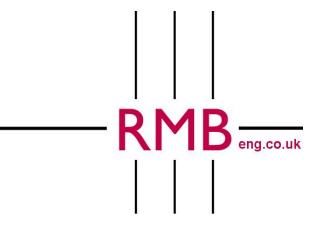
Surface Water Drainage Design Report Former Bus Depot High Street Herne Bay CT6 5LE

Coastal Developments Ltd

12th December 2018

RMB Consultants (Civil Engineering) Ltd 39 Cossington Road Canterbury Kent CT1 3HU

Tel 01227 472128 www.rmbconsultants.co.uk © RMB Consultants (Civil Engineering) Ltd 2018





1. Introduction

The following surface water drainage design report has been produced for the development at the Former Bus Depot, High Street, Herne Bay, CT6 5LE. The development consists of the demolition of the bus depot and the construction of retail space and residential dwellings at the former bus depot site.

This design parameters document provides details for the discharge of Condition 3 of Planning Permission 17/02055.

Condition 3

No development (other than demolition) shall take place until details of the means of foul and surface water disposal, including a detailed sustainable surface water drainage scheme for the site based on the submitted Flood Risk Assessment by Herrington Consulting Limited dated December 2017 that is compliant with the non-statutory technical standards for sustainable drainage and shall demonstrate the surface water run off generated up to and including the 100yr critical storm (including allowance for climate change) will not exceed the run off from the undeveloped site following the corresponding rainfall event, and so as not to increase the risk of flooding both on- or off-site, and including details for the implementation and long term management I maintenance of all surface water drainage infrastructure on site, the provision of measures to prevent the discharge of surface water onto the highway and the adequate management of silt and pollutants from the site use and construction to ensure there is no pollution risk to receiving waters, and a Verification Report pertaining to it have been submitted to and agreed in writing by the Local Planning Authority. The development shall be carried out in accordance with such details as are agreed and thereafter maintained.

Reason: To ensure adequate drainage provision, prevent pollution and protect water quality on / off site, in accordance with policies CC11, CC12, CC13 and QL12 of the Canterbury District Local Plan 2017 and the National Planning Policy Framework.



2. Local Development Documents

Canterbury District Local Plan Adopted July 2017

The following Policies are relevant to the foul and surface water drainage design:

Policy CC11 Sustainable Drainage Systems

All development applications should include drainage provision. This will ensure that surface water is appropriately controlled within the development site, manage flood risk on-site and offsite, and not exacerbate any existing flood risk in the locality. Within major¹ development sustainable drainage systems that deliver other benefits, such as biodiversity, water quality improvements and amenity, are expected to be included, except where they are demonstrated to be inappropriate. All developments should achieve as close to possible to the City Council's stipulated greenfield runoff rates, mimic natural flows and drainage pathways and ensure that surface water run-off is managed as close to its source as possible using the following hierarchy:

- 1. Discharge into the ground
- 2. Discharge to a surface water body
- 3. Discharge to a surface water sewer, highway drain or other drainage system.
- 4. Discharge to a combined sewer where there are absolutely no other options, and only where agreed in advance with the relevant sewage undertaker.

Any drainage scheme must manage all sources of surface water, including exceedance flows and surface flows from offsite, provide for emergency ingress and egress and ensure adequate drainage connectivity. It will not be acceptable for surface water runoff to enter the foul water system.

SuDS or other appropriate measures should:

- a. Maintain public safety;
- b. Provide sufficient attenuation to surface water flows as appropriate;
- c. Ensure that there is adequate treatment of surface water flows, such that there is no diminution in quality of any receiving watercourse;
- d. Ensure protection of groundwater; and
- e. Provide or enhance wetland habitat and biodiversity where possible.

On major and strategic developments it should be shown how this infrastructure will be delivered over the different building phases to ensure that schemes are delivered as envisaged and that ongoing and future flood risk is managed.

Approval of the design and long term management and maintenance of SuDS will be required prior to the development commencing.



Footnote: [1] As defined in Article 2 of the Town and Country Planning (Development Management Procedure) (England) Order 2015 (no.595) or any later amendment

Policy CC12 Water Quality

The City Council will require that new development incorporates well designed mitigation measures to ensure that the water environment does not deteriorate, both during construction and during the lifetime of the development. Furthermore, the City Council will seek to ensure that every opportunity is taken to enhance existing aquatic environments and ecosystems. This will include the restoration of natural river features (including riverbanks) and removal of barriers to fish passage when appropriate opportunities arise.

Any new development should not compromise Water Framework Directive objectives.

Policy CC13 Water Resources

The City Council will ensure that development is phased using appropriate time scales for the construction of any necessary water and/or wastewater infrastructure associated with development proposals. The City Council will consult in detail with water companies and the Environment Agency to ensure the need for new water services infrastructure is understood and planned for.

All new housing or commercial development will need to incorporate suitable arrangements for the disposal of foul water into a sewerage system, at the nearest point of adequate capacity, in consultation with the service provider. Development should minimise water use as far as practicable by incorporating appropriate water efficiency and water recycling measures. In new homes, the City Council will seek a required level of 110 litres maximum daily allowable usage per person in accordance Regulation 36(2)(b) of the Building Regulations 2010 (as amended).

Policy QL12 Potentially Polluting Development

When granting planning permission for development which could potentially result in pollution, the City Council will impose conditions or seek agreements to ensure subsequent mitigation measures are undertaken.

Guidance Note – Canterbury City Council, Surface Water Drainage Pro-forma

Canterbury City Council has published a guidance note covering surface water drainage for new development within the district. This splits the district into four Drainage Zones. The site lies within Drainage Zone 1.



For brownfield sites, all developments must make best endeavours to reduce the post development discharge rates to greenfield rates, under all return period rainfall events. Only if it can be demonstrated that it is not possible to achieve the greenfield runoff rate(s), can the rate of surface water discharged from a brownfield development be higher than greenfield runoff rates. In this case the proposals must never exceed 50% of the existing discharge rate for the site, including the appropriate allowance for climate change.

For sites within Drainage Zone 1 the greenfield limiting discharge rate has been set to a specific rate of 4 l/s/ha, which must be achieved for all return period events.

Kent County Council Drainage and Planning Policy Statement

This policy statement sets out how Kent County Council, as Lead Local Flood Authority and statutory consultee, will review drainage strategies and surface water management provisions associated with applications for major development.

For brownfield sites the following policy applies:

SuDS Policy 4: Seek to Reduce Existing Flood Risk

New development should be designed to take full account of any existing flood risk, irrespective of the source of flooding.

Where a site or its immediate surroundings have been identified to be at flood risk, all opportunities to reduce the identified risk should be investigated at the masterplanning stage of design and subsequently incorporated at the detailed design stage.

For brownfield sites, and unless demonstrated to be reasonably impracticable, we would expect a 50% reduction in the peak runoff rate.



3. Site Characteristics

Location - The site is located in Herne Bay Town Centre. It is bounded by roads on three sides with the High Street to the north, Richmond Street to the west and Hanover Street to the south, Figure 1.

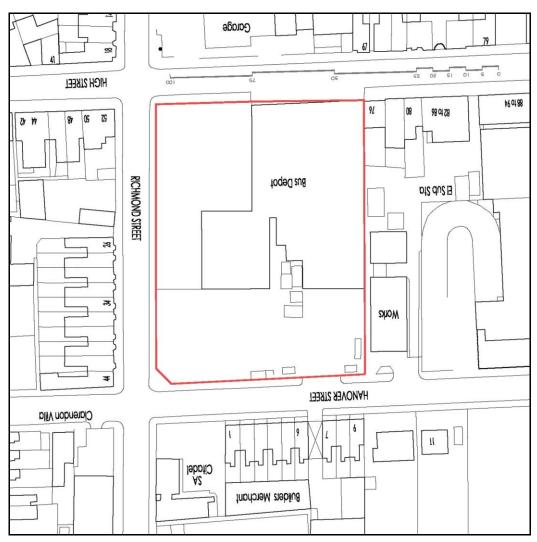
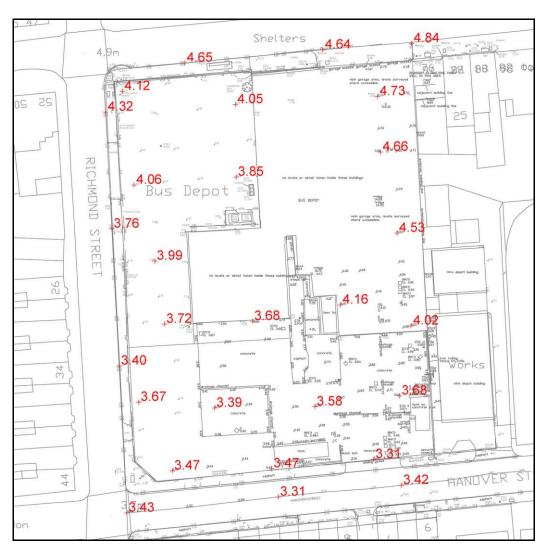


Figure 1. Site location.

Topography - A detailed topographical survey has been undertaken. The site falls from north to south. The High Street is at approximately 4.64mAOD (Above Ordnance Datum). Hanover Street is at approximately 3.31mAOD, Figure 2.



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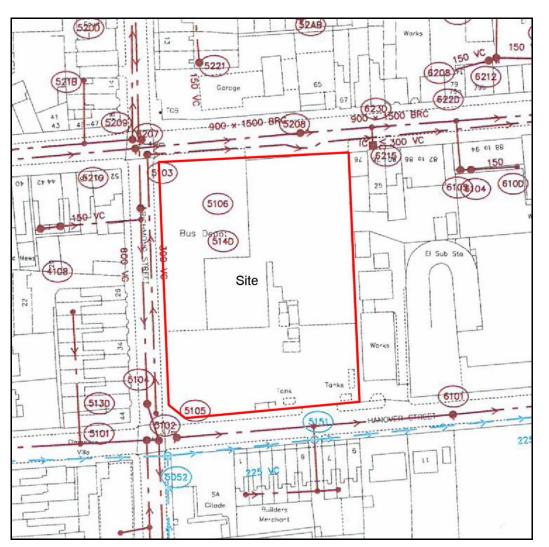
Figure 2. Local topography.

Geology - The bedrock geology consists of London Clay, clay and silt. Superficial deposits are recorded over the far north west corner of the site and consist of Head, clay and silt. Soils are classified as loamy soils with naturally high groundwater, draining to local shallow groundwater.

Groundwater - The site does not lie within any groundwater source protection zones. Records of boreholes sunk near the site indicate that resting groundwater is close to the surface.

Rainfall Data - Point rainfall data has been obtained from the Flood Estimation Handbook (FEH) Web Service. The FEH 2013 XML rainfall data has been used in the surface water drainage design. This provides rainfall data for return periods greater than 2 years.

Sewer Record - The site is served by public foul and surface water sewers, Figure 3. A surface water sewer runs west to east along Hanover Street, south of the site. Foul sewers run along the High Street and Richmond Street. The majority of these sewers are likely to be combined sewers taking surface water as well as foul water.



RME

Figure 3. Public sewer record.

Existing Drainage - The site lies within the Plenty Brook catchment. The Plenty Brook outfalls to the sea north of the site. The watercourse has been culverted and forms part of the public surface water sewerage network within the town centre.

The site covers 5,350m². The entire site is covered with impermeable materials.



Greenfield Runoff - The peak greenfield runoff for the critical storm duration for the site has been calculated using the IH124 method from the greenfield runoff rate estimation tool published online by HR Wallingford at uksuds.com. The peak runoff is shown in Table 1 for 1ha and for the site area.

Return	Runoff R	ate Q I/s
Period	per ha.	Site (0.535 ha)
QBar	3.9	2.1
1	3.3	1.8
30	8.9	4.8
100	12.3	6.6

Table 1. Greenfield runoff rate for the site.



4. Proposed Development

The proposed development consists of the construction of four blocks and a bin store. Impermeable surfaces will cover 4,200m², consisting of 2,250m² of roof and 1,950m² of paving, Figure 4.



Figure 4. Proposed impermeable areas.

The peak rate of runoff and volume of runoff for the critical storm duration for the existing and proposed site, is shown in Table 2.

Storm Return Period (years)	Peak Run	off (Q I/s)	Volume of Runoff 360 minute duration storm (m ³)			
	Existing (5,350m²)	Proposed (4,200m²)	Existing (5,350m²)	Proposed (4,200m²)		
2	50	39	121	96		
30	114	90	240	188		
100	147	115	326	256		
100 + 20%	176	139	392	308		
100 + 40%	205	162	457	359		

Table 2. Peak rate of runoff and volume of runoff from the existing and proposed site.





5. Surface Water Management Strategy

The London Clay geology and high groundwater level means that an attenuated discharge to the public surface water sewer is the most appropriate surface water management strategy.

Canterbury City Council drainage guidance requires best endeavours to achieve a discharge rate of 4 l/s/ha. Only if it can be demonstrated that it is not possible to this rate, can the rate of surface water discharged from a brownfield development be higher. In this case the proposals must never exceed 50% of the existing discharge rate for the site, including the appropriate allowance for climate change.

For an impermeable site area of 0.42ha the limiting discharge is 1.7 l/s. The guidance states that if the attenuated flow rate is too low, this could result in blockages in flow control device. In this case an alternative discharge rate of 2 l/s is acceptable.

The site is subject to several constraints which reduce the opportunities for limiting discharge from the site:

- 1. The depth to invert of the existing connection to the surface water sewer within Hanover Street is shallow, 1m deep.
- 2. The levels need to match the existing street levels on three sites. This further constrains the depth at which any attenuation can be provided, particularly along the Hanover Street frontage.
- 3. Refuse vehicle access is required to the main access, increasing the cover required for attenuation crates.

It is not practical to provide one attenuation structure to serve the whole development and limit runoff to 2 l/s. The only effective way to do this would be to provide storage crates at least 800mm deep and there is insufficient depth at the outlet to achieve this. Given that the existing site is 100% covered with impermeable materials and the site constraints it is not considered practical to limit discharge from the site to greenfield runoff rates. This strategy aims to limit runoff to 25% of the existing site runoff, 12.5 l/s. This is better than the requirements set out by Canterbury City Council and Kent County Council which require a minimum reduction in existing runoff of 50%.

The site has been split into three catchments.

- A. Covering the relatively flat area over the north and east of the site.
- B. The western and southern parts of the site fronting Richmond Street and Hanover Street, west of the access.
- C. The part of the site fronting Hanover Street east of the access.



Permeable paving and attenuation crates are proposed. The levels mean that attenuation is required within the access road. As sufficient cover for standard crates, generally 800mm, cannot be provided due to the shallow invert level of the outfall, Permavoid subbase replacement crates are proposed. These can be laid with a cover of 300mm.

Catchment A

The proposal is to discharge surface water runoff from roofs and paved areas to permeable paving. The catchment is shown in Figure 5.

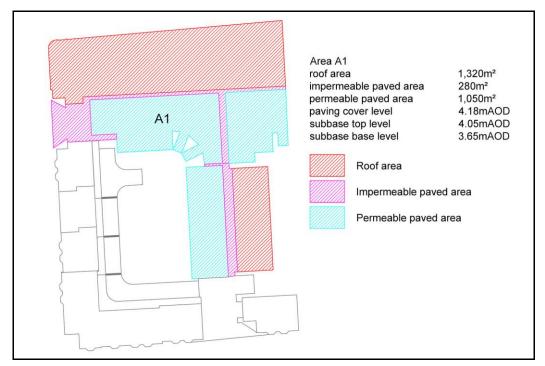


Figure 5. Catchment A.

The design parameters are shown in Table 3. The paving has been analysed using MicroDrainage Source Control published by XP Solutions. The analysis for the 1 in 100 year plus 20% allowance for climate change event is shown in Appendix A.

Parameter	Catchment A - Permeable Paving					
Rainfall return period	2 year	30 year	100 year	100 year + 20%	100 year + 40%	
Contributing area	2,650m ²	2,650m ²	2,650m ²	2,650m ²	2,650m ²	
Paving area	1,050m ²	1,050m ²	1,050m ²	1,050m ²	1,050m ²	
Subbase Depth	0.4m	0.4m	0.4m	0.4m	0.4m	
Porosity	30%	30%	30%	30%	30%	
Hydrobrake control	5 l/s	5 l/s	5 l/s	5 l/s	5 l/s	
Maximum discharge	4.2 l/s	4.5 l/s	4.7 l/s	4.9 l/s	5.3 l/s	
Maximum water depth	0.055m	0.175m	0.256m	0.341m	0.539m	
Half drain time	38 minutes	113 minutes	149 minutes	195 minutes	233 minutes	
Flood volume	-	-	-	-	9.2 m ³	

Table 3. Design parameters for Catchment A permeable paving.

Catchment B

The proposal is to discharge surface water runoff from roofs and paved areas to permeable paving and Permavoid subbase replacement storage crates. The catchment is shown in Figure 6.

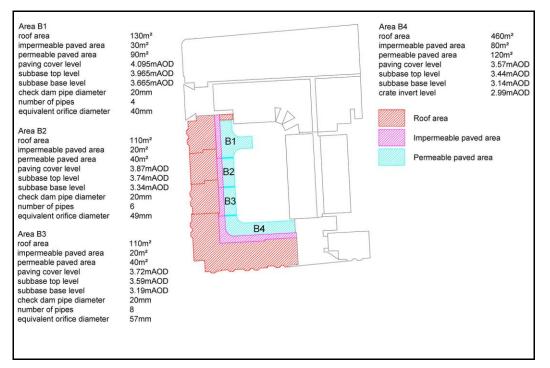


Figure 6. Catchment B.





The catchment has been modelled as four sub-catchments with check dams between them to maximise water storage. The check dams have been modelled as a single office but will be constructed with 20mm diameter holes as set out in Table 4.

Catchment	Number of 20mm diameter holes	Equivalent diameter orifice
B1	4	40mm
B2	6	49mm
B3	8	57mm

Table 4. Check dam modelling.

Catchment B4 consists of permeable paving and attenuation crate storage. To model this in Source Control the volume of storage has been converted to an increased depth in the attenuation storage. The permeable paving is 300mm deep and covers 120m². At 30% voids this equates to 10.8m³ of storage. The attenuation crates are 4.248m x 17.700m x 150mm deep. The crates cover 75.2m². The void space within the crates is 95%. The storage volume has been increased to 11.4m³ to allow for this. This increased volume, 11.4m³ over 75.2m² equates to an increased depth of 150mm.

The design parameters for Catchment B are shown in Table 5. The catchment has been analysed as cascading ponds using MicroDrainage Source Control published by XP Solutions. The analysis for the 1 in 100 year plus 20% allowance for climate change event is shown in Appendix B.

Parameter	Catchment B - Permeable Paving/Attenuation Crates				
Rainfall return period	2 year	30 year	100 year	100 year + 20%	100 year + 40%
Contributing area	1,250m ²	1,250m ²	1,250m ²	1,250m ²	1,250m ²
Paving area	290m ²	290m ²	290m ²	290m ²	290m ²
Crate area	75.2m ²	75.2m ²	75.2m ²	75.2m ²	75.2m ²
Hydrobrake control	5 l/s	5 l/s	5 l/s	5 l/s	5 l/s
Maximum discharge	3.5 l/s	4.1 l/s	4.6 l/s	4.9 l/s	5.9 l/s
Maximum water depth	0.029m	0.157m	0.245m	0.338m	0.584m
Half drain time	5 minutes	26 minutes	37 minutes	45 minutes	47 minutes
Flood volume	-	-	-	-	4.1 m ³

Table 5. Design parameters for Catchment B permeable paving/attenuation crates.



Catchment C

The proposal is to discharge surface water runoff from roofs and paved areas to Permavoid subbase replacement storage crates. The catchment is shown in Figure 7.

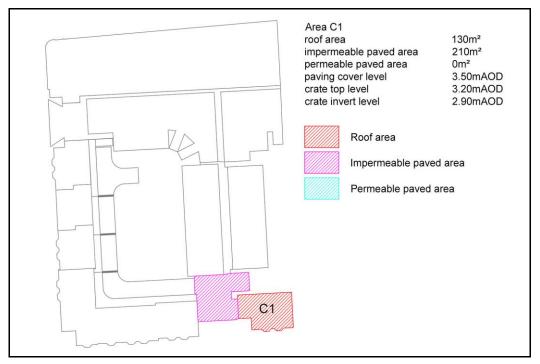


Figure 7. Catchment C.

The design parameters are shown in Table 6. The crates have been analysed using MicroDrainage Source Control published by XP Solutions. The analysis for the 1 in 100 year plus 20% allowance for climate change event is shown in Appendix C.

Parameter	Catchment C - Attenuation Crates					
Rainfall return period	2 year	30 year	100 year	100 year + 20%	100 year + 40%	
Contributing area	280m ²	280m ²	280m ²	280m ²	280m ²	
Crate area	19.3m ²	19.3m ²	19.3m ²	19.3m ²	19.3m ²	
Crate depth	0.3m	0.3m	0.3m	0.3m	0.3m	
Hydrobrake control	2.5 l/s	2.5 l/s	2.5 l/s	2.5 l/s	2.5 l/s	
Maximum discharge	1.7 l/s	2.1 l/s	2.3 l/s	2.5 l/s	3.1 l/s	
Maximum water depth	0.023m	0.153m	0.230m	0.298m	0.600m	
Half drain time	3 minutes	13 minutes	18 minutes	22 minutes	23 minutes	
Flood volume	-	-	-	-	0.5 m ³	

Table 6. Design parameters for Catchment C attenuation crates.

The peak discharge from the existing and proposed site is shown in Table 7.

Development	2 year	30 year	100 year	100 year + 20%	100 year + 40%
Existing	50 l/s	114 l/s	147 l/s	176 l/s	205 l/s
Proposed	9.4 l/s	10.7 l/s	11.6 l/s	12.3 l/s	14.3 l/s

Table 7. Peak discharge from the existing and proposed site.

The proposed surface water drainage strategy reduces peak runoff from the site to below 12.5 l/s under all storm events up to and including the 1 in 100 year with a 20% allowance for climate change. This is 25% of the peak runoff under the 2 year event for the existing site.

The drainage layout is shown on drawings 857/301A Foul and Surface Water Drainage Layout and 857/302A Permeable and Impermeable Paving Layout.

The above demonstrates that a suitable surface water drainage scheme has been designed to serve the proposed development in accordance with Condition 3 of the planning permission.





6. Water Quality

The SuDS Manual gives the following as standards of good practice for water quality:

Water quality standard 1: Prevent runoff from the site to receiving surface waters for the majority of small rainfall events.

No runoff should be discharged from the site to receiving surface waters or sewers for the majority of small (eg < 5 mm) rainfall events. This is termed Interception.

Water quality standard 2: Treat runoff to prevent negative impacts on the receiving water quality.

Runoff should be adequately treated to protect the receiving water body from:

- 1. Short-term acute pollution that may result from accidental spills or temporary high pollution loadings within the catchment area.
- 2. Long-term chronic pollution from the spectrum of runoff pollutant sources within the urban environment.

Water Quality Standard 1 - Interception

The use of permeable paving will allow runoff under smaller events to be retained on site. This promotes evaporation. The proposed strategy therefore meets the interception standard.

Water Quality Standard 2 - Treatment

The extent of treatment required depends on the land use, the level of pollution prevention in the catchment and for groundwater the natural protection afforded by underlying soil layers. High hazard sites will have a higher potential pollution load and higher potential maximum pollution concentrations. They therefore tend to require more treatment than low hazard sites in order to deliver discharges of an acceptable quality.

The SuDS Manual sets out minimum water quality management requirements for discharges to receiving surface waters and groundwater for various land use types, Table 8. The site consists of two land use types:

- 1. Roofs classed as residential roofs, very low pollution hazard.
- 2. The access and parking areas classed as *property driveways/low traffic roads*, low pollution hazard.



Land use	Pollution hazard	Requirements for discharge to:			
	level	surface waters	groundwater		
Residential roofs	Very low	Removal of gross solids and sediments only			
Individual property driveways, roofs (excluding residential), residential car parks, low traffic roads (eg cul de sacs, home zones, general access roads), non- residential car parking with infrequent change (eg schools, offices)	Low	Simple index approach Note: extra measures may be required for discharges to protected resources			
Commercial yard and delivery areas, non- residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	Simple index approach Note: extra measures may be required for discharges to protect resources In England and Wales, Risl Screening must be underta first to determine whether consultation with the environmental regulator is			
Trunk roads and motorways	High	Follow the guidance and risk assessment proces set out in HA (2009)			
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels are to be delivered, handled, stored, used or manufactured, industrial sites	High	Discharges may require a or permit. Obtain pre-per environmental regulator. to be required.			

Note 1. Filter drains can remove coarse sediments, but their use for this purpose will have significant implications with respect to maintenance requirements, and this should be taken into account in the design and Maintenance Plan.

Note 2. Ponds and wetlands can remove coarse sediments, but their use for this purpose will have significant implications with respect to the maintenance requirements and amenity value of the system. Sediment should normally be removed upstream, unless they are specifically designed to retain sediment in a separate part of the component, where it cannot easily migrate to the main body of water.

Note 3. Where a wetland is not specifically designed to provide significantly enhanced treatment, it should be considered as having the same mitigation indices as a pond.

Table 8. Minimum water quality management requirements.

For each land use type a simple index approach is appropriate which involves the following steps:

- 1. Allocate suitable pollution hazard indices for the proposed land use, Table 9.
- 2. Select SuDS with a total pollution mitigation index that equals or exceeds the pollution hazard index, Table 10.
- 3. Where the discharge is to protected surface waters or groundwater, consider the need for a more precautionary approach.

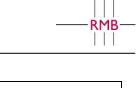
Land Use	Pollution hazard level	Total suspended solids	Metals	Hydro- carbons
Residential Roofs	Very low	0.2	0.2	0.05
Other roofs (commercial/industrial)	Low	0.3	0.2 ¹	0.05
Individual property driveways, residential car parks, low traffic roads and non-residential car parking with infrequent change (eg schools, offices) <300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non- residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites, sites where chemicals and fuels are to be delivered, handled, stored, used or manufactured, industrial sites, trunk roads and motorways ²	High	0.8 ³	0.8 ³	0.9 ³
Note 1. Up to 0.8 where there is potential for metals to leach from the ro Note 2. Motorways and trunk roads should follow the guidance and risk		set out in Highways	Agency (2009)	

Table 9. Pollution hazard indices for different land use classifications.

To deliver adequate treatment, the selected SuDS components should have a total pollution mitigation index, for each contaminant type, that equals or exceeds the pollution hazard index, for each contaminant type. Where the mitigation index of an individual component is insufficient, two components, or more, in series will be required. A factor of 0.5 is used to account for the reduced performance of secondary or tertiary components.

For residential roofs the removal of gross solids and sediments only, is required. This will be done by using silt traps. Permeable paving has a pollution mitigation index that is greater than the pollution hazard index for all pollutants for the land use types, Table 11. The impermeable paved area within catchment C will pass through trapped gullies or the Permachannel, a linear treatment system that combines run-off collection, silt and effluent interception and water treatment functions.

All runoff from the site will therefore receive an appropriate level of water quality treatment.



Type of SuDS component	Total suspended solids	Metals	Hydro-carbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4 ¹	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention system	0.8	0.8	0.8
Permeable pavement	0.7	0.6	0.7
Detention basin	0.5	0.5	0.5
Pond	0.7 ²	0.7	0.5
Wetland ³	0.8 ²	0.8	0.8
Proprietary treatment system		y can address each of the contamin ely the 1in 1 year return period ever ge area.	

Note 1. Filter drains can remove coarse sediments, but their use for this purpose will have significant implications with respect to maintenance requirements, and this should be taken into account in the design and Maintenance Plan.

Note 2. Ponds and wetlands can remove coarse sediments, but their use for this purpose will have significant implications with respect to the maintenance requirements and amenity value of the system. Sediment should normally be removed upstream, unless they are specifically designed to retain sediment in a separate part of the component, where it cannot easily migrate to the main body of water.

Note 3. Where a wetland is not specifically designed to provide significantly enhanced treatment, it should be considered as having the same mitigation indices as a pond.

Table 10. Indicative SuDS mitigation indices for discharge to surface waters.

Indices	Total suspended solids	Metals	Hydro-carbons
Roofs			
Maximum hazard index	0.2	0.2	0.05
Minimum SuDS mitigation index (permeable paving)	0.7	0.6	0.7
Appropriate treatment	✓	✓	\checkmark
Access road and parking areas			
Maximum hazard index	0.5	0.4	0.4
Minimum SuDS mitigation index (Pond)	0.7	0.6	0.7
Appropriate treatment	✓	✓	√

Table 11. Pollution hazard indices and SuDS mitigation indices for the development.



7. Implementation

The permeable paving, attenuation crates and control structures will be installed before the occupation of the development. As 100% of the existing site is covered with impermeable materials the development will not increase runoff during the construction period.



8. Management and Maintenance

A Sustainable Urban Drainage Systems Management and Maintenance Plan is attached at Appendix D.

Appendix A - Catchment A



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<u>S</u>	ummary c				-	Return minutes.	Period	<u>(+20%</u>))
St	orm	Max	Max	Ма	ax	Max	Max	Max	Status
Ev	rent	Level	Depth 3	Infilt	ration (Control S	Outflow	Volume	
		(m)	(m)	(1/	's)	(l/s)	(1/s)	(m³)	
15 m	in Summer	3 806	0 156		0.0	4.5	4.5	49.2	ОК
	in Summer				0.0	4.5	4.5	65.0	0 K
	in Summer				0.0	4.7	4.7	77.6	0 K
	in Summer				0.0	4.7	4.7	85.3	ОК
	in Summer				0.0	4.7	4.7	87.5	0 K
	in Summer				0.0	4.8	4.8	88.4	
	in Summer				0.0	4.8	4.8	90.4	0 K
	in Summer				0.0	4.8	4.8	92.0	0 K
	in Summer				0.0	4.8	4.8	92.4	
720 m.	in Summer	3.942	0.292		0.0	4.8	4.8	91.7	ΟK
960 m.	in Summer	3.930	0.280		0.0	4.7	4.7	88.0	ОК
1440 m.	in Summer	3.890	0.240		0.0	4.7	4.7	75.4	ОК
2160 m.	in Summer	3.821	0.171		0.0	4.5	4.5	53.9	O K
2880 m.	in Summer	3.762	0.112		0.0	4.4	4.4	35.1	O K
4320 m.	in Summer	3.681	0.031		0.0	4.2	4.2	9.8	O K
5760 m.	in Summer	3.650	0.000		0.0	4.1	4.1	0.0	O K
7200 m.	in Summer	3.650	0.000		0.0	3.4	3.4	0.0	O K
8640 m.	in Summer	3.650	0.000		0.0	2.9	2.9	0.0	ΟK
	in Summer				0.0	2.5	2.5		
15 m.	in Winter	3.829	0.179		0.0	4.5	4.5	56.3	ОК
		Storm Event		Rain m/hr)	Flooded Volume	Discharg Volume	e Time-Po (mins		
			(, ,	(m ³)	(m ³)	(,	
	1.5	min Su	mmer 11	9.734	0.0	54.	0	25	
		min Su		8.587	0.0			38	
		min Su		9.133	0.0	92.		66	
		min Su		0.027	0.0	113.		122	
		min Su		2.733	0.0	129.		164	
	240	min Su		8.777	0.0	143.		196	
	360	min Su	mmer 1	4.518	0.0	167.	0	264	
	480	min Su	mmer 1	2.171	0.0	187.	0	336	
	600	min Su	mmer 1	0.603	0.0	204.	0	406	
	720	min Su	mmer	9.453	0.0	218.	5	476	
	960	min Su	mmer	7.821	0.0	241.	4	616	
	1440	min Su	mmer	5.867	0.0	271.	2	884	
	2160	min Su	mmer	4.294	0.0	297.	2 1	264	
	2880	min Su	mmer	3.404	0.0	312.	9 1	620	
	4320	min Su	mmer	2.422	0.0	331.	8 2	296	
			mmor	1.895	0.0	343.	7	0	
	5760	min Su	IUIUET						
		min Su min Su		1.565	0.0	352.	3	0	
	7200 8640	min Su min Su	mmer mmer	1.565 1.338	0.0	358.	9	0	
	7200 8640 10080	min Su min Su min Su	mmer mmer	1.338 1.172		358.	9 1		

RMB Consultants Ltd							Page 2
39 Cossington Road		Form	ner Bus	Depot			
Canterbury		High	Stree	t, Herne	Bay		<u> </u>
Kent CT1 3HU				A - Perme	-	Paving	
						4 V 1 11 Y	- Micro
Date 12/12/2018			.gned b	-			Drainac
File Catchment A Perm	eable P	. Chec	cked by				brainidy
Micro Drainage		Sour	ce Con	trol 201	7.1.2		
Summary c	f Results	for 10)0 year	Return	Period	(+20%)	<u>)</u>
Storm	Max Max	M	ax	Max	Max	Max	Status
Event	Level Depth	n Infilt	ration (Control S	Outflow	Volume	
	(m) (m)	(1	/s)	(1/s)	(l/s)	(m³)	
30 min Winter	3.886 0.236	5	0.0	4.7	4.7	74.1	O K
60 min Winter	3.933 0.283	3	0.0	4.8	4.8	89.0	O K
120 min Winter	3.967 0.317	7	0.0	4.8	4.8	99.6	O K
180 min Winter	3.979 0.329)	0.0	4.9	4.9	103.6	O K
240 min Winter	3.983 0.333	3	0.0	4.9	4.9	104.9	0 K
360 min Winter	3.988 0.338	3	0.0	4.9	4.9	106.2	ОК
480 min Winter	3.991 0.341	-	0.0	4.9	4.9	107.2	O K
600 min Winter	3.989 0.339	9	0.0	4.9	4.9	106.5	O K
720 min Winter	3.982 0.332	2	0.0	4.9	4.9	104.4	0 K
960 min Winter	3.958 0.308	3	0.0	4.8	4.8	96.9	O K
1440 min Winter	3.893 0.243	3	0.0	4.7	4.7	76.3	0 K
2160 min Winter	3.792 0.142	2	0.0	4.4	4.4	44.6	O K
2880 min Winter	3.711 0.061	-	0.0	4.2	4.2	19.3	O K
4320 min Winter	3.650 0.000)	0.0	3.8	3.8	0.0	O K
5760 min Winter	3.650 0.000)	0.0	2.9	2.9	0.0	O K
7200 min Winter	3.650 0.000)	0.0	2.4	2.4	0.0	O K
8640 min Winter	3.650 0.000)	0.0	2.1	2.1	0.0	0 K
10080 min Winter	3.650 0.000)	0.0	1.8	1.8	0.0	O K
			_, , ,		 -		
	Storm	Rain		l Discharge			
1	Event	(mm/hr)	Volume		(min:	5)	
			(m³)	(m³)			
	min Winter					38	
	min Winter	49.133	0.0			66	
	min Winter	30.027	0.0			120	
	min Winter	22.733	0.0			176	
	min Winter	18.777	0.0			226	
	min Winter	14.518	0.0	187.8		284	
	min Winter	12.171	0.0			362	
600	min Winter	10.603	0.0			442	
	min Winter	9.453	0.0			518	
960	min Winter	7 821	0 0) 271 (n	666	

0.0

0.0

0.0

0.0

0.0

0.0

0.0

960 min Winter 7.821

1440 min Winter 5.867

2160 min Winter 4.294

2880 min Winter 3.404 4320 min Winter 2.422

5760 min Winter 1.895

10080 min Winter 1.172

7200 min Winter 1.565 0.0

8640 min Winter 1.338 0.0 404.9

666

948

1332

1676

0

0

0

0

0

271.0

304.6

334.1

351.8 373.5

387.1

397.1

411.2

RMB Consultants Ltd		Page 3
39 Cossington Road	Former Bus Depot	
Canterbury	High Street, Herne Bay	L'
Kent CT1 3HU	Catchment A - Permeable Paving	Micco
Date 12/12/2018	Designed by RB	Nainare
File Catchment A Permeable P	Checked by	Diamatje
Micro Drainage	Source Control 2017.1.2	

<u>Rainfall Details</u>

Rainfall Model		FEH	Winter Storms	Yes
Return Period (years)		100	Cv (Summer)	0.750
FEH Rainfall Version		2013	Cv (Winter)	0.840
Site Location	GB 617561	168162	Shortest Storm (mins)	15
Data Type		Point	Longest Storm (mins)	10080
Summer Storms		Yes	Climate Change %	+20

<u>Time Area Diagram</u>

Total Area (ha) 0.265

Time	(mins)	Area	Time	(mins)	Area	Time	(mins)	Area
From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)
0	4	0.105	4	8	0.080	8	12	0.080

RMB Consultants Ltd					Page 4
9 Cossington Road	Forme	r Bus Depot			
Canterbury	High :	Street, Her	ne Bay		L'
Kent CT1 3HU	Catch	ment A - Pe	ermeable	Paving	Micco
Date 12/12/2018	Desig	ned by RB			
File Catchment A Permeable	P Checke	ed by			Draina
Aicro Drainage	Source	e Control 2	017.1.2		
	Model I	Details			
Storag	e is Online Co	over Level (m) 4.180		
<u>P</u>	orous Car Pa	ark Structu	re		
Infiltration Coefficient		0.00000		Width (m)	21.4
Membrane Percola	())	1000		Length (m)	
	olation (l/s) Safety Factor			ope (1:X)	0.0 5
	Porosity	0.30 EV	vaporation	n (mm/day)	3
Inve	ert Level (m)		ap Volume	Depth (m)	0.400
<u>Hydro-E</u>	Brake® Optim	um Outflow	Control		
	Unit Refere	nce MD-CHE-0()98-5000-1	190-5000	
	Design Head			1.190	
I	Design Flow (1		0.	5.0	
	Flush-F	lo™ ive Minimis∈		alculated	
	Applicat		e upstrea	Surface	
	Sump Availa			No	
	Diameter (98	
	Invert Level	. ,		2.860	
Minimum Outlet Pi Suggested Manho	-			150 1200	
Cont	rol Points	Head (m)	Flow (l/s)	
Design Po	int (Calculate	ed) 1.190	5.	0	
	Flush-Fl	.o™ 0.241	4.	9	
	Kick-Fl		2.		
Mean Flow	over Head Ran	ige –	3.	7	
The hydrological calculations Hydro-Brake® Optimum as specif Hydro-Brake Optimum® be utilis invalidated	fied. Should	another type	of contro	ol device o	other than
Depth (m) Flow (l/s) Depth (n	n) Flow (l/s)	Depth (m) Fl	.ow (l/s)	Depth (m)	Flow (l/s
0.100 2.6 1.2		3.000	7.9	7.000	11.
0.200 4.6 1.4		3.500	8.5	7.500	12.
0.300 3.2 1.6 0.400 2.9 1.8		4.000 4.500	9.1 9.6	8.000 8.500	12.
0.400 2.9 1.80		4.500	9.6	9.000	13.
0.600 3.6 2.20		5.500	10.1	9.500	13.
0.800 4.1 2.4		6.000	11.1	2.000	-0.
1.000 4.6 2.6		6.500	11.5		
	©1982-2017 ≯				

Appendix B - Catchment B



MB Consult		-							Page 1
9 Cossingt	on Road			Forr	ner Bus	Depot			
Canterbury				High	n Stree	et, Herne	e Bay		4
Kent CT1 3	HU			-		B1 Perme	-	aving	Micro
Date 12/12/	2018				igned k			2	- Micio
File B1-B2-		ASX			cked by	-			Drainac
						ntrol 20	17 1 2		-
Micro Drain	aye			5001		ILIUI ZU.	⊥ / • ⊥ • ∠		
<u>Cascade S</u>	ummary	of Resul	<u>ts fo</u>	r Cat	chment	B1 Perm	eable P	aving	100+20.SRC>
	Upstrear Structure			Out	flow To		Or	verflow	То
	(None	e) Catchm	ent B2	Permea	ble Pav	ing 100+20	0.SRCX	(No	ne)
			Half D	rain T	ime : 50	minutes.			
	Storm Event	Max Level (m)	Max Depth (m)	Infilt	ax ration (/s)	Max Control Σ (1/s)	Max Outflow (1/s)	Max Volume (m ³)	Status
				,					
		ner 3.824			0.0	1.2	1.2		
		ner 3.865 ner 3.888			0.0 0.0	1.4 1.5	1.4 1.5		
		ler 3.894			0.0	1.5	1.5		
		ner 3.890			0.0	1.5	1.5		
		ner 3.883			0.0	1.5	1.5	5.9	ОК
360	min Summ	ner 3.869	0.204		0.0	1.4	1.4	5.5	ОК
		ner 3.855			0.0	1.4	1.4		
		ner 3.841			0.0	1.3	1.3		
		ner 3.829			0.0	1.3	1.3		
		ner 3.806			0.0	1.2	1.2		
		ner 3.772			0.0	1.0 0.8	1.0		
		ner 3.741 ner 3.725			0.0 0.0	0.8	0.8		
		ner 3.723			0.0	0.5	0.5		
		ner 3.705			0.0	0.4	0.4		
7200	min Summ	ner 3.701	0.036		0.0	0.3	0.3	1.0	ОК
		.							
		Storm		Rain		l Discharg			
		Event	(1	uuu/nr)	Volume (m³)	Volume (m³)	(min:	5)	
		15 min Su	mmer ¹	19 721	0.0		1	22	
		30 min Su		78.587	0.0			32	
		60 min Su		49.133	0.0			50	
	1	20 min Su	mmer	30.027	0.0	10.	8	84	
		80 min Su		22.733	0.0			118	
		40 min Su		18.777	0.0			152	
		60 min Su		14.518	0.0			216	
		80 min Su 00 min Su		12.171	0.0			280 342	
		20 min Su		9.453	0.0			342 404	
		60 min Su		7.821	0.0			524	
		40 min Su		5.867	0.0			764	
	21	60 min Su		4.294	0.0			124	
	28	80 min Su	mmer	3.404	0.0	29.	6 1	472	
		20 min Su		2.422	0.0			2200	
		60 min Su		1.895	0.0			2936	
	12	00 min Su	mmer	1.565	0.0	33.	4 3	3672	
			©1982	2-2017	XP So	lutions			

RMB Consultants Ltd						Page 2
39 Cossington Road	For	mer Bus	Depot			
Canterbury	Hiq	h Stree	et, Herne	Bay		4
Kent CT1 3HU			B1 Perme	—	zina	1 mm
Date 12/12/2018		igned k		a	9	– Micro
File B1-B2-B3-B4.CASX		-	-			Drainage
		cked by		7 1 0		
Micro Drainage	Sou	rce Cor	trol 201	1.1.2		
		. 1	D1 D			100100 0000
Cascade Summary of Result	s for Cat	<u>cnment</u>	BI Perme	eable Par	ving .	100+20.SRCX
Storm Max	Max 1	lax	Max	Max	Max	Status
	Depth Infil					Status
(m)	-	L/s)	(1/s)	(1/s)	(m ³)	
8640 min Summer 3.698 (0.0	0.3	0.3	0.9	
10080 min Summer 3.695 (15 min Winter 3.846 (0.0	0.2	0.2 1.3	0.8 4.9	
30 min Winter 3.893 (0.0	1.5	1.5	6.1	
60 min Winter 3.917 (0.0	1.6	1.6		
120 min Winter 3.915 (0.250	0.0	1.6	1.6	6.7	O K
180 min Winter 3.904 (0.0	1.6	1.6	6.4	
240 min Winter 3.890 (360 min Winter 3.864 (0.0	1.5 1.4	1.5 1.4	6.0	
480 min Winter 3.864 (0.0	1.4	1.4	5.4 4.8	
600 min Winter 3.823 (0.0	1.2	1.2		
720 min Winter 3.806 (0.0	1.2	1.2	3.8	O K
960 min Winter 3.779 (0.0	1.0	1.0	3.1	
1440 min Winter 3.745 (0.0	0.8	0.8	2.2	
2160 min Winter 3.721 (2880 min Winter 3.713 (0.0	0.6 0.5	0.6 0.5	1.5 1.3	
4320 min Winter 3.703 (0.0	0.4	0.3	1.0	
5760 min Winter 3.698 (0.0	0.3	0.3	0.9	
7200 min Winter 3.694 (0.029	0.0	0.2	0.2	0.8	0 K
8640 min Winter 3.691 (0.0	0.2	0.2		
10080 min Winter 3.689 (0.024	0.0	0.2	0.2	0.6	0 K
Storm	Rain	Floode	d Discharg	e Time-Pe	ak	
Event	(mm/hr)			(mins))	
		(m³)	(m³)			
8640 min Sum	mer 1.338	3 0.	0 34.	1 43	84	
10080 min Sum					36	
15 min Win	ter 119.734				22	
30 min Win					33	
	ter 49.133				54	
120 min Win 180 min Win					90 26	
240 min Win					20 60	
360 min Win					28	
480 min Win	ter 12.171	L 0.			92	
600 min Win					54	
720 min Win 960 min Win					16 38	
960 min Win 1440 min Win					38 72	
2160 min Win					12	
2880 min Win					72	
4320 min Win					08	
5760 min Win 7200 min Win					20	
7200 min Win 8640 min Win					48 68	
10080 min Win					24	

	Ltd						Page 3
39 Cossington Roa	ad		Form	ner Bus	Depot		
Canterbury			High	n Street	, Herne	Вау	4
Kent CT1 3HU						ble Paving	
Date 12/12/2018				gned by	RB		Drainage
File B1-B2-B3-B4	.CASX			cked by			Diamage
Micro Drainage			Sour	ce Cont	rol 2017	2.1.2	
<u>Cascade Rainfa</u>	all Deta	<u>ils for</u>	Catch	nment Bl	Permeak	ole Paving 10	0+20.SRCX
Return H		ears) rsion ation GB Type			hortest S Longest S	nter Storms 2 Cv (Summer) 0.7 Cv (Winter) 0.8 torm (mins) torm (mins) 100 te Change %	750 340 15 080
		<u>T</u>	ime Ar	ea Diag	am		
		Τc	otal Are	ea (ha) 0.	025		
Tin Fro			Time (: From:	mins) Are To: (ha		(mins) Area To: (ha)	
	0 4	0.009	4	8 0.0	08 8	12 0.008	

RMB Consultants Ltd		Page 4
39 Cossington Road	Former Bus Depot	
Canterbury	High Street, Herne Bay	<u>Y</u>
Kent CT1 3HU	Catchment B1 Permeable Paving	Micro
Date 12/12/2018	Designed by RB	
File B1-B2-B3-B4.CASX	Checked by	Drainage
Micro Drainage	Source Control 2017.1.2	

Cascade Model Details for Catchment B1 Permeable Paving 100+20.SRCX

Storage is Online Cover Level (m) 4.095

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	6.8
Membrane Percolation (mm/hr)	1000	Length (m)	13.2
Max Percolation (l/s)	24.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	3.665	Cap Volume Depth (m)	0.300

Orifice Outflow Control

Diameter (m) 0.040 Discharge Coefficient 0.600 Invert Level (m) 3.665

RMB Consultants Ltd							Page	1
39 Cossington Road		Form	ner Bus	B Depot				
Canterbury		High	n Stree	et, Herne	Вау		4	
Kent CT1 3HU		Cato	chment	B2 Perme	able Pa	ving	Mic	J
Date 12/12/2018		Des	igned k	by RB				U
File B1-B2-B3-B4.CAS	Х	Cheo	cked by	7			Ufal	nage
Micro Drainage				ntrol 201	7.1.2			
Cascade Summary of	Posulte f					avina	100+20	SPCY
_		OI Cat	CIIIIEIIC			aving	100120.	
Upstrea Structure				Out	flow To			Overflow
Catchment B1 Permeable P	aving 100+20	.SRCX C	atchmen	t B3 Permea	able Pav:	ing 100	+20.SRCX	(Nc
	Half	Drain T	ime : 10	õ minutes.				
Storm Event	Max Max Level Depth		ax	Max	Max	Max	Status	
Event	(m) (m)		/s)		(1/s)	(m ³)		
			-					
15 min Summer			0.0	2.3	2.3	3.0		
30 min Summer 60 min Summer			0.0	2.5 2.7	2.5 2.7	3.6 4.0		
120 min Summer			0.0	2.7	2.7	4.0		
180 min Summer			0.0	2.6	2.6	3.9		
240 min Summer			0.0	2.6	2.6	3.8		
360 min Summer			0.0	2.5	2.5	3.5		
480 min Summer 600 min Summer			0.0	2.4 2.3	2.4 2.3	3.2 3.0		
720 min Summer			0.0	2.3	2.3	2.8		
960 min Summer			0.0	2.0	2.0	2.4		
1440 min Summer			0.0	1.7	1.7	1.8		
2160 min Summer			0.0	1.3	1.3	1.3		
2880 min Summer 4320 min Summer			0.0	1.1 0.8	1.1 0.8	1.0 0.8		
5760 min Summer			0.0	0.8	0.0	0.8		
7200 min Summer			0.0	0.5	0.5	0.6		
	Storm Event	Rain (mm/hr)		l Discharge Volume	e Time-Pe (mins			
		,	(m ³)	(m ³)	, 	-		
15	min Summer	119.734	0.0	8.7		22		
	min Summer	78.587	0.0			32		
		49.133	0.0			50		
	min Summer min Summer	30.027	0.0			84 L18		
	min Summer	18.777	0.0			L50		
360	min Summer	14.518	0.0			216		
	min Summer	12.171	0.0			278		
	min Summer	10.603	0.0			340		
	min Summer min Summer	9.453 7.821	0.0			102 522		
	min Summer	5.867	0.0			760		
	min Summer	4.294	0.0			L16		
2880	min Summer	3.404	0.0	50.0		172		
	min Summer	2.422	0.0			204		
	min Summer	1.895				904 548		
7200	min Summer	1.565	0.0) 56.5	. 31	548		

	ultants	s Ltd								Page	2
39 Cossi	ngton F	Road			Form	er Bus	Depot				
Canterbu	ry				High	Stree	t, Herne	Bay		4	
Kent CT	- 1 3HU				-		B2 Perme	_	ving		Zm
Date 12/	12/2018	3				gned by			<u> </u>		
File B1-			x			ked by	1 112			Draii	naqe
Micro Dr							trol 201	7 1 2			
MICIO DI	ainaye				SOUL		201	/•⊥•∠			
Cascad	<u>e Summa</u>	<u>iry of</u>	Resul	ts for	Catc	hment	<u>B2 Perme</u>	able Pa	ving 1	100+20.5	SRCX
	<u>Char</u>		Maria	Mass	Ma		Mass	Man	Mass	<u>Chatwa</u>	
	Stor Even		Max Level	Max	Ma Tnfilt		Max Control Σ	Max	Max	Status	
	2101		(m)	(m)	(1/		(1/s)	(1/s)	(m ³)		
						-					
	3640 min					0.0	0.5	0.5	0.5		
10	0080 min					0.0	0.4	0.4			
		Winter Winter				0.0	2.4 2.7	2.4 2.7			
		Winter Winter				0.0	2.7	2.7			
	60 min 120 min					0.0	2.8	2.8			
	120 min 180 min					0.0	2.8	2.8			
	180 min 240 min					0.0	2.7	2.7			
	360 min					0.0	2.0	2.6			
	480 min					0.0	2.4	2.4			
	400 min 600 min					0.0	2.2	2.2			
	720 min					0.0	2.0	2.0			
	960 min					0.0	1.7	1.7			
	1440 min					0.0	1.4	1.4			
	2160 min					0.0	1.1	1.1			
	2880 min					0.0	0.8	0.8			
	4320 min					0.0	0.6	0.6			
	5760 min					0.0	0.5	0.5			
	7200 min					0.0	0.4	0.4			
	3640 min					0.0	0.3	0.3			
1(0080 min	Winter	3.369	0.029		0.0	0.3	0.3	0.4	O K	
			Storm	1	Rain	Flooded	Discharge	e Time-P	eak		
			Storm Event				Discharge Volume				
					Rain mm/hr)		Volume	e Time-Po (mins			
		8640	Event min Su	(n mmer	nm/hr) 1.338	Volume (m ³) 0.0	Volume (m ³)	(mins			
		8640 10080	Event min Su min Su	(n mmer mmer	nm/hr) 1.338 1.172	Volume (m ³) 0.0 0.0	Volume (m ³) 57.0 58.5	(mins 6 4 5 5	4 00 112		
		8640 10080 15	Event min Su min Su min Wi	(n mmer mmer nter 11	nm/hr) 1.338 1.172 19.734	Volume (m ³) 0.0 0.0 0.0	Volume (m ³) 57.0 58.0 9.8	(mins 5 4 5 5 3	400 112 22		
		8640 10080 15 30	Event min Su min Su min Wi min Wi	(m mmer nter 11 nter 7	nm/hr) 1.338 1.172 19.734 78.587	Volume (m ³) 0.0 0.0 0.0 0.0	Volume (m ³) 57.(58.(9.) 13.	(mins 6 4 5 5 8 1	400 112 22 33		
		8640 10080 15 30 <mark>60</mark>	Event min Su min Su min Wi min Wi min Wi	(n mmer nter 11 nter 7 nter 4	1.338 1.172 19.734 78.587 49.133	Volume (m ³) 0.0 0.0 0.0 0.0 0.0	Volume (m ³) 57.6 58.5 9.6 13.1 16.6	(mins 6 4 5 5 8 1 5	<pre>400 112 22 33 54</pre>		
		8640 10080 15 30 60 120	Event min Su min Su min Wi min Wi min Wi min Wi	(n mmer nter 11 nter 7 nter 4 nter 3	1.338 1.172 19.734 78.587 49.133 30.027	Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0	Volume (m ³) 57.(58.(9.) 13.(16.(20.((mins 6 4 5 5 1 5 5	<pre>400 112 22 33 54 90</pre>		
		8640 10080 15 30 60 120 180	Event min Su min Su min Wi min Wi min Wi min Wi min Wi	(n mmer nter 11 nter 7 nter 4 nter 3 nter 2	1.338 1.172 19.734 78.587 49.133 30.027 22.733	Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0	Volume (m ³) 57.(58.(9.) 13.(16.(20.(23.((mins 6 4 5 5 1 5 5 3	<pre>\$) 400 112 22 33 54 90 126</pre>		
		8640 10080 15 30 60 120 180 240	Event min Su min Su min Wi min Wi min Wi min Wi min Wi min Wi	(m mmer nter 11 nter 7 nter 4 nter 3 nter 2 nter 1	1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777	Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	Volume (m ³) 57.0 58.2 9.8 13.2 16.0 20.2 23.2 25.2	(mins 5 4 5 5 1 5 5 7	<pre>400 112 22 33 54 90 126 160</pre>		
		8640 10080 15 30 60 120 180 240 360	Event min Su min Su min Wi min Wi min Wi min Wi min Wi min Wi min Wi	(m mmer nter 11 nter 7 nter 4 nter 3 nter 2 nter 1 nter 1	1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518	Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m ³) 57.0 58.0 9.8 13.0 16.0 20.0 23.0 25.0 29.9	(mins 5 4 5 5 1 5 5 3 7 9	<pre>400 112 22 33 54 90 126 160 226</pre>		
		8640 10080 15 30 60 120 180 240 360 480	Event min Su: min Vi min Wi min Wi min Wi min Wi min Wi min Wi min Wi	(m mmer nter 11 nter 7 nter 4 nter 3 nter 2 nter 1 nter 1 nter 1	nm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171	Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m ³) 57.0 58.2 9.8 13.2 16.0 20.2 23.2 25.2 29.9 33.2	(mins 5 4 5 5 1 5 5 5 7 9 5	<pre>>) 400 112 22 33 54 90 126 160 226 290</pre>		
		8640 10080 15 30 60 120 180 240 360 480 600	Event min Su: min Su: min Wi min Wi min Wi min Wi min Wi min Wi min Wi min Wi	(m mmer nter 11 nter 7 nter 4 nter 2 nter 1 nter 1 nter 1 nter 1 nter 1	nm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603	Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m ³) 57.0 58.2 9.8 13.2 16.0 20.2 23.2 25.2 29.9 33.1 36.2	(mins 5 4 5 5 1 5 5 7 9 5 5 5	<pre>>) 400 112 22 33 54 90 126 160 226 290 352</pre>		
		8640 10080 15 30 60 120 180 240 360 480 600 720	Event min Su min Su min Wi min Wi min Wi min Wi min Wi min Wi min Wi min Wi	(m mmer nter 11 nter 7 nter 4 nter 3 nter 2 nter 1 nter 1 nter 1 nter 1 nter 1 nter 1 nter 1	nm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453	Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m ³) 57.0 58.2 9.8 13.2 16.0 20.2 23.2 25.2 29.9 33.1 36.1 39.2	(mins 5 4 5 5 1 5 5 5 7 9 5 5 1	<pre>>) 400 112 22 33 54 90 126 160 226 290 352 414</pre>		
		8640 10080 15 30 60 120 180 240 360 480 600 720 960	Event min Su min Su min Wi min Wi min Wi min Wi min Wi min Wi min Wi min Wi min Wi min Wi	(m mmer nter 11 nter 7 nter 4 nter 2 nter 1 nter 1 nter 1 nter 1 nter 1 nter 1 nter 1 nter 1	nm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821	Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m ³) 57.0 58.1 9.3 13.1 16.0 20.1 23.1 25.1 29.1 33.1 36.1 39.1 43.2	(mins 6 4 5 5 1 5 5 5 7 9 5 5 1 2	<pre>>) 400 112 22 33 54 90 126 160 226 290 352 414 536</pre>		
		8640 10080 15 30 60 120 180 240 360 480 600 720 960 1440	Event min Su min Su min Wi min Wi	(m mmer nter 11 nter 7 nter 4 nter 3 nter 2 nter 1 nter 1 nter 1 nter 1 nter 1 nter 1 nter 1 nter 1	mm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821 5.867	Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m ³) 57.0 58.1 9.3 13.1 16.0 20.1 23.1 25.1 29.1 33.1 36.1 39.1 43.2 48.0	(mins 6 4 5 5 1 5 5 5 7 9 5 5 1 2 5 5	<pre>>) 400 112 22 33 54 90 126 160 226 290 352 414 536 772</pre>		
		8640 10080 15 30 60 120 180 240 360 480 600 720 960 1440 2160	Event min Su min Su min Wi min Wi	(m mmer nter 11 nter 7 nter 4 nter 3 nter 2 nter 1 nter 1 nter 1 nter 1 nter 1 nter 1 nter 1 nter nter nter nter	nm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821 5.867 4.294	Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m ³) 57.0 58.1 9.0 13.1 16.0 20.1 23.2 25.2 29.1 33.1 36.1 39.1 43.2 48.0 53.1	(mins 6 4 5 5 8 1 5 5 5 7 9 5 5 1 2 5 1 1	<pre>>) 400 112 22 33 54 90 126 160 226 290 352 414 536 772 096</pre>		
		8640 10080 15 30 60 120 180 240 360 480 600 720 960 1440 2160 2880	Event min Su min Su min Wi min Wi	(m mmer nter 11 nter 7 nter 4 nter 3 nter 2 nter 1 nter 1 nter 1 nter 1 nter 1 nter 1 nter 1 nter nter nter nter nter nter	nm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821 5.867 4.294 3.404	Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m ³) 57.0 58.1 9.0 13.1 16.0 20.1 23.1 25.1 29.1 33.1 36.1 39.1 43.2 48.0 53.1 56.2	(mins 5 4 5 5 1 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	<pre>>) 400 112 22 33 54 90 126 160 226 290 352 414 536 772 096 468</pre>		
		8640 10080 15 30 60 120 180 240 360 480 600 720 960 1440 2160 2880 4320	Event min Su min Su min Wi min Wi	(m mmer mter 11 nter 11 nter 12 nter 1 nter 1	nm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821 5.867 4.294 3.404 2.422	Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m ³) 57.0 58.1 9.0 13.1 16.0 20.1 23.2 25.2 29.1 33.2 36.1 39.1 43.2 48.0 53.1 56.2	(mins 5 4 5 5 1 5 5 7 9 5 5 1 2 5 1 2 5 1 2 1 5 2 1 5 2 1 2 5 2 1 2 5 2 1 2 5 2 1 2 5 2 1 2 5 2 1 2 5 5 5 5	<pre>>) 400 112 22 33 54 90 126 160 226 290 352 414 536 772 096 468 204</pre>		
		8640 10080 15 30 120 180 240 360 480 600 720 960 1440 2160 2880 4320 5760	Event min Su min Su min Wi min Wi	(mmmer mmmer nter 11 nter 7 nter 4 nter 3 nter 2 nter 1 nter 1 nter 1 nter 1 nter 1 nter 1 nter 1 nter 1 nter nter nter nter nter nter nter nter	<pre>mm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821 5.867 4.294 3.404 2.422 1.895</pre>	Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m ³) 57.0 58.1 9.0 13.1 16.0 20.1 23.2 25.2 29.1 33.1 36.1 39.1 43.2 48.0 53.1 56.2 59.0 61.1	(mins 5 4 5 5 1 5 5 7 9 5 1 2 5 1 2 5 1 2 5 1 2 5 1 2 5 2 1 5 5 2 1 2 5 2 2 2 2	<pre>>) 400 112 22 33 54 90 126 160 226 290 352 414 536 772 096 468 204 936</pre>		
		8640 10080 15 30 120 180 240 360 480 600 720 960 1440 2160 2880 4320 5760 7200	Event min Su min Su min Wi min Wi	(mmmer mmmer nter 11 nter 7 nter 4 nter 3 nter 2 nter 1 nter 1	mm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821 5.867 4.294 3.404 2.422 1.895 1.565	Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m ³) 57.0 58.1 9.0 13.1 16.0 20.1 23.2 25.2 29.1 33.2 36.1 39.1 43.2 48.0 53.1 56.2 59.0 61.2 63.0	(mins 5 4 5 5 8 5 5 7 9 5 5 1 2 5 1 2 5 1 2 5 1 2 5 1 2 5 2 1 5 5 2 5 3 1 2 5 3 1 2 5 3 1 2 5 3 3 1 2 5 3 3 3 3 5 5 5 5 5 5 5 5 5 5 5 5 5 5	<pre>>) 400 112 22 33 54 90 126 160 226 290 352 414 536 772 096 468 204 936 632</pre>		
		8640 10080 15 30 120 180 240 360 480 600 720 960 1440 2160 2880 4320 5760 7200 8640	Event min Su min Su min Wi min Wi	(mmmer mmmer nter 11 nter 7 nter 4 nter 3 nter 2 nter 1 nter 1	mm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821 5.867 4.294 3.404 2.422 1.895 1.565 1.338	Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	Volume (m ³) 57.0 58.1 9.0 13.1 16.0 20.1 23.2 25.2 29.1 33.2 36.1 39.1 43.2 48.0 53.1 56.2 59.0 61.2 63.0 64.5	(mins 5 4 5 5 1 5 7 7 9 5 1 2 1 5 2 5 1 2 1 5 2 5 1 2 1 5 2 5 2 5 3 1 2 1 5 2 5 3 5 3 5 3 5 3 5 4 5 5 5 4 5 5 5 4 5 5 5 5 5 5 5 5 5 5	<pre>>) 400 112 22 33 54 90 126 160 226 290 352 414 536 772 096 468 204 936</pre>		

RMB Consultants Lto	1					Page 3
39 Cossington Road			rmer Bus	Depot		
Canterbury			High Street, Herne Bay			4
Kent CT1 3HU			Catchment B2 Permeable Paving			Micro
Date 12/12/2018			Designed by RB			Drainago
File B1-B2-B3-B4.CASX			Checked by			Diamag
Micro Drainage		So	urce Cont	rol 2017	2.1.2	
<u>Cascade Rainfall</u>	Details	for Cat	<u>chment B2</u>	Permeak	ole Paving 1	00+20.SRCX
Return Per FEH Rainfa Si	all Versio) n GB 61750 e		hortest S Longest S	nter Storms Cv (Summer) 0. Cv (Winter) 0. torm (mins) torm (mins) 10 te Change %	750 840 15 080
		<u>Time</u> A	Area Diagi	ram		
		Total A	area (ha) O.	017		
Time From:	(mins) Ar To: (h				(mins) Area To: (ha)	
0	4 0.0	004 4	8 0.0	06 8	12 0.007	

RMB Consultants Ltd		Page 4
39 Cossington Road	Former Bus Depot	
Canterbury	High Street, Herne Bay	L.
Kent CT1 3HU	Catchment B2 Permeable Paving	Micro
Date 12/12/2018	Designed by RB	
File B1-B2-B3-B4.CASX	Checked by	Drainage
Micro Drainage	Source Control 2017.1.2	

Cascade Model Details for Catchment B2 Permeable Paving 100+20.SRCX

Storage is Online Cover Level (m) 3.870

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.2
Membrane Percolation (mm/hr)	1000	Length (m)	10.4
Max Percolation (l/s)	12.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	3.340	Cap Volume Depth (m)	0.400

Orifice Outflow Control

Diameter (m) 0.049 Discharge Coefficient 0.600 Invert Level (m) 3.340

RMB Consultants Ltd		Page 1
39 Cossington Road	Former Bus Depot	
Canterbury	High Street, Herne Bay	4
Kent CT1 3HU	Catchment B3 Permeable Paving	Micro
Date 12/12/2018	Designed by RB	
File B1-B2-B3-B4.CASX	Checked by	Drainage
Micro Drainage	Source Control 2017.1.2	1

Cascade Summary of Results for Catchment B3 Permeable Paving 100+20.SRCX

Upstream Structures

Overflow To

Outflow To

Catchment B2 Permeable Paving 100+20.SRCX Catchment B4 Attenuation Crates 100+20.SRCX (None) Catchment B1 Permeable Paving 100+20.SRCX

Half Drain Time : 13 minutes.

	Stor Even		Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (1/s)	Max Σ Outflow (1/s)	Max Volume (m³)	Status
15	min	Summer	3.424	0.234	0.0	3.1	3.1	3.1	ОК
30	min	Summer	3.480	0.290	0.0	3.5	3.5	3.8	ОК
60	min	Summer	3.511	0.321	0.0	3.7	3.7	4.2	ОК
120	min	Summer	3.516	0.326	0.0	3.7	3.7	4.3	ОК
180	min	Summer	3.508	0.318	0.0	3.7	3.7	4.2	ОК
240	min	Summer	3.498	0.308	0.0	3.6	3.6	4.0	ОК
360	min	Summer	3.476	0.286	0.0	3.4	3.4	3.7	ОК
480	min	Summer	3.456	0.266	0.0	3.3	3.3	3.5	ОК
600	min	Summer	3.436	0.246	0.0	3.2	3.2	3.2	ОК
720	min	Summer	3.418	0.228	0.0	3.0	3.0	3.0	ОК
960	min	Summer	3.386	0.196	0.0	2.8	2.8	2.6	ОК
1440	min	Summer	3.338	0.148	0.0	2.3	2.3	1.9	ОК
2160	min	Summer	3.295	0.105	0.0	1.9	1.9	1.4	ОК
2880	min	Summer	3.273	0.083	0.0	1.6	1.6	1.1	O K
4320	min	Summer	3.256	0.066	0.0	1.2	1.2	0.9	O K
5760	min	Summer	3.247	0.057	0.0	0.9	0.9	0.7	ОК
7200	min	Summer	3.240	0.050	0.0	0.7	0.7	0.7	O K

	Stor Ever		Rain (mm/hr)		Discharge Volume (m³)	Time-Peak (mins)	
15	min	Summer	119.734	0.0	12.3	23	
30	min	Summer	78.587	0.0	16.4	33	
60	min	Summer	49.133	0.0	20.8	52	
120	min	Summer	30.027	0.0	25.6	86	
180	min	Summer	22.733	0.0	29.2	118	
240	min	Summer	18.777	0.0	32.2	152	
360	min	Summer	14.518	0.0	37.5	216	
480	min	Summer	12.171	0.0	42.0	280	
600	min	Summer	10.603	0.0	45.8	342	
720	min	Summer	9.453	0.0	49.0	404	
960	min	Summer	7.821	0.0	54.1	524	
1440	min	Summer	5.867	0.0	60.8	764	
2160	min	Summer	4.294	0.0	66.7	1124	
2880	min	Summer	3.404	0.0	70.3	1476	
4320	min	Summer	2.422	0.0	74.6	2200	
5760	min	Summer	1.895	0.0	77.4	2936	
7200	min	Summer	1.565	0.0	79.5	3632	
		©19	82-2017	XP Sol	utions		

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39 Cossington F	Road			Form	er Bus	Depot					
Canterbury				High	Stree	t, Her	ne	Bay		4	•
Kent CT1 3HU				-		B3 Per		-	ving		Zu
Date 12/12/2018	2				gned b					- MIC	
File B1-B2-B3-E					ked by	-				Drai	inage
	54.CASA					trol 2	017	1 0			
Micro Drainage				Sour	ce Con	trol 2	01/	.1.2			
					1	D) D.		1. 1. D.		100100	abav
<u>Cascade</u> Summa	ary of 1	Resul	<u>ts ior</u>	<u>c</u> Catc	hment	<u>B3 Per</u>	mea	ible Pa	aving .	100+20.	SRCX
Stor	~~~	Max	Max	Ма		Max		Max	Max	Status	
Ever						Control	ΣΟ			Status	
		(m)	(m)	(1/		(1/s)		(1/s)	(m ³)		
					-						
8640 min					0.0	0.6		0.6			
10080 min					0.0	0.6		0.6			
	Winter Winter				0.0	3.3 3.7		3.3 3.7			
	Winter				0.0	3.9		3.9			
	Winter				0.0	3.9		3.9			
	Winter				0.0	3.8		3.8			
240 min	Winter	3.506	0.316		0.0	3.6		3.6	4.1	ΟK	
	Winter				0.0	3.4		3.4			
	Winter				0.0	3.2		3.2			
	Winter				0.0	3.0		3.0			
	Winter Winter				0.0	2.8 2.4		2.8 2.4			
1440 min					0.0	2.4		2.4 1.9			
2160 min					0.0	1.5		1.5			
2880 min					0.0	1.2		1.2			
			0.007			±•2				0 10	
4320 min	Winter	3.244			0.0	0.8		0.8			
5760 min	Winter	3.237	0.054 0.047						0.7	0 K	
5760 min 7200 min	Winter Winter	3.237 3.231	0.054 0.047 0.041		0.0 0.0 0.0	0.8 0.7 0.5		0.8 0.7 0.5	0.7 0.6 0.5	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter	3.237 3.231 3.227	0.054 0.047 0.041 0.037		0.0 0.0 0.0 0.0	0.8 0.7 0.5 0.5		0.8 0.7 0.5 0.5	0.7 0.6 0.5 0.5	0 K 0 K 0 K	
5760 min 7200 min	Winter Winter Winter	3.237 3.231 3.227	0.054 0.047 0.041 0.037		0.0 0.0 0.0	0.8 0.7 0.5		0.8 0.7 0.5	0.7 0.6 0.5 0.5	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter	3.237 3.231 3.227	0.054 0.047 0.041 0.037		0.0 0.0 0.0 0.0	0.8 0.7 0.5 0.5		0.8 0.7 0.5 0.5	0.7 0.6 0.5 0.5	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter Winter	3.237 3.231 3.227 3.223	0.054 0.047 0.041 0.037 0.033		0.0 0.0 0.0 0.0	0.8 0.7 0.5 0.5 0.4		0.8 0.7 0.5 0.5 0.4	0.7 0.6 0.5 0.5 0.4	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter Winter	3.237 3.231 3.227 3.223	0.054 0.047 0.041 0.037 0.033	Rain	0.0 0.0 0.0 0.0 0.0	0.8 0.7 0.5 0.5 0.4	ırge	0.8 0.7 0.5 0.5 0.4 Time-P	0.7 0.6 0.5 0.5 0.4	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter Winter	3.237 3.231 3.227 3.223	0.054 0.047 0.041 0.037 0.033	Rain nm/hr)	0.0 0.0 0.0 0.0 Flooded Volume	0.8 0.7 0.5 0.5 0.4 I Discha Volu	arge	0.8 0.7 0.5 0.5 0.4	0.7 0.6 0.5 0.5 0.4	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter Winter	3.237 3.231 3.227 3.223	0.054 0.047 0.041 0.037 0.033		0.0 0.0 0.0 0.0 Flooded Volume	0.8 0.7 0.5 0.5 0.4	arge	0.8 0.7 0.5 0.5 0.4 Time-P	0.7 0.6 0.5 0.5 0.4	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter S E	3.237 3.231 3.227 3.223	0.054 0.047 0.041 0.037 0.033	nm/hr)	0.0 0.0 0.0 0.0 Flooded Volume	0.8 0.7 0.5 0.5 0.4 1 Discha Volum (m ³	arge	0.8 0.7 0.5 0.4 Time-P (mins	0.7 0.6 0.5 0.5 0.4	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter S E 8640 n	3.237 3.231 3.227 3.223 Storm Event	0.054 0.047 0.041 0.037 0.033	mm/hr) 1.338	0.0 0.0 0.0 0.0 Flooded Volume (m ³)	0.8 0.7 0.5 0.5 0.4 I Discha Volu (m ³	arge me)	0.8 0.7 0.5 0.4 Time-P (mins	0.7 0.6 0.5 0.5 0.4 eak	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter S 8640 m 10080 m 15 m	3.237 3.231 3.227 3.223 Storm Event min Sum min Sum min Sum	0.054 0.047 0.041 0.037 0.033 (r mmer mmer nter 12	nm/hr) 1.338 1.172 19.734	0.0 0.0 0.0 0.0 Flooded Volume (m ³) 0.0 0.0	0.8 0.7 0.5 0.4 1 Discha Volu (m ³) 8) 8	arge me) 31.2 32.5 3.9	0.8 0.7 0.5 0.4 Time-P (mins 4 5	0.7 0.6 0.5 0.5 0.4 eak 3) 408 128 23	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter Winter S 8640 1 10080 1 15 1 30 1	3.237 3.231 3.227 3.223 Storm Event min Sum min Sum min Sum min Win min Win	0.054 0.047 0.041 0.037 0.033 (r mmer mmer nter 12 nter 12	nm/hr) 1.338 1.172 19.734 78.587	0.0 0.0 0.0 0.0 Flooded Volume (m ³) 0.0 0.0 0.0	0.8 0.7 0.5 0.4 d Discha Volu (m ³) 0 8 0 8 0 1	arge me) 31.2 32.5 3.9 8.5	0.8 0.7 0.5 0.4 Time-P (mins 4 5	0.7 0.6 0.5 0.5 0.4 eak 3) 408 128 23 34	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter Winter S 8640 1 10080 1 15 1 30 1 60 1	3.237 3.231 3.227 3.223 Storm Event min Sum min Sum min Sum min Win min Win	0.054 0.047 0.041 0.037 0.033 (r mmer mmer nter 12 nter 4	nm/hr) 1.338 1.172 19.734 78.587 49.133	0.0 0.0 0.0 0.0 Flooded Volume (m ³) 0.0 0.0 0.0 0.0	0.8 0.7 0.5 0.4 A Discha Volu (m ³) 0 8 0 8 0 1 0 1 2	arge me) 31.2 32.5 3.9 .8.5 23.4	0.8 0.7 0.5 0.4 Time-P (mins 4 5	0.7 0.6 0.5 0.4 eak 3) 408 128 23 34 54	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter Winter 8640 m 10080 m 15 m 30 m 120 m	3.237 3.231 3.227 3.223 Storm Event min Sum min Sum min Win min Win min Win min Win	0.054 0.047 0.041 0.037 0.033 (r mmer nter 11 nter 12 nter 3	nm/hr) 1.338 1.172 19.734 78.587 49.133 30.027	0.0 0.0 0.0 0.0 Flooded Volume (m ³) 0.0 0.0 0.0 0.0 0.0	0.8 0.7 0.5 0.4 A Discha Volu (m ³) 8) 1) 1) 2) 2	arge me) 31.2 32.5 3.9 8.5 23.4 28.8	0.8 0.7 0.5 0.4 Time-P (mins 4 5	0.7 0.6 0.5 0.4 eak 3) 408 128 23 34 54 90	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter Winter 8640 m 10080 m 15 m 30 m 120 m 180 m	3.237 3.231 3.227 3.223 Storm Event min Sum min Sum min Win min Win min Win min Win min Win	0.054 0.047 0.041 0.037 0.033 (r mmer mmer nter 11 nter 2 nter 2	1.338 1.172 19.734 78.587 49.133 30.027 22.733	0.0 0.0 0.0 0.0 Flooded Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0.8 0.7 0.5 0.4 A Discha Volu (m ³) 8) 8) 1) 1) 2) 2) 2) 3	arge me) 31.2 32.5 3.9 8.5 23.4 28.8 82.8	0.8 0.7 0.5 0.4 Time-P (mins 4 5	0.7 0.6 0.5 0.5 0.4 eak 3) 408 128 23 34 54 90 126	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter Winter 8640 m 10080 m 15 m 30 m 120 m 180 m 240 m	3.237 3.231 3.227 3.223 Storm Event min Sum min Sum min Win min Win min Win min Win min Win min Win min Win	0.054 0.047 0.041 0.037 0.033 (r mmer nter 11 nter 12 nter 2 nter 12	1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777	0.0 0.0 0.0 0.0 Flooded Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0.8 0.7 0.5 0.4 A Discha Volu (m ³) 8) 1) 2) 2) 2) 3) 3	arge me) 31.2 32.5 3.9 8.5 23.4 28.8	0.8 0.7 0.5 0.4 Time-P (mins 4 5	0.7 0.6 0.5 0.4 eak 3) 408 128 23 34 54 90	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter Winter S 8640 f 10080 f 15 f 30 f 60 f 120 f 180 f 240 f 360 f	3.237 3.231 3.227 3.223 Storm Event Min Sum min Sum min Win min Win min Win min Win min Win min Win min Win min Win	0.054 0.047 0.041 0.037 0.033 (r mmer mmer nter 11 nter 2 nter 2	nm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518	0.0 0.0 0.0 0.0 Flooded Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0.8 0.7 0.5 0.4 H Discha Volu (m ³) 8) 1) 2) 2) 2) 3) 3) 4	arge me) 31.2 32.5 3.9 8.5 23.4 28.8 82.8 82.8 86.2	0.8 0.7 0.5 0.4 Time-P (mins 4 5	0.7 0.6 0.5 0.5 0.4 eak 23 34 54 90 126 162	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter Winter 8640 m 10080 m 15 m 30 m 120 m 180 m 240 m 360 m 480 m	3.237 3.231 3.227 3.223 Storm Event win Sum min Sum min Win min Win min Win min Win min Win min Win min Win min Win min Win	0.054 0.047 0.041 0.037 0.033 (r mmer nter 11 nter 12 nter 12 nter 12 nter 12 nter 13	<pre>mm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171</pre>	0.0 0.0 0.0 0.0 Flooded Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0.8 0.7 0.5 0.4 H Discha Volu (m ³) 8) 1) 2) 8) 1) 1) 2) 2) 3) 4) 4	arge me) 31.225 3.9 8.5 23.4 28.8 32.8 32.8 32.8 32.8 32.8 32.8 32.8	0.8 0.7 0.5 0.4 Time-P (mins 4 5	0.7 0.6 0.5 0.4 eak 23 34 54 90 126 162 228	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter Winter S 8640 m 10080 m 15 m 30 m 10080 m 120 m 180 m 240 m 360 m 360 m 360 m 720 m	3.237 3.231 3.227 3.223 Storm Event Storm Storm Event Storm Storm Event Storm	0.054 0.047 0.041 0.037 0.033 (r mmer nter 11 nter 12 nter 12 nter 11 nter 12 nter 11 nter 11	nm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453	0.0 0.0 0.0 0.0 Flooded Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0.8 0.7 0.5 0.4 H Discha Volu (m ³) 8) 1) 2) 2) 2) 3) 4) 4) 4) 4) 4) 5) 5	Arge me) 31.22.5 3.9 8.5 23.4 28.8 32.8 32.8 32.8 32.9 2.1 47.2 51.4 55.0	0.8 0.7 0.5 0.4 Time-P (mins 4 5	0.7 0.6 0.5 0.4 eak 23 34 54 90 126 162 228 292 354 416	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter Winter Winter 8640 m 10080 m 15 m 30 m 10080 m 120 m 180 m 240 m 360 m 360 m 360 m 720 m 960 m	3.237 3.231 3.227 3.223 Storm Event Storm Storm Event Storm Storm Event Storm	0.054 0.047 0.041 0.037 0.033 (r mmer mmer nter 11 nter 12 nter 12 nter 11 nter 11 nte	nm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821	0.0 0.0 0.0 0.0 Flooded Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0.8 0.7 0.5 0.4 H Discha Volu (m ³) 8) 1) 2) 8) 1) 2) 2) 3) 4) 4) 3) 4) 4) 3) 4) 3) 4) 5 5) 4) 5 5 (1) 5) 5 (1) 5) 5 (1) 5) 5 (1) 5 (1) 5) 5 (1)	Arge me) 31.22.5 3.9 8.5 23.4 28.8 82.8 82.8 82.2 2.1 47.2 2.1 47.2 5.0 60.7	0.8 0.7 0.5 0.4 Time-P (mins 4 5	0.7 0.6 0.5 0.4 eak 23 34 54 90 126 162 228 292 354 416 534	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter Winter Winter S 8640 m 10080 m 15 m 30 m 10080 m 120 m 180 m 240 m 360 m 360 m 180 m 240 m 180 m 240 m 180 m 18	3.237 3.231 3.227 3.223 Storm Event Storm Event Storm Event Storm Event Storm Event Storm Event Storm Storm Event Storm Storm Event Storm	0.054 0.047 0.041 0.037 0.033 (r mmer nter 11 nter 11 nter 12 nter 12 nter 11 nter 11	nm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821 5.867	0.0 0.0 0.0 0.0 Flooded Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0.8 0.7 0.5 0.4 A Discha Volu (m ³) 8) 1) 2) 8) 1) 2) 2) 3) 4) 3) 4) 3) 4) 4) 3) 4) 5) 6) 6) 6 (1) 1) 5 (1) 1) 5 (1) 5) 7 (1) 5) 7 (1) 5) 7 (1) 7) 7) 7 (1) 7 (1) 7 (1) 7 (1) 7 (1) 7 (1) 7 (1) 7 (1) 7 (1) 7 (1) 7 (1) 7 (1) 7 (1) 7 (1) 7 (1) 7 (1) 7 (1) 7 (1) 7 (1) 7 (1) 7	Arge me) 31.22.5 3.9 8.5 2.3.4 2.8 8.8 8.2.8 8.6.2 2.1 4.7.2 5.0 60.7 58.3 3.3 4.5 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5	0.8 0.7 0.5 0.4 Time-P (mins 4 5	0.7 0.6 0.5 0.4 eak 23 34 54 90 126 162 228 292 354 416 534 772	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter Winter Winter S 8640 m 10080 m 15 m 10080 m 15 m 10080 m 15 m 120 m 180 m 240 m 360 m 180 m 240 m 180 m 180 m 180 m 180 m 180 m 180 m 190 m 180 m 190 m 180 m 190 m 1	3.237 3.231 3.227 3.223 Storm Event Storm Event Storm Event Storm Event Storm	0.054 0.047 0.041 0.037 0.033 (r mmer nter 11 nter 11 nter 12 nter 11 nter 11	nm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821 5.867 4.294	0.0 0.0 0.0 0.0 0.0 Flooded Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0.8 0.7 0.5 0.4 H Discha Volu (m ³) 8) 1) 2) 8) 1 1) 2) 2) 3) 4) 3) 4) 4) 3) 4) 3) 4) 5) 5 () 4) 5 () 5 () 5) 5 () 5) 5 () 5 () 5 () 5 (Arge me) 31.22.5 3.9 8.5 2.3.4 2.8 8.8 8.2.8 8.6.2 2.1 4.7.2 5.0 60.7 5.0 60.7 58.3 4.9	0.8 0.7 0.5 0.4 Time-P (mins 4 5	0.7 0.6 0.5 0.4 eak 23 34 54 90 126 162 228 292 354 416 534 772 104	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter Winter Winter S 8640 10080 15 10080 15 120 120 180 120 120 180 120 120 120 120 120 120 120 120 120 12	3.237 3.231 3.227 3.223 Storm Event The sum min Sum min Sum min Win min Win	0.054 0.047 0.041 0.037 0.033 (r mmer mter nter nter nter nter nter nter nter n	<pre>mm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821 5.867 4.294 3.404</pre>	0.0 0.0 0.0 0.0 0.0 0.0 Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0.8 0.7 0.5 0.4 Discha Volu (m ³) 8) 1) 2) 8) 1) 2) 2) 3) 3) 4) 4) 3) 3) 4) 4) 5) 4) 5) 6) 5 (, 5) 5 (, 5) 5 (, 5) 5 (, 5) 5 (, 5) 7 (, 6) 7 (, 7) 7 (, 7) (, 7)) (, 7))) ()))))))))))))))))))))))))))))))))	Arge me) 31.2 2.5 3.9 8.5 2.3.4 2.8 8.8 8.2 2.1 4.7 2.5 0.7 5.0 0.7 5.0 0.7 5.0 0.7 5.0 0.7 5.3 2.9 9.0 0.7 5.0 0.7 7.2 5.0 0.7 7.5 7.2 7.2 7.2 7.2 7.2 7.2 7.2 7.2	0.8 0.7 0.5 0.4 Time-P (mins 4 5	0.7 0.6 0.5 0.4 eak 23 34 54 90 126 162 228 292 354 416 534 772 104 480	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter Winter 8640 1 10080 1 10080 1 10080 1 10080 1 120 1 180 1 240 1 360 1 120 1 180 1 240 1 360 1 120 1 180 1 240 1 180 1 240 1 180 1 240 1 180 1 240 1 180 1 240 1 100 1 240 1 100 100	3.237 3.231 3.227 3.223 Storm Event The sum min Sum min Sum min Win min Win	0.054 0.047 0.041 0.037 0.033 (r mmer mter 11 nter 12 nter 12 nter 13 nter 14 nter 14 nter 15 nter 14 nter 15 nter 14 nter 15 nter 15 nter 15 nter 15 nter 16 nter 16 nter 16 nter 17 nter 16 nter 16	<pre>mm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821 5.867 4.294 3.404 2.422</pre>	0.0 0.0 0.0 0.0 0.0 Flooded Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0.8 0.7 0.5 0.4 I Discha Volu (m ³) 8) 1) 2) 8) 1) 2) 3) 4) 3) 4) 3) 4) 3) 4) 5) 6) 6) 6) 7) 7) 7) 7) 7) 7) 7) 7) 7) 7	Arge me) 31.22.5 3.9 8.5 2.3.4 2.8 8.8 8.2.8 8.6.2 2.1 4.7.2 5.0 60.7 5.0 60.7 58.3 4.9	0.8 0.7 0.5 0.4 Time-P (mins 4 5	0.7 0.6 0.5 0.4 eak 23 34 54 90 126 162 228 292 354 416 534 772 104	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter Winter S 8640 1 10080 1 15 10080 1 15 10080 1 15 100 2 120 1 180 1 240 1 360 1 120 1 180 1 240 1 180 1 240 1 180 1 240 1 180 1 240 1 180 1 240 1 180 1 240 1 196 1 240 1 100 2 100 1 100 100	3.237 3.231 3.227 3.223 Storm Event Event Event Min Sum min Win min Win	0.054 0.047 0.041 0.037 0.033 (r mmer mter 11 nter 12 nter 12 nter 13 nter 14 nter 14 nter 15 nter 14 nter 15 nter 14 nter 15 nter 15 nter 15 nter 15 nter 16 nter 16 nter 16 nter 17 nter 16 nter 16	<pre>mm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821 5.867 4.294 3.404 2.422 1.895</pre>	0.0 0.0 0.0 0.0 0.0 Flooded Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0.8 0.7 0.5 0.4 Discha Volu (m ³) 8) 1) 2) 8) 1 1) 2) 3) 4) 3) 4) 3) 4) 5) 6) 6) 6) 7) 7) 7) 8) 7 , 7) 8) 7 , 7 , 8) 7 , 9 , 9 , 9 , 9 , 9 , 9 , 9 , 9 , 9 , 9	Arge me) 31.22.5 3.9 8.5 2.3.4 8.8 8.8 8.8 8.2.8 8.6.2 1.4 5.0 0.7 7.2 5.0 0.7 7.8 8.3 9.0 9.0 9.0 9.0 9.0 9.0 9.0 9.0	0.8 0.7 0.5 0.4 Time-P (mins 4 5	0.7 0.6 0.5 0.4 eak 23 34 54 90 126 162 228 292 354 416 534 772 104 480 200	0 K 0 K 0 K	
5760 min 7200 min 8640 min	Winter Winter Winter Winter S 8640 1 10080 1 15 10080 1 15 10080 1 15 100 1 10080 1 15 100 1 100 100	3.237 3.231 3.227 3.223 Storm Event Event Event Min Sum min Vin min Win min Win	0.054 0.047 0.041 0.037 0.033 (r mmer mter nter nter nter nter nter nter nter n	<pre>mm/hr) 1.338 1.172 19.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821 5.867 4.294 3.404 2.422 1.895 1.565</pre>	0.0 0.0 0.0 0.0 0.0 Flooded Volume (m ³) 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	0.8 0.7 0.5 0.4 A Discha Volu (m ³) 1 0 8 0 8 0 1 1 0 2 0 8 0 1 1 0 2 0 3 0 4 0 4 0 5 0 4 0 5 0 6 0 7 7 0 6 8 0 7 7 0 8 0 8 0 7 7 7 0 8 0 8 0 7 7 7 0 8 0 8 0 7 7 7 0 8 0 8 0 8 0 8 0 8 0 8 0 8 0 8 0 8 0 8	Arge me 31.225 3.93.44 28.88 32.88 32.88 32.88 32.88 32.88 32.88 32.88 32.88 32.88 32.88 32.88 32.99.00 33.99 33.91	0.8 0.7 0.5 0.4 Time-P (mins 4 5	0.7 0.6 0.5 0.4 eak 23 34 54 90 126 162 228 292 354 416 534 772 104 480 200 904	0 K 0 K 0 K	

RMB Consultants Lto	d							Page 3
39 Cossington Road		Fo	rmer Bu	s Dep	oot			
Canterbury		Hi	gh Stre	L'				
Kent CT1 3HU		Ca	tchment	- Micro				
Date 12/12/2018			signed	-	3			Drainag
File B1-B2-B3-B4.CA	ASX		ecked b					Diamary
Micro Drainage		So	urce Co	ntrol	L 2017	.1.2		
Cascade Rainfall	l Details	s for Cat	chment	B3 P6	ermeak	le Pav	ing 10	0+20.SRCX
Return Per FEH Rainf Si	nfall Mode iod (years fall Versic te Locatic Data Typ mmer Storn	s) on on GB 6175 oe	Poin) 3 2 Shor	test S gest S		er) 0.7 er) 0.8 ns) ns) 100	750 340 15)80
		<u>Time</u>	Area Di	agram	<u>1</u>			
		Total A	Area (ha)	0.01	7			
Time From:	(mins) An To: (1	rea Time ha) From:			Time From:		Area (ha)	
0	4 0.	004 4	8	0.006	8	12	0.007	

RMB Consultants Ltd		Page 4
39 Cossington Road	Former Bus Depot	
Canterbury	High Street, Herne Bay	L.
Kent CT1 3HU	Catchment B3 Permeable Paving	Micro
Date 12/12/2018	Designed by RB	
File B1-B2-B3-B4.CASX	Checked by	Drainage
Micro Drainage	Source Control 2017.1.2	

Cascade Model Details for Catchment B3 Permeable Paving 100+20.SRCX

Storage is Online Cover Level (m) 3.720

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.2
Membrane Percolation (mm/hr)	1000	Length (m)	10.4
Max Percolation (l/s)	12.1	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	3.190	Cap Volume Depth (m)	0.400

Orifice Outflow Control

Diameter (m) 0.057 Discharge Coefficient 0.600 Invert Level (m) 3.190

RMB Consultants 3	Ltd							Page	1
39 Cossington Ro	ad		Forr	ner Bus	Depot				
Canterbury			High	n Stree	4				
Kent CT1 3HU			Cato	chment		Zm			
Date 12/12/2018			Des	igned k	v RB				
File B1-B2-B3-B4	CASX			cked by	-			Drai	nage
	• 011071				trol 20	17 1 2			
Micro Drainage			Soul	ce cor	ILFOI ZU)1/.1.2			
Cascade Summary	of Resul	ts fo:	r Catcl	hment I	34 Atte	nuation	Crates	100+20	.SRCX
<u>ouboude building</u>	01 10001	00 10.	<u> </u>				014000	100120	• 01(021
		Upstrea			Out	Elow To Ov	verflow	То	
	5	tructu	res						
Catchme	ent B3 Perm ent B2 Perm ent B1 Perm	neable	Paving	100+20.3	SRCX	(None)	(Nor	ne)	
		Half	Drain T	ime : 45	minutes				
Storm	Max	Max	Ma	ax	Max	Max	Max	Status	
Event		-				Σ Outflow			
	(m)	(m)	(1,	/s)	(1/s)	(1/s)	(m³)		
15 min Su	ummer 3.161	0.171		0.0	4.2	4.2	12.2	ОК	
30 min Su	ummer 3.210	0.220		0.0	4.4	4.4	15.7	ОК	
60 min Su	ummer 3.245	0.255		0.0	4.6	4.6	18.2	ΟK	
120 min Su	ummer 3.262	0.272		0.0	4.7	4.7	19.5	ΟK	
180 min Su	ummer 3.266	0.276		0.0	4.7	4.7	19.7	O K	
240 min Su	ummer 3.267	0.277		0.0	4.7	4.7	19.8	O K	
360 min Su	ummer 3.267	0.277		0.0	4.7	4.7	19.8	O K	
480 min Su	ummer 3.261	0.271		0.0	4.7	4.7	19.4	ΟK	
	ummer 3.250			0.0	4.6	4.6			
	ummer 3.235			0.0	4.6	4.6			
	ummer 3.199			0.0	4.4	4.4			
1440 min Su				0.0	4.0	4.0			
2160 min Su				0.0	3.5	3.5			
2880 min Su 4320 min Su				0.0 0.0	3.4 2.5	3.4 2.5			
4320 min Su 5760 min Su				0.0	2.5	2.5			
	Storm		Rain	Flooded	l Dischar	ge Time-P	eak		
	Event		(mm/hr)	Volume (m³)	Volumo (m³)	e (mins	5)		
	15 min Sı	ummer 3	119.734	0.0	27	.1	25		
	30 min Su		78.587	0.0		.8	39		
	60 min Su	ummer	49.133	0.0	45	.1	68		
	120 min Su	ummer	30.027	0.0	55	5.3	120		
	180 min Sı		22.733	0.0			150		
	240 min Sı		18.777	0.0			182		
	360 min Sı		14.518	0.0			250		
	480 min Su		12.171	0.0			316		
	600 min Su		10.603	0.0		3.3	382		
	720 min St		9.453	0.0			448		
	960 min St		7.821	0.0			574 916		
	1440 min Su 2160 min Su		5.867	0.0			816 168		
	2160 min St 2880 min St		4.294 3.404	0.0			108		
	2880 min St 4320 min St		3.404 2.422	0.0			0		
	5760 min St		1.895	0.0			0		

	s Ltd							Page 2
9 Cossington 1	Road		Form	ner Bus	Depot			
Canterbury			High	Street	t, Herne	Вау		4
Kent CT1 3HU					B4 Attenu	-	Crate	
Date 12/12/2018	8			.gned by				- Micro
File B1-B2-B3-1		z		-				Drainag
	D4.CAS	2		ked by	L	7 1 ^		
Micro Drainage			Sour	ce Cont	trol 2017	1.1.2		
Cascade Summan	ry of H	Results fo	or Catch	nment B	4 Attenua	ation C	rates	100+20.SRC
Stor	rm	Max Max	ĸ Ma	ax	Max	Max	Max	Status
Eve	nt	Level Dep	th Infilt	ration (Control E	Outflow	Volume	
		(m) (m)) (1	/s)	(l/s)	(l/s)	(m³)	
7000	0	2 2 2 2 2 2	2.0	0 0	1 (1 (0 0	0 7
		2.990 0.00		0.0	1.6	1.6	0.0	OK
					1.4	1.4	0.0	O K
		2.990 0.00		0.0	1.2 4.3	1.2 4.3		ОК ОК
		3.245 0.2		0.0	4.3 4.6	4.3 4.6	14.0 18.2	0 K
		3.245 0.23		0.0	4.8	4.0	21.4	0 K
		3.325 0.3		0.0	4.8	4.8 4.9	21.4	0 K
		3.325 0.3		0.0	4.9	4.9 4.9	23.2	
		3.325 0.3		0.0	4.9	4.9	23.2	0 K
		3.306 0.3		0.0	4.9	4.9	23.2	0 K
		3.284 0.2		0.0	4.9	4.9	22.4	0 K
		3.258 0.2		0.0	4.8	4.8	19.2	0 K
		3.238 0.2		0.0	4.7	4.7	19.2	
		3.230 0.24		0.0	4.5	4.5 4.2	17.1	0 K
		3.064 0.0		0.0	4.2 3.7	4.2 3.7	5.3	0 K
		2.990 0.00		0.0	3.1	3.1	0.0	0 K
		2.990 0.00		0.0	2.5	2.5		0 K
		2.990 0.00		0.0	1.8	1.8	0.0	0 K
		2.990 0.00		0.0	1.4	1.0		0 K
		2.990 0.00		0.0	1.1	1.1		0 K
		2.990 0.00		0.0	1.0	1.0	0.0	0 K
		Storm	Rain	Flooded	Discharge	e Time-Pe	eak	
		Event	(mm/hr)	Volume	Volume	(mins	;)	
				(m³)	(m³)			
	7200	min Cummon	1 565	0 0	170 5		0	
		min Summer		0.0	172.5	,	0	
			1 3 3 0	$\cap \cap$	176 6			
			1.338				0	
	10080	min Summer	1.172	0.0	179.9)	0	
	10080 15	min Summer min Winter	1.172 119.734	0.0	179.9 30.4)	0 25	
	10080 15 30	min Summer min Winter min Winter	1.172 119.734 78.587	0.0 0.0 0.0	179.9 30.4 40.3) : ;	0 25 39	
	10080 15 30 60	min Summer min Winter min Winter min Winter	1.172 119.734 78.587 49.133	0.0 0.0 0.0 0.0	179.9 30.4 40.3 50.5) : :	0 25 39 68	
	10080 15 30 60 120	min Summer min Winter min Winter min Winter min Winter	1.172 119.734 78.587 49.133 30.027	0.0 0.0 0.0 0.0 0.0	179.9 30.4 40.3 50.5 62.1		0 25 39 68 120	
	10080 15 30 60 120 180	min Summer min Winter min Winter min Winter min Winter min Winter	1.172 119.734 78.587 49.133 30.027 22.733	0.0 0.0 0.0 0.0 0.0 0.0	179.9 30.4 40.3 50.5 62.1 70.6		0 25 39 68 120 158	
	10080 15 30 60 120 180 240	min Summer min Winter min Winter min Winter min Winter min Winter min Winter	1.172 119.734 78.587 49.133 30.027 22.733 18.777	0.0 0.0 0.0 0.0 0.0 0.0 0.0	179.9 30.4 40.3 50.5 62.1 70.6 77.7		0 25 39 68 120 158 192	
	10080 15 30 60 120 180 240 360	min Summer min Winter min Winter min Winter min Winter min Winter	1.172 119.734 78.587 49.133 30.027 22.733 18.777 14.518	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	179.9 30.4 40.3 50.5 62.1 70.6 77.7 90.6		0 25 39 68 120 158	
	10080 15 30 60 120 180 240 360 480	min Summer min Winter min Winter min Winter min Winter min Winter min Winter	1.172 119.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	179.9 30.4 40.3 50.5 62.1 70.6 77.7 90.6 101.0		0 25 39 68 120 158 192 266	
	10080 15 30 60 120 180 240 360 480 600	min Summer min Winter min Winter min Winter min Winter min Winter min Winter min Winter	1.172 119.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	179.9 30.4 40.3 50.5 62.1 70.6 77.7 90.6 101.0 110.2		0 25 39 68 120 158 192 266 336	
	10080 15 30 60 120 180 240 360 480 600 720	min Summer min Winter min Winter min Winter min Winter min Winter min Winter min Winter min Winter	1.172 119.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	179.9 30.4 40.3 50.5 62.1 70.6 77.7 90.6 101.0 110.2 118.0		0 25 39 68 120 158 192 266 336 404	
	10080 15 30 60 120 180 240 360 480 600 720 960	min Summer min Winter min Winter min Winter min Winter min Winter min Winter min Winter min Winter min Winter min Winter	1.172 119.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	179.9 30.4 40.3 50.5 62.1 70.6 77.7 90.6 101.0 110.2 118.0 130.0		0 25 39 68 120 158 192 266 336 404 472	
	10080 15 30 60 120 180 240 360 480 600 720 960 1440	min Summer min Winter min Winter	1.172 119.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821 5.867	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	179.9 30.4 40.3 50.5 62.1 70.6 77.7 90.6 101.0 110.2 118.0 130.0 146.3		0 25 39 68 120 158 192 266 336 404 472 598	
	10080 15 30 60 120 180 240 360 480 600 720 960 1440 2160	min Summer min Winter min Winter min Winter min Winter min Winter min Winter min Winter min Winter min Winter min Winter	1.172 119.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821 5.867 4.294	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	179.9 30.4 40.3 50.5 62.1 70.6 77.7 90.6 101.0 110.2 118.0 130.0 146.3 160.6		0 25 39 68 120 158 192 266 336 404 472 598 836	
	10080 15 30 60 120 180 240 360 480 600 720 960 1440 2160 2880	min Summer min Winter min Winter	1.172 119.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821 5.867 4.294 3.404	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	179.9 30.4 40.3 50.5 62.1 70.6 77.7 90.6 101.0 110.2 118.0 130.0 146.3 160.6 169.6		0 25 39 68 120 158 192 266 336 404 472 598 836 0	
	10080 15 30 60 120 180 240 360 480 600 720 960 1440 2160 2880 4320	min Summer min Winter min Winter	1.172 119.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821 5.867 4.294 3.404 2.422	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	179.9 30.4 40.3 50.5 62.1 70.6 77.7 90.6 101.0 110.2 118.0 130.0 146.3 160.6 169.6 180.6		0 25 39 68 120 158 192 266 336 404 472 598 836 0 0	
	10080 15 30 60 120 180 240 360 480 600 720 960 1440 2160 2880 4320 5760	min Summer min Winter min Winter	1.172 119.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821 5.867 4.294 3.404 2.422 1.895	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	179.9 30.4 40.3 50.5 62.1 70.6 77.7 90.6 101.0 110.2 118.0 130.0 146.3 160.6 169.6 180.6 187.9		0 25 39 68 120 158 192 266 336 404 472 598 836 0 0 0	
	10080 15 30 60 120 180 240 360 480 600 720 960 1440 2160 2880 4320 5760 7200	min Summer min Winter min Winter	1.172 119.734 78.587 49.133 30.027 22.733 18.777 14.518 12.171 10.603 9.453 7.821 5.867 4.294 3.404 2.422 1.895 1.565	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	179.9 30.4 40.3 50.5 62.1 70.6 77.7 90.6 101.0 110.2 118.0 130.0 146.3 160.6 169.6 180.6 187.9 193.6		0 25 39 68 120 158 192 266 336 404 472 598 836 0 0 0 0	

RMB Consulta	nta Itd								Daga 2	
RMB Consulta 39 Cossingto				Form	or Dia	Donot			Page 3	
39 Cossingto Canterbury	II RUdû				er Bus	Depot , Herne	Pau		4	
-				-		4 Atteni	-	Cmata		<u>, </u>
Kent CT1 3H Date 12/12/2							lation	crate	- Micro	
		7			gned by	' RB			Draina	NU
File B1-B2-B		X		1	ked by	1 0015	1 1 0		Breinte	5
Micro Draina	ge			Sour	ce Cont	rol 2017	1.1.2			
<u>Cascade Sum</u>	mary of B	Results	s for	Catch	nment B4	Attenua	ation C	<u>rates</u>	100+20.SF	<u>RCX</u>
	Storm	Max	Max		ax	Max	Max	Max	Status	
1	Ivent	Level (m)	Depth 1 (m)			ontrol Σ (l/s)	Outflow (1/s)	Volume (m³)		
		(111)	(111)	(1)	5)	(1/3)	(1/3)	()		
10080	min Winter	2.990	0.000		0.0	0.9	0.9	0.0	ОК	
		Storm Event		Rain m/hr)	Flooded Volume (m³)	Discharge Volume (m ³)	e Time-Pe (mins			
					(111 -)	(111-)				
	10080	min Wir	nter	1.172	0.0	202.1		0		
					XP Sol					

RMB Consultants Ltd		Page 4
39 Cossington Road	Former Bus Depot	
Canterbury	High Street, Herne Bay	4
Kent CT1 3HU	Catchment B4 Attenuation Crate	1 mm
Date 12/12/2018	Designed by RB	Micro
		Drainage
File B1-B2-B3-B4.CASX	Checked by	
Micro Drainage	Source Control 2017.1.2	
<u>Cascade Rainfall Details for Ca</u> Rainfall Model Return Period (years)	Atchment B4 Attenuation Crates 10 FEH Winter Storms Ye 100 Cv (Summer) 0.75	es
Data Type Summer Storms	2013 Cv (Winter) 0.84 17561 168162 Shortest Storm (mins) 2 Point Longest Storm (mins) 1008 Yes Climate Change % +2	L 5 3 0
<u>Tim</u>	ne Area Diagram	
Tota	al Area (ha) 0.066	
	me (mins) Area Time (mins) Area om: To: (ha) From: To: (ha)	
0 4 0.012	4 8 0.027 8 12 0.027	
<u></u>	2017 XP Solutions	
©1982-	ZULI AF SOLUTIONS	

RMB Consultants Lt					Pa	age 5
9 Cossington Road	1	Former H	Bus Depot			
anterbury		High St	ceet, Her	ne Bay	2	1.
Cent CT1 3HU		Catchmer	nt B4 Att	enuation C	rate	Airco
ate 12/12/2018		Designed	d by RB			NICLO
Tile B1-B2-B3-B4.0	CASX	Checked	-)rainaq
licro Drainage			Zontrol 2	017 1 2		
Cascade Model 1	Details for				es 100+2	0.SRCX
	Storage is	online Cove	r Level (m	a) 3.570		
	Cellu	lar Storag	e Structi	<u>ire</u>		
	Ir ation Coefficie ation Coefficie		r) 0.00000	Porosi		
Depth (m) A	Area (m²) Inf.	Area (m ²) De	pth (m) Ar	ea (m²) Inf	Area (m²)
0.000 0.300	75.2 75.2	74.3 87.5	0.400	0.0	87.	5
	<u>Hydro-Brak</u>	<u>xe® Optimum</u>	Outflow	Control		
	U	nit Reference	MD-CHE-01	108-5000-0600	0-5000	
	De	sign Head (m)			0.600	
	Desi	gn Flow (l/s)			5.0	
		Flush-Flo ^m			ulated	
		-		e upstream st	-	
	2	Application		Sı	urface	
		ump Available			No	
		Diameter (mm)			108	
Minimu	Inv m Outlet Pipe	ert Level (m)			2.740 150	
	ested Manhole				1200	
	Control	Points	Head (m)	Flow (l/s)		
	Design Point	(Calculated)	0.600	5.0		
	Debigii roine	Flush-Flo™		5.0		
		Kick-Flo®		3.4		
	Mean Flow ove			3.7		
The hydrological ca						-
Hydro-Brake® Optimu						
Hydro-Brake Optimum	NB be utilised	then these st	orage rout	cing calculat	cions will	be
invalidated						
Depth (m) Flow (1/	s) Depth (m) H	Flow (l/s) De	pth (m) Fl	.ow (l/s) Dep	oth (m) Fl	ow (l/s)
	1.200	7.0	3.000	11.0	7.000	16.6
0.200 5	1.400	7.6	3.500	11.9	7.500	17.2
	1.600	8.1	4.000	12.7	8.000	17.8
	.1 1.800	8.6	4.500	13.4	8.500	18.3
	.6 2.000	9.0	5.000	14.1	9.000	18.9
	.0 2.200	9.4	5.500	14.8	9.500	19.4
	.8 2.400	9.9	6.000	15.5		
1.000 6	2.600	10.3	6.500	16.0		
	©19	82-2017 XP	Solution	S		

Appendix C - Catchment C



RMB Consultant									Page 1
9 Cossington 1	Road				er Bus	-			5
Canterbury				High	Street	c, Herne	Bay		1
Cent CT1 3HU				Catc	hment (C Attenu	ation C	rates	Micco
ate 12/12/201	8			Desi	gned by	y RB			
ile Catchment	C Atte	enuati	on	Chec	ked by				Drainad
licro Drainage						rol 201	7.1.2		
2									
Sur	mmary c	of Res	ults f	or 10	0 year	Return	Period	(+20%))
					_				_
		1	Half Dr	ain Ti	me : 22	minutes.			
Sto	rm	Max	Max	Ma	x	Max	Max	Max	Status
Eve		Level	Depth :	Infilt	ration C	Control S	Outflow	Volume	
		(m)	(m)	(1/	/s)	(l/s)	(l/s)	(m³)	
15 mir	Summer	3 116	0 216		0.0	2.3	2.3	4.0	ОК
	1 Summer 1 Summer				0.0	2.3	2.3	4.0 4.7	
	1 Summer				0.0	2.4	2.4		
	Summer				0.0	2.3	2.3		
	Summer				0.0	2.2	2.2	3.5	
240 mir	Summer	3.063	0.163		0.0	2.1	2.1	3.0	O K
360 min	Summer	3.021	0.121		0.0	2.0	2.0	2.2	O K
480 min	n Summer	2.988	0.088		0.0	1.9	1.9	1.6	O K
600 min	n Summer	2.961	0.061		0.0	1.8	1.8	1.1	O K
	n Summer				0.0	1.7	1.7	0.7	
	n Summer				0.0	1.7	1.7	0.1	O K
1440 min					0.0	1.3	1.3	0.0	
2160 min					0.0	1.0	1.0	0.0	
2880 min					0.0	0.8	0.8	0.0	
4320 min 5760 min					0.0	0.6 0.4	0.6 0.4	0.0	
5760 min 7200 min					0.0	0.4	0.4	0.0 0.0	
8640 min					0.0	0.4	0.4		
10080 min					0.0	0.3	0.3	0.0	
	Winter				0.0	2.4	2.4		
		Storm	I	Rain	Flooded	Discharge	e Time-Po	eak	
		Event	(n	m/hr)	Volume	Volume	(mins	•)	
					(m³)	(m³)			
	15	min Su	mmer 11	9.734	0.0	6.3	2	21	
	30	min Su	mmer 7	8.587	0.0	8.	3	31	
		min Su		9.133	0.0	10.		48	
	120	min Su		0.027	0.0	12.		82	
				0 7 2 2 2	0 0	14.2	2	114	
		min Su		2.733	0.0		_		
	240	min Su	mmer 1	8.777	0.0	15.		146	
	240 360	min Su min Su	mmer 1 mmer 1	8.777	0.0	15. 18.3	3 :	208	
	240 360 480	min Su min Su min Su	mmer 1 mmer 1 mmer 1	8.777 4.518 2.171	0.0 0.0 0.0	15. 18. 20.	3 : 4 :	208 268	
	240 360 480 600	min Su min Su min Su min Su	mmer 1 mmer 1 mmer 1 mmer 1	8.777 4.518 2.171 0.603	0.0 0.0 0.0 0.0	15. 18. 20.	3 : 4 : 2 :	208 268 328	
	240 360 480 600 720	min Su min Su min Su min Su min Su	mmer 1 mmer 1 mmer 1 mmer 1 mmer 1	8.777 4.518 2.171 0.603 9.453	0.0 0.0 0.0 0.0 0.0	15. 18. 20. 22.2 23.	3 : 4 : 2 : 8 :	208 268 328 388	
	240 360 480 600 720 960	min Su min Su min Su min Su min Su min Su	mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer	8.777 4.518 2.171 0.603 9.453 7.821	0.0 0.0 0.0 0.0 0.0	15. 18. 20. 22. 23. 26.	3 : 4 : 2 : 8 : 3 :	208 268 328	
	240 360 480 600 720 960 1440	min Su min Su min Su min Su min Su	mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer mmer	8.777 4.518 2.171 0.603 9.453 7.821 5.867	0.0 0.0 0.0 0.0 0.0	15. 18. 20. 22.2 23.	3 : 4 : 2 : 8 : 3 : 6	208 268 328 388 498	
	240 360 480 600 720 960 1440 2160	min Su min Su min Su min Su min Su min Su min Su	mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer mmer mmer	8.777 4.518 2.171 0.603 9.453 7.821	0.0 0.0 0.0 0.0 0.0 0.0	15. 18. 20. 22. 23. 26. 29.	3 : 4 : 2 : 8 : 3 : 5	208 268 328 388 498 0	
	240 360 480 600 720 960 1440 2160 2880	min Su min Su min Su min Su min Su min Su min Su min Su	mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer mmer mmer mmer mmer	8.777 4.518 2.171 0.603 9.453 7.821 5.867 4.294	0.0 0.0 0.0 0.0 0.0 0.0 0.0	15. 18. 20. 22. 23. 26. 29. 32.	3 : 4 : 2 : 3 : 5 : 3	208 268 328 388 498 0 0	
	240 360 480 600 720 960 1440 2160 2880 4320	min Su min Su min Su min Su min Su min Su min Su min Su	mmer 1 mmer 1 mmer 1 mmer 1 mmer 1 mmer mmer mmer mmer mmer	8.777 4.518 2.171 0.603 9.453 7.821 5.867 4.294 3.404	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	15. 18. 20. 22. 23. 26. 29. 32. 34.	3 : 4 2 : 8 : 3 : 5 : 3 : 6 :	208 268 328 388 498 0 0 0	
	240 360 480 600 720 960 1440 2160 2880 4320 5760	min Su min Su min Su min Su min Su min Su min Su min Su min Su min Su	mmer 1 mmer 1	8.777 4.518 2.171 0.603 9.453 7.821 5.867 4.294 3.404 2.422	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	15. 18. 20. 22. 23. 26. 29. 32. 34. 36.	3 : 4 2 : 4 8 : 4 3 : 6 5 : 5 3 : 6 6 : 2	208 268 328 388 498 0 0 0 0	
	240 360 480 600 720 960 1440 2160 2880 4320 5760 7200	min Su min Su min Su min Su min Su min Su min Su min Su min Su min Su	mmer 1 mmer 1	8.777 4.518 2.171 0.603 9.453 7.821 5.867 4.294 3.404 2.422 1.895	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	15. 18. 20. 22. 23. 26. 29. 32. 34. 36. 38.	3 : 4 2 : 5 8 : 6 5 : 5 3 : 6 6 : 6 6 : 6 2 : 4	208 268 328 388 498 0 0 0 0 0 0	
	240 360 480 600 720 960 1440 2160 2880 4320 5760 7200 8640 10080	min Su min Su	mmer 1 mmer 1	8.777 4.518 2.171 0.603 9.453 7.821 5.867 4.294 3.404 2.422 1.895 1.565 1.338 1.172	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	15. 18. 20. 22. 23. 26. 29. 32. 34. 36. 38. 39.	3	208 268 328 388 498 0 0 0 0 0 0 0 0	

RMB Consultants Ltd							Page 2
39 Cossington Road Former Bus Depot							
Canterbury			High Stree	et, Hern	е Вау		4
Kent CT1 3HU			Catchment	C Atten	uation C	Crates	Micco
Date 12/12/2018			Designed B	oy RB			
File Catchment C Atte	enuati	on	Checked by	7			Draina
Micro Drainage			Source Con	-	17.1.2		
<u>Summary c</u> Storm Event	Max	Max	for 100 yea Max Infiltration	Max	Max	Max)_ Status
	(m)	(m)	(1/s)	(1/s)	(1/s)	(m³)	
30 min Winter	3.198	0.298	0.0	2.5	2.5	5.5	ОК
60 min Winter	3.189	0.289	0.0	2.5	2.5	5.3	ΟK
120 min Winter	3.135	0.235	0.0	2.3	2.3	4.3	ΟK
180 min Winter	3.086	0.186	0.0	2.2	2.2	3.4	ΟK
240 min Winter	3.045	0.145	0.0	2.1	2.1	2.7	ΟK
360 min Winter	2.984	0.084	0.0	1.9	1.9	1.5	O K
480 min Winter	2.940	0.040	0.0	1.7	1.7	0.7	ΟK
600 min Winter	2.905	0.005	0.0	1.7	1.7	0.1	ΟK
720 min Winter	2.900	0.000	0.0	1.6	1.6	0.0	ΟK
960 min Winter	2.900	0.000	0.0	1.3	1.3	0.0	O K
1440 min Winter	2.900	0.000	0.0	1.0	1.0	0.0	O K
2160 min Winter	2.900	0.000	0.0	0.7	0.7	0.0	O K
	2,900	0.000	0.0	0.6	0.6	0.0	O K
2880 min Winter				0.4	0.4	0.0	ОК
2880 min Winter 4320 min Winter		0.000	0.0	0.4	0.4	0.0	0 10
	2.900		0.0	0.4	0.4		
4320 min Winter	2.900 2.900	0.000				0.0	O K
4320 min Winter 5760 min Winter	2.900 2.900 2.900	0.000	0.0	0.3 0.3	0.3	0.0	O K O K

	Stor Even		Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
30	min	Winter	78.587	0.0	9.2	32
60	min	Winter	49.133	0.0	11.5	50
120	min	Winter	30.027	0.0	14.1	86
180	min	Winter	22.733	0.0	16.1	120
240	min	Winter	18.777	0.0	17.7	154
360	min	Winter	14.518	0.0	20.5	216
480	min	Winter	12.171	0.0	22.9	276
600	min	Winter	10.603	0.0	24.9	324
720	min	Winter	9.453	0.0	26.7	0
960	min	Winter	7.821	0.0	29.4	0
1440	min	Winter	5.867	0.0	33.1	0
2160	min	Winter	4.294	0.0	36.4	0
2880	min	Winter	3.404	0.0	38.4	0
4320	min	Winter	2.422	0.0	41.0	0
5760	min	Winter	1.895	0.0	42.8	0
7200	min	Winter	1.565	0.0	44.2	0
8640	min	Winter	1.338	0.0	45.3	0
10080	min	Winter	1.172	0.0	46.3	0

RMB Consultants Ltd		Page 3
39 Cossington Road	Former Bus Depot	
Canterbury	High Street, Herne Bay	4
Kent CT1 3HU	Catchment C Attenuation Crates	Micro
Date 12/12/2018	Designed by RB	Drainage
File Catchment C Attenuation	Checked by	Diamaye
Micro Drainage	Source Control 2017.1.2	

<u>Rainfall Details</u>

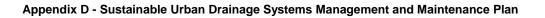
Rainfall Model		FEH	Winter Storms	Yes
Return Period (years)		100	Cv (Summer)	0.750
FEH Rainfall Version		2013	Cv (Winter)	0.840
Site Location	GB 617561	168162	Shortest Storm (mins)	15
Data Type		Point	Longest Storm (mins)	10080
Summer Storms		Yes	Climate Change %	+20

<u>Time Area Diagram</u>

Total Area (ha) 0.028

Time	(mins)	Area	Time	(mins)	Area	Time	(mins)	Area
From:	To:	(ha)	From:	To:	(ha)	From:	To:	(ha)
0	4	0.009	4	8	0.009	8	12	0.010

RMB Consultants Ltd				Pa	age 4
39 Cossington Road	Former	Bus Depot			
Canterbury	High St	reet, Herr	ne Bay		1
Kent CT1 3HU	Catchme	nt C Atter	uation Cra	ates	Aicco
Date 12/12/2018	Designe	d by RB			
File Catchment C Attenuatio		-			Irainag
Aicro Drainage		Control 20)17.1.2		
	Model Det	cails			
Storage	e is Online Cove	er Level (m)	3.500		
Ce	llular Storag	e Structu	re		
	-				
Infiltration Coeff: Infiltration Coeff:		r) 0.00000	-		
Depth (m) Area (m²) In	nf. Area (m²) De	epth (m) Are	a (m²) Inf.	Area (m²)
0.000 19.3	25.0	0.400	0.0	31.	1
0.300 19.3	31.1				
Undro - D	rake® Optimum	Outflow (Control		
<u>myuro-e</u>		OULIIOW			
	Unit Reference	e MD-CHE-008	31-2500-0500	-2500	
_	Design Head (m)			0.500	
L	esign Flow (l/s)) Flush-Flo [®]		Calau	2.5	
			Calcu upstream st		
	Application		-	rface	
	Sump Available		ou	No	
	Diameter (mm)			81	
	Invert Level (m))		2.700	
Minimum Outlet Pi	pe Diameter (mm))		100	
Suggested Manho	ole Diameter (mm))		1200	
Cont	rol Points	Head (m) F	low (l/s)		
Design Po:	int (Calculated)	0.500	2.5		
	Flush-Flo™	0.153	2.5		
	Kick-Flo®	0.210	1.7		
Mean Flow	over Head Range	-	1.9		
The hydrological calculations Hydro-Brake® Optimum as specif Hydro-Brake Optimum® be utilis invalidated	ied. Should and	other type o	of control d	evice oth	er than a
Depth (m) Flow (l/s) Depth (r	n) Flow (l/s) De	epth (m) Flo	w (l/s) Dep	th (m) Fl	ow (l/s)
0.100 1.9 1.20		3.000	6.0	7.000	9.1
0.200 1.7 1.40		3.500	6.5	7.500	9.4
0.300 1.9 1.60		4.000	6.9	8.000	9.7
0.400 2.2 1.80		4.500	7.3	8.500	10.0
0.500 2.5 2.00 0.600 2.7 2.20		5.000 5.500	7.7	9.000 9.500	10.3 10.6
0.800 2.7 2.20		6.000	8.4		T0.0
1.000 3.5 2.60		6.500	8.8		
'			·		
	D1982-2017 XP				





Former Bus Depot, High Street, Herne Bay, CT6 5LE Sustainable Urban Drainage Systems Management and Maintenance Plan

1. Introduction

This Sustainable Urban Drainage Systems (SuDS) Management and Maintenance Plan has been produced for SuDS elements at the Former Bus Depot, High Street, Herne Bay, CT6 5LE.

The following SuDS elements are proposed within the development.

- Permeable paving
- Attenuation crates
- Control structures

2. Management

The attenuation crates and associated structures will be maintained by a management company set up to maintain communal areas.

3. Maintenance

The following maintenance plans will be put in place for each of the SuDS elements present within the development.

Permeable Paving

SUDS Element	Permeable Paving				
Maintenance Issues	Pervious surfaces are susceptible to silt blockage.				
Maintenance Period	Maintenance Task	Frequency			
Regular	Surface brushing to reduce silt accumulation.	Monthly.			
	Brushing and jet wash in autumn after leaf fall.	Annually.			
	Mow grass edges to paving at 35-50mm and remove weeds and leaves.	As required.			
Occasional tasks	Jetting where silt has accumulated in joints or voids. Replace grit and vibrate surface to lock.	As required.			
Remedial Work	Where shrinkage or surface damage occurs, uplift paving, remove grit bedding layer and geotextile if present and reinstate to design profile.	As required.			

Attenuation Crates

SUDS Element	Attenuation Crates					
Maintenance Issues	Debris entering storage causing blockage.					
Maintenance Period	Maintenance Task Frequency					
Regular	Inspect storage and inlets to identify any elements not working correctly.	Monthly for 3 months, then six monthly.				
	Debris removal from gutters.	Annually in autumn after leaf fall.				
	Remove sediment from silt traps.	Annually or as required.				
Remedial Work	Repair inlets and silt traps	As required.				
	Clear out storage if it becomes blocked	As required.				

Control Structures

SUDS Element	Control Structure					
Maintenance Issues	Debris blocking control structure.					
Maintenance Period	Maintenance Task Frequency					
Regular	Inspect chamber and remove any debris from control device.	Quarterly and following heavy rainfall.				
Remedial Work	Repair or replace control device if it is damaged.	As required.				







1. Site details	
Site/development name	Former Bus Depot
Address including post code	High Street Herne Bay CT6 5LE
Grid reference	E 617561 N 168162
LPA reference	n/a
Type of application	Outline 🛛 Full 🗆
	Discharge of Conditions 🛛 Other 🛛
Site condition	Greenfield 🛛 Brownfield 🛛

2. Existing drainage	-	Doo	cument/Plan v	where information is stated	
Total site area (ha)	0.535			Surface Water	
Impermeable area (ha)	0.535			Drainage Design	
Final discharge location	Infiltration			Report	
	Watercourse				
	Sewer	X			
	Tidal reach/sea				
Greenfield discharge rate	QBAR (I/s)	2.1		Surface Water	
(I/s)	1 in 1 year (I/s)	1.8		Drainage Design	
for existing site area	1 in 30 year (I/s)	4.8		Report	
	1 in 100 year (I/s)	6.6			
3. Proposed drainage area	IS	Doo	cument/Plan v	where information is stated	
Impermeable area	Roof	0.210		Surface Water	
(ha)	Highway/road	0.000		Drainage Design	
	Other paved areas	0.325		Report	
	Total	0.535			
Permeable area	Open space	0.000			
(ha)	Other permeable				
	areas				
	Total	0.000			
Final discharge location	Infiltration			Surface Water	
	Infiltration rate	¢	m/s	Drainage Design	
	Watercourse			Report	
	Sewer	X			
	Tidal reach/sea				
Climate change allowance	20% 🖾 30% 🛙	□ 40%			
included in design					

4. Post-Development Discharge rates, Document/Plan where information is stated: without mitigation				
Developed discharge rates	1 in 2 year	39	Surface Water Drainage Design	
(l/s)	1 in 30 year	90		
	1 in 100 year	115	Report	
	1 in 100 year + CC	139		
5. Post-Development Discharge rates, Document/Plan where information is stated: with mitigation				
Describe development drainage strategy in general terms:			Surface Water	
Permeable paving plus subbase replacement attenuation storage provide storage with a controlled discharge from the site to the existing surface water sewer.			Drainage Design Report	
(a) No control required, all flows infiltrating				
(b) Controlled developed	1 in 2 year	9.4	Surface Water	
discharge rates (I/s)	1 in 30 year	10.7	Drainage Design Report	
	1 in 100 year	11.6	Report	
	1 in 100 year + CC	12.3		
6. Discharge Volumes Document/Plan where information is stated:				
	Existing volume	Proposed volume	Surface Water	
	(m³)	(m ³)	Drainage Design	
1 in 2 year	121	96	Report	
1 in 30 year	240	188		
1 in 100 year	326	256		
1 in 100 year + CC	392	308		

All information presented above should be contained within the attached Flood Risk Assessment, Drainage Strategy or Statement and be substantiated through plans and appropriate calculations.

Form completed by	Robert Beck
Qualifications	Chartered Civil Engineer
Company	RMB Consultants (Civil Engineering) Ltd
Telephone	01227 472128
Email	robert.beck@rmbconsultants.co.uk
On behalf of (client's details)	Coastal Developments Ltd
Date	12/12/18