
Project Name : Hanns Way, Eastleigh

Job No : 21-138

Note Title : Drainage Strategy Technical Note

Author : NA

Checked : GG

Approved : GG

Date : April 2023

1.0 INTRODUCTION

1.1.1 Odyssey has been commissioned by Doswell Projects to undertake a surface water and foul drainage strategy to be submitted in association with a planning application for residential development at Hanns Way in Eastleigh.

1.1.2 This report demonstrates the principles of surface and foul water management at the site.

2.0 DEVELOPMENT PROPOSALS

2.1.1 The development proposals comprise the construction of one residential building, containing six dwellings. The proposed site layout is presented in **Appendix A**.

3.0 EXISTING SITE

3.1 *Site Location*

3.1.1 The site is located approximately 290 metres (m) west of Eastleigh railway station. The site is bounded by residential development to the north and west, Wells Place to the south, and Hanns Way to the east. The Ordnance Survey grid reference for the site is 445436E, 119041N, and the nearest postcode is SO50 9DF.



3.1.2 The site is currently a brownfield site comprising a car parking area. The site location plan is presented in **Appendix A**.

3.2 Topography and Existing Drainage

3.2.1 A Topographical survey was undertaken by Baypoint Surveys in June 2021. The data obtained for the site shows the site area falls predominantly from the north towards the south. The levels range from 16.02 metres Above Ordnance Datum (m AOD) in the north to approximately 15.74m AOD in the south. The topographical data is presented in **Appendix B**.

3.2.2 Southern Water sewer records show an existing 225 millimetres (mm) surface water sewer running in a southern direction along Hanns Way to the east of the site, and an existing 750mm surface water sewer running in a western direction along Wells Place. The Southern Water sewer records are presented in **Appendix C**.

3.2.3 Southern Water sewer records also show there is a foul sewer pipe running in a southern direction along the eastern boundary of the site. There is also a foul sewer present in the residential area to the west of the site that could cross the south part of the site.

3.3 Geology and Hydrogeology

3.3.1 British Geological Survey (BGS) online maps (accessed April 2023) indicate the bedrock geology of the site comprises London Clay Formation (clay, silt and sand). There are superficial deposits comprising River Terrace Deposits (clay and silt) present at the site. BGS hydrogeology mapping indicates the site is located within the Thames Group described as "*Rocks with essentially no groundwater*" and summarised as a "*Predominantly clayey sequence up to 140 m thick containing underlying aquifers. Occasional springs at base have very hard water*". BGS mapping is presented in **Appendix D**.

3.3.2 Environment Agency (EA) online maps indicate the nearest 'Main River' is the River Itchen, located approximately 735m to the east of the site. Monk's Brook is also a 'Main River' which is located approximately 1.2 kilometres (km) to the south-west of the site.

3.3.3 Groundwater mapping published by the EA indicates the site is not located within any Source Protection Zones.



3.4 Greenfield Runoff Rates

3.4.1 As the developable area for this site is less than 50 hectares (ha), the Institute of Hydrology (IoH) Report 124 Flood Estimation for Smaller Catchments (1994) method is suitable to estimate greenfield peak flow rates (50 ha is used in the formula and the flow rate is linearly interpolated based on the ratio of the development area). This methodology is approved in the Construction Industry Research and Information Association (CIRIA) C753 The SuDS Manual; the parameters used can be seen in **Table 3.1**.

Table 3.1: Greenfield Runoff Rate Calculation Parameters

Parameter	Value	Unit
SAAR	800	mm
Soil Index	0.450	-
Region	7	-
Urban	0.000	-

3.4.2 **Table 3.2** summarises the greenfield discharge rates for proposed impermeable area of the site (0.032ha). Supporting calculations for the greenfield runoff rates are provided in **Appendix E**.

Table 3.2: Greenfield Runoff Rates

Return Period	Existing Greenfield Discharge Rates from Site (litres per second (l/s))	Existing Greenfield Discharge Rates per Hectare (l/s/ha)
QBAR	0.2	5.1
Q1	0.1	4.4
Q30	0.4	11.6
Q100	0.5	16.4

3.5 Existing Runoff Rates

3.5.1 As the site is currently in a developed state, brownfield rates have been calculated using Flood Estimation Handbook data. The existing runoff rates for the existing impermeable area (0.047ha) are shown in **Table 3.3**.

**Table 3.3: Estimated Total Brownfield Surface Water Discharge Rates**

Return Period	Estimated Brownfield Discharge Rates from site (l/s)
Q1	2.9
Q2	3.4
Q30	6.0
Q100	7.4

4.0 PROPOSED DRAINAGE STRATEGY

4.1 *Surface Water Management Strategy Requirements*

4.1.1 The current Planning Practice Guidance (PPG) for flood risk and coastal change sets out the following drainage hierarchy that the discharge of surface water runoff should adhere to:

- into the ground (infiltration);
- to a surface water body;
- to a surface water sewer, highway drain, or another drainage system; and,
- to a combined sewer.

4.1.2 This hierarchy builds upon the drainage hierarchy set out in the PPG and The Building Regulations 2000: Drainage and Waste Disposal Requirement H3 (3).

4.2 *Proposed Surface Water Drainage Strategy*

4.2.1 The options for discharging surface water generated by the site have been assessed in accordance with the drainage hierarchy set out in the PPG.

4.2.2 In accordance with the drainage hierarchy, the first option for surface water discharge is infiltration. The bedrock underlying the site is London Clay and therefore it is unlikely that infiltration would be viable.

4.2.3 The second most favourable option is to discharge to a watercourse, however there are no watercourses on or in close proximity to the site.

4.2.4 It is proposed to implement a lined cellular storage tank to attenuate surface water, prior to discharge at a controlled rate of 2l/s using a vortex control device. Flows would be discharged to the existing Southern Water surface water network and connect to existing surface water manhole 4852 in Wells Place to the south-east of the site, subject to approval by Southern Water. This



proposed discharge rate would provide 30% betterment compared to the Q1 existing runoff rate, and greater betterment for the less frequent storm events.

4.2.5 The attenuation tank has been designed to accommodate a 1 in 100 year storm plus 45% rainfall to account for climate change.

4.2.6 The proposed surface water drainage strategy is presented in **Drawing 21-138-001** in **Appendix E**, along with the associated Micro Drainage calculations.

4.2.7 Exceedance flows have been considered. Owing to the topography of the site, exceedance flows would be conveyed from the north of the site to the south, from the residential building towards the road, and therefore would not pose risk to buildings.

4.3 Water Quality

4.3.1 The “pollution hazard indices for different land use classifications” table has been extracted from CIRIA C753 The SuDS Manual and applied to the development proposals, as shown in **Table 4.1**.

Table 4.1: Pollution Hazard Indices

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydro-carbons
Residential roofs	Very low	0.2	0.2	0.05
Individual property driveways, residential car parks, low traffic roads (e.g. cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (e.g. schools, offices) i.e. less than 300 traffic movements per day	Low	0.5	0.4	0.4

4.3.2 The SuDS mitigation indices for a proprietary treatment system are set out in **Table 4.2**, in accordance with the guidance contained in The SuDS Manual.

**Table 4.2: SuDS Mitigation Indices**

Type of SuDS Component	Mitigation Indices		
	TSS	Metals	Hydrocarbons
Proprietary treatment system – Up-Flo™ Filter	0.8	0.69	0.4

4.3.3 **Table 4.2** demonstrates an Up-Flo™ Filter proprietary treatment system would provide a sufficient level of surface water runoff treatment prior to discharging to the Southern Water network.

4.4 SuDS Maintenance Requirements

4.4.1 Maintenance of the drainage system and SuDS features would be carried out in accordance with the manufacturer guidance and through an approved maintenance management plan to minimise the residual flood risk of drainage system blockage.

4.4.2 Maintenance would be the responsibility of the developer to assign, however the “*operation and maintenance requirements for an attenuation tank*” and “*operation and maintenance requirements for a proprietary treatment system*” tables have been extracted from The SuDS Manual and are presented in **Appendix F**.

5.0 PROPOSED FOUL DRAINAGE STRATEGY

5.1.1 It is proposed that foul flows would be conveyed by gravity to the foul sewer which runs along the eastern boundary of the site. Although the invert levels of the foul sewer manholes are unconfirmed, it is anticipated that a gravity connection would be possible as the foul sewer is located in such close proximity to the site. The connection would be subject to approval by Southern Water. The foul drainage strategy is presented in **Drawing 21-138-001** in **Appendix E**.

5.1.2 Southern Water has a duty to improve its network to cater for proposed developments. This is funded via increased infrastructure charges to developers. Should there be a requirement for offsite improvement works, Southern Water would programme these works with due regard to the build programme of the proposed development.

6.0 SUMMARY AND CONCLUSIONS

6.1.1 Odyssey has been commissioned by Doswell Projects to undertake a surface water and foul drainage strategy to be submitted in association with a planning application for one residential building, containing six dwellings.



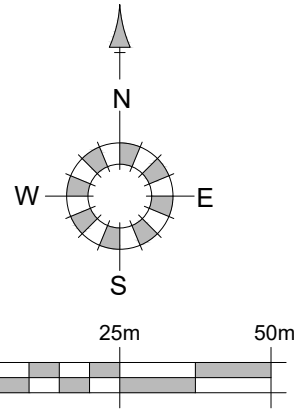
6.1.2 It is proposed to use a lined cellular storage tank to attenuate surface water, prior to discharge into existing Southern Water surface water network. Flows would be discharged to the existing Southern Water surface water network at manhole 4852 in Wells Place to the south-east of the site. The attenuation tank has been designed to accommodate the 1 in 100 year design event plus 45% climate change.

6.1.3 It is proposed that foul flows would be conveyed by gravity to the foul sewer that runs along the eastern boundary of the site. The connection would be subject to approval by Southern Water.

6.1.4 The drainage strategy demonstrates that the proposed development can be drained in a sustainable manner, commensurate with national and local policy.

APPENDIX A

Site Location Plan and Site Layout Plan

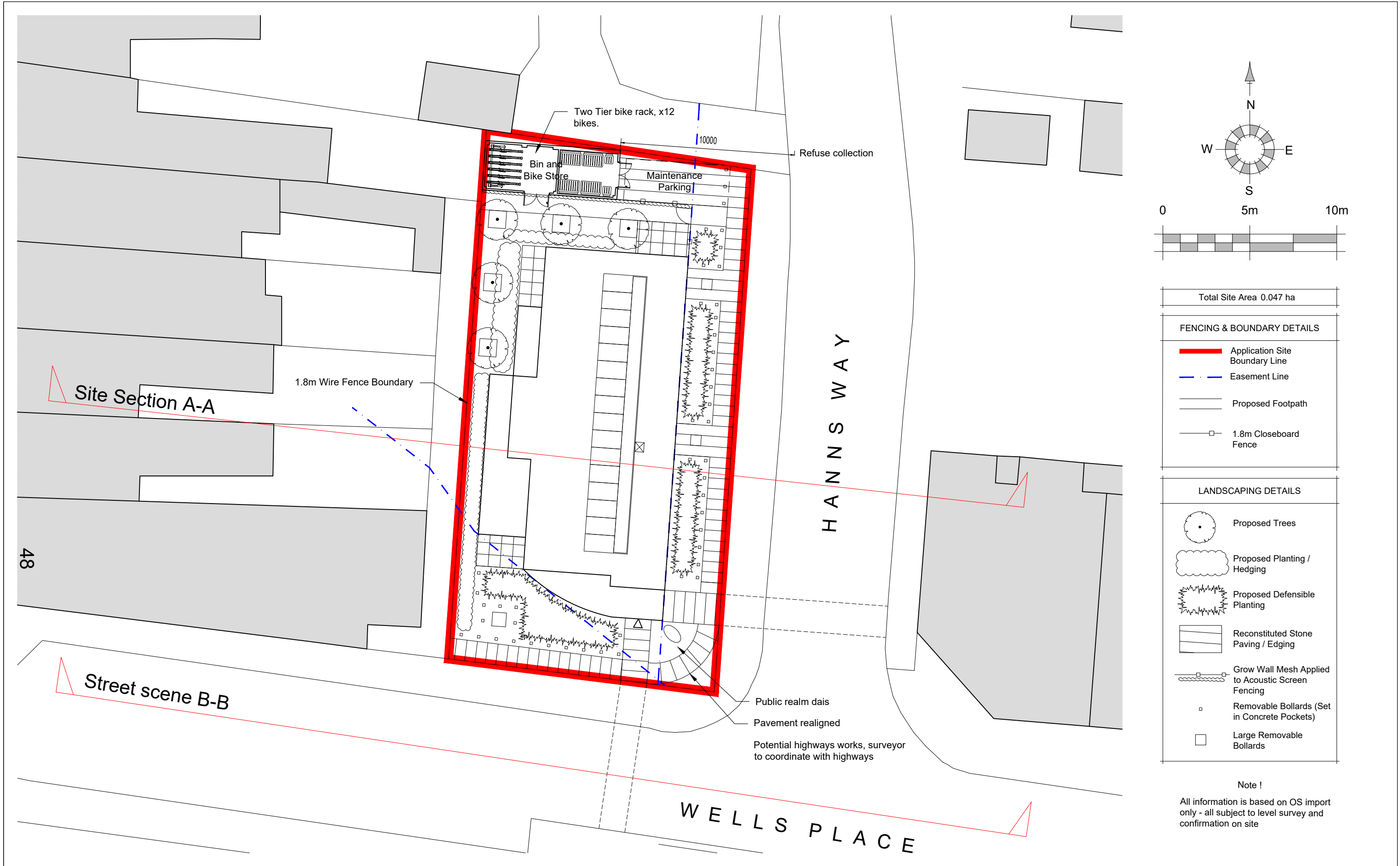


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Work in Progress

CLIENT: Doswell Projects		PROJECT: Hanns Way Eastleigh	
SCALE: 1:1250 (A4 ORIGINAL)		DRAWING: Site Location Plan	
DRAWN: NL	22205	S101	—
DATE: 27/03/23			





REV. A	DATE 11/04/22	REVISIONS: Minor Updates.	BY XX	STATUS:	Preliminary		CLIENT: Doswell Projects Ltd.	PROJECT: Hanns Way, Eastleigh	 architecture planning masterplanning Broadmeade House, Farnham Business Park, Weydon Lane, Farnham, Surrey GU9 8QT. info@osparchitecture.com www.osparchitecture.com Tel: 01252 267878	
							SCALE: 1:200 (A3 ORIGINAL)	DRAWING: Proposed Site Layout		
							DRAWN: MM	22205	SK101	A
							DATE: 29/03/23			

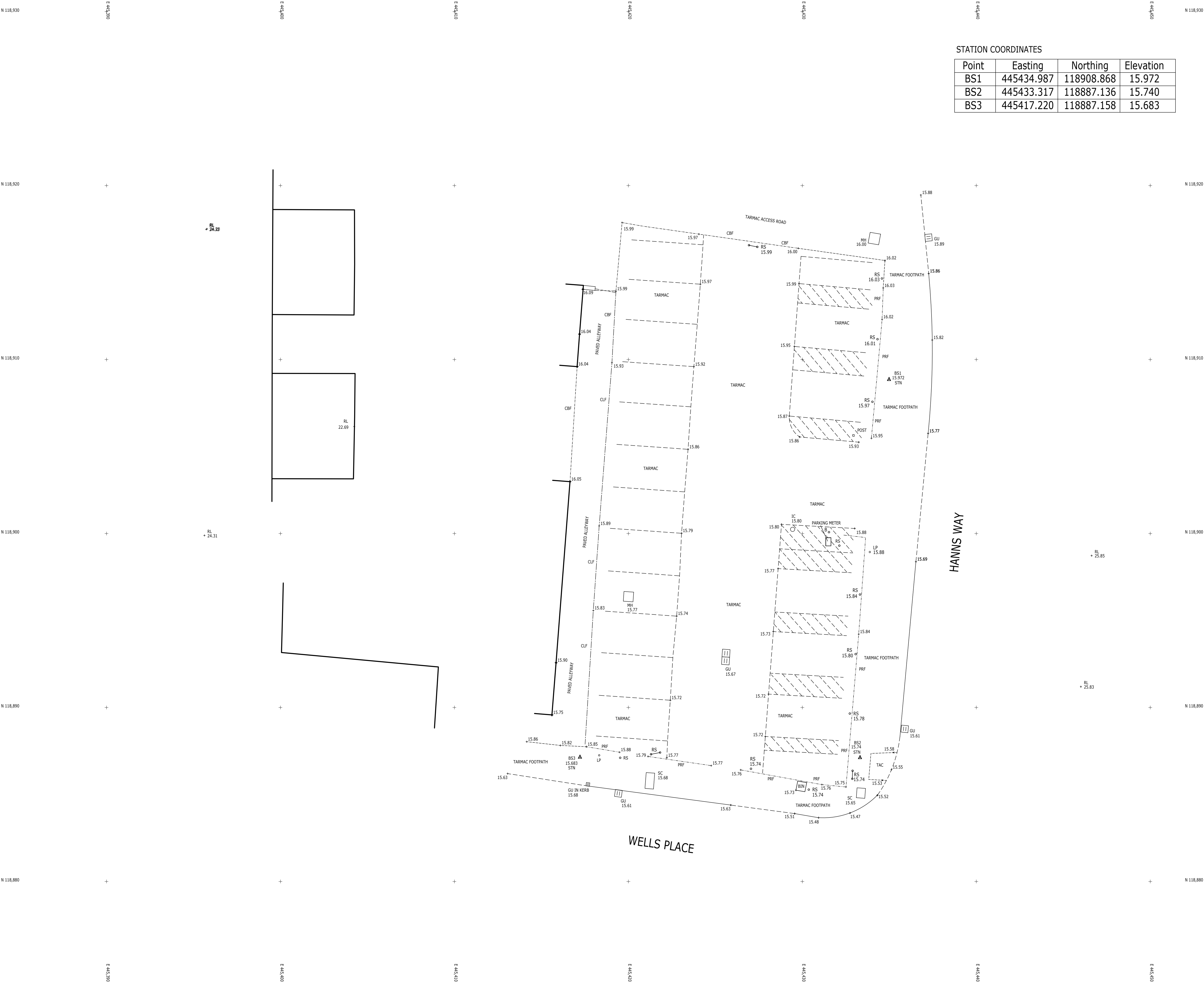
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APPENDIX B

Topographical Survey



STATION COORDINATES			
Point	Easting	Northing	Elevation
BS1	445434.987	118908.868	15.972
BS2	445433.317	118887.136	15.740
BS3	445417.220	118887.158	15.683

LEGEND

SERVICES/STREET FURNITURE

ADD

ABOVE ORDNANCE DATUM

AV

AIR VALVE

B

BOLLARD

B-ILL

ILLUMINATED BOLLARD

BB

BOLINA BEACON

BT

BRITISH TELECOM COVER

BTB

BRITISH TELECOM VMC BOX

BS

BUS STOP

CATV

CABLE TELEVISION COVER

CONC

CONCRETE

CPK

CONCRETE PAVING SLABS

CPK

CONCRETE

DK

DOWNPIPE

ECB

ELECTRICITY CONTROL BOX

ELCP

ELECTRICITY CABLE PIT

EP

ELECTRICITY POLE

ERC

EARTH ROD COVER

FI

FIRE HYDRANT

F/B

FLOWER BED

FL

FLOOR LEVEL

FP

FLAG POLE

GP

GATE POST

GV

GAS VALVE

GU

GULLY

IC

INSPECTION COVER

LB

LETTER BOX

LH

LAMP HOLE

LP

LAMP POST

MH

MANKLE

MP

MANNER POST

NP

ROAD NAME PLATE

OSBM

O.S. BENCHMARK

PCE

PRE-CAST CONCRETE EDGING

PCK

PRE-CAST CONCRETE KERBS

PM

PARKING METER

RE

RODGING EYE

RS

ROAD SIGN

RWP

RAINWATER DOWNPIPE

SP

SIGN POST

STN

SURVEY STATION

STP

STACK PIPE

SV

STOP VALVE/COCK

TAP

WATER TAP/STANDPIPE

TBM

TEMPORARY BENCHMARK

TL

TRAFFIC LIGHT

TP

TELEGRAPH POLE

VENT

VENT PIPE

WL

WATER LEVEL

WM

WATER METER

WMSV

WATER METER/STOP VALVE

WO

WASH OUT

WT

WATER TROUGH

TELEPHONE CABLE

ELECTRICITY CABLE

FOLIAGE

TREE CANOPY

SMALL TREES/BUSHES

HEDGES

Spines
Dashed 0.2m
No of trunks

GAK
0.2
x3

BUILDINGS

HEIGHTS ABOVE FL

SCH STRUCTURAL CEILING HEIGHT

POH FALSE CEILING HEIGHT

DH DOOR HEAD HEIGHT

C-H HEAD HEIGHT

F-C CELL HEIGHT

LEVELS RELATIVE TO DATUM

FL FLOOR LEVEL

EL EAVES LEVEL

RL RIDGE LEVEL

FRL FLAT ROOF LEVEL

PARAVET LEVEL

WINDOW

DOOR

ARCHWAY

ELECTRICAL

13AMP SOCKET

BLANKING PLATE

CCTV

LIGHT SWITCH

PIR

SPOT LIGHT

WALL LIGHT

FIRE

BREAK GLASS CALL POINT

SMOKE ALARM

DRY RISER OUTLET

FURNITURE

ACCESS POINT

Orientation to north

Scale

0m

5m

10m

Notes

This survey has been computed and drawn about a plane local grid and was surveyed for a scale of 1:100, any subsequent enlargements should be verified on site.

Whilst every care has been taken, no responsibility can be accepted for errors or omissions caused by detail obscured or not accessible at the time of this survey.

Visible features in the vicinity of the boundaries, as shown on this survey, may not represent the extent of legally conveyed ownership.

Revisions

Baypoint

surveys

Land Surveys

Site Setting Out

3D Laser Scanning

Measured Building Surveys

Baypoint Surveys Ltd, 82 Castle Lane West, Bournemouth, BH9 3JU

T 01202 301012 M 07770 386995

E info@baypoint.co.uk W www.baypoint.co.uk

THE SURVEY ASSOCIATION

project

Hanns Way Carpark
Hanns Way
Eastleigh

client

Vivid Homes

drawing title

Topographical Survey

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scale 1:100

paper size A1

drawn by JJF

checked by

date 23.06.21

grid OS National Grid

datum OS Datum

drawing number 3228-SV-1

revision

APPENDIX C

Southern Water Sewer Records

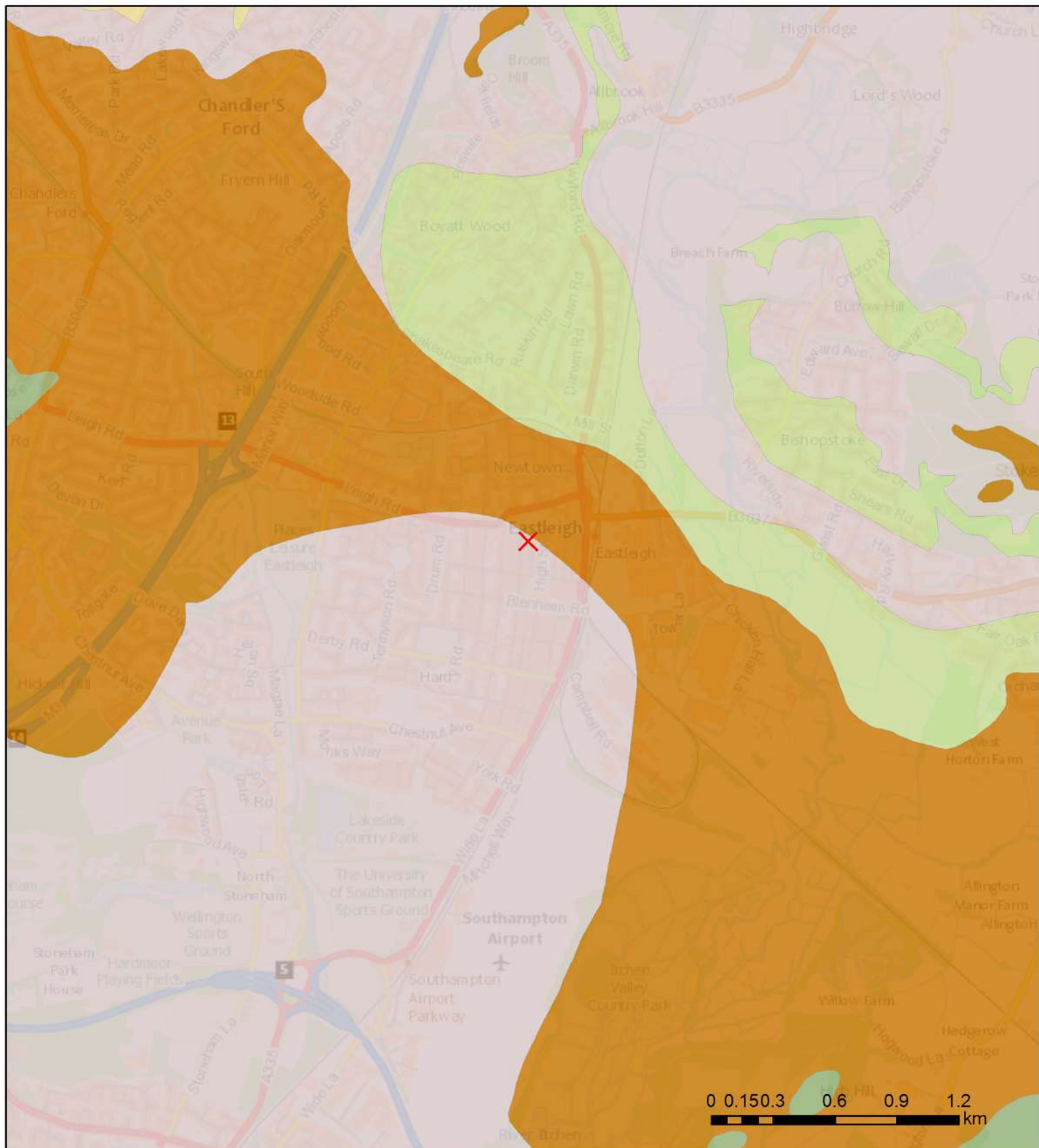
APPENDIX D

British Geological Survey Data

Bedrock



British
Geological
Survey



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GeolIndex Onshore Data Sources: NERC, Natural England, English Heritage and Ordnance Survey

Map Key

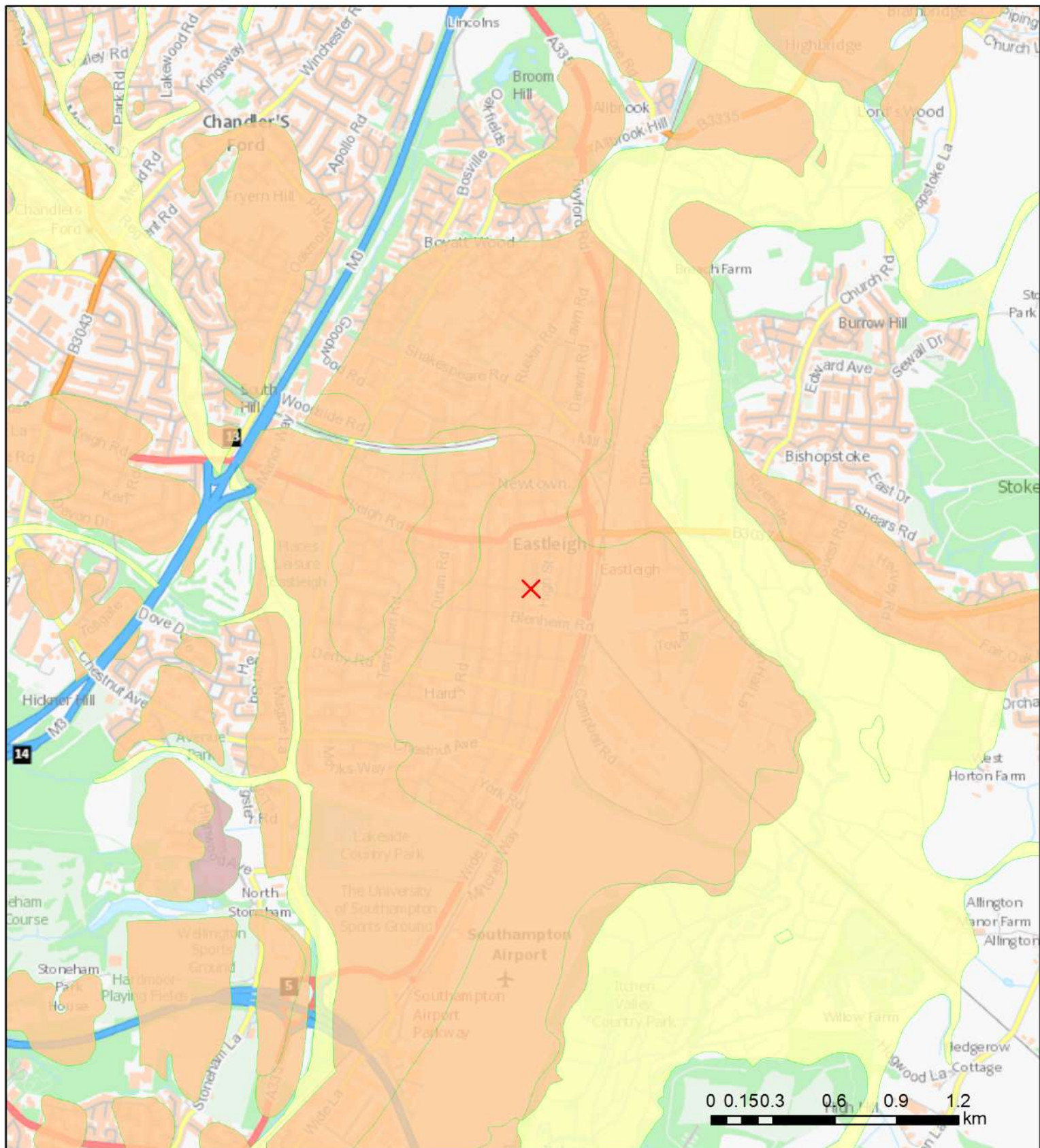
Bedrock geology 1:50,000 scale

-  [LONDON CLAY FORMATION - CLAY, SILT AND SAND](#)
-  [WHITECLIFF SAND MEMBER - SAND](#)
-  [EARNLEY SAND FORMATION - SAND, SILT AND CLAY](#)
-  [WITTERING FORMATION - SAND, SILT AND CLAY](#)

Superficial Deposits



British
Geological
Survey



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GeolIndex Onshore Data Sources: NERC, Natural England, English Heritage and Ordnance Survey

Map Key

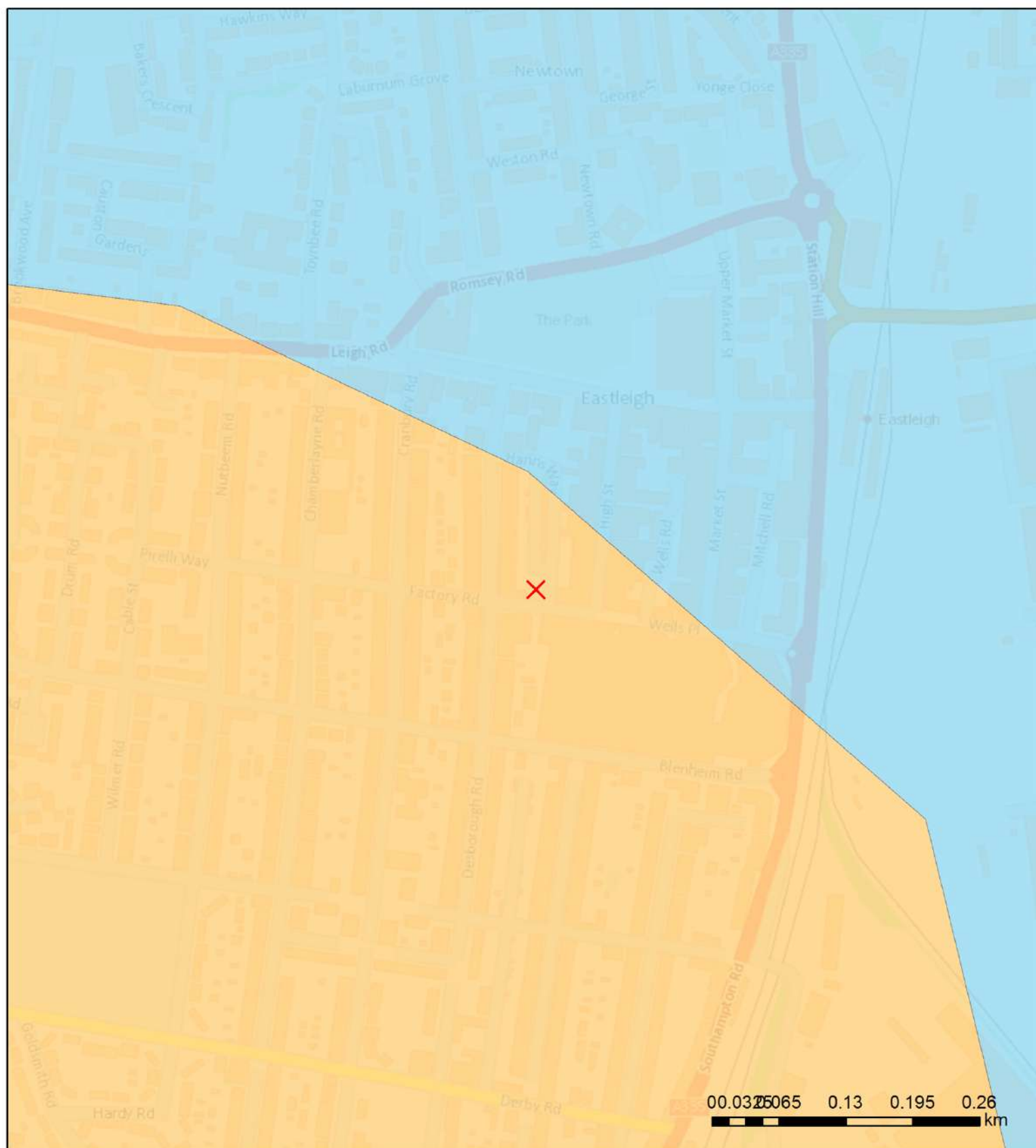
Superficial deposits 1:50,000 scale

-  [ALLUVIUM - CLAY, SILT, SAND AND GRAVEL](#)
-  [HEAD - CLAY, SILT, SAND AND GRAVEL](#)
-  [RIVER TERRACE DEPOSITS, 11 - SAND AND GRAVEL](#)
-  [CLAY-WITH-FLINTS FORMATION - CLAY, SILT, SAND AND GRAVEL](#)

Hydrogeology



British
Geological
Survey



Map Key

Hydrogeology 1:625,000 scale

Aquifers with significant intergranular flow

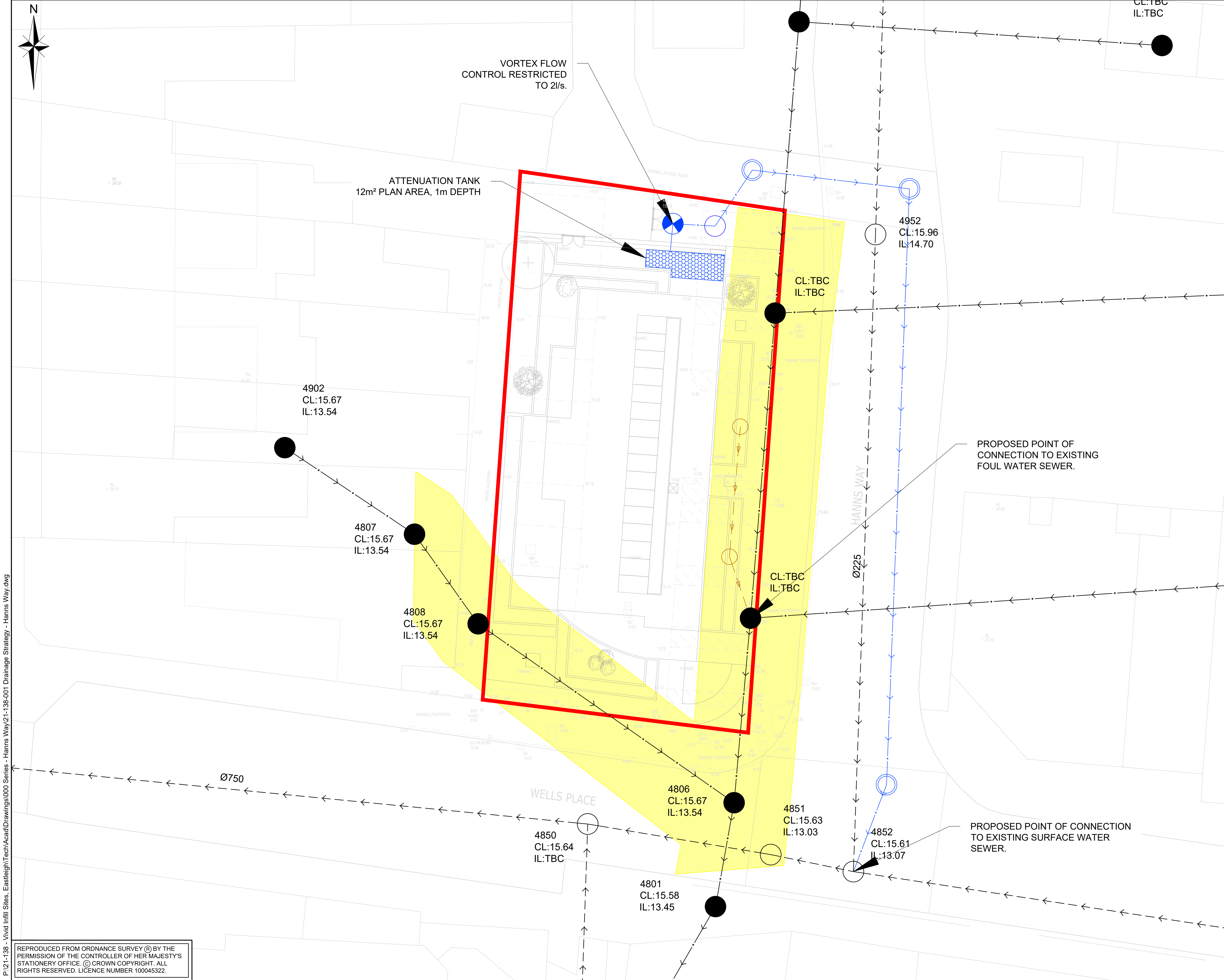
-  Highly productive aquifer
-  Moderately productive aquifer
-  Low productivity aquifer

Aquifers in which flow is virtually all through fractures and other discontinuities

-  Highly productive aquifer
-  Moderately productive aquifer
-  Low productivity aquifer
-  Rocks with essentially no groundwater

APPENDIX E

Preliminary Drainage Strategy and MicroDrainage Calculations



- NOTES
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 - THE DRAINAGE STRATEGY IS SUBJECT TO DETAILED DESIGN DEVELOPMENT

- LEGEND
- PROPOSED SITE BOUNDARY
 - EXISTING FOUL WATER PIPE AND MANHOLE
 - EXISTING SURFACE WATER PIPE AND MANHOLE
 - PROPOSED FOUL PIPE AND MANHOLE
 - PROPOSED SURFACE WATER PIPE AND MANHOLE
 - PROPOSED VORTEX CONTROL DEVICE
 - PROPOSED PROPRIETARY TREATMENT SYSTEM
 - PROPOSED ATTENUATION TANK
 - EASEMENT TO EXISTING FOUL NETWORK

A LAYOUT UPDATED		HM	NA	GS	20/04/23
Rev	Amendments	Dm	Chk	App	Date

**ODYSSEY**
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Job Title		
VIVID INFILL SITES, EASTLEIGH		
Drawing Title		
DRAINAGE STRATEGY, HANNS WAY		
Client		
RUND PARTERSHIP		
Scale	Date	Designed
1:100 @A1	JAN 22	JW
Drawn	Checked	Approved
HM	NA	GG
Job No	Drawing No	Rev
21-138	21-138/001	A

P:21-138 - Vivid Infill Sites, Eastleigh Tech Acad Drawings 000 Series - Hanns Way 21-138-001 Drainage Strategy - Hanns Way.dwg

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Odyssey Markides LLP		Page 1
Tuscany House White Hart Lane Basingstoke RG21 4AF	Hanns Way Eastleigh Greenfield Runoff	
Date 20/04/2023 15:39 File	Designed by NA Checked by GG	
Innovyze Source Control 2020.1		

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	0.032	Urban	0.000
SAAR (mm)	800	Region Number	Region 7

Results 1/s

QBAR Rural	0.2
QBAR Urban	0.2
Q100 years	0.5
Q1 year	0.1
Q30 years	0.4
Q100 years	0.5

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Odyssey Markides LLP						Page 1																																																																																																																																																																																																																																																																																		
Tuscany House White Hart Lane Basingstoke RG21 4AF			Hanns Way Eastleigh Attenuation Tank																																																																																																																																																																																																																																																																																					
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<u>Summary of Results for 100 year Return Period (+45%)</u> Half Drain Time : 51 minutes. <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Control (l/s)</th><th>Max Σ Outflow (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>14.856</td><td>0.606</td><td>0.0</td><td>1.9</td><td>1.9</td><td>6.9</td><td>O K</td></tr><tr><td>30 min Summer</td><td>14.991</td><td>0.741</td><td>0.0</td><td>1.9</td><td>1.9</td><td>8.4</td><td>O K</td></tr><tr><td>60 min Summer</td><td>15.050</td><td>0.800</td><td>0.0</td><td>1.9</td><td>1.9</td><td>9.1</td><td>O K</td></tr><tr><td>120 min Summer</td><td>14.945</td><td>0.695</td><td>0.0</td><td>1.9</td><td>1.9</td><td>7.9</td><td>O K</td></tr><tr><td>180 min Summer</td><td>14.843</td><td>0.593</td><td>0.0</td><td>1.9</td><td>1.9</td><td>6.8</td><td>O K</td></tr><tr><td>240 min Summer</td><td>14.740</td><td>0.490</td><td>0.0</td><td>1.9</td><td>1.9</td><td>5.6</td><td>O K</td></tr><tr><td>360 min Summer</td><td>14.590</td><td>0.340</td><td>0.0</td><td>1.9</td><td>1.9</td><td>3.9</td><td>O K</td></tr><tr><td>480 min Summer</td><td>14.490</td><td>0.240</td><td>0.0</td><td>1.9</td><td>1.9</td><td>2.7</td><td>O K</td></tr><tr><td>600 min Summer</td><td>14.426</td><td>0.176</td><td>0.0</td><td>1.9</td><td>1.9</td><td>2.0</td><td>O K</td></tr><tr><td>720 min Summer</td><td>14.385</td><td>0.135</td><td>0.0</td><td>1.8</td><td>1.8</td><td>1.5</td><td>O K</td></tr><tr><td>960 min Summer</td><td>14.342</td><td>0.092</td><td>0.0</td><td>1.6</td><td>1.6</td><td>1.1</td><td>O K</td></tr><tr><td>1440 min Summer</td><td>14.317</td><td>0.067</td><td>0.0</td><td>1.2</td><td>1.2</td><td>0.8</td><td>O K</td></tr><tr><td>2160 min Summer</td><td>14.302</td><td>0.052</td><td>0.0</td><td>0.9</td><td>0.9</td><td>0.6</td><td>O K</td></tr><tr><td>2880 min Summer</td><td>14.295</td><td>0.045</td><td>0.0</td><td>0.7</td><td>0.7</td><td>0.5</td><td>O K</td></tr><tr><td>4320 min Summer</td><td>14.288</td><td>0.038</td><td>0.0</td><td>0.5</td><td>0.5</td><td>0.4</td><td>O K</td></tr><tr><td>5760 min Summer</td><td>14.284</td><td>0.034</td><td>0.0</td><td>0.4</td><td>0.4</td><td>0.4</td><td>O K</td></tr><tr><td>7200 min Summer</td><td>14.281</td><td>0.031</td><td>0.0</td><td>0.4</td><td>0.4</td><td>0.4</td><td>O K</td></tr><tr><td>8640 min Summer</td><td>14.280</td><td>0.030</td><td>0.0</td><td>0.4</td><td>0.4</td><td>0.3</td><td>O K</td></tr><tr><td>10080 min Summer</td><td>14.278</td><td>0.028</td><td>0.0</td><td>0.3</td><td>0.3</td><td>0.3</td><td>O K</td></tr><tr><td>15 min Winter</td><td>14.940</td><td>0.690</td><td>0.0</td><td>1.9</td><td>1.9</td><td>7.9</td><td>O K</td></tr></table> <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Discharge Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>137.943</td><td>0.0</td><td>8.3</td><td>17</td></tr><tr><td>30 min Summer</td><td>92.461</td><td>0.0</td><td>11.1</td><td>31</td></tr><tr><td>60 min Summer</td><td>59.345</td><td>0.0</td><td>14.2</td><td>50</td></tr><tr><td>120 min Summer</td><td>33.803</td><td>0.0</td><td>16.2</td><td>84</td></tr><tr><td>180 min Summer</td><td>24.280</td><td>0.0</td><td>17.5</td><td>118</td></tr><tr><td>240 min Summer</td><td>19.205</td><td>0.0</td><td>18.4</td><td>148</td></tr><tr><td>360 min Summer</td><td>13.829</td><td>0.0</td><td>19.9</td><td>208</td></tr><tr><td>480 min Summer</td><td>10.976</td><td>0.0</td><td>21.1</td><td>266</td></tr><tr><td>600 min Summer</td><td>9.188</td><td>0.0</td><td>22.0</td><td>322</td></tr><tr><td>720 min Summer</td><td>7.953</td><td>0.0</td><td>22.9</td><td>378</td></tr><tr><td>960 min Summer</td><td>6.349</td><td>0.0</td><td>24.4</td><td>492</td></tr><tr><td>1440 min Summer</td><td>4.637</td><td>0.0</td><td>26.7</td><td>734</td></tr><tr><td>2160 min Summer</td><td>3.408</td><td>0.0</td><td>29.4</td><td>1092</td></tr><tr><td>2880 min Summer</td><td>2.756</td><td>0.0</td><td>31.7</td><td>1464</td></tr><tr><td>4320 min Summer</td><td>2.065</td><td>0.0</td><td>35.7</td><td>2200</td></tr><tr><td>5760 min Summer</td><td>1.702</td><td>0.0</td><td>39.2</td><td>2848</td></tr><tr><td>7200 min Summer</td><td>1.481</td><td>0.0</td><td>42.6</td><td>3576</td></tr><tr><td>8640 min Summer</td><td>1.331</td><td>0.0</td><td>46.0</td><td>4392</td></tr><tr><td>10080 min Summer</td><td>1.224</td><td>0.0</td><td>49.3</td><td>4984</td></tr><tr><td>15 min Winter</td><td>137.943</td><td>0.0</td><td>9.3</td><td>17</td></tr></table>								Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status	15 min Summer	14.856	0.606	0.0	1.9	1.9	6.9	O K	30 min Summer	14.991	0.741	0.0	1.9	1.9	8.4	O K	60 min Summer	15.050	0.800	0.0	1.9	1.9	9.1	O K	120 min Summer	14.945	0.695	0.0	1.9	1.9	7.9	O K	180 min Summer	14.843	0.593	0.0	1.9	1.9	6.8	O K	240 min Summer	14.740	0.490	0.0	1.9	1.9	5.6	O K	360 min Summer	14.590	0.340	0.0	1.9	1.9	3.9	O K	480 min Summer	14.490	0.240	0.0	1.9	1.9	2.7	O K	600 min Summer	14.426	0.176	0.0	1.9	1.9	2.0	O K	720 min Summer	14.385	0.135	0.0	1.8	1.8	1.5	O K	960 min Summer	14.342	0.092	0.0	1.6	1.6	1.1	O K	1440 min Summer	14.317	0.067	0.0	1.2	1.2	0.8	O K	2160 min Summer	14.302	0.052	0.0	0.9	0.9	0.6	O K	2880 min Summer	14.295	0.045	0.0	0.7	0.7	0.5	O K	4320 min Summer	14.288	0.038	0.0	0.5	0.5	0.4	O K	5760 min Summer	14.284	0.034	0.0	0.4	0.4	0.4	O K	7200 min Summer	14.281	0.031	0.0	0.4	0.4	0.4	O K	8640 min Summer	14.280	0.030	0.0	0.4	0.4	0.3	O K	10080 min Summer	14.278	0.028	0.0	0.3	0.3	0.3	O K	15 min Winter	14.940	0.690	0.0	1.9	1.9	7.9	O K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)	15 min Summer	137.943	0.0	8.3	17	30 min Summer	92.461	0.0	11.1	31	60 min Summer	59.345	0.0	14.2	50	120 min Summer	33.803	0.0	16.2	84	180 min Summer	24.280	0.0	17.5	118	240 min Summer	19.205	0.0	18.4	148	360 min Summer	13.829	0.0	19.9	208	480 min Summer	10.976	0.0	21.1	266	600 min Summer	9.188	0.0	22.0	322	720 min Summer	7.953	0.0	22.9	378	960 min Summer	6.349	0.0	24.4	492	1440 min Summer	4.637	0.0	26.7	734	2160 min Summer	3.408	0.0	29.4	1092	2880 min Summer	2.756	0.0	31.7	1464	4320 min Summer	2.065	0.0	35.7	2200	5760 min Summer	1.702	0.0	39.2	2848	7200 min Summer	1.481	0.0	42.6	3576	8640 min Summer	1.331	0.0	46.0	4392	10080 min Summer	1.224	0.0	49.3	4984	15 min Winter	137.943	0.0	9.3	17
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status																																																																																																																																																																																																																																																																																	
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Tuscany House White Hart Lane Basingstoke RG21 4AF				Hanns Way Eastleigh Attenuation Tank			
Date 21/04/2023 10:19 File 21-138 Attenuation Tank...				Designed by NA Checked by GG			
Innovyze				Source Control 2020.1			
<u>Summary of Results for 100 year Return Period (+45%)</u>							
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	15.100	0.850	0.0	1.9	1.9	9.7	O K
60 min Winter	15.173	0.923	0.0	1.9	1.9	10.5	O K
120 min Winter	15.037	0.787	0.0	1.9	1.9	9.0	O K
180 min Winter	14.895	0.645	0.0	1.9	1.9	7.4	O K
240 min Winter	14.734	0.484	0.0	1.9	1.9	5.5	O K
360 min Winter	14.521	0.271	0.0	1.9	1.9	3.1	O K
480 min Winter	14.410	0.160	0.0	1.8	1.8	1.8	O K
600 min Winter	14.355	0.105	0.0	1.7	1.7	1.2	O K
720 min Winter	14.334	0.084	0.0	1.5	1.5	1.0	O K
960 min Winter	14.316	0.066	0.0	1.2	1.2	0.8	O K
1440 min Winter	14.301	0.051	0.0	0.9	0.9	0.6	O K
2160 min Winter	14.292	0.042	0.0	0.6	0.6	0.5	O K
2880 min Winter	14.287	0.037	0.0	0.5	0.5	0.4	O K
4320 min Winter	14.281	0.031	0.0	0.4	0.4	0.4	O K
5760 min Winter	14.278	0.028	0.0	0.3	0.3	0.3	O K
7200 min Winter	14.276	0.026	0.0	0.3	0.3	0.3	O K
8640 min Winter	14.275	0.025	0.0	0.3	0.3	0.3	O K
10080 min Winter	14.274	0.024	0.0	0.2	0.2	0.3	O K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)			
30 min Winter	92.461	0.0	12.4	31			
60 min Winter	59.345	0.0	15.9	56			
120 min Winter	33.803	0.0	18.2	90			
180 min Winter	24.280	0.0	19.6	128			
240 min Winter	19.205	0.0	20.6	160			
360 min Winter	13.829	0.0	22.3	216			
480 min Winter	10.976	0.0	23.6	268			
600 min Winter	9.188	0.0	24.7	320			
720 min Winter	7.953	0.0	25.6	374			
960 min Winter	6.349	0.0	27.3	492			
1440 min Winter	4.637	0.0	29.9	736			
2160 min Winter	3.408	0.0	33.0	1100			
2880 min Winter	2.756	0.0	35.5	1464			
4320 min Winter	2.065	0.0	40.0	2204			
5760 min Winter	1.702	0.0	43.9	2904			
7200 min Winter	1.481	0.0	47.8	3576			
8640 min Winter	1.331	0.0	51.5	4296			
10080 min Winter	1.224	0.0	55.3	5208			
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Tuscany House White Hart Lane Basingstoke RG21 4AF	Hanns Way Eastleigh Attenuation Tank	
Date 21/04/2023 10:19 File 21-138 Attenuation Tank...	Designed by NA Checked by GG	
Innovyze Source Control 2020.1		

Model Details

Storage is Online Cover Level (m) 16.000

Cellular Storage Structure

Invert Level (m) 14.250 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)
0.000	12.0	12.0	1.001	0.0	25.9
1.000	12.0	25.9			

Hydro-Brake® Optimum Outflow Control

Unit Reference MD-SHE-0067-2000-1000-2000
Design Head (m) 1.000
Design Flow (l/s) 2.0
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 67
Invert Level (m) 14.250
Minimum Outlet Pipe Diameter (mm) 100
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	2.0
Flush-Flo™	0.296	1.9
Kick-Flo®	0.599	1.6
Mean Flow over Head Range	-	1.7

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)
0.100	1.6	1.200	2.2	3.000	3.3	7.000	4.9
0.200	1.9	1.400	2.3	3.500	3.5	7.500	5.1
0.300	1.9	1.600	2.5	4.000	3.8	8.000	5.2
0.400	1.9	1.800	2.6	4.500	4.0	8.500	5.4
0.500	1.8	2.000	2.7	5.000	4.2	9.000	5.5
0.600	1.6	2.200	2.9	5.500	4.4	9.500	5.7
0.800	1.8	2.400	3.0	6.000	4.6		
1.000	2.0	2.600	3.1	6.500	4.7		

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APPENDIX F

Maintenance Schedules

TABLE 21.3 Operation and maintenance requirements for attenuation storage tanks

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action	Monthly for 3 months, then annually
	Remove debris from the catchment surface (where it may cause risks to performance)	Monthly
	For systems where rainfall infiltrates into the tank from above, check surface of filter for blockage by sediment, algae or other matter; remove and replace surface infiltration medium as necessary.	Annually
	Remove sediment from pre-treatment structures and/or internal forebays	Annually, or as required
Remedial actions	Repair/rehabilitate inlets, outlet, overflows and vents	As required
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed	Annually
	Survey inside of tank for sediment build-up and remove if necessary	Every 5 years or as required

21.14 REFERENCES

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TABLE 14.2 An example of operation and maintenance requirements for a proprietary treatment system

Maintenance schedule	Required action	Typical 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 year of operation, then every six months

should be undertaken whenever access for maintenance is required. Removal of oil, silt and other pollutants must be in accordance with the appropriate waste management legislation.

Maintenance responsibility for all systems should be placed with an appropriate organisation, and Maintenance Plans and schedules should be developed during the design phase.

- Further detail on the preparation of maintenance specifications and schedules of work is given in **Chapter 32**.

Table 14.2 provides guidance on the type of operation and maintenance schedule that may be appropriate for a proprietary treatment system. The list of actions is not exhaustive and some actions may not always be required.

CDM 2015 requires designers to ensure that all maintenance risks have been identified, eliminated, reduced and/or controlled where appropriate. This information will be required as part of the health and safety file.

- Generic health and safety guidance is presented in **Chapter 36**.

14.12.2 Oil water separators

Specific requirements for oil/water separators are provided in PPG3 (EA/SEPA/EHSNI, 2006). The following items 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)
- check the function of the warning device (if fitted)

General inspection of the integrity of oil/water separators should occur at a maximum frequency of five years, and should cover the following:

- watertightness of system