WIC House, Transport Way

Surface Water Management Strategy

On behalf of **T-Squared P4 Ltd**

Project Ref: 48055 | Rev: A | Date: January 2021

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Document Control Sheet

Project Name: **WIC House, Transport Way**

Project Ref: **48055**

Report Title: **Surface Water Management Strategy**

Doc Ref: **48055-STN-ZZ-XX-RP-C-1001**

Date: **January 2021**

	Name	Position	Signature	Date
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Approved by:	Thomas Edwards	Director	TE	January 2021
For and on behalf of Stantec UK Limited				

Revision	Date	Description	Prepared	Reviewed	Approved
-	27/01/21	First Issue	JS	SH	TE
A	29/01/21	Revision to Site Layout included in Appendix A	JS	SH	TE

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1 Introduction

1.1 Summary

1.1.1 Stantec UK Ltd (Stantec) have been commissioned by T-Squared P4 Ltd to assist with the drainage input to the planning application for the proposed redevelopment of WIC House, Transport Way, Oxford.

1.1.2 The purpose of this report is to identify and describe the proposed site drainage, with consideration to ground conditions, geology, contamination, ground water across the site; and best Sustainable Drainage (SuDS) practice.

1.2 Site Proposals

1.2.1 The proposal for the site is to demolish the existing building comprising office and laboratory spaces and erect a new building on a similar footprint. The new building will comprise office and laboratory space, optimised for present and future uses of the building.

1.2.2 The site is fully occupied by the existing building and car parking, with only small borders comprising soft landscaping; the impermeable area is approaching 100% of the site area. The site proposals will retain a similar layout, so no significant change in impermeable area will occur. The gross internal area of the proposal is approximately 6,300m^3. Through redevelopment of the site there is potential for green roofs to be installed to parts of the roof structure to intercept and reduce run-off via evapotranspiration.

1.2.3 A site layout is included in Appendix A.

1.3 Reference Documents

1.3.1 This surface water and foul water management strategy has been designed and prepared with reference to documents and information sources provided and/or published by the following bodies:

a. CIRIA C753 – The SUDs Manual and SUDs Hierarchy;

b. National Planning Policy Framework (NPPF) and Planning Practice Guidance (PPG);

c. Oxfordshire County Council - Local Standards and Guidance for Surface Water Drainage on Major Development in Oxfordshire (November 2018);

d. Environment Agency (EA) Standing Advice;

e. Thames Water;

f. Code for Adoption / Sewerage Sector Guidance where applicable;

g. Relevant Building Regulations where applicable;

h. Best practice;

2 Site Context

2.1 Site Description and Location

2.1.1 The site is located in Cowley, Oxford, on Transport Way. The postcode is OX4 6LT and the National Grid Reference (NGR) is 455740E, 203470N. The site area is approximately 4,750m^2 (0.48ha).

2.1.2 The existing site consists of a 2 storey office block with a rear extension forming a single floor of lab spaces with a mezzanine. Staff parking is provided to the side and rear of the building.

2.1.3 The surrounding area includes further light industrial uses along Transport Way, to the north lies the BMW Mini plant, and to the west of Garsington Road lies Blackbird Leys and Greater Leys residential developments.

2.2 Flood Risk

2.2.1 A site-specific Flood Risk Assessment (FRA) is not required as Environment Agency (EA) standing advice, updated October 2015, states that an FRA is only required when the development area is greater than 1 ha or will change the use to a more vulnerable category for a proposed development within Flood Zone 1. This site is less than 1ha in area, and the site use following redevelopment will remain as before.

2.2.2 The site is located entirely within Flood Zone 1 and therefore has a low probability of flooding from nearby watercourses. The nearest watercourse is Northfield Brook, a tributary to the River Thames, located 850m to the south-east of the site. Figure 2.1, below, shows the site on the EA flood mapping service.

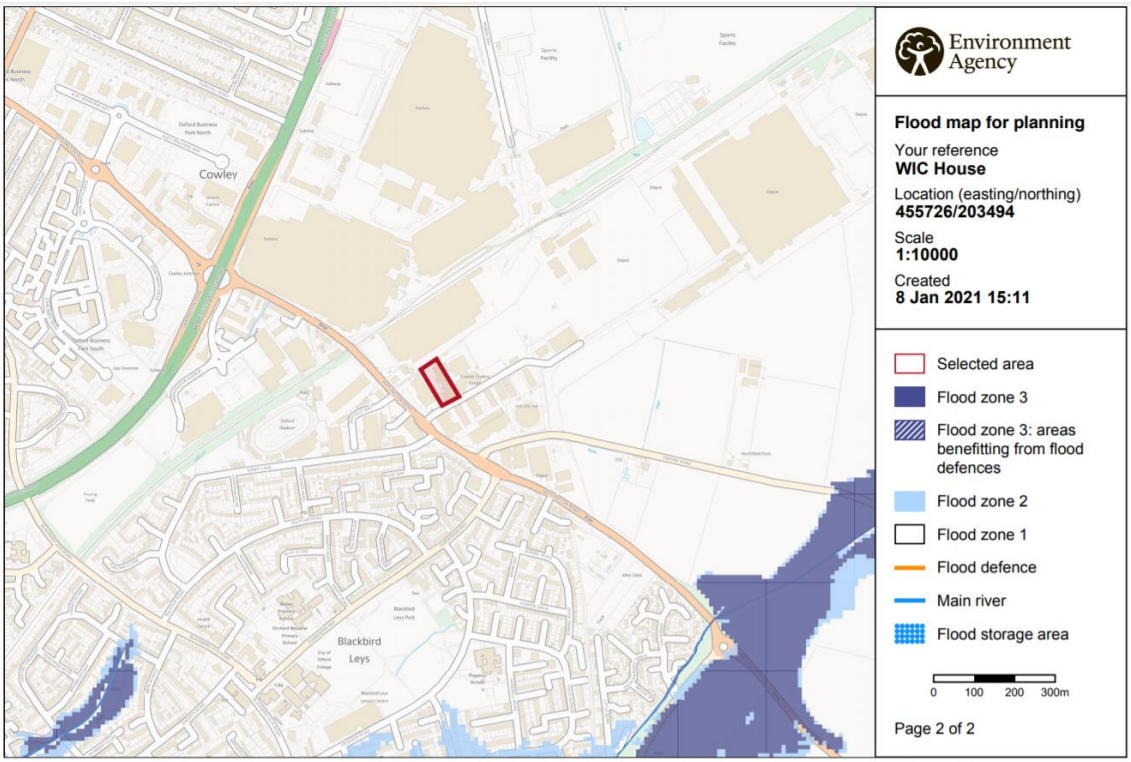


Figure 2.1: Site Location and Flood Zones (.gov.uk flood map)

2.2.3 The *Long Term Flood Risk Map for England* (gov.uk) shows the site to be at negligible to no risk of flooding from rivers, the sea or reservoirs. However, the mapping tool does show the site to be at *medium to high* risk of surface water flooding across part of its extent corresponding to the car parking areas. The flood risk map is based on mathematical modelling, considering surfaces, topology and existing land uses. This modelling suggests the site has some surface water flooding, which is shown to originate from the existing development only (see Figure 2.2, below). The proposed design for the site does not produce any surface flooding in the 1 in 100 year (+ 40% climate change allowance). Consequently, there should be no source for this flooding post-development.

Figure 2.2: Extract of the Long Term Flood Risk Map for England (gov.uk), site outline in red.

2.3 Site Topography

2.3.1 The site levels lie between 70.10mAOD at the junction on to Transport Way, to high points of 71.20mAOD along the back boundary of the site. The site is currently occupied by a large building and car parking, with limited soft landscaping.

2.4 Geology and Hydrology

2.4.1 The geological record data from the British Geological Society (BGS) indicate that the bedrock geology of the Site is the Beckley Sand Member. No superficial deposits were identified.

2.4.2 The permeability of the Beckley Sand Member varies with its silt/clay content although is predominantly sandy, it may be suitable for infiltration drainage. This suitability can be confirmed by site-specific infiltration testing as part of routine ground investigation at the detailed design phase of the project. See Figure 2.3 for British Geological Society mapping.

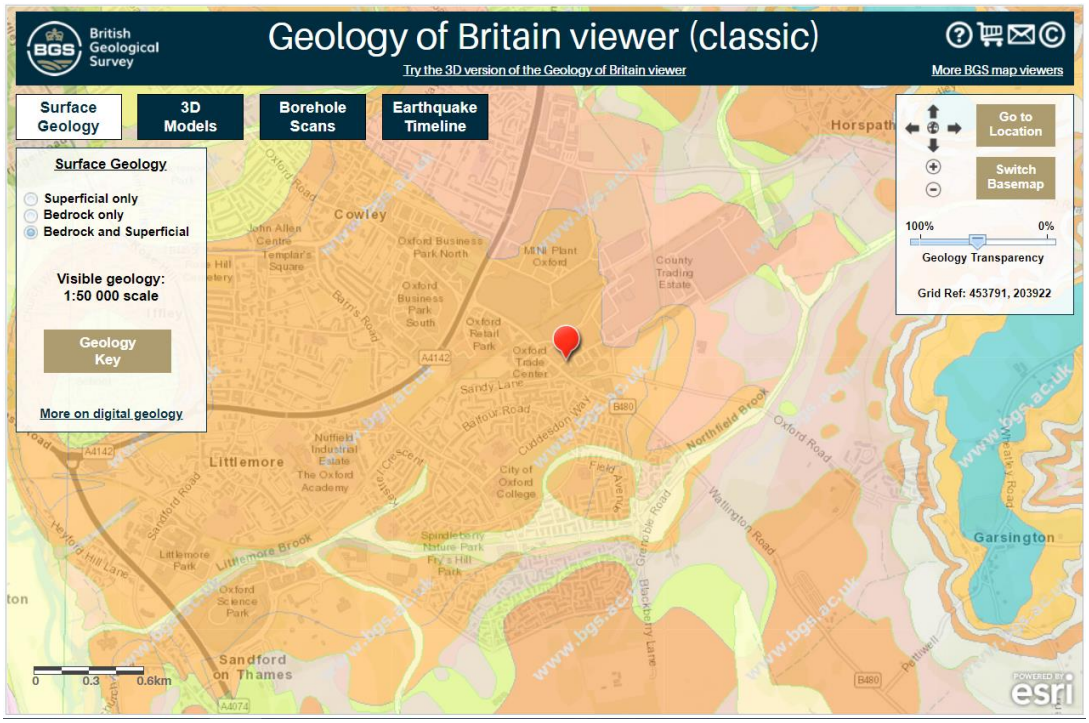


Figure 2.3: BGS Surface Geology Mapping

2.5 Existing Drainage Regime

2.5.1 The site is a brownfield site with almost 100% impermeable area of 0.475ha. The existing on-site surface water network is a simple piped system with road gullies draining the parking areas and direct connections from rainwater pipes (RWPs). No attenuation is present on-site, so the site discharges at brownfield rates which are unrestricted via a 300mm connection to the Thames Water surface water sewer within Transport Way.

2.5.2 In line with the now-withdrawn Pollution Prevention Guidance 3, as the on-site parking provides more than 50 parking spaces, the surface water discharges via a petrol interceptor to the Thames Water sewer.

2.5.3 Brownfield discharge rates for the Sites were calculated using Microdrainage to determine the present discharge rates from each Site. These can be seen in Table 2.1, below, and the calculations are in Appendix B.

Return Period (Years)	Brownfield Discharge Rate (l/s)
1 in 1	57.8
1 in 30	123.2
1 in 100	155.5

Table 2.1: Brownfield Discharge Rates for the Existing Sites.

2.5.4 The Rural Run-off function within Microdrainage was used to determine the calculated Greenfield Run-off rate of the Sites, shown in Table 2.2 below. Refer to Microdrainage Greenfield Runoff Calculations in Appendix C.

Return Period (Years)	Greenfield Run-off Rates	
	Per Hectare (l/s/ha)	Site (0.475ha) (l/s)
1 in 1	3.4	1.6
QBAR	3.8	1.8
1 in 30	8.6	4.1
1 in 100	12.2	5.8

Table 2.2: Greenfield Rates for the Sites.

2.5.5 A foul water network is also present on-site, discharging by gravity to the Thames Water foul water sewer within Transport Way.

3 Surface Water Drainage

3.1 Treatment of Existing Drainage

3.1.1 In line with local policy existing drainage shall be reused where possible. As the existing network does not provide any flow control or attenuation storage these will be added to the network, as outlined below.

3.1.2 Although the petrol interceptor will not be necessary for the treatment of surface water following the below proposals, it will be retained as a secondary treatment system.

3.1.3 The foul water network will be retained where possible and diverted where it falls within the footprint of the proposed building.

3.2 Climate Change Allowances

3.2.1 In February 2016 the Environment Agency released 'Flood risk assessments: climate change allowances' guidance to support the NPPF. Within this guidance it states that the appropriate allowances for increases in peak rainfall intensity for the proposed development over the next 100 years are the central and upper end allowances for increases in peak rainfall intensity of 20% and 40% respectively.

3.2.2 This SWMS has undertaken calculations to inform the design of surface water systems based on a 40% increase in peak rainfall intensity (the upper end allowance).

3.3 Proposed Surface Water Drainage

3.3.1 Following the SuDS hierarchy as outlined in the Planning Policy Guidance, see Figure 3.1, the preferable outfall option is an infiltration system. Due to limited space on site an infiltration solution is impractical. No surface water body is located close by and hence the third option is the most reasonably practicable. Hence the site redevelopment will re-use the existing surface water discharge, with modification, to the Thames Water surface water sewer in Transport Way.

Generally, the aim should be to discharge surface run off as high up the following hierarchy of drainage options as reasonably practicable:

1. into the ground (infiltration);
2. to a surface water body;
3. to a surface water sewer, highway drain, or another drainage system;
4. to a combined sewer.

Figure 3.1: Extract of Planning Policy Guidance on Flood Risk and Coastal Change.

3.3.2 Whilst the existing run-off discharged at unrestricted, brownfield, rates, in accordance with current guidance this run-off rate must be improved through the redevelopment. This has been achieved by the use of porous sub-base and filter drain systems and a double orifice plate flow control.

3.3.3 The site has negligible soft landscaping, consequently any attenuation storage required will be placed beneath the existing / proposed car park. The car park at present is surfaced with an impermeable concrete surface, drained by road gullies into the piped surface water network. The redevelopment will amend the parking layout slightly to suit the proposals, resulting in 700m^2 of parking bays and 650m^2 of circulation space.

3.3.4 Oxfordshire County Council's "Local Standards and Guidance for Surface Water Drainage on Major Development in Oxfordshire" document outlines that new development, including on brownfield sites, should always discharge at greenfield rates unless this is impractical. Calculations using Microdrainage's Quick Storage Estimate function (Appendix D) shows that limiting the discharge rate to QBar (1.8l/s) in the 1 in 100 year + 40% climate change rainfall event would require 340 to 450m^3 of attenuation storage. This would require in the region of 1,300m^3 of open graded coarse aggregate to be imported to site (with a similar volume of spoil exported); installed either as a 2.0m thickness of porous sub-base beneath the parking bays, or a 1.0m thickness if the whole concrete car park was replaced with a new surface with porous sub-base. This is an impractical solution and hence an approach seeking betterment over the existing discharge rates has been sought.

3.3.5 To achieve a practical volume of attenuation storage we have limited the attenuation storage to a 500mm blanket beneath the parking bays, for a total storage volume of 105m^3. This has allowed a betterment of 48 – 70% to be achieved over the design rainfall events (Table 3.1).

Return Period (years)	Brownfield Discharge Rate (l/s)	Proposed Discharge Rate (l/s)	Betterment Achieved
1 in 1	57.8	30.2	48%
1 in 30	123.2	37.7	69%
1 in 100	155.5	-	-
1 in 100 (+40% climate change)	-	46.0	70%

Table 3.1: Existing and Proposed Discharge Rates and Betterment Achieved.

3.3.6 To maximise the utilisation of the attenuation storage and the betterment across the rainfall events, a complex flow control is proposed for the outfall. This will comprise 2no. orifice plates. The lower orifice plate will be a 125mm diameter orifice, mounted at the invert level of the flow control chamber. The upper orifice plate, utilised in 1 in 30 year rainfall event and higher order events, will be mounted 1m above the invert level of the flow control chamber and comprise a 75mm orifice plate.

3.3.7 The porous sub-base of the parking bays will be connected to the existing piped network by filter drains. Where possible rainwater pipes will discharge directly into the porous sub-base via rainwater diffuser units, rather than into the piped network; this will add in attenuation of these flows.

3.3.8 It is proposed to resurface the parking bays with a porous surface course over the porous sub-base, and hence their surface area will drain directly into the porous sub-base. The majority of the remaining concrete surfacing, forming the circulation spaces of the car park, will drain by cross-fall onto the new porous-surfaced parking bays and hence into the drainage network. This mimics the existing drainage of the car park as the gullies where located along the edge of the parking bays, maintaining the same site levels will retain these low points at the edge of the porous paving. In accordance with CIRIA C753 (Section 20.5.1b), the approximately 1:1 ratio of the car parking bays to the remaining concrete area is acceptable for the discharge of the surface water flows from the concrete areas directly onto the porous surfacing.

3.3.9 The proposals have been calculated using Microdrainage, a Network Model report is included in Appendix E. The site is currently shown as being of medium to high risk of surface water flooding arising on-site (see Section 2.2.3). The calculations show the proposals will not flood up to and including the 1 in 100 year (+ 40% climate change) rainfall event; and hence will

eliminate surface water flooding on site for the design rainfall events and reduce the surface water flood risk for higher order rainfall events.

3.3.10 The drainage layout is included on drawing 48055-STN-ZZ-XX-DR-C-1001, Appendix F, with standard details included on drawing 48055-STN-ZZ-XX-DR-C-5001, Appendix G.

3.4 Volumetric Run-off Coefficient

3.4.1 In considering suitable volumetric run-off coefficients (C_v) values for the development we consulted Oxfordshire County Council's Local Standards and Guidance for Surface Water Drainage on Major Development in Oxfordshire document; however, no guidance on C_v values suitable for use locally in Oxfordshire was suggested.

3.4.2 The Wallingford Procedure Volume 4 states the average value of the Volumetric Run-off Coefficient (C_v) is 0.75. This value reflects the loss of some rainfall from impervious areas through cracks, into depressions and by drainage onto pervious areas. We have included an uplift in the value of C_v to 0.84 for winter rainfall events to reflect the higher antecedent wetness of the soils and surfaces due to winter weather conditions.

3.4.3 Whilst in some situations C_v values up to 0.95 may be necessary, this is commonly used where a roof catchment is collected directly into a sealed network via rainwater pipes. This scheme will direct roof run-off into the porous sub-base system and the external surfacing drain into the porous surfacing; these areas will not pass all surface water through the network as some will evaporate, infiltrate or run-off into soft landscaping areas. Consequently, we have used a C_v of 0.84 during winter events and a C_v value of 0.75 during summer events.

3.5 Contamination and Treatment

3.5.1 Guidance on contamination hazard levels, and suitable treatment, is given in the SuDS Manual 2015, CIRIA C753. The two sources of pollution the surface water network of this site may experience are rainfall-borne contaminants and contamination associated with the car park. In accordance with Table 26.2, these are classified as resulting as of *very low* and *medium* pollution hazard levels respectively.

3.5.2 CIRIA C753 outlines treatment indices in Table 26.3 (CIRIA C753), to quantify the treatment potential of differing SuDS systems as compared to the pollution hazard level of Table 26.2 (CIRIA C753). This table shows that filter drains will provide suitable treatment for the rainfall flows from the roofs. The pollution hazard associated with the car parking is higher, but the tables indicate the porous surfacing will provide sufficient treatment for this higher pollution load. This is also corroborated by the design notes accompanying section 9.7.3 of the Oxford City Council SuDS Guide (2018), showing permeable pavement systems provide sufficient treatment prior to infiltration of rainwater into the ground for the low to medium pollution hazard level classes, which includes car parking.

3.5.3 The site outfall at present includes a petrol interceptor. As this interceptor is understood to be functional it will be retained as a secondary treatment system in addition to the above outlined SuDS features.

3.6 Maintenance

Description of Features

3.6.1 With reference to the design proposals set out in drawing 48055-STN-ZZ-XX-DR-C-1001 (Appendix F), Table 3.2 below outlines which organisation or person is responsible for the maintenance of each of the elements of the sustainable drainage systems for this scheme.

Proposed SuDS Feature	Maintenance Responsibility
Porous Surfacing and Sub-base	Private Maintenance Company
Filter Drains	Private Maintenance Company
Catchpits	Private Maintenance Company
Flow Control Device	Private Maintenance Company

Table 3.2: Proposed SuDS Features Maintenance Responsibility

Types of maintenance

3.6.2 Maintenance requirements for the features in Table 3.2 have been reviewed and summarised in accordance with C753, the SuDS maintenance manual 2015, below:

- **Regular Maintenance:** consists of basic tasks carried out to a frequent and predictable schedule, including inspections/monitoring, silt or oil removal if required more frequently than once per year, vegetation management, sweeping of surfaces and litter and debris removal.

- **Occasional Maintenance:** comprises tasks that are likely to be required periodically, but on a much less frequent (typically less than yearly) and much less predictable basis than the regular tasks. Tasks considered occasional maintenance include sediment removal and filter replacement.

- **Remedial Actions:** describes the intermittent tasks that may be required to rectify faults associated with the system, although the likelihood of faults can be minimised by regular maintenance activities. Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events, and so timings are difficult to predict. Remedial maintenance can comprise activities such as: inlet and outlet repairs, reinstatement or realignment of edgings, infiltration surface rehabilitation, replacement of blocked filter materials/fabrics, construction stage sediment removal (although this activity should have been undertaken before the start of the maintenance contract) and system rehabilitation immediately following a pollution event.

3.6.3 It is important to note that all maintenance operations should be undertaken in accordance with the chosen manufacturer's guidance, recommendations and best practice.

3.6.4 Figure 3.2, below, an extract from CIRIA C753, shows anticipated maintenance requirements of SuDS features.

Typical key SuDS components operation and maintenance activities (for full specifications, see Chapters 11–23)

Operation and maintenance activity	SuDS component												
	Pond	Wetland	Detention basin	Infiltration basin	Soakaway	Infiltration trench	Filter drain	Modular storage	Pervious pavement	Swale/bioretention/ trees	Filter strip	Green roofs	Proprietary treatment systems
Regular maintenance													
Inspection	■	■	■	■	■	■	■	■	■	■	■	■	■
Litter and debris removal	■	■	■	■	□	■	■	□	■	■	■		□
Grass cutting	■	■	■	■	□	■	■	□	□	■	■		
Weed and invasive plant control	□	□	□	□		□	□		□		□	■	
Shrub management (including pruning)	□	□	□	□					□	□	□		
Shoreline vegetation management	■	■	□										
Aquatic vegetation management	■	■	□										
Occasional maintenance													
Sediment management[1]	■	■	■	■	■	■	■	■	■	■	■		■
Vegetation replacement	□	□	□	□						□	□	■	
Vacuum sweeping and brushing									■				
Remedial maintenance													
Structure rehabilitation /repair	□	□	□	□	□	□	□	□	□	□	□	□	
Infiltration surface reconditioning				□	□	□	□		□	□	□		

Key

■ will be required

□ may be required

Notes

1 Sediment should be collected and managed in pre-treatment systems, upstream of the main device.

Figure 3.2: Extract from CIRIA C753, summary of SuDS Maintenance Requirements.

3.6.5 Regular maintenance of the surface water network and SuDS features will ensure their continued operation and effectiveness in managing surface water and reducing local flood risks.

3.7 Further Drainage Design Notes

3.7.1 Catchpits are proposed for all new inspection chambers to capture silt where possible.

3.7.2 An allowance for urban creep has not been included in calculations; the impermeable area that is proposed cannot increase over the development's lifetime as it has been assumed to be 100% of the site area.

3.7.3 Flood exceedance flows are shown on drawing 48055-STN-ZZ-XX-DR-C-1002, Appendix H, showing that any potential flooding in extreme rainfall events will be channelled away for the proposed building on site.

4 Summary

4.1.1 It is proposed to redevelop the WIC House site to provide a new office and laboratory complex. This redevelopment will not change the impermeable area of the site, which is almost 100% impermeable.

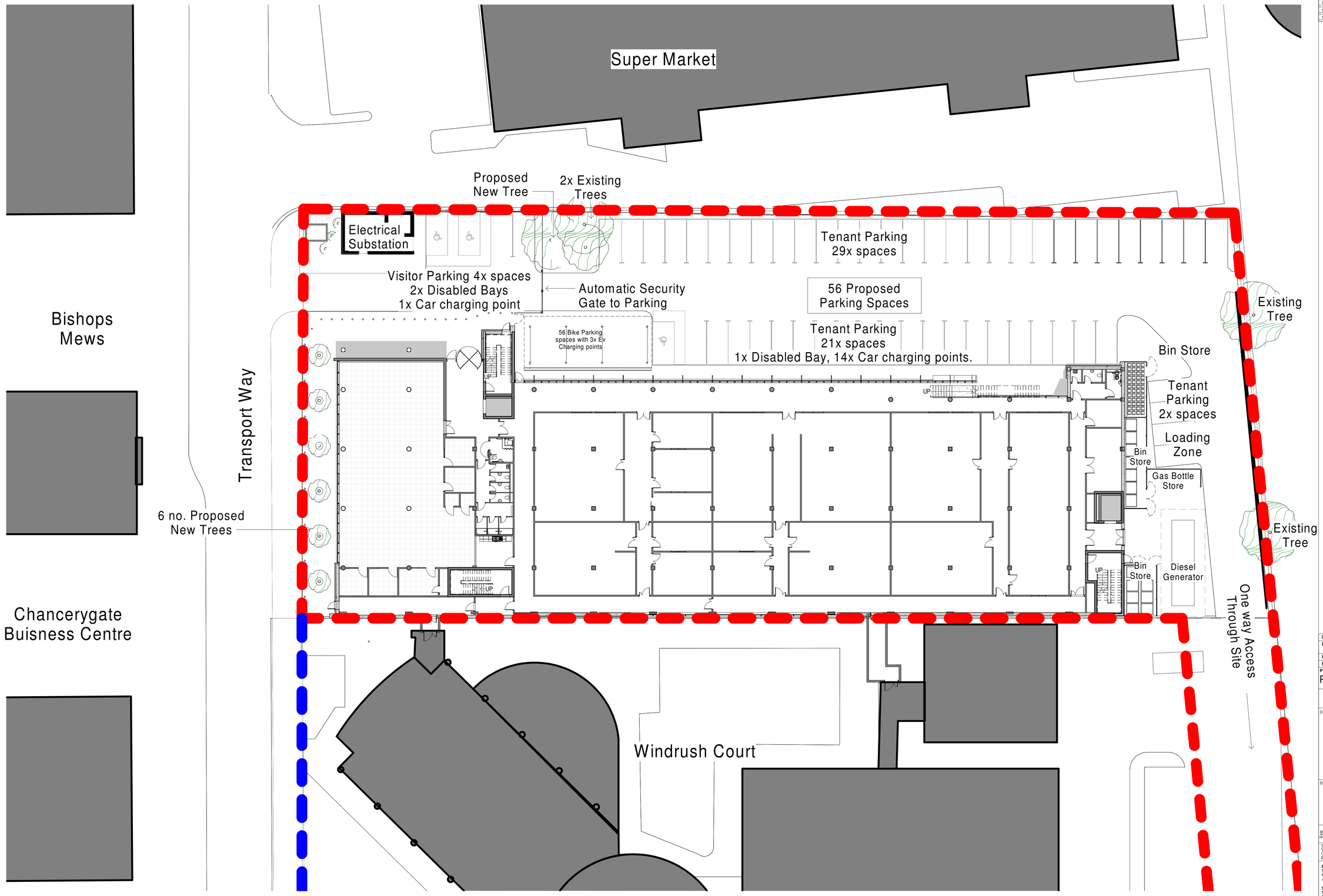
4.1.2 The surface water drainage strategy has been designed in accordance with Lead Local Flood Authority guidance for Major Developments. The site will re-use the existing outfall to the Thames Water surface water sewer in Transport Way. The site currently discharges at unrestricted brownfield rates, and the redevelopment will utilise porous paving and sub-base to provide treatment and attenuation storage before discharge at restricted rates. A betterment in discharge rates of 48 – 70% will be achieved across the design rainfall events.

4.1.3 The site is currently shown on Environment Agency data as being at medium to high risk of surface water flooding from on-site sources. The drainage design proposed will eliminate any causes of on-site flooding up to and including 1 in 100 year (+ 40% climate change allowance) rainfall event and hence will reduce the risk of surface water flooding on-site. Flood exceedance flows show that any potential flooding in rainfall events exceeding the design events will be directed away from the proposed building.

4.1.4 The presented drainage strategy demonstrates that the site boundary can be drained in a sustainable manner without increasing the risk of flooding to neighbouring properties for events up to and including the 1 in 100 year (plus 40% climate change) rainfall event.

4.1.5 This surface water drainage strategy has been prepared to demonstrate that the proposed development can meet national and local requirements.

Appendix A Site Layout



Proposed Site Plan
1 : 200

Notes
The Contractor is to check all dimensions and conditions on site before commencing. Do not scale from this drawing.

Scale Bars TO BE USED ONLY AS GUIDANCE

1:100	mm	1000	3000	5000	
1:200	mm	5000	8000		
1:500	M	5	15	25	
1:1250	M	10	30	50	70

North

Rev	Description	By	Date
P03	Issued for Planning	AMA	29/01/21
P02	Rear of building and parking amended to suit client requirments	PS	26/01/21
P01	Minor amendments to WIP plans	PS	07/01/21

Project Status: PLANNING
Drawing Status:

Client / Project
T-SQUARED

WIC HOUSE DEVELOPMENT

Drawing
Proposed Site Plan

Date	09/01/20	Scale	1 : 200		@ A1
3D Cd/Ind	PS	Drawn By	PS	Checked	MCA

Manchester:
55 King Street
Manchester M2 4LQ
+44 (0)161 831 7300

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www.fairhursts.com

FDG fairhursts design group

FDG Ref: 7682-08100 Status: Rev: P03

BS Ref: 7682-FDG-XX-XX-DR-A-08100-P03

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Appendix B Brownfield Run-off Calculations

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)	1	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	200	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 Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.245	4-8	0.146

Total Area Contributing (ha) = 0.391

Total Pipe Volume (m³) = 4.340

Network Design Table for Storm

« - Indicates pipe capacity < flow

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
S1.000	57.370	0.430	133.4	0.062	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	10.640	0.100	106.4	0.200	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	23.140	0.010	2314.0	0.129	0.00	0.0	0.600	o	300	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)
S1.000	50.98	5.85	69.000	0.062	0.0	0.0	0.0	1.13	44.9	8.6
S1.001	50.42	5.99	68.570	0.262	0.0	0.0	0.0	1.27	50.4	35.8
S1.002	46.08	7.20	68.470	0.391	0.0	0.0	0.0	0.32	22.5«	48.8

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)
S1	70.480	1.480	Open Manhole	1200	S1.000	69.000	225				
S2	70.370	1.800	Open Manhole	1200	S1.001	68.570	225	S1.000	68.570	225	
S3	70.390	1.920	Open Manhole	1200	S1.002	68.470	300	S1.001	68.470	225	
S	70.070	1.610	Open Manhole	0		OUTFALL		S1.002	68.460	300	

No coordinates have been specified, layout information cannot be produced.

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)
S1.000	o	225	S1	70.480	69.000	1.255	Open Manhole	1200
S1.001	o	225	S2	70.370	68.570	1.575	Open Manhole	1200
S1.002	o	300	S3	70.390	68.470	1.620	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	57.370	133.4	S2	70.370	68.570	1.575	Open Manhole	1200
S1.001	10.640	106.4	S3	70.390	68.470	1.695	Open Manhole	1200
S1.002	23.140	2314.0	S	70.070	68.460	1.310	Open Manhole	0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.062	0.062	0.062
1.001	-	-	100	0.200	0.200	0.200
1.002	-	-	100	0.129	0.129	0.129
				Total	Total	Total
				0.391	0.391	0.391

Network Classifications for Storm

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
S1.000	S1	225	1.255	1.575	Unclassified	1200	0	1.255	Unclassified
S1.001	S2	225	1.575	1.695	Unclassified	1200	0	1.575	Unclassified
S1.002	S3	300	1.310	1.620	Unclassified	1200	0	1.620	Unclassified

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.002	S	70.070	68.460	68.090	0	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 0
Number of Online Controls 0 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 0.400
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, 2, 30, 100
Climate Change (%) 0, 0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	1	+0%	30/15 Summer				69.068
S1.001	S2	15 Winter	1	+0%	1/15 Summer				68.852
S1.002	S3	15 Winter	1	+0%	1/15 Summer				68.797

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.157	0.000	0.19		8.3	OK	
S1.001	S2	0.057	0.000	0.73		31.1	SURCHARGED	
S1.002	S3	0.027	0.000	2.17		45.3	SURCHARGED	

2 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 0
Number of Online Controls 0 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 0.400
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, 2, 30, 100
Climate Change (%) 0, 0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	2	+0%	30/15 Summer				69.078
S1.001	S2	15 Winter	2	+0%	1/15 Summer				68.919
S1.002	S3	15 Winter	2	+0%	1/15 Summer				68.830

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.147	0.000	0.25		10.8	OK	
S1.001	S2	0.124	0.000	0.93		39.5	SURCHARGED	
S1.002	S3	0.060	0.000	2.77		57.8	SURCHARGED	

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 0
Number of Online Controls 0 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 0.400
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, 2, 30, 100
Climate Change (%) 0, 0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	30	+0%	30/15 Summer				69.590
S1.001	S2	15 Winter	30	+0%	1/15 Summer				69.519
S1.002	S3	15 Winter	30	+0%	1/15 Summer				69.138

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.365	0.000	0.50		21.6	SURCHARGED	
S1.001	S2	0.724	0.000	1.94		82.0	SURCHARGED	
S1.002	S3	0.368	0.000	5.90		123.2	SURCHARGED	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Storage Structures 0
Number of Online Controls 0 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 0.400
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, 2, 30, 100
Climate Change (%) 0, 0, 0, 0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Winter	100	+0%	30/15 Summer				70.094
S1.001	S2	15 Winter	100	+0%	1/15 Summer				69.959
S1.002	S3	15 Winter	100	+0%	1/15 Summer				69.367

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.869	0.000	0.65		28.0	SURCHARGED	
S1.001	S2	1.164	0.000	2.43		102.9	SURCHARGED	
S1.002	S3	0.597	0.000	7.45		155.5	SURCHARGED	

Appendix C Greenfield Run-off Calculations

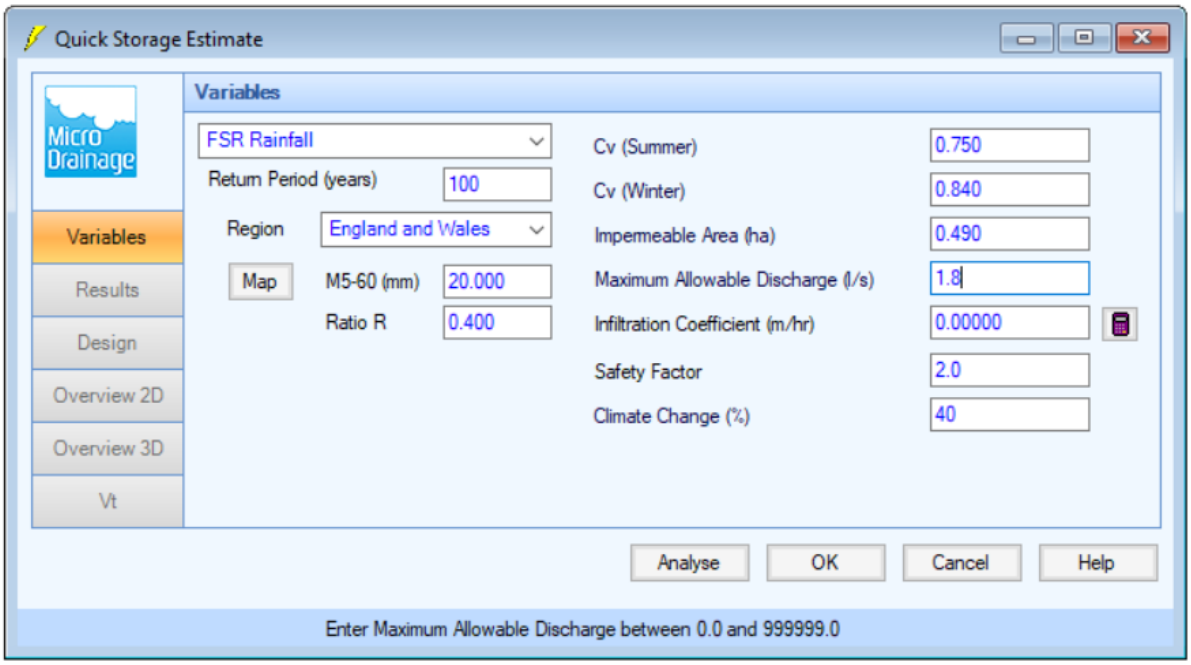
ICP SUDS Mean Annual Flood

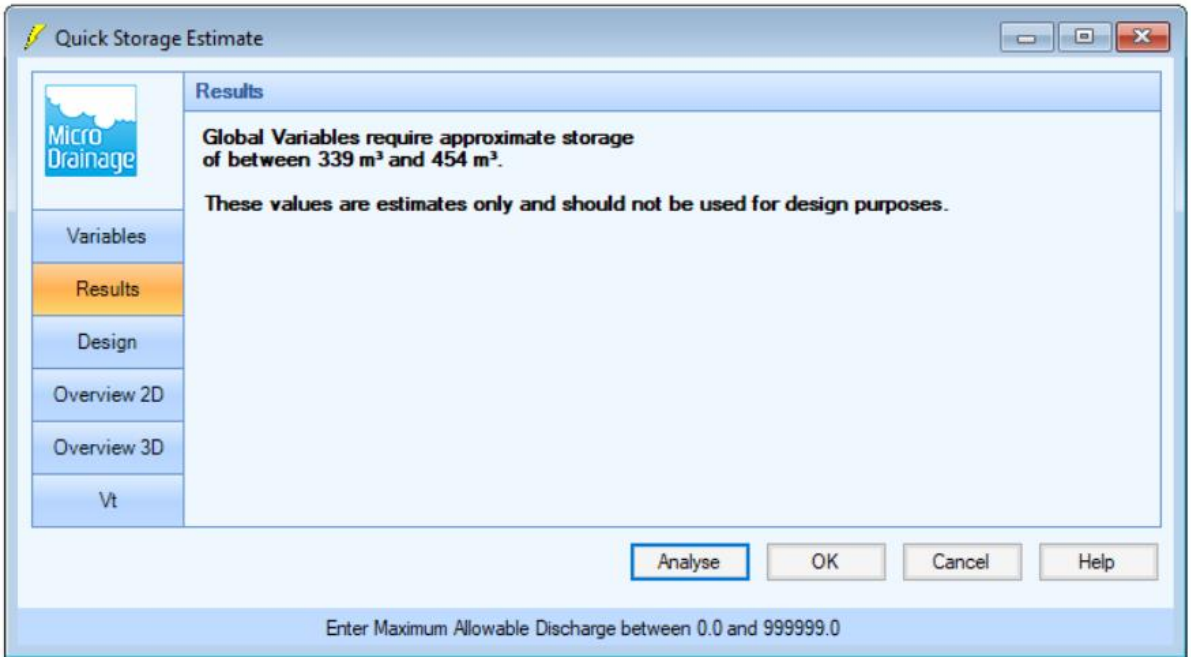
Input

Return Period (years)	2	Soil	0.450
Area (ha)	0.475	Urban	0.000
SAAR (mm)	624	Region Number	Region 6

Results	**l/s**
QBAR Rural	1.8
QBAR Urban	1.8
Q2 years	1.6
Q1 year	1.6
Q30 years	4.1
Q100 years	5.8

Appendix D Quick Storage Estimate for Greenfield Discharge Rates


Quick Storage Estimate
Micro Drainage
Variables
Results
Design
Overview 2D
Overview 3D
Vt
Variables
FSR Rainfall
Return Period (years)
100
Region
England and Wales
Map
M5-60 (mm)
20.000
Ratio R
0.400
Cv (Summer)
0.750
Cv (Winter)
0.840
Impermeable Area (ha)
0.490
Maximum Allowable Discharge (l/s)
1.8
Infiltration Coefficient (m/hr)
0.00000
Safety Factor
2.0
Climate Change (%)
40
Analyse
OK
Cancel
Help
Enter Maximum Allowable Discharge between 0.0 and 999999.0


Quick Storage Estimate
Micro Drainage
Results
Variables
Results
Design
Overview 2D
Overview 3D
Vt
Global Variables require approximate storage
of between 339 m³ and 454 m³.
These values are estimates only and should not be used for design purposes.
Analyse
OK
Cancel
Help
Enter Maximum Allowable Discharge between 0.0 and 999999.0

Appendix E Surface Water Design Calculations

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)	1	PIMP (%)	100
M5-60 (mm)	20.000	Add Flow / Climate Change (%)	0
Ratio R	0.400	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	200	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 Inverts

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.284	4-8	0.208

Total Area Contributing (ha) = 0.492

Total Pipe Volume (m³) = 5.433

Network Design Table for Storm

« - Indicates pipe capacity < flow

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
S1.000	27.500	0.180	152.8	0.031	5.00	0.0	0.600	o	225	Pipe/Conduit	
S1.001	28.685	0.215	133.4	0.094	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	28.685	0.215	133.4	0.120	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	10.640	0.100	106.4	0.155	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.004	23.140	0.010	2314.0	0.092	0.00	0.0	0.600	o	300	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)
S1.000	52.72	5.43	69.180	0.031	0.0	0.0	0.0	1.06	42.0	4.4
S1.001	50.94	5.86	69.000	0.125	0.0	0.0	0.0	1.13	44.9	17.2
S1.002	49.28	6.28	68.785	0.245	0.0	0.0	0.0	1.13	44.9	32.7
S1.003	48.76	6.42	68.570	0.400	0.0	0.0	0.0	1.27	50.4«	52.8
S1.004	44.73	7.63	68.470	0.492	0.0	0.0	0.0	0.32	22.5«	59.6

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)
S1	70.720	1.540	Open Manhole	1200	S1.000	69.180	225				
S1	70.480	1.480	Open Manhole	1200	S1.001	69.000	225	S1.000	69.000	225	
S3	70.425	1.640	Open Manhole	1200	S1.002	68.785	225	S1.001	68.785	225	
S2	70.370	1.800	Open Manhole	1200	S1.003	68.570	225	S1.002	68.570	225	
S3	70.390	1.920	Open Manhole	1200	S1.004	68.470	300	S1.003	68.470	225	
S	70.070	1.610	Open Manhole	0		OUTFALL		S1.004	68.460	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S3	288.690	167.500	288.690	167.500	Required	

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)
S1.000	o	225	S1	70.720	69.180	1.315	Open Manhole	1200
S1.001	o	225	S1	70.480	69.000	1.255	Open Manhole	1200
S1.002	o	225	S3	70.425	68.785	1.415	Open Manhole	1200
S1.003	o	225	S2	70.370	68.570	1.575	Open Manhole	1200
S1.004	o	300	S3	70.390	68.470	1.620	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	27.500	152.8	S1	70.480	69.000	1.255	Open Manhole	1200
S1.001	28.685	133.4	S3	70.425	68.785	1.415	Open Manhole	1200
S1.002	28.685	133.4	S2	70.370	68.570	1.575	Open Manhole	1200
S1.003	10.640	106.4	S3	70.390	68.470	1.695	Open Manhole	1200
S1.004	23.140	2314.0	S	70.070	68.460	1.310	Open Manhole	0

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.031	0.031	0.031
1.001	-	-	100	0.094	0.094	0.094
1.002	-	-	100	0.120	0.120	0.120
1.003	-	-	100	0.155	0.155	0.155
1.004	-	-	100	0.092	0.092	0.092
				Total	Total	Total
				0.492	0.492	0.492

Network Classifications for Storm

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
S1.000	S1	225	1.255	1.315	Unclassified	1200	0	1.315	Unclassified
S1.001	S1	225	1.255	1.415	Unclassified	1200	0	1.255	Unclassified
S1.002	S3	225	1.415	1.575	Unclassified	1200	0	1.415	Unclassified
S1.003	S2	225	1.575	1.695	Unclassified	1200	0	1.575	Unclassified
S1.004	S3	300	1.310	1.620	Unclassified	1200	0	1.620	Unclassified

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.004	S	70.070	68.460	68.090	0	0

Simulation Criteria for Storm

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

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	5	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.400		

Online Controls for Storm

Complex Manhole: S3, DS/PN: S1.004, Volume (m³): 2.5

Orifice

Diameter (m) 0.125 Discharge Coefficient 0.600 Invert Level (m) 68.470

Orifice

Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 69.470

Storage Structures for Storm

Porous Car Park Manhole: S1, DS/PN: S1.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	10.0
Membrane Percolation (mm/hr)	1000	Length (m)	5.0
Max Percolation (l/s)	13.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	69.500	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: S1, DS/PN: S1.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	44.0
Max Percolation (l/s)	61.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	69.500	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: S3, DS/PN: S1.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	40.0
Max Percolation (l/s)	55.6	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	69.500	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: S2, DS/PN: S1.003

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	35.0
Max Percolation (l/s)	48.6	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	69.500	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: S3, DS/PN: S1.004

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.0
Membrane Percolation (mm/hr)	1000	Length (m)	12.5
Max Percolation (l/s)	17.4	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	69.500	Cap Volume Depth (m)	0.500

Manhole Headloss for Storm

PN	US/MH Name	US/MH Headloss
S1.000	S1	0.500
S1.001	S1	0.500
S1.002	S3	0.500
S1.003	S2	0.500
S1.004	S3	0.500

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.400 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.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S1	30 Winter	1	+0%	1/15 Winter				69.503	0.098	0.000	0.08
S1.001	S1	30 Winter	1	+0%	1/15 Summer				69.499	0.274	0.000	0.25
S1.002	S3	30 Winter	1	+0%	1/15 Summer				69.482	0.472	0.000	0.36
S1.003	S2	30 Winter	1	+0%	1/15 Summer				69.447	0.652	0.000	0.58
S1.004	S3	30 Winter	1	+0%	1/15 Summer				69.412	0.642	0.000	1.44

PN	US/MH Name	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1		5	3.2	SURCHARGED	
S1.001	S1		8	10.6	SURCHARGED	
S1.002	S3		12	15.3	SURCHARGED	
S1.003	S2		15	24.4	SURCHARGED	
S1.004	S3		15	30.1	SURCHARGED	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.400 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.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S1	30 Winter	30	+0%	1/15 Winter				69.715	0.310	0.000	0.18
S1.001	S1	30 Winter	30	+0%	1/15 Summer				69.711	0.486	0.000	0.61
S1.002	S3	30 Winter	30	+0%	1/15 Summer				69.698	0.688	0.000	0.69
S1.003	S2	30 Winter	30	+0%	1/15 Summer				69.672	0.877	0.000	0.73
S1.004	S3	15 Winter	30	+0%	1/15 Summer				69.636	0.866	0.000	1.81

PN	US/MH Name	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1		20	7.0	SURCHARGED	
S1.001	S1		19	25.3	SURCHARGED	
S1.002	S3		19	29.0	SURCHARGED	
S1.003	S2		17	31.1	SURCHARGED	
S1.004	S3		11	37.7	SURCHARGED	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 5 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FSR M5-60 (mm) 20.000 Cv (Summer) 0.750
Region England and Wales Ratio R 0.400 Cv (Winter) 0.840

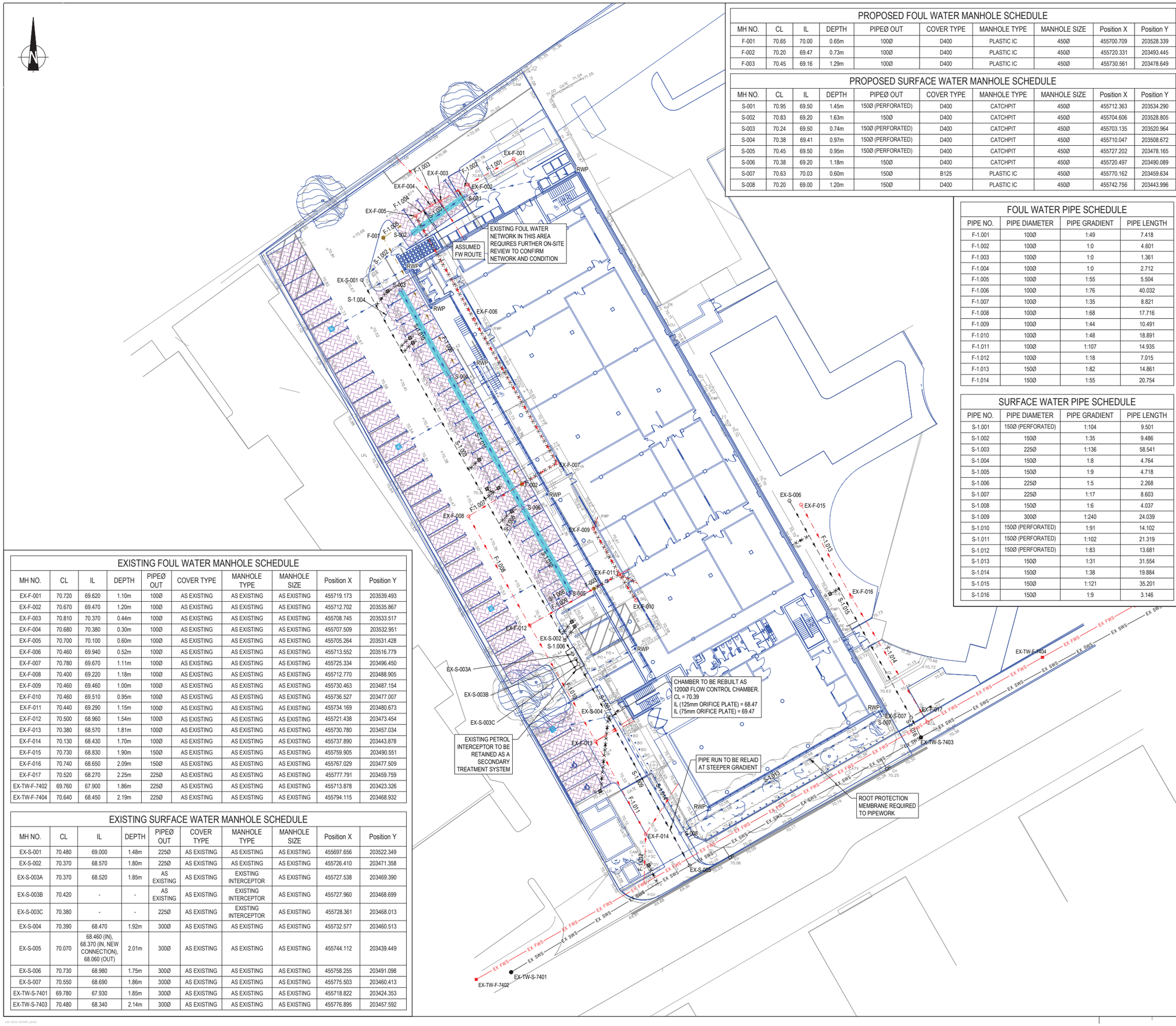
Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

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.	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S1	60 Winter	100	+40%	1/15 Winter				70.123	0.718	0.000	0.14
S1.001	S1	60 Winter	100	+40%	1/15 Summer				70.114	0.889	0.000	0.52
S1.002	S3	60 Winter	100	+40%	1/15 Summer				70.079	1.069	0.000	0.68
S1.003	S2	60 Winter	100	+40%	1/15 Summer				69.990	1.195	0.000	0.88
S1.004	S3	30 Winter	100	+40%	1/15 Summer				69.943	1.173	0.000	2.20

PN	US/MH Name	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1		44	5.6	SURCHARGED	
S1.001	S1		42	21.9	SURCHARGED	
S1.002	S3		40	28.5	SURCHARGED	
S1.003	S2		30	37.4	SURCHARGED	
S1.004	S3		25	46.0	SURCHARGED	

Appendix F Surface Water Drainage Layout



PROPOSED FOUL WATER MANHOLE SCHEDULE

MH NO.	CL	IL	DEPTH	PIPEØ OUT	COVER TYPE	MANHOLE TYPE	MANHOLE SIZE	Position X	Position Y
F-001	70.65	70.00	0.65m	100Ø	D400	PLASTIC IC	450Ø	455700.709	203528.339
F-002	70.20	69.47	0.73m	100Ø	D400	PLASTIC IC	450Ø	455720.331	203493.445
F-003	70.45	69.16	1.29m	100Ø	D400	PLASTIC IC	450Ø	455730.561	203478.649

PROPOSED SURFACE WATER MANHOLE SCHEDULE

MH NO.	CL	IL	DEPTH	PIPEØ OUT	COVER TYPE	MANHOLE TYPE	MANHOLE SIZE	Position X	Position Y
S-001	70.95	69.50	1.45m	150Ø (PERFORATED)	D400	CATCHPIT	450Ø	455712.363	203534.290
S-002	70.83	69.20	1.63m	150Ø	D400	CATCHPIT	450Ø	455704.606	203528.805
S-003	70.24	69.50	0.74m	150Ø (PERFORATED)	D400	CATCHPIT	450Ø	455703.135	203520.964
S-004	70.38	69.41	0.97m	150Ø (PERFORATED)	D400	CATCHPIT	450Ø	455710.047	203508.672
S-005	70.45	69.50	0.95m	150Ø (PERFORATED)	D400	CATCHPIT	450Ø	455727.202	203478.165
S-006	70.38	69.20	1.18m	150Ø	D400	CATCHPIT	450Ø	455720.497	203490.089
S-007	70.63	70.03	0.60m	150Ø	B125	PLASTIC IC	450Ø	455770.162	203459.634
S-008	70.20	69.00	1.20m	150Ø	D400	PLASTIC IC	450Ø	455742.756	203443.996

FOUL WATER PIPE SCHEDULE

PIPE NO.	PIPE DIAMETER	PIPE GRADIENT	PIPE LENGTH
F-1.001	100Ø	1:49	7.418
F-1.002	100Ø	1:0	4.601
F-1.003	100Ø	1:0	1.361
F-1.004	100Ø	1:0	2.712
F-1.005	100Ø	1:55	5.504
F-1.006	100Ø	1:76	40.032
F-1.007	100Ø	1:35	8.821
F-1.008	100Ø	1:68	17.716
F-1.009	100Ø	1:44	10.491
F-1.010	100Ø	1:48	18.891
F-1.011	100Ø	1:107	14.935
F-1.012	100Ø	1:18	7.015
F-1.013	150Ø	1:82	14.861
F-1.014	150Ø	1:55	20.754

SURFACE WATER PIPE SCHEDULE

PIPE NO.	PIPE DIAMETER	PIPE GRADIENT	PIPE LENGTH
S-1.001	150Ø (PERFORATED)	1:104	9.501
S-1.002	150Ø	1:35	9.486
S-1.003	225Ø	1:136	58.541
S-1.004	150Ø	1:8	4.764
S-1.005	150Ø	1:9	4.718
S-1.006	225Ø	1:5	2.268
S-1.007	225Ø	1:17	8.603
S-1.008	150Ø	1:6	4.037
S-1.009	300Ø	1:240	24.039
S-1.010	150Ø (PERFORATED)	1:91	14.102
S-1.011	150Ø (PERFORATED)	1:102	21.319
S-1.012	150Ø (PERFORATED)	1:83	13.681
S-1.013	150Ø	1:31	31.554
S-1.014	150Ø	1:38	19.884
S-1.015	150Ø	1:121	35.201
S-1.016	150Ø	1:9	3.146

EXISTING FOUL WATER MANHOLE SCHEDULE

MH NO.	CL	IL	DEPTH	PIPEØ OUT	COVER TYPE	MANHOLE TYPE	MANHOLE SIZE	Position X	Position Y
EX-F-001	70.720	69.620	1.10m	100Ø	AS EXISTING	AS EXISTING	AS EXISTING	455719.173	203539.493
EX-F-002	70.670	69.470	1.20m	100Ø	AS EXISTING	AS EXISTING	AS EXISTING	455712.702	203535.867
EX-F-003	70.810	70.370	0.44m	100Ø	AS EXISTING	AS EXISTING	AS EXISTING	455708.745	203533.517
EX-F-004	70.680	70.380	0.30m	100Ø	AS EXISTING	AS EXISTING	AS EXISTING	455707.509	203532.951
EX-F-005	70.700	70.100	0.60m	100Ø	AS EXISTING	AS EXISTING	AS EXISTING	455705.264	203531.428
EX-F-006	70.460	69.940	0.52m	100Ø	AS EXISTING	AS EXISTING	AS EXISTING	455713.552	203516.779
EX-F-007	70.780	69.670	1.11m	100Ø	AS EXISTING	AS EXISTING	AS EXISTING	455725.334	203496.450
EX-F-008	70.400	69.220	1.18m	100Ø	AS EXISTING	AS EXISTING	AS EXISTING	455712.770	203488.905
EX-F-009	70.460	69.460	1.00m	100Ø	AS EXISTING	AS EXISTING	AS EXISTING	455730.463	203487.154
EX-F-010	70.460	69.510	0.95m	100Ø	AS EXISTING	AS EXISTING	AS EXISTING	455736.527	203477.007
EX-F-011	70.440	69.290	1.15m	100Ø	AS EXISTING	AS EXISTING	AS EXISTING	455734.169	203480.673
EX-F-012	70.500	68.960	1.54m	100Ø	AS EXISTING	AS EXISTING	AS EXISTING	455721.438	203473.454
EX-F-013	70.380	68.570	1.81m	100Ø	AS EXISTING	AS EXISTING	AS EXISTING	455730.780	203457.034
EX-F-014	70.130	68.430	1.70m	100Ø	AS EXISTING	AS EXISTING	AS EXISTING	455737.890	203443.878
EX-F-015	70.730	68.830	1.90m	150Ø	AS EXISTING	AS EXISTING	AS EXISTING	455759.905	203490.551
EX-F-016	70.740	68.650	2.09m	150Ø	AS EXISTING	AS EXISTING	AS EXISTING	455767.029	203477.509
EX-F-017	70.520	68.270	2.25m	225Ø	AS EXISTING	AS EXISTING	AS EXISTING	455777.791	203459.759
EX-TW-F-7402	69.760	67.900	1.86m	225Ø	AS EXISTING	AS EXISTING	AS EXISTING	455713.878	203423.326
EX-TW-F-7404	70.640	68.450	2.19m	225Ø	AS EXISTING	AS EXISTING	AS EXISTING	455794.115	203468.932

EXISTING SURFACE WATER MANHOLE SCHEDULE

MH NO.	CL	IL	DEPTH	PIPEØ OUT	COVER TYPE	MANHOLE TYPE	MANHOLE SIZE	Position X	Position Y
EX-S-001	70.480	69.000	1.48m	225Ø	AS EXISTING	AS EXISTING	AS EXISTING	455697.656	203522.349
EX-S-002	70.370	68.570	1.80m	225Ø	AS EXISTING	AS EXISTING	AS EXISTING	455726.410	203471.358
EX-S-003A	70.370	68.520	1.85m	AS EXISTING	AS EXISTING	EXISTING INTERCEPTOR	AS EXISTING	455727.538	203469.390
EX-S-003B	70.420	-	-	AS EXISTING	AS EXISTING	EXISTING INTERCEPTOR	AS EXISTING	455727.960	203468.699
EX-S-003C	70.380	-	-	225Ø	AS EXISTING	EXISTING INTERCEPTOR	AS EXISTING	455728.361	203468.013
EX-S-004	70.390	68.470	1.92m	300Ø	AS EXISTING	AS EXISTING	AS EXISTING	455732.577	203460.513
EX-S-005	70.070	68.460 (IN), 68.370 (IN, NEW CONNECTION), 68.060 (OUT)	2.01m	300Ø	AS EXISTING	AS EXISTING	AS EXISTING	455744.112	203439.449
EX-S-006	70.730	68.980	1.75m	300Ø	AS EXISTING	AS EXISTING	AS EXISTING	455758.255	203491.098
EX-S-007	70.550	68.690	1.86m	300Ø	AS EXISTING	AS EXISTING	AS EXISTING	455775.503	203460.413
EX-TW-S-7401	69.780	67.930	1.85m	300Ø	AS EXISTING	AS EXISTING	AS EXISTING	455718.822	203424.353
EX-TW-S-7403	70.480	68.340	2.14m	300Ø	AS EXISTING	AS EXISTING	AS EXISTING	455776.895	203457.592

NOTES:

1. DO NOT SCALE FROM THIS DRAWING.
2. THIS DRAWING HAS BEEN PRODUCED IN COLOUR AND SHOULD BE REPRODUCED IN COLOUR.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELATED PROJECT DRAWINGS AND DOCUMENTS. ANY DISCREPANCIES BETWEEN THIS DRAWING AND ANY OTHER RELEVANT ENGINEERING DRAWING SHOULD BE REPORTED TO THE DESIGN ENGINEER IMMEDIATELY.
4. ALL DIMENSIONS ARE IN m UNLESS OTHERWISE STATED.
5. ALL LEVELS ARE IN m AOD UNLESS OTHERWISE STATED.
6. TOPOGRAPHICAL INFORMATION TAKEN FROM MK SURVEYS DRAWING NUMBER 29110 'TOPOGRAPHICAL SURVEY' DATED OCTOBER 2020.
7. EXISTING DRAINAGE INFORMATION TAKEN FROM MK SURVEYS DRAWING NUMBER 29110 'TOPOGRAPHICAL AND PAS 128:2014 UTILITY SURVEY' DATED OCTOBER 2020.
8. PROPOSED ARCHITECT'S PLAN OBTAINED FROM FAIRHURSTS DESIGN GROUP DRAWING NUMBER 7682-FDG-A-11101, DATED DECEMBER 2020.
9. ALL WORK TO ADOPTABLE SEWERS WILL BE CARRIED OUT STRICTLY IN ACCORDANCE WITH THE CODE FOR ADOPTION (APRIL 2020) AND THE REQUIREMENTS OF THAMES WATER. ALL PERMISSIONS MUST BE IN PLACE BEFORE WORK COMMENCES.
10. ALL MATERIAL USED IN THE CONSTRUCTION OF DRAINS AND MANHOLES SHALL COMPLY TO THE RELEVANT BRITISH STANDARDS AND BE KITE MARKED WHERE APPROPRIATE.
11. ALL FOUL CONNECTIONS TO BE LAID AT A MINIMUM GRADIENT OF 1:40, UNLESS OTHERWISE SPECIFIED.
12. ALL RWP CONNECTIONS TO BE 100mmØ AT A MINIMUM GRADIENT OF 1:100, UNLESS OTHERWISE SPECIFIED.
13. ALL SVPS SHALL HAVE RODDING ACCESS PLATES FITTED AT THEIR BASES (GROUND FLOOR LEVEL).
14. ALL DRAINAGE TO BE INSTALLED IN ACCORDANCE WITH RELEVANT BUILDING REGULATIONS DOCUMENTS AND CURRENT CODE FOR ADOPTION (APRIL 2020) WHERE APPLICABLE.
15. INVERT LEVELS, SIZE AND COVER LEVELS TO EXISTING MANHOLES AND SEWERS TO BE CHECKED PRIOR TO ANY CONSTRUCTION. ANY DISCREPANCIES TO BE REPORTED IMMEDIATELY.
16. ALL EXISTING DRAINAGE MUST BE CHECKED FOR ANY LIVE CONNECTIONS BEFORE REMOVAL OR GROUTING, AND THE ENGINEER NOTIFIED IF LIVE CONNECTIONS ARE FOUND.
17. RWP POSITIONS HAVE BEEN ASSUMED AND ARE INDICATIVE.

EXISTING KEY:

- EX SWS — SURFACE WATER SEWER (THAMES WATER)
- EX-TW-S-7401 — SURFACE WATER MANHOLE (THAMES WATER)
- SURFACE WATER SEWER (PRIVATE)
- EX-S-044 — SURFACE WATER MANHOLE (PRIVATE)
- G — SURFACE WATER GULLY
- EX FWS — FOUL WATER SEWER (THAMES WATER)
- EX-TW-F-7402 — FOUL WATER MANHOLE (THAMES WATER)
- FOUL WATER SEWER (PRIVATE)
- EX-F-043 — FOUL WATER MANHOLE (PRIVATE)

PROPOSED KEY:

- ARCHITECT'S SITE LAYOUT
- FOUL WATER SEWER TO BE ABANDONED
- SURFACE WATER SEWER TO BE ABANDONED
- GULLY TO BE ABANDONED
- PRIVATE FOUL WATER PIPEWORK
- F-001 — PRIVATE FOUL WATER CHAMBER
- PRIVATE SURFACE WATER PIPEWORK
- PRIVATE SURFACE WATER FILTER DRAIN
- S-001 — PRIVATE SURFACE WATER CHAMBER
- RELOCATED SURFACE WATER GULLY
- RAINWATER DIFFUSER UNIT
- RWP — INDICATIVE RWP LOCATIONS (REFER TO ARCHITECT'S LAYOUTS)
- POROUS PAVING - MINIMUM 500mm OF POROUS SUB-BASE. TANKED, WITH INVERT LEVEL OF POROUS SUB-BASE 69.50mAOD.

Mark	Revision	Date	Drawn	Chkd	Appd
A	Drawing renumbered and draft stamp removed. Proposed drainage amended to suit revised architect's layout.	26.01.21	JL	JS	SH

SCALING NOTE: Do not scale this drawing - any errors or omissions shall be reported to Stantec without delay.
UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.

Drawing Issue Status

FOR PLANNING

WIC HOUSE
TRANSPORT WAY

PROPOSED DRAINAGE ARRANGMENT

Client

T-SQUARED P4 LTD

Stantec

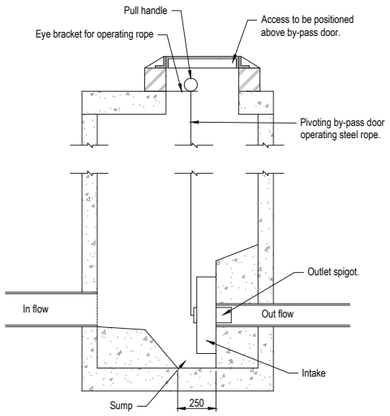
stantec.com/uk

OXFORD
Tel: 01865 410 000

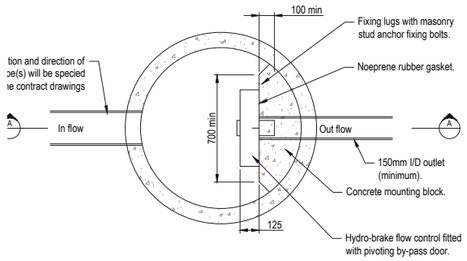
Date of 1st Issue	Designed	Drawn
08.01.2021	JL	JL
A1 Scale	**Checked**	**Approved**
1:250	JS	SH

Drawing Number	Revision
48055-STN-ZZ-XX-DR-C-1001	A

Appendix G Surface Water Drainage Standard Details



SECTION A-A

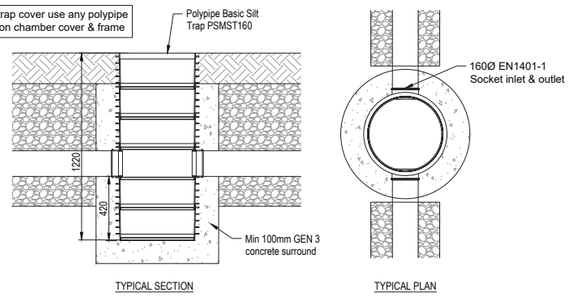


TYPICAL PLAN

1200Ø FLOW CONTROL CHAMBER

SCALE 1:20

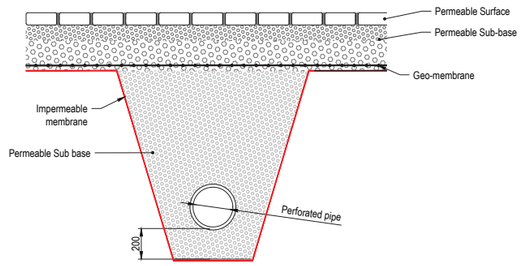
NOTE: For silt trap cover use any polypipe 460Ø inspection chamber cover & frame



TYPICAL SECTION TYPICAL PLAN

PLASTIC CATCHPIT DETAIL

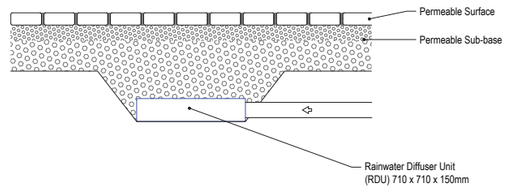
SCALE 1:20



TYPICAL SECTION

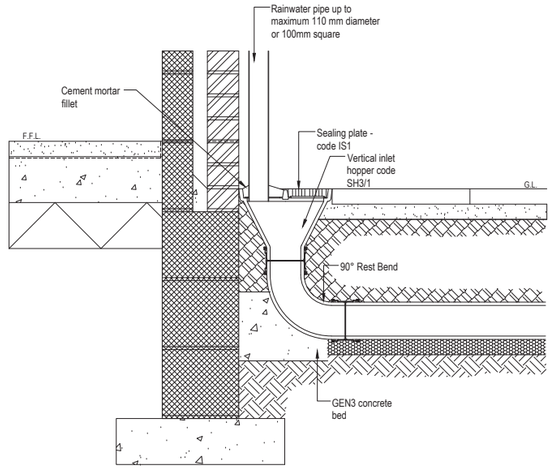
FILTER DRAIN UNDER POROUS BLOCK PAVING DETAIL

SCALE 1:20



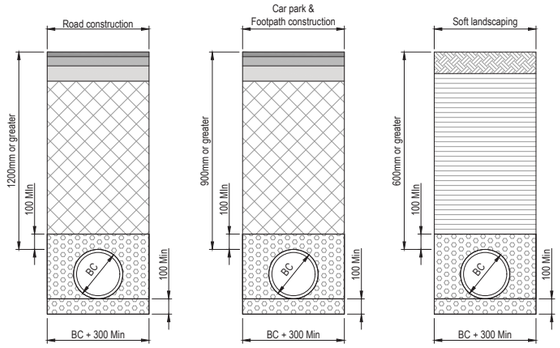
RAINWATER DIFFUSER UNIT

NTS

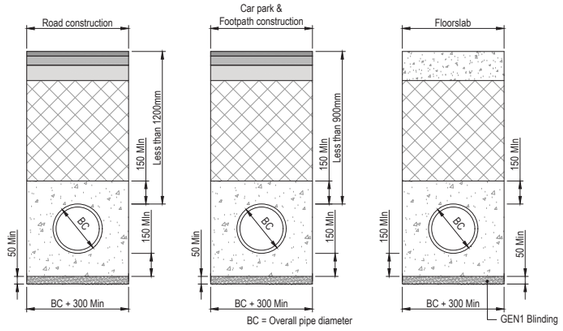


RWP TO BELOW GROUND DRAINAGE

NTS



CLASS "P" BEDDING DETAIL CLASS "P" BEDDING DETAIL CLASS "P" BEDDING DETAIL



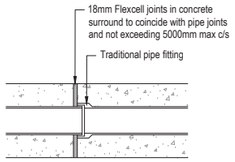
CLASS "Z" BEDDING DETAIL CLASS "Z" BEDDING DETAIL CLASS "Z" BEDDING DETAIL

Granular Bedding and Sidefill

GEN3 Concrete

DOT Type 1 granular fill backfill well compacted in 150mm layers

Material excavated from trench compacted in layers not exceeding 300mm thick. do not use heavy compactors before there is 600mm of material over pipes.



FLEXIBLE JOINTS IN CLASS "Z" CONCRETE SURROUND

Extract from Table A2 WIS 4-08-02

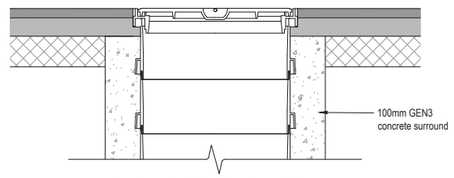
Processed granular bedding and sidefill materials for flexible pipes

PIPE NOMINAL BORE (mm)	NOMINAL MAXIMUM PARTICLE SIZE (mm)	MATERIALS SPECIFIED IN BRITISH STANDARDS
100	10	10mm nominal single-size
Over 100 to 500	15	10 or 14mm nominal single-size or 14mm to 5mm graded
Over 150 to 300	20	10, 14 or 20mm nominal single-size or 14mm to 5mm graded or 20mm to 5mm graded
Over 300 to 550	20	14 or 20mm nominal single-size or 14mm to 5mm graded or 20mm to 5mm graded
Over 550	40	14, 20 or 40mm nominal single-size or 14mm to 5mm graded or 20mm to 5mm graded or 40mm to 5mm graded

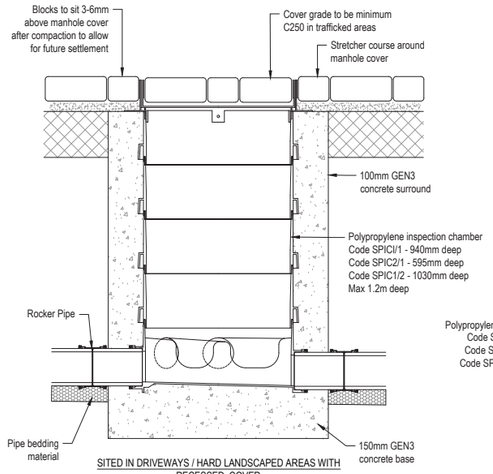
PLASTIC PIPE BEDDING DETAIL

SCALE 1:20

NB Chamber and base sizes used are to suit pipe network

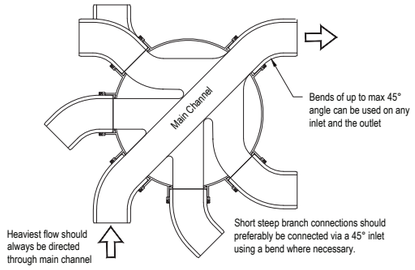


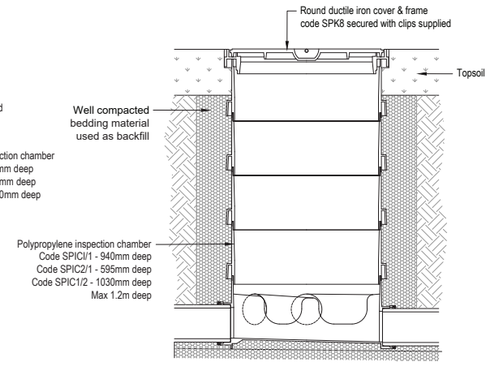
SITED IN TARMAC AREAS WITH STANDARD ROUND COVER



SITED IN DRIVEWAYS / HARD LANDSCAPED AREAS WITH RECESSED COVER

Note Chamber orientation to allow for 90° change in sewer direction.





SITED IN LANDSCAPED AREAS WITH STANDARD ROUND COVER

PLASTIC INSPECTION CHAMBER DETAIL

SCALE 1:10

NOTES:

1. DO NOT SCALE FROM THIS DRAWING.
2. THIS DRAWING HAS BEEN PRODUCED IN COLOUR AND SHOULD BE REPRODUCED IN COLOUR.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELATED PROJECT DRAWINGS AND DOCUMENTS. ANY DISCREPANCIES BETWEEN THIS DRAWING AND ANY OTHER RELEVANT ENGINEERING DRAWING SHOULD BE REPORTED TO THE DESIGN ENGINEER IMMEDIATELY.
4. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE STATED.
5. ALL MATERIAL USED IN THE CONSTRUCTION OF DRAINS AND MANHOLES SHALL COMPLY TO THE RELEVANT BRITISH STANDARDS AND BE KITE MARKED WHERE APPROPRIATE.

Mark	Revision	Date	Drawn	Chkd	Appd
A	Drawing renumbered.	26.01.21	JL	JS	SH

SCALING NOTE: Do not scale this drawing - any errors or omissions shall be reported to Stantec without delay.
UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.

Drawing Issue Status

FOR PLANNING

WIC HOUSE
TRANSPORT WAY

CONSTRUCTION DETAILS

Client

T-SQUARED P4 LTD

Stantec

stantec.com/uk

OXFORD
Tel: 01865 410 000

Date of 1st Issue	Designed	Drawn
22.01.21	JL	JL
A1 Scale	Checked	Approved
AS SHOWN	JS	SH

Drawing Number: 48055-STN-ZZ-XX-DR-C-5001

Revision: A

Appendix H Flood Exceedance Plan

NOTES:

1. DO NOT SCALE FROM THIS DRAWING.
2. THIS DRAWING HAS BEEN PRODUCED IN COLOUR AND SHOULD BE REPRODUCED IN COLOUR.
3. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELATED PROJECT DRAWINGS AND DOCUMENTS. ANY DISCREPANCIES BETWEEN THIS DRAWING AND ANY OTHER RELEVANT ENGINEERING DRAWING SHOULD BE REPORTED TO THE DESIGN ENGINEER IMMEDIATELY.
4. ALL DIMENSIONS ARE IN m UNLESS OTHERWISE STATED.
5. ALL LEVELS ARE IN m AOD UNLESS OTHERWISE STATED.
6. TOPOGRAPHICAL INFORMATION TAKEN FROM MK SURVEYS DRAWING NUMBER 29110 'TOPOGRAPHICAL SURVEY' DATED OCTOBER 2020.
7. PROPOSED ARCHITECT'S PLAN OBTAINED FROM FAIRHURSTS DESIGN GROUP DRAWING NUMBER 7682-FDG-A-11101, DATED DECEMBER 2020.

KEY:

▨	ARCHITECT'S SITE LAYOUT
➡	INDICATIVE DIRECTION OF POTENTIAL FLOOD EXCEEDANCE FLOW

Mark	Revision	Date	Drawn	Chkd	Appd
A	Drawing renumbered. Exceedance routing amended to suit revised architect's layout.	26.01.21	JL	JS	SH

SCALING NOTE: Do not scale this drawing - any errors or omissions shall be reported to Stantec without delay.

UTILITIES NOTE: The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such plant or apparatus may also be present but not shown. The Contractor is therefore advised to undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect their operations.

Drawing Issue Status

FOR PLANNING

WIC HOUSE
TRANSPORT WAY

FLOOD EXCEEDANCE ROUTING

Client

T-SQUARED P4 LTD

Date of 1st Issue 22.01.2021	Designed JL	Drawn JL
A1 Scale 1:250	Checked JS	Approved SH

Drawing Number
48055-STN-ZZ-XX-DR-C-1002

Revision
A

Stantec

stantec.com/uk

OXFORD
Tel: 01865 410 000

File Location: j:\48055 - wic house\200 - design (all drawings)\201 - all pba drawings\2000 - civils\cad\dwgs\48055-stn-zz-xx-dr-c-1002.dwg