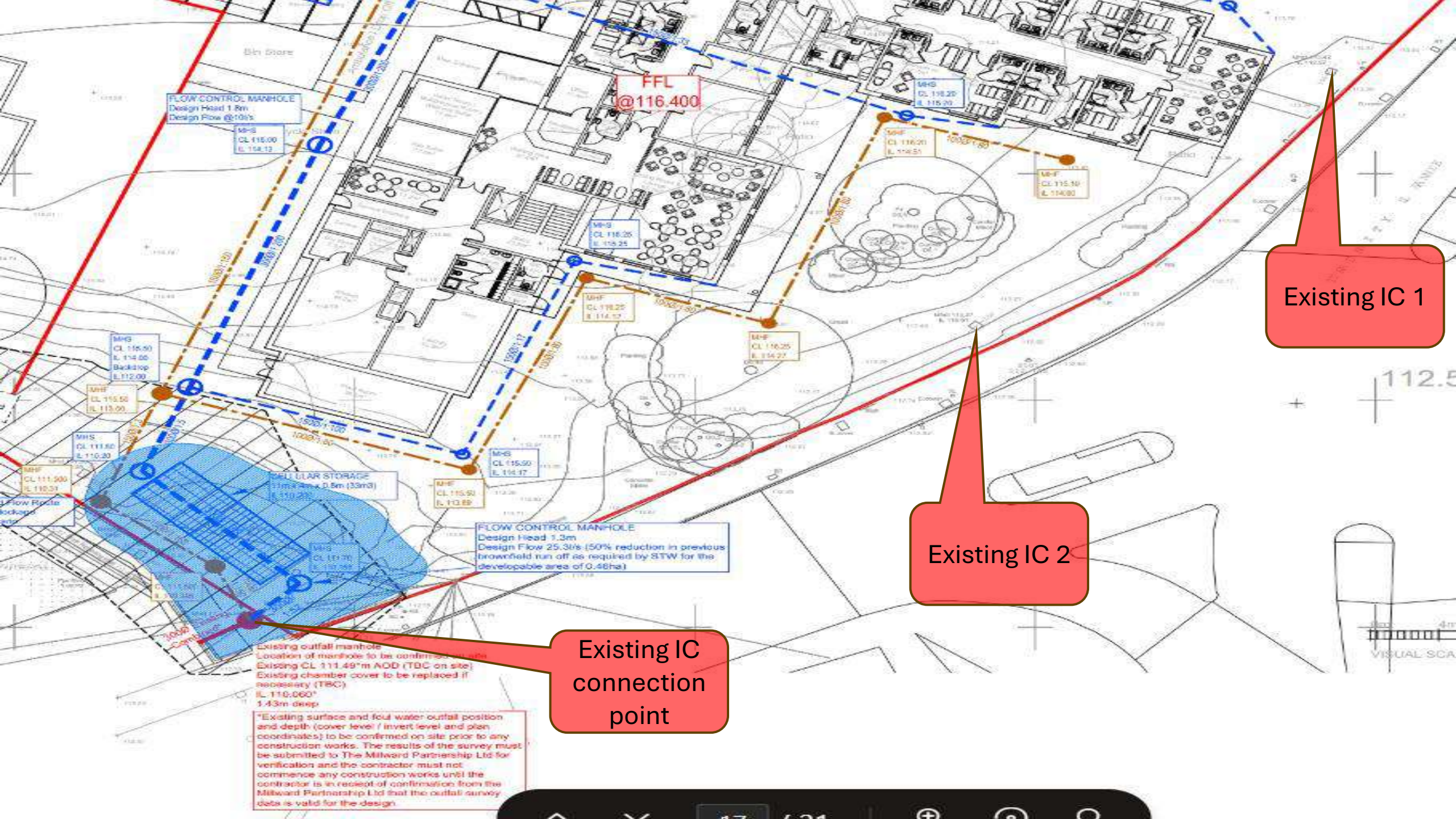
Rev	Date	Description
C	May 17	Level survey undertaken after demolition

This plan has been surveyed to the scale shown. Caution should be exercised when enlargements are made. Some services may not have been surveyed due to parked vehicles or other obstructions. All dimensions have been measured or estimated from ground level, unless stated otherwise. Tree species shown should be treated with caution and expert identification is advised. Drainage information has been taken from a surface inspection and should be treated as approximate only. All critical dimensions should be confirmed onsite prior to the commencement of any works.

PROJECT Former Hinckley Leisure Centre Site
CLIENT Hinckley & Bosworth Borough Council
TOPOGRAPHICAL SURVEY
Org. No. 1104-10 Date: April 2010
Drawn by: A.T.C. Scale: 1:200(A0)
Units: mm Cad Scale 1:1
C L B Surveys Ltd 38 Forest View Overseal Swadlincote Derbyshire DE12 6GZ Telephone: 01283 331788 Email: admin@clbsurveys.co.uk copyright reserved

This sketch is not to scale and does not represent the exact routing of the drainage system





Existing IC 1



Location of the existing
IC 1



Location of the existing
IC 1



IC 1 open



IC 1 view

IC 1 has a CL to IL of 860mm

Existing IC 2



Location of the
existing IC 2



Location of the
existing IC 2



Location of the
existing IC 2



View into IC 2



View into IC 2

IC 2 has a CL to IL of 2460mm, the channel looks to flow off the site and towards Sainsburys

Existing IC connection point



Location of
proposed
connection IC



Location of
proposed
connection IC



View into the
proposed
connection IC

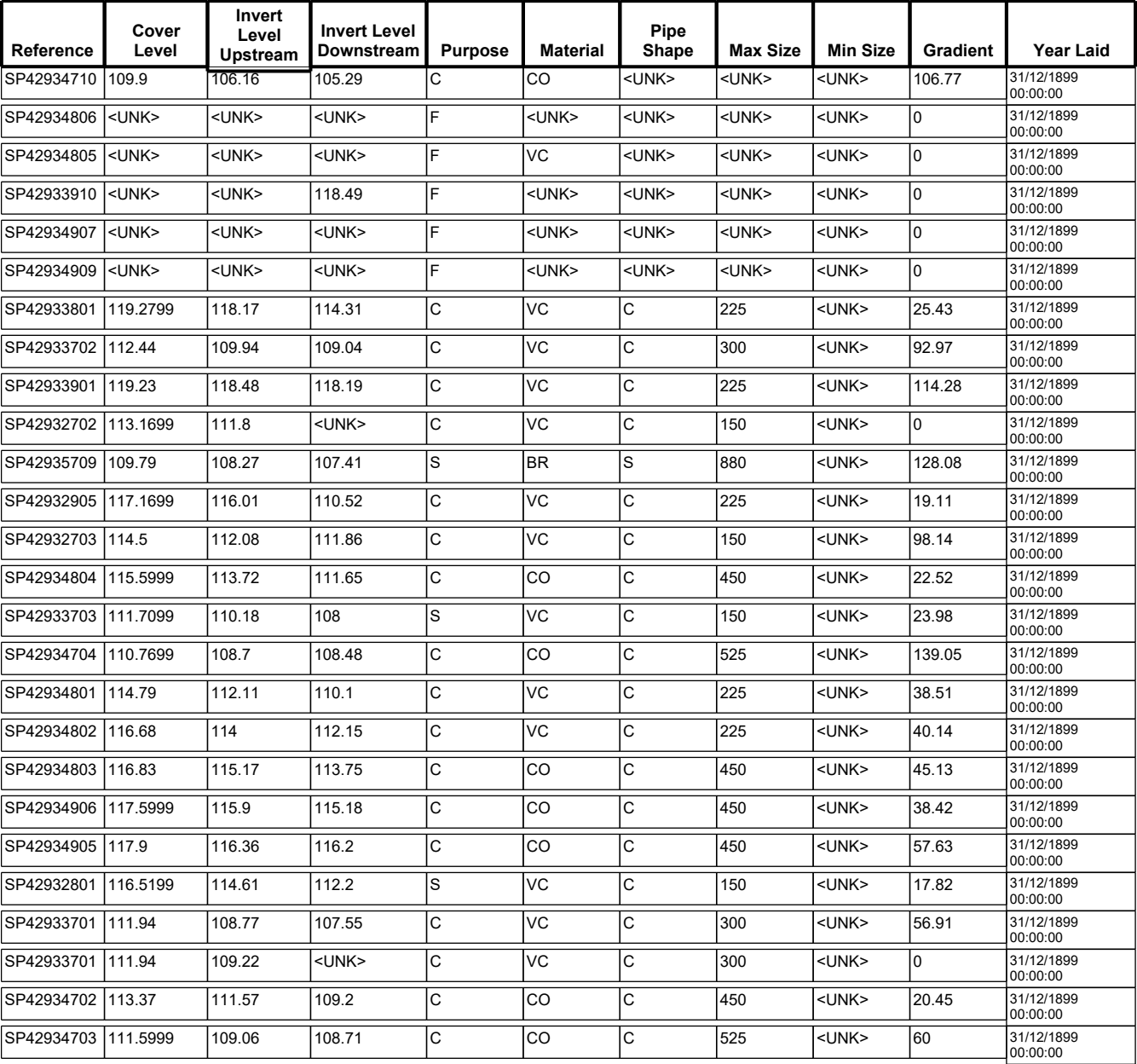


View into the
proposed
connection IC



View into the
proposed
connection IC

Existing IC connection point has a CL to IL of 1440mm, the location of this IC is 2100mm from Coventry Road and 3250mm from the Co-Op existing wall. This is to centre of the chamber.



Severn Trent Water Limited
Asset Data Management
PO Box 5344
Coventry
CV3 9FT
Telephone: 0345 601 6616

SEWER RECORD (Tabular)

O/S Map Scale: 1:1,250

This map is centred upon:

Date of Issue: 12-01-22

X: 442379.01 Y: 293810.03

Disclaimer Statement:

Do not scale off this Map.

2 This plan and any information supplied with it is furnished as a general guide, is only valid at the date of issue and no warranty as to its correctness is given or implied. In particular this plan and any information shown on it must not be relied upon in the event of any development or works (including but not limited to excavations) in the vicinity of SEVERN TRENT WATER assets or for the purposes of determining the suitability of a point of connection to the sewerage or distribution systems.

3 On 1 October 2011 most private sewers and private lateral drains in Severn Trent Water's sewerage area, which were connected to a public sewer as at 1 July 2011, transferred to the ownership of Severn Trent Water and became public sewers and public lateral drains. A further transfer takes place on 1 October 2012. Private pumping stations, which form part of these sewers or lateral drains, will transfer to ownership of Severn Trent Water on or before 1 October 2016. Severn Trent Water does not possess complete records of these assets. These assets may not be displayed on the map.

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6 Document users other than SEVERN TRENT WATER business users are advised that this document is provided for reference purpose only and is subject to copyright; therefore, no further copies should be made from it.

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Additional Storage (m ³ /ha)	0.0	Check Discharge Volume	x
Rainfall Events	Singular	Skip Steady State	x	Starting Level (m)			
Summer CV	1.000	Drain Down Time (mins)	960	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 %)
2	0	0	0	100	0	0	0
30	0	0	0	100	40	0	0
30	35	0	0	100	50	0	0

Design Settings

Rainfall Methodology	FEH-22	Maximum Time of Concentration (mins)	30.00	Preferred Cover Depth (m)	1.200
Return Period (years)	2	Maximum Rainfall (mm/hr)	50.0	Include Intermediate Ground	✓
Additional Flow (%)	0	Minimum Velocity (m/s)	1.00	Enforce best practice design rules	x
CV	1.000	Connection Type	Level Soffits		
Time of Entry (mins)	5.00	Minimum Backdrop Height (m)	0.200		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
SW 1.00	0.015	5.00	115.876	450	442359.423	293799.488	0.751	115.125
SW 1.01	0.088	5.00	115.800	1200	442341.089	293779.146	1.065	114.735
SW 1.02	0.005	5.00	115.755	1200	442339.899	293775.898	1.065	114.690
SW 1.03	0.013	5.00	115.833	600	442333.766	293759.165	1.363	114.470
SW 1.04	0.011	5.00	113.445	1200	442330.272	293749.632	2.540	110.905
SW 2.00	0.031	5.00	115.850	450	442375.604	293792.194	0.750	115.100
SW 2.01	0.012	5.00	113.985	450	442393.225	293785.736	0.750	113.235
SW 2.02	0.012	5.00	113.590	450	442386.458	293767.177	0.750	112.840
SW 2.03	0.028	5.00	114.187	450	442370.785	293769.741	1.527	112.660
SW 2.04			114.087	450	442364.863	293753.581	1.637	112.450
SW 2.05	0.020	5.00	113.799	450	442357.527	293756.257	1.479	112.320
SW 2.06	0.012	5.00	113.143	1200	442351.269	293739.216	2.008	111.135
SW 1.05 TANK			113.360	450	442329.392	293747.229	2.485	110.875
SW FC 1.06			112.840	2100	442327.134	293741.118	2.045	110.795
SW 1.07			112.585	450	442325.940	293737.959	1.830	110.755
SW 1.08			112.449	450	442334.637	293730.458	2.299	110.150
EX CW MH			110.879	1200	442334.541	293728.905	0.744	110.135

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	SW 1.00	SW 1.01	31.373	0.600	115.125	114.735	0.390	80.4	225	5.36	50.0
1.001	SW 1.01	SW 1.02	3.459	0.600	114.735	114.690	0.045	76.9	225	5.40	50.0
1.002	SW 1.02	SW 1.03	17.822	0.600	114.690	114.470	0.220	81.0	225	5.60	50.0
1.003	SW 1.03	SW 1.04	10.152	0.600	114.470	110.905	3.565	2.8	225	5.62	50.0
1.004	SW 1.04	SW 1.05 TANK	2.560	0.600	110.905	110.875	0.030	85.3	225	5.65	50.0
2.000	SW 2.00	SW 2.01	20.000	0.600	115.100	113.235	1.865	10.7	225	5.08	50.0
2.001	SW 2.01	SW 2.02	18.000	0.600	113.235	112.840	0.395	45.6	225	5.24	50.0
2.002	SW 2.02	SW 2.03	16.001	0.600	112.840	112.660	0.180	88.9	225	5.43	50.0
2.003	SW 2.03	SW 2.04	17.000	0.600	112.660	112.450	0.210	81.0	225	5.62	50.0
2.004	SW 2.04	SW 2.05	9.160	0.600	112.450	112.320	0.130	70.5	225	5.72	50.0
2.005	SW 2.05	SW 2.06	18.373	0.600	112.320	111.135	1.185	15.5	225	5.81	50.0
2.006	SW 2.06	SW 1.05 TANK	23.300	0.600	111.135	110.875	0.260	89.6	225	6.10	50.0
1.005	SW 1.05 TANK	SW FC 1.06	6.515	0.600	110.875	110.795	0.080	81.4	225	6.17	50.0
1.006	SW FC 1.06	SW 1.07	3.377	0.600	110.795	110.755	0.040	84.4	225	6.21	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	1.459	58.0	2.7	0.526	0.840	0.015	0.0
1.001	1.493	59.4	18.6	0.840	0.840	0.103	0.0
1.002	1.454	57.8	19.5	0.840	1.138	0.108	0.0
1.003	7.810	310.5	21.9	1.138	2.315	0.121	0.0
1.004	1.416	56.3	23.9	2.315	2.260	0.132	0.0
2.000	4.018	159.8	5.6	0.525	0.525	0.031	0.0
2.001	1.943	77.2	7.8	0.525	0.525	0.043	0.0
2.002	1.387	55.2	9.9	0.525	1.302	0.055	0.0
2.003	1.454	57.8	15.0	1.302	1.412	0.083	0.0
2.004	1.560	62.0	15.0	1.412	1.254	0.083	0.0
2.005	3.339	132.8	18.6	1.254	1.783	0.103	0.0
2.006	1.382	54.9	20.8	1.783	2.260	0.115	0.0
1.005	1.450	57.6	44.6	2.260	1.820	0.247	0.0
1.006	1.424	56.6	44.6	1.820	1.605	0.247	0.0

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)
1.007	SW 1.07	SW 1.08	11.485	0.600	110.755	110.150	0.605	19.0	225	6.27	50.0
1.008	SW 1.08	EX CW MH	1.556	0.600	110.150	110.135	0.015	103.7	225	6.29	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.007	3.017	119.9	44.6	1.605	2.074	0.247	0.0
1.008	1.283	51.0	44.6	2.074	0.519	0.247	0.0

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	31.373	80.4	225	Circular	115.876	115.125	0.526	115.800	114.735	0.840
1.001	3.459	76.9	225	Circular	115.800	114.735	0.840	115.755	114.690	0.840
1.002	17.822	81.0	225	Circular	115.755	114.690	0.840	115.833	114.470	1.138
1.003	10.152	2.8	225	Circular	115.833	114.470	1.138	113.445	110.905	2.315
1.004	2.560	85.3	225	Circular	113.445	110.905	2.315	113.360	110.875	2.260
2.000	20.000	10.7	225	Circular	115.850	115.100	0.525	113.985	113.235	0.525
2.001	18.000	45.6	225	Circular	113.985	113.235	0.525	113.590	112.840	0.525
2.002	16.001	88.9	225	Circular	113.590	112.840	0.525	114.187	112.660	1.302

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	SW 1.00	450	Manhole	Adoptable	SW 1.01	1200	Manhole	Adoptable
1.001	SW 1.01	1200	Manhole	Adoptable	SW 1.02	1200	Manhole	Adoptable
1.002	SW 1.02	1200	Manhole	Adoptable	SW 1.03	600	Manhole	Adoptable
1.003	SW 1.03	600	Manhole	Adoptable	SW 1.04	1200	Manhole	Adoptable
1.004	SW 1.04	1200	Manhole	Adoptable	SW 1.05 TANK	450	Manhole	Adoptable
2.000	SW 2.00	450	Manhole	Adoptable	SW 2.01	450	Manhole	Adoptable
2.001	SW 2.01	450	Manhole	Adoptable	SW 2.02	450	Manhole	Adoptable
2.002	SW 2.02	450	Manhole	Adoptable	SW 2.03	450	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)
2.003	17.000	81.0	225	Circular	114.187	112.660	1.302	114.087	112.450	1.412
2.004	9.160	70.5	225	Circular	114.087	112.450	1.412	113.799	112.320	1.254
2.005	18.373	15.5	225	Circular	113.799	112.320	1.254	113.143	111.135	1.783
2.006	23.300	89.6	225	Circular	113.143	111.135	1.783	113.360	110.875	2.260
1.005	6.515	81.4	225	Circular	113.360	110.875	2.260	112.840	110.795	1.820
1.006	3.377	84.4	225	Circular	112.840	110.795	1.820	112.585	110.755	1.605
1.007	11.485	19.0	225	Circular	112.585	110.755	1.605	112.449	110.150	2.074
1.008	1.556	103.7	225	Circular	112.449	110.150	2.074	110.879	110.135	0.519

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
2.003	SW 2.03	450	Manhole	Adoptable	SW 2.04	450	Manhole	Adoptable
2.004	SW 2.04	450	Manhole	Adoptable	SW 2.05	450	Manhole	Adoptable
2.005	SW 2.05	450	Manhole	Adoptable	SW 2.06	1200	Manhole	Adoptable
2.006	SW 2.06	1200	Manhole	Adoptable	SW 1.05 TANK	450	Manhole	Adoptable
1.005	SW 1.05 TANK	450	Manhole	Adoptable	SW FC 1.06	2100	Manhole	Adoptable
1.006	SW FC 1.06	2100	Manhole	Adoptable	SW 1.07	450	Manhole	Adoptable
1.007	SW 1.07	450	Manhole	Adoptable	SW 1.08	450	Manhole	Adoptable
1.008	SW 1.08	450	Manhole	Adoptable	EX CW MH	1200	Manhole	Adoptable

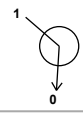
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
SW 1.00	442359.423	293799.488	115.876	0.751	450		0	1.000	115.125	225
SW 1.01	442341.089	293779.146	115.800	1.065	1200		1	1.000	114.735	225
							0	1.001	114.735	225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
SW 1.02	442339.899	293775.898	115.755	1.065	1200		1	1.001	114.690	225
						0	1.002	114.690	225	
SW 1.03	442333.766	293759.165	115.833	1.363	600		1	1.002	114.470	225
						0	1.003	114.470	225	
SW 1.04	442330.272	293749.632	113.445	2.540	1200		1	1.003	110.905	225
						0	1.004	110.905	225	
SW 2.00	442375.604	293792.194	115.850	0.750	450		0	2.000	115.100	225
SW 2.01	442393.225	293785.736	113.985	0.750	450		1	2.000	113.235	225
						0	2.001	113.235	225	
SW 2.02	442386.458	293767.177	113.590	0.750	450		1	2.001	112.840	225
						0	2.002	112.840	225	
SW 2.03	442370.785	293769.741	114.187	1.527	450		1	2.002	112.660	225
						0	2.003	112.660	225	
SW 2.04	442364.863	293753.581	114.087	1.637	450		1	2.003	112.450	225
						0	2.004	112.450	225	

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW 2.05	442357.527	293756.257	113.799	1.479	450		1 2.004	112.320	225
SW 2.06	442351.269	293739.216	113.143	2.008	1200		1 2.005	111.135	225
SW 1.05 TANK	442329.392	293747.229	113.360	2.485	450		1 2.006 2 1.004	110.875 110.875	225 225
SW FC 1.06	442327.134	293741.118	112.840	2.045	2100		1 1.005	110.795	225
SW 1.07	442325.940	293737.959	112.585	1.830	450		1 1.006	110.755	225
SW 1.08	442334.637	293730.458	112.449	2.299	450		1 1.007	110.150	225
EX CW MH	442334.541	293728.905	110.879	0.744	1200		1 1.008	110.135	225

Node SW FC 1.06 Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	110.795	Product Number	CTL-SHE-0145-1250-2100-1250
Design Depth (m)	2.100	Min Outlet Diameter (m)	0.225
Design Flow (l/s)	12.5	Min Node Diameter (mm)	1800

Node SW 1.05 TANK Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	110.875
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	67

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	80.0	0.0	1.125	80.0	0.0	1.126	0.0	0.0

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
15 minute summer	SW 1.00	10	115.157	0.032	2.6	0.0051	0.0000	OK
15 minute summer	SW 1.01	10	114.838	0.103	18.0	0.1166	0.0000	OK
15 minute summer	SW 1.02	10	114.791	0.101	18.6	0.1138	0.0000	OK
15 minute summer	SW 1.03	10	114.509	0.039	20.7	0.0109	0.0000	OK
30 minute summer	SW 1.04	24	111.038	0.133	20.1	0.1506	0.0000	OK
15 minute summer	SW 2.00	10	115.128	0.028	5.4	0.0045	0.0000	OK
15 minute summer	SW 2.01	10	113.282	0.047	7.5	0.0075	0.0000	OK
15 minute summer	SW 2.02	10	112.904	0.064	9.5	0.0102	0.0000	OK
15 minute summer	SW 2.03	10	112.739	0.079	14.3	0.0126	0.0000	OK
15 minute summer	SW 2.04	11	112.531	0.081	14.2	0.0128	0.0000	OK
15 minute summer	SW 2.05	11	112.375	0.055	17.6	0.0088	0.0000	OK
15 minute summer	SW 2.06	10	111.233	0.098	19.6	0.1113	0.0000	OK
30 minute summer	SW 1.05 TANK	24	111.038	0.163	37.3	12.3932	0.0000	OK
30 minute summer	SW FC 1.06	24	111.034	0.239	15.0	0.8294	0.0000	SURCHARGED
30 minute summer	SW 1.07	24	110.800	0.045	10.7	0.0072	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)
15 minute summer	SW 1.00	1.000	SW 1.01	2.6	0.256	0.044	0.3323	
15 minute summer	SW 1.01	1.001	SW 1.02	17.7	1.013	0.298	0.0604	
15 minute summer	SW 1.02	1.002	SW 1.03	18.4	1.769	0.318	0.1934	
15 minute summer	SW 1.03	1.003	SW 1.04	20.6	1.766	0.066	0.1324	
30 minute summer	SW 1.04	1.004	SW 1.05 TANK	19.8	1.275	0.352	0.0707	
15 minute summer	SW 2.00	2.000	SW 2.01	5.4	1.238	0.034	0.0886	
15 minute summer	SW 2.01	2.001	SW 2.02	7.4	0.978	0.096	0.1375	
15 minute summer	SW 2.02	2.002	SW 2.03	9.4	0.872	0.171	0.1739	
15 minute summer	SW 2.03	2.003	SW 2.04	14.2	1.131	0.246	0.2137	
15 minute summer	SW 2.04	2.004	SW 2.05	14.3	1.417	0.230	0.0929	
15 minute summer	SW 2.05	2.005	SW 2.06	17.6	1.493	0.133	0.2221	
15 minute summer	SW 2.06	2.006	SW 1.05 TANK	20.0	1.442	0.363	0.4369	
30 minute summer	SW 1.05 TANK	1.005	SW FC 1.06	15.0	0.612	0.260	0.2297	
30 minute summer	SW FC 1.06	Hydro-Brake®	SW 1.07	10.7				
30 minute summer	SW 1.07	1.007	SW 1.08	10.7	1.159	0.089	0.1083	

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
30 minute summer	SW 1.08	24	110.233	0.082	10.7	0.0131	0.0000	OK
30 minute summer	EX CW MH	24	110.205	0.070	10.7	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)
30 minute summer	SW 1.08	1.008	EX CW MH	10.7	0.911	0.210	0.0184	23.5

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.73%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW 1.00	10	115.175	0.050	6.4	0.0079	0.0000	OK
15 minute summer	SW 1.01	10	114.929	0.194	43.7	0.2196	0.0000	OK
15 minute summer	SW 1.02	10	114.866	0.176	45.0	0.1989	0.0000	OK
15 minute summer	SW 1.03	11	114.530	0.060	50.1	0.0170	0.0000	OK
60 minute summer	SW 1.04	46	111.388	0.483	37.0	0.5461	0.0000	SURCHARGED
15 minute summer	SW 2.00	10	115.144	0.044	13.2	0.0069	0.0000	OK
15 minute summer	SW 2.01	10	113.309	0.074	18.3	0.0117	0.0000	OK
15 minute summer	SW 2.02	10	112.949	0.109	23.2	0.0173	0.0000	OK
15 minute summer	SW 2.03	10	112.796	0.136	34.9	0.0216	0.0000	OK
15 minute summer	SW 2.04	10	112.585	0.135	34.7	0.0215	0.0000	OK
15 minute summer	SW 2.05	10	112.408	0.087	43.0	0.0139	0.0000	OK
60 minute summer	SW 2.06	46	111.390	0.255	32.4	0.2887	0.0000	SURCHARGED
60 minute summer	SW 1.05 TANK	46	111.387	0.512	67.7	38.9770	0.0000	SURCHARGED
60 minute summer	SW FC 1.06	46	111.380	0.585	14.3	2.0276	0.0000	SURCHARGED
60 minute summer	SW 1.07	46	110.804	0.049	12.5	0.0078	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)
15 minute summer	SW 1.00	1.000	SW 1.01	6.3	0.292	0.109	0.6742	
15 minute summer	SW 1.01	1.001	SW 1.02	42.9	1.229	0.723	0.1206	
15 minute summer	SW 1.02	1.002	SW 1.03	44.7	2.130	0.773	0.3722	
15 minute summer	SW 1.03	1.003	SW 1.04	50.1	2.068	0.161	0.2449	
60 minute summer	SW 1.04	1.004	SW 1.05 TANK	35.8	1.199	0.636	0.1018	
15 minute summer	SW 2.00	2.000	SW 2.01	13.2	1.602	0.082	0.1669	
15 minute summer	SW 2.01	2.001	SW 2.02	18.1	1.202	0.235	0.2727	
15 minute summer	SW 2.02	2.002	SW 2.03	23.0	1.050	0.418	0.3523	
15 minute summer	SW 2.03	2.003	SW 2.04	34.7	1.388	0.600	0.4248	
15 minute summer	SW 2.04	2.004	SW 2.05	34.6	1.770	0.558	0.1794	
15 minute summer	SW 2.05	2.005	SW 2.06	42.9	1.780	0.323	0.4572	
60 minute summer	SW 2.06	2.006	SW 1.05 TANK	31.9	1.181	0.581	0.9267	
60 minute summer	SW 1.05 TANK	1.005	SW FC 1.06	14.3	0.633	0.249	0.2591	
60 minute summer	SW FC 1.06	Hydro-Brake®	SW 1.07	12.5				
60 minute summer	SW 1.07	1.007	SW 1.08	12.5	1.205	0.104	0.1211	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.73%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
60 minute summer	SW 1.08	46	110.240	0.090	12.5	0.0143	0.0000	OK
60 minute summer	EX CW MH	46	110.210	0.075	12.5	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)
60 minute summer	SW 1.08	1.008	EX CW MH	12.5	0.948	0.245	0.0205	73.4

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.59%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW 1.00	10	115.183	0.058	8.6	0.0092	0.0000	OK
15 minute summer	SW 1.01	11	115.087	0.352	58.9	0.3979	0.0000	SURCHARGED
15 minute summer	SW 1.02	11	114.993	0.303	59.0	0.3431	0.0000	SURCHARGED
15 minute summer	SW 1.03	11	114.539	0.069	66.0	0.0195	0.0000	OK
60 minute summer	SW 1.04	51	111.643	0.737	49.9	0.8341	0.0000	SURCHARGED
15 minute summer	SW 2.00	10	115.151	0.050	17.8	0.0080	0.0000	OK
15 minute summer	SW 2.01	10	113.322	0.087	24.6	0.0138	0.0000	OK
15 minute summer	SW 2.02	10	112.973	0.133	31.4	0.0211	0.0000	OK
15 minute summer	SW 2.03	10	112.830	0.170	47.1	0.0271	0.0000	OK
15 minute summer	SW 2.04	10	112.616	0.165	46.8	0.0263	0.0000	OK
15 minute summer	SW 2.05	11	112.425	0.105	58.0	0.0166	0.0000	OK
15 minute summer	SW 2.06	12	111.657	0.522	64.8	0.5899	0.0000	SURCHARGED
60 minute summer	SW 1.05 TANK	52	111.642	0.766	89.7	58.3726	0.0000	SURCHARGED
60 minute summer	SW FC 1.06	52	111.635	0.840	15.7	2.9105	0.0000	SURCHARGED
15 minute summer	SW 1.07	25	110.804	0.049	12.5	0.0078	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)
15 minute summer	SW 1.00	1.000	SW 1.01	8.5	0.296	0.147	0.7505	
15 minute summer	SW 1.01	1.001	SW 1.02	56.3	1.416	0.949	0.1376	
15 minute summer	SW 1.02	1.002	SW 1.03	58.9	2.176	1.018	0.4463	
15 minute summer	SW 1.03	1.003	SW 1.04	66.0	2.206	0.212	0.2542	
60 minute summer	SW 1.04	1.004	SW 1.05 TANK	48.3	1.310	0.858	0.1018	
15 minute summer	SW 2.00	2.000	SW 2.01	17.7	1.734	0.111	0.2075	
15 minute summer	SW 2.01	2.001	SW 2.02	24.5	1.273	0.317	0.3461	
15 minute summer	SW 2.02	2.002	SW 2.03	31.1	1.095	0.564	0.4529	
15 minute summer	SW 2.03	2.003	SW 2.04	46.8	1.471	0.809	0.5404	
15 minute summer	SW 2.04	2.004	SW 2.05	46.6	1.881	0.752	0.2256	
15 minute summer	SW 2.05	2.005	SW 2.06	57.9	1.823	0.436	0.5311	
15 minute summer	SW 2.06	2.006	SW 1.05 TANK	61.7	1.552	1.123	0.9267	
60 minute summer	SW 1.05 TANK	1.005	SW FC 1.06	15.7	0.690	0.273	0.2591	
60 minute summer	SW FC 1.06	Hydro-Brake®	SW 1.07	12.5				
15 minute summer	SW 1.07	1.007	SW 1.08	12.5	1.205	0.104	0.1212	

Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.59%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW 1.08	25	110.240	0.090	12.5	0.0143	0.0000	OK
30 minute summer	EX CW MH	53	110.210	0.075	12.5	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)
15 minute summer	SW 1.08	1.008	EX CW MH	12.5	0.948	0.245	0.0205	61.3

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.58%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW 1.00	10	115.181	0.056	8.0	0.0089	0.0000	OK
15 minute summer	SW 1.01	11	115.020	0.285	54.8	0.3221	0.0000	SURCHARGED
15 minute summer	SW 1.02	11	114.939	0.249	56.0	0.2813	0.0000	SURCHARGED
15 minute summer	SW 1.03	11	114.537	0.067	61.5	0.0188	0.0000	OK
60 minute summer	SW 1.04	50	111.586	0.681	47.1	0.7705	0.0000	SURCHARGED
15 minute summer	SW 2.00	10	115.149	0.049	16.5	0.0077	0.0000	OK
15 minute summer	SW 2.01	10	113.318	0.083	22.9	0.0132	0.0000	OK
15 minute summer	SW 2.02	10	112.967	0.127	29.1	0.0201	0.0000	OK
15 minute summer	SW 2.03	10	112.821	0.160	43.8	0.0255	0.0000	OK
15 minute summer	SW 2.04	10	112.607	0.157	43.5	0.0250	0.0000	OK
15 minute summer	SW 2.05	10	112.419	0.099	54.0	0.0158	0.0000	OK
60 minute summer	SW 2.06	50	111.589	0.454	41.2	0.5130	0.0000	SURCHARGED
60 minute summer	SW 1.05 TANK	50	111.585	0.710	83.9	54.0867	0.0000	SURCHARGED
60 minute summer	SW FC 1.06	50	111.579	0.784	15.5	2.7152	0.0000	SURCHARGED
15 minute summer	SW 1.07	17	110.804	0.049	12.5	0.0078	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)
15 minute summer	SW 1.00	1.000	SW 1.01	7.9	0.296	0.136	0.7441	
15 minute summer	SW 1.01	1.001	SW 1.02	53.3	1.341	0.899	0.1376	
15 minute summer	SW 1.02	1.002	SW 1.03	54.9	2.135	0.950	0.4418	
15 minute summer	SW 1.03	1.003	SW 1.04	61.5	2.104	0.198	0.2517	
60 minute summer	SW 1.04	1.004	SW 1.05 TANK	45.6	1.284	0.811	0.1018	
15 minute summer	SW 2.00	2.000	SW 2.01	16.5	1.703	0.103	0.1960	
15 minute summer	SW 2.01	2.001	SW 2.02	22.7	1.254	0.294	0.3267	
15 minute summer	SW 2.02	2.002	SW 2.03	28.9	1.083	0.524	0.4263	
15 minute summer	SW 2.03	2.003	SW 2.04	43.5	1.451	0.752	0.5092	
15 minute summer	SW 2.04	2.004	SW 2.05	43.3	1.861	0.698	0.2128	
15 minute summer	SW 2.05	2.005	SW 2.06	53.8	1.829	0.405	0.5202	
60 minute summer	SW 2.06	2.006	SW 1.05 TANK	38.7	1.230	0.705	0.9267	
60 minute summer	SW 1.05 TANK	1.005	SW FC 1.06	15.5	0.668	0.269	0.2591	
60 minute summer	SW FC 1.06	Hydro-Brake®	SW 1.07	12.5				
15 minute summer	SW 1.07	1.007	SW 1.08	12.5	1.205	0.104	0.1212	

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.58%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW 1.08	17	110.240	0.090	12.5	0.0143	0.0000	OK
15 minute summer	EX CW MH	18	110.210	0.075	12.5	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)
15 minute summer	SW 1.08	1.008	EX CW MH	12.5	0.948	0.245	0.0205	57.0

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.58%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW 1.00	11	115.383	0.258	11.2	0.0410	0.0000	SURCHARGED
15 minute summer	SW 1.01	11	115.366	0.631	72.8	0.7133	0.0000	SURCHARGED
15 minute summer	SW 1.02	11	115.216	0.526	74.9	0.5944	0.0000	SURCHARGED
15 minute summer	SW 1.03	11	114.548	0.078	82.6	0.0220	0.0000	OK
60 minute summer	SW 1.04	62	112.140	1.235	65.8	1.3967	0.0000	SURCHARGED
15 minute summer	SW 2.00	10	115.158	0.058	23.1	0.0091	0.0000	OK
15 minute summer	SW 2.01	10	113.337	0.102	32.0	0.0162	0.0000	OK
15 minute summer	SW 2.02	11	113.038	0.198	40.9	0.0314	0.0000	OK
15 minute summer	SW 2.03	11	112.938	0.278	59.6	0.0441	0.0000	SURCHARGED
15 minute summer	SW 2.04	11	112.658	0.208	59.2	0.0331	0.0000	OK
15 minute summer	SW 2.05	12	112.484	0.164	73.6	0.0260	0.0000	OK
60 minute summer	SW 2.06	62	112.141	1.006	57.2	1.1381	0.0000	SURCHARGED
60 minute summer	SW 1.05 TANK	62	112.139	1.264	117.9	85.7390	0.0000	SURCHARGED
60 minute summer	SW FC 1.06	62	112.136	1.341	17.1	4.6444	0.0000	SURCHARGED
15 minute summer	SW 1.07	50	110.804	0.049	12.5	0.0078	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)
15 minute summer	SW 1.00	1.000	SW 1.01	12.4	0.414	0.214	1.2477	
15 minute summer	SW 1.01	1.001	SW 1.02	71.3	1.792	1.201	0.1376	
15 minute summer	SW 1.02	1.002	SW 1.03	73.3	2.383	1.268	0.4625	
15 minute summer	SW 1.03	1.003	SW 1.04	82.6	2.683	0.266	0.2635	
60 minute summer	SW 1.04	1.004	SW 1.05 TANK	63.6	1.598	1.129	0.1018	
15 minute summer	SW 2.00	2.000	SW 2.01	23.0	1.833	0.144	0.2544	
15 minute summer	SW 2.01	2.001	SW 2.02	31.9	1.320	0.413	0.4831	
15 minute summer	SW 2.02	2.002	SW 2.03	39.3	1.106	0.712	0.6139	
15 minute summer	SW 2.03	2.003	SW 2.04	59.2	1.497	1.024	0.6643	
15 minute summer	SW 2.04	2.004	SW 2.05	59.2	1.910	0.954	0.3146	
15 minute summer	SW 2.05	2.005	SW 2.06	72.7	1.986	0.548	0.6494	
60 minute summer	SW 2.06	2.006	SW 1.05 TANK	54.3	1.366	0.989	0.9267	
60 minute summer	SW 1.05 TANK	1.005	SW FC 1.06	17.1	0.723	0.296	0.2591	
60 minute summer	SW FC 1.06	Hydro-Brake®	SW 1.07	12.5				
15 minute summer	SW 1.07	1.007	SW 1.08	12.5	1.205	0.104	0.1212	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.58%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW 1.08	50	110.240	0.090	12.5	0.0143	0.0000	OK
15 minute summer	EX CW MH	50	110.210	0.075	12.5	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)
15 minute summer	SW 1.08	1.008	EX CW MH	12.5	0.948	0.245	0.0205	79.9

Results for 100 year +50% CC Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW 1.00	11	115.502	0.377	12.0	0.0599	0.0000	SURCHARGED
15 minute summer	SW 1.01	11	115.489	0.754	81.6	0.8526	0.0000	SURCHARGED
15 minute summer	SW 1.02	11	115.313	0.623	81.1	0.7045	0.0000	SURCHARGED
15 minute summer	SW 1.03	11	114.551	0.081	88.9	0.0228	0.0000	OK
60 minute summer	SW 1.04	58	112.850	1.945	68.8	2.1994	0.0000	SURCHARGED
15 minute summer	SW 2.00	10	115.160	0.060	24.8	0.0095	0.0000	OK
15 minute summer	SW 2.01	10	113.339	0.104	34.3	0.0166	0.0000	OK
15 minute summer	SW 2.02	11	113.185	0.345	43.8	0.0549	0.0000	SURCHARGED
15 minute summer	SW 2.03	11	113.047	0.387	64.1	0.0615	0.0000	SURCHARGED
60 minute summer	SW 2.04	58	112.859	0.409	44.4	0.0650	0.0000	SURCHARGED
60 minute summer	SW 2.05	58	112.857	0.537	55.1	0.0854	0.0000	SURCHARGED
60 minute summer	SW 2.06	58	112.854	1.719	61.1	1.9437	0.0000	FLOOD RISK
60 minute summer	SW 1.05 TANK	58	112.848	1.973	124.4	85.8517	0.0000	SURCHARGED
60 minute summer	SW FC 1.06	58	112.840	2.045	20.2	7.0839	0.2833	FLOOD
15 minute summer	SW 1.07	58	110.804	0.049	12.5	0.0078	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)
15 minute summer	SW 1.00	1.000	SW 1.01	15.9	0.458	0.274	1.2477	
15 minute summer	SW 1.01	1.001	SW 1.02	77.2	1.943	1.302	0.1376	
15 minute summer	SW 1.02	1.002	SW 1.03	79.0	2.543	1.367	0.4684	
15 minute summer	SW 1.03	1.003	SW 1.04	88.9	2.859	0.286	0.2668	
60 minute summer	SW 1.04	1.004	SW 1.05 TANK	66.4	1.669	1.179	0.1018	
15 minute summer	SW 2.00	2.000	SW 2.01	24.7	1.895	0.155	0.2638	
15 minute summer	SW 2.01	2.001	SW 2.02	34.2	1.337	0.443	0.5197	
15 minute summer	SW 2.02	2.002	SW 2.03	42.1	1.076	0.763	0.6364	
15 minute summer	SW 2.03	2.003	SW 2.04	63.3	1.591	1.095	0.6761	
60 minute summer	SW 2.04	2.004	SW 2.05	44.4	1.814	0.716	0.3643	
60 minute summer	SW 2.05	2.005	SW 2.06	54.7	1.797	0.412	0.7307	
60 minute summer	SW 2.06	2.006	SW 1.05 TANK	58.1	1.461	1.057	0.9267	
60 minute summer	SW 1.05 TANK	1.005	SW FC 1.06	20.2	0.724	0.350	0.2591	
60 minute summer	SW FC 1.06	Hydro-Brake®	SW 1.07	12.5				
15 minute summer	SW 1.07	1.007	SW 1.08	12.5	1.205	0.104	0.1212	

Results for 100 year +50% CC Critical Storm Duration. Lowest mass balance: 99.52%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	SW 1.08	58	110.240	0.090	12.5	0.0143	0.0000	OK
15 minute summer	EX CW MH	58	110.210	0.075	12.5	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)
15 minute summer	SW 1.08	1.008	EX CW MH	12.5	0.948	0.245	0.0205	85.6

Torsion Projects

Tomlinson House

Capitol Boulevard

Morley

Leeds

LS27 0TS

FAO Gareth Hicks / Abigail Sadler

RE: Torsion Hinckley – Discharge of Condition 26 – Soakaway Testing

This letter has been prepared for the benefit of Torsion Projects in relation to the new development between Marchant Road and Coventry Road. The site has planning permission for the 72 bed care home under planning application 25/00354/FUL, approved 02/04/25. Condition 26 of this permission is worded as follows:

No development approved by this planning permission shall take place until such time as infiltration testing has been carried out (or suitable evidence to preclude testing) to confirm or otherwise, the suitability of the site for the use of infiltration as a drainage element, has been submitted to and approved in writing by the Local Planning Authority.

To assist with the discharge of this condition and enable development to commence on site, the groundworker was instructed to undertake BRE365 soakaway tests at several locations on site. These locations are shown on 25202-DCE-XX-XX-D-C-SK010 - Soakaway Tests. Results are as follows:

- Soakaway Trench 1 – New Car Park. Excavation to 2m total depth into natural ground. 1m of made ground. 1m of firm clay. Water ingress was noted during the works. Water level raised during the works. Water stayed perched within the pit at same depth after 12 – 16 hours (overnight). Groundwater is assumed to be perched within the made ground layer and infiltration is not possible into the clay layer.
- Soakaway Trench 2 – Attenuation tank location. Excavation to 1.5m total depth into natural ground. Water ingress was noted during the works. Water level raised during the works. Water stayed perched within the pit at same depth after 12 – 16 hours (overnight). Groundwater is assumed to be perched, and infiltration is not possible. It is noted that there is a blocked manhole nearby which has an equivalent groundwater level.
- Soakaway Trench 3 – Future garden. Excavation to 1.0m total depth into natural ground. No water ingress noted. Topsoil and rubble down to 0.5m. Firm clay beyond.
- Two further trial holes dug under the building footprint to 2.5m. Made ground noted down to 1.8m in both, with firm clay beyond to the bottom of the excavation. No water ingress noted.

The above information is consistent with the Phase 2 Site Investigation by Solmek. Photographs of the excavations by the contractor is at the rear of this document, 160126 Torsion Projects Hinckley Soak Away Testing

The trial pits were undertaken at the proposed base level of the new drainage systems. In all cases, the drainage systems will sit within firm clays which are topped with made ground. It is evident from the lack of the movement in the groundwater that these clays are not permeable and no change in water level was noted over a period of up to 24 hours.



Following these observations, full BRE365 soakaway tests were not undertaken as from these observations the tests would have been unsuccessful in establishing an infiltration rate.

On this basis, infiltration is not possible on this site and the original drainage outfall route, via the Severn Trent Sewer at the south east corner of the site, is to be utilised as per the previous planning submissions.

Yours faithfully

Sebastian Reid CEng MICE MCIHT
Technical Director
For Dudleys Consulting Engineers Ltd

Soak Away 1



- Depth of fill material approx. 1 meter dark clay after 1 meter. Slight water ingress during excavation, water still present to 300mm depth after being left overnight.

Soak Away 2

Fill material approx. 500mm deep, excavated down to 1500mm, water ingress during excavation, clay material after 500mm, water still present at 800mm after being left overnight.





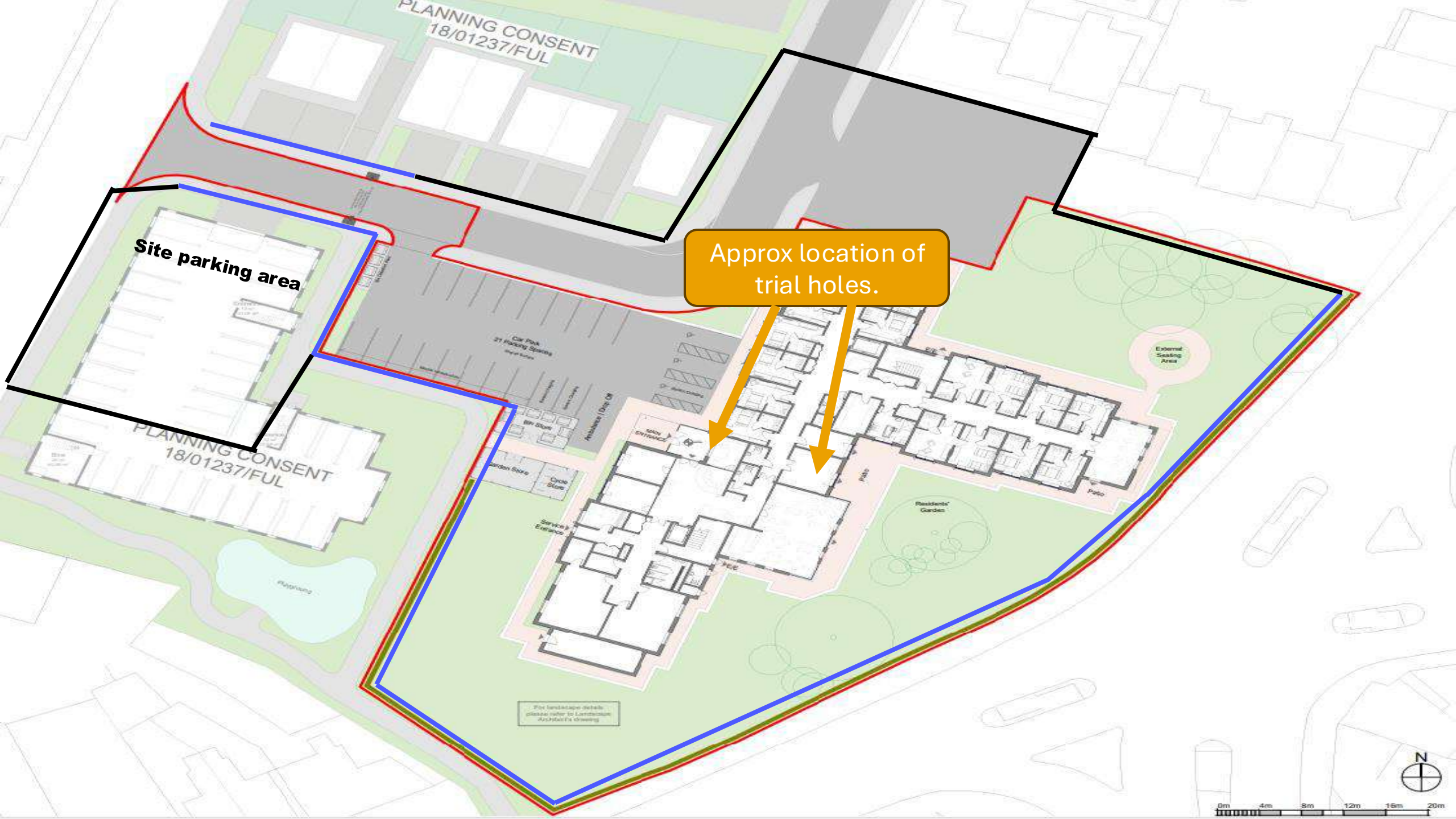
Soak Away 3

Dry brown clay found at 500mm below surface, no water ingress during excavation.

Trial Holes

Extar two trial holes dug to a depth of approx. 2.5m. Firm clay found at approx. 1.8m in both holes, no water ingress during the excavation.





Technical Specification

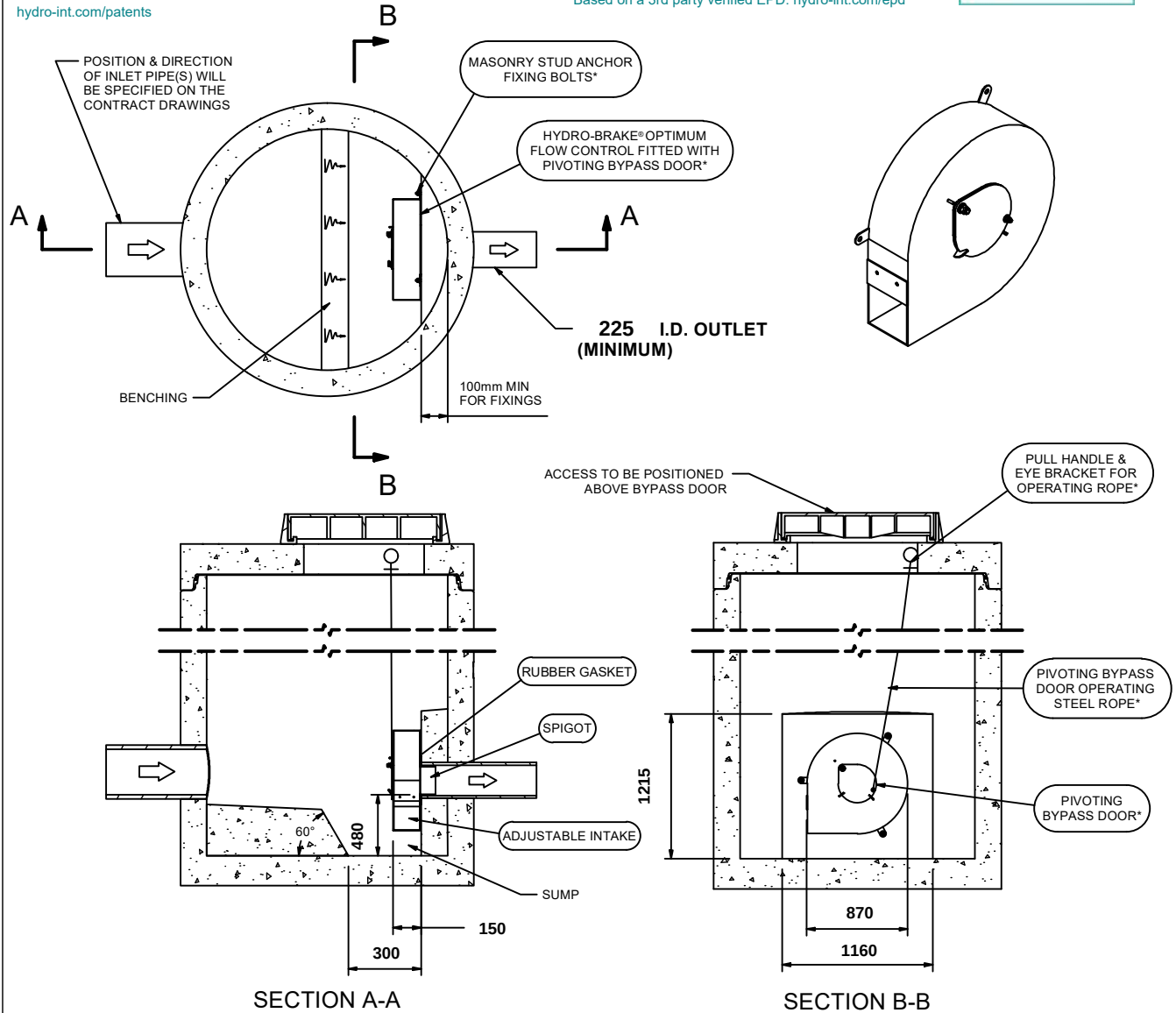
Control Point	Head (m)	Flow (l/s)
Primary Design	2.100	12.500
Flush-Flo™	0.620	12.469
Kick-Flo®	1.272	9.850
Mean Flow		10.938

hydro-int.com/patents

This Hydro-Brake® Optimum includes:

- All in 5 mm Grade 304L stainless steel
- Integral pivoting by-pass door allowing clear line of sight through to outlet, c/w operating rope
- Media blasted for corrosion resistance
- Variable flow rate post installation via adjustable inlet (if necessary)
- Indicative Weight: 70 kg
- Product Carbon Footprint: 292.05 kgCO2e

Based on a 3rd party verified EPD: hydro-int.com/epd



IMPORTANT: ○ LIMIT OF HYDRO INTERNATIONAL SUPPLY
THE DEVICE WILL BE HANDED TO SUIT SITE CONDITIONS
FOR SITE SPECIFIC DETAILS AND MINIMUM CHAMBER SIZE REFER TO HYDRO INTERNATIONAL
ALL CIVIL AND INSTALLATION WORK BY OTHERS
* WHERE SUPPLIED
HYDRO-BRAKE® IS A REGISTERED TRADEMARK FOR FLOW CONTROLS DESIGNED AND MANUFACTURED EXCLUSIVELY BY
HYDRO INTERNATIONAL

THIS DESIGN LAYOUT IS FOR ILLUSTRATIVE PURPOSES ONLY. NOT TO SCALE.

DESIGN ADVICE



The head/flow characteristics of this SHE-0145-1250-2100-1250 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.
The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro International
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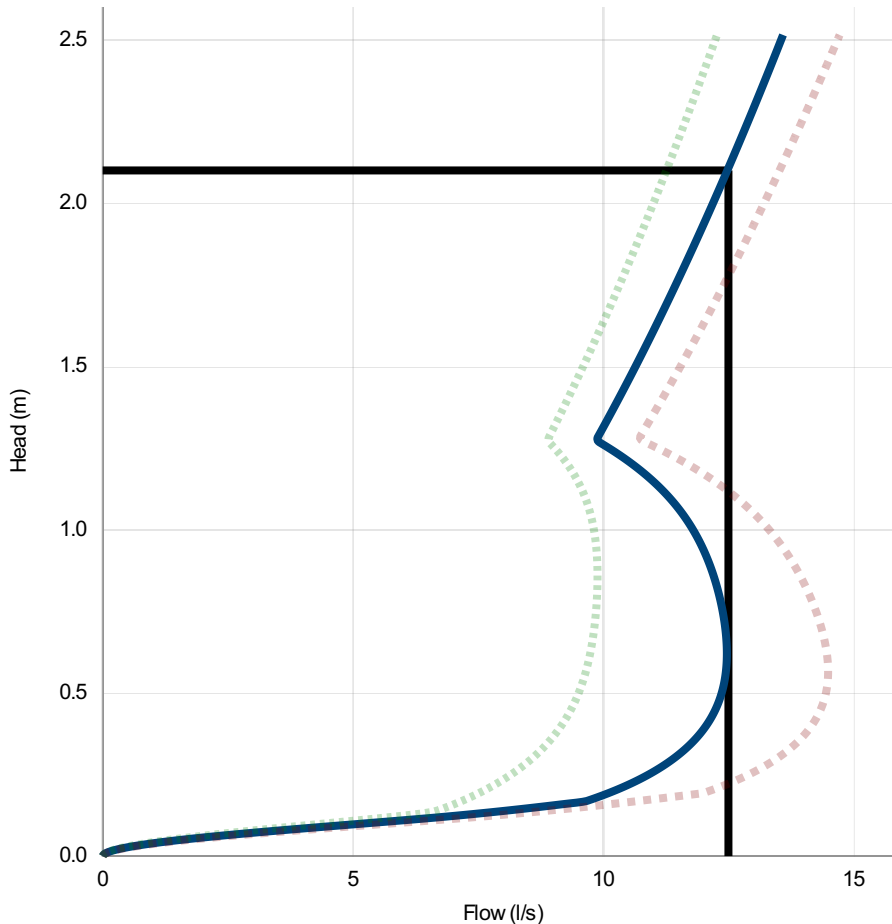
DATE	10/07/2026 12:55	SHE-0145-1250-2100-1250 Hydro-Brake® Optimum
SITE	Torsion Hinckley	
DESIGNER	Oliver Bastain	
REF	25202	

Technical Specification

	Original Setting		Minimum Setting		Maximum Setting	
Control Point	Head (m)	Flow (l/s)	Head (m)	Flow (l/s)	Head (m)	Flow (l/s)
Primary Design	2.100	12.500	2.100	11.261	2.100	13.520
Flush-Flo™	0.620	12.469	0.857	9.885	0.565	14.492
Kick-Flo®	1.272	9.850	1.271	8.875	1.276	10.700
Mean Flow		10.938		9.209		12.265



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Head (m)	Flow (l/s)
0.000	0.000
0.072	3.062
0.145	8.394
0.217	10.480
0.290	11.322
0.362	11.862
0.434	12.194
0.507	12.378
0.579	12.458
0.652	12.463
0.724	12.413
0.797	12.319
0.869	12.181
0.941	11.992
1.014	11.735
1.086	11.387
1.159	10.919
1.231	10.299
1.303	9.964
1.376	10.220
1.448	10.470
1.521	10.713
1.593	10.951
1.666	11.183
1.738	11.410
1.810	11.632
1.883	11.849
1.955	12.063
2.028	12.272
2.100	12.478

DESIGN ADVICE



The head/flow characteristics of this SHE-0145-1250-2100-1250 Hydro-Brake® Optimum Flow Control are unique. Dynamic hydraulic modelling evaluates the full head/flow characteristic curve.

The use of any other flow control will invalidate any design based on this data and could constitute a flood risk.

Hydro
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DATE 10/07/2026 12:55

Site Torsion Hinckley

DESIGNER Oliver Bastain

Ref 25202

SHE-0145-1250-2100-1250

Hydro-Brake® Optimum

SDS GEOLight®

Stormwater Management System

Product Profile

SDS GEOLight® is an ultra lightweight honeycombed modular structure made from recycled PVC. The ready to install units are preformed to provide an underground stormwater storage facility, for the application of stormwater attenuation or infiltration.

The high void rate (>95%), high compressive strength (to 1000KN/m²) and low resistance to water flow makes

SDS GEOLight® an ideal material for cost efficient and maintainable underground water storage during storm conditions.

SDS GEOLight® Benefits

- High compressive strength – can be located under all roads, car parks and amenity area surfaces.
- Reduced excavation costs – the very high void rate (95%) minimises the required volume of earthworks.
- Speed of installation – 1000m³ reservoir, completed in one week.
- Light and easy to handle.
- Excellent hydraulic characteristics.
- The honeycomb structure is highly permeable, offering low resistance to water flow.
- SDS GEOLight®'s unique lateral and vertical filling arrangement requires a minimum amount of pipework and stone.
- Depth of tank invert reduced by using patented lateral supply.
- Simplified distribution pipe network, easy maintenance – dispensing with costly and complicated pipework configurations.
- Modular format offers design flexibility to overcome topographical constraints and architectural requirements.
- Greatly reduces the risk of flooding when used as stormwater storage.
- Can also be used for water recycling and combining with irrigation systems.
- Can virtually eliminate pollution when used in combination with specialist separation and filtration technology such as SDS Aqua-Swirl™ and SDS Aqua-Filter™.
- Design service available, including calculations.



APPLICATIONS



RETAIL



INFRASTRUCTURE



INDUSTRIAL



RESIDENTIAL



COMMERCIAL



PUBLIC SECTOR



Material	Recycled Rigid PVC		
Colour	Dark grey to black		
Standard length of a block	2000 mm	2000 mm	2000 mm
Standard width of a block	500 mm	500 mm	500 mm
Standard height of a block*	750 mm	750 mm	750 mm

Void Ratio	> 95%	> 95%	> 95%
Compressive Strength	420 kN/m ²	610 kN/m ²	800 kN/m ²



SDS GEOLight® 400	SDS GEOLight® 600	SDS GEOLight® 800
APPLICATIONS		
Stormwater Management		
Attenuation / Infiltration		
Bacterial filter-bed for biological treatment		
Hydrocarbon Separation		
Filtration and Separation Units		
SPECIFICATIONS		
Recycled Rigid PVC		
Dark grey to black		
2000 mm	2000 mm	2000 mm
500 mm	500 mm	500 mm
750 mm	750 mm	750 mm
*Other block sizes available on request		
> 95%	> 95%	> 95%
420 kN/m ²	610 kN/m ²	800 kN/m ²
ADVANTAGES		
Highly cost effective		
Reduced excavation costs		
High void capacity		
Good UV resistance		
Good hydrocarbon resistance		

STORMWATER TREATMENT

SDS Aqua-Swirl®

Hydrodynamic Vortex Separator

SDS Aqua-Swirl® is a custom engineered, flow-through water quality device that utilises hydrodynamic separation technology to maximise the removal of coarse sediment, debris and free-floating oil from surface water runoff.

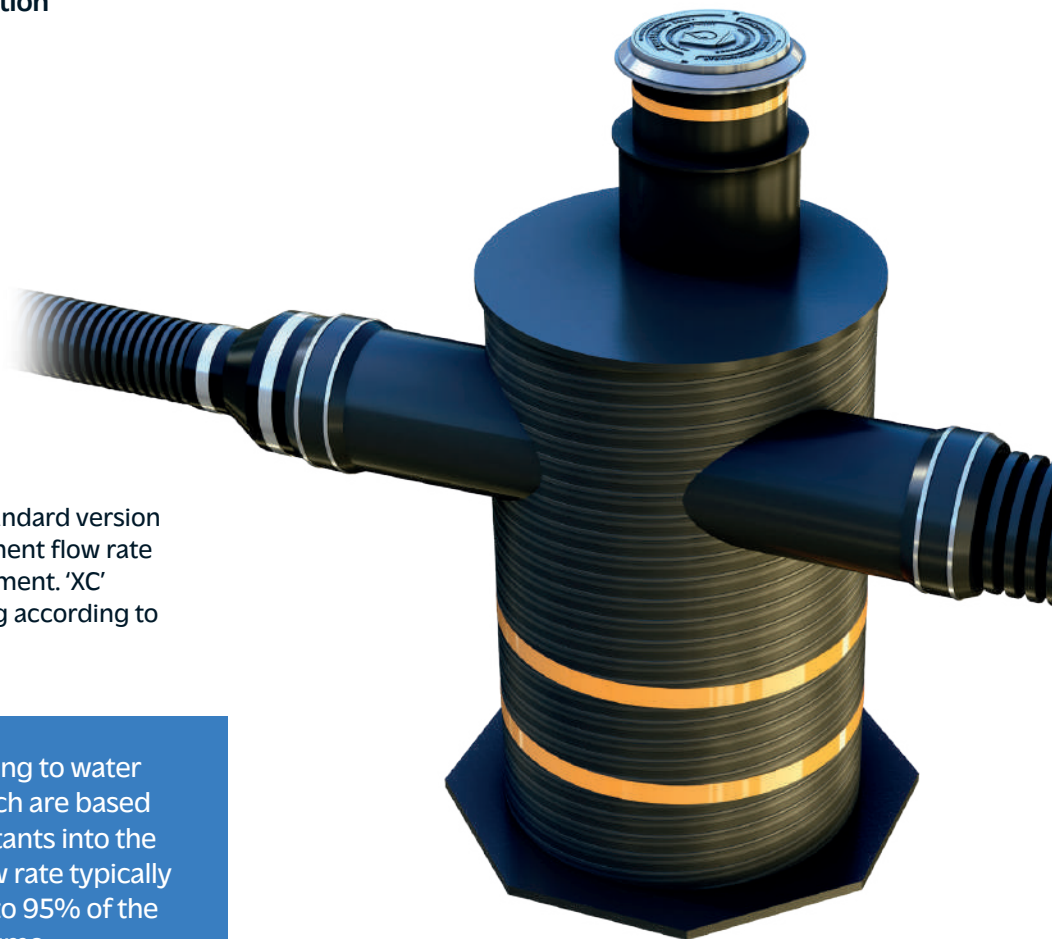
When connected to a SDS SYMBiotIC™ system, SDS Aqua-Swirl® provides real time data on a broad range of key operating factors such as pollutant loads and silt capture level.

SYMBiotIC™

- BBA HAPAS approved
- HDPE plastic modular construction
- No moving parts
- Sealed baffle
- Large debris storage chamber
- Lifting supports
- Compact dimensions
- Available in 9 different sizes
- Bespoke sizing available

SDS Aqua-Swirl® is supplied in the standard version when sizing to its water quality treatment flow rate according to OK-110 (coarse) test sediment. 'XC' versions are also available when sizing according to the NJDEP (finer) test sediment.

SDS Aqua-Swirl® is sized according to water quality treatment flow rates which are based on the initial movement of pollutants into the storm drainage system. This flow rate typically represents approximately 90% to 95% of the total pollutants in the runoff volume. The treatment flow rate of the SDS Aqua-Swirl® system is engineered to meet or exceed the local water quality treatment criteria and form an intrinsic part of the SuDS solution.



Features	Benefits
Performance monitoring available via SDS SYMBiotIC™.	Provides bespoke suite of operating data, such as silt levels and pollutants, viewable via a secure web portal dashboard with live notifications via email and text.
BBA HAPAS certified.	Approved for installation under roads and pavements; adoptable by National Highways.
NJCAT/NJDEP-verified performance for sediment removal and retention.	Verification accepted by the Environment Agency (as cited in the CIRIA C753 SuDS Manual).
'XC' models meet NJDEP testing protocol.	Ensures that particulates and adhered pollutants are not mobilised during major storm events, maximising the capture of floating debris, oil and hydrocarbons.
Manufactured from HDPE high strength plastic Weholite.	Offers a durable, light weight and low-cost alternative to concrete. Easy and quick to install resulting in substantial cost savings.
Bespoke construction.	No on-site assembly required.
Specialised sealed baffle.	Prevents captured floatables from escaping.
Internal bypass with pollution retention.	Able to treat localised rain and larger storm events while retaining captured pollutants.
Single easy-access chamber for pollutant removal and storage.	Simplifies inspection and maintenance facilities with no special equipment required.
Compact dimensions.	Reduces ground excavation and product installation costs.
Small footprint design.	Can be retro-fitted with minimal disruption to existing infrastructure utilities or surface features, extending the ability to meet new regulations.
Certified installation lifting supports.	Easy installation without the need for large, expensive cranes.
Suitable for use during site construction programme.	Can be put into operation prior to completion of the site build, with the inclusion of a planned maintenance schedule.
Available in 9 different standard sizes and also bespoke.	Provides greater design flexibility and assists the removal of sediments at a greater rate than comparable systems.

Specifications

Aqua-Swirl® Model No.	Maximum ID Pipe Connection (mm) BYP ¹	Chamber Internal Diameter (mm)	Water Quality Treatment Flow Rate OK-110 Coarse (l/s) Model AS- ²	Water Quality Treatment Flow Rate NJDEP Fine (l/s) Model XC-	Oil/ Debris Storage Capacity (litres)	Sediment Storage Capacity (m³)	Aqua-Swirl® Weight (kg)
AS-2/XC-2	375	750	30	16	136	0.3	300
AS-3/XC-3	500	1050	53	31	416	0.6	700
AS-4/XC-4	600	1200	77	40	644	0.8	1000
AS-5/XC-5	750	1500	120	63	1382	1.3	1100
AS-6/XC-6	900	1800	173	91	1439	1.8	1400
AS-7/XC-7	1050	2100	235	123	1987	2.5	1700
AS-8/XC-8	1200	2400	307	161	2612	3.3	2200
AS-9/XC-9	1350	2800	418	220	3596	4.4	2600
AS-10/XC-10	1500	3000	480	252	4164	5.1	3100

¹ BYP (Internal Bypass) provides full treatment of the first flush of water while the peak design storm is diverted and channelled through the main conveyance pipe.

² Based on the Tennessee Tech University 'Laboratory Evaluation of TSS Removal Efficiency for the Aqua-Swirl® Concentrator Stormwater Treatment System'.

Notes: **Details of pollution mitigation indices, head loss and CAD details, standard drawings and Installation Guides available upon request.**

The sediment storage capacity has been calculated in accordance with the relevant test protocol and is not a physical maximum; any additional sediment capacity required is achieved with bespoke deeper units.

For assistance in design and specific sizing using historical rainfall data, please contact SDS.

A-S DS/0125



SDS Limited mitigation indices for stormwater treatment devices November 2018

The pollution mitigation indices are as follows:

Device	Total suspended solids mitigation index	Total metals mitigation index	Soluble metals mitigation index ¹	Hydrocarbons ³
Aqua-swirl™ vortex grit separator	0.8 (0.5 on trunk roads and motorways where the suspended solids level is very high)	0.5 ⁴	The Aquaswirl™ is not designed to remove soluble pollutants	0.7 ³
Aqua-filter™ stormwater filtration unit	0.8	0.8	0.6	0.7 ³
Aqua-swirl™ and Aqua-filter™ in sequence	1.2 ²	0.9	0.6	1.0 ^{2,3}
Aqua-Xchange™	0.8 when installed as a layer in a filter drain	0.9	1.0	0.6 when installed as a layer in a filter drain

These indices can only be assumed when the treatment device is properly sized for the anticipated rate of runoff and the level of pollution in the runoff is not unusually high.

¹ When drainage schemes are designed for road developments in accordance with the Design Manual for Roads and Bridges, the mitigation index for soluble metals is required because particulate metals are considered separately in the total suspended solids assessment

² When designing in accordance with the SuDS Manual (Ciria C753), when two devices are used in sequence to target the same pollutant, half of the mitigation index of the second component should be allowed in the calculation.

³ The test procedures applied to manufactured treatment devices do not include measurement of hydrocarbon removal. Therefore, we have estimated that the Aqua-swirl™ removes free-phase hydrocarbons by flotation, and also removes hydrocarbons that are adhered to suspended solids. However, hydrocarbons are known to preferentially adhere to the smaller particles so the Aqua-filter™ will also remove a high proportion of those hydrocarbons as it is more effective at removing smaller suspended particles.

⁴ Where metals are present in the runoff in particulate form, particularly from vehicle emissions, the Aqua-swirl™ will effectively remove those particles in admixture with other suspended solids.