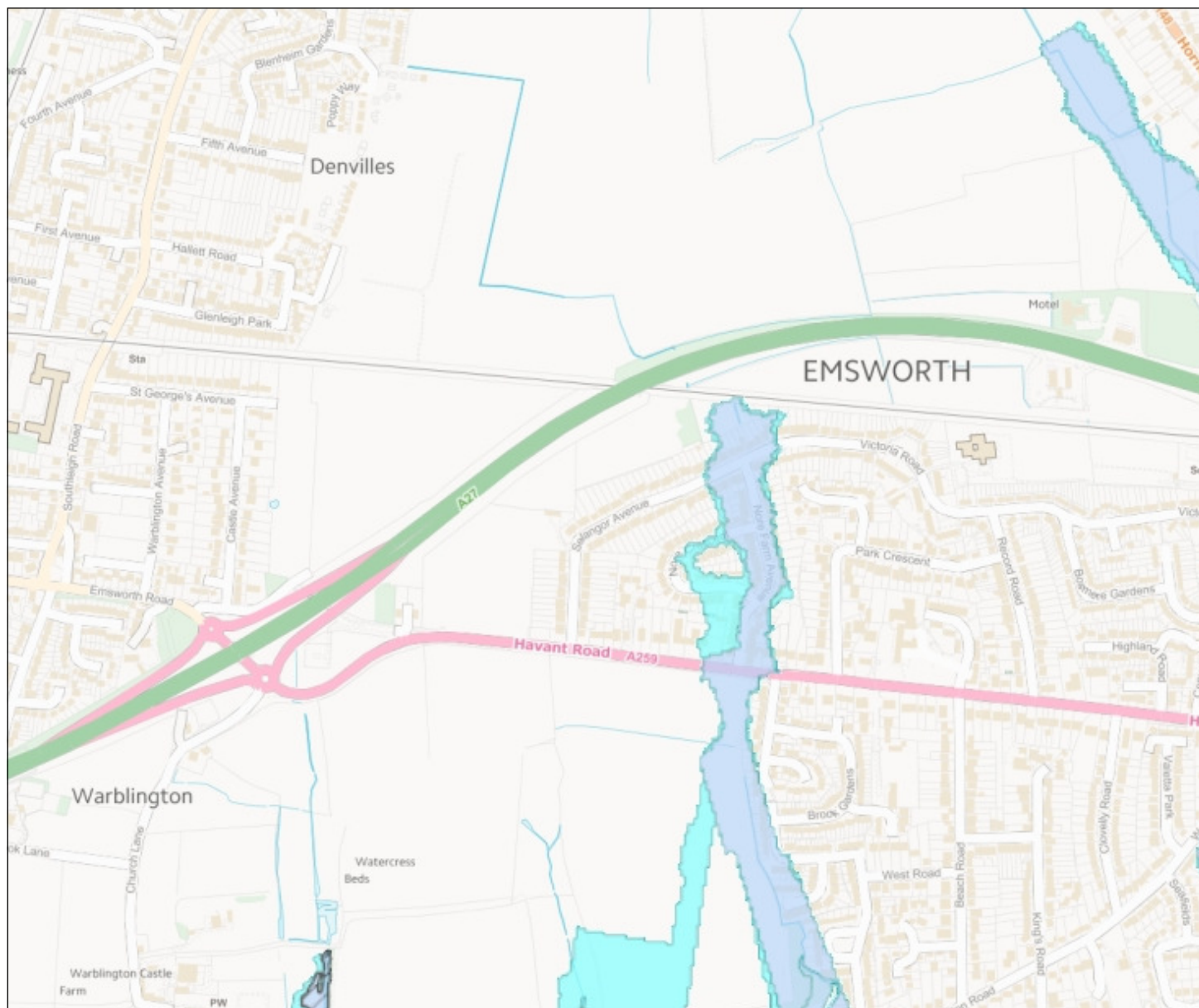


Appendix 4 – Environment Agency Product 4 Flood Risk Information

- Flood Map for Planning (Rivers and Seas)
- Risk of Flooding from Surface Water
- Surface Water Depths - 1 in 30
- Surface Water Depths - 1 in 100
- Surface Water Depths - 1 in 1000

Flood Map for Planning (Rivers and Sea) Centered on Havant Road - Created 03 February 2016



Scale 1: 10,001



Flood Map for Planning (Rivers & Sea)

- Flood Map - Defences
- Area Benefitting from Flood Defences
- Flood Map - Flood Storage Area
- Flood Zone 3
- Flood Zone 2

Flood Map Areas (assuming no defences)

Flood Zone 3 shows the area that could be affected by flooding:

- from the sea with a 1 in 200 or greater chance of happening each year
- or from a river with a 1 in 100 or greater chance of happening each year.

Flood Zone 2 shows the extent of an extreme flood from rivers or the sea with up to a 1 in 1000 chance of occurring each year.

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Risk of flooding from Surface Water



Scale 1: 10,001



Likelihood of flooding from Surface Water

- High (1 in 30yr)
- Medium (1 in 100yr)
- Low (1 in 1000yr)
- Very Low

Likelihood of flooding from Surface Water

- High:** Greater than or equal to 1 in 30 (3.3%) chance in any given year
- Medium:** Less than 1 in 30 (3.3%) but greater than or equal to 1 in 100 (1%) chance in any given year
- Low:** Less than 1 in 100 (1%) but greater than or equal to 1 in 1,000 (0.1%) chance in any given year
- Very Low:** Less than 1 in 1,000 (0.1%) chance in any given year

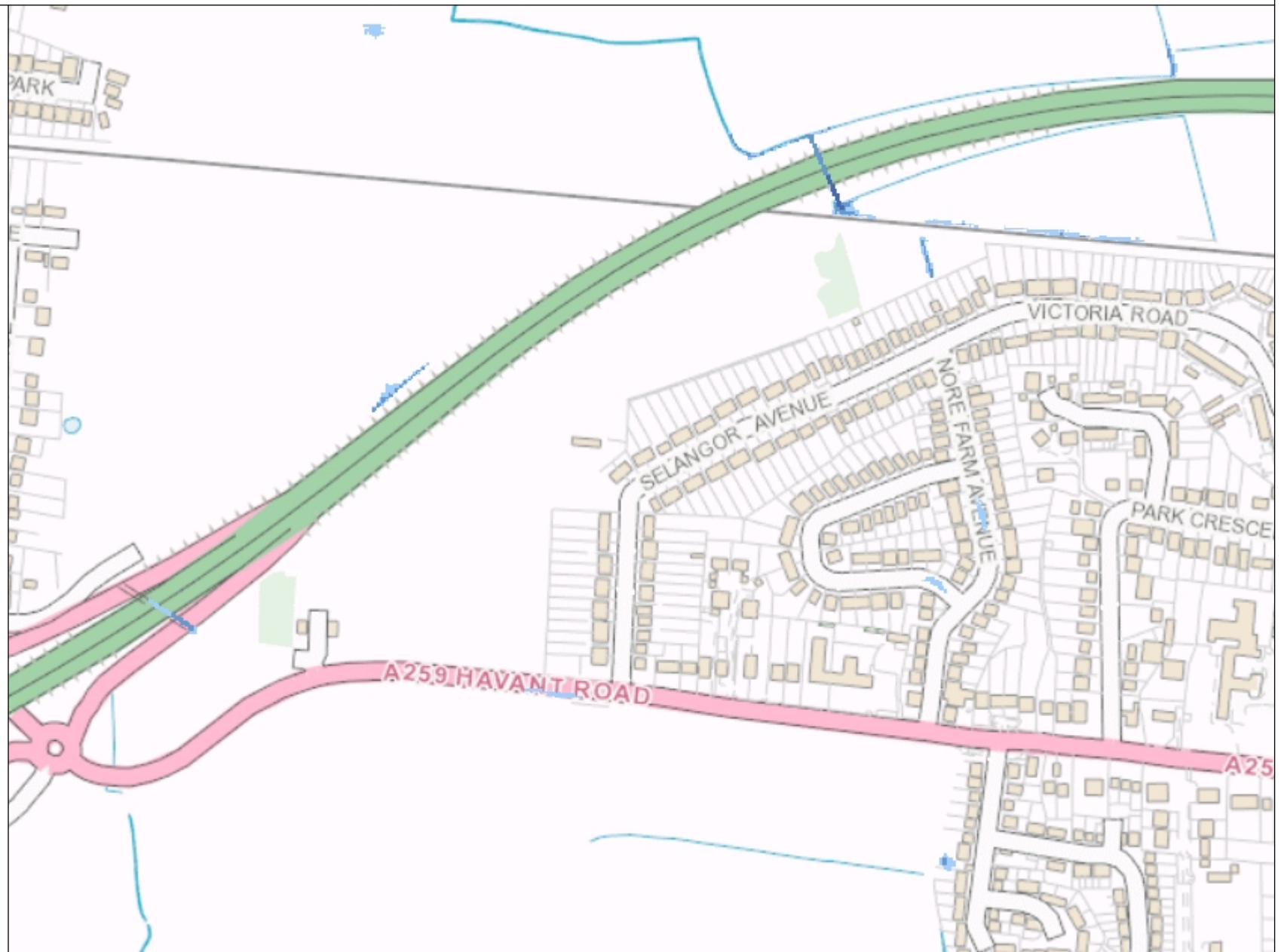
This information is shown on the Risk of Flooding from Surface Water map on our website.

Surface Water Depths Centered on Havant Road - Created 03 February 2016

Legend

Flood Depth 1 in 30

- Below 150mm
- 150-300mm
- 300-600mm
- 600-900mm
- 900-1200mm
- Over 1200mm



0 50 100 150
Metres

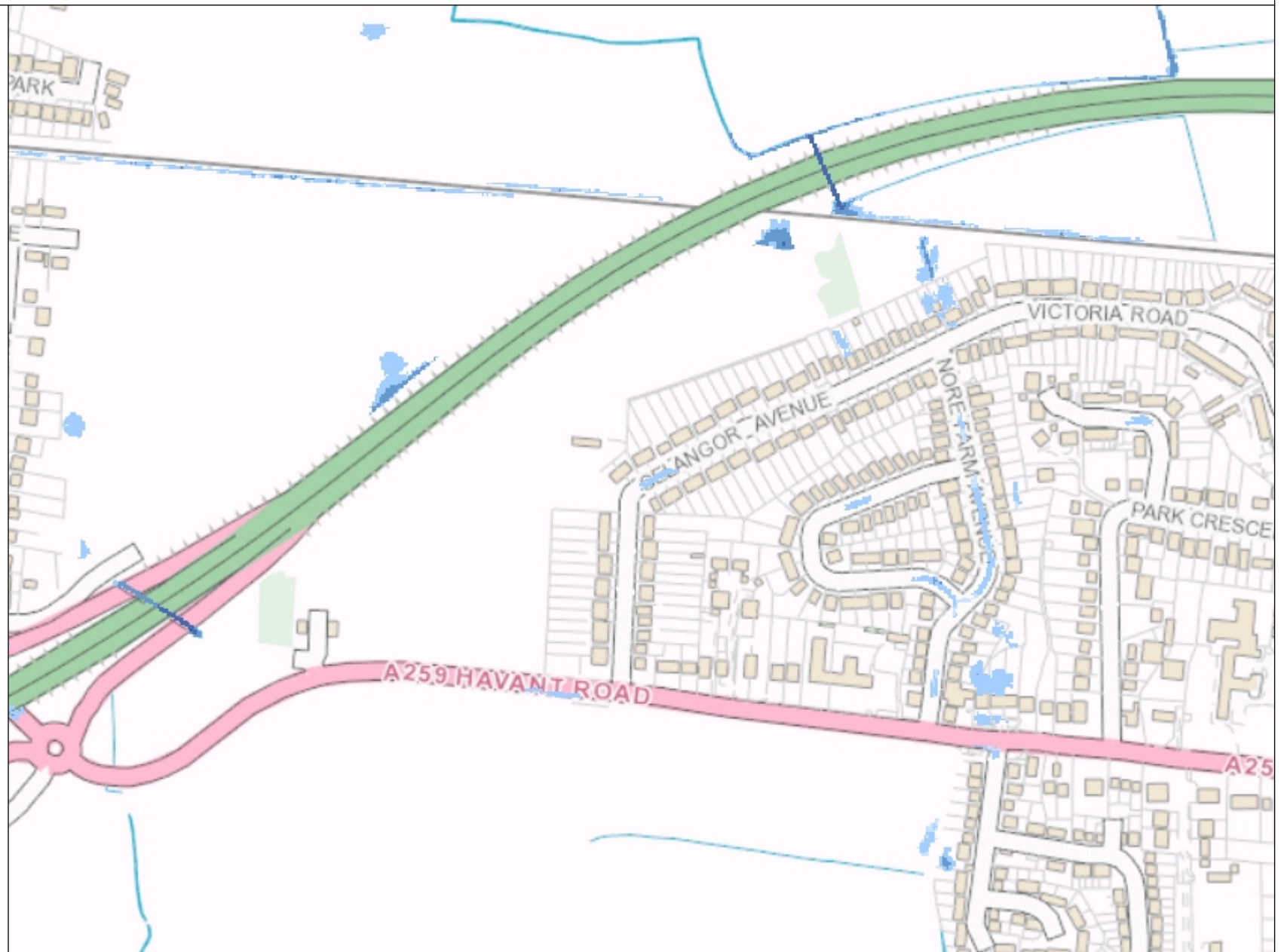


Surface Water Depths Centered on Havant Road - Created 03 February 2016

Legend

Flood Depth 1 in 100

- Below 150mm
- 150-300mm
- 300-600mm
- 600-900mm
- 900-1200mm
- Over 1200mm



0 50 100 150
Metres

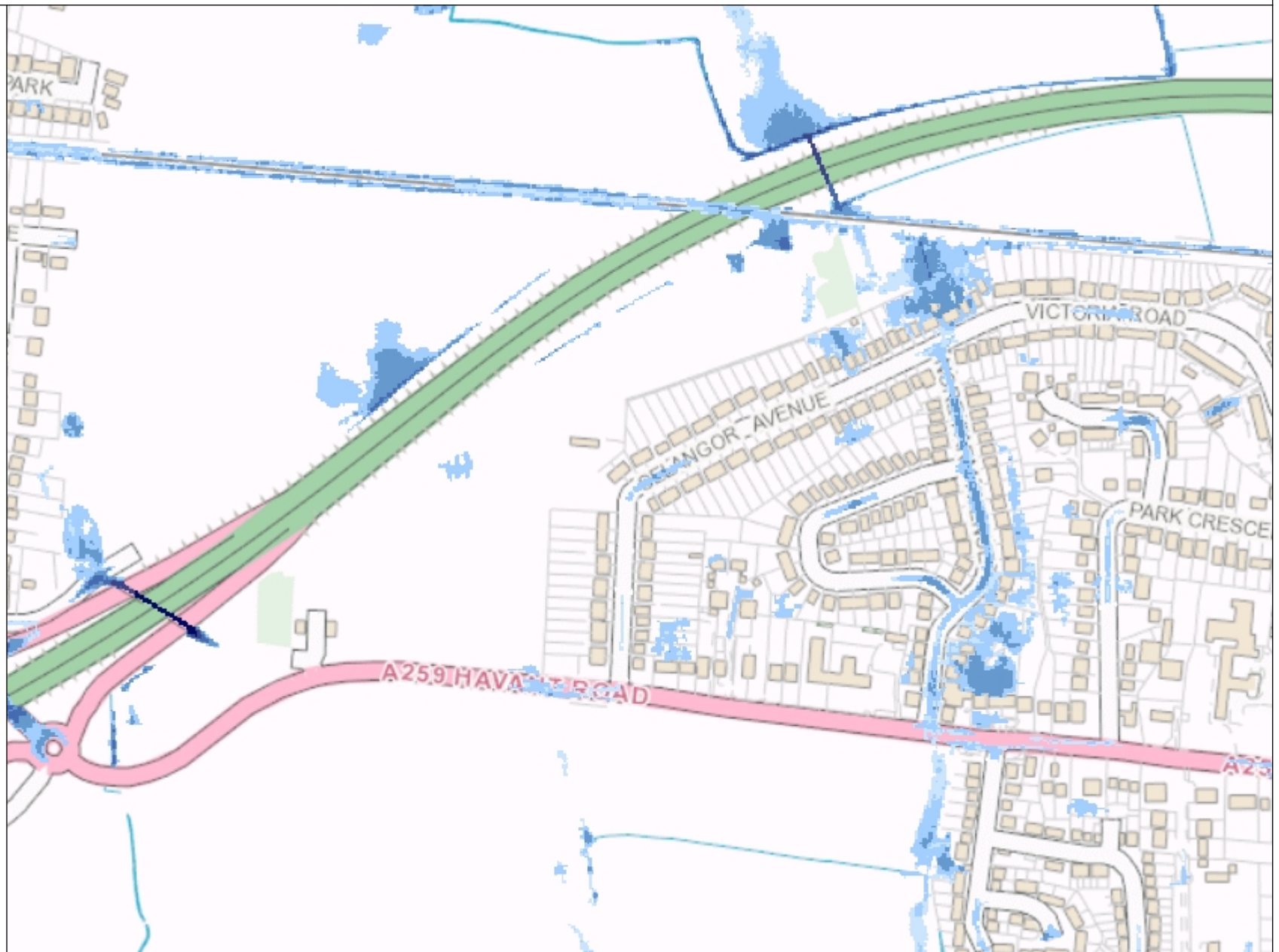


Surface Water Depths Centered on Havant Road - Created 03 February 2016

Legend

Flood Depth 1 in 1000

- Below 150mm
- 150-300mm
- 300-600mm
- 600-900mm
- 900-1200mm
- Over 1200mm



0 50 100 150
Metres



Appendix 5 – Flood Risk and Drainage Policy Review

National Planning Policy Framework

The Government's national policy on Development and Flood Risk is covered by the National Planning Policy Framework March 2012 and its associated Technical Guidance. The principal aim of the NPPF for flood risk is:

"Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk, but where development is necessary, making it safe without increasing flood risk elsewhere."

The Technical Guidance to the NPPF March 2012 sets out the sequential approach to development and flood risk and the responsibilities of key stakeholders in assessing flood risk. With regard to the sequential approach it states:

"The overall aim should be to steer new development to Flood Zone 1. Where there are no reasonably available sites in Flood Zone 1, local planning authorities allocating land in local plans or determining planning applications for development at any particular location should take into account the flood risk vulnerability of land uses (see table 2) and consider reasonably available sites in Flood Zone 2, applying the Exception Test if required (see table 3). Only where there are no reasonably available sites in Flood Zones 1 or 2 should the suitability of sites in Flood Zone 3 be considered, taking into account the flood risk vulnerability of land uses and applying the Exception Test if required."

The tables relating to flood risk vulnerability classification and flood zone compatibility are included in Appendix 6 below.

Central Government Written Statement to Parliament on Sustainable Drainage Systems, 18 December 2014

In absence of implementation of Section 3 of the Flood and Water Management Act 2010 relating to National Standards, Approving Bodies and Mandatory Adoption for sustainable drainage the Secretary of State for Communities and Local Government has instructed Local Planning Authorities to ensure that sustainable drainage systems for the management of run-off are put in place, unless demonstrated to be inappropriate and that there are clear arrangements in place for ongoing maintenance over the lifetime of the development.

The new guidance took effect on 6 April 2015 and include all major development as defined by Article 2(1) of the Town and Country Planning (Development Management Procedure) (England) Order 2010).

Update from Environment Agency on Flood Risk Assessments: Climate Change Allowances, 19 February 2016

The Environment Agency issued an update on previous climate change allowances to support the National Planning Policy Framework, effective from 19th February 2016. The updated guidance includes an increase in peak rainfall intensity allowance to 40% to account for climate change for small and urban catchments.

Havant Borough Core Strategy, March 2011

The Havant Borough Core Strategy is part of the borough's Local Development Framework [HBLDF] and sets an overall policy framework for all other local development documents. The Core Strategy was adopted on 1st March 2011 and as part of the HBLDF will guide the development of the borough until 2026.

Section 1.06 states: “[The Core Strategy] contains strategic policies and some detailed development management policies against which individual planning applications will be assessed. When considering planning applications the council will consider all the policies contained in the Core Strategy that are relevant to the proposal.”

Policy CS15 Flood and Coastal Erosion Risk states:

“Development in areas at risk of flooding now and in the future as identified on the latest Environment Agency flood risk maps and Strategic Flood Risk Assessment climate change maps will only be permitted where:

- 1. It meets the sequential and exception test (where required) in relation to PPS25.*
- 2. The site is located in a low hazard area as defined in the Strategic Flood Risk Assessment.*
- 3. A site-specific flood risk assessment demonstrates that the development will be safe, including the access, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.*
- 4. The scheme incorporates flood protection, flood resilience and resistance measures appropriate to the character and biodiversity of the area and the specific requirements of the site.*
- 5. Appropriate flood warning and evacuation plans are in place.*
- 6. New site drainage systems are designed taking account of events which exceed the normal design standard.*

All development will be required to ensure that there is no net increase in surface water run off. Priority should be given to incorporating Sustainable Drainage Systems (SuDS) to manage surface water drainage, unless it is proven that SuDS are not appropriate. Where SuDS are provided arrangements must be put in place for their whole life management and maintenance.

The council will work with partners to implement the Coastal Policy Zones in the North Solent Shoreline Management Plan to ensure that development avoids areas at risk from coastal erosion and coastal flooding and that areas required to offset coastal squeeze and prevent habitat fragmentation, to allow species to adapt to climate change, are identified and protected from development.”

Havant Borough Local Plan (Allocations), July 2014

The Allocations Plan was adopted on 23rd July 2014 and as part of the HBLDF will guide the development of the borough until 2026.

Policy DM25 states: “Planning permission will be granted for developments within the Emsworth urban area boundary that can demonstrate how post development runoff has been reduced by the greatest percentage rates and volumes that are possible in the context of cost, technical feasibility and viability.”

Havant Borough Local Plan Housing Statement, December 2016

Yet to be adopted, the Housing Statement identifies the requirement for new housing within Havant Borough. The proposed site is listed (reference ‘UW02b’), and as such is subject to the remainder of the policies listed in the Adopted Local Plan and Guiding Principles listed within the Housing Statement.

PUSH Strategic Flood Risk Assessment, December 2007

The Strategic Flood Risk Assessment was produced for the Partnership for Urban South Hampshire.

Section 4.2.1 states: *“Output Package 1 [of the SFRA] is intended to assist in the application of the Sequential test, by providing information to guide decisions on location of future development in relation to areas of flood risk and, more specifically, the Flood Zones.”*

The above package has been consulted in this Flood Risk Assessment.

Hampshire Local Flood Risk Management Strategy, July 2013

The Local Flood Risk Management Strategy (LFRMS) was produced to aid in the understanding and management of flood risk across the county.

The LFRMS identifies Emsworth and Selangor Avenue as subjects of previous instances of flooding.

Hampshire Groundwater Management Plan, October 2013

The Groundwater Management Plan establishes the risk of groundwater flooding throughout Hampshire.

Havant has previously been identified (in the LFRMS) as being at risk of groundwater flooding, however previous causes of flooding in the borough have not been attributable to groundwater therefore it is not addressed within this Plan.

Emsworth Flood Risk Strategy Review, October 2015

The area surrounding the site is identified as being affected by flooding.

Section 1.2 states: *“Emsworth is one of the Borough’s few urban areas to suffer from flooding. The settlement is located on the coast and includes the Nore Farm Stream, the West Brook and the River Ems. Over recent years, extreme weather and high tides have resulted in a high frequency of flood events, which have affected local residents and businesses and caused considerable damage to properties. These flood events were caused by a combination of fluvial and tidal influences and principally affected Selangor Avenue, Victoria Road, North Street and Bridge Road in Emsworth.”*

Policy DM25 from the Local Plan (allocations) is applicable to all new developments within Emsworth.

The proposed alleviation schemes for Emsworth are mentioned and the Nore Farm Stream Flood Alleviation Scheme is highlighted – this has been taken into account in this Flood Risk Assessment.

North Solent Coastline Management Plan, December 2010

The North Solent Coastline Management Plan was completed on 16th December 2010 and assesses risks associated with coastal flooding and shoreline evolution at a large scale.

The site has no specific mention in the policy statement maps.

Appendix 6 – NPPF Technical Guidance Tables 2 & 3

Table 2: Flood Risk Vulnerability Classification

Essential Infrastructure • Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk. • Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including electricity generating power stations and grid and primary substations; and water treatment works that need to remain operational in times of flood. • Wind turbines.
Highly Vulnerable • Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding. • Emergency dispersal points. • Basement dwellings. • Caravans, mobile homes and park homes intended for permanent residential use. • Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'Essential Infrastructure').
More Vulnerable • Hospitals • Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels. • Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels. • Non-residential uses for health services, nurseries and educational establishments. • Landfill* and sites used for waste management facilities for hazardous waste. • Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.

Less Vulnerable

- Police, ambulance and fire stations which are not required to be operational during flooding.
- Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'More Vulnerable' class; and assembly and leisure.
- Land and buildings used for agriculture and forestry.
- Waste treatment (except landfill* and hazardous waste facilities).
- Minerals working and processing (except for sand and gravel working).
- Water treatment works which do not need to remain operational during times of flood.
- Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.

Water-Compatible Development

- Flood control infrastructure.
- Water transmission infrastructure and pumping stations.
- Sewage transmission infrastructure and pumping stations.
- Sand and gravel working.
- Docks, marinas and wharves.
- Navigation facilities.
- Ministry of Defence defence installations.
- Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.
- Water-based recreation (excluding sleeping accommodation).
- Lifeguard and coastguard stations.
- Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.
- Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

Table 3: Flood Risk Vulnerability and Flood Risk Zone ‘Compatibility’

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	X	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	X	X	X	✓*

Key:

✓ Development is appropriate

X Development should not be permitted.

Notes to table 3:

- This table does not show the application of the Sequential Test which should be applied first to guide development to Flood Zone 1, then Zone 2, and then Zone 3; nor does it reflect the need to avoid flood risk from sources other than rivers and the sea;
- The Sequential and Exception Tests do not need to be applied to minor developments and changes of use, except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site;
- Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

† In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

* In Flood Zone 3b (functional floodplain) essential infrastructure that has to be there and has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows and not increase flood risk elsewhere.

Appendix 7 – Greenfield Runoff and SuDS Storage Calculations

- Greenfield Runoff to IH 124
- SuDS Component Sizing Summary and Micro Drainage Reports
 - Car Park Permeable Paving Areas
 - Road Permeable Paving
 - Road Swales
- Conveyance Drainage Network Model Schematic and Micro Drainage Reports

CUNDALL	JOB NUMBER / FILE:		CALCULATION NUMBER:		DRAWING REFERENCE:	
	1012052		CAL-CL001			
JOB TITLE:	REV	CALCULATION BY:	DATE	CHECKED BY	VERIFIED BY:	
Land at Havant Road, Emsworth	0	LK	05/05/16	AMF	AMF	
CALCULATION:	1	LK	21/04/17	AMF	AMF	
	2					
Greenfield Runoff						

CALCULATIONS:

Surface water storage requirement

Existing site	Total site area (m ²)	63000	
Hard standing	Area (m ²)		Area (m ²)
No hard standing on existing site		Greenfield land	63000
			63000

Existing Greenfield Run-off

Based on site size of 63000m², IH124 Method selected.

The screenshot displays the 'Rural Runoff Calculator' window. The 'IH 124' method is selected. The 'IH 124 Input' section contains the following fields: Return Period (Years) set to 1, Area (ha) set to 50.000, SAAR (mm) set to 700, Soil set to 0.400, and Growth Curve set to (None). The 'Partly Urbanised Catchment (QBAR)' section shows Urban set to 0.000 and Region set to Region 7. The 'Results' section shows QBAR rural (l/s) as 170.1 and QBAR urban (l/s) as 170.1. Below this is a 'Return Period Flood' table with columns for Region, QBAR (l/s), and Q for return periods of 1, 2, 5, and 10 years. The table lists values for Region 1 through Region 9. At the bottom, there are 'OK', 'Cancel', and 'Help' buttons, and a note: 'Enter Return Period between 1 and 1000'.

Region	QBAR (l/s)	Q (1yrs) (l/s)	Q (2 yrs) (l/s)	Q (5 yrs) (l/s)	Q (10 yrs) (l/s)
Region 1	170.1	144.6	144.6	154.6	204.1
Region 2	170.1	148.0	148.0	155.5	200.7
Region 3	170.1	146.3	146.3	160.5	212.6
Region 4	170.1	141.2	141.2	152.5	209.2
Region 5	170.1	148.0	148.0	152.0	219.4
Region 6/Region 7	170.1	144.6	144.6	149.9	217.7
Region 8	170.1	132.7	132.7	150.3	209.2
Region 9	170.1	149.7	149.7	158.0	205.8

CUNDALL	JOB NUMBER / FILE:		CALCULATION NUMBER:		DRAWING REFERENCE:	
	1012052		CAL-CL001			
JOB TITLE:	REV	CALCULATION BY:	DATE	CHECKED BY	VERIFIED BY:	
Land at Havant Road, Emsworth	0	LK	05/05/16	AMF	AMF	
CALCULATION:	1	LK	21/04/17	AMF	AMF	
	2					
Greenfield Runoff						

CALCULATIONS:

REF

OUTPUT

Rural Runoff Calculator

Micro Drainage

IH 124

IH 124 Input

Return Period (Years) 1

Area (ha) 50.000

SAAR (mm) 700

Soil 0.400

Growth Curve (None)

Partly Urbanised Catchment (QBAR)

Urban 0.000

Region Region 7

Calculate

Results

QBAR rural (l/s) 170.1

QBAR urban (l/s) 170.1

Return Period Flood

Region	QBAR (l/s)	Q (20 yrs) (l/s)	Q (25 yrs) (l/s)	Q (30 yrs) (l/s)	Q (50 yrs) (l/s)	Q (100 yrs) (l/s)
Region 1	170.1	290.7	307.6	321.4	361.3	421.9
Region 2	170.1	290.5	308.2	322.7	369.8	447.4
Region 3	170.1	279.4	290.2	299.0	322.2	353.8
Region 4	170.1	302.4	319.5	333.3	374.6	437.2
Region 5	170.1	355.7	384.8	408.7	483.5	605.6
Region 6/Region 7	170.1	340.8	365.4	385.5	445.7	542.7
Region 8	170.1	297.6	312.3	324.3	360.3	411.7
Region 9	170.1	277.5	289.9	299.9	329.3	370.9

OK Cancel Help

Enter Return Period between 1 and 1000

IH124 Method is used for areas of 50ha, therefore values factored down for site area:

Storm Return Period	(l/s)
QBAR	21.4
1 Year	18.2
2 Years	18.9
5 Years	27.4
10 Years	34.7
20 Years	42.9
50 Years	56.2
100 Years	68.4

For all soft-standing area for a 1 in 1 year event, Q1 = 18.2 l/s, Qbar = 21.4 l/s

Greenfield runoff rate = 18.2 l/s (1 in 1 year event)

Greenfield runoff for drainage areas A & B only (C to infiltrate to ground)

Approx. area of site within drainage areas A & B: 36033 m² = 3.6 ha

Approx. area of site kept as free-draining soft landscaping: 14389 m² = 1.44 ha

CUNDALL	JOB NUMBER / FILE:		CALCULATION NUMBER:		DRAWING REFERENCE:	
	1012052		CAL-CL001			
JOB TITLE: Land at Havant Road, Emsworth	REV	CALCULATION BY:	DATE	CHECKED BY	VERIFIED BY:	
	0	LK	05/05/16	AMF	AMF	
CALCULATION: Greenfield Runoff	1	LK	21/04/17	AMF	AMF	
	2					

CALCULATIONS:

REF				OUTPUT
	Storm Return Period	Flow Rate for Areas A & B (l/s)	Flow Rate for soft landscaping (l/s)	
	QBAR	12.3	4.9	
	1 Year	10.4	4.2	
	2 Years	10.8	4.3	
	5 Years	15.7	6.3	
	10 Years	19.9	7.9	
	20 Years	24.6	9.8	
	50 Years	32.1	12.8	
	100 Years	39.1	15.6	
	Greenfield runoff rate for areas A&B only = 12.3 l/s (QBAR)			

CUNDALL	JOB NUMBER / FILE:		CALCULATION NUMBER:		DRAWING REFERENCE:
	1012052		-		CLXX(52)2001 & 2002
JOB TITLE:	REV	CALCULATION BY:	DATE	CHECKED BY	VERIFIED BY:
Land at Havant Road, Emsworth	0	AC	01/03/17	AMF	AMF
CALCULATION:	1	LK	16/05/17	AMF	AMF
	2				
Soakaway Design Summary					

CALCULATIONS:							
SOAKAWAY REFERENCE	TYPE	TRIAL PIT REF	INFILTRATION RATE (m/s)	DRAINED AREA (m ²) + 10% URBAN CREEP	SIZE - PLAN AREA (m ²)	STORAGE DEPTH (mm)	TOTAL DEPTH (mm)
Area 1: Permeable Road 1 + interlinked driveways	Permeable Paving	Not infiltrating to ground		694	321	300	500
Area 2: Permeable Road 2 + Car Park 3 + Car Park 11 + Car Park 12 + interlinked driveways	Permeable Paving	Not infiltrating to ground		4543	2315	350	550
Area 3: Permeable Road 3 + Car Park 1 + Car Park 2 + interlinked driveways	Permeable Paving	Not infiltrating to ground		3090	1375	300	500
Area 4: Permeable Road 4 + Car Park 4 + Car Park 5 + Car Park 6 + Car Park 7 + interlinked driveways	Permeable Paving	Not infiltrating to ground		4711	2307	350	550
Permeable Road 5A	Permeable Paving	TP S9	5.20E-06	505	339	265	465
Permeable Road 5B	Perm. Paving + Permavoid	TP S9	5.20E-06	1833	968	300	500
Permeable Road 6	Permeable Paving	TP S10	9.20E-06	451	149	560	760
Car Park 8	Perm. Paving + Permavoid	TP S9	5.20E-06	947	348	450	650
Car Park 9	Permeable Paving	TP S10	9.20E-06	975	450	400	600
Car Park 10	Permeable Paving	TP S10	9.20E-06	391	187	350	550
Car Park 13	Permeable Paving	TP S9	5.20E-06	262	100	580	780
Road SA	Road Trench Soakaway	TP S9	5.20E-06	1293	70x3+38x3.6	300	500
Swale 1	Dry Swale	Not infiltrating to ground		663	16.5 x 3.3	300	600
Swale 2	Dry Swale	Not infiltrating to ground		393	29.1 x 3.3	300	600
Swale 3	Dry Swale	Not infiltrating to ground		270	15.2 x 3.3	300	600
Swale 4	Dry Swale	Not infiltrating to ground		266	11.2 x 3.3	300	600
Swale 5	Dry Swale	Not infiltrating to ground		1026	62.2 x 3.3	300	600
Swale 6	Dry Swale	Not infiltrating to ground		839	36.1 x 3.3	300	600
Swale 7	Dry Swale	Not infiltrating to ground		899	39.0 x 3.3	300	600

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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG		Havant Road, Emsworth SUDs Drainage Car Park 8			
Date 16/05/17 File Car Park 8.srcx		Designed by LK/AC Checked by AMF			
Micro Drainage		Source Control 2015.1			
Summary of Results for 100 year Return Period (+40%)					
Half Drain Time : 619 minutes.					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	0.122	0.122	0.9	23.6	0 K
30 min Summer	0.152	0.152	0.9	29.4	0 K
60 min Summer	0.180	0.180	0.9	36.1	0 K
120 min Summer	0.212	0.212	0.9	43.5	0 K
180 min Summer	0.230	0.230	0.9	47.8	0 K
240 min Summer	0.242	0.242	0.9	50.7	0 K
360 min Summer	0.257	0.257	0.9	54.1	0 K
480 min Summer	0.264	0.264	0.9	55.7	0 K
600 min Summer	0.268	0.268	0.9	56.6	0 K
720 min Summer	0.270	0.270	0.9	57.2	0 K
960 min Summer	0.257	0.257	0.9	54.1	0 K
1440 min Summer	0.233	0.233	0.9	48.5	0 K
2160 min Summer	0.202	0.202	0.9	41.1	0 K
2880 min Summer	0.174	0.174	0.9	34.6	0 K
4320 min Summer	0.137	0.137	0.9	26.5	0 K
5760 min Summer	0.103	0.103	0.9	19.9	0 K
7200 min Summer	0.078	0.078	0.9	15.0	0 K
8640 min Summer	0.060	0.060	0.9	11.6	0 K
10080 min Summer	0.050	0.050	0.9	9.7	0 K
15 min Winter	0.138	0.138	0.9	26.7	0 K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
15 min Summer	145.315	0.0	19		
30 min Summer	90.424	0.0	33		
60 min Summer	56.268	0.0	64		
120 min Summer	35.013	0.0	122		
180 min Summer	26.529	0.0	182		
240 min Summer	21.787	0.0	242		
360 min Summer	16.508	0.0	360		
480 min Summer	13.557	0.0	466		
600 min Summer	11.637	0.0	518		
720 min Summer	10.272	0.0	584		
960 min Summer	8.045	0.0	702		
1440 min Summer	5.701	0.0	968		
2160 min Summer	4.040	0.0	1364		
2880 min Summer	3.164	0.0	1760		
4320 min Summer	2.343	0.0	2508		
5760 min Summer	1.893	0.0	3224		
7200 min Summer	1.604	0.0	3896		
8640 min Summer	1.401	0.0	4576		
10080 min Summer	1.250	0.0	5152		
15 min Winter	145.315	0.0	19		
©1982-2015 XP Solutions					

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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG		Havant Road, Emsworth SUDs Drainage Car Park 8			
Date 16/05/17 File Car Park 8.srcx		Designed by LK/AC Checked by AMF			
Micro Drainage		Source Control 2015.1			
Summary of Results for 100 year Return Period (+40%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	0.168	0.168	0.9	33.2	0 K
60 min Winter	0.201	0.201	0.9	40.8	0 K
120 min Winter	0.237	0.237	0.9	49.4	0 K
180 min Winter	0.259	0.259	0.9	54.5	0 K
240 min Winter	0.273	0.273	0.9	58.0	0 K
360 min Winter	0.292	0.292	0.9	62.3	0 K
480 min Winter	0.302	0.302	0.9	64.7	0 K
600 min Winter	0.308	0.308	0.9	66.0	0 K
720 min Winter	0.310	0.310	0.9	66.5	0 K
960 min Winter	0.292	0.292	0.9	62.4	0 K
1440 min Winter	0.261	0.261	0.9	54.9	0 K
2160 min Winter	0.215	0.215	0.9	44.1	0 K
2880 min Winter	0.174	0.174	0.9	34.6	0 K
4320 min Winter	0.114	0.114	0.9	22.1	0 K
5760 min Winter	0.068	0.068	0.9	13.1	0 K
7200 min Winter	0.048	0.048	0.9	9.3	0 K
8640 min Winter	0.042	0.042	0.8	8.2	0 K
10080 min Winter	0.038	0.038	0.7	7.3	0 K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
30 min Winter	90.424	0.0	33		
60 min Winter	56.268	0.0	62		
120 min Winter	35.013	0.0	120		
180 min Winter	26.529	0.0	178		
240 min Winter	21.787	0.0	236		
360 min Winter	16.508	0.0	350		
480 min Winter	13.557	0.0	462		
600 min Winter	11.637	0.0	572		
720 min Winter	10.272	0.0	672		
960 min Winter	8.045	0.0	754		
1440 min Winter	5.701	0.0	1054		
2160 min Winter	4.040	0.0	1492		
2880 min Winter	3.164	0.0	1876		
4320 min Winter	2.343	0.0	2636		
5760 min Winter	1.893	0.0	3232		
7200 min Winter	1.604	0.0	3752		
8640 min Winter	1.401	0.0	4496		
10080 min Winter	1.250	0.0	5240		
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Cundall, Johnston & Partners		Page 3
19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Car Park 8	
Date 16/05/17 File Car Park 8.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage		Source Control 2015.1

Rainfall Details

Rainfall Model	FEH	F (1km)	2.263
Return Period (years)	100	Summer Storms	Yes
Site Location	GB 473800 105650	Winter Storms	Yes
C (1km)	-0.029	Cv (Summer)	0.750
D1 (1km)	0.449	Cv (Winter)	0.840
D2 (1km)	0.284	Shortest Storm (mins)	15
D3 (1km)	0.392	Longest Storm (mins)	10080
E (1km)	0.311	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.095

Time (mins)	Area	Time (mins)	Area
From: To: (ha)		From: To: (ha)	
0 2 0.038		2 4 0.057	

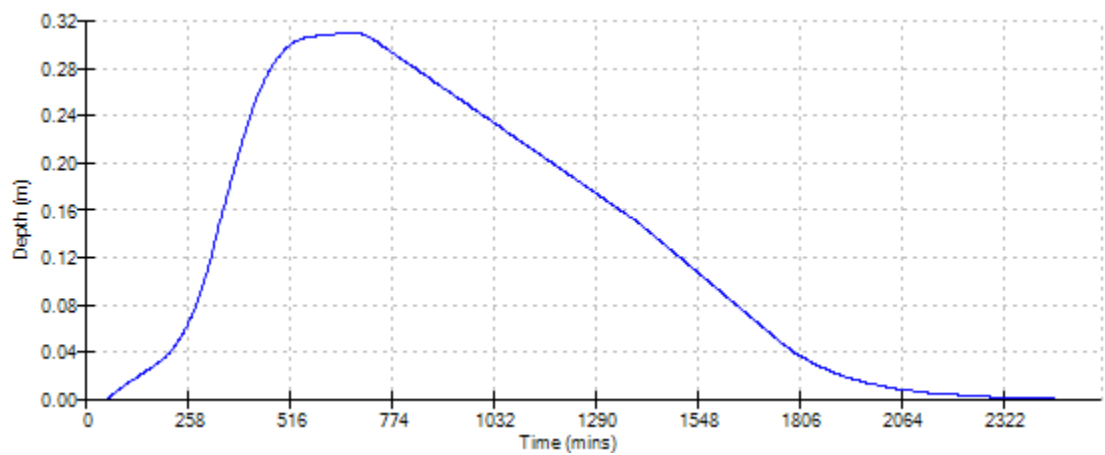
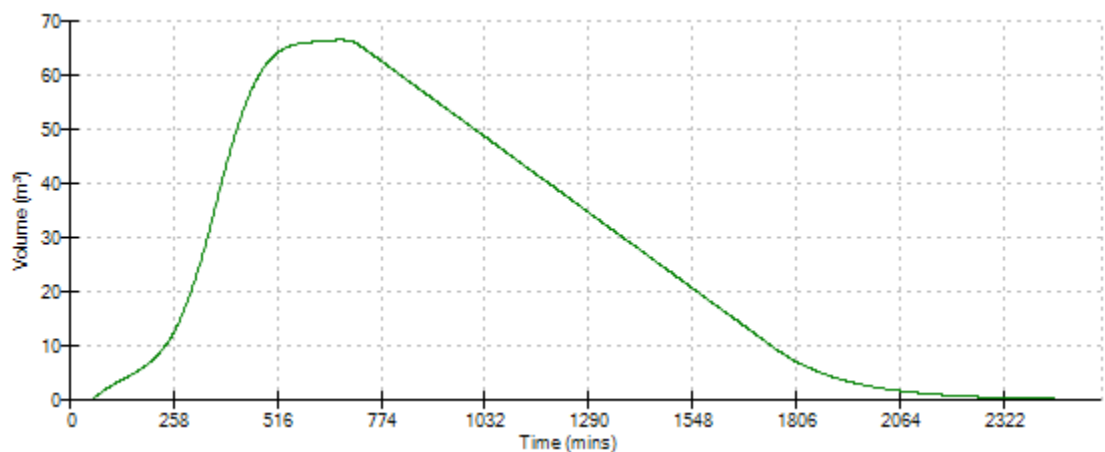
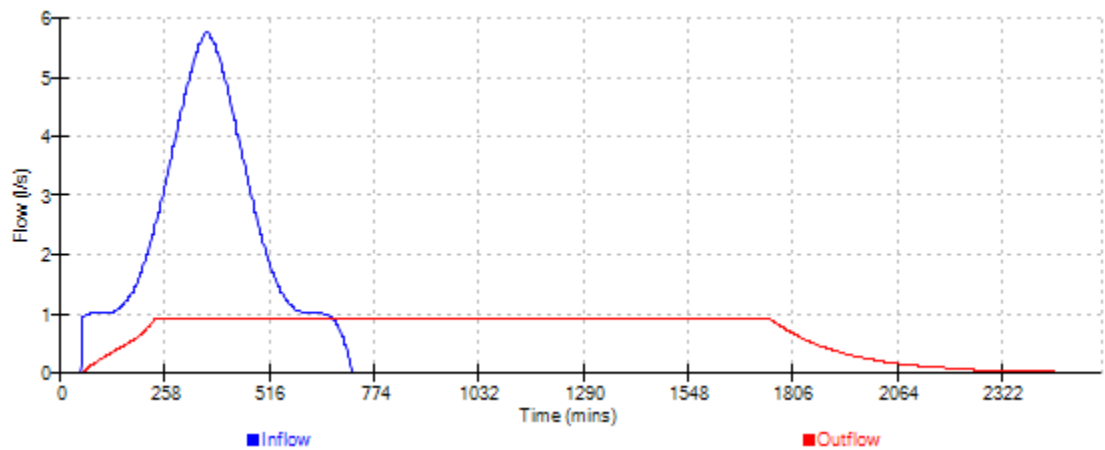
Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area
From: To: (ha)	
0 4 0.000	

Cundall, Johnston & Partners		Page 4												
19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Car Park 8													
Date 16/05/17 File Car Park 8.srcx	Designed by LK/AC Checked by AMF													
Micro Drainage														
Source Control 2015.1														
Model Details Storage is Online Cover Level (m) 0.650 Complex Structure Porous Car Park Infiltration Coefficient Base (m/hr) 0.01872 Membrane Percolation (mm/hr) 500 Max Percolation (l/s) 29.2 Safety Factor 2.0 Porosity 0.30 Invert Level (m) 0.000 Width (m) 8.8 Length (m) 23.9 Slope (1:X) 100000.0 Depression Storage (mm) 3 Evaporation (mm/day) 1 Cap Volume Depth (m) 0.150 Cellular Storage Invert Level (m) 0.000 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.01872 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>137.0</td><td>137.0</td><td>0.150</td><td>137.0</td><td>137.0</td></tr></table> Porous Car Park Infiltration Coefficient Base (m/hr) 0.00000 Membrane Percolation (mm/hr) 500 Max Percolation (l/s) 48.4 Safety Factor 2.0 Porosity 0.30 Invert Level (m) 0.150 Width (m) 39.6 Length (m) 8.8 Slope (1:X) 100000.0 Depression Storage (mm) 3 Evaporation (mm/day) 1 Cap Volume Depth (m) 0.300			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	137.0	137.0	0.150	137.0	137.0
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)									
0.000	137.0	137.0	0.150	137.0	137.0									
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Event: 720 min Winter



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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG			Havant Road, Emsworth SUDs Drainage Car Park 9			
Date 16/05/17 File Car Park 9.srcx			Designed by LK/AC Checked by AMF			
Micro Drainage			Source Control 2015.1			
Summary of Results for 100 year Return Period (+40%)						
Half Drain Time : 192 minutes.						
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	
15 min Summer	0.177	0.177	2.1	23.6	0 K	
30 min Summer	0.215	0.215	2.1	28.7	0 K	
60 min Summer	0.254	0.254	2.1	34.0	0 K	
120 min Summer	0.285	0.285	2.1	38.2	0 K	
180 min Summer	0.295	0.295	2.1	39.6	0 K	
240 min Summer	0.300	0.300	2.1	40.2	0 K	
360 min Summer	0.301	0.301	2.1	40.3	Flood Risk	
480 min Summer	0.296	0.296	2.1	39.7	0 K	
600 min Summer	0.289	0.289	2.1	38.8	0 K	
720 min Summer	0.281	0.281	2.1	37.7	0 K	
960 min Summer	0.241	0.241	2.1	32.3	0 K	
1440 min Summer	0.175	0.175	2.1	23.4	0 K	
2160 min Summer	0.104	0.104	2.1	13.8	0 K	
2880 min Summer	0.063	0.063	2.1	8.2	0 K	
4320 min Summer	0.043	0.043	1.8	5.6	0 K	
5760 min Summer	0.035	0.035	1.5	4.5	0 K	
7200 min Summer	0.030	0.030	1.3	3.8	0 K	
8640 min Summer	0.027	0.027	1.1	3.3	0 K	
10080 min Summer	0.024	0.024	1.0	2.9	0 K	
15 min Winter	0.200	0.200	2.1	26.7	0 K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)			
15 min Summer	145.315	0.0	18			
30 min Summer	90.424	0.0	33			
60 min Summer	56.268	0.0	62			
120 min Summer	35.013	0.0	120			
180 min Summer	26.529	0.0	158			
240 min Summer	21.787	0.0	192			
360 min Summer	16.508	0.0	258			
480 min Summer	13.557	0.0	328			
600 min Summer	11.637	0.0	398			
720 min Summer	10.272	0.0	466			
960 min Summer	8.045	0.0	598			
1440 min Summer	5.701	0.0	852			
2160 min Summer	4.040	0.0	1192			
2880 min Summer	3.164	0.0	1524			
4320 min Summer	2.343	0.0	2204			
5760 min Summer	1.893	0.0	2936			
7200 min Summer	1.604	0.0	3672			
8640 min Summer	1.401	0.0	4384			
10080 min Summer	1.250	0.0	5136			
15 min Winter	145.315	0.0	18			
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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Car Park 9	
Date 16/05/17 File Car Park 9.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage	Source Control 2015.1	

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	0.243	0.243	2.1	32.6	0 K
60 min Winter	0.289	0.289	2.1	38.7	0 K
120 min Winter	0.329	0.329	2.1	44.2	Flood Risk
180 min Winter	0.344	0.344	2.1	46.2	Flood Risk
240 min Winter	0.348	0.348	2.1	46.7	Flood Risk
360 min Winter	0.346	0.346	2.1	46.5	Flood Risk
480 min Winter	0.338	0.338	2.1	45.4	Flood Risk
600 min Winter	0.325	0.325	2.1	43.6	Flood Risk
720 min Winter	0.310	0.310	2.1	41.6	Flood Risk
960 min Winter	0.252	0.252	2.1	33.7	0 K
1440 min Winter	0.154	0.154	2.1	20.6	0 K
2160 min Winter	0.062	0.062	2.1	8.1	0 K
2880 min Winter	0.043	0.043	1.8	5.5	0 K
4320 min Winter	0.032	0.032	1.3	4.0	0 K
5760 min Winter	0.026	0.026	1.1	3.2	0 K
7200 min Winter	0.022	0.022	0.9	2.7	0 K
8640 min Winter	0.019	0.019	0.8	2.3	0 K
10080 min Winter	0.017	0.017	0.7	2.0	0 K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	90.424	0.0	32
60 min Winter	56.268	0.0	60
120 min Winter	35.013	0.0	118
180 min Winter	26.529	0.0	172
240 min Winter	21.787	0.0	222
360 min Winter	16.508	0.0	278
480 min Winter	13.557	0.0	356
600 min Winter	11.637	0.0	434
720 min Winter	10.272	0.0	508
960 min Winter	8.045	0.0	646
1440 min Winter	5.701	0.0	896
2160 min Winter	4.040	0.0	1192
2880 min Winter	3.164	0.0	1500
4320 min Winter	2.343	0.0	2204
5760 min Winter	1.893	0.0	2944
7200 min Winter	1.604	0.0	3648
8640 min Winter	1.401	0.0	4264
10080 min Winter	1.250	0.0	5136

Cundall, Johnston & Partners		Page 3
19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Car Park 9	
Date 16/05/17 File Car Park 9.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage	Source Control 2015.1	

Rainfall Details

Rainfall Model	FEH	F (1km)	2.263
Return Period (years)	100	Summer Storms	Yes
Site Location	GB 473800 105650	Winter Storms	Yes
C (1km)	-0.029	Cv (Summer)	0.750
D1 (1km)	0.449	Cv (Winter)	0.840
D2 (1km)	0.284	Shortest Storm (mins)	15
D3 (1km)	0.392	Longest Storm (mins)	10080
E (1km)	0.311	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.097

Time (mins)	Area	Time (mins)	Area
From: To: (ha)		From: To: (ha)	
0 2 0.050		2 4 0.047	

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area
From: To: (ha)	
0 4 0.000	

Cundall, Johnston & Partners		Page 4																								
19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Car Park 9																									
Date 16/05/17 File Car Park 9.srcx	Designed by LK/AC Checked by AMF																									
Micro Drainage Source Control 2015.1																										
<u>Model Details</u> Storage is Online Cover Level (m) 0.600 <u>Porous Car Park Structure</u> <table> <tr> <td>Infiltration Coefficient Base (m/hr)</td> <td>0.03312</td> <td>Width (m)</td> <td>10.9</td> </tr> <tr> <td>Membrane Percolation (mm/hr)</td> <td>500</td> <td>Length (m)</td> <td>41.3</td> </tr> <tr> <td>Max Percolation (l/s)</td> <td>62.5</td> <td>Slope (1:X)</td> <td>10000.0</td> </tr> <tr> <td>Safety Factor</td> <td>2.0</td> <td>Depression Storage (mm)</td> <td>3</td> </tr> <tr> <td>Porosity</td> <td>0.30</td> <td>Evaporation (mm/day)</td> <td>1</td> </tr> <tr> <td>Invert Level (m)</td> <td>0.000</td> <td>Cap Volume Depth (m)</td> <td>0.400</td> </tr> </table>			Infiltration Coefficient Base (m/hr)	0.03312	Width (m)	10.9	Membrane Percolation (mm/hr)	500	Length (m)	41.3	Max Percolation (l/s)	62.5	Slope (1:X)	10000.0	Safety Factor	2.0	Depression Storage (mm)	3	Porosity	0.30	Evaporation (mm/day)	1	Invert Level (m)	0.000	Cap Volume Depth (m)	0.400
Infiltration Coefficient Base (m/hr)	0.03312	Width (m)	10.9																							
Membrane Percolation (mm/hr)	500	Length (m)	41.3																							
Max Percolation (l/s)	62.5	Slope (1:X)	10000.0																							
Safety Factor	2.0	Depression Storage (mm)	3																							
Porosity	0.30	Evaporation (mm/day)	1																							
Invert Level (m)	0.000	Cap Volume Depth (m)	0.400																							
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Henderson Place Lane
Edinburgh EH3 5DG

Havant Road, Emsworth
SUDs Drainage
Car Park 9

Date 16/05/17

Designed by LK/AC

File Car Park 9.srcx

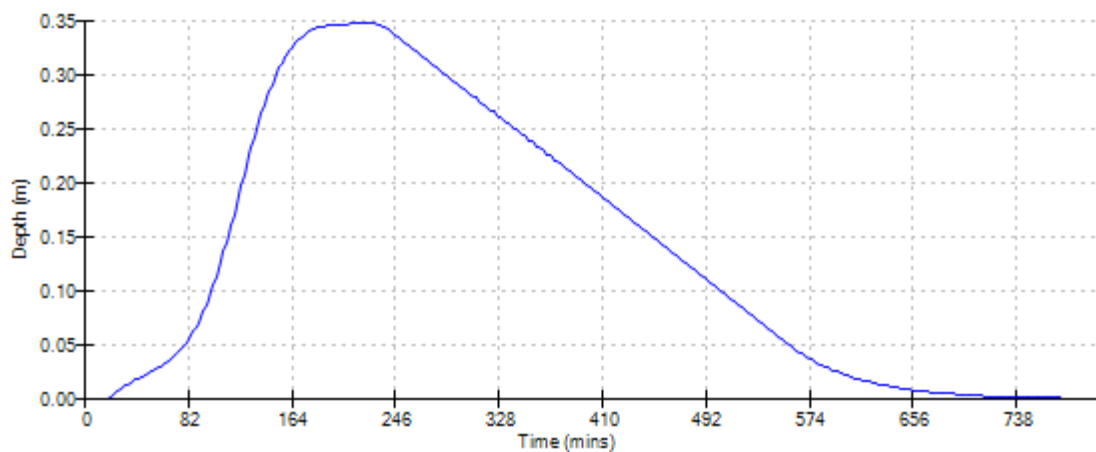
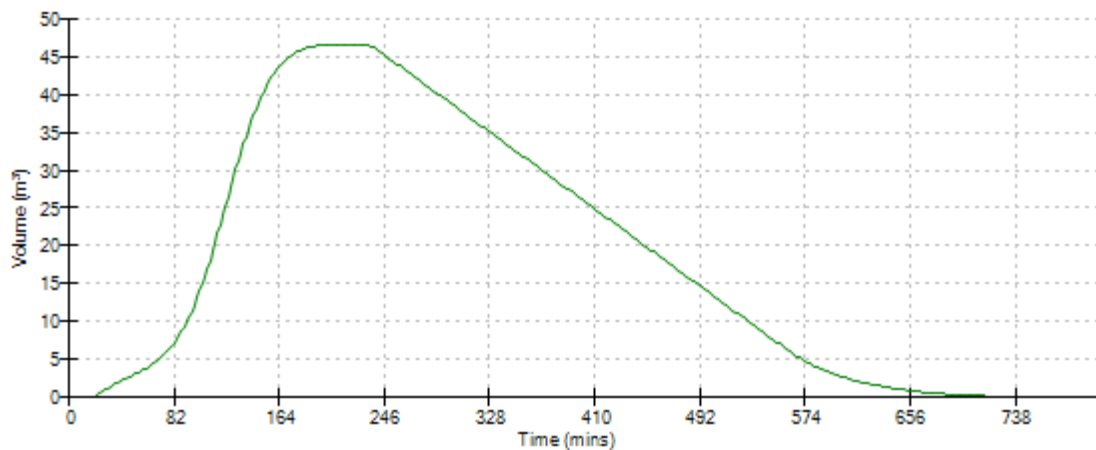
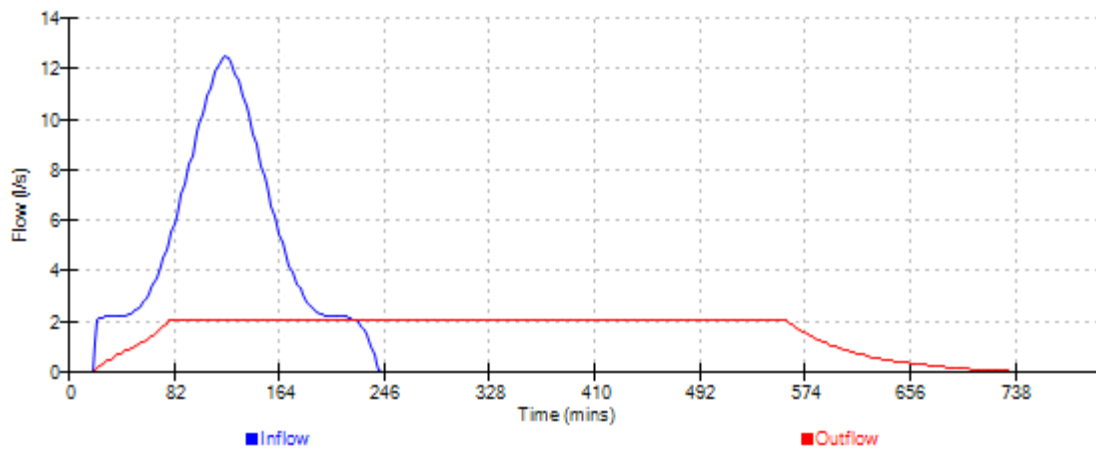
Checked by AMF



Micro Drainage

Source Control 2015.1

Event: 240 min Winter



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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG			Havant Road, Emsworth SUDs Drainage Car Park 10			
Date 16/05/17 File Car Park 10.srcx			Designed by LK/AC Checked by AMF			
Micro Drainage			Source Control 2015.1			
Summary of Results for 100 year Return Period (+40%)						
Half Drain Time : 183 minutes.						
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	
15 min Summer	0.170	0.170	0.9	9.4	0 K	
30 min Summer	0.206	0.206	0.9	11.5	0 K	
60 min Summer	0.244	0.244	0.9	13.6	0 K	
120 min Summer	0.273	0.273	0.9	15.2	Flood Risk	
180 min Summer	0.283	0.283	0.9	15.8	Flood Risk	
240 min Summer	0.287	0.287	0.9	16.0	Flood Risk	
360 min Summer	0.287	0.287	0.9	16.0	Flood Risk	
480 min Summer	0.283	0.283	0.9	15.8	Flood Risk	
600 min Summer	0.275	0.275	0.9	15.4	Flood Risk	
720 min Summer	0.267	0.267	0.9	14.9	Flood Risk	
960 min Summer	0.228	0.228	0.9	12.7	0 K	
1440 min Summer	0.164	0.164	0.9	9.1	0 K	
2160 min Summer	0.096	0.096	0.9	5.3	0 K	
2880 min Summer	0.059	0.059	0.9	3.2	0 K	
4320 min Summer	0.042	0.042	0.7	2.3	0 K	
5760 min Summer	0.034	0.034	0.6	1.8	0 K	
7200 min Summer	0.029	0.029	0.5	1.6	0 K	
8640 min Summer	0.026	0.026	0.4	1.4	0 K	
10080 min Summer	0.023	0.023	0.4	1.2	0 K	
15 min Winter	0.192	0.192	0.9	10.7	0 K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)			
15 min Summer	145.315	0.0	18			
30 min Summer	90.424	0.0	32			
60 min Summer	56.268	0.0	62			
120 min Summer	35.013	0.0	120			
180 min Summer	26.529	0.0	156			
240 min Summer	21.787	0.0	188			
360 min Summer	16.508	0.0	256			
480 min Summer	13.557	0.0	326			
600 min Summer	11.637	0.0	394			
720 min Summer	10.272	0.0	464			
960 min Summer	8.045	0.0	596			
1440 min Summer	5.701	0.0	850			
2160 min Summer	4.040	0.0	1188			
2880 min Summer	3.164	0.0	1500			
4320 min Summer	2.343	0.0	2204			
5760 min Summer	1.893	0.0	2936			
7200 min Summer	1.604	0.0	3672			
8640 min Summer	1.401	0.0	4400			
10080 min Summer	1.250	0.0	5136			
15 min Winter	145.315	0.0	18			
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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG			Havant Road, Emsworth SUDs Drainage Car Park 10			
Date 16/05/17 File Car Park 10.srcx			Designed by LK/AC Checked by AMF			
Micro Drainage			Source Control 2015.1			
Summary of Results for 100 year Return Period (+40%)						
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	
30 min Winter	0.234	0.234	0.9	13.1	0 K	
60 min Winter	0.278	0.278	0.9	15.5	Flood Risk	
120 min Winter	0.316	0.316	0.9	17.6	Flood Risk	
180 min Winter	0.329	0.329	0.9	18.4	Flood Risk	
240 min Winter	0.332	0.332	0.9	18.5	Flood Risk	
360 min Winter	0.331	0.331	0.9	18.5	Flood Risk	
480 min Winter	0.321	0.321	0.9	18.0	Flood Risk	
600 min Winter	0.308	0.308	0.9	17.2	Flood Risk	
720 min Winter	0.293	0.293	0.9	16.3	Flood Risk	
960 min Winter	0.235	0.235	0.9	13.1	0 K	
1440 min Winter	0.141	0.141	0.9	7.8	0 K	
2160 min Winter	0.056	0.056	0.9	3.1	0 K	
2880 min Winter	0.042	0.042	0.7	2.3	0 K	
4320 min Winter	0.031	0.031	0.5	1.7	0 K	
5760 min Winter	0.025	0.025	0.4	1.3	0 K	
7200 min Winter	0.021	0.021	0.4	1.1	0 K	
8640 min Winter	0.019	0.019	0.3	1.0	0 K	
10080 min Winter	0.017	0.017	0.3	0.9	0 K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)			
30 min Winter	90.424	0.0	32			
60 min Winter	56.268	0.0	60			
120 min Winter	35.013	0.0	118			
180 min Winter	26.529	0.0	172			
240 min Winter	21.787	0.0	220			
360 min Winter	16.508	0.0	276			
480 min Winter	13.557	0.0	354			
600 min Winter	11.637	0.0	432			
720 min Winter	10.272	0.0	506			
960 min Winter	8.045	0.0	644			
1440 min Winter	5.701	0.0	894			
2160 min Winter	4.040	0.0	1168			
2880 min Winter	3.164	0.0	1488			
4320 min Winter	2.343	0.0	2204			
5760 min Winter	1.893	0.0	2912			
7200 min Winter	1.604	0.0	3672			
8640 min Winter	1.401	0.0	4312			
10080 min Winter	1.250	0.0	5064			
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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Car Park 10	
Date 16/05/17 File Car Park 10.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage	Source Control 2015.1	

Rainfall Details

Rainfall Model	FEH	F (1km)	2.263
Return Period (years)	100	Summer Storms	Yes
Site Location	GB 473800 105650	Winter Storms	Yes
C (1km)	-0.029	Cv (Summer)	0.750
D1 (1km)	0.449	Cv (Winter)	0.840
D2 (1km)	0.284	Shortest Storm (mins)	15
D3 (1km)	0.392	Longest Storm (mins)	10080
E (1km)	0.311	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.039

Time (mins)	Area	Time (mins)	Area
From: To: (ha)		From: To: (ha)	
0 2 0.021		2 4 0.018	

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area
From: To: (ha)	
0 4 0.000	

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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Car Park 10																									
Date 16/05/17 File Car Park 10.srcx	Designed by LK/AC Checked by AMF																									
Micro Drainage	Source Control 2015.1																									
Model Details Storage is Online Cover Level (m) 0.550 Porous Car Park Structure <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.03312</td><td>Width (m)</td><td>6.8</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>500</td><td>Length (m)</td><td>27.5</td></tr><tr><td>Max Percolation (l/s)</td><td>26.0</td><td>Slope (1:X)</td><td>10000.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Depression Storage (mm)</td><td>3</td></tr><tr><td>Porosity</td><td>0.30</td><td>Evaporation (mm/day)</td><td>1</td></tr><tr><td>Invert Level (m)</td><td>0.000</td><td>Cap Volume Depth (m)</td><td>0.350</td></tr></table>			Infiltration Coefficient Base (m/hr)	0.03312	Width (m)	6.8	Membrane Percolation (mm/hr)	500	Length (m)	27.5	Max Percolation (l/s)	26.0	Slope (1:X)	10000.0	Safety Factor	2.0	Depression Storage (mm)	3	Porosity	0.30	Evaporation (mm/day)	1	Invert Level (m)	0.000	Cap Volume Depth (m)	0.350
Infiltration Coefficient Base (m/hr)	0.03312	Width (m)	6.8																							
Membrane Percolation (mm/hr)	500	Length (m)	27.5																							
Max Percolation (l/s)	26.0	Slope (1:X)	10000.0																							
Safety Factor	2.0	Depression Storage (mm)	3																							
Porosity	0.30	Evaporation (mm/day)	1																							
Invert Level (m)	0.000	Cap Volume Depth (m)	0.350																							
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Henderson Place Lane
Edinburgh EH3 5DG

Havant Road, Emsworth
SUDs Drainage
Car Park 10

Date 16/05/17

Designed by LK/AC

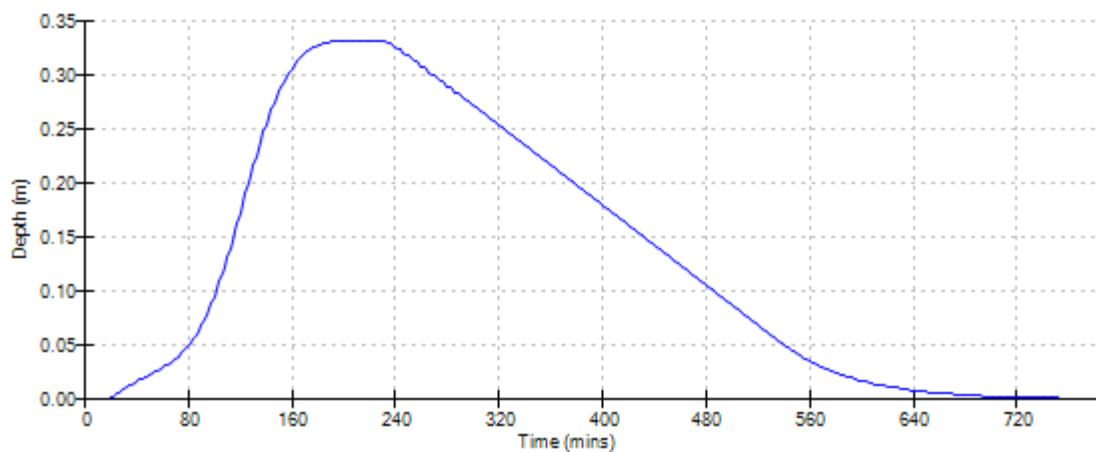
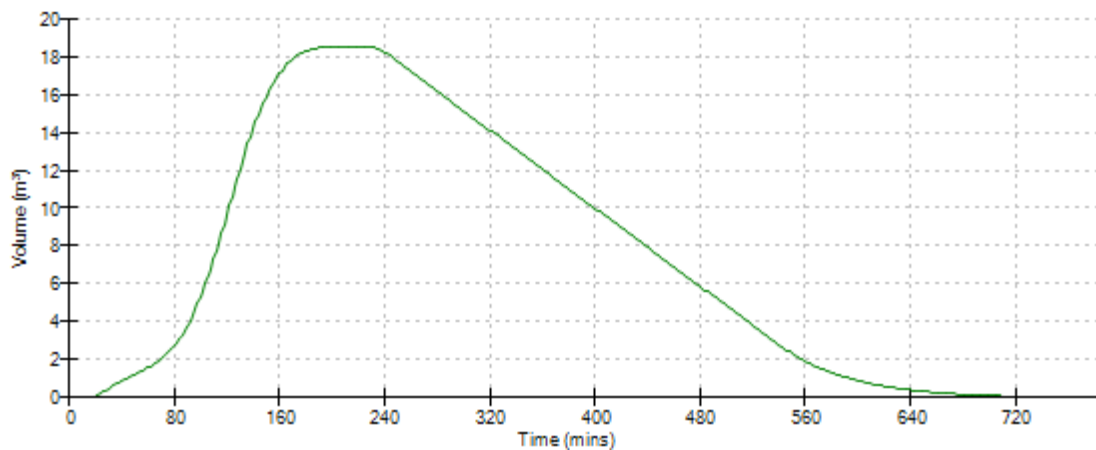
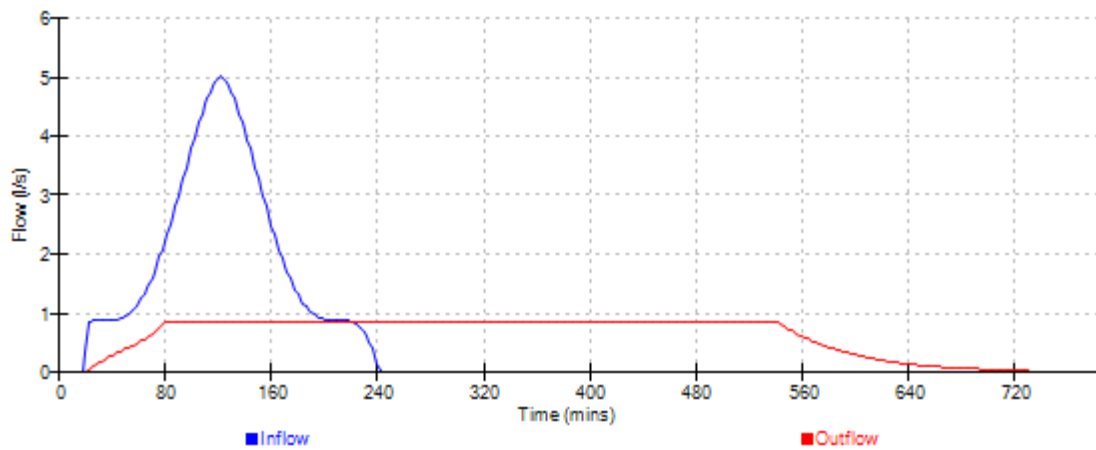
File Car Park 10.srcx

Checked by AMF



Micro Drainage

Source Control 2015.1

Event: 240 min Winter

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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG			Havant Road, Emsworth SUDs Drainage Car Park 13			
Date 16/05/17 File Car Park 13.srcx			Designed by LK Checked by AMF			
Micro Drainage			Source Control 2015.1			
Summary of Results for 100 year Return Period (+40%)						
Half Drain Time : 563 minutes.						
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	
15 min Summer	0.220	0.220	0.3	6.6	0 K	
30 min Summer	0.272	0.272	0.3	8.1	0 K	
60 min Summer	0.332	0.332	0.3	9.9	0 K	
120 min Summer	0.396	0.396	0.3	11.8	0 K	
180 min Summer	0.432	0.432	0.3	12.9	0 K	
240 min Summer	0.454	0.454	0.3	13.6	0 K	
360 min Summer	0.479	0.479	0.3	14.3	0 K	
480 min Summer	0.488	0.488	0.3	14.6	Flood Risk	
600 min Summer	0.493	0.493	0.3	14.8	Flood Risk	
720 min Summer	0.495	0.495	0.3	14.8	Flood Risk	
960 min Summer	0.463	0.463	0.3	13.9	0 K	
1440 min Summer	0.407	0.407	0.3	12.2	0 K	
2160 min Summer	0.336	0.336	0.3	10.0	0 K	
2880 min Summer	0.274	0.274	0.3	8.2	0 K	
4320 min Summer	0.197	0.197	0.3	5.9	0 K	
5760 min Summer	0.136	0.136	0.3	4.0	0 K	
7200 min Summer	0.091	0.091	0.3	2.7	0 K	
8640 min Summer	0.064	0.064	0.3	1.9	0 K	
10080 min Summer	0.050	0.050	0.3	1.5	0 K	
15 min Winter	0.249	0.249	0.3	7.4	0 K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)			
15 min Summer	145.315	0.0	19			
30 min Summer	90.424	0.0	33			
60 min Summer	56.268	0.0	64			
120 min Summer	35.013	0.0	122			
180 min Summer	26.529	0.0	182			
240 min Summer	21.787	0.0	242			
360 min Summer	16.508	0.0	360			
480 min Summer	13.557	0.0	448			
600 min Summer	11.637	0.0	506			
720 min Summer	10.272	0.0	572			
960 min Summer	8.045	0.0	692			
1440 min Summer	5.701	0.0	954			
2160 min Summer	4.040	0.0	1360			
2880 min Summer	3.164	0.0	1732			
4320 min Summer	2.343	0.0	2504			
5760 min Summer	1.893	0.0	3176			
7200 min Summer	1.604	0.0	3824			
8640 min Summer	1.401	0.0	4496			
10080 min Summer	1.250	0.0	5144			
15 min Winter	145.315	0.0	19			
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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG			Havant Road, Emsworth SUDs Drainage Car Park 13			
Date 16/05/17 File Car Park 13.srcx			Designed by LK Checked by AMF			
Micro Drainage			Source Control 2015.1			
Summary of Results for 100 year Return Period (+40%)						
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	
30 min Winter	0.307	0.307	0.3	9.2	0 K	
60 min Winter	0.375	0.375	0.3	11.2	0 K	
120 min Winter	0.450	0.450	0.3	13.5	0 K	
180 min Winter	0.493	0.493	0.3	14.8	Flood Risk	
240 min Winter	0.522	0.522	0.3	15.6	Flood Risk	
360 min Winter	0.556	0.556	0.3	16.7	Flood Risk	
480 min Winter	0.573	0.573	0.3	17.2	Flood Risk	
600 min Winter	0.579	0.579	0.3	17.4	Flood Risk	
720 min Winter	0.580	0.580	0.3	17.4	Flood Risk	
960 min Winter	0.538	0.538	0.3	16.1	Flood Risk	
1440 min Winter	0.462	0.462	0.3	13.8	0 K	
2160 min Winter	0.357	0.357	0.3	10.7	0 K	
2880 min Winter	0.266	0.266	0.3	7.9	0 K	
4320 min Winter	0.148	0.148	0.3	4.4	0 K	
5760 min Winter	0.070	0.070	0.3	2.1	0 K	
7200 min Winter	0.047	0.047	0.2	1.4	0 K	
8640 min Winter	0.041	0.041	0.2	1.2	0 K	
10080 min Winter	0.037	0.037	0.2	1.1	0 K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)			
30 min Winter	90.424	0.0	33			
60 min Winter	56.268	0.0	62			
120 min Winter	35.013	0.0	120			
180 min Winter	26.529	0.0	178			
240 min Winter	21.787	0.0	236			
360 min Winter	16.508	0.0	350			
480 min Winter	13.557	0.0	460			
600 min Winter	11.637	0.0	568			
720 min Winter	10.272	0.0	666			
960 min Winter	8.045	0.0	748			
1440 min Winter	5.701	0.0	1042			
2160 min Winter	4.040	0.0	1472			
2880 min Winter	3.164	0.0	1872			
4320 min Winter	2.343	0.0	2592			
5760 min Winter	1.893	0.0	3176			
7200 min Winter	1.604	0.0	3680			
8640 min Winter	1.401	0.0	4416			
10080 min Winter	1.250	0.0	5104			
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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Car Park 13	
Date 16/05/17 File Car Park 13.srcx	Designed by LK Checked by AMF	
Micro Drainage	Source Control 2015.1	

Rainfall Details

Rainfall Model	FEH	F (1km)	2.263
Return Period (years)	100	Summer Storms	Yes
Site Location	GB 473800 105650	Winter Storms	Yes
C (1km)	-0.029	Cv (Summer)	0.750
D1 (1km)	0.449	Cv (Winter)	0.840
D2 (1km)	0.284	Shortest Storm (mins)	15
D3 (1km)	0.392	Longest Storm (mins)	10080
E (1km)	0.311	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.026

Time (mins)	Area	Time (mins)	Area
From: To: (ha)		From: To: (ha)	
0 2 0.011		2 4 0.015	

Time Area Diagram

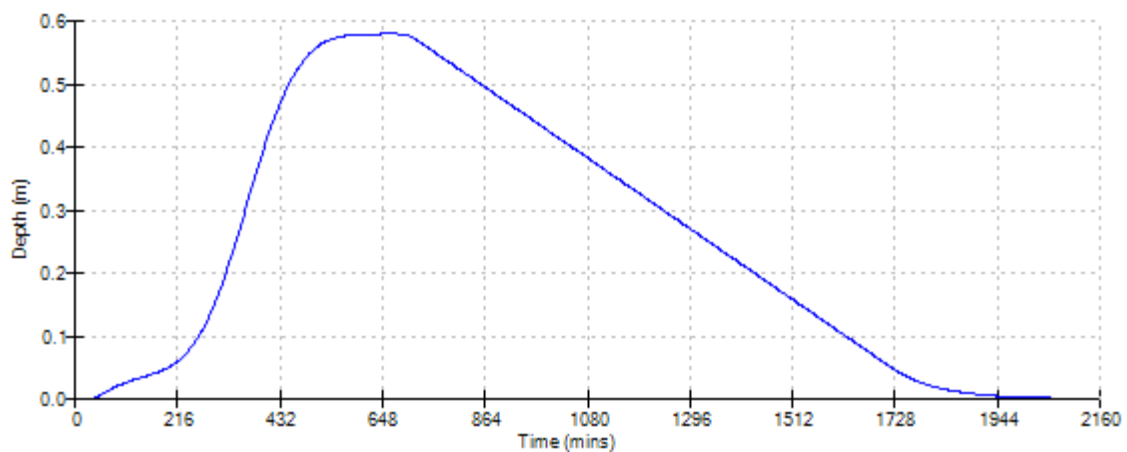
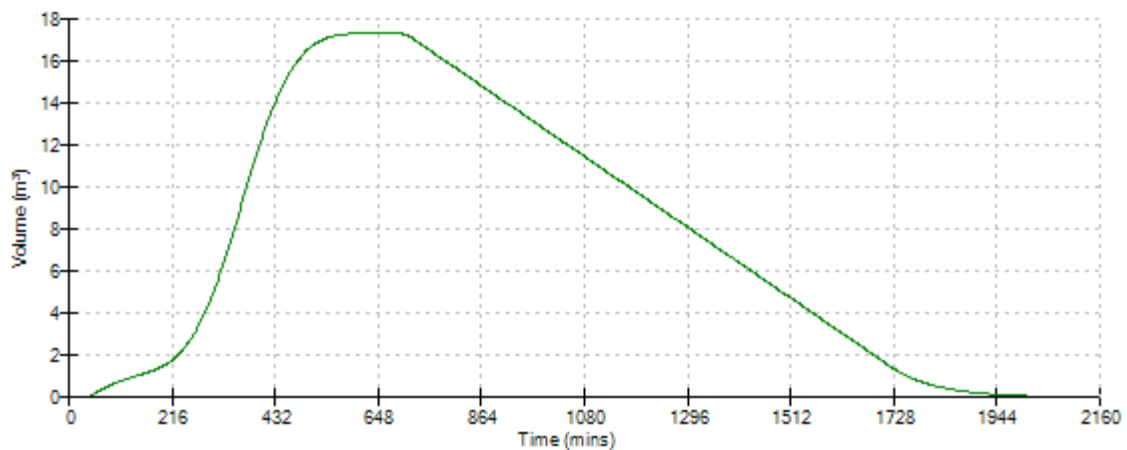
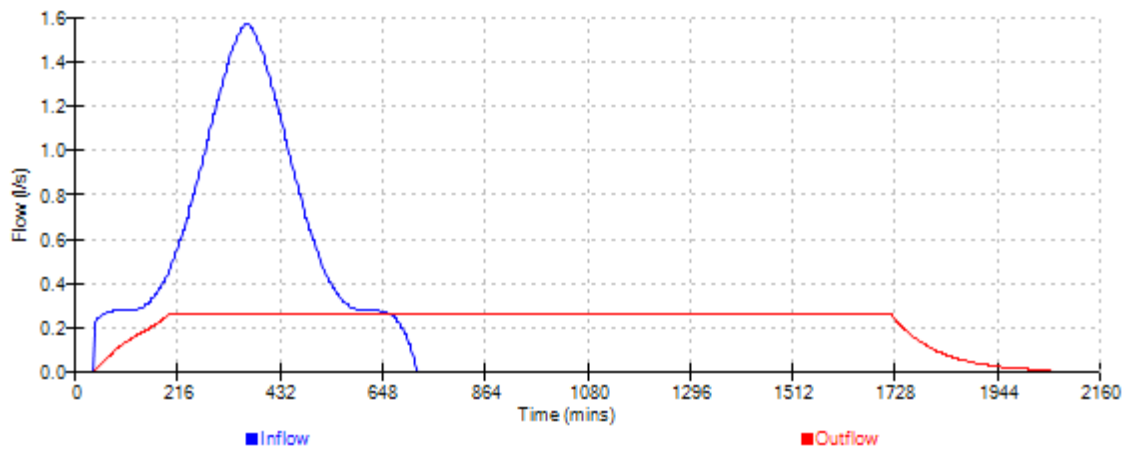
Total Area (ha) 0.000

Time (mins)	Area
From: To: (ha)	
0 4 0.000	

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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Car Park 13																									
Date 16/05/17 File Car Park 13.srcx	Designed by LK Checked by AMF																									
Micro Drainage Source Control 2015.1																										
<u>Model Details</u> Storage is Online Cover Level (m) 0.780 <u>Porous Car Park Structure</u> <table> <tr> <td>Infiltration Coefficient Base (m/hr)</td> <td>0.01872</td> <td>Width (m)</td> <td>5.0</td> </tr> <tr> <td>Membrane Percolation (mm/hr)</td> <td>500</td> <td>Length (m)</td> <td>20.0</td> </tr> <tr> <td>Max Percolation (l/s)</td> <td>13.9</td> <td>Slope (1:X)</td> <td>10000.0</td> </tr> <tr> <td>Safety Factor</td> <td>2.0</td> <td>Depression Storage (mm)</td> <td>3</td> </tr> <tr> <td>Porosity</td> <td>0.30</td> <td>Evaporation (mm/day)</td> <td>1</td> </tr> <tr> <td>Invert Level (m)</td> <td>0.000</td> <td>Cap Volume Depth (m)</td> <td>0.580</td> </tr> </table>			Infiltration Coefficient Base (m/hr)	0.01872	Width (m)	5.0	Membrane Percolation (mm/hr)	500	Length (m)	20.0	Max Percolation (l/s)	13.9	Slope (1:X)	10000.0	Safety Factor	2.0	Depression Storage (mm)	3	Porosity	0.30	Evaporation (mm/day)	1	Invert Level (m)	0.000	Cap Volume Depth (m)	0.580
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Date 16/05/17	Designed by LK	
File Car Park 13.srcx	Checked by AMF	
Micro Drainage		Source Control 2015.1

Event: 720 min Winter



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Summary of Results for 100 year Return Period (+40%) Half Drain Time : 258 minutes. <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>0.118</td><td>0.118</td><td>0.9</td><td>12.0</td><td>0 K</td></tr><tr><td>30 min Summer</td><td>0.145</td><td>0.145</td><td>0.9</td><td>14.8</td><td>0 K</td></tr><tr><td>60 min Summer</td><td>0.175</td><td>0.175</td><td>0.9</td><td>17.9</td><td>Flood Risk</td></tr><tr><td>120 min Summer</td><td>0.203</td><td>0.203</td><td>0.9</td><td>20.7</td><td>Flood Risk</td></tr><tr><td>180 min Summer</td><td>0.215</td><td>0.215</td><td>0.9</td><td>22.0</td><td>Flood Risk</td></tr><tr><td>240 min Summer</td><td>0.221</td><td>0.221</td><td>0.9</td><td>22.6</td><td>Flood Risk</td></tr><tr><td>360 min Summer</td><td>0.227</td><td>0.227</td><td>0.9</td><td>23.2</td><td>Flood Risk</td></tr><tr><td>480 min Summer</td><td>0.228</td><td>0.228</td><td>0.9</td><td>23.3</td><td>Flood Risk</td></tr><tr><td>600 min Summer</td><td>0.227</td><td>0.227</td><td>0.9</td><td>23.2</td><td>Flood Risk</td></tr><tr><td>720 min Summer</td><td>0.224</td><td>0.224</td><td>0.9</td><td>22.9</td><td>Flood Risk</td></tr><tr><td>960 min Summer</td><td>0.200</td><td>0.200</td><td>0.9</td><td>20.5</td><td>Flood Risk</td></tr><tr><td>1440 min Summer</td><td>0.159</td><td>0.159</td><td>0.9</td><td>16.2</td><td>0 K</td></tr><tr><td>2160 min Summer</td><td>0.111</td><td>0.111</td><td>0.9</td><td>11.3</td><td>0 K</td></tr><tr><td>2880 min Summer</td><td>0.077</td><td>0.077</td><td>0.9</td><td>7.9</td><td>0 K</td></tr><tr><td>4320 min Summer</td><td>0.049</td><td>0.049</td><td>0.9</td><td>5.0</td><td>0 K</td></tr><tr><td>5760 min Summer</td><td>0.041</td><td>0.041</td><td>0.7</td><td>4.2</td><td>0 K</td></tr><tr><td>7200 min Summer</td><td>0.035</td><td>0.035</td><td>0.6</td><td>3.6</td><td>0 K</td></tr><tr><td>8640 min Summer</td><td>0.031</td><td>0.031</td><td>0.6</td><td>3.2</td><td>0 K</td></tr><tr><td>10080 min Summer</td><td>0.028</td><td>0.028</td><td>0.5</td><td>2.8</td><td>0 K</td></tr><tr><td>15 min Winter</td><td>0.133</td><td>0.133</td><td>0.9</td><td>13.6</td><td>0 K</td></tr></table> <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>145.315</td><td>0.0</td><td>18</td></tr><tr><td>30 min Summer</td><td>90.424</td><td>0.0</td><td>32</td></tr><tr><td>60 min Summer</td><td>56.268</td><td>0.0</td><td>62</td></tr><tr><td>120 min Summer</td><td>35.013</td><td>0.0</td><td>120</td></tr><tr><td>180 min Summer</td><td>26.529</td><td>0.0</td><td>180</td></tr><tr><td>240 min Summer</td><td>21.787</td><td>0.0</td><td>208</td></tr><tr><td>360 min Summer</td><td>16.508</td><td>0.0</td><td>274</td></tr><tr><td>480 min Summer</td><td>13.557</td><td>0.0</td><td>342</td></tr><tr><td>600 min Summer</td><td>11.637</td><td>0.0</td><td>410</td></tr><tr><td>720 min Summer</td><td>10.272</td><td>0.0</td><td>482</td></tr><tr><td>960 min Summer</td><td>8.045</td><td>0.0</td><td>616</td></tr><tr><td>1440 min Summer</td><td>5.701</td><td>0.0</td><td>878</td></tr><tr><td>2160 min Summer</td><td>4.040</td><td>0.0</td><td>1236</td></tr><tr><td>2880 min Summer</td><td>3.164</td><td>0.0</td><td>1584</td></tr><tr><td>4320 min Summer</td><td>2.343</td><td>0.0</td><td>2208</td></tr><tr><td>5760 min Summer</td><td>1.893</td><td>0.0</td><td>2944</td></tr><tr><td>7200 min Summer</td><td>1.604</td><td>0.0</td><td>3672</td></tr><tr><td>8640 min Summer</td><td>1.401</td><td>0.0</td><td>4408</td></tr><tr><td>10080 min Summer</td><td>1.250</td><td>0.0</td><td>5136</td></tr><tr><td>15 min Winter</td><td>145.315</td><td>0.0</td><td>18</td></tr></table>							Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	15 min Summer	0.118	0.118	0.9	12.0	0 K	30 min Summer	0.145	0.145	0.9	14.8	0 K	60 min Summer	0.175	0.175	0.9	17.9	Flood Risk	120 min Summer	0.203	0.203	0.9	20.7	Flood Risk	180 min Summer	0.215	0.215	0.9	22.0	Flood Risk	240 min Summer	0.221	0.221	0.9	22.6	Flood Risk	360 min Summer	0.227	0.227	0.9	23.2	Flood Risk	480 min Summer	0.228	0.228	0.9	23.3	Flood Risk	600 min Summer	0.227	0.227	0.9	23.2	Flood Risk	720 min Summer	0.224	0.224	0.9	22.9	Flood Risk	960 min Summer	0.200	0.200	0.9	20.5	Flood Risk	1440 min Summer	0.159	0.159	0.9	16.2	0 K	2160 min Summer	0.111	0.111	0.9	11.3	0 K	2880 min Summer	0.077	0.077	0.9	7.9	0 K	4320 min Summer	0.049	0.049	0.9	5.0	0 K	5760 min Summer	0.041	0.041	0.7	4.2	0 K	7200 min Summer	0.035	0.035	0.6	3.6	0 K	8640 min Summer	0.031	0.031	0.6	3.2	0 K	10080 min Summer	0.028	0.028	0.5	2.8	0 K	15 min Winter	0.133	0.133	0.9	13.6	0 K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)	15 min Summer	145.315	0.0	18	30 min Summer	90.424	0.0	32	60 min Summer	56.268	0.0	62	120 min Summer	35.013	0.0	120	180 min 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600 min Summer	11.637	0.0	410																																																																																																																																																																																																																					
720 min Summer	10.272	0.0	482																																																																																																																																																																																																																					
960 min Summer	8.045	0.0	616																																																																																																																																																																																																																					
1440 min Summer	5.701	0.0	878																																																																																																																																																																																																																					
2160 min Summer	4.040	0.0	1236																																																																																																																																																																																																																					
2880 min Summer	3.164	0.0	1584																																																																																																																																																																																																																					
4320 min Summer	2.343	0.0	2208																																																																																																																																																																																																																					
5760 min Summer	1.893	0.0	2944																																																																																																																																																																																																																					
7200 min Summer	1.604	0.0	3672																																																																																																																																																																																																																					
8640 min Summer	1.401	0.0	4408																																																																																																																																																																																																																					
10080 min Summer	1.250	0.0	5136																																																																																																																																																																																																																					
15 min Winter	145.315	0.0	18																																																																																																																																																																																																																					
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Cundall, Johnston & Partners					Page 2	
19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG			Havant Road, Emsworth SUDs Drainage Permeable Road 5A			
Date 16/05/17			Designed by LK/AC			
File Permeable Road 5a.srcx			Checked by AMF			
Micro Drainage			Source Control 2015.1			
Summary of Results for 100 year Return Period (+40%)						
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	
30 min Winter	0.165	0.165	0.9	16.8	0 K	
60 min Winter	0.199	0.199	0.9	20.3	Flood Risk	
120 min Winter	0.233	0.233	0.9	23.8	Flood Risk	
180 min Winter	0.249	0.249	0.9	25.4	Flood Risk	
240 min Winter	0.257	0.257	0.9	26.2	Flood Risk	
360 min Winter	0.261	0.261	0.9	26.7	Flood Risk	
480 min Winter	0.261	0.261	0.9	26.7	Flood Risk	
600 min Winter	0.258	0.258	0.9	26.4	Flood Risk	
720 min Winter	0.252	0.252	0.9	25.8	Flood Risk	
960 min Winter	0.218	0.218	0.9	22.3	Flood Risk	
1440 min Winter	0.157	0.157	0.9	16.0	0 K	
2160 min Winter	0.088	0.088	0.9	9.0	0 K	
2880 min Winter	0.051	0.051	0.9	5.1	0 K	
4320 min Winter	0.038	0.038	0.7	3.9	0 K	
5760 min Winter	0.031	0.031	0.5	3.1	0 K	
7200 min Winter	0.026	0.026	0.5	2.7	0 K	
8640 min Winter	0.023	0.023	0.4	2.3	0 K	
10080 min Winter	0.021	0.021	0.4	2.1	0 K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)			
30 min Winter	90.424	0.0	32			
60 min Winter	56.268	0.0	60			
120 min Winter	35.013	0.0	118			
180 min Winter	26.529	0.0	174			
240 min Winter	21.787	0.0	230			
360 min Winter	16.508	0.0	294			
480 min Winter	13.557	0.0	370			
600 min Winter	11.637	0.0	446			
720 min Winter	10.272	0.0	526			
960 min Winter	8.045	0.0	672			
1440 min Winter	5.701	0.0	938			
2160 min Winter	4.040	0.0	1280			
2880 min Winter	3.164	0.0	1528			
4320 min Winter	2.343	0.0	2236			
5760 min Winter	1.893	0.0	2992			
7200 min Winter	1.604	0.0	3680			
8640 min Winter	1.401	0.0	4392			
10080 min Winter	1.250	0.0	5200			
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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Permeable Road 5A	
Date 16/05/17	Designed by LK/AC	
File Permeable Road 5a.srcx	Checked by AMF	
Micro Drainage		Source Control 2015.1

Rainfall Details

Rainfall Model	FEH	F (1km)	2.263
Return Period (years)	100	Summer Storms	Yes
Site Location	GB 473800 105650	Winter Storms	Yes
C (1km)	-0.029	Cv (Summer)	0.750
D1 (1km)	0.449	Cv (Winter)	0.840
D2 (1km)	0.284	Shortest Storm (mins)	15
D3 (1km)	0.392	Longest Storm (mins)	10080
E (1km)	0.311	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.050

Time (mins)	Area	Time (mins)	Area
From: To: (ha)		From: To: (ha)	
0 2 0.037		2 4 0.013	

Time Area Diagram

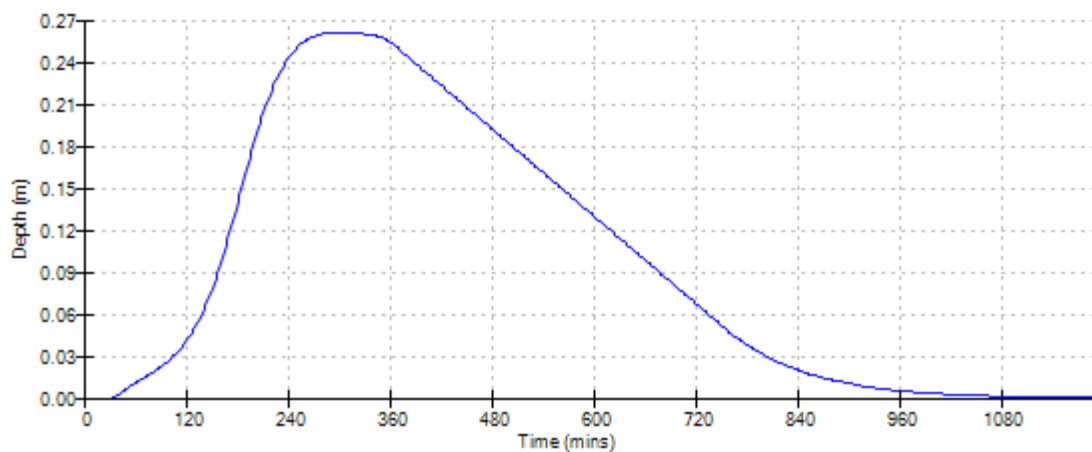
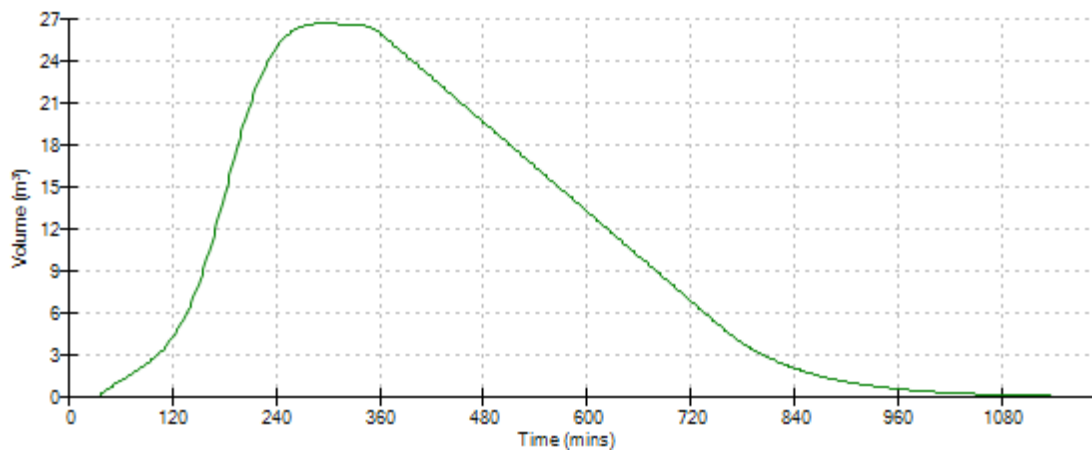
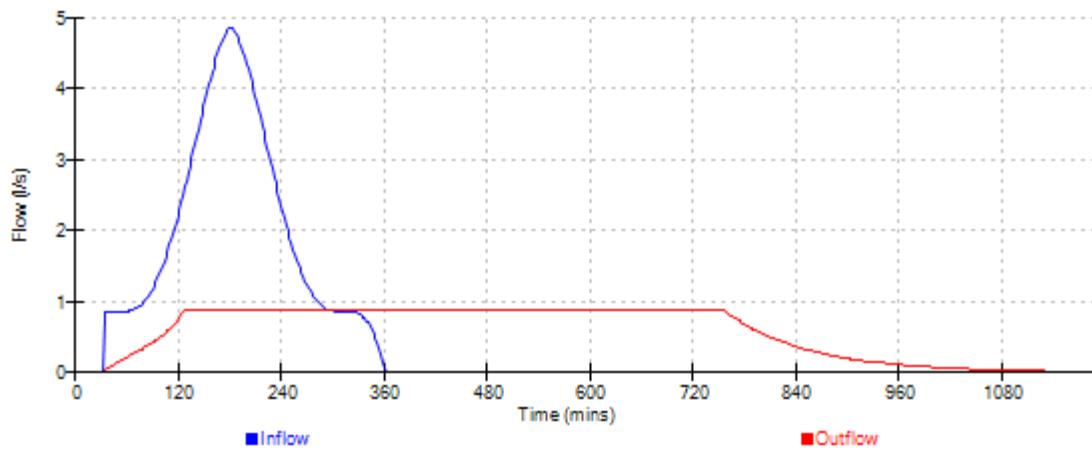
Total Area (ha) 0.000

Time (mins)	Area
From: To: (ha)	
0 4 0.000	

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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Permeable Road 5A	
Date 16/05/17 File Permeable Road 5a.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage	Source Control 2015.1	
Model Details Storage is Online Cover Level (m) 0.465 Porous Car Park Structure Infiltration Coefficient Base (m/hr) 0.01872 Membrane Percolation (mm/hr) 500 Max Percolation (l/s) 47.3 Safety Factor 2.0 Porosity 0.30 Invert Level (m) 0.000 Width (m) 7.1 Length (m) 48.0 Slope (1:X) 100000.0 Depression Storage (mm) 3 Evaporation (mm/day) 1 Cap Volume Depth (m) 0.265		
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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Permeable Road 5A	
Date 16/05/17	Designed by LK/AC	
File Permeable Road 5a.srcx	Checked by AMF	
Micro Drainage		Source Control 2015.1

Event: 360 min Winter



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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG		Havant Road, Emsworth SUDs Drainage Permeable Road 5B			
Date 16/05/17 File Permeable Road 5b.srcx		Designed by LK/AC Checked by AMF			
Micro Drainage		Source Control 2015.1			
Summary of Results for 100 year Return Period (+40%)					
Half Drain Time : 377 minutes.					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	0.081	0.081	2.5	43.6	0 K
30 min Summer	0.101	0.101	2.5	54.4	0 K
60 min Summer	0.124	0.124	2.5	66.6	0 K
120 min Summer	0.148	0.148	2.5	79.4	0 K
180 min Summer	0.158	0.158	2.5	86.1	0 K
240 min Summer	0.165	0.165	2.5	90.1	0 K
360 min Summer	0.171	0.171	2.5	94.2	0 K
480 min Summer	0.174	0.174	2.5	96.4	0 K
600 min Summer	0.176	0.176	2.5	97.6	0 K
720 min Summer	0.177	0.177	2.5	98.0	0 K
960 min Summer	0.166	0.166	2.5	91.1	0 K
1440 min Summer	0.145	0.145	2.5	78.3	0 K
2160 min Summer	0.115	0.115	2.5	61.7	0 K
2880 min Summer	0.090	0.090	2.5	48.5	0 K
4320 min Summer	0.063	0.063	2.5	33.9	0 K
5760 min Summer	0.049	0.049	2.5	26.3	0 K
7200 min Summer	0.043	0.043	2.2	22.9	0 K
8640 min Summer	0.038	0.038	1.9	20.5	0 K
10080 min Summer	0.035	0.035	1.7	18.5	0 K
15 min Winter	0.092	0.092	2.5	49.5	0 K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
15 min Summer	145.315	0.0	18		
30 min Summer	90.424	0.0	33		
60 min Summer	56.268	0.0	62		
120 min Summer	35.013	0.0	122		
180 min Summer	26.529	0.0	180		
240 min Summer	21.787	0.0	240		
360 min Summer	16.508	0.0	308		
480 min Summer	13.557	0.0	374		
600 min Summer	11.637	0.0	440		
720 min Summer	10.272	0.0	508		
960 min Summer	8.045	0.0	644		
1440 min Summer	5.701	0.0	910		
2160 min Summer	4.040	0.0	1296		
2880 min Summer	3.164	0.0	1648		
4320 min Summer	2.343	0.0	2336		
5760 min Summer	1.893	0.0	3000		
7200 min Summer	1.604	0.0	3744		
8640 min Summer	1.401	0.0	4416		
10080 min Summer	1.250	0.0	5144		
15 min Winter	145.315	0.0	18		
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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG		Havant Road, Emsworth SUDs Drainage Permeable Road 5B			
Date 16/05/17 File Permeable Road 5b.srcx		Designed by LK/AC Checked by AMF			
Micro Drainage		Source Control 2015.1			
Summary of Results for 100 year Return Period (+40%)					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	0.115	0.115	2.5	61.7	0 K
60 min Winter	0.141	0.141	2.5	75.7	0 K
120 min Winter	0.165	0.165	2.5	90.5	0 K
180 min Winter	0.178	0.178	2.5	98.7	0 K
240 min Winter	0.185	0.185	2.5	103.8	0 K
360 min Winter	0.193	0.193	2.5	109.0	0 K
480 min Winter	0.196	0.196	2.5	110.7	0 K
600 min Winter	0.197	0.197	2.5	111.6	0 K
720 min Winter	0.197	0.197	2.5	111.7	0 K
960 min Winter	0.183	0.183	2.5	102.2	0 K
1440 min Winter	0.154	0.154	2.5	83.5	0 K
2160 min Winter	0.110	0.110	2.5	59.1	0 K
2880 min Winter	0.075	0.075	2.5	40.4	0 K
4320 min Winter	0.047	0.047	2.4	25.3	0 K
5760 min Winter	0.039	0.039	1.9	20.9	0 K
7200 min Winter	0.033	0.033	1.7	17.8	0 K
8640 min Winter	0.029	0.029	1.5	15.6	0 K
10080 min Winter	0.026	0.026	1.3	13.9	0 K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
30 min Winter	90.424	0.0	32		
60 min Winter	56.268	0.0	62		
120 min Winter	35.013	0.0	120		
180 min Winter	26.529	0.0	176		
240 min Winter	21.787	0.0	234		
360 min Winter	16.508	0.0	342		
480 min Winter	13.557	0.0	436		
600 min Winter	11.637	0.0	472		
720 min Winter	10.272	0.0	550		
960 min Winter	8.045	0.0	702		
1440 min Winter	5.701	0.0	984		
2160 min Winter	4.040	0.0	1380		
2880 min Winter	3.164	0.0	1728		
4320 min Winter	2.343	0.0	2296		
5760 min Winter	1.893	0.0	3056		
7200 min Winter	1.604	0.0	3752		
8640 min Winter	1.401	0.0	4488		
10080 min Winter	1.250	0.0	5144		
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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Permeable Road 5B	
Date 16/05/17	Designed by LK/AC	
File Permeable Road 5b.srcx	Checked by AMF	
Micro Drainage		Source Control 2015.1

Rainfall Details

Rainfall Model	FEH	F (1km)	2.263
Return Period (years)	100	Summer Storms	Yes
Site Location	GB 473800 105650	Winter Storms	Yes
C (1km)	-0.029	Cv (Summer)	0.750
D1 (1km)	0.449	Cv (Winter)	0.840
D2 (1km)	0.284	Shortest Storm (mins)	15
D3 (1km)	0.392	Longest Storm (mins)	10080
E (1km)	0.311	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.183

Time (mins)	Area	Time (mins)	Area
From: To: (ha)		From: To: (ha)	
0 2 0.105		2 4 0.078	

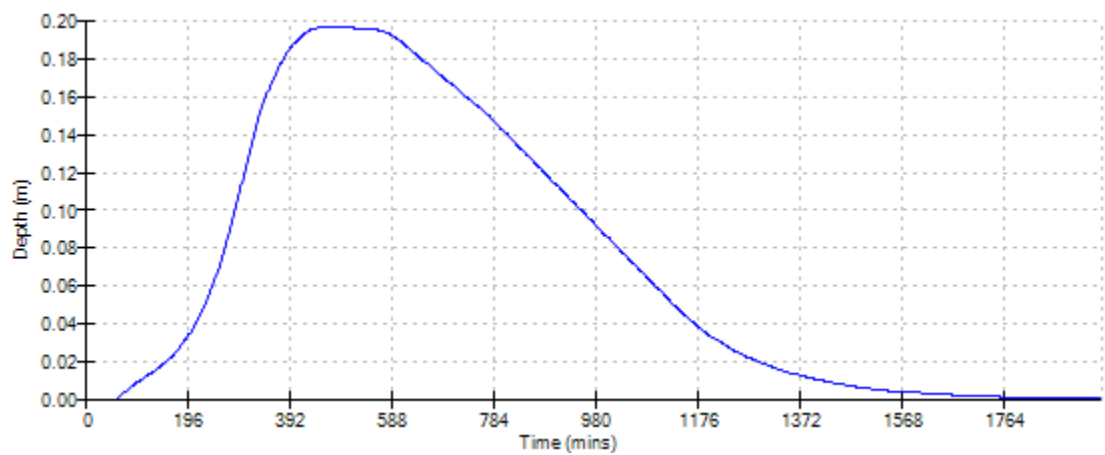
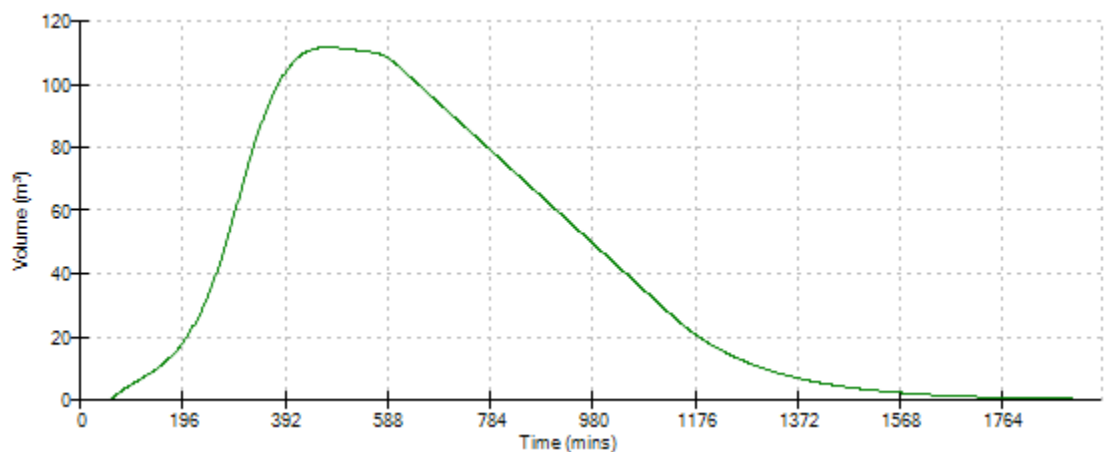
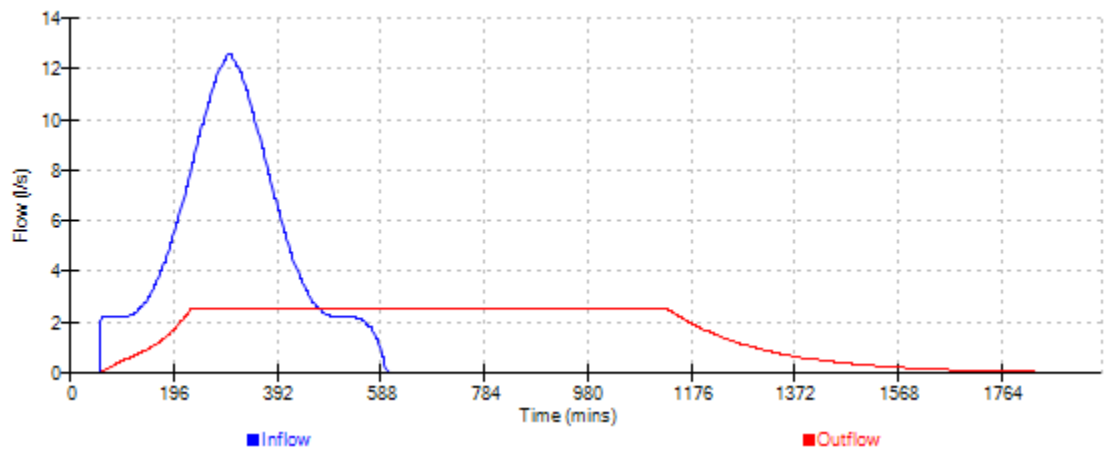
Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area
From: To: (ha)	
0 4 0.000	

Cundall, Johnston & Partners		Page 4												
19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Permeable Road 5B													
Date 16/05/17 File Permeable Road 5b.srcx	Designed by LK/AC Checked by AMF													
Micro Drainage Source Control 2015.1														
Model Details Storage is Online Cover Level (m) 0.500 Complex Structure Cellular Storage Invert Level (m) 0.000 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.01872 Porosity 0.95 Infiltration Coefficient Side (m/hr) 0.00000 <table><tr><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th><th>Inf. Area (m²)</th></tr><tr><td>0.000</td><td>382.0</td><td>382.0</td><td>0.150</td><td>382.0</td><td>382.0</td></tr></table> Porous Car Park Infiltration Coefficient Base (m/hr) 0.01872 Membrane Percolation (mm/hr) 500 Max Percolation (l/s) 81.3 Safety Factor 2.0 Porosity 0.30 Invert Level (m) 0.000 Width (m) 6.5 Length (m) 90.1 Slope (1:X) 100000.0 Depression Storage (mm) 3 Evaporation (mm/day) 1 Cap Volume Depth (m) 0.150 Porous Car Park Infiltration Coefficient Base (m/hr) 0.00000 Membrane Percolation (mm/hr) 500 Max Percolation (l/s) 135.4 Safety Factor 2.0 Porosity 0.30 Invert Level (m) 0.150 Width (m) 6.5 Length (m) 150.0 Slope (1:X) 100000.0 Depression Storage (mm) 3 Evaporation (mm/day) 1 Cap Volume Depth (m) 0.150			Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	0.000	382.0	382.0	0.150	382.0	382.0
Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)									
0.000	382.0	382.0	0.150	382.0	382.0									
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Event: 600 min Winter



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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG			Havant Road, Emsworth SUDs Drainage Permeable Road 6																																																																																																																																																																																																																					
Date 16/05/17 File Permeable Road 6.srcx			Designed by LK/AC Checked by AMF																																																																																																																																																																																																																					
Micro Drainage			Source Control 2015.1																																																																																																																																																																																																																					
Summary of Results for 100 year Return Period (+40%) Half Drain Time : 307 minutes. <table><thead><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr></thead><tbody><tr><td>15 min Summer</td><td>0.254</td><td>0.254</td><td>0.7</td><td>11.3</td><td>0 K</td></tr><tr><td>30 min Summer</td><td>0.310</td><td>0.310</td><td>0.7</td><td>13.8</td><td>0 K</td></tr><tr><td>60 min Summer</td><td>0.371</td><td>0.371</td><td>0.7</td><td>16.5</td><td>0 K</td></tr><tr><td>120 min Summer</td><td>0.429</td><td>0.429</td><td>0.7</td><td>19.1</td><td>0 K</td></tr><tr><td>180 min Summer</td><td>0.455</td><td>0.455</td><td>0.7</td><td>20.3</td><td>0 K</td></tr><tr><td>240 min Summer</td><td>0.467</td><td>0.467</td><td>0.7</td><td>20.8</td><td>Flood Risk</td></tr><tr><td>360 min Summer</td><td>0.475</td><td>0.475</td><td>0.7</td><td>21.2</td><td>Flood Risk</td></tr><tr><td>480 min Summer</td><td>0.476</td><td>0.476</td><td>0.7</td><td>21.2</td><td>Flood Risk</td></tr><tr><td>600 min Summer</td><td>0.473</td><td>0.473</td><td>0.7</td><td>21.1</td><td>Flood Risk</td></tr><tr><td>720 min Summer</td><td>0.468</td><td>0.468</td><td>0.7</td><td>20.9</td><td>Flood Risk</td></tr><tr><td>960 min Summer</td><td>0.421</td><td>0.421</td><td>0.7</td><td>18.8</td><td>0 K</td></tr><tr><td>1440 min Summer</td><td>0.341</td><td>0.341</td><td>0.7</td><td>15.2</td><td>0 K</td></tr><tr><td>2160 min Summer</td><td>0.241</td><td>0.241</td><td>0.7</td><td>10.7</td><td>0 K</td></tr><tr><td>2880 min Summer</td><td>0.164</td><td>0.164</td><td>0.7</td><td>7.3</td><td>0 K</td></tr><tr><td>4320 min Summer</td><td>0.083</td><td>0.083</td><td>0.7</td><td>3.6</td><td>0 K</td></tr><tr><td>5760 min Summer</td><td>0.050</td><td>0.050</td><td>0.7</td><td>2.2</td><td>0 K</td></tr><tr><td>7200 min Summer</td><td>0.043</td><td>0.043</td><td>0.6</td><td>1.9</td><td>0 K</td></tr><tr><td>8640 min Summer</td><td>0.037</td><td>0.037</td><td>0.5</td><td>1.6</td><td>0 K</td></tr><tr><td>10080 min Summer</td><td>0.033</td><td>0.033</td><td>0.5</td><td>1.4</td><td>0 K</td></tr><tr><td>15 min Winter</td><td>0.286</td><td>0.286</td><td>0.7</td><td>12.7</td><td>0 K</td></tr></tbody></table> <table><thead><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Time-Peak (mins)</th></tr></thead><tbody><tr><td>15 min Summer</td><td>145.315</td><td>0.0</td><td>19</td></tr><tr><td>30 min Summer</td><td>90.424</td><td>0.0</td><td>33</td></tr><tr><td>60 min Summer</td><td>56.268</td><td>0.0</td><td>62</td></tr><tr><td>120 min Summer</td><td>35.013</td><td>0.0</td><td>122</td></tr><tr><td>180 min Summer</td><td>26.529</td><td>0.0</td><td>180</td></tr><tr><td>240 min Summer</td><td>21.787</td><td>0.0</td><td>234</td></tr><tr><td>360 min Summer</td><td>16.508</td><td>0.0</td><td>294</td></tr><tr><td>480 min Summer</td><td>13.557</td><td>0.0</td><td>360</td></tr><tr><td>600 min Summer</td><td>11.637</td><td>0.0</td><td>428</td></tr><tr><td>720 min Summer</td><td>10.272</td><td>0.0</td><td>498</td></tr><tr><td>960 min Summer</td><td>8.045</td><td>0.0</td><td>628</td></tr><tr><td>1440 min Summer</td><td>5.701</td><td>0.0</td><td>896</td></tr><tr><td>2160 min Summer</td><td>4.040</td><td>0.0</td><td>1276</td></tr><tr><td>2880 min Summer</td><td>3.164</td><td>0.0</td><td>1616</td></tr><tr><td>4320 min Summer</td><td>2.343</td><td>0.0</td><td>2292</td></tr><tr><td>5760 min Summer</td><td>1.893</td><td>0.0</td><td>2936</td></tr><tr><td>7200 min Summer</td><td>1.604</td><td>0.0</td><td>3672</td></tr><tr><td>8640 min Summer</td><td>1.401</td><td>0.0</td><td>4400</td></tr><tr><td>10080 min Summer</td><td>1.250</td><td>0.0</td><td>5136</td></tr><tr><td>15 min Winter</td><td>145.315</td><td>0.0</td><td>18</td></tr></tbody></table>							Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	15 min Summer	0.254	0.254	0.7	11.3	0 K	30 min Summer	0.310	0.310	0.7	13.8	0 K	60 min Summer	0.371	0.371	0.7	16.5	0 K	120 min Summer	0.429	0.429	0.7	19.1	0 K	180 min Summer	0.455	0.455	0.7	20.3	0 K	240 min Summer	0.467	0.467	0.7	20.8	Flood Risk	360 min Summer	0.475	0.475	0.7	21.2	Flood Risk	480 min Summer	0.476	0.476	0.7	21.2	Flood Risk	600 min Summer	0.473	0.473	0.7	21.1	Flood Risk	720 min Summer	0.468	0.468	0.7	20.9	Flood Risk	960 min Summer	0.421	0.421	0.7	18.8	0 K	1440 min Summer	0.341	0.341	0.7	15.2	0 K	2160 min Summer	0.241	0.241	0.7	10.7	0 K	2880 min Summer	0.164	0.164	0.7	7.3	0 K	4320 min Summer	0.083	0.083	0.7	3.6	0 K	5760 min Summer	0.050	0.050	0.7	2.2	0 K	7200 min Summer	0.043	0.043	0.6	1.9	0 K	8640 min Summer	0.037	0.037	0.5	1.6	0 K	10080 min Summer	0.033	0.033	0.5	1.4	0 K	15 min Winter	0.286	0.286	0.7	12.7	0 K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)	15 min Summer	145.315	0.0	19	30 min Summer	90.424	0.0	33	60 min Summer	56.268	0.0	62	120 min Summer	35.013	0.0	122	180 min Summer	26.529	0.0	180	240 min Summer	21.787	0.0	234	360 min Summer	16.508	0.0	294	480 min Summer	13.557	0.0	360	600 min Summer	11.637	0.0	428	720 min Summer	10.272	0.0	498	960 min Summer	8.045	0.0	628	1440 min Summer	5.701	0.0	896	2160 min Summer	4.040	0.0	1276	2880 min Summer	3.164	0.0	1616	4320 min Summer	2.343	0.0	2292	5760 min Summer	1.893	0.0	2936	7200 min Summer	1.604	0.0	3672	8640 min Summer	1.401	0.0	4400	10080 min Summer	1.250	0.0	5136	15 min Winter	145.315	0.0	18
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Cundall, Johnston & Partners		Page 2
19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Permeable Road 6	
Date 16/05/17 File Permeable Road 6.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage		
Source Control 2015.1		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	0.351	0.351	0.7	15.6	0 K
60 min Winter	0.422	0.422	0.7	18.8	0 K
120 min Winter	0.493	0.493	0.7	22.0	Flood Risk
180 min Winter	0.528	0.528	0.7	23.5	Flood Risk
240 min Winter	0.546	0.546	0.7	24.3	Flood Risk
360 min Winter	0.557	0.557	0.7	24.8	Flood Risk
480 min Winter	0.555	0.555	0.7	24.7	Flood Risk
600 min Winter	0.549	0.549	0.7	24.5	Flood Risk
720 min Winter	0.540	0.540	0.7	24.1	Flood Risk
960 min Winter	0.474	0.474	0.7	21.1	Flood Risk
1440 min Winter	0.354	0.354	0.7	15.8	0 K
2160 min Winter	0.207	0.207	0.7	9.2	0 K
2880 min Winter	0.102	0.102	0.7	4.5	0 K
4320 min Winter	0.045	0.045	0.6	2.0	0 K
5760 min Winter	0.037	0.037	0.5	1.6	0 K
7200 min Winter	0.031	0.031	0.4	1.3	0 K
8640 min Winter	0.027	0.027	0.4	1.2	0 K
10080 min Winter	0.024	0.024	0.3	1.0	0 K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	90.424	0.0	33
60 min Winter	56.268	0.0	62
120 min Winter	35.013	0.0	120
180 min Winter	26.529	0.0	176
240 min Winter	21.787	0.0	232
360 min Winter	16.508	0.0	338
480 min Winter	13.557	0.0	386
600 min Winter	11.637	0.0	462
720 min Winter	10.272	0.0	542
960 min Winter	8.045	0.0	690
1440 min Winter	5.701	0.0	968
2160 min Winter	4.040	0.0	1344
2880 min Winter	3.164	0.0	1668
4320 min Winter	2.343	0.0	2204
5760 min Winter	1.893	0.0	2936
7200 min Winter	1.604	0.0	3664
8640 min Winter	1.401	0.0	4384
10080 min Winter	1.250	0.0	5120

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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Permeable Road 6	
Date 16/05/17 File Permeable Road 6.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage		
Source Control 2015.1		

Rainfall Details

Rainfall Model	FEH	F (1km)	2.263
Return Period (years)	100	Summer Storms	Yes
Site Location	GB 473800 105650	Winter Storms	Yes
C (1km)	-0.029	Cv (Summer)	0.750
D1 (1km)	0.449	Cv (Winter)	0.840
D2 (1km)	0.284	Shortest Storm (mins)	15
D3 (1km)	0.392	Longest Storm (mins)	10080
E (1km)	0.311	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.045

Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)
0 2	0.017	2 4	0.028

Time Area Diagram

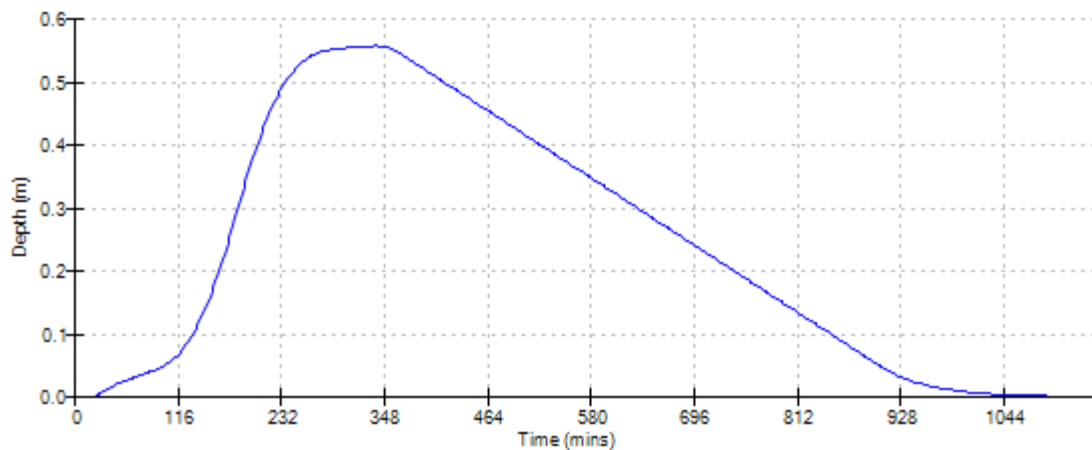
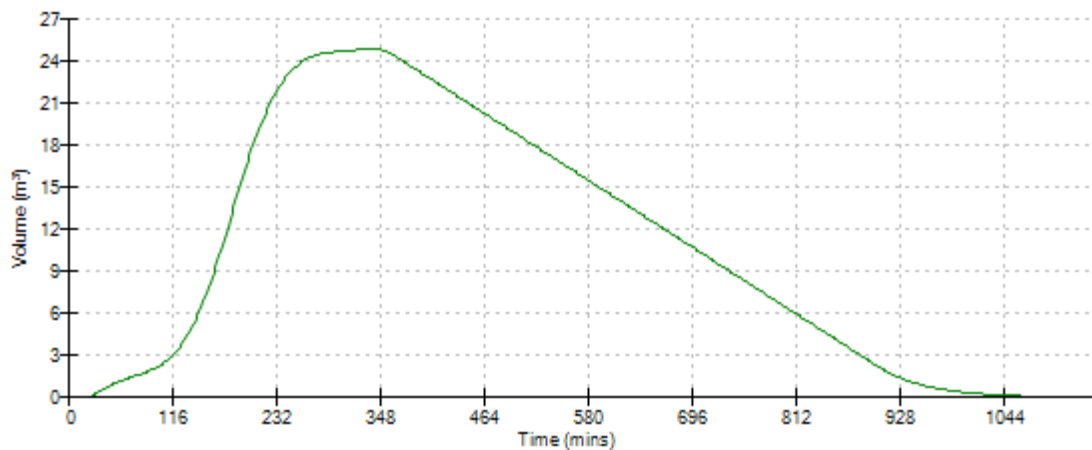
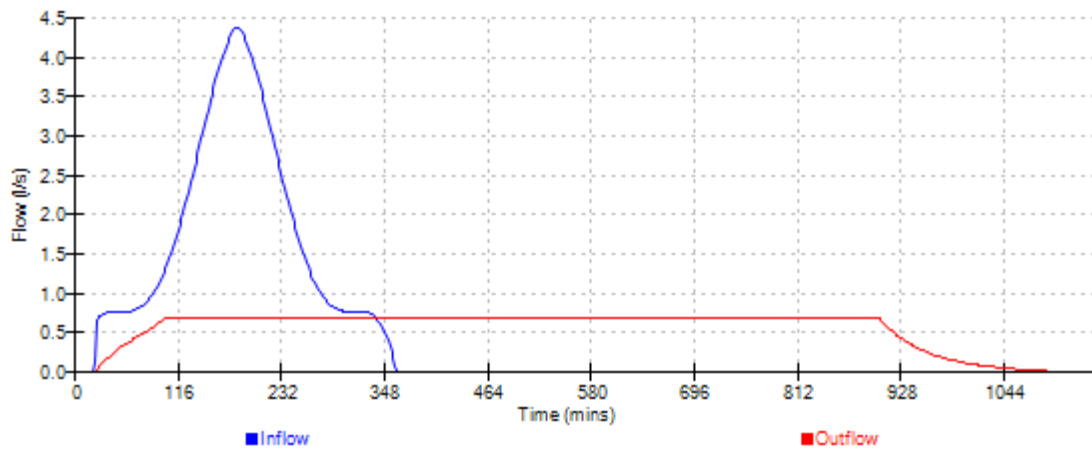
Total Area (ha) 0.000

Time (mins)	Area
From: To:	(ha)
0 4	0.000

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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Permeable Road 6																									
Date 16/05/17 File Permeable Road 6.srcx	Designed by LK/AC Checked by AMF																									
Micro Drainage Source Control 2015.1																										
<u>Model Details</u> Storage is Online Cover Level (m) 0.760 <u>Porous Car Park Structure</u> <table> <tr> <td>Infiltration Coefficient Base (m/hr)</td> <td>0.03312</td> <td>Width (m)</td> <td>7.3</td> </tr> <tr> <td>Membrane Percolation (mm/hr)</td> <td>500</td> <td>Length (m)</td> <td>20.4</td> </tr> <tr> <td>Max Percolation (l/s)</td> <td>20.7</td> <td>Slope (1:X)</td> <td>10000.0</td> </tr> <tr> <td>Safety Factor</td> <td>2.0</td> <td>Depression Storage (mm)</td> <td>3</td> </tr> <tr> <td>Porosity</td> <td>0.30</td> <td>Evaporation (mm/day)</td> <td>1</td> </tr> <tr> <td>Invert Level (m)</td> <td>0.000</td> <td>Cap Volume Depth (m)</td> <td>0.560</td> </tr> </table>			Infiltration Coefficient Base (m/hr)	0.03312	Width (m)	7.3	Membrane Percolation (mm/hr)	500	Length (m)	20.4	Max Percolation (l/s)	20.7	Slope (1:X)	10000.0	Safety Factor	2.0	Depression Storage (mm)	3	Porosity	0.30	Evaporation (mm/day)	1	Invert Level (m)	0.000	Cap Volume Depth (m)	0.560
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Date 16/05/17 File Permeable Road 6.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage	Source Control 2015.1	

Event: 360 min Winter



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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG			Havant Road, Emsworth SUDs Drainage Road Trench Soakaway [SA1+SA2]			
Date 16/05/17 File Road Soakaway.srcx			Designed by LK Checked by AMF			
Micro Drainage			Source Control 2015.1			
Summary of Results for 100 year Return Period (+40%)						
Half Drain Time : 935 minutes.						
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	
15 min Summer	0.105	0.105	0.9	34.6	0 K	
30 min Summer	0.130	0.130	0.9	42.6	0 K	
60 min Summer	0.158	0.158	0.9	52.1	0 K	
120 min Summer	0.190	0.190	0.9	62.9	0 K	
180 min Summer	0.209	0.209	0.9	69.6	Flood Risk	
240 min Summer	0.222	0.222	0.9	74.4	Flood Risk	
360 min Summer	0.239	0.239	0.9	80.7	Flood Risk	
480 min Summer	0.249	0.249	0.9	84.5	Flood Risk	
600 min Summer	0.256	0.256	0.9	86.9	Flood Risk	
720 min Summer	0.259	0.259	0.9	88.3	Flood Risk	
960 min Summer	0.250	0.250	0.9	84.8	Flood Risk	
1440 min Summer	0.234	0.234	0.9	78.7	Flood Risk	
2160 min Summer	0.211	0.211	0.9	70.5	Flood Risk	
2880 min Summer	0.191	0.191	0.9	63.1	0 K	
4320 min Summer	0.165	0.165	0.9	54.3	0 K	
5760 min Summer	0.140	0.140	0.9	46.0	0 K	
7200 min Summer	0.118	0.118	0.9	38.7	0 K	
8640 min Summer	0.099	0.099	0.9	32.4	0 K	
10080 min Summer	0.083	0.083	0.9	27.2	0 K	
15 min Winter	0.118	0.118	0.9	38.8	0 K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)			
15 min Summer	145.315	0.0	17			
30 min Summer	90.424	0.0	32			
60 min Summer	56.268	0.0	62			
120 min Summer	35.013	0.0	122			
180 min Summer	26.529	0.0	182			
240 min Summer	21.787	0.0	242			
360 min Summer	16.508	0.0	360			
480 min Summer	13.557	0.0	480			
600 min Summer	11.637	0.0	600			
720 min Summer	10.272	0.0	700			
960 min Summer	8.045	0.0	798			
1440 min Summer	5.701	0.0	1038			
2160 min Summer	4.040	0.0	1448			
2880 min Summer	3.164	0.0	1844			
4320 min Summer	2.343	0.0	2636			
5760 min Summer	1.893	0.0	3408			
7200 min Summer	1.604	0.0	4112			
8640 min Summer	1.401	0.0	4840			
10080 min Summer	1.250	0.0	5544			
15 min Winter	145.315	0.0	17			
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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG			Havant Road, Emsworth SUDs Drainage Road Trench Soakaway [SA1+SA2]			
Date 16/05/17 File Road Soakaway.srcx			Designed by LK Checked by AMF			
Micro Drainage			Source Control 2015.1			
Summary of Results for 100 year Return Period (+40%)						
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	
30 min Winter	0.145	0.145	0.9	47.8	0 K	
60 min Winter	0.177	0.177	0.9	58.5	0 K	
120 min Winter	0.213	0.213	0.9	71.0	Flood Risk	
180 min Winter	0.234	0.234	0.9	78.7	Flood Risk	
240 min Winter	0.249	0.249	0.9	84.3	Flood Risk	
360 min Winter	0.269	0.269	0.9	91.9	Flood Risk	
480 min Winter	0.281	0.281	0.9	96.9	Flood Risk	
600 min Winter	0.289	0.289	0.9	100.1	Flood Risk	
720 min Winter	0.295	0.295	0.9	102.3	Flood Risk	
960 min Winter	0.285	0.285	0.9	98.4	Flood Risk	
1440 min Winter	0.265	0.265	0.9	90.4	Flood Risk	
2160 min Winter	0.236	0.236	0.9	79.3	Flood Risk	
2880 min Winter	0.206	0.206	0.9	68.7	Flood Risk	
4320 min Winter	0.166	0.166	0.9	54.6	0 K	
5760 min Winter	0.127	0.127	0.9	41.7	0 K	
7200 min Winter	0.094	0.094	0.9	30.8	0 K	
8640 min Winter	0.068	0.068	0.9	22.4	0 K	
10080 min Winter	0.052	0.052	0.9	17.0	0 K	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)			
30 min Winter	90.424	0.0	32			
60 min Winter	56.268	0.0	62			
120 min Winter	35.013	0.0	120			
180 min Winter	26.529	0.0	178			
240 min Winter	21.787	0.0	238			
360 min Winter	16.508	0.0	352			
480 min Winter	13.557	0.0	468			
600 min Winter	11.637	0.0	582			
720 min Winter	10.272	0.0	692			
960 min Winter	8.045	0.0	902			
1440 min Winter	5.701	0.0	1112			
2160 min Winter	4.040	0.0	1576			
2880 min Winter	3.164	0.0	2016			
4320 min Winter	2.343	0.0	2852			
5760 min Winter	1.893	0.0	3624			
7200 min Winter	1.604	0.0	4320			
8640 min Winter	1.401	0.0	4928			
10080 min Winter	1.250	0.0	5352			
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Cundall, Johnston & Partners		Page 3
19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Road Trench Soakaway [SA1+SA2]	
Date 16/05/17	Designed by LK	
File Road Soakaway.srcx	Checked by AMF	
Micro Drainage		Source Control 2015.1

Rainfall Details

Rainfall Model	FEH	F (1km)	2.263
Return Period (years)	100	Summer Storms	Yes
Site Location	GB 473800 105650	Winter Storms	Yes
C (1km)	-0.029	Cv (Summer)	0.750
D1 (1km)	0.449	Cv (Winter)	0.840
D2 (1km)	0.284	Shortest Storm (mins)	15
D3 (1km)	0.392	Longest Storm (mins)	10080
E (1km)	0.311	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.129

Time (mins)	Area
From:	To: (ha)

0	2	0.129
---	---	-------

Time Area Diagram

Total Area (ha) 0.000

Time (mins)	Area
From:	To: (ha)

0	4	0.000
---	---	-------

Cundall, Johnston & Partners		Page 4
19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Road Trench Soakaway [SA1+SA2]	
Date 16/05/17 File Road Soakaway.srcx	Designed by LK Checked by AMF	
Micro Drainage Source Control 2015.1		

Model Details

Storage is Online Cover Level (m) 0.500

Complex Structure

Cellular Storage

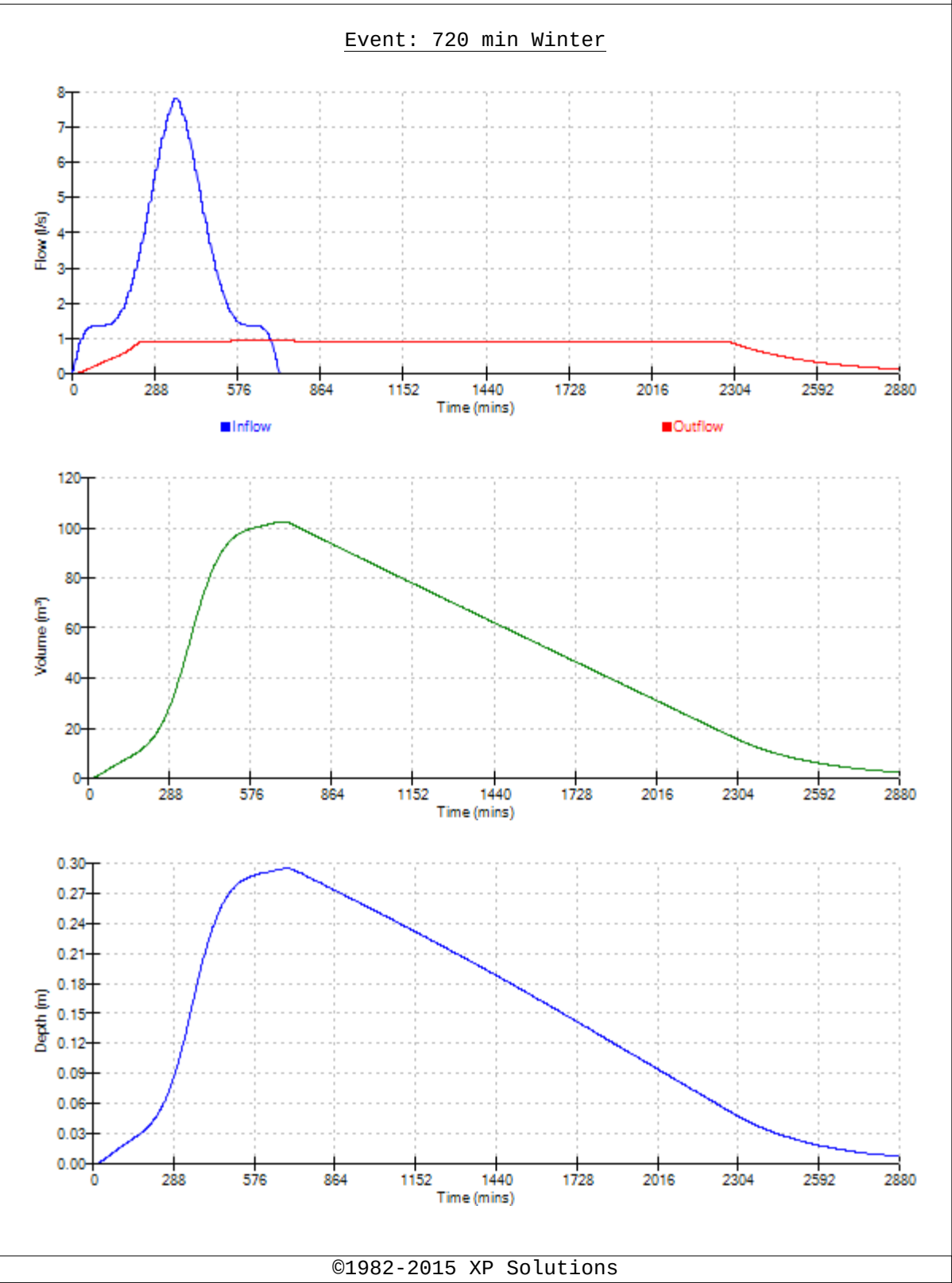
Invert Level (m) 0.000 Safety Factor 2.0
 Infiltration Coefficient Base (m/hr) 0.01872 Porosity 0.95
 Infiltration Coefficient Side (m/hr) 0.01872

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	346.0	346.0	0.150	346.0	346.0

Infiltration Trench

Infiltration Coefficient Base (m/hr) 0.00000 Trench Width (m) 3.2
 Infiltration Coefficient Side (m/hr) 0.01872 Trench Length (m) 108.0
 Safety Factor 2.0 Slope (1:X) 540.0
 Porosity 0.30 Cap Volume Depth (m) 0.150
 Invert Level (m) 0.150 Cap Infiltration Depth (m) 0.150

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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Swale 1	
Date 17/05/17 File Swale 1.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage	Source Control 2015.1	

Rainfall Details

Rainfall Model	FEH	F (1km)	2.263
Return Period (years)	100	Summer Storms	Yes
Site Location	GB 473800 105650	Winter Storms	Yes
C (1km)	-0.029	Cv (Summer)	0.750
D1 (1km)	0.449	Cv (Winter)	0.840
D2 (1km)	0.284	Shortest Storm (mins)	15
D3 (1km)	0.392	Longest Storm (mins)	10080
E (1km)	0.311	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.066

Time (mins)	Area
From:	To: (ha)

0	2 0.066
---	---------

Cundall, Johnston & Partners		Page 4
19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Swale 1	
Date 17/05/17 File Swale 1.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage Source Control 2015.1		

Model Details

Storage is Online Cover Level (m) 0.600

Dry Swale Structure

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.5
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	16.5
Safety Factor	2.0	Side Slope (1:X)	3.0
Porosity	0.30	Slope (1:X)	200.0
Invert Level (m)	0.000	Cap Volume Depth (m)	0.000
Trench Height (m)	0.300	Cap Infiltration Depth (m)	0.000

Pipe Outflow Control

Diameter (m)	0.150	Entry Loss Coefficient	0.500
Slope (1:X)	150.0	Coefficient of Contraction	0.600
Length (m)	5.000	Upstream Invert Level (m)	0.000
Roughness k (mm)	0.600		

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19 - 21 Silvermills Court
Henderson Place Lane
Edinburgh EH3 5DG

Havant Road, Emsworth
SUDs Drainage
Swale 1

Date 17/05/17

Designed by LK/AC

File Swale 1.srcx

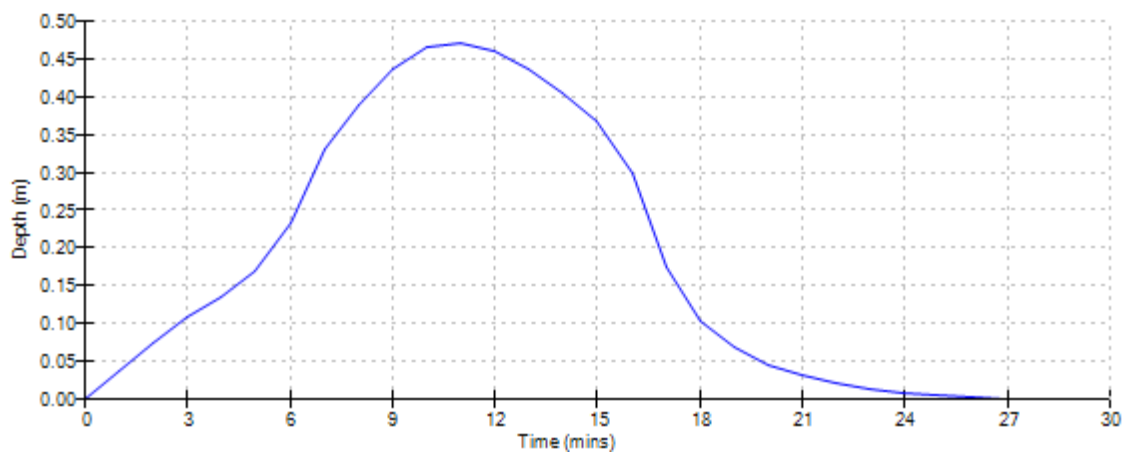
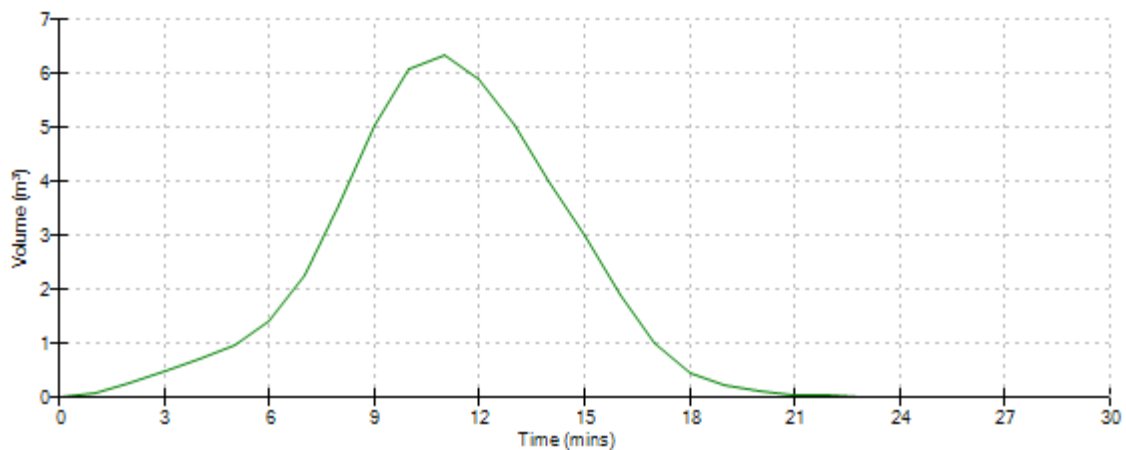
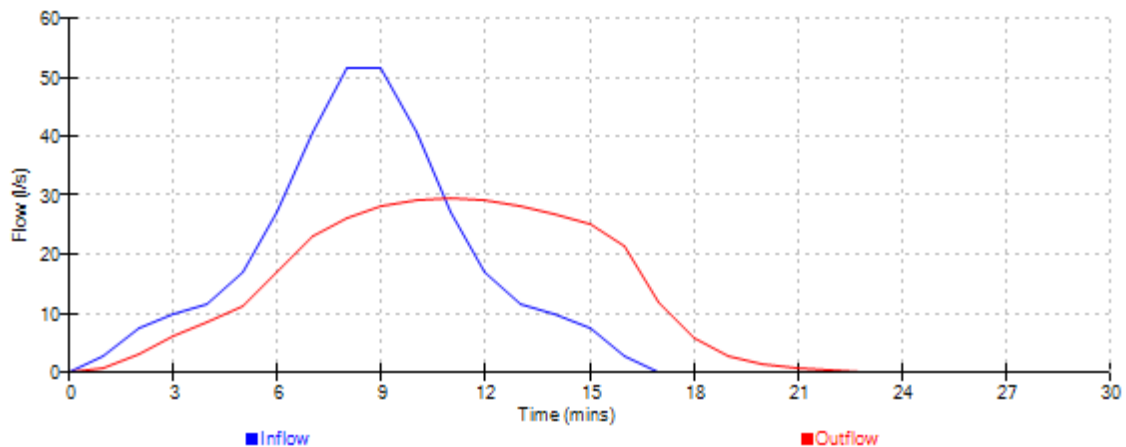
Checked by AMF

Micro Drainage

Source Control 2015.1



Event: 15 min Winter



Cundall, Johnston & Partners							Page 1	
19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG				Havant Road, Emsworth SUDs Drainage Swale 2				
Date 17/05/17 File Swale 2.srcx				Designed by LK/AC Checked by AMF				
Micro Drainage				Source Control 2015.1				
Summary of Results for 100 year Return Period (+40%)								
Half Drain Time : 2 minutes.								
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status	
15 min Summer	0.316	0.316	0.0	22.3	22.3	3.2	Flood Risk	
30 min Summer	0.264	0.264	0.0	19.1	19.1	2.5	0 K	
60 min Summer	0.202	0.202	0.0	14.5	14.5	1.7	0 K	
120 min Summer	0.158	0.158	0.0	10.0	10.0	1.1	0 K	
180 min Summer	0.130	0.130	0.0	8.2	8.2	0.8	0 K	
240 min Summer	0.116	0.116	0.0	6.8	6.8	0.6	0 K	
360 min Summer	0.096	0.096	0.0	5.2	5.2	0.4	0 K	
480 min Summer	0.086	0.086	0.0	4.3	4.3	0.3	0 K	
600 min Summer	0.080	0.080	0.0	3.7	3.7	0.3	0 K	
720 min Summer	0.076	0.076	0.0	3.3	3.3	0.3	0 K	
960 min Summer	0.069	0.069	0.0	2.6	2.6	0.2	0 K	
1440 min Summer	0.056	0.056	0.0	1.8	1.8	0.1	0 K	
2160 min Summer	0.048	0.048	0.0	1.3	1.3	0.1	0 K	
2880 min Summer	0.042	0.042	0.0	1.0	1.0	0.1	0 K	
4320 min Summer	0.036	0.036	0.0	0.8	0.8	0.1	0 K	
5760 min Summer	0.033	0.033	0.0	0.6	0.6	0.0	0 K	
7200 min Summer	0.030	0.030	0.0	0.5	0.5	0.0	0 K	
8640 min Summer	0.028	0.028	0.0	0.5	0.5	0.0	0 K	
10080 min Summer	0.026	0.026	0.0	0.4	0.4	0.0	0 K	
15 min Winter	0.315	0.315	0.0	22.2	22.2	3.2	Flood Risk	
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)				
15 min Summer	145.315	0.0	10.6	10				
30 min Summer	90.424	0.0	13.2	18				
60 min Summer	56.268	0.0	16.5	32				
120 min Summer	35.013	0.0	20.5	64				
180 min Summer	26.529	0.0	23.3	92				
240 min Summer	21.787	0.0	25.5	122				
360 min Summer	16.508	0.0	29.0	184				
480 min Summer	13.557	0.0	31.7	242				
600 min Summer	11.637	0.0	34.0	306				
720 min Summer	10.272	0.0	36.1	366				
960 min Summer	8.045	0.0	37.7	488				
1440 min Summer	5.701	0.0	40.0	726				
2160 min Summer	4.040	0.0	42.5	1092				
2880 min Summer	3.164	0.0	44.4	1468				
4320 min Summer	2.343	0.0	49.3	2136				
5760 min Summer	1.893	0.0	53.2	2872				
7200 min Summer	1.604	0.0	56.3	3616				
8640 min Summer	1.401	0.0	59.0	4360				
10080 min Summer	1.250	0.0	61.4	5008				
15 min Winter	145.315	0.0	11.9	10				
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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Swale 2	
Date 17/05/17 File Swale 2.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage	Source Control 2015.1	

Rainfall Details

Rainfall Model	FEH	F (1km)	2.263
Return Period (years)	100	Summer Storms	Yes
Site Location	GB 473800 105650	Winter Storms	Yes
C (1km)	-0.029	Cv (Summer)	0.750
D1 (1km)	0.449	Cv (Winter)	0.840
D2 (1km)	0.284	Shortest Storm (mins)	15
D3 (1km)	0.392	Longest Storm (mins)	10080
E (1km)	0.311	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.039

Time (mins)	Area
From:	To: (ha)

0	2 0.039
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Cundall, Johnston & Partners		Page 4
19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Swale 2	
Date 17/05/17 File Swale 2.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage Source Control 2015.1		

Model Details

Storage is Online Cover Level (m) 0.600

Dry Swale Structure

Infiltration Coefficient Base (m/hr) 0.00000	Trench Width (m) 1.5
Infiltration Coefficient Side (m/hr) 0.00000	Trench Length (m) 29.1
Safety Factor 2.0	Side Slope (1:X) 3.0
Porosity 0.30	Slope (1:X) 200.0
Invert Level (m) 0.000	Cap Volume Depth (m) 0.000
Trench Height (m) 0.300	Cap Infiltration Depth (m) 0.000

Pipe Outflow Control

Diameter (m) 0.150	Entry Loss Coefficient 0.500
Slope (1:X) 150.0	Coefficient of Contraction 0.600
Length (m) 5.000	Upstream Invert Level (m) 0.000
Roughness k (mm) 0.600	

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Henderson Place Lane
Edinburgh EH3 5DG

Havant Road, Emsworth
SUDs Drainage
Swale 2

Date 17/05/17

Designed by LK/AC

File Swale 2.srcx

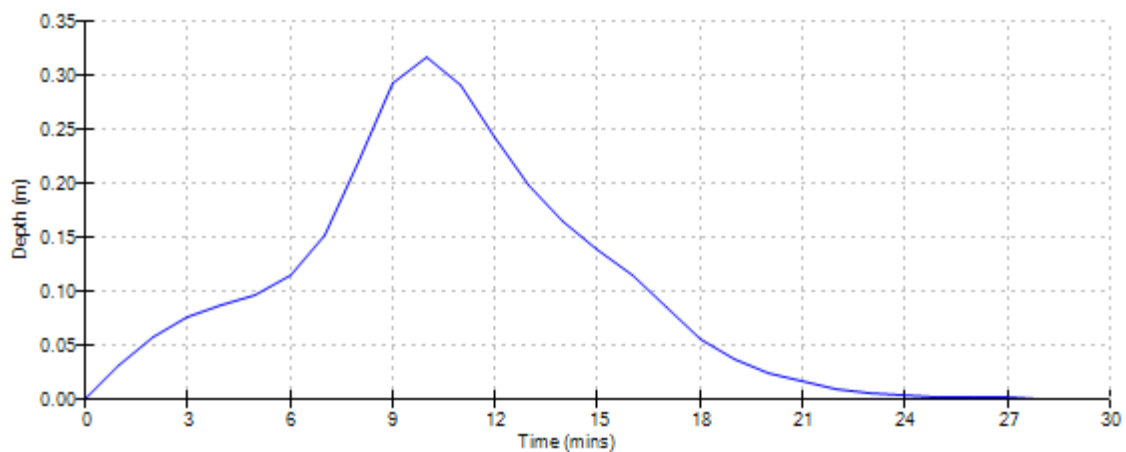
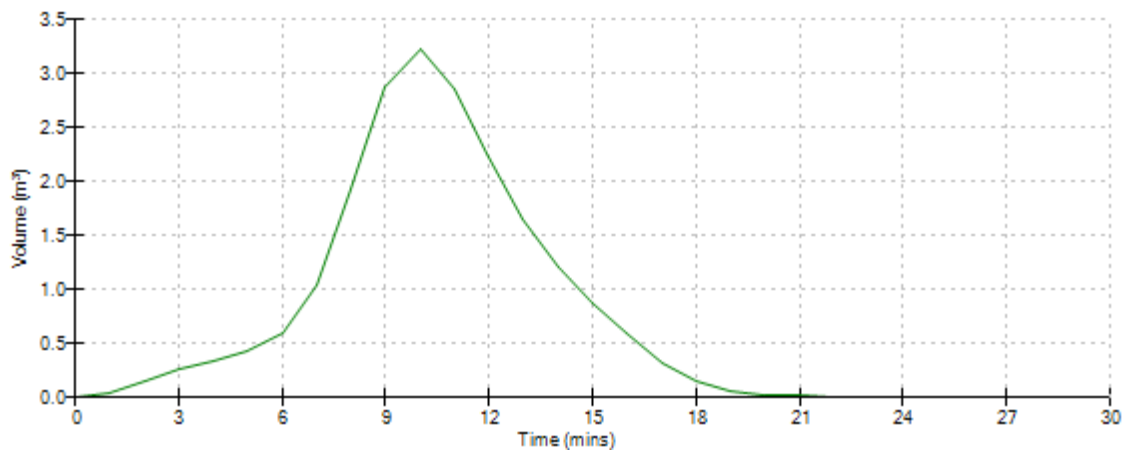
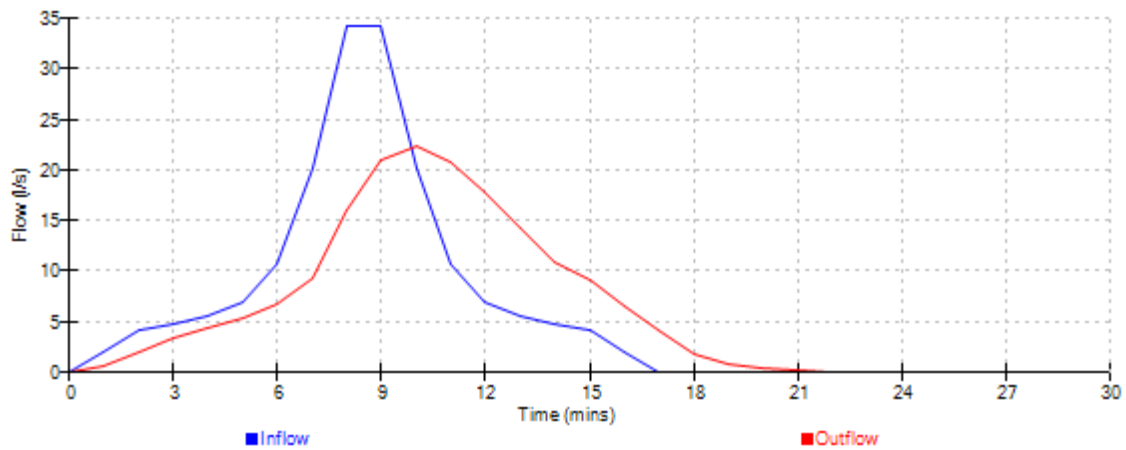
Checked by AMF

Micro Drainage

Source Control 2015.1



Event: 15 min Summer



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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Swale 3	
Date 17/05/17 File Swale 3.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage	Source Control 2015.1	

Rainfall Details

Rainfall Model	FEH	F (1km)	2.263
Return Period (years)	100	Summer Storms	Yes
Site Location	GB 473800 105650	Winter Storms	Yes
C (1km)	-0.029	Cv (Summer)	0.750
D1 (1km)	0.449	Cv (Winter)	0.840
D2 (1km)	0.284	Shortest Storm (mins)	15
D3 (1km)	0.392	Longest Storm (mins)	10080
E (1km)	0.311	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.027

Time (mins)	Area
From:	To: (ha)

0	2 0.027
---	---------

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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Swale 3	
Date 17/05/17 File Swale 3.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage Source Control 2015.1		

Model Details

Storage is Online Cover Level (m) 0.600

Dry Swale Structure

Infiltration Coefficient Base (m/hr)	0.00000	Trench Width (m)	1.5
Infiltration Coefficient Side (m/hr)	0.00000	Trench Length (m)	15.2
Safety Factor	2.0	Side Slope (1:X)	3.0
Porosity	0.30	Slope (1:X)	200.0
Invert Level (m)	0.000	Cap Volume Depth (m)	0.000
Trench Height (m)	0.300	Cap Infiltration Depth (m)	0.000

Pipe Outflow Control

Diameter (m)	0.150	Entry Loss Coefficient	0.500
Slope (1:X)	150.0	Coefficient of Contraction	0.600
Length (m)	5.000	Upstream Invert Level (m)	0.000
Roughness k (mm)	0.600		

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Henderson Place Lane
Edinburgh EH3 5DG

Havant Road, Emsworth
SUDs Drainage
Swale 3

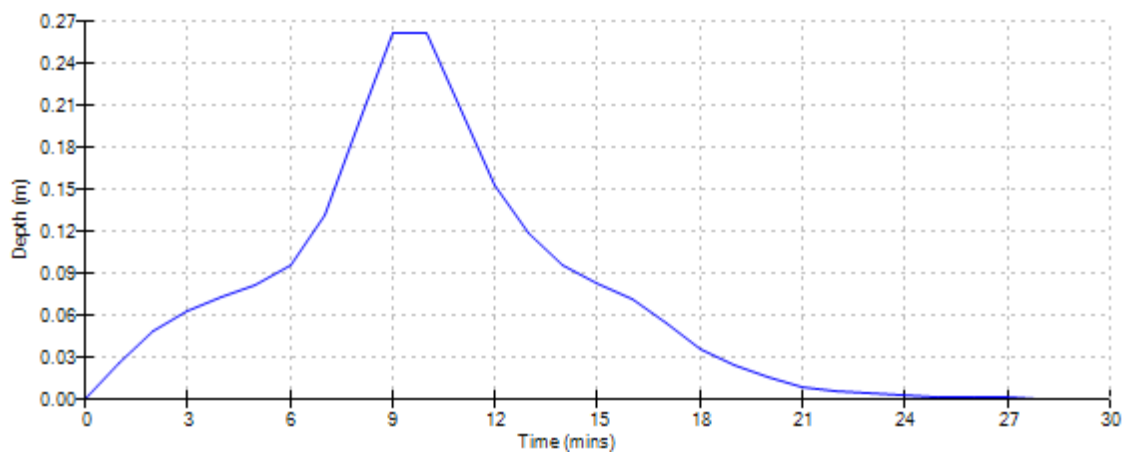
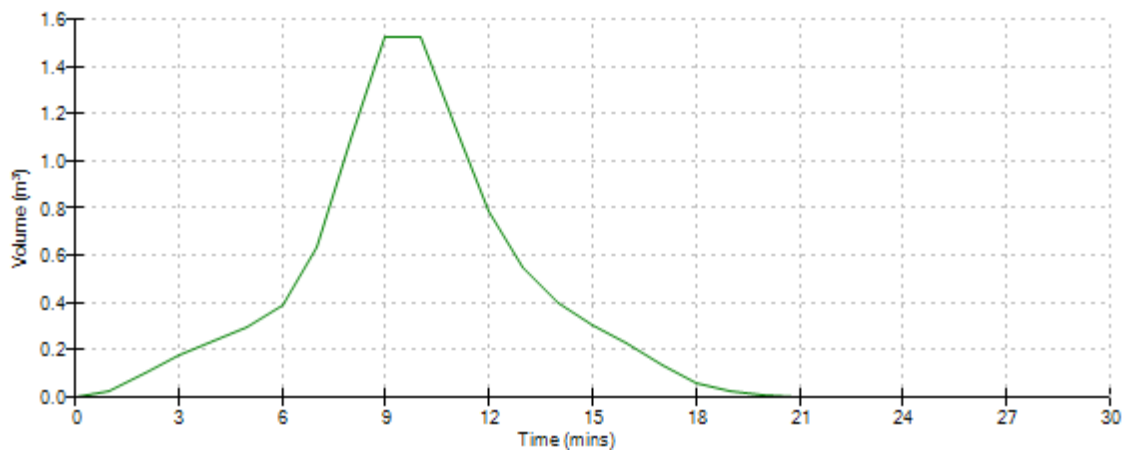
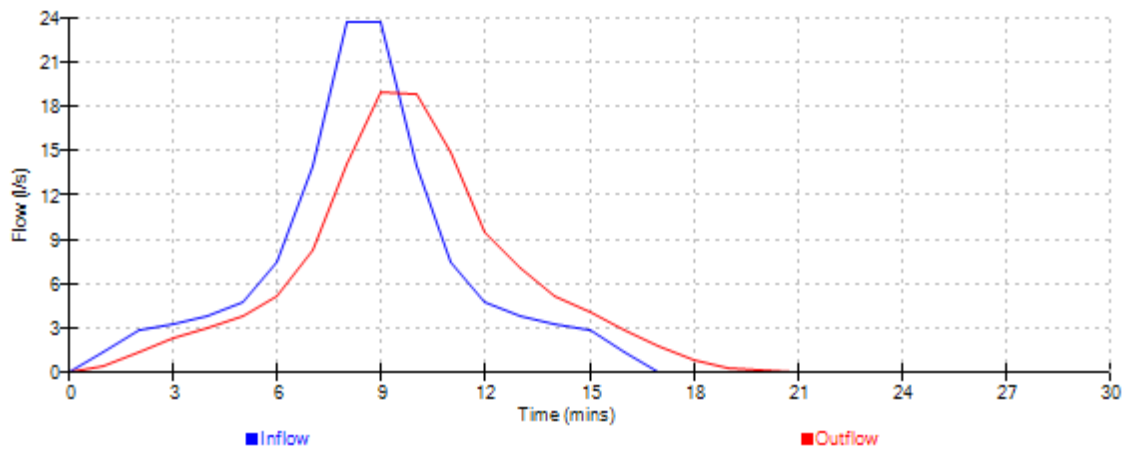
Date 17/05/17
File Swale 3.srcx

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Micro Drainage

Source Control 2015.1

Event: 15 min Summer

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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Swale 4	
Date 17/05/17 File Swale 4.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage	Source Control 2015.1	

Rainfall Details

Rainfall Model	FEH	F (1km)	2.263
Return Period (years)	100	Summer Storms	Yes
Site Location	GB 473800 105650	Winter Storms	Yes
C (1km)	-0.029	Cv (Summer)	0.750
D1 (1km)	0.449	Cv (Winter)	0.840
D2 (1km)	0.284	Shortest Storm (mins)	15
D3 (1km)	0.392	Longest Storm (mins)	10080
E (1km)	0.311	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.027

Time (mins)	Area
From:	To: (ha)

0	2 0.027
---	---------

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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Swale 4	
Date 17/05/17 File Swale 4.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage Source Control 2015.1		

Model Details

Storage is Online Cover Level (m) 0.600

Dry Swale Structure

Infiltration Coefficient Base (m/hr) 0.00000	Trench Width (m) 1.5
Infiltration Coefficient Side (m/hr) 0.00000	Trench Length (m) 11.2
Safety Factor 2.0	Side Slope (1:X) 3.0
Porosity 0.30	Slope (1:X) 200.0
Invert Level (m) 0.000	Cap Volume Depth (m) 0.000
Trench Height (m) 0.300	Cap Infiltration Depth (m) 0.000

Pipe Outflow Control

Diameter (m) 0.150	Entry Loss Coefficient 0.500
Slope (1:X) 150.0	Coefficient of Contraction 0.600
Length (m) 5.000	Upstream Invert Level (m) 0.000
Roughness k (mm) 0.600	

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Edinburgh EH3 5DG

Havant Road, Emsworth
SUDs Drainage
Swale 4

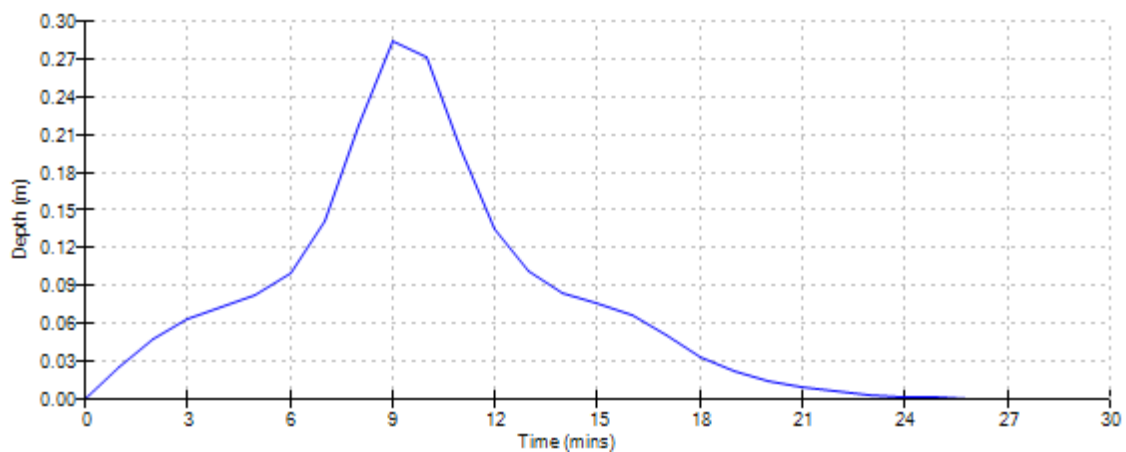
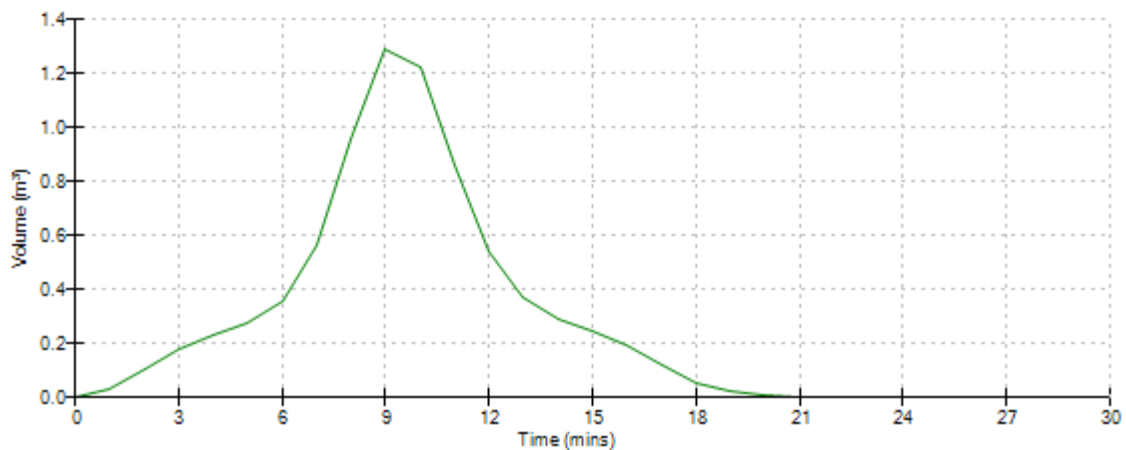
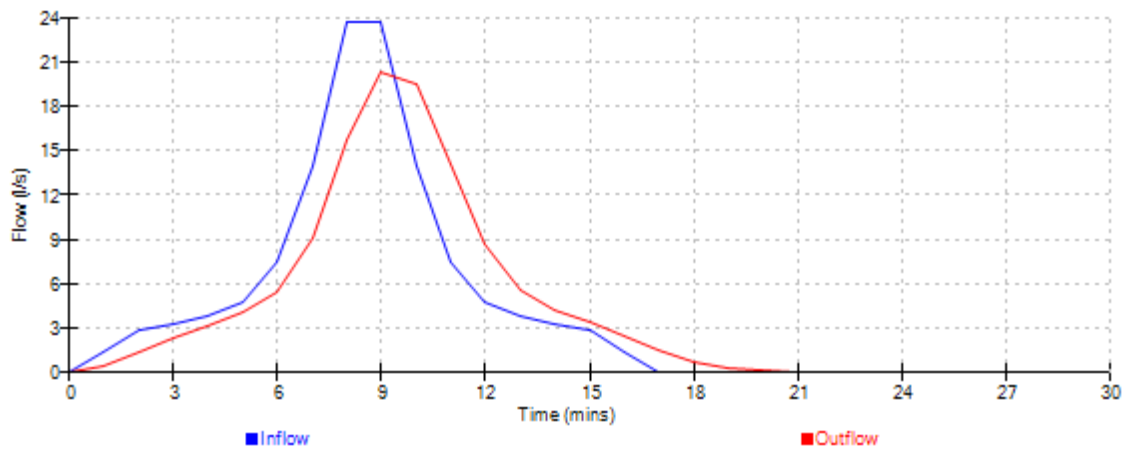
Date 17/05/17
File Swale 4.srcx

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Micro Drainage

Source Control 2015.1

Event: 15 min Summer

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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Swale 5	
Date 17/05/17 File Swale 5.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage	Source Control 2015.1	

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

Half Drain Time : 6 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	0.478	0.478	0.0	29.8	29.8	13.5	Flood Risk
30 min Summer	0.458	0.458	0.0	29.1	29.1	11.9	Flood Risk
60 min Summer	0.410	0.410	0.0	27.0	27.0	8.7	Flood Risk
120 min Summer	0.333	0.333	0.0	23.2	23.2	5.1	Flood Risk
180 min Summer	0.276	0.276	0.0	19.9	19.9	3.4	0 K
240 min Summer	0.236	0.236	0.0	17.2	17.2	2.5	0 K
360 min Summer	0.192	0.192	0.0	13.7	13.7	1.7	0 K
480 min Summer	0.169	0.169	0.0	11.3	11.3	1.3	0 K
600 min Summer	0.156	0.156	0.0	9.8	9.8	1.1	0 K
720 min Summer	0.135	0.135	0.0	8.7	8.7	0.8	0 K
960 min Summer	0.116	0.116	0.0	6.8	6.8	0.6	0 K
1440 min Summer	0.091	0.091	0.0	4.8	4.8	0.4	0 K
2160 min Summer	0.077	0.077	0.0	3.4	3.4	0.3	0 K
2880 min Summer	0.070	0.070	0.0	2.7	2.7	0.2	0 K
4320 min Summer	0.059	0.059	0.0	2.0	2.0	0.2	0 K
5760 min Summer	0.053	0.053	0.0	1.6	1.6	0.1	0 K
7200 min Summer	0.049	0.049	0.0	1.4	1.4	0.1	0 K
8640 min Summer	0.046	0.046	0.0	1.2	1.2	0.1	0 K
10080 min Summer	0.043	0.043	0.0	1.1	1.1	0.1	0 K
15 min Winter	0.496	0.496	0.0	30.5	30.5	15.0	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	145.315	0.0	28.1	11
30 min Summer	90.424	0.0	34.9	19
60 min Summer	56.268	0.0	43.5	36
120 min Summer	35.013	0.0	54.1	64
180 min Summer	26.529	0.0	61.5	94
240 min Summer	21.787	0.0	67.3	124
360 min Summer	16.508	0.0	76.5	184
480 min Summer	13.557	0.0	83.8	244
600 min Summer	11.637	0.0	89.9	306
720 min Summer	10.272	0.0	95.2	362
960 min Summer	8.045	0.0	99.4	486
1440 min Summer	5.701	0.0	105.7	730
2160 min Summer	4.040	0.0	112.4	1084
2880 min Summer	3.164	0.0	117.3	1464
4320 min Summer	2.343	0.0	130.3	2132
5760 min Summer	1.893	0.0	140.4	2904
7200 min Summer	1.604	0.0	148.7	3672
8640 min Summer	1.401	0.0	155.9	4256
10080 min Summer	1.250	0.0	162.2	5048
15 min Winter	145.315	0.0	31.4	12

Cundall, Johnston & Partners		Page 3
19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Swale 5	
Date 17/05/17 File Swale 5.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage	Source Control 2015.1	

Rainfall Details

Rainfall Model	FEH	F (1km)	2.263
Return Period (years)	100	Summer Storms	Yes
Site Location	GB 473800 105650	Winter Storms	Yes
C (1km)	-0.029	Cv (Summer)	0.750
D1 (1km)	0.449	Cv (Winter)	0.840
D2 (1km)	0.284	Shortest Storm (mins)	15
D3 (1km)	0.392	Longest Storm (mins)	10080
E (1km)	0.311	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.103

Time (mins)	Area
From: To:	(ha)

0	2	0.103
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Cundall, Johnston & Partners		Page 4
19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Swale 5	
Date 17/05/17 File Swale 5.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage Source Control 2015.1		

Model Details

Storage is Online Cover Level (m) 0.600

Dry Swale Structure

Infiltration Coefficient Base (m/hr) 0.00000	Trench Width (m) 1.5
Infiltration Coefficient Side (m/hr) 0.00000	Trench Length (m) 62.2
Safety Factor 2.0	Side Slope (1:X) 3.0
Porosity 0.30	Slope (1:X) 200.0
Invert Level (m) 0.000	Cap Volume Depth (m) 0.000
Trench Height (m) 0.300	Cap Infiltration Depth (m) 0.000

Pipe Outflow Control

Diameter (m) 0.150	Entry Loss Coefficient 0.500
Slope (1:X) 150.0	Coefficient of Contraction 0.600
Length (m) 5.000	Upstream Invert Level (m) 0.000
Roughness k (mm) 0.600	

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Henderson Place Lane
Edinburgh EH3 5DG

Havant Road, Emsworth
SUDs Drainage
Swale 5

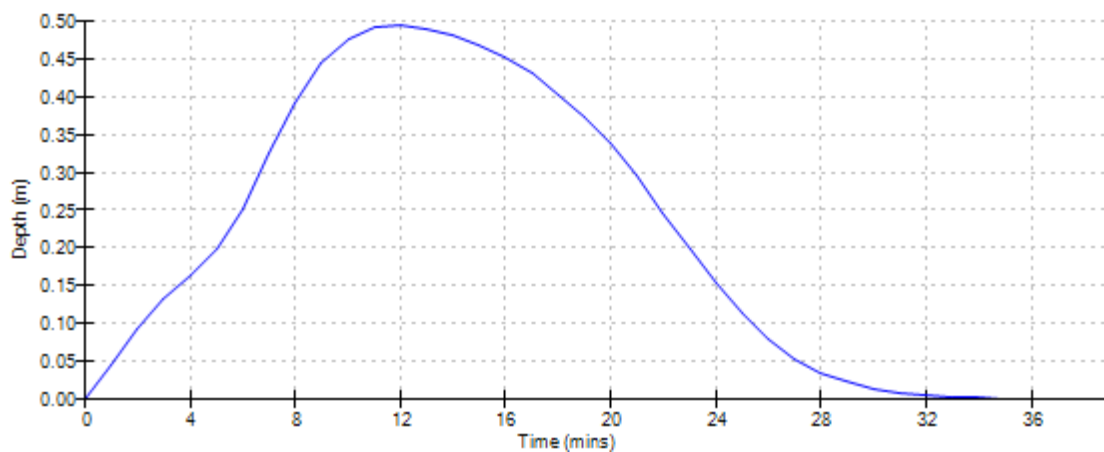
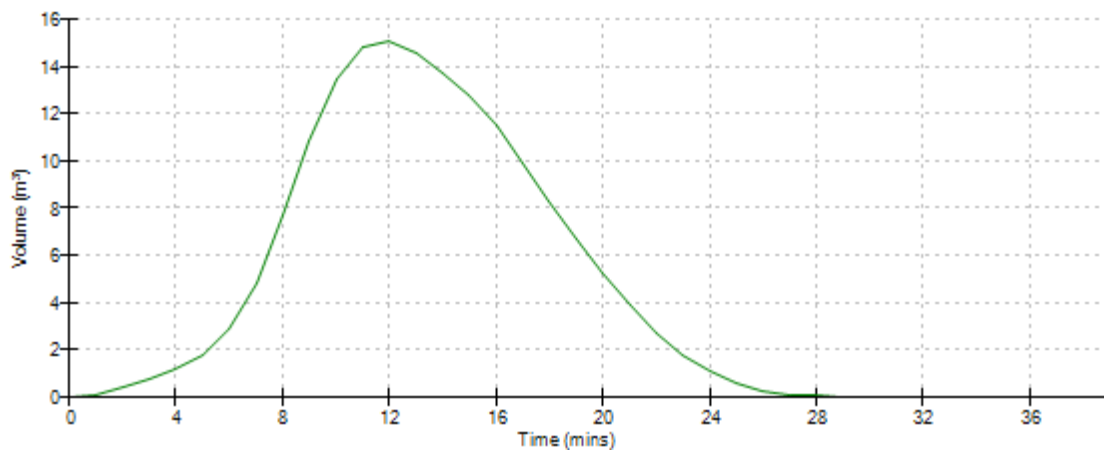
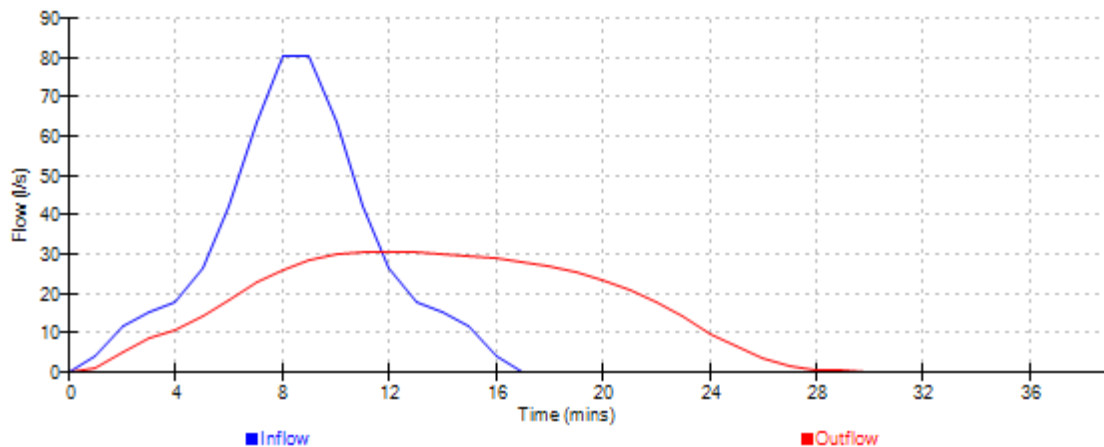
Date 17/05/17
File Swale 5.srcx

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Micro Drainage

Source Control 2015.1

Event: 15 min Winter

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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Swale 6	
Date 17/05/17 File Swale 6.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage	Source Control 2015.1	

Rainfall Details

Rainfall Model	FEH	F (1km)	2.263
Return Period (years)	100	Summer Storms	Yes
Site Location	GB 473800 105650	Winter Storms	Yes
C (1km)	-0.029	Cv (Summer)	0.750
D1 (1km)	0.449	Cv (Winter)	0.840
D2 (1km)	0.284	Shortest Storm (mins)	15
D3 (1km)	0.392	Longest Storm (mins)	10080
E (1km)	0.311	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.084

Time (mins)	Area
From:	To: (ha)

0	2 0.084
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19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth SUDs Drainage Swale 6	
Date 17/05/17 File Swale 6.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage Source Control 2015.1		

Model Details

Storage is Online Cover Level (m) 0.600

Dry Swale Structure

Infiltration Coefficient Base (m/hr) 0.00000	Trench Width (m) 1.5
Infiltration Coefficient Side (m/hr) 0.00000	Trench Length (m) 36.1
Safety Factor 2.0	Side Slope (1:X) 3.0
Porosity 0.30	Slope (1:X) 200.0
Invert Level (m) 0.000	Cap Volume Depth (m) 0.000
Trench Height (m) 0.300	Cap Infiltration Depth (m) 0.000

Pipe Outflow Control

Diameter (m) 0.150	Entry Loss Coefficient 0.500
Slope (1:X) 150.0	Coefficient of Contraction 0.600
Length (m) 5.000	Upstream Invert Level (m) 0.000
Roughness k (mm) 0.600	

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Henderson Place Lane
Edinburgh EH3 5DG

Havant Road, Emsworth
SUDs Drainage
Swale 6

Date 17/05/17

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File Swale 6.srcx

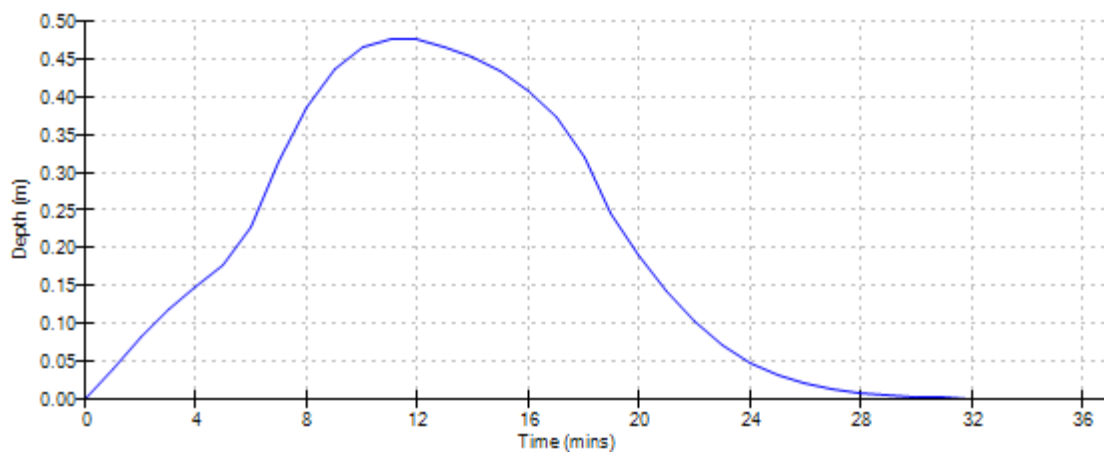
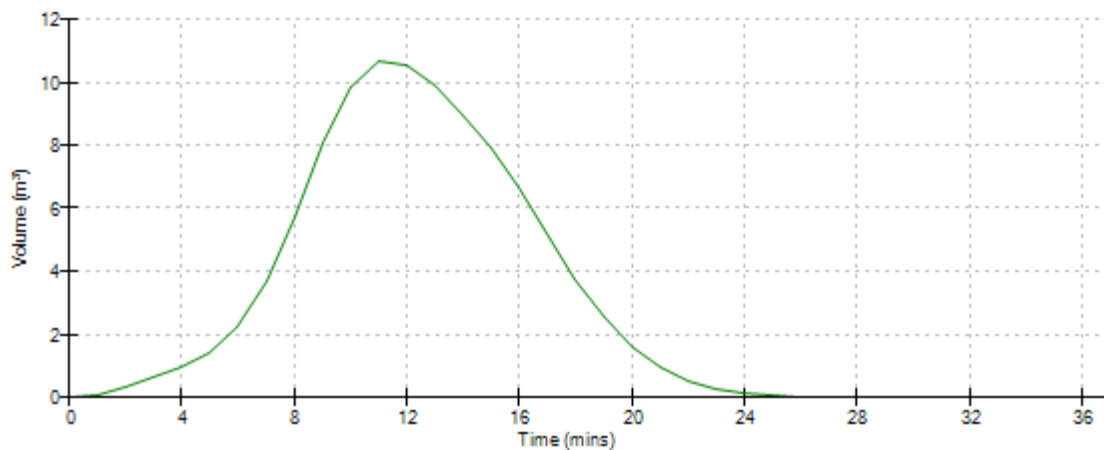
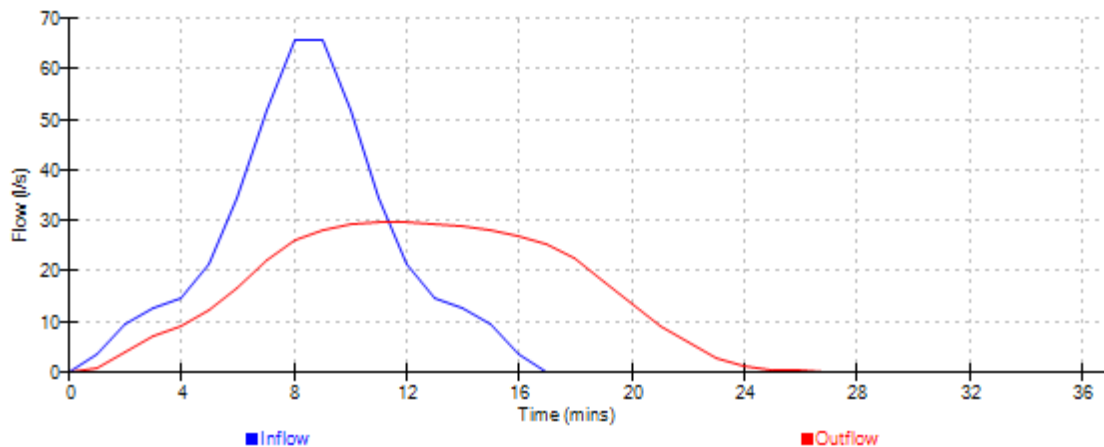
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Micro Drainage

Source Control 2015.1



Event: 15 min Winter



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Micro Drainage	Source Control 2015.1	

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

Half Drain Time : 5 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	0.474	0.474	0.0	29.7	29.7	10.9	Flood Risk
30 min Summer	0.451	0.451	0.0	28.8	28.8	9.3	Flood Risk
60 min Summer	0.398	0.398	0.0	26.5	26.5	6.5	Flood Risk
120 min Summer	0.310	0.310	0.0	21.9	21.9	3.7	Flood Risk
180 min Summer	0.247	0.247	0.0	18.0	18.0	2.6	0 K
240 min Summer	0.211	0.211	0.0	15.3	15.3	2.0	0 K
360 min Summer	0.176	0.176	0.0	12.0	12.0	1.4	0 K
480 min Summer	0.157	0.157	0.0	9.9	9.9	1.1	0 K
600 min Summer	0.134	0.134	0.0	8.6	8.6	0.8	0 K
720 min Summer	0.124	0.124	0.0	7.5	7.5	0.7	0 K
960 min Summer	0.105	0.105	0.0	5.9	5.9	0.5	0 K
1440 min Summer	0.085	0.085	0.0	4.2	4.2	0.3	0 K
2160 min Summer	0.073	0.073	0.0	3.0	3.0	0.2	0 K
2880 min Summer	0.065	0.065	0.0	2.3	2.3	0.2	0 K
4320 min Summer	0.055	0.055	0.0	1.7	1.7	0.1	0 K
5760 min Summer	0.049	0.049	0.0	1.4	1.4	0.1	0 K
7200 min Summer	0.046	0.046	0.0	1.2	1.2	0.1	0 K
8640 min Summer	0.042	0.042	0.0	1.0	1.0	0.1	0 K
10080 min Summer	0.040	0.040	0.0	0.9	0.9	0.1	0 K
15 min Winter	0.488	0.488	0.0	30.2	30.2	11.9	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	145.315	0.0	24.5	11
30 min Summer	90.424	0.0	30.5	19
60 min Summer	56.268	0.0	38.0	34
120 min Summer	35.013	0.0	47.3	64
180 min Summer	26.529	0.0	53.7	94
240 min Summer	21.787	0.0	58.8	124
360 min Summer	16.508	0.0	66.9	184
480 min Summer	13.557	0.0	73.2	244
600 min Summer	11.637	0.0	78.6	304
720 min Summer	10.272	0.0	83.2	366
960 min Summer	8.045	0.0	86.9	488
1440 min Summer	5.701	0.0	92.4	712
2160 min Summer	4.040	0.0	98.2	1084
2880 min Summer	3.164	0.0	102.5	1468
4320 min Summer	2.343	0.0	113.9	2204
5760 min Summer	1.893	0.0	122.7	2888
7200 min Summer	1.604	0.0	129.9	3664
8640 min Summer	1.401	0.0	136.2	4280
10080 min Summer	1.250	0.0	141.7	5088
15 min Winter	145.315	0.0	27.5	11

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Micro Drainage	Source Control 2015.1	

Rainfall Details

Rainfall Model	FEH	F (1km)	2.263
Return Period (years)	100	Summer Storms	Yes
Site Location	GB 473800 105650	Winter Storms	Yes
C (1km)	-0.029	Cv (Summer)	0.750
D1 (1km)	0.449	Cv (Winter)	0.840
D2 (1km)	0.284	Shortest Storm (mins)	15
D3 (1km)	0.392	Longest Storm (mins)	10080
E (1km)	0.311	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.090

Time (mins)	Area
From:	To: (ha)

0	2 0.090
---	---------

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Date 17/05/17 File Swale 7.srcx	Designed by LK/AC Checked by AMF	
Micro Drainage Source Control 2015.1		

Model Details

Storage is Online Cover Level (m) 0.600

Dry Swale Structure

Infiltration Coefficient Base (m/hr) 0.00000	Trench Width (m) 1.5
Infiltration Coefficient Side (m/hr) 0.00000	Trench Length (m) 39.0
Safety Factor 2.0	Side Slope (1:X) 3.0
Porosity 0.30	Slope (1:X) 200.0
Invert Level (m) 0.000	Cap Volume Depth (m) 0.000
Trench Height (m) 0.300	Cap Infiltration Depth (m) 0.000

Pipe Outflow Control

Diameter (m) 0.150	Entry Loss Coefficient 0.500
Slope (1:X) 150.0	Coefficient of Contraction 0.600
Length (m) 5.000	Upstream Invert Level (m) 0.000
Roughness k (mm) 0.600	

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19 - 21 Silvermills Court
Henderson Place Lane
Edinburgh EH3 5DG

Havant Road, Emsworth
SUDs Drainage
Swale 7

Date 17/05/17

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File Swale 7.srcx

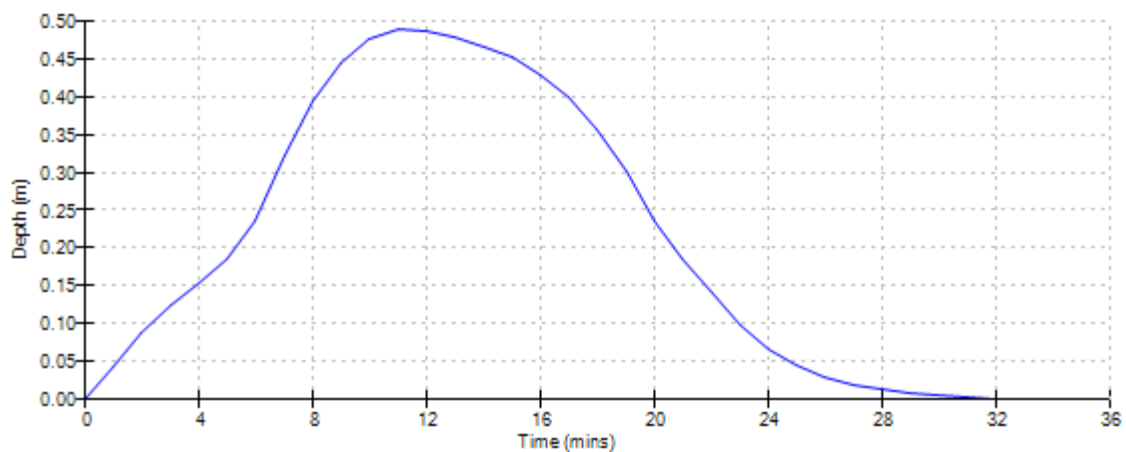
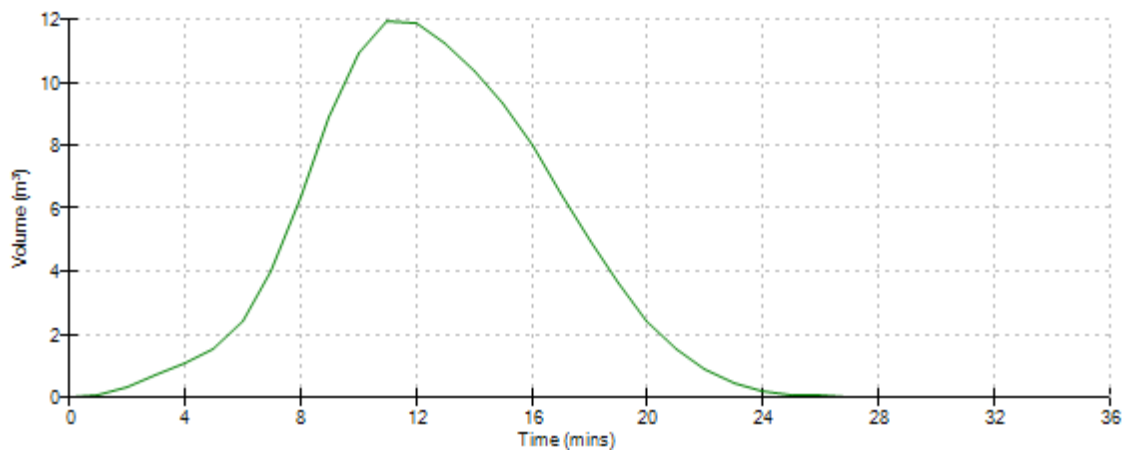
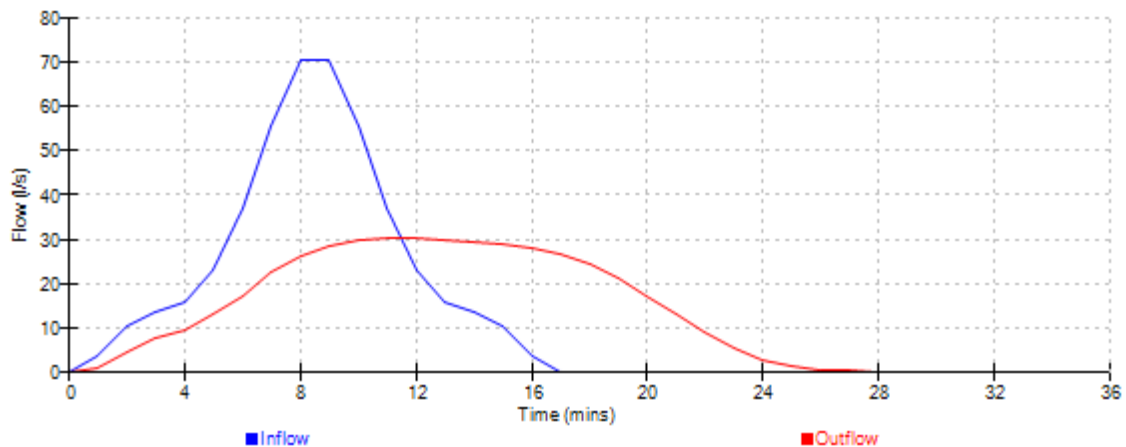
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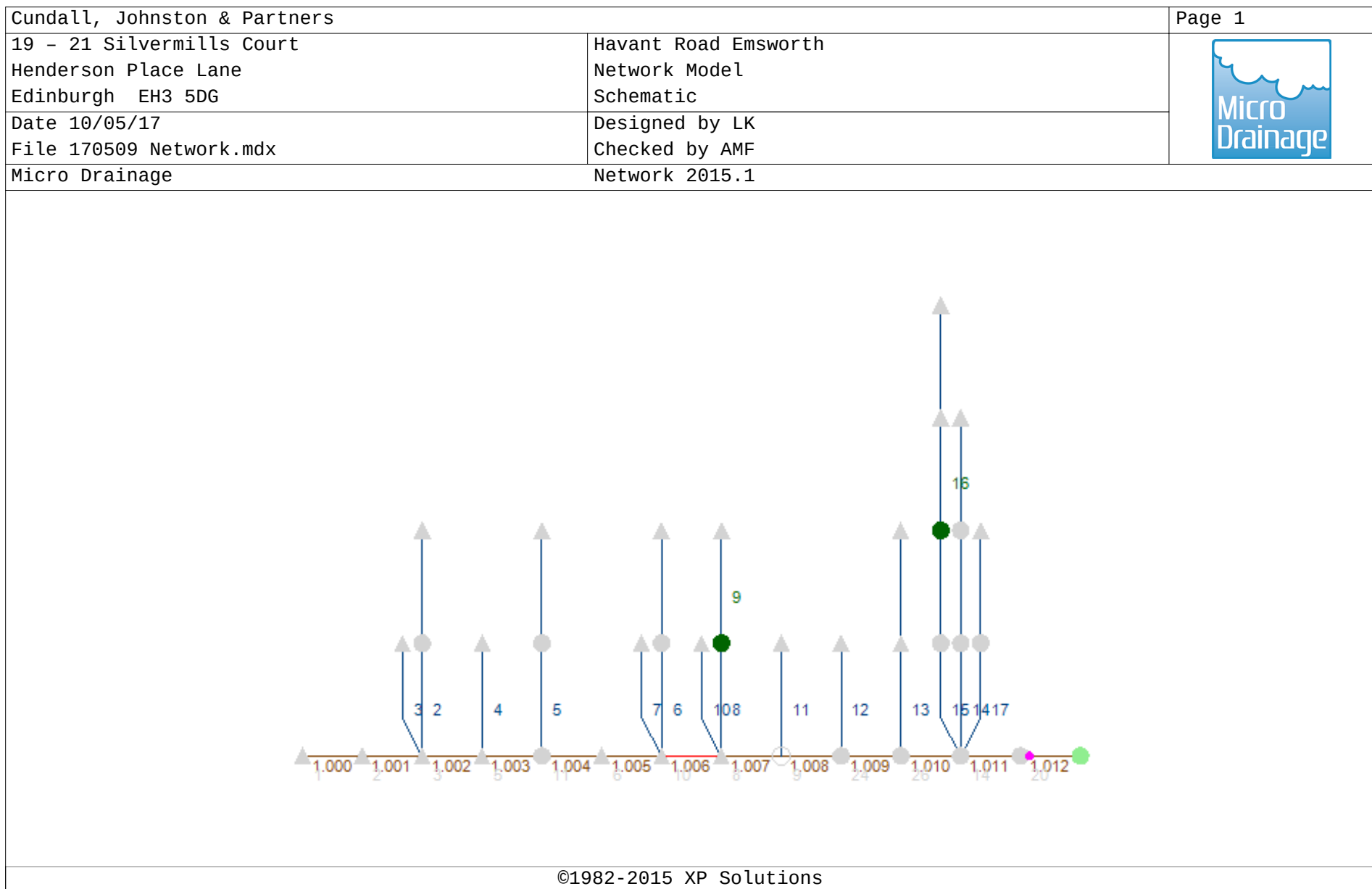
Micro Drainage

Source Control 2015.1



Event: 15 min Winter





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Micro Drainage	Network 2015.1	

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.000	16.829	0.112	150.3	0.000	2.00	0.0	0.600	o	150	
1.001	47.992	0.400	120.0	0.000	0.00	0.0	0.600	o	150	
2.000	55.200	0.100	552.0	0.000	2.00	0.0	0.600	o	150	
2.001	8.641	0.086	100.5	0.000	0.00	0.0	0.600	o	225	
3.000	7.849	0.196	40.0	0.000	2.00	0.0	0.600	o	150	
1.002	50.186	0.264	190.1	0.000	0.00	0.0	0.600	o	225	
4.000	10.762	0.269	40.0	0.000	2.00	0.0	0.600	o	150	
1.003	46.685	0.156	299.3	0.000	0.00	0.0	0.600	o	300	
5.000	26.200	0.100	262.0	0.000	2.00	0.0	0.600	o	150	
5.001	9.251	0.093	99.5	0.000	0.00	0.0	0.600	o	225	
1.004	6.799	0.023	295.6	0.000	0.00	0.0	0.600	o	300	
1.005	33.009	0.110	300.1	0.000	0.00	0.0	0.600	o	300	
6.000	62.300	0.100	623.0	0.000	2.00	0.0	0.600	o	150	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	57.39	2.34	10.050	0.000	0.0	0.0	0.0	0.82	14.4	0.0
1.001	48.20	3.22	9.938	0.000	0.0	0.0	0.0	0.92	16.2	0.0
2.000	41.69	4.19	10.150	0.000	0.0	0.0	0.0	0.42	7.4	0.0
2.001	41.09	4.30	9.800	0.000	0.0	0.0	0.0	1.30	51.9	0.0
3.000	61.25	2.08	9.937	0.000	0.0	0.0	0.0	1.60	28.2	0.0
1.002	37.06	5.18	9.463	0.000	0.0	0.0	0.0	0.94	37.6	0.0
4.000	60.76	2.11	9.945	0.000	0.0	0.0	0.0	1.60	28.2	0.0
1.003	34.05	6.04	9.124	0.000	0.0	0.0	0.0	0.90	63.9	0.0
5.000	52.98	2.71	10.150	0.000	0.0	0.0	0.0	0.62	10.9	0.0
5.001	51.75	2.83	9.800	0.000	0.0	0.0	0.0	1.31	52.1	0.0
1.004	33.67	6.17	8.968	0.000	0.0	0.0	0.0	0.91	64.3	0.0
1.005	31.97	6.78	8.945	0.000	0.0	0.0	0.0	0.90	63.8	0.0
6.000	39.46	4.62	10.400	0.000	0.0	0.0	0.0	0.40	7.0	0.0

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Micro Drainage	Network 2015.1	

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
6.001	8.643	0.086	100.5	0.000	0.00	0.0	0.600	o	225	
7.000	6.872	0.172	40.0	0.000	2.00	0.0	0.600	o	150	
1.006	37.169	0.169	219.9	0.000	0.00	0.0	0.600	o	300	
8.000	47.000	0.100	470.0	0.000	2.00	0.0	0.600	o	150	
9.000	51.500	0.100	515.0	0.000	2.00	0.0	0.600	o	150	
8.001	14.965	0.075	199.5	0.000	0.00	0.0	0.600	o	225	
10.000	7.695	0.192	40.0	0.000	2.00	0.0	0.600	o	150	
1.007	23.234	0.145	160.2	0.000	0.00	0.0	0.600	o	300	
11.000	4.499	0.045	100.0	0.000	2.00	0.0	0.600	o	150	
1.008	30.773	0.192	160.3	0.000	0.00	0.0	0.600	o	300	
12.000	6.249	0.062	100.8	0.000	2.00	0.0	0.600	o	150	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
6.001	38.95	4.74	10.000	0.000	0.0	0.0	0.0	1.30	51.9	0.0
7.000	61.41	2.07	10.021	0.000	0.0	0.0	0.0	1.60	28.2	0.0
1.006	30.54	7.36	8.835	0.000	0.0	0.0	0.0	1.06	74.7	0.0
8.000	44.53	3.71	10.000	0.000	0.0	0.0	0.0	0.46	8.1	0.0
9.000	42.93	3.97	10.000	0.000	0.0	0.0	0.0	0.44	7.7	0.0
8.001	41.40	4.24	9.450	0.000	0.0	0.0	0.0	0.92	36.7	0.0
10.000	61.27	2.08	9.846	0.000	0.0	0.0	0.0	1.60	28.2	0.0
1.007	29.85	7.68	8.666	0.000	0.0	0.0	0.0	1.24	87.6	0.0
11.000	61.37	2.07	8.716	0.000	0.0	0.0	0.0	1.00	17.8	0.0
1.008	28.99	8.09	8.521	0.000	0.0	0.0	0.0	1.24	87.6	0.0
12.000	60.89	2.10	9.731	0.000	0.0	0.0	0.0	1.00	17.7	0.0

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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
1.009	10.678	0.067	160.0	0.000	0.00	0.0	0.600	o	300	
13.000	20.378	0.136	150.0	0.000	2.00	0.0	0.600	o	150	
13.001	16.163	0.108	149.7	0.000	0.00	0.0	0.600	o	150	
1.010	3.805	0.024	158.5	0.000	0.00	0.0	0.600	o	300	
14.000	61.300	0.100	613.0	0.000	2.00	0.0	0.600	o	150	
14.001	7.230	0.072	100.4	0.000	0.00	0.0	0.600	o	225	
14.002	8.106	0.081	100.1	0.000	0.00	0.0	0.600	o	225	
15.000	11.465	0.076	150.9	0.000	2.00	0.0	0.600	o	150	
15.001	23.506	0.157	149.7	0.000	0.00	0.0	0.600	o	150	
16.000	2.690	0.027	99.6	0.000	2.00	0.0	0.600	o	150	
15.002	16.083	0.107	150.3	0.000	0.00	0.0	0.600	o	150	
15.003	4.119	0.027	152.6	0.000	0.00	0.0	0.600	o	150	
17.000	25.800	0.100	258.0	0.000	2.00	0.0	0.600	o	150	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.009	28.71	8.23	8.329	0.000	0.0	0.0	0.0	1.24	87.7	0.0
13.000	56.44	2.42	9.770	0.000	0.0	0.0	0.0	0.82	14.5	0.0
13.001	52.60	2.74	9.634	0.000	0.0	0.0	0.0	0.82	14.5	0.0
1.010	28.62	8.28	8.262	0.000	0.0	0.0	0.0	1.25	88.1	0.0
14.000	39.76	4.56	10.600	0.000	0.0	0.0	0.0	0.40	7.0	0.0
14.001	39.32	4.65	10.000	0.000	0.0	0.0	0.0	1.30	51.9	0.0
14.002	38.85	4.76	9.928	0.000	0.0	0.0	0.0	1.31	52.0	0.0
15.000	58.91	2.23	9.500	0.000	0.0	0.0	0.0	0.82	14.4	0.0
15.001	52.94	2.71	9.424	0.000	0.0	0.0	0.0	0.82	14.5	0.0
16.000	61.86	2.04	9.569	0.000	0.0	0.0	0.0	1.01	17.8	0.0
15.002	49.71	3.04	9.267	0.000	0.0	0.0	0.0	0.82	14.4	0.0
15.003	48.97	3.13	9.160	0.000	0.0	0.0	0.0	0.81	14.3	0.0
17.000	53.16	2.69	10.650	0.000	0.0	0.0	0.0	0.62	11.0	0.0

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STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Auto Design
17.001	3.564	0.024	148.5	0.000	0.00	0.0	0.600	o	150	
1.011	370.000	0.001	370000.0	0.000	0.00	0.0	0.600	o	2100	
1.012	2.000	0.017	117.6	0.000	0.00	0.0	0.600	o	150	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
17.001	52.39	2.76	10.000	0.000	0.0	0.0	0.0	0.82	14.5	0.0
1.011	14.08	30.00	8.000	0.000	0.0	0.0	0.0	0.08	271.9	0.0
1.012	14.08	30.00	7.999	0.000	0.0	0.0	0.0	0.93	16.4	0.0

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Micro Drainage										Network 2015.1	
Manhole Schedules for Storm											
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)
1	10.750	0.700	Open Manhole	1200	1.000	10.050	150				
2	10.650	0.712	Open Manhole	1200	1.001	9.938	150	1.000	9.938	150	
7	10.700	0.550	Open Manhole	1200	2.000	10.150	150				
6	10.700	0.900	Open Manhole	1200	2.001	9.800	225	2.000	10.050	150	175
5	10.500	0.563	Open Manhole	1200	3.000	9.937	150				
3	10.620	1.157	Open Manhole	1200	1.002	9.463	225	1.001	9.538	150	
								2.001	9.714	225	251
								3.000	9.741	150	203
7	10.600	0.655	Open Manhole	1200	4.000	9.945	150				
5	10.620	1.496	Open Manhole	1200	1.003	9.124	300	1.002	9.199	225	
								4.000	9.676	150	402
11	10.900	0.750	Open Manhole	1200	5.000	10.150	150				
10	10.900	1.100	Open Manhole	1200	5.001	9.800	225	5.000	10.050	150	175
11	10.750	1.782	Open Manhole	1200	1.004	8.968	300	1.003	8.968	300	
								5.001	9.707	225	664
6	10.700	1.755	Open Manhole	1200	1.005	8.945	300	1.004	8.945	300	
13	10.950	0.550	Open Manhole	1200	6.000	10.400	150				
12	10.950	0.950	Open Manhole	1200	6.001	10.000	225	6.000	10.300	150	225
15	10.700	0.679	Open Manhole	1200	7.000	10.021	150				
10	10.820	1.985	Open Manhole	1200	1.006	8.835	300	1.005	8.835	300	
								6.001	9.914	225	1004
								7.000	9.849	150	864
15	10.500	0.500	Open Manhole	1200	8.000	10.000	150				
16	10.700	0.700	Open Manhole	1200	9.000	10.000	150				
15	10.600	1.150	Open Manhole	1200	8.001	9.450	225	8.000	9.900	150	375
								9.000	9.900	150	375
20	10.650	0.804	Open Manhole	1200	10.000	9.846	150				
8	10.700	2.034	Open Manhole		1.007	8.666	300	1.006	8.666	300	
								8.001	9.375	225	634
								10.000	9.654	150	838
22	10.400	1.684	Open Manhole		11.000	8.716	150				
9	10.780	2.259	Junction	0	1.008	8.521	300	1.007	8.521	300	
								11.000	8.671	150	
24	10.250	0.519	Open Manhole	1200	12.000	9.731	150				
24	10.750	2.421	Open Manhole	1200	1.009	8.329	300	1.008	8.329	300	
								12.000	9.669	150	1190
26	10.850	1.080	Open Manhole	1200	13.000	9.770	150				
27	10.500	0.866	Open Manhole	1200	13.001	9.634	150	13.000	9.634	150	
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Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam., L*W (mm)	PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
26	10.450	2.188	Open Manhole	1200	1.010	8.262	300	1.009	8.262	300	1114
								13.001	9.526	150	
1	11.350	0.750	Open Manhole	1200	14.000	10.600	150				425
1	11.200	1.200	Open Manhole	1200	14.001	10.000	225	14.000	10.500	150	
13	11.150	1.222	Open Manhole	1200	14.002	9.928	225	14.001	9.928	225	
23	10.450	0.950	Open Manhole	1200	15.000	9.500	150				
24	10.350	0.926	Open Manhole	1200	15.001	9.424	150	15.000	9.424	150	
34	10.270	0.701	Open Manhole	1200	16.000	9.569	150				
34	10.270	1.003	Open Manhole	1200	15.002	9.267	150	15.001	9.267	150	275
								16.000	9.542	150	
35	10.500	1.340	Open Manhole	1200	15.003	9.160	150	15.002	9.160	150	550
29	11.250	0.600	Open Manhole	1200	17.000	10.650	150				
37	11.250	1.250	Open Manhole	1200	17.001	10.000	150	17.000	10.550	150	
14	10.500	2.500	Open Manhole	1200	1.011	8.000	2100	1.010	8.238	300	
								14.002	9.847	225	
								15.003	9.133	150	
								17.001	9.976	150	26
20	10.700	2.701	Open Manhole	1200	1.012	7.999	150	1.011	7.999	2100	
	10.500	2.518	Open Manhole	1200		OUTFALL		1.012	7.982	150	

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D, L (mm)	W (mm)
1.012		10.500	7.982	8.000	1200	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	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 Storage Structures	25
Number of Online Controls	1	Number of Time/Area Diagrams	41
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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Simulation Criteria for Storm <table><tr><td>Rainfall Model</td><td>FSR</td><td>Profile Type</td><td>Summer</td></tr><tr><td>Return Period (years)</td><td>1</td><td>Cv (Summer)</td><td>0.750</td></tr><tr><td>Region</td><td>England and Wales</td><td>Cv (Winter)</td><td>0.840</td></tr><tr><td>M5-60 (mm)</td><td>19.100</td><td>Storm Duration (mins)</td><td>30</td></tr><tr><td>Ratio R</td><td>0.350</td><td></td><td></td></tr></table>			Rainfall Model	FSR	Profile Type	Summer	Return Period (years)	1	Cv (Summer)	0.750	Region	England and Wales	Cv (Winter)	0.840	M5-60 (mm)	19.100	Storm Duration (mins)	30	Ratio R	0.350		
Rainfall Model	FSR	Profile Type	Summer																			
Return Period (years)	1	Cv (Summer)	0.750																			
Region	England and Wales	Cv (Winter)	0.840																			
M5-60 (mm)	19.100	Storm Duration (mins)	30																			
Ratio R	0.350																					
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Online Controls for Storm

Pump Manhole: 20, DS/PN: 1.012, Volume (m³): 1280.4

Invert Level (m) 7.999

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	12.3000	0.700	12.3000	1.300	12.3000	1.900	12.3000
0.200	12.3000	0.800	12.3000	1.400	12.3000	2.000	12.3000
0.300	12.3000	0.900	12.3000	1.500	12.3000	2.100	12.3000
0.400	12.3000	1.000	12.3000	1.600	12.3000		
0.500	12.3000	1.100	12.3000	1.700	12.3000		
0.600	12.3000	1.200	12.3000	1.800	12.3000		

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Storage Structures for Storm

Porous Car Park Manhole: 1, DS/PN: 1.000

```

Infiltration Coefficient Base (m/hr)  0.00000
Membrane Percolation (mm/hr)         500
Max Percolation (l/s)                 11.5
Safety Factor                         2.0
Porosity                             0.30
Invert Level (m)                     10.282
Width (m)                            9.1
Length (m)                           9.1
Slope (1:X)                          100000.0
Depression Storage (mm)               3
Evaporation (mm/day)                  1
Cap Volume Depth (m)                 0.300

```

Porous Car Park Manhole: 2, DS/PN: 1.001

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Infiltration Coefficient Base (m/hr)  0.00000
Membrane Percolation (mm/hr)         500
Max Percolation (l/s)                 11.5
Safety Factor                         2.0
Porosity                             0.30
Invert Level (m)                     10.170
Width (m)                            9.1
Length (m)                           9.1
Slope (1:X)                          100000.0
Depression Storage (mm)               3
Evaporation (mm/day)                  1
Cap Volume Depth (m)                 0.000

```

Porous Car Park Manhole: 7, DS/PN: 2.000

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Infiltration Coefficient Base (m/hr)  0.00000
Membrane Percolation (mm/hr)         500
Max Percolation (l/s)                 206.9
Safety Factor                         2.0
Porosity                             0.30
Invert Level (m)                     10.150
Width (m)                            38.6
Length (m)                           38.6
Slope (1:X)                          100000.0
Depression Storage (mm)               3
Evaporation (mm/day)                  1
Cap Volume Depth (m)                 0.350

```

Dry Swale Manhole: 5, DS/PN: 3.000

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

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Micro Drainage	Network 2015.1																																																																																																									
<u>Dry Swale Manhole: 5, DS/PN: 3.000</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Trench Length (m)</td><td>39.0</td></tr><tr><td>Infiltration Coefficient Side (m/hr)</td><td>0.00000</td><td>Side Slope (1:X)</td><td>3.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Slope (1:X)</td><td>500.0</td></tr><tr><td>Porosity</td><td>0.30</td><td>Cap Volume Depth (m)</td><td>0.000</td></tr><tr><td>Invert Level (m)</td><td>9.947</td><td>Cap Infiltration Depth (m)</td><td>0.000</td></tr><tr><td>Trench Height (m)</td><td>0.300</td><td>Include Swale Volume</td><td>Yes</td></tr><tr><td>Trench Width (m)</td><td>1.5</td><td></td><td></td></tr></table> <u>Porous Car Park Manhole: 3, DS/PN: 1.002</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>500</td></tr><tr><td>Max Percolation (l/s)</td><td>5.7</td></tr><tr><td>Safety Factor</td><td>2.0</td></tr><tr><td>Porosity</td><td>0.30</td></tr><tr><td>Invert Level (m)</td><td>9.625</td></tr><tr><td>Width (m)</td><td>6.4</td></tr><tr><td>Length (m)</td><td>6.4</td></tr><tr><td>Slope (1:X)</td><td>100000.0</td></tr><tr><td>Depression Storage (mm)</td><td>3</td></tr><tr><td>Evaporation (mm/day)</td><td>1</td></tr><tr><td>Cap Volume Depth (m)</td><td>0.300</td></tr></table> <u>Dry Swale Manhole: 7, DS/PN: 4.000</u> Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Trench Length (m)</td><td>36.1</td></tr><tr><td>Infiltration Coefficient Side (m/hr)</td><td>0.00000</td><td>Side Slope (1:X)</td><td>3.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Slope (1:X)</td><td>501.4</td></tr><tr><td>Porosity</td><td>0.30</td><td>Cap Volume Depth (m)</td><td>0.000</td></tr><tr><td>Invert Level (m)</td><td>9.953</td><td>Cap Infiltration Depth (m)</td><td>0.000</td></tr><tr><td>Trench Height (m)</td><td>0.300</td><td>Include Swale Volume</td><td>Yes</td></tr><tr><td>Trench Width (m)</td><td>1.5</td><td></td><td></td></tr></table> <u>Porous Car Park Manhole: 5, DS/PN: 1.003</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>500</td></tr><tr><td>Max Percolation (l/s)</td><td>35.6</td></tr><tr><td>Safety Factor</td><td>2.0</td></tr><tr><td>Porosity</td><td>0.30</td></tr><tr><td>Invert Level (m)</td><td>9.458</td></tr><tr><td>Width (m)</td><td>16.0</td></tr><tr><td>Length (m)</td><td>16.0</td></tr><tr><td>Slope (1:X)</td><td>100000.0</td></tr><tr><td>Depression Storage (mm)</td><td>3</td></tr><tr><td>Evaporation (mm/day)</td><td>1</td></tr><tr><td>Cap Volume Depth (m)</td><td>0.300</td></tr></table>			Infiltration Coefficient Base (m/hr)	0.00000	Trench Length (m)	39.0	Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0	Safety Factor	2.0	Slope (1:X)	500.0	Porosity	0.30	Cap Volume Depth (m)	0.000	Invert Level (m)	9.947	Cap Infiltration Depth (m)	0.000	Trench Height (m)	0.300	Include Swale Volume	Yes	Trench Width (m)	1.5			Infiltration Coefficient Base (m/hr)	0.00000	Membrane Percolation (mm/hr)	500	Max Percolation (l/s)	5.7	Safety Factor	2.0	Porosity	0.30	Invert Level (m)	9.625	Width (m)	6.4	Length (m)	6.4	Slope (1:X)	100000.0	Depression Storage (mm)	3	Evaporation (mm/day)	1	Cap Volume Depth (m)	0.300	Infiltration Coefficient Base (m/hr)	0.00000	Trench Length (m)	36.1	Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0	Safety Factor	2.0	Slope (1:X)	501.4	Porosity	0.30	Cap Volume Depth (m)	0.000	Invert Level (m)	9.953	Cap Infiltration Depth (m)	0.000	Trench Height (m)	0.300	Include Swale Volume	Yes	Trench Width (m)	1.5			Infiltration Coefficient Base (m/hr)	0.00000	Membrane Percolation (mm/hr)	500	Max Percolation (l/s)	35.6	Safety Factor	2.0	Porosity	0.30	Invert Level (m)	9.458	Width (m)	16.0	Length (m)	16.0	Slope (1:X)	100000.0	Depression Storage (mm)	3	Evaporation (mm/day)	1	Cap Volume Depth (m)	0.300
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<u>Porous Car Park Manhole: 11, DS/PN: 5.000</u> Infiltration Coefficient Base (m/hr) 0.00000 Membrane Percolation (mm/hr) 500 Max Percolation (l/s) 106.6 Safety Factor 2.0 Porosity 0.30 Invert Level (m) 10.150 Width (m) 27.7 Length (m) 27.7 Slope (1:X) 100000.0 Depression Storage (mm) 3 Evaporation (mm/day) 1 Cap Volume Depth (m) 0.350 <u>Porous Car Park Manhole: 6, DS/PN: 1.005</u> Infiltration Coefficient Base (m/hr) 0.00000 Membrane Percolation (mm/hr) 500 Max Percolation (l/s) 10.5 Safety Factor 2.0 Porosity 0.30 Invert Level (m) 9.127 Width (m) 8.7 Length (m) 8.7 Slope (1:X) 100000.0 Depression Storage (mm) 3 Evaporation (mm/day) 1 Cap Volume Depth (m) 0.300 <u>Porous Car Park Manhole: 13, DS/PN: 6.000</u> Infiltration Coefficient Base (m/hr) 0.00000 Membrane Percolation (mm/hr) 500 Max Percolation (l/s) 185.0 Safety Factor 2.0 Porosity 0.30 Invert Level (m) 10.400 Width (m) 36.5 Length (m) 36.5 Slope (1:X) 100000.0 Depression Storage (mm) 3 Evaporation (mm/day) 1 Cap Volume Depth (m) 0.350 <u>Dry Swale Manhole: 15, DS/PN: 7.000</u> Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.30 Infiltration Coefficient Side (m/hr) 0.00000 Invert Level (m) 10.030 Safety Factor 2.0 Trench Height (m) 0.300		
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<u>Dry Swale Manhole: 15, DS/PN: 7.000</u> <table><tr><td>Trench Width (m)</td><td>1.5</td><td>Cap Volume Depth (m)</td><td>0.000</td></tr><tr><td>Trench Length (m)</td><td>29.0</td><td>Cap Infiltration Depth (m)</td><td>0.000</td></tr><tr><td>Side Slope (1:X)</td><td>3.0</td><td>Include Swale Volume</td><td>Yes</td></tr><tr><td>Slope (1:X)</td><td>200.0</td><td></td><td></td></tr></table> <u>Porous Car Park Manhole: 10, DS/PN: 1.006</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>500</td></tr><tr><td>Max Percolation (l/s)</td><td>16.8</td></tr><tr><td>Safety Factor</td><td>2.0</td></tr><tr><td>Porosity</td><td>0.30</td></tr><tr><td>Invert Level (m)</td><td>9.798</td></tr><tr><td>Width (m)</td><td>11.0</td></tr><tr><td>Length (m)</td><td>11.0</td></tr><tr><td>Slope (1:X)</td><td>100000.0</td></tr><tr><td>Depression Storage (mm)</td><td>3</td></tr><tr><td>Evaporation (mm/day)</td><td>1</td></tr><tr><td>Cap Volume Depth (m)</td><td>0.300</td></tr></table> <u>Porous Car Park Manhole: 15, DS/PN: 8.000</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>500</td></tr><tr><td>Max Percolation (l/s)</td><td>119.2</td></tr><tr><td>Safety Factor</td><td>2.0</td></tr><tr><td>Porosity</td><td>0.30</td></tr><tr><td>Invert Level (m)</td><td>10.000</td></tr><tr><td>Width (m)</td><td>29.3</td></tr><tr><td>Length (m)</td><td>29.3</td></tr><tr><td>Slope (1:X)</td><td>100000.0</td></tr><tr><td>Depression Storage (mm)</td><td>3</td></tr><tr><td>Evaporation (mm/day)</td><td>1</td></tr><tr><td>Cap Volume Depth (m)</td><td>0.300</td></tr></table> <u>Porous Car Park Manhole: 16, DS/PN: 9.000</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>500</td></tr><tr><td>Max Percolation (l/s)</td><td>70.9</td></tr><tr><td>Safety Factor</td><td>2.0</td></tr><tr><td>Porosity</td><td>0.30</td></tr><tr><td>Invert Level (m)</td><td>10.000</td></tr><tr><td>Width (m)</td><td>22.6</td></tr><tr><td>Length (m)</td><td>22.6</td></tr><tr><td>Slope (1:X)</td><td>100000.0</td></tr><tr><td>Depression Storage (mm)</td><td>3</td></tr><tr><td>Evaporation (mm/day)</td><td>1</td></tr><tr><td>Cap Volume Depth (m)</td><td>0.300</td></tr></table>			Trench Width (m)	1.5	Cap Volume Depth (m)	0.000	Trench Length (m)	29.0	Cap Infiltration Depth (m)	0.000	Side Slope (1:X)	3.0	Include Swale Volume	Yes	Slope (1:X)	200.0			Infiltration Coefficient Base (m/hr)	0.00000	Membrane Percolation (mm/hr)	500	Max Percolation (l/s)	16.8	Safety Factor	2.0	Porosity	0.30	Invert Level (m)	9.798	Width (m)	11.0	Length (m)	11.0	Slope (1:X)	100000.0	Depression Storage (mm)	3	Evaporation (mm/day)	1	Cap Volume Depth (m)	0.300	Infiltration Coefficient Base (m/hr)	0.00000	Membrane Percolation (mm/hr)	500	Max Percolation (l/s)	119.2	Safety Factor	2.0	Porosity	0.30	Invert Level (m)	10.000	Width (m)	29.3	Length (m)	29.3	Slope (1:X)	100000.0	Depression Storage (mm)	3	Evaporation (mm/day)	1	Cap Volume Depth (m)	0.300	Infiltration Coefficient Base (m/hr)	0.00000	Membrane Percolation (mm/hr)	500	Max Percolation (l/s)	70.9	Safety Factor	2.0	Porosity	0.30	Invert Level (m)	10.000	Width (m)	22.6	Length (m)	22.6	Slope (1:X)	100000.0	Depression Storage (mm)	3	Evaporation (mm/day)	1	Cap Volume Depth (m)	0.300
Trench Width (m)	1.5	Cap Volume Depth (m)	0.000																																																																																							
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<u>Dry Swale Manhole: 20, DS/PN: 10.000</u> Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Trench Length (m)</td><td>33.2</td></tr><tr><td>Infiltration Coefficient Side (m/hr)</td><td>0.00000</td><td>Side Slope (1:X)</td><td>3.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Slope (1:X)</td><td>200.0</td></tr><tr><td>Porosity</td><td>0.30</td><td>Cap Volume Depth (m)</td><td>0.000</td></tr><tr><td>Invert Level (m)</td><td>9.855</td><td>Cap Infiltration Depth (m)</td><td>0.000</td></tr><tr><td>Trench Height (m)</td><td>0.300</td><td>Include Swale Volume</td><td>Yes</td></tr><tr><td>Trench Width (m)</td><td>1.5</td><td></td><td></td></tr></table> <u>Porous Car Park Manhole: 8, DS/PN: 1.007</u> <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>500</td></tr><tr><td>Max Percolation (l/s)</td><td>6.8</td></tr><tr><td>Safety Factor</td><td>2.0</td></tr><tr><td>Porosity</td><td>0.30</td></tr><tr><td>Invert Level (m)</td><td>8.677</td></tr><tr><td>Width (m)</td><td>7.0</td></tr><tr><td>Length (m)</td><td>7.0</td></tr><tr><td>Slope (1:X)</td><td>100000.0</td></tr><tr><td>Depression Storage (mm)</td><td>3</td></tr><tr><td>Evaporation (mm/day)</td><td>1</td></tr><tr><td>Cap Volume Depth (m)</td><td>0.300</td></tr></table> <u>Dry Swale Manhole: 22, DS/PN: 11.000</u> Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Trench Length (m)</td><td>11.2</td></tr><tr><td>Infiltration Coefficient Side (m/hr)</td><td>0.00000</td><td>Side Slope (1:X)</td><td>3.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Slope (1:X)</td><td>200.0</td></tr><tr><td>Porosity</td><td>0.30</td><td>Cap Volume Depth (m)</td><td>0.000</td></tr><tr><td>Invert Level (m)</td><td>9.969</td><td>Cap Infiltration Depth (m)</td><td>0.000</td></tr><tr><td>Trench Height (m)</td><td>0.300</td><td>Include Swale Volume</td><td>Yes</td></tr><tr><td>Trench Width (m)</td><td>1.5</td><td></td><td></td></tr></table> <u>Dry Swale Manhole: 24, DS/PN: 12.000</u> Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier <table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td><td>Trench Length (m)</td><td>15.2</td></tr><tr><td>Infiltration Coefficient Side (m/hr)</td><td>0.00000</td><td>Side Slope (1:X)</td><td>3.0</td></tr><tr><td>Safety Factor</td><td>2.0</td><td>Slope (1:X)</td><td>200.0</td></tr><tr><td>Porosity</td><td>0.30</td><td>Cap Volume Depth (m)</td><td>0.000</td></tr><tr><td>Invert Level (m)</td><td>9.749</td><td>Cap Infiltration Depth (m)</td><td>0.000</td></tr><tr><td>Trench Height (m)</td><td>0.300</td><td>Include Swale Volume</td><td>Yes</td></tr><tr><td>Trench Width (m)</td><td>1.5</td><td></td><td></td></tr></table>			Infiltration Coefficient Base (m/hr)	0.00000	Trench Length (m)	33.2	Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0	Safety Factor	2.0	Slope (1:X)	200.0	Porosity	0.30	Cap Volume Depth (m)	0.000	Invert Level (m)	9.855	Cap Infiltration Depth (m)	0.000	Trench Height (m)	0.300	Include Swale Volume	Yes	Trench Width (m)	1.5			Infiltration Coefficient Base (m/hr)	0.00000	Membrane Percolation (mm/hr)	500	Max Percolation (l/s)	6.8	Safety Factor	2.0	Porosity	0.30	Invert Level (m)	8.677	Width (m)	7.0	Length (m)	7.0	Slope (1:X)	100000.0	Depression Storage (mm)	3	Evaporation (mm/day)	1	Cap Volume Depth (m)	0.300	Infiltration Coefficient Base (m/hr)	0.00000	Trench Length (m)	11.2	Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0	Safety Factor	2.0	Slope (1:X)	200.0	Porosity	0.30	Cap Volume Depth (m)	0.000	Invert Level (m)	9.969	Cap Infiltration Depth (m)	0.000	Trench Height (m)	0.300	Include Swale Volume	Yes	Trench Width (m)	1.5			Infiltration Coefficient Base (m/hr)	0.00000	Trench Length (m)	15.2	Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	3.0	Safety Factor	2.0	Slope (1:X)	200.0	Porosity	0.30	Cap Volume Depth (m)	0.000	Invert Level (m)	9.749	Cap Infiltration Depth (m)	0.000	Trench Height (m)	0.300	Include Swale Volume	Yes	Trench Width (m)	1.5		
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<u>Complex Manhole: 26, DS/PN: 13.000</u>																														
<u>Porous Car Park</u>																														
<table><tr><td>Infiltration Coefficient Base (m/hr)</td><td>0.00000</td></tr><tr><td>Membrane Percolation (mm/hr)</td><td>500</td></tr><tr><td>Max Percolation (l/s)</td><td>13.1</td></tr><tr><td>Safety Factor</td><td>2.0</td></tr><tr><td>Porosity</td><td>0.30</td></tr><tr><td>Invert Level (m)</td><td>9.570</td></tr><tr><td>Width (m)</td><td>9.7</td></tr><tr><td>Length (m)</td><td>9.7</td></tr><tr><td>Slope (1:X)</td><td>100000.0</td></tr><tr><td>Depression Storage (mm)</td><td>3</td></tr><tr><td>Evaporation (mm/day)</td><td>1</td></tr><tr><td>Cap Volume Depth (m)</td><td>0.300</td></tr></table>			Infiltration Coefficient Base (m/hr)	0.00000	Membrane Percolation (mm/hr)	500	Max Percolation (l/s)	13.1	Safety Factor	2.0	Porosity	0.30	Invert Level (m)	9.570	Width (m)	9.7	Length (m)	9.7	Slope (1:X)	100000.0	Depression Storage (mm)	3	Evaporation (mm/day)	1	Cap Volume Depth (m)	0.300				
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<u>Dry Swale Manhole: 27, DS/PN: 13.001</u>																														
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<u>Porous Car Park Manhole: 1, DS/PN: 14.000</u>																														
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Micro Drainage	Network 2015.1	
<u>Porous Car Park Manhole: 1, DS/PN: 14.000</u> Length (m) 31.3 Slope (1:X) 100000.0 Depression Storage (mm) 3 Evaporation (mm/day) 1 Cap Volume Depth (m) 0.350 <u>Porous Car Park Manhole: 23, DS/PN: 15.000</u> Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 9.8 Membrane Percolation (mm/hr) 500 Length (m) 9.8 Max Percolation (l/s) 13.3 Slope (1:X) 200.0 Safety Factor 2.0 Depression Storage (mm) 3 Porosity 0.30 Evaporation (mm/day) 1 Invert Level (m) 9.421 Cap Volume Depth (m) 0.300 <u>Porous Car Park Manhole: 24, DS/PN: 15.001</u> Infiltration Coefficient Base (m/hr) 0.00000 Membrane Percolation (mm/hr) 500 Max Percolation (l/s) 7.6 Safety Factor 2.0 Porosity 0.30 Invert Level (m) 9.224 Width (m) 7.4 Length (m) 7.4 Slope (1:X) 100000.0 Depression Storage (mm) 3 Evaporation (mm/day) 1 Cap Volume Depth (m) 0.300 <u>Dry Swale Manhole: 34, DS/PN: 16.000</u> Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier Infiltration Coefficient Base (m/hr) 0.00000 Trench Length (m) 16.5 Infiltration Coefficient Side (m/hr) 0.00000 Side Slope (1:X) 3.0 Safety Factor 2.0 Slope (1:X) 198.8 Porosity 0.30 Cap Volume Depth (m) 0.000 Invert Level (m) 9.587 Cap Infiltration Depth (m) 0.000 Trench Height (m) 0.300 Include Swale Volume Yes Trench Width (m) 1.5 <u>Porous Car Park Manhole: 29, DS/PN: 17.000</u> Infiltration Coefficient Base (m/hr) 0.00000 Membrane Percolation (mm/hr) 500 Max Percolation (l/s) 44.5 Safety Factor 2.0 Porosity 0.30 Invert Level (m) 10.650		
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<u>Porous Car Park Manhole: 29, DS/PN: 17.000</u> <table><tr><td>Width (m)</td><td>17.9</td></tr><tr><td>Length (m)</td><td>17.9</td></tr><tr><td>Slope (1:X)</td><td>100000.0</td></tr><tr><td>Depression Storage (mm)</td><td>3</td></tr><tr><td>Evaporation (mm/day)</td><td>1</td></tr><tr><td>Cap Volume Depth (m)</td><td>0.300</td></tr></table> <u>Time Area Diagram at Pipe Number 1.000 for Storm</u> Total Area (ha) 0.013 <table><thead><tr><th>Time (mins)</th><th>Area (ha)</th><th>Time (mins)</th><th>Area (ha)</th></tr><tr><th>From:</th><th>To:</th><th>From:</th><th>To:</th></tr></thead><tbody><tr><td>0</td><td>2 0.000</td><td>2</td><td>4 0.013</td></tr></tbody></table> <u>Time Area Diagram for Green Roof at Pipe Number 1.000 (Storm)</u> <table><tr><td>Area (m³)</td><td>91</td><td>Evaporation (mm/day)</td><td>1</td></tr><tr><td>Depression Storage (mm)</td><td>3</td><td>Decay Coefficient</td><td>0.050</td></tr></table> <table><thead><tr><th>Time (mins)</th><th>Area (ha)</th><th>Time (mins)</th><th>Area (ha)</th><th>Time (mins)</th><th>Area (ha)</th><th>Time (mins)</th><th>Area (ha)</th></tr><tr><th>From:</th><th>To:</th><th>From:</th><th>To:</th><th>From:</th><th>To:</th><th>From:</th><th>To:</th></tr></thead><tbody><tr><td>0</td><td>4 0.001654</td><td>32</td><td>36 0.000334</td><td>64</td><td>68 0.000067</td><td>96</td><td>100 0.000014</td></tr><tr><td>4</td><td>8 0.001354</td><td>36</td><td>40 0.000273</td><td>68</td><td>72 0.000055</td><td>100</td><td>104 0.000011</td></tr><tr><td>8</td><td>12 0.001108</td><td>40</td><td>44 0.000224</td><td>72</td><td>76 0.000045</td><td>104</td><td>108 0.000009</td></tr><tr><td>12</td><td>16 0.000908</td><td>44</td><td>48 0.000183</td><td>76</td><td>80 0.000037</td><td>108</td><td>112 0.000007</td></tr><tr><td>16</td><td>20 0.000743</td><td>48</td><td>52 0.000150</td><td>80</td><td>84 0.000030</td><td>112</td><td>116 0.000006</td></tr><tr><td>20</td><td>24 0.000608</td><td>52</td><td>56 0.000123</td><td>84</td><td>88 0.000025</td><td>116</td><td>120 0.000005</td></tr><tr><td>24</td><td>28 0.000498</td><td>56</td><td>60 0.000101</td><td>88</td><td>92 0.000020</td><td></td><td></td></tr><tr><td>28</td><td>32 0.000408</td><td>60</td><td>64 0.000082</td><td>92</td><td>96 0.000017</td><td></td><td></td></tr></tbody></table> <u>Time Area Diagram at Pipe Number 1.001 for Storm</u> Total Area (ha) 0.037 <table><thead><tr><th>Time (mins)</th><th>Area (ha)</th><th>Time (mins)</th><th>Area (ha)</th></tr><tr><th>From:</th><th>To:</th><th>From:</th><th>To:</th></tr></thead><tbody><tr><td>0</td><td>2 0.000</td><td>2</td><td>4 0.037</td></tr></tbody></table> <u>Time Area Diagram for Green Roof at Pipe Number 1.001 (Storm)</u> <table><tr><td>Area (m³)</td><td>91</td><td>Evaporation (mm/day)</td><td>1</td></tr><tr><td>Depression Storage (mm)</td><td>3</td><td>Decay Coefficient</td><td>0.050</td></tr></table> <table><thead><tr><th>Time (mins)</th><th>Area (ha)</th><th>Time (mins)</th><th>Area (ha)</th><th>Time (mins)</th><th>Area (ha)</th><th>Time (mins)</th><th>Area (ha)</th></tr><tr><th>From:</th><th>To:</th><th>From:</th><th>To:</th><th>From:</th><th>To:</th><th>From:</th><th>To:</th></tr></thead><tbody><tr><td>0</td><td>4 0.001654</td><td>4</td><td>8 0.001354</td><td>8</td><td>12 0.001108</td><td>12</td><td>16 0.000908</td></tr></tbody></table>								Width (m)	17.9	Length (m)	17.9	Slope (1:X)	100000.0	Depression Storage (mm)	3	Evaporation (mm/day)	1	Cap Volume Depth (m)	0.300	Time (mins)	Area (ha)	Time (mins)	Area (ha)	From:	To:	From:	To:	0	2 0.000	2	4 0.013	Area (m³)	91	Evaporation (mm/day)	1	Depression Storage (mm)	3	Decay Coefficient	0.050	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	From:	To:	From:	To:	From:	To:	From:	To:	0	4 0.001654	32	36 0.000334	64	68 0.000067	96	100 0.000014	4	8 0.001354	36	40 0.000273	68	72 0.000055	100	104 0.000011	8	12 0.001108	40	44 0.000224	72	76 0.000045	104	108 0.000009	12	16 0.000908	44	48 0.000183	76	80 0.000037	108	112 0.000007	16	20 0.000743	48	52 0.000150	80	84 0.000030	112	116 0.000006	20	24 0.000608	52	56 0.000123	84	88 0.000025	116	120 0.000005	24	28 0.000498	56	60 0.000101	88	92 0.000020			28	32 0.000408	60	64 0.000082	92	96 0.000017			Time (mins)	Area (ha)	Time (mins)	Area (ha)	From:	To:	From:	To:	0	2 0.000	2	4 0.037	Area (m³)	91	Evaporation (mm/day)	1	Depression Storage (mm)	3	Decay Coefficient	0.050	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	From:	To:	From:	To:	From:	To:	From:	To:	0	4 0.001654	4	8 0.001354	8	12 0.001108	12	16 0.000908
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Time Area Diagram for Green Roof at Pipe Number 1.001 (Storm)

Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)
16 20	0.000743	44 48	0.000183	72 76	0.000045	100 104	0.000011
20 24	0.000608	48 52	0.000150	76 80	0.000037	104 108	0.000009
24 28	0.000498	52 56	0.000123	80 84	0.000030	108 112	0.000007
28 32	0.000408	56 60	0.000101	84 88	0.000025	112 116	0.000006
32 36	0.000334	60 64	0.000082	88 92	0.000020	116 120	0.000005
36 40	0.000273	64 68	0.000067	92 96	0.000017		
40 44	0.000224	68 72	0.000055	96 100	0.000014		

Time Area Diagram at Pipe Number 2.000 for Storm

Total Area (ha) 0.146

Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)
0 2	0.020	2 4	0.126

Time Area Diagram for Green Roof at Pipe Number 2.000 (Storm)

Area (m³) 1642 Evaporation (mm/day) 1
Depression Storage (mm) 3 Decay Coefficient 0.050

Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)
0 4	0.029838	32 36	0.006024	64 68	0.001216	96 100	0.000246
4 8	0.024430	36 40	0.004932	68 72	0.000996	100 104	0.000201
8 12	0.020001	40 44	0.004038	72 76	0.000815	104 108	0.000165
12 16	0.016376	44 48	0.003306	76 80	0.000668	108 112	0.000135
16 20	0.013407	48 52	0.002707	80 84	0.000547	112 116	0.000110
20 24	0.010977	52 56	0.002216	84 88	0.000447	116 120	0.000090
24 28	0.008987	56 60	0.001814	88 92	0.000366		
28 32	0.007358	60 64	0.001486	92 96	0.000300		

Time Area Diagram at Pipe Number 3.000 for Storm

Total Area (ha) 0.090

Time (mins) From: To:	Area (ha)
0 2	0.090

Time Area Diagram at Pipe Number 1.002 for Storm

Total Area (ha) 0.008

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Time Area Diagram for Green Roof at Pipe Number 1.003 (Storm)

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
48	52	0.000467	68	72	0.000172	88	92	0.000063	108	112	0.000023
52	56	0.000382	72	76	0.000141	92	96	0.000052	112	116	0.000019
56	60	0.000313	76	80	0.000115	96	100	0.000042	116	120	0.000016
60	64	0.000256	80	84	0.000094	100	104	0.000035			
64	68	0.000210	84	88	0.000077	104	108	0.000028			

Time Area Diagram at Pipe Number 5.000 for Storm

Total Area (ha) 0.077

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	2	0.014	2	4	0.063

Time Area Diagram for Green Roof at Pipe Number 5.000 (Storm)

Area (m³) 849 Evaporation (mm/day) 1
Depression Storage (mm) 3 Decay Coefficient 0.050

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.015428	32	36	0.003115	64	68	0.000629	96	100	0.000127
4	8	0.012631	36	40	0.002550	68	72	0.000515	100	104	0.000104
8	12	0.010342	40	44	0.002088	72	76	0.000422	104	108	0.000085
12	16	0.008467	44	48	0.001709	76	80	0.000345	108	112	0.000070
16	20	0.006932	48	52	0.001400	80	84	0.000283	112	116	0.000057
20	24	0.005676	52	56	0.001146	84	88	0.000231	116	120	0.000047
24	28	0.004647	56	60	0.000938	88	92	0.000189			
28	32	0.003804	60	64	0.000768	92	96	0.000155			

Time Area Diagram at Pipe Number 1.005 for Storm

Total Area (ha) 0.017

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	2	0.000	2	4	0.017

Time Area Diagram for Green Roof at Pipe Number 1.005 (Storm)

Area (m³) 85 Evaporation (mm/day) 1
Depression Storage (mm) 3 Decay Coefficient 0.050

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Time Area Diagram for Green Roof at Pipe Number 1.005 (Storm)

Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)
0 4	0.001545	32 36	0.000312	64 68	0.000063	96 100	0.000013
4 8	0.001265	36 40	0.000255	68 72	0.000052	100 104	0.000010
8 12	0.001035	40 44	0.000209	72 76	0.000042	104 108	0.000009
12 16	0.000848	44 48	0.000171	76 80	0.000035	108 112	0.000007
16 20	0.000694	48 52	0.000140	80 84	0.000028	112 116	0.000006
20 24	0.000568	52 56	0.000115	84 88	0.000023	116 120	0.000005
24 28	0.000465	56 60	0.000094	88 92	0.000019		
28 32	0.000381	60 64	0.000077	92 96	0.000016		

Time Area Diagram at Pipe Number 6.000 for Storm

Total Area (ha) 0.112

Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)
0 2	0.020	2 4	0.092

Time Area Diagram for Green Roof at Pipe Number 6.000 (Storm)

Area (m³) 1469 Evaporation (mm/day) 1
Depression Storage (mm) 3 Decay Coefficient 0.050

Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)
0 4	0.026695	32 36	0.005390	64 68	0.001088	96 100	0.000220
4 8	0.021856	36 40	0.004413	68 72	0.000891	100 104	0.000180
8 12	0.017894	40 44	0.003613	72 76	0.000729	104 108	0.000147
12 16	0.014650	44 48	0.002958	76 80	0.000597	108 112	0.000121
16 20	0.011995	48 52	0.002422	80 84	0.000489	112 116	0.000099
20 24	0.009820	52 56	0.001983	84 88	0.000400	116 120	0.000081
24 28	0.008040	56 60	0.001623	88 92	0.000328		
28 32	0.006583	60 64	0.001329	92 96	0.000268		

Time Area Diagram at Pipe Number 7.000 for Storm

Total Area (ha) 0.060

Time (mins) From: To:	Area (ha)
0 2	0.060

Time Area Diagram at Pipe Number 1.006 for Storm

Total Area (ha) 0.014

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Time Area Diagram at Pipe Number 1.006 for Storm

Time (mins)		Area	Time (mins)		Area
From:	To:	(ha)	From:	To:	(ha)
0	2	0.000	2	4	0.014

Time Area Diagram for Green Roof at Pipe Number 1.006 (Storm)

Area (m³) 135 Evaporation (mm/day) 1
Depression Storage (mm) 3 Decay Coefficient 0.050

Time (mins)		Area	Time (mins)		Area	Time (mins)		Area
From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)
0	4	0.002453	32	36	0.000495	64	68	0.000100
4	8	0.002009	36	40	0.000406	68	72	0.000082
8	12	0.001644	40	44	0.000332	72	76	0.000067
12	16	0.001346	44	48	0.000272	76	80	0.000055
16	20	0.001102	48	52	0.000223	80	84	0.000045
20	24	0.000902	52	56	0.000182	84	88	0.000037
24	28	0.000739	56	60	0.000149	88	92	0.000030
28	32	0.000605	60	64	0.000122	92	96	0.000025

Time Area Diagram at Pipe Number 8.000 for Storm

Total Area (ha) 0.097

Time (mins)		Area	Time (mins)		Area
From:	To:	(ha)	From:	To:	(ha)
0	2	0.012	2	4	0.085

Time Area Diagram for Green Roof at Pipe Number 8.000 (Storm)

Area (m³) 949 Evaporation (mm/day) 1
Depression Storage (mm) 3 Decay Coefficient 0.050

Time (mins)		Area	Time (mins)		Area	Time (mins)		Area
From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)
0	4	0.017245	32	36	0.003482	64	68	0.000703
4	8	0.014119	36	40	0.002851	68	72	0.000576
8	12	0.011560	40	44	0.002334	72	76	0.000471
12	16	0.009464	44	48	0.001911	76	80	0.000386
16	20	0.007749	48	52	0.001564	80	84	0.000316
20	24	0.006344	52	56	0.001281	84	88	0.000259
24	28	0.005194	56	60	0.001049	88	92	0.000212
28	32	0.004253	60	64	0.000859	92	96	0.000173

Time Area Diagram at Pipe Number 9.000 for Storm

Total Area (ha) 0.061

Time Area Diagram at Pipe Number 9.000 for Storm

Time Area Diagram for Green Roof at Pipe Number 9.000 (Storm)

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)	From: To:	(ha)	From: To:	(ha)
0 4	0.010231	32 36	0.002066	64 68	0.000417	96 100	0.000084
4 8	0.008376	36 40	0.001691	68 72	0.000341	100 104	0.000069
8 12	0.006858	40 44	0.001385	72 76	0.000280	104 108	0.000056
12 16	0.005615	44 48	0.001134	76 80	0.000229	108 112	0.000046
16 20	0.004597	48 52	0.000928	80 84	0.000187	112 116	0.000038
20 24	0.003764	52 56	0.000760	84 88	0.000153	116 120	0.000031
24 28	0.003081	56 60	0.000622	88 92	0.000126		
28 32	0.002523	60 64	0.000509	92 96	0.000103		

Time Area Diagram at Pipe Number 10.000 for Storm

Time (mins)	Area
From: To:	(ha)
0 2	0.043

Time Area Diagram at Pipe Number 1.007 for Storm

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	2	0.000	2	4	0.011

Time Area Diagram for Green Roof at Pipe Number 1.007 (Storm)

Time (mins)	Area	Time (mins)	Area	Time (mins)	Area	Time (mins)	Area
From: To:	(ha)	From: To:	(ha)	From: To:	(ha)	From: To:	(ha)
0 4	0.0000999	12 16	0.000549	24 28	0.000301	36 40	0.000165
4 8	0.000818	16 20	0.000449	28 32	0.000246	40 44	0.000135
8 12	0.000670	20 24	0.000368	32 36	0.000202	44 48	0.000111

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Time Area Diagram for Green Roof at Pipe Number 13.000 (Storm)

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
112	116	0.000007	116	120	0.000006						

Time Area Diagram at Pipe Number 14.000 for Storm

Total Area (ha) 0.087

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	2	0.023	2	4	0.064

Time Area Diagram for Green Roof at Pipe Number 14.000 (Storm)

Area (m³) 1078 Evaporation (mm/day) 1
Depression Storage (mm) 3 Decay Coefficient 0.050

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.019589	32	36	0.003955	64	68	0.000799	96	100	0.000161
4	8	0.016038	36	40	0.003238	68	72	0.000654	100	104	0.000132
8	12	0.013131	40	44	0.002651	72	76	0.000535	104	108	0.000108
12	16	0.010751	44	48	0.002171	76	80	0.000438	108	112	0.000088
16	20	0.008802	48	52	0.001777	80	84	0.000359	112	116	0.000072
20	24	0.007207	52	56	0.001455	84	88	0.000294	116	120	0.000059
24	28	0.005900	56	60	0.001191	88	92	0.000241			
28	32	0.004831	60	64	0.000975	92	96	0.000197			

Time Area Diagram at Pipe Number 15.000 for Storm

Total Area (ha) 0.014

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	2	0.000	2	4	0.014

Time Area Diagram for Green Roof at Pipe Number 15.000 (Storm)

Area (m³) 108 Evaporation (mm/day) 1
Depression Storage (mm) 3 Decay Coefficient 0.050

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.001963	12	16	0.001077	24	28	0.000591	36	40	0.000324
4	8	0.001607	16	20	0.000882	28	32	0.000484	40	44	0.000266
8	12	0.001316	20	24	0.000722	32	36	0.000396	44	48	0.000217

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Time Area Diagram for Green Roof at Pipe Number 15.000 (Storm)

Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)
48 52	0.000178	68 72	0.000065	88 92	0.000024	108 112	0.000009
52 56	0.000146	72 76	0.000054	92 96	0.000020	112 116	0.000007
56 60	0.000119	76 80	0.000044	96 100	0.000016	116 120	0.000006
60 64	0.000098	80 84	0.000036	100 104	0.000013		
64 68	0.000080	84 88	0.000029	104 108	0.000011		

Time Area Diagram at Pipe Number 15.001 for Storm

Total Area (ha) 0.023

Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)
0 2	0.000	2 4	0.023

Time Area Diagram for Green Roof at Pipe Number 15.001 (Storm)

Area (m³) 62 Evaporation (mm/day) 1
Depression Storage (mm) 3 Decay Coefficient 0.050

Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)	Time (mins) From: To:	Area (ha)
0 4	0.001127	32 36	0.000227	64 68	0.000046	96 100	0.000009
4 8	0.000922	36 40	0.000186	68 72	0.000038	100 104	0.000008
8 12	0.000755	40 44	0.000152	72 76	0.000031	104 108	0.000006
12 16	0.000618	44 48	0.000125	76 80	0.000025	108 112	0.000005
16 20	0.000506	48 52	0.000102	80 84	0.000021	112 116	0.000004
20 24	0.000414	52 56	0.000084	84 88	0.000017	116 120	0.000003
24 28	0.000339	56 60	0.000069	88 92	0.000014		
28 32	0.000278	60 64	0.000056	92 96	0.000011		

Time Area Diagram at Pipe Number 16.000 for Storm

Total Area (ha) 0.066

Time (mins) From: To:	Area (ha)
0 2	0.066

Time Area Diagram at Pipe Number 17.000 for Storm

Total Area (ha) 0.034

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Time Area Diagram at Pipe Number 17.000 for Storm

Time (mins)		Area	Time (mins)		Area
From:	To:	(ha)	From:	To:	(ha)
0	2	0.000	2	4	0.034

Time Area Diagram for Green Roof at Pipe Number 17.000 (Storm)

Area (m³) 353 Evaporation (mm/day) 1
Depression Storage (mm) 3 Decay Coefficient 0.050

Time (mins)		Area	Time (mins)		Area	Time (mins)		Area	Time (mins)		Area
From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)
0	4	0.006415	32	36	0.001295	64	68	0.000261	96	100	0.000053
4	8	0.005252	36	40	0.001060	68	72	0.000214	100	104	0.000043
8	12	0.004300	40	44	0.000868	72	76	0.000175	104	108	0.000035
12	16	0.003520	44	48	0.000711	76	80	0.000144	108	112	0.000029
16	20	0.002882	48	52	0.000582	80	84	0.000117	112	116	0.000024
20	24	0.002360	52	56	0.000476	84	88	0.000096	116	120	0.000019
24	28	0.001932	56	60	0.000390	88	92	0.000079			
28	32	0.001582	60	64	0.000319	92	96	0.000064			

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

PN	US/MH Name	Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)			
1.000	1	-0.114	0.000	0.12		1.6	OK	
1.001	2	-0.085	0.000	0.33		5.2	OK	
2.000	7	-0.076	0.000	0.49		3.6	OK	
2.001	6	-0.181	0.000	0.09		3.6	OK	
3.000	5	-0.071	0.000	0.50		12.1	OK	
1.002	3	-0.123	0.000	0.41		14.7	OK	
4.000	7	-0.076	0.000	0.45		11.4	OK	
1.003	5	-0.171	0.000	0.38		22.6	OK	
5.000	11	-0.098	0.000	0.26		2.7	OK	
5.001	10	-0.188	0.000	0.06		2.7	OK	
1.004	11	-0.153	0.000	0.48		22.1	OK	
1.005	6	-0.165	0.000	0.40		23.7	OK	
6.000	13	-0.081	0.000	0.43		3.0	OK	
6.001	12	-0.186	0.000	0.07		3.0	OK	
7.000	15	-0.084	0.000	0.39		9.3	OK	
1.006	10	-0.169	0.000	0.39		26.9	OK	
8.000	15	-0.087	0.000	0.37		2.9	OK	

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Micro Drainage

Havant Road, Emsworth
Network Model

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
9.000	16 360	Winter	2	+0%	100/30	Winter			10.054
8.001	15 360	Winter	2	+0%	100/120	Winter			9.508
10.000	20 15	Summer	2	+0%	100/15	Summer			9.900
1.007	8 30	Winter	2	+0%	30/120	Summer			8.795
11.000	22 15	Summer	2	+0%	30/120	Summer			8.775
1.008	9 30	Winter	2	+0%					8.644
12.000	24 15	Summer	2	+0%	100/15	Summer			9.786
1.009	24 960	Winter	2	+0%	30/15	Summer			8.527
13.000	26 480	Summer	2	+0%	100/15	Summer			9.804
13.001	27 480	Summer	2	+0%	100/15	Summer			9.668
1.010	26 960	Winter	2	+0%	30/15	Summer			8.520
14.000	1 480	Winter	2	+0%	100/30	Winter			10.663
14.001	1 480	Winter	2	+0%					10.038
14.002	13 480	Winter	2	+0%					9.965
15.000	23 360	Winter	2	+0%	100/15	Summer			9.519
15.001	24 360	Winter	2	+0%	100/15	Summer			9.451
16.000	34 15	Summer	2	+0%	30/15	Summer			9.676
15.002	34 15	Summer	2	+0%	30/15	Summer			9.356
15.003	35 15	Summer	2	+0%	30/15	Summer			9.263
17.000	29 240	Winter	2	+0%					10.688
17.001	37 240	Winter	2	+0%					10.037
1.011	14 960	Winter	2	+0%					8.516
1.012	20 960	Winter	2	+0%	2/15	Summer			8.513

PN	US/MH Name	Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
9.000	16	-0.096	0.000	0.28		2.1	OK	
8.001	15	-0.167	0.000	0.15		4.9	OK	
10.000	20	-0.096	0.000	0.28		6.7	OK	
1.007	8	-0.171	0.000	0.38		29.8	OK	
11.000	22	-0.091	0.000	0.33		4.3	OK	
1.008	9	-0.177	0.000	0.35		30.8	OK*	
12.000	24	-0.095	0.000	0.27		4.1	OK	
1.009	24	-0.102	0.000	0.27		17.7	OK	
13.000	26	-0.116	0.000	0.11		1.5	OK	
13.001	27	-0.116	0.000	0.12		1.5	OK	
1.010	26	-0.042	0.000	0.35		18.6	OK	
14.000	1	-0.087	0.000	0.37		2.6	OK	
14.001	1	-0.187	0.000	0.07		2.6	OK	
14.002	13	-0.188	0.000	0.06		2.6	OK	
15.000	23	-0.131	0.000	0.04		0.5	OK	
15.001	24	-0.123	0.000	0.07		1.0	OK	
16.000	34	-0.043	0.000	0.80		8.7	OK	
15.002	34	-0.061	0.000	0.65		8.7	OK	
15.003	35	-0.047	0.000	0.79		8.5	OK	

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

PN	US/MH Name	Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)			
17.000	29	-0.112	0.000	0.15		1.5	OK	
17.001	37	-0.113	0.000	0.14		1.5	OK	
1.011	14	-1.584	0.000	0.00		23.0	OK	
1.012	20	0.364	0.000	1.13		12.3	SURCHARGED	

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	-0.031	0.000	0.36		4.8	OK	
1.001	2	0.063	0.000	1.02		16.1	SURCHARGED	
2.000	7	-0.012	0.000	1.00		7.3	OK	
2.001	6	-0.162	0.000	0.18		7.3	OK	
3.000	5	0.014	0.000	1.04		25.4	SURCHARGED	
1.002	3	0.014	0.000	1.02		36.6	SURCHARGED	
4.000	7	0.002	0.000	1.00		25.4	SURCHARGED	
1.003	5	0.013	0.000	0.30		18.2	SURCHARGED	
5.000	11	-0.059	0.000	0.68		7.1	OK	
5.001	10	-0.164	0.000	0.17		7.1	OK	
1.004	11	0.153	0.000	0.52		23.8	SURCHARGED	
1.005	6	0.169	0.000	0.42		24.7	SURCHARGED	
6.000	13	-0.026	0.000	1.00		6.9	OK	
6.001	12	-0.164	0.000	0.17		6.9	OK	
7.000	15	-0.030	0.000	0.95		22.8	OK	
1.006	10	0.260	0.000	0.48		33.3	SURCHARGED	
8.000	15	-0.038	0.000	0.92		7.2	OK	

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

PN	US/MH Name	Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m³)	Flow / Cap.	Overflow (l/s)			
17.000	29	-0.083	0.000	0.41		4.3	OK	
17.001	37	-0.084	0.000	0.40		4.3	OK	
1.011	14	-1.008	0.000	0.01		42.6	OK	
1.012	20	0.938	0.000	1.13		12.3	SURCHARGED	

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Storage Structures 25
 Number of Online Controls 1 Number of Time/Area Diagrams 41
 Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model FEH D3 (1km) 0.392
 Site Location GB 473800 105650 E (1km) 0.311
 C (1km) -0.029 F (1km) 2.263
 D1 (1km) 0.449 Cv (Summer) 0.750
 D2 (1km) 0.284 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
 Analysis Timestep 2.5 Second Increment (Extended)
 DTS Status OFF
 DVD Status ON
 Inertia Status ON

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
 Return Period(s) (years) 2, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	1	15 Winter	100	+40%	100/15 Summer				10.337
1.001	2	15 Winter	100	+40%	30/15 Summer				10.323
2.000	7	360 Winter	100	+40%	100/30 Summer				10.443
2.001	6	960 Winter	100	+40%	100/15 Summer				10.285
3.000	5	15 Winter	100	+40%	30/15 Summer				10.325
1.002	3	960 Winter	100	+40%	30/15 Winter				10.277
4.000	7	15 Winter	100	+40%	30/15 Summer				10.325
1.003	5	960 Winter	100	+40%	30/480 Winter				10.248
5.000	11	120 Winter	100	+40%	100/60 Summer				10.338
5.001	10	960 Winter	100	+40%	100/240 Winter				10.235
1.004	11	960 Winter	100	+40%	30/15 Summer				10.233
1.005	6	960 Winter	100	+40%	30/240 Winter				10.226
6.000	13	240 Winter	100	+40%	100/30 Winter				10.664
6.001	12	960 Winter	100	+40%					10.224
7.000	15	15 Summer	100	+40%	100/15 Summer				10.333
1.006	10	960 Winter	100	+40%	30/120 Winter				10.210
8.000	15	240 Winter	100	+40%	100/30 Winter				10.239

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

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	1	0.137	0.000	0.65		8.8	SURCHARGED	
1.001	2	0.235	0.000	1.03		16.3	SURCHARGED	
2.000	7	0.143	0.000	1.58		11.5	FLOOD RISK	
2.001	6	0.260	0.000	0.23		9.6	SURCHARGED	
3.000	5	0.238	0.000	1.50		36.6	FLOOD RISK	
1.002	3	0.589	0.000	0.44		15.9	SURCHARGED	
4.000	7	0.230	0.000	1.37		34.7	FLOOD RISK	
1.003	5	0.824	0.000	0.33		20.1	SURCHARGED	
5.000	11	0.038	0.000	1.20		12.5	SURCHARGED	
5.001	10	0.210	0.000	0.17		7.3	SURCHARGED	
1.004	11	0.965	0.000	0.58		26.6	SURCHARGED	
1.005	6	0.981	0.000	0.47		27.6	SURCHARGED	
6.000	13	0.114	0.000	1.49		10.2	FLOOD RISK	
6.001	12	-0.001	0.000	0.21		8.5	OK	
7.000	15	0.162	0.000	1.39		33.4	SURCHARGED	
1.006	10	1.075	0.000	0.57		39.3	SURCHARGED	
8.000	15	0.089	0.000	1.40		11.0	FLOOD RISK	

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

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
9.000	16	120 Winter	100	+40%	100/30 Winter				10.200
8.001	15	960 Winter	100	+40%	100/120 Winter				10.166
10.000	20	960 Winter	100	+40%	100/15 Summer				10.165
1.007	8	960 Winter	100	+40%	30/120 Summer				10.164
11.000	22	960 Winter	100	+40%	30/120 Summer				10.140
1.008	9	60 Winter	100	+40%					8.821
12.000	24	960 Winter	100	+40%	100/15 Summer				10.120
1.009	24	960 Winter	100	+40%	30/15 Summer				10.119
13.000	26	15 Winter	100	+40%	100/15 Summer				10.421
13.001	27	960 Winter	100	+40%	100/15 Summer				10.109
1.010	26	960 Winter	100	+40%	30/15 Summer				10.106
14.000	1	240 Winter	100	+40%	100/30 Winter				10.839
14.001	1	960 Winter	100	+40%					10.105
14.002	13	960 Winter	100	+40%					10.102
15.000	23	960 Winter	100	+40%	100/15 Summer				10.109
15.001	24	960 Winter	100	+40%	100/15 Summer				10.108
16.000	34	960 Winter	100	+40%	30/15 Summer				10.106
15.002	34	960 Winter	100	+40%	30/15 Summer				10.106
15.003	35	960 Winter	100	+40%	30/15 Summer				10.102
17.000	29	60 Winter	100	+40%					10.768
17.001	37	60 Winter	100	+40%					10.115
1.011	14	960 Winter	100	+40%					10.100
1.012	20	960 Winter	100	+40%	2/15 Summer				10.093

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
9.000	16	0.050	0.000	1.25		9.4	SURCHARGED	
8.001	15	0.491	0.000	0.41		13.1	SURCHARGED	
10.000	20	0.169	0.000	0.08		2.0	SURCHARGED	
1.007	8	1.198	0.000	0.70		54.7	SURCHARGED	
11.000	22	1.274	0.000	0.09		1.2	FLOOD RISK	
1.008	9	0.000	0.000	1.20		104.9	SURCHARGED*	
12.000	24	0.239	0.000	0.09		1.3	FLOOD RISK	
1.009	24	1.490	0.000	0.88		56.7	SURCHARGED	
13.000	26	0.501	0.000	1.98		27.0	SURCHARGED	
13.001	27	0.325	0.000	0.24		3.2	SURCHARGED	
1.010	26	1.544	0.000	1.11		59.6	SURCHARGED	
14.000	1	0.089	0.000	1.40		9.7	SURCHARGED	
14.001	1	-0.120	0.000	0.19		7.2	OK	
14.002	13	-0.051	0.000	0.18		7.2	OK	
15.000	23	0.459	0.000	0.09		1.2	SURCHARGED	
15.001	24	0.534	0.000	0.18		2.5	FLOOD RISK	
16.000	34	0.387	0.000	0.29		3.1	FLOOD RISK	
15.002	34	0.689	0.000	0.42		5.7	FLOOD RISK	
15.003	35	0.792	0.000	0.52		5.7	SURCHARGED	

Cundall, Johnston & Partners		Page 38
19 - 21 Silvermills Court Henderson Place Lane Edinburgh EH3 5DG	Havant Road, Emsworth Network Model	
Date 10/05/17 File 170509 Network.mdx	Designed by LK Checked by AMF	
Micro Drainage	Network 2015.1	

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

PN	US/MH Name	Surcharged		Flooded		Pipe Flow (l/s)	Status	Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Overflow (l/s)			
17.000	29	-0.032	0.000	0.98		10.3	OK	
17.001	37	-0.035	0.000	0.95		10.3	OK	
1.011	14	0.000	0.000	0.01		74.2	OK	
1.012	20	1.944	0.000	1.13		12.3	SURCHARGED	

Appendix 8 – Drainage Strategy Plans

- CLXX(52)2001 Drainage Strategy Plan Sheet 1 of 2
- CLXX(52)2002 Drainage Strategy Plan Sheet 2 of 2
- CLXX(52)2003 Drainage Strategy Indicative Details

TANKED PERMEABLE AREA REFERENCES IN SITE ZONES A AND B

AREA 1: PERMEABLE ROAD 1 + INTERLINKED DRIVEWAYS

AREA 2: PERMEABLE ROAD 2 + CAR PARK 3 + CAR PARK 11 + CAR PARK 12 + INTERLINKED DRIVEWAYS

AREA 3: PERMEABLE ROAD 3 + CAR PARK 1 + CAR PARK 2 + INTERLINKED DRIVEWAYS

AREA 4: PERMEABLE ROAD 4 + CAR PARK 4 + CAR PARK 5 + CAR PARK 6 + CAR PARK 7 + INTERLINKED DRIVEWAYS

1012052

A1

Based on:
Architects Dwg No.
Structural Dwg No.
Survey Dwg No.
Other Dwg No.

Rev
Rev
Rev
Rev

DO NOT SCALE FROM THIS DRAWING

Notes

KEY

- SITE BOUNDARY
- IMPERMEABLE CONSTRUCTION ROAD - DRAINING TO SWALE OR TRENCH SOAKAWAY
- PERMEABLE CONSTRUCTION ROAD, CAR PARKING & DRIVEWAYS IN DRAINAGE ZONES A & B (TANKED)
- PERMEABLE CONSTRUCTION ROAD, CAR PARKING & DRIVEWAYS IN DRAINAGE ZONE C (INFILTRATING)
- SERVICE CORRIDOR
- FOUL WATER DRAIN & MANHOLE / INSPECTION CHAMBER (FWMH)
- PLOT FOUL FLOW DIRECTION
- SURFACE WATER DRAIN & MANHOLE / INSPECTION CHAMBER (SWMH)
- SURFACE WATER DISTRIBUTION BOX
- ROOF AREA RUNOFF DIRECTION TO DISCHARGE POINT
- PERFORATED PIPE
- KERB DRAIN
- SWALE
- SITE ZONES (A-C)
- ROOT PROTECTION ZONES
- WILSON BAILEY TRIAL PITS
- PERMAVOID INFILTRATION TANK
- FILTER DRAIN
- OVERFLOW / EXCEEDANCE ROUTE
- WINDAS MODEL PIPE REFERENCE

P3	19/05/2017	PLANNING RESUBMISSION	SJ	AMF	AMF
P2	01/03/2017	REVISED TO SUIT SCHEME ALTERATION	SJ	AMF	AMF
P1	21/07/2016	ISSUED FOR PLANNING	SJ	AMF	AMF
-	14/07/2016	ISSUED FOR COMMNET	SJ	AMF	AMF
Issue	Date	Description	By	Chkd	Verfd

Project
LAND AT HAVANT ROAD, EMSWORTH

Client
BDW SOUTHAMPTON

Architect
SIMON COOPER ASSOCIATES

Title
DRAINAGE LAYOUT
SHEET 1 OF 2

Drawing No. CLXX(52)2001	Drawing Status PLANNING
Job No. 1012052	Scale 1:500 @A1
Originator LK/AC	Checked AMF
Verified AMF	Issue P3

CUNDALL

One Carter Lane
London EC4V 5ER
Telephone: +44 (0)20 7438 1600

Website: www.cundall.com

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TANKED PERMEABLE AREA REFERENCES IN SITE ZONES A AND B

AREA 1: PERMEABLE ROAD 1 + INTERLINKED DRIVEWAYS

AREA 2: PERMEABLE ROAD 2 + CAR PARK 3 + CAR PARK 11 + CAR PARK 12 + INTERLINKED DRIVEWAYS

AREA 3: PERMEABLE ROAD 3 + CAR PARK 1 + CAR PARK 2 + INTERLINKED DRIVEWAYS

AREA 4: PERMEABLE ROAD 4 + CAR PARK 4 + CAR PARK 5 + CAR PARK 6 + CAR PARK 7 + INTERLINKED DRIVEWAYS

1012052

A1

Based on:
Architect's Dwg No.
Structural Dwg No.
Survey Dwg No.
Other Dwg No.

Rev
Rev
Rev
Rev

DO NOT SCALE FROM THIS DRAWING

Notes

KEY

- SITE BOUNDARY
- IMPERMEABLE CONSTRUCTION ROAD - DRAINING TO SWALE OR TRENCH SOAKAWAY
- PERMEABLE CONSTRUCTION ROAD, CAR PARKING & DRIVEWAYS IN DRAINAGE ZONES A & B (TANKED)
- PERMEABLE CONSTRUCTION ROAD, CAR PARKING & DRIVEWAYS IN DRAINAGE ZONE C (INFILTRATING)
- SERVICE CORRIDOR
- FOUL WATER DRAIN & MANHOLE / INSPECTION CHAMBER (FWMH)
- PLOT FOUL FLOW DIRECTION
- SURFACE WATER DRAIN & MANHOLE / INSPECTION CHAMBER (SWMH)
- SURFACE WATER DISTRIBUTION BOX
- ROOF AREA RUNOFF DIRECTION TO DISCHARGE POINT
- PERFORATED PIPE
- KERB DRAIN
- SWALE
- SITE ZONES (A-C)
- ROOT PROTECTION ZONES
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P3	19/05/2017	PLANNING RESUBMISSION	SJ	AMF	AMF
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-	14/07/2016	ISSUED FOR COMMNET	SJ	AMF	AMF
Issue	Date	Description	By	Chkd	Verfd

Project
LAND AT HAVANT ROAD, EMSWORTH

Client
BDW SOUTHAMPTON

Architect
SIMON COOPER ASSOCIATES

Title
DRAINAGE LAYOUT
SHEET 2 OF 2

Drawing No. CLXX(52)2002	Drawing Status PLANNING
Job No. 1012052	Scale 1:500 @A1
Originator LK/AC	Checked AMF
Verified AMF	Issue P3

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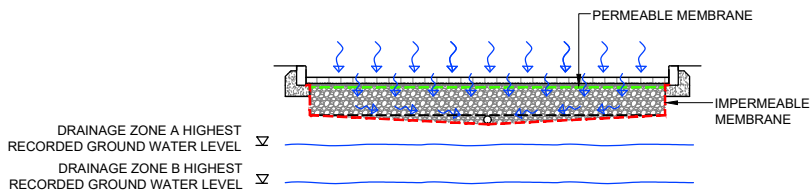
One Carter Lane
London EC4V 5ER
Telephone: +44 (0)20 7438 1600

Website: www.cundall.com

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Architects Drg No.	Rev
Structural Drg No.	Rev
Survey Drg No.	Rev
Other Drg No.	Rev

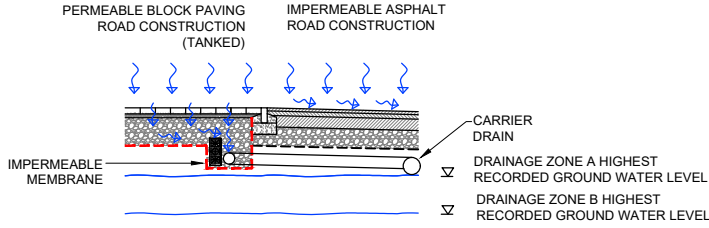
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- Notes
1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTURAL, STRUCTURAL AND ENGINEERING SERVICES DRAWINGS, SPECIFICATIONS, SCHEDULES AND PROJECT SPECIFIC DOCUMENTS.
 2. ALL PLANT AND EQUIPMENT IS TO BE INSTALLED TO MANUFACTURER'S RECOMMENDATIONS, ALLOWING FULL ACCESS FOR COMMISSIONING, MAINTENANCE AND REMOVAL/REPLACEMENT.
 3. ALL DIMENSIONS IN mm UNLESS OTHERWISE STATED.
 4. DO NOT SCALE FROM THIS DRAWING.



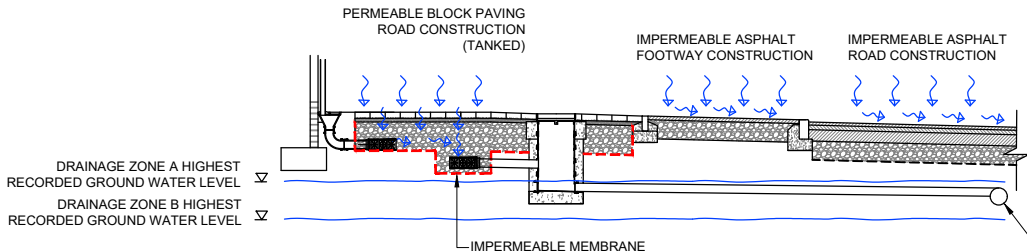
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SCALE 1:50



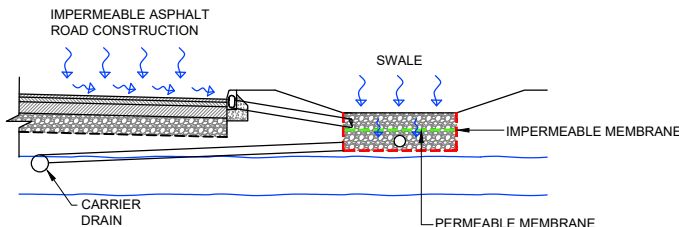
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SCALE 1:50



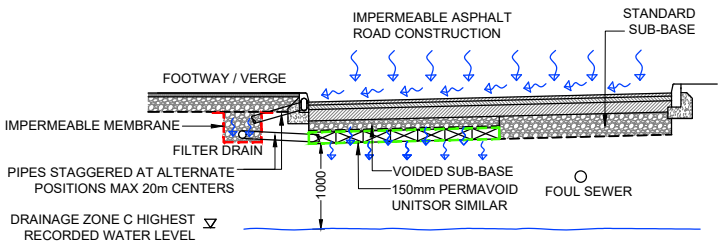
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SCALE 1:50



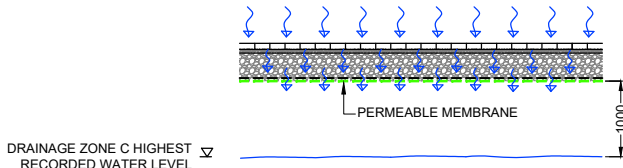
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SCALE 1:50



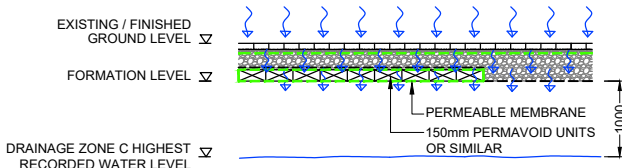
SITE ZONE C IMPERMEABLE ROAD WITH PERMAVOID (INFILTRATING)

SCALE 1:50



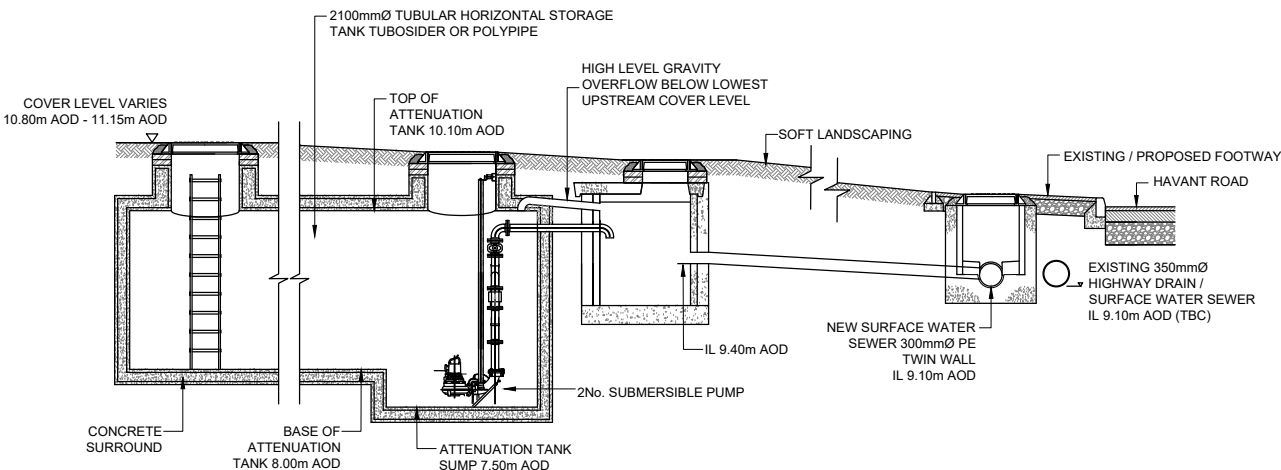
SITE ZONE C PERMEABLE PAVING IN ROADS, DRIVEWAYS & CAR PARKING AREAS (INFILTRATING)

SCALE 1:50



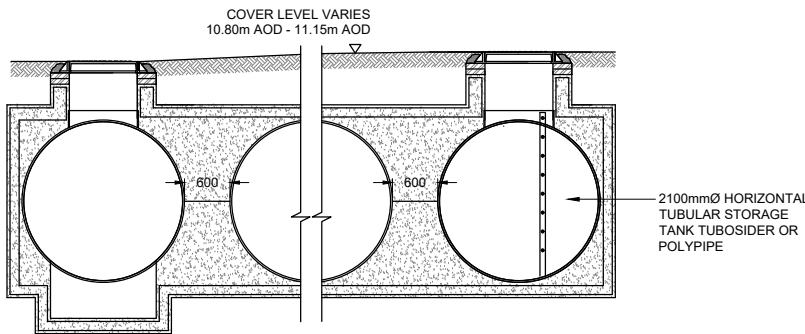
SITE ZONE C PERMEABLE PAVING / PERMAVOID IN ROADS & CAR PARKING AREAS (INFILTRATING)

SCALE 1:50



PUMPED ATTENUATION SCHEMATIC A

SCALE 1:50



PUMPED ATTENUATION SCHEMATIC B

SCALE 1:50

P1	19/05/2017	PLANNING RESUBMISSION	SJ	AMF	AMF
Issue	Date	Description	By	Chkd	Verfd

Project
LAND AT HAVANT ROAD,
EMSWORTH

Client
BDW SOUTHAMPTON
Architect
SIMON COOPER ASSOCIATES

Title
DRAINAGE STRATEGY
INDICATIVE DETAILS

Drawing No.	CLXX(52)2003	Drawing Status	PLANNING
Job No.	1012052	Scale	1:50 @ A1
Originator	SJ	Checked	AMF
Verified	AMF	Issue	P1

CUNDALL

One Carter Lane
London EC4V 5ER
Telephone: +44 (0)20 7438 1600

Website: www.cundall.com