AKSWard

CONSTRUCTION CONSULTANTS

Begbroke Science Park CIE

Drainage Strategy

Prepared for

Oxford University Estates Services

May 2015

Job №: X152002

App 15/01105/REM
Received 15 September 2015.

1.0 DRAINAGE STRATEGY

1.1. Introduction

AKS Ward has been appointed to provide a Drainage Strategy in support of the planning application for the construction of an innovation centre with associated hard standing.

1.2. Purpose of this Report

This report provides a proposal for the foul and surface water drainage strategies.

1.3. Flood Zone

From the Environment Agency plans and information the site is located in Flood zone 1 and the site is less than 1 hectare therefore no flood risk assessment is required.

Zone 1 Low Probability

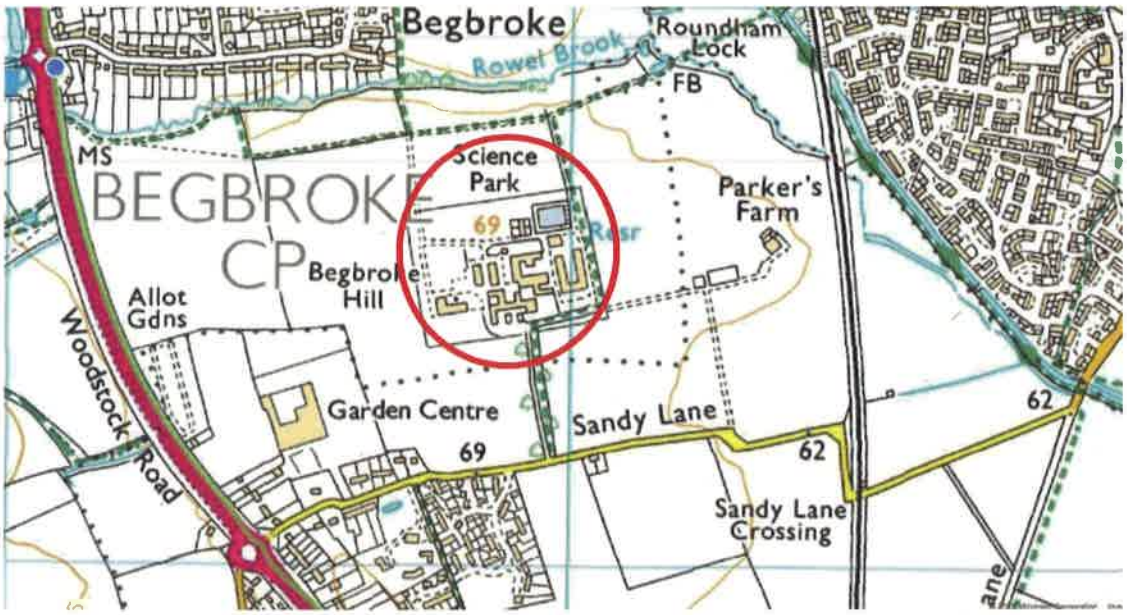
Definition: This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).

Appropriate uses

All uses of land are appropriate in this zone.

Environment Agency Flood Map

2.0 Site Details

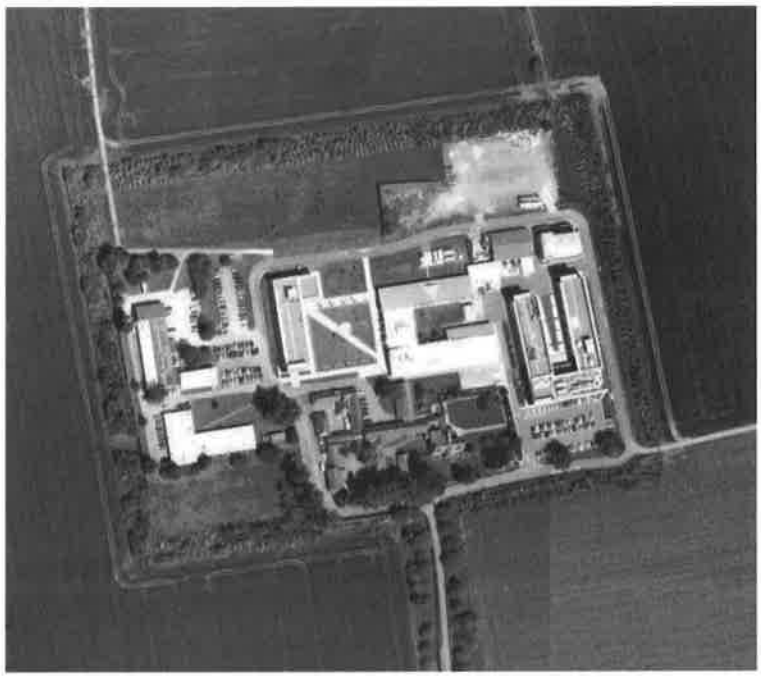


Ordnance Survey Map

2.1. Site Location

The proposed site is located to the West of Kidlington and South East of Begbroke. Reference TQ 448705 212745.

The area of site being developed is currently a mix of paved walkways and soft landscaping. Access to the site is via the existing site access road off Woodstock Road.



2.2. A topographic survey was carried out and is contained within Appendix A. The ground levels in the vicinity of the proposed extension are slightly elevated in comparison to the surrounding land. The topographical survey indicates the highest level of 69.06 on the soft landscaped area. The existing building adjacent to the site is shown to have a level of 68.50.

2.3. Site Proposals

The proposal is to construct an additional wing to that existing creating a horseshoe shaped building. Refer to Architects drawings for site proposals.

3.0 Existing Surface Water Drainage

The existing building on the site adjacent to the proposed extension currently drains to an existing soakaway to north east of the building within the soft landscaping.

From local knowledge the ground is anticipated to be permeable (existing soakaway). An intrusive site investigation including boreholes and trial holes will be carried out at a later stage to confirm the ground conditions. Percolation tests will be carried out as part of the site investigation to confirm the sites permeability.

4.0 Existing Foul Water Drainage

The existing foul system for the site drains via gravity into a private sewerage pumping station which discharges into the existing Thames Water sewer.

5.0 Existing Chemical Drainage

The chemical drainage system outfalls into an attenuation tank which, it is understood, discharges into the foul system under license from Thames Water.

6.0 Proposed Surface Water Drainage

All surface water drainage from the proposed extension will connect under gravity to a new soakaway which will be sized to accommodate both the existing building and proposed extension. The soakaway will be positioned 5m from the new/existing buildings.
The existing soakaway will be abandoned.

The surface water drainage will be designed with no flooding for all 30 year events and all flood water contained within the site with no risk of flooding to buildings for all events up to and including the 100 year plus 20% climate change. This design philosophy is in accordance with CIRIA 693 The SuDS manual.
Details of the proposed drainage layout are included in Appendix B.

7.0 Proposed Foul Drainage

It is proposed to connect the foul drainage via gravity sewers to the existing private drainage system. This system discharges into a private pumping station located on site. It is understood that the pumping station has been sized for the current and future development therefore there will be no increase in flow from the pumping station into the public sewer system and no works are required to the existing off site public foul sewer system to accommodate this development.

8.0 Proposed Chemical Drainage

It is proposed to connect the chemical drainage via gravity sewers to the existing chemical drainage system which discharges into a holding/ dilution tank prior to discharging into the pumping station. It is understood that the University has a license to discharge from the site.

Appendix A

Survey

OS NORTH

Topographical Abbreviations

A/R	Assumed Route	MKR	Marker
BH	Borehole	MT	Mercury Telecom Cover
BOL	Bollard	OHC	Overhead Cable
BT	British Telecom Cover	OHP	Overhead Pipe
BW	Barbed Wire Fence	OSBM	Ordnance Survey Bench Mark
BWK	Brickwork	PB	Post Box
CATV	Cable TV Cover	PGM	Permanent Ground Marker
CB	Close Boarded Fence	PR	Post & Rail Fence
CCTV	Closed Circuit TV	PW	Post & Wire Fence
CHLK	Chainlink Fence	PWM	Post & Wire Mesh Fence
CHPL	Chestnut Paling Fence	RE	Rodding Eye
CL	Cover Level	RG	Road Gully
CM	Cable Marker	RN	Road Name
CP	Catch Pit	RS	Road Sign
CPL	Catch Pit Base Level	RW	Retaining Wall
DIA	Diameter	RWP	Rain Water Pipe
DK	Drop Kerb	SAP	Sapling
DP	Down Pipe	SC	Stop Cock
EJB	Electricity Junction Box	SPR	Spread
EC	Electricity Cover	STA	Traverse Station
EP	Electricity Pole	SV	Stop Valve
ER	Earthing Rod	SVP	Soil Vent Pipe
FH	Fire Hydrant	SW	Storm Water
FIG	Feed into Ground	TB	Telephone Box
FW	Foul Water	TBM	Temporary Bench Mark
GU	Gully	TFR	Taken From Records
GV	Gas Valve	TJB	Telephone Junction Box
HT	Height	TPT	Trial Pit
IC	Inspection Cover	TL	Traffic Light
IL	Invert Level	TP	Telephone Pole
IR	Iron Railing Fence	UTL	Unable To Lift
KO	Kerb Outlet	UTT	Unable To Trace
LB	Litter Bin	VP	Vent Pipe
LC	Lamp Column	WKH	Water Key Hole
LP	Lamp Post	WM	Water Meter
MH	Manhole	WV	Water Valve

Survey Station Information

STN No.	Easting	Northing	Level	Type
STN1	447888.60	213505.98	68.48	Nail
STN2	447883.81	213579.34	69.01	Nail
STN3	447813.31	213577.65	69.01	Nail
STN4	447819.29	213500.74	68.43	Nail

Notes
The Grid is Related to OS using GPS
All Levels are related to OS using GPS

Rev	QA Check	Description	Date
5	-	-	-
4	-	-	-
3	-	-	-
2	-	-	-
1	-	-	-
0	BF	First Complete Issue	05/03/2015
Prelim	-	Preliminary - Not Complete	-

Warner Land Surveys Ltd
Beaumont House, 59 High Street, Theale,
READING, Berkshire, RG7 5AL
Tel: +44 (0)1189 303 314 Fax: +44 (0)1189 301 859
wlsl@warnerlandsurveys.com - www.warnerlandsurveys.com
Construction Projects Division: Surveying, Monitoring (inc. NVD)
Industrial Measurement Division: Oil, Chemical & Energy
Land and Measured Building Surveys Division: inc.
Verified Views, Right of Light, Net Lettable Areas
3D Laser Scanning & Dimensional Control
CAD Resource – 3D Modelling, Visualisations, etc

SURVEYED	FA	Ridge & Partners LLP
DRAWN	FA	
SCALE	1:200	

University of Oxford
Begbroke Science Park

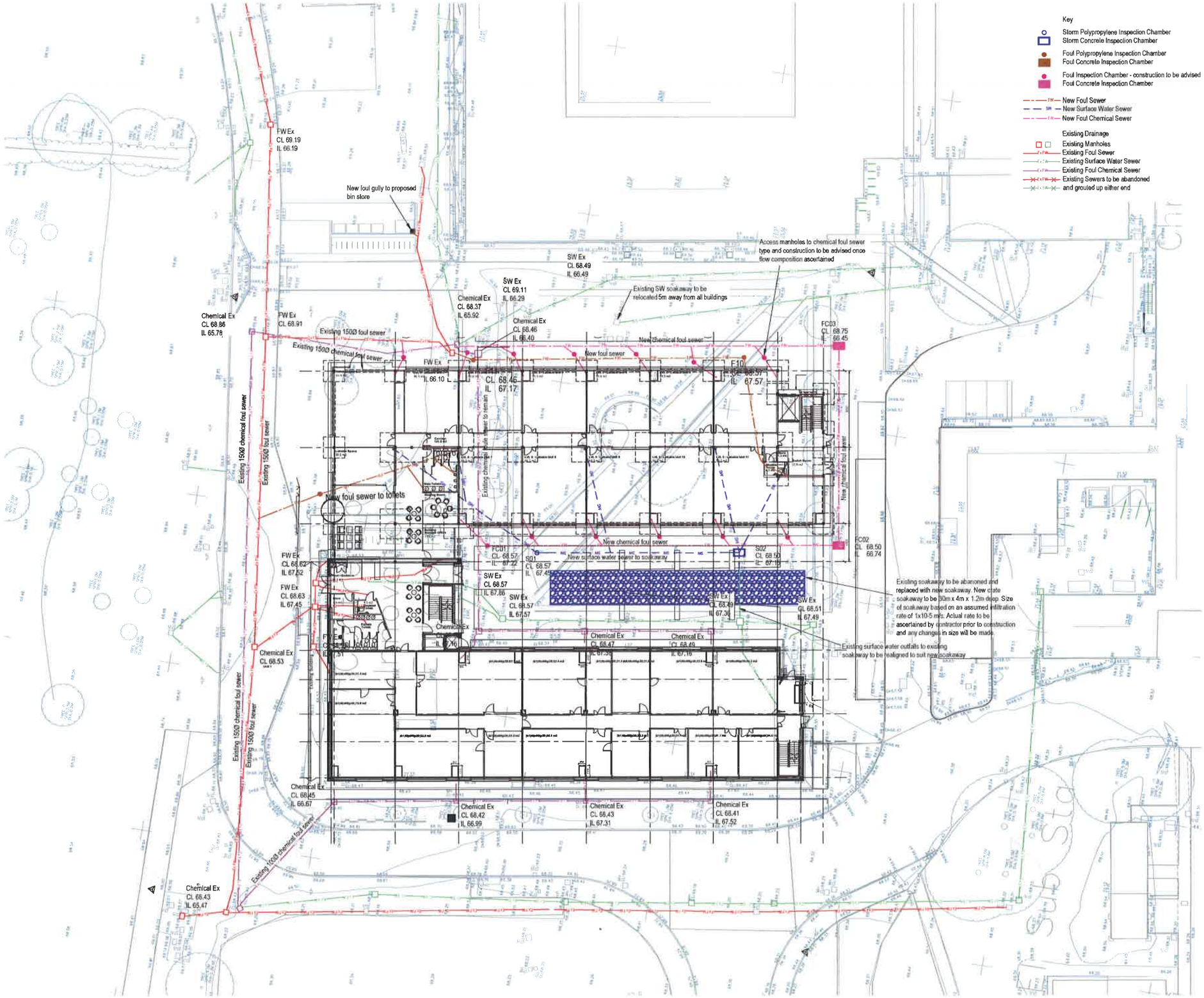
TOPOGRAPHICAL SURVEY WITH OS BACKDROP

JOB No	DRAWING NUMBER
S715/0552	S715/0552/P/0002

A0 Sheet - 1,189mm X 841mm

Appendix B

Proposed Drainage



NOTES

1. All setting out to be in accordance with the Architects drawings. Any discrepancies between the Engineers and the Architects drawings to be referred to the Architect before proceeding. Dimensions must not be scaled.
2. All drainage to be installed in accordance with relevant Building Regulations documents and Current Sewers for Adoption where applicable.
3. All drainage pipes to foul chemical sewer to be clay. All other pipework to be plastic.
4. Connections to Public sewers to be agreed and inspected by Water Authority.
5. Invert level, size and cover levels to existing manholes and sewers to be checked prior to any construction. Any discrepancies to be reported immediately.
6. Invert to base of soil stack bends to be 450mm below lowest branch connection for up to 3 storeys buildings. For buildings up to 5 storeys the invert to base of soil stack bends should be not less than 750mm.
7. All RWP and Foul Water drain point setting out is to be confirmed by Architect.
8. All RWP & SVP sizes & setting out by Architect / M&E Engineer. All below ground connections to match above ground outlet size, Min 100/110mm diameter.
9. Foul drains to project 100mm above finished floor level.
10. All internal Manholes and Inspection Chambers to have double sealed recessed covers to suit floor finishes by Architect.
11. All external covers in footpaths and roads in non tarmac areas to have recessed trays to suit the paving material.
12. Refer to drainage specification for pipe materials.
13. **All pipework to be 100/110Ø UNO. Refer to note 7** connection sizes.
14. All foul and surface water drainage stacks to have above ground rodding access, refer to above ground drainage layout by others.
15. This drawing has been produced in colour and should be reproduced in colour for clarity.
16. A CCTV Survey and report in WINCAN format for all new drainage will be required before the "As Built" drawings will be issued.

Rev.	Amendment	Drn	Chkd	Date
P8	Soakaway design added. Bin store relocated	DH	GT	18.05.15
P7	Updated Drainage	DH	GT	14.05.15
P6	Stage D	DG	GT	29.04.15
P5	Drainage updated to suit sewer survey	DG	GT	21.04.15
P4	Ground floor updated	DG	GT	27.03.15
P3	Bin store gully aded	DG	GT	11.03.2015
P2	Additonal foul run from disabled toilet added	DG	GT	09.03.2015
P1	Preliminary	DG	GT	06.03.2015

Drg Status: Preliminary

AKS Ward
CONSTRUCTION CONSULTANTS
Seacourt Tower
West Way
Oxford
OX2 0JJ
Tel: 01865 240071
Fax: 01865 248006
e-mail: oxford@aksward.com
web: www.aksward.com

☐ London
☐ Hitchin
■ Oxford
☐ Southampton

Client: **The University of Oxford**

Project: **Begbroke Innovation Accelerator Phase 1 Project**

Title: **Drainage Layout**

Scales	A1	1:200	A3	1:400
Reviewed Scheme	GT		Date	03.03.2015
Reviewed Final			Date	

Project No.	Drg No.	Rev.
X152002	200	P8

Summary of Results for 100 year Return Period (+20%)

Half Drain Time : 1235 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	66.231	0.431	0.7	49.1	O K
30 min Summer	66.363	0.563	0.8	64.2	O K
60 min Summer	66.496	0.696	0.8	79.4	O K
120 min Summer	66.623	0.823	0.9	93.8	O K
180 min Summer	66.688	0.888	0.9	101.3	O K
240 min Summer	66.727	0.927	0.9	105.7	O K
360 min Summer	66.771	0.971	0.9	110.7	O K
480 min Summer	66.794	0.994	0.9	113.3	O K
600 min Summer	66.803	1.003	0.9	114.3	O K
720 min Summer	66.803	1.003	0.9	114.4	O K
960 min Summer	66.789	0.989	0.9	112.7	O K
1440 min Summer	66.752	0.952	0.9	108.5	O K
2160 min Summer	66.695	0.895	0.9	102.0	O K
2880 min Summer	66.643	0.843	0.9	96.1	O K
4320 min Summer	66.550	0.750	0.9	85.5	O K
5760 min Summer	66.467	0.667	0.8	76.0	O K
7200 min Summer	66.391	0.591	0.8	67.4	O K
8640 min Summer	66.323	0.523	0.8	59.6	O K
10080 min Summer	66.260	0.460	0.8	52.5	O K
15 min Winter	66.283	0.483	0.8	55.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	118.417	0.0	27
30 min Summer	77.747	0.0	41
60 min Summer	48.611	0.0	70
120 min Summer	29.354	0.0	130
180 min Summer	21.556	0.0	188
240 min Summer	17.210	0.0	248
360 min Summer	12.501	0.0	366
480 min Summer	9.962	0.0	484
600 min Summer	8.347	0.0	604
720 min Summer	7.221	0.0	722
960 min Summer	5.740	0.0	914
1440 min Summer	4.148	0.0	1140
2160 min Summer	2.992	0.0	1524
2880 min Summer	2.371	0.0	1940
4320 min Summer	1.705	0.0	2768
5760 min Summer	1.348	0.0	3576
7200 min Summer	1.123	0.0	4336
8640 min Summer	0.967	0.0	5112
10080 min Summer	0.852	0.0	5864
15 min Winter	118.417	0.0	26

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	66.432	0.632	0.8	72.0	O K
60 min Winter	66.582	0.782	0.9	89.2	O K
120 min Winter	66.727	0.927	0.9	105.7	O K
180 min Winter	66.803	1.003	0.9	114.3	O K
240 min Winter	66.849	1.049	1.0	119.5	O K
360 min Winter	66.904	1.104	1.0	125.8	O K
480 min Winter	66.934	1.134	1.0	129.3	O K
600 min Winter	66.949	1.149	1.0	131.0	O K
720 min Winter	66.955	1.155	1.0	131.7	O K
960 min Winter	66.949	1.149	1.0	131.0	O K
1440 min Winter	66.903	1.103	1.0	125.8	O K
2160 min Winter	66.835	1.035	1.0	118.0	O K
2880 min Winter	66.763	0.963	0.9	109.8	O K
4320 min Winter	66.629	0.829	0.9	94.6	O K
5760 min Winter	66.508	0.708	0.8	80.7	O K
7200 min Winter	66.399	0.599	0.8	68.3	O K
8640 min Winter	66.302	0.502	0.8	57.2	O K
10080 min Winter	66.215	0.415	0.7	47.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	77.747	0.0	41
60 min Winter	48.611	0.0	70
120 min Winter	29.354	0.0	128
180 min Winter	21.556	0.0	186
240 min Winter	17.210	0.0	244
360 min Winter	12.501	0.0	360
480 min Winter	9.962	0.0	474
600 min Winter	8.347	0.0	590
720 min Winter	7.221	0.0	702
960 min Winter	5.740	0.0	922
1440 min Winter	4.148	0.0	1206
2160 min Winter	2.992	0.0	1632
2880 min Winter	2.371	0.0	2104
4320 min Winter	1.705	0.0	2988
5760 min Winter	1.348	0.0	3856
7200 min Winter	1.123	0.0	4680
8640 min Winter	0.967	0.0	5456
10080 min Winter	0.852	0.0	6248

Model Details

Storage is Online Cover Level (m) 68.500

Cellular Storage Structure

Invert Level (m) 65.800 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.03600 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.03600

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	120.0	120.0	1.300	0.0	201.6
1.200	120.0	201.6			