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Client: Folkestone and Hythe District Council

Technical Addendum – Discharge of Surface Water Runoff (Watercourse) for the Proposed Development at Princes Parade, Hythe, Kent

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1 Background Scope of Appraisal

This report has been prepared to supplement the Flood Risk Assessment (FRA) submitted within Technical Annex 4, dated August 2017, in relation to planning application Y17/1042/SH. The objective of this Technical Addendum is to outline the details of an alternative option with regard to the discharge of surface water runoff from the development site and to demonstrate that discharge into the adjacent watercourse (Royal Military Canal - RMC) presents a viable alternative solution. It should be recognised that this addendum does not supersede the main findings of the original drainage assessment (contained within the original FRA), nor is it intended to bypass the drainage hierarchy. Instead, this report has been prepared in response to the comments received from the Environment Agency (reference KT/2017/123369/03-L01) and provides additional information to enable the outstanding objection to be removed.

The opportunities for discharging surface water runoff from the proposed development have been assessed within the FRA, in accordance with the hierarchy stated within the (Non-Statutory) Technical Standards for Sustainable Drainage (NTSS). The original assessment identified that the preferred option is to discharge surface water directly to the sea, and the text iterates that this option should be considered above *all* alternative options within the drainage hierarchy. The FRA also confirms that infiltration into the ground may not be feasible at this location and therefore, it is recognised that one of the alternative options would be to discharge surface water into the RMC. Notwithstanding this, it is acknowledged from the discussions held with the EA that the option to discharge to the RMC will be considered if it is demonstrated that a direct discharge into the sea is not viable.

For the purpose of this assessment, it is assumed that the alternative (more preferable) options mentioned above are not viable. Therefore, this report explores the technical details associated with discharging surface water from the proposed development at Princes Parade into the adjacent RMC, to ensure that a sustainable solution will be available.

2 Existing Surface Water Runoff Characteristics

2.1 Site Background and Makeup

The existing site comprises an area where refuse was historically buried (a former landfill site) and since the abandonment of this practice, the majority of the site has remained undeveloped. The exception is the highway fronting the Princes Parade site, which runs along the southern boundary of the site, and a public car park and play area to the east of the site. These developed areas comprise hardstanding consisting of concrete and asphalt.

Geological maps for this area indicate storm beach / sand dune deposits across most of the site, and typically these types of deposits are freely draining. Flood Estimation Handbook point data (FEH 13) has been obtained for the site, and from this data the BFIHOST and the PROPWET values have been extracted. These values are 0.889 and 0.34 respectively. This suggests a relatively dry, permeable catchment with limited surface water runoff from the undeveloped parts of the site.

Site specific geotechnical investigations have been undertaken, by others, to better understand the true ground condition of the site (post landfill). The results of the ground investigation report confirms that made ground deposits are present beneath most of the site and consequently, these overlying deposits will exhibit different soil characteristics to the natural values described above.

A number of trial pits were dug across the site (to depths up to 0.4m Below Ground Level) and the results indicate sandy gravelly **clay**, mixed with general refuse material. The soil descriptions are summarised in Figure 2.1 below.

Location	Depth (m)	Soil Description
HP1	0.00-0.33	Brown slightly silty sandy gravelly CLAY. Gravel is fine to medium subangular to subrounded flint and bituminous surfacing. Two glass bottles, glass and metal fragments.
HP2	0.00-0.20	Brown slightly sandy gravelly CLAY with some rootlets. Gravel is subangular to subrounded flint.
	0.20-0.33	Pale brown gravelly CLAY. Gravel is fine to medium subangular to subrounded flint and concrete.
HP3	0.00-0.33	Brown sandy gravelly CLAY with some rootlets. Gravel is angular to surrounded flint, brick and bituminous surfacing.
HP4	0.00-0.30	Greenish brown to brown sandy slightly gravelly CLAY. Gravel is fine to medium subrounded flint and rare brick. Rare inclusions of glass and pottery fragments.
	0.30-0.40	Greenish brown to brown slightly sandy slightly gravelly CLAY. Gravel is fine to medium coarse subrounded flint.
HP5	0.00-0.34	Greenish brown to brown sandy slightly gravelly CLAY with some rootlets. Gravel is subangular to subrounded flint, bituminous surfacing, concrete and brick.
HP6	0.00-0.20	Brown sandy CLAY with rootlets.
	0.20-0.30	Yellowish brown to light brown very sandy gravelly CLAY. Gravel is medium to coarse angular to subrounded flint, brick and concrete. Single brick cobble.
HP7	0.00-0.33	Brown sandy slightly gravelly CLAY with rootlets. Gravel is fine to medium subangular to subrounded flint and brick. Occasional inclusions of plastic, glass and metal fragments. A single boot.
HP8	0.00-0.33	Brown sandy slightly gravelly CLAY with rootlets and roots. Gravel is fine to medium angular to surrounded brick, flint and rare bituminous surfacing. and a shoe.
HP9	0.00-0.33	Brown sandy slightly gravelly CLAY. Gravel is fine to medium subrounded to rounded flint.
HP10	0.00-0.40	Yellowish brown clayey SAND with rootlets. Occasional inclusions of plastic.

Figure 2.1 – Extract of trial pit descriptions from Idom Merebrook Ltd site investigation report.

The above figure suggests that the surface topsoil is therefore significantly less permeable than the underlying made ground and superficial geology (present at depth). Given the relatively high

groundwater levels, and less permeable topsoil located over the permeable made ground and sand deposits, it is considered reasonable to assume that actual BFIHOST values are likely to be lower (i.e. will vary between 0.32 and 0.75).

Due to the makeup of the landfill and made ground it is not possible to quantify the actual HOST value, nonetheless, to quantify the greenfield discharge rates and volumes from the existing site a conservative approach can be adopted. This approach assumes a high BFI value for the site (0.889), which is based on the BGS data, rather than the BFI value attributed to the results of the site-specific ground investigations. Although this is not technically accurate, it does ensure that the greenfield runoff rates and volumes which have been calculated for the pre-developed site, using this method, are under-estimated (i.e. the rates would otherwise be higher if the site-specific data was applied).

2.2 Royal Military Canal Tide Lock Analysis

Basic analysis has been undertaken to determine the tidal Mean High Water Spring Tide (MHWS) within the vicinity of the site. The calculations show that the adjusted MHWS level at Folkestone is 3.43m Above Ordinance Datum Newlyn (AODN). A T2 surge (i.e. a surge with a 1 in 2 year return period) gives a value of 4.18m AODN.

As-built drawings for the outlet weir of the RMC show a plate level of 2.1m AODN. Assuming this is the level at which the RMC becomes tide locked, basic analysis indicates that during the MHWS tide the canal is tide locked for a period of 3 hours 45 minutes. During a T2 surge this period of tide locking is increased to 4 hours 45 minutes.

To assess the impact that discharging surface water runoff from the development into the RMC could have, both the existing (pre-developed) site and proposed (post-developed) site have been considered. To ensure a suitable comparison, the outfall from the canal has been assumed to be tide locked for 4 hours 45 minutes (i.e. 285 minute duration event) for both pre and post developed scenarios. This represents the T2 surge event, which probabilistically, has the potential to coincide with a design pluvial event at this location (i.e. 1 in 100 year rainfall scenario). A summary showing the Tide Lock Analysis Curve has been included within Appendix A.1.

2.3 Topography and Cross Sections

A topography survey has been undertaken on the site, which identifies that the majority of the site is relatively flat longitudinally from east to west. A series of cross sections have been drawn (from north to south) throughout the site and these cross sections can be found within Appendix A.3. The sections indicate a clear raised platform running through the centre of the site, which is likely to be attributed to the made ground over the landfill. The sections also indicate that the northern part of the site falls towards the RMC, whilst the southern part of the site falls towards Princes Parade (the road). There is a lowered section in the middle of the site, opposite the footbridge crossing the RMC, which would also direct surface water runoff towards the RMC.

The embankment to the north of the site slopes steeply at ~1:4 towards the RMC. The embankment to the south of the site slopes steeply towards the road.

2.4 Surface Water Flow Route Analysis

Based on the available topographical and Light Detection and Ranging (LiDAR) data for the site, a ground model has been constructed within the Causeway Professional Design Suite (PDS). The PDS software interpolates the ground data to build a Digital Ground Model (DGM) grid mesh layer. Utilising the DGM, a rolling ball flow analysis can be conducted which enables potential flow routes to be quantified. This process represents 'rain' falling on a specific point on the site and delineates the direction that the water will take if the ground is assumed to be fully saturated.

Figure 2.2 below shows the general flow trace lines on the northern part of the site, providing further clarification as to the general direction that surface water runoff would flow.

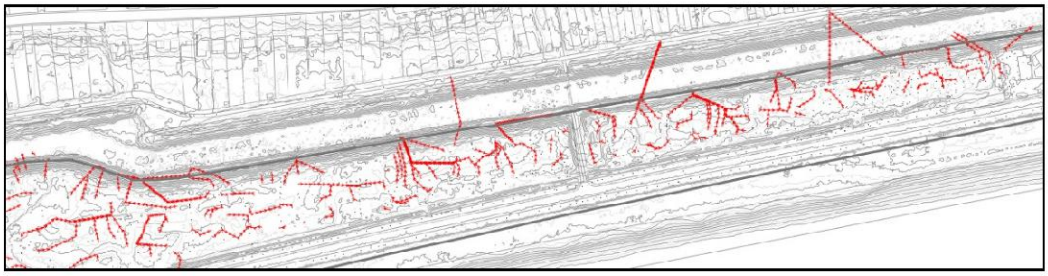

Figure 2.2 – Flow Trace lines across the site delineating flow direction.

With reference to Figure 2.2, it is evident that the flow direction is congruent with the general topography shown in the cross sections. This information suggests that when the ground is saturated, or where the ground is steeply sloped, surface water is likely to run off the surface of the site and will flow along the routes shown. In the northern part of the site, surface water currently flows northwards towards the RMC. In the southern parts of the site, water will flow towards the road.

2.5 Existing Surface Water Runoff from Undeveloped Land

From the information above, a catchment area has been derived to determine the amount of water that can currently enter the RMC. Figure 3 below shows the estimated catchment areas based on the flow route analysis and topography. This has been split into two discrete catchments (A & B respectively). Catchment A represents the undeveloped part of the site which has the potential to drain surface water into the RMC. Catchment B represents the developed area (i.e. car park and play area) which currently drains surface water into the RMC.

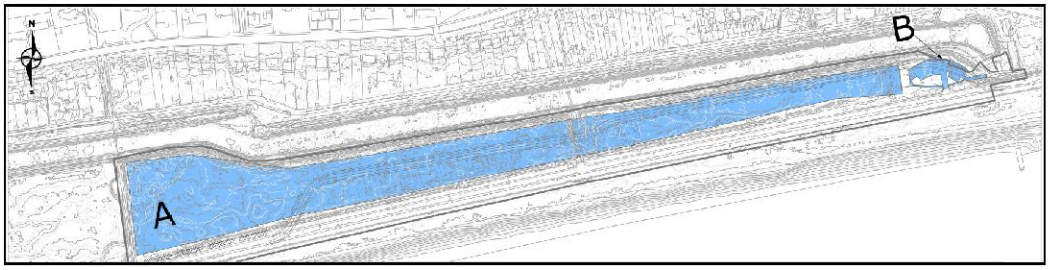

Figure 2.3 – Showing total catchment area falling towards the RMC. Undeveloped land forms part of Catchment A, developed land forms Catchment B.

Catchment Area A (comprising undeveloped land which would drain into the RMC if saturated) has been calculated as ~4.948 Hectares.

Catchment Area B (comprising developed land which drains directly into the RMC) has been calculated as 0.106 Hectares.

It is acknowledged that there are some areas within the existing site (e.g. along the canal banks), which are proposed to remain unchanged when the proposed site is developed (refer to Figure 2.4).

Figure 2.4 – Catchment area within the proposed development boundary which currently discharges into the RMC.

As the areas in Figure 2.4 will continue to discharge via the same mechanism post-development (i.e. directly into the RMC), these areas have been subtracted from Catchment Area A to determine the area which *currently* has the potential to discharge surface water runoff into the RMC, but is proposed to be developed. This catchment area measures ~2.636 Ha and is shown in Figure 2.5 below.

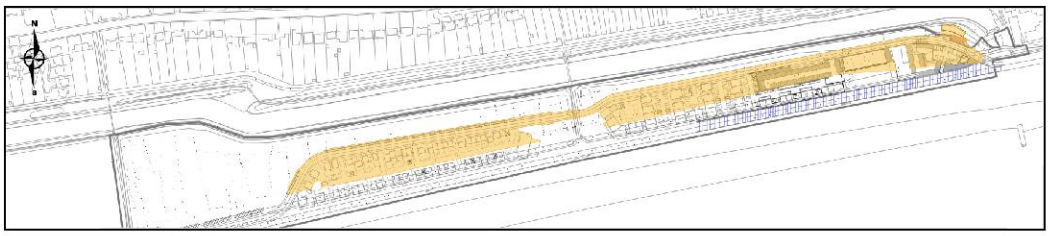

Figure 2.5 – Catchment area within the proposed development boundary which currently discharges into the RMC.

FEH13 point data has been applied to calculate both the greenfield runoff rates and volumes that are attributed to the catchment area (2.636 ha) delineated in Figure 2.5. This data includes the conservative BFIHOST value of 0.889, which does not consider the actual characteristics of the made ground (discussed in Section 2.1 of this report - which is likely to yield a lower BFIHOST value ranging between 0.32 and 0.75). To calculate the greenfield runoff rates and volumes, the SPR Host value (12.88) has been calculated using the correlation equation outlined within the IH126 report, applying both the conservative BFIHOST value (0.889) and the contributing catchment of 2.636ha. Greenfield runoff calculations have been included within Appendix A.4. of this report.

For comparison, the peak surface water runoff rates and total volumes for a pluvial event with a 285 minute duration and a 360 minute duration have been calculated for a range of return period events. These values and are shown in Table 2.1 below.

Return Period	Greenfield Surface Water Runoff Rate (BFIHOST 0.889)	Surface Water Runoff Volume (285minute)	Surface Water Runoff Volume (360minute)
1:2 year	~1.67 l/s	58.5 m^3	63 m^3
1:30 year	3.83 l/s	145 m^3	162 m^3
1:100 year	5.31 l/s	222 m^3	250 m^3

Table 2.1 – Greenfield runoff rates and volumes for the area currently draining to the RMC, that will form part of the proposed developed site.

The above figures represent the volume of surface water that can be discharged into the canal directly from the development, without having a detrimental impact. Similarly, the rate of discharge from this area has also been provided.

2.6 Surface Water Runoff from Existing Developed Land (Catchment B)

There is an existing public car park area located to the east of the site which consists of impermeable surfacing (concrete/asphalt). This existing car park currently drains informally towards the RMC, with surface water following the natural existing topography. The approximate impermeable area of the car park is 1,056m^2 and is shown in Figure 2.2 (labelled Catchment B). The runoff rates from this existing hardstanding area have been calculated using FEH13 data for a range of return period events (refer to Table 2.1). The CV value in the drainage model has been reduced to 0.6 to account for runoff draining across the neighbouring sloped embankment, thus providing a conservative estimate. The corresponding greenfield runoff volumes have also been provided in Table 2.2 for both the 240 minute and 360 minute duration events.

It should be recognised that a 240 minute duration has been applied instead of a 285 minute duration, as peak runoff rates from the 285 minute duration cannot be calculated within industry

standard software. Nevertheless, this will result in a slight *under estimate* when the existing pre-developed runoff volume is calculated.

Return Period	Surface Water Runoff Rate (FEH-13)	Surface Water Runoff Volume (240minute)	Surface Water Runoff Volume (360minute)
1:2 year	11.6 l/s	14.5 m^3	16.5 m^3
1:30 year	31.5 l/s	31.4 m^3	35.2 m^3
1:100 year	40.4 l/s	40.4 m^3	45.7 m^3

Table 2.2 – Catchment Area B runoff rates and volumes.

3 Proposed Development - Surface Water Runoff

3.1 Surface Water Management

The drainage strategy which discusses each of the different elements of the proposed scheme is set out below. This does not represent a detailed surface water drainage design; it is simply an assessment to demonstrate that the objectives and requirements of the NPPF and NTSS can be met at the planning stage, for the alternative option of discharging surface water runoff to the RMC.

Based on the current masterplan and the topography of the site, the development site has been sub-divided into five separate drainage catchments. Figure 3.1 (below) shows the location of each drainage catchment across the site.

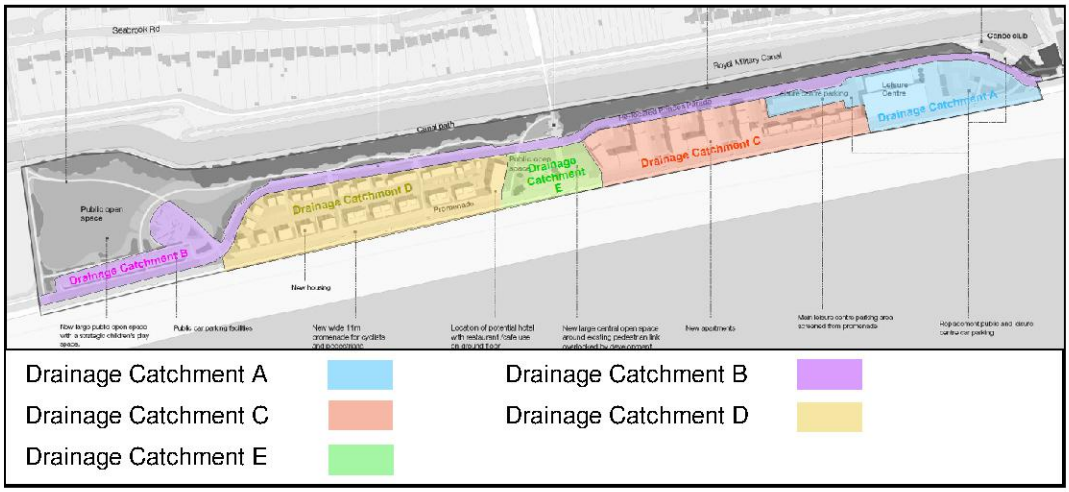

Figure 3.1 – Plan showing the drainage catchments across the site.

It is envisaged that runoff draining from the roads, buildings, and hardstanding within each of these drainage catchments will be managed within Sustainable Drainage Systems (SuDS) before being discharged at a restricted rate to the RMC.

Three separate outfalls into the canal are proposed;

- Drainage Catchments A and B will drain into the RMC via 2 separate outfall structures,
- Drainage Catchments C and D will drain into catchment E before being discharging via a single outfall into the canal.

A summary of the impermeable areas draining to SuDS within each drainage catchment is provided in Table 3.1 (below).

Drainage Catchment	Areas Draining to Drainage Catchment	Drains to	Total Impermeable Area Draining to Catchment (including a 10% allowance for urban creep)
Drainage Catchment A	Leisure centre and carpark	Royal Military Canal	0.75 ha
Drainage Catchment B	Public highway, play area, and public parking	Royal Military Canal	1.48 ha
Drainage Catchment C	Private development east	Drainage catchment E	0.92 ha
Drainage Catchment D	Private development west	Drainage catchment E	0.99 ha
Drainage Catchment E	Promenade, and public hardstanding + inflows from catchments C & D	Royal Military Canal	0.26 ha
Total			**4.4 ha**

Table 3.1 – Summary of drainage Catchments A-E.

A summary of the proposed SuDS to be used within each drainage catchment, along with calculations to confirm that the drainage system can manage the design rainfall event is provided below.

Drainage Catchment A

Runoff from the roof of the leisure centre will be discharged into permeable paving located across the carpark. The permeable paving will be laid on top of a 1m deep layer of open graded sub-base, which is proposed to be lined to ensure no interaction between any leachates and surface water. A summary of the Micro Drainage analysis for the permeable paving is shown in Table 3.2 below.

Drainage Catchment A (Leisure Centre and carpark)	**Value (1:100yr+20%cc event)**	
SuDS	Permeable Paving	
Storage Provided within	Permeable Paving	
Area draining to permeable paving (including 10% allowance for urban creep)	7,520 m^2	
Area of permeable paving	~ 4,490 m^2	
Sub-base depth	1000 mm	
Infiltration	Not Permitted Lined System (due to contamination)	
Flow control device	Orifice plate (30mm diameter)	
Discharges too	Royal Military Canal	
Maximum depth of water above base of the drainage system.	711 mm	
Overflow control device	Pipe set at 800mm above the base of the permeable paving, (overflows to beach)	
Critical storm duration	2880 minutes	
Return Period	**Half drain time**	**Peak discharge rate**
1 in 2yr+cc	3964 minutes	1.0 l/s
1 in 30yr+cc	4992 minutes	1.3 l/s
1 in 100yr+cc	6003 minutes	1.6 l/s

Table 3.2 – Summary of Micro Drainage analysis for Drainage Catchment A.

Drainage Catchment B

Runoff from the new trunk road, public parking areas, and play area will be drained into a swale. This swale will convey surface water runoff across the site to and discharge into a large pond. The pond will be designed to manage runoff from the design rainfall event before it is discharged via a vortex flow control device (Hydro-Brake or similar) into the RMC. To maximise the available amenity space, the pond and surrounding area will be terraced to keep low volumes of runoff from small storms within the permanently wet portion of the pond. It is envisaged that the final pond design will accommodate areas where water depths will be greater, however these areas would not be expected to be wet on a regular basis. A suitable pond profile and planting scheme will need to be specified such that "bogs" are not created (refer to Figure 3.2 below).

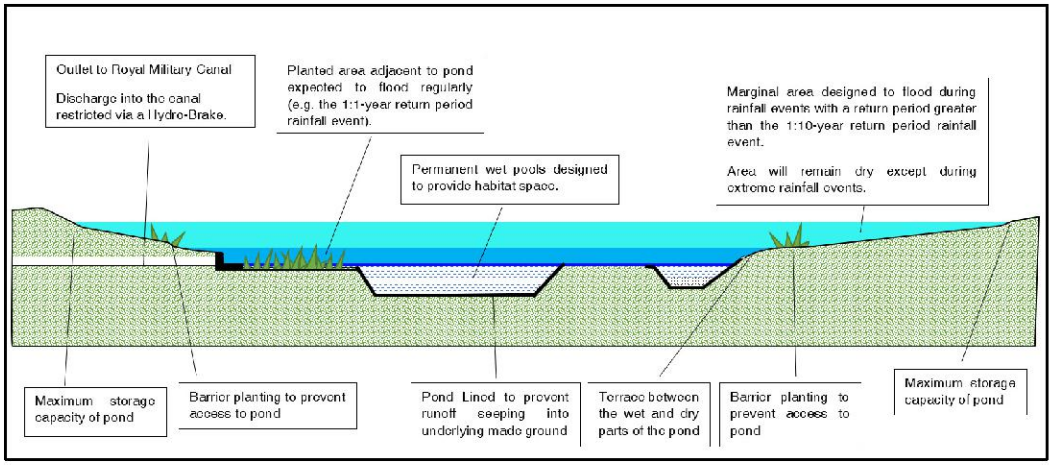

Figure 3.2 – Indicative sketch showing the profile of pond (outline design only).

A summary of the Micro Drainage analysis for Drainage Catchment B is shown in Table 3.3 below.

Drainage Catchment B (public highway, parking and play area)	**Value (1:100yr+20%cc event)**
SuDS	Swale and Pond
Storage Provided within	Pond
Area draining to permeable paving (including 10% allowance for urban creep)	14,840 m^2
Area of pond	~ 5,000 m^2
Active storage depth within pond	~ 1 m
Infiltration	Not Permitted, Lined System (due to contamination)
Flow control device	Hydro-Brake
Limiting Discharge Rate	2.0l/s
Overflow control device	200mm wide weir with crest level at 960mm above normal water level within pond. Overflows to the Royal Military Canal
Critical storm duration	5,760 minutes

Return Period	**Depth of water**	**Peak discharge rate**
1 in 2yr+cc	486 mm	1.7 l/s
1 in 30yr+cc	696 mm	1.7 l/s
1 in 100yr+cc	862 mm	1.9 l/s

Table 3.3 – Summary of Micro Drainage analysis for Drainage Catchment B.

Drainage Catchment C

Runoff from the roofs of the dwellings can be drained into a lined permeable paving system, located across the driveways and parking areas, before discharging into a lined underground storage tank. The storage tank will discharge surface water runoff at a restricted rate into a second storage tank located in Drainage Catchment E (discussed below). It is envisaged that the primary storage tank can be located underneath the existing road, thus limiting the removal of any contaminated land and providing easy access for future maintenance.

A summary of the Micro Drainage analysis for Drainage Catchment C is shown in Table 3.4 below.

Drainage Catchment C (East part of the private housing development)	**Value (1:100yr+20%cc event)**	
SuDS	Permeable Paving and Underground Storage	
Storage Provided within	Underground Storage	
Area draining to permeable paving (including 10% allowance for urban creep)	9,160 m^2	
Assumed dimensions of underground storage	~ 1,000 m^2 x 1.5m (deep)	
Infiltration	Not Permitted, Lined System (due to contamination)	
Flow control device	Hydro-Brake	
Limiting Discharge Rate	2.0l/s	
Discharges into	Drainage Catchment E	
Overflow control	Pipe located ~1.3m above the base of the storage tank (discharges to beach)	
Critical storm duration	2,880 minutes	
Return Period	**Half Drain Time**	**Peak discharge rate**
1 in 2yr+cc	3736 Minutes	1.3 l/s
1 in 30yr+cc	4320 Minutes	1.5 l/s
1 in 100yr+cc	6397 Minutes	1.8 l/s

Table 3.4 – Summary of Micro Drainage analysis for Drainage Catchment C.

Drainage Catchment D

Runoff from the roofs of the dwellings can be drained into a lined permeable paving system located across the driveways and parking areas. This permeable paving will drain into a lined underground storage tank, designed to store surface water runoff before discharging at a restricted rate into a second storage tank located in Drainage Catchment E (discussed below). It is envisaged that the primary storage tank can be located underneath the existing road, thus limiting the removal of any contaminated land and providing easy access for future maintenance.

A summary of the Micro Drainage analysis for Drainage Catchment D is shown in Table 3.5 below.

Drainage Catchment D (West part of the private housing development)	**Value (1:100yr+20%cc event)**	
SuDS	Permeable Paving and Underground Storage	
Storage Provided within	Underground Storage	
Area draining to permeable paving (including 10% allowance for urban creep)	9860 m^2	
Assumed dimensions of underground storage	~ 1000 m^2 x 1.5m (deep)	
Infiltration	Not Permitted, Lined System (due to contamination)	
Flow control device	Hydro-Brake	
Limiting Discharge Rate	2.0l/s	
Discharges into	Drainage Catchment E	
Overflow control	Pipe located ~1.4m above the base of the storage tank (discharges to beach)	
Critical storm duration	2880 minutes	
Return Period	**Half Drain Time**	**Peak discharge rate**
1 in 2yr+cc	4050 Minutes	1.3 l/s
1 in 30yr+cc	5467 Minutes	1.6 l/s
1 in 100yr+cc	6675 Minutes	1.9 l/s

Table 3.5 – Summary of Micro Drainage analysis for Drainage Catchment D.

Drainage Catchment E

Runoff from the communal hardstanding areas will be drained directly to a lined underground storage tank located beneath the central area of public open space. Runoff exiting the storage tanks within Drainage Catchment C and Drainage Catchment D will also be drained into this storage tank at an attenuated rate. To provide additional storage, the area above the storage tank will be landscaped to form an above ground detention basin, which can be designed to flood during *extreme* rainfall events. An overflow can be installed to allow excess water to be directed towards the beach if the detention basin reaches maximum capacity. A summary of the Micro Drainage analysis for Drainage Catchment E is shown in Table 3.6 below.

Drainage Catchment C (East part of the private housing development)	**Value (1:100yr+20%cc event)**
SuDS	Underground Storage and overlying detention basin.
Storage Provided within	Underground Storage
Area draining to permeable paving (including 10% allowance for urban creep)	2,590 m^2
Assumed dimensions of underground storage	~ 800 m^2 x 0.5m (deep)
Assumed dimensions of overlying detention basin	~ 1,000 m^2 x 0.5m (deep)
Infiltration	Not Permitted (due to contamination)
Flow control device (invert level 500mm below base of storage tank)	Orifice plate (41mm diameter)
Discharges into	Royal Military Canal
Overflow control device	Minimum 300mm diameter, pipe just below the top of the detention basin, (discharges to the beach).
Critical storm duration	4,320 minutes
Return Period	**Peak discharge rate**
1 in 2yr+cc	2.7 l/s
1 in 30yr+cc	3.2 l/s
1 in 100yr+cc	4.3 l/s

Table 3.6 – Summary of Micro Drainage analysis for Drainage Catchment D.

General Considerations

Runoff from the new promenade, which will replace the existing road, will be drained directly to the beach. This will prevent saltwater from entering the drainage system and thus reaching the RMC. The current road discharges unattenuated to the beach through a series of road drains (refer to Figure 3.3) and currently there are no pollution control measures, resulting in hydrocarbons being washed onto the beach. There will be no public vehicular access along the seafront and as such, any surface water discharged to the beach from the new area of promenade will be uncontaminated.

Figure 3.3 – Existing road drainage along Princes Parade.

With respect to the proposed surface water storage system (e.g. permeable paving, cellular storage etc.), it should be recognised that these systems provide attenuation for peak flow events and do not generally hold standing water. Consequently, these systems are not cleaned with chemicals and as such, present no risk to receiving watercourse (i.e. the RMC).

3.2 Indicative Drainage Layout Plan

An indicative drainage layout plan delineating how the proposed SuDS can be incorporated into the scheme proposals is located in Appendix A.6 of this report.

3.3 Proposed Surface Water Runoff Discharge Rates

It is proposed to provide 3 separate outfalls into the RMC. The first is at the proposed leisure centre, located to the east of the site, where water will be discharged directly from the permeable paving system. The second outfall will be located in the centre of the development, connecting the central storage tank to the RMC. The final outfall will be located to the west of the site, connecting the green space to the RMC. All of the proposed outfalls are likely to comprise a single pipe connected to a flow control device, ensuring the rate of discharge is both restricted and controlled.

The proposed discharge rates which are based on the above drainage strategy are summarised in Table 3.7 below:

Return Period	Leisure Centre	Residential	Highway	Combined Total
1:2 year + 20%	0.9 l/s	2.7 l/s	1.7 l/s	5.3 l/s
1:30 year +20%	1.3 l/s	3.2 l/s	1.7 l/s	6.2 l/s
1:100 year +20%	1.6 l/s	4.3 l/s	1.9 l/s	7.8 l/s

Table 3.7 – Runoff rates from the proposed development for each outfall.

The proposed surface water discharge rates have been compared to the existing surface water run off rates derived in Section 2 of this report (i.e. Table 2.0 and 2.1), for a range of return period events. The rates have been summarised in Table 3.8 below.

Return Period	Pre-development runoff rate	Proposed Development (with 20% cc) runoff rate	Betterment
1:2 year	13.0 l/s	5.3 l/s	60%
1:30 year	35.3 l/s	6.2 l/s	82%
1:100 year	45.7 l/s	7.8 l/s	83%

Table 3.8 – Comparison between pre and post development runoff rates.

The figures in Table 3.8 above demonstrate that with SuDS included within the proposed development, it is possible to restrict the discharge of surface water runoff into the RMC. In particular, under the design event (1 in 100 year return period event, including a 20% allowance for 100 years of climate change), it is evident that there is a significant reduction in the peak rate at which surface water runoff is discharged offsite when compared to the existing situation.

3.4 Proposed Surface Water Runoff Discharge Volume

An assessment has been made to determine the volume of water entering the RMC from the developed site, for two rainfall events with different durations (i.e. the 360 minute 'design event' and a 285 minute event). The latter event takes into consideration the entire period in which the RMC could be tide locked. A conservative estimate has been made when calculating the post development volume of runoff discharged to the RMC, by assuming that the flow restriction devices are discharging at the maximum rate for the entire duration of the storm event.

Table 3.9 below summarises the total volume of surface water discharged from the proposed development site during both scenarios.

Return Period	Post-development Total Volume (285min event)	Post-development Total Volume (360min event)
1:2 year + 20% cc	91m³	114 m³
1:30 year + 20% cc	106 m³	134 m³
1:100 year + 20%cc	133 m³	168 m³

Table 3.9 – Post development discharge volumes generated for rainfall events with a 285 minute and 360 minute duration, for a range of return period events. All calculations include a 20% increase in peak rainfall intensity to account for climate change.

A summary table comparing the total volume of runoff discharged into the RMC for both the pre and post developed scenarios, for a range of return period events, is provided in Table 3.10 (below).

Return Period	285min (total volume discharged to the canal)			360min (total volume discharged to the canal)		
	Existing (greenfield)	Proposed	Difference	Existing (greenfield)	Proposed	Difference
1:2 year + 20% cc	73 m³	91m³	18 m³ (increase)	80 m³	114 m³	<35 m³ (increase)
1:30 year + 20% cc	176 m³	106 m³	70 m³ (decrease)	197 m³	134 m³	63 m³ (decrease)
1:100 year + 20%cc	262 m³	133 m³	129 m³ (decrease)	296 m³	168 m³	128 m³ (decrease)

Table 3.10 – Showing approximate discharge volumes for a range of return periods (both pre and post development.

From Table 3.10 above it is evident that under the design flood event (i.e. the 1 in 100 year event including an allowance for 100 years of climate change), less water will be discharged into the RMC during the time over which the RMC is assumed to be tide locked (refer to Section 2.2). Furthermore, during the 360 minute design event, the volume of water discharged offsite has been reduced when compared to the pre-developed situation.

The exception to this is under the 1 in 2 year event, where the estimated volume discharged from the proposed development to the RMC is shown to increase by less than 35m³. However considering the number of conservative assumptions that have been made to derive this figure, it is recognised that this number is likely to be significantly lower, and in reality is unlikely to result in an increase.

Notwithstanding this, even if this small volume increase was assumed to be the 'worst case scenario', when compared to the overall size of the canal from West Hythe to Seabrook, it is evident that this volume of water would equate to an increase in the water level of less than 1cm during the design event, or tide lock scenario. Given the existing freeboard within the RMC is greater than 1cm, this small increase in water level is very unlikely to increase the risk of flooding offsite. Furthermore, given the proposed development would significantly reduce the volume of water discharged to the RMC during higher return period events, the benefits of the development significantly outweigh any marginal increase in water level (i.e. less than 1cm) under low return period events.

On balance, taking the above into consideration, it is evident that the drainage proposals will not increase the risk of flooding within the RMC during the design rainfall event, even when the RMC is tide locked during the design storm.

3.5 Drain Down Times and Long-Term Performance

Under the design rainfall event, the calculations show that the proposed drainage system would not have an adverse impact on the development site, or the RMC. Nonetheless, to achieve this, a low limiting discharge rate has been used for each of the flow control devices specified within the drainage network. These very low discharge rates result in slow drain down times for each of the SuDS, which as a result could make the drainage system susceptible to flooding during either; long duration (low intensity) rainfall events, or from multiple back to back storms. The performance of the proposed drainage system during both of these scenarios has therefore been assessed to ensure that there will be no increased risk of flooding to the RMC, or to the proposed development.

The critical storm duration defines the event where the drainage system is most susceptible to flooding. Therefore, by ensuring that the system is designed to function under the critical storm duration, it will by default ensure that the system will not flood during a storm event which has either a longer, or shorter duration.

Table 3.11 below shows each of the proposed SuDS, alongside the critical storm duration for the design event (i.e. an event with a 1 in 100 year return period).

Drainage Catchment	SuDS	Critical Storm Duration (minutes)
A	Permeable Paving	2880
B	Pond	5760
C	Underground Storage	2880
D	Underground Storage	2880
E	Underground Storage and Detention basin	4320

Table 3.11 – Critical storm durations for each of the proposed SuDS during the design rainfall event.

In addition to assessing the response of the drainage system during the critical storm event, a further sensitivity test has been undertaken to determine the impact of back to back rainfall events, e.g. the design rainfall event (1:100 year return period rainfall event, including climate change), followed by a 1:10 year return period rainfall event. The Susdrain and CIRIA factsheet *"Assessing attenuation storage volumes for SuDS"*, questions the appropriateness of meeting 24 hour half drain times when long term storage for stormwater is provided. This factsheet suggests that a more appropriate solution could be to ensure that 24 hours after the design rainfall event, there is room within the drainage system to accommodate a subsequent 1:10 year event. This combination has therefore been selected to represent a realistic back to back rainfall scenario, albeit the probability of such extreme events coinciding is considered to be very low.

A summary of this analysis is provided in Table 3.12 (below).

SuDS	Max water level without overflow control (mm)	Max water level with overflow control (mm)	Volume overflowing drainage system (m^3)	Overflow discharge location
Permeable Paving (leisure centre)	984	960	155	Beach
Pond (highway & hardstanding)	954	954 (water level does not reach crest level of overflow weir)	0	RMC
Underground Storage (East)	1400	1394	44	Beach
Underground Storage (West)	1453	1452	12	Beach
Detention basin	N/A basin overflows	1414	1037	Beach

Table 3.12 – Summary of SuDS performance during the critical 1:100+cc event, combined with a 1:10 year rainfall event (60 minute duration).

From the above calculations it is evident that by oversizing the proposed SuDS, and by incorporating independent overflows within each of the proposed SuDS, there is a solution available which will ensures that no additional volume of water will be discharged to the RMC. Once the overflow is activated, any additional surface water can, in most cases, be directed onto the beach, or stored safely on site.

3.6 Additional and Alternative Opportunities for Reducing Drain Down Times

An alternative option to increasing the volume of storage provided onsite (to accommodate the additional runoff generated during back to back rainfall events), would be to increase the discharge rates to the RMC. However, it is recognised that the rate of discharge to the RMC should only be increased when the water levels within the RMC are low and flooding is unlikely to occur. This

approach allows any additional water to be discharged to the sea without having any detrimental impact to the RMC and the surrounding area.

The increase discharge rates could be achieved by incorporating mechanical float valves, or actuated valves into the flow control system for the development. These devices would change the rate at which runoff can be discharged offsite based on the water level within the RMC, only allowing more water to be discharged offsite when this approach is unlikely to present a risk of flooding.

A similar, but alternative option to a mechanical system, is to use a telemetry based system. This type of system enables the flow rates into the RMC to be controlled remotely, based on weather forecasting (i.e. closing the outlets when a storm event is predicted, thus reducing the risk of flooding to the RMC).

If the development site is prevented from discharging surface water to the RMC, the SuDS would begin to store water onsite. A sensitivity test has been undertaken to determine the maximum length of time the site could be prevented from discharging to the RMC, before the SuDS reach maximum capacity. The calculations show that there is sufficient room available within the development to store water for 12 hours, before any overflow is activated. This water can be stored safely onsite, without increasing the risk of flooding to the new properties or surrounding area. (Refer to Section 3.8 for more details). Consequently, it is evident that there is more than sufficient time for the water level within the RMC to drop, before the site is required to discharge to the RMC.

3.7 Maintenance and Management

For any surface water drainage system to operate as originally designed, it is necessary to ensure that it is adequately maintained throughout its lifetime. This can be achieved by undertaking routine inspection and maintenance of the drainage system, including all outlet and overflow controls. Any manufacturer specific requirements should also be taken into consideration.

In this case, a regulated specialist management and maintenance company will be appointed to ensure maintenance is carried out regularly and to the appropriate standards, to ensure that there is no risk of flooding to the development site or to offsite properties.

3.8 Residual Risk

When considering residual risk it is necessary to consider the impact of a flood event that exceeds the design event, or the implications if the proposed drainage system becomes blocked/fails.

The underground storage systems, detention basin and permeable paving all include an overflow system, designed to discharge excess runoff through the seawall and onto the beach, thus minimising the risk of additional water entering the RMC.

For the pond system an overflow into the beach is not considered viable, due to the lower land levels to the north west of the site where the pond is located. Consequently, an overflow weir into the RMC has been specified to control the rate at which additional runoff is discharged. However, it should be recognised that significant additional storage has been included within the public open

space to store a back to back rainfall event and as such, during an exceedance or blockage scenario this additional storage will become active. This will provide a visual warning in the event that the outlet has become blocked and will enable the problem to be rectified, without increasing the risk to the RMC.

Figure 3.4 (below) delineates the proposed overflow control systems and shows where additional runoff can be discharged offsite in the event of a blockage, or during a storm event which exceeds the design parameters for the proposed drainage system.

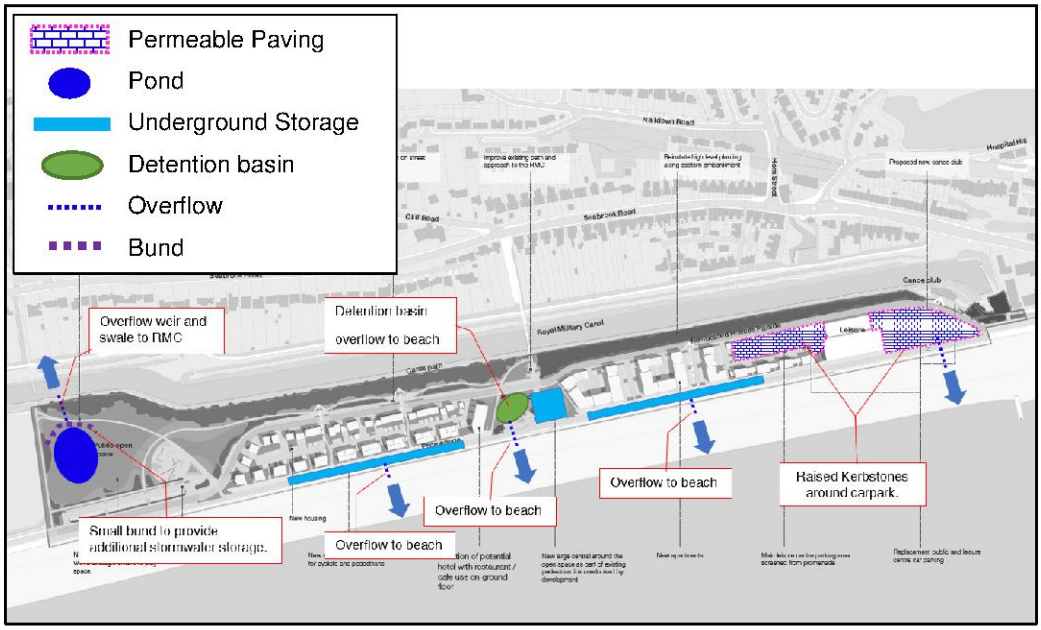

Figure 3.4 – Plan showing proposed SuDS and overflow control systems.

In addition to the overflow control systems, additional measures can also be used to further reduce the volume of water discharged offsite, either to the beach or to the RMC.

One option could be to use raised kerbstones and reprofile the land levels around the permeable car parking areas, allowing water to pond to a shallow depth above the surface of the carpark. Calculations suggest that 100mm of flooding across the entire carpark area will provide storage for an additional 450m^3 of water. Similarly, a small bund could also be located to the north of the pond, where land levels are lower. By incorporating this bund within the landscaping of the public open space it will be possible to store a large amount of additional stormwater, prevented it from entering the RMC.

3.9 Water Quality

Given the significant importance of the RMC with respect to ecology and biodiversity, it is evident that the risk of the development polluting the RMC needs to be considered. The pollution hazard indices for each part of the proposed development has been calculated using CIRIA C753 and the results of this analysis are summarised in Table 3.11 below. These values have been compared with the mitigation index for proposed SuDS at this site.

Parameter		Total suspended solids (TSS)	Metals	Hydro-Carbons
Leisure centre and carpark (permeable paving)	Pollution Hazard Index (4)	0.7	0.6	0.7
	Mitigation Index from permeable paving	0.7	0.6	0.7
Access road play area and public parking (Swale and Pond)	Pollution Hazard Index (5)	5	0.8	0.8
	Mitigation Index from swale and pond	0.85	0.95	0.85
Private dwellings parking and access (permeable paving and underground storage)	Pollution Hazard Index (3)	0.5	0.4	0.4
	Mitigation Index for permeable paving (underground storage provides no treatment)	0.7	0.6	0.7

Table 3.11 – CIRIA C753 simple index approach to water quality management.

With reference to Table 3.11 (above), the simple index approach to water quality management has been applied for each of the drainage catchments. Providing the SuDS outlined in the proposed strategy are adopted and designed in accordance with best practice (as outlined within CIRIA C753), it is evident that the pollution hazard index is considered acceptable.

The drainage system should be designed to capture the first 5mm rainfall event, which will ensure that any pollutants (such as surface hydrocarbons from the road, for example) are not discharged into the RMC. In addition, sediment traps and pollution control features (such as oil interceptors) can be specified as part of the detailed drainage design to ensure any unexpected pollution can be contained on site and prevented from reaching the RMC.

3.10 Environmental Permit for Flood Risk Activities (FRAP)

The RMC is designated as a Main River and as such, any discharge to this watercourse will require an environmental permit and agreement from the Environment Agency. Typically, a permit is required for the following reasons if work is to be carried out:

- in, under, over or near a main river (including where the river is in a culvert),
- on or near a flood defence on a main river,
- in the flood plain of a main river,
- on or near a sea defence.

It is recommended that the EA are consulted regarding the requirements for permitting at the detailed design stage.

4 Conclusions and Recommendations

The overarching objective of this report is to appraise the suitability of discharging the proposed development into the Royal Military Canal (RMC). This report provides additional details to supplement the Flood Risk Assessment and drainage strategy, submitted within Technical Annex 4 dated August 2017.

The original assessment acknowledges that the preferred method of discharging surface water runoff from the development is via a connection to the sea (in accordance with S1 of the NTSS). Although these conclusions are still valid, this assessment has been prepared on the assumption that a connection to the sea will not be viable and therefore, presents an alternative solution for draining the site in a sustainable way.

The runoff rates and the volume of surface water discharged from the existing site have been calculated, taking account of the sub-catchments within the development site. The results from a rolling ball analysis, site investigations, and hydrological data have all be used in this process to provide a baseline against which to compare the post development impacts.

The findings from the analysis show that by restricting the peak rate at which surface water is discharged from the development site, the risk of flooding will not increase. Whilst it is acknowledged that the total volume of runoff discharged from the development will be increased when compared to the exiting pre-developed conditions, under normal conditions there will be no detrimental impact to the RMC, or to the surrounding area. This is due to the flow restrictions placed on the three outfalls from the proposed development, which will limit the rate and safely control the volume of surface water runoff discharged from the development site.

The primary risk of flooding to the surrounding area is during the period when the RMC is at full capacity, during which period, discharging any additional volume of water to the RMC has the potential to exacerbate the risk of flooding. In response, several sensitivity tests have been undertaken to appraise the impact that the development could have when the RMC is tide locked. The results show that under a tide locked scenario, the development will discharge a lower volume of water into the RMC for the period at which the system is sealed and consequently, the development will have no detrimental impact under this scenario.

Notwithstanding this, it is recognised that the precautionary approach adopted to restrict the offsite discharge volumes has resulted in high half drain times and therefore, in the event that back to back storm events were to occur it is important to ensure that the risk of the drainage system flooding is not increased. Consequently, additional testing has been undertaken to confirm whether the redundant storage within the drainage system is sufficient to protect both the development and the RMC from flooding. The analysis shows that during a back to back storm event, parts of the site are susceptible to flooding, however, the depth of flooding can be managed appropriately.

The analysis also shows that during such an event, the drainage system can hold all of the surface water generated for up to 12 hours on site, without the requirement to discharge to the RMC. By including a series of overflows into the drainage system, additional flows can be directed onto the beach, further reducing the pressure on the RMC.

Alternative options including the use of telemetry, actuated values and float values have also been considered and may present a complementary solution to the final design.

In addition to the discharge rates and volumes, pollution control measures have been considered as part of the drainage strategy. It is evident that by incorporating a variety of SuDS within the development, the risk of pollutants entering the RMC can be minimised.

In conclusion, this report demonstrates that there is a drainage solution that will enable surface water runoff from the development at Princes Parade to be discharged into the RMC, as an alternative and sustainable solution for draining the site, and one which will not increase the risk of flooding.

5 Appendices

Appendix A.1 – Royal Military Canal – Tide Lock Analysis

Appendix A.2 – Catchment Area Drawing

Appendix A.3 – Topographical Sections

Appendix A.4 – Greenfield Runoff Calculations

Appendix A.5 – Surface Water Runoff Calculations & Drawings

Appendix A.6 – Indicative Drainage Layout

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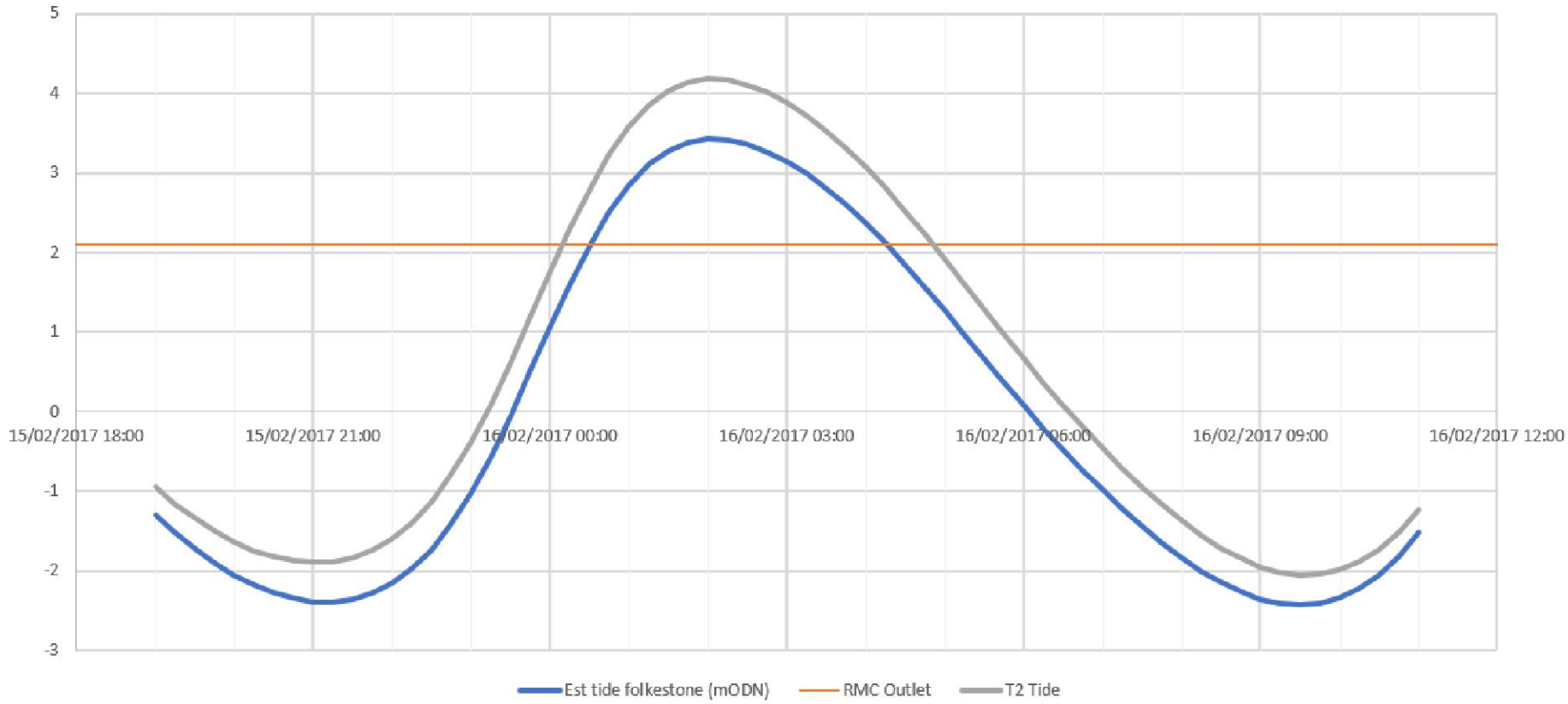
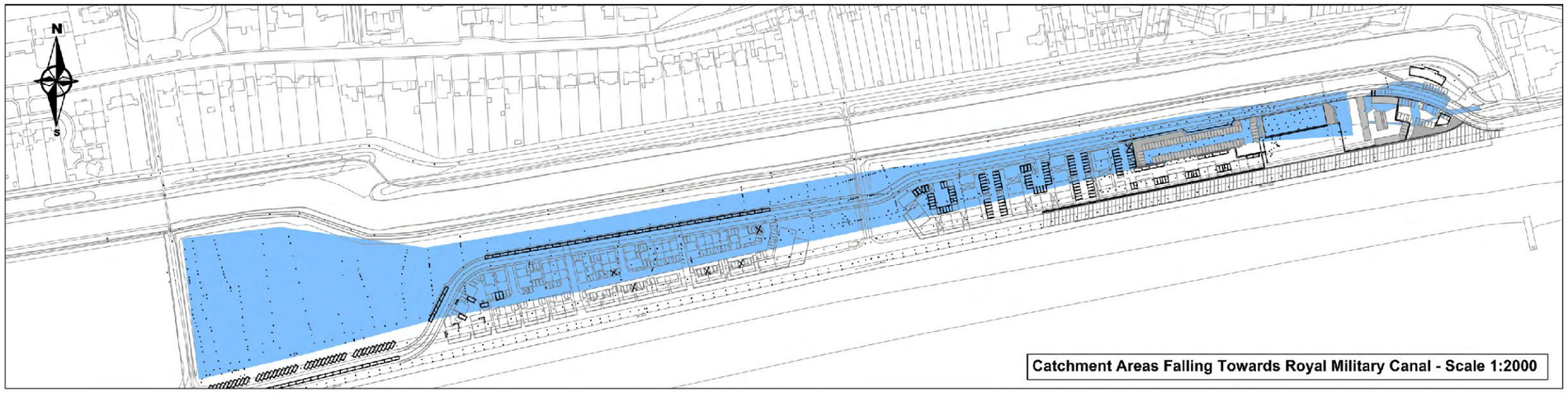
Appendix A.1 – Royal Military Canal – Tide Lock Analysis

Royal Military Canal - Tide Lock Analysis

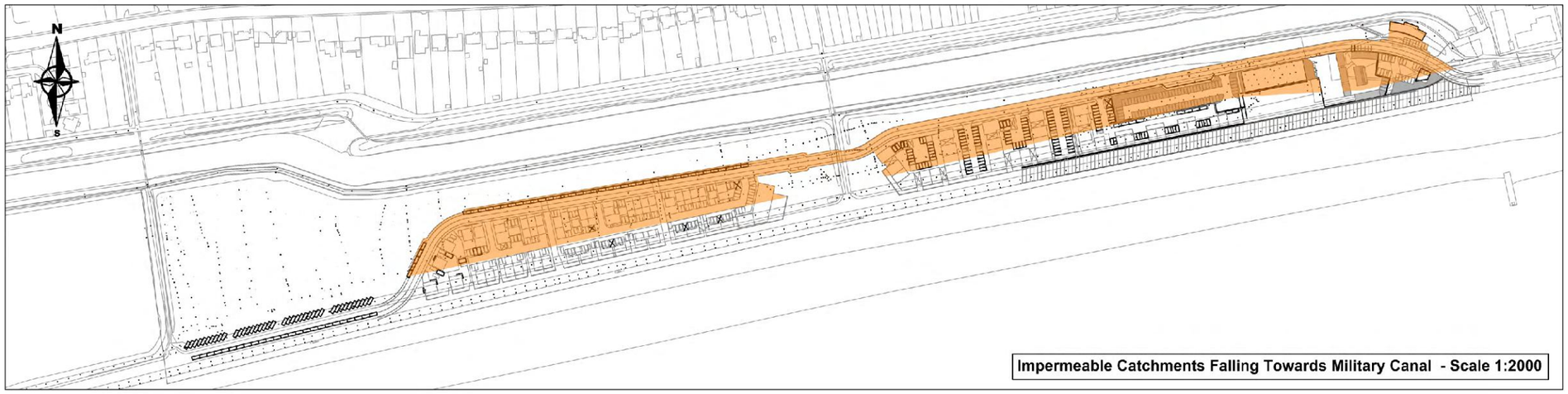


	MHWS tide	T2 surge tide
Exceedance time	03:45:00	04:45:00

Appendix A.2 – Catchment Area Drawing



Catchment Areas Falling Towards Royal Military Canal - Scale 1:2000



Impermeable Catchments Falling Towards Military Canal - Scale 1:2000

Flow Trace Showing Localized Flow Routes - Scale 1:2000

Notes

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2. All dimensions are in metres unless otherwise stated elsewhere.
3. Proposed drainage positions will be subject to detailed design.
4. The size and extent of the pond will be subject to infiltration testing and trial holes.
5. All drainage systems will need to be installed and designed for suitable loading requirements.

Key

- Flow Path
- Catchment Area (49475m^2)
- Impermeable Catchment Area (26359m^2)

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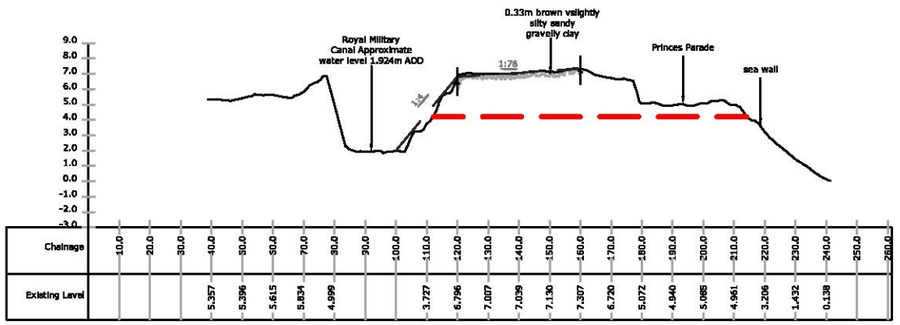
1:1000	1494	LA	SJB

DWG REF: Long Section H-J

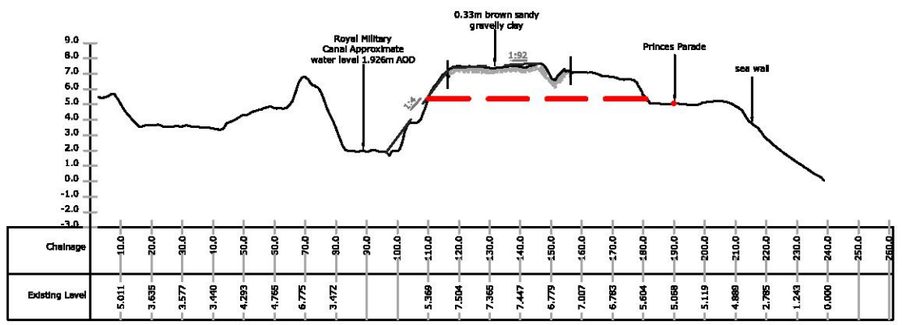
DWG No.: 1494-0003

Appendix A.3 – Topographical Sections

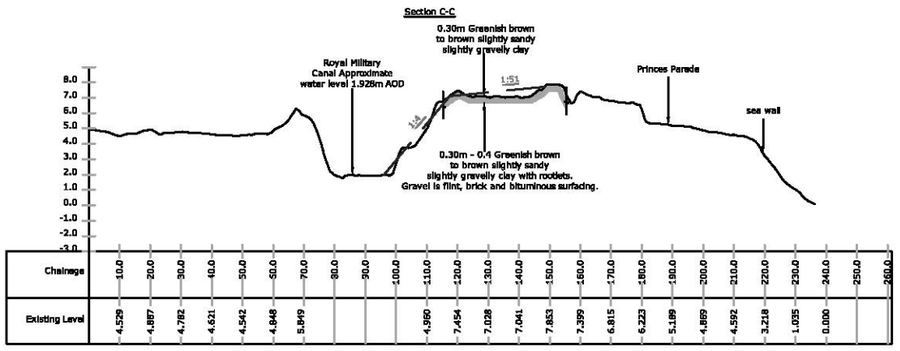
Section A-A



Section B-B



Section C-C



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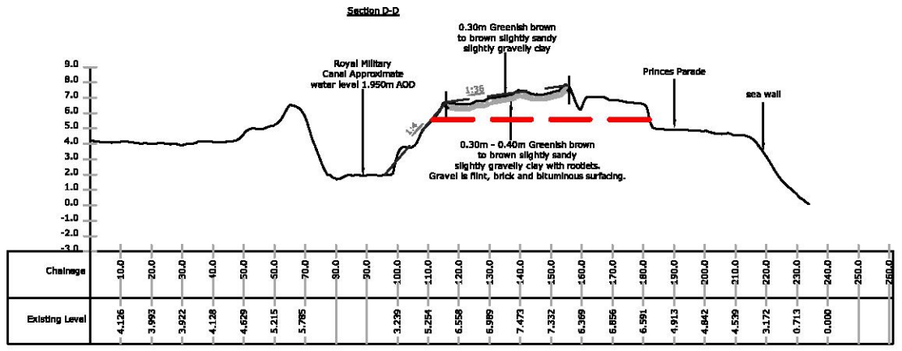

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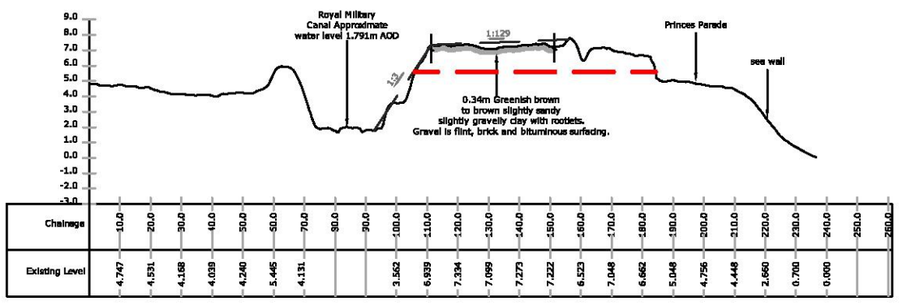

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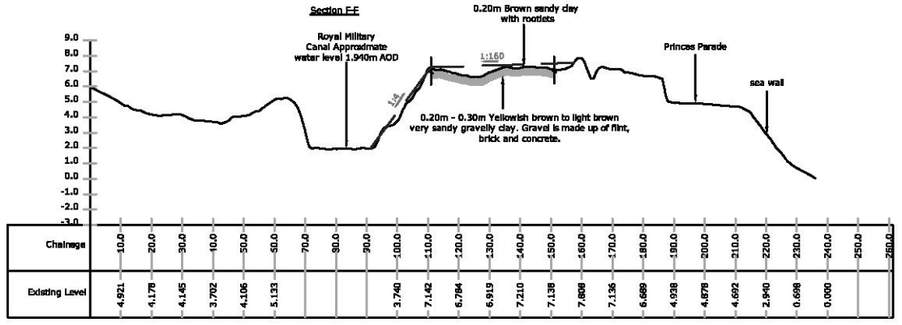
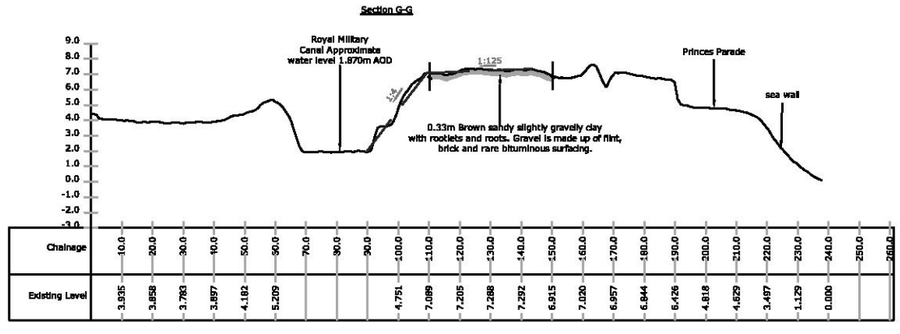
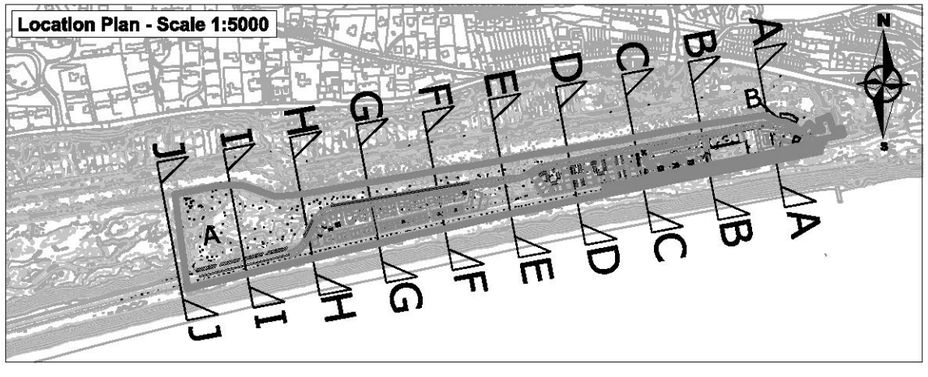


Section G-G



Location Plan - Scale 1:5000



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Key

Made Ground Level

Average Gradient 1:XX

Average Gradient line taken

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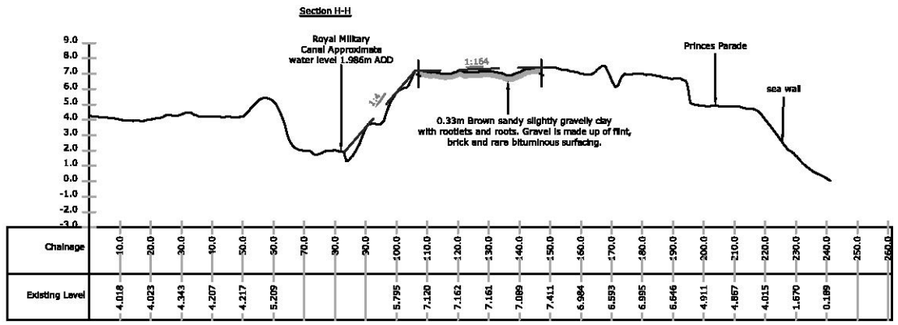
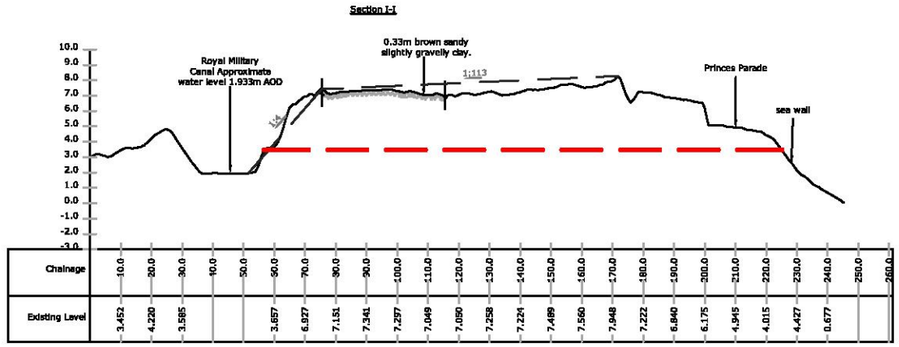
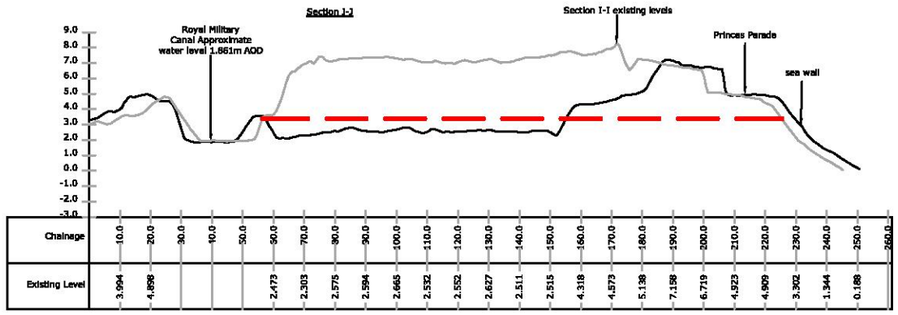
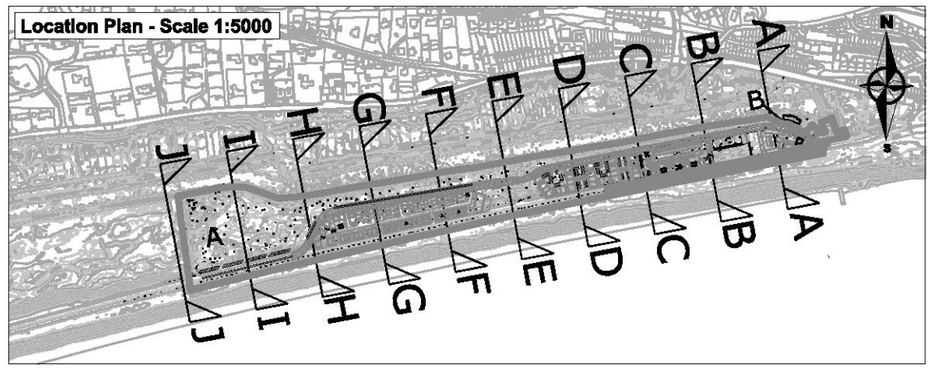
DWG No.: 1494-0002









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Appendix A.6 – Indicative Drainage Layout

Appendix A.4 – Greenfield Runoff Calculations

HR Wallingford
Working with water

Greenfield runoff estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Bradley Whittaker
Site name:	Princes Parade
Site location:	Hythe

This is an estimation of the greenfield runoff rate limits that are needed to meet normal best practice criteria in line with Environment Agency guidance "Preliminary rainfall runoff management for developments", W5-074/A/TR1/1 rev. E (2012) and the SuDS Manual, C753 (Ciria, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site coordinates

Latitude:	51.07092° N
Longitude:	1.11443° E

Reference:	6422713
Date:	2018-08-30T16:11:51

Methodology	FEH Statistical

Site characteristics

Total site area (ha)	2.6359

Methodology

Qmed estimation method	Calculate from BFI and SAAR
BFI and SPR estimation method	Specify BFI manually
HOST class	N/A
BFI / BFIHOST	0.889
Qmed (l/s)	NaN
Qbar / Qmed Conversion Factor	1.14

Hydrological characteristics

	Default	Edited
SAAR (mm)	700	700
Hydrological region	7	7
Growth curve factor: 1 year	0.85	0.85
Growth curve factor: 30 year	2.3	2.3
Growth curve factor: 100 year	3.19	3.19

Notes:

(1) Is Q_{BAR} < 2.0 l/s/ha?

Normally limiting discharge rates which are less than 2.0 l/s/ha are set at 2.0 l/s/ha.

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consents are usually set at 5.0l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set in which case blockage work must be addressed by using appropriate drainage elements

(3) Is SPR/SPRHOST ≤ 0.3?

Greenfield runoff rates

	Default	Edited
Qbar (l/s)	NaN	1.67
1 in 1 year (l/s)	NaN	1.42
1 in 30 years (l/s)	NaN	3.83
1 in 100 years (l/s)	NaN	5.31

Greenfield Runoff Volume

FEH Data

Return Period (years)	100
Storm Duration (mins)	360
FEH Rainfall Version	2013
Site Location	GB 618329 134790
Data Type	Point
Areal Reduction Factor	0.99
Area (ha)	2.636
SAAR (mm)	716
CWI	107.065
SPR Host	12.880
URBEXT (1990)	0.0000

Results

Percentage Runoff (%)	13.43
Greenfield Runoff Volume (m^3)	250.535

Greenfield Runoff Volume

FEH Data

Return Period (years)	30
Storm Duration (mins)	360
FEH Rainfall Version	2013
Site Location	GB 618329 134790
Data Type	Point
Areal Reduction Factor	0.99
Area (ha)	2.636
SAAR (mm)	716
CWI	107.065
SPR Host	12.880
URBEXT (1990)	0.0000

Results

Percentage Runoff (%)	11.35
Greenfield Runoff Volume (m^3)	161.851

Greenfield Runoff Volume

FEH Data

Return Period (years)	2
Storm Duration (mins)	360
FEH Rainfall Version	2013
Site Location	GB 618329 134790
Data Type	Point
Areal Reduction Factor	0.99
Area (ha)	2.636
SAAR (mm)	716
CWI	107.065
SPR Host	12.880
URBEXT (1990)	0.0000

Results

Percentage Runoff (%)	8.40
Greenfield Runoff Volume (m^3)	62.999

Drainage Design Report

Flow+

v7.0

Network	Storm Network
Filename	S:\LIVE Project Files\1494 - Princes Parade, Hythe - MEET\SS Data\1 Pre VS post analysis 14_09_2018\Existing Discharge Rates Causeway\1494 - Existing Impermeable Areas.pfd
Username	Stephen Hayward (stephen@herringtonconsulting.co.uk)
Last analysed	13/09/2018 10:54:15
Report produced on	21/09/2018 11:51:36

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	Name	Area (ha)	T of E (mins)	Add Inflow (l/s)	Cover Level (m)	Node Type	Manhole Type	Diameter (mm)	Width (mm)	Easting (m)	Northing (m)	Depth (m)	Notes
	E.Impermeable	0.106	4.00		10.000	Manhole	Adoptable	1900		110.000	100.000	2.200	Locked
	E.Outlet				9.500	Junction				120.000	100.000	2.200	Locked
	E.Discharge				9.000	Junction				130.000	100.000	2.200	Locked
	P.Impermeable	1.310	4.00		10.000	Manhole	Adoptable	1900		110.000	80.000	1.650	
	P.Outlet				9.500	Junction				120.000	80.000	2.200	
	P.Discharge				9.000	Junction				130.000	80.000	2.200	

<table>
<tr><th></th><th>Name</th><th>US Node</th><th>DS Node</th><th>Vel (m/s)</th><th>Cap (l/s)</th><th>Flow (l/s)</th><th>US Depth (m)</th><th>DS Depth (m)</th><th>Minimum Depth (m)</th><th>Maximum Depth (m)</th><th>Σ Area (ha)</th><th>Σ Add Inflow (ha)</th><th>Pro Depth (mm)</th><th>Pro Velocity (m/s)</th><th>Notes</th></tr>
<tr><td>?</td><td>E.Drain2</td><td>E.Impermeable</td><td>E.Outlet</td><td>9.362</td><td>7352.6</td><td>46.0</td><td>1.200</td><td>1.200</td><td>1.200</td><td>1.200</td><td>0.106</td><td>0.0</td><td>54</td><td>2.815</td><td>Locked | TC is outside FEH-13 range | Velocity is more than 3 m/s</td></tr>
<tr><td>?</td><td>E.Outfall</td><td>E.Outlet</td><td>E.Discharge</td><td>11.739</td><td>11738.9</td><td>46.0</td><td>1.200</td><td>1.200</td><td>1.200</td><td>1.200</td><td>0.106</td><td>0.0</td><td>35</td><td>2.600</td><td>Locked | TC is outside FEH-13 range | Velocity is more than 3 m/s</td></tr>
<tr><td>?</td><td>P.Drain2</td><td>P.Impermeable</td><td>P.Outlet</td><td>13.620</td><td>10697.0</td><td>568.1</td><td>0.650</td><td>1.200</td><td>0.650</td><td>1.200</td><td>1.310</td><td>0.0</td><td>152</td><td>7.555</td><td>TC is outside FEH-13 range | Velocity is more than 3 m/s | Upstream Depth is less than the specified minimum</td></tr>
<tr><td>?</td><td>P.Outfall</td><td>P.Outlet</td><td>P.Discharge</td><td>11.739</td><td>11738.9</td><td>568.1</td><td>1.200</td><td>1.200</td><td>1.200</td><td>1.200</td><td>1.310</td><td>0.0</td><td>168</td><td>5.775</td><td>TC is outside FEH-13 range | Velocity is more than 3 m/s</td></tr>
</table>

Link Name	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)	US Node Name	Dia (mm)	Width (mm)	Node Type	MH Type	DS Node Name	Dia (mm)	Width (mm)	Node Type	MH Type
E.Drain2	10.000	20.0	1000	Circular	10.000	7.800	1.200	9.500	7.300	1.200	E. mpermeable	1900		Manhole	Adoptable	E.Outlet			Junction	
E.Outfall	10.000	20.0	1000	Ditch	9.500	7.300	1.200	9.000	6.800	1.200	E.Outlet			Junction		E.Discharge			Junction	
P.Drain2	10.000	9.5	1000	Circular	10.000	8.350	0.650	9.500	7.300	1.200	P. mpermeable	1900		Manhole	Adoptable	P.Outlet			Junction	
P.Outfall	10.000	20.0	1000	Ditch	9.500	7.300	1.200	9.000	6.800	1.200	P.Outlet			Junction		P.Discharge			Junction	

Node Name	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Width (mm)	Node Type	MH Type		Link ID	IL (m)	Dia (mm)	Link Type
E.Impermeable	110.000	100.000	10.000	2.200	1900		Manhole	Adoptable					
									0	E.Drain2	7.800	1000	Circular
E.Outlet	120.000	100.000	9.500	2.200			Junction		1	E.Drain2	7.300	1000	Circular
									0	E.Outfall	7.300	1000	Ditch
E.Discharge	130.000	100.000	9.000	2.200			Junction		1	E.Outfall	6.800	1000	Ditch
P.Impermeable	110.000	80.000	10.000	1.650	1900		Manhole	Adoptable					
									0	P.Drain2	8.350	1000	Circular
P.Outlet	120.000	80.000	9.500	2.200			Junction		1	P.Drain2	7.300	1000	Circular
									0	P.Outfall	7.300	1000	Ditch
P.Discharge	130.000	80.000	9.000	2.200			Junction		1	P.Outfall	6.800	1000	Ditch

Rainfall Methodology	FEH-13		Return Period (years)	Climate Change (%)
Summer CV	0.600		2	0
Winter CV	0.600		2	20
Analysis Speed	Normal		30	0
Drain Down Time (mins)	240		30	20
Additional Storage (m³/ha)	20.0		100	0
Storm Durations (mins)	15		100	20
	30			
	60			
	120			
	180			
	240			
	360			
	480			
	600			
	720			
	960			
	1440			
Check Discharge Rate(s)	x			
1 year (l/s)				
30 year (l/s)				
100 year (l/s)				
Check Discharge Volume	x			
100 year 360 minute (m³)				

Depth/Area/Inf Area									
Node	**Base Inf Coefficient (m/hr)**	**Side Inf Coefficient (m/hr)**	**Safety Factor**	**Porosity**	**Invert Level (m)**	**Time to half empty (mins)**	**Depth (m)**	**Area (m²)**	**Inf. Area (m²)**
1	0.01000	0.01000	2.0	1.00	0.000		0.000	1.0	0.0
							0.500	1.0	0.0
							1.000	10.0	0.0
2	0.01000	0.01000	2.0	1.00	0.000		0.000	1.0	0.0
							0.500	1.0	0.0
							1.000	10.0	0.0

Results for 2 year Critical Storm Duration. Lowest mass balance: 99.87%

Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	E.Impermeable	10	7.831	0.031	11.6	0.1196	0.0000	OK	E.Drain2	E.Outlet	11.6	2.804	0.002	0.0452	
15 minute summer	E.Outlet	10	7.314	0.014	11.6	0.0000	0.0000	OK	E.Outfall	E.Discharge	11.6	1.659	0.001	0.0699	4.5
15 minute summer	E.Discharge	10	6.814	0.014	11.6	0.0000	0.0000	OK							
15 minute summer	P.Impermeable	10	8.432	0.082	143.0	1.5352	0.0000	OK	P.Drain2	P.Outlet	143.2	5.631	0.013	0.2550	
15 minute summer	P.Outlet	10	7.364	0.064	143.2	0.0000	0.0000	OK	P.Outfall	P.Discharge	143.2	4.189	0.012	0.3419	55.7
15 minute summer	P.Discharge	10	6.864	0.064	143.2	0.0000	0.0000	OK							

Results for 2 year +20% Critical Storm Duration. Lowest mass balance: 99.87%

Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	E.Impermeable	10	7.834	0.034	13.9	0.1292	0.0000	OK	E.Drain2	E.Outlet	13.9	2.910	0.002	0.0513	
15 minute summer	E.Outlet	10	7.315	0.015	13.9	0.0000	0.0000	OK	E.Outfall	E.Discharge	13.9	1.778	0.001	0.0782	5.4
15 minute summer	E.Discharge	10	6.815	0.015	13.9	0.0000	0.0000	OK							
15 minute summer	P.Impermeable	10	8.440	0.090	171.7	1.6815	0.0000	OK	P.Drain2	P.Outlet	171.9	5.817	0.016	0.2960	
15 minute summer	P.Outlet	9	7.372	0.072	171.9	0.0000	0.0000	OK	P.Outfall	P.Discharge	171.9	4.458	0.015	0.3857	66.8
15 minute summer	P.Discharge	10	6.872	0.072	171.9	0.0000	0.0000	OK							

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.87%

Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	E.Impermeable	10	7.849	0.049	31.5	0.1857	0.0000	OK	E.Drain2	E.Outlet	31.5	3.489	0.004	0.0944	
15 minute summer	E.Outlet	10	7.325	0.025	31.5	0.0000	0.0000	OK	E.Outfall	E.Discharge	31.5	2.426	0.003	0.1299	12.3
15 minute summer	E.Discharge	10	6.825	0.025	31.5	0.0000	0.0000	OK							
15 minute summer	P.Impermeable	10	8.487	0.137	388.7	2.5708	0.0000	OK	P.Drain2	P.Outlet	389.1	6.665	0.036	0.5862	
15 minute summer	P.Outlet	9	7.420	0.120	389.1	0.0000	0.0000	OK	P.Outfall	P.Discharge	389.2	5.833	0.033	0.6673	151.4
15 minute summer	P.Discharge	10	6.919	0.119	389.2	0.0000	0.0000	OK							

Results for 30 year +20% Critical Storm Duration. Lowest mass balance: 99.87%

Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	E.Impermeable	10	7.853	0.053	37.8	0.2019	0.0000	OK	E.Drain2	E.Outlet	37.8	3.635	0.005	0.1088	
15 minute summer	E.Outlet	10	7.328	0.028	37.8	0.0000	0.0000	OK	E.Outfall	E.Discharge	37.8	2.597	0.003	0.1456	14.7
15 minute summer	E.Discharge	10	6.828	0.028	37.8	0.0000	0.0000	OK							
15 minute summer	P.Impermeable	10	8.502	0.152	466.5	2.8412	0.0000	OK	P.Drain2	P.Outlet	466.9	6.844	0.044	0.6844	
15 minute summer	P.Outlet	9	7.434	0.134	466.9	0.0000	0.0000	OK	P.Outfall	P.Discharge	467.1	6.170	0.040	0.7572	181.7
15 minute summer	P.Discharge	10	6.933	0.133	467.1	0.0000	0.0000	OK							

Results for 100 year Critical Storm Duration. Lowest mass balance: 99.87%

Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	E.Impermeable	10	7.855	0.055	40.3	0.2082	0.0000	OK	E.Drain2	E.Outlet	40.4	3.688	0.005	0.1145	
15 minute summer	E.Outlet	10	7.330	0.030	40.4	0.0000	0.0000	OK	E.Outfall	E.Discharge	40.4	2.663	0.003	0.1518	15.7
15 minute summer	E.Discharge	10	6.829	0.029	40.4	0.0000	0.0000	OK							
15 minute summer	P.Impermeable	10	8.507	0.157	498.2	2.9472	0.0000	OK	P.Drain2	P.Outlet	498.7	6.913	0.047	0.7249	
15 minute summer	P.Outlet	9	7.440	0.140	498.7	0.0000	0.0000	OK	P.Outfall	P.Discharge	498.9	6.298	0.043	0.7923	194.0
15 minute summer	P.Discharge	10	6.939	0.139	498.9	0.0000	0.0000	OK							

Results for 100 year +20% Critical Storm Duration. Lowest mass balance: 99.87%

Event	US Node ID	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status	Link ID	DS Node ID	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	E.Impermeable	9	7.860	0.060	48.3	0.2264	0.0000	OK	E.Drain2	E.Outlet	48.4	3.807	0.007	0.1313	
15 minute summer	E.Outlet	10	7.333	0.033	48.4	0.0000	0.0000	OK	E.Outfall	E.Discharge	48.4	2.847	0.004	0.1701	18.8
15 minute summer	E.Discharge	10	6.833	0.033	48.4	0.0000	0.0000	OK							
15 minute summer	P.Impermeable	9	8.525	0.175	597.9	3.2677	0.0000	OK	P.Drain2	P.Outlet	598.5	7.094	0.056	0.8473	
15 minute summer	P.Outlet	9	7.457	0.157	598.5	0.0000	0.0000	OK	P.Outfall	P.Discharge	598.7	6.653	0.051	0.9001	232.8
15 minute summer	P.Discharge	10	6.956	0.156	598.7	0.0000	0.0000	OK							

Appendix A.5 – Surface Water Runoff Calculations

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

Half Drain Time : 6003 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	9.149	0.149	0.0	0.7	0.0	0.7	200.2	O K
30 min Summer	9.203	0.203	0.0	0.8	0.0	0.8	273.6	O K
60 min Summer	9.261	0.261	0.0	0.9	0.0	0.9	351.7	O K
120 min Summer	9.324	0.324	0.0	1.0	0.0	1.0	436.7	O K
180 min Summer	9.367	0.367	0.0	1.1	0.0	1.1	493.9	O K
240 min Summer	9.400	0.400	0.0	1.2	0.0	1.2	538.8	O K
360 min Summer	9.453	0.453	0.0	1.2	0.0	1.2	610.4	O K
480 min Summer	9.496	0.496	0.0	1.3	0.0	1.3	668.5	O K
600 min Summer	9.532	0.532	0.0	1.4	0.0	1.4	716.1	O K
720 min Summer	9.561	0.561	0.0	1.4	0.0	1.4	755.8	O K
960 min Summer	9.607	0.607	0.0	1.4	0.0	1.4	816.8	O K
1440 min Summer	9.661	0.661	0.0	1.5	0.0	1.5	890.4	O K
2160 min Summer	9.696	0.696	0.0	1.6	0.0	1.6	937.6	O K
2880 min Summer	9.708	0.708	0.0	1.6	0.0	1.6	953.1	O K
4320 min Summer	9.700	0.700	0.0	1.6	0.0	1.6	942.8	O K
5760 min Summer	9.689	0.689	0.0	1.5	0.0	1.5	927.5	O K
7200 min Summer	9.679	0.679	0.0	1.5	0.0	1.5	914.0	O K
8640 min Summer	9.670	0.670	0.0	1.5	0.0	1.5	902.0	O K
10080 min Summer	9.662	0.662	0.0	1.5	0.0	1.5	891.2	O K
15 min Winter	9.149	0.149	0.0	0.7	0.0	0.7	200.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Summer	118.731	0.0	54.2	0.0	19
30 min Summer	79.046	0.0	65.0	0.0	34
60 min Summer	50.083	0.0	140.7	0.0	64
120 min Summer	30.883	0.0	159.1	0.0	124
180 min Summer	23.263	0.0	170.0	0.0	184
240 min Summer	19.052	0.0	177.6	0.0	244
360 min Summer	14.441	0.0	188.3	0.0	364
480 min Summer	11.921	0.0	195.6	0.0	484
600 min Summer	10.272	0.0	200.6	0.0	604
720 min Summer	9.088	0.0	203.8	0.0	724
960 min Summer	7.457	0.0	206.5	0.0	962
1440 min Summer	5.562	0.0	203.0	0.0	1442
2160 min Summer	4.067	0.0	425.1	0.0	2160
2880 min Summer	3.231	0.0	414.5	0.0	2880
4320 min Summer	2.313	0.0	377.7	0.0	4020
5760 min Summer	1.823	0.0	780.0	0.0	4672
7200 min Summer	1.519	0.0	753.6	0.0	5400
8640 min Summer	1.311	0.0	720.4	0.0	6144
10080 min Summer	1.160	0.0	681.6	0.0	6968
15 min Winter	118.731	0.0	54.2	0.0	19

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	9.203	0.203	0.0	0.8	0.0	0.8	273.6	O K
60 min Winter	9.261	0.261	0.0	0.9	0.0	0.9	351.7	O K
120 min Winter	9.324	0.324	0.0	1.0	0.0	1.0	436.6	O K
180 min Winter	9.367	0.367	0.0	1.1	0.0	1.1	493.9	O K
240 min Winter	9.400	0.400	0.0	1.2	0.0	1.2	538.9	O K
360 min Winter	9.453	0.453	0.0	1.2	0.0	1.2	610.4	O K
480 min Winter	9.496	0.496	0.0	1.3	0.0	1.3	668.6	O K
600 min Winter	9.532	0.532	0.0	1.4	0.0	1.4	716.3	O K
720 min Winter	9.561	0.561	0.0	1.4	0.0	1.4	756.1	O K
960 min Winter	9.607	0.607	0.0	1.4	0.0	1.4	817.2	O K
1440 min Winter	9.662	0.662	0.0	1.5	0.0	1.5	891.3	O K
2160 min Winter	9.698	0.698	0.0	1.6	0.0	1.6	939.7	O K
2880 min Winter	9.711	0.711	0.0	1.6	0.0	1.6	956.8	O K
4320 min Winter	9.706	0.706	0.0	1.6	0.0	1.6	950.2	O K
5760 min Winter	9.688	0.688	0.0	1.5	0.0	1.5	926.9	O K
7200 min Winter	9.676	0.676	0.0	1.5	0.0	1.5	910.7	O K
8640 min Winter	9.664	0.664	0.0	1.5	0.0	1.5	894.4	O K
10080 min Winter	9.652	0.652	0.0	1.5	0.0	1.5	878.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
30 min Winter	79.046	0.0	65.0	0.0	34
60 min Winter	50.083	0.0	140.7	0.0	64
120 min Winter	30.883	0.0	159.2	0.0	124
180 min Winter	23.263	0.0	170.0	0.0	182
240 min Winter	19.052	0.0	177.7	0.0	242
360 min Winter	14.441	0.0	188.4	0.0	360
480 min Winter	11.921	0.0	195.8	0.0	478
600 min Winter	10.272	0.0	200.7	0.0	596
720 min Winter	9.088	0.0	204.0	0.0	714
960 min Winter	7.457	0.0	206.8	0.0	952
1440 min Winter	5.562	0.0	203.4	0.0	1414
2160 min Winter	4.067	0.0	425.7	0.0	2116
2880 min Winter	3.231	0.0	415.3	0.0	2792
4320 min Winter	2.313	0.0	378.9	0.0	4104
5760 min Winter	1.823	0.0	781.3	0.0	4848
7200 min Winter	1.519	0.0	755.4	0.0	5616
8640 min Winter	1.311	0.0	722.8	0.0	6488
10080 min Winter	1.160	0.0	684.6	0.0	7456

Rainfall Details

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	1.000
FEH Rainfall Version	2013	Cv (Winter)	1.000
Site Location	GB 618329 134790	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.752

Time (mins) From:	To:	Area (ha)
0	4	0.752

Model Details

Storage is Online Cover Level (m) 10.000

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	67.0
Membrane Percolation (mm/hr)	1000	Length (m)	67.0
Max Percolation (l/s)	1246.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	9.000	Membrane Depth (m)	0

Orifice Outflow Control

Diameter (m) 0.030 Discharge Coefficient 0.600 Invert Level (m) 9.000

Pipe Overflow Control

Diameter (m)	0.150	Entry Loss Coefficient	0.500
Slope (1:X)	100.0	Coefficient of Contraction	0.600
Length (m)	10.000	Upstream Invert Level (m)	9.800
Manning's n	0.015		

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	9.287	0.287	1.6	0.0	1.6	439.6	O K
30 min Summer	9.360	0.360	1.6	0.0	1.6	584.7	O K
60 min Summer	9.431	0.431	1.7	0.0	1.7	739.4	O K
120 min Summer	9.501	0.501	1.7	0.0	1.7	908.5	O K
180 min Summer	9.545	0.545	1.7	0.0	1.7	1023.1	O K
240 min Summer	9.578	0.578	1.7	0.0	1.7	1113.7	O K
360 min Summer	9.628	0.628	1.7	0.0	1.7	1258.9	O K
480 min Summer	9.665	0.665	1.7	0.0	1.7	1378.3	O K
600 min Summer	9.695	0.695	1.7	0.0	1.7	1477.2	O K
720 min Summer	9.720	0.720	1.7	0.0	1.7	1560.9	O K
960 min Summer	9.756	0.756	1.7	0.0	1.7	1692.1	O K
1440 min Summer	9.801	0.801	1.8	0.0	1.8	1860.3	O K
2160 min Summer	9.833	0.833	1.8	0.0	1.8	1988.2	O K
2880 min Summer	9.849	0.849	1.9	0.0	1.9	2052.7	O K
4320 min Summer	9.859	0.859	1.9	0.0	1.9	2094.6	O K
5760 min Summer	9.858	0.858	1.9	0.0	1.9	2092.8	O K
7200 min Summer	9.853	0.853	1.9	0.0	1.9	2072.6	O K
8640 min Summer	9.847	0.847	1.8	0.0	1.8	2044.4	O K
10080 min Summer	9.841	0.841	1.8	0.0	1.8	2021.1	O K
15 min Winter	9.287	0.287	1.6	0.0	1.6	439.6	O K
30 min Winter	9.360	0.360	1.7	0.0	1.7	584.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Summer	118.731	0.0	89.8	0.0	19
30 min Summer	79.046	0.0	101.0	0.0	34
60 min Summer	50.083	0.0	215.3	0.0	64
120 min Summer	30.883	0.0	233.4	0.0	124
180 min Summer	23.263	0.0	243.6	0.0	184
240 min Summer	19.052	0.0	250.7	0.0	244
360 min Summer	14.441	0.0	260.3	0.0	364
480 min Summer	11.921	0.0	266.6	0.0	484
600 min Summer	10.272	0.0	270.8	0.0	604
720 min Summer	9.088	0.0	273.5	0.0	724
960 min Summer	7.457	0.0	275.9	0.0	964
1440 min Summer	5.562	0.0	274.0	0.0	1444
2160 min Summer	4.067	0.0	568.8	0.0	2164
2880 min Summer	3.231	0.0	561.2	0.0	2884
4320 min Summer	2.313	0.0	536.0	0.0	4320
5760 min Summer	1.823	0.0	1117.9	0.0	5760
7200 min Summer	1.519	0.0	1096.5	0.0	7200
8640 min Summer	1.311	0.0	1070.6	0.0	8216
10080 min Summer	1.160	0.0	1040.8	0.0	8776
15 min Winter	118.731	0.0	89.8	0.0	19
30 min Winter	79.046	0.0	101.0	0.0	34

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
60 min Winter	9.431	0.431	1.7	0.0	1.7	739.4	O K
120 min Winter	9.501	0.501	1.7	0.0	1.7	908.6	O K
180 min Winter	9.545	0.545	1.7	0.0	1.7	1023.3	O K
240 min Winter	9.578	0.578	1.7	0.0	1.7	1114.1	O K
360 min Winter	9.628	0.628	1.7	0.0	1.7	1259.6	O K
480 min Winter	9.666	0.666	1.7	0.0	1.7	1379.2	O K
600 min Winter	9.696	0.696	1.7	0.0	1.7	1478.4	O K
720 min Winter	9.720	0.720	1.7	0.0	1.7	1562.2	O K
960 min Winter	9.757	0.757	1.7	0.0	1.7	1694.0	O K
1440 min Winter	9.802	0.802	1.8	0.0	1.8	1863.2	O K
2160 min Winter	9.834	0.834	1.8	0.0	1.8	1992.6	O K
2880 min Winter	9.850	0.850	1.9	0.0	1.9	2059.0	O K
4320 min Winter	9.861	0.861	1.9	0.0	1.9	2105.7	O K
5760 min Winter	9.862	0.862	1.9	0.0	1.9	2109.7	O K
7200 min Winter	9.859	0.859	1.9	0.0	1.9	2096.4	O K
8640 min Winter	9.854	0.854	1.9	0.0	1.9	2074.8	O K
10080 min Winter	9.848	0.848	1.8	0.0	1.8	2049.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
60 min Winter	50.083	0.0	215.3	0.0	64
120 min Winter	30.883	0.0	233.3	0.0	124
180 min Winter	23.263	0.0	243.5	0.0	182
240 min Winter	19.052	0.0	250.5	0.0	242
360 min Winter	14.441	0.0	259.9	0.0	362
480 min Winter	11.921	0.0	266.0	0.0	480
600 min Winter	10.272	0.0	270.0	0.0	598
720 min Winter	9.088	0.0	272.6	0.0	716
960 min Winter	7.457	0.0	274.7	0.0	954
1440 min Winter	5.562	0.0	272.2	0.0	1428
2160 min Winter	4.067	0.0	566.3	0.0	2136
2880 min Winter	3.231	0.0	557.9	0.0	2828
4320 min Winter	2.313	0.0	530.9	0.0	4232
5760 min Winter	1.823	0.0	1111.4	0.0	5592
7200 min Winter	1.519	0.0	1088.1	0.0	6912
8640 min Winter	1.311	0.0	1060.4	0.0	8208
10080 min Winter	1.160	0.0	1029.0	0.0	9472

Rainfall Details

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	1.000
FEH Rainfall Version	2013	Cv (Winter)	1.000
Site Location	GB 618329 134790	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+20

Time Area Diagram

Total Area (ha) 1.484

Time (mins) From:	To:	Area (ha)
0	4	1.484

Model Details

Storage is Online Cover Level (m) 10.000

Tank or Pond Structure

Invert Level (m) 9.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1200.0	0.500	2500.0	1.000	5000.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-CHE-0064-2000-1000-2000
Design Head (m)	1.000
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	No
Diameter (mm)	64
Invert Level (m)	9.000
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	2.0
Flush-Flo™	0.156	1.7
Kick-Flo®	0.223	1.0
Mean Flow over Head Range	-	1.4

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.3	1.200	2.2	3.000	3.4	7.000	5.2
0.200	1.1	1.400	2.4	3.500	3.7	7.500	5.4
0.300	1.1	1.600	2.5	4.000	4.0	8.000	5.6
0.400	1.3	1.800	2.7	4.500	4.2	8.500	5.7
0.500	1.4	2.000	2.8	5.000	4.4	9.000	5.9
0.600	1.6	2.200	2.9	5.500	4.6	9.500	6.0
0.800	1.8	2.400	3.1	6.000	4.8		
1.000	2.0	2.600	3.2	6.500	5.0		

Weir Overflow Control

Discharge Coef 0.544 Width (m) 0.200 Invert Level (m) 9.960

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

Half Drain Time : 6397 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	8.285	0.285	0.0	1.2	0.0	1.2	271.2	O K
30 min Summer	8.380	0.380	0.0	1.3	0.0	1.3	360.6	O K
60 min Summer	8.480	0.480	0.0	1.3	0.0	1.3	455.7	O K
120 min Summer	8.589	0.589	0.0	1.3	0.0	1.3	559.1	O K
180 min Summer	8.662	0.662	0.0	1.3	0.0	1.3	628.8	O K
240 min Summer	8.720	0.720	0.0	1.4	0.0	1.4	683.6	O K
360 min Summer	8.811	0.811	0.0	1.5	0.0	1.5	770.8	O K
480 min Summer	8.886	0.886	0.0	1.5	0.0	1.5	841.9	O K
600 min Summer	8.947	0.947	0.0	1.6	0.0	1.6	900.1	O K
720 min Summer	8.999	0.999	0.0	1.6	0.0	1.6	948.8	O K
960 min Summer	9.078	1.078	0.0	1.7	0.0	1.7	1023.8	O K
1440 min Summer	9.174	1.174	0.0	1.8	0.0	1.8	1115.1	O K
2160 min Summer	9.237	1.237	0.0	1.8	0.0	1.8	1175.1	O K
2880 min Summer	9.259	1.259	0.0	1.8	0.0	1.8	1196.4	O K
4320 min Summer	9.249	1.249	0.0	1.8	0.0	1.8	1186.6	O K
5760 min Summer	9.221	1.221	0.0	1.8	0.0	1.8	1159.7	O K
7200 min Summer	9.197	1.197	0.0	1.8	0.0	1.8	1136.9	O K
8640 min Summer	9.176	1.176	0.0	1.8	0.0	1.8	1116.9	O K
10080 min Summer	9.158	1.158	0.0	1.8	0.0	1.8	1099.8	O K
15 min Winter	8.285	0.285	0.0	1.3	0.0	1.3	271.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Summer	118.731	0.0	71.4	0.0	19
30 min Summer	79.046	0.0	82.6	0.0	34
60 min Summer	50.083	0.0	176.6	0.0	64
120 min Summer	30.883	0.0	196.9	0.0	124
180 min Summer	23.263	0.0	209.2	0.0	184
240 min Summer	19.052	0.0	218.0	0.0	244
360 min Summer	14.441	0.0	230.7	0.0	364
480 min Summer	11.921	0.0	239.8	0.0	484
600 min Summer	10.272	0.0	246.2	0.0	604
720 min Summer	9.088	0.0	250.8	0.0	724
960 min Summer	7.457	0.0	255.7	0.0	962
1440 min Summer	5.562	0.0	255.7	0.0	1442
2160 min Summer	4.067	0.0	527.1	0.0	2160
2880 min Summer	3.231	0.0	521.1	0.0	2880
4320 min Summer	2.313	0.0	492.1	0.0	4320
5760 min Summer	1.823	0.0	992.1	0.0	4968
7200 min Summer	1.519	0.0	973.4	0.0	5696
8640 min Summer	1.311	0.0	946.7	0.0	6480
10080 min Summer	1.160	0.0	912.8	0.0	7264
15 min Winter	118.731	0.0	71.4	0.0	19

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	8.380	0.380	0.0	1.3	0.0	1.3	360.6	O K
60 min Winter	8.480	0.480	0.0	1.3	0.0	1.3	455.7	O K
120 min Winter	8.589	0.589	0.0	1.3	0.0	1.3	559.2	O K
180 min Winter	8.662	0.662	0.0	1.3	0.0	1.3	629.0	O K
240 min Winter	8.720	0.720	0.0	1.4	0.0	1.4	683.9	O K
360 min Winter	8.812	0.812	0.0	1.5	0.0	1.5	771.4	O K
480 min Winter	8.887	0.887	0.0	1.5	0.0	1.5	842.6	O K
600 min Winter	8.949	0.949	0.0	1.6	0.0	1.6	901.1	O K
720 min Winter	9.000	1.000	0.0	1.6	0.0	1.6	950.0	O K
960 min Winter	9.079	1.079	0.0	1.7	0.0	1.7	1025.5	O K
1440 min Winter	9.177	1.177	0.0	1.8	0.0	1.8	1117.7	O K
2160 min Winter	9.242	1.242	0.0	1.8	0.0	1.8	1179.7	O K
2880 min Winter	9.267	1.267	0.0	1.8	0.0	1.8	1203.2	O K
4320 min Winter	9.263	1.263	0.0	1.8	0.0	1.8	1199.6	O K
5760 min Winter	9.235	1.235	0.0	1.8	0.0	1.8	1173.3	O K
7200 min Winter	9.204	1.204	0.0	1.8	0.0	1.8	1144.2	O K
8640 min Winter	9.182	1.182	0.0	1.8	0.0	1.8	1122.8	O K
10080 min Winter	9.160	1.160	0.0	1.8	0.0	1.8	1102.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
30 min Winter	79.046	0.0	82.7	0.0	34
60 min Winter	50.083	0.0	176.6	0.0	64
120 min Winter	30.883	0.0	196.9	0.0	124
180 min Winter	23.263	0.0	209.1	0.0	182
240 min Winter	19.052	0.0	217.9	0.0	242
360 min Winter	14.441	0.0	230.4	0.0	360
480 min Winter	11.921	0.0	239.4	0.0	478
600 min Winter	10.272	0.0	245.7	0.0	596
720 min Winter	9.088	0.0	250.1	0.0	716
960 min Winter	7.457	0.0	254.9	0.0	952
1440 min Winter	5.562	0.0	254.5	0.0	1424
2160 min Winter	4.067	0.0	525.5	0.0	2116
2880 min Winter	3.231	0.0	519.0	0.0	2796
4320 min Winter	2.313	0.0	488.6	0.0	4148
5760 min Winter	1.823	0.0	988.4	0.0	5408
7200 min Winter	1.519	0.0	968.6	0.0	5840
8640 min Winter	1.311	0.0	940.9	0.0	6736
10080 min Winter	1.160	0.0	906.2	0.0	7656

Rainfall Details

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	1.000
FEH Rainfall Version	2013	Cv (Winter)	1.000
Site Location	GB 618329 134790	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.916

Time (mins) From:	To:	Area (ha)
0	4	0.916

Model Details

Storage is Online Cover Level (m) 10.000

Cellular Storage Structure

Invert Level (m) 8.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	1000.0	1000.0	1.501	0.0	1189.8
1.500	1000.0	1189.7			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-CHE-0058-2000-1500-2000
Design Head (m)	1.500
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	No
Diameter (mm)	58
Invert Level (m)	8.000
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	2.0
Flush-Flo™	0.141	1.3
Kick-Flo®	0.202	0.8
Mean Flow over Head Range	-	1.4

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.1	1.200	1.8	3.000	2.8	7.000	4.3
0.200	0.8	1.400	1.9	3.500	3.0	7.500	4.4
0.300	0.9	1.600	2.1	4.000	3.2	8.000	4.5
0.400	1.0	1.800	2.2	4.500	3.4	8.500	4.7
0.500	1.2	2.000	2.3	5.000	3.6	9.000	4.8
0.600	1.3	2.200	2.4	5.500	3.8	9.500	4.9
0.800	1.5	2.400	2.5	6.000	3.9		
1.000	1.6	2.600	2.6	6.500	4.1		

Pipe Overflow Control

Diameter (m)	0.150	Entry Loss Coefficient	0.500
Slope (1:X)	100.0	Coefficient of Contraction	0.600
Length (m)	10.000	Upstream Invert Level (m)	9.300
Manning's n	0.015		

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

Half Drain Time : 6675 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	8.307	0.307	0.0	1.3	0.0	1.3	292.0	O K
30 min Summer	8.409	0.409	0.0	1.3	0.0	1.3	388.2	O K
60 min Summer	8.516	0.516	0.0	1.3	0.0	1.3	490.6	O K
120 min Summer	8.634	0.634	0.0	1.3	0.0	1.3	602.1	O K
180 min Summer	8.713	0.713	0.0	1.4	0.0	1.4	677.3	O K
240 min Summer	8.775	0.775	0.0	1.4	0.0	1.4	736.5	O K
360 min Summer	8.874	0.874	0.0	1.5	0.0	1.5	830.7	O K
480 min Summer	8.955	0.955	0.0	1.6	0.0	1.6	907.6	O K
600 min Summer	9.022	1.022	0.0	1.7	0.0	1.7	970.7	O K
720 min Summer	9.077	1.077	0.0	1.7	0.0	1.7	1023.5	O K
960 min Summer	9.163	1.163	0.0	1.8	0.0	1.8	1105.0	O K
1440 min Summer	9.268	1.268	0.0	1.8	0.0	1.8	1205.0	O K
2160 min Summer	9.339	1.339	0.0	1.9	0.0	1.9	1272.1	O K
2880 min Summer	9.366	1.366	0.0	1.9	0.0	1.9	1297.4	O K
4320 min Summer	9.359	1.359	0.0	1.9	0.0	1.9	1291.3	O K
5760 min Summer	9.330	1.330	0.0	1.9	0.0	1.9	1263.8	O K
7200 min Summer	9.306	1.306	0.0	1.9	0.0	1.9	1240.4	O K
8640 min Summer	9.284	1.284	0.0	1.9	0.0	1.9	1219.8	O K
10080 min Summer	9.265	1.265	0.0	1.8	0.0	1.8	1202.2	O K
15 min Winter	8.307	0.307	0.0	1.3	0.0	1.3	291.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Summer	118.731	0.0	74.2	0.0	19
30 min Summer	79.046	0.0	85.9	0.0	34
60 min Summer	50.083	0.0	183.9	0.0	64
120 min Summer	30.883	0.0	204.9	0.0	124
180 min Summer	23.263	0.0	217.6	0.0	184
240 min Summer	19.052	0.0	226.8	0.0	244
360 min Summer	14.441	0.0	239.9	0.0	364
480 min Summer	11.921	0.0	249.2	0.0	484
600 min Summer	10.272	0.0	255.8	0.0	604
720 min Summer	9.088	0.0	260.4	0.0	724
960 min Summer	7.457	0.0	265.5	0.0	962
1440 min Summer	5.562	0.0	265.2	0.0	1442
2160 min Summer	4.067	0.0	548.2	0.0	2160
2880 min Summer	3.231	0.0	541.5	0.0	2880
4320 min Summer	2.313	0.0	510.6	0.0	4320
5760 min Summer	1.823	0.0	1036.1	0.0	5128
7200 min Summer	1.519	0.0	1015.9	0.0	5832
8640 min Summer	1.311	0.0	987.4	0.0	6568
10080 min Summer	1.160	0.0	951.9	0.0	7352
15 min Winter	118.731	0.0	74.2	0.0	19

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
30 min Winter	8.409	0.409	0.0	1.3	0.0	1.3	388.2	O K
60 min Winter	8.516	0.516	0.0	1.3	0.0	1.3	490.6	O K
120 min Winter	8.634	0.634	0.0	1.3	0.0	1.3	602.2	O K
180 min Winter	8.713	0.713	0.0	1.4	0.0	1.4	677.5	O K
240 min Winter	8.776	0.776	0.0	1.4	0.0	1.4	736.8	O K
360 min Winter	8.875	0.875	0.0	1.5	0.0	1.5	831.3	O K
480 min Winter	8.956	0.956	0.0	1.6	0.0	1.6	908.3	O K
600 min Winter	9.023	1.023	0.0	1.7	0.0	1.7	971.6	O K
720 min Winter	9.079	1.079	0.0	1.7	0.0	1.7	1024.7	O K
960 min Winter	9.165	1.165	0.0	1.8	0.0	1.8	1106.7	O K
1440 min Winter	9.271	1.271	0.0	1.8	0.0	1.8	1207.5	O K
2160 min Winter	9.344	1.344	0.0	1.9	0.0	1.9	1276.5	O K
2880 min Winter	9.373	1.373	0.0	1.9	0.0	1.9	1304.0	O K
4320 min Winter	9.373	1.373	0.0	1.9	0.0	1.9	1304.1	O K
5760 min Winter	9.346	1.346	0.0	1.9	0.0	1.9	1279.1	O K
7200 min Winter	9.314	1.314	0.0	1.9	0.0	1.9	1247.9	O K
8640 min Winter	9.291	1.291	0.0	1.9	0.0	1.9	1226.4	O K
10080 min Winter	9.270	1.270	0.0	1.8	0.0	1.8	1206.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
30 min Winter	79.046	0.0	85.9	0.0	34
60 min Winter	50.083	0.0	183.8	0.0	64
120 min Winter	30.883	0.0	204.8	0.0	124
180 min Winter	23.263	0.0	217.5	0.0	182
240 min Winter	19.052	0.0	226.6	0.0	242
360 min Winter	14.441	0.0	239.6	0.0	360
480 min Winter	11.921	0.0	248.8	0.0	478
600 min Winter	10.272	0.0	255.3	0.0	596
720 min Winter	9.088	0.0	259.8	0.0	716
960 min Winter	7.457	0.0	264.7	0.0	952
1440 min Winter	5.562	0.0	264.0	0.0	1426
2160 min Winter	4.067	0.0	546.8	0.0	2120
2880 min Winter	3.231	0.0	539.6	0.0	2800
4320 min Winter	2.313	0.0	507.4	0.0	4148
5760 min Winter	1.823	0.0	1032.6	0.0	5416
7200 min Winter	1.519	0.0	1011.2	0.0	5976
8640 min Winter	1.311	0.0	981.6	0.0	6744
10080 min Winter	1.160	0.0	945.0	0.0	7664

Rainfall Details

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	1.000
FEH Rainfall Version	2013	Cv (Winter)	1.000
Site Location	GB 618329 134790	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.986

Time (mins) From:	To:	Area (ha)
0	4	0.986

Model Details

Storage is Online Cover Level (m) 10.000

Cellular Storage Structure

Invert Level (m) 8.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	1000.0	1000.0	1.501	0.0	1189.8
1.500	1000.0	1189.7			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-CHE-0058-2000-1500-2000
Design Head (m)	1.500
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	No
Diameter (mm)	58
Invert Level (m)	8.000
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	2.0
Flush-Flo™	0.141	1.3
Kick-Flo®	0.202	0.8
Mean Flow over Head Range	-	1.4

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.1	1.200	1.8	3.000	2.8	7.000	4.3
0.200	0.8	1.400	1.9	3.500	3.0	7.500	4.4
0.300	0.9	1.600	2.1	4.000	3.2	8.000	4.5
0.400	1.0	1.800	2.2	4.500	3.4	8.500	4.7
0.500	1.2	2.000	2.3	5.000	3.6	9.000	4.8
0.600	1.3	2.200	2.4	5.500	3.8	9.500	4.9
0.800	1.5	2.400	2.5	6.000	3.9		
1.000	1.6	2.600	2.6	6.500	4.1		

Pipe Overflow Control

Diameter (m)	0.150	Entry Loss Coefficient	0.500
Slope (1:X)	100.0	Coefficient of Contraction	0.600
Length (m)	10.000	Upstream Invert Level (m)	9.400
Manning's n	0.015		

Cascade Summary of Results for Drainage Area E, Basin and Storage.SRCX

Upstream Structures	Outflow To	Overflow To
Drainage Area C, Private East.SRCX Drainage Area D, Private West.SRCX	(None)	(None)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	8.594	0.094	2.7	75.5	O K
30 min Summer	8.625	0.125	2.7	100.0	O K
60 min Summer	8.658	0.158	2.8	126.1	O K
120 min Summer	8.692	0.192	2.9	153.8	O K
180 min Summer	8.716	0.216	2.9	172.6	O K
240 min Summer	8.734	0.234	3.0	187.5	O K
360 min Summer	8.765	0.265	3.0	211.6	O K
480 min Summer	8.791	0.291	3.1	232.8	O K
600 min Summer	8.815	0.315	3.1	252.2	O K
720 min Summer	8.837	0.337	3.2	269.7	O K
960 min Summer	8.874	0.374	3.2	299.2	O K
1440 min Summer	8.925	0.425	3.3	339.7	O K
2160 min Summer	8.968	0.468	3.4	374.8	O K
2880 min Summer	8.994	0.494	3.5	395.4	O K
4320 min Summer	9.501	1.001	4.3	400.8	O K
5760 min Summer	9.437	0.937	4.2	400.7	O K
7200 min Summer	9.374	0.874	4.1	400.6	O K
8640 min Summer	9.328	0.828	4.0	400.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	118.731	0.0	220.3	19
30 min Summer	79.046	0.0	228.5	34
60 min Summer	50.083	0.0	461.3	64
120 min Summer	30.883	0.0	480.5	124
180 min Summer	23.263	0.0	492.2	184
240 min Summer	19.052	0.0	500.6	244
360 min Summer	14.441	0.0	512.4	364
480 min Summer	11.921	0.0	520.7	914
600 min Summer	10.272	0.0	526.4	1380
720 min Summer	9.088	0.0	530.0	1754
960 min Summer	7.457	0.0	532.5	2340
1440 min Summer	5.562	0.0	526.9	2880
2160 min Summer	4.067	0.0	1094.7	3964
2880 min Summer	3.231	0.0	1075.2	4612
4320 min Summer	2.313	0.0	1033.8	4320
5760 min Summer	1.823	0.0	2163.8	5248
7200 min Summer	1.519	0.0	2111.8	6264
8640 min Summer	1.311	0.0	2049.3	7256

Cascade Summary of Results for Drainage Area E, Basin and Storage.SRCX

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
10080 min Summer	9.286	0.786	3.9	400.6	O K
15 min Winter	8.594	0.094	2.7	75.5	O K
30 min Winter	8.625	0.125	2.7	100.1	O K
60 min Winter	8.658	0.158	2.8	126.0	O K
120 min Winter	8.692	0.192	2.9	153.9	O K
180 min Winter	8.716	0.216	2.9	172.7	O K
240 min Winter	8.734	0.234	3.0	187.5	O K
360 min Winter	8.765	0.265	3.0	211.7	O K
480 min Winter	8.791	0.291	3.1	233.1	O K
600 min Winter	8.816	0.316	3.1	252.6	O K
720 min Winter	8.838	0.338	3.2	270.2	O K
960 min Winter	8.875	0.375	3.2	299.6	O K
1440 min Winter	8.925	0.425	3.3	340.0	O K
2160 min Winter	8.969	0.469	3.4	375.0	O K
2880 min Winter	8.994	0.494	3.5	395.5	O K
4320 min Winter	9.426	0.926	4.2	400.7	O K
5760 min Winter	9.501	1.001	4.3	400.8	O K
7200 min Winter	9.425	0.925	4.2	400.7	O K
8640 min Winter	9.352	0.852	4.0	400.6	O K
10080 min Winter	9.295	0.795	4.0	400.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
10080 min Summer	1.160	0.0	1979.0	8264
15 min Winter	118.731	0.0	220.3	19
30 min Winter	79.046	0.0	228.5	34
60 min Winter	50.083	0.0	461.3	64
120 min Winter	30.883	0.0	480.4	124
180 min Winter	23.263	0.0	491.9	182
240 min Winter	19.052	0.0	500.1	242
360 min Winter	14.441	0.0	511.7	364
480 min Winter	11.921	0.0	519.6	920
600 min Winter	10.272	0.0	524.9	1380
720 min Winter	9.088	0.0	528.2	1756
960 min Winter	7.457	0.0	530.4	2336
1440 min Winter	5.562	0.0	524.3	2880
2160 min Winter	4.067	0.0	1091.3	3976
2880 min Winter	3.231	0.0	1070.9	4632
4320 min Winter	2.313	0.0	1027.1	4192
5760 min Winter	1.823	0.0	2155.3	5304
7200 min Winter	1.519	0.0	2100.8	6384
8640 min Winter	1.311	0.0	2036.4	7392
10080 min Winter	1.160	0.0	1964.7	8456

Cascade Rainfall Details for Drainage Area E, Basin and Storage.SRCX

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	1.000
FEH Rainfall Version	2013	Cv (Winter)	1.000
Site Location	GB 618329 134790	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+20

Time Area Diagram

Total Area (ha) 0.259

Time (mins) From:	To:	Area (ha)
0	4	0.259

Cascade Model Details for Drainage Area E, Basin and Storage.SRCX

Storage is Online Cover Level (m) 10.000

Tank or Pond Structure

Invert Level (m) 8.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	800.0	0.501	1.0	1.001	640.0
0.500	800.0	1.000	1.0	1.500	1000.0

Orifice Outflow Control

Diameter (m) 0.041 Discharge Coefficient 0.600 Invert Level (m) 8.000

Summary of Results for Input Hydrograph

Half Drain Time : 7035 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
Input Hydrograph	9.984	0.984	0.0	1.8	1.8	1325.1	O K

Storm Event	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
Input Hydrograph	0.0	623.9	3008

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
4	0.0	204	0.0	404	2.8	604	3.1	804	4.9	1004	8.6
8	0.0	208	0.0	408	2.8	608	3.3	808	5.1	1008	8.6
12	0.0	212	0.0	412	2.8	612	3.3	812	5.3	1012	9.2
16	0.0	216	0.0	416	2.8	616	3.3	816	5.3	1016	9.2
20	0.0	220	0.0	420	2.8	620	3.3	820	5.3	1020	9.2
24	0.0	224	0.0	424	2.8	624	3.3	824	5.3	1024	9.2
28	0.0	228	0.0	428	2.8	628	3.3	828	5.3	1028	9.2
32	0.0	232	2.4	432	2.8	632	3.3	832	5.3	1032	9.2
36	0.0	236	2.7	436	2.8	636	3.4	836	5.4	1036	9.2
40	0.0	240	2.7	440	2.8	640	3.5	840	5.8	1040	9.7
44	0.0	244	2.7	444	2.8	644	3.5	844	5.8	1044	9.8
48	0.0	248	2.7	448	2.8	648	3.5	848	5.8	1048	9.8
52	0.0	252	2.7	452	2.8	652	3.5	852	5.8	1052	9.8
56	0.0	256	2.7	456	2.8	656	3.5	856	5.8	1056	9.8
60	0.0	260	2.8	460	2.8	660	3.5	860	5.8	1060	9.8
64	0.0	264	2.8	464	2.9	664	3.5	864	5.8	1064	9.8
68	0.0	268	2.8	468	2.9	668	3.7	868	6.3	1068	10.2
72	0.0	272	2.8	472	2.9	672	3.7	872	6.3	1072	10.5
76	0.0	276	2.8	476	2.9	676	3.7	876	6.3	1076	10.5
80	0.0	280	2.8	480	2.9	680	3.7	880	6.3	1080	10.5
84	0.0	284	2.8	484	2.9	684	3.7	884	6.3	1084	10.5
88	0.0	288	2.8	488	2.9	688	3.7	888	6.3	1088	10.5
92	0.0	292	2.8	492	2.9	692	3.7	892	6.3	1092	10.5
96	0.0	296	2.8	496	2.9	696	3.9	896	6.7	1096	10.8
100	0.0	300	2.8	500	2.9	700	3.9	900	6.8	1100	11.2
104	0.0	304	2.8	504	2.9	704	3.9	904	6.8	1104	11.2
108	0.0	308	2.8	508	2.9	708	3.9	908	6.8	1108	11.2
112	0.0	312	2.8	512	2.9	712	3.9	912	6.8	1112	11.2
116	0.0	316	2.8	516	2.9	716	3.9	916	6.8	1116	11.2
120	0.0	320	2.8	520	2.9	720	3.9	920	6.8	1120	11.2
124	0.0	324	2.9	524	2.9	724	4.2	924	7.1	1124	11.3
128	0.0	328	2.9	528	2.9	728	4.2	928	7.4	1128	11.9
132	0.0	332	2.9	532	2.9	732	4.2	932	7.4	1132	11.9
136	0.0	336	2.9	536	2.9	736	4.2	936	7.4	1136	11.9
140	0.0	340	2.9	540	2.9	740	4.2	940	7.4	1140	11.9
144	0.0	344	2.9	544	2.9	744	4.2	944	7.4	1144	11.9
148	0.0	348	2.9	548	3.0	748	4.2	948	7.4	1148	11.9
152	0.0	352	2.9	552	3.0	752	4.5	952	7.6	1152	11.9
156	0.0	356	2.9	556	3.0	756	4.6	956	7.9	1156	12.5
160	0.0	360	2.9	560	3.0	760	4.6	960	7.9	1160	12.5
164	0.0	364	2.9	564	3.0	764	4.6	964	7.9	1164	12.5
168	0.0	368	2.9	568	3.0	768	4.6	968	7.9	1168	12.5
172	0.0	372	2.9	572	3.0	772	4.6	972	7.9	1172	12.5
176	0.0	376	2.9	576	3.0	776	4.6	976	7.9	1176	12.5
180	0.0	380	2.8	580	3.1	780	4.8	980	8.1	1180	12.5
184	0.0	384	2.8	584	3.1	784	4.9	984	8.6	1184	13.0
188	0.0	388	2.8	588	3.1	788	4.9	988	8.6	1188	13.2
192	0.0	392	2.8	592	3.1	792	4.9	992	8.6	1192	13.2
196	0.0	396	2.8	596	3.1	796	4.9	996	8.6	1196	13.2
200	0.0	400	2.8	600	3.1	800	4.9	1000	8.6	1200	13.2

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
1204	13.2	1404	16.7	1604	15.0	1804	10.5	2004	6.3	2204	3.7
1208	13.2	1408	16.7	1608	15.0	1808	10.5	2008	6.3	2208	3.7
1212	13.6	1412	16.7	1612	15.0	1812	10.5	2012	6.3	2212	3.7
1216	13.8	1416	16.9	1616	14.5	1816	10.2	2016	6.3	2216	3.7
1220	13.8	1420	16.9	1620	14.4	1820	9.8	2020	5.8	2220	3.5
1224	13.8	1424	16.9	1624	14.4	1824	9.8	2024	5.8	2224	3.5
1228	13.8	1428	16.9	1628	14.4	1828	9.8	2028	5.8	2228	3.5
1232	13.8	1432	16.9	1632	14.4	1832	9.8	2032	5.8	2232	3.5
1236	13.8	1436	16.9	1636	14.4	1836	9.8	2036	5.8	2236	3.5
1240	14.0	1440	16.9	1640	14.4	1840	9.8	2040	5.8	2240	3.5
1244	14.4	1444	16.9	1644	14.0	1844	9.7	2044	5.8	2244	3.5
1248	14.4	1448	16.9	1648	13.8	1848	9.2	2048	5.4	2248	3.4
1252	14.4	1452	16.9	1652	13.8	1852	9.2	2052	5.3	2252	3.3
1256	14.4	1456	16.9	1656	13.8	1856	9.2	2056	5.3	2256	3.3
1260	14.4	1460	16.9	1660	13.8	1860	9.2	2060	5.3	2260	3.3
1264	14.4	1464	16.9	1664	13.8	1864	9.2	2064	5.3	2264	3.3
1268	14.5	1468	16.9	1668	13.8	1868	9.2	2068	5.3	2268	3.3
1272	15.0	1472	16.7	1672	13.6	1872	9.2	2072	5.3	2272	3.3
1276	15.0	1476	16.7	1676	13.2	1876	8.6	2076	5.1	2276	3.3
1280	15.0	1480	16.7	1680	13.2	1880	8.6	2080	4.9	2280	3.1
1284	15.0	1484	16.7	1684	13.2	1884	8.6	2084	4.9	2284	3.1
1288	15.0	1488	16.7	1688	13.2	1888	8.6	2088	4.9	2288	3.1
1292	15.0	1492	16.7	1692	13.2	1892	8.6	2092	4.9	2292	3.1
1296	15.0	1496	16.7	1696	13.2	1896	8.6	2096	4.9	2296	3.1
1300	15.5	1500	16.5	1700	13.0	1900	8.6	2100	4.9	2300	3.1
1304	15.5	1504	16.4	1704	12.5	1904	8.1	2104	4.8	2304	3.1
1308	15.5	1508	16.4	1708	12.5	1908	7.9	2108	4.6	2308	3.0
1312	15.5	1512	16.4	1712	12.5	1912	7.9	2112	4.6	2312	3.0
1316	15.5	1516	16.4	1716	12.5	1916	7.9	2116	4.6	2316	3.0
1320	15.5	1520	16.4	1720	12.5	1920	7.9	2120	4.6	2320	3.0
1324	15.5	1524	16.4	1724	12.5	1924	7.9	2124	4.6	2324	3.0
1328	15.9	1528	16.2	1728	12.5	1928	7.9	2128	4.6	2328	3.0
1332	16.0	1532	16.0	1732	11.9	1932	7.6	2132	4.5	2332	3.0
1336	16.0	1536	16.0	1736	11.9	1936	7.4	2136	4.2	2336	3.0
1340	16.0	1540	16.0	1740	11.9	1940	7.4	2140	4.2	2340	2.9
1344	16.0	1544	16.0	1744	11.9	1944	7.4	2144	4.2	2344	2.9
1348	16.0	1548	16.0	1748	11.9	1948	7.4	2148	4.2	2348	2.9
1352	16.0	1552	16.0	1752	11.9	1952	7.4	2152	4.2	2352	2.9
1356	16.2	1556	15.9	1756	11.9	1956	7.4	2156	4.2	2356	2.9
1360	16.4	1560	15.5	1760	11.3	1960	7.1	2160	4.2	2360	2.9
1364	16.4	1564	15.5	1764	11.2	1964	6.8	2164	3.9	2364	2.9
1368	16.4	1568	15.5	1768	11.2	1968	6.8	2168	3.9	2368	2.9
1372	16.4	1572	15.5	1772	11.2	1972	6.8	2172	3.9	2372	2.9
1376	16.4	1576	15.5	1776	11.2	1976	6.8	2176	3.9	2376	2.9
1380	16.4	1580	15.5	1780	11.2	1980	6.8	2180	3.9	2380	2.9
1384	16.5	1584	15.5	1784	11.2	1984	6.8	2184	3.9	2384	2.9
1388	16.7	1588	15.0	1788	10.8	1988	6.7	2188	3.9	2388	2.9
1392	16.7	1592	15.0	1792	10.5	1992	6.3	2192	3.7	2392	2.9
1396	16.7	1596	15.0	1796	10.5	1996	6.3	2196	3.7	2396	2.9
1400	16.7	1600	15.0	1800	10.5	2000	6.3	2200	3.7	2400	2.9

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
2404	2.9	2604	2.8	2804	1.2	3004	9.7	3204	0.0	3404	0.0
2408	2.9	2608	2.8	2808	1.2	3008	0.0	3208	0.0	3408	0.0
2412	2.9	2612	2.8	2812	1.2	3012	0.0	3212	0.0	3412	0.0
2416	2.9	2616	2.8	2816	1.2	3016	0.0	3216	0.0	3416	0.0
2420	2.9	2620	2.8	2820	1.2	3020	0.0	3220	0.0	3420	0.0
2424	2.8	2624	2.8	2824	1.0	3024	0.0	3224	0.0	3424	0.0
2428	2.8	2628	2.7	2828	0.7	3028	0.0	3228	0.0	3428	0.0
2432	2.8	2632	2.7	2832	0.7	3032	0.0	3232	0.0	3432	0.0
2436	2.8	2636	2.7	2836	0.7	3036	0.0	3236	0.0	3436	0.0
2440	2.8	2640	2.7	2840	0.7	3040	0.0	3240	0.0	3440	0.0
2444	2.8	2644	2.7	2844	0.7	3044	0.0	3244	0.0	3444	0.0
2448	2.8	2648	2.7	2848	0.7	3048	0.0	3248	0.0	3448	0.0
2452	2.8	2652	2.7	2852	0.6	3052	0.0	3252	0.0	3452	0.0
2456	2.8	2656	2.6	2856	0.1	3056	0.0	3256	0.0	3456	0.0
2460	2.8	2660	2.6	2860	0.1	3060	0.0	3260	0.0	3460	0.0
2464	2.8	2664	2.6	2864	0.1	3064	0.0	3264	0.0	3464	0.0
2468	2.8	2668	2.6	2868	0.1	3068	0.0	3268	0.0	3468	0.0
2472	2.8	2672	2.6	2872	0.1	3072	0.0	3272	0.0	3472	0.0
2476	2.8	2676	2.6	2876	0.1	3076	0.0	3276	0.0	3476	0.0
2480	2.8	2680	2.6	2880	0.1	3080	0.0	3280	0.0	3480	0.0
2484	2.8	2684	2.5	2884	0.0	3084	0.0	3284	0.0	3484	0.0
2488	2.8	2688	2.5	2888	0.0	3088	0.0	3288	0.0	3488	0.0
2492	2.8	2692	2.5	2892	0.0	3092	0.0	3292	0.0	3492	0.0
2496	2.8	2696	2.5	2896	0.0	3096	0.0	3296	0.0	3496	0.0
2500	2.8	2700	2.5	2900	0.0	3100	0.0	3300	0.0	3500	0.0
2504	2.8	2704	2.5	2904	0.0	3104	0.0	3304	0.0	3504	0.0
2508	2.9	2708	2.5	2908	0.0	3108	0.0	3308	0.0	3508	0.0
2512	2.9	2712	2.3	2912	0.0	3112	0.0	3312	0.0	3512	0.0
2516	2.9	2716	2.3	2916	25.9	3116	0.0	3316	0.0	3516	0.0
2520	2.9	2720	2.3	2920	40.1	3120	0.0	3320	0.0	3520	0.0
2524	2.9	2724	2.3	2924	50.7	3124	0.0	3324	0.0	3524	0.0
2528	2.9	2728	2.3	2928	68.9	3128	0.0	3328	0.0	3528	0.0
2532	2.9	2732	2.3	2932	97.9	3132	0.0	3332	0.0	3532	0.0
2536	2.9	2736	2.3	2936	136.5	3136	0.0	3336	0.0	3536	0.0
2540	2.9	2740	2.0	2940	184.7	3140	0.0	3340	0.0	3540	0.0
2544	2.9	2744	2.0	2944	211.9	3144	0.0	3344	0.0	3544	0.0
2548	2.9	2748	2.0	2948	184.7	3148	0.0	3348	0.0	3548	0.0
2552	2.9	2752	2.0	2952	136.5	3152	0.0	3352	0.0	3552	0.0
2556	2.9	2756	2.0	2956	97.9	3156	0.0	3356	0.0	3556	0.0
2560	2.9	2760	2.0	2960	68.9	3160	0.0	3360	0.0	3560	0.0
2564	2.8	2764	2.0	2964	50.7	3164	0.0	3364	0.0	3564	0.0
2568	2.8	2768	1.7	2968	40.1	3168	0.0	3368	0.0	3568	0.0
2572	2.8	2772	1.7	2972	34.0	3172	0.0	3372	0.0	3572	0.0
2576	2.8	2776	1.7	2976	30.2	3176	0.0	3376	0.0	3576	0.0
2580	2.8	2780	1.7	2980	27.4	3180	0.0	3380	0.0	3580	0.0
2584	2.8	2784	1.7	2984	25.1	3184	0.0	3384	0.0	3584	0.0
2588	2.8	2788	1.7	2988	23.3	3188	0.0	3388	0.0	3588	0.0
2592	2.8	2792	1.7	2992	22.0	3192	0.0	3392	0.0	3592	0.0
2596	2.8	2796	1.4	2996	21.1	3196	0.0	3396	0.0	3596	0.0
2600	2.8	2800	1.2	3000	20.0	3200	0.0	3400	0.0	3600	0.0

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
3604	0.0	3804	0.0	4004	0.0	4204	0.0	4404	0.0	4604	0.0
3608	0.0	3808	0.0	4008	0.0	4208	0.0	4408	0.0	4608	0.0
3612	0.0	3812	0.0	4012	0.0	4212	0.0	4412	0.0	4612	0.0
3616	0.0	3816	0.0	4016	0.0	4216	0.0	4416	0.0	4616	0.0
3620	0.0	3820	0.0	4020	0.0	4220	0.0	4420	0.0	4620	0.0
3624	0.0	3824	0.0	4024	0.0	4224	0.0	4424	0.0	4624	0.0
3628	0.0	3828	0.0	4028	0.0	4228	0.0	4428	0.0	4628	0.0
3632	0.0	3832	0.0	4032	0.0	4232	0.0	4432	0.0	4632	0.0
3636	0.0	3836	0.0	4036	0.0	4236	0.0	4436	0.0	4636	0.0
3640	0.0	3840	0.0	4040	0.0	4240	0.0	4440	0.0	4640	0.0
3644	0.0	3844	0.0	4044	0.0	4244	0.0	4444	0.0	4644	0.0
3648	0.0	3848	0.0	4048	0.0	4248	0.0	4448	0.0	4648	0.0
3652	0.0	3852	0.0	4052	0.0	4252	0.0	4452	0.0	4652	0.0
3656	0.0	3856	0.0	4056	0.0	4256	0.0	4456	0.0	4656	0.0
3660	0.0	3860	0.0	4060	0.0	4260	0.0	4460	0.0	4660	0.0
3664	0.0	3864	0.0	4064	0.0	4264	0.0	4464	0.0	4664	0.0
3668	0.0	3868	0.0	4068	0.0	4268	0.0	4468	0.0	4668	0.0
3672	0.0	3872	0.0	4072	0.0	4272	0.0	4472	0.0	4672	0.0
3676	0.0	3876	0.0	4076	0.0	4276	0.0	4476	0.0	4676	0.0
3680	0.0	3880	0.0	4080	0.0	4280	0.0	4480	0.0	4680	0.0
3684	0.0	3884	0.0	4084	0.0	4284	0.0	4484	0.0	4684	0.0
3688	0.0	3888	0.0	4088	0.0	4288	0.0	4488	0.0	4688	0.0
3692	0.0	3892	0.0	4092	0.0	4292	0.0	4492	0.0	4692	0.0
3696	0.0	3896	0.0	4096	0.0	4296	0.0	4496	0.0	4696	0.0
3700	0.0	3900	0.0	4100	0.0	4300	0.0	4500	0.0	4700	0.0
3704	0.0	3904	0.0	4104	0.0	4304	0.0	4504	0.0	4704	0.0
3708	0.0	3908	0.0	4108	0.0	4308	0.0	4508	0.0	4708	0.0
3712	0.0	3912	0.0	4112	0.0	4312	0.0	4512	0.0	4712	0.0
3716	0.0	3916	0.0	4116	0.0	4316	0.0	4516	0.0	4716	0.0
3720	0.0	3920	0.0	4120	0.0	4320	0.0	4520	0.0	4720	0.0
3724	0.0	3924	0.0	4124	0.0	4324	0.0	4524	0.0	4724	0.0
3728	0.0	3928	0.0	4128	0.0	4328	0.0	4528	0.0	4728	0.0
3732	0.0	3932	0.0	4132	0.0	4332	0.0	4532	0.0	4732	0.0
3736	0.0	3936	0.0	4136	0.0	4336	0.0	4536	0.0	4736	0.0
3740	0.0	3940	0.0	4140	0.0	4340	0.0	4540	0.0	4740	0.0
3744	0.0	3944	0.0	4144	0.0	4344	0.0	4544	0.0	4744	0.0
3748	0.0	3948	0.0	4148	0.0	4348	0.0	4548	0.0	4748	0.0
3752	0.0	3952	0.0	4152	0.0	4352	0.0	4552	0.0	4752	0.0
3756	0.0	3956	0.0	4156	0.0	4356	0.0	4556	0.0	4756	0.0
3760	0.0	3960	0.0	4160	0.0	4360	0.0	4560	0.0	4760	0.0
3764	0.0	3964	0.0	4164	0.0	4364	0.0	4564	0.0	4764	0.0
3768	0.0	3968	0.0	4168	0.0	4368	0.0	4568	0.0	4768	0.0
3772	0.0	3972	0.0	4172	0.0	4372	0.0	4572	0.0	4772	0.0
3776	0.0	3976	0.0	4176	0.0	4376	0.0	4576	0.0	4776	0.0
3780	0.0	3980	0.0	4180	0.0	4380	0.0	4580	0.0	4780	0.0
3784	0.0	3984	0.0	4184	0.0	4384	0.0	4584	0.0	4784	0.0
3788	0.0	3988	0.0	4188	0.0	4388	0.0	4588	0.0	4788	0.0
3792	0.0	3992	0.0	4192	0.0	4392	0.0	4592	0.0	4792	0.0
3796	0.0	3996	0.0	4196	0.0	4396	0.0	4596	0.0	4796	0.0
3800	0.0	4000	0.0	4200	0.0	4400	0.0	4600	0.0	4800	0.0

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
4804	0.0	5004	0.0	5204	0.0	5404	0.0	5604	0.0	5804	0.0
4808	0.0	5008	0.0	5208	0.0	5408	0.0	5608	0.0	5808	0.0
4812	0.0	5012	0.0	5212	0.0	5412	0.0	5612	0.0	5812	0.0
4816	0.0	5016	0.0	5216	0.0	5416	0.0	5616	0.0	5816	0.0
4820	0.0	5020	0.0	5220	0.0	5420	0.0	5620	0.0	5820	0.0
4824	0.0	5024	0.0	5224	0.0	5424	0.0	5624	0.0	5824	0.0
4828	0.0	5028	0.0	5228	0.0	5428	0.0	5628	0.0	5828	0.0
4832	0.0	5032	0.0	5232	0.0	5432	0.0	5632	0.0	5832	0.0
4836	0.0	5036	0.0	5236	0.0	5436	0.0	5636	0.0	5836	0.0
4840	0.0	5040	0.0	5240	0.0	5440	0.0	5640	0.0	5840	0.0
4844	0.0	5044	0.0	5244	0.0	5444	0.0	5644	0.0	5844	0.0
4848	0.0	5048	0.0	5248	0.0	5448	0.0	5648	0.0	5848	0.0
4852	0.0	5052	0.0	5252	0.0	5452	0.0	5652	0.0	5852	0.0
4856	0.0	5056	0.0	5256	0.0	5456	0.0	5656	0.0	5856	0.0
4860	0.0	5060	0.0	5260	0.0	5460	0.0	5660	0.0	5860	0.0
4864	0.0	5064	0.0	5264	0.0	5464	0.0	5664	0.0	5864	0.0
4868	0.0	5068	0.0	5268	0.0	5468	0.0	5668	0.0	5868	0.0
4872	0.0	5072	0.0	5272	0.0	5472	0.0	5672	0.0	5872	0.0
4876	0.0	5076	0.0	5276	0.0	5476	0.0	5676	0.0	5876	0.0
4880	0.0	5080	0.0	5280	0.0	5480	0.0	5680	0.0	5880	0.0
4884	0.0	5084	0.0	5284	0.0	5484	0.0	5684	0.0	5884	0.0
4888	0.0	5088	0.0	5288	0.0	5488	0.0	5688	0.0	5888	0.0
4892	0.0	5092	0.0	5292	0.0	5492	0.0	5692	0.0	5892	0.0
4896	0.0	5096	0.0	5296	0.0	5496	0.0	5696	0.0	5896	0.0
4900	0.0	5100	0.0	5300	0.0	5500	0.0	5700	0.0	5900	0.0
4904	0.0	5104	0.0	5304	0.0	5504	0.0	5704	0.0	5904	0.0
4908	0.0	5108	0.0	5308	0.0	5508	0.0	5708	0.0	5908	0.0
4912	0.0	5112	0.0	5312	0.0	5512	0.0	5712	0.0	5912	0.0
4916	0.0	5116	0.0	5316	0.0	5516	0.0	5716	0.0	5916	0.0
4920	0.0	5120	0.0	5320	0.0	5520	0.0	5720	0.0	5920	0.0
4924	0.0	5124	0.0	5324	0.0	5524	0.0	5724	0.0	5924	0.0
4928	0.0	5128	0.0	5328	0.0	5528	0.0	5728	0.0	5928	0.0
4932	0.0	5132	0.0	5332	0.0	5532	0.0	5732	0.0	5932	0.0
4936	0.0	5136	0.0	5336	0.0	5536	0.0	5736	0.0	5936	0.0
4940	0.0	5140	0.0	5340	0.0	5540	0.0	5740	0.0	5940	0.0
4944	0.0	5144	0.0	5344	0.0	5544	0.0	5744	0.0	5944	0.0
4948	0.0	5148	0.0	5348	0.0	5548	0.0	5748	0.0	5948	0.0
4952	0.0	5152	0.0	5352	0.0	5552	0.0	5752	0.0	5952	0.0
4956	0.0	5156	0.0	5356	0.0	5556	0.0	5756	0.0	5956	0.0
4960	0.0	5160	0.0	5360	0.0	5560	0.0	5760	0.0	5960	0.0
4964	0.0	5164	0.0	5364	0.0	5564	0.0	5764	0.0	5964	0.0
4968	0.0	5168	0.0	5368	0.0	5568	0.0	5768	0.0	5968	0.0
4972	0.0	5172	0.0	5372	0.0	5572	0.0	5772	0.0	5972	0.0
4976	0.0	5176	0.0	5376	0.0	5576	0.0	5776	0.0	5976	0.0
4980	0.0	5180	0.0	5380	0.0	5580	0.0	5780	0.0	5980	0.0
4984	0.0	5184	0.0	5384	0.0	5584	0.0	5784	0.0	5984	0.0
4988	0.0	5188	0.0	5388	0.0	5588	0.0	5788	0.0	5988	0.0
4992	0.0	5192	0.0	5392	0.0	5592	0.0	5792	0.0	5992	0.0
4996	0.0	5196	0.0	5396	0.0	5596	0.0	5796	0.0	5996	0.0
5000	0.0	5200	0.0	5400	0.0	5600	0.0	5800	0.0	6000	0.0

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
6004	0.0	6008	0.0								

Model Details

Storage is Online Cover Level (m) 10.000

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	67.0
Membrane Percolation (mm/hr)	1000	Length (m)	67.0
Max Percolation (l/s)	1246.9	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	9.000	Membrane Depth (m)	0

Orifice Outflow Control

Diameter (m) 0.030 Discharge Coefficient 0.600 Invert Level (m) 9.000

Summary of Results for Input Hydrograph

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
Input Hydrograph	9.954	0.954	2.0	2521.3	O K

Storm Event	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
Input Hydrograph	0.0	1148.7	5792

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
8	0.2	408	3.0	808	3.3	1208	3.7	1608	5.7	2008	9.7
16	0.2	416	3.1	816	3.3	1216	3.8	1616	5.8	2016	9.7
24	0.2	424	3.1	824	3.3	1224	3.8	1624	6.1	2024	10.4
32	0.2	432	3.1	832	3.3	1232	3.8	1632	6.1	2032	10.4
40	0.2	440	3.1	840	3.3	1240	3.8	1640	6.1	2040	10.4
48	0.2	448	3.1	848	3.3	1248	3.8	1648	6.1	2048	10.4
56	0.2	456	3.1	856	3.3	1256	3.8	1656	6.1	2056	10.4
64	0.8	464	3.2	864	3.3	1264	3.8	1664	6.1	2064	10.4
72	1.0	472	3.2	872	3.3	1272	3.9	1672	6.2	2072	10.4
80	1.0	480	3.2	880	3.3	1280	4.0	1680	6.6	2080	11.0
88	1.0	488	3.2	888	3.3	1288	4.0	1688	6.6	2088	11.1
96	1.0	496	3.2	896	3.3	1296	4.0	1696	6.6	2096	11.1
104	1.0	504	3.2	904	3.3	1304	4.0	1704	6.6	2104	11.1
112	1.0	512	3.2	912	3.3	1312	4.0	1712	6.6	2112	11.1
120	1.3	520	3.2	920	3.3	1320	4.0	1720	6.6	2120	11.1
128	1.6	528	3.3	928	3.4	1328	4.1	1728	6.6	2128	11.1
136	1.6	536	3.3	936	3.4	1336	4.3	1736	7.2	2136	11.6
144	1.6	544	3.3	944	3.4	1344	4.3	1744	7.2	2144	11.9
152	1.6	552	3.3	952	3.4	1352	4.3	1752	7.2	2152	11.9
160	1.6	560	3.3	960	3.4	1360	4.3	1760	7.2	2160	11.9
168	1.6	568	3.3	968	3.4	1368	4.3	1768	7.2	2168	11.9
176	1.8	576	3.3	976	3.4	1376	4.3	1776	7.2	2176	11.9
184	2.0	584	3.3	984	3.4	1384	4.3	1784	7.2	2184	11.9
192	2.0	592	3.3	992	3.4	1392	4.5	1792	7.6	2192	12.2
200	2.0	600	3.3	1000	3.4	1400	4.5	1800	7.8	2200	12.6
208	2.0	608	3.3	1008	3.4	1408	4.5	1808	7.8	2208	12.6
216	2.0	616	3.3	1016	3.4	1416	4.5	1816	7.8	2216	12.6
224	2.0	624	3.3	1024	3.4	1424	4.5	1824	7.8	2224	12.6
232	2.1	632	3.3	1032	3.4	1432	4.5	1832	7.8	2232	12.6
240	2.4	640	3.3	1040	3.4	1440	4.5	1840	7.8	2240	12.6
248	2.4	648	3.3	1048	3.5	1448	4.9	1848	8.1	2248	12.8
256	2.4	656	3.3	1056	3.5	1456	4.9	1856	8.4	2256	13.4
264	2.4	664	3.3	1064	3.5	1464	4.9	1864	8.4	2264	13.4
272	2.4	672	3.3	1072	3.5	1472	4.9	1872	8.4	2272	13.4
280	2.4	680	3.3	1080	3.5	1480	4.9	1880	8.4	2280	13.4
288	2.4	688	3.3	1088	3.5	1488	4.9	1888	8.4	2288	13.4
296	2.7	696	3.4	1096	3.5	1496	4.9	1896	8.4	2296	13.4
304	2.7	704	3.4	1104	3.5	1504	5.2	1904	8.6	2304	13.4
312	2.7	712	3.4	1112	3.5	1512	5.2	1912	9.0	2312	14.1
320	2.7	720	3.4	1120	3.5	1520	5.2	1920	9.0	2320	14.1
328	2.7	728	3.4	1128	3.5	1528	5.2	1928	9.0	2328	14.1
336	2.7	736	3.4	1136	3.5	1536	5.2	1936	9.0	2336	14.1
344	2.7	744	3.4	1144	3.5	1544	5.2	1944	9.0	2344	14.1
352	2.9	752	3.3	1152	3.5	1552	5.2	1952	9.0	2352	14.1
360	3.0	760	3.3	1160	3.7	1560	5.5	1960	9.2	2360	14.1
368	3.0	768	3.3	1168	3.7	1568	5.7	1968	9.7	2368	14.7
376	3.0	776	3.3	1176	3.7	1576	5.7	1976	9.7	2376	14.8
384	3.0	784	3.3	1184	3.7	1584	5.7	1984	9.7	2384	14.8
392	3.0	792	3.3	1192	3.7	1592	5.7	1992	9.7	2392	14.8
400	3.0	800	3.3	1200	3.7	1600	5.7	2000	9.7	2400	14.8

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
2408	14.8	2808	18.8	3208	16.9	3608	11.9	4008	7.2	4408	4.3
2416	14.8	2816	18.8	3216	16.9	3616	11.9	4016	7.2	4416	4.3
2424	15.3	2824	18.8	3224	16.9	3624	11.9	4024	7.2	4424	4.3
2432	15.6	2832	19.0	3232	16.3	3632	11.6	4032	7.2	4432	4.3
2440	15.6	2840	19.0	3240	16.2	3640	11.1	4040	6.6	4440	4.1
2448	15.6	2848	19.0	3248	16.2	3648	11.1	4048	6.6	4448	4.0
2456	15.6	2856	19.0	3256	16.2	3656	11.1	4056	6.6	4456	4.0
2464	15.6	2864	19.0	3264	16.2	3664	11.1	4064	6.6	4464	4.0
2472	15.6	2872	19.0	3272	16.2	3672	11.1	4072	6.6	4472	4.0
2480	15.8	2880	19.0	3280	16.2	3680	11.1	4080	6.6	4480	4.0
2488	16.2	2888	19.0	3288	15.8	3688	11.0	4088	6.6	4488	4.0
2496	16.2	2896	19.0	3296	15.6	3696	10.4	4096	6.2	4496	3.9
2504	16.2	2904	19.0	3304	15.6	3704	10.4	4104	6.1	4504	3.8
2512	16.2	2912	19.0	3312	15.6	3712	10.4	4112	6.1	4512	3.8
2520	16.2	2920	19.0	3320	15.6	3720	10.4	4120	6.1	4520	3.8
2528	16.2	2928	19.0	3328	15.6	3728	10.4	4128	6.1	4528	3.8
2536	16.3	2936	19.0	3336	15.6	3736	10.4	4136	6.1	4536	3.8
2544	16.9	2944	18.8	3344	15.3	3744	10.4	4144	6.1	4544	3.8
2552	16.9	2952	18.8	3352	14.8	3752	9.7	4152	5.8	4552	3.8
2560	16.9	2960	18.8	3360	14.8	3760	9.7	4160	5.7	4560	3.7
2568	16.9	2968	18.8	3368	14.8	3768	9.7	4168	5.7	4568	3.7
2576	16.9	2976	18.8	3376	14.8	3776	9.7	4176	5.7	4576	3.7
2584	16.9	2984	18.8	3384	14.8	3784	9.7	4184	5.7	4584	3.7
2592	16.9	2992	18.8	3392	14.8	3792	9.7	4192	5.7	4592	3.7
2600	17.4	3000	18.5	3400	14.7	3800	9.7	4200	5.7	4600	3.7
2608	17.4	3008	18.4	3408	14.1	3808	9.2	4208	5.5	4608	3.7
2616	17.4	3016	18.4	3416	14.1	3816	9.0	4216	5.2	4616	3.5
2624	17.4	3024	18.4	3424	14.1	3824	9.0	4224	5.2	4624	3.5
2632	17.4	3032	18.4	3432	14.1	3832	9.0	4232	5.2	4632	3.5
2640	17.4	3040	18.4	3440	14.1	3840	9.0	4240	5.2	4640	3.5
2648	17.4	3048	18.4	3448	14.1	3848	9.0	4248	5.2	4648	3.5
2656	17.8	3056	18.2	3456	14.1	3856	9.0	4256	5.2	4656	3.5
2664	17.9	3064	17.9	3464	13.4	3864	8.6	4264	5.2	4664	3.5
2672	17.9	3072	17.9	3472	13.4	3872	8.4	4272	4.9	4672	3.5
2680	17.9	3080	17.9	3480	13.4	3880	8.4	4280	4.9	4680	3.5
2688	17.9	3088	17.9	3488	13.4	3888	8.4	4288	4.9	4688	3.5
2696	17.9	3096	17.9	3496	13.4	3896	8.4	4296	4.9	4696	3.5
2704	17.9	3104	17.9	3504	13.4	3904	8.4	4304	4.9	4704	3.5
2712	18.2	3112	17.8	3512	13.4	3912	8.4	4312	4.9	4712	3.5
2720	18.4	3120	17.4	3520	12.8	3920	8.1	4320	4.9	4720	3.5
2728	18.4	3128	17.4	3528	12.6	3928	7.8	4328	4.5	4728	3.4
2736	18.4	3136	17.4	3536	12.6	3936	7.8	4336	4.5	4736	3.4
2744	18.4	3144	17.4	3544	12.6	3944	7.8	4344	4.5	4744	3.4
2752	18.4	3152	17.4	3552	12.6	3952	7.8	4352	4.5	4752	3.4
2760	18.4	3160	17.4	3560	12.6	3960	7.8	4360	4.5	4760	3.4
2768	18.5	3168	17.4	3568	12.6	3968	7.8	4368	4.5	4768	3.4
2776	18.8	3176	16.9	3576	12.2	3976	7.6	4376	4.5	4776	3.4
2784	18.8	3184	16.9	3584	11.9	3984	7.2	4384	4.3	4784	3.4
2792	18.8	3192	16.9	3592	11.9	3992	7.2	4392	4.3	4792	3.4
2800	18.8	3200	16.9	3600	11.9	4000	7.2	4400	4.3	4800	3.4

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
4808	3.4	5208	3.3	5608	1.6	6008	0.0	6408	0.0	6808	0.0
4816	3.4	5216	3.3	5616	1.6	6016	0.0	6416	0.0	6816	0.0
4824	3.4	5224	3.3	5624	1.6	6024	0.0	6424	0.0	6824	0.0
4832	3.4	5232	3.3	5632	1.6	6032	0.0	6432	0.0	6832	0.0
4840	3.4	5240	3.3	5640	1.6	6040	0.0	6440	0.0	6840	0.0
4848	3.3	5248	3.2	5648	1.3	6048	0.0	6448	0.0	6848	0.0
4856	3.3	5256	3.2	5656	1.0	6056	0.0	6456	0.0	6856	0.0
4864	3.3	5264	3.2	5664	1.0	6064	0.0	6464	0.0	6864	0.0
4872	3.3	5272	3.2	5672	1.0	6072	0.0	6472	0.0	6872	0.0
4880	3.3	5280	3.2	5680	1.0	6080	0.0	6480	0.0	6880	0.0
4888	3.3	5288	3.2	5688	1.0	6088	0.0	6488	0.0	6888	0.0
4896	3.3	5296	3.2	5696	1.0	6096	0.0	6496	0.0	6896	0.0
4904	3.3	5304	3.2	5704	0.8	6104	0.0	6504	0.0	6904	0.0
4912	3.3	5312	3.1	5712	0.8	6112	0.0	6512	0.0	6912	0.0
4920	3.3	5320	3.1	5720	0.2	6120	0.0	6520	0.0	6920	0.0
4928	3.3	5328	3.1	5728	19.4	6128	0.0	6528	0.0	6928	0.0
4936	3.3	5336	3.1	5736	46.4	6136	0.0	6536	0.0	6936	0.0
4944	3.3	5344	3.1	5744	67.3	6144	0.0	6544	0.0	6944	0.0
4952	3.3	5352	3.1	5752	193.5	6152	0.0	6552	0.0	6952	0.0
4960	3.3	5360	3.0	5760	364.8	6160	0.0	6560	0.0	6960	0.0
4968	3.3	5368	3.0	5768	100.4	6168	0.0	6568	0.0	6968	0.0
4976	3.3	5376	3.0	5776	54.3	6176	0.0	6576	0.0	6976	0.0
4984	3.3	5384	3.0	5784	41.9	6184	0.0	6584	0.0	6984	0.0
4992	3.3	5392	3.0	5792	0.0	6192	0.0	6592	0.0	6992	0.0
5000	3.3	5400	3.0	5800	0.0	6200	0.0	6600	0.0	7000	0.0
5008	3.3	5408	3.0	5808	0.0	6208	0.0	6608	0.0	7008	0.0
5016	3.3	5416	2.9	5816	0.0	6216	0.0	6616	0.0	7016	0.0
5024	3.4	5424	2.7	5824	0.0	6224	0.0	6624	0.0	7024	0.0
5032	3.4	5432	2.7	5832	0.0	6232	0.0	6632	0.0	7032	0.0
5040	3.4	5440	2.7	5840	0.0	6240	0.0	6640	0.0	7040	0.0
5048	3.4	5448	2.7	5848	0.0	6248	0.0	6648	0.0	7048	0.0
5056	3.4	5456	2.7	5856	0.0	6256	0.0	6656	0.0	7056	0.0
5064	3.4	5464	2.7	5864	0.0	6264	0.0	6664	0.0	7064	0.0
5072	3.4	5472	2.7	5872	0.0	6272	0.0	6672	0.0	7072	0.0
5080	3.4	5480	2.4	5880	0.0	6280	0.0	6680	0.0	7080	0.0
5088	3.4	5488	2.4	5888	0.0	6288	0.0	6688	0.0	7088	0.0
5096	3.4	5496	2.4	5896	0.0	6296	0.0	6696	0.0	7096	0.0
5104	3.4	5504	2.4	5904	0.0	6304	0.0	6704	0.0	7104	0.0
5112	3.4	5512	2.4	5912	0.0	6312	0.0	6712	0.0	7112	0.0
5120	3.4	5520	2.4	5920	0.0	6320	0.0	6720	0.0	7120	0.0
5128	3.3	5528	2.4	5928	0.0	6328	0.0	6728	0.0	7128	0.0
5136	3.3	5536	2.1	5936	0.0	6336	0.0	6736	0.0	7136	0.0
5144	3.3	5544	2.0	5944	0.0	6344	0.0	6744	0.0	7144	0.0
5152	3.3	5552	2.0	5952	0.0	6352	0.0	6752	0.0	7152	0.0
5160	3.3	5560	2.0	5960	0.0	6360	0.0	6760	0.0	7160	0.0
5168	3.3	5568	2.0	5968	0.0	6368	0.0	6768	0.0	7168	0.0
5176	3.3	5576	2.0	5976	0.0	6376	0.0	6776	0.0	7176	0.0
5184	3.3	5584	2.0	5984	0.0	6384	0.0	6784	0.0	7184	0.0
5192	3.3	5592	1.8	5992	0.0	6392	0.0	6792	0.0	7192	0.0
5200	3.3	5600	1.6	6000	0.0	6400	0.0	6800	0.0	7200	0.0

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
7208	0.0	7608	0.0	8008	0.0	8408	0.0	8808	0.0	9208	0.0
7216	0.0	7616	0.0	8016	0.0	8416	0.0	8816	0.0	9216	0.0
7224	0.0	7624	0.0	8024	0.0	8424	0.0	8824	0.0	9224	0.0
7232	0.0	7632	0.0	8032	0.0	8432	0.0	8832	0.0	9232	0.0
7240	0.0	7640	0.0	8040	0.0	8440	0.0	8840	0.0	9240	0.0
7248	0.0	7648	0.0	8048	0.0	8448	0.0	8848	0.0	9248	0.0
7256	0.0	7656	0.0	8056	0.0	8456	0.0	8856	0.0	9256	0.0
7264	0.0	7664	0.0	8064	0.0	8464	0.0	8864	0.0	9264	0.0
7272	0.0	7672	0.0	8072	0.0	8472	0.0	8872	0.0	9272	0.0
7280	0.0	7680	0.0	8080	0.0	8480	0.0	8880	0.0	9280	0.0
7288	0.0	7688	0.0	8088	0.0	8488	0.0	8888	0.0	9288	0.0
7296	0.0	7696	0.0	8096	0.0	8496	0.0	8896	0.0	9296	0.0
7304	0.0	7704	0.0	8104	0.0	8504	0.0	8904	0.0	9304	0.0
7312	0.0	7712	0.0	8112	0.0	8512	0.0	8912	0.0	9312	0.0
7320	0.0	7720	0.0	8120	0.0	8520	0.0	8920	0.0	9320	0.0
7328	0.0	7728	0.0	8128	0.0	8528	0.0	8928	0.0	9328	0.0
7336	0.0	7736	0.0	8136	0.0	8536	0.0	8936	0.0	9336	0.0
7344	0.0	7744	0.0	8144	0.0	8544	0.0	8944	0.0	9344	0.0
7352	0.0	7752	0.0	8152	0.0	8552	0.0	8952	0.0	9352	0.0
7360	0.0	7760	0.0	8160	0.0	8560	0.0	8960	0.0	9360	0.0
7368	0.0	7768	0.0	8168	0.0	8568	0.0	8968	0.0	9368	0.0
7376	0.0	7776	0.0	8176	0.0	8576	0.0	8976	0.0	9376	0.0
7384	0.0	7784	0.0	8184	0.0	8584	0.0	8984	0.0	9384	0.0
7392	0.0	7792	0.0	8192	0.0	8592	0.0	8992	0.0	9392	0.0
7400	0.0	7800	0.0	8200	0.0	8600	0.0	9000	0.0	9400	0.0
7408	0.0	7808	0.0	8208	0.0	8608	0.0	9008	0.0	9408	0.0
7416	0.0	7816	0.0	8216	0.0	8616	0.0	9016	0.0	9416	0.0
7424	0.0	7824	0.0	8224	0.0	8624	0.0	9024	0.0	9424	0.0
7432	0.0	7832	0.0	8232	0.0	8632	0.0	9032	0.0	9432	0.0
7440	0.0	7840	0.0	8240	0.0	8640	0.0	9040	0.0	9440	0.0
7448	0.0	7848	0.0	8248	0.0	8648	0.0	9048	0.0	9448	0.0
7456	0.0	7856	0.0	8256	0.0	8656	0.0	9056	0.0	9456	0.0
7464	0.0	7864	0.0	8264	0.0	8664	0.0	9064	0.0	9464	0.0
7472	0.0	7872	0.0	8272	0.0	8672	0.0	9072	0.0	9472	0.0
7480	0.0	7880	0.0	8280	0.0	8680	0.0	9080	0.0	9480	0.0
7488	0.0	7888	0.0	8288	0.0	8688	0.0	9088	0.0	9488	0.0
7496	0.0	7896	0.0	8296	0.0	8696	0.0	9096	0.0	9496	0.0
7504	0.0	7904	0.0	8304	0.0	8704	0.0	9104	0.0	9504	0.0
7512	0.0	7912	0.0	8312	0.0	8712	0.0	9112	0.0	9512	0.0
7520	0.0	7920	0.0	8320	0.0	8720	0.0	9120	0.0	9520	0.0
7528	0.0	7928	0.0	8328	0.0	8728	0.0	9128	0.0	9528	0.0
7536	0.0	7936	0.0	8336	0.0	8736	0.0	9136	0.0	9536	0.0
7544	0.0	7944	0.0	8344	0.0	8744	0.0	9144	0.0	9544	0.0
7552	0.0	7952	0.0	8352	0.0	8752	0.0	9152	0.0	9552	0.0
7560	0.0	7960	0.0	8360	0.0	8760	0.0	9160	0.0	9560	0.0
7568	0.0	7968	0.0	8368	0.0	8768	0.0	9168	0.0	9568	0.0
7576	0.0	7976	0.0	8376	0.0	8776	0.0	9176	0.0	9576	0.0
7584	0.0	7984	0.0	8384	0.0	8784	0.0	9184	0.0	9584	0.0
7592	0.0	7992	0.0	8392	0.0	8792	0.0	9192	0.0	9592	0.0
7600	0.0	8000	0.0	8400	0.0	8800	0.0	9200	0.0	9600	0.0

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
9608	0.0	9688	0.0	9768	0.0	9848	0.0	9928	0.0	10008	0.0
9616	0.0	9696	0.0	9776	0.0	9856	0.0	9936	0.0	10016	0.0
9624	0.0	9704	0.0	9784	0.0	9864	0.0	9944	0.0	10024	0.0
9632	0.0	9712	0.0	9792	0.0	9872	0.0	9952	0.0	10032	0.0
9640	0.0	9720	0.0	9800	0.0	9880	0.0	9960	0.0	10040	0.0
9648	0.0	9728	0.0	9808	0.0	9888	0.0	9968	0.0	10048	0.0
9656	0.0	9736	0.0	9816	0.0	9896	0.0	9976	0.0	10056	0.0
9664	0.0	9744	0.0	9824	0.0	9904	0.0	9984	0.0	10064	0.0
9672	0.0	9752	0.0	9832	0.0	9912	0.0	9992	0.0	10072	0.0
9680	0.0	9760	0.0	9840	0.0	9920	0.0	10000	0.0	10080	0.0

Model Details

Storage is Online Cover Level (m) 10.000

Tank or Pond Structure

Invert Level (m) 9.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1200.0	0.500	2500.0	1.000	5000.0

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-CHE-0064-2000-1000-2000
Design Head (m)	1.000
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	No
Diameter (mm)	64
Invert Level (m)	9.000
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	2.0
Flush-Flo™	0.156	1.7
Kick-Flo®	0.223	1.0
Mean Flow over Head Range	-	1.4

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.3	1.200	2.2	3.000	3.4	7.000	5.2
0.200	1.1	1.400	2.4	3.500	3.7	7.500	5.4
0.300	1.1	1.600	2.5	4.000	4.0	8.000	5.6
0.400	1.3	1.800	2.7	4.500	4.2	8.500	5.7
0.500	1.4	2.000	2.8	5.000	4.4	9.000	5.9
0.600	1.6	2.200	2.9	5.500	4.6	9.500	6.0
0.800	1.8	2.400	3.1	6.000	4.8		
1.000	2.0	2.600	3.2	6.500	5.0		

Summary of Results for Input Hydrograph

Half Drain Time : 7381 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
Input Hydrograph	9.400	1.400	0.0	1.9	1.9	1463.4	O K

Storm Event	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
Input Hydrograph	0.0	1049.5	2948

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
4	0.3	204	3.3	404	3.7	604	4.0	804	6.2	1004	10.6
8	0.3	208	3.4	408	3.7	608	4.2	808	6.4	1008	10.6
12	0.3	212	3.4	412	3.7	612	4.2	812	6.7	1012	11.4
16	0.3	216	3.4	416	3.7	616	4.2	816	6.7	1016	11.4
20	0.3	220	3.4	420	3.7	620	4.2	820	6.7	1020	11.4
24	0.3	224	3.4	424	3.7	624	4.2	824	6.7	1024	11.4
28	0.3	228	3.4	428	3.7	628	4.2	828	6.7	1028	11.4
32	0.9	232	3.5	432	3.7	632	4.2	832	6.7	1032	11.4
36	1.1	236	3.5	436	3.7	636	4.3	836	6.8	1036	11.4
40	1.1	240	3.5	440	3.7	640	4.4	840	7.2	1040	12.0
44	1.1	244	3.5	444	3.7	644	4.4	844	7.2	1044	12.2
48	1.1	248	3.5	448	3.7	648	4.4	848	7.2	1048	12.2
52	1.1	252	3.5	452	3.7	652	4.4	852	7.2	1052	12.2
56	1.1	256	3.5	456	3.7	656	4.4	856	7.2	1056	12.2
60	1.4	260	3.5	460	3.7	660	4.4	860	7.2	1060	12.2
64	1.7	264	3.6	464	3.7	664	4.5	864	7.2	1064	12.2
68	1.7	268	3.6	468	3.7	668	4.7	868	7.8	1068	12.7
72	1.7	272	3.6	472	3.7	672	4.7	872	7.8	1072	13.0
76	1.7	276	3.6	476	3.7	676	4.7	876	7.8	1076	13.0
80	1.7	280	3.6	480	3.7	680	4.7	880	7.8	1080	13.0
84	1.7	284	3.6	484	3.7	684	4.7	884	7.8	1084	13.0
88	1.9	288	3.6	488	3.7	688	4.7	888	7.8	1088	13.0
92	2.2	292	3.6	492	3.7	692	4.7	892	7.8	1092	13.0
96	2.2	296	3.6	496	3.7	696	5.0	896	8.4	1096	13.3
100	2.2	300	3.6	500	3.7	700	5.0	900	8.5	1100	13.8
104	2.2	304	3.6	504	3.7	704	5.0	904	8.5	1104	13.8
108	2.2	308	3.6	508	3.7	708	5.0	908	8.5	1108	13.8
112	2.2	312	3.6	512	3.7	712	5.0	912	8.5	1112	13.8
116	2.3	316	3.6	516	3.7	716	5.0	916	8.5	1116	13.8
120	2.7	320	3.7	520	3.7	720	5.0	920	8.5	1120	13.8
124	2.7	324	3.7	524	3.8	724	5.3	924	8.9	1124	14.0
128	2.7	328	3.7	528	3.8	728	5.3	928	9.2	1128	14.6
132	2.7	332	3.7	532	3.8	732	5.3	932	9.2	1132	14.6
136	2.7	336	3.7	536	3.8	736	5.3	936	9.2	1136	14.6
140	2.7	340	3.7	540	3.8	740	5.3	940	9.2	1140	14.6
144	2.7	344	3.7	544	3.8	744	5.3	944	9.2	1144	14.6
148	3.0	348	3.7	548	3.8	748	5.3	948	9.2	1148	14.6
152	3.0	352	3.7	552	3.9	752	5.7	952	9.4	1152	14.6
156	3.0	356	3.7	556	3.9	756	5.7	956	9.9	1156	15.4
160	3.0	360	3.7	560	3.9	760	5.7	960	9.9	1160	15.4
164	3.0	364	3.7	564	3.9	764	5.7	964	9.9	1164	15.4
168	3.0	368	3.7	568	3.9	768	5.7	968	9.9	1168	15.4
172	3.0	372	3.7	572	3.9	772	5.7	972	9.9	1172	15.4
176	3.2	376	3.7	576	3.9	776	5.7	976	9.9	1176	15.4
180	3.2	380	3.7	580	4.0	780	6.0	980	10.0	1180	15.4
184	3.2	384	3.7	584	4.0	784	6.2	984	10.6	1184	16.1
188	3.2	388	3.7	588	4.0	788	6.2	988	10.6	1188	16.2
192	3.2	392	3.7	592	4.0	792	6.2	992	10.6	1192	16.2
196	3.2	396	3.7	596	4.0	796	6.2	996	10.6	1196	16.2
200	3.2	400	3.7	600	4.0	800	6.2	1000	10.6	1200	16.2

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
1204	16.2	1404	20.5	1604	18.4	1804	13.0	2004	7.8	2204	4.7
1208	16.2	1408	20.5	1608	18.4	1808	13.0	2008	7.8	2208	4.7
1212	16.7	1412	20.6	1612	18.4	1812	13.0	2012	7.8	2212	4.7
1216	17.0	1416	20.8	1616	17.9	1816	12.7	2016	7.8	2216	4.7
1220	17.0	1420	20.8	1620	17.7	1820	12.2	2020	7.2	2220	4.5
1224	17.0	1424	20.8	1624	17.7	1824	12.2	2024	7.2	2224	4.4
1228	17.0	1428	20.8	1628	17.7	1828	12.2	2028	7.2	2228	4.4
1232	17.0	1432	20.8	1632	17.7	1832	12.2	2032	7.2	2232	4.4
1236	17.0	1436	20.8	1636	17.7	1836	12.2	2036	7.2	2236	4.4
1240	17.3	1440	20.8	1640	17.7	1840	12.2	2040	7.2	2240	4.4
1244	17.7	1444	20.8	1644	17.3	1844	12.0	2044	7.2	2244	4.4
1248	17.7	1448	20.8	1648	17.0	1848	11.4	2048	6.8	2248	4.3
1252	17.7	1452	20.8	1652	17.0	1852	11.4	2052	6.7	2252	4.2
1256	17.7	1456	20.8	1656	17.0	1856	11.4	2056	6.7	2256	4.2
1260	17.7	1460	20.8	1660	17.0	1860	11.4	2060	6.7	2260	4.2
1264	17.7	1464	20.8	1664	17.0	1864	11.4	2064	6.7	2264	4.2
1268	17.9	1468	20.8	1668	17.0	1868	11.4	2068	6.7	2268	4.2
1272	18.4	1472	20.6	1672	16.7	1872	11.4	2072	6.7	2272	4.2
1276	18.4	1476	20.5	1676	16.2	1876	10.6	2076	6.4	2276	4.2
1280	18.4	1480	20.5	1680	16.2	1880	10.6	2080	6.2	2280	4.0
1284	18.4	1484	20.5	1684	16.2	1884	10.6	2084	6.2	2284	4.0
1288	18.4	1488	20.5	1688	16.2	1888	10.6	2088	6.2	2288	4.0
1292	18.4	1492	20.5	1692	16.2	1892	10.6	2092	6.2	2292	4.0
1296	18.4	1496	20.5	1696	16.2	1896	10.6	2096	6.2	2296	4.0
1300	19.1	1500	20.3	1700	16.1	1900	10.6	2100	6.2	2300	4.0
1304	19.1	1504	20.1	1704	15.4	1904	10.0	2104	6.0	2304	4.0
1308	19.1	1508	20.1	1708	15.4	1908	9.9	2108	5.7	2308	3.9
1312	19.1	1512	20.1	1712	15.4	1912	9.9	2112	5.7	2312	3.9
1316	19.1	1516	20.1	1716	15.4	1916	9.9	2116	5.7	2316	3.9
1320	19.1	1520	20.1	1720	15.4	1920	9.9	2120	5.7	2320	3.9
1324	19.1	1524	20.1	1724	15.4	1924	9.9	2124	5.7	2324	3.9
1328	19.5	1528	19.9	1728	15.4	1928	9.9	2128	5.7	2328	3.9
1332	19.6	1532	19.6	1732	14.6	1932	9.4	2132	5.7	2332	3.9
1336	19.6	1536	19.6	1736	14.6	1936	9.2	2136	5.3	2336	3.8
1340	19.6	1540	19.6	1740	14.6	1940	9.2	2140	5.3	2340	3.8
1344	19.6	1544	19.6	1744	14.6	1944	9.2	2144	5.3	2344	3.8
1348	19.6	1548	19.6	1748	14.6	1948	9.2	2148	5.3	2348	3.8
1352	19.6	1552	19.6	1752	14.6	1952	9.2	2152	5.3	2352	3.8
1356	19.9	1556	19.5	1756	14.6	1956	9.2	2156	5.3	2356	3.8
1360	20.1	1560	19.1	1760	14.0	1960	8.9	2160	5.3	2360	3.8
1364	20.1	1564	19.1	1764	13.8	1964	8.5	2164	5.0	2364	3.7
1368	20.1	1568	19.1	1768	13.8	1968	8.5	2168	5.0	2368	3.7
1372	20.1	1572	19.1	1772	13.8	1972	8.5	2172	5.0	2372	3.7
1376	20.1	1576	19.1	1776	13.8	1976	8.5	2176	5.0	2376	3.7
1380	20.1	1580	19.1	1780	13.8	1980	8.5	2180	5.0	2380	3.7
1384	20.3	1584	19.1	1784	13.8	1984	8.5	2184	5.0	2384	3.7
1388	20.5	1588	18.4	1788	13.3	1988	8.4	2188	5.0	2388	3.7
1392	20.5	1592	18.4	1792	13.0	1992	7.8	2192	4.7	2392	3.7
1396	20.5	1596	18.4	1796	13.0	1996	7.8	2196	4.7	2396	3.7
1400	20.5	1600	18.4	1800	13.0	2000	7.8	2200	4.7	2400	3.7

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
2404	3.7	2604	3.6	2804	1.7	3004	0.0	3204	0.0	3404	0.0
2408	3.7	2608	3.6	2808	1.7	3008	0.0	3208	0.0	3408	0.0
2412	3.7	2612	3.6	2812	1.7	3012	0.0	3212	0.0	3412	0.0
2416	3.7	2616	3.6	2816	1.7	3016	0.0	3216	0.0	3416	0.0
2420	3.7	2620	3.6	2820	1.7	3020	0.0	3220	0.0	3420	0.0
2424	3.7	2624	3.5	2824	1.4	3024	0.0	3224	0.0	3424	0.0
2428	3.7	2628	3.5	2828	1.1	3028	0.0	3228	0.0	3428	0.0
2432	3.7	2632	3.5	2832	1.1	3032	0.0	3232	0.0	3432	0.0
2436	3.7	2636	3.5	2836	1.1	3036	0.0	3236	0.0	3436	0.0
2440	3.7	2640	3.5	2840	1.1	3040	0.0	3240	0.0	3440	0.0
2444	3.7	2644	3.5	2844	1.1	3044	0.0	3244	0.0	3444	0.0
2448	3.7	2648	3.5	2848	1.1	3048	0.0	3248	0.0	3448	0.0
2452	3.7	2652	3.5	2852	0.9	3052	0.0	3252	0.0	3452	0.0
2456	3.7	2656	3.4	2856	0.3	3056	0.0	3256	0.0	3456	0.0
2460	3.7	2660	3.4	2860	0.3	3060	0.0	3260	0.0	3460	0.0
2464	3.7	2664	3.4	2864	0.3	3064	0.0	3264	0.0	3464	0.0
2468	3.7	2668	3.4	2868	0.3	3068	0.0	3268	0.0	3468	0.0
2472	3.7	2672	3.4	2872	0.3	3072	0.0	3272	0.0	3472	0.0
2476	3.7	2676	3.4	2876	0.3	3076	0.0	3276	0.0	3476	0.0
2480	3.7	2680	3.3	2880	0.3	3080	0.0	3280	0.0	3480	0.0
2484	3.7	2684	3.2	2884	12.0	3084	0.0	3284	0.0	3484	0.0
2488	3.7	2688	3.2	2888	25.8	3088	0.0	3288	0.0	3488	0.0
2492	3.7	2692	3.2	2892	28.6	3092	0.0	3292	0.0	3492	0.0
2496	3.7	2696	3.2	2896	33.5	3096	0.0	3296	0.0	3496	0.0
2500	3.7	2700	3.2	2900	41.5	3100	0.0	3300	0.0	3500	0.0
2504	3.7	2704	3.2	2904	62.0	3104	0.0	3304	0.0	3504	0.0
2508	3.7	2708	3.2	2908	119.5	3108	0.0	3308	0.0	3508	0.0
2512	3.7	2712	3.0	2912	225.2	3112	0.0	3312	0.0	3512	0.0
2516	3.7	2716	3.0	2916	225.2	3116	0.0	3316	0.0	3516	0.0
2520	3.7	2720	3.0	2920	119.5	3120	0.0	3320	0.0	3520	0.0
2524	3.7	2724	3.0	2924	62.0	3124	0.0	3324	0.0	3524	0.0
2528	3.7	2728	3.0	2928	41.5	3128	0.0	3328	0.0	3528	0.0
2532	3.7	2732	3.0	2932	33.5	3132	0.0	3332	0.0	3532	0.0
2536	3.7	2736	3.0	2936	28.6	3136	0.0	3336	0.0	3536	0.0
2540	3.7	2740	2.7	2940	25.8	3140	0.0	3340	0.0	3540	0.0
2544	3.7	2744	2.7	2944	12.0	3144	0.0	3344	0.0	3544	0.0
2548	3.7	2748	2.7	2948	0.0	3148	0.0	3348	0.0	3548	0.0
2552	3.7	2752	2.7	2952	0.0	3152	0.0	3352	0.0	3552	0.0
2556	3.7	2756	2.7	2956	0.0	3156	0.0	3356	0.0	3556	0.0
2560	3.7	2760	2.7	2960	0.0	3160	0.0	3360	0.0	3560	0.0
2564	3.7	2764	2.7	2964	0.0	3164	0.0	3364	0.0	3564	0.0
2568	3.6	2768	2.3	2968	0.0	3168	0.0	3368	0.0	3568	0.0
2572	3.6	2772	2.2	2972	0.0	3172	0.0	3372	0.0	3572	0.0
2576	3.6	2776	2.2	2976	0.0	3176	0.0	3376	0.0	3576	0.0
2580	3.6	2780	2.2	2980	0.0	3180	0.0	3380	0.0	3580	0.0
2584	3.6	2784	2.2	2984	0.0	3184	0.0	3384	0.0	3584	0.0
2588	3.6	2788	2.2	2988	0.0	3188	0.0	3388	0.0	3588	0.0
2592	3.6	2792	2.2	2992	0.0	3192	0.0	3392	0.0	3592	0.0
2596	3.6	2796	1.9	2996	0.0	3196	0.0	3396	0.0	3596	0.0
2600	3.6	2800	1.7	3000	0.0	3200	0.0	3400	0.0	3600	0.0

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
3604	0.0	3804	0.0	4004	0.0	4204	0.0	4404	0.0	4604	0.0
3608	0.0	3808	0.0	4008	0.0	4208	0.0	4408	0.0	4608	0.0
3612	0.0	3812	0.0	4012	0.0	4212	0.0	4412	0.0	4612	0.0
3616	0.0	3816	0.0	4016	0.0	4216	0.0	4416	0.0	4616	0.0
3620	0.0	3820	0.0	4020	0.0	4220	0.0	4420	0.0	4620	0.0
3624	0.0	3824	0.0	4024	0.0	4224	0.0	4424	0.0	4624	0.0
3628	0.0	3828	0.0	4028	0.0	4228	0.0	4428	0.0	4628	0.0
3632	0.0	3832	0.0	4032	0.0	4232	0.0	4432	0.0	4632	0.0
3636	0.0	3836	0.0	4036	0.0	4236	0.0	4436	0.0	4636	0.0
3640	0.0	3840	0.0	4040	0.0	4240	0.0	4440	0.0	4640	0.0
3644	0.0	3844	0.0	4044	0.0	4244	0.0	4444	0.0	4644	0.0
3648	0.0	3848	0.0	4048	0.0	4248	0.0	4448	0.0	4648	0.0
3652	0.0	3852	0.0	4052	0.0	4252	0.0	4452	0.0	4652	0.0
3656	0.0	3856	0.0	4056	0.0	4256	0.0	4456	0.0	4656	0.0
3660	0.0	3860	0.0	4060	0.0	4260	0.0	4460	0.0	4660	0.0
3664	0.0	3864	0.0	4064	0.0	4264	0.0	4464	0.0	4664	0.0
3668	0.0	3868	0.0	4068	0.0	4268	0.0	4468	0.0	4668	0.0
3672	0.0	3872	0.0	4072	0.0	4272	0.0	4472	0.0	4672	0.0
3676	0.0	3876	0.0	4076	0.0	4276	0.0	4476	0.0	4676	0.0
3680	0.0	3880	0.0	4080	0.0	4280	0.0	4480	0.0	4680	0.0
3684	0.0	3884	0.0	4084	0.0	4284	0.0	4484	0.0	4684	0.0
3688	0.0	3888	0.0	4088	0.0	4288	0.0	4488	0.0	4688	0.0
3692	0.0	3892	0.0	4092	0.0	4292	0.0	4492	0.0	4692	0.0
3696	0.0	3896	0.0	4096	0.0	4296	0.0	4496	0.0	4696	0.0
3700	0.0	3900	0.0	4100	0.0	4300	0.0	4500	0.0	4700	0.0
3704	0.0	3904	0.0	4104	0.0	4304	0.0	4504	0.0	4704	0.0
3708	0.0	3908	0.0	4108	0.0	4308	0.0	4508	0.0	4708	0.0
3712	0.0	3912	0.0	4112	0.0	4312	0.0	4512	0.0	4712	0.0
3716	0.0	3916	0.0	4116	0.0	4316	0.0	4516	0.0	4716	0.0
3720	0.0	3920	0.0	4120	0.0	4320	0.0	4520	0.0	4720	0.0
3724	0.0	3924	0.0	4124	0.0	4324	0.0	4524	0.0	4724	0.0
3728	0.0	3928	0.0	4128	0.0	4328	0.0	4528	0.0	4728	0.0
3732	0.0	3932	0.0	4132	0.0	4332	0.0	4532	0.0	4732	0.0
3736	0.0	3936	0.0	4136	0.0	4336	0.0	4536	0.0	4736	0.0
3740	0.0	3940	0.0	4140	0.0	4340	0.0	4540	0.0	4740	0.0
3744	0.0	3944	0.0	4144	0.0	4344	0.0	4544	0.0	4744	0.0
3748	0.0	3948	0.0	4148	0.0	4348	0.0	4548	0.0	4748	0.0
3752	0.0	3952	0.0	4152	0.0	4352	0.0	4552	0.0	4752	0.0
3756	0.0	3956	0.0	4156	0.0	4356	0.0	4556	0.0	4756	0.0
3760	0.0	3960	0.0	4160	0.0	4360	0.0	4560	0.0	4760	0.0
3764	0.0	3964	0.0	4164	0.0	4364	0.0	4564	0.0	4764	0.0
3768	0.0	3968	0.0	4168	0.0	4368	0.0	4568	0.0	4768	0.0
3772	0.0	3972	0.0	4172	0.0	4372	0.0	4572	0.0	4772	0.0
3776	0.0	3976	0.0	4176	0.0	4376	0.0	4576	0.0	4776	0.0
3780	0.0	3980	0.0	4180	0.0	4380	0.0	4580	0.0	4780	0.0
3784	0.0	3984	0.0	4184	0.0	4384	0.0	4584	0.0	4784	0.0
3788	0.0	3988	0.0	4188	0.0	4388	0.0	4588	0.0	4788	0.0
3792	0.0	3992	0.0	4192	0.0	4392	0.0	4592	0.0	4792	0.0
3796	0.0	3996	0.0	4196	0.0	4396	0.0	4596	0.0	4796	0.0
3800	0.0	4000	0.0	4200	0.0	4400	0.0	4600	0.0	4800	0.0

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
4804	0.0	5004	0.0	5204	0.0	5404	0.0	5604	0.0	5804	0.0
4808	0.0	5008	0.0	5208	0.0	5408	0.0	5608	0.0	5808	0.0
4812	0.0	5012	0.0	5212	0.0	5412	0.0	5612	0.0	5812	0.0
4816	0.0	5016	0.0	5216	0.0	5416	0.0	5616	0.0	5816	0.0
4820	0.0	5020	0.0	5220	0.0	5420	0.0	5620	0.0	5820	0.0
4824	0.0	5024	0.0	5224	0.0	5424	0.0	5624	0.0	5824	0.0
4828	0.0	5028	0.0	5228	0.0	5428	0.0	5628	0.0	5828	0.0
4832	0.0	5032	0.0	5232	0.0	5432	0.0	5632	0.0	5832	0.0
4836	0.0	5036	0.0	5236	0.0	5436	0.0	5636	0.0	5836	0.0
4840	0.0	5040	0.0	5240	0.0	5440	0.0	5640	0.0	5840	0.0
4844	0.0	5044	0.0	5244	0.0	5444	0.0	5644	0.0	5844	0.0
4848	0.0	5048	0.0	5248	0.0	5448	0.0	5648	0.0	5848	0.0
4852	0.0	5052	0.0	5252	0.0	5452	0.0	5652	0.0	5852	0.0
4856	0.0	5056	0.0	5256	0.0	5456	0.0	5656	0.0	5856	0.0
4860	0.0	5060	0.0	5260	0.0	5460	0.0	5660	0.0	5860	0.0
4864	0.0	5064	0.0	5264	0.0	5464	0.0	5664	0.0	5864	0.0
4868	0.0	5068	0.0	5268	0.0	5468	0.0	5668	0.0	5868	0.0
4872	0.0	5072	0.0	5272	0.0	5472	0.0	5672	0.0	5872	0.0
4876	0.0	5076	0.0	5276	0.0	5476	0.0	5676	0.0	5876	0.0
4880	0.0	5080	0.0	5280	0.0	5480	0.0	5680	0.0	5880	0.0
4884	0.0	5084	0.0	5284	0.0	5484	0.0	5684	0.0	5884	0.0
4888	0.0	5088	0.0	5288	0.0	5488	0.0	5688	0.0	5888	0.0
4892	0.0	5092	0.0	5292	0.0	5492	0.0	5692	0.0	5892	0.0
4896	0.0	5096	0.0	5296	0.0	5496	0.0	5696	0.0	5896	0.0
4900	0.0	5100	0.0	5300	0.0	5500	0.0	5700	0.0	5900	0.0
4904	0.0	5104	0.0	5304	0.0	5504	0.0	5704	0.0	5904	0.0
4908	0.0	5108	0.0	5308	0.0	5508	0.0	5708	0.0	5908	0.0
4912	0.0	5112	0.0	5312	0.0	5512	0.0	5712	0.0	5912	0.0
4916	0.0	5116	0.0	5316	0.0	5516	0.0	5716	0.0	5916	0.0
4920	0.0	5120	0.0	5320	0.0	5520	0.0	5720	0.0	5920	0.0
4924	0.0	5124	0.0	5324	0.0	5524	0.0	5724	0.0	5924	0.0
4928	0.0	5128	0.0	5328	0.0	5528	0.0	5728	0.0	5928	0.0
4932	0.0	5132	0.0	5332	0.0	5532	0.0	5732	0.0	5932	0.0
4936	0.0	5136	0.0	5336	0.0	5536	0.0	5736	0.0	5936	0.0
4940	0.0	5140	0.0	5340	0.0	5540	0.0	5740	0.0	5940	0.0
4944	0.0	5144	0.0	5344	0.0	5544	0.0	5744	0.0	5944	0.0
4948	0.0	5148	0.0	5348	0.0	5548	0.0	5748	0.0	5948	0.0
4952	0.0	5152	0.0	5352	0.0	5552	0.0	5752	0.0	5952	0.0
4956	0.0	5156	0.0	5356	0.0	5556	0.0	5756	0.0	5956	0.0
4960	0.0	5160	0.0	5360	0.0	5560	0.0	5760	0.0	5960	0.0
4964	0.0	5164	0.0	5364	0.0	5564	0.0	5764	0.0	5964	0.0
4968	0.0	5168	0.0	5368	0.0	5568	0.0	5768	0.0	5968	0.0
4972	0.0	5172	0.0	5372	0.0	5572	0.0	5772	0.0	5972	0.0
4976	0.0	5176	0.0	5376	0.0	5576	0.0	5776	0.0	5976	0.0
4980	0.0	5180	0.0	5380	0.0	5580	0.0	5780	0.0	5980	0.0
4984	0.0	5184	0.0	5384	0.0	5584	0.0	5784	0.0	5984	0.0
4988	0.0	5188	0.0	5388	0.0	5588	0.0	5788	0.0	5988	0.0
4992	0.0	5192	0.0	5392	0.0	5592	0.0	5792	0.0	5992	0.0
4996	0.0	5196	0.0	5396	0.0	5596	0.0	5796	0.0	5996	0.0
5000	0.0	5200	0.0	5400	0.0	5600	0.0	5800	0.0	6000	0.0

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
6004	0.0	6204	0.0	6404	0.0	6604	0.0	6804	0.0	7004	0.0
6008	0.0	6208	0.0	6408	0.0	6608	0.0	6808	0.0	7008	0.0
6012	0.0	6212	0.0	6412	0.0	6612	0.0	6812	0.0	7012	0.0
6016	0.0	6216	0.0	6416	0.0	6616	0.0	6816	0.0	7016	0.0
6020	0.0	6220	0.0	6420	0.0	6620	0.0	6820	0.0	7020	0.0
6024	0.0	6224	0.0	6424	0.0	6624	0.0	6824	0.0	7024	0.0
6028	0.0	6228	0.0	6428	0.0	6628	0.0	6828	0.0	7028	0.0
6032	0.0	6232	0.0	6432	0.0	6632	0.0	6832	0.0	7032	0.0
6036	0.0	6236	0.0	6436	0.0	6636	0.0	6836	0.0	7036	0.0
6040	0.0	6240	0.0	6440	0.0	6640	0.0	6840	0.0	7040	0.0
6044	0.0	6244	0.0	6444	0.0	6644	0.0	6844	0.0	7044	0.0
6048	0.0	6248	0.0	6448	0.0	6648	0.0	6848	0.0	7048	0.0
6052	0.0	6252	0.0	6452	0.0	6652	0.0	6852	0.0	7052	0.0
6056	0.0	6256	0.0	6456	0.0	6656	0.0	6856	0.0	7056	0.0
6060	0.0	6260	0.0	6460	0.0	6660	0.0	6860	0.0	7060	0.0
6064	0.0	6264	0.0	6464	0.0	6664	0.0	6864	0.0	7064	0.0
6068	0.0	6268	0.0	6468	0.0	6668	0.0	6868	0.0	7068	0.0
6072	0.0	6272	0.0	6472	0.0	6672	0.0	6872	0.0	7072	0.0
6076	0.0	6276	0.0	6476	0.0	6676	0.0	6876	0.0	7076	0.0
6080	0.0	6280	0.0	6480	0.0	6680	0.0	6880	0.0	7080	0.0
6084	0.0	6284	0.0	6484	0.0	6684	0.0	6884	0.0	7084	0.0
6088	0.0	6288	0.0	6488	0.0	6688	0.0	6888	0.0	7088	0.0
6092	0.0	6292	0.0	6492	0.0	6692	0.0	6892	0.0	7092	0.0
6096	0.0	6296	0.0	6496	0.0	6696	0.0	6896	0.0	7096	0.0
6100	0.0	6300	0.0	6500	0.0	6700	0.0	6900	0.0	7100	0.0
6104	0.0	6304	0.0	6504	0.0	6704	0.0	6904	0.0	7104	0.0
6108	0.0	6308	0.0	6508	0.0	6708	0.0	6908	0.0	7108	0.0
6112	0.0	6312	0.0	6512	0.0	6712	0.0	6912	0.0	7112	0.0
6116	0.0	6316	0.0	6516	0.0	6716	0.0	6916	0.0	7116	0.0
6120	0.0	6320	0.0	6520	0.0	6720	0.0	6920	0.0	7120	0.0
6124	0.0	6324	0.0	6524	0.0	6724	0.0	6924	0.0	7124	0.0
6128	0.0	6328	0.0	6528	0.0	6728	0.0	6928	0.0	7128	0.0
6132	0.0	6332	0.0	6532	0.0	6732	0.0	6932	0.0	7132	0.0
6136	0.0	6336	0.0	6536	0.0	6736	0.0	6936	0.0	7136	0.0
6140	0.0	6340	0.0	6540	0.0	6740	0.0	6940	0.0	7140	0.0
6144	0.0	6344	0.0	6544	0.0	6744	0.0	6944	0.0	7144	0.0
6148	0.0	6348	0.0	6548	0.0	6748	0.0	6948	0.0	7148	0.0
6152	0.0	6352	0.0	6552	0.0	6752	0.0	6952	0.0	7152	0.0
6156	0.0	6356	0.0	6556	0.0	6756	0.0	6956	0.0	7156	0.0
6160	0.0	6360	0.0	6560	0.0	6760	0.0	6960	0.0	7160	0.0
6164	0.0	6364	0.0	6564	0.0	6764	0.0	6964	0.0	7164	0.0
6168	0.0	6368	0.0	6568	0.0	6768	0.0	6968	0.0	7168	0.0
6172	0.0	6372	0.0	6572	0.0	6772	0.0	6972	0.0	7172	0.0
6176	0.0	6376	0.0	6576	0.0	6776	0.0	6976	0.0	7176	0.0
6180	0.0	6380	0.0	6580	0.0	6780	0.0	6980	0.0	7180	0.0
6184	0.0	6384	0.0	6584	0.0	6784	0.0	6984	0.0	7184	0.0
6188	0.0	6388	0.0	6588	0.0	6788	0.0	6988	0.0	7188	0.0
6192	0.0	6392	0.0	6592	0.0	6792	0.0	6992	0.0	7192	0.0
6196	0.0	6396	0.0	6596	0.0	6796	0.0	6996	0.0	7196	0.0
6200	0.0	6400	0.0	6600	0.0	6800	0.0	7000	0.0	7200	0.0

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
7204	0.0	7404	0.0	7604	0.0	7804	0.0	8004	0.0	8204	0.0
7208	0.0	7408	0.0	7608	0.0	7808	0.0	8008	0.0	8208	0.0
7212	0.0	7412	0.0	7612	0.0	7812	0.0	8012	0.0	8212	0.0
7216	0.0	7416	0.0	7616	0.0	7816	0.0	8016	0.0	8216	0.0
7220	0.0	7420	0.0	7620	0.0	7820	0.0	8020	0.0	8220	0.0
7224	0.0	7424	0.0	7624	0.0	7824	0.0	8024	0.0	8224	0.0
7228	0.0	7428	0.0	7628	0.0	7828	0.0	8028	0.0	8228	0.0
7232	0.0	7432	0.0	7632	0.0	7832	0.0	8032	0.0	8232	0.0
7236	0.0	7436	0.0	7636	0.0	7836	0.0	8036	0.0	8236	0.0
7240	0.0	7440	0.0	7640	0.0	7840	0.0	8040	0.0	8240	0.0
7244	0.0	7444	0.0	7644	0.0	7844	0.0	8044	0.0	8244	0.0
7248	0.0	7448	0.0	7648	0.0	7848	0.0	8048	0.0	8248	0.0
7252	0.0	7452	0.0	7652	0.0	7852	0.0	8052	0.0	8252	0.0
7256	0.0	7456	0.0	7656	0.0	7856	0.0	8056	0.0	8256	0.0
7260	0.0	7460	0.0	7660	0.0	7860	0.0	8060	0.0	8260	0.0
7264	0.0	7464	0.0	7664	0.0	7864	0.0	8064	0.0	8264	0.0
7268	0.0	7468	0.0	7668	0.0	7868	0.0	8068	0.0	8268	0.0
7272	0.0	7472	0.0	7672	0.0	7872	0.0	8072	0.0	8272	0.0
7276	0.0	7476	0.0	7676	0.0	7876	0.0	8076	0.0	8276	0.0
7280	0.0	7480	0.0	7680	0.0	7880	0.0	8080	0.0	8280	0.0
7284	0.0	7484	0.0	7684	0.0	7884	0.0	8084	0.0	8284	0.0
7288	0.0	7488	0.0	7688	0.0	7888	0.0	8088	0.0	8288	0.0
7292	0.0	7492	0.0	7692	0.0	7892	0.0	8092	0.0	8292	0.0
7296	0.0	7496	0.0	7696	0.0	7896	0.0	8096	0.0	8296	0.0
7300	0.0	7500	0.0	7700	0.0	7900	0.0	8100	0.0	8300	0.0
7304	0.0	7504	0.0	7704	0.0	7904	0.0	8104	0.0	8304	0.0
7308	0.0	7508	0.0	7708	0.0	7908	0.0	8108	0.0	8308	0.0
7312	0.0	7512	0.0	7712	0.0	7912	0.0	8112	0.0	8312	0.0
7316	0.0	7516	0.0	7716	0.0	7916	0.0	8116	0.0	8316	0.0
7320	0.0	7520	0.0	7720	0.0	7920	0.0	8120	0.0	8320	0.0
7324	0.0	7524	0.0	7724	0.0	7924	0.0	8124	0.0	8324	0.0
7328	0.0	7528	0.0	7728	0.0	7928	0.0	8128	0.0	8328	0.0
7332	0.0	7532	0.0	7732	0.0	7932	0.0	8132	0.0	8332	0.0
7336	0.0	7536	0.0	7736	0.0	7936	0.0	8136	0.0	8336	0.0
7340	0.0	7540	0.0	7740	0.0	7940	0.0	8140	0.0	8340	0.0
7344	0.0	7544	0.0	7744	0.0	7944	0.0	8144	0.0	8344	0.0
7348	0.0	7548	0.0	7748	0.0	7948	0.0	8148	0.0	8348	0.0
7352	0.0	7552	0.0	7752	0.0	7952	0.0	8152	0.0	8352	0.0
7356	0.0	7556	0.0	7756	0.0	7956	0.0	8156	0.0	8356	0.0
7360	0.0	7560	0.0	7760	0.0	7960	0.0	8160	0.0	8360	0.0
7364	0.0	7564	0.0	7764	0.0	7964	0.0	8164	0.0	8364	0.0
7368	0.0	7568	0.0	7768	0.0	7968	0.0	8168	0.0	8368	0.0
7372	0.0	7572	0.0	7772	0.0	7972	0.0	8172	0.0	8372	0.0
7376	0.0	7576	0.0	7776	0.0	7976	0.0	8176	0.0	8376	0.0
7380	0.0	7580	0.0	7780	0.0	7980	0.0	8180	0.0	8380	0.0
7384	0.0	7584	0.0	7784	0.0	7984	0.0	8184	0.0	8384	0.0
7388	0.0	7588	0.0	7788	0.0	7988	0.0	8188	0.0	8388	0.0
7392	0.0	7592	0.0	7792	0.0	7992	0.0	8192	0.0	8392	0.0
7396	0.0	7596	0.0	7796	0.0	7996	0.0	8196	0.0	8396	0.0
7400	0.0	7600	0.0	7800	0.0	8000	0.0	8200	0.0	8400	0.0

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
8404	0.0	8604	0.0	8804	0.0	9004	0.0	9204	0.0	9404	0.0
8408	0.0	8608	0.0	8808	0.0	9008	0.0	9208	0.0	9408	0.0
8412	0.0	8612	0.0	8812	0.0	9012	0.0	9212	0.0	9412	0.0
8416	0.0	8616	0.0	8816	0.0	9016	0.0	9216	0.0	9416	0.0
8420	0.0	8620	0.0	8820	0.0	9020	0.0	9220	0.0	9420	0.0
8424	0.0	8624	0.0	8824	0.0	9024	0.0	9224	0.0	9424	0.0
8428	0.0	8628	0.0	8828	0.0	9028	0.0	9228	0.0	9428	0.0
8432	0.0	8632	0.0	8832	0.0	9032	0.0	9232	0.0	9432	0.0
8436	0.0	8636	0.0	8836	0.0	9036	0.0	9236	0.0	9436	0.0
8440	0.0	8640	0.0	8840	0.0	9040	0.0	9240	0.0	9440	0.0
8444	0.0	8644	0.0	8844	0.0	9044	0.0	9244	0.0	9444	0.0
8448	0.0	8648	0.0	8848	0.0	9048	0.0	9248	0.0	9448	0.0
8452	0.0	8652	0.0	8852	0.0	9052	0.0	9252	0.0	9452	0.0
8456	0.0	8656	0.0	8856	0.0	9056	0.0	9256	0.0	9456	0.0
8460	0.0	8660	0.0	8860	0.0	9060	0.0	9260	0.0	9460	0.0
8464	0.0	8664	0.0	8864	0.0	9064	0.0	9264	0.0	9464	0.0
8468	0.0	8668	0.0	8868	0.0	9068	0.0	9268	0.0	9468	0.0
8472	0.0	8672	0.0	8872	0.0	9072	0.0	9272	0.0	9472	0.0
8476	0.0	8676	0.0	8876	0.0	9076	0.0	9276	0.0	9476	0.0
8480	0.0	8680	0.0	8880	0.0	9080	0.0	9280	0.0	9480	0.0
8484	0.0	8684	0.0	8884	0.0	9084	0.0	9284	0.0	9484	0.0
8488	0.0	8688	0.0	8888	0.0	9088	0.0	9288	0.0	9488	0.0
8492	0.0	8692	0.0	8892	0.0	9092	0.0	9292	0.0	9492	0.0
8496	0.0	8696	0.0	8896	0.0	9096	0.0	9296	0.0	9496	0.0
8500	0.0	8700	0.0	8900	0.0	9100	0.0	9300	0.0	9500	0.0
8504	0.0	8704	0.0	8904	0.0	9104	0.0	9304	0.0	9504	0.0
8508	0.0	8708	0.0	8908	0.0	9108	0.0	9308	0.0	9508	0.0
8512	0.0	8712	0.0	8912	0.0	9112	0.0	9312	0.0	9512	0.0
8516	0.0	8716	0.0	8916	0.0	9116	0.0	9316	0.0	9516	0.0
8520	0.0	8720	0.0	8920	0.0	9120	0.0	9320	0.0	9520	0.0
8524	0.0	8724	0.0	8924	0.0	9124	0.0	9324	0.0	9524	0.0
8528	0.0	8728	0.0	8928	0.0	9128	0.0	9328	0.0	9528	0.0
8532	0.0	8732	0.0	8932	0.0	9132	0.0	9332	0.0	9532	0.0
8536	0.0	8736	0.0	8936	0.0	9136	0.0	9336	0.0	9536	0.0
8540	0.0	8740	0.0	8940	0.0	9140	0.0	9340	0.0	9540	0.0
8544	0.0	8744	0.0	8944	0.0	9144	0.0	9344	0.0	9544	0.0
8548	0.0	8748	0.0	8948	0.0	9148	0.0	9348	0.0	9548	0.0
8552	0.0	8752	0.0	8952	0.0	9152	0.0	9352	0.0	9552	0.0
8556	0.0	8756	0.0	8956	0.0	9156	0.0	9356	0.0	9556	0.0
8560	0.0	8760	0.0	8960	0.0	9160	0.0	9360	0.0	9560	0.0
8564	0.0	8764	0.0	8964	0.0	9164	0.0	9364	0.0	9564	0.0
8568	0.0	8768	0.0	8968	0.0	9168	0.0	9368	0.0	9568	0.0
8572	0.0	8772	0.0	8972	0.0	9172	0.0	9372	0.0	9572	0.0
8576	0.0	8776	0.0	8976	0.0	9176	0.0	9376	0.0	9576	0.0
8580	0.0	8780	0.0	8980	0.0	9180	0.0	9380	0.0	9580	0.0
8584	0.0	8784	0.0	8984	0.0	9184	0.0	9384	0.0	9584	0.0
8588	0.0	8788	0.0	8988	0.0	9188	0.0	9388	0.0	9588	0.0
8592	0.0	8792	0.0	8992	0.0	9192	0.0	9392	0.0	9592	0.0
8596	0.0	8796	0.0	8996	0.0	9196	0.0	9396	0.0	9596	0.0
8600	0.0	8800	0.0	9000	0.0	9200	0.0	9400	0.0	9600	0.0

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
9604	0.0	9684	0.0	9764	0.0	9844	0.0	9924	0.0	10004	0.0
9608	0.0	9688	0.0	9768	0.0	9848	0.0	9928	0.0	10008	0.0
9612	0.0	9692	0.0	9772	0.0	9852	0.0	9932	0.0	10012	0.0
9616	0.0	9696	0.0	9776	0.0	9856	0.0	9936	0.0	10016	0.0
9620	0.0	9700	0.0	9780	0.0	9860	0.0	9940	0.0	10020	0.0
9624	0.0	9704	0.0	9784	0.0	9864	0.0	9944	0.0	10024	0.0
9628	0.0	9708	0.0	9788	0.0	9868	0.0	9948	0.0	10028	0.0
9632	0.0	9712	0.0	9792	0.0	9872	0.0	9952	0.0	10032	0.0
9636	0.0	9716	0.0	9796	0.0	9876	0.0	9956	0.0	10036	0.0
9640	0.0	9720	0.0	9800	0.0	9880	0.0	9960	0.0	10040	0.0
9644	0.0	9724	0.0	9804	0.0	9884	0.0	9964	0.0	10044	0.0
9648	0.0	9728	0.0	9808	0.0	9888	0.0	9968	0.0	10048	0.0
9652	0.0	9732	0.0	9812	0.0	9892	0.0	9972	0.0	10052	0.0
9656	0.0	9736	0.0	9816	0.0	9896	0.0	9976	0.0	10056	0.0
9660	0.0	9740	0.0	9820	0.0	9900	0.0	9980	0.0	10060	0.0
9664	0.0	9744	0.0	9824	0.0	9904	0.0	9984	0.0	10064	0.0
9668	0.0	9748	0.0	9828	0.0	9908	0.0	9988	0.0	10068	0.0
9672	0.0	9752	0.0	9832	0.0	9912	0.0	9992	0.0	10072	0.0
9676	0.0	9756	0.0	9836	0.0	9916	0.0	9996	0.0	10076	0.0
9680	0.0	9760	0.0	9840	0.0	9920	0.0	10000	0.0	10080	0.0

Model Details

Storage is Online Cover Level (m) 10.000

Cellular Storage Structure

Invert Level (m) 8.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	1100.0	1100.0	1.501	0.0	1299.1
1.500	1100.0	1299.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-CHE-0058-2000-1500-2000
Design Head (m)	1.500
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	No
Diameter (mm)	58
Invert Level (m)	8.000
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	2.0
Flush-Flo™	0.141	1.3
Kick-Flo®	0.202	0.8
Mean Flow over Head Range	-	1.4

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.1	1.200	1.8	3.000	2.8	7.000	4.3
0.200	0.8	1.400	1.9	3.500	3.0	7.500	4.4
0.300	0.9	1.600	2.1	4.000	3.2	8.000	4.5
0.400	1.0	1.800	2.2	4.500	3.4	8.500	4.7
0.500	1.2	2.000	2.3	5.000	3.6	9.000	4.8
0.600	1.3	2.200	2.4	5.500	3.8	9.500	4.9
0.800	1.5	2.400	2.5	6.000	3.9		
1.000	1.6	2.600	2.6	6.500	4.1		

Summary of Results for Input Hydrograph

Half Drain Time : 7884 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
Input Hydrograph	9.453	1.453	0.0	2.0	2.0	1587.8	O K

Storm Event	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
Input Hydrograph	0.0	1078.6	2948

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
4	0.3	204	3.6	404	3.9	604	4.3	804	6.7	1004	11.4
8	0.3	208	3.7	408	3.9	608	4.5	808	6.9	1008	11.4
12	0.3	212	3.7	412	3.9	612	4.5	812	7.2	1012	12.3
16	0.3	216	3.7	416	3.9	616	4.5	816	7.2	1016	12.3
20	0.3	220	3.7	420	3.9	620	4.5	820	7.2	1020	12.3
24	0.3	224	3.7	424	3.9	624	4.5	824	7.2	1024	12.3
28	0.3	228	3.7	428	3.9	628	4.5	828	7.2	1028	12.3
32	1.0	232	3.7	432	3.9	632	4.5	832	7.2	1032	12.3
36	1.1	236	3.8	436	3.9	636	4.6	836	7.3	1036	12.3
40	1.1	240	3.8	440	3.9	640	4.7	840	7.8	1040	12.9
44	1.1	244	3.8	444	3.9	644	4.7	844	7.8	1044	13.1
48	1.1	248	3.8	448	3.9	648	4.7	848	7.8	1048	13.1
52	1.1	252	3.8	452	3.9	652	4.7	852	7.8	1052	13.1
56	1.1	256	3.8	456	3.9	656	4.7	856	7.8	1056	13.1
60	1.6	260	3.8	460	3.9	660	4.7	860	7.8	1060	13.1
64	1.8	264	3.9	464	4.0	664	4.9	864	7.8	1064	13.1
68	1.8	268	3.9	468	4.0	668	5.0	868	8.4	1068	13.6
72	1.8	272	3.9	472	4.0	672	5.0	872	8.4	1072	14.0
76	1.8	276	3.9	476	4.0	676	5.0	876	8.4	1076	14.0
80	1.8	280	3.9	480	4.0	680	5.0	880	8.4	1080	14.0
84	1.8	284	3.9	484	4.0	684	5.0	884	8.4	1084	14.0
88	2.1	288	3.9	488	4.0	688	5.0	888	8.4	1088	14.0
92	2.4	292	3.9	492	4.0	692	5.1	892	8.4	1092	14.0
96	2.4	296	3.9	496	4.0	696	5.4	896	9.0	1096	14.3
100	2.4	300	3.9	500	4.0	700	5.4	900	9.1	1100	14.9
104	2.4	304	3.9	504	4.0	704	5.4	904	9.1	1104	14.9
108	2.4	308	3.9	508	4.0	708	5.4	908	9.1	1108	14.9
112	2.4	312	3.9	512	4.0	712	5.4	912	9.1	1112	14.9
116	2.5	316	3.9	516	4.0	716	5.4	916	9.1	1116	14.9
120	2.9	320	3.9	520	4.0	720	5.4	920	9.1	1120	14.9
124	2.9	324	3.9	524	4.1	724	5.7	924	9.6	1124	15.0
128	2.9	328	3.9	528	4.1	728	5.7	928	9.9	1128	15.7
132	2.9	332	3.9	532	4.1	732	5.7	932	9.9	1132	15.7
136	2.9	336	3.9	536	4.1	736	5.7	936	9.9	1136	15.7
140	2.9	340	3.9	540	4.1	740	5.7	940	9.9	1140	15.7
144	2.9	344	3.9	544	4.1	744	5.7	944	9.9	1144	15.7
148	3.2	348	3.9	548	4.1	748	5.7	948	9.9	1148	15.7
152	3.2	352	3.9	552	4.2	752	6.1	952	10.2	1152	15.7
156	3.2	356	3.9	556	4.2	756	6.2	956	10.6	1156	16.6
160	3.2	360	3.9	560	4.2	760	6.2	960	10.6	1160	16.6
164	3.2	364	3.9	564	4.2	764	6.2	964	10.6	1164	16.6
168	3.2	368	3.9	568	4.2	768	6.2	968	10.6	1168	16.6
172	3.2	372	3.9	572	4.2	772	6.2	972	10.6	1172	16.6
176	3.4	376	3.9	576	4.2	776	6.2	976	10.6	1176	16.6
180	3.5	380	3.9	580	4.3	780	6.5	980	10.8	1180	16.6
184	3.5	384	3.9	584	4.3	784	6.7	984	11.4	1184	17.3
188	3.5	388	3.9	588	4.3	788	6.7	988	11.4	1188	17.5
192	3.5	392	3.9	592	4.3	792	6.7	992	11.4	1192	17.5
196	3.5	396	3.9	596	4.3	796	6.7	996	11.4	1196	17.5
200	3.5	400	3.9	600	4.3	800	6.7	1000	11.4	1200	17.5

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
1204	17.5	1404	22.1	1604	19.8	1804	14.0	2004	8.4	2204	5.0
1208	17.5	1408	22.1	1608	19.8	1808	14.0	2008	8.4	2208	5.0
1212	18.0	1412	22.1	1612	19.8	1812	14.0	2012	8.4	2212	5.0
1216	18.3	1416	22.4	1616	19.2	1816	13.6	2016	8.4	2216	5.0
1220	18.3	1420	22.4	1620	19.1	1820	13.1	2020	7.8	2220	4.9
1224	18.3	1424	22.4	1624	19.1	1824	13.1	2024	7.8	2224	4.7
1228	18.3	1428	22.4	1628	19.1	1828	13.1	2028	7.8	2228	4.7
1232	18.3	1432	22.4	1632	19.1	1832	13.1	2032	7.8	2232	4.7
1236	18.3	1436	22.4	1636	19.1	1836	13.1	2036	7.8	2236	4.7
1240	18.6	1440	22.4	1640	19.1	1840	13.1	2040	7.8	2240	4.7
1244	19.1	1444	22.4	1644	18.6	1844	12.9	2044	7.8	2244	4.7
1248	19.1	1448	22.4	1648	18.3	1848	12.3	2048	7.3	2248	4.6
1252	19.1	1452	22.4	1652	18.3	1852	12.3	2052	7.2	2252	4.5
1256	19.1	1456	22.4	1656	18.3	1856	12.3	2056	7.2	2256	4.5
1260	19.1	1460	22.4	1660	18.3	1860	12.3	2060	7.2	2260	4.5
1264	19.1	1464	22.4	1664	18.3	1864	12.3	2064	7.2	2264	4.5
1268	19.2	1468	22.4	1668	18.3	1868	12.3	2068	7.2	2268	4.5
1272	19.8	1472	22.1	1672	18.0	1872	12.3	2072	7.2	2272	4.5
1276	19.8	1476	22.1	1676	17.5	1876	11.4	2076	6.9	2276	4.5
1280	19.8	1480	22.1	1680	17.5	1880	11.4	2080	6.7	2280	4.3
1284	19.8	1484	22.1	1684	17.5	1884	11.4	2084	6.7	2284	4.3
1288	19.8	1488	22.1	1688	17.5	1888	11.4	2088	6.7	2288	4.3
1292	19.8	1492	22.1	1692	17.5	1892	11.4	2092	6.7	2292	4.3
1296	19.8	1496	22.1	1696	17.5	1896	11.4	2096	6.7	2296	4.3
1300	20.5	1500	21.8	1700	17.3	1900	11.4	2100	6.7	2300	4.3
1304	20.5	1504	21.7	1704	16.6	1904	10.8	2104	6.5	2304	4.3
1308	20.5	1508	21.7	1708	16.6	1908	10.6	2108	6.2	2308	4.2
1312	20.5	1512	21.7	1712	16.6	1912	10.6	2112	6.2	2312	4.2
1316	20.5	1516	21.7	1716	16.6	1916	10.6	2116	6.2	2316	4.2
1320	20.5	1520	21.7	1720	16.6	1920	10.6	2120	6.2	2320	4.2
1324	20.5	1524	21.7	1724	16.6	1924	10.6	2124	6.2	2324	4.2
1328	21.0	1528	21.4	1728	16.6	1928	10.6	2128	6.2	2328	4.2
1332	21.1	1532	21.1	1732	15.7	1932	10.2	2132	6.1	2332	4.2
1336	21.1	1536	21.1	1736	15.7	1936	9.9	2136	5.7	2336	4.1
1340	21.1	1540	21.1	1740	15.7	1940	9.9	2140	5.7	2340	4.1
1344	21.1	1544	21.1	1744	15.7	1944	9.9	2144	5.7	2344	4.1
1348	21.1	1548	21.1	1748	15.7	1948	9.9	2148	5.7	2348	4.1
1352	21.1	1552	21.1	1752	15.7	1952	9.9	2152	5.7	2352	4.1
1356	21.4	1556	21.0	1756	15.7	1956	9.9	2156	5.7	2356	4.1
1360	21.7	1560	20.5	1760	15.0	1960	9.6	2160	5.7	2360	4.1
1364	21.7	1564	20.5	1764	14.9	1964	9.1	2164	5.4	2364	4.0
1368	21.7	1568	20.5	1768	14.9	1968	9.1	2168	5.4	2368	4.0
1372	21.7	1572	20.5	1772	14.9	1972	9.1	2172	5.4	2372	4.0
1376	21.7	1576	20.5	1776	14.9	1976	9.1	2176	5.4	2376	4.0
1380	21.7	1580	20.5	1780	14.9	1980	9.1	2180	5.4	2380	4.0
1384	21.8	1584	20.5	1784	14.9	1984	9.1	2184	5.4	2384	4.0
1388	22.1	1588	19.8	1788	14.3	1988	9.0	2188	5.4	2388	4.0
1392	22.1	1592	19.8	1792	14.0	1992	8.4	2192	5.1	2392	4.0
1396	22.1	1596	19.8	1796	14.0	1996	8.4	2196	5.0	2396	4.0
1400	22.1	1600	19.8	1800	14.0	2000	8.4	2200	5.0	2400	4.0

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
2404	4.0	2604	3.9	2804	1.8	3004	0.0	3204	0.0	3404	0.0
2408	4.0	2608	3.9	2808	1.8	3008	0.0	3208	0.0	3408	0.0
2412	4.0	2612	3.9	2812	1.8	3012	0.0	3212	0.0	3412	0.0
2416	4.0	2616	3.9	2816	1.8	3016	0.0	3216	0.0	3416	0.0
2420	4.0	2620	3.9	2820	1.8	3020	0.0	3220	0.0	3420	0.0
2424	3.9	2624	3.8	2824	1.6	3024	0.0	3224	0.0	3424	0.0
2428	3.9	2628	3.8	2828	1.1	3028	0.0	3228	0.0	3428	0.0
2432	3.9	2632	3.8	2832	1.1	3032	0.0	3232	0.0	3432	0.0
2436	3.9	2636	3.8	2836	1.1	3036	0.0	3236	0.0	3436	0.0
2440	3.9	2640	3.8	2840	1.1	3040	0.0	3240	0.0	3440	0.0
2444	3.9	2644	3.8	2844	1.1	3044	0.0	3244	0.0	3444	0.0
2448	3.9	2648	3.8	2848	1.1	3048	0.0	3248	0.0	3448	0.0
2452	3.9	2652	3.7	2852	1.0	3052	0.0	3252	0.0	3452	0.0
2456	3.9	2656	3.7	2856	0.3	3056	0.0	3256	0.0	3456	0.0
2460	3.9	2660	3.7	2860	0.3	3060	0.0	3260	0.0	3460	0.0
2464	3.9	2664	3.7	2864	0.3	3064	0.0	3264	0.0	3464	0.0
2468	3.9	2668	3.7	2868	0.3	3068	0.0	3268	0.0	3468	0.0
2472	3.9	2672	3.7	2872	0.3	3072	0.0	3272	0.0	3472	0.0
2476	3.9	2676	3.7	2876	0.3	3076	0.0	3276	0.0	3476	0.0
2480	3.9	2680	3.6	2880	0.3	3080	0.0	3280	0.0	3480	0.0
2484	3.9	2684	3.5	2884	12.9	3084	0.0	3284	0.0	3484	0.0
2488	3.9	2688	3.5	2888	27.8	3088	0.0	3288	0.0	3488	0.0
2492	3.9	2692	3.5	2892	30.8	3092	0.0	3292	0.0	3492	0.0
2496	3.9	2696	3.5	2896	36.1	3096	0.0	3296	0.0	3496	0.0
2500	3.9	2700	3.5	2900	44.7	3100	0.0	3300	0.0	3500	0.0
2504	3.9	2704	3.5	2904	66.7	3104	0.0	3304	0.0	3504	0.0
2508	3.9	2708	3.4	2908	128.6	3108	0.0	3308	0.0	3508	0.0
2512	3.9	2712	3.2	2912	242.4	3112	0.0	3312	0.0	3512	0.0
2516	3.9	2716	3.2	2916	242.4	3116	0.0	3316	0.0	3516	0.0
2520	3.9	2720	3.2	2920	128.6	3120	0.0	3320	0.0	3520	0.0
2524	3.9	2724	3.2	2924	66.7	3124	0.0	3324	0.0	3524	0.0
2528	3.9	2728	3.2	2928	44.7	3128	0.0	3328	0.0	3528	0.0
2532	3.9	2732	3.2	2932	36.1	3132	0.0	3332	0.0	3532	0.0
2536	3.9	2736	3.2	2936	30.8	3136	0.0	3336	0.0	3536	0.0
2540	3.9	2740	2.9	2940	27.8	3140	0.0	3340	0.0	3540	0.0
2544	3.9	2744	2.9	2944	12.9	3144	0.0	3344	0.0	3544	0.0
2548	3.9	2748	2.9	2948	0.0	3148	0.0	3348	0.0	3548	0.0
2552	3.9	2752	2.9	2952	0.0	3152	0.0	3352	0.0	3552	0.0
2556	3.9	2756	2.9	2956	0.0	3156	0.0	3356	0.0	3556	0.0
2560	3.9	2760	2.9	2960	0.0	3160	0.0	3360	0.0	3560	0.0
2564	3.9	2764	2.9	2964	0.0	3164	0.0	3364	0.0	3564	0.0
2568	3.9	2768	2.5	2968	0.0	3168	0.0	3368	0.0	3568	0.0
2572	3.9	2772	2.4	2972	0.0	3172	0.0	3372	0.0	3572	0.0
2576	3.9	2776	2.4	2976	0.0	3176	0.0	3376	0.0	3576	0.0
2580	3.9	2780	2.4	2980	0.0	3180	0.0	3380	0.0	3580	0.0
2584	3.9	2784	2.4	2984	0.0	3184	0.0	3384	0.0	3584	0.0
2588	3.9	2788	2.4	2988	0.0	3188	0.0	3388	0.0	3588	0.0
2592	3.9	2792	2.4	2992	0.0	3192	0.0	3392	0.0	3592	0.0
2596	3.9	2796	2.1	2996	0.0	3196	0.0	3396	0.0	3596	0.0
2600	3.9	2800	1.8	3000	0.0	3200	0.0	3400	0.0	3600	0.0

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
3604	0.0	3804	0.0	4004	0.0	4204	0.0	4404	0.0	4604	0.0
3608	0.0	3808	0.0	4008	0.0	4208	0.0	4408	0.0	4608	0.0
3612	0.0	3812	0.0	4012	0.0	4212	0.0	4412	0.0	4612	0.0
3616	0.0	3816	0.0	4016	0.0	4216	0.0	4416	0.0	4616	0.0
3620	0.0	3820	0.0	4020	0.0	4220	0.0	4420	0.0	4620	0.0
3624	0.0	3824	0.0	4024	0.0	4224	0.0	4424	0.0	4624	0.0
3628	0.0	3828	0.0	4028	0.0	4228	0.0	4428	0.0	4628	0.0
3632	0.0	3832	0.0	4032	0.0	4232	0.0	4432	0.0	4632	0.0
3636	0.0	3836	0.0	4036	0.0	4236	0.0	4436	0.0	4636	0.0
3640	0.0	3840	0.0	4040	0.0	4240	0.0	4440	0.0	4640	0.0
3644	0.0	3844	0.0	4044	0.0	4244	0.0	4444	0.0	4644	0.0
3648	0.0	3848	0.0	4048	0.0	4248	0.0	4448	0.0	4648	0.0
3652	0.0	3852	0.0	4052	0.0	4252	0.0	4452	0.0	4652	0.0
3656	0.0	3856	0.0	4056	0.0	4256	0.0	4456	0.0	4656	0.0
3660	0.0	3860	0.0	4060	0.0	4260	0.0	4460	0.0	4660	0.0
3664	0.0	3864	0.0	4064	0.0	4264	0.0	4464	0.0	4664	0.0
3668	0.0	3868	0.0	4068	0.0	4268	0.0	4468	0.0	4668	0.0
3672	0.0	3872	0.0	4072	0.0	4272	0.0	4472	0.0	4672	0.0
3676	0.0	3876	0.0	4076	0.0	4276	0.0	4476	0.0	4676	0.0
3680	0.0	3880	0.0	4080	0.0	4280	0.0	4480	0.0	4680	0.0
3684	0.0	3884	0.0	4084	0.0	4284	0.0	4484	0.0	4684	0.0
3688	0.0	3888	0.0	4088	0.0	4288	0.0	4488	0.0	4688	0.0
3692	0.0	3892	0.0	4092	0.0	4292	0.0	4492	0.0	4692	0.0
3696	0.0	3896	0.0	4096	0.0	4296	0.0	4496	0.0	4696	0.0
3700	0.0	3900	0.0	4100	0.0	4300	0.0	4500	0.0	4700	0.0
3704	0.0	3904	0.0	4104	0.0	4304	0.0	4504	0.0	4704	0.0
3708	0.0	3908	0.0	4108	0.0	4308	0.0	4508	0.0	4708	0.0
3712	0.0	3912	0.0	4112	0.0	4312	0.0	4512	0.0	4712	0.0
3716	0.0	3916	0.0	4116	0.0	4316	0.0	4516	0.0	4716	0.0
3720	0.0	3920	0.0	4120	0.0	4320	0.0	4520	0.0	4720	0.0
3724	0.0	3924	0.0	4124	0.0	4324	0.0	4524	0.0	4724	0.0
3728	0.0	3928	0.0	4128	0.0	4328	0.0	4528	0.0	4728	0.0
3732	0.0	3932	0.0	4132	0.0	4332	0.0	4532	0.0	4732	0.0
3736	0.0	3936	0.0	4136	0.0	4336	0.0	4536	0.0	4736	0.0
3740	0.0	3940	0.0	4140	0.0	4340	0.0	4540	0.0	4740	0.0
3744	0.0	3944	0.0	4144	0.0	4344	0.0	4544	0.0	4744	0.0
3748	0.0	3948	0.0	4148	0.0	4348	0.0	4548	0.0	4748	0.0
3752	0.0	3952	0.0	4152	0.0	4352	0.0	4552	0.0	4752	0.0
3756	0.0	3956	0.0	4156	0.0	4356	0.0	4556	0.0	4756	0.0
3760	0.0	3960	0.0	4160	0.0	4360	0.0	4560	0.0	4760	0.0
3764	0.0	3964	0.0	4164	0.0	4364	0.0	4564	0.0	4764	0.0
3768	0.0	3968	0.0	4168	0.0	4368	0.0	4568	0.0	4768	0.0
3772	0.0	3972	0.0	4172	0.0	4372	0.0	4572	0.0	4772	0.0
3776	0.0	3976	0.0	4176	0.0	4376	0.0	4576	0.0	4776	0.0
3780	0.0	3980	0.0	4180	0.0	4380	0.0	4580	0.0	4780	0.0
3784	0.0	3984	0.0	4184	0.0	4384	0.0	4584	0.0	4784	0.0
3788	0.0	3988	0.0	4188	0.0	4388	0.0	4588	0.0	4788	0.0
3792	0.0	3992	0.0	4192	0.0	4392	0.0	4592	0.0	4792	0.0
3796	0.0	3996	0.0	4196	0.0	4396	0.0	4596	0.0	4796	0.0
3800	0.0	4000	0.0	4200	0.0	4400	0.0	4600	0.0	4800	0.0

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
4804	0.0	5004	0.0	5204	0.0	5404	0.0	5604	0.0	5804	0.0
4808	0.0	5008	0.0	5208	0.0	5408	0.0	5608	0.0	5808	0.0
4812	0.0	5012	0.0	5212	0.0	5412	0.0	5612	0.0	5812	0.0
4816	0.0	5016	0.0	5216	0.0	5416	0.0	5616	0.0	5816	0.0
4820	0.0	5020	0.0	5220	0.0	5420	0.0	5620	0.0	5820	0.0
4824	0.0	5024	0.0	5224	0.0	5424	0.0	5624	0.0	5824	0.0
4828	0.0	5028	0.0	5228	0.0	5428	0.0	5628	0.0	5828	0.0
4832	0.0	5032	0.0	5232	0.0	5432	0.0	5632	0.0	5832	0.0
4836	0.0	5036	0.0	5236	0.0	5436	0.0	5636	0.0	5836	0.0
4840	0.0	5040	0.0	5240	0.0	5440	0.0	5640	0.0	5840	0.0
4844	0.0	5044	0.0	5244	0.0	5444	0.0	5644	0.0	5844	0.0
4848	0.0	5048	0.0	5248	0.0	5448	0.0	5648	0.0	5848	0.0
4852	0.0	5052	0.0	5252	0.0	5452	0.0	5652	0.0	5852	0.0
4856	0.0	5056	0.0	5256	0.0	5456	0.0	5656	0.0	5856	0.0
4860	0.0	5060	0.0	5260	0.0	5460	0.0	5660	0.0	5860	0.0
4864	0.0	5064	0.0	5264	0.0	5464	0.0	5664	0.0	5864	0.0
4868	0.0	5068	0.0	5268	0.0	5468	0.0	5668	0.0	5868	0.0
4872	0.0	5072	0.0	5272	0.0	5472	0.0	5672	0.0	5872	0.0
4876	0.0	5076	0.0	5276	0.0	5476	0.0	5676	0.0	5876	0.0
4880	0.0	5080	0.0	5280	0.0	5480	0.0	5680	0.0	5880	0.0
4884	0.0	5084	0.0	5284	0.0	5484	0.0	5684	0.0	5884	0.0
4888	0.0	5088	0.0	5288	0.0	5488	0.0	5688	0.0	5888	0.0
4892	0.0	5092	0.0	5292	0.0	5492	0.0	5692	0.0	5892	0.0
4896	0.0	5096	0.0	5296	0.0	5496	0.0	5696	0.0	5896	0.0
4900	0.0	5100	0.0	5300	0.0	5500	0.0	5700	0.0	5900	0.0
4904	0.0	5104	0.0	5304	0.0	5504	0.0	5704	0.0	5904	0.0
4908	0.0	5108	0.0	5308	0.0	5508	0.0	5708	0.0	5908	0.0
4912	0.0	5112	0.0	5312	0.0	5512	0.0	5712	0.0	5912	0.0
4916	0.0	5116	0.0	5316	0.0	5516	0.0	5716	0.0	5916	0.0
4920	0.0	5120	0.0	5320	0.0	5520	0.0	5720	0.0	5920	0.0
4924	0.0	5124	0.0	5324	0.0	5524	0.0	5724	0.0	5924	0.0
4928	0.0	5128	0.0	5328	0.0	5528	0.0	5728	0.0	5928	0.0
4932	0.0	5132	0.0	5332	0.0	5532	0.0	5732	0.0	5932	0.0
4936	0.0	5136	0.0	5336	0.0	5536	0.0	5736	0.0	5936	0.0
4940	0.0	5140	0.0	5340	0.0	5540	0.0	5740	0.0	5940	0.0
4944	0.0	5144	0.0	5344	0.0	5544	0.0	5744	0.0	5944	0.0
4948	0.0	5148	0.0	5348	0.0	5548	0.0	5748	0.0	5948	0.0
4952	0.0	5152	0.0	5352	0.0	5552	0.0	5752	0.0	5952	0.0
4956	0.0	5156	0.0	5356	0.0	5556	0.0	5756	0.0	5956	0.0
4960	0.0	5160	0.0	5360	0.0	5560	0.0	5760	0.0	5960	0.0
4964	0.0	5164	0.0	5364	0.0	5564	0.0	5764	0.0	5964	0.0
4968	0.0	5168	0.0	5368	0.0	5568	0.0	5768	0.0	5968	0.0
4972	0.0	5172	0.0	5372	0.0	5572	0.0	5772	0.0	5972	0.0
4976	0.0	5176	0.0	5376	0.0	5576	0.0	5776	0.0	5976	0.0
4980	0.0	5180	0.0	5380	0.0	5580	0.0	5780	0.0	5980	0.0
4984	0.0	5184	0.0	5384	0.0	5584	0.0	5784	0.0	5984	0.0
4988	0.0	5188	0.0	5388	0.0	5588	0.0	5788	0.0	5988	0.0
4992	0.0	5192	0.0	5392	0.0	5592	0.0	5792	0.0	5992	0.0
4996	0.0	5196	0.0	5396	0.0	5596	0.0	5796	0.0	5996	0.0
5000	0.0	5200	0.0	5400	0.0	5600	0.0	5800	0.0	6000	0.0

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
6004	0.0	6204	0.0	6404	0.0	6604	0.0	6804	0.0	7004	0.0
6008	0.0	6208	0.0	6408	0.0	6608	0.0	6808	0.0	7008	0.0
6012	0.0	6212	0.0	6412	0.0	6612	0.0	6812	0.0	7012	0.0
6016	0.0	6216	0.0	6416	0.0	6616	0.0	6816	0.0	7016	0.0
6020	0.0	6220	0.0	6420	0.0	6620	0.0	6820	0.0	7020	0.0
6024	0.0	6224	0.0	6424	0.0	6624	0.0	6824	0.0	7024	0.0
6028	0.0	6228	0.0	6428	0.0	6628	0.0	6828	0.0	7028	0.0
6032	0.0	6232	0.0	6432	0.0	6632	0.0	6832	0.0	7032	0.0
6036	0.0	6236	0.0	6436	0.0	6636	0.0	6836	0.0	7036	0.0
6040	0.0	6240	0.0	6440	0.0	6640	0.0	6840	0.0	7040	0.0
6044	0.0	6244	0.0	6444	0.0	6644	0.0	6844	0.0	7044	0.0
6048	0.0	6248	0.0	6448	0.0	6648	0.0	6848	0.0	7048	0.0
6052	0.0	6252	0.0	6452	0.0	6652	0.0	6852	0.0	7052	0.0
6056	0.0	6256	0.0	6456	0.0	6656	0.0	6856	0.0	7056	0.0
6060	0.0	6260	0.0	6460	0.0	6660	0.0	6860	0.0	7060	0.0
6064	0.0	6264	0.0	6464	0.0	6664	0.0	6864	0.0	7064	0.0
6068	0.0	6268	0.0	6468	0.0	6668	0.0	6868	0.0	7068	0.0
6072	0.0	6272	0.0	6472	0.0	6672	0.0	6872	0.0	7072	0.0
6076	0.0	6276	0.0	6476	0.0	6676	0.0	6876	0.0	7076	0.0
6080	0.0	6280	0.0	6480	0.0	6680	0.0	6880	0.0	7080	0.0
6084	0.0	6284	0.0	6484	0.0	6684	0.0	6884	0.0	7084	0.0
6088	0.0	6288	0.0	6488	0.0	6688	0.0	6888	0.0	7088	0.0
6092	0.0	6292	0.0	6492	0.0	6692	0.0	6892	0.0	7092	0.0
6096	0.0	6296	0.0	6496	0.0	6696	0.0	6896	0.0	7096	0.0
6100	0.0	6300	0.0	6500	0.0	6700	0.0	6900	0.0	7100	0.0
6104	0.0	6304	0.0	6504	0.0	6704	0.0	6904	0.0	7104	0.0
6108	0.0	6308	0.0	6508	0.0	6708	0.0	6908	0.0	7108	0.0
6112	0.0	6312	0.0	6512	0.0	6712	0.0	6912	0.0	7112	0.0
6116	0.0	6316	0.0	6516	0.0	6716	0.0	6916	0.0	7116	0.0
6120	0.0	6320	0.0	6520	0.0	6720	0.0	6920	0.0	7120	0.0
6124	0.0	6324	0.0	6524	0.0	6724	0.0	6924	0.0	7124	0.0
6128	0.0	6328	0.0	6528	0.0	6728	0.0	6928	0.0	7128	0.0
6132	0.0	6332	0.0	6532	0.0	6732	0.0	6932	0.0	7132	0.0
6136	0.0	6336	0.0	6536	0.0	6736	0.0	6936	0.0	7136	0.0
6140	0.0	6340	0.0	6540	0.0	6740	0.0	6940	0.0	7140	0.0
6144	0.0	6344	0.0	6544	0.0	6744	0.0	6944	0.0	7144	0.0
6148	0.0	6348	0.0	6548	0.0	6748	0.0	6948	0.0	7148	0.0
6152	0.0	6352	0.0	6552	0.0	6752	0.0	6952	0.0	7152	0.0
6156	0.0	6356	0.0	6556	0.0	6756	0.0	6956	0.0	7156	0.0
6160	0.0	6360	0.0	6560	0.0	6760	0.0	6960	0.0	7160	0.0
6164	0.0	6364	0.0	6564	0.0	6764	0.0	6964	0.0	7164	0.0
6168	0.0	6368	0.0	6568	0.0	6768	0.0	6968	0.0	7168	0.0
6172	0.0	6372	0.0	6572	0.0	6772	0.0	6972	0.0	7172	0.0
6176	0.0	6376	0.0	6576	0.0	6776	0.0	6976	0.0	7176	0.0
6180	0.0	6380	0.0	6580	0.0	6780	0.0	6980	0.0	7180	0.0
6184	0.0	6384	0.0	6584	0.0	6784	0.0	6984	0.0	7184	0.0
6188	0.0	6388	0.0	6588	0.0	6788	0.0	6988	0.0	7188	0.0
6192	0.0	6392	0.0	6592	0.0	6792	0.0	6992	0.0	7192	0.0
6196	0.0	6396	0.0	6596	0.0	6796	0.0	6996	0.0	7196	0.0
6200	0.0	6400	0.0	6600	0.0	6800	0.0	7000	0.0	7200	0.0

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
7204	0.0	7404	0.0	7604	0.0	7804	0.0	8004	0.0	8204	0.0
7208	0.0	7408	0.0	7608	0.0	7808	0.0	8008	0.0	8208	0.0
7212	0.0	7412	0.0	7612	0.0	7812	0.0	8012	0.0	8212	0.0
7216	0.0	7416	0.0	7616	0.0	7816	0.0	8016	0.0	8216	0.0
7220	0.0	7420	0.0	7620	0.0	7820	0.0	8020	0.0	8220	0.0
7224	0.0	7424	0.0	7624	0.0	7824	0.0	8024	0.0	8224	0.0
7228	0.0	7428	0.0	7628	0.0	7828	0.0	8028	0.0	8228	0.0
7232	0.0	7432	0.0	7632	0.0	7832	0.0	8032	0.0	8232	0.0
7236	0.0	7436	0.0	7636	0.0	7836	0.0	8036	0.0	8236	0.0
7240	0.0	7440	0.0	7640	0.0	7840	0.0	8040	0.0	8240	0.0
7244	0.0	7444	0.0	7644	0.0	7844	0.0	8044	0.0	8244	0.0
7248	0.0	7448	0.0	7648	0.0	7848	0.0	8048	0.0	8248	0.0
7252	0.0	7452	0.0	7652	0.0	7852	0.0	8052	0.0	8252	0.0
7256	0.0	7456	0.0	7656	0.0	7856	0.0	8056	0.0	8256	0.0
7260	0.0	7460	0.0	7660	0.0	7860	0.0	8060	0.0	8260	0.0
7264	0.0	7464	0.0	7664	0.0	7864	0.0	8064	0.0	8264	0.0
7268	0.0	7468	0.0	7668	0.0	7868	0.0	8068	0.0	8268	0.0
7272	0.0	7472	0.0	7672	0.0	7872	0.0	8072	0.0	8272	0.0
7276	0.0	7476	0.0	7676	0.0	7876	0.0	8076	0.0	8276	0.0
7280	0.0	7480	0.0	7680	0.0	7880	0.0	8080	0.0	8280	0.0
7284	0.0	7484	0.0	7684	0.0	7884	0.0	8084	0.0	8284	0.0
7288	0.0	7488	0.0	7688	0.0	7888	0.0	8088	0.0	8288	0.0
7292	0.0	7492	0.0	7692	0.0	7892	0.0	8092	0.0	8292	0.0
7296	0.0	7496	0.0	7696	0.0	7896	0.0	8096	0.0	8296	0.0
7300	0.0	7500	0.0	7700	0.0	7900	0.0	8100	0.0	8300	0.0
7304	0.0	7504	0.0	7704	0.0	7904	0.0	8104	0.0	8304	0.0
7308	0.0	7508	0.0	7708	0.0	7908	0.0	8108	0.0	8308	0.0
7312	0.0	7512	0.0	7712	0.0	7912	0.0	8112	0.0	8312	0.0
7316	0.0	7516	0.0	7716	0.0	7916	0.0	8116	0.0	8316	0.0
7320	0.0	7520	0.0	7720	0.0	7920	0.0	8120	0.0	8320	0.0
7324	0.0	7524	0.0	7724	0.0	7924	0.0	8124	0.0	8324	0.0
7328	0.0	7528	0.0	7728	0.0	7928	0.0	8128	0.0	8328	0.0
7332	0.0	7532	0.0	7732	0.0	7932	0.0	8132	0.0	8332	0.0
7336	0.0	7536	0.0	7736	0.0	7936	0.0	8136	0.0	8336	0.0
7340	0.0	7540	0.0	7740	0.0	7940	0.0	8140	0.0	8340	0.0
7344	0.0	7544	0.0	7744	0.0	7944	0.0	8144	0.0	8344	0.0
7348	0.0	7548	0.0	7748	0.0	7948	0.0	8148	0.0	8348	0.0
7352	0.0	7552	0.0	7752	0.0	7952	0.0	8152	0.0	8352	0.0
7356	0.0	7556	0.0	7756	0.0	7956	0.0	8156	0.0	8356	0.0
7360	0.0	7560	0.0	7760	0.0	7960	0.0	8160	0.0	8360	0.0
7364	0.0	7564	0.0	7764	0.0	7964	0.0	8164	0.0	8364	0.0
7368	0.0	7568	0.0	7768	0.0	7968	0.0	8168	0.0	8368	0.0
7372	0.0	7572	0.0	7772	0.0	7972	0.0	8172	0.0	8372	0.0
7376	0.0	7576	0.0	7776	0.0	7976	0.0	8176	0.0	8376	0.0
7380	0.0	7580	0.0	7780	0.0	7980	0.0	8180	0.0	8380	0.0
7384	0.0	7584	0.0	7784	0.0	7984	0.0	8184	0.0	8384	0.0
7388	0.0	7588	0.0	7788	0.0	7988	0.0	8188	0.0	8388	0.0
7392	0.0	7592	0.0	7792	0.0	7992	0.0	8192	0.0	8392	0.0
7396	0.0	7596	0.0	7796	0.0	7996	0.0	8196	0.0	8396	0.0
7400	0.0	7600	0.0	7800	0.0	8000	0.0	8200	0.0	8400	0.0

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
8404	0.0	8604	0.0	8804	0.0	9004	0.0	9204	0.0	9404	0.0
8408	0.0	8608	0.0	8808	0.0	9008	0.0	9208	0.0	9408	0.0
8412	0.0	8612	0.0	8812	0.0	9012	0.0	9212	0.0	9412	0.0
8416	0.0	8616	0.0	8816	0.0	9016	0.0	9216	0.0	9416	0.0
8420	0.0	8620	0.0	8820	0.0	9020	0.0	9220	0.0	9420	0.0
8424	0.0	8624	0.0	8824	0.0	9024	0.0	9224	0.0	9424	0.0
8428	0.0	8628	0.0	8828	0.0	9028	0.0	9228	0.0	9428	0.0
8432	0.0	8632	0.0	8832	0.0	9032	0.0	9232	0.0	9432	0.0
8436	0.0	8636	0.0	8836	0.0	9036	0.0	9236	0.0	9436	0.0
8440	0.0	8640	0.0	8840	0.0	9040	0.0	9240	0.0	9440	0.0
8444	0.0	8644	0.0	8844	0.0	9044	0.0	9244	0.0	9444	0.0
8448	0.0	8648	0.0	8848	0.0	9048	0.0	9248	0.0	9448	0.0
8452	0.0	8652	0.0	8852	0.0	9052	0.0	9252	0.0	9452	0.0
8456	0.0	8656	0.0	8856	0.0	9056	0.0	9256	0.0	9456	0.0
8460	0.0	8660	0.0	8860	0.0	9060	0.0	9260	0.0	9460	0.0
8464	0.0	8664	0.0	8864	0.0	9064	0.0	9264	0.0	9464	0.0
8468	0.0	8668	0.0	8868	0.0	9068	0.0	9268	0.0	9468	0.0
8472	0.0	8672	0.0	8872	0.0	9072	0.0	9272	0.0	9472	0.0
8476	0.0	8676	0.0	8876	0.0	9076	0.0	9276	0.0	9476	0.0
8480	0.0	8680	0.0	8880	0.0	9080	0.0	9280	0.0	9480	0.0
8484	0.0	8684	0.0	8884	0.0	9084	0.0	9284	0.0	9484	0.0
8488	0.0	8688	0.0	8888	0.0	9088	0.0	9288	0.0	9488	0.0
8492	0.0	8692	0.0	8892	0.0	9092	0.0	9292	0.0	9492	0.0
8496	0.0	8696	0.0	8896	0.0	9096	0.0	9296	0.0	9496	0.0
8500	0.0	8700	0.0	8900	0.0	9100	0.0	9300	0.0	9500	0.0
8504	0.0	8704	0.0	8904	0.0	9104	0.0	9304	0.0	9504	0.0
8508	0.0	8708	0.0	8908	0.0	9108	0.0	9308	0.0	9508	0.0
8512	0.0	8712	0.0	8912	0.0	9112	0.0	9312	0.0	9512	0.0
8516	0.0	8716	0.0	8916	0.0	9116	0.0	9316	0.0	9516	0.0
8520	0.0	8720	0.0	8920	0.0	9120	0.0	9320	0.0	9520	0.0
8524	0.0	8724	0.0	8924	0.0	9124	0.0	9324	0.0	9524	0.0
8528	0.0	8728	0.0	8928	0.0	9128	0.0	9328	0.0	9528	0.0
8532	0.0	8732	0.0	8932	0.0	9132	0.0	9332	0.0	9532	0.0
8536	0.0	8736	0.0	8936	0.0	9136	0.0	9336	0.0	9536	0.0
8540	0.0	8740	0.0	8940	0.0	9140	0.0	9340	0.0	9540	0.0
8544	0.0	8744	0.0	8944	0.0	9144	0.0	9344	0.0	9544	0.0
8548	0.0	8748	0.0	8948	0.0	9148	0.0	9348	0.0	9548	0.0
8552	0.0	8752	0.0	8952	0.0	9152	0.0	9352	0.0	9552	0.0
8556	0.0	8756	0.0	8956	0.0	9156	0.0	9356	0.0	9556	0.0
8560	0.0	8760	0.0	8960	0.0	9160	0.0	9360	0.0	9560	0.0
8564	0.0	8764	0.0	8964	0.0	9164	0.0	9364	0.0	9564	0.0
8568	0.0	8768	0.0	8968	0.0	9168	0.0	9368	0.0	9568	0.0
8572	0.0	8772	0.0	8972	0.0	9172	0.0	9372	0.0	9572	0.0
8576	0.0	8776	0.0	8976	0.0	9176	0.0	9376	0.0	9576	0.0
8580	0.0	8780	0.0	8980	0.0	9180	0.0	9380	0.0	9580	0.0
8584	0.0	8784	0.0	8984	0.0	9184	0.0	9384	0.0	9584	0.0
8588	0.0	8788	0.0	8988	0.0	9188	0.0	9388	0.0	9588	0.0
8592	0.0	8792	0.0	8992	0.0	9192	0.0	9392	0.0	9592	0.0
8596	0.0	8796	0.0	8996	0.0	9196	0.0	9396	0.0	9596	0.0
8600	0.0	8800	0.0	9000	0.0	9200	0.0	9400	0.0	9600	0.0

Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
9604	0.0	9684	0.0	9764	0.0	9844	0.0	9924	0.0	10004	0.0
9608	0.0	9688	0.0	9768	0.0	9848	0.0	9928	0.0	10008	0.0
9612	0.0	9692	0.0	9772	0.0	9852	0.0	9932	0.0	10012	0.0
9616	0.0	9696	0.0	9776	0.0	9856	0.0	9936	0.0	10016	0.0
9620	0.0	9700	0.0	9780	0.0	9860	0.0	9940	0.0	10020	0.0
9624	0.0	9704	0.0	9784	0.0	9864	0.0	9944	0.0	10024	0.0
9628	0.0	9708	0.0	9788	0.0	9868	0.0	9948	0.0	10028	0.0
9632	0.0	9712	0.0	9792	0.0	9872	0.0	9952	0.0	10032	0.0
9636	0.0	9716	0.0	9796	0.0	9876	0.0	9956	0.0	10036	0.0
9640	0.0	9720	0.0	9800	0.0	9880	0.0	9960	0.0	10040	0.0
9644	0.0	9724	0.0	9804	0.0	9884	0.0	9964	0.0	10044	0.0
9648	0.0	9728	0.0	9808	0.0	9888	0.0	9968	0.0	10048	0.0
9652	0.0	9732	0.0	9812	0.0	9892	0.0	9972	0.0	10052	0.0
9656	0.0	9736	0.0	9816	0.0	9896	0.0	9976	0.0	10056	0.0
9660	0.0	9740	0.0	9820	0.0	9900	0.0	9980	0.0	10060	0.0
9664	0.0	9744	0.0	9824	0.0	9904	0.0	9984	0.0	10064	0.0
9668	0.0	9748	0.0	9828	0.0	9908	0.0	9988	0.0	10068	0.0
9672	0.0	9752	0.0	9832	0.0	9912	0.0	9992	0.0	10072	0.0
9676	0.0	9756	0.0	9836	0.0	9916	0.0	9996	0.0	10076	0.0
9680	0.0	9760	0.0	9840	0.0	9920	0.0	10000	0.0	10080	0.0

Model Details

Storage is Online Cover Level (m) 10.000

Cellular Storage Structure

Invert Level (m) 8.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	1150.0	1150.0	1.501	0.0	1353.5
1.500	1150.0	1353.5			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-CHE-0058-2000-1500-2000
Design Head (m)	1.500
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	No
Diameter (mm)	58
Invert Level (m)	8.000
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	2.0
Flush-Flo™	0.141	1.3
Kick-Flo®	0.202	0.8
Mean Flow over Head Range	-	1.4

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.1	1.200	1.8	3.000	2.8	7.000	4.3
0.200	0.8	1.400	1.9	3.500	3.0	7.500	4.4
0.300	0.9	1.600	2.1	4.000	3.2	8.000	4.5
0.400	1.0	1.800	2.2	4.500	3.4	8.500	4.7
0.500	1.2	2.000	2.3	5.000	3.6	9.000	4.8
0.600	1.3	2.200	2.4	5.500	3.8	9.500	4.9
0.800	1.5	2.400	2.5	6.000	3.9		
1.000	1.6	2.600	2.6	6.500	4.1		

Summary of Results for 10 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
15 min Summer	9.870	1.370	4.8	99.8	104.5	283.6	O K
30 min Summer	9.909	1.409	4.8	101.0	105.8	319.1	O K
60 min Summer	9.909	1.409	4.8	101.0	105.8	319.0	O K
120 min Summer	9.908	1.408	4.8	101.0	105.8	318.2	O K
180 min Summer	9.881	1.381	4.8	100.1	104.9	292.9	O K
240 min Summer	9.844	1.344	4.7	98.9	103.7	260.2	O K
360 min Summer	9.764	1.264	4.6	96.3	100.9	192.0	O K
480 min Summer	9.687	1.187	4.5	93.7	98.3	130.8	O K
600 min Summer	9.620	1.120	4.4	91.5	95.9	81.9	O K
720 min Summer	9.568	1.068	4.4	89.6	94.0	44.8	O K
960 min Summer	9.507	1.007	4.3	87.4	91.7	4.5	O K
1440 min Summer	9.323	0.823	4.0	65.4	69.4	0.3	O K
2160 min Summer	9.263	0.763	3.9	46.7	50.6	0.3	O K
2880 min Summer	9.226	0.726	3.9	36.7	40.6	0.2	O K
4320 min Summer	9.181	0.681	3.8	26.6	30.4	0.2	O K
5760 min Summer	9.162	0.662	3.7	21.3	25.1	0.2	O K
7200 min Summer	9.150	0.650	3.7	17.8	21.5	0.2	O K
8640 min Summer	9.143	0.643	3.7	15.7	19.5	0.2	O K
10080 min Summer	9.135	0.635	3.7	14.0	17.7	0.1	O K
15 min Winter	9.872	1.372	4.8	99.8	104.6	285.3	O K
30 min Winter	9.914	1.414	4.8	101.1	106.0	323.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
15 min Summer	70.251	0.0	380.2	362.3	16
30 min Summer	45.840	0.0	495.8	472.7	28
60 min Summer	28.723	0.0	623.9	594.3	46
120 min Summer	18.561	0.0	803.2	762.0	80
180 min Summer	14.151	0.0	919.4	869.2	114
240 min Summer	11.591	0.0	1002.4	941.1	148
360 min Summer	8.654	0.0	1122.1	1034.9	212
480 min Summer	6.973	0.0	1205.4	1092.6	272
600 min Summer	5.875	0.0	1269.6	1130.9	330
720 min Summer	5.097	0.0	1321.8	1157.5	384
960 min Summer	4.061	0.0	1403.9	1188.7	492
1440 min Summer	2.947	0.0	1528.3	1210.7	722
2160 min Summer	2.146	0.0	1668.8	1199.7	1076
2880 min Summer	1.723	0.0	1785.8	1168.5	1428
4320 min Summer	1.281	0.0	1976.3	1137.9	2184
5760 min Summer	1.051	0.0	2171.7	1135.8	2896
7200 min Summer	0.911	0.0	2353.1	1135.1	3544
8640 min Summer	0.817	0.0	2531.0	1148.4	4376
10080 min Summer	0.748	0.0	2704.3	1163.3	4952
15 min Winter	70.251	0.0	380.7	362.8	16
30 min Winter	45.840	0.0	496.1	472.7	29

Summary of Results for 10 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Overflow (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
60 min Winter	9.905	1.405	4.8	100.9	105.7	315.6	O K
120 min Winter	9.881	1.381	4.8	100.1	104.9	293.4	O K
180 min Winter	9.827	1.327	4.7	98.4	103.1	244.9	O K
240 min Winter	9.765	1.265	4.6	96.3	101.0	192.6	O K
360 min Winter	9.643	1.143	4.5	92.2	96.7	98.1	O K
480 min Winter	9.544	1.044	4.3	88.8	93.1	28.8	O K
600 min Winter	9.442	0.942	4.2	85.1	89.2	0.4	O K
720 min Winter	9.349	0.849	4.0	73.4	77.5	0.3	O K
960 min Winter	9.299	0.799	4.0	57.7	61.6	0.3	O K
1440 min Winter	9.244	0.744	3.9	41.1	45.0	0.2	O K
2160 min Winter	9.191	0.691	3.8	29.0	32.8	0.2	O K
2880 min Winter	9.166	0.666	3.8	22.6	26.4	0.2	O K
4320 min Winter	9.143	0.643	3.7	15.9	19.6	0.2	O K
5760 min Winter	9.125	0.625	3.7	12.4	16.0	0.1	O K
7200 min Winter	9.113	0.613	3.7	10.2	13.9	0.1	O K
8640 min Winter	9.106	0.606	3.7	9.0	12.7	0.1	O K
10080 min Winter	9.100	0.600	3.6	8.0	11.6	0.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Overflow Volume (m³)	Time-Peak (mins)
60 min Winter	28.723	0.0	624.7	595.1	48
120 min Winter	18.561	0.0	805.6	765.0	86
180 min Winter	14.151	0.0	920.3	871.3	122
240 min Winter	11.591	0.0	1003.6	943.8	156
360 min Winter	8.654	0.0	1122.3	1037.0	216
480 min Winter	6.973	0.0	1205.4	1094.9	270
600 min Winter	5.875	0.0	1269.6	1134.3	300
720 min Winter	5.097	0.0	1321.8	1161.0	356
960 min Winter	4.061	0.0	1403.9	1192.7	488
1440 min Winter	2.947	0.0	1528.3	1217.8	724
2160 min Winter	2.146	0.0	1669.1	1213.7	1044
2880 min Winter	1.723	0.0	1786.4	1190.1	1412
4320 min Winter	1.281	0.0	1986.8	1144.1	2240
5760 min Winter	1.051	0.0	2167.7	1119.5	2904
7200 min Winter	0.911	0.0	2356.2	1107.9	3680
8640 min Winter	0.817	0.0	2536.7	1103.3	4160
10080 min Winter	0.748	0.0	2712.4	1102.3	4928

Rainfall Details

Rainfall Model	FEH	Winter Storms	Yes
Return Period (years)	10	Cv (Summer)	1.000
FEH Rainfall Version	2013	Cv (Winter)	1.000
Site Location	GB 618329 134790	Shortest Storm (mins)	15
Data Type	Point	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+20

Time Area Diagram

Total Area (ha) 2.161

Time (mins) From:	To:	Area (ha)
0	4	2.161

Model Details

Storage is Online Cover Level (m) 10.000

Tank or Pond Structure

Invert Level (m) 8.500

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	0.0	0.501	1.0	1.001	640.0
0.500	0.0	1.000	1.0	1.500	1000.0

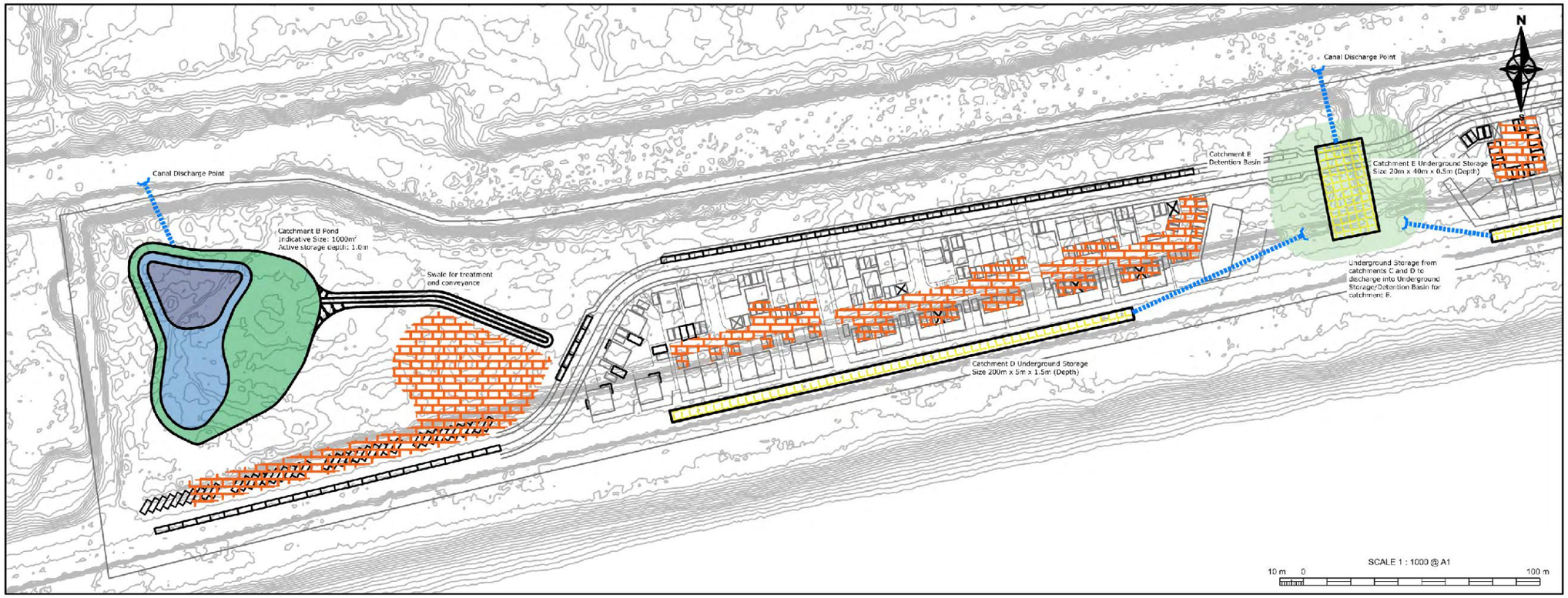
Orifice Outflow Control

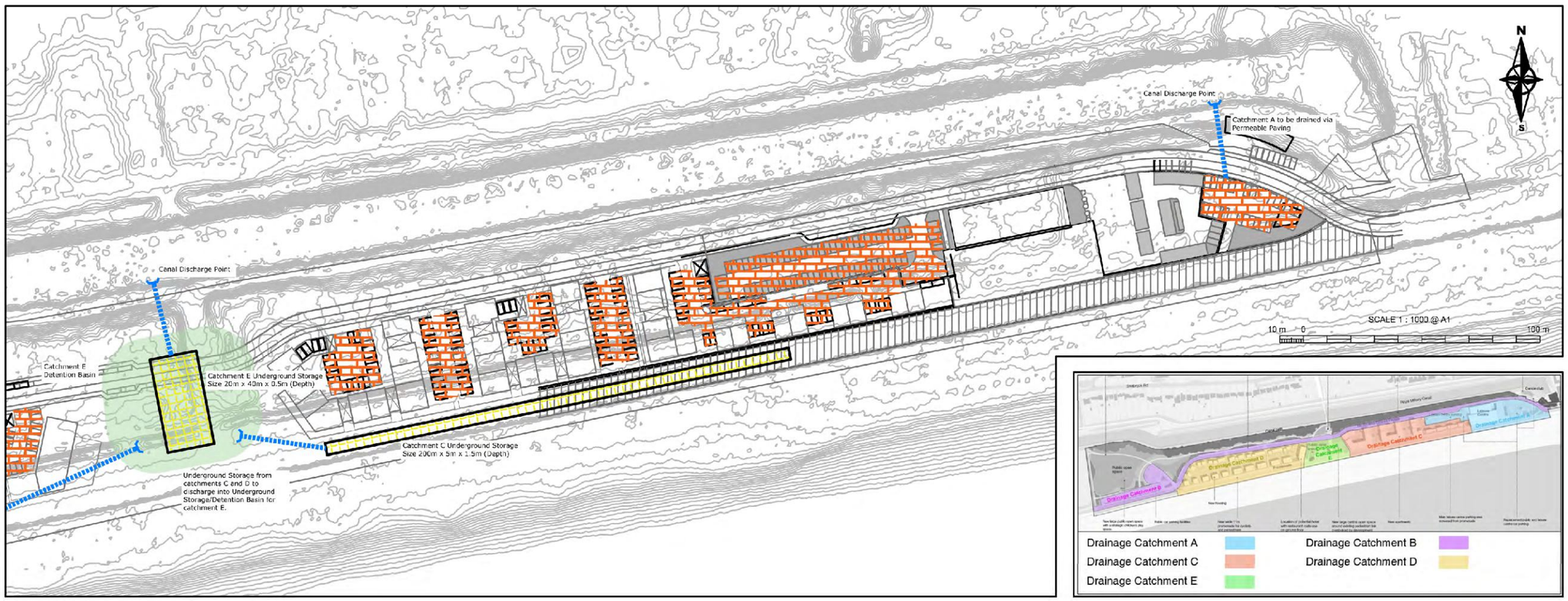
Diameter (m) 0.041 Discharge Coefficient 0.600 Invert Level (m) 8.000

Pipe Overflow Control

Diameter (m)	0.300	Entry Loss Coefficient	0.500
Slope (1:X)	100.0	Coefficient of Contraction	0.600
Length (m)	100.000	Upstream Invert Level (m)	9.001
Manning's n	0.015		

Appendix A.6 – Indicative Drainage Layout





PRIVATE DRAINAGE AND LEVELS KEY

- Surface Water Drain
- Underground Storage
- Permanent Wet Area
- Planted Area (1:1 Year use)
- Marginal Area (1:10 Year use)
- Detention Basin
- Permeable Paving
- Headwall

Notes

1. Contains Ordnance Survey data © Crown copyright and database right 2018.
2. All dimensions are in metres unless otherwise stated elsewhere.
3. Proposed drainage positions will be subject to detailed design.
4. The size and extent of the pond will be subject to infiltration testing and trial holes.
5. All drainage systems will need to be installed and designed for suitable loading requirements.

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Rev	Description	Date
P1	First issue	14/09/2018

CLIENT: Folkestone and Hythe District Council

PROJECT: Princes Parade, Hythe

SCALE	PROJ REF	ORIGINATOR	CHECKED BY
1:1000	1494	LA	SJB

DWG REF: INDICATIVE DRAINAGE LAYOUT

DWG No: HC-1494-500