LAND OFF HEMPTON ROAD, DEDDINGTON
TECHNICAL NOTE: DRAINAGE STATEMENT
MARCH 2021
REF: 23933-01-TN-02 REV C

Consulting Development Engineers

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Introduction

Mewies Engineering Consultants Ltd (M-EC) has been commissioned by Pembury Estates to produce a Drainage Statement in support of a proposed Phase 2 residential development at Hempton Road, Deddington. The Phase 2 site area is shown in red in Figure 1 below.

The land to the south of this site is shown in blue in Figure 1 below (Phase 1) and this area currently benefits from outline planning permission for 21 dwellings (application 18/02147/OUT).

Figure 1: Site location plan

The purpose of this technical note is to support an outline planning application for an additional 14 dwellings at Hampton Road, Deddington. The proposed residential development at Hampton Road, Deddington will consist of a total of 35 dwellings with associated infrastructure, parking and access to Hampton Road.

The submitted drainage design is in accordance with the principles set out in previous M-EC documents including:

- M-EC Flood Risk Technical Note (ref. 23933/05-18/6010 Rev C) dated June 2018
- M-EC Technical Note: Surface Water Drainage (ref. 23933-01-TN-01) dated June 2020

A copy of both statements can be found in Appendix A.

A proposed layout plan showing both phases of development are included in Appendix B and the site topographic survey is included in Appendix C.

Surface Water Drainage

It is essential that the proposed development does not increase flood risk to adjacent land or downstream of the site, as well as protecting the development from flooding itself. To ensure that the flood risk is minimised, the drainage design will incorporate the following flood mitigation measures:

- Finished floor levels will be designed to retain and direct all overland surface water flows away from the dwellings following the natural topography of the land.

- The proposed development will include a surface water drainage system that will intercept the runoff generated within the development. This will minimise the risk to the new buildings and also reduce the incidence of overland flows.

- The surface water drainage system will convey flows into an infiltration basin in the southeastern part of the site. This will store surface water flows generated from the development up to and including a 1 in 100-year return period, plus 40% climate change, and release runoff to the ground. This will ensure there is no increase in runoff from the site and provide betterment during critical storm events. The infiltration basin is sized to take flows from Phase 1 and Phase 2.

The flood risk and drainage route as approved under planning application 18/02147/OUT has considered the outfall options in accordance with the surface water runoff discharge hierarchy, Part H of the Building Regulations 2015. This assessment established that surface water run-off shall discharge via infiltration at source within the site boundary, in the south eastern corner. The proposed infiltration basin has been designed to accommodate the flows for 35 dwellings and forms part of this red line.

As established within the approved document, soakage testing was undertaken in June 2018 with two trial pits in the site's south-east corner. Both pits were found to infiltrate very well and the soakage results are included in Appendix D. The post-development land use for the site has been calculated using the proposed layout plan seen in Appendix B. The post-development land use calculations can be seen in Appendix E. Surface water flows for an impermeable area of 0.847ha including a 10% allowance for urban creep will be collected via a piped network running under the roads and conveyed towards an infiltration basin located in the southeastern corner of Phase 2.

A storage volume if 156.8m^3 is required to accommodate the flows generated from the Phase 2 development. A total storage volume of 364.8m^3 will be available for surface water storage within the infiltration basin. This is to allow sufficient time for all surface water to discharge at the proposed rates and cater for all events up to the 1 in 100-year return period with a 40% climate change allowance. Detailed Micro-Drainage Network calculations are included in Appendix F. Attenuated runoff from the site is to be discharged to the ground at the established soakage rate of 2.797m/hr.

In the event that there is a failure of the drainage system or an event exceeding the design storm any exceedance flows and overland flows will be routed away from dwelling houses to the areas of lowest risk on the site.

A detailed drainage strategy for all 35 dwellings based on the principles above is shown on drawing 23933_01_230_03b in Appendix G.

The CIRIA SuDS Manual, C753, indicates the minimum treatment indices appropriate for contributing pollution hazards for different land use classifications. Surface water runoff from the residential roofs has a very low pollution hazard, while the minor road and parking areas have a low pollution hazard. As shown in Table 1 from the CIRIA SuDS Manual, the Mitigation Indices provided by the infiltration basin are greater than or equal to the Pollution Hazard Indices for each component, ensuring the proposed system provides adequate water quality treatment for surface water runoff.

Table 1: CIRIA C753 Pollution Hazard Indices and SuDS Mitigation Indices

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, home zones and general access roads) and non-residential car parking with infrequent change (e.g. schools, offices) i.e. < 300 traffic movements/day	Low	0.5	0.4	0.4
SuDS Mitigation indices for SuDS components for discharging surface water				
Detention/ Infiltration Basins		0.5	0.5	0.6

Maintenance and Management
The continued maintenance of any adopted sewer will be the responsibility of Thames Water, private drainage systems will be maintained by the landowners and a management company appointed on their behalf.

The detention basin will first be offered to bodies such as the Local Authority for adoption and future maintenance. Should this not be taken up, a management company will be employed. Full details will be provided of the responsible body to conduct the maintenance activities identified in Table 2.

Table 2: Proposed Maintenance Regime

Drainage Asset	Responsible Organisation	Maintenance Work	Frequency
Pipework / Manholes	Private Ownership / Management Company / Thames Water	Inspect pipework and clear blockages	Annually or after severe storms.
		Inspect manholes and clear blockages	
		Repair any defects in the network	
Headwalls	Local Authority/ Management Company	Inspect structure and remove any debris/litter on structure	Monthly or after severe storms.
Infiltration Basin	Local Authority/ Management Company	Amenity grass cutting of surrounding green spaces	As required
		Litter and debris removal	Monthly
		Inspect and clear inlets, outlets and overflows	6 Monthly

Foul Water Drainage
Foul sewage generated by Phase 2 will discharge via gravity into the proposed drainage network within the Phase 1 development area. Foul water within Phase 1 will be gathered by a gravity-based foul sewerage network and will outfall to an existing foul sewer in Wimborn Close to the east connecting at manhole ref. 0701. The connection will be subject to an S106 application with Thames Water. Details of the developer enquiry are included in Appendix H.

Summary
To summarise the key points outlined above:

- The proposed drainage strategy is in accordance with the principles set by the approved FRA and previously submitted details.
- All surface water drainage will be via a gravity system with no pumping of flows involved. The system will cater for 35 dwellings.
- Surface water runoff will be attenuated in an infiltration basin on-site and will be discharged to the ground at an infiltration rate of 2.797 m/hr. A total storage volume of 364.8m^3 will be available for surface water storage within the infiltration basin, this is to allow sufficient time for all surface water to discharge at the proposed rates and cater for all events up to the 1 in 100-year return period with a 40% climate change allowance.
- The development will not increase runoff or flood risk downstream by utilizing a sustainable drainage system to store and infiltrate any surface water generated to the ground.
- Foul water drainage will discharge to the existing sewer network and be offered for adoption to Thames Water.

Report Prepared By:

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Ryan Chafer BSc (Hons)

Report Checked By:

……
Alexander Bennett BSc (Hons) MCIHT MTPS

Appendix:

A. M-EC Flood Risk and Drainage Technical Note (ref. 23933/05-18/6010 Rev C), June 2018
   M-EC Technical Note: Surface Water Drainage (ref. 23933-01-TN-01), June 2020
B. Proposed Site Layout Plan
C. Topographical Survey
D. Soakage Testing Results
E. EXPEDITE Land Use Calculations
F. REV A Micro-Drainage Network Calculations
G. Detailed Drainage Strategy Drawing – 23933_01_230_03b
H. Thames Water Developer Enquiry

Registration of Amendments

Revision	Comments	Prepared By:	Checked By:
- Dec 2020	Initial submission	RC	AB
A Dec 2020	Client amendments and updated site layout	AB	AB
B Mar 2021	Updates to site layout	RC	AB
C Mar 2021	Client comments and amendements	AB	AB

APPENDIX A

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Offices also at **Birmingham, Milton Keynes, Nottingham** and **Leeds**

PROPOSED RESIDENTIAL DEVELOPMENT AT HEMPTON ROAD, DEDDINGTON
FLOOD RISK AND DRAINAGE TECHNICAL NOTE
FEBRUARY 2019
REF. 23933/05-18/6010 - REV C

Introduction

Mewies Engineering Consultants Ltd (M-EC) has been instructed to produce this Technical Note to describe the drainage strategy designed for a proposed residential development of 21 units on land off Hempton Road, Deddington, Oxfordshire.

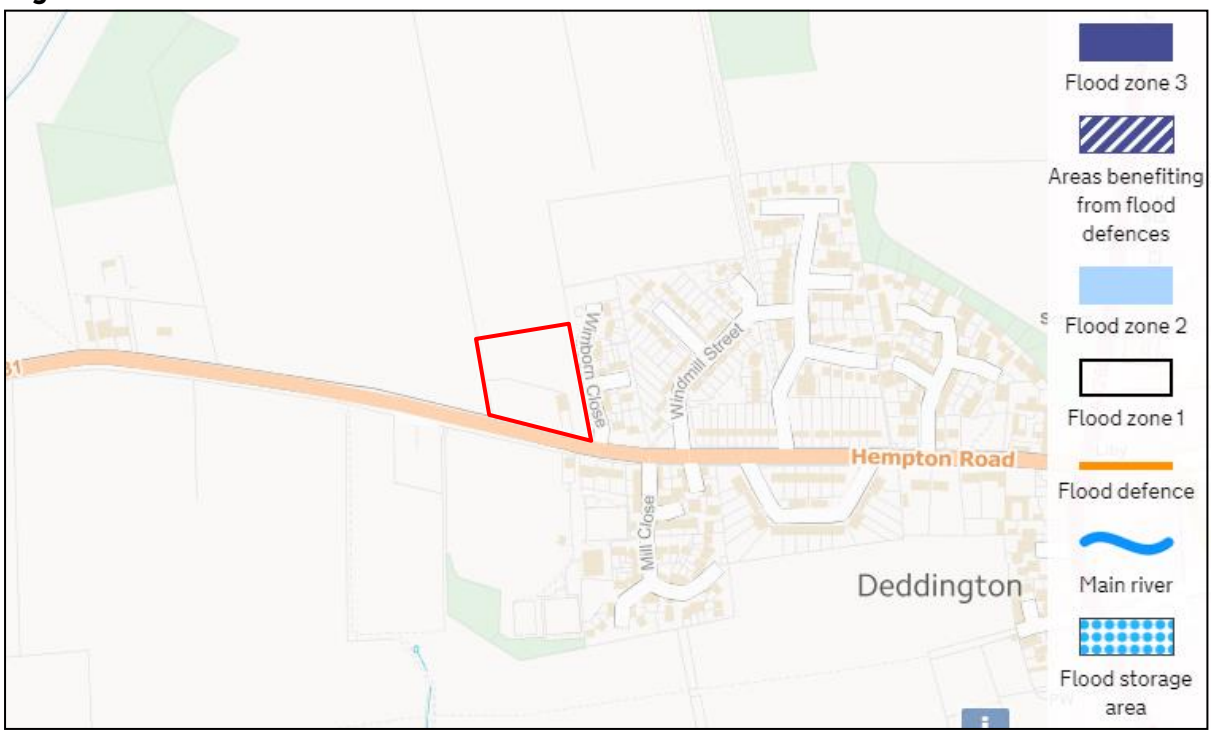
Site Location & Description

The site is mostly comprised of undeveloped agricultural land although its southern half is currently used as a vegetable garden. A single large corrugated iron shed is present on the site accessed from a gate in the south-east corner. The site measures approximately 1.177ha. The site falls from north to south towards Hempton Road with a fall of 2.5m from a high point around 139.2m AOD in its north-west corner to a low point of 136.7m AOD in the centre of its southern boundary.

Flood Risk

Based on the latest Flood Zone Mapping issued by the Environment Agency, the site area is located entirely in Flood Zone 1. The closest designated flood zones are over a kilometre to the north.

Figure 1: EA Flood Zones



Environment Agency Surface Water Flood Risk Mapping shows that there are no areas of designated surface water flood risk within the site's boundaries. There are small areas of low risk extending along Hempton Road further east. All development will be located a sufficient distance from these areas to negate any risk.

The proposed development area will be located wholly within Flood Zone 1 (less than 0.1% chance of flooding). In accordance with Table 3 of the Planning Practice Guidance the development is therefore "sequentially acceptable".

Geology & Ground Conditions

Geological mapping indicates that the site is underlain by two types of solid geology; the north of the site is underlain by Whitby Mudstone Formation while the south of the site is Marlstone Rock Formation – Ferruginous Limestone and Ironstone. No superficial deposits are present within the site's boundaries.

Soakage testing was undertaken in June 2018 with two trial pits in the site's south-east corner. Both pits were found to infiltrate very well (findings are summarised in Table 1). As a result of this the site's proposed drainage strategy has been revised to be based on infiltration.

Table 1: Soakage Test Summary

SA01		SA02	
m/s	m/hr	m/s	m/hr
1.27×10^{-3}	4.572	5.93×10^{-3}	21.348
9.55×10^{-4}	3.438	7.35×10^{-3}	26.460
7.77×10^{-4}	2.797	1.84×10^{-3}	6.624
		1.67×10^{-3}	6.012
		1.57×10^{-3}	5.652
		1.67×10^{-3}	6.012
		1.66×10^{-3}	5.976

Drainage Strategy

No ditches or significant drainage features are located within the site and therefore existing surface water runs off directly downhill towards Hempton Road along the southern boundary.

Given the confirmation of viable infiltration and the lack of nearby watercourses, surface water runoff from the site will be attenuated on-site and then discharged into the underlying ironstone bedrock. No existing public surface water sewers are present within the site's boundaries.

The proposed surface water strategy for the site will comprise of a single infiltration basin with a total storage capacity of 156m^3 based on an impermeable area of 0.74ha inclusive of 10% urban creep. This system will have sufficient capacity for the 1 in 100 year storm event (plus a 40% allowance of climate change).

The SUDS scheme will be offered to the Borough Council or other local bodies such as the Town or Parish Council for adoption and future maintenance. A proposed maintenance plan shown in Table 2 breaks down the maintenance responsibility of the various assets.

Table 2: Proposed Maintenance Regime

Drainage Asset	Responsible Organisation	Maintenance Work	Frequency
Pipework / Manholes	Private Ownership / Management Company / Water Authority / Developer	Inspect pipe work and clear blockages	Annually or after severe storms.
		Inspect manholes and clear blockages	
		Repair any defects in network	
Headwalls	Private Ownership / Water Authority / Management Company	Inspect structure and remove any debris/litter on structure	Monthly or after severe storms.
Infiltration Basin	Borough Council / Management Company	Amenity grass cutting of surrounding green spaces	As required
		Litter and Debris removal	Monthly
		Inspect and clear inlets, outlets and overflows	6 Monthly
Catch Pit	Private Ownership / Management Company	Inspect structure and remove excessive silt build up	Annually or after severe storms.

Foul Drainage
Foul sewage from the site will be gathered by a gravity based foul sewerage network and outfall to an existing foul sewer in Wimborn Close to the east connecting at manhole ref. 0701. Connection will be subject to a S106 application with Thames Water.

Summary
To summarise the key points outlined above:

- All development will be contained in Flood Zone 1 and is therefore sequentially acceptable. Other sources of flood risk to the site are considered to be low to very low.
- The site's surface water will be attenuated by a drainage network with an infiltration basin.
- The development will not increase runoff or flood risk downstream by utilising a sustainable drainage system to store runoff and discharge into the underlying bedrock.
- Foul drainage for the site will entail a gravity based system gathering to the existing foul sewer in Wimborn Close south-east of the site.

Overall it is considered there are no insurmountable Flood Risk and Drainage constraints to the development of this site for residential use.

Report Prepared By:

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Dave Moffatt

Report Checked By:

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Alexander Bennett BSc MCIHT, MTPS

APPENDICES

A. Site Location Plan
B. Proposed Site Layout
C. Topographical Survey
D. Water Authority Correspondence
E. Microdrainage Calculations
F. Strategy Drawing
G. Soakage Testing Results

HAMPTON ROAD, DEDDINGTON, OXFORDSHIRE
TECHNICAL NOTE: SURFACE WATER DRAINAGE
JUNE 2020
REF: 23933-01-TN-01

M-EC Consulting Development Engineers

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Introduction

Mewies Engineering Consultants Ltd (M-EC) has been commissioned by Pembury Estates to produce a drainage statement in support of a proposed residential development at Hampton Road, Deddington. The site location is shown in Figure 1.

Figure 1: Site location plan

Part of the site currently benefits from outline planning permission for 21 dwellings (application 18/02147/OUT) and this technical note responds to Condition 10 of this permission. Condition 10 states:

Development shall not begin until a surface water drainage scheme for the site, based on sustainable drainage principles and an assessment of the hydrological and hydro-geological context of the development, has been submitted to and approved in writing by the local planning authority. The scheme shall subsequently be implemented in accordance with the approved details before the development is completed and prior to the first occupation of the development. The scheme shall also include:

- *Discharge Rates*
- *Discharge Volumes*
- *SUDS (Permeable Paving, Soakaway Tanks)*
- *Maintenance and management of SUDS features (To include provision of a SuDS Management and Maintenance Plan)*
- *Infiltration in accordance with BRE365*
- *Detailed drainage layout with pipe numbers*
- *Network drainage calculations*
- *Phasing*

- *Flood Flow Routing in exceedance conditions (to include provision of a flood exceedance route plan)*

Reason: To ensure that sufficient capacity is made available to accommodate the new development and in order to avoid adverse environmental impact upon the community and to ensure compliance with Policy ESD 7 of the Cherwell Local Plan 2011-2031 Part 1 and Government guidance within the National Planning Policy Framework. This information is required prior to commencement of the development as it is fundamental to the acceptability of the scheme.

The purpose of this technical note is to support an application for the discharge of Condition 10 of the approved application of 21 dwellings while also incorporating a proposed phase 2 development area (additional 14 dwellings) in to the drainage design.

The submitted drainage design is in accordance with the principles set by the previously approved Flood Risk Assessment (FRA) and should be read in conjunction with the original M-EC Flood Risk Technical Note (ref. 23933/05-18/6010 Rev C) dated June 2018, M-EC Ltd. A copy of this statement is included in Appendix A.

A proposed layout plan showing both phases of development are included in Appendix B and the site topographic survey is included in Appendix C.

Surface Water Drainage
It is essential that the proposed development does not increase flood risk to adjacent land or downstream of the site, as well as protecting the development from flooding itself. To ensure that the flood risk is minimised, the drainage design will incorporate the following flood mitigation measures:

- Finished floor levels will be designed to retain and direct all overland surface water flows away from the dwellings following the natural topography of the land.

- The proposed development will include a surface water drainage system that will intercept runoff generated within the development. This will minimise the risk to the new buildings and also reduce the incidence of overland flows.

- The surface water drainage system will convey flows to an infiltration basin. This will store surface water flows generated from the development up to and including a 1 in 100-year return period, plus 40% climate change, and release runoff to the ground. This will ensure there is no increase in runoff from the site and provide betterment during critical storm events.

The approved FRA, 23933/05-18/6010 Rev C, has considered the outfall options in accordance with the surface water runoff discharge hierarchy, Part H of the Building Regulations 2015, this assessment established that surface water run-off shall discharge via infiltration at source within the site boundary.

As established within the approved document Soakage testing was undertaken in June 2018 with two trial pits in the site's south-east corner. Both pits were found to infiltrate very well and the soakage results are included in Appendix D. Runoff from the development will be collected via a piped network running under the roads within the site. These shall then be conveyed towards an infiltration basin.

The infiltration basin will manage surface water for all storm events up to the 1 in 100-year return period, plus a 40% allowance for climate change. This will provide adequate storage for the 100-year plus 40% climate change event. Detailed Micro-Drainage – Network calculations are included in Appendix E. Attenuated runoff from the site is to be discharged to the ground at the established soakage rate of 2.797m/hr.

In the event that there is a failure of the drainage system or an event exceeding the design storm it will be ensured that any exceedance flows and overland flows are routed away from dwelling houses to the areas of lowest risk on the site.

The above principles are shown on the drainage strategy drawing 23933_01_230_01 in Appendix F.

The CIRIA SuDS Manual, C753, indicates the minimum treatment indices appropriate for contributing pollution hazards for different land use classifications. Surface water runoff from the residential roofs

has a very low pollution hazard, while the minor road and parking areas have a low pollution hazard. As shown in Table 1 from the CIRIA SuDS Manual, the Mitigation Indices provided by the infiltration basin are greater than or equal to the Pollution Hazard Indices for each component, ensuring the proposed system provides adequate water quality treatment for surface water runoff.

Table 1: CIRIA C753 Pollution Hazard Indices and SuDS Mitigation Indices

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, home zones and general access roads) and non-residential car parking with infrequent change (e.g. schools, offices) i.e. < 300 traffic movements/day	Low	0.5	0.4	0.4
SuDS Mitigation indices for SuDS components for discharging surface water				
Detention/ Infiltration Basins		0.5	0.5	0.6

Maintenance and Management

The continued maintenance of any adopted sewer will be the responsibility of Thames Water, private drainage systems will be maintained by the land owners and a management company appointed on their behalf.

The detention basin will first be offered to bodies such as the Local Authority for adoption and future maintenance. Should this not be taken up, a management company will be employed. Full details will be provided of the responsible body to conduct the maintenance activities identified in Table 2.

Table 2: Proposed Maintenance Regime

Drainage Asset	Responsible Organisation	Maintenance Work	Frequency
Pipework / Manholes	Private Ownership / Management Company / Thames Water	Inspect pipe work and clear blockages	Annually or after severe storms.
		Inspect manholes and clear blockages	
		Repair any defects in network	
Headwalls	Local Authority/ Management Company	Inspect structure and remove any debris/litter on structure	Monthly or after severe storms.
Infiltration Basin	Local Authority/ Management Company	Amenity grass cutting of surrounding green spaces	As required
		Litter and debris removal	Monthly
		Inspect and clear inlets, outlets and overflows	6 Monthly

Foul Water Drainage

Foul sewage from the site will be gathered by a gravity based foul sewerage network and outfall to an existing foul sewer in Wimborn Close to the east connecting at manhole ref. 0701. Connection will be subject to a S106 application with Thames Water. Details of the developer enquiry are included in

Appendix G.

Summary
To summarise the key points outlined above:

- The proposed drainage strategy is in accordance with the principles set by the approved FRA and previously submitted details.
- All surface water drainage will be via a gravity system with no pumping of flows involved.
- Surface water runoff will be attenuated in an infiltration basin on site and will be discharged to the ground, soakage testing confirmed a rate of 2.797 m/hr, the storage volume on site will cater for the 1 in 100 year +40% Climate Change storm event.
- The development will not increase runoff or flood risk downstream by utilizing a sustainable drainage system to store and infiltrate any surface water generated to the ground.
- Foul water drainage will discharge to the existing sewer network and be offered for adoption to Thames Water.

Report Prepared By:

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Hardeep Rai BSc (Hons) MCIWEM

Report Checked By:

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Alexander Bennett BSc (Hons) MCIHT MTPS

Appended Documents

A. Flood Risk and Drainage Technical Note, 23933, June 2018, M-EC Ltd.
B. Proposed Site Layout Plan
C. Topographical Survey
D. Soakage Testing Results
E. Micro-Drainage Network Calculations
F. Drainage Strategy Drawing - 23933-01-230-01
G. Thames Water Developer Enquiry

APPENDIX B

Wimborne Close

Hempton Road

136.89

REV.	DATE	DESCRIPTION

CLIENT:
BURRINGTON ESTATES

PROJECT TITLE:
HEMPTON ROAD, DEDDINGTON,
PHASE 1

DRAWING TITLE:
SITE PLAN - PHASE 2
RED LINE PLAN AS PROPOSED

SCALE:	1:500 @A3	DATE:	February 21
DWG NO.:	201-305	REVISION:	B

N

0 5 10 15 20 25m

REV.	DATE	DESCRIPTION

CLIENT:
BURRINGTON ESTATES

PROJECT TITLE:
HEMPTON ROAD, DEDDINGTON, PHASE 1

DRAWING TITLE:
SITE PLAN - PHASE 2
RED LINE PLAN AS PROPOSED

SCALE:	1:500 @A3	DATE:	February 21
DWG NO.:	201-304	REVISION:	E

KEY:

*A - Affordable housing

N

0 5 10 15 20 25m

APPENDIX C

445900E

445950E

446000E

446050E

231950N

231900N

231850N

231800N

231750N

N

Station Information:

Station	Easting (m)	Northing (m)	Level (m)
GH1	445923.387	231775.714	138.730
GH2	446024.264	231764.244	137.023
GH3	446098.551	231744.779	135.773

OS Note:

Some services may have been omitted due to parked vehicles. The Ordnance Survey tile is to be used as a guide only.

OS Buildings *Surveyed Buildings*

This survey has been orientated to the Ordnance Survey (O.S) National Grid OSGB36(15) via Global Navigational Satellite Systems (GNSS) and the O.S. Active Network (OS Net).

A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN15GB & OSGM15GB transformation models.

The survey has been correlated to this point and a further one or more OSGB36 (15) points established to create a true O.S. bearing for angle orientation.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.

Please refer to Survey Station Table to enable establishment of the on-site grid and datum.

Legend:

Buildings, Wall, Kerb line, Line marking, Drop kerb, Centre line, Top of bank, Station and Name, Station Level, Tree / Bush / Sapling, Area of Undergrowth, Woodland, R: Ridge Level, E: Eaves Level, F: Flat Roof Level, Gate

Overhead Cable, Concrete edge, Tarmac edge, Grass verge, Canopy/Overhang, Verge, Bottom of bank, 1 100.000

Fence types: IW Interwoven, IR Iron Railings, WM Wire Mesh, PJR Post & Rail, PW Post & Wire, CL Chain Link, WP Wooden Panels, CB Close Boarded, SP Steel Palisade

IC	Inspection chamber	Bo	Bollard		
PInv	Pipe invert	IB	Illuminated bollard		
Gy	Gully	Bin	Rubbish bin		
Bg	Back gully	Vp	Vent pipe		
Dp	Down pipe	Grl	Ground light		
Pipe	Pipe above ground	Lbox	Letter box		
MH	Manhole	Stmp	Tree Stump		
WL	Water level	Sty	Stile		
Fl	Flood light	IFL	Internal floor level		
Lp	Lamp post	THL	Threshold level		
Tp	Telegraph post	Sp	Sign post		
Ep	Electricity post	TH	Trialhole		
Tl	Traffic light	BH	Borehole		
Bus	Bus stop	ELC	Electric		
Sv	Stop valve	BT	British Telecom		
St	Stop tap	C'box	Control box		
Er	Earth rod	TT	Tactile		
Wm	Water meter	BP	Brick paved		
Gas	Gas valve	CPS	Concrete paving slabs		
Av	Air valve	CVR	Cover		
ICU	Unidentified inspection	R/wall	Retaining wall		
Wo	Wash out	TWL	Top of Wall Level		
Re	Rodding eye	TCL	Tree canopy level		
BB	Bellisha beacon	G:	Girth		
CTV	Cable tv	MG	Multi girth		
Mkr	Marker post	IC	Inspection chamber		
Gmkr	Gas marker post	CL:	Cover level		
So	Soffit	IL:	Invert level		
Fh	Fire hydrant	UTL	Unable to lift		

Rev	Date	Description	Drawn	Q. Ref.

greenhatch group

- Topographical Surveys
- Site Engineering
- Utility / CCTV Surveys
- Measured Building Surveys
- 3D Laser Scanning
- Revit & BIM Models

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CLIENT

Webb Developments Ltd

PROJECT

Hempton Road Deddington, Banbury

TITLE

Topographical Survey

SCALE	DATE
A2@ 1: 500	23/03/18
DRAWN: LUP	QUALITY REF: GH2683

Level datum	See note
Grid orientation	See note
Job number	29833

Drawing No.: *29833_T* Rev.: *0*

Comments

This plan should only be used for its original purpose. Greenhatch Group accepts no responsibility for this plan if supplied to any party other than the original client.

All dimensions should be checked on site prior to design and construction.

Drainage information (where applicable) has been visually inspected from the surface and therefore should be treated as approximate only.

Notes:

APPENDIX D

M-EC
The Old Chapel
Station Road
Hugglescote
Leicestershire
LE67 2GB

SOAKAGE PIT LOCATION PLAN

Project:	**LAND AT HEMPTON ROAD, DEDDINGTON**
File Ref:	**23933**
O.S. Grid Ref:	**445952, 231916**
Postcode:	**OX15 0QJ**

Basin requested in south-east corner
Geology – Marlstone Rock Formation – Limestone and Ironstone
Look into Highways Drainage in Wimborn Close (implied to be Soakage, any evidence of this)

Mewies Engineering Consultants Ltd
The Old Chapel, Station Road, Hugglescote, Leicestershire, LE67 2GB
Telephone 01530 264753 email group@m-ec.co.uk

Scheme	**Hempton Road, Deddington**	Page No.	1
Client	**Robert Webb**	Calcs by	CN
Job ref.	**23933**	Date	14/06/18
		Test Number	1

Soil infiltration test

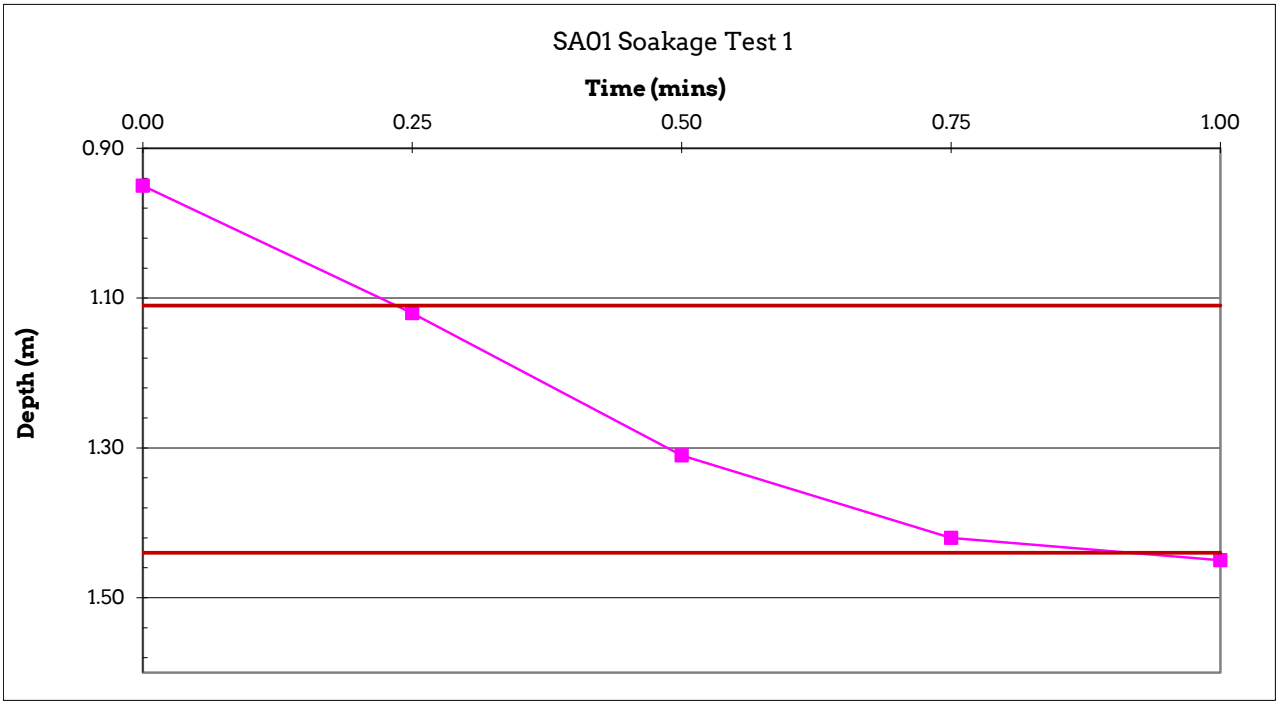
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Trial pit ref.	**SA01**	
Length	**1.80**	m
Width	**0.45**	m
Depth	**1.60**	m
Ground water level	**N/A**	
Ground conditions	**0.00 - 0.20**	**TOPSOIL comprising reddish brown, clayey, gravelly, SAND.**
	0.20 - 0.50	**Reddish brown, gravelly SAND with a low cobble content.**
	0.50 - 1.60	**Reddish brown, sandy, fine to coarse angular GRAVEL with high cobble and low boulder content.**

Weather Conditions: Overcast

Time mins	Depth to water
0.00	0.95
0.25	1.12
0.50	1.31
0.75	1.42
1.00	1.45

Effective storage depth =	0.65	m
75% effective storage depth =	0.49	m
(ie depth below GL) =	1.11	m
25% effective storage depth =	0.16	m
(ie depth below GL) =	1.44	m
effective storage depth 75%-25% =	0.33	m
Time to fall to 75% effective depth =	0.24	mins
Time to fall to 25% effective depth =	0.85	mins
Void Ratio =	40%	
V (75%-25%) =	0.1053	m3
a (50%) =	2.2725	m2
t (75%-25%) =	0.61	mins
SOIL INFILTRATION RATE =	**1.27E-03**	**m/s**



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Scheme	**Hempton Road, Deddington**	Page No.	2
Client	**Robert Webb**	Calcs by	CN
Job ref.	**23933**	Date	14/06/18
		Test Number	2

Soil infiltration test

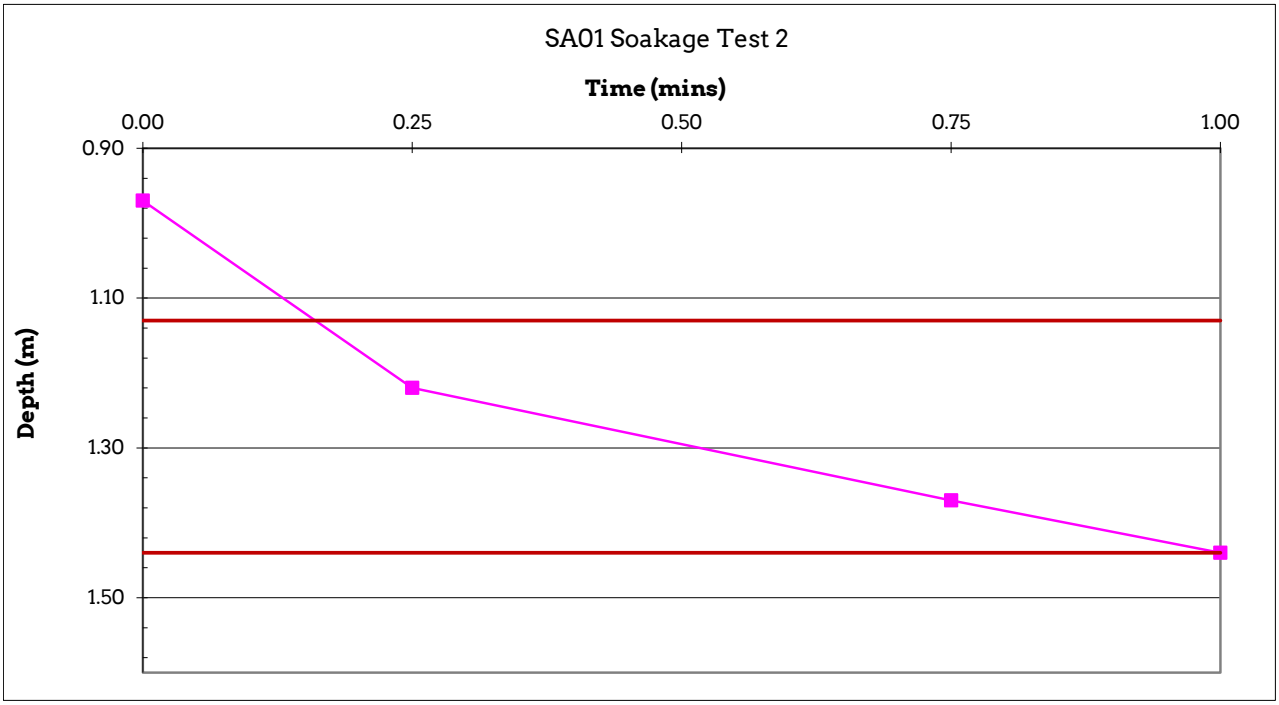
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Trial pit ref.	**SA01**	
Length	**1.80**	m
Width	**0.45**	m
Depth	**1.60**	m
Ground water level	**N/A**	
Ground conditions	**0.00 - 0.20**	**TOPSOIL comprising reddish brown, clayey, gravelly, SAND.**
	0.20 - 0.50	**Reddish brown, gravelly SAND with a low cobble content.**
	0.50 - 1.60	**Reddish brown, sandy, fine to coarse angular GRAVEL with high cobble and low boulder content.**

Weather Conditions: Overcast

Time mins	Depth to water
0.00	0.97
0.25	1.22
0.75	1.37
1.00	1.44

Effective storage depth =	0.63	m
75% effective storage depth =	0.47	m
(ie depth below GL) =	1.13	m
25% effective storage depth =	0.16	m
(ie depth below GL) =	1.44	m
effective storage depth 75%-25% =	0.32	m
Time to fall to 75% effective depth =	0.20	mins
Time to fall to 25% effective depth =	1.00	mins
Void Ratio =	40%	
V (75%-25%) =	0.1021	m3
a (50%) =	2.2275	m2
t (75%-25%) =	0.80	mins
SOIL INFILTRATION RATE =	**9.55E-04**	**m/s**



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Scheme	**Hempton Road, Deddington**	Page No.	3
Client	**Robert Webb**	Calcs by	CN
Job ref.	**23933**	Date	14/06/18
		Test Number	3

Soil infiltration test

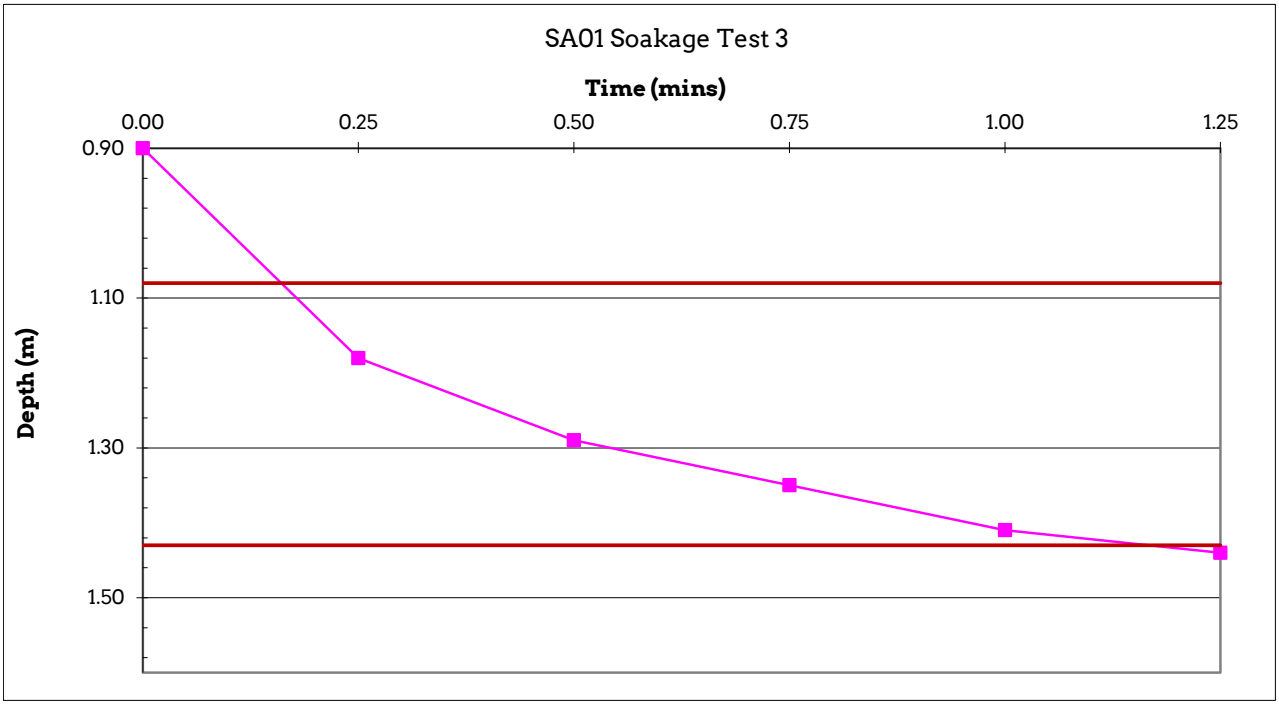
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Trial pit ref.	**SA01**	
Length	**1.80**	m
Width	**0.45**	m
Depth	**1.60**	m
Ground water level	**N/A**	
Ground conditions	**0.00 - 0.20**	**TOPSOIL comprising reddish brown, clayey, gravelly, SAND.**
	0.20 - 0.50	**Reddish brown, gravelly SAND with a low cobble content.**
	0.50 - 1.60	**Reddish brown, sandy, fine to coarse angular GRAVEL with high cobble and low boulder content.**

Weather Conditions: Overcast

Time mins	Depth to water
0.00	0.90
0.25	1.18
0.50	1.29
0.75	1.35
1.00	1.41
1.25	1.44

Effective storage depth =	0.70	m
75% effective storage depth =	0.53	m
(ie depth below GL) =	1.08	m
25% effective storage depth =	0.18	m
(ie depth below GL) =	1.43	m
effective storage depth 75%-25% =	0.35	m
Time to fall to 75% effective depth =	0.13	mins
Time to fall to 25% effective depth =	1.15	mins
Void Ratio =	40%	
V (75%-25%) =	0.1134	m3
a (50%) =	2.3850	m2
t (75%-25%) =	1.02	mins
SOIL INFILTRATION RATE =	**7.77E-04**	**m/s**



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Scheme	**Hempton Road, Deddington**	Page No.	1
Client	**Robert Webb**	Calcs by	CN
Job ref.	**23933**	Date	14/06/18
		Test Number	1

Soil infiltration test

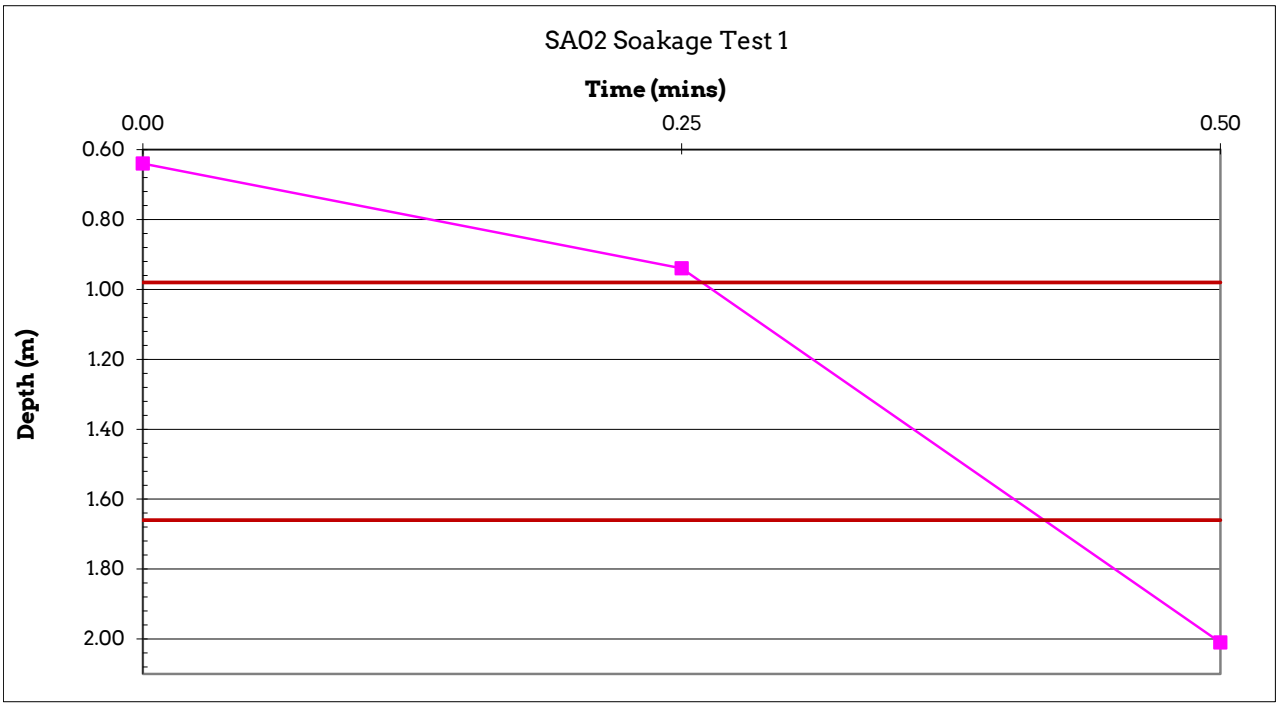
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Trial pit ref.	**SA02**	
Length	**1.80**	m
Width	**0.45**	m
Depth	**2.00**	m
Ground water level	**N/A**	
Ground conditions	**0.00 - 0.20**	**TOPSOIL comprising reddish brown, clayey, gravelly, SAND.**
	0.20 - 0.60	**Reddish brown, clayey, gravelly SAND with a low cobble content.**
	0.60 - 0.90	**Reddish brown, sandy, fine to coarse angular GRAVEL with a high cobble and low boulder content.**
	0.90 - 2.00	**Reddish brown, clayey, sandy, fine to coarse angular GRAVEL with a high cobble and low boulder content.**

Weather Conditions: Overcast

Time mins	Depth to water
0.00	0.64
0.25	0.94
0.50	2.01

Effective storage depth =	1.36	m
75% effective storage depth =	1.02	m
(ie depth below GL) =	0.98	m
25% effective storage depth =	0.34	m
(ie depth below GL) =	1.66	m
effective storage depth 75%-25% =	0.68	m
Time to fall to 75% effective depth =	0.26	mins
Time to fall to 25% effective depth =	0.42	mins
Void Ratio =	40%	
V (75%-25%) =	0.2203	m3
a (50%) =	3.8700	m2
t (75%-25%) =	0.16	mins
SOIL INFILTRATION RATE =	**5.93E-03**	**m/s**



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Scheme	**Hempton Road, Deddington**	Page No.	2
Client	**Robert Webb**	Calcs by	CN
Job ref.	**23933**	Date	14/06/18
		Test Number	2

Soil infiltration test

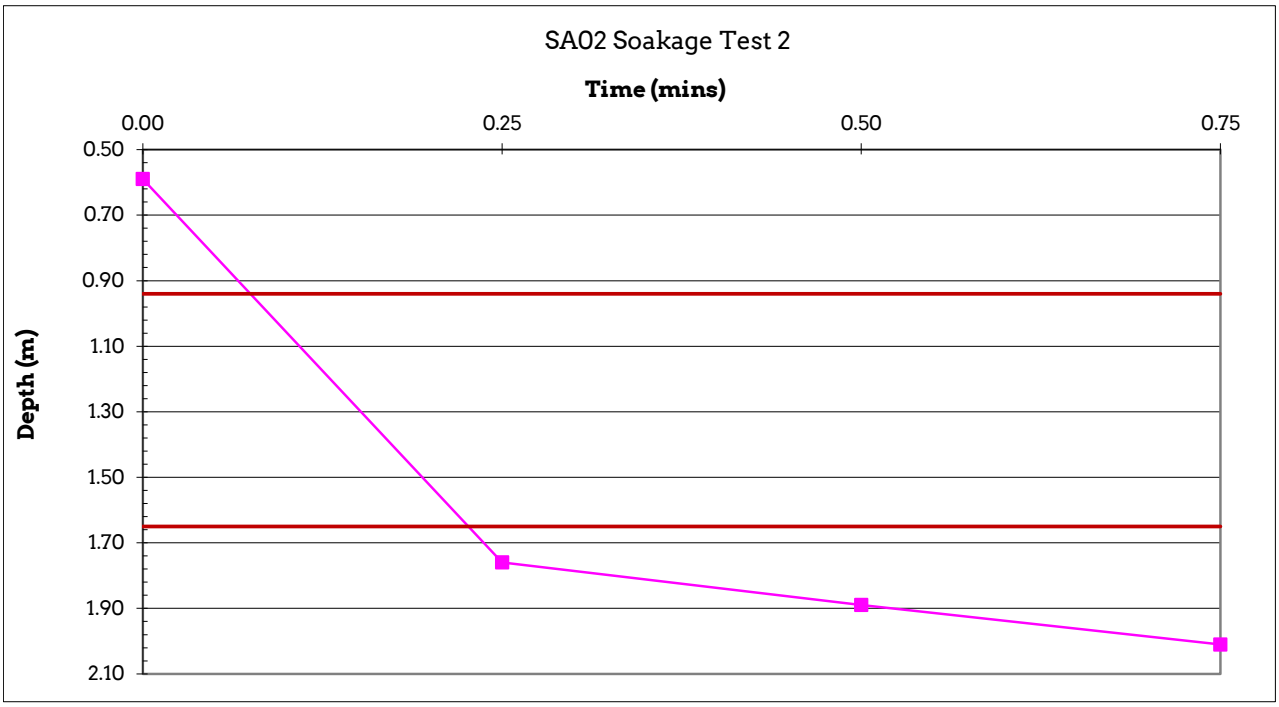
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Trial pit ref.	**SA02**	
Length	**1.80**	m
Width	**0.45**	m
Depth	**2.00**	m
Ground water level	**N/A**	
Ground conditions	**0.00 - 0.20**	**TOPSOIL comprising reddish brown, clayey, gravelly, SAND.**
	0.20 - 0.60	**Reddish brown, clayey, gravelly SAND with a low cobble content.**
	0.60 - 0.90	**Reddish brown, sandy, fine to coarse angular GRAVEL with a high cobble and low boulder content.**
	0.90 - 2.00	**Reddish brown, clayey, sandy, fine to coarse angular GRAVEL with a high cobble and low boulder content.**

Weather Conditions: Overcast

Time mins	Depth to water
0.00	0.59
0.25	1.76
0.50	1.89
0.75	2.01

Effective storage depth =	1.41	m
75% effective storage depth =	1.06	m
(ie depth below GL) =	0.94	m
25% effective storage depth =	0.35	m
(ie depth below GL) =	1.65	m
effective storage depth 75%-25% =	0.71	m
Time to fall to 75% effective depth =	0.08	mins
Time to fall to 25% effective depth =	0.21	mins
Void Ratio =	40%	
V (75%-25%) =	0.2284	m3
a (50%) =	3.9825	m2
t (75%-25%) =	0.13	mins
SOIL INFILTRATION RATE =	**7.35E-03**	**m/s**



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Scheme	**Hempton Road, Deddington**	Page No.	3
Client	**Robert Webb**	Calcs by	CN
Job ref.	**23933**	Date	14/06/18
		Test Number	3

Soil infiltration test

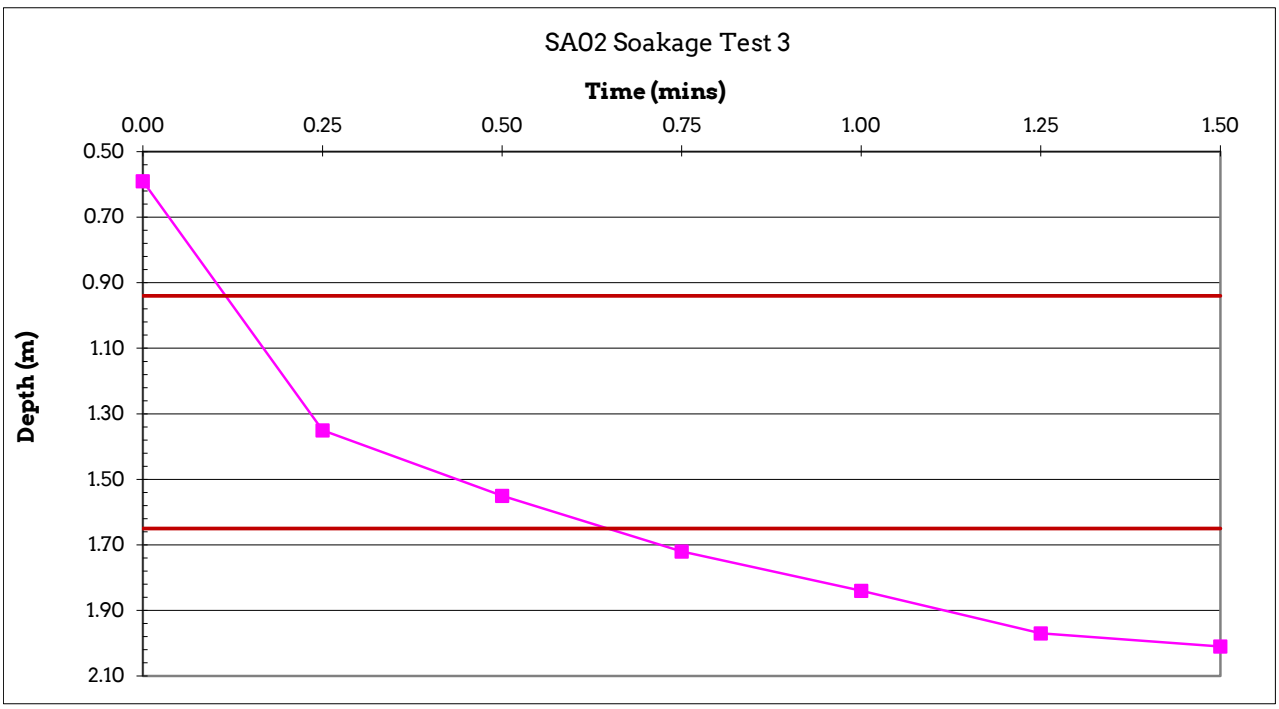
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Trial pit ref.	**SA02**	
Length	**1.80**	m
Width	**0.45**	m
Depth	**2.00**	m
Ground water level	**N/A**	
Ground conditions	**0.00 - 0.20**	**TOPSOIL comprising reddish brown, clayey, gravelly, SAND.**
	0.20 - 0.60	**Reddish brown, clayey, gravelly SAND with a low cobble content.**
	0.60 - 0.90	**Reddish brown, sandy, fine to coarse angular GRAVEL with a high cobble and low boulder content.**
	0.90 - 2.00	**Reddish brown, clayey, sandy, fine to coarse angular GRAVEL with a high cobble and low boulder content.**

Weather Conditions: Overcast

Time mins	Depth to water
0.00	0.59
0.25	1.35
0.50	1.55
0.75	1.72
1.00	1.84
1.25	1.97
1.50	2.01

Effective storage depth =	1.41	m
75% effective storage depth =	1.06	m
(ie depth below GL) =	0.94	m
25% effective storage depth =	0.35	m
(ie depth below GL) =	1.65	m
effective storage depth 75%-25% =	0.71	m
Time to fall to 75% effective depth =	0.12	mins
Time to fall to 25% effective depth =	0.64	mins
Void Ratio =	40%	
V (75%-25%) =	0.2284	m3
a (50%) =	3.9825	m2
t (75%-25%) =	0.52	mins
SOIL INFILTRATION RATE =	**1.84E-03**	**m/s**



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Scheme	**Hempton Road, Deddington**	Page No.	4
Client	**Robert Webb**	Calcs by	CN
Job ref.	**23933**	Date	14/06/18
		Test Number	4

Soil infiltration test

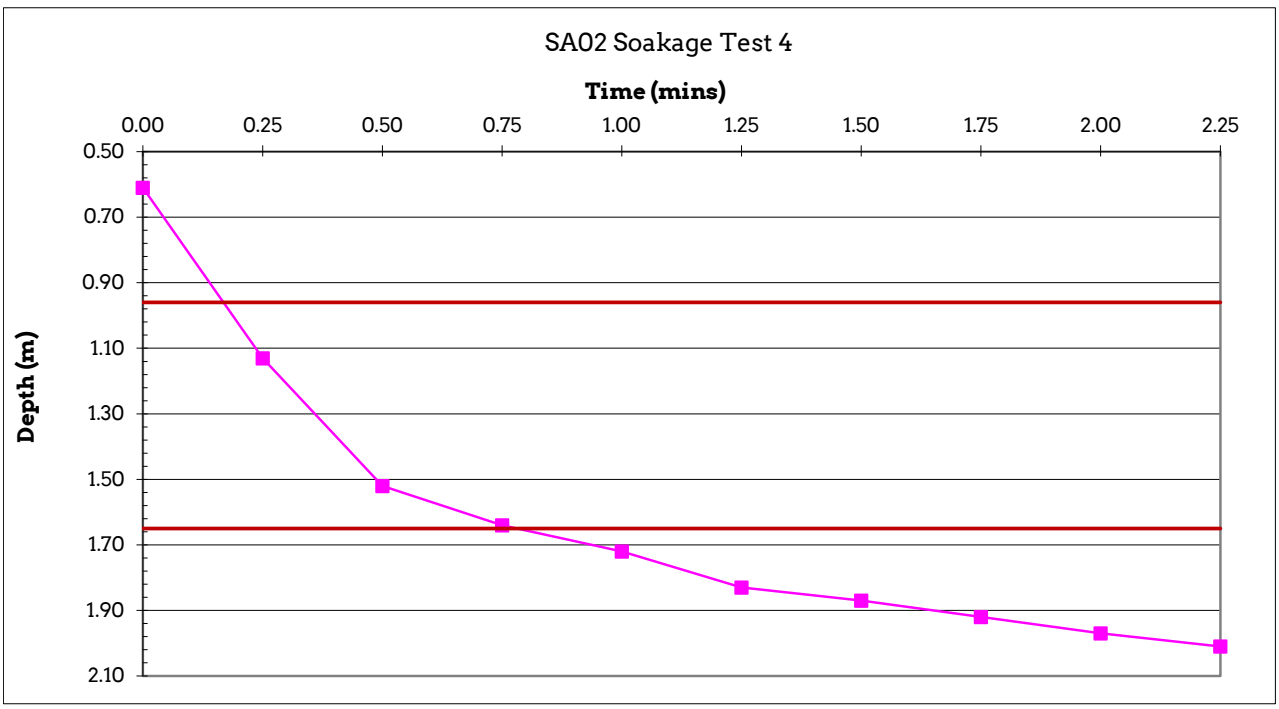
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Trial pit ref.	**SA02**	
Length	**1.80**	m
Width	**0.45**	m
Depth	**2.00**	m
Ground water level	**N/A**	
Ground conditions	**0.00 - 0.20**	**TOPSOIL comprising reddish brown, clayey, gravelly, SAND.**
	0.20 - 0.60	**Reddish brown, clayey, gravelly SAND with a low cobble content.**
	0.60 - 0.90	**Reddish brown, sandy, fine to coarse angular GRAVEL with a high cobble and low boulder content.**
	0.90 - 2.00	**Reddish brown, clayey, sandy, fine to coarse angular GRAVEL with a high cobble and low boulder content.**

Weather Conditions: Overcast

Time mins	Depth to water
0.00	0.61
0.25	1.13
0.50	1.52
0.75	1.64
1.00	1.72
1.25	1.83
1.50	1.87
1.75	1.92
2.00	1.97
2.25	2.01

Effective storage depth =	1.39	m
75% effective storage depth =	1.04	m
(ie depth below GL) =	0.96	m
25% effective storage depth =	0.35	m
(ie depth below GL) =	1.65	m
effective storage depth 75%-25% =	0.70	m
Time to fall to 75% effective depth =	0.19	mins
Time to fall to 25% effective depth =	0.76	mins
Void Ratio =	40%	
V (75%-25%) =	0.2252	m3
a (50%) =	3.9375	m2
t (75%-25%) =	0.57	mins
SOIL INFILTRATION RATE =	**1.67E-03**	**m/s**



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Telephone 01530 264753 email group@m-ec.co.uk

Scheme	**Hempton Road, Deddington**	Page No.	5
Client	**Robert Webb**	Calcs by	CN
Job ref.	**23933**	Date	14/06/18
		Test Number	5

Soil infiltration test

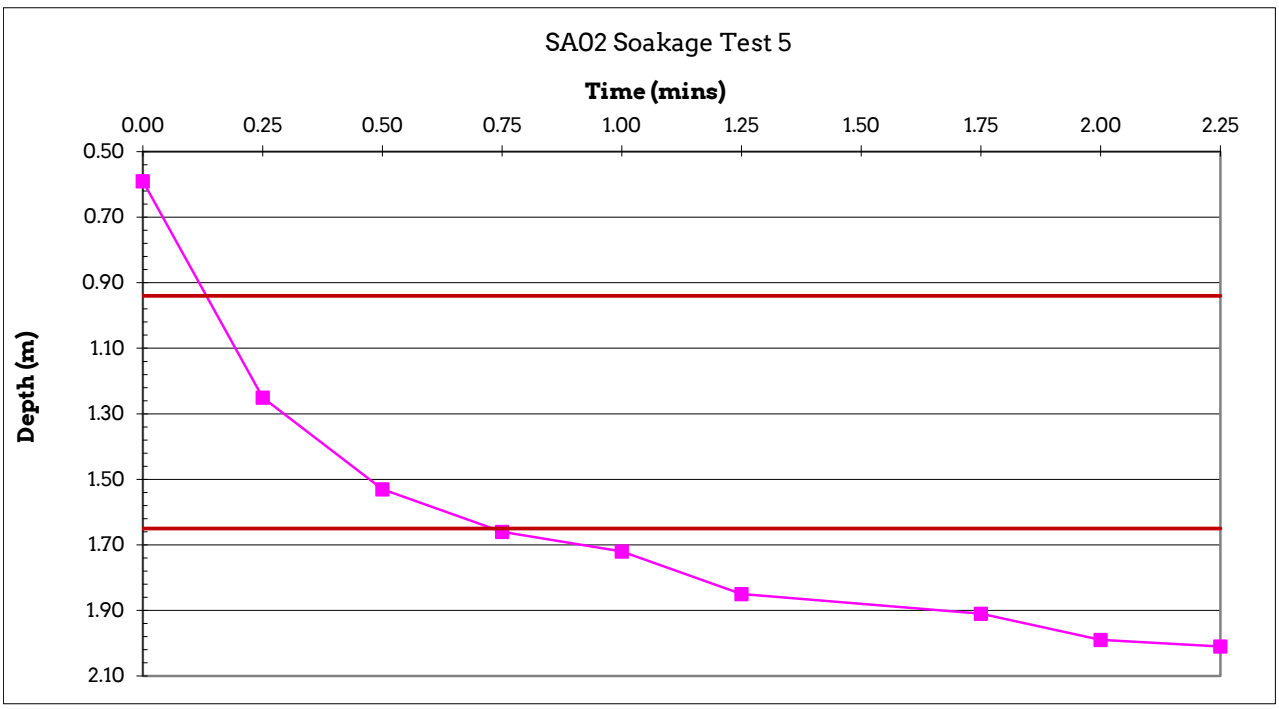
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Trial pit ref.	**SA02**	
Length	**1.80**	m
Width	**0.45**	m
Depth	**2.00**	m
Ground water level	**N/A**	
Ground conditions	**0.00 - 0.20**	**TOPSOIL comprising reddish brown, clayey, gravelly, SAND.**
	0.20 - 0.60	**Reddish brown, clayey, gravelly SAND with a low cobble content.**
	0.60 - 0.90	**Reddish brown, sandy, fine to coarse angular GRAVEL with a high cobble and low boulder content.**
	0.90 - 2.00	**Reddish brown, clayey, sandy, fine to coarse angular GRAVEL with a high cobble and low boulder content.**

Weather Conditions: Overcast

Time mins	Depth to water
0.00	0.59
0.25	1.25
0.50	1.53
0.75	1.66
1.00	1.72
1.25	1.85
1.75	1.91
2.00	1.99
2.25	2.01

Effective storage depth =	1.41	m
75% effective storage depth =	1.06	m
(ie depth below GL) =	0.94	m
25% effective storage depth =	0.35	m
(ie depth below GL) =	1.65	m
effective storage depth 75%-25% =	0.71	m
Time to fall to 75% effective depth =	0.13	mins
Time to fall to 25% effective depth =	0.74	mins
Void Ratio =	40%	
V (75%-25%) =	0.2284	m3
a (50%) =	3.9825	m2
t (75%-25%) =	0.61	mins
SOIL INFILTRATION RATE =	**1.57E-03**	**m/s**



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Scheme	**Hempton Road, Deddington**	Page No.	6
Client	**Robert Webb**	Calcs by	CN
Job ref.	**23933**	Date	14/06/18
		Test Number	6

Soil infiltration test

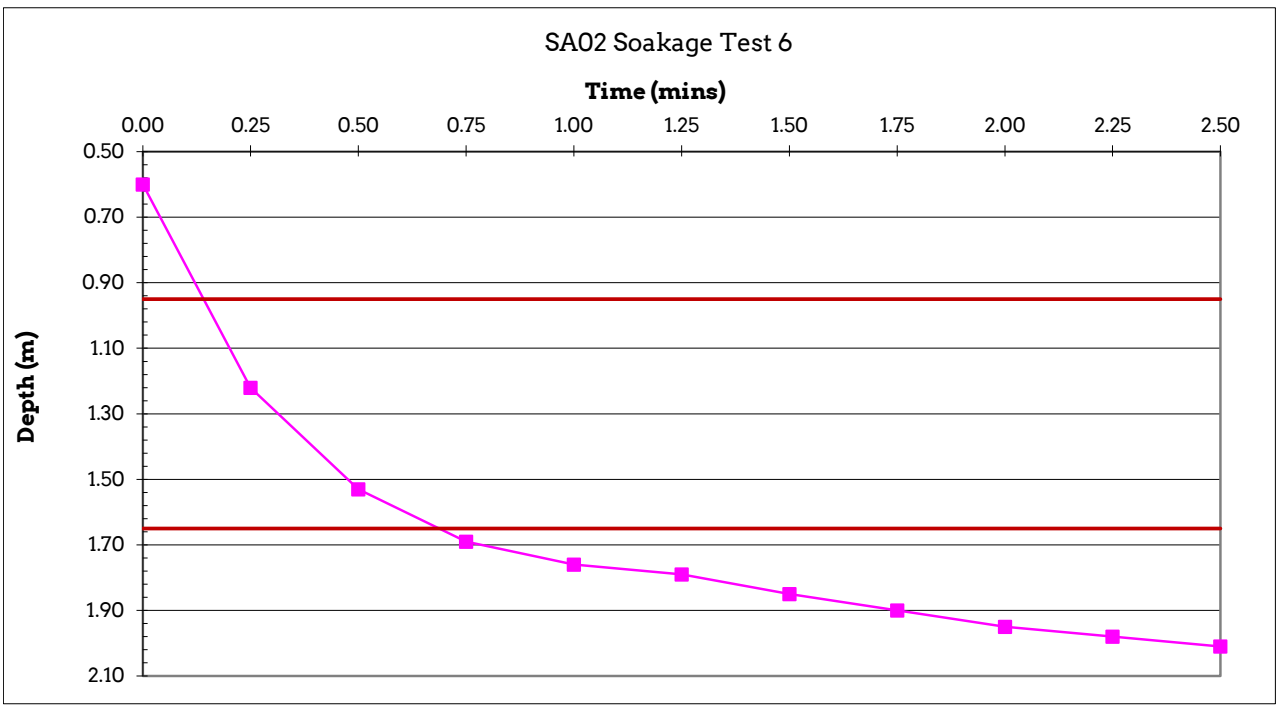
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Trial pit ref.	**SA02**	
Length	**1.80**	m
Width	**0.45**	m
Depth	**2.00**	m
Ground water level	**N/A**	
Ground conditions	**0.00 - 0.20**	**TOPSOIL comprising reddish brown, clayey, gravelly, SAND.**
	0.20 - 0.60	**Reddish brown, clayey, gravelly SAND with a low cobble content.**
	0.60 - 0.90	**Reddish brown, sandy, fine to coarse angular GRAVEL with a high cobble and low boulder content.**
	0.90 - 2.00	**Reddish brown, clayey, sandy, fine to coarse angular GRAVEL with a high cobble and low boulder content.**

Weather Conditions: Overcast

Time mins	Depth to water
0.00	0.60
0.25	1.22
0.50	1.53
0.75	1.69
1.00	1.76
1.25	1.79
1.50	1.85
1.75	1.90
2.00	1.95
2.25	1.98
2.50	2.01

Effective storage depth =	1.40	m
75% effective storage depth =	1.05	m
(ie depth below GL) =	0.95	m
25% effective storage depth =	0.35	m
(ie depth below GL) =	1.65	m
effective storage depth 75%-25% =	0.70	m
Time to fall to 75% effective depth =	0.13	mins
Time to fall to 25% effective depth =	0.70	mins
Void Ratio =	40%	
V (75%-25%) =	0.2268	m3
a (50%) =	3.9600	m2
t (75%-25%) =	0.57	mins
SOIL INFILTRATION RATE =	**1.67E-03**	**m/s**



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Telephone 01530 264753 email group@m-ec.co.uk

Scheme	**Hempton Road, Deddington**	Page No.	7
Client	**Robert Webb**	Calcs by	CN
Job ref.	**23933**	Date	14/06/18
		Test Number	7

Soil infiltration test

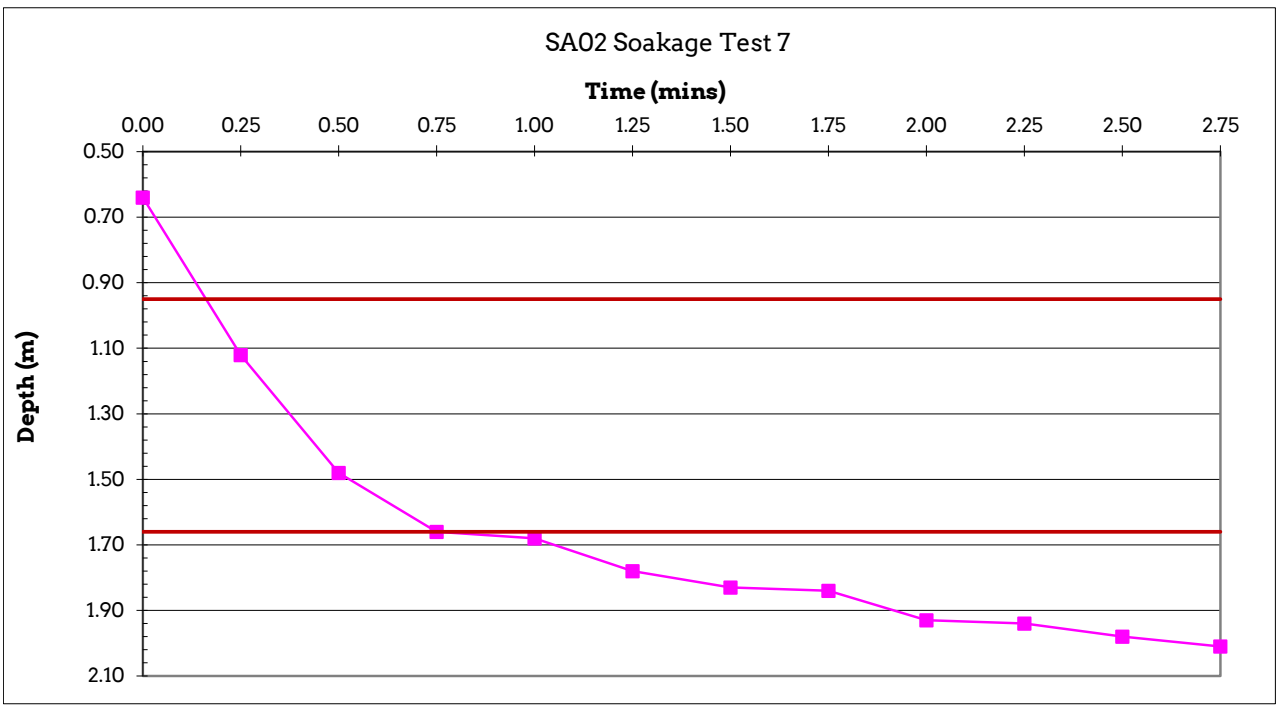
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Trial pit ref.	**SA02**	
Length	**1.80**	m
Width	**0.45**	m
Depth	**2.00**	m
Ground water level	**N/A**	
Ground conditions	**0.00 - 0.20**	**TOPSOIL comprising reddish brown, clayey, gravelly, SAND.**
	0.20 - 0.60	**Reddish brown, clayey, gravelly SAND with a low cobble content.**
	0.60 - 0.90	**Reddish brown, sandy, fine to coarse angular GRAVEL with a high cobble and low boulder content.**
	0.90 - 2.00	**Reddish brown, clayey, sandy, fine to coarse angular GRAVEL with a high cobble and low boulder content.**

Weather Conditions: Overcast

Time mins	Depth to water
0.00	0.64
0.25	1.12
0.50	1.48
0.75	1.66
1.00	1.68
1.25	1.78
1.50	1.83
1.75	1.84
2.00	1.93
2.25	1.94
2.50	1.98
2.75	2.01

Effective storage depth =	1.36	m
75% effective storage depth =	1.02	m
(ie depth below GL) =	0.98	m
25% effective storage depth =	0.34	m
(ie depth below GL) =	1.66	m
effective storage depth 75%-25% =	0.68	m
Time to fall to 75% effective depth =	0.18	mins
Time to fall to 25% effective depth =	0.75	mins
Void Ratio =	40%	
V (75%-25%) =	0.2203	m3
a (50%) =	3.8700	m2
t (75%-25%) =	0.57	mins
SOIL INFILTRATION RATE =	**1.66E-03**	**m/s**



APPENDIX E

EXPEDITE

SURFACE WATER DRAINAGE STATEMENT

PROPOSED RESIDENTIAL DEVELOPMENT

LAND AT HEMPTON ROAD, DEDDINGTON

20/03660/REM

Proposed Residential Development

Surface Water Drainage Statement

Issued by:	Expedite 35 Southernhay East Exeter EX1 1NX
Client:	Burrington Estates Ltd
Project Reference:	ES20.060
Project Title:	Land at Hempton Road, Deddington
Revision:	-
Date:	2nd February 2020
Prepared by:	Drew McGilchrist
Checked by:	Kris Tovey
Approved by:	Simon Lancaster

1.0 Introduction

1.1 This Drainage Statement has been prepared on behalf of Burrington Estates Ltd by Expedite Engineering Services Ltd to describe the proposed surface water drainage strategy for the proposed residential development at Hempton Road, Deddington.

2.0 Proposed Drainage Strategy

Method of Discharge

2.1 The underlying soil of the development site has good infiltration characteristics and therefore infiltration is proposed to be the method of surface water discharge for the development.

2.2 Infiltration testing was carried out in June 2018 by M-EC within two trial pits in the south-eastern corner of the site, at the location of the proposed infiltration feature. Encountered rates were between $7.35x10^{-3}$m/s and $7.77x10^{-4}$m/s.

2.3 An infiltration rate of $7.77x10^{-4}$m/s was taken forward for design as this was the lowest tested infiltration rate.

Infiltration Basin Sizing

2.4 The basin has been sized using the MicroDrainage software package. The modelled basin uses the design infiltration rate of $7.77x10^{-4}$m/s, a safety factor of 2.0, and assumes that there is no infiltration through the base of the basin (to account for a possible long-term reduction in infiltration performance due to sedimentation).

2.5 A catchment area of 8470m^2 was used to account for the proposed development in addition to the possible future addition of 14 dwellings in the plot of land to the north of the development, with the total area increased by 10% to account for urban creep. The breakdown of areas is as follows:

This Development (21 dwellings)

Impermeable area	4920m^2

Potential Future Development (14 dwellings)

Impermeable area	2780m^2
Total impermeable area	7700m^2
+10% urban creep	**8470m^2**

2.6 The above information gives a conservative infiltration basin design with capacity to safely store excess flows in the 1 in 100yr (+40% climate change) design storm.

2.7 The proposed basin shall have a maximum water depth of 1.4 metres and maximum side slopes of 1:3.

2.8 Due to the favourable infiltration rates the modelled basin achieves a half-drain time of 21 minutes, well within the generally specified 24-hour half-drain time target.

2.9 MicroDrainage calculations are included within **Appendix A**.

Appendix A – MicroDrainage Calculations

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.670	4-8	0.177

Total Area Contributing (ha) = 0.847

Total Pipe Volume (m^3) = 2.165

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	5.000	0.125	40.0	0.847	5.00	0.0	0.600	o	525	Pipe/Conduit	
1.001	5.000	0.125	40.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.02	10.000	0.847	0.0	0.0	0.0	3.55	768.3	114.7
1.001	50.00	5.05	9.875	0.847	0.0	0.0	0.0	3.55	768.3	114.7

Storage Structures for Storm

Infiltration Basin Manhole: 2, DS/PN: 1.001

Invert Level (m) 9.875 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 1.00
Infiltration Coefficient Side (m/hr) 2.79700

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	15.0	0.300	63.0	0.600	129.0	0.900	216.0	1.200	319.0
0.100	30.0	0.400	82.0	0.700	156.0	1.000	249.0	1.300	357.0
0.200	45.0	0.500	105.0	0.800	185.0	1.100	283.0	1.400	396.0

1 year Return Period 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 Coeffiecient	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	C (1km)	-0.022	D3 (1km)	0.262	Cv (Summer)	0.750
FEH Rainfall Version	1999	D1 (1km)	0.328	E (1km)	0.292	Cv (Winter)	0.840
Site Location		D2 (1km)	0.286	F (1km)	2.480		

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flow / Cap.	Infil. Flow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	1	30 minute 1 year Winter I+0%	12.000	10.407	-0.118	0.29			79.4	OK
1.001	2	30 minute 1 year Winter I+0%	12.000	10.392	-0.008	0.00	36.8	17	0.0	OK

30 year Return Period 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 Coeffiecient	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	C (1km)	-0.022	D3 (1km)	0.262	Cv (Summer)	0.750
FEH Rainfall Version	1999	D1 (1km)	0.328	E (1km)	0.292	Cv (Winter)	0.840
Site Location		D2 (1km)	0.286	F (1km)	2.480		

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flow / Cap.	Infil. Flow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	1	30 minute 30 year Winter I+0%	12.000	10.936	0.411	0.86			232.9	SURCHARGED
1.001	2	15 minute 30 year Winter I+0%	12.000	10.832	0.432	0.00	86.1	17	0.0	SURCHARGED

100 year Return Period 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 Coeffiecient	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	C (1km)	-0.022	D3 (1km)	0.262	Cv (Summer)	0.750
FEH Rainfall Version	1999	D1 (1km)	0.328	E (1km)	0.292	Cv (Winter)	0.840
Site Location		D2 (1km)	0.286	F (1km)	2.480		

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flow / Cap.	Infil. Flow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)
1.000	1	15 minute 100 year Winter I+40%	12.000	11.808	1.283	2.49			676.4
1.001	2	15 minute 100 year Winter I+40%	12.000	11.257	0.857	0.00	147.0	21	0.0

PN	US/MH Name	Status
1.000	1	FLOOD RISK
1.001	2	SURCHARGED

APPENDIX F

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	40
Ratio R	0.401	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.512	4-8	0.258

Total Area Contributing (ha) = 0.770

Total Pipe Volume (m³) = 19.634

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	26.420	0.300	88.1	0.069	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	31.618	0.200	158.1	0.087	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.000	21.710	0.400	54.3	0.037	5.00	0.0	0.600	o	100	Pipe/Conduit	
1.002	13.724	0.100	137.2	0.048	0.00	0.0	0.600	o	250	Pipe/Conduit	
1.003	26.385	0.200	131.9	0.040	0.00	0.0	0.600	o	250	Pipe/Conduit	
3.000	25.420	0.450	56.5	0.054	5.00	0.0	0.600	o	150	Pipe/Conduit	
1.004	22.788	0.150	151.9	0.038	0.00	0.0	0.600	o	400	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	5.41	137.300	0.069	0.0	0.0	3.7	1.07	18.9	13.1
1.001	50.00	5.92	136.925	0.156	0.0	0.0	8.4	1.04	41.2	29.6
2.000	50.00	5.35	136.800	0.037	0.0	0.0	2.0	1.05	8.2	7.0
1.002	50.00	6.11	136.250	0.241	0.0	0.0	13.1	1.19	58.5	45.7
1.003	50.00	6.47	136.150	0.281	0.0	0.0	15.2	1.22	59.7	53.3
3.000	50.00	5.32	136.500	0.054	0.0	0.0	2.9	1.34	23.7	10.2
1.004	50.00	6.72	135.800	0.373	0.0	0.0	20.2	1.53	192.1	70.7

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.005	24.482	0.150	163.2	0.110	0.00	0.0	0.600	o	400	Pipe/Conduit	
1.006	22.471	0.385	58.4	0.050	0.00	0.0	0.600	o	400	Pipe/Conduit	
4.000	16.884	0.285	59.2	0.030	5.00	0.0	0.600	o	100	Pipe/Conduit	
4.001	17.992	0.200	90.0	0.035	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.007	16.162	0.115	140.5	0.020	0.00	0.0	0.600	o	400	Pipe/Conduit	
5.000	19.131	0.300	63.8	0.053	5.00	0.0	0.600	o	150	Pipe/Conduit	
5.001	24.799	0.700	35.4	0.025	0.00	0.0	0.600	o	150	Pipe/Conduit	
5.002	21.070	0.200	105.4	0.031	0.00	0.0	0.600	o	175	Pipe/Conduit	
5.003	24.676	0.200	123.4	0.030	0.00	0.0	0.600	o	225	Pipe/Conduit	
5.004	17.038	0.550	31.0	0.013	0.00	0.0	0.600	o	225	Pipe/Conduit	
1.008	9.025	0.100	90.3	0.000	0.00	0.0	0.600	o	400	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.005	50.00	7.00	135.650	0.483	0.0	0.0	26.2	1.47	185.3	91.6
1.006	50.00	7.15	135.500	0.533	0.0	0.0	28.9	2.47	311.0	101.0
4.000	50.00	5.28	135.900	0.030	0.0	0.0	1.6	1.00	7.9	5.7
4.001	50.00	5.56	135.565	0.065	0.0	0.0	3.5	1.06	18.7	12.3
1.007	50.00	7.32	135.115	0.618	0.0	0.0	33.5	1.59	199.8	117.2
5.000	50.00	5.25	137.200	0.053	0.0	0.0	2.9	1.26	22.3	10.0
5.001	50.00	5.50	136.900	0.078	0.0	0.0	4.2	1.70	30.0	14.8
5.002	50.00	5.82	136.175	0.109	0.0	0.0	5.9	1.08	26.0	20.7
5.003	50.00	6.17	135.925	0.139	0.0	0.0	7.5	1.18	46.8	26.4
5.004	50.00	6.29	135.725	0.152	0.0	0.0	8.2	2.36	93.8	28.8
1.008	50.00	7.39	135.000	0.770	0.0	0.0	41.7	1.99	249.8	146.0

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
1	138.800	1.500	Open Manhole	1200	1.000	137.300	150				
2	138.700	1.775	Open Manhole	1200	1.001	136.925	225	1.000	137.000	150	
3	138.300	1.500	Open Manhole	1200	2.000	136.800	100				
4	138.300	2.050	Open Manhole	1200	1.002	136.250	250	1.001	136.725	225	450
								2.000	136.400	100	
5	138.200	2.050	Open Manhole	1200	1.003	136.150	250	1.002	136.150	250	
6	138.000	1.500	Open Manhole	1200	3.000	136.500	150				
7	137.950	2.150	Open Manhole	1350	1.004	135.800	400	1.003	135.950	250	
								3.000	136.050	150	
8	137.860	2.210	Open Manhole	1350	1.005	135.650	400	1.004	135.650	400	
9	137.100	1.600	Open Manhole	1350	1.006	135.500	400	1.005	135.500	400	
10	137.100	1.200	Open Manhole	1200	4.000	135.900	100				
11	137.100	1.535	Open Manhole	1200	4.001	135.565	150	4.000	135.615	100	
12	136.950	1.835	Open Manhole	1350	1.007	135.115	400	1.006	135.115	400	
								4.001	135.365	150	
13	138.550	1.350	Open Manhole	1200	5.000	137.200	150				
14	138.340	1.440	Open Manhole	1200	5.001	136.900	150	5.000	136.900	150	
15	138.000	1.825	Open Manhole	1200	5.002	136.175	175	5.001	136.200	150	
16	137.600	1.675	Open Manhole	1200	5.003	135.925	225	5.002	135.975	175	
17	137.100	1.375	Open Manhole	1200	5.004	135.725	225	5.003	135.725	225	
18	136.600	1.600	Open Manhole	1350	1.008	135.000	400	1.007	135.000	400	
								5.004	135.175	225	
	136.600	1.700	Open Manhole	0		OUTFALL		1.008	134.900	400	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
1	445918.980	231891.833	445918.980	231891.833	Required	
2	445944.994	231896.445	445944.994	231896.445	Required	
3	445976.033	231924.138	445976.033	231924.138	Required	
4	445976.033	231902.428	445976.033	231902.428	Required	
5	445978.830	231888.992	445978.830	231888.992	Required	
6	445994.837	231869.685	445994.837	231869.685	Required	
7	445970.035	231864.116	445970.035	231864.116	Required	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
8	445967.643	231841.454	445967.643	231841.454	Required	
9	445973.555	231817.697	445973.555	231817.697	Required	
10	446010.156	231800.987	446010.156	231800.987	Required	
11	445993.538	231798.000	445993.538	231798.000	Required	
12	445975.745	231795.333	445975.745	231795.333	Required	
13	445918.183	231838.032	445918.183	231838.032	Required	
14	445921.631	231819.214	445921.631	231819.214	Required	
15	445928.826	231795.482	445928.826	231795.482	Required	
16	445948.204	231787.210	445948.204	231787.210	Required	
17	445972.708	231784.299	445972.708	231784.299	Required	
18	445989.544	231786.918	445989.544	231786.918	Required	
	445997.567	231782.786			No Entry	

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	150	1	138.800	137.300	1.350	Open Manhole	1200
1.001	o	225	2	138.700	136.925	1.550	Open Manhole	1200
2.000	o	100	3	138.300	136.800	1.400	Open Manhole	1200
1.002	o	250	4	138.300	136.250	1.800	Open Manhole	1200
1.003	o	250	5	138.200	136.150	1.800	Open Manhole	1200
3.000	o	150	6	138.000	136.500	1.350	Open Manhole	1200
1.004	o	400	7	137.950	135.800	1.750	Open Manhole	1350
1.005	o	400	8	137.860	135.650	1.810	Open Manhole	1350
1.006	o	400	9	137.100	135.500	1.200	Open Manhole	1350
4.000	o	100	10	137.100	135.900	1.100	Open Manhole	1200
4.001	o	150	11	137.100	135.565	1.385	Open Manhole	1200
1.007	o	400	12	136.950	135.115	1.435	Open Manhole	1350
5.000	o	150	13	138.550	137.200	1.200	Open Manhole	1200
5.001	o	150	14	138.340	136.900	1.290	Open Manhole	1200
5.002	o	175	15	138.000	136.175	1.650	Open Manhole	1200
5.003	o	225	16	137.600	135.925	1.450	Open Manhole	1200
5.004	o	225	17	137.100	135.725	1.150	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	26.420	88.1	2	138.700	137.000	1.550	Open Manhole	1200
1.001	31.618	158.1	4	138.300	136.725	1.350	Open Manhole	1200
2.000	21.710	54.3	4	138.300	136.400	1.800	Open Manhole	1200
1.002	13.724	137.2	5	138.200	136.150	1.800	Open Manhole	1200
1.003	26.385	131.9	7	137.950	135.950	1.750	Open Manhole	1350
3.000	25.420	56.5	7	137.950	136.050	1.750	Open Manhole	1350
1.004	22.788	151.9	8	137.860	135.650	1.810	Open Manhole	1350
1.005	24.482	163.2	9	137.100	135.500	1.200	Open Manhole	1350
1.006	22.471	58.4	12	136.950	135.115	1.435	Open Manhole	1350
4.000	16.884	59.2	11	137.100	135.615	1.385	Open Manhole	1200
4.001	17.992	90.0	12	136.950	135.365	1.435	Open Manhole	1350
1.007	16.162	140.5	18	136.600	135.000	1.200	Open Manhole	1350
5.000	19.131	63.8	14	138.340	136.900	1.290	Open Manhole	1200
5.001	24.799	35.4	15	138.000	136.200	1.650	Open Manhole	1200
5.002	21.070	105.4	16	137.600	135.975	1.450	Open Manhole	1200
5.003	24.676	123.4	17	137.100	135.725	1.150	Open Manhole	1200
5.004	17.038	31.0	18	136.600	135.175	1.200	Open Manhole	1350

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)
1.008	o	400	18	136.600	135.000	1.200	Open Manhole	1350

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)
1.008	9.025	90.3		136.600	134.900	1.300	Open Manhole	0

Network Classifications for Storm

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
1.000	1	150	1.350	1.550	Unclassified	1200	0	1.350	Unclassified
1.001	2	225	1.350	1.550	Unclassified	1200	0	1.550	Unclassified
2.000	3	100	1.400	1.800	Unclassified	1200	0	1.400	Unclassified
1.002	4	250	1.800	1.800	Unclassified	1200	0	1.800	Unclassified
1.003	5	250	1.750	1.809	Unclassified	1200	0	1.800	Unclassified
3.000	6	150	1.350	1.750	Unclassified	1200	0	1.350	Unclassified
1.004	7	400	1.718	1.810	Unclassified	1350	0	1.750	Unclassified
1.005	8	400	1.200	1.810	Unclassified	1350	0	1.810	Unclassified
1.006	9	400	1.200	1.435	Unclassified	1350	0	1.200	Unclassified
4.000	10	100	1.100	1.763	Unclassified	1200	0	1.100	Unclassified
4.001	11	150	1.375	1.435	Unclassified	1200	0	1.385	Unclassified
1.007	12	400	1.200	1.435	Unclassified	1350	0	1.435	Unclassified
5.000	13	150	1.200	1.363	Unclassified	1200	0	1.200	Unclassified
5.001	14	150	1.290	1.650	Unclassified	1200	0	1.290	Unclassified
5.002	15	175	1.450	1.650	Unclassified	1200	0	1.650	Unclassified
5.003	16	225	1.150	1.450	Unclassified	1200	0	1.450	Unclassified
5.004	17	225	1.150	1.326	Unclassified	1200	0	1.150	Unclassified
1.008	18	400	1.200	1.776	Unclassified	1350	0	1.200	Unclassified

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)
1.008		136.600	134.900	135.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.401		

Online Controls for Storm

Pump Manhole: 18, DS/PN: 1.008, Volume (m³): 4.8

Invert Level (m) 135.000

Storage Structures for Storm

Infiltration Basin Manhole: 18, DS/PN: 1.008

Invert Level (m) 135.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 1.00
Infiltration Coefficient Side (m/hr) 2.79700

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	266.0	1.600	700.0

1 year Return Period 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 Coeffiecient	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)	0.262
FEH Rainfall Version	1999	E (1km)	0.292
Site Location	GB 446100 232550 SP 46100 32550	F (1km)	2.480
C (1km)	-0.022	Cv (Summer)	0.750
D1 (1km)	0.328	Cv (Winter)	0.840
D2 (1km)	0.286		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	1	15 Winter	1	+0%	30/15 Summer	100/15 Summer			137.377	-0.073
1.001	2	15 Winter	1	+0%	30/15 Summer	100/15 Summer			137.038	-0.112
2.000	3	15 Winter	1	+0%	30/15 Summer	100/15 Summer			136.858	-0.042
1.002	4	15 Winter	1	+0%	30/15 Summer	100/15 Summer			136.389	-0.111
1.003	5	15 Winter	1	+0%	30/15 Summer				136.294	-0.106
3.000	6	15 Winter	1	+0%	100/15 Summer	100/15 Summer			136.559	-0.091
1.004	7	15 Winter	1	+0%	100/15 Summer				135.944	-0.256
1.005	8	15 Winter	1	+0%	100/15 Summer				135.817	-0.233
1.006	9	15 Winter	1	+0%	100/15 Summer				135.632	-0.268
4.000	10	15 Winter	1	+0%	30/15 Summer	100/15 Summer			135.953	-0.047
4.001	11	15 Winter	1	+0%	30/15 Summer				135.637	-0.078
1.007	12	15 Winter	1	+0%	30/15 Summer				135.309	-0.206
5.000	13	15 Winter	1	+0%	30/15 Summer	100/15 Summer			137.261	-0.089
5.001	14	15 Winter	1	+0%	30/15 Summer	100/15 Summer			136.962	-0.088
5.002	15	15 Winter	1	+0%	30/15 Summer				136.269	-0.081
5.003	16	15 Winter	1	+0%	30/15 Summer				136.023	-0.127
5.004	17	15 Winter	1	+0%	100/15 Winter				135.796	-0.154
1.008	18	60 Winter	1	+0%	30/30 Winter				135.176	-0.224

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.000	0.51			9.2	OK	4
1.001	2	0.000	0.50			19.4	OK	2
2.000	3	0.000	0.62			5.0	OK	4
1.002	4	0.000	0.60			29.8	OK	2

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

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.003	5	0.000	0.62			33.9	OK	
3.000	6	0.000	0.32			7.2	OK	2
1.004	7	0.000	0.28			44.9	OK	
1.005	8	0.000	0.36			56.9	OK	
1.006	9	0.000	0.24			62.2	OK	
4.000	10	0.000	0.53			4.0	OK	4
4.001	11	0.000	0.46			8.1	OK	
1.007	12	0.000	0.48			71.9	OK	
5.000	13	0.000	0.34			7.2	OK	4
5.001	14	0.000	0.35			10.0	OK	2
5.002	15	0.000	0.56			13.6	OK	
5.003	16	0.000	0.39			16.9	OK	
5.004	17	0.000	0.22			18.2	OK	
1.008	18	0.000	0.00		52	0.0	OK	

30 year Return Period 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 Coeffiecient	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)	0.262
FEH Rainfall Version	1999	E (1km)	0.292
Site Location	GB 446100 232550 SP 46100 32550	F (1km)	2.480
C (1km)	-0.022	Cv (Summer)	0.750
D1 (1km)	0.328	Cv (Winter)	0.840
D2 (1km)	0.286		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	1	15 Winter	30	+0%	30/15 Summer	100/15 Summer			137.947	0.497
1.001	2	15 Winter	30	+0%	30/15 Summer	100/15 Summer			137.395	0.245
2.000	3	15 Winter	30	+0%	30/15 Summer	100/15 Summer			137.700	0.800
1.002	4	15 Winter	30	+0%	30/15 Summer	100/15 Summer			137.001	0.501
1.003	5	15 Winter	30	+0%	30/15 Summer				136.755	0.355
3.000	6	15 Winter	30	+0%	100/15 Summer	100/15 Summer			136.618	-0.032
1.004	7	15 Winter	30	+0%	100/15 Summer				136.119	-0.081
1.005	8	15 Winter	30	+0%	100/15 Summer				136.034	-0.016
1.006	9	15 Winter	30	+0%	100/15 Summer				135.766	-0.134
4.000	10	15 Winter	30	+0%	30/15 Summer	100/15 Summer			136.373	0.373
4.001	11	15 Winter	30	+0%	30/15 Summer				135.906	0.191
1.007	12	15 Winter	30	+0%	30/15 Summer				135.592	0.077
5.000	13	15 Winter	30	+0%	30/15 Summer	100/15 Summer			137.507	0.157
5.001	14	15 Winter	30	+0%	30/15 Summer	100/15 Summer			137.264	0.214
5.002	15	15 Winter	30	+0%	30/15 Summer				136.661	0.311
5.003	16	15 Winter	30	+0%	30/15 Summer				136.189	0.039
5.004	17	15 Winter	30	+0%	100/15 Winter				135.855	-0.095
1.008	18	60 Winter	30	+0%	30/30 Winter				135.432	0.032

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.000	1.36			24.5	SURCHARGED	4
1.001	2	0.000	1.43			55.4	SURCHARGED	2
2.000	3	0.000	1.35			10.7	SURCHARGED	4
1.002	4	0.000	1.58			79.3	SURCHARGED	2

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.003	5	0.000	1.66			91.0	SURCHARGED	
3.000	6	0.000	0.96			21.6	OK	2
1.004	7	0.000	0.76			123.3	OK	
1.005	8	0.000	1.00			158.1	OK	
1.006	9	0.000	0.67			175.2	OK	
4.000	10	0.000	1.33			10.0	SURCHARGED	4
4.001	11	0.000	1.24			21.7	SURCHARGED	
1.007	12	0.000	1.35			203.4	SURCHARGED	
5.000	13	0.000	0.89			18.6	SURCHARGED	4
5.001	14	0.000	0.94			26.7	SURCHARGED	2
5.002	15	0.000	1.52			37.0	SURCHARGED	
5.003	16	0.000	1.11			47.8	SURCHARGED	
5.004	17	0.000	0.63			52.5	OK	
1.008	18	0.000	0.00		54	0.0	SURCHARGED	

100 year Return Period 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 Coeffiecient	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)	0.262
FEH Rainfall Version	1999	E (1km)	0.292
Site Location	GB 446100 232550 SP 46100 32550	F (1km)	2.480
C (1km)	-0.022	Cv (Summer)	0.750
D1 (1km)	0.328	Cv (Winter)	0.840
D2 (1km)	0.286		

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 40

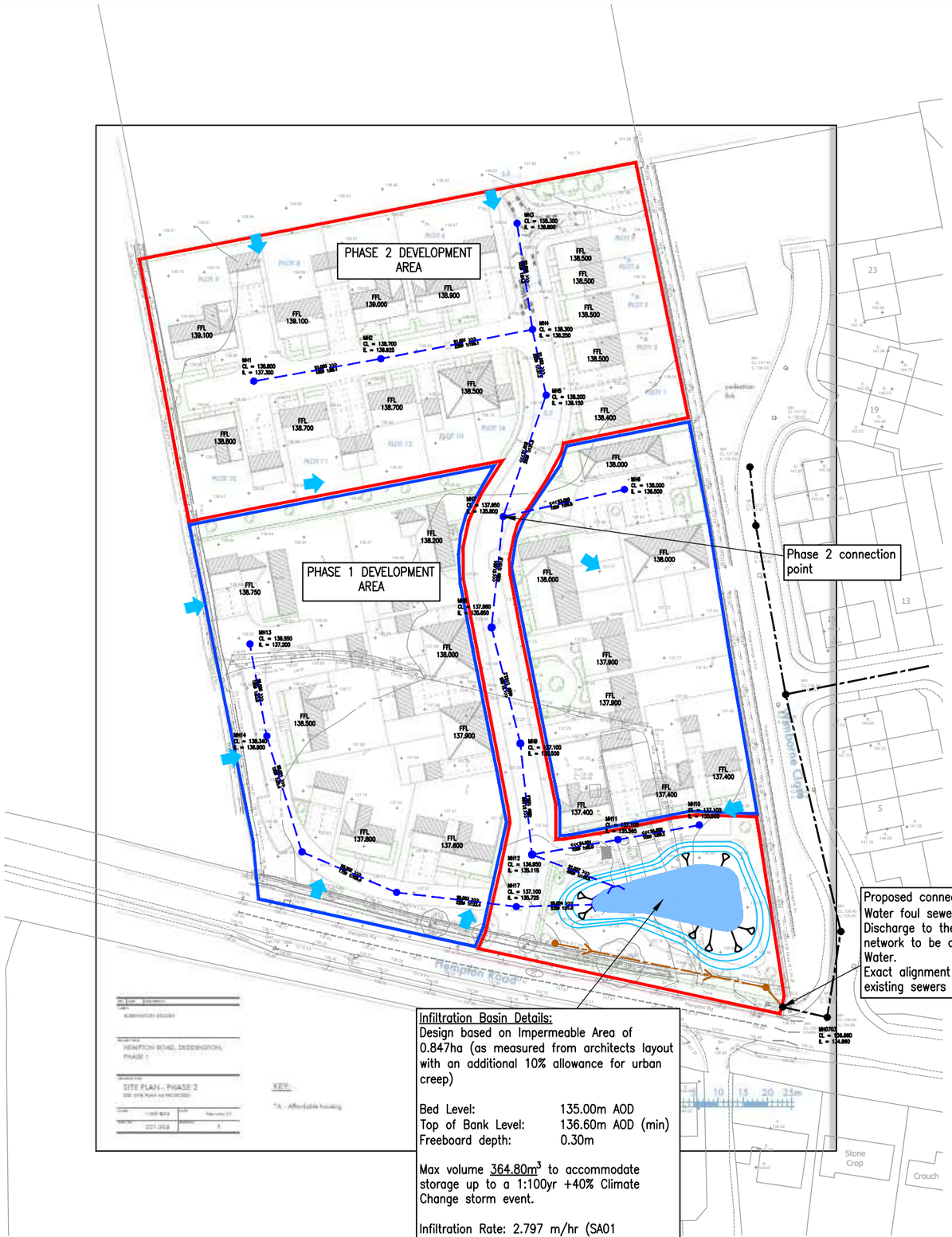
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	1	15 Winter	100	+40%	30/15 Summer	100/15 Summer			138.811	1.361
1.001	2	15 Winter	100	+40%	30/15 Summer	100/15 Summer			138.704	1.554
2.000	3	15 Winter	100	+40%	30/15 Summer	100/15 Summer			138.307	1.407
1.002	4	15 Winter	100	+40%	30/15 Summer	100/15 Summer			138.301	1.801
1.003	5	15 Winter	100	+40%	30/15 Summer				138.039	1.639
3.000	6	15 Winter	100	+40%	100/15 Summer	100/15 Summer			138.001	1.351
1.004	7	15 Winter	100	+40%	100/15 Summer				137.100	0.900
1.005	8	15 Winter	100	+40%	100/15 Summer				136.920	0.870
1.006	9	15 Winter	100	+40%	100/15 Summer				136.507	0.607
4.000	10	15 Winter	100	+40%	30/15 Summer	100/15 Summer			137.103	1.103
4.001	11	15 Winter	100	+40%	30/15 Summer				136.798	1.083
1.007	12	15 Winter	100	+40%	30/15 Summer				136.001	0.486
5.000	13	15 Winter	100	+40%	30/15 Summer	100/15 Summer			138.555	1.205
5.001	14	15 Winter	100	+40%	30/15 Summer	100/15 Summer			138.341	1.291
5.002	15	15 Winter	100	+40%	30/15 Summer				137.595	1.245
5.003	16	15 Winter	100	+40%	30/15 Summer				136.595	0.445
5.004	17	15 Winter	100	+40%	100/15 Winter				135.959	0.009
1.008	18	60 Winter	100	+40%	30/30 Winter				135.774	0.374

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	11.377	2.32			41.9	FLOOD	4
1.001	2	3.966	1.92			74.0	FLOOD	2
2.000	3	6.738	2.11			16.8	FLOOD	4
1.002	4	1.141	2.00			99.9	FLOOD	2

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.003	5	0.000	2.22			121.3	FLOOD RISK	
3.000	6	0.653	1.64			37.0	FLOOD	2
1.004	7	0.000	1.10			178.7	SURCHARGED	
1.005	8	0.000	1.65			261.4	SURCHARGED	
1.006	9	0.000	1.14			298.1	SURCHARGED	
4.000	10	2.909	1.98			14.9	FLOOD	4
4.001	11	0.000	2.00			35.1	SURCHARGED	
1.007	12	0.000	2.29			346.3	SURCHARGED	
5.000	13	4.583	1.53			31.9	FLOOD	4
5.001	14	0.865	1.28			36.6	FLOOD	2
5.002	15	0.000	2.22			54.0	SURCHARGED	
5.003	16	0.000	1.79			76.9	SURCHARGED	
5.004	17	0.000	1.01			84.1	SURCHARGED	
1.008	18	0.000	0.00		56	0.0	SURCHARGED	

APPENDIX G



GENERAL NOTES

1. DO NOT SCALE THIS DRAWING.
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEERS, ARCHITECTS AND SPECIALIST DESIGN DRAWINGS AND DETAILS.
3. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE. ALL LEVELS ARE IN METRES UNLESS NOTED OTHERWISE.
4. THIS DRAWING IS FOR STRATEGY PURPOSES ONLY AND IS NOT TO BE USED FOR CONSTRUCTION PURPOSES.

KEY

- PHASE 2 SITE BOUNDARY
- PHASE 1 SITE BOUNDARY
- EXISTING FOUL WATER DRAIN
- PROPOSED FOUL WATER DRAIN
- PROPOSED SURFACE WATER DRAIN
- PROPOSED HEADWALL
- EXISTING FOUL WATER MANHOLE
- PROPOSED FOUL WATER MANHOLE
- PROPOSED SURFACE WATER MANHOLE
- PROPOSED INFILTRATION BASIN AND BANKING (MAXIMUM 1 : 3 GRADIENT)
- INDICATIVE OVERLAND FLOW DIRECTION

REV:	AMENDMENTS:	DRN:	CHK:	APP:	DATE:
B	UPDATE TO SITE LAYOUT	RC	AB	AB	05.03.21
A	UPDATED SITE LAYOUT	AB	AB	AB	22.12.20
-	FIRST ISSUE	RC	HR	AB	18.12.20

PROJECT: HAMPTON ROAD DEDDINGTON

DRAWING TITLE: DETIALED PHASE 1 AND 2 DRAINAGE STRATEGY

CLIENT: PEMBURY ESTATES LIMITED (MORTIMER)

DRAWING NUMBER: 23933_01_230_03

REVISION: B | SHEET SIZE: A3 | SCALE: 1:1000

STATUS: FOR INFORMATION / APPROVAL

M-EC Consulting Development Engineers
Telephone: 01530 264 753
Email: group@m-ec.co.uk
Website: www.m-ec.co.uk

File Location: T:\M-EC Jab Book\23933\drawings\01 series - hydrology\23933_01_230_03 drainage strategy phase 2.dwg

Printed 09.03.2021

APPENDIX H

Asset location search

Property Searches

Infrastructure Gateway Ltd
Kettering Parkway Kettering V
Vantage House
KETTERING
NN15 6XR

Search address supplied

Hepmton Road
Hempton Road
Deddington
Oxfordshire
OX15 0QH

Your reference w18-3231

Our reference ALS/ALS Standard/2018_3774307

Search date 13 April 2018

Keeping you up-to-date

Knowledge of features below the surface is essential in every development. The benefits of this not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility for any commercial or residential project.

An asset location search provides information on the location of known Thames Water clean and/or wastewater assets, including details of pipe sizes, direction of flow and depth. Please note that information on cover and invert levels will only be provided where the data is available.

Thames Water Utilities Ltd
Property Searches, PO Box 3189, Slough SL1 4WW
DX 151280 Slough 13

searches@thameswater.co.uk
www.thameswater-propertysearches.co.uk

0845 070 9148

searchcode

Asset location search

Property Searches

Search address supplied: Hepmton Road, Hempton Road, Deddington, Oxfordshire, OX15 0QH

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This searchprovides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0845 070 9148, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Waste Water Services

Please provide a copy extract from the public sewer map.

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

For your guidance:

- The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.
- Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an ‘as constructed’ record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and

pressure test to be carried out for a fee.

For your guidance:

- Assets other than vested water mains may be shown on the plan, for information only.
- If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

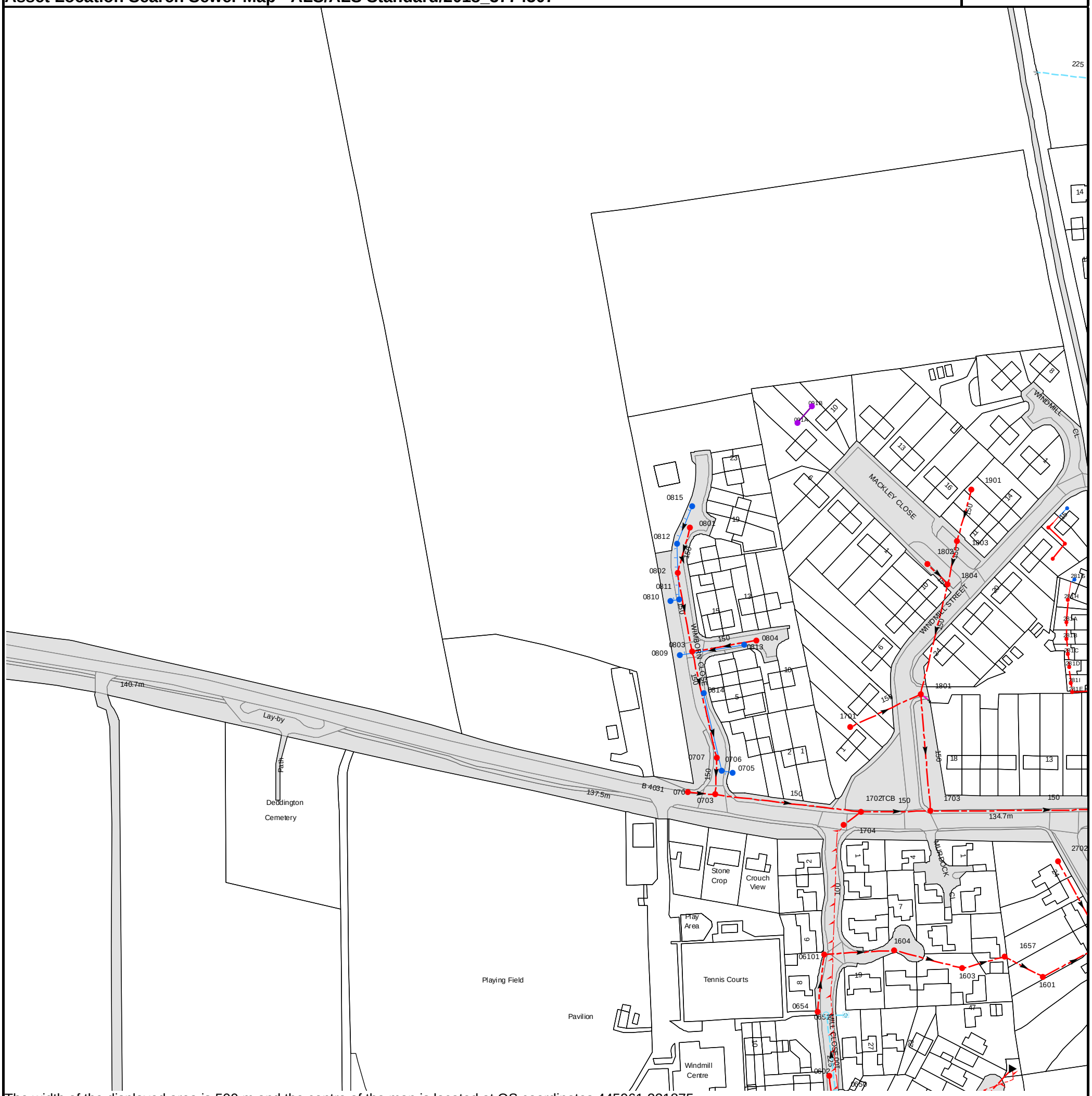
Clean Water queries

Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2018_3774307



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 445961,231875

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
281H	n/a	n/a
281G	n/a	n/a
281K	n/a	n/a
281A	n/a	n/a
281C	n/a	n/a
281D	n/a	n/a
281I	n/a	n/a
281E	n/a	n/a
0810	n/a	n/a
0812	n/a	n/a
0802	137.22	135.98
0811	n/a	n/a
0809	n/a	n/a
0701	n/a	n/a
0801	137.37	136.47
0803	n/a	n/a
0815	n/a	n/a
0814	n/a	n/a
0703	n/a	n/a
0707	136.45	135.05
0706	n/a	n/a
0705	n/a	n/a
0813	n/a	n/a
0804	136.79	135.87
091A	n/a	n/a
091B	n/a	n/a
1701	135.86	134.66
1801	135.68	133.97
1802	136.23	134.66
1804	136.13	134.47
1803	136.03	134.67
1901	136.31	134.94
181A	n/a	n/a
181B	n/a	n/a
281L	n/a	n/a
281B	n/a	n/a
0654	134.88	133.97
06101	134.65	n/a
0651	134.84	132.52
0602	134.5	132.69
1704	135.89	134.06
1653	n/a	132.81
1702	135.88	133.95
1604	134.17	n/a
1703	135.41	133.36
1603	133.87	n/a
1657	133.82	132.94
1601	n/a	n/a
2702	134.08	132.84

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.

Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.

Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.

Trunk Surface Water

Trunk Foul

Storm Relief

Trunk Combined

Vent Pipe

Bio-solids (Sludge)

Proposed Thames Surface Water Sewer

Proposed Thames Water Foul Sewer

Gallery

Foul Rising Main

Surface Water Rising Main

Combined Rising Main

Sludge Rising Main

Proposed Thames Water Rising Main

Vacuum

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

Air Valve

Dam Chase

Fitting

Meter

Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

Control Valve

Drop Pipe

Ancillary

Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

Outfall

Undefined End

Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

Public/Private Pumping Station

Change of characteristic indicator (C.O.C.I.)

Invert Level

Summit

Areas

Lines denoting areas of underground surveys, etc.

Agreement

Operational Site

Chamber

Tunnel

Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

Foul Sewer

Surface Water Sewer

Combined Sewer

Gulley

Culverted Watercourse

Proposed

Abandoned Sewer

Notes:

1) All levels associated with the plans are to Ordnance Datum Newlyn.
2) All measurements on the plans are metric.
3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
5) 'na' or '0' on a manhole level indicates that data is unavailable.
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

Asset Location Search Water Map - ALS/ALS Standard/2018_3774307

The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 445961, 231875.

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

16"

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

3" SUPPLY

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

3" FIRE

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

3" METERED

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

- Booster Station
- Other
- Other (Proposed)
- Pumping Station
- Service Reservoir
- Shaft Inspection
- Treatment Works
- Unknown
- Water Tower

Other Symbols

- Data Logger

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Other Water Pipes (Not Operated or Maintained by Thames Water)

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL`s terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**	**Cheque**
Call **0845 070 9148** quoting your invoice number starting CBA or ADS / OSS	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number	Made payable to '**Thames Water Utilities Ltd**' Write your Thames Water account number on the back. Send to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW** or by DX to **151280 Slough 13**

Search Code

IMPORTANT CONSUMER PROTECTION INFORMATION

This search has been produced by Thames Water Property Searches, Clearwater Court, Vastern Road, Reading RG1 8DB, which is registered with the Property Codes Compliance Board (PCCB) as a subscriber to the Search Code. The PCCB independently monitors how registered search firms maintain compliance with the Code.

The Search Code:

- provides protection for homebuyers, sellers, estate agents, conveyancers and mortgage lenders who rely on the information included in property search reports undertaken by subscribers on residential and commercial property within the United Kingdom
- sets out minimum standards which firms compiling and selling search reports have to meet
- promotes the best practise and quality standards within the industry for the benefit of consumers and property professionals
- enables consumers and property professionals to have confidence in firms which subscribe to the code, their products and services.

By giving you this information, the search firm is confirming that they keep to the principles of the Code. This provides important protection for you.

The Code's core principles

Firms which subscribe to the Search Code will:

- display the Search Code logo prominently on their search reports
- act with integrity and carry out work with due skill, care and diligence
- at all times maintain adequate and appropriate insurance to protect consumers
- conduct business in an honest, fair and professional manner
- handle complaints speedily and fairly
- ensure that products and services comply with industry registration rules and standards and relevant laws
- monitor their compliance with the Code

Complaints

If you have a query or complaint about your search, you should raise it directly with the search firm, and if appropriate ask for any complaint to be considered under their formal internal complaints procedure. If you remain dissatisfied with the firm's final response, after your complaint has been formally considered, or if the firm has exceeded the response timescales, you may refer your complaint for consideration under The Property Ombudsman scheme (TPOs). The Ombudsman can award compensation of up to £5,000 to you if he finds that you have suffered actual loss as a result of your search provider failing to keep to the Code.

Please note that all queries or complaints regarding your search should be directed to your search provider in the first instance, not to TPOs or to the PCCB.

TPOs Contact Details

The Property Ombudsman scheme
Milford House
43-55 Milford Street
Salisbury
Wiltshire SP1 2BP
Tel: 01722 333306
Fax: 01722 332296
Email: admin@tpos.co.uk

You can get more information about the PCCB from www.propertycodes.org.uk

PLEASE ASK YOUR SEARCH PROVIDER IF YOU WOULD LIKE A COPY OF THE SEARCH CODE

Mr Shyam Joshi
The Old Chapel
Station Road
Hugglescote
LE67 2GB

Wastewater pre-planning
Our ref DS6048759

26 May 2018

Pre-planning enquiry: Confirmation of sufficient capacity

Dear Mr Joshi

Thank you for providing information on your development at **Land off Hempton Road, Deddignton, OX15 0NA, OS grid ref. 445962, 231842.**

Residential development comprising 20 dwellings. Foul water to be discharged by gravity into foul water sewer in Hempton Road. Surface Water to be disposed via suds.

We're pleased to confirm that there will be sufficient foul and surface water capacity in our sewerage network to serve your development, so long as your phasing follows the timescale you've suggested.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

You'll need to keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient capacity.

What happens next?

Please make sure you submit your connection application, giving us at least 21 days' notice of the date you wish to make your new connection/s.

If you've any further questions, please contact me on 0203 577 8082.

Yours sincerely

Artur Jaroma

Thames Water

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