



TURNER JOMAS & ASSOCIATES

Environmental & Civil Engineers & Transport Planners

48 WARREN ROAD, ICKENHAM

SURFACE WATER DRAINAGE STRATEGY

BANCIL PARTNERSHIP

November 2017



TURNER JOMAS & ASSOCIATES

Environmental & Civil Engineers & Transport Planners

48 WARREN ROAD, ICKENHAM

Ref. – P1173J1219

Document Status – Final

Produced by:

Date:

Richard Fillingham

Nov 2017

Checked by:

Date:

Roni Savage

Nov 2017

Amendment Record

Issue / Rev.	Date	Status	Checked by	Initials



TURNER JOMAS & ASSOCIATES

Environmental & Civil Engineers & Transport Planners

CONTENTS

	Page
1 INTRODUCTION	1
2 SURFACE WATER DRAINAGE	2
2.1 Existing	2
2.2 Proposed	2
3 CONCLUSIONS & RECOMMENDATIONS	4

APPENDICES

Appendix A	Site Location Plan (Bancil Partnership Ltd)
Appendix B	Existing/Proposed Layout Plans (Bancil Partnership Ltd)
Appendix C	Public Sewer Record Extract (Thames Water)
Appendix D	Preliminary Attenuation Calculations
Appendix E	Proposed Attenuation Location Plan



TURNER JOMAS & ASSOCIATES

Environmental & Civil Engineers & Transport Planners

1 INTRODUCTION

- 1.1.1 This Surface Water Drainage Strategy has been prepared by Turner Jomas & Associates on behalf of The Bancil Partnership in respect of a proposed replacement residential dwelling at 48 Warren Road, Ickenham UB10 8AD.
- 1.1.2 The application site is classified as Brownfield with a gross area of approx. 0.114 ha and is occupied by an existing detached residential dwelling, garage, driveway and gardens. An OS based site location plan with the site boundary edged in red is included within Appendix A for reference.
- 1.1.3 Planning consent for a proposed replacement detached dwelling has been granted by the London Borough of Hillingdon (Application Ref: 4185/APP/2017/1850) and this report has been prepared to address Planning Condition No.8.
- 1.1.4 Planning Condition No.8 states '*No development approved by this permission shall be commenced until a scheme for the provision of sustainable water management has been submitted to and approved in writing by the Local Planning Authority. The scheme shall clearly demonstrate that sustainable drainage systems (SUDS) have been incorporated into the designs of the development in accordance with the hierarchy set out in accordance with Policy 5.15 of the London Plan.*'
- 1.1.5 A copy of the existing and proposed site layout plans is included within Appendix B for reference.



2 SURFACE WATER DRAINAGE

2.1 Existing

2.1.1 An extract of the public sewer records has been obtained from Thames Water and a copy is included within Appendix C. The records confirm that there is a 225mm diameter public surface water sewer located within Warren Road.

2.1.2 Whilst a survey of the existing site drainage has not been carried out, we understand that surface water run-off currently drains to the public sewer network. It is not clear whether the existing site is served by a combined or separate connection. This will be subject to confirmation on site. There is no evidence of any existing SUDS techniques.

2.1.3 The existing dwelling has a built footprint of approx. 157m². The existing driveway/parking area has an impermeable area of approx. 90m².

2.2 Proposed

2.2.1 A sustainable surface water drainage strategy should be provided to comply with Planning Condition No.8 and to ensure the development does not increase the risk of flooding in accordance with Policy OE8 Hillingdon Local Plan: Part Two Saved UDP Policies (November 2012) and London Plan (2016) Policy 5.12.

2.2.2 Whilst on site percolation testing has not been carried out, the British Geological Survey (BGS) mapping indicates that the site is directly underlain by London Clay Formation. It is therefore considered unlikely that proprietary infiltration SUDS techniques such as soakaways will be viable.

2.2.1 In consideration of all the information available, it is therefore proposed to provide a cellular crate attenuation structure to serve run-off from the proposed dwelling. The proposed dwelling will have a built footprint of approx. 180m².

2.2.2 It is proposed to connect a nominal residual discharge from the attenuation structure to the public surface water sewer directly or via the existing on site surface water drainage connection, restricted to a max. of 2 l/s, with the balance of flows being attenuated up to the 100 year climate change event. Any new connection to the public sewer network, or amendments to existing connections, will require the consent of Thames Water via an application made under Section 106 of the Water Industry Act 1991.

2.2.3 Calculations have been prepared using the Micro Drainage software suite to assess the maximum size of attenuation structure that will be required, based on the following design criteria.

- Design Event 1 in 100 year
- Contributing Area 180m²
- Max. Discharge Rate 2 l/s (via Hydrobrake Flow Control Device)



TURNER JOMAS & ASSOCIATES

Environmental & Civil Engineers & Transport Planners

- Climate Change 40% (in accordance with EA requirements)
- Block system Stormbloc cellular crate system or similar.
- Depth 1.0m (0.5m crates + 0.5m cover)

- 2.2.4 The depth of the structure will be restricted due to the indicated invert level of the public surface water sewer in Warren Road. The calculations confirm that a structure with a plan area of 10m² will be required to accommodate a volume of 4m³. A copy of the calculation outputs is included within Appendix D.
- 2.2.5 A plan indicating the location of the proposed attenuation structure is included within Appendix E.
- 2.2.6 The final design and location of the proposed attenuation structure will be subject to confirmation of the depth and location of the existing surface water connection and/or the public surface water sewer on site.
- 2.2.7 Permeable paving is generally effective in all but the worst ground conditions. It is therefore proposed to utilise a permeable paving construction for the new external areas, laid with falls to landscaped/garden areas as a precaution.
- 2.2.8 With respect to other SUDS techniques, the proposed pitched roof will not be suitable for the use of a green roof. The use of rainwater harvesting techniques will be financially and logistically prohibitive. It is, however, recommended that the use of rainwater butts is considered. Whilst their use will not alter the design of the below ground drainage system, they do provide valuable rainwater harvesting for irrigation purposes.
- 2.2.9 With regard to pollution control, the proposed development is residential and therefore is classified as a low pollution risk. Roof run-off is classified as uncontaminated and, in accordance with EA pollution prevention guidance, will not require any treatment. Run-off from the new external areas soaking through the proposed permeable paving areas will receive an adequate level of treatment via filtration through the associated substrate.
- 2.2.10 With respect to maintenance, the proposed SUDS techniques are considered to be low maintenance. The proposed cellular attenuation structure and control chamber should be checked for silt build up annually, or in accordance with the supplier's recommendations, and cleared out as necessary. Permeable paving areas should be jetted annually to clear any debris to ensure effective operation. Such maintenance will be the responsibility of the new house owner in perpetuity.

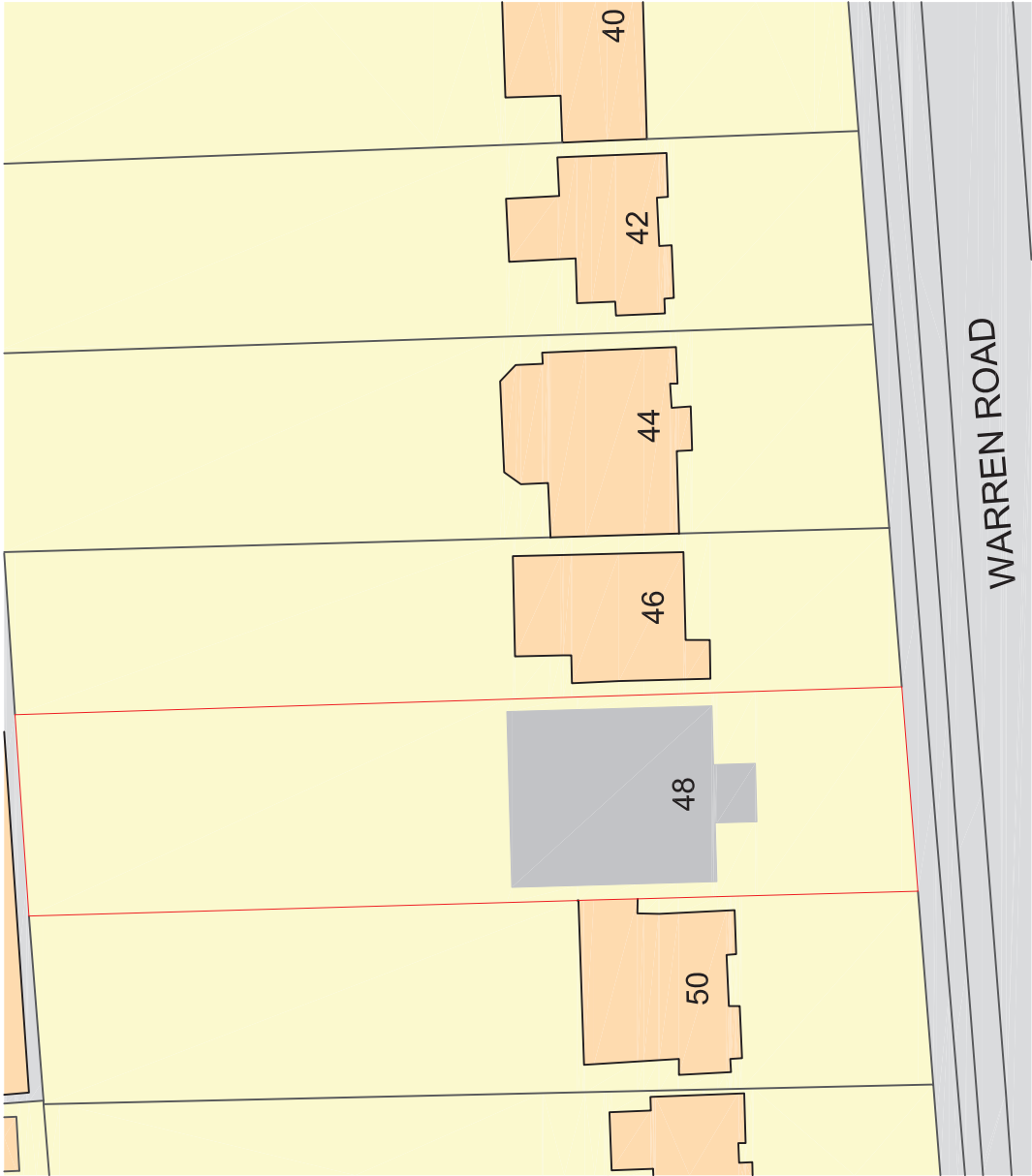


3 CONCLUSIONS & RECOMMENDATIONS

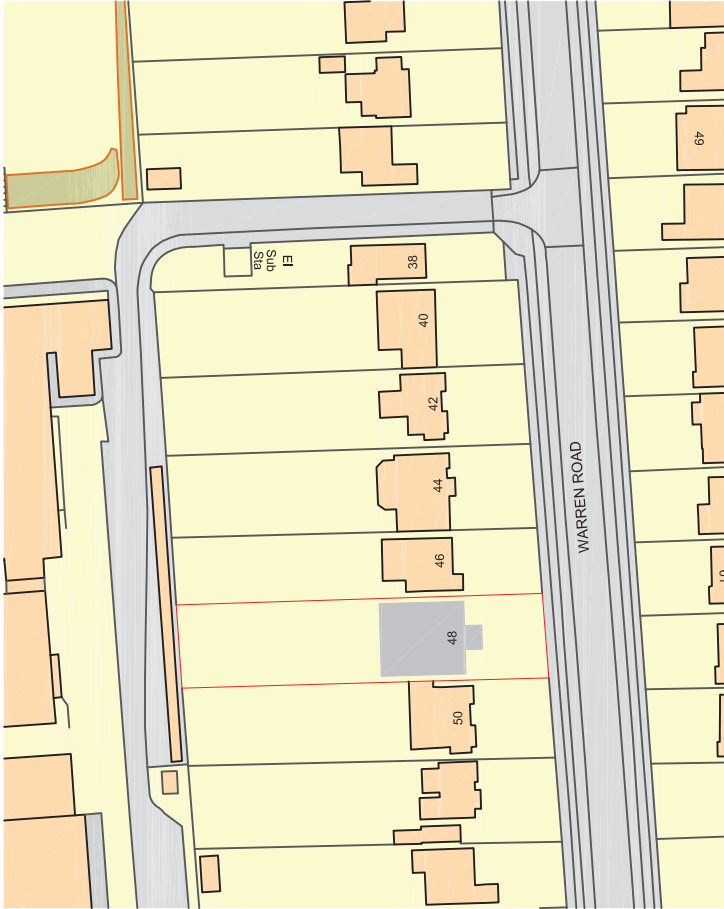
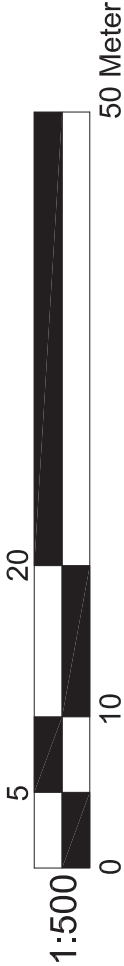
- 3.1.1 It is proposed to provide an attenuation based surface water drainage system, supplemented by permeable paving.
- 3.1.2 The proposed attenuation structure will serve roof run-off from the new dwelling. The structure will have a max. residual positive discharge of 2 l/s to the public sewer network, controlled by a vortex flow control device, and will accommodate the balance of flows on site up to the 1 in 100 year climate change event.
- 3.1.3 The proposed surface water system will offer a significant reduction in positive surface water discharge when compared to the existing scenario, therefore providing a reduction in flood risk. Any amendments to the existing drainage arrangements will, however, be subject to the approval of Thames Water via a Section 106 connection application.
- 3.1.4 The proposed drainage system will need to be constructed in accordance with Part H of the Building Regulations.

APPENDICES

APPENDIX A



BLOCK PLAN
(scale: 1:500)



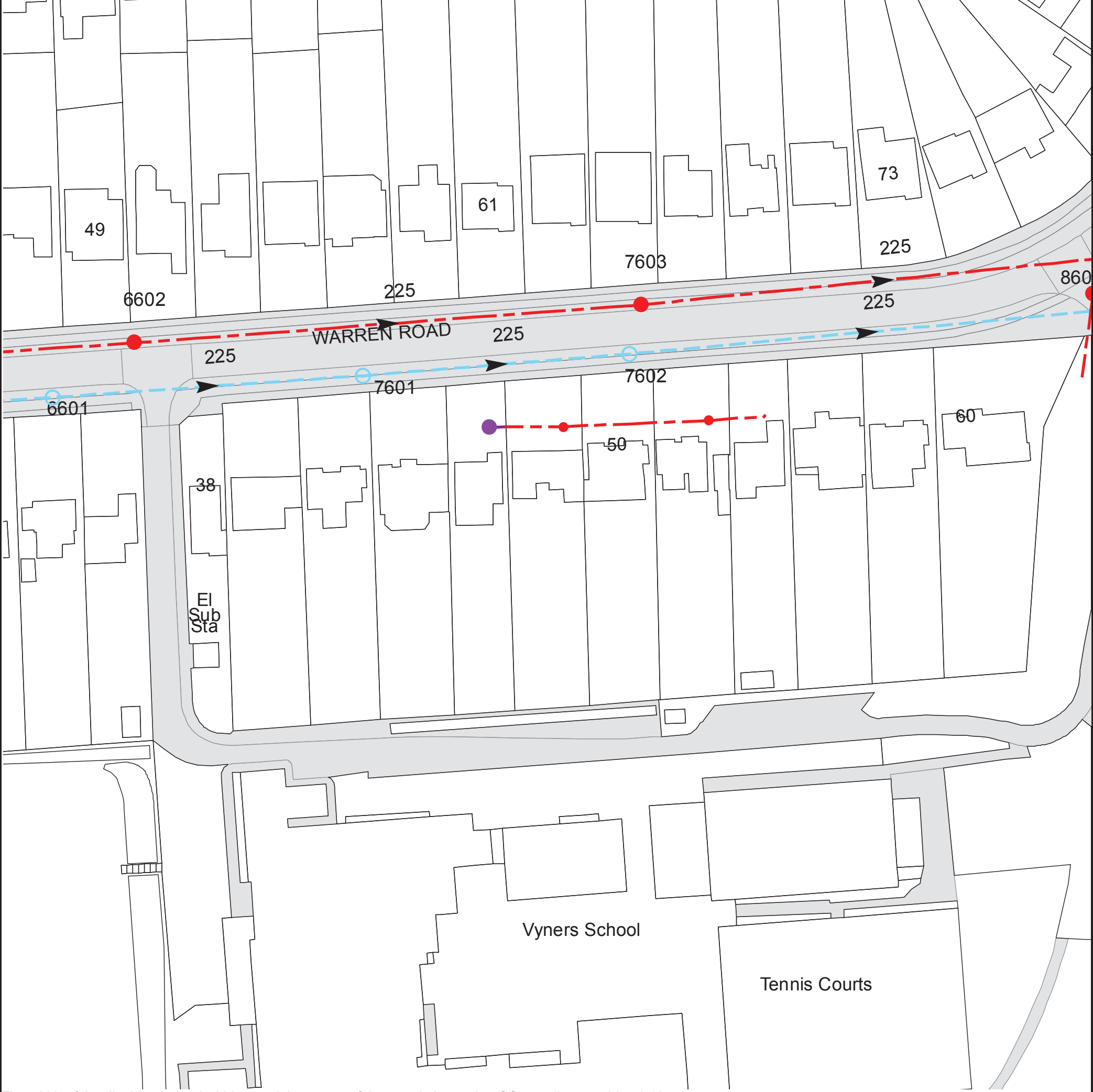
LOCATION PLAN
(scale: 1:1250)



 BANCIL PARTNERSHIP LTD	Dimensions to be verified on site DO NOT SCALE FROM THIS DRAWING. Any areas indicated on this drawing are for guidance only. No responsibility is taken for their accuracy. This drawing is the property of BANCIL PARTNERSHIP LTD Copyright is reserved by them and the drawing is issued on the condition that it is not copied, reproduced, retained or disclosed to any unauthorised person, either wholly or in part without the consent in writing of BANCIL PARTNERSHIP LTD	Site Address: 48, Warren Road, Ickenham, UB10 8AD.	Client Detail: 48, Warren Road, Ickenham, UB10 8AD.	Title: Block & Location		 N	Drawn By: NM	Revisions:				
								Rev	Revision			
								Checked By: PP				
								Date: 06/2017				
								Drawing No. PL/PP/2765 - 00				
27-29 The Broadway, Southall, Middx, UB1 1JY Tel: 020 8574 4546 Fax: 020 8574 4526				Scale:	As Shown	Paper Size:						

APPENDIX B

APPENDIX C



The width of the displayed area is 200 m and the centre of the map is located at OS coordinates 506751,185597
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
6601	44.27	43.29
6602	44.04	42.18
7601	42.43	41.05
761A	n/a	n/a
761B	n/a	n/a
7602	40.68	39.35
7603	n/a	n/a
761C	n/a	n/a
8601	n/a	n/a
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.		

APPENDIX D

R J Fillingham Associates Ltd							Page 1
37 Brooke Road Oakham Rutland LE15 6HG			48 Warren Road Ickenham 100yr CC Cellular				
Date Nov 17 File dwelling 100yr cc cellular.srcx			Designed by RJF Checked by				
XP Solutions			Source Control 2016.1				

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 19 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	99.345	0.345	0.0	2.0	2.0	3.3	O K
30 min Summer	99.390	0.390	0.0	2.0	2.0	3.7	O K
60 min Summer	99.385	0.385	0.0	2.0	2.0	3.7	O K
120 min Summer	99.308	0.308	0.0	2.0	2.0	2.9	O K
180 min Summer	99.227	0.227	0.0	2.0	2.0	2.2	O K
240 min Summer	99.164	0.164	0.0	2.0	2.0	1.6	O K
360 min Summer	99.098	0.098	0.0	1.9	1.9	0.9	O K
480 min Summer	99.079	0.079	0.0	1.7	1.7	0.7	O K
600 min Summer	99.068	0.068	0.0	1.4	1.4	0.6	O K
720 min Summer	99.061	0.061	0.0	1.2	1.2	0.6	O K
960 min Summer	99.052	0.052	0.0	1.0	1.0	0.5	O K
1440 min Summer	99.043	0.043	0.0	0.7	0.7	0.4	O K
2160 min Summer	99.036	0.036	0.0	0.5	0.5	0.3	O K
2880 min Summer	99.032	0.032	0.0	0.4	0.4	0.3	O K
4320 min Summer	99.026	0.026	0.0	0.3	0.3	0.2	O K
5760 min Summer	99.023	0.023	0.0	0.2	0.2	0.2	O K
7200 min Summer	99.021	0.021	0.0	0.2	0.2	0.2	O K
8640 min Summer	99.020	0.020	0.0	0.2	0.2	0.2	O K
10080 min Summer	99.018	0.018	0.0	0.2	0.2	0.2	O K
15 min Winter	99.395	0.395	0.0	2.0	2.0	3.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	133.840	0.0	4.5	16
30 min Summer	88.785	0.0	6.0	25
60 min Summer	56.129	0.0	7.6	42
120 min Summer	34.254	0.0	9.2	76
180 min Summer	25.291	0.0	10.2	106
240 min Summer	20.257	0.0	10.9	134
360 min Summer	14.799	0.0	12.0	188
480 min Summer	11.836	0.0	12.8	248
600 min Summer	9.944	0.0	13.4	308
720 min Summer	8.621	0.0	14.0	368
960 min Summer	6.877	0.0	14.8	490
1440 min Summer	4.992	0.0	16.2	730
2160 min Summer	3.617	0.0	17.6	1092
2880 min Summer	2.874	0.0	18.6	1456
4320 min Summer	2.076	0.0	20.2	2200
5760 min Summer	1.646	0.0	21.3	2880
7200 min Summer	1.374	0.0	22.3	3576
8640 min Summer	1.185	0.0	23.0	4344
10080 min Summer	1.046	0.0	23.7	4960
15 min Winter	133.840	0.0	5.1	16

©1982-2016 XP Solutions

R J Fillingham Associates Ltd		Page 3																														
37 Brooke Road Oakham Rutland LE15 6HG	48 Warren Road Ickenham 100yr CC Cellular																															
Date Nov 17 File dwelling 100yr cc cellular.srcx	Designed by RJF Checked by																															
XP Solutions		Source Control 2016.1																														
<u>Rainfall Details</u> <table> <tr> <td>Rainfall Model</td> <td>FSR</td> <td>Winter Storms</td> <td>Yes</td> </tr> <tr> <td>Return Period (years)</td> <td>100</td> <td>Cv (Summer)</td> <td>0.750</td> </tr> <tr> <td>Region</td> <td>England and Wales</td> <td>Cv (Winter)</td> <td>0.840</td> </tr> <tr> <td>M5-60 (mm)</td> <td>19.800</td> <td>Shortest Storm (mins)</td> <td>15</td> </tr> <tr> <td>Ratio R</td> <td>0.377</td> <td>Longest Storm (mins)</td> <td>10080</td> </tr> <tr> <td>Summer Storms</td> <td>Yes</td> <td>Climate Change %</td> <td>+40</td> </tr> </table> <u>Time Area Diagram</u> Total Area (ha) 0.018 <table> <thead> <tr> <th>Time (mins)</th> <th>Area</th> </tr> <tr> <th>From:</th> <th>To: (ha)</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>4 0.018</td> </tr> </tbody> </table>			Rainfall Model	FSR	Winter Storms	Yes	Return Period (years)	100	Cv (Summer)	0.750	Region	England and Wales	Cv (Winter)	0.840	M5-60 (mm)	19.800	Shortest Storm (mins)	15	Ratio R	0.377	Longest Storm (mins)	10080	Summer Storms	Yes	Climate Change %	+40	Time (mins)	Area	From:	To: (ha)	0	4 0.018
Rainfall Model	FSR	Winter Storms	Yes																													
Return Period (years)	100	Cv (Summer)	0.750																													
Region	England and Wales	Cv (Winter)	0.840																													
M5-60 (mm)	19.800	Shortest Storm (mins)	15																													
Ratio R	0.377	Longest Storm (mins)	10080																													
Summer Storms	Yes	Climate Change %	+40																													
Time (mins)	Area																															
From:	To: (ha)																															
0	4 0.018																															
©1982-2016 XP Solutions																																

R J Fillingham Associates Ltd		Page 4																																																																																																									
37 Brooke Road Oakham Rutland LE15 6HG	48 Warren Road Ickenham 100yr CC Cellular																																																																																																										
Date Nov 17 File dwelling 100yr cc cellular.srcx	Designed by RJF Checked by																																																																																																										
XP Solutions																																																																																																											
Source Control 2016.1																																																																																																											
<u>Model Details</u> Storage is Online Cover Level (m) 100.000 <u>Cellular Storage Structure</u> Invert Level (m) 99.000 Infiltration Coefficient Base (m/hr) 0.00000 Infiltration Coefficient Side (m/hr) 0.00000 Safety Factor 2.0 Porosity 0.95 <table border="1"> <thead> <tr> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> <th>Depth (m)</th> <th>Area (m²)</th> <th>Inf. Area (m²)</th> </tr> </thead> <tbody> <tr> <td>0.000</td> <td>10.0</td> <td>10.0</td> <td>0.600</td> <td>0.0</td> <td>17.0</td> </tr> <tr> <td>0.500</td> <td>10.0</td> <td>17.0</td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <u>Hydro-Brake Optimum® Outflow Control</u> Unit Reference MD-SHE-0074-2000-0500-2000 Design Head (m) 0.500 Design Flow (l/s) 2.0 Flush-Flo™ Calculated Objective Minimise upstream storage Application Surface Sump Available Yes Diameter (mm) 74 Invert Level (m) 99.000 Minimum Outlet Pipe Diameter (mm) 100 Suggested Manhole Diameter (mm) 1200 <table border="1"> <thead> <tr> <th>Control Points</th> <th>Head (m)</th> <th>Flow (l/s)</th> </tr> </thead> <tbody> <tr> <td>Design Point (Calculated)</td> <td>0.500</td> <td>2.0</td> </tr> <tr> <td>Flush-Flo™</td> <td>0.149</td> <td>2.0</td> </tr> <tr> <td>Kick-Flo®</td> <td>0.342</td> <td>1.7</td> </tr> <tr> <td>Mean Flow over Head Range</td> <td>-</td> <td>1.7</td> </tr> </tbody> </table> The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake Optimum® as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated <table border="1"> <thead> <tr> <th>Depth (m)</th> <th>Flow (l/s)</th> <th>Depth (m)</th> <th>Flow (l/s)</th> <th>Depth (m)</th> <th>Flow (l/s)</th> <th>Depth (m)</th> <th>Flow (l/s)</th> </tr> </thead> <tbody> <tr> <td>0.100</td> <td>1.9</td> <td>1.200</td> <td>3.0</td> <td>3.000</td> <td>4.6</td> <td>7.000</td> <td>6.8</td> </tr> <tr> <td>0.200</td> <td>2.0</td> <td>1.400</td> <td>3.2</td> <td>3.500</td> <td>4.9</td> <td>7.500</td> <td>7.1</td> </tr> <tr> <td>0.300</td> <td>1.8</td> <td>1.600</td> <td>3.4</td> <td>4.000</td> <td>5.2</td> <td>8.000</td> <td>7.3</td> </tr> <tr> <td>0.400</td> <td>1.8</td> <td>1.800</td> <td>3.6</td> <td>4.500</td> <td>5.5</td> <td>8.500</td> <td>7.5</td> </tr> <tr> <td>0.500</td> <td>2.0</td> <td>2.000</td> <td>3.8</td> <td>5.000</td> <td>5.8</td> <td>9.000</td> <td>7.8</td> </tr> <tr> <td>0.600</td> <td>2.2</td> <td>2.200</td> <td>3.9</td> <td>5.500</td> <td>6.1</td> <td>9.500</td> <td>8.0</td> </tr> <tr> <td>0.800</td> <td>2.5</td> <td>2.400</td> <td>4.1</td> <td>6.000</td> <td>6.3</td> <td></td> <td></td> </tr> <tr> <td>1.000</td> <td>2.7</td> <td>2.600</td> <td>4.3</td> <td>6.500</td> <td>6.6</td> <td></td> <td></td> </tr> </tbody> </table>			Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)	0.000	10.0	10.0	0.600	0.0	17.0	0.500	10.0	17.0				Control Points	Head (m)	Flow (l/s)	Design Point (Calculated)	0.500	2.0	Flush-Flo™	0.149	2.0	Kick-Flo®	0.342	1.7	Mean Flow over Head Range	-	1.7	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	0.100	1.9	1.200	3.0	3.000	4.6	7.000	6.8	0.200	2.0	1.400	3.2	3.500	4.9	7.500	7.1	0.300	1.8	1.600	3.4	4.000	5.2	8.000	7.3	0.400	1.8	1.800	3.6	4.500	5.5	8.500	7.5	0.500	2.0	2.000	3.8	5.000	5.8	9.000	7.8	0.600	2.2	2.200	3.9	5.500	6.1	9.500	8.0	0.800	2.5	2.400	4.1	6.000	6.3			1.000	2.7	2.600	4.3	6.500	6.6		
Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)																																																																																																						
0.000	10.0	10.0	0.600	0.0	17.0																																																																																																						
0.500	10.0	17.0																																																																																																									
Control Points	Head (m)	Flow (l/s)																																																																																																									
Design Point (Calculated)	0.500	2.0																																																																																																									
Flush-Flo™	0.149	2.0																																																																																																									
Kick-Flo®	0.342	1.7																																																																																																									
Mean Flow over Head Range	-	1.7																																																																																																									
Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)																																																																																																				
0.100	1.9	1.200	3.0	3.000	4.6	7.000	6.8																																																																																																				
0.200	2.0	1.400	3.2	3.500	4.9	7.500	7.1																																																																																																				
0.300	1.8	1.600	3.4	4.000	5.2	8.000	7.3																																																																																																				
0.400	1.8	1.800	3.6	4.500	5.5	8.500	7.5																																																																																																				
0.500	2.0	2.000	3.8	5.000	5.8	9.000	7.8																																																																																																				
0.600	2.2	2.200	3.9	5.500	6.1	9.500	8.0																																																																																																				
0.800	2.5	2.400	4.1	6.000	6.3																																																																																																						
1.000	2.7	2.600	4.3	6.500	6.6																																																																																																						
©1982-2016 XP Solutions																																																																																																											

APPENDIX E

PROPOSED SURFACE WATER ATTENUATION

