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

M-EC Consulting Development Engineers

01530 264 753
group@m-ec.co.uk
www.m-ec.co.uk

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:

……
Hardeep Rai BSc (Hons) MCIWEM

Report Checked By:

……
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

The Old Chapel
Station Road, Hugglescote
Leicestershire
LE67 2GB

T: 01530 264 753
group@m-ec.co.uk
www.m-ec.co.uk

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.

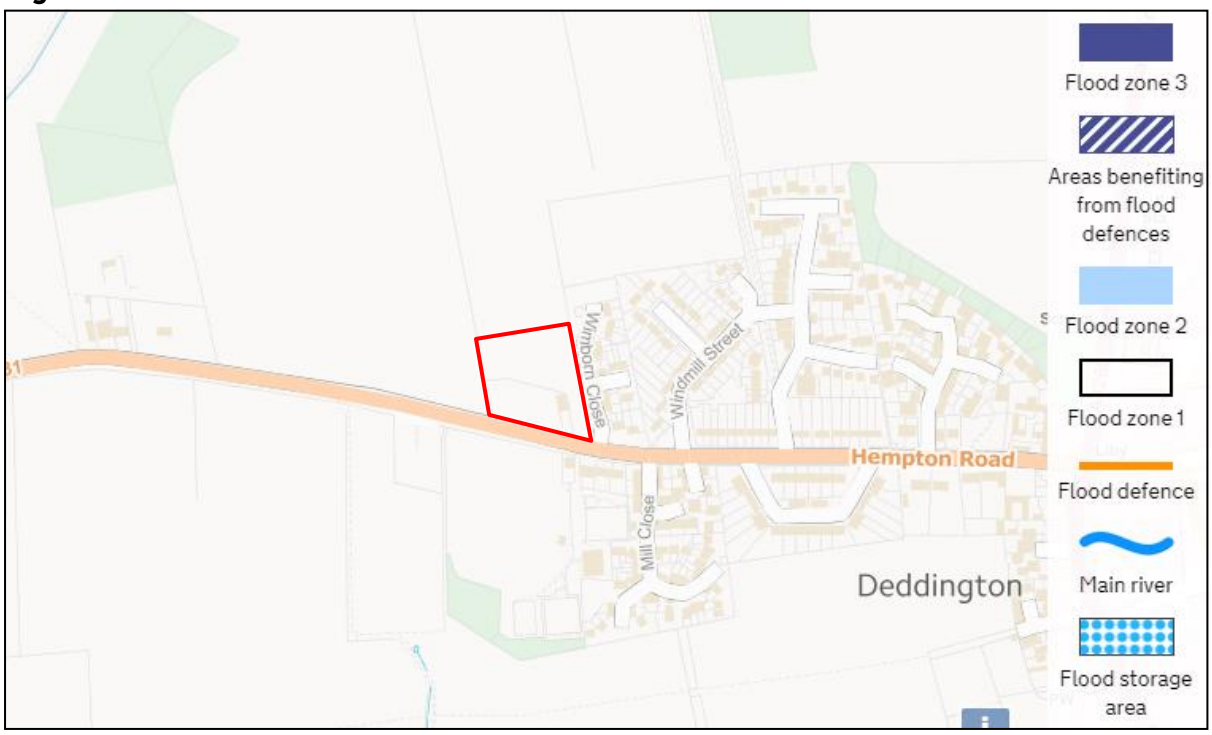
Site Location & Description

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:

.....
Dave Moffatt

Report Checked By:

.....
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

PHASE 1					
	House Type	Square Footage	No. Storeys	No. Units	Total Sqft
OPEN MARKET					
3 bed house	**11**				
	3B-A	884	2	4	3,536
	3B-B	896	2	1	896
	3B-C	908	2	2	1,816
	3B-D	966	2	2	1,932
	3B-E	1,124	2	2	2,248
4 bed house	**3**				
	4B-A	1,240	2	2	2,480
	4B-B	1,414	2	1	1,414
TOTAL OPEN MARKET				**14**	**14,322**
AFFORDABLE UNITS					
1 bed flats	**2**				
	1BF	538	1	2	1,076
2 bed house	**3**				
	2B AFF	850	2	3	2,550
3 bed house	**2**				
	3B AFF	1,001	2	2	2,002
TOTAL AFFORDABLE				**7**	**5,628**
GRAND TOTAL				**21**	**19,950**
		Net Developable Area		0.73 Ha 1.80 Acres	
		Coverage		**11,105** sqft/acre	
		Density		29 dph	

PHASE 2					
	House Type	Square Footage	No. Storeys	No. Units	Total Sqft
OPEN MARKET					
3 bed house	**6**				
	3B-A	884	2	1	884
	3B-C	908	2	2	1,816
	3B-D	966	2	2	1,932
	3B-E	1,124	2	1	1,124
4 bed house	**3**				
	4B-A	1,240	2	2	2,480
	4B-B	1,414	2	1	1,414
TOTAL OPEN MARKET				**9**	**9,650**
AFFORDABLE UNITS					
2 bed house	**2**				
	2B AFF	850	2	2	1,700
3 bed house	**3**				
	3B AFF	1,001	2	3	3,003
TOTAL AFFORDABLE				**5**	**4,703**
GRAND TOTAL				**14**	**14,353**
		Net Developable Area		0.42 Ha 1.03 Acres	
		Coverage		**13,929** sqft/acre	
		Density		34 dph	

Land at Hempton Road, Deddington **- ILLUSTRATIVE LAYOUT**

Pegasus Design

PLANNING | DESIGN | ENVIRONMENT | ECONOMICS | WWW.PEGASUSGROUP.CO.UK | TEAM/DRAWN BY: EMH | APPROVED BY P.M: ET | DATE: 28.04.2020 | SCALE: 1:500 @ A2 / 1:1,000 @A4 | DRWG: **P20-0384_01** SHEET NO: __ REV: C | CLIENT: **PEMBURY ESTATES** |

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

Rowan House
Duffield Road
Little Eaton
Derby
DE21 5DR

Tel (01332) 830044 Fax (01332) 830055
admin@greenhatch-group.co.uk
www.greenhatch-group.co.uk

St Albans: Unit B, The Courtyard, Alban Park, St Albans, Hertfordshire, AL4 0LA, t. (01727) 854481

Newcastle: 24 Riverside Studios, Amethyst Road, Newcastle Bus. Park, Newcastle-U-Tyne, NE4 7YL, t. (01912) 736391

London: 27, Cornwall Terrace Mews, Regents Park, London, NW1 5LL, t. (02072) 241806

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:

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

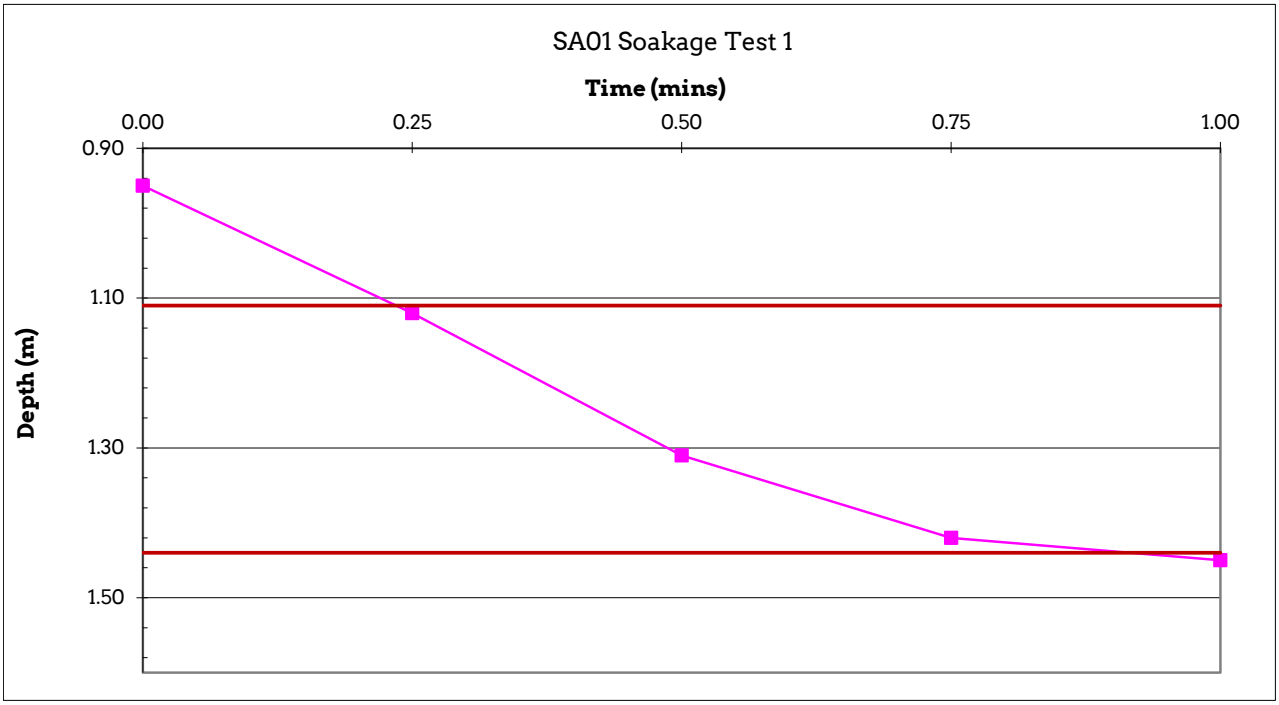
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

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**



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.	2
Client	**Robert Webb**	Calcs by	CN
Job ref.	**23933**	Date	14/06/18
		Test Number	2

Soil infiltration test

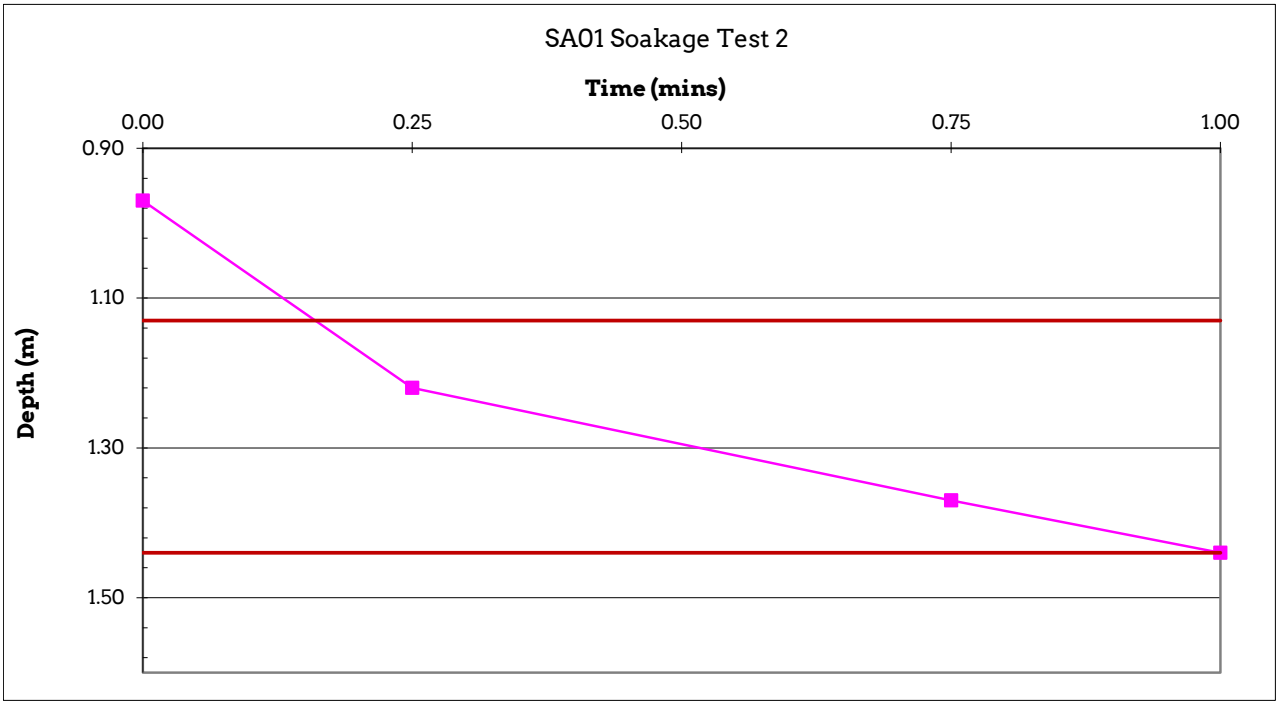
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

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**



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.	3
Client	**Robert Webb**	Calcs by	CN
Job ref.	**23933**	Date	14/06/18
		Test Number	3

Soil infiltration test

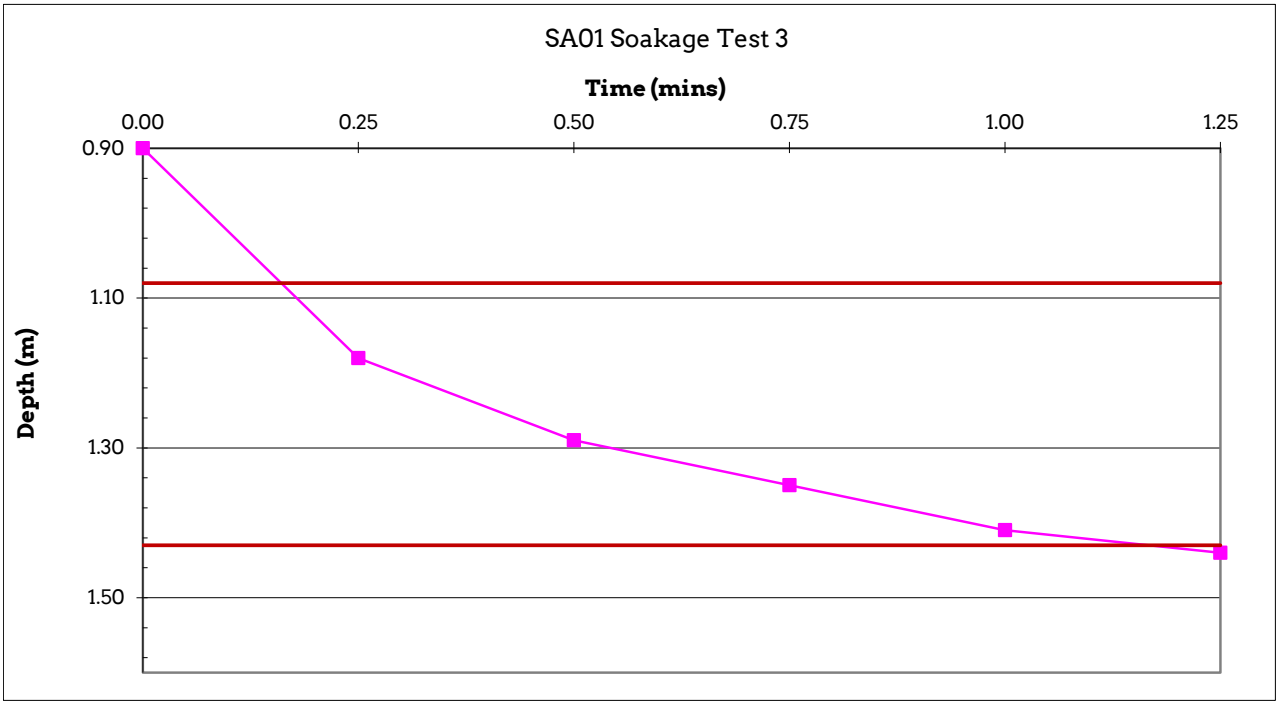
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

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**



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

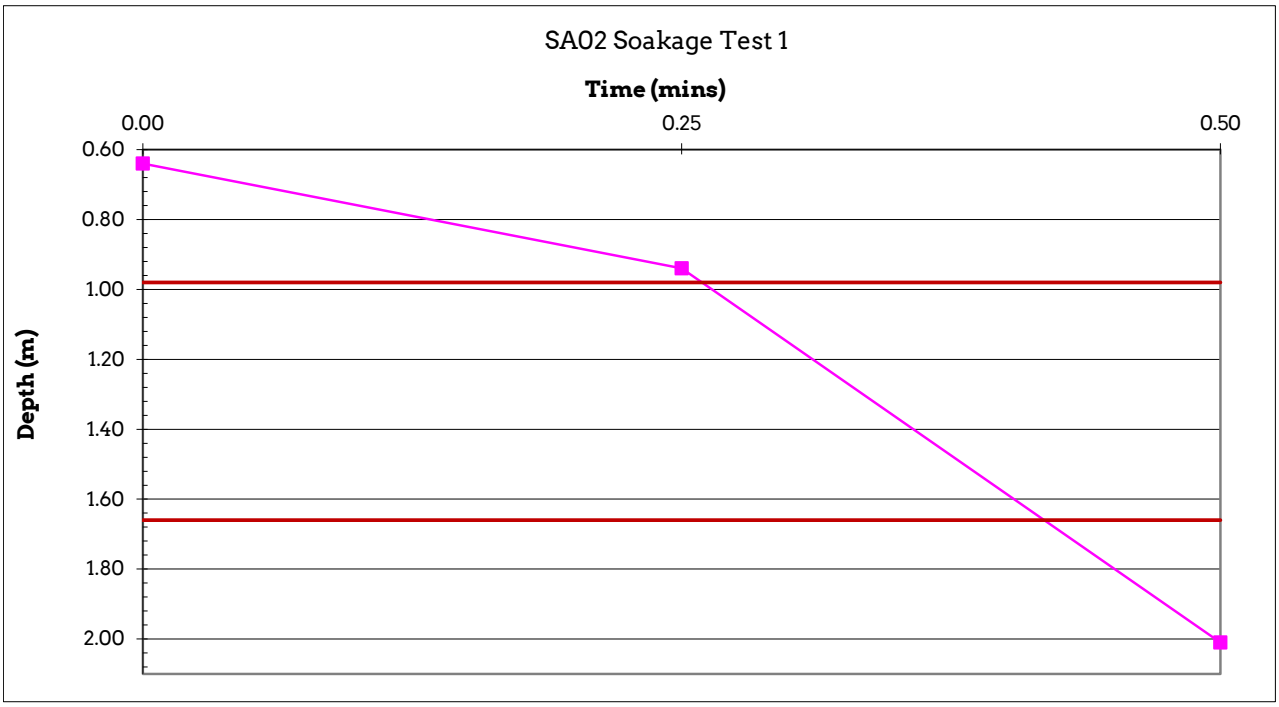
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

Trial pit ref.	**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**



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.	2
Client	**Robert Webb**	Calcs by	CN
Job ref.	**23933**	Date	14/06/18
		Test Number	2

Soil infiltration test

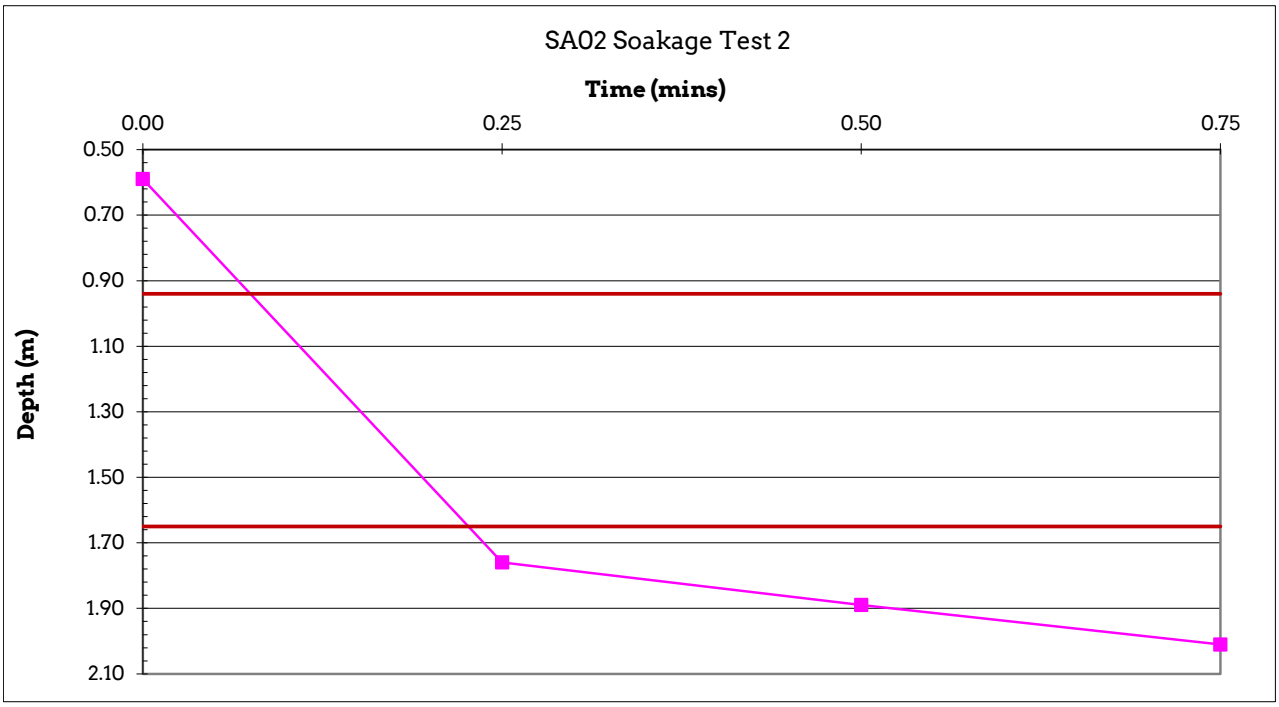
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

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**



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.	3
Client	**Robert Webb**	Calcs by	CN
Job ref.	**23933**	Date	14/06/18
		Test Number	3

Soil infiltration test

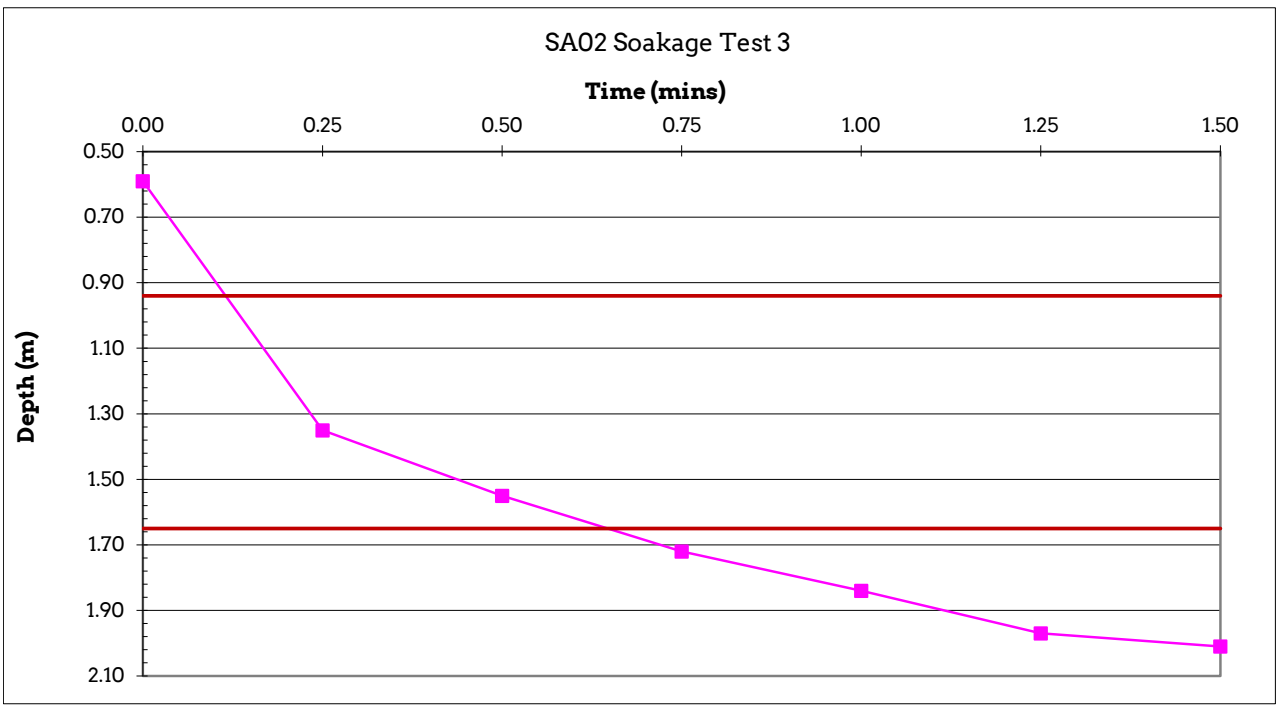
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

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**



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.	4
Client	**Robert Webb**	Calcs by	CN
Job ref.	**23933**	Date	14/06/18
		Test Number	4

Soil infiltration test

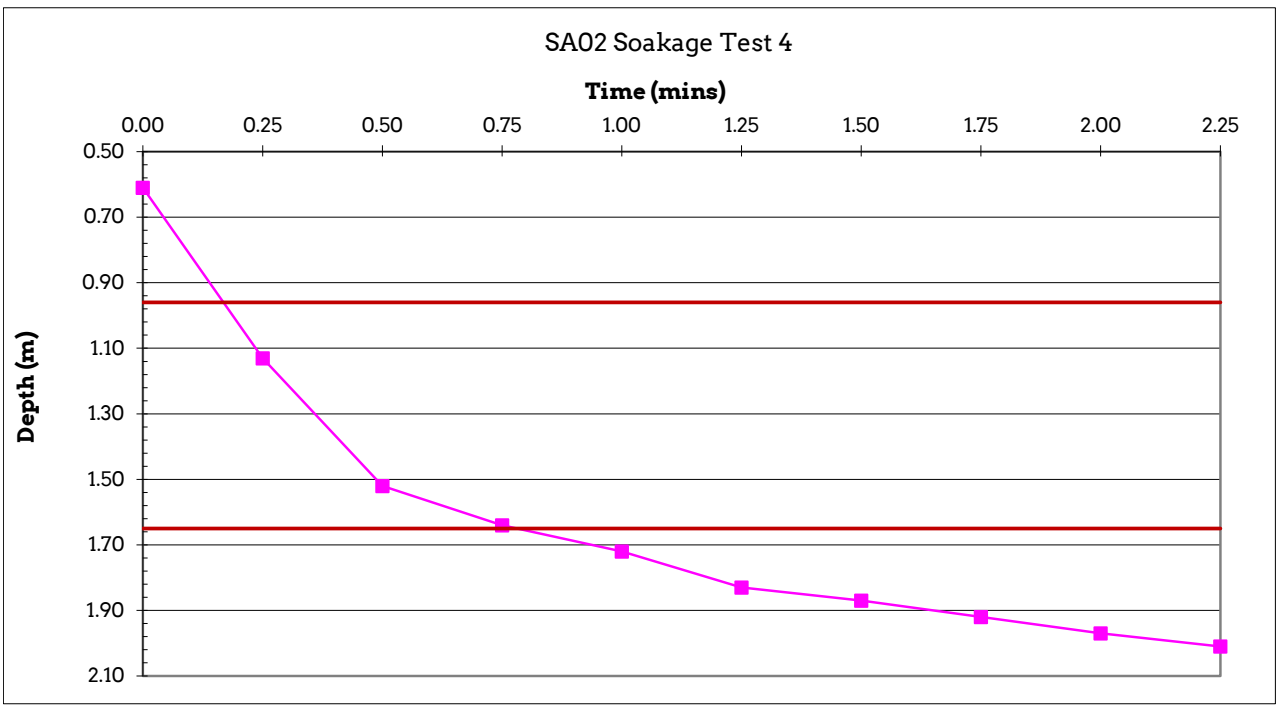
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

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**



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.	5
Client	**Robert Webb**	Calcs by	CN
Job ref.	**23933**	Date	14/06/18
		Test Number	5

Soil infiltration test

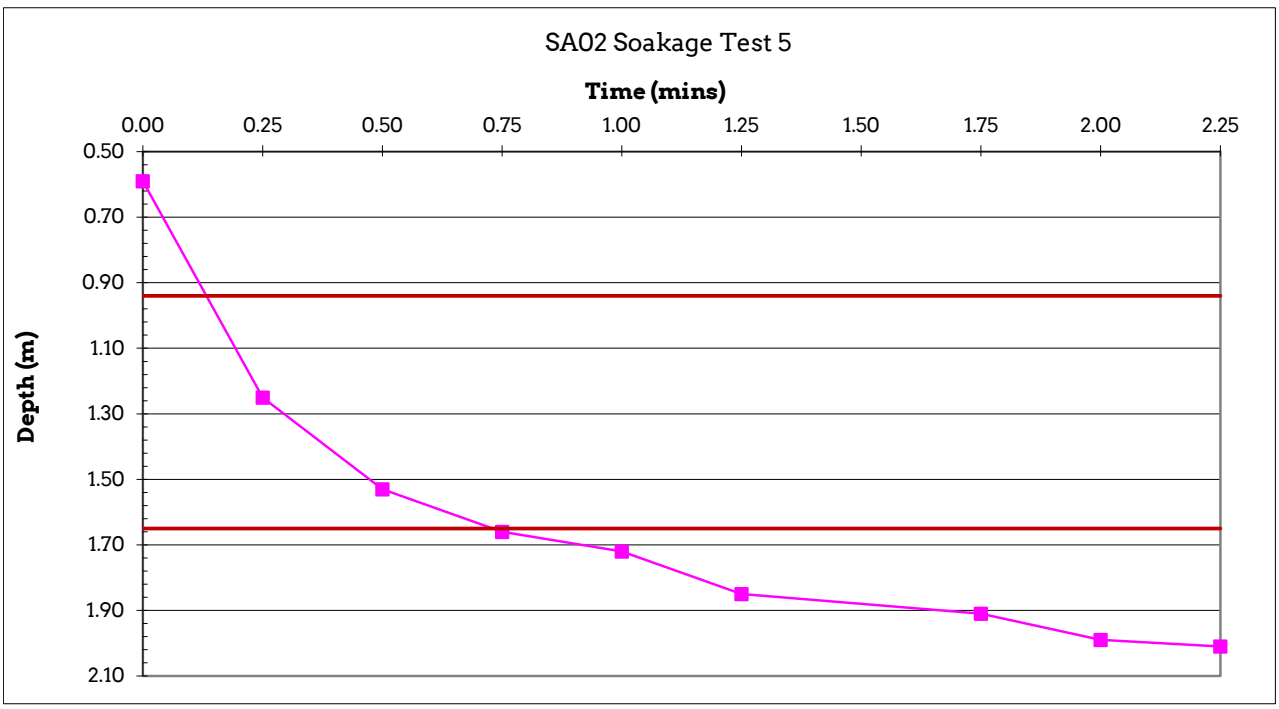
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

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**



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.	6
Client	**Robert Webb**	Calcs by	CN
Job ref.	**23933**	Date	14/06/18
		Test Number	6

Soil infiltration test

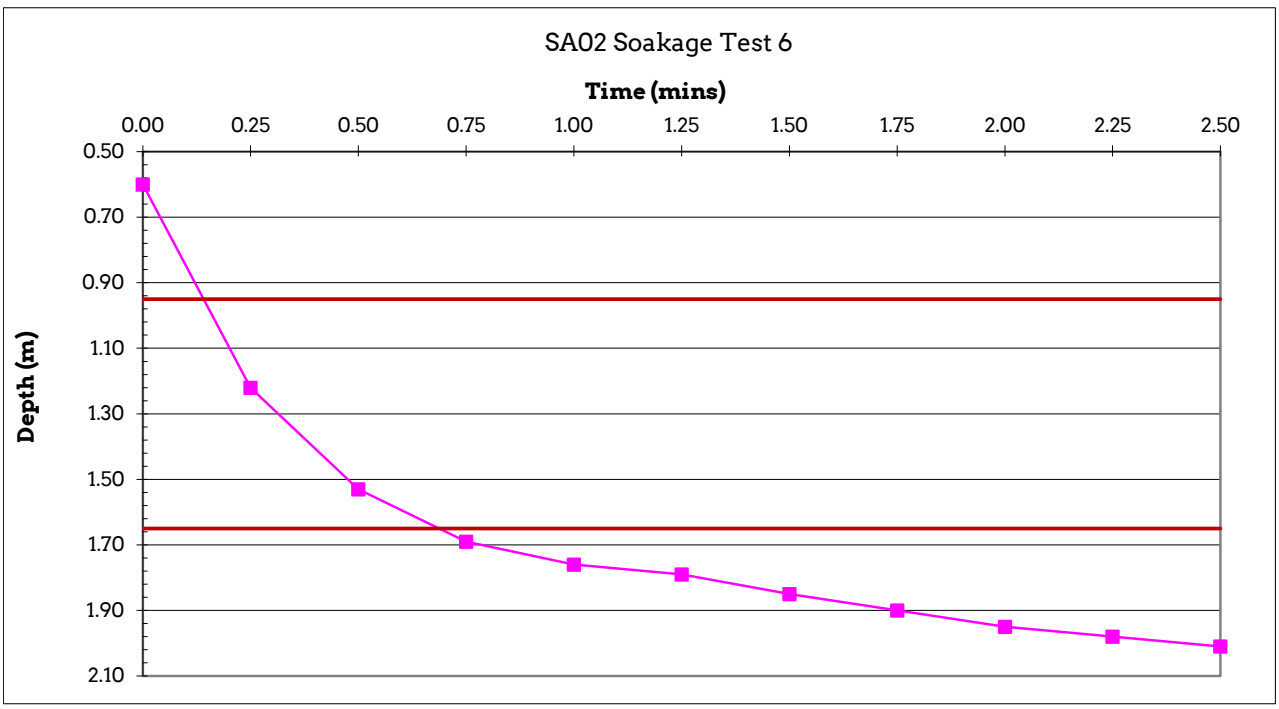
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

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**



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.	7
Client	**Robert Webb**	Calcs by	CN
Job ref.	**23933**	Date	14/06/18
		Test Number	7

Soil infiltration test

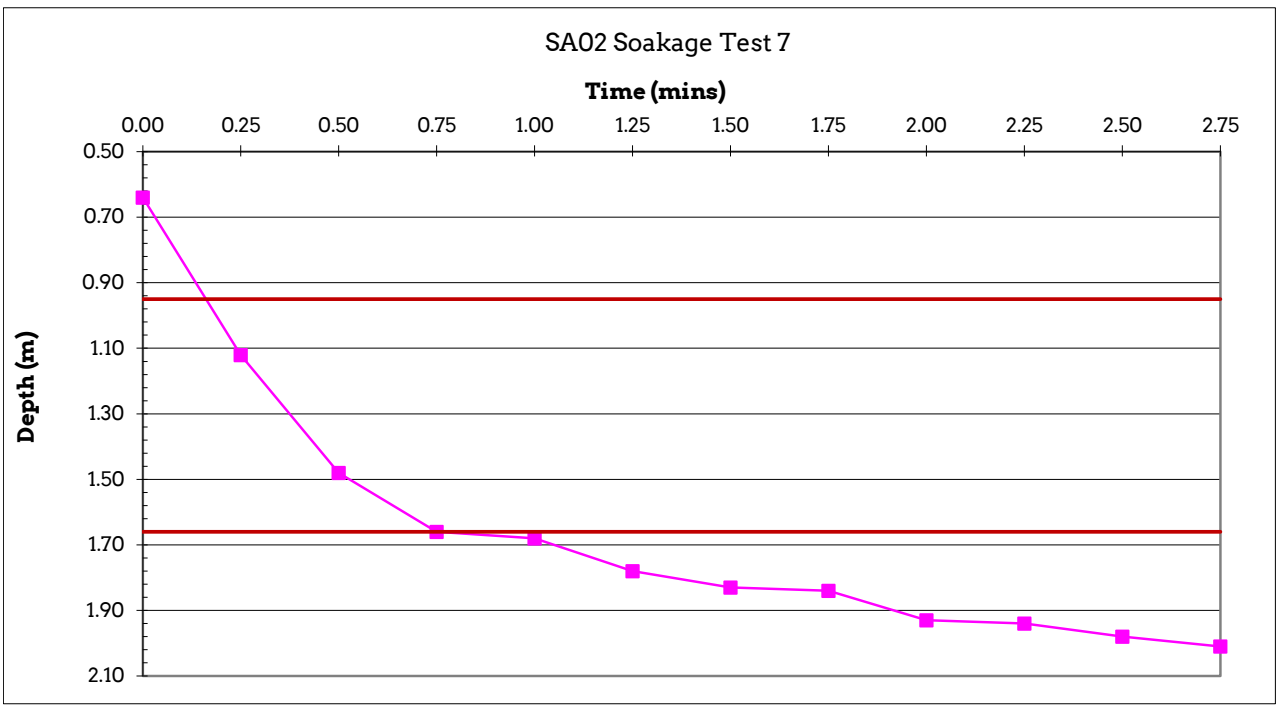
(In general accordance with BRE Digest 365, 2016, Soakaway Design)

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**



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

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	18.816	0.322	58.5	0.028	5.00	0.0	0.600	o	100	Pipe/Conduit	
1.001	20.051	0.202	99.3	0.027	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	13.785	0.139	99.3	0.017	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	13.518	0.362	37.3	0.028	5.00	0.0	0.600	o	100	Pipe/Conduit	
1.003	10.216	0.084	121.2	0.018	0.00	0.0	0.600	o	175	Pipe/Conduit	
1.004	16.916	0.158	107.4	0.018	0.00	0.0	0.600	o	175	Pipe/Conduit	
1.005	12.062	0.109	110.8	0.037	0.00	0.0	0.600	o	225	Pipe/Conduit	
3.000	29.043	0.497	58.5	0.033	5.00	0.0	0.600	o	100	Pipe/Conduit	
3.001	13.606	0.137	99.2	0.026	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.002	7.875	0.079	99.2	0.015	0.00	0.0	0.600	o	150	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	5.31	137.700	0.028	0.0	0.0	1.5	1.01	7.9	5.3
1.001	50.00	5.64	137.328	0.055	0.0	0.0	3.0	1.01	17.8	10.4
1.002	50.00	5.87	137.126	0.072	0.0	0.0	3.9	1.01	17.8	13.6
2.000	50.00	5.18	137.400	0.028	0.0	0.0	1.5	1.27	9.9	5.3
1.003	50.00	6.04	136.963	0.117	0.0	0.0	6.3	1.01	24.2	22.2
1.004	50.00	6.30	136.878	0.135	0.0	0.0	7.3	1.07	25.8	25.6
1.005	50.00	6.46	136.671	0.172	0.0	0.0	9.3	1.24	49.4	32.6
3.000	50.00	5.48	137.400	0.033	0.0	0.0	1.8	1.01	7.9	6.2
3.001	50.00	5.70	136.853	0.059	0.0	0.0	3.2	1.01	17.8	11.2
3.002	50.00	5.83	136.716	0.075	0.0	0.0	4.0	1.01	17.8	14.1

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
1.006	20.591	0.148	138.8	0.017	0.00	0.0	0.600	o	250	Pipe/Conduit	
4.000	12.269	0.212	57.9	0.064	5.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	14.844	0.150	99.2	0.009	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.007	21.450	0.061	349.0	0.017	0.00	0.0	0.600	o	400	Pipe/Conduit	
1.008	22.843	0.377	60.6	0.063	0.00	0.0	0.600	o	400	Pipe/Conduit	
1.009	21.288	0.530	40.2	0.041	0.00	0.0	0.600	o	400	Pipe/Conduit	
5.000	14.914	0.255	58.5	0.025	5.00	0.0	0.600	o	100	Pipe/Conduit	
5.001	17.387	0.175	99.3	0.026	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.010	16.162	0.243	66.5	0.021	0.00	0.0	0.600	o	400	Pipe/Conduit	
6.000	32.843	0.562	58.5	0.032	5.00	0.0	0.600	o	100	Pipe/Conduit	
6.001	26.445	0.388	68.1	0.045	0.00	0.0	0.600	o	150	Pipe/Conduit	
6.002	26.457	0.308	85.8	0.024	0.00	0.0	0.600	o	150	Pipe/Conduit	
6.003	18.678	0.492	38.0	0.023	0.00	0.0	0.600	o	150	Pipe/Conduit	
6.004	15.383	0.373	41.2	0.022	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.011	9.025	0.027	333.7	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)
1.006	50.00	6.75	136.537	0.264	0.0	0.0	14.3	1.19	58.2	50.0
4.000	50.00	5.15	136.850	0.064	0.0	0.0	3.5	1.32	23.4	12.2
4.001	50.00	5.40	136.638	0.073	0.0	0.0	4.0	1.01	17.8	13.9
1.007	50.00	7.11	136.238	0.354	0.0	0.0	19.2	1.00	126.2	67.1
1.008	50.00	7.27	136.177	0.416	0.0	0.0	22.6	2.43	305.2	79.0
1.009	50.00	7.38	135.800	0.458	0.0	0.0	24.8	2.99	375.2	86.8
5.000	50.00	5.25	136.000	0.025	0.0	0.0	1.4	1.01	7.9	4.8
5.001	50.00	5.53	135.695	0.051	0.0	0.0	2.8	1.01	17.8	9.7
1.010	50.00	7.50	135.270	0.530	0.0	0.0	28.7	2.32	291.1	100.4
6.000	50.00	5.54	137.450	0.032	0.0	0.0	1.7	1.01	7.9	6.1
6.001	50.00	5.90	136.838	0.077	0.0	0.0	4.2	1.22	21.6	14.6
6.002	50.00	6.31	136.450	0.101	0.0	0.0	5.5	1.09	19.2	19.1
6.003	50.00	6.50	136.142	0.124	0.0	0.0	6.7	1.64	29.0	23.6
6.004	50.00	6.66	135.650	0.146	0.0	0.0	7.9	1.57	27.8	27.7
1.011	50.00	7.65	135.027	0.676	0.0	0.0	36.6	1.03	129.1	128.1

The Old Chapel Station Road, Hugglescote Leicestershire LE67 2GB	29333 Hempton Road, Deddington Drianage Design
Date 08/06/2020 File 23933 - Storm network D...	Designed by H. RAI Checked by A. Bennett
XP Solutions	Network 2020.1

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	139.000	1.300	Open Manhole	1200	1.000	137.700	100				
2	138.800	1.472	Open Manhole	1200	1.001	137.328	150	1.000	137.378	100	
3	138.800	1.674	Open Manhole	1200	1.002	137.126	150	1.001	137.126	150	
4	138.700	1.300	Open Manhole	1200	2.000	137.400	100				
4	138.500	1.537	Open Manhole	1200	1.003	136.963	175	1.002	136.988	150	
								2.000	137.038	100	
1	138.400	1.522	Open Manhole	1200	1.004	136.878	175	1.003	136.878	175	
2	138.300	1.629	Open Manhole	1200	1.005	136.671	225	1.004	136.721	175	
3	138.700	1.300	Open Manhole	1200	3.000	137.400	100				
4	138.500	1.647	Open Manhole	1200	3.001	136.853	150	3.000	136.903	100	
5	138.200	1.484	Open Manhole	1200	3.002	136.716	150	3.001	136.716	150	
3	138.200	1.663	Open Manhole	1200	1.006	136.537	250	1.005	136.562	225	
								3.002	136.637	150	
12	138.200	1.350	Open Manhole	1200	4.000	136.850	150				
13	138.100	1.462	Open Manhole	1200	4.001	136.638	150	4.000	136.638	150	
3	138.000	1.762	Open Manhole	1350	1.007	136.238	400	1.006	136.388	250	
								4.001	136.488	150	
15	137.800	1.623	Open Manhole	1350	1.008	136.177	400	1.007	136.177	400	
15	137.400	1.600	Open Manhole	1350	1.009	135.800	400	1.008	135.800	400	
15	137.300	1.300	Open Manhole	1200	5.000	136.000	100				
16	137.200	1.505	Open Manhole	1200	5.001	135.695	150	5.000	135.745	100	
4	137.000	1.730	Open Manhole	1350	1.010	135.270	400	1.009	135.270	400	
								5.001	135.520	150	
5	138.750	1.300	Open Manhole	1200	6.000	137.450	100				
6	138.400	1.562	Open Manhole	1200	6.001	136.838	150	6.000	136.888	100	
7	137.800	1.350	Open Manhole	1200	6.002	136.450	150	6.001	136.450	150	
8	137.500	1.358	Open Manhole	1200	6.003	136.142	150	6.002	136.142	150	
8	137.000	1.350	Open Manhole	1200	6.004	135.650	150	6.003	135.650	150	
16	136.600	1.573	Open Manhole	1350	1.011	135.027	400	1.010	135.027	400	
								6.004	135.277	150	
	136.600	1.600	Open Manhole	0		OUTFALL		1.011	135.000	400	

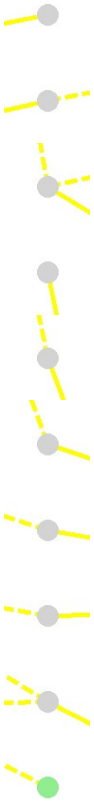
MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
1	445916.222	231912.584	445916.222	231912.584	Required	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
2	445934.658	231916.346	445934.658	231916.346	Required	
3	445954.472	231919.418	445954.472	231919.418	Required	
4	445980.008	231924.663	445980.008	231924.663	Required	
4	445968.194	231918.094	445968.194	231918.094	Required	
1	445970.253	231908.088	445970.253	231908.088	Required	
2	445973.588	231891.504	445973.588	231891.504	Required	
3	445920.449	231872.678	445920.449	231872.678	Required	
4	445948.952	231878.256	445948.952	231878.256	Required	
5	445962.242	231881.172	445962.242	231881.172	Required	
3	445970.026	231879.979	445970.026	231879.979	Required	
12	445991.656	231863.759	445991.656	231863.759	Required	
13	445979.389	231863.541	445979.389	231863.541	Required	
3	445964.968	231860.019	445964.968	231860.019	Required	
15	445968.154	231838.807	445968.154	231838.807	Required	
15	445972.078	231816.303	445972.078	231816.303	Required	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
15	446007.342	231802.026	446007.342	231802.026	Required	
16	445992.711	231799.137	445992.711	231799.137	Required	
4	445975.745	231795.333	445975.745	231795.333	Required	
5	445914.687	231855.046	445914.687	231855.046	Required	
6	445921.339	231822.883	445921.339	231822.883	Required	
7	445930.635	231798.126	445930.635	231798.126	Required	
8	445955.765	231789.852	445955.765	231789.852	Required	
8	445974.164	231786.639	445974.164	231786.639	Required	
16	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	100	1	139.000	137.700	1.200	Open Manhole	1200
1.001	o	150	2	138.800	137.328	1.322	Open Manhole	1200
1.002	o	150	3	138.800	137.126	1.524	Open Manhole	1200
2.000	o	100	4	138.700	137.400	1.200	Open Manhole	1200
1.003	o	175	4	138.500	136.963	1.362	Open Manhole	1200
1.004	o	175	1	138.400	136.878	1.347	Open Manhole	1200
1.005	o	225	2	138.300	136.671	1.404	Open Manhole	1200
3.000	o	100	3	138.700	137.400	1.200	Open Manhole	1200
3.001	o	150	4	138.500	136.853	1.497	Open Manhole	1200
3.002	o	150	5	138.200	136.716	1.334	Open Manhole	1200
1.006	o	250	3	138.200	136.537	1.413	Open Manhole	1200
4.000	o	150	12	138.200	136.850	1.200	Open Manhole	1200
4.001	o	150	13	138.100	136.638	1.312	Open Manhole	1200
1.007	o	400	3	138.000	136.238	1.362	Open Manhole	1350
1.008	o	400	15	137.800	136.177	1.223	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)
1.000	18.816	58.5	2	138.800	137.378	1.322	Open Manhole	1200
1.001	20.051	99.3	3	138.800	137.126	1.524	Open Manhole	1200
1.002	13.785	99.3	4	138.500	136.988	1.362	Open Manhole	1200
2.000	13.518	37.3	4	138.500	137.038	1.362	Open Manhole	1200
1.003	10.216	121.2	1	138.400	136.878	1.347	Open Manhole	1200
1.004	16.916	107.4	2	138.300	136.721	1.404	Open Manhole	1200
1.005	12.062	110.8	3	138.200	136.562	1.413	Open Manhole	1200
3.000	29.043	58.5	4	138.500	136.903	1.497	Open Manhole	1200
3.001	13.606	99.2	5	138.200	136.716	1.334	Open Manhole	1200
3.002	7.875	99.2	3	138.200	136.637	1.413	Open Manhole	1200
1.006	20.591	138.8	3	138.000	136.388	1.362	Open Manhole	1350
4.000	12.269	57.9	13	138.100	136.638	1.312	Open Manhole	1200
4.001	14.844	99.2	3	138.000	136.488	1.362	Open Manhole	1350
1.007	21.450	349.0	15	137.800	136.177	1.223	Open Manhole	1350
1.008	22.843	60.6	15	137.400	135.800	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)
1.009	o	400	15	137.400	135.800	1.200	Open Manhole	1350
5.000	o	100	15	137.300	136.000	1.200	Open Manhole	1200
5.001	o	150	16	137.200	135.695	1.355	Open Manhole	1200
1.010	o	400	4	137.000	135.270	1.330	Open Manhole	1350
6.000	o	100	5	138.750	137.450	1.200	Open Manhole	1200
6.001	o	150	6	138.400	136.838	1.412	Open Manhole	1200
6.002	o	150	7	137.800	136.450	1.200	Open Manhole	1200
6.003	o	150	8	137.500	136.142	1.208	Open Manhole	1200
6.004	o	150	8	137.000	135.650	1.200	Open Manhole	1200
1.011	o	400	16	136.600	135.027	1.173	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)
1.009	21.288	40.2	4	137.000	135.270	1.330	Open Manhole	1350
5.000	14.914	58.5	16	137.200	135.745	1.355	Open Manhole	1200
5.001	17.387	99.3	4	137.000	135.520	1.330	Open Manhole	1350
1.010	16.162	66.5	16	136.600	135.027	1.173	Open Manhole	1350
6.000	32.843	58.5	6	138.400	136.888	1.412	Open Manhole	1200
6.001	26.445	68.1	7	137.800	136.450	1.200	Open Manhole	1200
6.002	26.457	85.8	8	137.500	136.142	1.208	Open Manhole	1200
6.003	18.678	38.0	8	137.000	135.650	1.200	Open Manhole	1200
6.004	15.383	41.2	16	136.600	135.277	1.173	Open Manhole	1350
1.011	9.025	333.7		136.600	135.000	1.200	Open Manhole	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 Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Simulation Criteria for Storm

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		

Storage Structures for Storm

Infiltration Basin Manhole: 16, DS/PN: 1.011

Invert Level (m) 135.027 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 Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.401
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

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.
1.000	1	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
1.001	2	15 Winter	1	+0%	30/15 Summer	100/15 Winter		
1.002	3	15 Winter	1	+0%	30/15 Summer			
2.000	4	15 Winter	1	+0%	30/15 Summer	100/15 Winter		
1.003	4	15 Winter	1	+0%	30/15 Summer			
1.004	1	15 Winter	1	+0%	30/15 Summer			
1.005	2	15 Winter	1	+0%	30/15 Summer			
3.000	3	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
3.001	4	15 Winter	1	+0%	30/15 Summer			
3.002	5	15 Winter	1	+0%	30/15 Summer			
1.006	3	15 Winter	1	+0%	30/15 Summer			
4.000	12	15 Winter	1	+0%	30/15 Summer			
4.001	13	15 Winter	1	+0%	30/15 Summer			
1.007	3	15 Winter	1	+0%	100/15 Summer			
1.008	15	15 Winter	1	+0%				
1.009	15	15 Winter	1	+0%				
5.000	15	15 Winter	1	+0%	30/15 Summer			
5.001	16	15 Winter	1	+0%	100/15 Summer			
1.010	4	15 Winter	1	+0%	100/15 Winter			

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	137.751	-0.049	0.000	0.50			3.8	OK	4
1.001	2	137.396	-0.082	0.000	0.42			7.0	OK	1
1.002	3	137.206	-0.070	0.000	0.55			9.0	OK	
2.000	4	137.445	-0.055	0.000	0.41			3.9	OK	1
1.003	4	137.071	-0.066	0.000	0.70			14.9	OK	
1.004	1	136.988	-0.065	0.000	0.71			16.8	OK	
1.005	2	136.784	-0.112	0.000	0.50			21.0	OK	
3.000	3	137.456	-0.044	0.000	0.58			4.5	OK	3
3.001	4	136.926	-0.077	0.000	0.47			7.6	OK	
3.002	5	136.801	-0.065	0.000	0.61			9.4	OK	
1.006	3	136.680	-0.107	0.000	0.62			32.2	OK	
4.000	12	136.918	-0.082	0.000	0.42			8.9	OK	
4.001	13	136.724	-0.065	0.000	0.60			9.9	OK	
1.007	3	136.418	-0.221	0.000	0.41			43.5	OK	
1.008	15	136.297	-0.280	0.000	0.20			50.4	OK	
1.009	15	135.912	-0.288	0.000	0.17			54.8	OK	
5.000	15	136.048	-0.052	0.000	0.46			3.5	OK	
5.001	16	135.761	-0.084	0.000	0.39			6.5	OK	
1.010	4	135.416	-0.254	0.000	0.29			63.0	OK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
6.000	5	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
6.001	6	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
6.002	7	15 Winter	1	+0%	30/15 Summer	100/15 Summer		
6.003	8	15 Winter	1	+0%	30/15 Summer			
6.004	8	15 Winter	1	+0%	30/15 Summer			
1.011	16	60 Winter	1	+0%	100/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
6.000	5	137.505	-0.045	0.000	0.57			4.4	OK	4
6.001	6	136.911	-0.077	0.000	0.47			9.7	OK	2
6.002	7	136.541	-0.059	0.000	0.67			12.3	OK	4
6.003	8	136.222	-0.070	0.000	0.55			14.9	OK	
6.004	8	135.741	-0.059	0.000	0.67			17.3	OK	
1.011	16	135.193	-0.234	0.000	0.00		54	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 Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.401
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

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.
1.000	1	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
1.001	2	15 Winter	30	+0%	30/15 Summer	100/15 Winter		
1.002	3	15 Winter	30	+0%	30/15 Summer			
2.000	4	15 Winter	30	+0%	30/15 Summer	100/15 Winter		
1.003	4	15 Winter	30	+0%	30/15 Summer			
1.004	1	15 Winter	30	+0%	30/15 Summer			
1.005	2	15 Winter	30	+0%	30/15 Summer			
3.000	3	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
3.001	4	15 Winter	30	+0%	30/15 Summer			
3.002	5	15 Winter	30	+0%	30/15 Summer			
1.006	3	15 Winter	30	+0%	30/15 Summer			
4.000	12	15 Winter	30	+0%	30/15 Summer			
4.001	13	15 Winter	30	+0%	30/15 Summer			
1.007	3	15 Winter	30	+0%	100/15 Summer			
1.008	15	15 Winter	30	+0%				
1.009	15	15 Winter	30	+0%				
5.000	15	15 Winter	30	+0%	30/15 Summer			
5.001	16	15 Winter	30	+0%	100/15 Summer			
1.010	4	15 Winter	30	+0%	100/15 Winter			

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	1	138.030	0.230	0.000	0.97			7.4	SURCHARGED
1.001	2	137.749	0.271	0.000	0.82			13.8	SURCHARGED
1.002	3	137.621	0.344	0.000	1.06			17.4	SURCHARGED
2.000	4	137.692	0.192	0.000	0.81			7.6	SURCHARGED
1.003	4	137.467	0.330	0.000	1.38			29.3	SURCHARGED
1.004	1	137.313	0.260	0.000	1.41			33.4	SURCHARGED
1.005	2	137.004	0.108	0.000	1.02			43.1	SURCHARGED
3.000	3	137.790	0.290	0.000	1.15			8.9	SURCHARGED
3.001	4	137.157	0.154	0.000	0.97			15.9	SURCHARGED
3.002	5	137.024	0.158	0.000	1.31			20.2	SURCHARGED
1.006	3	136.886	0.099	0.000	1.30			68.0	SURCHARGED
4.000	12	137.115	0.115	0.000	0.95			20.2	SURCHARGED
4.001	13	136.921	0.132	0.000	1.38			22.6	SURCHARGED
1.007	3	136.537	-0.102	0.000	0.90			95.2	OK
1.008	15	136.363	-0.214	0.000	0.43			111.2	OK
1.009	15	135.976	-0.224	0.000	0.39			123.7	OK
5.000	15	136.139	0.039	0.000	1.08			8.1	SURCHARGED
5.001	16	135.838	-0.007	0.000	1.00			16.6	OK
1.010	4	135.511	-0.159	0.000	0.67			146.4	OK

PN	US/MH Name	Level Exceeded
1.000	1	4
1.001	2	1
1.002	3	
2.000	4	1
1.003	4	
1.004	1	
1.005	2	
3.000	3	3
3.001	4	
3.002	5	
1.006	3	
4.000	12	
4.001	13	
1.007	3	
1.008	15	
1.009	15	
5.000	15	
5.001	16	
1.010	4	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
6.000	5	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
6.001	6	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
6.002	7	15 Winter	30	+0%	30/15 Summer	100/15 Summer		
6.003	8	15 Winter	30	+0%	30/15 Summer			
6.004	8	15 Winter	30	+0%	30/15 Summer			
1.011	16	60 Winter	30	+0%	100/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
6.000	5	137.926	0.376	0.000	1.03			7.9	SURCHARGED
6.001	6	137.356	0.367	0.000	0.91			18.7	SURCHARGED
6.002	7	137.065	0.465	0.000	1.27			23.2	SURCHARGED
6.003	8	136.572	0.280	0.000	1.04			28.2	SURCHARGED
6.004	8	136.038	0.238	0.000	1.28			33.0	SURCHARGED
1.011	16	135.400	-0.027	0.000	0.00		52	0.0	OK

PN	US/MH Name	Level Exceeded
6.000	5	4
6.001	6	2
6.002	7	4
6.003	8	
6.004	8	
1.011	16	

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

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.401
Region	England and Wales	Cv (Summer)	0.750
M5-60 (mm)	20.000	Cv (Winter)	0.840

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.
1.000	1	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
1.001	2	15 Winter	100	+40%	30/15 Summer	100/15 Winter		
1.002	3	15 Winter	100	+40%	30/15 Summer			
2.000	4	15 Winter	100	+40%	30/15 Summer	100/15 Winter		
1.003	4	15 Winter	100	+40%	30/15 Summer			
1.004	1	15 Winter	100	+40%	30/15 Summer			
1.005	2	15 Winter	100	+40%	30/15 Summer			
3.000	3	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
3.001	4	15 Winter	100	+40%	30/15 Summer			
3.002	5	15 Winter	100	+40%	30/15 Summer			
1.006	3	15 Winter	100	+40%	30/15 Summer			
4.000	12	15 Winter	100	+40%	30/15 Summer			
4.001	13	15 Winter	100	+40%	30/15 Summer			
1.007	3	15 Winter	100	+40%	100/15 Summer			
1.008	15	15 Winter	100	+40%				
1.009	15	15 Winter	100	+40%				
5.000	15	15 Winter	100	+40%	30/15 Summer			
5.001	16	15 Winter	100	+40%	100/15 Summer			
1.010	4	15 Winter	100	+40%	100/15 Winter			

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

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
1.000	1	139.001	1.201	0.918	1.48			11.2	FLOOD
1.001	2	138.800	1.322	0.012	1.03			17.2	FLOOD
1.002	3	138.609	1.332	0.000	1.41			23.0	FLOOD RISK
2.000	4	138.700	1.200	0.264	1.23			11.6	FLOOD
1.003	4	138.333	1.196	0.000	1.89			40.0	FLOOD RISK
1.004	1	138.042	0.989	0.000	1.97			46.6	SURCHARGED
1.005	2	137.476	0.581	0.000	1.46			61.9	SURCHARGED
3.000	3	138.701	1.201	0.787	1.64			12.7	FLOOD
3.001	4	137.827	0.823	0.000	1.41			23.0	SURCHARGED
3.002	5	137.544	0.678	0.000	1.97			30.5	SURCHARGED
1.006	3	137.233	0.447	0.000	1.92			100.3	SURCHARGED
4.000	12	137.963	0.963	0.000	1.56			33.1	FLOOD RISK
4.001	13	137.431	0.643	0.000	2.25			37.0	SURCHARGED
1.007	3	136.674	0.036	0.000	1.37			144.4	SURCHARGED
1.008	15	136.422	-0.155	0.000	0.67			173.6	OK
1.009	15	136.032	-0.168	0.000	0.63			196.5	OK
5.000	15	136.805	0.705	0.000	1.70			12.8	SURCHARGED
5.001	16	136.116	0.271	0.000	1.58			26.2	SURCHARGED
1.010	4	135.688	0.018	0.000	1.05			230.7	SURCHARGED

PN	US/MH Name	Level Exceeded
1.000	1	4
1.001	2	1
1.002	3	
2.000	4	1
1.003	4	
1.004	1	
1.005	2	
3.000	3	3
3.001	4	
3.002	5	
1.006	3	
4.000	12	
4.001	13	
1.007	3	
1.008	15	
1.009	15	
5.000	15	
5.001	16	
1.010	4	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
6.000	5	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
6.001	6	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
6.002	7	15 Winter	100	+40%	30/15 Summer	100/15 Summer		
6.003	8	15 Winter	100	+40%	30/15 Summer			
6.004	8	15 Winter	100	+40%	30/15 Summer			
1.011	16	60 Winter	100	+40%	100/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
6.000	5	138.752	1.202	1.940	1.41			10.9	FLOOD
6.001	6	138.400	1.412	0.426	1.24			25.5	FLOOD
6.002	7	137.803	1.203	2.655	1.70			31.0	FLOOD
6.003	8	137.385	1.093	0.000	1.26			34.3	FLOOD RISK
6.004	8	136.591	0.791	0.000	1.75			45.0	SURCHARGED
1.011	16	135.663	0.236	0.000	0.00		52	0.0	SURCHARGED

PN	US/MH Name	Level Exceeded
6.000	5	4
6.001	6	2
6.002	7	4
6.003	8	
6.004	8	
1.011	16	

Proposed connection point to Thames Water foul sewer (ref. 0701)
Discharge to the existing sewer network to be agreed with Thames Water.
Exact alignment and routing of existing sewers to be confirmed.

Infiltration Basin Details:
Design based on Impermeable Area of 0.676ha (as measured from architects layout with an additional 10% allowance for urban creep)

Bed Level: 135.00m AOD
Top of Bank Level: 136.60m AOD (min)
Maximum water depth: 135.50m AOD
Freeboard depth: 0.30m

Max volume 364.80m^3 to accommodate storage up to a 1:100yr +40% Climate Change storm event.

Basin to accommodate storage up to a 1:100yr +40% Climate Change storm event.

Infiltration Rate: 2.797 m/hr (SA01 Repeat-3)

Internal embankments to be constructed at a maximum 1 in 3 gradient.

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

- 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:
-	FIRST ISSUE	AB2	HR	AB	10.06.20

PROJECT:
HAMPTON ROAD
DEDDINGTON

DRAWING TITLE:
DRAINAGE STRATERGY

CLIENT:
PEMBURY ESTATES
LIMITED (MORTIMER)

DRAWING NUMBER:
23933_01_230_02

REVISION:	SHEET SIZE:	SCALE:
-	A1	1:500

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 Job Book\23933\drawings\01 series - hydrology\23933_01_230_02 drainage strategy.dwg
Printed:11.06.2020

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

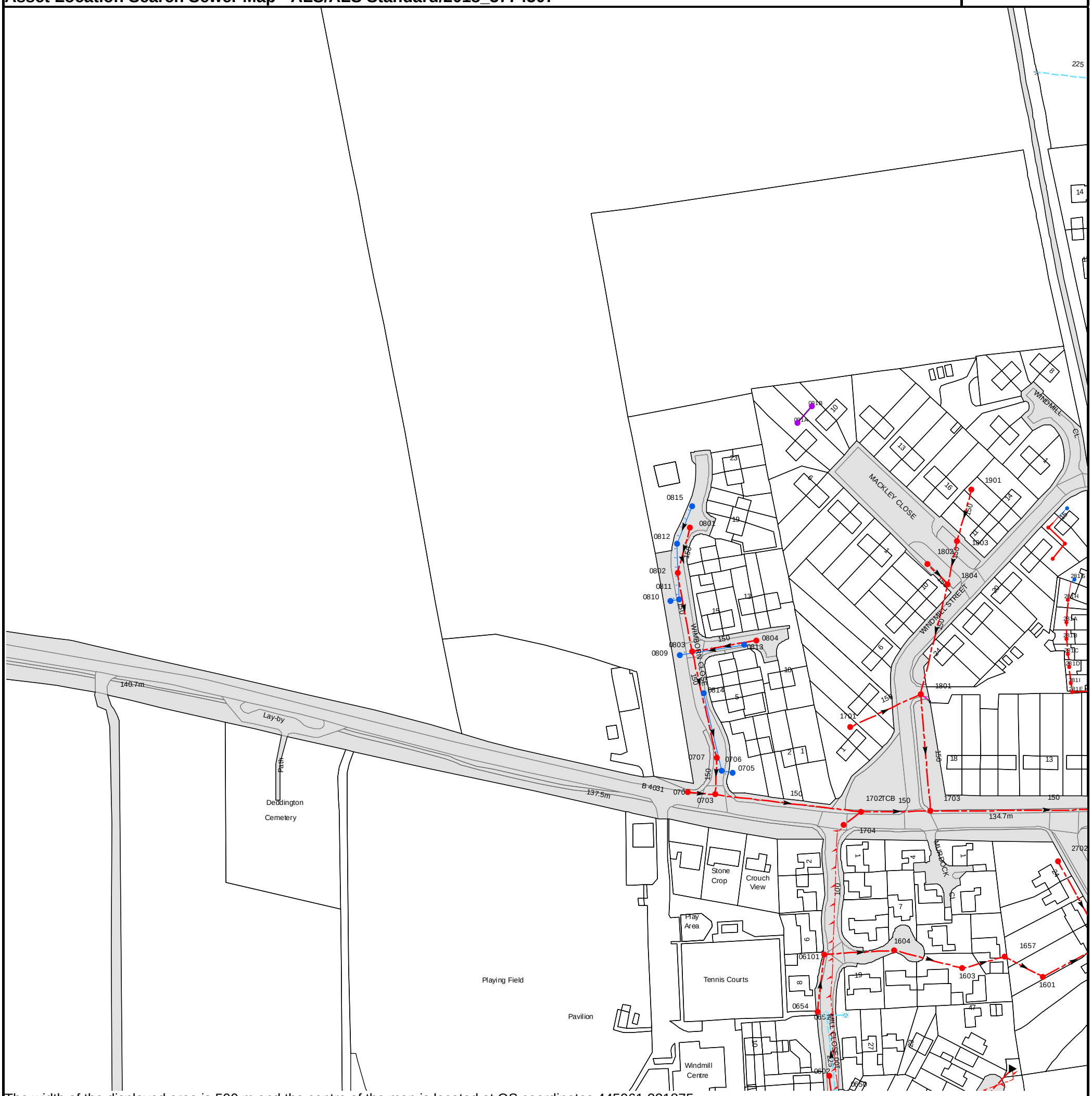
Clean Water queries

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