



**LIDL GREAT BRITAIN LTD
PURBROOK WAY
HAVANT**

**FLOOD RISK ASSESSMENT &
DRAINAGE STRATEGY**

FEBRUARY 2021



the journey is the reward

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Lidl Great Britain Ltd
Purbrook Way
Havant
Flood Risk Assessment & Drainage Strategy

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1 Introduction

1.1 Mayer Brown Ltd has been commissioned by Lidl Great Britain Limited (Lidl GB) to undertake a Flood Risk Assessment (FRA) and Drainage Strategy in support of a planning application for a proposed new store located at Purbrook Way in Havant.

1.2 The planning application for the new store was validated by Havant Borough Council on 21st December 2020, which was also accompanied by the original version of this Flood Risk Assessment and Drainage Strategy (FRA).

Hampshire County Council, as the Lead local Flood Authority, subsequently responded as a Statutory Consultee on 4th February 2021 and their response is contained in Appendix N of this report. This updated version of the FRA addresses the comments from the LLFA and provides amended / additional/ updated information where necessary. (For ease of review, when compared to the original report, the amended text is coloured blue)

1.3 In summary, the LLFA find the proposals acceptable in principle and request two further items/actions:

- They require written clarification from the Landowner that it will be acceptable to discharge surface water into their drainage network. provided in paragraph 5.3 and in Appendix M of this report.
- The require clarification on the proposed outfall location, provided in paragraph 5.10 and the updated drainage GA drawing.
- Detailed micro drainage model for the proposed surface water network is required as opposed to the more rudimentary source control calculation. Now included within the report and include the analysis using requested return periods and climate change allowance. The modelled drainage network is also cross referenced with the pipes runs in the drainage general arrangement drawing.

1.4 According to the Landmark Flood Risk Information (Appendix C), the approx. **1.27 hectare site** is in a low risk **Flood Zone 1**.

1.5 As outlined in the NPPF, for development proposals on sites comprising one hectare or more in area in a Flood Zone 1, the FRA should consider i) the vulnerability of flooding from sources other than river and sea flooding, ii) the potential to increase flood risk elsewhere through the addition of hard surfaces and iii) the effect of the new development on surface water runoff.

- 1.6 This FRA considers the impact of the proposed development in addition to the common ways in which flooding can occur. The conditions currently existing in the location of the site are described, together with the methods used to identify and assess potential impacts caused by the development proposals. The mitigation measures proposed have been identified to avoid and/or reduce the impacts caused by the development proposals.
- 1.7 This FRA and drainage strategy has been compiled in accordance with the “National Planning Policy Framework (NPPF)” published by Communities and Local Government in February 2019, “Technical Guidance to the National Planning Policy Framework” and ‘CIRIA C624: Development and Flood Risk Guidance’.

BREEAM Assessment

- 1.8 The proposed new store aims to achieve a rating of Very Good under the BREEAM UK Construction 2018 02 guidance.
- 1.9 POL 03 within the BREEAM assessment specifically relates to Flood and Surface Water Management and the credits achieved are summarised below:
- Flood Resilience (Two credits, Low flood risk) – A site specific Flood Risk Assessment (this document) confirms the development is in a flood zone that is defined as having a low annual probability of flooding. This FRA also takes all current and future sources of flooding into consideration. **2 Credits**
 - Surface Water Run-off - Rate (One credit) – For Greenfield sites, drainage measures are specified so that the peak rate of run-off from the development is not greater than it was for the pre-development site. The peak rate of the surface water run-off from the new store will not exceed QBAR Greenfield rates. A maintenance and management plan has been produced, and a 40% allowance has been made for climate change. **1 Credit**
 - Surface Water Run-off – Volume (One credit)
 - o Flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance).
- And
- o Drainage design measures are specified so that the post-development peak rate of run-off is reduced to the limiting discharge, where the limiting discharge is defined as the mean annual flow rate (Qbar). **1 Credit**

- Minimising Watercourse Pollution (One credit) – There is no discharge from the developed site for rainfall up to 5mm. Infiltration drainage is not possible on the Development so the proposed drainage network will discharge all surface water run-off from off-site and, as such, the criteria for not discharging the first 5mm of rainfall from the cannot be met. **0 credits**

1.10 The report shows that out of a possible 5 credits available, **4 credits** can be achieved with the overall BREEAM rating of the Development.

2 Site Location and Description

Site Location

- 2.1 The application site is located in the north west of Havant with the A3(M) running approximately 50m to the west, Purbrook Way to the south and a B&Q store to the east, refer to Appendix A for the Site Location Plan.
- 2.2 The site falls under the administrative boundary of Havant Borough Council. The postcode is PO9 3QJ and the approximate co-ordinates to the centre are E469412, N107772.
- 2.3 The area surrounding the application site is predominantly commercial and quasi-retail in its nature with a large B&Q warehouse located to the immediate east.

Topography

- 2.4 The site covers a total area of approximately 1.27 hectares and is undeveloped greenfield land.
- 2.5 A topographical survey was undertaken in June 2020 by EDI Surveys Ltd and can be seen in Appendix B. The site consists predominantly of scrub with trees around the periphery. The levels fall from north west to south east with ground levels ranging between 42.90m AOD and 36.20m AOD.

Geology

- 2.6 A Phase 2 Ground investigation report was produced by Remada Ltd in October 2020 following their intrusive site investigation works carried out in August 2020. The relevant extracts are contained in Appendix L of this report.
- 2.7 Published geological maps indicate that the site is directly underlain by London Clay of thickness 77m to 120m, which is designated as unproductive strata.
- 2.8 The site has not been previously developed but its present-day topography and historic maps indicate that is formed of a spoil heap of surplus soils. The source of spoil heap (made ground) is not known but may be due to construction of either the B&Q store or adjacent roads (Purbrook Way and/or A3(M)). This is confirmed by the made ground observed at all exploratory locations as firm to stiff orange/brown grey slightly gravelly clay to a maximum depth of 5.0m.

Existing Drainage

- 2.9 The Southern Water sewer records in Appendix D show that there are no public sewers in the vicinity of the site.
- 2.10 As explained above, there is a large existing B&Q Warehouse immediately to the east. The topographic survey identified that there are existing surface and foul water sewers that drain the B&Q access road to the west and the western part of the existing warehouse.

3 Proposed Layout

- 3.1 The proposed development is for a new Lidl supermarket with associated parking and access road. Access to the site will be via the B&Q access road off Purbrook Way. Refer to Figure 3.1 and Appendix E for the Proposed Layout.

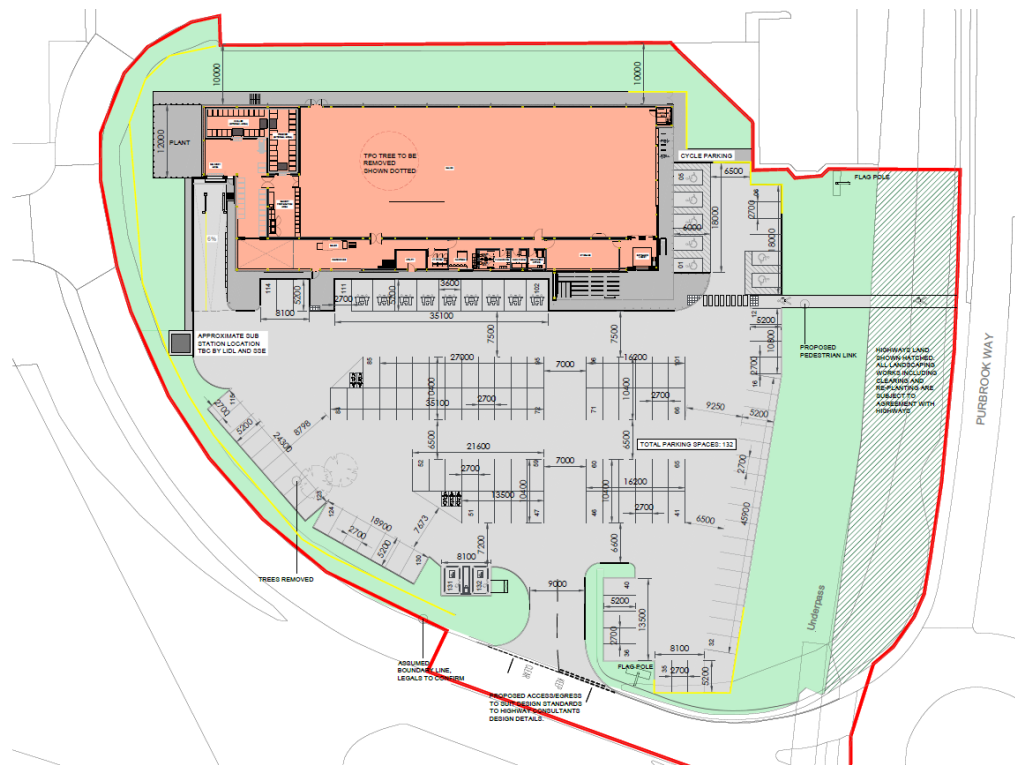


Figure 3.1: Proposed Layout

- 3.2 As shown in Figure 3.1, a large proportion of the Development will be impermeable hardstanding area with soft landscaping situated around the perimeter. The total amount of impermeable area to be positively drained is 0.79ha.
- 3.3 The development is in a low risk Flood Zone 1 area, so the proposed store and car park levels are dictated by boundary and engineering constraints as opposed to predicted fluvial or tidal levels.

4 Flood Risk and Mitigation Measures

4.1 In theory there are five principal types/sources of flooding that could affect the proposed development. These are outlined below with proposed mitigation measures described where necessary. The relevant sections and mitigation measures have come about through a review of the Havant Borough Council (HBC) SFRA, the EA flood Maps for Planning and the Landmark Flood Risk information (Appendix C).

- **Fluvial** – The site is in a low risk Flood Zone 1. This means that it has an annual probability of <0.1% of experiencing flooding from fluvial sources. There are no mitigation measures required so it will not be addressed further in this FRA.
- **Tidal** – The site is in a low risk Flood Zone 1. This means that it has an annual probability of <0.1% of experiencing flooding from tidal sources. There are no mitigation measures required so it will not be addressed further in this FRA.
- **Groundwater** – The clay layers in the London Clay Formation form a low permeability layer (aquitard) which should stop any vertical movement of groundwater. The Landmark flood information (Appendix C) and SFRA confirm the site is at a low risk of flooding from groundwater. This means that there are no mitigation measures required so it will not be addressed further in this FRA.
- **Surface Water Runoff** – The Landmark information (Appendix C) and SFRA indicate that there is a very small area at high risk of surface water flooding along the south west boundary of the site. However, the sequential approach to design has been taken so this area is not to be developed and will remain as existing. A Surface Water drainage system will be implemented which is discussed further in Section 5.
- **Infrastructure Failure** – The SFRA identifies no historic sewer flood events in the vicinity of the site. Therefore, the site is at a low risk of flooding from infrastructure failure and there are no mitigation measures required so it will not be addressed further in this FRA.

Flood Mechanism	Source	Flood Risk to the Development	Mitigation Required?
Fluvial	N/A	Low	No
Tidal	N/A	Low	No
Groundwater	Underlying geology and groundwater levels	Low	No
Surface Water / Overland Flow	Runoff from surrounding elevated land and highway corridors	Low-High	Natural flow paths to be maintained.
Infrastructure Failure	Surface water systems and Water mains	Low	No

Table 4.1: Flood Risk Summary

5 Proposed Surface Water Drainage

Existing Surface Water Drainage

- 5.1 The Southern Water sewer records in Appendix D show that there are no public sewers in the vicinity of the site.
- 5.2 There is a large existing B&Q Warehouse immediately to the east. The topographic survey identified that there are existing surface and foul water sewers that drain the B&Q access road to the west and the western part of the existing warehouse.
- 5.3 Lidl GB have secured the rights to purchase the Site from “GHM Jackson 1972 Children’s Settlement Trust” who will retain the B&Q warehouse, access road and associated drainage. Within the Transfer the Seller is also granting the right to Lidl GB to install or connect into the existing service apparatus. Refer to the confirmation letter in Appendix M. (The definition of Services includes water, foul water and surface water, and the definition of Service Apparatus includes sewers, drains, channels, pipes, water courses, gutters and ducts).

Infiltration & Underlying Geology

- 5.4 Published geological maps indicate that the site is directly underlain by London Clay of thickness 77m to 120m, which is designated as unproductive strata.
- 5.5 The site has not been previously developed but its present-day topography and historic maps indicate that is formed of a spoil heap of surplus soils. The source of spoil heap (made ground) is not known but may be due to construction of either the B&Q store or adjacent roads (Purbrook Way and/or A3(M)). This is confirmed by the made ground observed at all exploratory locations as firm to stiff orange/brown grey slightly gravelly clay to a maximum depth of 5.0m. (Refer to Appendix L)
- 5.6 Clay is impermeable and it is therefore considered that infiltration drainage is not suitable at the development site.

Sustainable Drainage (SuDS) and Drainage Hierarchy

- 5.7 Hampshire County Council as the Lead Local Flood Authority (LLFA) are predominantly concerned about the quantity, rate and quality of surface water run-off leaving the Development. It is proposed that surface water leaving the development should not exceed the existing greenfield QBAR rate of flow.
- 5.8 Sustainable Urban Drainage Systems (SUDS) are a range of techniques that aim to mimic the way rainfall drains in natural systems and so reduces the hydraulic and

hydrological impact on the local area and downstream catchments. There are a number of options available to impose surface water restrictions on proposed development plots such as oversized sewers, below ground storage tanks, attenuation ponds and basins, swales, permeable paving, or infiltration systems.

5.9 To determine the most sustainable method of surface water disposal the hierarchy from approved document part H was used, see below:

- **An adequate soakaway or some other adequate infiltration system** – Infiltration drainage is not possible at the application site as it is underlain by London Clay Formation.
- **A Watercourse** – There are no watercourses in close vicinity of the site, refer to Appendix A.
- **A Sewer** – There are no public surface water sewers in the vicinity, but there is a the private 150mm diameter surface water in the B&Q access road immediately to the north of the site.

5.10 With the above in mind the proposed surface water outfall location will discharge at a restricted rate into the existing B&Q surface water sewer network in the verge of the private main access road ([This is not a public highway drain and is the nearest place to make the proposed connection](#)). The proposed drainage strategy shows the proposed connection point and is contained in Appendix G. [Lidl GB have secured the rights to make this connection as part of their agreement to purchase the site, see paragraph 5.3 of this report.](#)

Proposed Discharge Rates and Calculations

5.11 The existing greenfield rates from the 0.79 hectare of impermeable area have been calculated using microdrainage, see below (for full calculations refer to Appendix F):

- Q1 years: 2.6l/s
- Q30 years: 6.8l/s
- Q100 years: 9.6l/s
- **QBAR: 3.0l/s**

5.12 The proposed peak discharge from the completed development into the existing drainage network will be restricted to the existing QBAR rate of **3 litres / second** using a hydrobrake and tank system.

5.13 [The proposed surface water network has been modelled in Micro Drainage \(Appendix F\), which shows the surface water network will not flood for up to and including the critical 1in100yr+40% climate change storm event.](#)

- 5.14 In order to restrict the run-off to **3 litres / second** a total volume of approximately **662m³** will be required for the critical **1in100yr+40% climate change event**.

Proposed Surface Water Disposal

- 5.15 It is proposed to discharge surface water run-off into the existing B&Q drainage network to the north, refer to Appendix G for the proposed drainage strategy.
- Water from the roof of the building will drain via a piped network directly into the proposed new attenuation tank.
 - The car park will drain via a gully system and through a petrol interceptor, to provide treatment, before discharging into the proposed new attenuation tank.
- 5.16 A hydro-brake chamber (Appendix I) will be located just downstream of the attenuation tank that will restrict the discharge to a peak rate of 3 litres / second prior to discharging off site, with excess water backing up into the attenuation tank provided.
- 5.17 The proposed attenuation tank will be a proprietary crate system chosen by the Main Contractor based on availability and price. (A typical product is the Geolight system manufactured and supplied by SDS limited as shown in Appendix H).

Surface Water Treatment

- 5.18 A petrol interceptor will be included in the surface water drainage network, which will remove any oil, silts and sediments present in the water from the car park and circulation areas prior to discharging into the sewer.

Adoption and Maintenance

- 5.19 The proposed surface water network will remain in private ownership. This should enable tight control over the operation and maintenance of the drainage/SuDS systems on site. A site specific SuDs Maintenance and Management Plan is contained in Appendix K.

Design Criteria

- 5.20 The positive drainage will be designed in accordance with Sewers for Adoption, and BS EN 752 – Drain and sewer systems outside buildings and the Building Regulations - part H (2015).
- 5.21 The surface water network design and rate of surface water runoff would be based on the Modified Rational method and designed in accordance with the Wallingford Procedure. To carry out the design of the networks, a number of Global Variables are used. These Global Variables/parameters are related to the location of the site in the UK and have been obtained from Maps for “design and analysis of urban storm drainage – Wallingford procedure”. These are as follows;

- Region = England & Wales
- $M(5-60) = 19.50\text{mm}$
- Ration (r) = 0.35

5.22 The positive surface water system would be designed such that:

- The pipes remain unsurcharged during the 1 in 2 year design storm;
- The system should not flood during the worst case 1 in 30 year storm with a free outfall;
- The surface water run-off from the proposed development would be contained on site for up to and including the worst case 1 in 100 year storm event, plus an additional 40% for climate change;
- The pipe velocities are such that self-cleansing is achieved at lesser more moderate storm intensities :-
 - o Pipe roughness (k_s) = 0.6
 - o Minimum pipe velocity at full flow = 1.00m/s
 - o Percentage Impermeable areas:
 - Buildings = 100%
 - Roads = 100%
 - Parking = 100%
 - Soft Landscaping = 0%

6 Proposed Foul Drainage

Existing Foul Drainage

- 6.1 The Southern Water sewer records in Appendix D show that there are no public sewers in the vicinity of the site.
- 6.2 There is a large existing B&Q Warehouse immediately to the east. The topographic survey has recorded the existing surface and foul water sewers that drain the B&Q access road to the west and the western part of the existing warehouse.

Proposed Foul Drainage

- 6.3 All sewers will fall on a gravity basis (no pumps required) to the proposed connection point to the B&Q existing drainage network as shown on the drainage strategy drawing in Appendix G.
- 6.4 [Lidl GB have secured the rights to make this connection as part of their agreement to purchase the site, see paragraph 5.3 of this report.](#)

Proposed Foul Flow

- 6.5 The application is for a new Lidl supermarket where the foul flows from the welfare facilities and other connections associated with a supermarket (chiller, freezer, bakery etc) are anticipated to be minimal and, as such, the downstream receiving foul network will have sufficient capacity.

7 Conclusion

7.1 The development is in a low risk Flood Zone 1 area so the proposed levels will be dictated by boundary and engineering constraints as opposed to a predicted fluvial or tidal flood level.

7.2 The development is also at low risk from flooding from the following sources: Groundwater and Infrastructure Failure (see Table 7.1):

Flood Mechanism	Source	Flood Risk to the Development	Mitigation Required?
Fluvial	N/A	Low	No
Tidal	N/A	Low	No
Groundwater	Underlying geology and groundwater levels	Low	No
Surface Water / Overland Flow	Runoff from surrounding elevated land and highway corridors	Low-High	Natural flow paths to be maintained.
Infrastructure Failure	Surface water systems and Water mains	Low	No

Table 7.1: Flood Risk Summary

7.3 The surface water run-off from the Development will discharge via a network of pipes and gullies into the existing B&Q drainage network to the north at a peak discharge rate of **3 litres / second**. [Lidl GB have secured the rights to make this connection as part of their agreement to purchase the site.](#)

7.4 The SuDS features will ensure excess water will be safely contained within the site boundary up to and including the 1 in 100 year event plus 40% climate change.

7.5 The proposed foul sewers serving the development will connect to the existing B&Q network to the north. [Lidl GB have secured the rights to make this connection as part of their agreement to purchase the site.](#)

7.6 Surface water treatment will be provided using a petrol interceptor.

7.7 This report aims to achieve a rating of Excellent under the BREEAM UK Construction 2018 02 guidance. POL 03 relates to Flood and Surface Water management out of a possible 5 credits available, 4 credits have been met which assists with the overall BREEAM rating of the Development.

7.8 Having completed this Flood Risk Assessment and Drainage Strategy, the conclusion is that the proposed new Lidl supermarket at Purbrook Way, Havant is not at risk of flooding and can be safely constructed without flooding itself and will not increase the risk of flooding to downstream/surrounding properties.

APPENDIX A: Site Location

Property Location



Location Plan

The map below shows the location of the property.

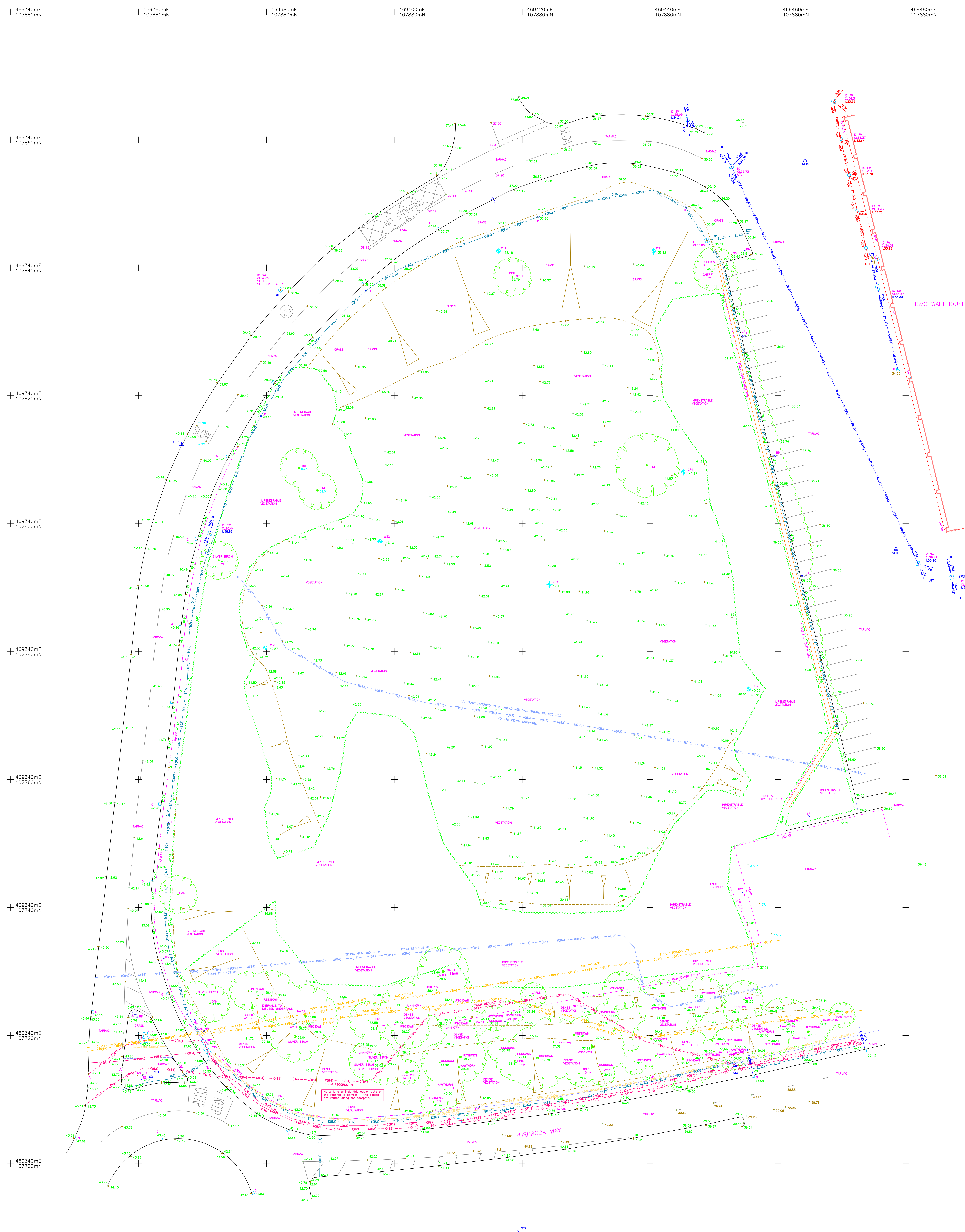
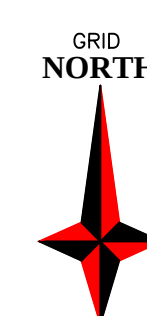


Contains Ordnance Survey data © Crown copyright and database right 2020.

◇ Site

○ Search Radii

APPENDIX B: Topographic Survey



NOTES:

The accuracy and content of this drawing are dependent on the original specification and ERI shall be consulted before use at other sites.

Where underground services are shown, all reasonable care has been taken within the spirit of the original specification and requirement. Before use of the information the user must satisfy themselves as to the completeness and accuracy of such data before undertaking any works. Due to the nature of this work and limitations imposed by ground conditions and the detection equipment no guarantee can be given that all services have been recorded. Trial holes should be dug at critical locations.

All reasonable care has been taken in the survey data represented on this drawing but any discrepancies must be reported to ERI immediately.

Our aim is to produce the best possible results within the specification and cost constraints of our clients. Any comments are most welcome.

Levels shown on kerbs are channel level unless stated.

[illegible]

Legend	Symbol	Feature
== E ==		Sunrise Station
== G ==		Gate
== D ==		Drain
== C ==		Canal
== F ==		Flood water
== H ==		Hunting hut
== S ==		Service duct
== T ==		Telecom cab.
== U ==		Unidentified
== W ==		Water pipes
== P ==		Power Channel/Power
== O ==		Overhead Lines
== T ==		Tree
== B ==		Bank
== R ==		Railroad
== S ==		Building
== O ==		Overhead Building Detail
== W ==		Wall

Station Schedule				
Station	Earliest	Normal	Latest	Type
468045-32	107715-154	42,792	1081	NEB Nst
10	468045-14	107715-154	39,228	NEB Nst
18	469045-14	107850-262	33,228	NEB Nst
10	469045-1025	107850-262	33,228	NEB Nst
10	469045-1025	107739-015	36,623	NEB Nst
18	469045-1025	107739-015	36,623	NEB Nst
10	469045-312	107739-268	39,125	NEB Nst

The services on this survey have been traced using a combination of Radisearch/ROB000 and Nst/DS2000 Detector and/or a hand-held RFL-1000. The RFL-1000 has been made to locate all services no system or equipment is able to locate. The RFL-1000 is a hand-held device that will find in most soils those that are relatively undisturbed but works poorly in soils that are disturbed. The RFL-1000 has been used where there has been previously disturbed or built up, and it also works in soils that are disturbed. The RFL-1000 is a hand-held device that is difficult to trace small bore connections to individual properties. The ROB000 cannot distinguish between services if they are adjacent, cannot always distinguish small diameter pipes, and cannot distinguish between services radiated from buildings (when very close to them) or services outside buildings. The RFL-1000 has been used where possible without damage to covers.

The Survey has been carried out to PAS 128 Detection Method M2)
Orthogonal search trajectories of 2m intervals for both Electro Magnetic Location and Ground Penetrating Radar techniques.

The Quality levels achieved are indicated on a five level scale B1, B2, B3 or B4.
B1 horizontal location accuracy ±150mm or ±15% of distance detected whichever is greater.
B2 vertical location accuracy ±150mm or ±15% of depth detected whichever is greater.
B3 is achieved by horizontal and vertical location by multiple geophysical techniques used.
B4 is achieved by horizontal and vertical location by one geophysical technique used.
C1 vertical location accuracy ±40% of detected depth.
C2 vertical location accuracy ±40% of detected depth.
D1 horizontal location accuracy ±40% of detected depth.
D2 horizontal location accuracy ±40% of detected depth.
D3 horizontal location accuracy ±40% of detected depth.
D4 horizontal location accuracy ±40% of detected depth.
E1 horizontal location accuracy undefined.
E2 horizontal location accuracy undefined.
F1 horizontal location accuracy undefined.
F2 horizontal location accuracy undefined.
F3 horizontal location accuracy undefined.
F4 horizontal location accuracy undefined.

A note regarding the above quality levels to exist but has not been detected or taken from records and is an assumed route only.

B	H9044	06/70	Utility and level survey of cleared area.	NW	AR
X	H9044	08/70	Drainage in B&Q car park & Geo locations.	NW	AR
A	Revit	No Data	Delete (Related)	Surveyor	Chief
CLIENT					
Lidl Great Britain Ltd Fosse Park Bromwich Way Nuneaton CV11 2JH S016 DAW					
PROJECT					
Topographic & Utilities Survey Land adjacent to B&Q Purbrook Way Havant PO9 3JJ					
Date:	No Data	Surveyor	Checked:	Date:	Scale:
18/7/06		N Wright	RJA	June 2020	1:200
DRAWING NO:					REV:

[illegible]

APPENDIX C: Flood Risk Information

Flood map for planning

Your reference
Lidl Havant

Location (easting/northing)
469394/107780

Created
18 Nov 2020 18:24

Your selected location is in flood zone 1, an area with a low probability of flooding.

This means:

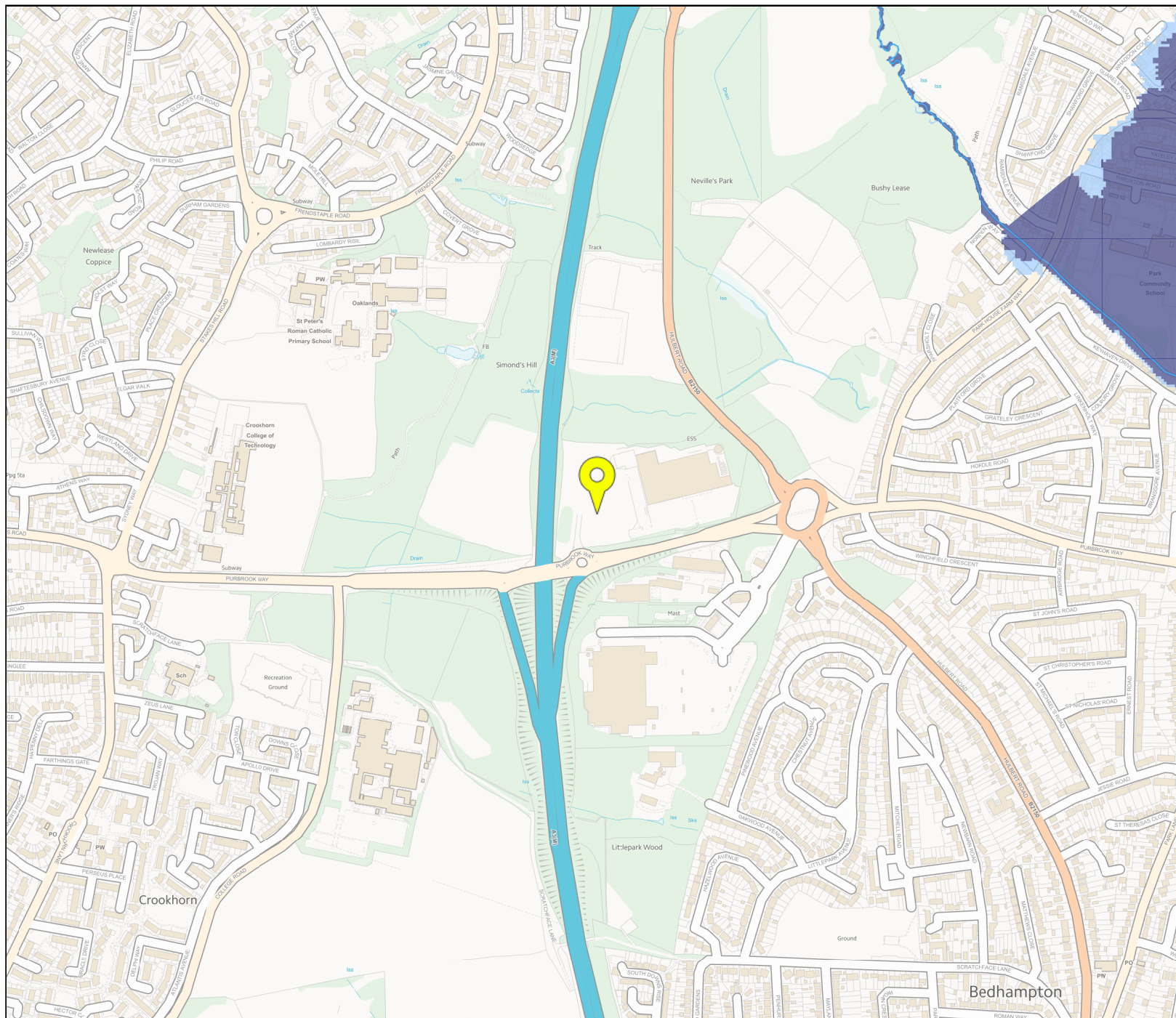
- you don't need to do a flood risk assessment if your development is smaller than 1 hectare and not affected by other sources of flooding
- you may need to do a flood risk assessment if your development is larger than 1 hectare or affected by other sources of flooding or in an area with critical drainage problems

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

The Open Government Licence sets out the terms and conditions for using government data.
<https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3/>



Flood map for planning

Your reference
Lidl Havant

Location (easting/northing)
469394/107780

Scale
1:10000

Created
18 Nov 2020 18:24

-  Selected point
-  Flood zone 3
-  Flood zone 3: areas benefitting from flood defences
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Flood storage area


0 100 200 300m



Section 2a: River and Coastal Flooding

No features relating to potential river and/or coastal flooding have been identified within 500m of the property. Please see the Front Page and the Professional Opinion and Recommendations section for our overall risk opinion, further information and next steps guidance.

Details	Distance	Bearing	Contact
Risk of Flooding From Rivers and Sea (RoFRS) No features identified for this property.			
Flooding From Rivers or Sea Without Defences (Flood Zone 3) No features identified for this property.			
Extreme Flooding From Rivers or Sea Without Defences (Flood Zone 2) No features identified for this property.			
Area Benefiting from Defences No features identified for this property.			
Flood Defences No features identified for this property.			

Flood



Section 2b: Surface Water Flooding

The map below shows the location of surface water flood risks within 500m of the property, with further details in the tables that follow. Please see the Front Page and the Professional Opinion and Recommendations section for our overall risk opinion, further information and next steps guidance.



- Surface Water - 1 in 75 year return
- Surface Water - 1 in 200 year return
- Surface Water - 1 in 1000 year return



Section 2b: Surface Water Flooding

The table below provides details of potential surface water flooding identified within 500m of the property. Please see the Front Page and the Professional Opinion and Recommendations section for our overall risk opinion, further information and next steps guidance.

Details	Distance	Bearing	Contact
Surface Water Flooding Return Period: 1 in 75			
Depth of flood water: Greater than 0.3m and Less than or equal to 1.0m Data Provider: JBA Risk Management Limited	On Site	SW	1
Depth of flood water: Greater than 0.1m and Less than or equal to 0.3m Data Provider: JBA Risk Management Limited	On Site	SW	1
Depth of flood water: Greater than 1.0m Data Provider: JBA Risk Management Limited	129m	N	1
Depth of flood water: Equal to 0.1m Data Provider: JBA Risk Management Limited	282m	E	1
Surface Water Flooding Return Period: 1 in 200			
Depth of flood water: Greater than 0.3m and Less than or equal to 1.0m Data Provider: JBA Risk Management Limited	On Site	SW	1
Depth of flood water: Greater than 0.1m and Less than or equal to 0.3m Data Provider: JBA Risk Management Limited	On Site	S	1
Depth of flood water: Greater than 1.0m Data Provider: JBA Risk Management Limited	128m	N	1
Surface Water Flooding Return Period: 1 in 1000			
Depth of flood water: Greater than 0.3m and Less than or equal to 1.0m Data Provider: JBA Risk Management Limited	On Site	SW	1
Depth of flood water: Greater than 0.1m and Less than or equal to 0.3m Data Provider: JBA Risk Management Limited	On Site	SW	1
Depth of flood water: Greater than 1.0m Data Provider: JBA Risk Management Limited	126m	N	1
Depth of flood water: Equal to 0.1m Data Provider: JBA Risk Management Limited	153m	SE	1

Flood data provided by JBA Risk Management Limited. © Copyright JBA Risk Management Limited 2008-2020

What does this mean?

Surface Water Flooding Return Period: 1 in 75

This area is at risk of flooding in a 1:75 year rainfall event (an event that has a 1 in 75 chance of happening in any given year). It is expected that in this event a large amount of rainfall would overwhelm the drainage systems or be unable to soak away into the ground immediately, and would therefore gather at the areas shown on the map. The depth information above will help you understand how severe any resulting flood might be. If your property/site is within this area we would recommend you consider further investigations to clarify the impact of any flooding.

Flood

Surface Water Flooding Return Period: 1 in 200

This area is at risk of flooding in a 1:200 year rainfall event (an event that has a 1 in 200 chance of happening in any given year). It is expected that in this event a large amount of rainfall would overwhelm the drainage systems or be unable to soak away into the ground immediately, and would therefore gather at the areas shown on the map. The depth information above will help you understand how severe any resulting flood might be. If the predicted flood levels at your property/site are deep (over 1m) we would recommend you consider further investigations to clarify the impact of any flooding.

Surface Water Flooding Return Period: 1 in 1000

This area is at risk of flooding in a 1:1000 year rainfall event (an event that has a 1 in 1000 chance of happening in any given year). It is expected that in this event a large amount of rainfall would overwhelm the drainage systems or be unable to soak away into the ground immediately, and would therefore gather at the areas shown on the map. The depth information above will help you understand how severe any resulting flood might be. If the predicted flood levels at your property/site are deep (over 1m) we would recommend you consider further investigations to clarify the impact of any flooding.



Section 2c: Groundwater Flooding

The map below shows the location of groundwater flood risks within 500m of the property, with further details in the tables that follow. Please see the Front Page and the Professional Opinion and Recommendations section for our overall risk opinion, further information and next steps guidance.



- Groundwater Flood Risk - High Risk
- Groundwater Flood Risk - Moderate Risk
- Groundwater Flood Risk - Low Risk



Section 2c Groundwater Flooding

The table below provides details of potential groundwater flooding identified within 500m of the property. Please see the Front Page and the Professional Opinion and Recommendations section for our overall risk opinion, further information and next steps guidance.

Details	Distance	Bearing	Contact
Groundwater Flooding			
Risk: Low Data Provider: GeoSmart Information Ltd	286m	SW	1

What does this mean?

Groundwater Flooding

This area is considered to be at risk of groundwater flooding in a 1:100 year event. This means that in this type of rainfall event it is predicted that damage to property or harm to other sensitive receptors at, or near, this location could occur. Flooding may result in damage to property, road or rail closures and, in exceptional cases, may pose a risk to life. Further consideration of the local level of risk and mitigation, by a suitably qualified professional, is recommended.

Flood



Section 2d: Other Flooding

The map below shows the location of other flood risks within 500m of the property, with further details in the tables that follow. Please see the Front Page and the Professional Opinion and Recommendations section for our overall risk opinion, further information and next steps guidance.



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- | | |
|--|--|
|  Historic Flood Events |  OS Mastermap Water Network |
|  Flood Water Storage Areas |  Flood Defences |
|  OS VectorMap District - Water Features |  Areas Benefiting from Flood Defences |



Section 2d: Other Flooding

The table below provides details of potential other flooding identified within 500m of the property. Please see the Front Page and the Professional Opinion and Recommendations section for our overall risk opinion, further information and next steps guidance.

Details	Distance	Bearing	Contact
Flood Water Storage Areas			
No features identified for this property.			
Historic Flood Events			
No features identified for this property.			
OS VectorMap District - Water Features			
Data Provider: Ordnance Survey	212m	NE	6
Data Provider: Ordnance Survey	314m	NW	6
Data Provider: Ordnance Survey	366m	NE	6
OS Mastermap Water Network			
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	106m	S	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	112m	N	6
Watercourse Level: Watercourse Name: Not Supplied Data Provider: Ordnance Survey	116m	NW	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	122m	NW	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	141m	N	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	142m	N	6
Watercourse Level: underground Watercourse Name: Not Supplied Data Provider: Ordnance Survey	142m	N	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	206m	NW	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	215m	W	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	218m	NW	6

Flood

Details	Distance	Bearing	Contact
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	228m	W	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	302m	W	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	307m	W	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	307m	W	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	314m	NW	6
Watercourse Level: Watercourse Name: Not Supplied Data Provider: Ordnance Survey	332m	W	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	332m	W	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	332m	NW	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	351m	W	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	355m	W	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	364m	NE	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	364m	NE	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	367m	NE	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	371m	NE	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	378m	NW	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	390m	NE	6

Flood

Details	Distance	Bearing	Contact
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	392m	NE	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	394m	W	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	454m	E	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	458m	S	6
Watercourse Level: Watercourse Name: Not Supplied Data Provider: Ordnance Survey	461m	S	6
Watercourse Level: Watercourse Name: Not Supplied Data Provider: Ordnance Survey	468m	N	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	473m	S	6
Watercourse Level: onGroundSurface Watercourse Name: Not Supplied Data Provider: Ordnance Survey	490m	N	6
Area Benefiting from Defences No features identified for this property.			
Flood Defences No features identified for this property.			

What does this mean?

OS VectorMap District — Water Features / OS Mastermap Water Network

Ordnance Survey Mapping has indicated that there is a water feature such as a river, stream, drain or coastal feature at this location. This may not necessarily pose a risk to the property, but if the water feature transects the property, the property owner may have maintenance responsibilities. Please see Landmark's Overall Flood Risk result to understand the expected impact on the property.

Next Steps

If you would like any further information in respect of the above findings, we recommend that you contact our Customer Services Team on 0844 844 9966 or helpdesk@landmark.co.uk. Further Information is also available in the 'Useful Information' section.

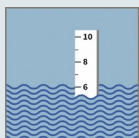
Preparation for a Flood Event

Understanding Flood Risk

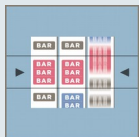
It is important to understand that flooding can happen anywhere, even if the property is not near to a watercourse or the sea. This is because in periods of very heavy rainfall, water can collect in many places where there may be a dip in the ground or a barrier blocking the water's path. Severe rainfall events can also lead to water rising from under the ground as the ground becomes saturated and water is unable to drain away naturally.

The impacts of flooding are not just financial as flooding can also devastate lives, causing both severe disruption at the time as well as continued disturbance through the drying out period in the months that follow. Therefore, it is important to consider any potential flood risk when purchasing a property.

How is the Overall Flood Risk Calculated?



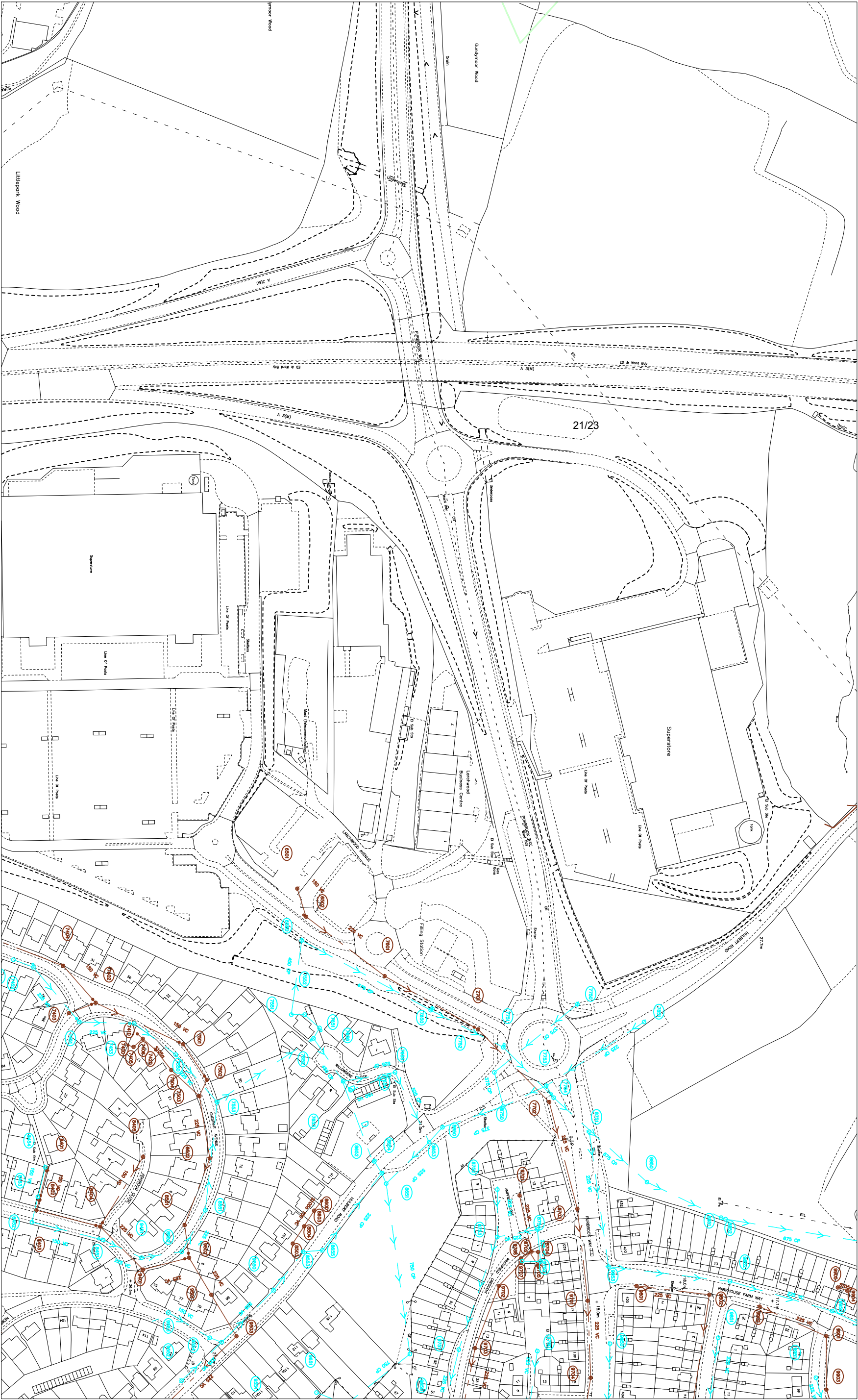
Impact: We consider the expected depths of flooding at your property. Low depths, for example, 10cm, are unlikely to put people at risk but water damage to buildings and contents may be significant without any flood protection. High water depths, for example 1m, may severely threaten the safety of people and may cause extensive damage to buildings. It may be dangerous to keep deep floods out of a building because of the large weight of water pressing against the wall.



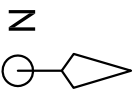
Likelihood: Flood risk is based on probability and different approaches to flood protection may be needed depending upon how likely flooding is expected. A common way of expressing how likely a flood event is to occur is 'return period'. For example, a 1:100 year event has a 1% likelihood of occurring in any given year, whereas a 1:200 year event has a 0.5% likelihood of occurring in any given year. The 1:200 event would be expected to result in a greater extent of flooding than the 1:100 event, as it would be more severe, but the likelihood of it occurring is lower.

APPENDIX D: Southern Water Sewer Records

107971



107393

O.S. REF. SU6907NE		Drawn by: dassuta		The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. WARNING: BAC pipes are constructed of Bonded Asbestos Cement WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement
		Scale: 1:2500		
Title: Land at Purbrook Way	Date: 03/02/2020	Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530.		

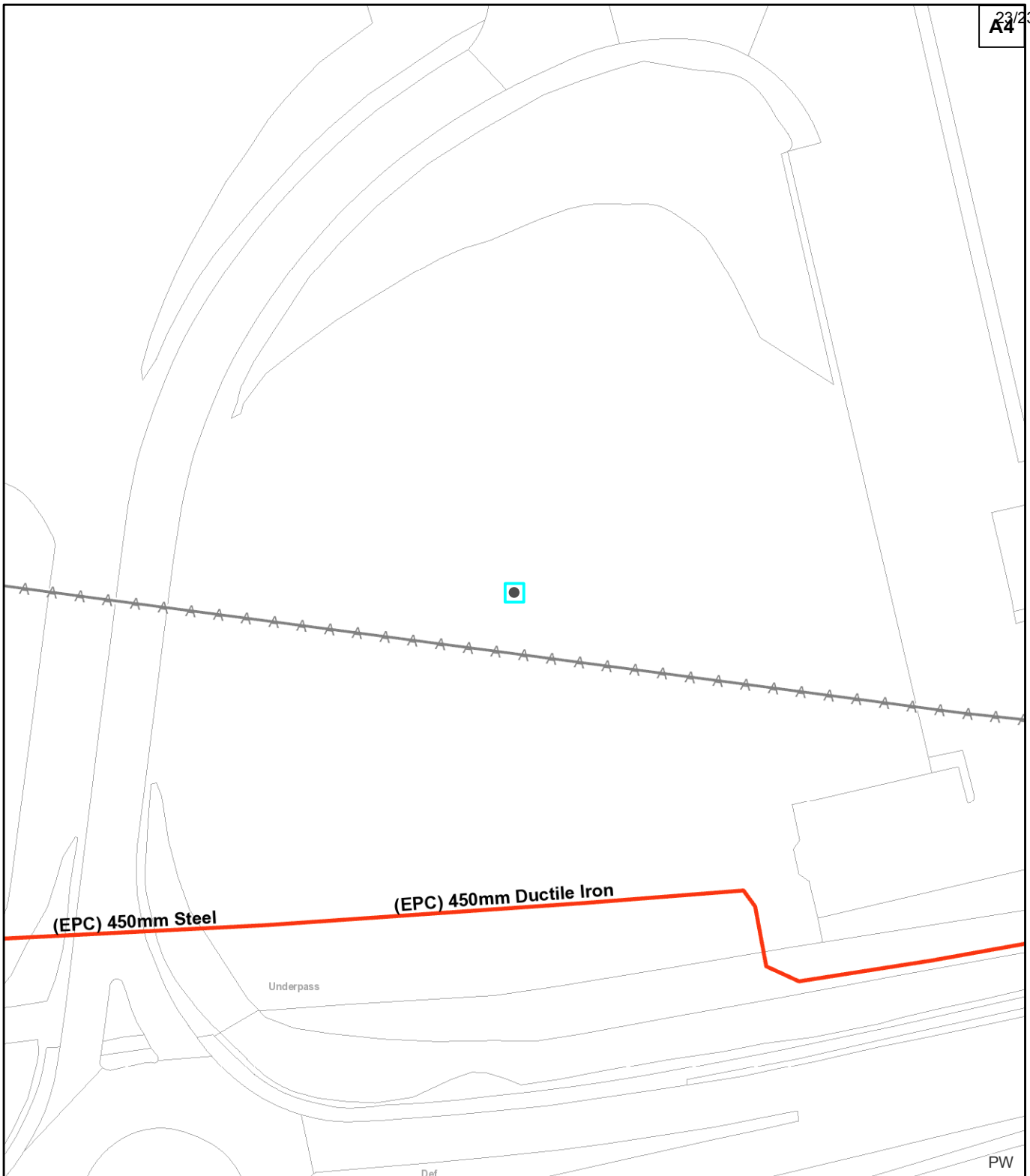
469056

469996

SEWER RECORDS PAGE 2 OF 2

[illegible][illegible]

Drawn by:	dassuta
Title:	Land at Purbrook Way
Date:	03/02/2020
	



Water Supply	Valves / Fittings	Hydrant
— Distribution Main - - - Fire Main — Trunk Main — Raw Water Main — Communication Pipe — Abandoned Main	- Capped End - StopCock - Butterfly Valve - Pressure Flow Valve	- Reflux Valve - Air Valve - Open Valve - Closed Valve - Company Washout Hydrant(Double) - Company Washout Hydrant(Double) Offset - Company Washout Hydrant(Single) - Company Washout Hydrant(Single) Offset
		- Fire Brigade Hydrant(Double) - Fire Brigade Hydrant(Double) Offset - Fire Brigade Hydrant(Single) - Fire Brigade Hydrant(Single) Offset - Fire Brigade Washout Hydrant

The information supplied is given in good faith as a guide to locating underground apparatus. Its accuracy cannot be guaranteed, nor does it include comprehensive information about the existence or location of service pipes or cables to individual premises. The responsibility for locating and avoiding damage to apparatus on site shall be that of the person proposing to excavate in the street who shall be liable to the apparatus owner and any third party who may be affected in any way for any loss or damage caused by their failure to do so.

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U1490087

OS Ref: SU6804SW

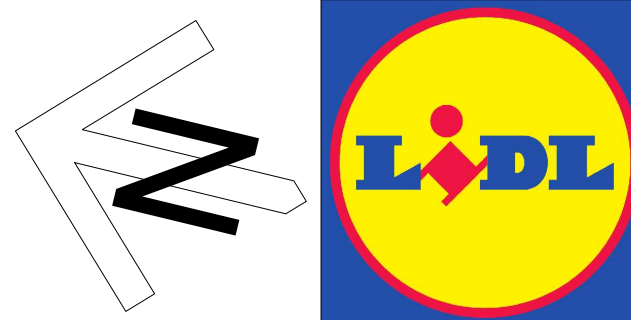


Registered Office
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Registered in England No. 2536455
Telephone: (023) 9249 9888
Fax: (023) 9245 3632
Website: www.portsmouthwater.co.uk

Scale: 1:1,250

Date: 17/01/2020

APPENDIX E: Proposed Layout



APPENDIX F: Proposed Calculations

Mayer Brown Ltd		Page 1
Lion House Oriental Road Woking GU22 8AR	Purbrook Way Havant Greenfield Run-off Calculation	
Date 27/08/2020 File	Designed by CG Checked by	
XP Solutions Source Control 2018.1		

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.400
Area (ha)	0.790	Urban	0.000
SAAR (mm)	771	Region Number	Region 7

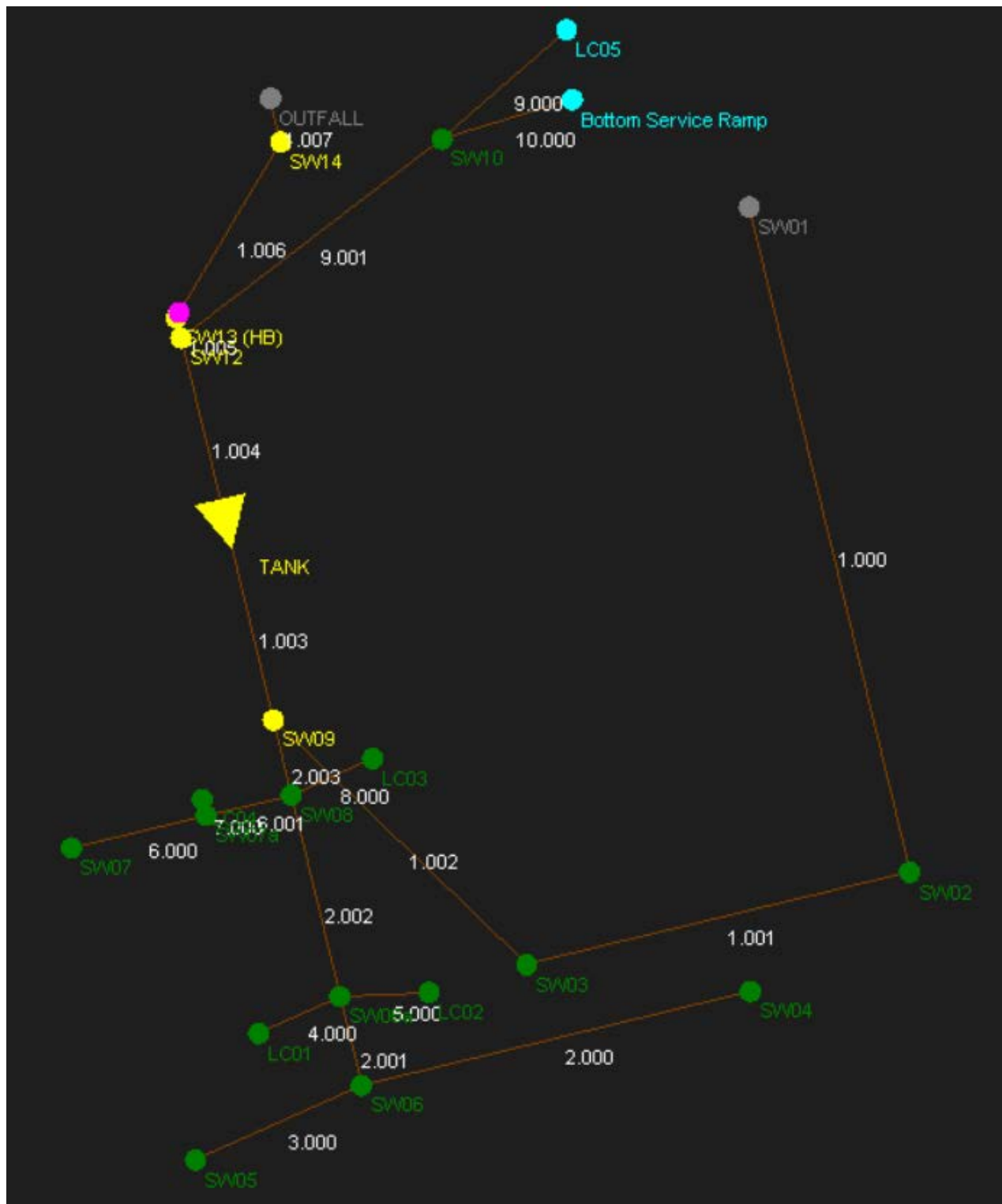
Results 1/s

QBAR Rural	3.0
QBAR Urban	3.0
Q100 years	9.6
Q1 year	2.6
Q30 years	6.8
Q100 years	9.6

©1982-2018 Innovyze

LIDL HAVANT

MICRODRAINAGE SURFACE WATER NETWORK



Mayer Brown Limited		Page 1
Lion House Oriental Road Woking, GU22 8AR	Lidl, Havant Surface Water Network	
Date 15/02/2021 17:05 File 210209 - Surface Water ...	Designed by TC Checked by SF	
Innovyze	Network 2020.1	

Existing Network Details for Storm

* - Indicates pipe has been modified outside of System 1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
1.000	65.999	0.440	150.0	0.116	5.00	0.600	o	225	Pipe/Conduit
1.001	38.000	0.250	152.0	0.116	0.00	0.600	o	225	Pipe/Conduit
1.002	33.989	0.780	43.6	0.000	0.00	0.600	o	225	Pipe/Conduit
2.000	38.597	0.320	120.6	0.038	5.00	0.600	o	225	Pipe/Conduit
3.000	17.551	0.370	47.4	0.000	5.00	0.600	o	150	Pipe/Conduit
2.001	8.823	0.060	147.1	0.081	0.00	0.600	o	225	Pipe/Conduit
4.000	8.607	0.440	19.6	0.064	5.00	0.600	o	225	Pipe/Conduit
5.000	8.607	0.440	19.6	0.046	5.00	0.600	o	225	Pipe/Conduit
2.002	20.002	0.150	133.3	0.000	0.00	0.600	o	225	Pipe/Conduit
* 6.000	13.447	0.095	141.5	0.017	5.00	0.600	o	150	Pipe/Conduit
7.000	1.566	0.300	5.2	0.057	5.00	0.600	o	225	Pipe/Conduit
6.001	8.594	0.210	40.9	0.000	0.00	0.600	o	225	Pipe/Conduit
8.000	8.595	0.590	14.6	0.132	5.00	0.600	o	225	Pipe/Conduit
2.003	7.420	0.440	16.9	0.000	0.00	0.600	o	300	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
1.000	SW01	41.950	40.950	0.775	41.950	40.510	1.215		600
1.001	SW02	41.950	40.510	1.215	41.740	40.260	1.255		600
1.002	SW03	41.740	40.260	1.255	41.550	39.480	1.845		1200
2.000	SW04	41.870	40.370	1.275	41.550	40.050	1.275		1200
3.000	SW05	41.700	40.500	1.050	41.550	40.130	1.270		600
2.001	SW06	41.550	40.050	1.275	41.550	39.990	1.335		1200
4.000	LC01	41.630	40.430	0.975	41.550	39.990	1.335		600
5.000	LC02	41.640	40.430	0.985	41.550	39.990	1.335		600
2.002	SW06a	41.550	39.990	1.335	41.550	39.840	1.485		1200
* 6.000	SW07	41.800	40.300	1.350	41.630	40.205	1.275		1200
7.000	LC04	41.630	40.430	0.975	41.630	40.130	1.275		600
6.001	SW07a	41.630	40.130	1.275	41.550	39.920	1.405		1200
8.000	LC03	41.640	40.430	0.985	41.550	39.840	1.485		600
2.003	SW08	41.550	39.840	1.410	41.550	39.400	1.850		1200

Mayer Brown Limited		Page 2
Lion House Oriental Road Woking, GU22 8AR	Lidl, Havant Surface Water Network	
Date 15/02/2021 17:05 File 210209 - Surface Water ...	Designed by TC Checked by SF	
Innovyze	Network 2020.1	

Existing Network Details for Storm

	PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	k (mm)	HYD SECT	DIA (mm)	Section Type
*	1.003	19.409	0.050	388.2	0.000	0.00	0.600	o	450	Pipe/Conduit
*	1.004	18.501	0.050	370.0	0.000	0.00	0.600	o	450	Pipe/Conduit
*	9.000	15.990	1.710	9.4	0.000	5.00	0.600	o	150	Pipe/Conduit
*	10.000	13.000	0.240	54.2	0.000	5.00	0.600	o	150	Pipe/Conduit
	9.001	31.653	0.210	150.7	0.023	5.00	0.600	o	150	Pipe/Conduit
*	1.005	2.000	0.050	40.0	0.065	0.00	0.600	o	450	Pipe/Conduit
*	1.006	19.745	0.300	65.8	0.000	0.00	0.600	o	150	Pipe/Conduit
*	1.007	4.321	0.100	43.2	0.000	0.00	0.600	o	150	Pipe/Conduit

PN	US/MH Name	US/CL (m)	US/IL (m)	US C.Depth (m)	DS/CL (m)	DS/IL (m)	DS C.Depth (m)	Ctrl	US/MH (mm)
* 1.003		SW09	41.550	39.100	2.000	41.550	39.050		1500
* 1.004		TANK	41.550	39.050	2.050	41.550	39.000		1200
* 9.000		LC05	41.950	41.250	0.550	41.350	39.540		600
* 10.000	Bottom Service Ramp	40.580	39.780	0.650	41.350	39.540	1.660		600
9.001		SW10	41.350	39.540	1.660	41.550	39.330		1200
* 1.005		SW12	41.550	39.000	2.100	41.550	38.950		1200
* 1.006	SW13 (HB)	41.550	38.950	2.450	40.950	38.650	2.150	Hydro-Brake®	1200
* 1.007		SW14	40.950	37.000	3.800	37.890	36.900		1200

Mayer Brown Limited		Page 3
Lion House Oriental Road Woking, GU22 8AR	Lidl, Havant Surface Water Network	
Date 15/02/2021 17:05 File 210209 - Surface Water ...	Designed by TC Checked by SF	
Innovyze	Network 2020.1	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	225	SW01	41.950	40.950	0.775	Open Manhole	600
1.001	o	225	SW02	41.950	40.510	1.215	Open Manhole	600
1.002	o	225	SW03	41.740	40.260	1.255	Open Manhole	1200
2.000	o	225	SW04	41.870	40.370	1.275	Open Manhole	1200
3.000	o	150	SW05	41.700	40.500	1.050	Open Manhole	600
2.001	o	225	SW06	41.550	40.050	1.275	Open Manhole	1200
4.000	o	225	LC01	41.630	40.430	0.975	Open Manhole	600
5.000	o	225	LC02	41.640	40.430	0.985	Open Manhole	600
2.002	o	225	SW06a	41.550	39.990	1.335	Open Manhole	1200
6.000	o	150	SW07	41.800	40.300	1.350	Open Manhole	1200
7.000	o	225	LC04	41.630	40.430	0.975	Open Manhole	600
6.001	o	225	SW07a	41.630	40.130	1.275	Open Manhole	1200
8.000	o	225	LC03	41.640	40.430	0.985	Open Manhole	600
2.003	o	300	SW08	41.550	39.840	1.410	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	65.999	150.0	SW02	41.950	40.510	1.215	Open Manhole	600
1.001	38.000	152.0	SW03	41.740	40.260	1.255	Open Manhole	1200
1.002	33.989	43.6	SW09	41.550	39.480	1.845	Open Manhole	1500
2.000	38.597	120.6	SW06	41.550	40.050	1.275	Open Manhole	1200
3.000	17.551	47.4	SW06	41.550	40.130	1.270	Open Manhole	1200
2.001	8.823	147.1	SW06a	41.550	39.990	1.335	Open Manhole	1200
4.000	8.607	19.6	SW06a	41.550	39.990	1.335	Open Manhole	1200
5.000	8.607	19.6	SW06a	41.550	39.990	1.335	Open Manhole	1200
2.002	20.002	133.3	SW08	41.550	39.840	1.485	Open Manhole	1200
6.000	13.447	141.5	SW07a	41.630	40.205	1.275	Open Manhole	1200
7.000	1.566	5.2	SW07a	41.630	40.130	1.275	Open Manhole	1200
6.001	8.594	40.9	SW08	41.550	39.920	1.405	Open Manhole	1200
8.000	8.595	14.6	SW08	41.550	39.840	1.485	Open Manhole	1200
2.003	7.420	16.9	SW09	41.550	39.400	1.850	Open Manhole	1500

Mayer Brown Limited		Page 4
Lion House Oriental Road Woking, GU22 8AR	Lidl, Havant Surface Water Network	
Date 15/02/2021 17:05 File 210209 - Surface Water ...	Designed by TC Checked by SF	
Innovyze	Network 2020.1	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.003	o	450	SW09	41.550	39.100	2.000	Open Manhole	1500
1.004	o	450	TANK	41.550	39.050	2.050	Open Manhole	1200
9.000	o	150	LC05	41.950	41.250	0.550	Open Manhole	600
10.000	o	150	Bottom Service Ramp	40.580	39.780	0.650	Open Manhole	600
9.001	o	150	SW10	41.350	39.540	1.660	Open Manhole	1200
1.005	o	450	SW12	41.550	39.000	2.100	Open Manhole	1200
1.006	o	150	SW13 (HB)	41.550	38.950	2.450	Open Manhole	1200
1.007	o	150	SW14	40.950	37.000	3.800	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.003	19.409	388.2	TANK	41.550	39.050	2.050	Open Manhole	1200
1.004	18.501	370.0	SW12	41.550	39.000	2.100	Open Manhole	1200
9.000	15.990	9.4	SW10	41.350	39.540	1.660	Open Manhole	1200
10.000	13.000	54.2	SW10	41.350	39.540	1.660	Open Manhole	1200
9.001	31.653	150.7	SW12	41.550	39.330	2.070	Open Manhole	1200
1.005	2.000	40.0	SW13 (HB)	41.550	38.950	2.150	Open Manhole	1200
1.006	19.745	65.8	SW14	40.950	38.650	2.150	Open Manhole	1200
1.007	4.321	43.2	OUTFALL	37.890	36.900	0.840	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.007	OUTFALL	37.890	36.900	0.000	0	0

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: SW13 (HB), DS/PN: 1.006, Volume (m³): 3.1

Unit Reference	MD-SHE-0074-3000-1600-3000
Design Head (m)	1.600
Design Flow (l/s)	3.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	74
Invert Level (m)	38.950
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.600	3.0	Kick-Flo®	0.661	2.0
Flush-Flo™	0.323	2.5	Mean Flow over Head Range	-	2.4

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.0	0.800	2.2	2.000	3.3	4.000	4.6	7.000	6.0
0.200	2.4	1.000	2.4	2.200	3.5	4.500	4.9	7.500	6.2
0.300	2.5	1.200	2.6	2.400	3.6	5.000	5.1	8.000	6.4
0.400	2.5	1.400	2.8	2.600	3.8	5.500	5.3	8.500	6.5
0.500	2.4	1.600	3.0	3.000	4.0	6.000	5.6	9.000	6.7
0.600	2.2	1.800	3.2	3.500	4.3	6.500	5.8	9.500	6.9

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Storage Structures for Storm

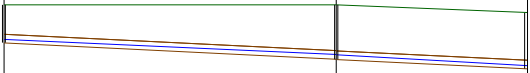
Cellular Storage Manhole: TANK, DS/PN: 1.004

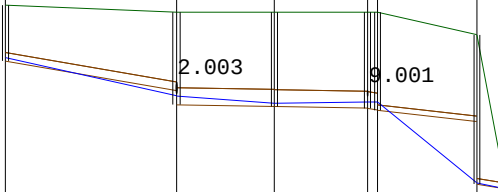
Invert Level (m) 39.050 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.00000

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	465.0	465.0	1.500	465.0	603.0	1.501	0.0	603.0

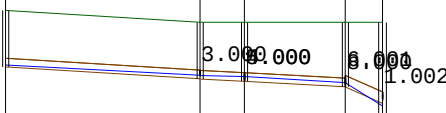
©1982-2020 Innovyze

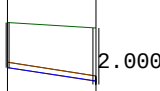
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MH Name		SW01	SW02	SW03
Hor Scale 1500				
Ver Scale 200				
Datum (m)	37.000			
PN		1.000	1.001	
Dia (mm)		225	225	
Slope (1:X)		150.0	152.0	
Cover Level (m)		41.950	41.950	41.740
Invert Level (m)		40.950	40.510	40.260
Length (m)		65.999	38.000	

MH Name		SW03	SW09	TANK	SW13 (HB)	OUTFALL
Hor Scale 1500						
Ver Scale 200						
Datum (m)	35.000					
PN		1.002	1.003	1.004	1.006	
Dia (mm)		225	450	450	150	
Slope (1:X)		43.6	388.2	370.0	65.8	
Cover Level (m)		41.740	41.550	41.550	41.550	37.890
Invert Level (m)		40.260	39.480	39.100	38.950	38.650
Length (m)		33.989	19.409	18.501	19.745	

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MH Name		SW04		SW06a		SW09
Hor Scale 1500						
Ver Scale 200						
Datum (m)	36.000					
PN		2.000		2.002		
Dia (mm)		225		225		
Slope (1:X)		120.6		133.3		
Cover Level (m)		41.870		41.550		41.550
Invert Level (m)		40.370	40.050	39.990	39.840	
Length (m)		38.597		20.002		

MH Name			SW06
Hor Scale 1500			
Ver Scale 200			
Datum (m)	36.000		
PN			
Dia (mm)			
Slope (1:X)			
Cover Level (m)		41.700	41.550
Invert Level (m)		40.500	40.130
Length (m)			

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MH Name		SW06a
Hor Scale 1500		2.000
Ver Scale 200		
Datum (m)36.000		
PN		
Dia (mm)		
Slope (1:X)		
Cover Level (m)	41.630	41.550
Invert Level (m)	40.430	
Length (m)		

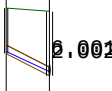
MH Name		SW06a
Hor Scale 1500		2.000
Ver Scale 200		
Datum (m)36.000		
PN		
Dia (mm)		
Slope (1:X)		
Cover Level (m)	41.640	41.550
Invert Level (m)	40.430	
Length (m)		

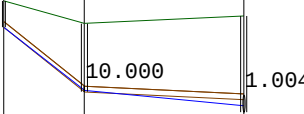
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MH Name				SW08
Hor Scale 1500				
Ver Scale 200				
Datum (m)36.000				
PN				
Dia (mm)				
Slope (1:X)				
Cover Level (m)		41.800	41.630	41.550
Invert Level (m)		40.300	40.205	40.130
Length (m)				

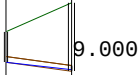
MH Name				SW07a
Hor Scale 1500				
Ver Scale 200				
Datum (m)36.000				
PN				
Dia (mm)				
Slope (1:X)				
Cover Level (m)			41.630	
Invert Level (m)				
Length (m)				

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MH Name		SW08
Hor Scale 1500		
Ver Scale 200		
Datum (m)36.000		
PN		
Dia (mm)		
Slope (1:X)		
Cover Level (m)	41.640	41.550
Invert Level (m)	40.430	
Length (m)		

MH Name		SW10	SW12
Hor Scale 1500			
Ver Scale 200			
Datum (m)36.000			
PN			
Dia (mm)			
Slope (1:X)			
Cover Level (m)	41.950	41.350	41.550
Invert Level (m)	41.250	39.540	39.330
Length (m)		31.653	

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MH Name			SW10
Hor Scale 1500			
Ver Scale 200			
Datum (m)36.000			
PN			
Dia (mm)			
Slope (1:X)			
Cover Level (m)		40.580	41.350
Invert Level (m)		39.780 39.540	
Length (m)			

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D3 (1km) 0.383
 FEH Rainfall Version 1999 E (1km) 0.310
 Site Location GB 470100 107800 SU 70100 07800 F (1km) 2.245
 C (1km) -0.029 Cv (Summer) 0.750
 D1 (1km) 0.462 Cv (Winter) 0.840
 D2 (1km) 0.300

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status OFF

Profile(s) Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 2
 Climate Change (%) 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	SW01	15 Winter	2	+0%					41.038
1.001	SW02	15 Winter	2	+0%					40.634
1.002	SW03	15 Winter	2	+0%					40.346
2.000	SW04	15 Winter	2	+0%					40.417
3.000	SW05	15 Winter	2	+0%					40.500
2.001	SW06	15 Winter	2	+0%					40.144
4.000	LC01	15 Winter	2	+0%					40.472
5.000	LC02	15 Winter	2	+0%					40.464
2.002	SW06a	15 Winter	2	+0%					40.116
6.000	SW07	15 Winter	2	+0%					40.338
7.000	LC04	15 Winter	2	+0%					40.474
6.001	SW07a	15 Winter	2	+0%					40.184
8.000	LC03	15 Winter	2	+0%					40.486
2.003	SW08	15 Winter	2	+0%					39.950
1.003	SW09	960 Winter	2	+0%					39.355
1.004	TANK	960 Winter	2	+0%					39.354
9.000	LC05	15 Winter	2	+0%					41.250
10.000	Bottom Service Ramp	15 Winter	2	+0%					39.780
9.001	SW10	15 Winter	2	+0%					39.584
1.005	SW12	960 Winter	2	+0%					39.360
1.006	SW13 (HB)	960 Winter	2	+0%	2/15 Winter				39.368
1.007	SW14	960 Winter	2	+0%					37.035

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW01	-0.137	0.000	0.31			12.5	OK	
1.001	SW02	-0.101	0.000	0.58			23.0	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.002	SW03	-0.139	0.000	0.31			23.1	OK	
2.000	SW04	-0.178	0.000	0.09			4.2	OK	
3.000	SW05	-0.150	0.000	0.00			0.0	OK	
2.001	SW06	-0.131	0.000	0.35			12.0	OK	
4.000	LC01	-0.183	0.000	0.08			7.3	OK	
5.000	LC02	-0.191	0.000	0.06			5.2	OK	
2.002	SW06a	-0.099	0.000	0.60			24.4	OK	
6.000	SW07	-0.112	0.000	0.14			1.9	OK	
7.000	LC04	-0.181	0.000	0.08			6.5	OK	
6.001	SW07a	-0.171	0.000	0.13			8.3	OK	
8.000	LC03	-0.169	0.000	0.14			15.0	OK	
2.003	SW08	-0.190	0.000	0.29			47.6	OK	
1.003	SW09	-0.195	0.000	0.07			9.3	OK	
1.004	TANK	-0.146	0.000	0.07		667	9.0	OK	
9.000	LC05	-0.150	0.000	0.00			0.0	OK	
10.000	Bottom Service Ramp	-0.150	0.000	0.00			0.0	OK	
9.001	SW10	-0.106	0.000	0.19			2.6	OK	
1.005	SW12	-0.090	0.000	0.03			4.8	OK	
1.006	SW13 (HB)	0.268	0.000	0.12			2.4	SURCHARGED	
1.007	SW14	-0.115	0.000	0.12			2.4	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D3 (1km) 0.383
 FEH Rainfall Version 1999 E (1km) 0.310
 Site Location GB 470100 107800 SU 70100 07800 F (1km) 2.245
 C (1km) -0.029 Cv (Summer) 0.750
 D1 (1km) 0.462 Cv (Winter) 0.840
 D2 (1km) 0.300

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status OFF

Profile(s) Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 10
 Climate Change (%) 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	SW01	15 Winter	10	+0%					41.071
1.001	SW02	15 Winter	10	+0%	10/15 Winter				40.746
1.002	SW03	15 Winter	10	+0%					40.379
2.000	SW04	15 Winter	10	+0%					40.432
3.000	SW05	15 Winter	10	+0%					40.500
2.001	SW06	15 Winter	10	+0%					40.248
4.000	LC01	15 Winter	10	+0%					40.485
5.000	LC02	15 Winter	10	+0%					40.477
2.002	SW06a	15 Winter	10	+0%					40.215
6.000	SW07	15 Winter	10	+0%					40.350
7.000	LC04	15 Winter	10	+0%					40.487
6.001	SW07a	15 Winter	10	+0%					40.203
8.000	LC03	15 Winter	10	+0%					40.505
2.003	SW08	15 Winter	10	+0%					39.989
1.003	SW09	960 Winter	10	+0%	10/960 Winter				39.556
1.004	TANK	960 Winter	10	+0%	10/480 Winter				39.555
9.000	LC05	15 Winter	10	+0%					41.250
10.000	Bottom Service Ramp	15 Winter	10	+0%					39.780
9.001	SW10	15 Winter	10	+0%					39.599
1.005	SW12	960 Winter	10	+0%	10/360 Winter				39.582
1.006	SW13 (HB)	960 Winter	10	+0%	10/15 Winter				39.583
1.007	SW14	1440 Winter	10	+0%					37.035

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW01	-0.104	0.000	0.53			21.6	OK	
1.001	SW02	0.011	0.000	1.02			40.8	SURCHARGED	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.002	SW03	-0.106	0.000	0.55			40.9	OK	
2.000	SW04	-0.163	0.000	0.16			7.3	OK	
3.000	SW05	-0.150	0.000	0.00			0.0	OK	
2.001	SW06	-0.027	0.000	0.62			21.3	OK	
4.000	LC01	-0.170	0.000	0.13			12.6	OK	
5.000	LC02	-0.178	0.000	0.10			9.1	OK	
2.002	SW06a	0.000	0.000	1.01			41.0	OK	
6.000	SW07	-0.100	0.000	0.24			3.3	OK	
7.000	LC04	-0.168	0.000	0.15			11.2	OK	
6.001	SW07a	-0.152	0.000	0.22			14.3	OK	
8.000	LC03	-0.150	0.000	0.24			25.9	OK	
2.003	SW08	-0.151	0.000	0.49			80.7	OK	
1.003	SW09	0.006	0.000	0.10			13.3	SURCHARGED	
1.004	TANK	0.055	0.000	0.07		893	9.7	SURCHARGED	
9.000	LC05	-0.150	0.000	0.00			0.0	OK	
10.000	Bottom Service Ramp	-0.150	0.000	0.00			0.0	OK	
9.001	SW10	-0.091	0.000	0.33			4.5	OK	
1.005	SW12	0.132	0.000	0.03			4.6	SURCHARGED	
1.006	SW13 (HB)	0.483	0.000	0.12			2.4	SURCHARGED	
1.007	SW14	-0.115	0.000	0.12			2.4	OK	

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Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D3 (1km) 0.383
 FEH Rainfall Version 1999 E (1km) 0.310
 Site Location GB 470100 107800 SU 70100 07800 F (1km) 2.245
 C (1km) -0.029 Cv (Summer) 0.750
 D1 (1km) 0.462 Cv (Winter) 0.840
 D2 (1km) 0.300

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status OFF

Profile(s) Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 30
 Climate Change (%) 0

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000		SW01 15 Winter	30	+0%	30/15 Winter				41.232
1.001		SW02 15 Winter	30	+0%	30/15 Winter				40.989
1.002		SW03 15 Winter	30	+0%					40.407
2.000		SW04 15 Winter	30	+0%					40.482
3.000		SW05 15 Winter	30	+0%					40.500
2.001		SW06 15 Winter	30	+0%	30/15 Winter				40.454
4.000		LC01 15 Winter	30	+0%					40.498
5.000		LC02 15 Winter	30	+0%					40.487
2.002		SW06a 15 Winter	30	+0%	30/15 Winter				40.376
6.000		SW07 15 Winter	30	+0%					40.363
7.000		LC04 15 Winter	30	+0%					40.501
6.001		SW07a 15 Winter	30	+0%					40.220
8.000		LC03 15 Winter	30	+0%					40.523
2.003		SW08 15 Winter	30	+0%					40.028
1.003		SW09 960 Winter	30	+0%	30/15 Winter				39.780
1.004		TANK 960 Winter	30	+0%	30/240 Winter				39.779
9.000		LC05 15 Winter	30	+0%					41.250
10.000	Bottom Service	Ramp 15 Winter	30	+0%					39.780
9.001		SW10 960 Winter	30	+0%	30/480 Winter				39.758
1.005		SW12 960 Winter	30	+0%	30/120 Winter				39.853
1.006	SW13 (HB)	960 Winter	30	+0%	30/15 Winter				39.862
1.007		SW14 240 Winter	30	+0%					37.035

Mayer Brown Limited		Page 2
Lion House Oriental Road Woking, GU22 8AR	Lidl, Havant Surface Water Network	
Date 15/02/2021 17:10 File 210209 - Surface Water ...	Designed by TC Checked by SF	
Innovyze	Network 2020.1	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW01	0.057	0.000	0.73			29.8	SURCHARGED	
1.001	SW02	0.254	0.000	1.41			56.2	SURCHARGED	
1.002	SW03	-0.078	0.000	0.75			55.8	OK	
2.000	SW04	-0.113	0.000	0.24			10.6	OK	
3.000	SW05	-0.150	0.000	0.00			0.0	OK	
2.001	SW06	0.179	0.000	0.83			28.7	SURCHARGED	
4.000	LC01	-0.157	0.000	0.20			18.7	OK	
5.000	LC02	-0.168	0.000	0.14			13.5	OK	
2.002	SW06a	0.161	0.000	1.44			58.6	SURCHARGED	
6.000	SW07	-0.087	0.000	0.36			4.9	OK	
7.000	LC04	-0.154	0.000	0.22			16.7	OK	
6.001	SW07a	-0.135	0.000	0.33			21.4	OK	
8.000	LC03	-0.132	0.000	0.36			38.6	OK	
2.003	SW08	-0.112	0.000	0.71			117.4	OK	
1.003	SW09	0.230	0.000	0.13			17.3	SURCHARGED	
1.004	TANK	0.279	0.000	0.10			13.6	SURCHARGED	
9.000	LC05	-0.150	0.000	0.00			0.0	OK	
10.000	Bottom Service Ramp	-0.150	0.000	0.00			0.0	OK	
9.001	SW10	0.068	0.000	0.09			1.3	SURCHARGED	
1.005	SW12	0.403	0.000	0.04			6.9	SURCHARGED	
1.006	SW13 (HB)	0.762	0.000	0.12			2.4	SURCHARGED	
1.007	SW14	-0.115	0.000	0.12			2.4	OK	

Mayer Brown Limited		Page 1
Lion House Oriental Road Woking, GU22 8AR	Lidl, Havant Surface Water Network	
Date 15/02/2021 17:07 File 210209 - Surface Water ...	Designed by TC Checked by SF	
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Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
 Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
 Number of Online Controls 1 Number of Storage Structures 1 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D3 (1km) 0.383
 FEH Rainfall Version 1999 E (1km) 0.310
 Site Location GB 470100 107800 SU 70100 07800 F (1km) 2.245
 C (1km) -0.029 Cv (Summer) 0.750
 D1 (1km) 0.462 Cv (Winter) 0.840
 D2 (1km) 0.300

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status ON
 DVD Status ON
 Inertia Status OFF

Profile(s) Winter
 Duration(s) (mins) 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 100
 Climate Change (%) 40

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	SW01	60 Winter	100	+40%	100/60 Winter				41.526
1.001	SW02	60 Winter	100	+40%	100/60 Winter				41.211
1.002	SW03	960 Winter	100	+40%	100/960 Winter				40.562
2.000	SW04	60 Winter	100	+40%	100/60 Winter				40.609
3.000	SW05	60 Winter	100	+40%					40.576
2.001	SW06	60 Winter	100	+40%	100/60 Winter				40.576
4.000	LC01	960 Winter	100	+40%					40.561
5.000	LC02	960 Winter	100	+40%					40.561
2.002	SW06a	960 Winter	100	+40%	100/60 Winter				40.569
6.000	SW07	960 Winter	100	+40%	100/960 Winter				40.559
7.000	LC04	960 Winter	100	+40%					40.561
6.001	SW07a	960 Winter	100	+40%	100/480 Winter				40.570
8.000	LC03	960 Winter	100	+40%					40.558
2.003	SW08	960 Winter	100	+40%	100/240 Winter				40.578
1.003	SW09	960 Winter	100	+40%	100/60 Winter				40.586
1.004	TANK	960 Winter	100	+40%	100/60 Winter				40.598
9.000	LC05	60 Winter	100	+40%					41.250
10.000	Bottom Service Ramp	960 Winter	100	+40%	100/240 Winter				40.561
9.001	SW10	960 Winter	100	+40%	100/60 Winter				40.561
1.005	SW12	960 Winter	100	+40%	100/60 Winter				40.618
1.006	SW13 (HB)	960 Winter	100	+40%	100/60 Winter				40.629
1.007	SW14	960 Winter	100	+40%					37.039

Mayer Brown Limited		Page 2
Lion House Oriental Road Woking, GU22 8AR	Lidl, Havant Surface Water Network	
Date 15/02/2021 17:07 File 210209 - Surface Water ...	Designed by TC Checked by SF	
Innovyze	Network 2020.1	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW01	0.351	0.000	0.84			34.5	SURCHARGED	
1.001	SW02	0.476	0.000	1.71			68.1	SURCHARGED	
1.002	SW03	0.077	0.000	0.15			11.2	SURCHARGED	
2.000	SW04	0.014	0.000	0.26			11.5	SURCHARGED	
3.000	SW05	-0.074	0.000	0.01			0.1	OK	
2.001	SW06	0.301	0.000	1.04			35.8	SURCHARGED	
4.000	LC01	-0.094	0.000	0.03			3.1	OK	
5.000	LC02	-0.094	0.000	0.02			2.2	OK	
2.002	SW06a	0.354	0.000	0.27			11.0	SURCHARGED	
6.000	SW07	0.109	0.000	0.06			0.8	SURCHARGED	
7.000	LC04	-0.094	0.000	0.04			2.7	OK	
6.001	SW07a	0.215	0.000	0.06			3.6	SURCHARGED	
8.000	LC03	-0.097	0.000	0.06			6.4	OK	
2.003	SW08	0.438	0.000	0.13			21.0	SURCHARGED	
1.003	SW09	1.036	0.000	0.24			32.0	SURCHARGED	
1.004	TANK	1.098	0.000	0.16			20.9	SURCHARGED	
9.000	LC05	-0.150	0.000	0.00			0.0	OK	
10.000	Bottom Service Ramp	0.631	0.000	0.03			0.7	FLOOD RISK	
9.001	SW10	0.871	0.000	0.19			2.6	SURCHARGED	
1.005	SW12	1.168	0.000	0.07			11.9	SURCHARGED	
1.006	SW13 (HB)	1.529	0.000	0.15			3.0	SURCHARGED	
1.007	SW14	-0.111	0.000	0.15			3.0	OK	

APPENDIX G: Proposed Drainage Layout

APPENDIX H: Geolight Proprietary Tank Details

SDS

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WATER TECHNOLOGY

SDS GEOLight®

Stormwater Management System



SDS GEOLight® is an ultra lightweight honeycombed modular structure, made from recycled PVC, that provides an underground storage facility for the application of stormwater attenuation or infiltration.

SDS
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Infrastructure
Systems

Stormwater Management

The Environment Agency is keen to promote the wider use of sustainable drainage systems, which reduce the impact of surface water runoff. There are two main ways of storing surface water for stormwater management:

- Stormwater attenuation tanks
- Soakaway infiltration systems

Stormwater Attenuation Systems

This consists of underground water storage facilities that hold excess water during periods of peak rainfall.

The stored water is gradually released in a controlled manner into the surface water drainage system or directly into watercourses, reducing the risk of upstream and downstream flooding.

Soakaway Infiltration Systems

Soakaways are designed to store surface water runoff until it can be gradually absorbed by the surrounding ground.

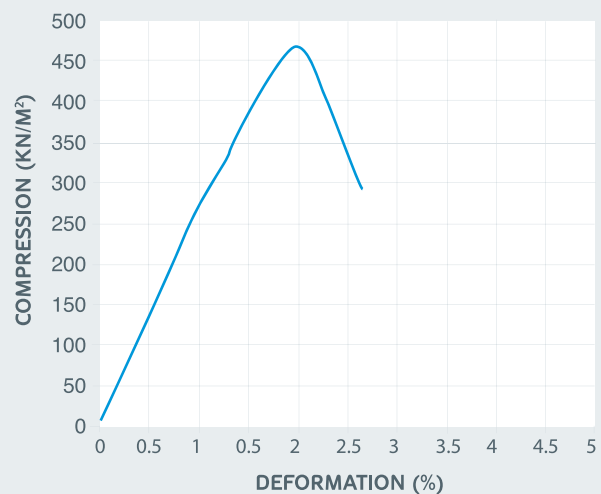
SDS GEOLight® – an efficient and economic solution for stormwater management.

SDS GEOLight® Attenuation

SDS GEOLight® has been specifically designed to form underground water storage reservoirs in stormwater management schemes. Its honeycombed structure gives it certain unique characteristics that make it ideal for this purpose:

- The high void rate (95%) of GEOLight® means that the maximum volume of water is stored in the minimum volume of storage unit.
- High compressive strength. GEOLight® is available in two strengths as standard: 200 and 400kN/m². Note: Higher compressive strengths available from 600 to 1000 kN/m². The graph on the right shows the results of a compression test, where samples of GEOLight® 400 were compressed at the rate of 1mm per minute. The deformation at 400kN/m² is about 1.6%.

RESULTS OF COMPRESSION TEST ON SDS GEOLIGHT® 400



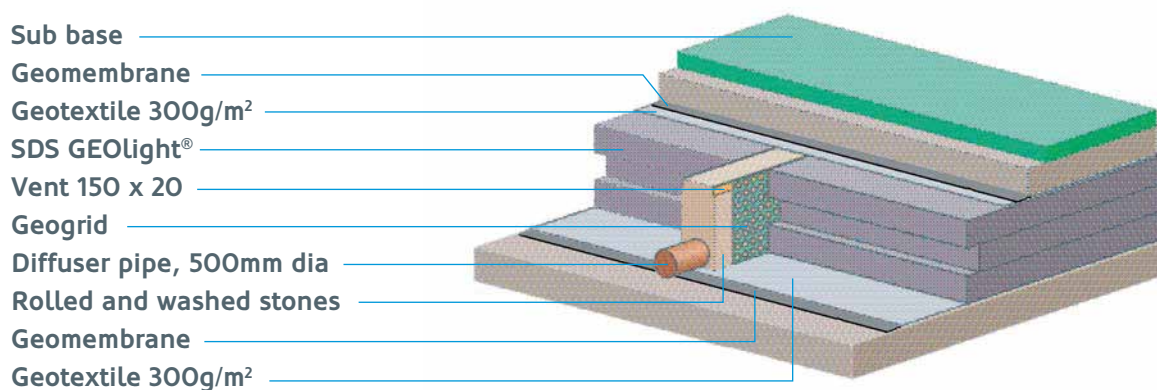
The GEOLight® Stormwater Attenuation System consists of two manholes (inspection chambers) connected by a length of perforated distribution pipe which feeds the stormwater storage reservoirs on either side formed from GEOLight®.

The distribution pipe is normally from 225mm up to 500mm diameter, generally covered in a trench that is filled with draining material such as 15/25 clean graded stone, free from fines.

The reservoirs and distribution pipe are wrapped in a waterproof membrane, such as butyl, to prevent seepage of water into the surrounding ground. The top of each GEOLight® reservoir has a vent which is connected back to the upstream manhole.

A geotextile or 10mm mesh geogrid is laid between the distribution pipe and GEOLight® to prevent the GEOLight® units being clogged by the draining materials.

SDS GEOLight® Attenuation



How does it work?

- 1. In normal conditions, water enters a back drop manhole. This is the upstream manhole and any silt or sediment will collect in the bottom of the chamber. The water then flows along the distribution pipe into the downstream manhole. The upstream pipework is sized to cope with normal flow conditions. The distribution pipe and attenuation tank are sized to cope with storm conditions. The outflow pipe is sized to cope with the permissible discharge.
- 2. In storm conditions the flow restrictor (vortex flow control or orifice plate) in the downstream manhole limits the amount of water flowing out of the manhole. This causes the water level in the distribution pipe to rise and water to spill into the GEOLight® reservoirs on either side. As the water level rises in the reservoirs, air is forced out of the high level vents into the upstream manhole.

- 3. Once the storm has passed, the water level in the GEOLight® reservoirs gradually falls as water passes through the flow restrictor in the downstream manhole. The vents now allow air to return into the GEOLight® reservoirs. Gradually the reservoirs empty. The flow restrictor prevents excess surges of flood water to pass downstream and uses the storage reservoirs to store the water for the period of the storm.

Calculating the storage capacity

The storage capacity of the GEOLight® reservoirs is determined by the maximum outflow permitted, (set by the water company or Environment Agency), the impermeable area of the site and the rainfall return period – normally 1 in 30 years, but again can be dictated by the water company. A full design service, including calculations, can be supplied via a third party consultant.

Please contact SDS for details.

Other uses

The water storage ability of SDS GEOLight® lends itself to a number of other uses:

- Water recycling combines with irrigation systems – this is increasingly popular: GEOLight® is used to retain stormwater which is then pumped as required to a network of standpipes for irrigation.
- Drainage channels – the natural permeability of GEOLight® lends itself for use as an underground drainage channel that collects and drains away groundwater.
- Pollution control – improved water runoff quality. When used in combination with oil / petrol separators, GEOLight® can replenish groundwater without the risk of contamination from oil, chemicals or suspended solids.
- To form lightweight embankments (slope stabilisation) – GEOLight® can be used to quickly form the base of embankments that only weigh a fraction of earth embankments.

Stormwater Attenuation System

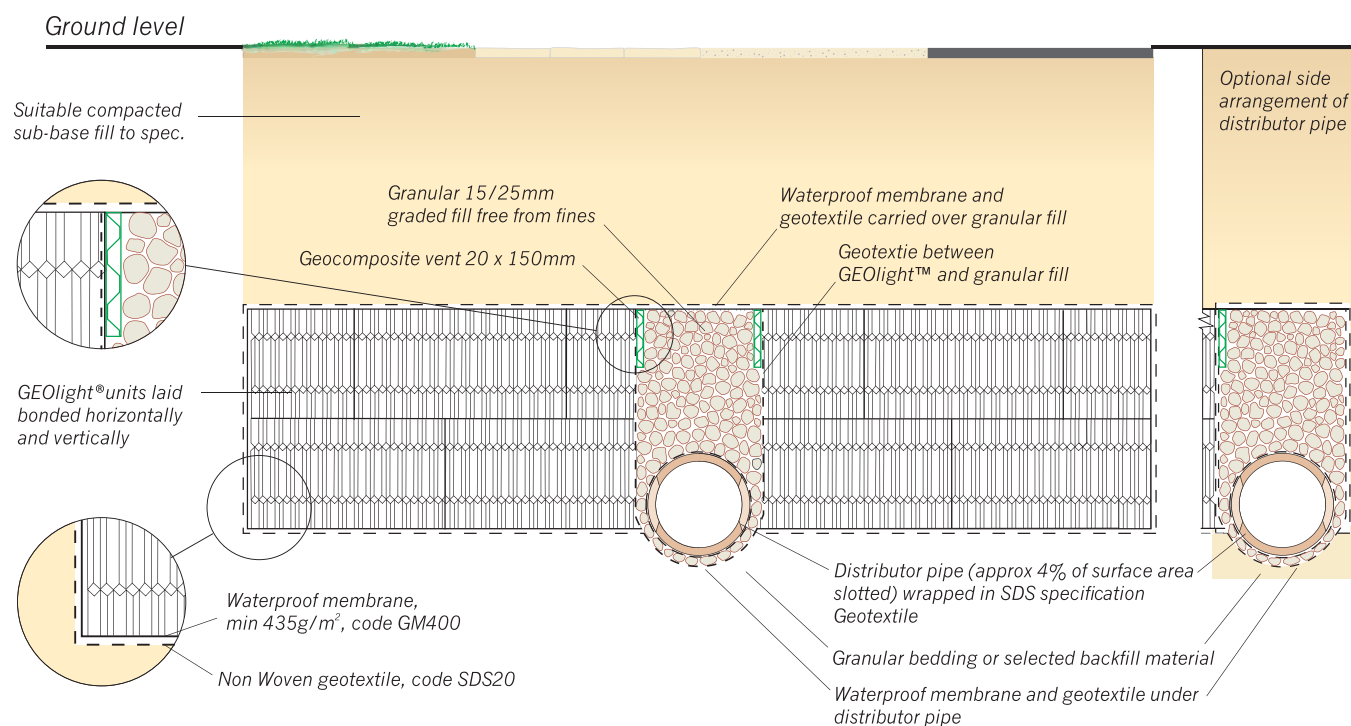
Design Details

The details on these two pages illustrate the construction of a typical SDS GEOLight® Stormwater Attenuation System. The length and height of the GEOLight® reservoirs is determined by the quantity of water to be stored.

The layout of each scheme is specifically designed to suit the characteristics and limitation of the site. Typically the distributor pipe would be arranged in the centre of the reservoir, but can alternatively be placed at the side where topographical constraints dictate.

The high performance waterproof membrane should be sealed continuously to encapsulate the GEOLight® reservoirs, distributor pipe and granular fill. It is protected by a heavyweight needle punched, non woven geotextile. To help with maintenance a high flow geotextile is placed between the granular fill and GEOLight® attenuation units to prevent silt and particles being washed into the reservoir. GEOLight® can be used under a range of surfaces e.g. grass, porous paving, standard paving block, tarmac and concrete.

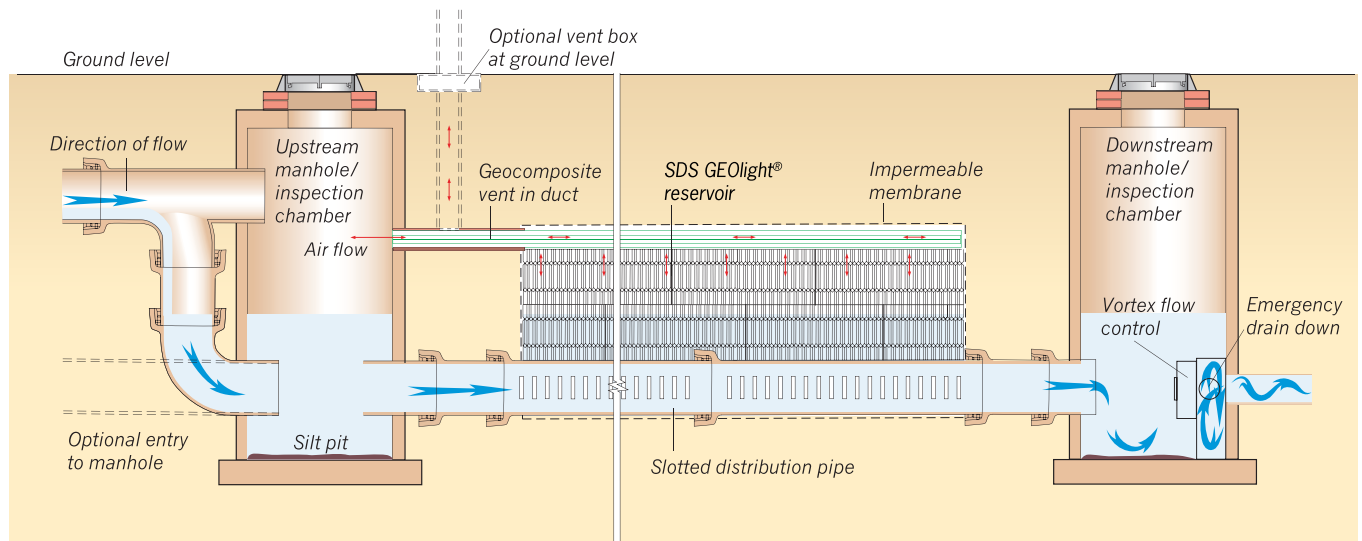
Cross Section



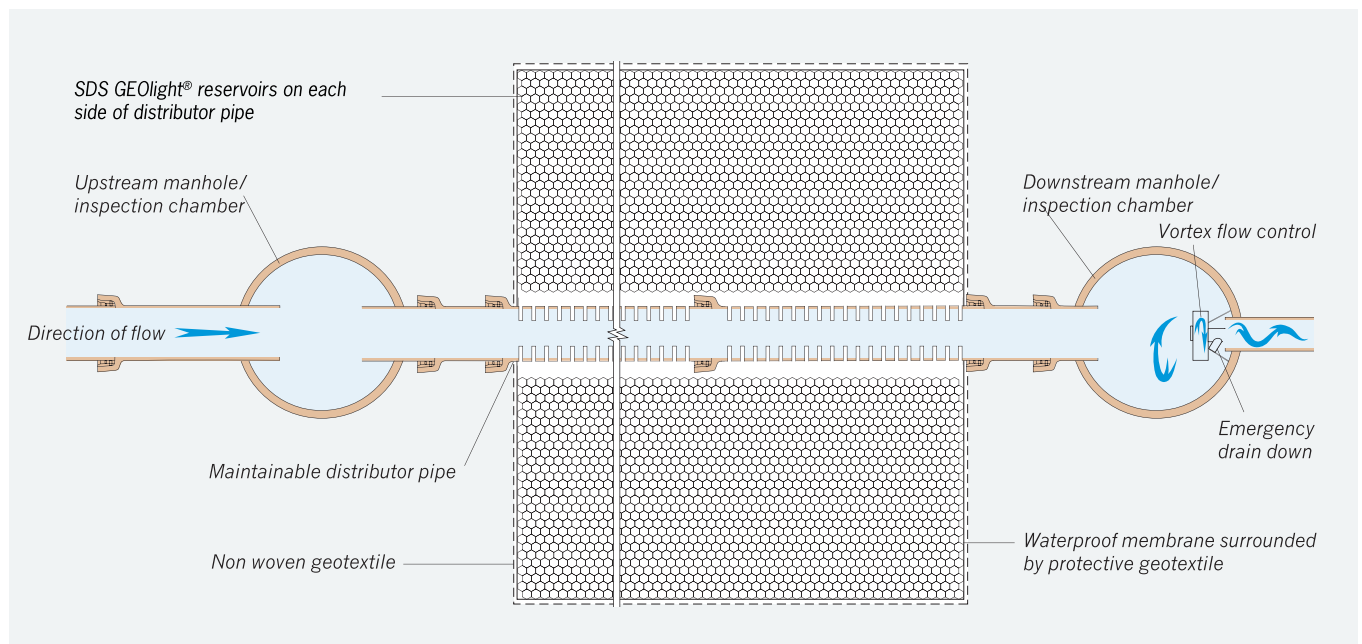
Stormwater Attenuation System

Design Details

Long Section



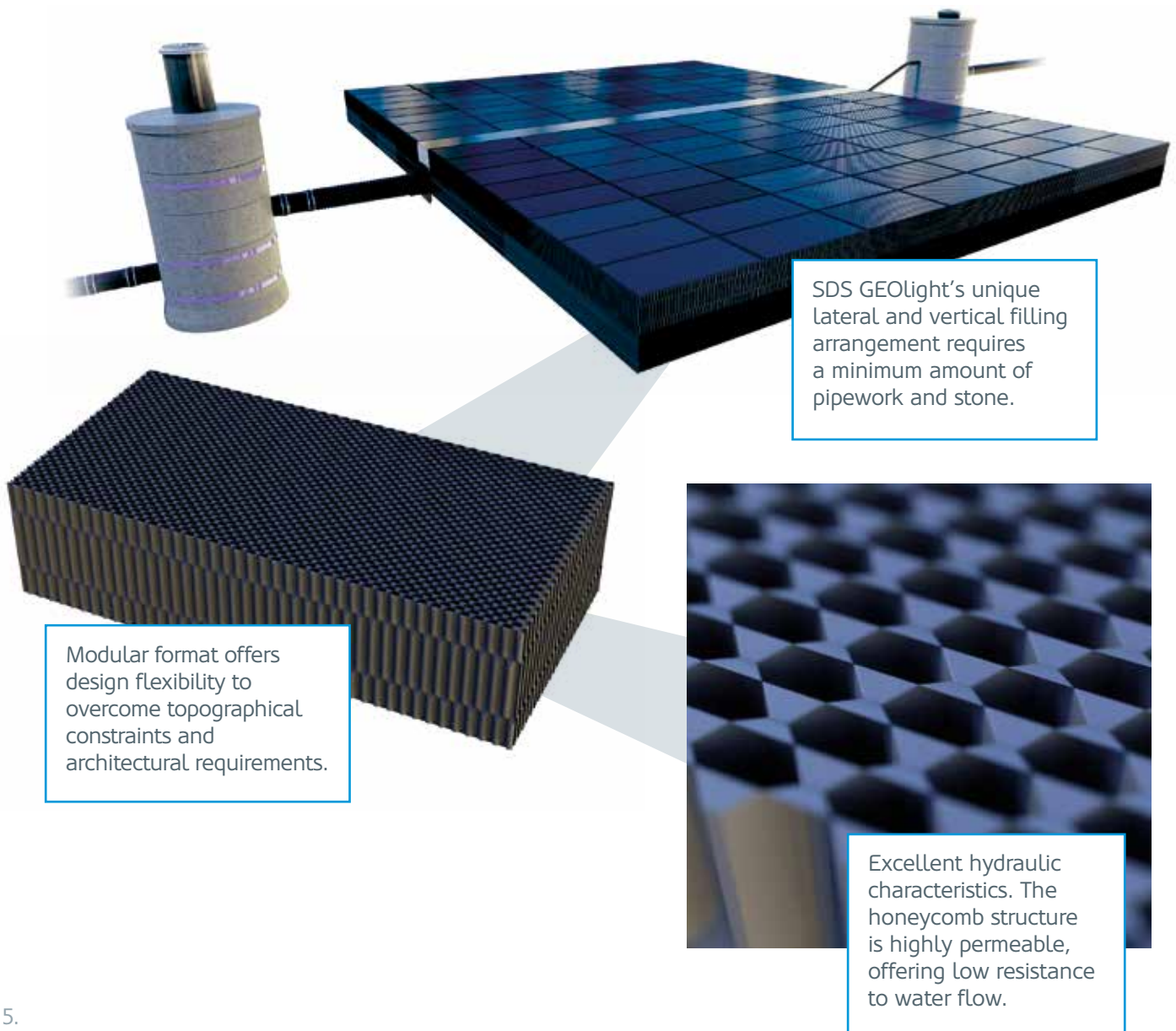
Plan



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.
- Depth of tank invert reduced by using patented lateral supply.
- Simplified distribution pipe network, easy maintenance – dispensing with costly and complicated pipework configurations.
- 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 petrol / oil separators.
- Design service available, including calculations.

GEOLight® block



COSHH and Handling Information

1. COMPOSITION/INFORMATION ON INGREDIENTS:

Hazardous ingredients:

None as finished goods or products.

Types of materials:

Polyvinyl chloride (PVC)
MEK

2. HAZARDS IDENTIFICATION

Nature of hazard:

There are no health risks from the products during normal use. The products may contain various pigment colours and stabilisers that may be toxic. The chemicals are, however, bound within the product material and not easily extracted.

3. FIRST-AID MEASURES

Eye contact:

Plastic materials may cause physical irritation in the eyes. Wash out with large amounts of water. If irritation persists, seek medical advice.

Skin contact:

Not applicable.

Inhalation:

Not applicable.

Ingestion:

Not expected to have any toxic effects.

4. FIRE-FIGHTING MEASURES

Extinguishing media:

On small fires use any hand-held extinguisher type.
On large fires use water.

Fire and explosion hazards:

Melting plastics may flow and spread in a large fire.
Products of fire will be thick black toxic smoke.

Material characteristics:

PVC products will burn in the presence of a flame but are classed as self-extinguishing.

Protective equipment:

Wear self-contained breathing apparatus and protective clothing.

5. HANDLING AND STORAGE

Handling:

There are no hazards associated with the finished products. However, when cutting SDS GEOLight®, we recommend that the correct tools are used e.g. Handsaw or Alligator saw. When cutting, dust may be created; avoid inhaling these dusts. Take care of heat build-up within materials during cutting etc. The pallets of SDS GEOLight® units should be placed on level ground and should not be stacked on site. The maximum weight of the pallet of SDS GEOLight® units as delivered to site is 650kg (700kg on one copy), including packaging. Machines used to lift the pallet should be able to lift this weight safely. Loose individual units should not be stored more than three units high. SDS GEOLight® units are lightweight ranging from 23kg to 55kg and can be easily handled – one or two person lift.

Storage:

SDS GEOLight® units will resist the effects of UV light for up to six months; however, prolonged storage in direct sunlight should be avoided. SDS GEOLight® units should not be stored near to any fuel storage areas or any other solvents. SDS GEOLight® units are very robust and resistant to damage during normal handling; however, they should be secured in areas where impacts from vehicles or construction plant will be avoided.

Material characteristics:

PVC products will burn in the presence of a flame but are classed as self-extinguishing.

Protective equipment:

Wear self-contained breathing apparatus and protective clothing.

6. EXPOSURE CONTROLS / PERSONAL PROTECTION

Respiratory protection:

Not required under normal conditions of use. Where cutting etc. creates dust, wear a disposable half-mask to the standard FFP2S.

Hand protection:

Wear impervious strong gloves to prevent cuts to the hands while handling, cutting etc.

Eye protection:

Wear safety glasses when cutting etc.

Skin protection:

Wear overalls.

7. SITE HAZARDS

Other hazards for consideration:

Working in excavations and trenches – SDS GEOLight® may be designed with a shallow invert for infiltration (soakaway) or attenuation (storage) system. This negates the need for deep excavations or trenches, excavation near services e.g. gas, electricity or contaminated soil areas. N.B. All risk assessments should be undertaken by the main contractor for forklift, access to and working in excavations and trench support.

8. STABILITY AND REACTIVITY

Decomposition products:

Major thermal decomposition products are oxides of carbon. Relevant differences are (in addition): PVC may produce amounts of Hydrogen Chloride.

Stability:

These materials are stable at temperatures up to normal operating limits (moulding parameters).

9. ECOLOGICAL INFORMATION

Biodegradability:

Plastic products are not readily biodegradable but are not detrimental to terrestrial wildlife.

Aquatic toxicity:

Non-toxic to marine life.

10. DISPOSAL CONSIDERATIONS

Method:

The preferred method of disposal is collection and recycling. Plastics can safely be placed with regular industrial or household wastes where recycling is not available.

11. OTHER INFORMATION

As the handling, storage, use and disposal of the product are beyond our control SDS disclaims all liability for loss, damage, injury or expense in any way connected with such activities and further makes no warranties, expressed or implied, as to the suitability of the product for any particular use.

The preferred method of disposal is collection and recycling. Plastics can safely be placed with regular industrial or household wastes where recycling is not available.

SDS

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INNOVATORS IN WATER TECHNOLOGY



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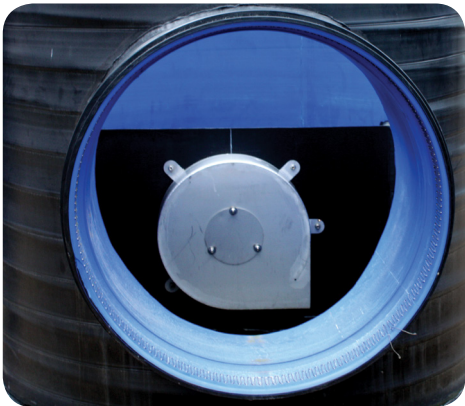
APPENDIX I: Vortex Flow Control Chamber Details

RIDGISTORMCheck Vortex Flow Control Chambers

Data Sheet

Where flows within a drainage system are required to be limited (i.e. prior to discharge from site), with improved hydraulic performance and reduced maintenance, we are able to offer our RIDGISTORMCheck Vortex Flow Control Chamber.

Pre-fabricated under factory controlled conditions, the RIDGISTORMCheck Chamber is available in a range of diameters from 1050-3000mm and incorporates a vortex flow control unit, fitted onto a preformed headwall. Each vortex flow control unit is manufactured to suit the unique hydraulic characteristics of the site's drainage system design. RIDGISTORMCheck Vortex Flow Control Chambers are typically supplied as a single unit, allowing simple installation and eliminating a number of construction risks associated with in-situ construction. When installed in conjunction with our range of pipe systems, they offer a fully integrated drainage system.



Applications

Site specific RIDGISTORMCheck Vortex Flow Control Chambers are engineered to suit a range of stormwater systems, providing a hydraulically efficient means of flow regulation that does not use moving parts or require power to operate.

Key Features and Benefits

- Self-activating vortex flow controller which controls forward flow of water
- No moving parts - virtually maintenance free
- Manufactured with an integral sump for silt catchment/removal
- Can be manufactured to adoptable standards
- Multiple inlet and outlet options, allowing quick and seamless connection to pipelines
- Depths can be tailored to suit project requirements
- Optional integral benching
- Optional step rungs to BS EN 13101 and ladders to BS EN 14396
- Optional riser section and riser location ring
- Integral lifting points available on request to improve Health and Safety during handling and installation
- Stub connections and rocker pipes are available
- Manufactured in a factory controlled environment for improved quality of finish
- Eliminates wastage associated with in-situ construction

Other fabrications in our RIDGISTORMCheck range:

- Orifice Plate Flow Control Chambers

Performance

RIDGISTORMCheck Vortex Flow Control Chambers are fabricated from Ridgistorm-XL pipework, which is manufactured to meet the material requirements of BS EN 13476.

RIDGISTORMCHECK VORTEX FLOW CONTROL CHAMBER	
PHYSICAL PROPERTIES	
Diameter	1050-3000mm
Depth	To suit requirements
Material	HDPE
Colour	Black with Blue Interior
Flow control units	Grade 304 Stainless Steel
Chemical resistance	HDPE is naturally resistant to most chemicals associated with stormwater drainage systems
Inlets/outlets	100-3000mm
Hydraulic performance	Unit manufactured to suit site specific conditions

Our Ridgistorm-XL Fabrications range

All of our Ridgistorm-XL fabrications are tailor-made, fully-welded, watertight structured wall chambers to suit project-specific requirements. Health and Safety benefits become apparent during handling and installation, due to our fabrications' strong but light in weight nature. In addition, off-site construction ensures uncompromised, high quality products being delivered to site ready-to-install, reducing installation time and costs.



RIDGISTORMCheck Vortex Flow Control Chambers

Data Sheet

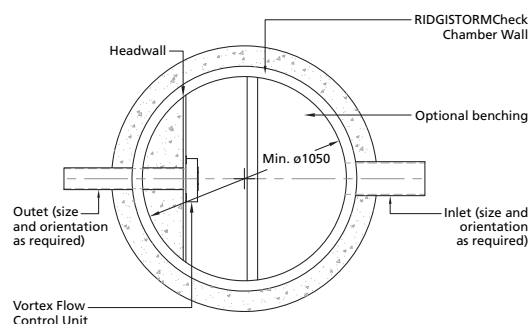
PRODUCT INFORMATION

P2

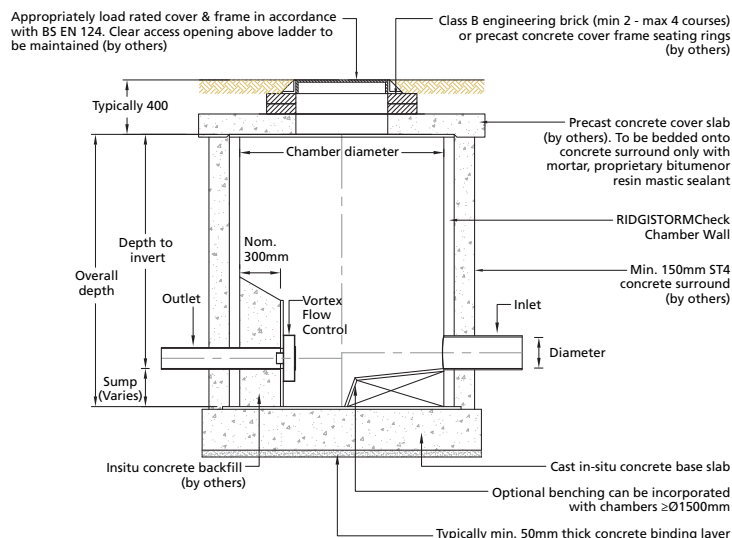
ISSUE 2 - MAR 2019

Non-Bypass Chamber

For sites where discharge rates must be guaranteed to not exceed a prescribed limit(s).

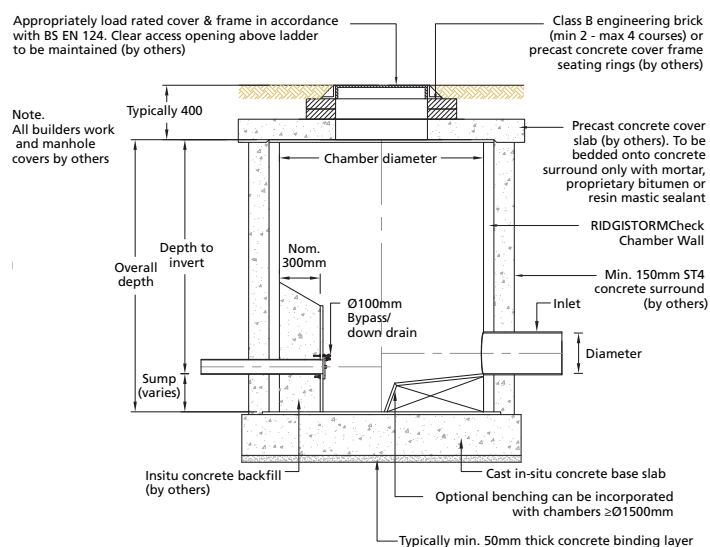
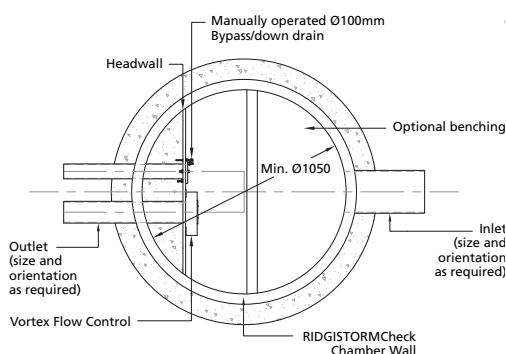


Note.
All builders work and
manhole covers by others



Manual Bypass Design

The manual bypass design offers a bypass the ability to flow control device to facilitate maintenance. Manually operated from the surface, the activation of the bypass system opens a door in the head wall allowing water in the chamber to drain down via the bypass pipe.



For further information please contact our Technical Team on +44 (0) 1509 615100 or download our CAD Standard Details from our website www.polypipe.com/civils-technical-hub

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www.polypipe.com/civils



APPENDIX J: Bypass Separator Details

SEPARATORS

A RANGE OF FUEL/OIL SEPARATORS
FOR PEACE OF MIND



Klargester

60 YEARS OF
Expertise &
Innovation
1955-2015



Bypass NSB RANGE

APPLICATION

Bypass separators are used when it is considered an acceptable risk not to provide full treatment, for very high flows, and are used, for example, where the risk of a large spillage and heavy rainfall occurring at the same time is small, e.g.

- Surface car parks.
- Roadways.
- Lightly contaminated commercial areas.

PERFORMANCE

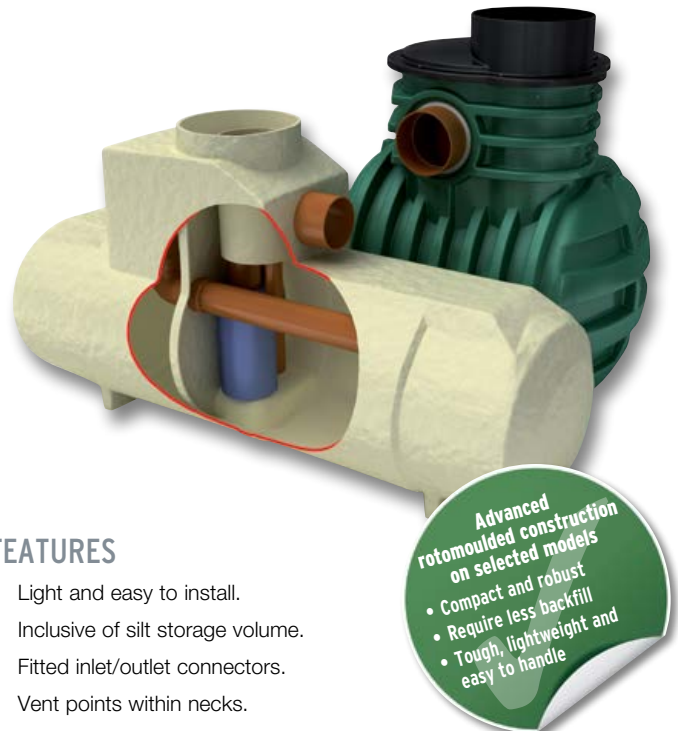
Klargester were one of the first UK manufacturers to have separators tested to EN 858-1. Klargester have now added the NSB bypass range to their portfolio of certified and tested models. The NSB number denotes the maximum flow at which the separator treats liquids. The British Standards Institute (BSI) tested the required range of Kingspan Klargester Bypass separators and certified their performance in relation to their flow and process performance assessing the effluent qualities to the requirements of EN 858-1. Klargester bypass separator designs follow the parameters determined during the testing of the required range of bypass separators.

Each bypass separator design includes the necessary volume requirements for:

- Oil separation capacity.
- Oil storage volume.
- Silt storage capacity.
- Coalescer.

The unit is designed to treat 10% of peak flow. The calculated drainage areas served by each separator are indicated according to the formula given by PPG3 $NSB = 0.0018A(m^2)$. Flows generated by higher rainfall rates will pass through part of the separator and bypass the main separation chamber.

Class I separators are designed to achieve a concentration of 5mg/litre of oil under standard test conditions.



FEATURES

- Light and easy to install.
- Inclusive of silt storage volume.
- Fitted inlet/outlet connectors.
- Vent points within necks.
- Oil alarm system available (required by EN 858-1 and PPG3).
- Extension access shafts for deep inverts.
- Maintenance from ground level.
- GRP or rotomoulded construction (subject to model).

To specify a nominal size bypass separator, the following information is needed:-

- The calculated flow rate for the drainage area served. Our designs are based on the assumption that any interconnecting pipework fitted elsewhere on site does not impede flow into or out of the separator and that the flow is not pumped.
- The drain invert inlet depth.
- Pipework type, size and orientation.

SIZES AND SPECIFICATIONS

UNIT NOMINAL SIZE	FLOW (l/s)	PEAK FLOW RATE (l/s)	DRAINAGE AREA (m ²)	STORAGE CAPACITY (litres)		UNIT LENGTH (mm)	UNIT DIA. (mm)	ACCESS SHAFT DIA. (mm)	BASE TO INLET INVERT (mm)	BASE TO OUTLET INVERT	STANDARD FALL ACROSS (mm)	MIN. INLET INVERT (mm)	STANDARD PIPEWORK DIA.
NSBP003	3	30	1670	300	45	1700	1350	600	1420	1320	100	500	160
NSBP004	4.5	45	2500	450	60	1700	1350	600	1420	1320	100	500	160
NSBP006	6	60	3335	600	90	1700	1350	600	1420	1320	100	500	160
NSBE010	10	100	5560	1000	150	2069	1220	750	1450	1350	100	700	315
NSBE015	15	150	8335	1500	225	2947	1220	750	1450	1350	100	700	315
NSBE020	20	200	11111	2000	300	3893	1220	750	1450	1350	100	700	375
NSBE025	25	250	13890	2500	375	3575	1420	750	1680	1580	100	700	375
NSBE030	30	300	16670	3000	450	4265	1420	750	1680	1580	100	700	450
NSBE040	40	400	22222	4000	600	3230	1920	600	2185	2035	150	1000	500
NSBE050	50	500	27778	5000	750	3960	1920	600	2185	2035	150	1000	600
NSBE075	75	750	41667	7500	1125	5841	1920	600	2235	2035	200	950	675
NSBE100	100	1000	55556	10000	1500	7661	1920	600	2235	2035	200	950	750
NSBE125	125	1250	69444	12500	1875	9548	1920	600	2235	2035	200	950	750

■ Rotomoulded chamber construction ■ GRP chamber construction * Some units have more than one access shaft – diameter of largest shown.

PROFESSIONAL INSTALLERS

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Experience shows that correct installation is a prerequisite for the long-lasting and successful operation of any wastewater treatment product. This is why using an installer with the experience and expertise to install your product is highly recommended.



Services include :

- Site survey to establish ground conditions and soil types
- Advice on system design and product selection
- Assistance on gaining environmental consents and building approvals
- Tank and drainage system installation
- Connection to discharge point and electrical networks
- Waste emptying and disposal

Discover more about the Accredited Installers and locate your local expert online.

www.kingspanenviro.com/klargester



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Who better to look after your treatment plant than the people who designed and built it?



Kingspan Environmental have a dedicated service division providing maintenance for wastewater products.

Factory trained engineers are available for site visits as part of a planned maintenance contract or on a one-off call out basis.

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- GREASE & SILT TRAPS

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- BELOW GROUND RAINWATER HARVESTING SYSTEMS
- ABOVE GROUND RAINWATER HARVESTING SYSTEMS

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Visit our website www.kingspanenviro.com/klargester



In keeping with Company policy of continuing research and development and in order to offer our clients the most advanced products, Kingspan Environmental reserves the right to alter specifications and drawings without prior notice.

APPENDIX K: SuDS Maintenance and Management Plan



**LIDL GREAT BRITAIN LTD
PURBROOK WAY
HAVANT**

**SUDS MANAGEMENT AND
MAINTENANCE PLAN**

NOVEMBER 2020



the journey is the reward

**LIDL GREAT BRITAIN LTD
PURBROOK WAY
HAVANT**

**SUDS MANAGEMENT AND
MAINTENANCE PLAN**

NOVEMBER 2020

Project Code:	A/LIDLHAVANT.23
Prepared by:	CG
Approved by:	SF
Issue Date:	November 2020
Status:	1st Issue

**LIDL Great Britain Ltd
Purbrook Way
Havant
SuDS Management and Maintenance Plan**

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APPENDIX A: Proposed Drainage Strategy	
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1 Introduction

- 1.1 Mayer Brown Ltd have been commissioned by Lidl Great Britain Ltd to provide a SuDS Management and Maintenance Plan in support of a planning application for a proposed new food store development located at Purbrook Way, Havant.
- 1.2 The proposed surface water drainage network (refer to Appendix A) utilises Sustainable Drainage techniques (SuDS) including a petrol interceptor and a proprietary attenuation tank. The management and maintenance of these features is of paramount importance to ensure their effectiveness over the lifetime of the development.
- 1.3 The proposed surface water attenuation features will not be adopted by any public body and will remain in private ownership. There will be a designated site maintenance team employed who should enable tight control over the operation and maintenance of the drainage/SuDS systems as proposed in this report.
- 1.4 This Owner's Manual is for advising the required maintenance activities for the sustainable drainage network. This report has been prepared with reference to CIRIA document C753 – The SuDS Manual and provides current best practice guidance on Sustainable Drainage Systems (SuDS) to facilitate their effective implementation within developments.

2 Management and Maintenance of SuDS Features

Introduction

- 2.1 Unlike conventional drainage systems, SuDS features should be visible and their function should be easily understood by those responsible for maintenance. When problems occur, they are generally obvious and can be remedied simply, using standard landscaping practice. If systems are properly monitored and maintained, any deterioration in performance can often be managed out.
- 2.2 There are three categories of maintenance activities:
- **Regular Maintenance** (*including inspections and monitoring*) – Consists of basic tasks done on a frequent and predictable schedule, including vegetation management, litter and debris removal, and inspections.
 - **Occasional Maintenance** – Comprises tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (e.g. sediment removal).
 - **Remedial Maintenance** – Comprises intermittent tasks that may be required to rectify faults associated with the system.

Health and Safety

- 2.3 All those responsible for maintenance should take appropriate health and safety precautions of all activities (including lone working, if relevant) and risk assessments should always be undertaken.

Attenuation Tank

- 2.4 Attenuation tanks are excavations that are filled with a void-forming material (typically geocellular units) that allows the temporary storage of water before it discharges at a controlled rate into the downstream sewer network or watercourse.
- 2.5 Regular inspection and maintenance are required to ensure the effective long-term operation of the below ground storage tanks, see Table 2.1 below for details:

Maintenance Schedule	Required Action	Recommended Frequency
Regular Maintenance	Inspect for sediment and debris in pre-treatment components.	Annually
	Cleaning of gutters and any filters on downpipes.	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages.	Annually, or as required.
Occasional Maintenance	Remove sediments and debris from pre-treatment components.	As required, based on inspections.
Remedial Actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failures occur.	As required.
	Replacement of clogged geotextile (will require reconstruction of soakaway).	As required.
Monitoring	Inspect silt traps and note rate of sediment accumulation.	Monthly in the first year and then annually.
	Check soakaway to ensure emptying is occurring.	Annually.

Table 2.1: Soakaway Tank Maintenance Requirements

Petrol Interceptor

- 2.6 The petrol interceptor is designed in this system to remove oils, silts and sediments from the surface water before it is discharged into the sewer.
- 2.7 A petrol interceptor is a type of proprietary treatment system which are surface and subsurface manufactured products designed to provide treatment of water through the removal of contaminants.
- 2.8 Regular inspection and maintenance are important for the effective operation of proprietary treatment systems as designed; these are described in Table 2.2:

Maintenance Schedule	Required Action	Recommended Frequency
Routine Maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation.	Six monthly.
	Change the filter media.	As recommended by manufacturer.
	Remove sediment, oil, grease and floatables.	As necessary – indicated by system inspections or immediately following significant spill.
Remedial Actions	Replace malfunctioning parts or structures.	As required.
Monitoring	Inspect for evidence of poor operation.	Six monthly.
	Inspect filter media and establish appropriate replacement frequencies.	Six monthly.
	Inspect sediment accumulation rates and establish appropriate removal frequencies.	Monthly during first half of operation, then every six months.

Table 2.2: Proprietary Treatment System Maintenance Requirements

- 2.9 However, there are specific requirements for oil/water separators. The following should be undertaken every six months as a minimum:
- Check volume of sludge,
 - Check thickness of light liquid,
 - Check function of automatic closure device,
 - Empty the separator, if required,
 - Check the coalescing material and clean or change if necessary (class 1 only), and
 - Check the function of the warning device (if fitted).
- 2.10 General inspection of the integrity of the oil/water separator should take place every five years and should cover:
- Watertightness of system,
 - Structural condition,

- Internal coatings,
- In-built parts,
- Electrical devices and installations, and
- Adjustment of automatic closure device.

2.11 It is usually required to fill separators with clean water before they are put into operation and after every time it is emptied for maintenance. Failure to do this will cause the separator to malfunction until surface water builds up the required permanent water level in the facility. It is possible to fit an alarm to separators that will indicate when the collected oil volume is at a maximum, and this may be a regulatory requirement. The alarms should be placed in a location that is clearly visible to those responsible for maintenance of the system.

3 Maintenance Activities

Regular Maintenance Activities

Inspections and Reporting

- 3.1 Inspections can generally be carried out at monthly site visits and should be subsumed into regular maintenance requirements. During the first year of operation, inspections should ideally be carried out after every significant storm event to ensure proper functioning, but in practice this may be difficult or impractical to arrange.
- 3.2 Typical routine inspection questions that will indicate when occasional or remedial maintenance activities are required, and/or when water quality requires investigation include:
- Are inlets or outlets blocked?
 - Is there evidence of sediment build up?
 - Is there evidence of structural damage that requires repair?

Litter/Debris Removal

- 3.3 This is an integral part of SuDS maintenance and reduces the risks of inlet and outlet blockages, retains amenity value and minimises pollution risks.

Irregular Maintenance Activities

Sediment Removal

- 3.4 To ensure long-term effectiveness, the sediment that accumulates in SuDS should be removed periodically.
- 3.5 Sediment accumulation will typically be rapid for the entire construction period (including time required for the building, turfing and landscaping of all upstream development plots). Once a catchment is completely developed and all vegetation is well-established, sediment mobility and accumulation is likely to drop significantly.

Remedial Maintenance

Structure rehabilitation/repair

- 3.6 There will come a time with most SuDS techniques when a major overhaul of the system is required to remove clogged filters, geotextiles, gravel etc. This will typically be between 10 and 25 years, depending on the technique and factors such as the type of catchment and sediment load.

- 3.7 Major overhaul is most likely to be required on techniques that rely on filtration through soils or aggregates, such as sand filters and infiltration devices. Other SuDS techniques are unlikely to need major overhaul if routine maintenance is undertaken as required.

APPENDIX A: Proposed Drainage Strategy



APPENDIX L: Remada Ground Investigation Extract & Site Logs

PHASE 2 GROUND INVESTIGATION

Lidl Great Britain Ltd
Purbrook Way, Havant



Executive Summary

Remada Ltd was commissioned by Lidl Great Britain Ltd to undertake a Phase 2 Ground Investigation at Purbrook Way, Havant, PO9 3QJ at the location indicated in **Figure 1**.

Site Setting & History

The site is irregular in shape and with boundaries that are parallel with Purbrook Way the south and the adjacent B&Q store to the east. The western and northern boundary is curved and formed by the access road to B&Q. The topography of the site is obscured by impenetrable dense vegetation in central and southern parts however the northern is grassy and slopes down to the access road that serves B&Q.

The site has not been previously developed but its present-day topography and historic maps indicated that is formed of a spoil heap of surplus soils. The source of spoil heap (made ground) is not known but may be due to construction of either the B&Q store or adjacent roads (Purbrook Way and/or A3(M)).

Published Geology & Hydrogeology

Published geological maps indicate that the site is directly underlain by London Clay of thickness 77 to 120m which is designated as unproductive strata, overlying Reading Beds and a sequence of chalks.

The investigation comprised 3 No cable tool boreholes to target 10m depth and 5 No window sample holes to 5m depth. Due to dense vegetation and restraints imposed by the ecologist, it was not possible to access all window sample locations with the proposed car park. Made Ground was observed at all exploratory locations as firm to stiff orange/brown grey slightly gravelly clay to a maximum depth of 5.0m in CP1 and CP2 beneath the store footprint. At CP3A and CP3B the fill material contained concrete boulders and concrete kerbstones that were removed by excavator and the exploratory hole was advanced as a trial pit. WS2 was also obstructed by a concrete boulder within the fill material that was subsequently removed by excavator and the exploratory hole was advanced as a trial pit.

Bedrock was encountered in all of the exploratory holes as stiff to very stiff micaceous blue grey CLAY considered to be representative of London Clay. Due to the change in topographical elevation between the perimeter of the site and central area beneath the proposed store footprint, the depth to bedrock varied from 0.25m at WS1 to 5.0m in CP1 and CP2.

Human Health Assessment

The results of soil chemical analysis were compared to Human Health Generic Assessment Criteria for commercial land use. None of the analytes tested were detected at concentrations that exceeded the human health GAC protective of on-site workers.

Water Resources Assessment

The results of the soil chemical analysis undertaken has identified that concentrations of metals and inorganic contaminants are within the range of typical made ground. Detectable concentrations of TPH and PAHs were encountered WS2 however BGS Sheet 316 indicates that the London Clay extends to a minimum of 77m and it is therefore considered to be protective of the underlying groundwater source protection zone. There are no watercourses within close proximity of site.

Waste Classification

Additional sampling and analyses were undertaken on the made ground fill at between 0.5m and 3.5m bgl to enable an assessment of potential waste disposal classification as it anticipated that ground will be reduced to enable the development. The concentrations of metals and organic contaminants were generally in the range of inert soils and in general, the results of the chemical analysis indicates that the material would generally be classified as inert however due to concentration of Total Organic Carbon it may necessary to discuss the results with potential receive site to ensure that the surplus is removed as an inert material.



2 SUMMARY OF PHASE 1 DESK STUDY

The Executive Summary and Conceptual Site Model presented within the Phase 1 Desk Study are reproduced below:

Site Setting

*The site is irregular in shape and with boundaries that are parallel with Purbrook Way the south and the adjacent B&Q store to the east as indicated in **Figure 2**. The western and northern boundary is curved and formed by the access road to B&Q. The topography of the site is obscured by impenetrable dense vegetation in central and southern parts however the northern is grassy and slopes down to the access road that serves B&Q. The boundary to B&Q is formed by a retaining wall that retains the site at approximately 3m above the adjacent car park. The southern boundary of the site also reduces in level to form a low-lying abandoned track adjacent to Purbrook Way.*

Site History

The site has not been previously developed but its present-day topography and historic maps indicated that is formed of a spoil heap of surplus soils. The source of spoil heap (made ground) is not known but may be due to construction of either the B&Q store or adjacent roads (Purbrook Way and/or A3(M)).

Published Geology / Hydrogeology

Published geological maps indicate that the site is directly underlain by London Clay of thickness 77 to 120m which is designated as unproductive strata.

Recommendations

Environmental

The desk study has identified a number of on-site and off-site potential sources of contamination that would require further investigation. The following is recommended:

- *Investigation of the lateral and vertical extent of made ground/fill beneath the proposed store footprint;*
- *Collection of soil and groundwater samples from the areas identified above for contaminants of concern; and*
- *Ground gas monitoring.*

Geotechnical

It is recommended that a ground investigation is undertaken to enable preliminary foundation design.



4 GEOTECHNICAL & ENVIRONMENTAL INVESTIGATION FINDINGS

4.1 Ground Conditions

A brief description of the published geology is provided together with a summary of the ground conditions encountered during the intrusive investigation. Exploratory logs are presented at the end of the report.

4.1.1 Published Geology

Bedrock beneath the site is formed of London Clay and designated as unproductive strata. However, a Principal Aquifer associated with a sequence of chalk members is recorded approximately 2000m to the south. BGS Map 316 indicates that the site is underlain by London Clay to a depth of 77 to 120m, overlying Reading Beds and the following sequence of chalk members: Portsdown, Spetisbury, Tarrant, Newhaven, Seaford and Lewes etc.

4.1.2 Made Ground

Made Ground was observed at all exploratory locations as firm to stiff orange/brown grey slightly gravelly clay to a maximum depth of 5.0m in CP1 and CP2 beneath the store footprint. At CP3A and CP3B the fill material contained concrete boulders and concrete kerbstones that were removed by excavator and the exploratory hole was advanced as a trial pit.

4.1.3 Superficial Deposits

No superficial deposits were positively identified underlying the study site during Remada's investigation.

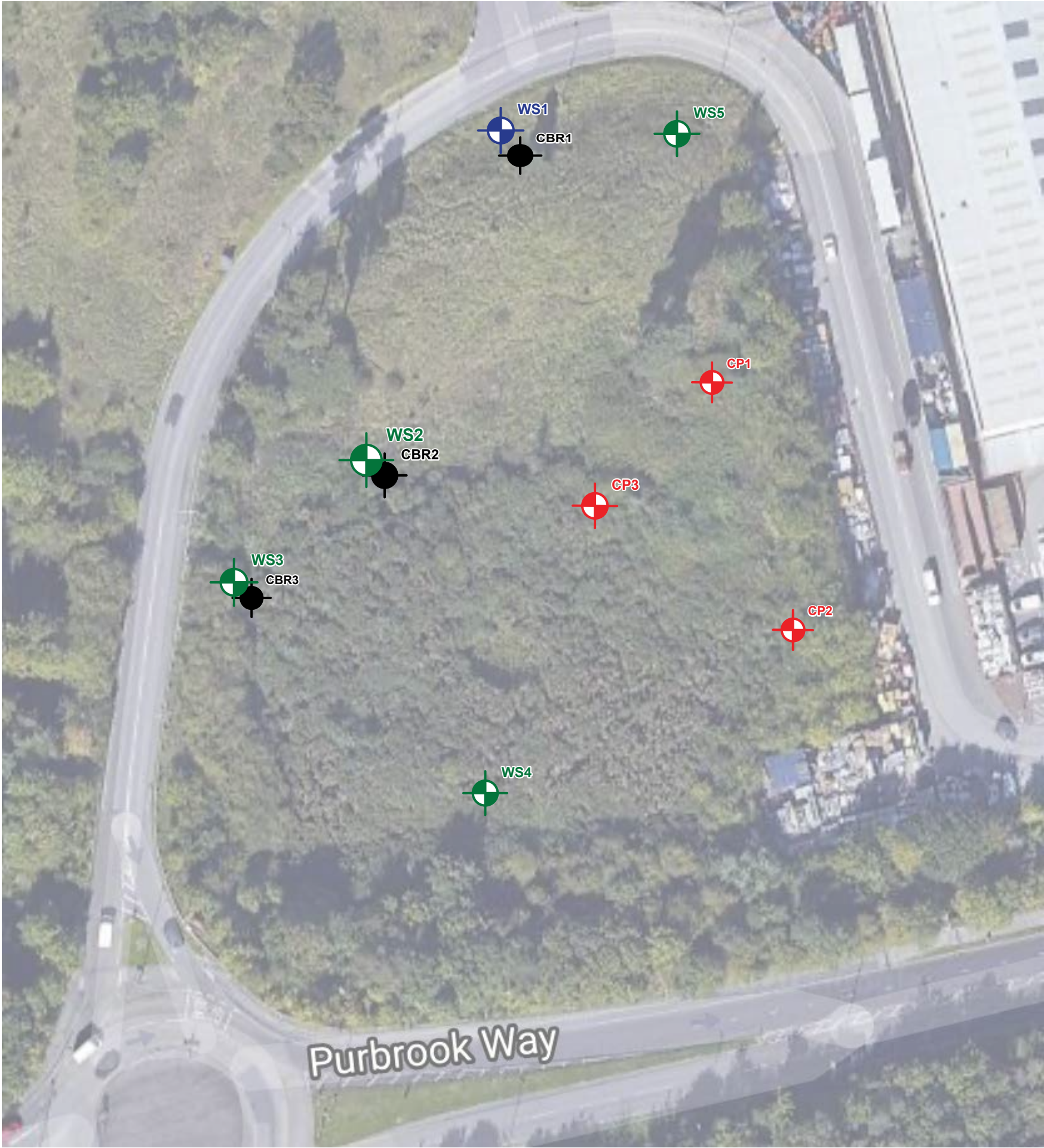
4.1.4 Bedrock

Bedrock was encountered in all of the exploratory holes as stiff to very stiff micaceous blue grey CLAY considered to be representative of London Clay. Due to the change in topographical elevation between the permitted of the site and central area beneath the proposed store footprint, the depth to bedrock varied from 0.25m at WS1 to 5.0m in CP1 and CP2. The topographical elevation of the stiff to very stiff micaceous blue grey CLAY reduced from 37.9m AOD beneath the north of the site at WS1 to 35.3m AOD at CP2 adjacent to the retaining wall beneath the southern end of the proposed store footprint.

4.2 In-situ Testing

4.2.1 Standard Penetration Tests (SPTs)

In-situ SPTs were undertaken to assist with the interpretation of strata encountered and the results of uncorrected N-values versus depth are plotted in the graph below. It should be noted that the SPTs that refused within the made ground and the weathered bedrock have not been included in the graph.



Legend

-  WS1 Window Sample & Installation
-  WS2 Window Sample
-  CP1 Cabletool Borehole & Installation
-  CBR1 CBR Test

Notes

WS 4: proposed location not accessible as vegetation clearance not permitted by ecologist

Project Title		
Havant, Purbrook Way		
Drawing Title		
Figure 2: Exploratory Locations with Existing Layout		
Client		
Lidl Great Britain Ltd		
Scale	Drawn	Size
As shown	GJ	A3
Date	Job No.	Drawing / Rev No.
20.07.20	770	02



Legend

-  WS1 Window Sample & Installation
-  WS2 Window Sample
-  CP1 Cabletool Borehole & Installation
-  CBR1 CBR Test

Notes

WS 4: proposed location not accessible as vegetation clearance not permitted by ecologist
Proposed layout reproduced from One Design Drawing 19139 AD110

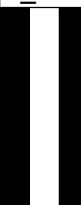
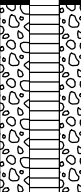
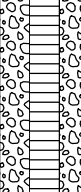
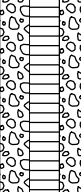
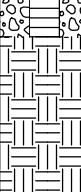
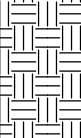
Project Title		
Havant, Purbrook Way		
Drawing Title		
Figure 3: Exploratory Locations with Proposed Layout		
Client		
Lidl Great Britain Ltd		
Scale	Drawn	Size
As shown	GJ	A3
Date	Job No.	Drawing / Rev No.
27.10.20	770	02



EXPLORATORY LOGS

BOREHOLE LOG

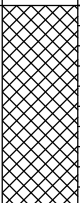
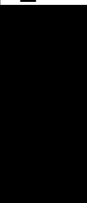
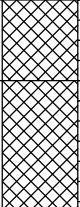
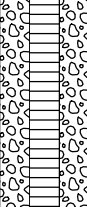
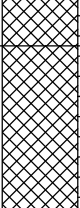
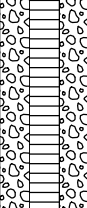
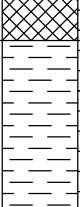
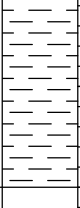
Project Havant				BOREHOLE No WS1	
Job No 770.02	Date 11-08-20	Ground Level (m) 38.18	Co-Ordinates () E 469,415.0 N 107,845.0		
Contractor				Sheet 1 of 1	

SAMPLES & TESTS			Water				STRATA		Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION			
0.00-0.25	ES			37.93		0.25	MADE GROUND: Firm to stiff ferruginous red/brown/grey silty clay with flecks of chalk (earthworks fill).			
0.25-1.00	D							Firm to stiff micaceous blue/grey CLAY (London Clay). Becoming stiff...		
1.00		N14					Becoming very stiff....			
2.00		N19								
3.00		N24				(5.25)				
4.00		N26								
5.00		N39								
				32.68		5.50				

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	From	To	Hours	From	To	
											NVO - No Visual or Olfactory Evidence of Contamination No groundwater encountered. Borehole positioned on slope so working platform cut with excavator. Top of borehole approximately 0.5m below adjacent ground surface.
All dimensions in metres Scale 1:37.5			Client Lidl Great Britain Ltd			Method/ Plant Used Tracked Rig					

BOREHOLE LOG

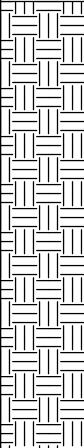
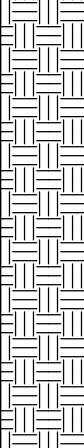
Project Havant				BOREHOLE No WS2	
Job No 770.02	Date 11-08-20	Ground Level (m) 42.12	Co-Ordinates () E 469,396.0 N 107,796.0		
Contractor				Sheet 1 of 1	

SAMPLES & TESTS			Water				STRATA		Geology	Instrument/ Backfill	
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION				
1.00	ES	N10				(1.00)	MADE GROUND: Light brown/grey gravelly sandy clay. Gravel is chalk, brick and concrete (earthworks fill).				
				41.12		1.00	MADE GROUND: Concrete boulder with steel beam - Removed by excavator.				
40.62				1.50		MADE GROUND: Soft to firm red/brown/grey clay with black staining and a hydrocarbon odour (earthworks fill).					
1.50-1.90	D	N8		40.22		(0.40)	MADE GROUND: Firm to stiff blue/grey/brown clay (earthworks fill).				
2.00-2.75				2.00			39.37			2.75	MADE GROUND: Firm to stiff brown/grey clay (earthworks fill).
											(0.85)
3.00	N18			38.37		(1.00)	MADE GROUND: Firm to stiff brown/grey clay (earthworks fill).				
				3.75							
4.00				N29							(1.75)
	5.50										
5.00	N32		36.62								

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	From	To	Hours	From	To	
											NVO - No Visual or Olfactory Evidence of Contamination No groundwater encountered.
All dimensions in metres Scale 1:37.5			Client Lidl Great Britain Ltd			Method/ Plant Used Tracked Rig			Logged By GJ		

BOREHOLE LOG

Project Havant				BOREHOLE No WS3	
Job No 770.02	Date 11-08-20	Ground Level (m) 42.57	Co-Ordinates () E 469,380.0 N 107,780.0		
Contractor				Sheet 1 of 1	

SAMPLES & TESTS			Water				STRATA		Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick-ness)	DESCRIPTION			
1.00-2.00 1.00	ES	N21				(2.25)	MADE GROUND: Stiff light brown gravelly slightly sandy clay. Gravel is brick (earthworks fill). Becoming very stiff.....			
2.00		N58/ 200 mm		40.32		2.25	MADE GROUND: Firm brown gravelly clay. Gravel is chalk (earthworks fill).			
3.00		N18		39.37		3.20	MADE GROUND: Stiff brown/blue/grey sandy clay (earthworks fill).			
4.00		N19				(2.30)				
				37.07		5.50	Stiff blue/grey micaceous clay			
				36.57		6.00				

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Depth	Date	Time	Casing Depth	Dia. mm	Water Depth	From	To	Hours	From	To	
											NVO - No Visual or Olfactory Evidence of Contamination No groundwater encountered.
All dimensions in metres Scale 1:37.5			Client Lidl Great Britain Ltd			Method/ Plant Used Tracked Rig			Logged By GJ		

BOREHOLE LOG

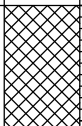
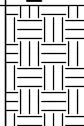
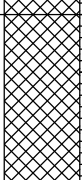
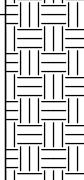
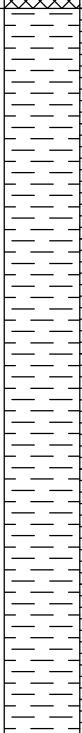
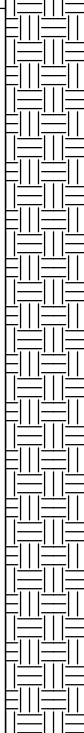
Project Havant				BOREHOLE No WS5	
Job No 770.02	Date 11-08-20	Ground Level (m) 39.12	Co-Ordinates () E 469,442.0 N 107,844.0		
Contractor				Sheet 1 of 1	

SAMPLES & TESTS				STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
0.60-0.80	ES					(1.60)	MADE GROUND: Firm to stiff ferruginous red/brown/grey clay.		
1.00		N10							
				37.52		1.60	Firm blue grey micaceous CLAY.		
2.00		N37					Becoming stiff...		
2.55-3.00	U						Becoming very stiff....		
3.00		N50/ 295 mm				(3.90)			
				33.62		5.50			

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Depth	Date	Time	Casing Depth	Dia. mm	Water Depth	From	To	Hours	From	To	
											NVO - No Visual or Olfactory Evidence of Contamination No groundwater encountered.
All dimensions in metres Scale 1:37.5			Client Lidl Great Britain Ltd			Method/ Plant Used Tracked Rig			Logged By GJ		

BOREHOLE LOG

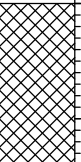
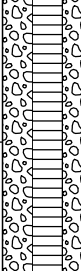
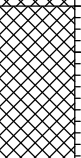
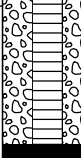
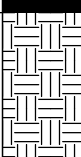
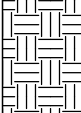
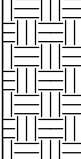
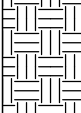
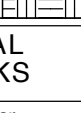
Project Havant				BOREHOLE No CP1	
Job No 770.02	Date 17-08-20 18-08-20	Ground Level (m) 41.87	Co-Ordinates () E 469,447.0 N 107,809.0		
Contractor				Sheet 1 of 1	

SAMPLES & TESTS			Water				STRATA	Geology	Instrument/ Backfill				
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick- ness)	DESCRIPTION						
0.50	ES	N22	40.77		(1.10)	MADE GROUND: Firm to stiff orange/brown very sandy slightly gravelly clay (earthworks fill).							
1.50	D ES U100				(0.90)	MADE GROUND: Firm to stiff orange / brown sandy clay (earthworks fill).							
2.00 2.00					2.00	MADE GROUND: Orange brown silty clayey sand (earthworks fill).							
2.50					2.50	MADE GROUND: Stiff orange brown/grey clay (earthworks fill).							
3.00 3.00	D	N12	37.87		(1.50)								
4.00	U100				4.00	Stiff to very stiff blue grey slightly micacious CLAY.							
4.45 4.50	D	N20	31.37										
5.50	D												
6.00 6.00	D	N18											
7.00	U100				(6.50)								
7.50	N20												
9.00													
10.00		N24											

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Depth	Date	Time	Casing Depth	Dia. mm	Water Depth	From	To	Hours	From	To	
											NVO - No Visual or Olfactory Evidence of Contamination No groundwater encountered.
All dimensions in metres Scale 1:65.625			Client Lidl Great Britain Ltd			Method/ Plant Used Dando 2000			Logged By GJ		

BOREHOLE LOG

Project Havant				BOREHOLE No CP2	
Job No 770.02	Date 18-08-20 19-08-20	Ground Level (m) 40.53	Co-Ordinates () E 107,744.0 N 469,455.0		
Contractor				Sheet 1 of 1	

SAMPLES & TESTS				STRATA				Geology	Instrument/ Backfill
Depth	Type No	Test Result	Water	Reduced Level	Legend	Depth (Thickness)	DESCRIPTION		
0.50	ES	N13				(2.60)	MADE GROUND: Firm to stiff orange/brown grey slightly gravelly clay (earthworks fill).		
1.50	ES								
2.20	U100			37.93		2.60			
3.00	ES	N19				(2.40)	MADE GROUND: Stiff to very stiff orange brown silty clay (earthworks fill).		
4.50	D			35.53		5.00			
6.00		N16					Stiff to very stiff blue/grey slightly micaceous CLAY.		
7.00	U100								
7.45	D	N18				(5.50)			
9.00									
10.00		N24							
				30.03		10.50			

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Depth	Date	Time	Casing Depth	Dia. mm	Water Depth	From	To	Hours	From	To	
											NVO - No Visual or Olfactory Evidence of Contamination No groundwater encountered
All dimensions in metres Scale 1:65.625			Client Lidl Great Britain Ltd			Method/ Plant Used Dando 2000			Logged By GJ		

BOREHOLE LOG

Project Havant				BOREHOLE No CP3A	
Job No 770.02	Date 17-08-20 17-08-20	Ground Level (m) 42.11	Co-Ordinates () E 469,424.0 N 107,791.0		
Contractor				Sheet 1 of 1	

SAMPLES & TESTS			Water				STRATA	Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick- ness)	DESCRIPTION		
0.50-0.70	ES	N16				(2.05)	Made Ground: Stiff to very stiff orange brown slightly gravelly clay. Gravel is concrete and brick.		
1.50			40.06		2.05				
			39.61		2.50	Obstruction			

Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Depth	Date	Time	Casing Depth	Dia. mm	Water Depth	From	To	Hours	From	To	
											NVO - No Visual or Olfactory Evidence of Contamination No groundwater encountered
All dimensions in metres Scale 1:65.625			Client Lidl Great Britain Ltd			Method/ Plant Used Dando 2000			Logged By GJ		

BOREHOLE LOG

Project Havant				BOREHOLE No CP3B	
Job No 770.02	Date 17-08-20 17-08-20	Ground Level (m) 42.11	Co-Ordinates () E 469,424.0 N 107,792.0		
Contractor				Sheet 1 of 1	

SAMPLES & TESTS			Water	STRATA					Geology	Instrument/ Backfill
Depth	Type No	Test Result		Reduced Level	Legend	Depth (Thick- ness)	DESCRIPTION			
0.50	ES	N38				(2.10)	MADE GROUND: Stiff to very stiff slightly gravelly clay. Gravel is concrete and brick.			
1.50	D ES									
1.50										
1.50										
				40.01		2.10				
				39.71		2.40	OBSTRUCTION: Concrete boulders and kerbstones removed by 8 tonne excavator and explorator hole continued as as trial pit - see photos.			
				39.21		(0.50) 2.90	MADE GROUND: Stiff to very stiff orange brown/grey gravelly clay. Gravel is concrete and brick.			
						(2.10)	MADE GROUND: Stiff to very stiff orange/brown slightly sandy CLAY.			
			37.11		5.00					
			36.61		(0.50) 5.50	Very stiff blue grey slightly micacious CLAY.				



Boring Progress and Water Observations						Chiselling			Water Added		GENERAL REMARKS
Depth	Date	Time	Casing Depth	Casing Dia. mm	Water Depth	From	To	Hours	From	To	
											NVO - No Visual or Olfactory Evidence of Contamination No groundwater encountered
All dimensions in metres Scale 1:65.625			Client Lidl Great Britain Ltd			Method/ Plant Used Dando 2000			Logged By GJ		

APPENDIX M: Confirmation of off-site Drainage Connections

Flood and Water Management Team
Economy, Transport & Environment Department,
Hampshire County Council
1st Floor, Ell Court West,
The Castle
Winchester
Hampshire SO23 8UD

FAO Santiago Manzanero

New Kings Court
Tollgate
Chandler's Ford
Eastleigh SO53 3LG

DX 155850 Eastleigh 7

DDI: 023 8085 7307
T: 023 8090 8090
E: felicity.marshall@blakemorgan.co.uk

www.blakemorgan.co.uk

12 February 2021

Our ref: FLM/00606300/000077

Your ref: SWM/2021/0042

Dear Sirs

Our client: Lidl Great Britain Limited

Erection of retail foodstore with associated car parking, access, landscaping and engineering works at Land to the west of B&Q, Purbrook Way, Havant ("the Property")

We are acting for Lidl Great Britain Limited in the purchase of the Property and confirm that the rights referred to in your letter dated 4th February 2021 in respect of the discharge and connection required for the drainage are granted in the agreed Transfer attached to the Agreement for Sale for the Property. The Property is being purchased out of Title SH20195.

The Seller, and owner of the retained land, over which the drainage rights are required, is Smith & Williamson Trust Corporation Limited and Mark Graham Weaver as trustees of The GHM Jackson 1972 Children's Settlement Trust. They are granting within the Transfer the right of free and uninterrupted passage of Services to and from the Property through the Service Apparatus that now or may at any time following the date of the agreed Transfer be laid in, under, over or through the Retained Land.

Within the Transfer the Seller is also granting the right to Lidl Great Britain Limited to install or connect into that Service Apparatus.

The definition of Services includes water, foul water and surface water, and the definition of Service Apparatus includes sewers, drains, channels, pipes, water courses, gutters and ducts.

Both parties are under contract to purchase and sell the Property respectively using the form of Transfer agreed attached to the Agreement for Sale they have entered into including the rights as detailed above.

If you need any further information please do not hesitate to contact Felicity Marshall on the above details.

Yours faithfully

A handwritten signature in black ink, appearing to read "Blake Morgan". The signature is fluid and cursive, with the first name "Blake" and the last name "Morgan" clearly distinguishable.

Blake Morgan LLP

APPENDIX N: LLFA Initial Consultee Response



Hampshire County Council

*Economy, Transport and Environment Department
Elizabeth II Court West, The Castle
Winchester, Hampshire SO23 8UD*

Tel: 0300 555 1375 (General Enquiries)
0300 555 1388 (Roads and Transport)
0300 555 1389 (Recycling Waste & Planning)
Textphone 0300 555 1390
Fax 01962 847055
www.hants.gov.uk

<i>Enquiries to</i>	Santiago Manzanero	<i>My reference</i>	SWM/2021/0042
<i>Direct Line</i>	01962 846777	<i>Your reference</i>	APP/20/01221
<i>Date</i>	4 February 2021	<i>Email</i>	SWM.consultee@hants.gov.uk

Dear Sir/Madam,

Erection of retail foodstore with associated car parking, access, landscaping and engineering works at Land to the west of B&Q, Purbrook Way, Havant.

Hampshire County Council as Lead Local Flood Authority has provided comments in relation to the above application in our role as statutory consultee on surface water drainage for major developments.

In order to assist applicants in providing the correct information to their Local Planning Authority for planning permission, Hampshire County Council has set out the information it requires to provide a substantive response at <https://www.hants.gov.uk/landplanningandenvironment/environment/flooding/planning>

The County Council has reviewed the following documents relating to the above application:

- FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY; ref: A/LIDLHAVANT.10; dated: DECEMBER 2020.

The information submitted by the applicant in support of this planning application indicates that surface water runoff from the application site will be managed through an attenuation tank. Additionally, surface water will be discharged at a rate of 3.0l/s into a private 150mm diameter surface water sewer in the B&Q access road immediately to the north of the site. This is acceptable in principle since infiltration is not feasible at the application site, and in the absence of any nearby watercourse.

*Director of Economy, Transport and Environment
Stuart Jarvis BSc DipTP FCIHT MRTPI*

However, the drainage layout included within the submitted document indicates that surface water will be discharged into a highway drain in the verge. Therefore, it is unclear which drainage strategy the applicant is seeking for approval.

Additionally, there is no information within the planning website which demonstrate that the asset owner (adjacent warehouse landowner or the highways authority) has agreed to the principle of connection and discharge rate. Failure to secure this agreement is likely to necessitate in the need to review the drainage proposals for the application, which may have implications for the drainage proposals, proposed quantum and layout of the proposed development.

Therefore, we **request** clarification on the proposed outfall location including an updated drainage layout, and written agreement in principle from the relevant asset owner for the proposed discharge rate and connection.

The Source Control calculations are very high level at this stage considering that this is an application for full planning permission. Therefore, we **request** detailed network hydraulic calculations for all rainfall events, including the listed below. The hydraulic calculations should take into account the connectivity of the entire drainage features including the discharge location. The results should include design and simulation criteria, network design and result tables, manholes schedule tables and summary of critical result by maximum level during the 1 in 1, 1 in 30 and 1 in 100 (plus an allowance for climate change) rainfall events. The drainage features should have the same reference that the submitted drainage layout.

Bearing in mind that this is an application for full planning permission and the layout will be fixed, we **request** that the above issues are addressed at this stage and not through planning conditions, to demonstrate that the development site has a secure outfall to dispose surface water, and to demonstrate that the quantum of development is achievable, whilst ensuring that flood risk will not be increased on or off site.

We would also recommend that the applicant is directed to our website <http://www3.hants.gov.uk/flooding/hampshireflooding/drainagesystems.htm> for further information on recommended surface water drainage techniques.

Please note that Hampshire County Council as Lead Local Flood Authority will not comment on the fluvial systems as these are outside our remit.

As a statutory consultee, the County Council has a duty to respond to consultations within **21 days**. The 21-day period will not begin until we have received sufficient information to enable us to provide a meaningful response. Please ensure all data is sent to us via the relevant Local Planning Authority.

For guidance on providing the correct information, please review the checklist and associated guidance document available on our [website](#).

This response has been provided using the best knowledge and information submitted as part of the planning application at the time of responding and is reliant on the accuracy of that information.

Yours faithfully,

A handwritten signature in black ink, appearing to be 'PP' followed by a stylized name.

Flood and Water Management Team
Economy, Transport & Environment Department,
Hampshire County Council, 1st Floor, Ell Court West,
The Castle, Winchester, Hampshire SO23 8UD
Web: <http://www3.hants.gov.uk/flooding/watercourses.htm>

General guidance for the application

It is important to ensure that the long-term maintenance and responsibility for Sustainable Drainage Systems is agreed between the Local Planning Authority and the applicant before planning permission is granted. This should involve discussions with those adopting and/or maintaining the proposed systems, which could include the Highway Authority, Planning Authority, Parish Councils, Water Companies and private management companies.

For SuDS systems to be adopted by Hampshire Highways it is recommended that you visit the website at:

<https://www.hants.gov.uk/transport/developers/constructionstandards> for guidance on which drainage features would be suitable for adoption.

Where the proposals are connecting to an existing drainage system it is likely that the authorities responsible for maintaining those systems will have their own design requirements. These requirements will need to be reviewed and agreed as part of any surface water drainage scheme.

Works in relation to ordinary watercourses

PLEASE NOTE: *If the proposals include works to an ordinary watercourse, under the Land Drainage Act 1991, as amended by the Flood and Water Management Act 2010, prior consent from the Lead Local Flood Authority is required. **This consent is required as a separate permission to planning.***

Information on ordinary watercourse consenting can be found at the following link <http://www3.hants.gov.uk/flooding/hampshireflooding/watercourses.htm>

It is strongly recommended that this information is reviewed before Land Drainage consent application is made.

*For guidance on providing the correct information, we recommend you use our **Ordinary Watercourse Consents Pre-application service** and help avoid delays occurring at the formal application stage. A Pre-application service for Ordinary Watercourse Consents is available, allowing consents to go through in a smoother, often more timely manner. For full information please visit:*

<https://www.hants.gov.uk/landplanningandenvironment/environment/flooding/WatercoursePreApplication>

