

Technical Note

Project: Cambridge North Development

Subject: Flood Risk Assessment Addendum

Client:	Brookgate Land Limited	Version:	D
Project No:	05425	Author:	JG
Date:	13/10/2022	Approved:	MC

г Introduction

- 1.1.1 PJA has been commissioned by Brookgate Land Limited to prepare an addendum to the Cambridge North Development Flood Risk Assessment and Drainage Strategy (document ref. 05425-R-03-C-FRA) issued in June 2022 and submitted as part of the planning application for the mixed-use development at Land North of Cambridge North Station, Milton Avenue, Cambridge (planning ref. 22/02771/OUT).
- 1.1.2 This addendum addresses the comments received from Cambridgeshire County Council (CCC) in their role as the Lead Local Flood Authority (LLFA) and comments received from Cambridge City Council's Sustainable Drainage Engineer. Appendix A contains a copy of the LLFA comments letter (document ref. 201107945) and Appendix B contains a copy of the Cambridge City Council consultation response.
- 1.1.3 Further information regarding modifications to the drainage strategy and the opportunity to incorporate rainwater harvesting techniques at the development site are also set out in this addendum.

2 Climate Change Allowances

- 2.1.1 The first comment from the LLFA requires the surface water management scheme to incorporate climate change allowances for the 3.3% annual exceedance probability event (1 in 30 year event) in accordance with the recently updated climate change estimates.
- 2.1.2 As set out in the FRA and Drainage Strategy (paragraph 6.6.5) the climate change allowances applied to the 1% annual exceedance probability events are based on the expected lifetime of the development. A 20% climate change allowance was therefore used for the commercial, retail, and laboratory uses. For the residential area, further measures in the form of sunken areas



in the central courtyard were proposed to provide additional storage to accommodate the effects of a 40% climate change allowance.

- 2.1.3 The updated peak rainfall intensity climate change allowances vary by Management Catchment. The site lies within the Cam and Ely Ouse Management Catchment. For development with a lifetime of between 2061 and 2100, the central climate change allowances for the 2070s epoch should be used; this applies to the commercial, retail, and laboratory uses.
- 2.1.4 The central climate change allowances for the 2070s epoch in the Cam and Ely Ouse Management Catchment are as follows:
 - 3.3% annual exceedance event: 20%
 - 1% annual exceedance event: 25%
- 2.1.5 The MicroDrainage models for the commercial, retail, and laboratory development have therefore been updated to include a 20% climate change allowance for the 3.3% annual exceedance probability events (previously a 0% allowance was used) and a 25% climate change allowance for the 1% annual exceedance probability events (previously a 20% allowance was used). The updated MicroDrainage model outputs are included at Appendix C.
- 2.1.6 The updated climate change allowances require additional storage to be provided in some parts of the development. The updated Drainage Strategy is included at Appendix D.
- 2.1.7 For development with a lifetime beyond 2100 (i.e. the residential development) the updated guidance still recommends that a 40% climate change allowance is used. The design principals set out in the FRA and Drainage Strategy for this aspect of the drainage strategy are therefore still applicable and do not need to be developed further at this stage. The MicroDrainage model has been updated to include an assessment of the effects of a 35% climate change allowance during the 3.3% annual exceedance events (see Appendix C).

3 First Public Drain Overflow Diversion

- 3.1.1 The Cambridge City Council consultation response states that the proposed diversion of the First Public Drain Overflow introduces a number of 90 degree bends, noting that this will likely impact upon the culvert capacity and risk of blockages.
- 3.1.2 The route of the diversion has been revised to create an alignment with angles of change in direction similar to, and where possible less acute than, those on the existing culvert (approx. 130°). By adjusting the alignment of the diversion and introducing an additional chamber along



the route, the angles have been increased to approx. 120°, 130°, and 150°. The revised route is shown on the updated Drainage Strategy (Appendix D).

- 3.1.3 To reduce the impact of the bends, bespoke design manholes should be installed at each bend. Design measures for these chambers shall include using oversized manholes with deep catchpits (minimum 500mm depth), high specification concrete benching to prevent scour and increased access hatch sizes to facilitate silt/debris removal. These manhole chambers will be specified at the detailed design stage.
- 3.1.4 The First Public Drain Overflow Culvert has been checked under surcharge conditions (surcharge to culvert soffit level) to ensure that flow from the site can discharge to the culvert during storm conditions without flooding occurring on the site. This is possible because of the elevation difference between the culvert and the proposed surface water drainage network on the site.

4 First Public Drain Overflow Condition Survey

- 4.1.1 Comments from both the LLFA and Cambridge City Council related to the condition of the drainage network downstream of the proposed points of discharge on-site. The Drainage Strategy proposes to discharge surface water run-off into the First Public Drain overflow culvert, which crosses the site from west to east before continuing east beneath the railway line to outfall to the River Cam.
- 4.1.2 The consultees requested confirmation that the downstream network (between the proposed points of discharge and the River Cam outfall) is in suitable condition to convey the proposed flows. Verifying the condition of the downstream network will require off-site survey work to be undertaken; this will require approvals from Network Rail and other landowners for access to the drainage network.
- 4.1.3 A drainage survey has been specified, the extent of which covers the following lengths:
 - Box Culvert beneath Railway Lines, dimensions 1.4m width by 1.1m height. A previous survey dated 2015 has identified silt and sediment build-up therefore jetting will be undertaken prior to the new survey. Approx length 50m.
 - II. Open Channel from Railway Lines to Fen Road. Approx length 190m.
 - III. Culverted section beneath Fen Road. Approx length 40m, dimensions unknown.
 - IV. Open Channel from Fen Road to River Cam. Approx length 260m

Total length approximately 540m.



- 4.1.4 Further discussions have been held with the LLFA Drainage Officer and it has been agreed that the LLFA will request for the details of the survey to be added as a pre-commencement condition to any planning permission for this application. Appendix E includes the relevant correspondence.
- 4.1.5 The developer has agreed to the following statement which could be applied as a condition of planning:

Should the downstream condition survey of the culverted section of the First Public Drain overflow beneath the railway lines identify structural (or other defects) that require repair work then the developer agrees to address such defects, in liaison with the culvert owner. Defects identified as requiring repairs shall be defined in accordance with the Manual of Sewer Condition Classification 5th Edition (Sewer Rehabilitation Manual 5th edition scoring).

5 Sustainable Drainage Systems

- 5.1.1 The Cambridge City Council consultation response notes that green roofs and permeable paving should be more widely used throughout the development. The Drainage Strategy drawing has been updated to show additional green roofs, rain gardens and areas of permeable paving/porous asphalt throughout the site, and further amendments have been made to the presentation of this information on the drawing in order to improve clarity.
- 5.1.2 The Cambridge City Council consultation response also requests that the CIRIA SuDS Manual Simple Index Method is applied to demonstrate that all discharges will meet the minimum water quality mitigation requirements.
- 5.1.3 Table 5-1 provides a summary of the land uses in each catchment and the associated pollution hazard levels and indices, as well the proposed surface water drainage features serving each catchment and their corresponding mitigation indices.



Table 5-1: Simple Index Method Assessment

Catchment	Land Use(s)	Pollution Hazard Level	Proposed Surface Water Drainage	Hazard/Mitigation Indices (C753 Tables 26.2 and 26.3)				
				TSS	Metals	Hydrocarbons		
1	Residential,	Low	Pond	0.5	0.4	0.4		
	Commercial	LOW	Fond	0.7	0.7	0.5		
2	Residential	Very Low	Bioretention	Removal of gros	ss solids and sedi Table 4.3)	ments only (C753		
			(rain gardens)	0.8	0.8	0.8		
3	Commercial	Low	Swale	0.5	0.4	0.4		
3				0.5	0.6	0.6		
	Commercial, access	D.4. alterna	Aedium Bioretention (rain gardens)	0.7	0.6	0.7		
4	roads, delivery areas	wealum		0.8	0.8	0.8		
-	Commercial, access		Dand	0.5	0.4	0.4		
5	roads	Low	Pond	0.7	0.7	0.5		
6			Bioretention	0.5	0.4	0.4		
6	Access roads	Low	(rain gardens)	0.8	0.8	0.8		
7	Car park, access	Madium	Bioretention	0.7	0.6	0.7		
7	roads	Medium	(rain gardens)	0.8	0.8	0.8		

5.1.4 The assessment above confirms that all discharges from the development meet the water quality mitigation requirements as set out in CIRIA C753 (The SuDS Manual).

6 Drainage Strategy Modifications

- 6.1.1 Following recent stakeholder consultation, it has been confirmed that the existing combined footway/cycleway running along the western side of the busway will be widened to improve the pedestrian and cyclist infrastructure in this area.
- 6.1.2 This reduces the space available for the proposed swale that was previously shown running parallel to the footway/cycleway. In the previous strategy the swale provided around 44% of the attenuation storage required for Catchment 1, with the remaining 56% provided in underground storage tanks beneath the busway.



- 6.1.3 The widening leaves only a limited area available between the proposed cycleway/footway and the wooded area to the west. To minimise the impact on tree roots in this area, and to retain as much of the existing Open Mosaic Habitat as possible, it is proposed that a swale will not be provided in this area. Attenuation storage for Catchment 1 will instead be provided entirely in underground tanks. The Drainage Strategy drawing has been updated to reflect this change (included at Appendix D).
- 6.1.4 The new tanks will be installed beneath the widened footway/cycleway. There is a 900mmØ oversized pipe associated with the surface water drainage system serving Cambridge North Station, One Cambridge Square and the busway that is located beneath the existing footway/cycleway. This pipe will be removed to accommodate the new tanks. The volume of the removed pipe will be reinstated as part of the total volume of the new tanks. The total tank volume is 740m³, comprising 660m³ for the Catchment 1 area and 80m³ to compensate for the volume in the 900mmØ pipe being removed.
- 6.1.5 The new footway/cycleway will be formed with a porous asphalt surface which will drain via an underlying granular layer directly into the tanks located underneath.
- 6.1.6 Surface water from the Catchment 1 drainage network will discharge to the existing surface water drainage system serving the Cambridge North Station, One Cambridge Square, and the busway.

7 Rainwater Harvesting

- 7.1.1 The FRA and Drainage Strategy noted the potential to incorporate rainwater harvesting and reuse measures, recommending further assessment at the detailed design stage.
- 7.1.2 This section provides an overview of one such potential rainwater harvesting system that could be incorporated into the proposed development. Refer to the Drainage Strategy in Appendix D for further information.
- 7.1.3 The rainwater harvesting system would be connected to the pond to the north of building S9. The inlet to the storage tank would be set at the design pond permanent water level and the outlet from the pond to the First Public Drain would be raised to ensure that incoming water fills the rainwater harvesting tank first before any discharge to the First Public Drain.
- 7.1.4 The rainwater harvesting tank could be installed in an area of open space near the pond, potentially beneath the temporary logistics area. Pumped outlets from the rainwater harvesting



tank would convey water across the site for irrigation of planted areas such as the Chesterton Gardens, Chesterton Square, and Swale Street (if required).

7.1.5 Utilising rainwater harvesting techniques can reduce the demand for potable water supply while also providing additional flood management benefits by reducing the volume of water discharged from the site.



Appendix A LLFA Consultation Response



My ref:FR/22-000248Your ref:22/02771/OUTDate:11/08/2022Doc no:201107945Officer:Harry PickfordE Mail:harry.pickford@cambridgeshire.gov.uk

Steve Cox: Executive Director Place and Economy Planning, Growth & Environment

Fiona Bradley Greater Cambridge Shared Planning South Cambridge Hall Cambourne Business Park CB23 6EA

New Shire Hall Emery Crescent Enterprise Campus Alconbury Weald PE28 4YE

Proposal: A hybrid planning application for: a) An outline application (all matters reserved apart from access and landscaping) for the construction of: three new residential blocks providing for up to 425 residential units and providing flexible Class E and Class F uses on the ground floor (excluding Class E (g) (iii)); and two commercial buildings for Use Classes E(g) i(offices), ii (research and development) providing flexible Class E and Class F uses on the ground floor (excluding Class E (g) (iii)),together with the construction of basements for parking and building services, car and cycle parking and infrastructure works. b) A full application for the construction of three commercial buildings for Use Classes E(g) i (offices) ii (research and development), providing flexible Class E and Class F uses on the ground floor (excluding Services, car and cycle parking and infrastructure works. b) A full application for the construction of three commercial buildings for Use Classes E(g) i (offices) ii (research and development), providing flexible Class E and Class F uses on the ground floor (excluding Class E (g) (iii)) with associated car and cycle, the construction of a multi storey car and cycle park building, together with the construction of basements for parking and building services, car and cycle parking and associated landscaping, infrastructure works and demolition of existing structures

Land North Of Cambridge North Station Milton Avenue Cambridge Cambridgeshire

Comments from Lead Local Flood Authority (LLFA)

Dear Fiona,

Thank you for your consultation which we received on 24th July 2022.

At present we **object** to the grant of planning permission for the following reasons:

1. Climate Change Allowances

In accordance with the <u>latest climate change peak rainfall intensity allowances</u>, a climate change allowance should be incorporated into the surface water management scheme for the 3.3% annual exceedance probability rainfall event. The allowance used should be based on the lifetime of the development.



2. Downstream Network

The applicant proposes to discharge into the First Public Drain overflow culvert. It is not clear what the state of the downstream network is and whether this has capacity in the current state to receive these flows. Until it is clear that there is capacity in the downstream network to receive these flows, we are unable to support this application.

Informatives

Ordinary Watercourse Consent

Constructions or alterations within an ordinary watercourse (temporary or permanent) require consent from the Lead Local Flood Authority under the Land Drainage Act 1991. Ordinary watercourses include every river, drain, stream, ditch, dyke, sewer (other than public sewer) and passage through which water flows that do not form part of Main Rivers (Main Rivers are regulated by the Environment Agency). The applicant should refer to Cambridgeshire County Council's Culvert Policy for further guidance:

https://www.cambridgeshire.gov.uk/business/planning-and-development/water-minerals-and-waste/watercourse-management/

Please note the council does not regulate ordinary watercourses in Internal Drainage Board areas.

Pollution Control

Surface water and groundwater bodies are highly vulnerable to pollution and the impact of construction activities. It is essential that the risk of pollution (particularly during the construction phase) is considered and mitigated appropriately. It is important to remember that flow within the watercourse is likely to vary by season and it could be dry at certain times throughout the year. Dry watercourses should not be overlooked as these watercourses may flow or even flood following heavy rainfall.

Yours sincerely,

H Ellis

Hilary Ellis Flood Risk Business Manager

If you have any queries regarding this application, please contact the Officer named at the <u>top</u> of this letter (contact details are above).

Please note: We are reliant on the accuracy and completeness of the reports in undertaking our review and can take no responsibility for incorrect data or interpretation made by the authors.



Appendix B Cambridge City Council Consultation Response



Responding Officer:	Rachel Veysey Sustainable Drainage Engineer
Date:	27/09/2022
Planning Ref No:	22/02771/OUT
Description of Development:	A hybrid planning application for: a) An outline application (all matters reserved apart from access and landscaping) for the construction of: three new residential blocks providing for up to 425 residential units and providing flexible Class E and Class F uses on the ground floor (excluding Class E (g) (iii)); and two commercial buildings for Use Classes E(g) i(offices), ii (research and development) providing flexible Class E and Class F uses on the ground floor (excluding Class E (g) (iii)),together with the construction of basements for parking and building services, car and cycle parking and infrastructure works. b) A full application for the construction of three commercial buildings for Use Classes E(g) i (offices) ii (research and development), providing flexible Class E and Class F uses on the ground floor (excluding Class E (g) (iii)), together with the construction of three commercial buildings for Use Classes E(g) i (offices) ii (research and development), providing flexible Class E and Class F uses on the ground floor (excluding Class E (g) (iii)) with associated car and cycle parking, the construction of a multi storey car and cycle parking and building, together with the construction of basements for parking and building, infrastructure works and demolition of existing structures. Land North Of Cambridge North Station Milton Avenue Cambridge Cambridgeshire

Cross one:

The development proposed is **acceptable** subject to the imposition of the condition(s) outlined below.



The development proposed is **unacceptable** and should be refused for the reason(s) set out below.



It is not possible to comment on the proposed development and the additional information set out below will be required in order to provide comments.

Comments

The following documents have been reviewed in assessing this application:

Environmental Statement Volume 1 Main Report, Section 10 Flood Risk and Drainage (June 2022)

Planning Consultation Response (Planning Applications)



Appendix 10.1 Cambridge North Development Flood Risk Assessment and Drainage Strategy (June 2022)

1 Surface Water Drainage

Overall there are a number of deficiencies which need to be addressed by the applicant to ensure the development is policy compliant.

1.1 First Public Drain

Section 10.64 of the Environmental statement states that details of the First Public Drain Overflow downstream of the site were not available.

Previous investigations detailed that the culvert where it passes under the railway line would likely need some repairs. It must be shown at application stage that the discharge point is suitable by undertaking a condition survey of the downstream network or that there is an alternative viable discharge point.

There are proposals for a new alignment to part of the First Public Drain overflow where it passes under the development site. The alignment introduces a number of 90 degree bends. This is not satisfactory and has previously been raised in the pre applications stages as being unacceptable. It will likely impact on culvert capacity and increase the risk of blockage as well as likely speed up the rate of degradation to the existing culvert by introducing additional turbulence in the culvert under the railway line.

1.2 Climate change allowances

Reference is made to the use of a lower climate change allowance for some buildings. Whilst we recognise commercial buildings will be constructed with a shorter design life, following Eurocodes the design life will be at least 50 years, this means that it will be necessary to design for the building to still be in use up to year 2075. Commercial use buildings are now entering the 2070 climate change period (from 2061 onwards) and should use the relevant climate change allowances, there is not a scenario where it will be appropriate to use the lower 20% or 25% climate change allowance for modelling the 1% or 3.3% annual exceedance events. Additionally the 3.3% annual exceedance event must be incorporated into the surface water drainage scheme.

1.3 Discharge Rates

It is proposed that the majority of catchments discharge at 2l/s/ha with the exception of existing catchment area 5 which is set to 3.3l/s/ha This is acceptable and in line with current policy.

We would encourage the applicant to consider if any changes are proposed to catchment 5 that opportunities for betterment to the discharge rate must be provided.

1.4 SuDS

The design of the SuDS do not go far enough, this is a high density development therefore there should be a big emphasis on using interception storage wherever possible close to where rain falls. We see no reason why green roofs are not used more widely along with rain

Planning Consultation Response (Planning Applications)



gardens and permeable paving which overall are lacking. There is still a large reliance of tanks, these appear very constrained and we are concerned with the deliverability of them without impacting on wider landscape proposals or SuDS measures. The need to use the site efficiently for sustainable drainage purposes should also be driving the building and landscape designs to some degree.

The approach to SuDS should seek to improve water quality before it goes into the First Public Drain which ultimately outfalls into the River Cam. The application will need to demonstrate using the CIRIA SuDS Manual Simple Index Assessment Method for water quality that all discharges will meet the minimum water quality mitigation requirements.



Appendix C MicroDrainage Output Reports

Catchment 1

	Variables		
Variables Results Design Overview 2D Overview 3D	FEH Rainfall ✓ Retum Period (years) 100 Version 2013 ✓ Catchment Site GB 547650 260850 TL 47650 60850	Cv (Summer) Cv (Winter) Impermeable Area (ha) Maximum Allowable Discharge (l/s) Infiltration Coefficient (m/hr) Safety Factor Climate Change (%)	0.750 0.840 0.713 1.4 0.00000 2.0 25
		Analyse OK	Cancel Help

	Results
Aicro Drainage	Global Variables require approximate storage of between 595 m ³ and 714 m ³ .
Variables	These values are estimates only and should not be used for design purposes.
Results	
Design	
Overview 2D	
Dverview 3D	
Vt	
	Analyse OK Cancel Help

PJA					
Seven House, High Street	05425				
Longbridge	Cambridge North				
Birmingham, B31 2UQ	Catchment 2	Micro			
Date 13/10/2022 10:34	Designed by JG	Drainage			
File 05425 - CATCHMENT 2 NETWORK MC	Checked by MC	Diginarie			
Innovyze	Network 2019.1				

Existing Network Details for Catchment 2

- Indicates pipe length does not match coordinates

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	se (1/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
1.000 1.001	55.000# 37.026			0.255 0.900	5.00 0.00		0.600 0.600	0		Pipe/Conduit Pipe/Conduit
2.000 2.001	37.213 45.168			0.130 0.000	5.00 0.00		0.600 0.600	0 0		Pipe/Conduit Pipe/Conduit
1.002 1.003	121.860 22.445			0.340	0.00		0.600	0		Pipe/Conduit Pipe/Conduit

Network Results Table

PN	US/IL (m)		Σ Base Flow (l/s)		-
	5.725 5.500	0.255 1.155		1.15 1.33	127.5 146.7
	6.000 5.700	0.130 0.130	0.0	1.41 1.33	99.7 94.1
	5.300 5.140	1.625 1.625	0.0	0.65 0.99	71.7 17.6

PJA					
Seven House, High Street	05425				
Longbridge	Cambridge North				
Birmingham, B31 2UQ	Catchment 2	Micro			
Date 13/10/2022 10:34	Designed by JG	Drainage			
File 05425 - CATCHMENT 2 NETWORK MC	Checked by MC	Diamage			
Innovyze	Network 2019.1				

Manhole	Schedules	for	Catchment	2

MH Name	MH CL (m)	MH Depth (m)		MH Nection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter	Backdrop (mm)
S101	6.500	0.775	Open	Manhole	1200	1.000	5.725	375				
S102	6.500	1.000	Open	Manhole	1200	1.001	5.500	375	1.000	5.500	375	
S103	7.200	1.200	Open	Manhole	1200	2.000	6.000	300				
S104	7.200	1.500	Open	Manhole	1200	2.001	5.700	300	2.000	5.700	300	
S105	6.500	1.200	Open	Manhole	1200	1.002	5.300	375	1.001	5.300	375	
									2.001	5.375	300	
S106	6.500	1.360	Open	Manhole	1200	1.003	5.140	150	1.002	5.140	375	
FPD	7.000	2.080	Open	Manhole	0		OUTFALL		1.003	4.920	150	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S101	547445.102	260890.102	547445.102	260890.102	Required	
S102	547355.822	260888.402	547355.822	260888.402	Required	\
S103	547318.715	260861.371	547318.715	260861.371	Required	
S104	547297.728	260892.101	547297.728	260892.101	Required	
S105	547334.337	260918.557	547334.337	260918.557	Required	
S106	547433.423	260989.493	547433.423	260989.493	Required	
FPD	547452.676	261001.029			No Entry	

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Longbridge							ge North	1						
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(mins) (1 5. 2 5. 3 5. 4 5. 5 5.	(m) (mins) .482 19 .482 20 .482 21 .482 22 .482 23	Pip Depth (m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482	Time (mins) 37 38 39 40 41	Depth (m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482	FPD tum (m) Time (mins) 55 56 57 58 59	7.000 0.000 Depth (m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482	4.920 Dffset (m Time De (mins) (73 5. 74 5. 75 5. 76 5. 77 5.	(m) 4. ins) (m) 482 482 482 482 482 482 482) 500 0 Time mins) 91 92 93 94 95	0 Depth (m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482	0 Time (mins) 109 110 111 112 113	(m) 5.482 5.482 5.482 5.482 5.482 5.482	(mins) 127 128 129 130 131	(m) 5.482 5.482 5.482 5.482 5.482
(mins) (1 5. 2 5. 3 5. 4 5. 5 5. 6 5.	(m) (mins) .482 19 .482 20 .482 21 .482 22 .482 22 .482 23 .482 24	Pip Depth (m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482	Time (mins) 37 38 39 40 41 42	Depth (m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482	FPD tum (m) Time (mins) 55 56 57 58 59 60	7.000 0.000 Depth (m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482	4.920 Dffset (m Time De (mins) (73 5. 74 5. 75 5. 76 5. 76 5. 77 5. 78 5.	(m) 4. (ins) (m) 482 482 482 482 482 482 482 482 482) 500 0 Time mins) 91 92 93 94 95 96	0 Depth (m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482	Time (mins) 109 110 111 112 113 114	(m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482	(mins) 127 128 129 130 131 132	(m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482
(mins) (1 5. 2 5. 3 5. 4 5. 5 5.	(m) (mins) .482 19 .482 20 .482 21 .482 21 .482 22 .482 23 .482 24 .482 25	Pip Depth (m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482	Time (mins) 37 38 39 40 41 42 43	Depth (m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482	FPD tum (m) Time (mins) 55 56 57 58 59 60 61	7.000 0.000 Depth (m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482	4.920 Dffset (m Time De (mins) (73 5. 74 5. 75 5. 76 5. 77 5.	(m) 4. (ins) (m) 482 482 482 482 482 482 482 482 482 482) 500 0 Time mins) 91 92 93 94 95 96 97	0 Depth (m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482	0 Time (mins) 109 110 111 112 113 114 115	(m) 5.482 5.482 5.482 5.482 5.482 5.482	(mins) 127 128 129 130 131 132 133	(m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482
(mins) (1 5. 2 5. 3 5. 4 5. 5 5. 6 5. 7 5.	(m) (mins) .482 19 .482 20 .482 21 .482 21 .482 22 .482 22 .482 23 .482 24 .482 25 .482 26	Pip Depth (m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482	Time (mins) 37 38 39 40 41 42 43 44	Depth (m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482	FPD tum (m) Time (mins) 55 56 57 58 59 60 61 62	7.000 0.000 Depth (m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482	4.920 Dffset (m Time De (mins) (73 5. 74 5. 75 5. 76 5. 77 5. 78 5. 79 5.	(m) 4. (ins) (m) 482 482 482 482 482 482 482 482 482 482) 500 D Time mins) 91 92 93 94 95 96 97 98	0 Depth (m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482	Time (mins) 109 110 111 112 113 114 115 116	(m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482	(mins) 127 128 129 130 131 132 133 134	(m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482
(mins) (1 5. 2 5. 3 5. 4 5. 5 5. 6 5. 7 5. 8 5.	(m) (mins) .482 19 .482 20 .482 21 .482 21 .482 22 .482 23 .482 24 .482 25 .482 26 .482 27	Pip Depth (m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482	Time (mins) 37 38 39 40 41 42 43 44	Depth (m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482	FPD tum (m) Time (mins) 55 56 57 58 59 60 61 62 63	7.000 0.000 Depth (m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482	4.920 Dffset (m Time De (mins) (73 5. 74 5. 75 5. 76 5. 77 5. 78 5. 79 5. 80 5.	(m) 4. (ins) (m) (m) (m) (m) (m) (m) (m) (m) (m) (m) 500 D Time mins) 91 92 93 94 95 96 97 98 99	0 Depth (m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482	0 Time (mins) 109 110 111 112 113 114 115 116 117	(m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482	(mins) 127 128 129 130 131 132 133 134 135	(m) 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482 5.482
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PJA		Page 4
Seven House, High Street	05425	
Longbridge	Cambridge North	
Birmingham, B31 2UQ	Catchment 2	Micro
Date 13/10/2022 10:34	Designed by JG	Drainage
File 05425 - CATCHMENT 2 NETWORK MC	Checked by MC	Diamage
Innovyze	Network 2019.1	1

Surcharged Outfall Details for Catchment ${\bf 2}$

Time	Depth														
(mins)	(m)														
145	5.482	157	5.482	169	5.482	181	5.482	193	5.482	205	5.482	217	5.482	229	5.482
146	5.482	158	5.482	170	5.482	182	5.482	194	5.482	206	5.482	218	5.482	230	5.482
147	5.482	159	5.482	171	5.482	183	5.482	195	5.482	207	5.482	219	5.482	231	5.482
148	5.482	160	5.482	172	5.482	184	5.482	196	5.482	208	5.482	220	5.482	232	5.482
149	5.482	161	5.482	173	5.482	185	5.482	197	5.482	209	5.482	221	5.482	233	5.482
150	5.482	162	5.482	174	5.482	186	5.482	198	5.482	210	5.482	222	5.482	234	5.482
151	5.482	163	5.482	175	5.482	187	5.482	199	5.482	211	5.482	223	5.482	235	5.482
152	5.482	164	5.482	176	5.482	188	5.482	200	5.482	212	5.482	224	5.482	236	5.482
153	5.482	165	5.482	177	5.482	189	5.482	201	5.482	213	5.482	225	5.482	237	5.482
154	5.482	166	5.482	178	5.482	190	5.482	202	5.482	214	5.482	226	5.482	238	5.482
155	5.482	167	5.482	179	5.482	191	5.482	203	5.482	215	5.482	227	5.482	239	5.482
156	5.482	168	5.482	180	5.482	192	5.482	204	5.482	216	5.482	228	5.482	240	5.482

Simulation Criteria for Catchment 2

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 (1/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 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model				FEH	Summer Storms	Yes
Return Period (years)				30	Winter Storms	No
FEH Rainfall Version				2013	Cv (Summer)	0.750
Site Location	GB 547650	260850	TL 47650	60850	Cv (Winter)	0.840
Data Type			Cat	chment	Storm Duration (mins)	30

РЈА				Page 5
Seven House, High Street	05425			
Longbridge	Cambridge	North		
Birmingham, B31 2UQ	Catchment	2		Micro
Date 13/10/2022 10:34	Designed k	by JG		
File 05425 - CATCHMENT 2 NETWORK MC	Checked by	y MC		Drainage
Innovyze	Network 20	019.1		1
Online C	ontrols for	r Catchment 2		
Hydro-Brake® Optimum Manho	le: S106, i	DS/PN: 1.003, Volume	e (m³): 14.	9
Un	it Reference	MD-SHE-0080-3200-1360-	3200	
	ign Head (m)		.360	
Desig	n Flow (l/s)		3.2	
	Flush-Flo™	Calcul	ated	
	Objective	Minimise upstream sto	rage	
	Application	Sur	face	
Su	mp Available		Yes	
D	iameter (mm)		80	
Inve	rt Level (m)	5	.140	
Minimum Outlet Pipe D	iameter (mm)		100	
Suggested Manhole D	iameter (mm)		1200	
Control Points Head (m) Fl	low (1/s)	Control Points	Head (m) Flo	w (l/s)
Design Point (Calculated) 1.360			0.711	
Flush-Flo™ 0.350	3.0 Mea	an Flow over Head Range	-	2.7
The hydrological calculations have been based		5 1	-	-

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m) Fl	.ow (l/s)	Depth (m) F	low (l/s)	Depth (m) F	low (l/s)	Depth (m)	Flow (l/s)
0.100	2.3	0.800	2.5	2.000	3.8	4.000	5.3	7.000	6.9
0.200	2.8	1.000	2.8	2.200	4.0	4.500	5.6	7.500	7.1
0.300	2.9	1.200	3.0	2.400	4.2	5.000	5.9	8.000	7.3
0.400	2.9	1.400	3.2	2.600	4.3	5.500	6.1	8.500	7.5
0.500	2.9	1.600	3.4	3.000	4.6	6.000	6.4	9.000	7.7
0.600	2.7	1.800	3.6	3.500	5.0	6.500	6.6	9.500	7.9

Seven House, High Street 05425 Longbridge Cambridge North Birmingham, B31 2UQ Catchment 2 Date 13/10/2022 10:34 Designed by JG File 05425 - CATCHMENT 2 NETWORK MC Checked by MC Innovyze Network 2019.1 Cellular Storage Manhole: S102, DS/PN: 1.001 Invert Level (m) 5.500 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Popth (m) Area (m²) Inf. Area (m²) Pepth (m) Area (m²) Inf. Area (m²) 0.000 970.0 0.0 0.600 970.0 0.0 Cellular Storage Manhole: S106, DS/PN: 1.003 Invert Level (m) 5.200 Safety Factor 2.0 0.00	PJA		Page 6
Birmingham, B31 2UQ Catchment 2 Date 13/10/2022 10:34 Designed by JG File 05425 - CATCHMENT 2 NETWORK MC Checked by MC Innovyze Network 2019.1 Metwork 2019.1 Innovyze Otellular Storage Manhole: S102, DS/PN: 1.001 Invert Level (m) 5.500 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.0000 Perth (m) Area (m ²) Inf. Area (m ²) 0.000 970.0 0.000 970.0 Otellular Storage Manhole: S106, DS/PN: 1.003	Seven House, High Street	05425	
Date 13/10/2022 10:34 Designed by JG File 05425 - CATCHMENT 2 NETWORK MC Checked by MC Innovyze Network 2019.1 Cellular Storage Manhole: S102, DS/PN: 1.001 Invert Level (m) 5.500 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Depth (m) Area (m²) Inf. Area (m²) Pepth (m) Area (m²) Inf. Area (m²) 0.000 970.0 0.0 0.600 970.0 0.0 Cellular Storage Manhole: S106, DS/PN: 1.003	Longbridge	Cambridge North	
Date 13/10/2022 10:34 Designed by JG Drainage File 05425 - CATCHMENT 2 NETWORK MC Checked by MC Drainage Innovyze Network 2019.1 Cellular Storage Structures for Catchment 2 Cellular Storage Manhole: S102, DS/PN: 1.001 Invert Level (m) 5.500 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.0000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.0000 Depth (m) Area (m²) Inf. Area (m²) Depth (m) Area (m²) Depth (m) Area (m²) Depth (m) Area (m²) Inf. Area (m²) 0.000 970.0 0.0 0.600 970.0 0.0 0.0 0.0	Birmingham, B31 2UQ	Micco	
Innovyze Network 2019.1 Storage Structures for Catchment 2 Cellular Storage Manhole: S102, DS/PN: 1.001 Invert Level (m) 5.500 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.0000 Depth (m) Area (m ²) Inf. Area (m ²) Depth (m) Area (m ²) Inf. Area (m ²) 0.000 970.0 Cellular Storage Manhole: S106, DS/PN: 1.003	Date 13/10/2022 10:34	Designed by JG	
Storage Structures for Catchment 2 Cellular Storage Manhole: S102, DS/PN: 1.001 Invert Level (m) 5.500 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.0000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.0000 Depth (m) Area (m ²) Inf. Area (m ²) Inf. Area (m ²) Depth (m) Area (m ²) 0.000 970.0 0.0 0.00 970.0 0.0 Cellular Storage Manhole: S106, DS/PN: 1.003	File 05425 - CATCHMENT 2 NETWORK MC	Checked by MC	Diamacje
Cellular Storage Manhole: S102, DS/PN: 1.001 Invert Level (m) 5.500 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.0000 Porosity 0.95 Infiltration Coefficient Side (m/hr) Infiltration Coefficient Side (m/hr) 0.0000 Depth (m) Area (m²) Inf. Area (m²) Depth (m) Area (m²) Inf. Area (m²) 0.000 970.0 0.0 0.000 970.0 0.0 0.001 0.00 0.00 0.002 970.0 0.0 0.003 970.0 0.0 0.004 0.00 970.0 0.005 970.0 0.0 0.004 0.00 970.0 0.005 970.0 0.0 0.005 970.0 0.0 0.005 970.0 0.0 0.005 970.0 0.0 0.005 970.0 0.0 0.005 970.0 0.0 0.005 970.0 0.0 0.005 970.0 0.0	Innovyze	Network 2019.1	-1
0.000 970.0 0.0 0.600 970.0 0.0 0.601 0.0 0.0 <u>Cellular Storage Manhole: S106, DS/PN: 1.003</u>	Cellular Stora In Infiltration Coefficien Infiltration Coefficien	ge Manhole: S102, DS/PN: 1.001 vert Level (m) 5.500 Safety Factor 2.0 nt Base (m/hr) 0.00000 Porosity 0.95 nt Side (m/hr) 0.00000	
Cellular Storage Manhole: S106, DS/PN: 1.003	Depth (m) Area (m ²) Inf. Area (m ²) Depth (m	n) Area (m²) Inf. Area (m²) Depth (m) Area (m²) :	Inf. Area (m²)
	0.000 970.0 0.0 0.60	00 970.0 0.0 0.601 0.0	0.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000	In Infiltration Coefficien	vert Level (m) 5.200 Safety Factor 2.0 nt Base (m/hr) 0.00000 Porosity 0.95	
Depth (m) Area (m ²) Inf. Area (m ²) Depth (m) Area (m ²) Inf. Area (m ²) Depth (m) Area (m ²) Inf. Area (m ²)	Depth (m) Area (m ²) Inf. Area (m ²) Depth (m	n) Area (m²) Inf. Area (m²) Depth (m) Area (m²) I	Inf. Area (m²)

0.000	1140.0	0.0	0.800	1140.0	0.0	0.801	0.0	0.0

PJA						1						Pag	je 7
Seven Ho	ouse, Hi	igh Stre	et			054	425						
Longbrid	dge					Car	nbridge	e North					
Birmingh	nam, B31	L 2UQ				Cat	tchment	t 2				Ν	<i>l</i> icro
Date 13,	/10/2022	2 10:34				Des	signed	by JG)rainage
File 054	425 - CA	ATCHMENI	' 2 NETI	WORK M	IC	Che	ecked b	оу МС					Janage
Innovyze	e					Net	twork 2	2019.1					
<u>2</u> yea	ır Retur	n Perio	d Summa	ary of	Critic	cal	Result	s by Max	imum Le	vel (Ra	ank 1) f	for Cat	chment 2
					S	Simul	lation (Criteria					
								dditional					
					t (mins) vel (mm)			MADD Fa			corage 2. ecient 0.		
		Manhole H						w per Pers					
			ewage per					-	-		-		
	Number	of Input	Hydrogr	ranhe O	Numbe	r of	f Offlir	ne Control	e () Numbe	ar of Ti	me/Area D	iagrame	0
		-		-				Structure				-	
			Rainfall	Model	Synt	heti	<u>c</u> Rainf	all Detail		+	Catchment	F	
			infall V								0.75		
					GB 5476	50 2	60850 T	L 47650 60					
		Ма	wain for		Diel We		~ (mm)				300.0		
		Ma	rgin for				-	2.5 Second	d Increme:				
					-		Status				OFF		
							Status				ON		
					Iner	tia	Status				ON		
			Г		Profile	. ,	15 30	60, 120,		and Wint			
					(s) (yea:		10, 50,	00, 120,		, 400, J 2, 30, 1			
					Change					0, 35,	20		
							Water	Surcharged	l Flooded			Pipe	
	US/MH				US/	/CL	Level	Depth	Volume	Flow /	Overflow	Flow	
PN	Name		Event		(1	n)	(m)	(m)	(m³)	Cap.	(l/s)	(l/s)	Status
1.000	S101 1	5 minute	2 year 1	Winter	I+0% 6.5	500	5.882	-0.218	0.000	0.36		42.6	OK
1.001	S102 12	0 minute	2 year N	Winter	I+0% 6.5	500	5.621	-0.254	0.000	0.23		30.4	OK
2.000		5 minute					6.099	-0.201				21.5	OK
2.001		5 minute	-				5.801	-0.199				21.3	OK
1.002 1.003		5 minute 0 minute					5.583 5.479	-0.092				55.0	OK SURCHARGED
1.003	SIU0 48	o minure	z year N	wincer	TLA D'S	000	J.4/9	0.185	0.000	0.10		2.9 3	JUKCHAKGED

РЈА						Pac	le 8
Seven House, High Street	05425						je o
_		a Nonth					
Longbridge		lge North					
Birmingham, B31 2UQ	Catchme					_	<i>licro</i>
Date 13/10/2022 10:34	-	d by JG)rainage
File 05425 - CATCHMENT 2 NETWORK MC		-					
Innovyze	Network	2019.1					
30 year Return Period Summary of Crit	cical Res	ults by Maxi	imum Lev	vel (Ra	nk 1) fc	or Cat	cchment 2
Areal Reduction Fact Hot Start (min Hot Start Level (m Manhole Headloss Coeff (Globa Foul Sewage per hectare (1/ Number of Input Hydrographs 0 Num	or 1.000 s) 0 m) 0 1) 0.500 F s) 0.000	MADD Fact Low per Persor	tor * 10m Inlet n per Day	³ /ha Sto Coeffied (l/per,	orage 2.00 cient 0.80 (day) 0.00	00 00 00	0
Number of Online Controls 1 Numbe	er of Stora					-	
Rainfall Model					atchment		
FEH Rainfall Version Site Location GB 54	7650 260850		13 Cv (Si 50 Cv (M	- ,	0.750 0.840		
Site Location GB 54	/050 200050	IL 47050 000	JU CV (W.	LIICEL)	0.040		
	-	p 2.5 Second s s	Increment		00.0 ded) OFF ON ON		
Profil Duration(s) (r Return Period(s) (ye	mins) 15, 3				0		
Climate Change), 35, 2			
	Wate	er Surcharged	Flooded			Pipe	
US/MH		el Depth			Overflow	-	
PN Name Event	(m) (m)	(m)	(m³)	Cap.	(l/s)	(l/s)	Status
1.000 S101 15 minute 30 year Winter I+35%	6.500 6.1	51 0.051	0.000	1.09		129.3	SURCHARGED
1.001 S102 120 minute 30 year Winter I+35%	6.500 5.9	14 0.039	0.000	0.51			SURCHARGED
2.000 S103 15 minute 30 year Winter I+35%				0.73			SURCHARGED
2.001 S104 15 minute 30 year Winter I+35% 1.002 S105 15 minute 30 year Winter I+35%				0.80 1.57			SURCHARGED
1.002 S105 15 minute 30 year Winter 1+35% 1.003 S106 960 minute 30 year Winter I+35%				0.18			SURCHARGED

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Seven House, High Street	05425	
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	_	
Birmingham, B31 2UQ	Catchment 2	— Micro
Date 13/10/2022 10:34	Designed by JG	Drainage
File 05425 - CATCHMENT 2 NETWORK MC	Checked by MC	brainage
Innovyze	Network 2019.1	
100 year Return Period Summary of Crit	ical Results by Maximum Level (Rank	1) for Catchment 2
Areal Reduction Facto Hot Start (mins Hot Start Level (mm Manhole Headloss Coeff (Global Foul Sewage per hectare (l/s) 0 Inlet Coeffiecient) 0.500 Flow per Person per Day (l/per/day)	e 2.000 t 0.800) 0.000
<u>Synt</u> Rainfall Model FEH Rainfall Version		
	arning (mm) 300.0 is Timestep 2.5 Second Increment (Extended) DTS Status OFF DVD Status ON rtia Status ON	,
Profile Duration(s) (m: Return Period(s) (yea Climate Change	ins) 15, 30, 60, 120, 240, 360, 480, 960 ars) 2, 30, 100	
	Water Surcharged Flooded	Pipe
	US/CL Level Depth Volume Flow / Over	
PN Name Event	(m) (m) (m) (m^3) Cap. (1	l/s) (l/s) Status
1.000 S101 15 minute 100 year Winter I+20%	6.500 6.261 0.161 0.000 1.28	151.8 FLOOD RISK
1.001 S102 120 minute 100 year Winter I+20%	6.500 6.016 0.141 0.000 0.58	77.4 SURCHARGED
2.000 S103 15 minute 100 year Winter I+20%		79.0 SURCHARGED
2.001 S104 15 minute 100 year Winter I+20%		81.3 SURCHARGED
1.002 S105 15 minute 100 year Winter I+20%		115.9 SURCHARGED
1.003 S106 960 minute 100 year Winter I+20%	6.500 5.992 0.702 0.000 0.18	2.9 SURCHARGED

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Seven House, High Street	05425	
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File 05425 - CATCHMENTS 3 AND 7 NETW	Checked by MC	Diamage
Innovyze	Network 2019.1	1

Existing Network Details for C3, C4, C7

- Indicates pipe length does not match coordinates

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)		Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
	(/	()	、 =,	()	((/			(,	
1.000	11.189	0.050	223.8	0.584	5.00	0.0	0.600		0	375	Pipe/Conduit
1.001	108.847	0.025	4353.9	0.000	0.00	0.0		0.035	\backslash	-1	Pipe/Conduit
1.002	39.925	0.075	532.3	0.000	0.00	0.0		0.035	\backslash	-1	Pipe/Conduit
2.000	36.091	0.150	240.6	1.154	5.00	0.0	0.600		0	375	Pipe/Conduit
1.003	61.223	0.025	2448.9	0.000	0.00	0.0		0.035	$\backslash/$	-1	Pipe/Conduit
1.004	15.766	0.025	630.6	0.000	0.00	0.0	0.600		0	375	Pipe/Conduit
1.005	37.018	0.250	148.1	0.000	0.00	0.0	0.600		0	150	Pipe/Conduit
1.006	3.845	0.025	153.8	0.000	0.00	0.0	0.600		0	150	Pipe/Conduit
1.007	57.619#	0.105	548.8	0.000	0.00	0.0	0.600		0	900	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (1/s)
1.000	5.100	0.584	0.0	1.21	133.3
1.001	5.050	0.584	0.0	0.34	1470.1
1.002	5.025	0.584	0.0	0.97	4204.3
2.000	5.100	1.154	0.0	1.16	128.5
1.003	4.950	1.738	0.0	0.45	1960.2
1.004	4.925	1.738	0.0	0.71	78.9
1.005	4.900	1.738	0.0	0.82	14.6
1.006	4.650	1.738	0.0	0.81	14.3
1.007	4.425	1.738	0.0	1.33	846.4

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Seven House, High Street	05425	
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File 05425 - CATCHMENTS 3 AND 7 NETW	Checked by MC	Diamaye
Innovyze	Network 2019.1	1

Manhole Schedules for C3, C4, C7

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S5	6.500	1.400	Open Manhole	1200	1.000	5.100	375				
SwaleA	6.250	1.200	Open Manhole	1	1.001	5.050	-1	1.000	5.050	375	
SwaleB	6.200	1.175	Open Manhole	1	1.002	5.025	-1	1.001	5.025	-1	
S8S9S10	6.500	1.400	Open Manhole	1200	2.000	5.100	375				
SwaleC	6.150	1.200	Open Manhole	1	1.003	4.950	-1	1.002	4.950	-1	
								2.000	4.950	375	
SwaleEnd	6.125	1.200	Open Manhole	1	1.004	4.925	375	1.003	4.925	-1	
FlowControl1	6.500	1.600	Open Manhole	1200	1.005	4.900	150	1.004	4.900	375	
Outfall	6.500	1.850	Open Manhole	1200	1.006	4.650	150	1.005	4.650	150	
FPDDiv1	6.500	2.075	Open Manhole	1800	1.007	4.425	900	1.006	4.625	150	
FPD	7.000	2.680	Open Manhole	0		OUTFALL		1.007	4.320	900	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S5	547488.260	260746.143	547488.260	260746.143	Required	
SwaleA	547478.608	260751.803	547478.608	260751.803	Required	
SwaleB	547519.471	260852.688	547519.471	260852.688	Required	
\$8\$9\$10	547496.771	260894.067	547496.771	260894.067	Required	/
SwaleC	547532.672	260890.367	547532.672	260890.367	Required	/
SwaleEnd	547555.721	260947.086	547555.721	260947.086	Required	-
FlowControll	547571.045	260950.791	547571.045	260950.791	Required	
Outfall	547605.029	260936.114	547605.029	260936.114	Required	/
FPDDiv1	547607.800	260938.779	547607.800	260938.779	Required	
FPD	547630.987	260868.930			No Entry	

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Date 13/10/2022 10:19	Designed by JG	Drainage
File 05425 - CATCHMENTS 3 AND 7 NETW	Checked by MC	Dianiaye
Innovyze	Network 2019.1	

PIPELINE SCHEDULES for C3, C4, C7

Upstream Manhole

- Indicates pipe length does not match coordinates

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	0	375	S5	6.500	5.100	1.025	Open Manhole	1200
1.001	$\backslash/$	-1	SwaleA	6.250	5.050	0.000	Open Manhole	1
1.002	$\backslash/$	-1	SwaleB	6.200	5.025	-0.025	Open Manhole	1
2.000	0	375	S8S9S10	6.500	5.100	1.025	Open Manhole	1200
1.003	$\backslash/$	-1	SwaleC	6.150	4.950	0.000	Open Manhole	1
1.004	0	375	SwaleEnd	6.125	4.925	0.825	Open Manhole	1
1.005	0	150	FlowControl1	6.500	4.900	1.450	Open Manhole	1200
1.006	0	150	Outfall	6.500	4.650	1.700	Open Manhole	1200
1.007	0	900	FPDDiv1	6.500	4.425	1.175	Open Manhole	1800

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	11.189	223.8	SwaleA	6.250	5.050	0.825	Open Manhole	1
1.001	108.847	4353.9	SwaleB	6.200	5.025	-0.025	Open Manhole	1
1.002	39.925	532.3	SwaleC	6.150	4.950	0.000	Open Manhole	1
2.000	36.091	240.6	SwaleC	6.150	4.950	0.825	Open Manhole	1
1.003	61.223	2448.9	SwaleEnd	6.125	4.925	0.000	Open Manhole	1
1.004	15.766	630.6	FlowControl1	6.500	4.900	1.225	Open Manhole	1200
1.005	37.018	148.1	Outfall	6.500	4.650	1.700	Open Manhole	1200
1.006	3.845	153.8	FPDDiv1	6.500	4.625	1.725	Open Manhole	1800
1.007	57.619#	548.8	FPD	7.000	4.320	1.780	Open Manhole	0

Surcharged Outfall Details for C3, C4, C7

Outfall Pipe Number	Outfall C Name	. Level (m)		Min Level (m)		
1.007	FPD	7.000	4.320	0.000	0	0

Datum (m) 0.000 Offset (mins) 0

Time	Depth														
(mins)	(m)														
1	5.240	13	5.240	25	5.240	37	5.240	49	5.240	61	5.240	73	5.240	85	5.240
2	5.240	14	5.240	26	5.240	38	5.240	50	5.240	62	5.240	74	5.240	86	5.240
3	5.240	15	5.240	27	5.240	39	5.240	51	5.240	63	5.240	75	5.240	87	5.240
4	5.240	16	5.240	28	5.240	40	5.240	52	5.240	64	5.240	76	5.240	88	5.240
5	5.240	17	5.240	29	5.240	41	5.240	53	5.240	65	5.240	77	5.240	89	5.240
6	5.240	18	5.240	30	5.240	42	5.240	54	5.240	66	5.240	78	5.240	90	5.240
7	5.240	19	5.240	31	5.240	43	5.240	55	5.240	67	5.240	79	5.240	91	5.240
8	5.240	20	5.240	32	5.240	44	5.240	56	5.240	68	5.240	80	5.240	92	5.240
9	5.240	21	5.240	33	5.240	45	5.240	57	5.240	69	5.240	81	5.240	93	5.240
10	5.240	22	5.240	34	5.240	46	5.240	58	5.240	70	5.240	82	5.240	94	5.240
11	5.240	23	5.240	35	5.240	47	5.240	59	5.240	71	5.240	83	5.240	95	5.240
12	5.240	24	5.240	36	5.240	48	5.240	60	5.240	72	5.240	84	5.240	96	5.240

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File 05425 - CATCHMENTS 3 AND 7 NETW	Checked by MC	Diginarie
Innovyze	Network 2019.1	

Surcharged Outfall Details for C3, C4, C7

Time	Depth	Time	Depth		Depth										
(mins)	(m)														
97	5.240	115	5.240	133	5.240	151	5.240	169	5.240	187	5.240	205	5.240	223	5.240
98	5.240	116	5.240	134	5.240	152	5.240	170	5.240	188	5.240	206	5.240	224	5.240
99	5.240	117	5.240	135	5.240	153	5.240	171	5.240	189	5.240	207	5.240	225	5.240
100	5.240	118	5.240	136	5.240	154	5.240	172	5.240	190	5.240	208	5.240	226	5.240
101	5.240	119	5.240	137	5.240	155	5.240	173	5.240	191	5.240	209	5.240	227	5.240
102	5.240	120	5.240	138	5.240	156	5.240	174	5.240	192	5.240	210	5.240	228	5.240
103	5.240	121	5.240	139	5.240	157	5.240	175	5.240	193	5.240	211	5.240	229	5.240
104	5.240	122	5.240	140	5.240	158	5.240	176	5.240	194	5.240	212	5.240	230	5.240
105	5.240	123	5.240	141	5.240	159	5.240	177	5.240	195	5.240	213	5.240	231	5.240
106	5.240	124	5.240	142	5.240	160	5.240	178	5.240	196	5.240	214	5.240	232	5.240
107	5.240	125	5.240	143	5.240	161	5.240	179	5.240	197	5.240	215	5.240	233	5.240
108	5.240	126	5.240	144	5.240	162	5.240	180	5.240	198	5.240	216	5.240	234	5.240
109	5.240	127	5.240	145	5.240	163	5.240	181	5.240	199	5.240	217	5.240	235	5.240
110	5.240	128	5.240	146	5.240	164	5.240	182	5.240	200	5.240	218	5.240	236	5.240
111	5.240	129	5.240	147	5.240	165	5.240	183	5.240	201	5.240	219	5.240	237	5.240
112	5.240	130	5.240	148	5.240	166	5.240	184	5.240	202	5.240	220	5.240	238	5.240
113	5.240	131	5.240	149	5.240	167	5.240	185	5.240	203	5.240	221	5.240	239	5.240
114	5.240	132	5.240	150	5.240	168	5.240	186	5.240	204	5.240	222	5.240	240	5.240

Simulation Criteria for C3, C4, C7

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 2 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model			FEH	Summer Storms	Yes
Return Period (years)			30	Winter Storms	No
FEH Rainfall Version			2013	Cv (Summer)	0.750
Site Location G	B 547650 2	260850 TL	47650 60850	Cv (Winter)	0.840
Data Type			Catchment	Storm Duration (mins)	30

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Date 13/10/2022 10:19	Designed by JG			
File 05425 - CATCHMENTS 3 AND 7 NETW	. Checked by MC			Drainage
Innovyze	Network 2019.1			
<u>Online</u> Hydro-Brake® Optimum Manhole	e Controls for C3, C e: FlowControl1, DS/		ume (m³):	3.5
	Unit Reference MD-SHE-0	084-3400-1225-340	0	
	Unit Reference MD-SHE-0 Design Head (m)	084-3400-1225-340		
E	Design Head (m)		5	
E		1.22	5 4	
E	Design Head (m) Sign Flow (l/s)	1.22 3. Calculate	5 4 d	
E	Design Head (m) sign Flow (l/s) Flush-Flo™	1.22 3. Calculate	5 4 d	
E Des	Design Head (m) sign Flow (l/s) Flush-Flo™ Objective Minimis Application Sump Available	1.22 3. Calculate se upstream storag Surfac Ye	5 4 d e e s	
Des	Design Head (m) sign Flow (l/s) Flush-Flo™ Objective Minimis Application Sump Available Diameter (mm)	1.22 3. Calculate se upstream storag Surfac Ye 8	5 4 d e e s 4	
L Des In	Design Head (m) sign Flow (l/s) Flush-Flo™ Objective Minimis Application Sump Available Diameter (mm) nvert Level (m)	1.22 3. Calculate se upstream storag Surfac Ye 8 4.90	5 4 d e e s 4 0	
E Des In Minimum Outlet Pipe	Design Head (m) sign Flow (l/s) Flush-Flo™ Objective Minimis Application Sump Available Diameter (mm) nvert Level (m) a Diameter (mm)	1.22 3. Calculate se upstream storag Surfac Ye 8 4.90 10	5 4 d e e s 4 0 0	
L Des In	Design Head (m) sign Flow (l/s) Flush-Flo™ Objective Minimis Application Sump Available Diameter (mm) nvert Level (m) a Diameter (mm)	1.22 3. Calculate se upstream storag Surfac Ye 8 4.90	5 4 d e e s 4 0 0	
E Des In Minimum Outlet Pipe	Design Head (m) sign Flow (1/s) Flush-Flo™ Objective Minimis Application Sump Available Diameter (mm) hvert Level (m) a Diameter (mm) b Diameter (mm)	1.22 3. Calculate se upstream storag Surfac Ye 8 4.90 10	5 4 d e e s 4 0 0 0	w (1/s)
E Des In Minimum Outlet Pipe Suggested Manhole	Design Head (m) sign Flow (1/s) Flush-Flo ^m Objective Minimis Application Sump Available Diameter (mm) tvert Level (m) e Diameter (mm) Flow (1/s) Contro	1.22 3. Calculate se upstream storag Surfac Ye 8 4.90 10 120	5 4 e s 4 0 0 0 0 ad (m) Flo	

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)								
0.100	2.5	0.800	2.8	2.000	4.3	4.000	5.9	7.000	7.7
0.200	3.2	1.000	3.1	2.200	4.5	4.500	6.2	7.500	7.9
0.300	3.4	1.200	3.4	2.400	4.6	5.000	6.5	8.000	8.2
0.400	3.4	1.400	3.6	2.600	4.8	5.500	6.8	8.500	8.4
0.500	3.3	1.600	3.8	3.000	5.1	6.000	7.1	9.000	8.7
0.600	3.2	1.800	4.1	3.500	5.5	6.500	7.4	9.500	8.9

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Seven House, High Street	05425			
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Birmingham, B31 2UQ	Catchments 3 and 7			
Date 13/10/2022 10:19	Designed by JG	Drainage		
File 05425 - CATCHMENTS 3 AND 7 NETW	Checked by MC	Diamage		
Innovyze	Network 2019.1	1		
Cellular Storage Inv Infiltration Coefficien Infiltration Coefficien		nf Area (m ²)		
0.000 330.0 0.0 0.800	0 330.0 0.0 0.801 0.0	0.0		
Cellular Storage Ma	anhole: FlowControl1, DS/PN: 1.005			
Inv Infiltration Coefficien Infiltration Coefficien				
Depth (m) Area (m ²) Inf. Area (m ²) Depth (m)) Area (m²) Inf. Area (m²) Depth (m) Area (m²) I	nf. Area (m²)		
0.000 410.0 0.0 1.200	0 410.0 0.0 1.201 0.0	0.0		

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Seven House, High Street	05425						1
Longbridge	Cambridge	North					
Birmingham, B31 2UQ	Catchment		17				
Date 13/10/2022 10:19	Designed B		. /				cio
File 05425 - CATCHMENTS 3 AND 7 NETW	2	-					ainage
	Checked by	-					<u> </u>
Innovyze	Network 20	019.1					
2 year Return Period Summary of Criti	cal Result	s by Ma	aximum Lev	vel (Rai	nk 1) 1	for C3,	C4, C7
Areal Reduction Factor Hot Start (mins) Hot Start Level (mm) Manhole Headloss Coeff (Global) Foul Sewage per hectare (1/s)) 0) 0) 0.500 Flow	ditional MADD F	actor * 10m Inlet	³/ha Sto Coeffiec	rage 2. ient 0.	000 800	
Number of Input Hydrographs 0 Number Number of Online Controls 1 Number	er of Offline					5	
	-			OI Keai	IIIIIe C	UNCLOSS 0	
Rainfall Model	chetic Rainfa	II Detai		a Type Ca	atchment		
FEH Rainfall Version			2013 Cv (Si		0.750		
Site Location GB 5476	550 260850 TL	47650 6	0850 Cv (Wi	inter)	0.840)	
	arning (mm) Ls Timestep 2 DTS Status DVD Status ctia Status	.5 Secon	nd Increment)0.0 ded) OFF ON ON		
Prof: Duration(s) Return Period(s) Climate Chang	years)		2, 3				
US/MH PN Name Event	US/CL (m)		Surcharged Depth (m)			Overflow (1/s)	Pipe Flow (l/s)
1.000 S5 15 minute 2 year Winte	r I+0% 6.500	5.398	-0.077	0.000	0.96		97.1
1.001 SwaleA 480 minute 2 year Winte		5.357	-0.893	0.000	0.00		12.2
1.002 SwaleB 480 minute 2 year Winte		5.357	-0.868	0.000	0.00		8.0
2.000 S8S9S10 480 minute 2 year Winte		5.358	-0.117	0.000	0.16		18.2
1.003SwaleC 480 minute 2 year Winte1.004SwaleEnd 480 minute 2 year Winte		5.357 5.356	-0.793	0.000	0.01 0.41		22.7 18.5
1.004 SwaleEnd 480 minute 2 year winte 1.005 FlowControll 480 minute 2 year Winte		5.356 5.355	0.056	0.000	0.41		18.5 3.4
T. T		5.245	0.303	0.000	1.68		
1.006 Outfall 240 minute 2 year Winte	r 1+03 6.000	5.245	0.110				18.2
1.006Outfall 240 minute 2 year Winte1.007FPDDiv1 240 minute 2 year Winte		5.241	-0.084	0.000	0.04		26.7

PN	Name	Status
1.000	S5	OK
1.001	SwaleA	OK
1.002	SwaleB	OK
2.000	S8S9S10	OK
1.003	SwaleC	OK
1.004	SwaleEnd	SURCHARGED
1.005	FlowControl1	SURCHARGED
1.006	Outfall	SURCHARGED
1.007	FPDDiv1	OK

PJA										Page	
even Hou	use, High Stro	eet		0)5425						
ongbridg	ae			С	Cambridge	North					
	am, B31 2UQ				Catchments		7			Mic	
	10/2022 10:19			-	Designed k		,			— Mic	
					2	-				Dra	inac
	25 - CATCHMEN	IS 3 AND	/ NETW		Checked by						
Innovyze				N	Network 20)19.1					
<u>30 yea</u>	ar Return Peri	od Summa:	ry of (Critic	<u>al Result</u>	s by Ma	ximum Lev	el (Rar	nk 1) f	or C3, (C4, C
	Foul Son Number of Input	Hot Hot Star Headloss Co ewage per h t Hydrograp	Start (rt Level peff (Gl nectare phs 0	Tactor 1 (mins) (mm) obal) ((l/s) (Number	0 0 0.500 Flow 0.000 of Offline	itional MADD Fa per Pers Control	on per Day s O Number	/ha Stor oeffieci (l/per/d of Time/	age 2.00 ent 0.80 ay) 0.00 Area Dia	00 00 00 agrams 0	
	Number of On	line Contro	ols 1 Nu	umber of	f Storage S	tructure	s 2 Number	of Real	Time Co	ntrols O	
				Comthe	tia Doinfo	ll Dotail	S				
				Synthe	etic Rainfa	LI Decall	0				
		Rainfall M	iodel	synthe	CIC RAINIA.	LI Detail		Type Cat	chment		
	FEH Ra	infall Ver	sion			2	FEH Data 013 Cv (Sum	mer)	0.750		
		infall Ver	sion tion GB	547650	260850 TL	2	FEH Data	mer)	0.750 0.840		
		infall Ver Site Loca	sion tion GB 'lood Ri	547650 sk Warn alysis DT DV	260850 TL	2 47650 60	FEH Data 013 Cv (Sum	umer) iter) 300 (Extende	0.750 0.840		
		Ainfall Ver Site Loca Argin for F	sion tion GB 'lood Ri An. Duration	547650 sk Warn alysis DT DV Inerti Profile	260850 TL ing (mm) Timestep 2 S Status D Status a Status e(s) ins) 15, 30	2 47650 60 .5 Second	FEH Data 013 Cv (Sun 850 Cv (Wir d Increment ummer and W 0, 240, 360	inter (Extende (inter , 480	0.750 0.840 0.0 ed) DFF ON		
		Ainfall Ver Site Loca Argin for F I Return	sion tion GB Clood Ri An	547650 sk Warn alysis DT DV Inerti Profile n(s) (mi (s) (yea	260850 TL ing (mm) Timestep 2 S Status D Status a Status e(s) ins) 15, 30 ars)	2 47650 60 .5 Second	FEH Data 013 Cv (Sun 850 Cv (Wir d Increment ummer and W 0, 240, 360 2, 30	inter (Extende (inter , 480	0.750 0.840 0.0 ed) DFF ON		
		Ainfall Ver Site Loca Argin for F I Return	sion tion GB 'lood Ri An Duration Period	547650 sk Warn alysis DT DV Inerti Profile n(s) (mi (s) (yea	260850 TL ing (mm) Timestep 2 S Status D Status a Status e(s) ins) 15, 30 ars)	2 47650 60 .5 Second s , 60, 12	FEH Data 013 Cv (Sun 850 Cv (Wir d Increment ummer and W 0, 240, 360 2, 30	inter , 480 , 25	0.750 0.840 0.0 ed) 0FF ON ON		Pipe
		Ainfall Ver Site Loca Argin for F I Return	sion tion GB 'lood Ri An Duration Period	547650 sk Warn alysis DT DV Inerti Profile n(s) (mi (s) (yea	260850 TL ing (mm) Timestep 2 S Status D Status a Status e(s) ins) 15, 30 ars)	2 47650 60 .5 Second S , 60, 12 Water Level	FEH Data 013 Cv (Sun 850 Cv (Wir d Increment ummer and W 0, 240, 360 2, 30 0, 2	<pre>inter)</pre>	0.750 0.840 0.0 ed) 0FF ON ON	Overflow	Flow
PN	Ma	Ainfall Ver Site Loca Argin for F I Return	sion tion GB 'lood Ri An Duration Period	547650 sk Warn alysis DT DV Inerti Profile n(s) (mi (s) (yea	260850 TL ing (mm) Timestep 2 S Status D Status a Status e(s) ins) 15, 30 ars) (%)	2 47650 60 .5 Second S , 60, 12 Water	FEH Data 013 Cv (Sun 850 Cv (Wir d Increment ummer and W 0, 240, 360 2, 30 0, 2 Surcharged	<pre>inter)</pre>	0.750 0.840 0.0 ed) 0FF ON ON	Overflow (1/s)	-
	US/MH Name	Ainfall Ver. Site Loca argin for F I Return (sion tion GB Clood Ri An Duration Period Climate	547650 sk Warn DT DV Inerti Profile n(s) (mi (s) (yea Change	260850 TL ing (mm) Timestep 2 S Status D Status a Status e(s) ins) 15, 30 ars) (%) US/CI (m)	2 47650 60 .5 Second , 60, 12 Water Level (m)	FEH Data 013 CV (Sun 850 CV (Wir d Increment ummer and W 0, 240, 360 2, 30 0, 2 Surcharged Depth (m)	inter , 480 , 100 0, 25 Flooded Volume (m ³)	0.750 0.840 0.0 ed) 0FF ON ON FF ON ON		Flow (1/s)
1.000	US/MH Name S5 1	Site Loca argin for F Return C	sion tion GB 'lood Ri An Duration Period Climate Event 0 year V	547650 sk Warn alysis DT DV Inerti Profile n(s) (mi (s) (yea Change	260850 TL ing (mm) Timestep 2 S Status D Status a Status e(s) ins) 15, 30 ars) (%) US/CI (m) I+20% 6.500	2 47650 60 .5 Second S , 60, 12 Water Level (m) 0 5.937	FEH Data 013 CV (Sun 850 CV (Wir 1 Increment 1 Increment 0, 240, 360 2, 30 0, 2 Surcharged Depth (m) 0.462	<pre>inter)</pre>	0.750 0.840 0.0 ed) 0FF ON ON ON Flow / Cap. 2.73		Flow (1/s) 274.3
1.000 1.001	US/MH Name S5 1 SwaleA 48	Site Loca argin for F Return 0 minute 30	sion tion GB 'lood Ri An Duration Period Climate Event 0 year V 0 year V	547650 sk Warn alysis DT DV Inerti Profile n(s) (mi (s) (yea Change	260850 TL ing (mm) Timestep 2 S Status D Status a Status e(s) ins) 15, 30 ars) (%) US/CI (m) I+20% 6.500 I+20% 6.250	2 47650 60 .5 Second S , 60, 12 Water Level (m) 5.937 5.783	FEH Data 013 CV (Sun 850 CV (Wir 1 Increment 1 Increment 0, 240, 360 2, 30 0, 2 Surcharged Depth (m) 0.462 -0.467	<pre>inter)</pre>	0.750 0.840 0.0 ed) 0FF ON ON ON Flow / Cap. 2.73 0.01		Flow (1/s) 274.3 29.8
1.000 1.001 1.002	US/MH Name S5 1 SwaleA 48 SwaleB 48	Site Loca argin for F Return 0 minute 30 0 minute 30	sion tion GB 'lood Ri An. Duration Period (Climate Event 0 year V 0 year V 0 year V	547650 sk Warn alysis DT DV Inerti Profile h(s) (mi (s) (yea Change	260850 TL ing (mm) Timestep 2 S Status D Status a Status e(s) ins) 15, 30 ars) (%) US/CI (%) I+20% 6.500 I+20% 6.200	2 47650 60 .5 Second (, 60, 12 Water Level (m) 5.937 5.783 5.783	FEH Data 013 CV (Sun 850 CV (Wir d Increment ummer and W 0, 240, 360 2, 30 0, 2 Surcharged Depth (m) 0.462 -0.467 -0.442	<pre>inter)</pre>	0.750 0.840 0.0 ed) 0FF ON ON ON Flow / Cap. 2.73 0.01 0.00		Flow (1/s) 274.3 29.8 17.6
1.000 1.001 1.002 2.000	US/MH Name S5 1 SwaleA 48 SwaleB 48 S8S9S10 48	Site Loca argin for F Return 0 minute 30 0 minute 30 0 minute 30	Sion tion GB Clood Ri An Duration Period Climate U year 0 year 0 year 0 year 0 year 0 year	547650 sk Warn alysis DT DV Inerti Profile n(s) (mi (s) (yea Change Winter T Winter T Winter T	260850 TL ing (mm) Timestep 2 S Status D Status a Status e(s) ins) 15, 30 ars) (%) US/CI (%) I+20% 6.500 I+20% 6.200 I+20% 6.500	2 47650 60 .5 Second (, 60, 12 Water Level (m) 5.937 5.783 5.783 5.783	FEH Data 013 CV (Sun 850 CV (Wir d Increment ummer and W 0, 240, 360 2, 30 0, 2 Surcharged Depth (m) 0.462 -0.467 -0.442 0.311	<pre>inter)</pre>	0.750 0.840 0.0 ed) 0FF ON ON ON Flow / Cap. 2.73 0.01 0.00 0.42		Flow (1/s) 274.3 29.8 17.6 48.9
1.000 1.001 1.002	US/MH Name S5 1 SwaleA 48 SwaleB 48 S8S9S10 48 SwaleC 48	5 minute 30 0 minute 30 0 minute 30 0 minute 31 0 minute 31	Sion tion GB Clood Ri An Duration Period Climate U year 0 year 0 year 0 year 0 year 0 year 0 year 0 year	547650 sk Warn alysis DT DV Inerti Profile n(s) (mi (s) (yea Change Winter Winter Winter	260850 TL ing (mm) Timestep 2 S Status D Status a Status e(s) ins) 15, 30 ars) (%) US/CI (%) I+20% 6.500 I+20% 6.200 I+20% 6.500 I+20% 6.500 I+20	2 47650 60 .5 Second .5 Second . 60, 12 Water . Level (m) 5.937 5.783 5.783 5.783 5.783	FEH Data 013 CV (Sun 850 CV (Wir d Increment ummer and W 0, 240, 360 2, 30 0, 2 Surcharged Depth (m) 0.462 -0.467 -0.442	<pre>inter)</pre>	0.750 0.840 0.0 ed) 0FF ON ON ON Flow / Cap. 2.73 0.01 0.00		Flow (1/s) 274.3 29.8 17.6 48.9 46.3
1.000 1.001 1.002 2.000 1.003 1.004	US/MH Name S5 1 SwaleA 48 SwaleB 48 S8S9S10 48	5 minute 30 0 minute 30 0 minute 30 0 minute 31 0 minute 31 0 minute 31 0 minute 31 0 minute 31	sion tion GB lood Ri An Duration Period Climate U year 0 y	547650 sk Warn alysis DT DV Inerti Profile n(s) (mi (s) (yea Change Winter Winter Winter	260850 TL ing (mm) Timestep 2 S Status D Status a Status e(s) ins) 15, 30 ars) (%) US/CI (%) I+20% 6.500 I+20% 6.200 I+20% 6.200 I+20% 6.125 I+20% I+20% I	2 47650 60 .5 Second .5 Second . 60, 12 Water . Level (m) 5.937 5.783 5.783 5.783 5.783 5.783 5.783	FEH Data 013 CV (Sun 850 CV (Wir 1 Increment 4 Increment 0, 240, 360 2, 30 0, 2 Surcharged Depth (m) 0.462 -0.467 -0.442 0.311 -0.367	<pre>inter) 30((Extende (Extende) inter , 480 , 100 0, 25 Flooded Volume (m³) 0.000 0.000 0.000 0.000 0.000</pre>	0.750 0.840 0.0 ed) 0FF ON ON ON Flow / Cap. 2.73 0.01 0.00 0.42 0.02		Flow (1/s) 274.3 29.8 17.6 48.9 46.3 33.0
1.000 1.001 1.002 2.000 1.003 1.004	US/MH Name S5 1 SwaleA 48 SwaleB 48 S8S9S10 48 SwaleEn 48 SwaleEnd 48 FlowControl1 48	5 minute 30 0 minute 30 0 minute 30 0 minute 31 0 minute 31 0 minute 31 0 minute 31 0 minute 31 0 minute 31	sion tion GB lood Ri An Duration Period Climate U year 0 y	547650 sk Warn alysis DT DV Inerti Profile n(s) (mi (s) (yea Change Winter Winter Winter Winter	260850 TL ing (mm) Timestep 2 S Status D Status a Status e(s) ins) 15, 30 ars) (%) US/CI (%) I+20% 6.500 I+20% 6.200 I+20% 6.200 I+20% 6.125 I+20% I+20% I	2 47650 60 .5 Second .5 Second . 60, 12 Water Level (m) 5.937 5.783 5.783 5.783 5.783 5.783 5.783 5.783	FEH Data 013 CV (Sun 850 CV (Wir 1 Increment 4 Increment 0, 240, 360 2, 30 0, 2 Surcharged Depth (m) 0.462 -0.467 -0.442 0.311 -0.367 0.482	<pre>inter) 30((Extende (Extende) inter , 480 , 100 0, 25 Flooded Volume (m³) 0.000 0.000 0.000 0.000 0.000 0.000</pre>	0.750 0.840 0.0 ed) 0FF ON ON ON Flow / Cap. 2.73 0.01 0.00 0.42 0.02 0.73		Flow (1/s) 274.3 29.8 17.6

PN	US/MH Name	Status
1.000	S5	SURCHARGED
1.001	SwaleA	OK
1.002	SwaleB	OK
2.000	S8S9S10	SURCHARGED
1.003	SwaleC	OK
1.004	SwaleEnd	SURCHARGED
1.005	FlowControl1	SURCHARGED
1.006	Outfall	SURCHARGED
1.007	FPDDiv1	OK

PJA										Page 9)
Seven Ho	ouse, High S	Street		05425							
Longbric	lge			Cambr	idge N	orth					
Birmingh	nam, B31 2UQ	2		Catch	nents	3 and	7			Mic	
Date 13/	/10/2022 10:	19		Desig	ned by	JG					
File 054	125 - CATCHM	ients 3 an	D 7 NETW	-	-					Did	nage
Innovyze	2			Netwo							
- 1	-										
<u>100 y</u> e	ear Return I	Period Sum	mary of Cr:	itical R	esults	s by Ma	aximum Lev	rel (Rar	nk 1) f	for C3, (C4, C7
	Fou Number of I	Hot S Hot S le Headloss l Sewage pe: nput Hydrogi	eduction Fact ot Start (min cart Level (m Coeff (Globa c hectare (1/ caphs 0 Num crols 1 Numbe	s) 0 m) 0 1) 0.500 s) 0.000	Addi [:] I Flow pe	tional H MADD Fac er Perso Controls	on per Day s 0 Number o	/ha Stora peffiecie (l/per/da pf Time/ <i>l</i>	age 2.00 ent 0.80 ay) 0.00 Area Dia	0 0 0 grams 0	
					2						
				nthetic Ra	ainfall						
	नजन	Rainfall I Rainfall V					FEH Data 013 Cv (Sum	Type Cat mer)	0.750		
	1 11		cation GB 54	7650 2608	50 TL 4			,	0.840		
		Ţ	-	-	tep 2.5 tus tus	Second	Increment	0	d) FF ON ON		
		Retu		(years)			ummer and W: 0, 240, 360, 2, 30, 0, 20	, 480 , 100			
						Water	Surcharged	Flooded			Pipe
	US/MH				US/CL	Level	Depth		Flow /		Flow
PN	Name		Event		(m)	(m)	(m)	(m³)	Cap.	(1/s)	(1/s)
1.000	S5	15 minute	100 year Win	ter I+25%	6.500	6.402	0.927	0.000	3.70		372.3
1.001	SwaleA	480 minute	100 year Win	ter I+25%	6.250	6.105	-0.145	0.000	0.01		43.4
1.002			100 year Win			6.103	-0.122	0.000	0.01		18.4
2.000			100 year Win			6.145	0.670	0.000	2.01		232.2
1.003			100 year Win			6.102	-0.048	0.000	0.02		56.4
1.004			100 year Win			6.086	0.786	0.000	0.83		37.4
1.005	FlowControl1		100 year win 100 year Sum			6.084 5.249	1.034 0.449	0.000	0.24 0.31		3.3 3.4
1.000			100 year Sum 100 year Sum			5.249	-0.082	0.000	0.00		3.4
			a								

	US/MH		
PN	Name	Status	
1.000	S5	FLOOD RIS	K
1.001	SwaleA	FLOOD RIS	K
1.002	SwaleB	FLOOD RIS	K
2.000	S8S9S10	SURCHARGE	D
1.003	SwaleC	FLOOD RIS	K
1.004	SwaleEnd	FLOOD RIS	K
1.005	FlowControll	SURCHARGE	D
1.006	Outfall	SURCHARGE	D
1.007	FPDDiv1	01	K

PJA		Page 1
Seven House, High Street	05425	
Longbridge	Cambridge North	
Birmingham, B31 2UQ	Catchments 3, 4 and 7	Micro
Date 13/10/2022 10:44	Designed by JG	Drainage
File 05425 - CATCHMENT 4 NETWORK MC	Checked by MC	Diamaye
Innovyze	Network 2019.1	1

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (1/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type
1.000	11.189		223.8	0.584	5.00		0.600		0		Pipe/Conduit
1.001	108.847	0.025	4353.9	0.000	0.00	0.0		0.035	\/		Pipe/Conduit
1.002	39.925	0.075	532.3	0.000	0.00	0.0		0.035	$\backslash/$	-1	Pipe/Conduit
2.000	36.091	0.150	240.6	1.154	5.00	0.0	0.600		0	375	Pipe/Conduit
1.003	61.223	0.025	2448.9	0.000	0.00	0.0		0.035	$\backslash/$	-1	Pipe/Conduit
1.004	15.766	0.025	630.6	0.000	0.00	0.0	0.600		0	375	Pipe/Conduit
1.005	37.018	0.250	148.1	0.000	0.00	0.0	0.600		0	150	Pipe/Conduit
1.006	3.845	0.025	153.8	0.000	0.00	0.0	0.600		0	150	Pipe/Conduit
1.007	11.921	0.025	476.8	0.000	0.00	0.0	0.600		0	900	Pipe/Conduit
1.008	45.698	0.080	571.2	0.000	0.00	0.0	0.600		0	900	Pipe/Conduit
3.000	45.110	0.050	902.2	0.817	5.00	0.0	0.600		0	450	Pipe/Conduit
3.001	5.364	0.041	130.8	0.000	0.00	0.0	0.600		0	150	Pipe/Conduit
1.009	31.680	0.059	536.9	0.000	0.00	0.0	0.600		[]	-2	Pipe/Conduit

Existing Network Details for C3, C4, C7

Network Results Table

PN	US/IL (m)		Σ Base Flow (l/s)		Cap (1/s)
1.001	5.100 5.050 5.025	0.584 0.584 0.584	0.0 0.0 0.0	0.34	133.3 1470.1 4204.3
2.000	5.100	1.154	0.0	1.16	128.5
1.003	4.950	1.738	0.0	0.45	1960.2
1.004	4.925	1.738	0.0	0.71	78.9
1.005	4.900	1.738	0.0	0.82	14.6
1.006	4.650	1.738	0.0	0.81	14.3
1.007	4.425	1.738	0.0	1.43	908.5
1.008	4.400	1.738	0.0	1.30	829.4
3.000	4.650	0.817	0.0	0.67	106.4
3.001	4.350	0.817	0.0	0.88	15.5
1.009	4.309	2.555	0.0	1.63	2516.0

РЈА		Page 2
Seven House, High Street	05425	
Longbridge	Cambridge North	
Birmingham, B31 2UQ	Catchments 3, 4 and 7	Micro
Date 13/10/2022 10:44	Designed by JG	Drainage
File 05425 - CATCHMENT 4 NETWORK MC	Checked by MC	Diamaye
Innovyze	Network 2019.1	1

Manhole Schedules for C3, C4, C7											
MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	PN	Pipe Out Invert Level (m)	Diameter (mm)	PN	Pipes In Invert Level (m)	Diameter (mm)	Backdrop (mm)
S5	6.500	1.400	Open Manhole	1200	1.000	5.100	375				
SwaleA	6.250	1.200	Open Manhole	1	1.001	5.050	-1	1.000	5.050	375	
SwaleB	6.200	1.175	Open Manhole	1	1.002	5.025	-1	1.001	5.025	-1	
S8S9S10	6.500	1.400	Open Manhole	1200	2.000	5.100	375				
SwaleC	6.150	1.200	Open Manhole	1	1.003	4.950	-1	1.002	4.950	-1	
								2.000	4.950	375	
SwaleEnd	6.125	1.200	Open Manhole	1	1.004	4.925	375	1.003	4.925	-1	
FlowControl1	6.500	1.600	Open Manhole	1200	1.005	4.900	150	1.004	4.900	375	
Outfall	6.500	1.850	Open Manhole	1200	1.006	4.650	150	1.005	4.650	150	
FPDDiv1	6.500	2.075	Open Manhole	1800	1.007	4.425	900	1.006	4.625	150	
FPDDiv2	6.500	2.100	Open Manhole	1800	1.008	4.400	900	1.007	4.400	900	
S6S7			Open Manhole	1200	3.000	4.650	450				
FlowControl2	6.500	2.150	Open Manhole	1200	3.001	4.350	150	3.000	4.600	450	550
FPD	6.500	2.191	Open Manhole	1	1.009	4.309	-2	1.008	4.320	900	
								3.001	4.309	150	
FPD	7.000	2.750	Open Manhole	0		OUTFALL		1.009	4.250	-2	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S5	547488.260	260746.143	547488.260	260746.143	Required	
SwaleA	547478.608	260751.803	547478.608	260751.803	Required	
SwaleB	547519.471	260852.688	547519.471	260852.688	Required	
S8S9S10	547496.771	260894.067	547496.771	260894.067	Required	; •
SwaleC	547532.672	260890.367	547532.672	260890.367	Required	
SwaleEnd	547555.721	260947.086	547555.721	260947.086	Required	/
FlowControl1	547571.045	260950.791	547571.045	260950.791	Required	
Outfall	547605.029	260936.114	547605.029	260936.114	Required	/
FPDDiv1	547607.800	260938.779	547607.800	260938.779	Required	
FPDDiv2	547618.466	260933.454	547618.466	260933.454	Required	

PJA		Page 3
Seven House, High Street	05425	
Longbridge	Cambridge North	
Birmingham, B31 2UQ	Catchments 3, 4 and 7	Micro
Date 13/10/2022 10:44	Designed by JG	Drainage
File 05425 - CATCHMENT 4 NETWORK MC	Checked by MC	Diginada
Innovyze	Network 2019.1	

Manhole Schedules for C3, C4, C7

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S6S7	547586.587	260843.244	547586.587	260843.244	Required	1
FlowControl2	547603.396	260885.080	547603.396	260885.080	Required	
FPD	547606.718	260889.292	547606.718	260889.292	Required	
FPD	547630.987	260868.930			No Entry	

PJA		Page 4
Seven House, High Street	05425	
Longbridge	Cambridge North	
Birmingham, B31 2UQ	Catchments 3, 4 and 7	Micro
Date 13/10/2022 10:44	Designed by JG	Drainage
File 05425 - CATCHMENT 4 NETWORK MC	Checked by MC	Diamage
Innovyze	Network 2019.1	1

PIPELINE SCHEDULES for C3, C4, C7

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	0	375	S5	6.500	5.100	1.025	Open Manhole	1200
1.001	$\backslash/$	-1	SwaleA	6.250	5.050	0.000	Open Manhole	1
1.002	\/	-1	SwaleB	6.200	5.025	-0.025	Open Manhole	1
2.000	0	375	S8S9S10	6.500	5.100	1.025	Open Manhole	1200
1.003	$\backslash/$	-1	SwaleC	6.150	4.950	0.000	Open Manhole	1
1.004	0	375	SwaleEnd	6.125	4.925	0.825	Open Manhole	1
1.005	0	150	FlowControl1	6.500	4.900	1.450	Open Manhole	1200
1.006	0	150	Outfall	6.500	4.650	1.700	Open Manhole	1200
1.007	0	900	FPDDiv1	6.500	4.425	1.175	Open Manhole	1800
1.008	0	900	FPDDiv2	6.500	4.400	1.200	Open Manhole	1800
3.000	0	450	S6S7	6.500	4.650	1.400	Open Manhole	1200
3.001	0	150	FlowControl2	6.500	4.350	2.000	Open Manhole	1200
1.009	[]	-2	FPD	6.500	4.309	1.091	Open Manhole	1

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	11.189	223.8	SwaleA	6.250	5.050	0.825	Open Manhole	1
1.001	108.847	4353.9	SwaleB	6.200	5.025	-0.025	Open Manhole	1
1.002	39.925	532.3	SwaleC	6.150	4.950	0.000	Open Manhole	1
2.000	36.091	240.6	SwaleC	6.150	4.950	0.825	Open Manhole	1
1.003	61.223	2448.9	SwaleEnd	6.125	4.925	0.000	Open Manhole	1
1.004	15.766	630.6	FlowControl1	6.500	4.900	1.225	Open Manhole	1200
1.005	37.018	148.1	Outfall	6.500	4.650	1.700	Open Manhole	1200
1.006	3.845	153.8	FPDDiv1	6.500	4.625	1.725	Open Manhole	1800
1.007	11.921	476.8	FPDDiv2	6.500	4.400	1.200	Open Manhole	1800
1.008	45.698	571.2	FPD	6.500	4.320	1.280	Open Manhole	1
3.000	45.110	902.2	FlowControl2	6.500	4.600	1.450	Open Manhole	1200
3.001	5.364	130.8	FPD	6.500	4.309	2.041	Open Manhole	1
1.009	31.680	536.9	FPD	7.000	4.250	1.650	Open Manhole	0

Surcharged Outfall Details for C3, C4, C7

Outfall	Outfall (C. Level	I.	Level	Min	D,L	W
Pipe Number	Name	(m)		(m)	I. Level	(mm)	(mm)
					(m)		
1.009	FPD	7.000		4.250	4.500	0	0

Datum (m) 0.000 Offset (mins) 0

Time (mins)	Depth (m)														
1	5.612	4	5.612	7	5.612	10	5.612	13	5.612	16	5.612	19	5.612	22	5.612
2	5.612	5	5.612	8	5.612	11	5.612	14	5.612	17	5.612	20	5.612	23	5.612
3	5.612	6	5.612	9	5.612	12	5.612	15	5.612	18	5.612	21	5.612	24	5.612

РЈА		Page 5
Seven House, High Street	05425	
Longbridge	Cambridge North	
Birmingham, B31 2UQ	Catchments 3, 4 and 7	Micro
Date 13/10/2022 10:44	Designed by JG	Drainage
File 05425 - CATCHMENT 4 NETWORK MC	Checked by MC	Diamage
Innovyze	Network 2019.1	1

Surcharged Outfall Details for C3, C4, C7

Time	Depth														
(mins)	- (m)														
	5.612		5.612		5.612		5.612		5.612		5.612		5.612		5.612
	5.612		5.612		5.612	-	5.612	-	5.612	-	5.612		5.612		5.612
	5.612		5.612		5.612		5.612		5.612		5.612		5.612		5.612
	5.612		5.612		5.612		5.612		5.612		5.612		5.612		5.612
	5.612		5.612		5.612		5.612		5.612		5.612		5.612		5.612
30	5.612	57	5.612	84	5.612	111	5.612	138	5.612	165	5.612	192	5.612		5.612
	5.612		5.612	85	5.612		5.612	139	5.612	166	5.612	193	5.612		5.612
32	5.612	59	5.612	86	5.612	113	5.612	140	5.612	167	5.612	194	5.612	221	5.612
33	5.612	60	5.612	87	5.612	114	5.612	141	5.612	168	5.612	195	5.612		5.612
34	5.612	61	5.612	88	5.612	115	5.612	142	5.612	169	5.612	196	5.612	223	5.612
35	5.612	62	5.612	89	5.612	116	5.612	143	5.612	170	5.612	197	5.612	224	5.612
36	5.612	63	5.612	90	5.612	117	5.612	144	5.612	171	5.612	198	5.612	225	5.612
37	5.612	64	5.612	91	5.612	118	5.612	145	5.612	172	5.612	199	5.612	226	5.612
38	5.612	65	5.612	92	5.612	119	5.612	146	5.612	173	5.612	200	5.612	227	5.612
39	5.612	66	5.612	93	5.612	120	5.612	147	5.612	174	5.612	201	5.612	228	5.612
40	5.612	67	5.612	94	5.612	121	5.612	148	5.612	175	5.612	202	5.612	229	5.612
41	5.612	68	5.612	95	5.612	122	5.612	149	5.612	176	5.612	203	5.612	230	5.612
42	5.612	69	5.612	96	5.612	123	5.612	150	5.612	177	5.612	204	5.612	231	5.612
43	5.612	70	5.612	97	5.612	124	5.612	151	5.612	178	5.612	205	5.612	232	5.612
44	5.612	71	5.612	98	5.612	125	5.612	152	5.612	179	5.612	206	5.612	233	5.612
45	5.612	72	5.612	99	5.612	126	5.612	153	5.612	180	5.612	207	5.612	234	5.612
46	5.612	73	5.612	100	5.612	127	5.612	154	5.612	181	5.612	208	5.612	235	5.612
47	5.612	74	5.612	101	5.612	128	5.612	155	5.612	182	5.612	209	5.612	236	5.612
48	5.612	75	5.612	102	5.612	129	5.612	156	5.612	183	5.612	210	5.612	237	5.612
49	5.612	76	5.612	103	5.612	130	5.612	157	5.612	184	5.612	211	5.612	238	5.612
50	5.612	77	5.612	104	5.612	131	5.612	158	5.612	185	5.612	212	5.612	239	5.612
51	5.612		5.612	105	5.612	132	5.612	159	5.612	186	5.612	213	5.612	240	5.612
01	0.012	,,,,	0.012	1 100	0.012	1 102	0.012	1 100	0.012	1 100	0.012	1 210	0.012	1 210	0.012

Simulation Criteria for C3, C4, C7

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 4 Number of Storage Structures 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model		FEH	Summer Storms	Yes
Return Period (years)		30	Winter Storms	No
FEH Rainfall Version		2013	Cv (Summer)	0.750
Site Location	GB 547650 260850	TL 47650 60850	Cv (Winter)	0.840
Data Type		Catchment	Storm Duration (mins)	30

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Innovyze						Netw	ork 201	19.1								
	<u>Hydro-</u>	-Brake	Minimur	num Ma	unhole E Des In t Pipe	Obj	Control Ference M ead (m) 7 (1/s) Sh-Flo TM Jective .cation wilable er (mm) rel (m) er (mm)	.1, DS MD-SHE-	/PN: 2	1.00 400-: Ca	1225-3 1. alcula n stom Surf 4.	3400 225 3.4 ated cage	e (m³): 3	<u>.5</u>	
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	Con	tral D	ainta	Чор	a (m)	\mathbf{E}	(-)	Contr	al Dai							
	Con	ntrol P	oints	Hea	id (m)	Flow (1,	/s)	Contr	col Poi	nts		неас	(m) F	low (1/5)	
	Con Design Po		Calculate	ed)	1.225	3	3.4		F	Kick-	Flo®		(m) F 753	low (2.7	
	Design Po	oint (C	Calculate Flush-Fl	ed) .0™	1.225		3.4 3.4 Mean	Flow	P over He	Kick- ead R	Flo® ange	0.	753		2.7 3.0	Optimum
The hydro specified storage 1		oint (C calcula d anot) calcula	Calculate Flush-Fl ations h her type tions wi	d) .o™ ave bee of cor Ll be i	1.225 0.370 en base htrol c invalio	ed on the device ot dated	3.4 3.4 Mean e Head/D ther than	Flow ischarg	F over He ge rela dro-Bra	Kick- ead R tion ke O	Flo® ange ship : ptimur	0. for th n® be	753 - ne Hyd utili	lro-Br .sed t	2.7 3.0 take®	hese
The hydro specified storage n Depth (Design Po cological ed. Shoul routing c (m) Flow	oint (C calcula d anoth calcula (1/s)	Calculate Flush-Fl ations h her type tions wi Depth (m	d) o™ ave bee of cor ll be i) Flow	1.225 0.370 en base ntrol o invalio (1/s)	ed on the device ot dated	3.4 3.4 Mean e Head/D ther than (m) Flow	Flow ischarg n a Hyd (l/s)	P over He ge rela dro-Bra Depth	Kick- ead R tion ke O (m)	Flo® ange ship : ptimur	0. for th n® be (1/s)	753 - utili Deptl	dro-Br .sed t h (m)	2.7 3.0 cake® chen t Flow	hese (1/s)
The hydro specified storage n Depth (0.1	Design Po cological ed. Shoul routing c (m) Flow 100	oint (C calcula d anoth calcula (1/s)	Calculate Flush-Fl ations h her type tions wi Depth (m 0.80	ed) o™ ave bee of cor Ll be i) Flow	1.225 0.370 en base invalio (1/s) 2.8	ed on the device of dated Depth (2.0	3.4 3.4 Mean e Head/D: ther than (m) Flow	Flow ischarg n a Hyd (1/s) 4.3	F over He ge rela dro-Bra Depth 4.	Kick- ead R tion ke O (m) 000	Flo® ange ship : ptimur	0. for th n® be (1/s) 5.9	753 - utili Deptl	lro-Br .sed t h (m) 7.000	2.7 3.0 cake® chen t Flow	hese (1/s) 7.7
The hydro specified storage n Depth (0.1 0.2	Design Po cological ed. Shoul routing c (m) Flow	oint (C calcula d anoth calcula (1/s)	Calculate Flush-Fl ations h her type tions wi Depth (m	d) o TM of cor ll be i) Flow D	1.225 0.370 en base ntrol o invalio (1/s)	ed on the device of dated Depth (2.0 2.2	3.4 3.4 Mean e Head/D: ther than (m) Flow	Flow ischarg n a Hyd (l/s)	F over He ge rela dro-Bra Depth 4. 4.	Kick- ead R tion ke O (m)	Flo® ange ship : ptimur	0. for th n® be (1/s)	753 - utili Deptl	dro-Br .sed t h (m)	2.7 3.0 cake® chen t Flow	hese (1/s)
The hydro specified storage n Depth (0.1 0.2 0.3	Design Po cological ed. Shoul routing c (m) Flow 100 200	oint (C calcula d anoth alcula (1/s) = 2.5 3.2	Calculate Flush-Fl ations h her type tions wi Depth (m 0.80 1.00	d) o™ of cor ll be i) Flow 0 0	1.225 0.370 en base trol c invalic (1/s) 2.8 3.1	ed on the device of dated Depth (2.0 2.2 2.4	3.4 3.4 Mean e Head/D: ther than (m) Flow 000 000 000	Flow ischarg n a Hyd (1/s) 4.3 4.5	r over He ge rela dro-Bra Depth 4. 5.	(ick- ead R tion ke O (m) 000 500	Flo® ange ship : ptimur	0. for th m® be (1/s) 5.9 6.2	753 - utili Deptl	dro-Br .sed t h (m) 7.000 7.500	2.7 3.0 cake® chen t Flow	hese (1/s) 7.7 7.9
The hydro specified storage 1 Depth (0.1 0.2 0.3 0.4 0.5	Design Po cological ed. Shoul routing c (m) Flow 100 200 300 400 500	oint (C calcula d anoth alcula (1/s) 2.5 3.2 3.4 3.4 3.3	Calculate Flush-Fl ations h her type tions wi Depth (m 0.80 1.00 1.20 1.40 1.60	d) o™ of cor ll be i) Flow 0 0 0 0 0	1.225 0.370 en basentrol o invalio (1/s) 2.8 3.1 3.4	ed on the device of dated Depth (2.0 2.2 2.4 2.6 3.0	3.4 3.4 Mean e Head/D: ther than (m) Flow 200 200 200 200 200 200 200 200 200 20	<pre>Flow discharge ischarge (1/s) 4.3 4.5 4.6 4.8 5.1</pre>	F over He ge rela dro-Bra Depth 4. 4. 5. 5. 6.	<pre>(ick- ead R tion ke 0; (m) 000 500 000 500 000 500 000</pre>	Flo® ange ship : ptimur	0. for th m® be (1/s) 5.9 6.2 6.5 6.8 7.1	753 - utili Deptl	dro-Br .sed t h (m) 7.000 7.500 8.000	2.7 3.0 cake® chen t Flow	hese (1/s) 7.7 7.9 8.2 8.4 8.7
The hydro specified storage 1 Depth (0.1 0.2 0.3 0.4 0.5	Design Po cological ed. Shoul routing c (m) Flow 100 200 300 400	oint (C calcula d anoth alcula (1/s) = 2.5 3.2 3.4 3.4 3.4	Calculate Flush-Fl ations h her type tions wi Depth (m 0.80 1.00 1.20 1.40	d) o™ of cor ll be i) Flow 0 0 0 0 0 0	1.225 0.370 en base htrol o invalio (1/s) 2.8 3.1 3.4 3.6	ed on the device of dated Depth (2.0 2.2 2.4 2.6 3.0	3.4 3.4 Mean e Head/D: ther than (m) Flow 200 200 200 200 200 200 200 200 200 20	Flow (1/s) (1/s) 4.3 4.5 4.6 4.8	F over He ge rela dro-Bra Depth 4. 4. 5. 5. 6.	<pre>(ick- ead R tion ke 0; (m) 000 500 000 500 500</pre>	Flo® ange ship : ptimur	0. for th m® be (1/s) 5.9 6.2 6.5 6.8	753 - utili Deptl	dro-Br .sed t h (m) 7.000 7.500 8.000 8.500	2.7 3.0 cake® chen t Flow	hese (1/s) 7.7 7.9 8.2 8.4
The hydro specified storage 1 Depth (0.1 0.2 0.3 0.4 0.5	Design Po cological ed. Shoul routing c (m) Flow 100 200 300 400 500 600	oint (C calcula d anoth alcula (1/s) 2.5 3.2 3.4 3.4 3.4 3.3 3.2	Calculate Flush-Fl ations h her type tions wi Depth (m 0.80 1.00 1.20 1.40 1.60 1.80	d) o™ of cor ll be i) Flow 0 0 0 0 0 0 0	1.225 0.370 en basentrol o invalio (1/s) 2.8 3.1 3.4 3.6 3.8 4.1	ed on the device of dated Depth (2.0 2.2 2.4 2.6 3.0	3.4 3.4 Mean e Head/D: ther than (m) Flow 000 000 000 000 000 000 000 000	<pre>state = Flow of state = f</pre>	F over He ge rela dro-Bra Depth 4. 4. 5. 5. 6. 6.	(ick- ead R tion ke 0 (m) 000 500 000 500 000 500	Flo® ange ship : ptimur Flow	0. for th m® be (1/s) 5.9 6.2 6.5 6.8 7.1 7.4	753 - utili Deptl	dro-Br sed t h (m) 7.000 7.500 8.000 8.500 9.000 9.500	2.7 3.0 cake® chen t Flow	hese (1/s) 7.7 7.9 8.2 8.4 8.7
The hydro specified storage 1 Depth (0.1 0.2 0.3 0.4 0.5	Design Po cological ed. Shoul routing c (m) Flow 100 200 300 400 500 600	oint (C calcula d anoth calcula (1/s) 1 2.5 3.2 3.4 3.4 3.4 3.3 3.2 Non Ref	Calculate Flush-Fl ations h her type tions wi Depth (m 0.80 1.00 1.20 1.40 1.60 1.80 turn Va	d) o™ ave bee of cor ll be i) Flow 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.225 0.370 en base trol o invalio (1/s) 2.8 3.1 3.4 3.6 3.8 4.1 anhol	ed on the device of dated Depth (2.0 2.2 2.4 2.6 3.0 3.5	3.4 3.4 Mean e Head/D: ther than (m) Flow 000 000 000 000 000 000 000 000 000 0	<pre>I Flow (ischarge ischarge (i/s) 4.3 4.5 4.6 4.8 5.1 5.5 S/PN:</pre>	F over He ge rela dro-Bra Depth 4. 4. 5. 5. 6. 6. 1.007	(ick- ead R tion ke O (m) 000 500 000 500 000 500 , VC	Flo® ange ship : ptimur Flow	0. for th m® be (1/s) 5.9 6.2 6.5 6.8 7.1 7.4 (m ³)	753 - utili Deptl	dro-Br .sed t h (m) 7.000 7.500 8.000 8.500 9.000 9.500 <u>.3</u>	2.7 3.0 cake® chen t Flow	hese (1/s) 7.7 7.9 8.2 8.4 8.7
The hydro specified storage 1 Depth (0.1 0.2 0.3 0.4 0.5	Design Po cological ed. Shoul routing c (m) Flow 100 200 300 400 500 600	oint (C calcula d anoth calcula (1/s) 1 2.5 3.2 3.4 3.4 3.4 3.3 3.2 Non Ref	Calculate Flush-Fl ations h her type tions wi Depth (m 0.80 1.00 1.20 1.40 1.60 1.80 turn Va	d) o™ ave bee of cor ll be i) Flow 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.225 0.370 en base trol o invalio (1/s) 2.8 3.1 3.4 3.6 3.8 4.1 anhol	ed on the device of dated 2.0 2.2 2.4 2.6 3.0 3.5 e: FPDD	3.4 3.4 Mean e Head/D: ther than (m) Flow 000 000 000 000 000 000 000 0	<pre>Flow (ischargen a Hyd) (1/s) 4.3 4.5 4.6 4.8 5.1 5.5 S/PN: .2, DS</pre>	F over He ge rela dro-Bra Depth 4. 4. 5. 5. 6. 6. 1.007	(ick- ead R ition ke O (m) 000 500 000 500 000 500 000 500 000 500 000 500	Flo® ange ship : otimur Flow	0. for th m® be (1/s) 5.9 6.2 6.5 6.8 7.1 7.4 (m ³)	753 - utili Deptl	dro-Br .sed t h (m) 7.000 7.500 8.000 8.500 9.000 9.500 <u>.3</u>	2.7 3.0 cake® chen t Flow	hese (1/s) 7.7 7.9 8.2 8.4 8.7
The hydro specified storage 1 Depth (0.1 0.2 0.3 0.4 0.5	Design Po cological ed. Shoul routing c (m) Flow 100 200 300 400 500 600	oint (C calcula d anoth calcula (1/s) 1 2.5 3.2 3.4 3.4 3.4 3.3 3.2 Non Ref	Calculate Flush-Fl ations h her type tions wi Depth (m 0.80 1.00 1.20 1.40 1.60 1.80 turn Va	d) o™ ave bee of cor ll be i) Flow 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.225 0.370 en base htrol o invalio (1/s) 2.8 3.1 3.4 3.6 3.8 4.1 anhol	ed on the device of dated 2.0 2.2 2.4 2.6 3.0 3.5 e: FPDD	3.4 3.4 Mean e Head/D: ther than (m) Flow (00 000 000 000 000 000 000 00	<pre>Flow (ischargen a Hyd) (1/s) 4.3 4.5 4.6 4.8 5.1 5.5 S/PN: .2, DS</pre>	F over He ge rela dro-Bra Depth 4. 4. 5. 5. 6. 6. 1.007	(ick- ead R ition ke O (m) 000 500 000 500 000 500 000 500 000 500 000 500	Flo® ange ship : otimur Flow <u>blume</u> 1, Vo	0. for th m® be (1/s) 5.9 6.2 6.5 6.8 7.1 7.4 (m ³)	753 - utili Deptl	dro-Br .sed t h (m) 7.000 7.500 8.000 8.500 9.000 9.500 <u>.3</u>	2.7 3.0 cake® chen t Flow	hese (1/s) 7.7 7.9 8.2 8.4 8.7
The hydro specified storage 1 Depth (0.1 0.2 0.3 0.4 0.5	Design Po cological ed. Shoul routing c (m) Flow 100 200 300 400 500 600	oint (C calcula d anoth calcula (1/s) 1 2.5 3.2 3.4 3.4 3.4 3.3 3.2 Non Ref	Calculate Flush-Fl ations h her type tions wi Depth (m 0.80 1.00 1.20 1.40 1.60 1.80 turn Va	d) o™ ave bee of cor ll be i) Flow 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.225 0.370 en base htrol o invalio (1/s) 2.8 3.1 3.4 3.6 3.8 4.1 anhol enhole	ed on the device of dated Depth (2.0 2.2 2.4 2.6 3.0 3.5 e: FPDD e: FPDD Unit Ref	3.4 3.4 Mean e Head/D: ther than (m) Flow (m) Flow (00 (00 (00 (00 (00 (00 (00 (0	<pre>Flow (ischargen a Hyd) (1/s) 4.3 4.5 4.6 4.8 5.1 5.5 S/PN: .2, DS</pre>	F over He ge rela dro-Bra Depth 4. 4. 5. 5. 6. 6. 1.007	(ick- ead R ition ke O (m) 000 500 000 500 000 500 000 500 000 500 000 500	Flo® ange ship : otimur Flow <u>blume</u> 1, Vo	0. for th m® be (1/s) 5.9 6.2 6.5 6.8 7.1 7.4 (m ³) colume	753 - utili Deptl	dro-Br .sed t h (m) 7.000 7.500 8.000 8.500 9.000 9.500 <u>.3</u>	2.7 3.0 cake® chen t Flow	hese (1/s) 7.7 7.9 8.2 8.4 8.7
The hydro specified storage 1 Depth (0.1 0.2 0.3 0.4 0.5	Design Po cological ed. Shoul routing c (m) Flow 100 200 300 400 500 600	oint (C calcula d anoth calcula (1/s) 1 2.5 3.2 3.4 3.4 3.4 3.3 3.2 Non Ref	Calculate Flush-Fl ations h her type tions wi Depth (m 0.80 1.00 1.20 1.40 1.60 1.80 turn Va	d) o™ ave bee of cor ll be i) Flow 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.225 0.370 en base htrol o invalio (1/s) 2.8 3.1 3.4 3.6 3.8 4.1 anhol enhole	ed on the device of dated Depth (2.0 2.2 2.4 2.6 3.0 3.5 e: FPDD e: FPDD Unit Ref Design He sign Flow	3.4 3.4 Mean e Head/D: ther than (m) Flow (m) Flow (00 (00 (00 (00 (00 (00 (00 (0	<pre>Flow (ischargen a Hyd) (1/s) 4.3 4.5 4.6 4.8 5.1 5.5 S/PN: .2, DS</pre>	F over He ge rela dro-Bra Depth 4. 4. 5. 5. 6. 6. 1.007	(ick- ead R ition ike 0 (m) 000 500 000 500 500 500 500 500 500 50	Flo® ange ship : otimur Flow <u>blume</u> 1, Vo	0. for th m® be (1/s) 5.9 6.2 6.5 6.8 7.1 7.4 (m ³) clume 2000 850 2.0	753 - utili Deptl	dro-Br .sed t h (m) 7.000 7.500 8.000 8.500 9.000 9.500 <u>.3</u>	2.7 3.0 cake® chen t Flow	hese (1/s) 7.7 7.9 8.2 8.4 8.7
The hydro specified storage 1 Depth (0.1 0.2 0.3 0.4 0.5	Design Po cological ed. Shoul routing c (m) Flow 100 200 300 400 500 600	oint (C calcula d anoth calcula (1/s) 1 2.5 3.2 3.4 3.4 3.4 3.3 3.2 Non Ref	Calculate Flush-Fl ations h her type tions wi Depth (m 0.80 1.00 1.20 1.40 1.60 1.80 turn Va	d) o™ ave bee of cor ll be i) Flow 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.225 0.370 en base htrol o invalio (1/s) 2.8 3.1 3.4 3.6 3.8 4.1 anhol enhole	ed on the device of dated Depth (2.0 2.2 2.4 2.6 3.0 3.5 e: FPDD e: FPDD Unit Ref Design He sign Flow Flus	3.4 3.4 Mean Head/D: ther than (m) Flow (m) Flow (00 000 000 000 000 000 000 00	<pre>Flow (ischarge n a Hyge (1/s) 4.3 4.5 4.6 4.8 5.1 5.5 S/PN: .2, DS MD-SHE-</pre>	F over He ge rela dro-Bra Depth 4. 4. 5. 5. 6. 6. 1.007	(ick- ead R ition ike 0 (m) 000 500 000 500 000 500 000 500 000 500 000 500 2, VC	Flo® ange ship : ptimur Flow 1. Vo 1850-2 1. alcula	0. for th m® be (1/s) 5.9 6.2 6.5 6.8 7.1 7.4 (m ³) clume 2000 850 2.0 ated	753 - utili Deptl	dro-Br .sed t h (m) 7.000 7.500 8.000 8.500 9.000 9.500 <u>.3</u>	2.7 3.0 cake® chen t Flow	hese (1/s) 7.7 7.9 8.2 8.4 8.7
The hydro specified storage 1 Depth (0.1 0.2 0.3 0.4 0.5	Design Po cological ed. Shoul routing c (m) Flow 100 200 300 400 500 600	oint (C calcula d anoth calcula (1/s) 1 2.5 3.2 3.4 3.4 3.4 3.3 3.2 Non Ref	Calculate Flush-Fl ations h her type tions wi Depth (m 0.80 1.00 1.20 1.40 1.60 1.80 turn Va	d) o™ ave bee of cor ll be i) Flow 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.225 0.370 en base trol o invalio (1/s) 2.8 3.1 3.4 3.6 3.8 4.1 anhol enhole	ed on the device of dated Depth (2.0 2.2 2.4 2.6 3.0 3.5 e: FPDD e: FPDD Unit Ref Design He sign Flow Flus Obj Appli	3.4 3.4 Mean Head/D: ther than (m) Flow (m) Flow	<pre>Flow (ischarge n a Hyge (1/s) 4.3 4.5 4.6 4.8 5.1 5.5 S/PN: .2, DS MD-SHE-</pre>	F over He ge rela dro-Bra 4. 4. 5. 5. 6. 1.007 /PN: 2 -0058-2	(ick- ead R ition ike 0 (m) 000 500 000 500 000 500 000 500 000 500 000 500 2, VC	Flo® ange ship : ptimur Flow 1. Vo 1850-2 1. alcula	0. for th m® be (1/s) 5.9 6.2 6.5 6.8 7.1 7.4 (m ³) clume 2000 850 2.0 ated rage	753 - utili Deptl	dro-Br .sed t h (m) 7.000 7.500 8.000 8.500 9.000 9.500 <u>.3</u>	2.7 3.0 cake® chen t Flow	hese (1/s) 7.7 7.9 8.2 8.4 8.7
The hydro specified storage 1 Depth (0.1 0.2 0.3 0.4 0.5	Design Po cological ed. Shoul routing c (m) Flow 100 200 300 400 500 600	oint (C calcula d anoth calcula (1/s) 1 2.5 3.2 3.4 3.4 3.4 3.3 3.2 Non Ref	Calculate Flush-Fl ations h her type tions wi Depth (m 0.80 1.00 1.20 1.40 1.60 1.80 turn Va	d) o™ ave bee of cor ll be i) Flow 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.225 0.370 en base trol o invalio (1/s) 2.8 3.1 3.4 3.6 3.8 4.1 anhol enhole	ed on the device of dated Depth (2.0 2.2 2.4 2.6 3.0 3.5 e: FPDD e: FPDD Unit Ref Design He sign Flow Flus Obj Appli Sump Ava	3.4 3.4 Mean Head/D: ther than (m) Flow (m) Flow	<pre>Flow (ischarge n a Hyge (1/s) 4.3 4.5 4.6 4.8 5.1 5.5 S/PN: .2, DS MD-SHE-</pre>	F over He ge rela dro-Bra 4. 4. 5. 5. 6. 1.007 /PN: 2 -0058-2	(ick- ead R ition ike 0 (m) 000 500 000 500 000 500 000 500 000 500 000 500 2, VC	Flo® ange ship : ptimur Flow 1. 0lume 1. Vo 1850-2 1. alcula a stor	0. for th m® be (1/s) 5.9 6.2 6.5 6.8 7.1 7.4 (m ³) colume 2000 850 2.0 ated rage Face Yes	753 - utili Deptl	dro-Br .sed t h (m) 7.000 7.500 8.000 8.500 9.000 9.500 <u>.3</u>	2.7 3.0 cake® chen t Flow	hese (1/s) 7.7 7.9 8.2 8.4 8.7
The hydro specified storage 1 Depth (0.1 0.2 0.3 0.4 0.5	Design Po cological ed. Shoul routing c (m) Flow 100 200 300 400 500 600	oint (C calcula d anoth calcula (1/s) 1 2.5 3.2 3.4 3.4 3.4 3.3 3.2 Non Ref	Calculate Flush-Fl ations h her type tions wi Depth (m 0.80 1.00 1.20 1.40 1.60 1.80 turn Va	d) o™ ave bee of cor ll be i) Flow 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.225 0.370 en base trol o invalio (1/s) 2.8 3.1 3.4 3.6 3.8 4.1 anhol enhole	ed on the device of dated Depth (2.0 2.2 2.4 2.6 3.0 3.5 <u>e: FPDD</u> <u>e: FPDD</u> Unit Ref Design He sign Flow Flus Obj Appli Sump Ava Diamete	3.4 3.4 Mean Head/D: ther than (m) Flow (m) Flow	<pre>Flow (ischarge n a Hyge (1/s) 4.3 4.5 4.6 4.8 5.1 5.5 S/PN: .2, DS MD-SHE-</pre>	F over He ge rela dro-Bra 4. 4. 5. 5. 6. 1.007 /PN: 2 -0058-2	(ick- ead R ition ike 0 (m) 000 500 000 500 500 500 500 500 500 50	Flo® ange ship : otimur Flow 1. 0lume 1. Vo 1850-2 1. alcula a stor Surf	0. for th m® be (1/s) 5.9 6.2 6.5 6.8 7.1 7.4 (m ³) colume 2000 850 2.0 ated cage cage cage 58	753 - utili Deptl	dro-Br .sed t h (m) 7.000 7.500 8.000 8.500 9.000 9.500 <u>.3</u>	2.7 3.0 cake® chen t Flow	hese (1/s) 7.7 7.9 8.2 8.4 8.7
The hydro specified storage 1 Depth (0.1 0.2 0.3 0.4 0.5	Design Po cological ed. Shoul routing c (m) Flow 100 200 300 400 500 600	oint (C calcula d anoth calcula (1/s) 1 2.5 3.2 3.4 3.4 3.4 3.3 3.2 Non Ref	Calculate Flush-Fl ations h her type tions wi Depth (m 0.80 1.00 1.20 1.40 1.60 1.80 turn Va	nd) o™ ave bee of cor 11 be i) Flow 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.225 0.370 en base trol o invalio (1/s) 2.8 3.1 3.4 3.6 3.8 4.1 anhol Enhole	ed on the device of dated Depth (2.0 2.2 2.4 2.6 3.0 3.5 e: FPDD e: FPDD Unit Ref Design He sign Flow Flus Obj Appli Sump Ava Diamete overt Lev	3.4 3.4 3.4 Mean e Head/D: ther than (m) Flow 000 000 000 000 000 000 000 0	<pre>Flow (ischarge n a Hyge (1/s) 4.3 4.5 4.6 4.8 5.1 5.5 S/PN: .2, DS MD-SHE-</pre>	F over He ge rela dro-Bra 4. 4. 5. 5. 6. 1.007 /PN: 2 -0058-2	(ick- ead R ition ike 0 (m) 000 500 000 500 500 500 500 500 500 50	Flo® ange ship : otimur Flow 1. 0lume 1. Vo 1850-2 1. alcula a stor Surf	0. for th m® be (1/s) 5.9 6.2 6.5 6.8 7.1 7.4 (m ³) (m ³) clume 2000 850 2.0 ated cage 5.8 3.50	753 - utili Deptl	dro-Br .sed t h (m) 7.000 7.500 8.000 8.500 9.000 9.500 <u>.3</u>	2.7 3.0 cake® chen t Flow	hese (1/s) 7.7 7.9 8.2 8.4 8.7
The hydro specified storage 1 Depth (0.1 0.2 0.3 0.4 0.5	Design Po cological ed. Shoul routing c (m) Flow 100 200 300 400 500 600	oint (C calcula d anoth calcula (1/s) 1 2.5 3.2 3.4 3.4 3.4 3.3 3.2 Non Ref	Calculate Flush-Fl ations h her type tions wi Depth (m 0.80 1.00 1.20 1.40 1.60 1.80 <u>turn Va</u> Se Optin	nd) o™ ave bee of cor 11 be i) Flow 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.225 0.370 en base trol o invalio (1/s) 2.8 3.1 3.4 3.6 3.8 4.1 anhol E Des	ed on the device of dated Depth (2.0 2.2 2.4 2.6 3.0 3.5 e: FPDD Unit Ref Design He sign Flow Flus Obj Appli Sump Ava Diamete Ivert Lev	3.4 3.4 Mean Head/D: ther than ther than (m) Flow 000 000 000 000 000 000 000 0	<pre>Flow (ischarge n a Hyge (1/s) 4.3 4.5 4.6 4.8 5.1 5.5 S/PN: .2, DS MD-SHE-</pre>	F over He ge rela dro-Bra 4. 4. 5. 5. 6. 1.007 /PN: 2 -0058-2	(ick- ead R ition ike 0 (m) 000 500 000 500 500 500 500 500 500 50	Flo® ange ship : otimur Flow 1. 0lume 1. Vo 1.850-2 1. alcula a stor Surf 4.	0. for th m® be (1/s) 5.9 6.2 6.5 6.8 7.1 7.4 (m ³) clume 2000 850 2.0 ated cage 58 .350 75	753 - utili Deptl	dro-Br .sed t h (m) 7.000 7.500 8.000 8.500 9.000 9.500 <u>.3</u>	2.7 3.0 cake® chen t Flow	hese (1/s) 7.7 7.9 8.2 8.4 8.7
The hydro specified storage 1 Depth (0.1 0.2 0.3 0.4 0.5	Design Po cological ed. Shoul routing c (m) Flow 100 200 300 400 500 600	oint (C calcula d anoth calcula (1/s) 1 2.5 3.2 3.4 3.4 3.4 3.3 3.2 Non Ref	Calculate Flush-Fl ations h her type tions wi Depth (m 0.80 1.00 1.20 1.40 1.60 1.80 <u>turn Va</u> Se Optin	nd) o™ ave bee of cor 11 be i) Flow 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1.225 0.370 en base trol o invalio (1/s) 2.8 3.1 3.4 3.6 3.8 4.1 anhol E Des	ed on the device of dated Depth (2.0 2.2 2.4 2.6 3.0 3.5 e: FPDD e: FPDD Unit Ref Design He sign Flow Flus Obj Appli Sump Ava Diamete overt Lev	3.4 3.4 Mean Head/D: ther than ther than (m) Flow 000 000 000 000 000 000 000 0	<pre>Flow (ischarge n a Hyge (1/s) 4.3 4.5 4.6 4.8 5.1 5.5 S/PN: .2, DS MD-SHE-</pre>	F over He ge rela dro-Bra 4. 4. 5. 5. 6. 1.007 /PN: 2 -0058-2	(ick- ead R ition ike 0 (m) 000 500 000 500 500 500 500 500 500 50	Flo® ange ship : otimur Flow 1. 0lume 1. Vo 1.850-2 1. alcula a stor Surf 4.	0. for th m® be (1/s) 5.9 6.2 6.5 6.8 7.1 7.4 (m ³) (m ³) clume 2000 850 2.0 ated cage 5.8 3.50	753 - utili Deptl	dro-Br .sed t h (m) 7.000 7.500 8.000 8.500 9.000 9.500 <u>.3</u>	2.7 3.0 cake® chen t Flow	hese (1/s) 7.7 7.9 8.2 8.4 8.7

00110101	1011100	nead (m)	1104 (1/0/	00110101 1011100	meaa (m) 1104	(1)0/
Design Point	(Calculated)	1.850	2.0	Kick-Flo®	0.519	1.1
	Flush-Flo™	0.255	1.4	Mean Flow over Head Range	-	1.5

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m) Flow (l/s)	Depth (m) Flow (1	's) Depth (m) H	Flow (1/s) Depth (m)	Flow (l/s)	Depth (m) Flow (l/s)
		4 0.500 3 0.600			1.200 1.6 1.400 1.8

PJA		Page 7
Seven House, High Street	05425	
Longbridge	Cambridge North	
Birmingham, B31 2UQ	Catchments 3, 4 and 7	Micro
Date 13/10/2022 10:44	Designed by JG	Drainage
File 05425 - CATCHMENT 4 NETWORK MC	Checked by MC	Diamage
Innovyze	Network 2019.1	1

Hydro-Brake® Optimum Manhole: FlowControl2, DS/PN: 3.001, Volume (m³): 9.4

Depth (m)	Flow (l/s)								
1.600	1.9	2.400	2.3	4.000	2.8	6.000	3.4	8.000	3.9
1.800	2.0	2.600	2.3	4.500	3.0	6.500	3.6	8.500	4.1
2.000	2.1	3.000	2.5	5.000	3.2	7.000	3.7	9.000	4.2
2.200	2.2	3.500	2.7	5.500	3.3	7.500	3.8	9.500	4.3
						I			

Non Return Valve Manhole: FPD, DS/PN: 1.009, Volume (m³): 28.6

PJA		Page 8
Seven House, High Street	05425	
Longbridge	Cambridge North	
Birmingham, B31 2UQ	Catchments 3, 4 and 7	Micro
Date 13/10/2022 10:44	Designed by JG	
File 05425 - CATCHMENT 4 NETWORK MC .	Checked by MC	Drainage
Innovyze	Network 2019.1	
Storag	e Structures for C3, C4, C7	
Cellular Stor	age Manhole: S8S9S10, DS/PN: 2.000	
	Invert Level (m) 5.100 Safety Factor 2.0 cient Base (m/hr) 0.00000 Porosity 0.95 cient Side (m/hr) 0.00000	
Depth (m) Area (m ²) Inf. Area (m ²) Dept	n (m) Area (m²) Inf. Area (m²) Depth (m) Area (m	²) Inf. Area (m ²)
0.000 330.0 0.0	0.800 330.0 0.0 0.801 0	0.0
Infiltration Coeff:	Manhole: FlowControll, DS/PN: 1.005 Invert Level (m) 4.900 Safety Factor 2.0 cient Base (m/hr) 0.00000 Porosity 0.95 cient Side (m/hr) 0.00000	
Depth (m) Area (m ²) Inf. Area (m ²) Dept	n (m) Area (m²) Inf. Area (m²) Depth (m) Area (m	ı²) Inf. Area (m²)
0.000 410.0 0.0	.200 410.0 0.0 1.201 0	0.0
Cellular Storag	e Manhole: FlowControl2, DS/PN: 3.001	
	Invert Level (m) 4.600 Safety Factor 2.0 cient Base (m/hr) 0.00000 Porosity 0.95 cient Side (m/hr) 0.00000	
Depth (m) Area (m ²) Inf. Area (m ²) Dept	n (m) Area (m²) Inf. Area (m²) Depth (m) Area (m	ı²) Inf. Area (m²)
0.000 595.0 0.0	200 595.0 0.0 1.201 0	0.0 0.0

7												Dago	0
A	Inco Ilich Cl	roct				0 5 4 0	5					Page	3
	ise, High St	reet				0542		NT - 1 1					
ngbridg							ridge						
	am, B31 2UQ						hments	-	and 7			M	cro
te 13/1	.0/2022 10:4	4				Desi	gned b	y JG					ainag
le 0542	25 - CATCHME	ENT 4 NE	WORK	MC			ked by						
novyze						Netw	ork 20	19.1					
<u>2 year</u>	Foul Number of Ing Number of C FEH	Areal I Hot S Headloss Sewage pe Dut Hydrog Dnline Cor Rainfall Rainfall	educt lot St tart coef raphs trols l Mode Versic ocatic r Floo	ion F art (Level if (Gl tare 0 4 Nu el on 5 GB con 5 Ana	<u>Si</u> actor mins) (mm) obal) (l/s) Number mber o <u>Synth</u> 54765 sk War alysis D D Inert	imulat 1.000 (0.500 0.000 c of (of Sto etic 0 260 ning Time TS St VD St	tion Cr. D Add D D D Flow p D Flow p D ffline prage St Rainfal 850 TL (mm) step 2. atus atus	iteria itional MADD Fa per Per Contro cructure 1 Detai 47650 6	Flow - % c actor * 10r Inlet son per Day ls 0 Numbe: es 3 Numbe: .1s FEH Dat 2013 Cv (S :0850 Cv (W	of Total n ³ /ha Sto Coeffiec y (l/per/ c of Time c of Time c of Real a Type Ca ummer) inter) 30 t (Extend	Flow 0. rage 2. ient 0. day) 0. /Area D Time C atchment 0.750 0.840 0.840 0.0 GFF ON ON	000 000 800 000 iagrams 0 ontrols 0	
	Ret	Durati urn Peric Climat	on(s) d(s)	(years	s) 15, s)	30,	60, 120	, 240,	Su 360, 480,	2, 3			
								Water	Surcharged	Flooded			Pipe
	US/MH						US/CL	Level	Depth			Overflow	
PN	Name		Εv	vent			(m)	(m)	(m)	(m³)	Cap.	(l/s)	(l/s)
1.000	S5	15 minu	te 2 y	year W	Vinter	I+0%	6.500	5.398	-0.077	0.000	0.96		97.1
1.001	SwaleA	480 minu	te 2 y	year W	Vinter	I+0%	6.250	5.343	-0.907		0.00		12.3
1.002		480 minu						5.343	-0.882		0.00		8.6
2.000		480 minu	-	•				5.345	-0.130		0.17		19.5
1.003 1.004		480 minu 480 minu	-	-				5.343 5.343	-0.807 0.043		0.01 0.46		25.0 20.7
	FlowControl1		-	•				5.341	0.291	0.000	0.24		3.4
1.006		120 minu	-	-				5.118	0.318	0.000	0.30		3.3
1.007	FPDDiv1	120 minu	te 2 y	year W	Vinter	I+0%	6.500	5.113	-0.212		0.01		3.2
1.008		120 minu	-	-				5.113	-0.187		0.00		2.7
3.000	S6S7 FlowControl2	15 minu	-	-				5.134	0.034		1.42 0.11		136.2 1.4
1.009		120 minu	-	-				4.910 5.113	0.410 -0.296		0.00		0.0
					PN		/MH ame	Stat	us				
								Stat	us				
				1	.000		ame S5	Stat	OK				
				1			ame	Stat					

SwaleA	OK
SwaleB	OK
S8S9S10	OK
SwaleC	OK
SwaleEnd	SURCHARGED
FlowControl1	SURCHARGED
Outfall	SURCHARGED
FPDDiv1	OK
FPDDiv2	OK
S6S7	SURCHARGED
FlowControl2	SURCHARGED
FPD	OK
	SwaleB S8S9S10 SwaleC SwaleEnd FlowControl1 Gutfall FPDDiv1 FPDDiv2 S6S7 FlowControl2

PJA													
												Page	10
Seven Ho	use, High S	treet				05425							
Longbrid	ge					Cambr	idge i	North					
Birmingh	am, B31 2UQ					Catch	ments	3, 4 ar	nd 7			_ Mic	
Date 13/	10/2022 10:	44				Desig	ned b	y JG					
File 054	25 - CATCHM	ENT 4	NETW	JORK MC		Check	ed by	MC				Ulc	inage
Innovyze						Netwo							
<u>30 ye</u> a	Foul Number of In Number of FEH	Area Hc Le Headl Sewage uput Hyd Online Rain Rainfa Sit Margin Dur	al Rea Hot ot Sta loss (e per drogra Contr hfall all Ve te Loc h for	duction t Start art Leve Coeff ((hectare aphs 0 rols 4 1 Model ersion cation G Flood R A Profile n(s) (mi	<u>S.</u> Factor (mins) el (mm) Global) e (1/s) Number <u>Synth</u> BB 54765 Risk War analysis D Inert e(s) .ns) 15,	imulati 1.000 0 0.500 0.000 r of Of pf Stor etic R 0 2608 ning (i Times TS Sta VD Sta ia Sta	on Cri Addi Flow p fline age St ainfal 50 TL mm) tep 2. tus tus	teria tional F MADD Factor per Person Controls ructures <u>1 Details</u> F 20 47650 608 5 Second	low - % of tor * 10m ³ Inlet C n per Day 0 Number 3 Number EH Data 13 Cv (Su 50 Cv (Win Increment	Total F /ha Stor coeffieci (l/per/d of Time/ of Real Type Cat mmer) nter) 300 (Extende C mer and W	low 0.0 age 2.0 ent 0.8 ay) 0.0 Area Di Time Co cchment 0.750 0.840 0.0 ed) DFF ON ON Vinter	00 00 00 00 agrams 0	<u>C4, C7</u>
	Re			(s) (yea Change							0, 100 20, 25		
								Water S	urcharged	Flooded			Pipe
	US/MH						US/CL	Level	Depth	Volume	Flow /	Overflow	
PN	Name			Event			(m)	(m)	(m)	(m³)	Cap.	(1/s)	(l/s)
1.000	S5	15 mi:	nute	30 year	Winter	I+20%	6.500	5.937	0.462	0.000	2.73		274.3
1.001	SwaleA	960 min	nute	30 year	Winter	I+20%	6.250	5.789	-0.461	0.000	0.01		16.9
1.002				30 year				5.789	-0.436	0.000	0.00		10.5
2.000								5.790	0.315	0.000	0.23		27.0
1.003				30 year				5.789	-0.361	0.000	0.01		26.5
1.004				-				5.788	0.488	0.000	0.49		22.0
1.005	FlowControl1			-				5.786	0.736	0.000	0.24		3.4
			nute	30 year	Winter	1+20%	6.500	5.569	0.769	0.000	1.53		16.6
1.006	Outfall			-					~ ~ ~ ~ ~	0 000			
1.006 1.007	FPDDiv1	240 mi	nute	30 year	Winter	I+20%	6.500	5.568	0.243	0.000	0.09		35.4
1.006 1.007 1.008	FPDDiv1 FPDDiv2	240 min 240 min	nute nute	30 year 30 year	Winter Winter	I+20% I+20%	6.500 6.500	5.601	0.301	0.000	0.16		35.4 103.9
1.006 1.007 1.008 3.000	FPDDiv1 FPDDiv2 S6S7	240 min 240 min 15 min	nute nute nute	30 year 30 year 30 year	Winter Winter Winter	I+20% I+20% I+20%	6.500 6.500 6.500	5.601 5.833	0.301 0.733	0.000	0.16 3.81		35.4 103.9 365.2
1.006 1.007 1.008 3.000	FPDDiv1 FPDDiv2 S6S7 FlowControl2	240 min 240 min 15 min 960 min	nute nute nute	30 year 30 year 30 year	Winter Winter Winter Winter	I+20% I+20% I+20% I+20%	6.500 6.500 6.500 6.500	5.601	0.301	0.000	0.16		35.4 103.9
1.006 1.007 1.008 3.000 3.001	FPDDiv1 FPDDiv2 S6S7 FlowControl2	240 min 240 min 15 min 960 min	nute nute nute	30 year 30 year 30 year 30 year	Winter Winter Winter Winter Winter	I+20% I+20% I+20% I+20%	6.500 6.500 6.500 6.500 6.500	5.601 5.833 5.418 5.613 Status	0.301 0.733 0.918 0.204	0.000 0.000 0.000	0.16 3.81 0.12		35.4 103.9 365.2 1.5
1.006 1.007 1.008 3.000 3.001	FPDDiv1 FPDDiv2 S6S7 FlowControl2	240 min 240 min 15 min 960 min	nute nute nute	30 year 30 year 30 year 30 year	Winter Winter Winter Winter PN 1.000	I+20% I+20% I+20% I+20% I+20% US/ Nam	6.500 6.500 6.500 6.500 6.500	5.601 5.833 5.418 5.613 Status	0.301 0.733 0.918 0.204	0.000 0.000 0.000	0.16 3.81 0.12		35.4 103.9 365.2 1.5
1.006 1.007 1.008 3.000 3.001	FPDDiv1 FPDDiv2 S6S7 FlowControl2	240 min 240 min 15 min 960 min	nute nute nute	30 year 30 year 30 year 30 year	Winter Winter Winter Winter PN 1.000 1.001	I+20% I+20% I+20% I+20% I+20% US/ Nam	6.500 6.500 6.500 6.500 6.500 MH ne SS SwaleA	5.601 5.833 5.418 5.613 Status	0.301 0.733 0.918 0.204	0.000 0.000 0.000	0.16 3.81 0.12		35.4 103.9 365.2 1.5
1.006 1.007 1.008 3.000 3.001	FPDDiv1 FPDDiv2 S6S7 FlowControl2	240 min 240 min 15 min 960 min	nute nute nute	30 year 30 year 30 year 30 year	Winter Winter Winter Winter PN 1.000 1.001 1.002	I+20% I+20% I+20% I+20% I+20% US/ Nan	6.500 6.500 6.500 6.500 6.500 MH ME SwaleA SwaleA	5.601 5.833 5.418 5.613 Status	0.301 0.733 0.918 0.204	0.000 0.000 0.000	0.16 3.81 0.12		35.4 103.9 365.2 1.5
1.006 1.007 1.008 3.000 3.001	FPDDiv1 FPDDiv2 S6S7 FlowControl2	240 min 240 min 15 min 960 min	nute nute nute	30 year 30 year 30 year 30 year	Winter Winter Winter Winter PN 1.000 1.001 1.002 2.000	I+20% I+20% I+20% I+20% I+20% US/ Nam	6.500 6.500 6.500 6.500 6.500 MH ME SwaleA SwaleA SwaleB Syss10	5.601 5.833 5.418 5.613 Status SURCHARGE	0.301 0.733 0.918 0.204 ED OK OK ED	0.000 0.000 0.000	0.16 3.81 0.12		35.4 103.9 365.2 1.5
1.006 1.007 1.008 3.000 3.001	FPDDiv1 FPDDiv2 S6S7 FlowControl2	240 min 240 min 15 min 960 min	nute nute nute	30 year 30 year 30 year 30 year	Winter Winter Winter Winter PN 1.000 1.001 1.002	I+20% I+20% I+20% I+20% I+20% US/ Nam	6.500 6.500 6.500 6.500 6.500 6.500 MH Me Syssio SwaleA Syssio SwaleC	5.601 5.833 5.418 5.613 Status SURCHARGE	0.301 0.733 0.918 0.204 ED OK ED OK	0.000 0.000 0.000	0.16 3.81 0.12		35.4 103.9 365.2 1.5

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3.001 FlowControl2 SURCHARGED

1.005 FlowControl1 SURCHARGED 1.006 Outfall SURCHARGED

FPDDiv1 SURCHARGED FPDDiv2 SURCHARGED S6S7 SURCHARGED

FPD SURCHARGED

1.007

1.008 3.000

1.009

PJA											Page 1	.1
Seven Ho	ouse, High S	Street		()5425							
Longbrid	lge			C	Cambri	ldge N	orth					· · · · ·
Birmingh	am, B31 2UÇ	2		C	Catchr	nents	3, 4 a	nd 7			_ Mic	ſ
Date 13/	10/2022 10:	: 4 4		Ι	Design	ned by	JG					
File 054	25 - CATCHN	MENT 4 NET	WORK MC	(Checke	ed by	MC				DIC	inage
Innovyze	2			1	Netwo	 ck 201	9.1					
-												
<u>100 y</u> e	Fou Number of I Number of	Areal R H Hot S le Headloss l Sewage pe nput Hydrogr Online Cont Rainfall H Rainfall V	eduction F ot Start () tart Level Coeff (Gl r hectare raphs 0 trols 4 Nu Model Version ocation GB	<u>Si</u> actor mins) (mm) obal) (1/s) Number o <u>Synthe</u> 54765(<u>mulati</u> 1.000 0 0.500 0.000 of Of f Stor etic Ra	on Crit Addit Flow pe fline C age Str Ainfall	eria Lional F MADD Fac Per Perso Controls Details F 20	low - % of tor * 10m³/ Inlet Co n per Day 0 0 Number o 3 Number o	Total FJ /ha Stora beffiecie (l/per/da of Time/A of Real ? Type Cat mer)	Low 0.00 age 2.00 ent 0.80 ay) 0.00 Area Dia Fime Cor Chment 0.750 0.840	00 00 00 00 00 ngrams 0	<u>24, C7</u>
	Re	eturn Perioc	Profile(s on(s) (mins	DT DV Inerti 5) 5) 15, 5)	IS Stat 7D Stat La Stat	us us us		Increment Summ 50, 480, 96	0 er and W 0, 1440, 2, 30	FF ON ON inter 2880		
PN	US/MH Name		Event			US/CL (m)	Water Level (m)	Surcharged Depth (m)			Overflow (l/s)	Pipe Flow (1/s)
1.000	.55	15 minute	100 vear ^I	Winter	I+25%	6.500	6.402	0.927	0.000	3.70		372.3
1.001 1.002 2.000 1.003 1.004 1.005 1.006 1.007 1.008 3.000	SwaleA SwaleB S8S9S10 SwaleC SwaleEnd FlowControl1 FPDDiv1 FPDDiv2 S6S7 FlowControl2	960 minute 960 minute 30 minute 960 minute 960 minute 240 minute 120 minute 15 minute	100 year 1 100 year 1	Winter Winter Winter Winter Summer Summer Winter Winter Winter	I+25% I+25% I+25% I+25% I+25% I+25% I+25% I+25% I+25% I+25% I+25% I+25%	6.250 6.200 6.500 6.150 6.125 6.500 6.500 6.500 6.500 6.500 6.500 6.500	6.402 6.127 6.127 6.145 6.126 6.119 6.268 5.618 5.613 5.613 6.483 6.373 5.613	-0.123 -0.098 0.670 -0.024 0.819 1.218 0.288 0.313 1.383 1.873 0.204	0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000	0.01 0.00 2.01 0.01 0.24 1.56 0.09 0.00 5.20 0.16 0.16		23.8 10.7 232.2 32.5 22.5 3.4 16.9 36.6 3.1 497.8 2.1 275.1
				PN	US/N Nam		Status					
					14011	-	Juaius					
				.000 .001	S		FLOOD RI FLOOD RI					

1.000	S5	FLOOD RISK
1.001	SwaleA	FLOOD RISK
1.002	SwaleB	FLOOD RISK
2.000	S8S9S10	SURCHARGED
1.003	SwaleC	FLOOD RISK
1.004	SwaleEnd	FLOOD RISK
1.005	FlowControl1	FLOOD RISK
1.006	Outfall	SURCHARGED
1.007	FPDDiv1	SURCHARGED
1.008	FPDDiv2	SURCHARGED
3.000	S6S7	FLOOD RISK
3.001	FlowControl2	FLOOD RISK
1.009	FPD	SURCHARGED

Corron Harris T						Page 1
Seven House, Hi	.gh Street	05425				_
Longbridge	5	Balan	cing Por	nd		
Birmingham, B31	2110		-		tics area	
Date 31/08/2022				-	CICS AIGA	_ Micro
		-	ned by J			Drainage
File 05425 - Ca	tchment 5 and.		ed by MC			
Innovyze		Sourc	e Contro	ol 2019	.1	
Sur	mary of Result	s for 100	year Re	eturn P	eriod (+25%)
	Storm Event	Max Max Level Dept		Max	Status	
	Event	(m) (m)		(m ³)		
		(,	(=, =,	()		
	15 min Summer			967.4	0 K	
	30 min Summer			5 1246.3	O K	
	60 min Summer			5 1514.4		
	120 min Summer			5 1890.5	ОК	
	180 min Summer			5 2111.2	O K	
	240 min Summer 360 min Summer				Flood Risk	
	480 min Summer				Flood Risk Flood Risk	
	600 min Summer				Flood Risk Flood Risk	
	720 min Summer				Flood Risk	
	960 min Summer				Flood Risk	
	1440 min Summer	5.966 1.26	6 11.6	5 2339.4	Flood Risk	
	2160 min Summer	5.867 1.16	7 11.6	5 2121.9	O K	
	2880 min Summer			5 1957.1	O K	
	4320 min Summer			5 1720.0	0 K	
	5760 min Summer			5 1521.5	ОК	
	7200 min Summer 8640 min Summer			5 1377.7		
	10080 min Summer			5 1268.9 5 1185.4	ок ок	
	15 min Winter			5 1084.6	0 K	
	30 min Winter			5 1397.9	0 K	
	Storm	Rain F	looded Di	scharge	Time-Peak	
	Event	(mm/hr) V		Volume	(mins)	
			(m³)	(m³)		
	15 min Summe	r 147.000	0.0	863.5	23	
	30 min Summe		0.0	972.8	38	
	<u> </u>	∽ E0 10E	0.0	1402 0	68	
	60 min Summe			1492.0		
	120 min Summe	r 36.688	0.0	1800.2	128	
	120 min Summe 180 min Summe	r 36.688 r 27.629	0.0	1800.2 1824.0	128 186	
	120 min Summe 180 min Summe 240 min Summe	r 36.688 r 27.629 r 22.375	0.0 0.0 0.0	1800.2 1824.0 1805.3	128 186 246	
	120 min Summe 180 min Summe 240 min Summe 360 min Summe	r 36.688 r 27.629 r 22.375 r 16.333	0.0 0.0 0.0 0.0	1800.2 1824.0 1805.3 1776.9	128 186 246 366	
	120 min Summe 180 min Summe 240 min Summe	r 36.688 r 27.629 r 22.375 r 16.333 r 12.905	0.0 0.0 0.0	1800.2 1824.0 1805.3	128 186 246	
	120 min Summe 180 min Summe 240 min Summe 360 min Summe 480 min Summe	r 36.688 r 27.629 r 22.375 r 16.333 r 12.905 r 10.679	0.0 0.0 0.0 0.0 0.0	1800.2 1824.0 1805.3 1776.9 1757.7	128 186 246 366 486	
	120 min Summe 180 min Summe 240 min Summe 360 min Summe 480 min Summe 600 min Summe	r 36.688 r 27.629 r 22.375 r 16.333 r 12.905 r 10.679 r 9.115	0.0 0.0 0.0 0.0 0.0 0.0	1800.2 1824.0 1805.3 1776.9 1757.7 1742.0	128 186 246 366 486 604	
	120 min Summe 180 min Summe 240 min Summe 360 min Summe 480 min Summe 600 min Summe 720 min Summe	r 36.688 r 27.629 r 22.375 r 16.333 r 12.905 r 10.679 r 9.115 r 7.053 r 4.875	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	1800.2 1824.0 1805.3 1776.9 1757.7 1742.0 1727.3	128 186 246 366 486 604 724 962 1440	
	120 min Summe 180 min Summe 240 min Summe 360 min Summe 480 min Summe 600 min Summe 960 min Summe 1440 min Summe 2160 min Summe	r 36.688 r 27.629 r 22.375 r 16.333 r 12.905 r 10.679 r 9.115 r 7.053 r 4.875 r 3.359	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	1800.2 1824.0 1805.3 1776.9 1757.7 1742.0 1727.3 1698.5 1639.4 3149.9	128 186 246 366 486 604 724 962 1440 1816	
	120 min Summe 180 min Summe 240 min Summe 360 min Summe 480 min Summe 600 min Summe 960 min Summe 1440 min Summe 2160 min Summe	r 36.688 r 27.629 r 22.375 r 16.333 r 12.905 r 10.679 r 9.115 r 7.053 r 4.875 r 3.359 r 2.586	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	1800.2 1824.0 1805.3 1776.9 1757.7 1742.0 1727.3 1698.5 1639.4 3149.9 3195.8	128 186 246 366 486 604 724 962 1440 1816 2164	
	120 min Summe 180 min Summe 240 min Summe 360 min Summe 480 min Summe 600 min Summe 960 min Summe 1440 min Summe 2160 min Summe 2880 min Summe	r 36.688 r 27.629 r 22.375 r 16.333 r 12.905 r 10.679 r 9.115 r 7.053 r 4.875 r 3.359 r 2.586 r 1.815	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	1800.2 1824.0 1805.3 1776.9 1757.7 1742.0 1727.3 1698.5 1639.4 3149.9 3195.8 3046.2	128 186 246 366 486 604 724 962 1440 1816 2164 2984	
	120 min Summe 180 min Summe 240 min Summe 360 min Summe 480 min Summe 600 min Summe 960 min Summe 1440 min Summe 2160 min Summe 4320 min Summe 5760 min Summe	r 36.688 r 27.629 r 22.375 r 16.333 r 12.905 r 10.679 r 9.115 r 7.053 r 4.875 r 3.359 r 2.586 r 1.815 r 1.430	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	1800.2 1824.0 1805.3 1776.9 1757.7 1742.0 1727.3 1698.5 1639.4 3149.9 3195.8 3046.2 3641.6	128 186 246 366 486 604 724 962 1440 1816 2164 2984 3744	
	120 min Summe 180 min Summe 240 min Summe 360 min Summe 480 min Summe 600 min Summe 720 min Summe 960 min Summe 1440 min Summe 2160 min Summe 4320 min Summe 5760 min Summe 7200 min Summe	r 36.688 r 27.629 r 22.375 r 16.333 r 12.905 r 10.679 r 9.115 r 7.053 r 4.875 r 3.359 r 2.586 r 1.815 r 1.430 r 1.205	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	$\begin{array}{c} 1800.2\\ 1824.0\\ 1805.3\\ 1776.9\\ 1757.7\\ 1742.0\\ 1727.3\\ 1698.5\\ 1639.4\\ 3149.9\\ 3195.8\\ 3046.2\\ 3641.6\\ 3834.0 \end{array}$	128 186 246 366 486 604 724 962 1440 1816 2164 2984 3744 4536	
	120 min Summe 180 min Summe 240 min Summe 360 min Summe 480 min Summe 600 min Summe 960 min Summe 1440 min Summe 2160 min Summe 4320 min Summe 5760 min Summe	r 36.688 r 27.629 r 22.375 r 16.333 r 12.905 r 10.679 r 9.115 r 7.053 r 4.875 r 3.359 r 2.586 r 1.815 r 1.430 r 1.205 r 1.058	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	$\begin{array}{c} 1800.2\\ 1824.0\\ 1805.3\\ 1776.9\\ 1757.7\\ 1742.0\\ 1727.3\\ 1698.5\\ 1639.4\\ 3149.9\\ 3195.8\\ 3046.2\\ 3641.6\\ 3834.0\\ 4037.1 \end{array}$	128 186 246 366 486 604 724 962 1440 1816 2164 2984 3744 4536 5280	
	120 min Summe 180 min Summe 240 min Summe 360 min Summe 480 min Summe 600 min Summe 960 min Summe 1440 min Summe 2160 min Summe 2880 min Summe 4320 min Summe 5760 min Summe 8640 min Summe	r 36.688 r 27.629 r 22.375 r 16.333 r 12.905 r 10.679 r 9.115 r 7.053 r 4.875 r 3.359 r 2.586 r 1.815 r 1.430 r 1.205 r 1.058 r 0.956	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	$\begin{array}{c} 1800.2\\ 1824.0\\ 1805.3\\ 1776.9\\ 1757.7\\ 1742.0\\ 1727.3\\ 1698.5\\ 1639.4\\ 3149.9\\ 3195.8\\ 3046.2\\ 3641.6\\ 3834.0 \end{array}$	128 186 246 366 486 604 724 962 1440 1816 2164 2984 3744 4536	
	120 min Summe 180 min Summe 240 min Summe 360 min Summe 480 min Summe 600 min Summe 720 min Summe 960 min Summe 1440 min Summe 2880 min Summe 4320 min Summe 5760 min Summe 7200 min Summe 8640 min Summe	r 36.688 r 27.629 r 22.375 r 16.333 r 12.905 r 10.679 r 9.115 r 7.053 r 4.875 r 3.359 r 2.586 r 1.815 r 1.430 r 1.205 r 1.058 r 0.956 r 147.000	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	$\begin{array}{c} 1800.2\\ 1824.0\\ 1805.3\\ 1776.9\\ 1757.7\\ 1742.0\\ 1727.3\\ 1698.5\\ 1639.4\\ 3149.9\\ 3195.8\\ 3046.2\\ 3641.6\\ 3834.0\\ 4037.1\\ 4246.2 \end{array}$	128 186 246 366 486 604 724 962 1440 1816 2164 2984 3744 4536 5280 6056	

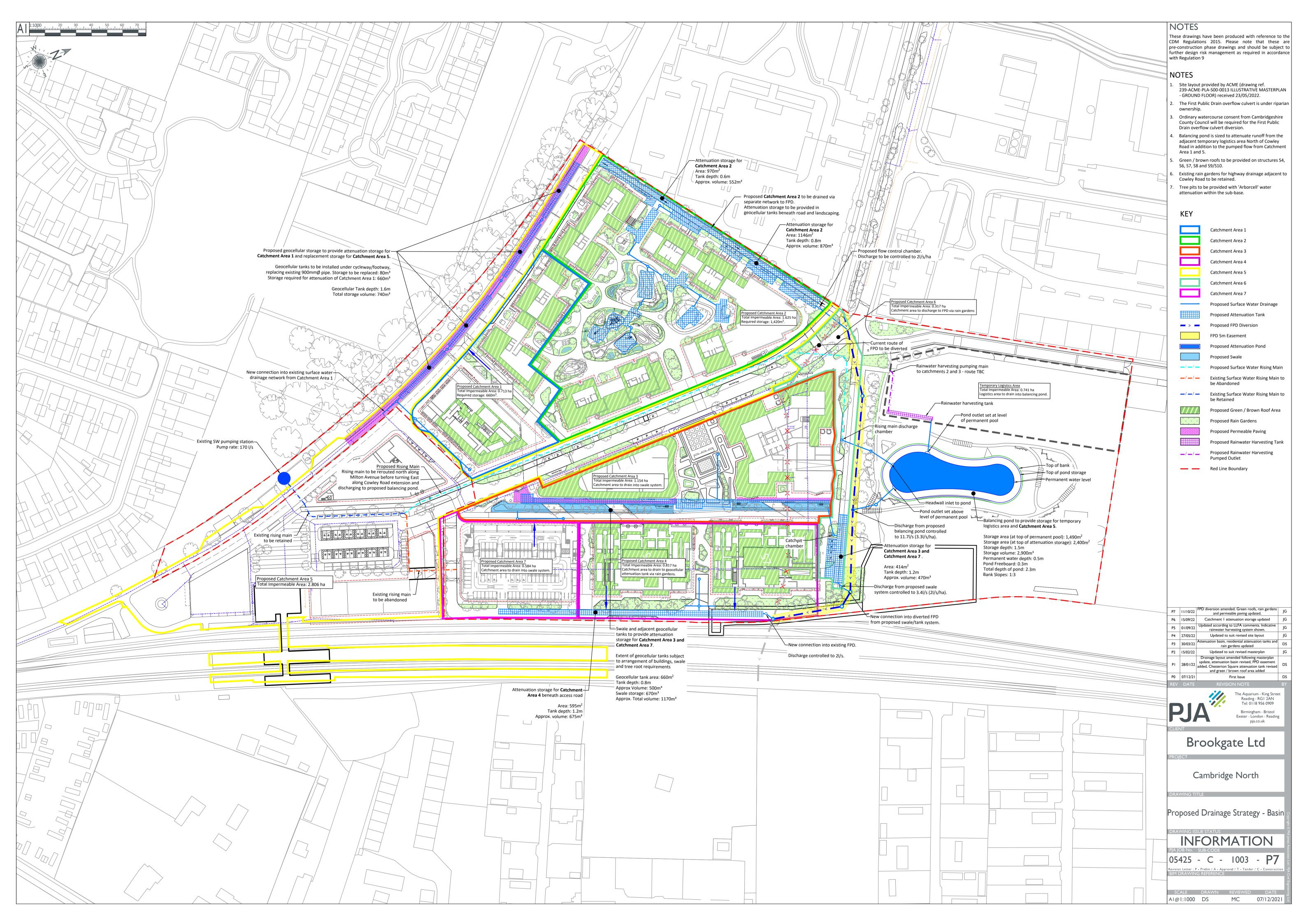
High Street 331 2UQ 022 15:02 Catchment 5 and. Summary of Result Storm Event	Catcl Desig Check Source	ncing Po nment 5 gned by ked by M ce Contr	+ logis JG IC Fol 2019	tics area .1	Micro Drainad
22 15:02 Catchment 5 and. Summary of Result Storm	Catch Desig Chech Source s for 10	nment 5 gned by ked by M ce Contr	+ logis JG IC Fol 2019		
22 15:02 Catchment 5 and. Summary of Result Storm	Desig Check Sources	gned by Ked by M Ce Contr	JG IC 01 2019		
22 15:02 Catchment 5 and. Summary of Result Storm	Desig Check Sources	gned by Ked by M Ce Contr	JG IC 01 2019		Drainac
Catchment 5 and. Summary of Result Storm	Check Source s for 10	ked by M ce Contr	IC 101 2019	.1	Urainag
Summary of Result Storm	Sources for 10	ce Contr	ol 2019	.1	
Storm	s for 10			• ⊥	
Storm		0 year H) a t 11		
	Max Ma		<u>keturn P</u>	<u>eriod (+25%)</u>)
Event		x Max	Max	Status	
	Level Dep	th Contro	l Volume		
	(m) (m) (1/s)	(m³)		
60 min Winter	5.667 0.9	67 11.	6 1700.3	ОК	
120 min Winter			6 2123.4		
180 min Winter				Flood Risk	
240 min Winter				Flood Risk	
				ОК	
				ОК	
Storm Event)ischarge Volume		
		(m³)	(m³)		
60 min Winter	r 58.125	0.0	1653.5	66	
		0.0	1832.3	126	
		0.0	1807.5	184	
240 min Winter	r 22.375	0.0	1791.1	242	
		0.0	1776.5	360	
480 min Winter	r 12.905	0.0	1769.7	478	
		0.0	1764.6	594	
720 min Winter	r 9.115	0.0	1759.8	710	
		0.0	1748.3	942	
		0.0	1714.0	1388	
		0.0	3449.5	2016	
		0.0	3381.2	2280	
		0.0	3110.2	3200	
		0.0	4078.4	4144	
		0.0	4294.2	4904	
		0.0		5704	
10080 min Winter	r 0.956	0.0	4760.3	6456	
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РЈА		Page 3			
Seven House, High Street	05425				
Longbridge	Balancing Pond				
Birmingham, B31 2UQ					
Date 31/08/2022 15:02	Designed by JG	– Micro			
File 05425 - Catchment 5 and	Checked by MC	Drainage			
Innovyze	Source Control 2019.1				
11110 V y 20	Source concror 2019.1				
<u>Rainfall Details</u>					
Rainfall Mode	el FEH				
Return Period (years					
FEH Rainfall Versio					
	on GB 547650 260850 TL 47650 60850 De Catchment				
	Data Type Catchment Summer Storms Yes				
Winter Storr	ns Yes				
Cv (Summer					
Cv (Winter Shortest Storm (mins	•				
Longest Storm (mins					
Climate Change					
<u></u>	<u>Time Area Diagram</u>				
Tota	al Area (ha) 3.548				
	Area Time (mins) Area (ha) From: To: (ha)				
0 4	4 1.774 4 8 1.774				
<u>Time Area Diagram</u>					
Total Area (ha) 0.000					
Time (mins) Area From: To: (ha)					
	0 4 0.000				
	0 4 0.000				
©198	32-2019 Innovyze				
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PJA					Page 4
Seven House, High Street	05425				-
Longbridge	Balanci	.ng Pond			
Birmingham, B31 2UQ		ent 5 + lo	gistics a	rea	Misso
Date 31/08/2022 15:02		ed by JG	5		Micro
File 05425 - Catchment 5	_	-			Drainage
Innovyze		Control 2	0191		
11110 V y 2 C	Dource	CONCLOT 2	019.1		
	<u>Model De</u>	tails			
Stor	age is Online Cov	er Level (m	6.200		
	Tank or Pond	Structure	<u>-</u>		
	Invert Level	(m) 4.700			
Dept	ch (m) Area (m²) D	epth (m) Ar	ea (m²)		
	0.000 1484.0	1.500	2394.0		
Hydro-Brake® Optimum Outflow Control					
	Unit Referenc		49-1170-150		
	Design Head (m Design Flow (l/s			1.500 11.7	
	Flush-Flc		Calc	ulated	
		ve Minimise			
	Applicatio		5	Surface	
	Sump Availabl Diameter (mm			Yes 149	
	Invert Level (m			4.700	
Minimum Outlet	Pipe Diameter (mm	n)		225	
Suggested Ma	nhole Diameter (mm	n)		1500	
c	ontrol Points	Head (m)	Flow (l/s)		
Design	Point (Calculated)) 1.500	11.7		
		0.440	11.6		
Moor El	Kick-Flo		9.4		
Mean Fi	low over Head Range	e –	10.1		
The hydrological calculatio Hydro-Brake® Optimum as spe Hydro-Brake Optimum® be uti invalidated	cified. Should ar	nother type	of control	device ot	her than a
Depth (m) Flow (1/s) Depth	n (m) Flow (l/s) D	epth (m) Fl	ow (l/s) De	epth (m) H	flow (l/s)
	.200 10.5	3.000	16.2	7.000	24.3
	.400 11.3	3.500	17.5	7.500	25.2
	600 12.0 800 12.7	4.000 4.500	18.6 19.7	8.000 8.500	26.0 26.7
	2.000 13.4	4.300	20.7	9.000	20.7
	2.200 14.0	5.500	21.7	9.500	28.2
	14.6	6.000	22.6		
1.000 9.6 2	15.2	6.500	23.5		
	©1982-2019	Innovvze			
©1982-2019 Innovyze					



Appendix D Drainage Strategy Drawing





Appendix E LLFA Correspondence

Joe Garlick

From:	Harry Pickford <harry.pickford@cambridgeshire.gov.uk></harry.pickford@cambridgeshire.gov.uk>		
Sent:	17 August 2022 17:00		
To:	Malcolm Crowther		
Subject:	RE: [PJA: 05425-C] Cambridge North Phase Two		
Categories:	Scanned by Gekko		

Good afternoon Malcolm,

Thanks for the email. As discussed yesterday, the LLFA could request a condition for the details for the survey to be put on any permission for this application by the LPA. This would be a pre-commencement condition.

Kind regards

Harry Pickford

Principal Sustainable Drainage Officer T: 01223 715952 | M: 07469 377536 Flood Risk Team

Upcoming annual leave:



From: Malcolm Crowther <malcolm.crowther@pja.co.uk>
Sent: 16 August 2022 11:55
To: Harry Pickford <Harry.Pickford@cambridgeshire.gov.uk>
Subject: RE:[PJA: 05425-C] Cambridge North Phase Two

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Hi Harry

Following our discussion regarding the downstream capacity of the overflow culvert to the First Public Drain yesterday, the client has requested if you could confirm in writing that this investigation can be deferred to a precommencement condition. As you can appreciate procuring a survey and arranging the access onto third party land (including network rail permissions) can take some time to arrange.

Kind Regards Malcolm



Malcolm Crowther Associate T. 0118 338 4860 The Aquarium, King Street, Reading, RG1 2AN, UK www.pja.co.uk