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AKSward

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CONSTRUCTION CONSULTANTS

Begbroke Science Park CIE

Drainage Strategy

Prepared for

Oxford University Estates Services

May 2015

Job No: X152002

App 15/00414/DISC
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

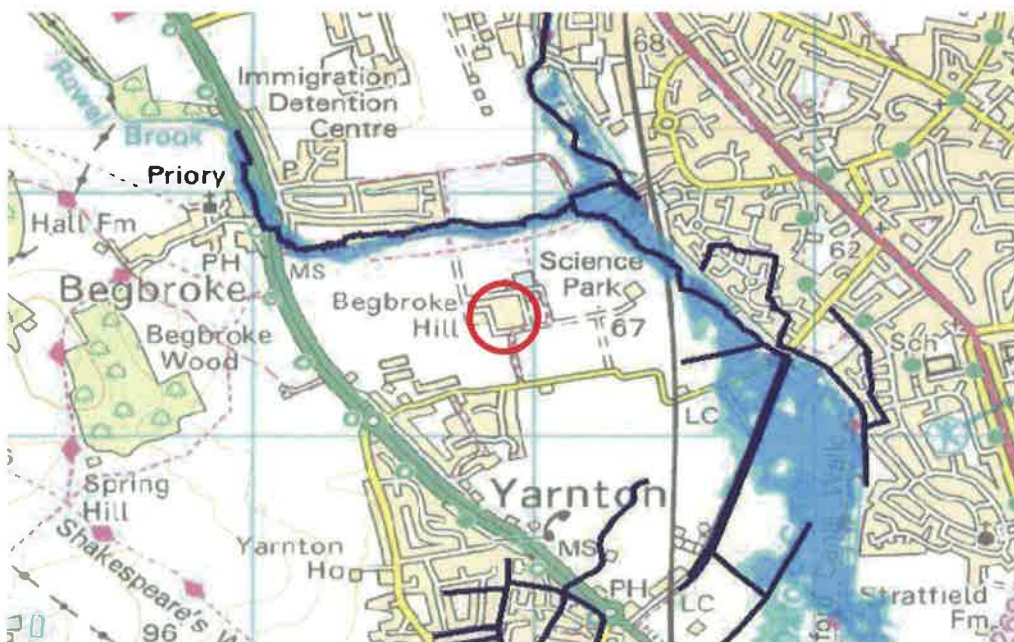
From the Environment Agency plans and information the site is located in Flood zone 1 and the site is less than 1 hectare therefore no flood risk assessment is required.

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



Topographical Abbreviations

A/R	Assevad Route	MR	Marker
BH	Borehole	MT	Mercury Telecom Cover
BOL	Balder	OC	Overhead Cable
BT	British Telecom Cover	OP	Overhead Pipe
SW	Barbed Wire Fence	OSM	Ordnance Survey Bench Mark
SWH	Brickwork	PS	Point Slew
CA/TV	Cable TV Cover	PSM	Permanent Ground Marker
CB	Cross Boarded Fence	PR	Post & Rail Fence
CD	Classified Drift TV	PWF	Post & Wire Fence
CH/K	Chalk/Kiln	PWM	Post & Wire Mesh Fence
CHL	Chalk	RC	Roading Edge
CHL	Chalk	RC	Road Gully
CL	Cover Lead	RS	Road Sign
CM	Cable Marker	RW	Rail
CP	Catch Pit	RW	Rail Water Pipe
CP/L	Catch Pit Base Level	SAP	Sapping
CP/L	Chamber	SC	Shed Cook
DP	Drop Pipe	SP	Sprinkler
DP	Down Pipe	SP	Station
EAB	Electricity Junction Box	STA	Transit Station
EC	Electricity Cover	SV	Step Valve
EP	Electricity Pole	SV	Sub Vent Pipe
EP	Earthing Rod	SW	Storm Water
PH	Fire Hydrant	TR	Telephone Box
FG	Fuel Oil Ground	TBM	Temporary Bench Mark
FW	Foul Water	TB	Telephone Junction Box
GS	Gully	TR	Traverse
GV	Gas Valve	TR	Traverse Station
H	Height	TR	Traverse
I	Inspection Cover	TL	Trench Light
IL	Inset Level	TR	Telephone Pole
IR	Iron Railway Fence	UTL	Unable To Locate
KB	Kiln	UTL	Unable To Trace
LB	Liter Bin	VP	Vent Pipe
LC	Lamp Column	WAI	Water Way Hole
LP	Lamp Post	WAI	Water Wall
MP	Manhole	WV	Water Valve

Survey Station Information

Stn No.	Eastings	Northing	Level	Type
STN1	44788.63	21325.88	68.48	Ben
STN2	44782.89	21326.34	68.01	Ben
STN3	44783.31	21327.63	69.01	Ben
STN4	44788.25	21320.34	68.43	Ben

Notes

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

Rev	DA	Description	Date
0	0	Final Complete Issue	05/03/2015
1	1	Final Complete Issue	05/03/2015

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COMPANIES PROVIDED BY: Surveying, Mapping, etc. (MVO)
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SURVEYED	FA	
DRAWN	FA	Ridge & Partners LLP
SCALE	1:200	

University of Oxford
 Begbroke Science Park

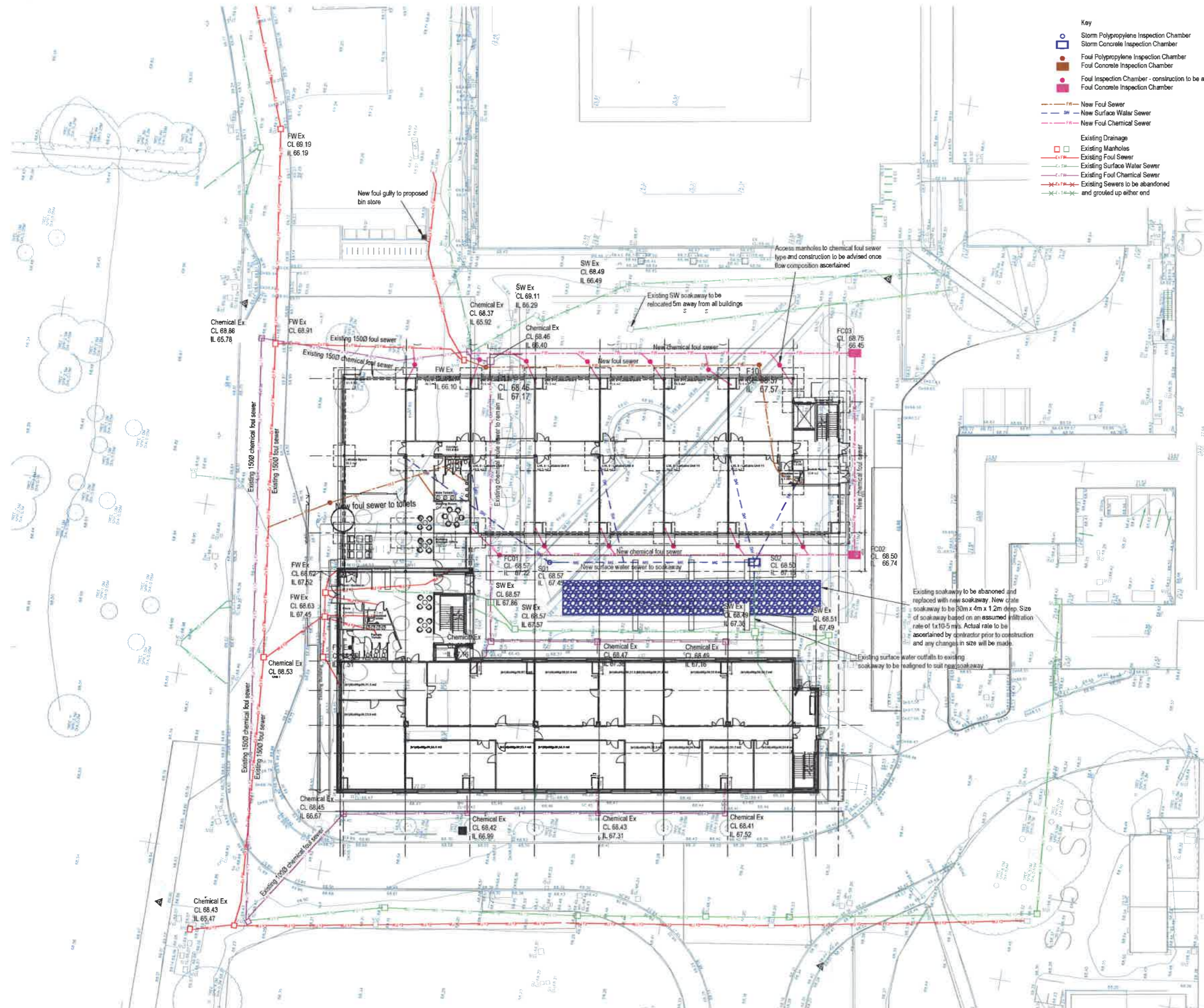
TOPOGRAPHICAL SURVEY WITH OS BACKDROP

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

A0 Sheet - 1,188mm X 841mm

Appendix B

Proposed Drainage



- Key**
- Storm Polypropylene Inspection Chamber
 - Storm Concrete Inspection Chamber
 - Foul Polypropylene Inspection Chamber
 - Foul Concrete Inspection Chamber
 - Foul Inspection Chamber - construction to be advised
 - Foul Concrete Inspection Chamber
- FW — New Foul Sewer
 - SW — New Surface Water Sewer
 - FC — New Foul Chemical Sewer
- Existing Drainage**
- Existing Manholes
 - Existing Foul Sewer
 - Existing Surface Water Sewer
 - Existing Foul Chemical Sewer
 - Existing Sewers to be abandoned and grouted up either end

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- 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 lamac areas to have recessed trays to suit the paving material.
 12. Refer to drainage specification for pipe materials.
 13. All pipework to be 100/110 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.

P8	Soakaway design added	DH	GT	18.05.15
P7	Bin store relocated	DH	GT	14.05.15
P6	Updated Drainage	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 added	DG	GT	11.03.2015
P2	Additional foul run from disabled toilet added	DG	GT	09.03.2015
P1	Preliminary	DG	GT	06.03.2015

Rev	Amendment	Drm	Chkd	Date
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Drig Status Preliminary

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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	Drig No	Rev
X152002	200	P8


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Seacourt Tower	Begbrook Innovation	
West Way Oxford	Accelerator	
OX2 0JJ	Soakaway	
Date 14/09/2015 16:48	Designed by KL	
File SOAKAWAY.SRCX	Checked by GT	
Micro Drainage	Source Control 2014.1.1	

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 (m ³)	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 (m ³)	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

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Seacourt Tower	Begbrook Innovation	
West Way Oxford	Accelerator	
OX2 0JJ	Soakaway	
Date 14/09/2015 16:48	Designed by KL	
File SOAKAWAY.SRCX	Checked by GT	
Micro Drainage	Source Control 2014.1.1	

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	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 (m ³)	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

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Seacourt Tower	Begbrook Innovation	
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OX2 0JJ	Soakaway	
Date 14/09/2015 16:48	Designed by KL	
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Micro Drainage	Source Control 2014.1.1	

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 (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	120.0	120.0	1.300	0.0	201.6
1.200	120.0	201.6			