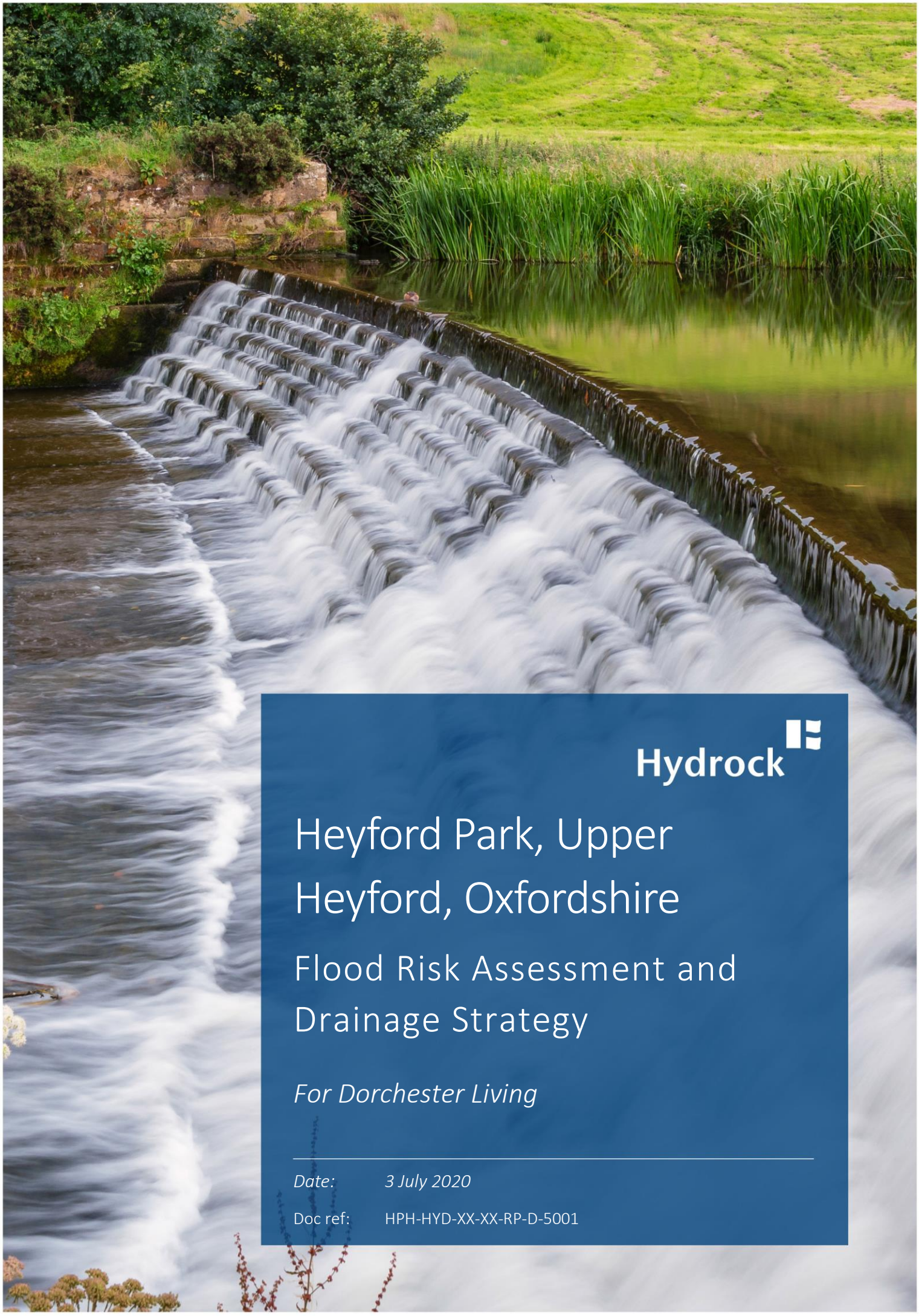

Hydrock

Heyford Park, Upper Heyford, Oxfordshire

Flood Risk Assessment and Drainage Strategy

For Dorchester Living

Date: *3 July 2020*

Doc ref: HPH-HYD-XX-XX-RP-D-5001

DOCUMENT CONTROL SHEET

Issued by	Hydrock Consultants Limited Over Court Barns Over Lane Almondsbury Bristol BS32 4DF	Tel: 01454 619533 Fax: 01454 614125 www.hydrock.com
Client	Dorchester Living	
Project name	Heyford Park, Upper Heyford, Oxfordshire	
Title	Flood Risk Assessment and Drainage Strategy	
Doc ref	HPH-HYD-XX-XX-RP-D-5001	
Project no.	C-04583	
Status	S2	
Date	03/07/2020	

Document Production Record		
Issue Number	P5	Name
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Document Revision Record			
Issue Number	Status	Date	Revision Details
P2	Draft	10th April 2018	P2-S2
P3	Final	4th March 2020	P3 S2
P4	Final	10th March 2020	P4-S2 updated to take on review comments
P5	Final	3rd July 2020	P5-S2 Updated following OCC comments

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1. INTRODUCTION

This report has been prepared by Hydrock Consultants Limited (Hydrock) on behalf of our client, Dorchester Living, in support of a Planning Application to be submitted to Cherwell District Council for a proposed mixed use development at Heyford Park, Upper Heyford, Oxfordshire.

This Flood Risk Assessment report has been prepared to address the requirements of the National Planning Policy Framework (NPPF), through:

- Assessing whether the site is likely to be affected by flooding.
- Assessing whether the proposed development is appropriate in the suggested location.
- Presenting any flood risk mitigation measures necessary to ensure that the proposed development and occupants will be safe, whilst ensuring flood risk is not increased elsewhere.

The report considers the requirements for undertaking a Flood Risk Assessment as detailed in NPPF guidance.

2. SITE INFORMATION

2.1 Existing Situation

2.1.1 Location

Table 1 provides the summary site location details.

Table 1: Site Referencing Information

Address	Former RAF Upper Heyford, Oxfordshire, OX25 5HA
Grid Reference	451497, 226743 SP514267
Easting, Northing	451497, 226743

2.1.2 Existing Land Use

The Masterplan Area covers an area of around 449ha around the former RAF Upper Heyford the total development area included within this application is 43.5ha across 12 separate parcels. For the purpose of this report the Application Site to referred to as Heyford Park.

Heyford Park comprises an unused flying field (runway, taxi areas, control tower etc.) with a large portion of the remaining site area currently developed with former personnel living quarters, administrative office buildings, aircraft hangers, storage facilities, and areas of hardstanding working yards. Many of the former buildings are currently to commercial and industrial uses and these are currently accessed via internal site roads linked to main site entrance off Camp Road which runs through the middle of the site. There has already been some residential development on the site. The remainder of the site is undeveloped and is predominantly grassed.

Heyford Park has the B430 to the east and the B4030 to the south, with another B class road, Camp Road, running through the approximate centre of the site. The A43 is approximately 1.6km to the east of the site. Upper Heyford village is located to the west of the site and beyond Station Road. The next nearest urban centre is Bicester which is around 5.8km to the south east of the site.

2.1.3 Topography

A detailed topographical survey has been provided for the areas to the south of the flying field and existing runway areas. Where topographical information isn't available for the flying field and area to the north, Ordnance Survey contour mapping has been used to inform the general topography and falls. The flying field is shown as being the local high point within the wider area with ground the levels falling away in all directions.

This survey shows that there are a number of different falls through the site but, in general, there is a ridge that runs through the approximate centre of the site with site levels falling away from this. The level of the ridge varies but is generally around 125m AOD though levels do rise to around 130mAOD locally. Ground levels fall in a generally westerly direction with levels dropping along Camp Road to around 108m AOD at the junction with Somerton Road. The topographical survey also shows that site levels to the west of the ridge fall in a southerly direction with levels falling from Camp Road to a surveyed low of around 115.50m AOD, whilst levels rise to the northwest to a high within the site (within parcel 26) at around 138mAOD.

Levels to the east of the of the high point are shown to generally fall from a level of around 126m AOD on the south eastern apron of the runway to around 118.50m AOD at the southern limit of the survey.

2.1.4 Proposed Development

Planning permission is being sought for a hybrid planning application consisting of:

- demolition of buildings and structures as listed in Schedule 1;
- outline planning permission for up to:
  - 1,175 new dwellings (Class C3);
  - 60 close care dwellings (Class C2/C3);
  - 929 m^2 of retail (Class A1);
  - 670 m^2 comprising a new medical centre (Class D1);
  - 35,175 m^2 of new employment buildings, (comprising up to 6,330 m^2 Class B1a, 13,635 m^2 B1b/c, 9,250 m^2 Class B2, and 5,960 m^2 B8);
  - 2,415 m^2 of new school building on 2.4 ha site for a new school (Class D1);
  - 925 m^2 of community use buildings (Class D2); and 515 m^2 of indoor sports, if provided on-site (Class D2);
  - 30m in height observation tower with zip-wire with ancillary visitor facilities of up of 100 m^2 (Class D1/A1/A3);
  - 1,000 m^2 energy facility/infrastructure with a stack height of up to 24m (sui generis);
  - 2,520 m^2 additional education facilities (buildings and associated external infrastructure) at Buildings 73, 74 and 583 for education use (Class D1);
  - creation of areas of Open Space, Sports Facilities, Public Park and other green infrastructure.

- the change of use of the following buildings and areas:
  - Buildings 3036, 3037, 3038, 3039, 3040, 3041, and 3042 for employment use (Class B1b/c, B2, B8);

  - Buildings 217, 3052, 3053, 3054, 3055, 3102, and 3136 for employment use (Class B8);
  - Buildings 2010 and 3009 for filming and heritage activities (Sui Generis/Class D1);
  - Buildings 73 and 2004 (Class D1);
  - Buildings 391, 1368, 1443, 2005, 2006, 2007, 2008 and 2009 (Class D1/D2 with ancillary A1-A5 use);
  - Building 340 (Class D1, D2, A3);
  - 20.3ha of hardstanding for car processing (Sui Generis); and
  - 76.6ha for filming activities, including 2.1 ha for filming set construction and event parking (Sui Generis);
- the continuation of use of areas, buildings and structures already benefiting from previous planning permissions, as specified in Schedule 2.
- associated infrastructure works, including surface water attenuation provision and upgrading Chilgrove Drive and the junction with Camp Road.

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3. ASSESSMENT OF FLOOD RISK

3.1 Fluvial and Tidal Flooding

The Environment Agency's (EA's) Flood Zone Mapping shows that the site is entirely within Flood Zone 1 which comprises land assessed as having a less than 1 in 1,000 annual probability of fluvial or tidal flooding (<0.1%) in any year.

Being categorised as Flood Zone 1, it is therefore concluded that the site is suitably elevated above all surrounding watercourses to be above the extreme 1 in 1,000 year flood level. As such, the site is concluded as being at low risk from fluvial flooding. The closest watercourse to the site is the Gallos Brook which is a tributary of the larger River Cherwell.

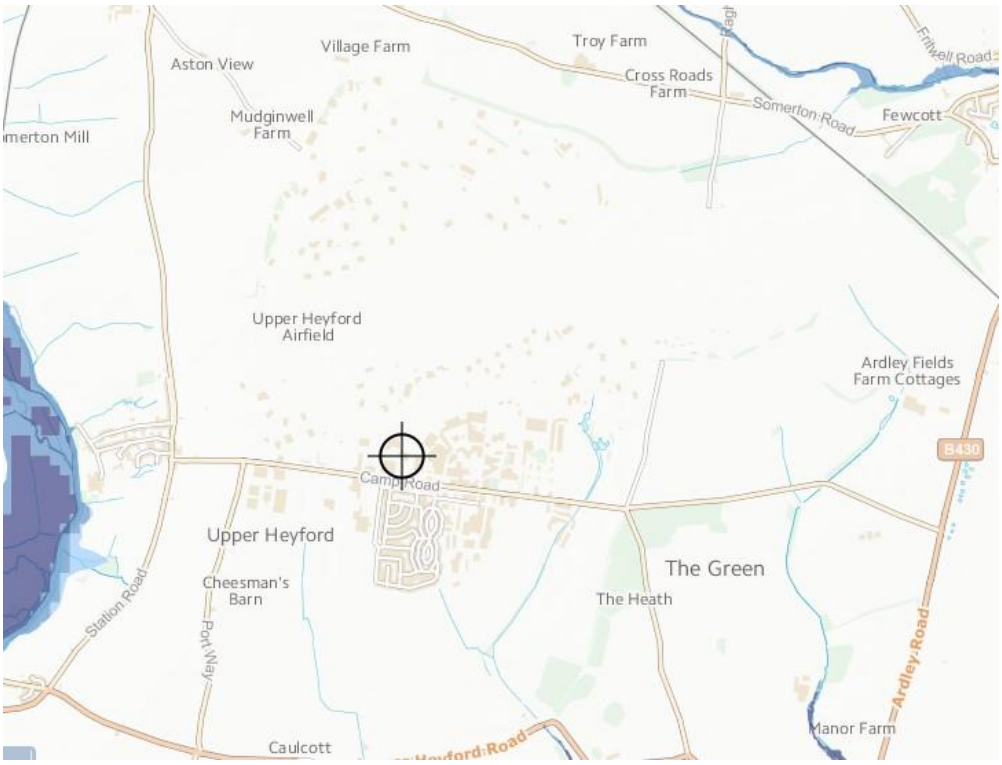


Figure 1: Environment Agency Fluvial Flood Risk Map

Owing to the location and elevation of the site it is also concluded to be at negligible risk from tidal flooding.

3.2 Surface Water Flooding

The EA's flooding from surface water mapping shows that the site is predominantly classified as being at 'very low' risk from this source of flooding.

Whilst the site has been shown as being predominantly at low risk, some areas are classified as being at slightly higher risk with two potential surface flow routes within the site identified. One of these flows in an easterly direction along the northern site boundary and away from the site and poses little risk to the site.

The second flow route starts within the existing buildings at the south eastern corner of the site and drains across the site in a southerly direction with depths typically being below 300mm and only

impacts a small area of the site. As such, the area immediately affected could be at an increased risk from this source.

In addition to the two identified surface flow routes there are a number of sections within the site shown to be at an increased risk. These areas are not shown to have connectivity (i.e. act as a flow route) with the wider area and are therefore only representative of locally lower sections within the site.

Figure 2: Environment Agency Surface Water Flood Risk Map

Apart from two localised areas where two flow routes have been identified the site is concluded as being at low risk from this source of flooding.

3.3 Groundwater Flooding

British Geological Survey mapping shows the site to be underlain by the White Limestone Formation.

Noting the potentially permeable nature of the underlying geology, and as detailed within the Oxfordshire County Council Strategic Flood Risk Assessment, groundwater has been known to result in localised issues but these are restricted to locally lower lying areas. For the purpose of this assessment, the Flood Zone 3 extent is considered representative of the 'worst case' groundwater flood risk.

As the site has been confirmed as being within Flood Zone 1, the site is concluded as being sufficiently elevated above the worst case groundwater risk and to therefore conducted to be at low risk from this source.

3.4 Infrastructure Failure Flooding

Owing to the generally developed nature of the site there is considered to be an existing sewer network (both surface and foul drainage systems). In the event of the surcharging of any of this network, overland flows will likely be conveyed by topography and contained within the existing road network and directed away from/around the site and not pose any significant risk to the site.

The site is therefore concluded to be at low risk from sewer flooding.

3.5 Flooding from Artificial Sources

A review of the EA's Flooding from Reservoirs map indicates that the site is not within the maximum extent of flooding in the event of a failure of any artificial source. There are also no raised large waterbodies identified in the near vicinity of the site (the closest being the Oxford Canal to the west which is at significantly lower elevation to the site).

The site is therefore concluded to be at negligible risk of flooding from artificial sources.

3.6 Emergency Access Requirements

In terms of emergency access and egress, all of the local external main highway and pedestrian routes serving the site are elevated well above any fluvial floodplain. The routing of the main access route in to and out of the development site is also located outside of any fluvial floodplain and therefore any restriction of access from flood risk is deemed negligible and no specific mitigation measures are required.

3.7 Summary

EA data for the area indicates that the entirety of the site is at low risk of flooding from fluvial and tidal sources and entirely within Flood Zone 1.

The site has also been concluded as being at low or negligible risk from all other assessed sources of potential flooding.

4. NPPF REQUIREMENTS

4.1 Planning Policy Requirements

The proposed development has been confirmed as being located within Flood Zone 1.

Residential development is considered 'more vulnerable' in terms of flood risk and all other forms of the proposed development are considered as 'less vulnerable' in terms of flood risk.

The NPPF Flood Risk Vulnerability and Flood Zone Compatibility matrix (Table 3) indicates that 'more vulnerable' and 'less vulnerable' development is appropriate in Flood Zone 1 and accordingly the proposed development is concluded to meet the requirements of the Sequential Test.

4.2 Exception Test

Whilst the site is demonstrated to pass the Sequential Test, the following section details potential measures necessary to mitigate any residual flood risks, to ensure that the proposed development and occupants will be safe, and that flood risk will not be increased elsewhere within the design life of the proposed development, akin to the requirements of the second section of the Exception Test.

4.2.1 Resistance and Resilience of Site

No specific measures are considered necessary to protect the proposed development from flooding (as no significant sources of potential flood risk have been identified).

4.2.2 Safe Access and Egress

Safe / dry access is demonstrated to be possible via all directions onto Camp Road.

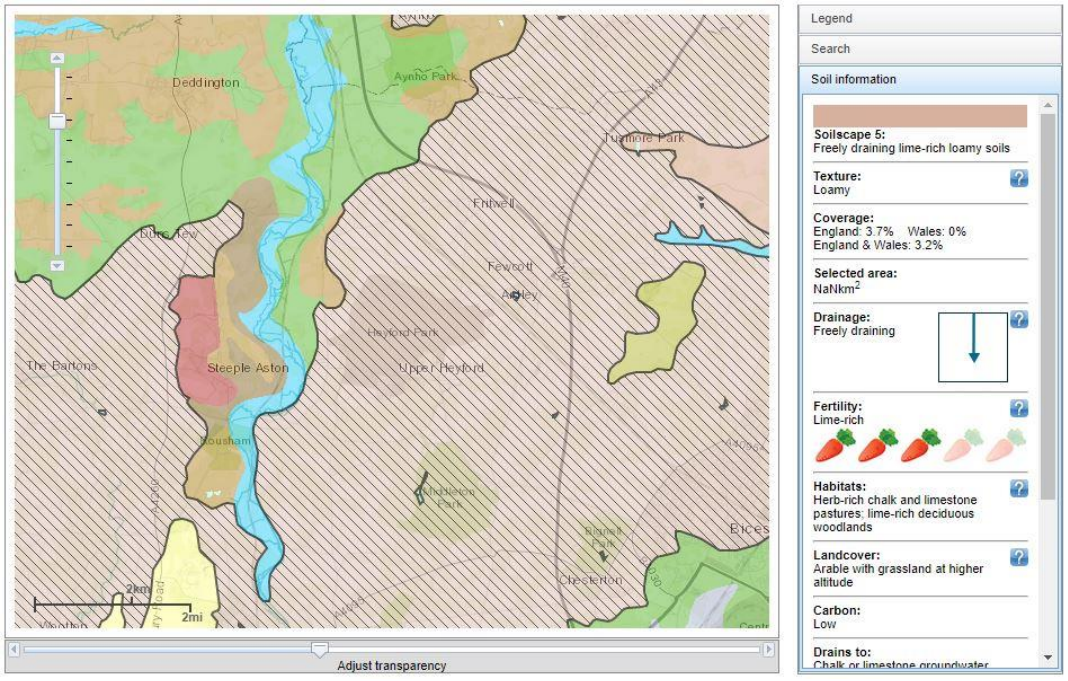
5. SURFACE WATER MANAGEMENT

5.1 Existing Surface Water Drainage

The existing site consists of approximately 455.5ha formed from the former RAF Upper Heyford airfield. The site comprises an unused flying field, personnel living quarters, administrative buildings, aircraft hangers and areas of hardstanding. The site is served by an extensive site wide private surface water drainage network with thirteen individual discharge locations to the surrounding water courses. The surrounding watercourses include the Gallos Brook and other unnamed brooks in the south, which are tributaries of the River Cherwell. In the north east there is the Padbury Brook. The current catchment for the site is roughly split in to five separate catchment zones due to the natural topography of the land. The majority of the area discharges in a southerly direction to the Gallos Brook and unnamed watercourses, with the north-eastern area draining in an easterly direction to the Padbury Brook.

An initial investigation in to the underlying bedrock shows predominantly White Limestone formation. This suggests that surface water discharge via infiltration may be a possibility though this will be subject to confirmation through site specific/plot specific infiltration testing at a later stage.

Figure 3: Cranfield University Soilscape Mapping



Infiltration solutions will therefore need to be confirmed via a full ground investigation and infiltration testing in accordance with BRE 365 to determine infiltration rates and groundwater levels but in the absence of such confirmation a solution that utilises attenuation is proposed to confirm a suitable strategy is deliverable for the site.

5.2 Proposed Surface Water Drainage

The proposed development consists of individual parcels located within the greater 455.5ha redline boundary. Figure 4 indicates the location of each of the parcels covered in this drainage strategy. The existing site is served by a traditional gravity surface water network discharging to local watercourses. However, the underlying soils suggests that surface water may be able to discharge via infiltration, where ground water levels would allow. In the absence of infiltration information and confirmation of

any possible contamination requiring the potential for remediation it is therefore proposed to demonstrate that surface water runoff can be reduced to the existing QBAR greenfield rates. The surface water discharge from the individual parcels will be connected to a swale and attenuation basin network with a restricted flow to the adjacent water courses.

The surface water discharge rate will be restricted to the Mean Annual Flood (QBAR) rate. The greenfield run off rate for the site has been calculated to be 4.3l/s/ha. Greenfield run off calculations are provided in Appendix A. Attenuation for each parcel will be in the form of surface features including detention basins and swales or, where this is not practicable, underground tanks. Table 2 below summarises the required attenuation volumes and discharge rates for each of the proposed parcels. A 65% rate of development has been assumed for each parcel unless otherwise stated to calculate the allowable QBAR greenfield run off rate.

A 10% allowance for urban creep has also been applied to the residential parcel impermeable areas with the net storage volumes adjusted to suit.

A factor of 40% allowance for climate change has been included for the 1 in 100-year event to determine the maximum storage volumes required in each attenuation basin.

Table 2: Parcel Attenuation Requirements

Phase	Gross Area (Ha)	Impermeable Area & 65% (Ha)	Area Including Urban Creep (Ha)	Discharge Rate (4.3l/s/ha)	Attenuation Volume (m^3)
10	4.6	2.99	3.289	12.8	2616
11, 12 & 21	6.90	4.48	4.92	19.2	3912
13	0.50	0.325	0.357	2.0	260
16	7.8	5.07	5.577	21.80	4432
17	2.6	1.69	1.86	7.2	1481
19	0.9	0.58	0.64	2.5	1017
20	0.5	0.5	0.5	2.15	386
21	4.4	2.86	3.146	12.30	2500
23	14.40	9.36	10.296	40.25	8180
39	0.4	0.26	0.286	2.0	197

40	0.50	0.325	0.357	2.0	260

Table 3: Attenuation Half Drain Times

Parcel No.	Attenuation Max Volume (m^3)	Half Drain Time (Hrs)	Critical Duration (1 in 100 year +40% event) (mins)
10	2582	28	960
11, 12 & 21	6928	50	1440
13	277	19	720
16	4768	30	1440
17	1580	30	1440
19	505	28	960
20	417	26	960
23	6631	22	960
39	202	14	600
40	272	18	720

Table 3 identifies the maximum storage volume present in each attenuation basin based on the critical duration and the time required for half of this volume to drain away to ensure there is attenuation volume available in the event a second storm event happens within a 24-hour period.

There are two non-residential parcels, 19 and parcel 20, which consists of 60 extra care units and a medical centre respectively. Due to limited space it is proposed that these are served by below ground attenuation tanks in the form of either a geocellular storage system or oversized plastic pipes. To deliver adequate treatment and mitigate pollution downstream, additional treatment trains will be proposed such as a tanked permeable paving system on any parking areas. The SuDS manual sets the requirements for acceptable pollution mitigation measures based on the land use classification.

It is recommended that a ground investigation is carried out and that this includes infiltration testing in accordance with BRE 365 to confirm that surface water discharge via infiltration is a possibility. If infiltration is viable, soakaway structures may compliment any attenuation.

Where areas of the site are to operate under their current use or remain undeveloped the existing drainage routes and discharge points will need to be maintained. It may be necessary for elements of exiting surface water drainage network passing through the proposed residential developments to be diverted to maintain a positive connection. Any surface water treatment elements such as petrol interceptors will also need to be maintained and/or relocated. Where proposed residential developments are to utilise existing networks the incoming discharge to this network will be significantly reduced as all redeveloped area will be restricted to greenfield run-off rate. The current surface water run-off from impermeable areas is discharged unrestricted to the existing system.

5.3 Catchment & Discharge Locations

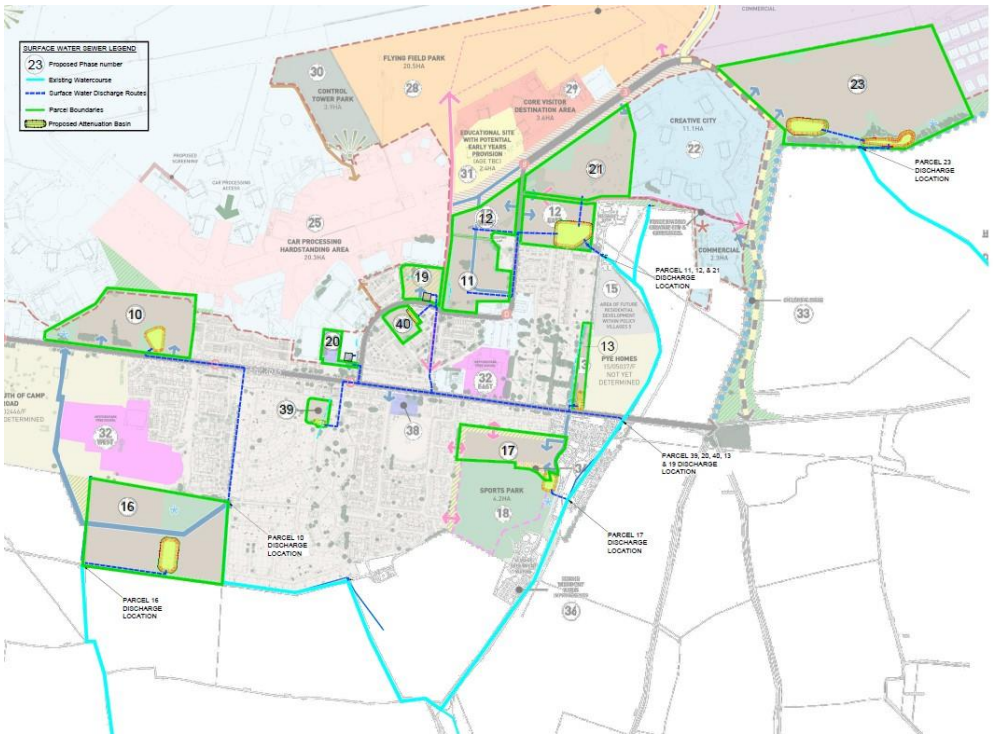


Figure 4: Discharge Location Plan

Figure 4 above identifies the boundaries of the development parcels covered by the drainage strategy described in this report and also identifies the discharge location and watercourse that each parcel and catchment discharges to.

5.4 Exceedance Flow Routes

In order to reduce risk to downstream catchments and to residential plots within each parcel it will be necessary to provide areas to contain surface water run-off in the event of exceedance flows. Exceedance flows will be directed to the open space areas via the internal estate roads or swale network. Depressions within the open space areas will prevent the exceedance flows from leaving the site boundary. Drawing HPH-HYD-XX-XX-DR-C-2204 in Appendix D shows the potential exceedance flow routes and indicative sacrificial areas. The internal layout of residential parcels will need to ensure exceedance flows can be directed to open space areas.

5.5 Water Quality

The proposed scheme will be designed to satisfy the guidance given in the CIRIA SuDS Manual 2015 and to comply with advice from the LLFA and to do so it is recommended that measures are put in place to improve water discharge quality. Such measures would include the provision of swales alongside proposed highway networks for carriageway run-off to convey water to attenuation storage features, rather than traditional gully systems. In addition to this permeable paving on private drives and tree-pits can be used. Forebay areas can also be included in to attenuation basins to contain accumulating sediments. Consideration will also need to be given to the future maintenance and adoption of any green SuDS features proposed. In accordance with table 26.2 of the SuDS Manual the site has a low pollution hazard. The pollution hazard indices for the site are:

Table 4: Pollution hazard level (taken from table 26.2 CIRIA SuDS Manual

	Total suspended solids	Metals	Hydro-carbons
Individual driveways, residential car parks, roads	0.5	0.4	0.4
Residential Roofs	0.2	0.2	0.05

In accordance with Table 26.3, the proposed SuDS within the site offer mitigation indices of:

Table 5: Pollution Hazard Mitigation Table

	Total suspended solids	Metal	Hydro-carbons
Attenuation Basin	0.5	0.5	0.6
Swale	0.5	0.6	0.6
Permeable Paving	0.7	0.6	0.7

5.6 Amenity

The green spaces used by the proposed attenuation basins will be able to double up as recreation areas as well as allowing for a space for landscaping to help support flora and fauna.

5.7 Biodiversity

The swale and attenuation basin network will be part of an enhanced site wide landscape strategy and will provide opportunities to support local habitats and species.

5.8 On Parcel Source Control Opportunities

5.8.1 Permeable Paving

Permeable paving allows infiltration through the surface and filter layers and in to a sub base or void structure below, which may be a clean stone layer or in the from of plastic crates. The surface water is then allowed to infiltrate in to the subsoil below. Where infiltration is not possible the run off the surface water is attenuated within the clean stone layer before being discharged to a surface water outfall.

5.8.2 Swales and Filter Drains

Swales and filter drains are designed to convey surface water run off at surface level to a point of discharge or to an attenuation/infiltration system. Swales could be used within the development plots alongside highways to convey runoff downstream to attenuation features.

5.8.3 Infiltration Techniques

Although localised infiltration testing has not been carried out, there is the potential to utilise private soakaways in rear gardens where space allows. This will be dependant on local groundwater levels and the presence of contamination, although these techniques could be used to reduce the size of downstream attenuation/infiltration basins.

5.8.4 Green/Blue Roofs

Green roofs are living vegetation installed on the top of buildings to reduce the volume of surface water run-off, a blue roof is a roof designed explicitly to store water to be either used as grey water recycling or attenuated and released in to a surface water discharge point. Although it is not suitable to use green roofs on private residencies there is potential to utilise green or blue roof on the Creative City area of the development, part of the future development.

5.9 Surface Water & SuDs Maintenance

The CIRIA SuDS Manual (CIRIA C753) highlights the various aspects of maintenance requirements for different sustainable drainage elements. The table below gives an overview of the potential maintenance processes for each individual form of surface water management system. The frequency to which these processes will need to be carried out is dependent on various factors, such as the size of the catchment area the system serves, the size of the feature itself, and the environment in which the feature is situated.

Table 6: Maintenance requirements for various SuDS features

Operation and maintenance activity	Swale	Attenuation Basin	Permeable Paving
Regular Maintenance			
Inspection	✓	✓	✓
Litter and debris removal	✓	✓	
Sediment removal	✓	✓	
Grass cutting	✓	✓	
Inspect inlets/outlets	✓		✓
Brushing & Vacuuming			✓
Occasional Maintenance			
Sediment Management	✓		
Removal of weeds	✓	✓	✓
Remove or control tree roots	✓		

Repair inlets, outlets		✓	
Stabilise and mow contributing and adjacent areas			✓
Remedial Maintenance			
Repair erosion by re-turfing	✓		
Relevel uneven surfaces	✓	✓	
Remediate any landscaping		✓	
Rehabilitation of surface and upper sub-structure			✓

It is proposed that any SuDS features be adopted and maintained by a private management company. The surface water drainage network could be offered to Thames Water under a Section 104 legal agreement.

6. FOUL WATER MANAGEMENT

6.1 Existing Foul Water

The site is currently served by an existing foul water system, which consists of pumping stations and a foul treatment plant in the south-east corner of the site. The existing foul network and sewerage treatment plant are all currently under private ownership. There is no record of any other foul sewers within the site boundary or adjacent to the site.

6.2 Proposed Foul Water

Currently all foul drainage from the site discharges to the existing sewerage treatment plant in the south-east corner of the site where the sewerage is treated and discharged to the Gallos Brook. Various elements of the sewerage treatment plant are to be refurbished to address issues of capacity, reliability and monitoring following the redevelopment of the site.

The table below shows the estimated foul discharge rates based on 4000litres/dwelling/day for each of the parcels.

Table 4: Parcel Foul Discharge Rates

Phase	Plots	Foul Discharge (l/s)
10	130	6.0
11	80	3.70
12	123	5.7
13	6	0.27
16	178	8.24
17	62	2.8
19	60	2.7
20	670m² Medical Centre	0.033
21	122	5.6
23	430	19.90
39	13	0.60

40	27	1.25

The site is currently served by various existing pumping stations. To achieve connections to the existing foul treatment plant from the proposed developments it will be necessary to use some pumped solutions due to the topography of the site. A new pumping station is proposed for parcel 23 which will be pumped to high ground within the creative city. A new gravity sewer will then serve parcels 11, 12 & 21 as well as 23 and connect to an existing pumping station located to the south of parcel 12 with a peak flow rate of 34.90l/s. It is likely that this pumping station will need to be upgraded to receive these proposed flows. A survey of the existing pump rate and overall condition of the pumping station will need to be carried out.

An additional pumping station will be required in the south west corner of parcel 16 to serve both parcel 10 & 16. This will potentially be pumped to a proposed pumping station within the redeveloped site to the east of parcel 16. The peak flow rate from parcel 10 and 16 would be approximately 14.24l/s. Parcels 13, 17, 19, 20 and the changing facilities are proposed to discharge to the treatment plant via gravity. Where possible the existing foul network can be utilised, dependant on the condition and capacity of the existing pipework.

A full CCTV assessment of the existing network is recommended if not already carried out to confirm existing connectivity, condition, and capacities.

An overall strategy plan for the proposed foul drainage is provided in Appendix E.

It is proposed that it may be possible for the new foul network, pumping stations and existing treatment plant to be adopted an appropriate water authority further down the line via a Section 104 Legal Agreement.

7. CONCLUSIONS

This report has considered the flood risk posed to the site from a variety of sources of flooding, as defined by the NPPF.

EA data for the area indicates that the entirety of the site is at low risk of flooding from fluvial and tidal sources and entirely within Flood Zone 1.

The site has also been concluded as being at low or negligible risk from all other assessed sources of potential flooding and is therefore considered suitable for all forms of development.

The proposals are therefore concluded to meet the requirements of the Sequential Test.

Owing to the fact that no significant sources of flood risk were identified, no specific mitigation measures are considered necessary to address any flood risk to the development.

This report therefore demonstrates that - provided a suitable sustainable drainage system is employed – in line with the strategies outlined above, the proposed scheme:

- Is suitable in the location proposed.
- Will be adequately flood resistant and resilient.
- Will not place additional persons at risk of flooding, and will offer a safe means of access and egress.
- Will not increase flood risk elsewhere as a result of the proposed development through the loss of floodplain storage or impedance of flood flows.
- Will put in place measures to ensure surface and foul water is appropriately managed.
- Will include suitable surface water treatment trains in the form of highway swales, permeable paving, tree pits and forebay areas to attenuation basins to be considered.
- Ensure confirmation that improvement works to the treatment plant has taken place and provides enough capacity for the development outlined above.

As such, the Application is concluded to meet the flood risk requirements of the NPPF.

Hydrock Consultants Limited

Appendix A – Greenfield Run Off Calculations

Reference	Title
04583-HYD-INF-XX-C-CA-0001	Greenfield Run-Off Calculations

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	1.000	Urban	0.000
SAAR (mm)	694	Region Number	Region 5

Results l/s

QBAR Rural	4.3
QBAR Urban	4.3
Q100 years	15.5
Q1 year	3.8
Q30 years	10.4
Q100 years	15.5

Appendix B – Attenuation Volume Calculations

Reference	Title
04583-HYD-INF-XX-C-CA-0002	Attenuation Volume Calculations

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	124.500	0.500	12.7	839.4	O K
30 min Summer	124.635	0.635	12.7	1098.0	O K
60 min Summer	124.766	0.766	12.7	1361.6	O K
120 min Summer	124.887	0.887	12.7	1618.0	O K
180 min Summer	124.948	0.948	12.7	1753.7	O K
240 min Summer	124.986	0.986	12.7	1838.0	O K
360 min Summer	125.032	1.032	12.7	1942.3	O K
480 min Summer	125.059	1.059	12.7	2004.0	O K
600 min Summer	125.074	1.074	12.7	2039.5	O K
720 min Summer	125.082	1.082	12.7	2058.1	O K
960 min Summer	125.084	1.084	12.7	2063.3	O K
1440 min Summer	125.061	1.061	12.7	2009.3	O K
2160 min Summer	125.020	1.020	12.7	1914.3	O K
2880 min Summer	124.978	0.978	12.7	1820.5	O K
4320 min Summer	124.897	0.897	12.7	1640.0	O K
5760 min Summer	124.814	0.814	12.7	1462.4	O K
7200 min Summer	124.721	0.721	12.7	1269.4	O K
8640 min Summer	124.637	0.637	12.7	1101.2	O K
10080 min Summer	124.561	0.561	12.7	953.5	O K
15 min Winter	124.555	0.555	12.7	941.8	O K
30 min Winter	124.703	0.703	12.7	1232.5	O K
60 min Winter	124.846	0.846	12.7	1529.7	O K
120 min Winter	124.977	0.977	12.7	1818.6	O K
180 min Winter	125.046	1.046	12.7	1973.8	O K
240 min Winter	125.088	1.088	12.7	2071.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	138.634	0.0	780.9	30
30 min Summer	90.866	0.0	986.4	45
60 min Summer	56.713	0.0	1360.0	74
120 min Summer	34.190	0.0	1628.9	134
180 min Summer	25.088	0.0	1777.6	192
240 min Summer	20.020	0.0	1871.2	252
360 min Summer	14.528	0.0	1969.6	370
480 min Summer	11.570	0.0	1979.4	488
600 min Summer	9.690	0.0	1962.3	606
720 min Summer	8.380	0.0	1942.5	726
960 min Summer	6.658	0.0	1902.1	962
1440 min Summer	4.807	0.0	1823.6	1316
2160 min Summer	3.465	0.0	3039.8	1672
2880 min Summer	2.744	0.0	3196.0	2056
4320 min Summer	1.973	0.0	3316.3	2900
5760 min Summer	1.559	0.0	3682.3	3704
7200 min Summer	1.298	0.0	3832.2	4472
8640 min Summer	1.118	0.0	3954.9	5192
10080 min Summer	0.985	0.0	4053.4	5952
15 min Winter	138.634	0.0	867.8	30
30 min Winter	90.866	0.0	1046.9	45
60 min Winter	56.713	0.0	1518.9	74
120 min Winter	34.190	0.0	1806.6	132
180 min Winter	25.088	0.0	1946.6	190
240 min Winter	20.020	0.0	2004.7	248

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
360 min Winter	125.140	1.140	12.7	2195.3	O K
480 min Winter	125.172	1.172	12.7	2271.5	O K
600 min Winter	125.191	1.191	12.7	2318.3	O K
720 min Winter	125.203	1.203	12.8	2346.1	Flood Risk
960 min Winter	125.211	1.211	12.8	2365.9	Flood Risk
1440 min Winter	125.195	1.195	12.8	2328.5	O K
2160 min Winter	125.144	1.144	12.7	2203.2	O K
2880 min Winter	125.094	1.094	12.7	2085.2	O K
4320 min Winter	124.985	0.985	12.7	1834.4	O K
5760 min Winter	124.869	0.869	12.7	1580.1	O K
7200 min Winter	124.731	0.731	12.7	1289.3	O K
8640 min Winter	124.600	0.600	12.7	1030.1	O K
10080 min Winter	124.487	0.487	12.7	815.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
360 min Winter	14.528	0.0	2004.7	364
480 min Winter	11.570	0.0	1987.9	480
600 min Winter	9.690	0.0	1971.3	596
720 min Winter	8.380	0.0	1955.8	710
960 min Winter	6.658	0.0	1927.1	936
1440 min Winter	4.807	0.0	1877.2	1374
2160 min Winter	3.465	0.0	3394.2	1752
2880 min Winter	2.744	0.0	3552.0	2200
4320 min Winter	1.973	0.0	3461.3	3124
5760 min Winter	1.559	0.0	4124.4	4040
7200 min Winter	1.298	0.0	4292.7	4832
8640 min Winter	1.118	0.0	4431.7	5536
10080 min Winter	0.985	0.0	4544.6	6248

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.404	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 3.289

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.823	4	8	0.822	8	12	0.822	12	16	0.822

Model Details

Storage is Online Cover Level (m) 125.500

Tank or Pond Structure

Invert Level (m) 124.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1500.0	0.600	1940.2	1.200	2436.9	1.800	2990.1	2.400	3599.9
0.100	1569.4	0.700	2019.0	1.300	2525.1	1.900	3087.8	2.500	3707.0
0.200	1640.4	0.800	2099.4	1.400	2615.0	2.000	3187.1		
0.300	1713.0	0.900	2181.4	1.500	2706.4	2.100	3287.9		
0.400	1787.2	1.000	2265.0	1.600	2799.4	2.200	3390.4		
0.500	1862.9	1.100	2350.1	1.700	2894.0	2.300	3494.4		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0160-1280-1200-1280
Design Head (m)	1.200
Design Flow (l/s)	12.8
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	160
Invert Level (m)	124.000
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	12.8	Kick-Flo®	0.793	10.5
Flush-Flo™	0.363	12.7	Mean Flow over Head Range	-	11.0

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)	Depth (m)	Flow (l/s)
0.100	5.7	0.800	10.6	2.000	16.3	4.000	22.7	7.000	29.7
0.200	12.0	1.000	11.7	2.200	17.0	4.500	24.0	7.500	30.7
0.300	12.7	1.200	12.8	2.400	17.8	5.000	25.2	8.000	31.7
0.400	12.7	1.400	13.8	2.600	18.5	5.500	26.4	8.500	32.6
0.500	12.5	1.600	14.7	3.000	19.8	6.000	27.6	9.000	33.5
0.600	12.2	1.800	15.5	3.500	21.3	6.500	28.6	9.500	34.4

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	119.593	0.493	31.6	2060.8	O K
30 min Summer	119.733	0.633	31.6	2695.0	O K
60 min Summer	119.870	0.770	31.6	3341.8	O K
120 min Summer	120.000	0.900	31.6	3976.2	O K
180 min Summer	120.068	0.968	31.6	4315.4	O K
240 min Summer	120.109	1.009	31.6	4527.1	O K
360 min Summer	120.161	1.061	31.6	4792.0	O K
480 min Summer	120.192	1.092	31.6	4951.6	O K
600 min Summer	120.210	1.110	31.6	5046.3	O K
720 min Summer	120.220	1.120	31.6	5099.0	O K
960 min Summer	120.225	1.125	31.6	5124.2	O K
1440 min Summer	120.205	1.105	31.6	5018.2	O K
2160 min Summer	120.166	1.066	31.6	4819.4	O K
2880 min Summer	120.125	1.025	31.6	4608.9	O K
4320 min Summer	120.040	0.940	31.6	4176.2	O K
5760 min Summer	119.949	0.849	31.6	3724.5	O K
7200 min Summer	119.855	0.755	31.6	3270.9	O K
8640 min Summer	119.771	0.671	31.6	2875.1	O K
10080 min Summer	119.695	0.595	31.6	2520.6	O K
15 min Winter	119.649	0.549	31.6	2311.8	O K
30 min Winter	119.803	0.703	31.6	3024.3	O K
60 min Winter	119.955	0.855	31.6	3753.7	O K
120 min Winter	120.098	0.998	31.6	4467.7	O K
180 min Winter	120.173	1.073	31.6	4852.5	O K
240 min Winter	120.219	1.119	31.6	5095.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	138.634	0.0	1795.6	30
30 min Summer	90.866	0.0	2300.4	45
60 min Summer	56.713	0.0	3252.8	74
120 min Summer	34.190	0.0	3896.1	134
180 min Summer	25.088	0.0	4251.4	192
240 min Summer	20.020	0.0	4480.3	252
360 min Summer	14.528	0.0	4760.1	370
480 min Summer	11.570	0.0	4884.1	488
600 min Summer	9.690	0.0	4885.1	606
720 min Summer	8.380	0.0	4833.4	726
960 min Summer	6.658	0.0	4718.0	962
1440 min Summer	4.807	0.0	4483.9	1288
2160 min Summer	3.465	0.0	7371.7	1652
2880 min Summer	2.744	0.0	7732.5	2048
4320 min Summer	1.973	0.0	8027.5	2864
5760 min Summer	1.559	0.0	9002.6	3696
7200 min Summer	1.298	0.0	9365.7	4464
8640 min Summer	1.118	0.0	9656.8	5192
10080 min Summer	0.985	0.0	9877.3	5944
15 min Winter	138.634	0.0	2003.6	30
30 min Winter	90.866	0.0	2497.7	45
60 min Winter	56.713	0.0	3634.5	74
120 min Winter	34.190	0.0	4323.3	132
180 min Winter	25.088	0.0	4678.7	190
240 min Winter	20.020	0.0	4877.2	248

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
360 min Winter	120.278	1.178	31.6	5405.9	O K
480 min Winter	120.314	1.214	31.8	5598.7	Flood Risk
600 min Winter	120.337	1.237	32.0	5719.0	Flood Risk
720 min Winter	120.350	1.250	32.2	5792.5	Flood Risk
960 min Winter	120.361	1.261	32.4	5850.9	Flood Risk
1440 min Winter	120.347	1.247	32.2	5776.2	Flood Risk
2160 min Winter	120.296	1.196	31.6	5502.2	O K
2880 min Winter	120.245	1.145	31.6	5231.7	O K
4320 min Winter	120.130	1.030	31.6	4631.7	O K
5760 min Winter	120.005	0.905	31.6	4004.2	O K
7200 min Winter	119.861	0.761	31.6	3298.1	O K
8640 min Winter	119.732	0.632	31.6	2693.6	O K
10080 min Winter	119.620	0.520	31.6	2180.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
360 min Winter	14.528	0.0	5014.4	364
480 min Winter	11.570	0.0	4981.1	480
600 min Winter	9.690	0.0	4934.9	596
720 min Winter	8.380	0.0	4888.1	710
960 min Winter	6.658	0.0	4797.2	936
1440 min Winter	4.807	0.0	4623.1	1370
2160 min Winter	3.465	0.0	8225.8	1732
2880 min Winter	2.744	0.0	8590.0	2192
4320 min Winter	1.973	0.0	8490.2	3116
5760 min Winter	1.559	0.0	10084.6	4032
7200 min Winter	1.298	0.0	10493.7	4768
8640 min Winter	1.118	0.0	10826.0	5536
10080 min Winter	0.985	0.0	11082.9	6168

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.404	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 8.066

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	2.017	4	8	2.017	8	12	2.016	12	16	2.016

Model Details

Storage is Online Cover Level (m) 120.600

Tank or Pond Structure

Invert Level (m) 119.100

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3900.0	0.600	4592.4	1.200	5341.4	1.800	6146.9	2.400	7008.9
0.100	4011.5	0.700	4713.3	1.300	5471.7	1.900	6286.6	2.500	7158.1
0.200	4124.5	0.800	4835.8	1.400	5603.6	2.000	6428.0		
0.300	4239.1	0.900	4959.8	1.500	5737.1	2.100	6570.8		
0.400	4355.3	1.000	5085.4	1.600	5872.1	2.200	6715.3		
0.500	4473.1	1.100	5212.6	1.700	6008.7	2.300	6861.3		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0240-3160-1200-3160
Design Head (m)	1.200
Design Flow (l/s)	31.6
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	240
Invert Level (m)	119.100
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	31.6	Kick-Flo®	0.863	27.0
Flush-Flo™	0.410	31.6	Mean Flow over Head Range	-	26.6

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)	Depth (m)	Flow (l/s)
0.100	7.9	0.800	28.7	2.000	40.4	4.000	56.4	7.000	74.0
0.200	24.3	1.000	29.0	2.200	42.3	4.500	59.7	7.500	76.6
0.300	31.1	1.200	31.6	2.400	44.1	5.000	62.9	8.000	79.0
0.400	31.6	1.400	34.0	2.600	45.8	5.500	65.9	8.500	81.4
0.500	31.4	1.600	36.3	3.000	49.1	6.000	68.7	9.000	83.7
0.600	30.9	1.800	38.4	3.500	52.9	6.500	71.4	9.500	85.9

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	117.836	0.586	1.8	90.5	O K
30 min Summer	117.952	0.702	1.8	118.2	O K
60 min Summer	118.054	0.804	1.8	145.8	O K
120 min Summer	118.140	0.890	1.8	171.4	O K
180 min Summer	118.180	0.930	1.8	184.2	O K
240 min Summer	118.202	0.952	1.8	191.3	O K
360 min Summer	118.225	0.975	1.8	198.9	O K
480 min Summer	118.233	0.983	1.8	201.9	O K
600 min Summer	118.234	0.984	1.8	202.2	O K
720 min Summer	118.230	0.980	1.8	200.7	O K
960 min Summer	118.214	0.964	1.8	195.3	O K
1440 min Summer	118.182	0.932	1.8	184.7	O K
2160 min Summer	118.138	0.888	1.8	170.8	O K
2880 min Summer	118.097	0.847	1.8	158.5	O K
4320 min Summer	118.019	0.769	1.8	136.0	O K
5760 min Summer	117.941	0.691	1.8	115.4	O K
7200 min Summer	117.858	0.608	1.8	95.5	O K
8640 min Summer	117.751	0.501	1.8	72.5	O K
10080 min Summer	117.660	0.410	1.8	55.3	O K
15 min Winter	117.884	0.634	1.8	101.6	O K
30 min Winter	118.007	0.757	1.8	132.8	O K
60 min Winter	118.116	0.866	1.8	164.0	O K
120 min Winter	118.208	0.958	1.8	193.5	O K
180 min Winter	118.253	1.003	1.8	208.5	O K
240 min Winter	118.278	1.028	1.9	217.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	138.634	0.0	92.2	30
30 min Summer	90.866	0.0	120.3	45
60 min Summer	56.713	0.0	151.6	74
120 min Summer	34.190	0.0	182.8	132
180 min Summer	25.088	0.0	201.1	192
240 min Summer	20.020	0.0	214.0	250
360 min Summer	14.528	0.0	232.8	368
480 min Summer	11.570	0.0	247.0	486
600 min Summer	9.690	0.0	258.3	604
720 min Summer	8.380	0.0	267.5	722
960 min Summer	6.658	0.0	278.7	880
1440 min Summer	4.807	0.0	271.3	1118
2160 min Summer	3.465	0.0	333.8	1512
2880 min Summer	2.744	0.0	352.5	1928
4320 min Summer	1.973	0.0	379.9	2736
5760 min Summer	1.559	0.0	400.7	3568
7200 min Summer	1.298	0.0	417.1	4336
8640 min Summer	1.118	0.0	430.9	5024
10080 min Summer	0.985	0.0	442.6	5656
15 min Winter	138.634	0.0	103.2	30
30 min Winter	90.866	0.0	133.2	44
60 min Winter	56.713	0.0	169.8	74
120 min Winter	34.190	0.0	204.7	130
180 min Winter	25.088	0.0	225.2	188
240 min Winter	20.020	0.0	239.5	246

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
360 min Winter	118.305	1.055	1.9	227.2	O K
480 min Winter	118.318	1.068	1.9	232.0	O K
600 min Winter	118.323	1.073	1.9	233.7	O K
720 min Winter	118.322	1.072	1.9	233.4	O K
960 min Winter	118.312	1.062	1.9	229.5	O K
1440 min Winter	118.274	1.024	1.9	215.9	O K
2160 min Winter	118.221	0.971	1.8	197.8	O K
2880 min Winter	118.168	0.918	1.8	180.2	O K
4320 min Winter	118.058	0.808	1.8	146.8	O K
5760 min Winter	117.942	0.692	1.8	115.7	O K
7200 min Winter	117.791	0.541	1.8	80.9	O K
8640 min Winter	117.632	0.382	1.8	50.4	O K
10080 min Winter	117.514	0.264	1.8	31.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
360 min Winter	14.528	0.0	260.3	362
480 min Winter	11.570	0.0	275.6	476
600 min Winter	9.690	0.0	285.2	590
720 min Winter	8.380	0.0	286.7	702
960 min Winter	6.658	0.0	284.2	920
1440 min Winter	4.807	0.0	277.3	1176
2160 min Winter	3.465	0.0	373.9	1628
2880 min Winter	2.744	0.0	394.8	2084
4320 min Winter	1.973	0.0	425.4	2984
5760 min Winter	1.559	0.0	448.8	3856
7200 min Winter	1.298	0.0	467.2	4616
8640 min Winter	1.118	0.0	482.6	5184
10080 min Winter	0.985	0.0	495.8	5744

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.404	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.357

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.090	4	8	0.089	8	12	0.089	12	16	0.089

Model Details

Storage is Online Cover Level (m) 118.750

Tank or Pond Structure

Invert Level (m) 117.250

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	95.0	0.600	226.9	1.200	415.4	1.800	660.4	2.400	962.0
0.100	113.1	0.700	254.4	1.300	452.3	1.900	706.8	2.500	1017.8
0.200	132.7	0.800	283.5	1.400	490.8	2.000	754.7		
0.300	153.9	0.900	314.1	1.500	530.9	2.100	804.2		
0.400	176.7	1.000	346.3	1.600	572.5	2.200	855.2		
0.500	201.0	1.100	380.1	1.700	615.7	2.300	907.8		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0064-2000-1200-2000
Design Head (m)	1.200
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	64
Invert Level (m)	117.250
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	2.0	Kick-Flo®	0.573	1.4
Flush-Flo™	0.282	1.8	Mean Flow over Head Range	-	1.6

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)	Depth (m)	Flow (l/s)
0.100	1.5	0.800	1.7	2.000	2.5	4.000	3.5	7.000	4.5
0.200	1.7	1.000	1.8	2.200	2.6	4.500	3.7	7.500	4.7
0.300	1.8	1.200	2.0	2.400	2.7	5.000	3.9	8.000	4.8
0.400	1.7	1.400	2.1	2.600	2.8	5.500	4.0	8.500	5.0
0.500	1.6	1.600	2.3	3.000	3.0	6.000	4.2	9.000	5.1
0.600	1.5	1.800	2.4	3.500	3.3	6.500	4.4	9.500	5.2

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	120.281	0.581	21.8	1423.3	O K
30 min Summer	120.438	0.738	21.8	1861.7	O K
60 min Summer	120.591	0.891	21.8	2307.8	O K
120 min Summer	120.733	1.033	21.8	2744.1	O K
180 min Summer	120.806	1.106	21.8	2976.3	O K
240 min Summer	120.850	1.150	21.8	3120.7	O K
360 min Summer	120.905	1.205	21.8	3300.2	O K
480 min Summer	120.937	1.237	21.8	3407.4	O K
600 min Summer	120.956	1.256	21.8	3470.1	O K
720 min Summer	120.966	1.266	21.8	3504.1	O K
960 min Summer	120.970	1.270	21.8	3517.4	O K
1440 min Summer	120.944	1.244	21.8	3430.8	O K
2160 min Summer	120.895	1.195	21.8	3268.9	O K
2880 min Summer	120.847	1.147	21.8	3108.1	O K
4320 min Summer	120.748	1.048	21.8	2793.1	O K
5760 min Summer	120.640	0.940	21.8	2456.7	O K
7200 min Summer	120.535	0.835	21.8	2141.0	O K
8640 min Summer	120.440	0.740	21.8	1864.9	O K
10080 min Summer	120.352	0.652	21.8	1617.6	O K
15 min Winter	120.344	0.644	21.8	1597.0	O K
30 min Winter	120.517	0.817	21.8	2089.6	O K
60 min Winter	120.684	0.984	21.8	2593.3	O K
120 min Winter	120.839	1.139	21.8	3085.2	O K
180 min Winter	120.920	1.220	21.8	3349.7	O K
240 min Winter	120.970	1.270	21.8	3516.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	138.634	0.0	1314.3	30
30 min Summer	90.866	0.0	1666.4	45
60 min Summer	56.713	0.0	2300.3	74
120 min Summer	34.190	0.0	2755.9	134
180 min Summer	25.088	0.0	3007.3	192
240 min Summer	20.020	0.0	3166.4	252
360 min Summer	14.528	0.0	3338.7	370
480 min Summer	11.570	0.0	3362.8	488
600 min Summer	9.690	0.0	3330.5	608
720 min Summer	8.380	0.0	3292.8	726
960 min Summer	6.658	0.0	3216.1	964
1440 min Summer	4.807	0.0	3069.5	1344
2160 min Summer	3.465	0.0	5147.1	1692
2880 min Summer	2.744	0.0	5409.3	2080
4320 min Summer	1.973	0.0	5629.5	2904
5760 min Summer	1.559	0.0	6242.1	3696
7200 min Summer	1.298	0.0	6495.8	4464
8640 min Summer	1.118	0.0	6702.9	5192
10080 min Summer	0.985	0.0	6868.1	5944
15 min Winter	138.634	0.0	1461.8	30
30 min Winter	90.866	0.0	1782.6	45
60 min Winter	56.713	0.0	2569.8	74
120 min Winter	34.190	0.0	3056.3	132
180 min Winter	25.088	0.0	3295.1	190
240 min Winter	20.020	0.0	3399.6	248

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
360 min Winter	121.032	1.332	21.8	3728.7	O K
480 min Winter	121.070	1.370	21.8	3860.1	O K
600 min Winter	121.093	1.393	21.8	3941.6	O K
720 min Winter	121.107	1.407	21.8	3990.8	O K
960 min Winter	121.118	1.418	21.8	4028.5	O K
1440 min Winter	121.101	1.401	21.8	3971.8	O K
2160 min Winter	121.041	1.341	21.8	3759.2	O K
2880 min Winter	120.982	1.282	21.8	3558.6	O K
4320 min Winter	120.852	1.152	21.8	3127.4	O K
5760 min Winter	120.709	1.009	21.8	2671.2	O K
7200 min Winter	120.541	0.841	21.8	2159.7	O K
8640 min Winter	120.395	0.695	21.8	1738.1	O K
10080 min Winter	120.266	0.566	21.8	1381.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
360 min Winter	14.528	0.0	3401.0	364
480 min Winter	11.570	0.0	3365.5	480
600 min Winter	9.690	0.0	3330.6	596
720 min Winter	8.380	0.0	3298.3	712
960 min Winter	6.658	0.0	3239.8	938
1440 min Winter	4.807	0.0	3137.2	1378
2160 min Winter	3.465	0.0	5744.8	1776
2880 min Winter	2.744	0.0	6007.2	2216
4320 min Winter	1.973	0.0	5854.4	3152
5760 min Winter	1.559	0.0	6991.5	4048
7200 min Winter	1.298	0.0	7276.7	4824
8640 min Winter	1.118	0.0	7511.4	5536
10080 min Winter	0.985	0.0	7701.1	6168

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.404	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 5.577

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	1.395	4	8	1.394	8	12	1.394	12	16	1.394

Model Details

Storage is Online Cover Level (m) 121.500

Tank or Pond Structure

Invert Level (m) 119.700

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	2200.0	0.600	2727.1	1.200	3310.7	1.800	3950.9	2.400	4647.6
0.100	2283.9	0.700	2820.4	1.300	3413.5	1.900	4063.1	2.500	4769.3
0.200	2369.4	0.800	2915.3	1.400	3517.8	2.000	4176.9		
0.300	2456.5	0.900	3011.8	1.500	3623.7	2.100	4292.2		
0.400	2545.1	1.000	3109.9	1.600	3731.2	2.200	4409.1		
0.500	2635.3	1.100	3209.5	1.700	3840.3	2.300	4527.6		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0199-2180-1500-2180
Design Head (m)	1.500
Design Flow (l/s)	21.8
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	199
Invert Level (m)	119.700
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	21.8	Kick-Flo®	0.988	17.9
Flush-Flo™	0.450	21.8	Mean Flow over Head Range	-	18.8

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)	Depth (m)	Flow (l/s)
0.100	6.9	0.800	20.6	2.000	25.0	4.000	34.9	7.000	45.7
0.200	18.8	1.000	18.0	2.200	26.2	4.500	36.9	7.500	47.3
0.300	21.2	1.200	19.6	2.400	27.3	5.000	38.8	8.000	48.8
0.400	21.7	1.400	21.1	2.600	28.4	5.500	40.7	8.500	50.2
0.500	21.8	1.600	22.5	3.000	30.4	6.000	42.4	9.000	51.6
0.600	21.5	1.800	23.8	3.500	32.7	6.500	44.1	9.500	53.0

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	113.508	0.508	7.2	474.4	O K
30 min Summer	113.639	0.639	7.2	620.7	O K
60 min Summer	113.764	0.764	7.2	769.8	O K
120 min Summer	113.878	0.878	7.2	913.7	O K
180 min Summer	113.936	0.936	7.2	989.8	O K
240 min Summer	113.971	0.971	7.2	1036.8	O K
360 min Summer	114.013	1.013	7.2	1094.7	O K
480 min Summer	114.037	1.037	7.2	1128.7	O K
600 min Summer	114.051	1.051	7.2	1147.9	O K
720 min Summer	114.058	1.058	7.2	1157.7	O K
960 min Summer	114.059	1.059	7.2	1159.2	O K
1440 min Summer	114.035	1.035	7.2	1125.6	O K
2160 min Summer	113.994	0.994	7.2	1067.9	O K
2880 min Summer	113.953	0.953	7.2	1013.1	O K
4320 min Summer	113.876	0.876	7.2	911.1	O K
5760 min Summer	113.799	0.799	7.2	812.7	O K
7200 min Summer	113.711	0.711	7.2	704.4	O K
8640 min Summer	113.626	0.626	7.2	605.4	O K
10080 min Summer	113.550	0.550	7.2	520.1	O K
15 min Winter	113.561	0.561	7.2	532.4	O K
30 min Winter	113.704	0.704	7.2	696.9	O K
60 min Winter	113.840	0.840	7.2	864.6	O K
120 min Winter	113.964	0.964	7.2	1027.4	O K
180 min Winter	114.027	1.027	7.2	1114.7	O K
240 min Winter	114.066	1.066	7.2	1169.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	138.634	0.0	454.2	30
30 min Summer	90.866	0.0	569.4	45
60 min Summer	56.713	0.0	776.9	74
120 min Summer	34.190	0.0	931.3	134
180 min Summer	25.088	0.0	1016.7	192
240 min Summer	20.020	0.0	1069.2	252
360 min Summer	14.528	0.0	1112.9	370
480 min Summer	11.570	0.0	1108.8	488
600 min Summer	9.690	0.0	1098.9	608
720 min Summer	8.380	0.0	1088.2	726
960 min Summer	6.658	0.0	1067.4	962
1440 min Summer	4.807	0.0	1028.1	1326
2160 min Summer	3.465	0.0	1726.8	1680
2880 min Summer	2.744	0.0	1817.6	2072
4320 min Summer	1.973	0.0	1880.2	2900
5760 min Summer	1.559	0.0	2084.7	3744
7200 min Summer	1.298	0.0	2169.8	4480
8640 min Summer	1.118	0.0	2240.1	5200
10080 min Summer	0.985	0.0	2298.0	5952
15 min Winter	138.634	0.0	504.2	30
30 min Winter	90.866	0.0	590.9	45
60 min Winter	56.713	0.0	867.9	74
120 min Winter	34.190	0.0	1032.9	132
180 min Winter	25.088	0.0	1107.6	190
240 min Winter	20.020	0.0	1125.3	248

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
360 min Winter	114.114	1.114	7.2	1238.8	O K
480 min Winter	114.143	1.143	7.2	1281.2	O K
600 min Winter	114.161	1.161	7.2	1307.1	O K
720 min Winter	114.171	1.171	7.2	1322.2	O K
960 min Winter	114.178	1.178	7.2	1332.4	O K
1440 min Winter	114.162	1.162	7.2	1309.4	O K
2160 min Winter	114.111	1.111	7.2	1234.6	O K
2880 min Winter	114.064	1.064	7.2	1165.9	O K
4320 min Winter	113.961	0.961	7.2	1023.5	O K
5760 min Winter	113.853	0.853	7.2	881.1	O K
7200 min Winter	113.724	0.724	7.2	720.8	O K
8640 min Winter	113.591	0.591	7.2	565.8	O K
10080 min Winter	113.478	0.478	7.2	442.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
360 min Winter	14.528	0.0	1118.8	364
480 min Winter	11.570	0.0	1109.1	480
600 min Winter	9.690	0.0	1100.3	596
720 min Winter	8.380	0.0	1092.5	710
960 min Winter	6.658	0.0	1079.1	938
1440 min Winter	4.807	0.0	1060.0	1378
2160 min Winter	3.465	0.0	1929.2	1764
2880 min Winter	2.744	0.0	2021.3	2204
4320 min Winter	1.973	0.0	1953.6	3124
5760 min Winter	1.559	0.0	2334.9	4040
7200 min Winter	1.298	0.0	2430.4	4904
8640 min Winter	1.118	0.0	2509.7	5544
10080 min Winter	0.985	0.0	2575.5	6256

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.404	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 1.860

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.465	4	8	0.465	8	12	0.465	12	16	0.465

Model Details

Storage is Online Cover Level (m) 114.500

Tank or Pond Structure

Invert Level (m) 113.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	800.0	0.600	1129.1	1.200	1514.7	1.800	1956.9	2.400	2455.6
0.100	850.9	0.700	1189.4	1.300	1584.5	1.900	2036.0	2.500	2544.2
0.200	903.4	0.800	1251.3	1.400	1655.8	2.000	2116.8		
0.300	957.5	0.900	1314.8	1.500	1728.7	2.100	2199.1		
0.400	1013.1	1.000	1379.9	1.600	1803.2	2.200	2283.0		
0.500	1070.3	1.100	1446.5	1.700	1879.2	2.300	2368.5		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0122-7200-1200-7200
Design Head (m)	1.200
Design Flow (l/s)	7.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	122
Invert Level (m)	113.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	7.2	Kick-Flo®	0.755	5.8
Flush-Flo™	0.350	7.2	Mean Flow over Head Range	-	6.3

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)	Depth (m)	Flow (l/s)
0.100	4.4	0.800	6.0	2.000	9.1	4.000	12.7	7.000	16.6
0.200	6.8	1.000	6.6	2.200	9.6	4.500	13.4	7.500	17.2
0.300	7.2	1.200	7.2	2.400	10.0	5.000	14.1	8.000	17.7
0.400	7.2	1.400	7.7	2.600	10.4	5.500	14.8	8.500	18.2
0.500	7.0	1.600	8.2	3.000	11.1	6.000	15.4	9.000	18.7
0.600	6.8	1.800	8.7	3.500	11.9	6.500	16.0	9.500	19.2

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	123.127	0.327	2.5	163.3	O K
30 min Summer	123.227	0.427	2.5	213.6	O K
60 min Summer	123.329	0.529	2.5	264.7	O K
120 min Summer	123.429	0.629	2.5	314.6	O K
180 min Summer	123.483	0.683	2.5	341.4	O K
240 min Summer	123.516	0.716	2.5	358.1	O K
360 min Summer	123.558	0.758	2.5	378.8	O K
480 min Summer	123.582	0.782	2.5	391.1	O K
600 min Summer	123.597	0.797	2.5	398.4	O K
720 min Summer	123.605	0.805	2.5	402.4	O K
960 min Summer	123.608	0.808	2.5	404.1	O K
1440 min Summer	123.589	0.789	2.5	394.4	O K
2160 min Summer	123.551	0.751	2.5	375.6	O K
2880 min Summer	123.514	0.714	2.5	356.9	O K
4320 min Summer	123.439	0.639	2.5	319.6	O K
5760 min Summer	123.359	0.559	2.5	279.4	O K
7200 min Summer	123.289	0.489	2.5	244.6	O K
8640 min Summer	123.228	0.428	2.5	214.1	O K
10080 min Summer	123.174	0.374	2.5	187.0	O K
15 min Winter	123.166	0.366	2.5	183.2	O K
30 min Winter	123.279	0.479	2.5	239.7	O K
60 min Winter	123.395	0.595	2.5	297.4	O K
120 min Winter	123.508	0.708	2.5	354.0	O K
180 min Winter	123.569	0.769	2.5	384.4	O K
240 min Winter	123.607	0.807	2.5	403.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	138.634	0.0	152.8	30
30 min Summer	90.866	0.0	192.2	45
60 min Summer	56.713	0.0	265.6	74
120 min Summer	34.190	0.0	318.4	134
180 min Summer	25.088	0.0	347.4	192
240 min Summer	20.020	0.0	365.4	252
360 min Summer	14.528	0.0	382.6	370
480 min Summer	11.570	0.0	384.0	488
600 min Summer	9.690	0.0	381.2	608
720 min Summer	8.380	0.0	377.4	726
960 min Summer	6.658	0.0	368.8	964
1440 min Summer	4.807	0.0	351.2	1368
2160 min Summer	3.465	0.0	592.2	1712
2880 min Summer	2.744	0.0	622.6	2088
4320 min Summer	1.973	0.0	647.6	2940
5760 min Summer	1.559	0.0	716.9	3688
7200 min Summer	1.298	0.0	746.0	4408
8640 min Summer	1.118	0.0	770.0	5192
10080 min Summer	0.985	0.0	789.5	5864
15 min Winter	138.634	0.0	169.6	30
30 min Winter	90.866	0.0	203.7	45
60 min Winter	56.713	0.0	296.9	74
120 min Winter	34.190	0.0	352.9	132
180 min Winter	25.088	0.0	379.2	190
240 min Winter	20.020	0.0	388.5	248

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
360 min Winter	123.656	0.856	2.5	427.9	O K
480 min Winter	123.686	0.886	2.5	443.0	O K
600 min Winter	123.705	0.905	2.5	452.4	O K
720 min Winter	123.716	0.916	2.5	458.1	O K
960 min Winter	123.725	0.925	2.5	462.5	O K
1440 min Winter	123.713	0.913	2.5	456.3	O K
2160 min Winter	123.664	0.864	2.5	432.0	O K
2880 min Winter	123.618	0.818	2.5	409.1	O K
4320 min Winter	123.520	0.720	2.5	359.8	O K
5760 min Winter	123.408	0.608	2.5	304.1	O K
7200 min Winter	123.295	0.495	2.5	247.7	O K
8640 min Winter	123.203	0.403	2.5	201.7	O K
10080 min Winter	123.127	0.327	2.5	163.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
360 min Winter	14.528	0.0	388.8	364
480 min Winter	11.570	0.0	385.4	480
600 min Winter	9.690	0.0	381.5	596
720 min Winter	8.380	0.0	377.7	712
960 min Winter	6.658	0.0	370.5	938
1440 min Winter	4.807	0.0	357.4	1380
2160 min Winter	3.465	0.0	661.1	1792
2880 min Winter	2.744	0.0	690.8	2224
4320 min Winter	1.973	0.0	668.8	3160
5760 min Winter	1.559	0.0	802.9	4040
7200 min Winter	1.298	0.0	835.7	4768
8640 min Winter	1.118	0.0	862.8	5528
10080 min Winter	0.985	0.0	885.0	6168

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.404	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.640

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.160	4	8	0.160	8	12	0.160	12	16	0.160

Model Details

Storage is Online Cover Level (m) 125.000

Tank or Pond Structure

Invert Level (m) 122.800

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	500.0	1.200	0.0	2.400	0.0	3.600	0.0	4.800	0.0
0.200	500.0	1.400	0.0	2.600	0.0	3.800	0.0	5.000	0.0
0.400	500.0	1.600	0.0	2.800	0.0	4.000	0.0		
0.600	500.0	1.800	0.0	3.000	0.0	4.200	0.0		
0.800	500.0	2.000	0.0	3.200	0.0	4.400	0.0		
1.000	500.0	2.200	0.0	3.400	0.0	4.600	0.0		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0075-2500-1000-2500
Design Head (m)	1.000
Design Flow (l/s)	2.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	75
Invert Level (m)	122.800
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	2.5	Kick-Flo®	0.627	2.0
Flush-Flo™	0.307	2.5	Mean Flow over Head Range	-	2.2

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)	Depth (m)	Flow (l/s)
0.100	2.1	0.800	2.3	2.000	3.4	4.000	4.7	7.000	6.2
0.200	2.4	1.000	2.5	2.200	3.6	4.500	5.0	7.500	6.4
0.300	2.5	1.200	2.7	2.400	3.7	5.000	5.3	8.000	6.6
0.400	2.5	1.400	2.9	2.600	3.9	5.500	5.5	8.500	6.8
0.500	2.4	1.600	3.1	3.000	4.1	6.000	5.7	9.000	7.0
0.600	2.1	1.800	3.3	3.500	4.5	6.500	6.0	9.500	7.1

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	123.118	0.318	2.2	127.3	O K
30 min Summer	123.216	0.416	2.2	166.4	O K
60 min Summer	123.315	0.515	2.2	206.0	O K
120 min Summer	123.411	0.611	2.2	244.3	O K
180 min Summer	123.462	0.662	2.2	264.8	O K
240 min Summer	123.493	0.693	2.2	277.2	O K
360 min Summer	123.530	0.730	2.2	292.2	O K
480 min Summer	123.552	0.752	2.2	300.7	O K
600 min Summer	123.563	0.763	2.2	305.2	O K
720 min Summer	123.568	0.768	2.2	307.2	O K
960 min Summer	123.566	0.766	2.2	306.4	O K
1440 min Summer	123.540	0.740	2.2	296.1	O K
2160 min Summer	123.499	0.699	2.2	279.5	O K
2880 min Summer	123.457	0.657	2.2	262.9	O K
4320 min Summer	123.368	0.568	2.2	227.2	O K
5760 min Summer	123.289	0.489	2.2	195.8	O K
7200 min Summer	123.221	0.421	2.2	168.5	O K
8640 min Summer	123.161	0.361	2.2	144.5	O K
10080 min Summer	123.110	0.310	2.2	124.1	O K
15 min Winter	123.157	0.357	2.2	142.9	O K
30 min Winter	123.267	0.467	2.2	186.8	O K
60 min Winter	123.379	0.579	2.2	231.6	O K
120 min Winter	123.488	0.688	2.2	275.2	O K
180 min Winter	123.546	0.746	2.2	298.4	O K
240 min Winter	123.582	0.782	2.2	312.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	138.634	0.0	121.8	30
30 min Summer	90.866	0.0	156.6	45
60 min Summer	56.713	0.0	208.8	74
120 min Summer	34.190	0.0	251.2	134
180 min Summer	25.088	0.0	275.5	192
240 min Summer	20.020	0.0	291.9	252
360 min Summer	14.528	0.0	314.2	370
480 min Summer	11.570	0.0	327.4	488
600 min Summer	9.690	0.0	332.5	606
720 min Summer	8.380	0.0	332.1	724
960 min Summer	6.658	0.0	326.7	962
1440 min Summer	4.807	0.0	311.0	1264
2160 min Summer	3.465	0.0	464.5	1644
2880 min Summer	2.744	0.0	489.6	2048
4320 min Summer	1.973	0.0	524.7	2816
5760 min Summer	1.559	0.0	560.3	3576
7200 min Summer	1.298	0.0	583.1	4328
8640 min Summer	1.118	0.0	601.9	5096
10080 min Summer	0.985	0.0	617.3	5760
15 min Winter	138.634	0.0	135.9	30
30 min Winter	90.866	0.0	170.7	44
60 min Winter	56.713	0.0	233.7	74
120 min Winter	34.190	0.0	280.2	132
180 min Winter	25.088	0.0	306.0	190
240 min Winter	20.020	0.0	322.2	248

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
360 min Winter	123.626	0.826	2.2	330.5	O K
480 min Winter	123.653	0.853	2.2	341.1	O K
600 min Winter	123.668	0.868	2.2	347.2	O K
720 min Winter	123.676	0.876	2.2	350.5	O K
960 min Winter	123.679	0.879	2.2	351.7	O K
1440 min Winter	123.657	0.857	2.2	342.8	O K
2160 min Winter	123.603	0.803	2.2	321.4	O K
2880 min Winter	123.551	0.751	2.2	300.5	O K
4320 min Winter	123.437	0.637	2.2	254.8	O K
5760 min Winter	123.308	0.508	2.2	203.2	O K
7200 min Winter	123.204	0.404	2.2	161.6	O K
8640 min Winter	123.119	0.319	2.2	127.5	O K
10080 min Winter	123.052	0.252	2.2	100.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
360 min Winter	14.528	0.0	337.9	364
480 min Winter	11.570	0.0	339.5	480
600 min Winter	9.690	0.0	337.6	594
720 min Winter	8.380	0.0	334.7	710
960 min Winter	6.658	0.0	328.0	934
1440 min Winter	4.807	0.0	314.1	1368
2160 min Winter	3.465	0.0	519.7	1720
2880 min Winter	2.744	0.0	547.1	2188
4320 min Winter	1.973	0.0	577.5	3120
5760 min Winter	1.559	0.0	627.6	3872
7200 min Winter	1.298	0.0	653.2	4616
8640 min Winter	1.118	0.0	674.4	5288
10080 min Winter	0.985	0.0	691.9	5960

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.404	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.500

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.125	4	8	0.125	8	12	0.125	12	16	0.125

Model Details

Storage is Online Cover Level (m) 125.000

Tank or Pond Structure

Invert Level (m) 122.800

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	400.0	1.200	0.0	2.400	0.0	3.600	0.0	4.800	0.0
0.200	400.0	1.400	0.0	2.600	0.0	3.800	0.0	5.000	0.0
0.400	400.0	1.600	0.0	2.800	0.0	4.000	0.0		
0.600	400.0	1.800	0.0	3.000	0.0	4.200	0.0		
0.800	400.0	2.000	0.0	3.200	0.0	4.400	0.0		
1.000	400.0	2.200	0.0	3.400	0.0	4.600	0.0		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0070-2200-1000-2200
Design Head (m)	1.000
Design Flow (l/s)	2.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	70
Invert Level (m)	122.800
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.000	2.2	Kick-Flo®	0.625	1.8
Flush-Flo™	0.307	2.2	Mean Flow over Head Range	-	1.9

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)	Depth (m)	Flow (l/s)
0.100	1.8	0.800	2.0	2.000	3.0	4.000	4.2	7.000	5.4
0.200	2.1	1.000	2.2	2.200	3.2	4.500	4.4	7.500	5.6
0.300	2.2	1.200	2.4	2.400	3.3	5.000	4.6	8.000	5.8
0.400	2.2	1.400	2.6	2.600	3.4	5.500	4.8	8.500	5.9
0.500	2.1	1.600	2.7	3.000	3.6	6.000	5.0	9.000	6.1
0.600	1.9	1.800	2.9	3.500	3.9	6.500	5.2	9.500	6.3

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	120.311	0.611	34.1	2018.5	O K
30 min Summer	120.478	0.778	34.1	2639.4	O K
60 min Summer	120.640	0.940	34.1	3270.3	O K
120 min Summer	120.791	1.091	34.1	3883.5	O K
180 min Summer	120.868	1.168	34.1	4206.2	O K
240 min Summer	120.914	1.214	34.1	4403.6	O K
360 min Summer	120.969	1.269	34.1	4643.7	O K
480 min Summer	121.001	1.301	34.1	4780.8	O K
600 min Summer	121.017	1.317	34.1	4854.8	O K
720 min Summer	121.025	1.325	34.1	4888.1	O K
960 min Summer	121.023	1.323	34.1	4877.9	O K
1440 min Summer	120.989	1.289	34.1	4731.6	O K
2160 min Summer	120.935	1.235	34.1	4494.1	O K
2880 min Summer	120.879	1.179	34.1	4254.3	O K
4320 min Summer	120.764	1.064	34.1	3772.0	O K
5760 min Summer	120.636	0.936	34.1	3255.9	O K
7200 min Summer	120.520	0.820	34.1	2802.1	O K
8640 min Summer	120.416	0.716	34.1	2406.3	O K
10080 min Summer	120.321	0.621	34.1	2058.1	O K
15 min Winter	120.378	0.678	34.1	2265.0	O K
30 min Winter	120.562	0.862	34.1	2962.9	O K
60 min Winter	120.740	1.040	34.1	3675.4	O K
120 min Winter	120.905	1.205	34.1	4366.3	O K
180 min Winter	120.990	1.290	34.1	4734.2	O K
240 min Winter	121.042	1.342	34.1	4963.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	138.634	0.0	1863.6	30
30 min Summer	90.866	0.0	2402.1	45
60 min Summer	56.713	0.0	3263.0	74
120 min Summer	34.190	0.0	3920.9	134
180 min Summer	25.088	0.0	4296.3	192
240 min Summer	20.020	0.0	4548.7	252
360 min Summer	14.528	0.0	4890.1	370
480 min Summer	11.570	0.0	5100.5	488
600 min Summer	9.690	0.0	5201.2	606
720 min Summer	8.380	0.0	5201.7	724
960 min Summer	6.658	0.0	5094.1	962
1440 min Summer	4.807	0.0	4844.4	1240
2160 min Summer	3.465	0.0	7317.5	1612
2880 min Summer	2.744	0.0	7704.3	2020
4320 min Summer	1.973	0.0	8197.2	2856
5760 min Summer	1.559	0.0	8862.1	3632
7200 min Summer	1.298	0.0	9220.5	4392
8640 min Summer	1.118	0.0	9512.2	5104
10080 min Summer	0.985	0.0	9743.2	5840
15 min Winter	138.634	0.0	2081.2	30
30 min Winter	90.866	0.0	2628.8	45
60 min Winter	56.713	0.0	3650.1	74
120 min Winter	34.190	0.0	4370.2	132
180 min Winter	25.088	0.0	4768.0	190
240 min Winter	20.020	0.0	5019.6	246

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
360 min Winter	121.106	1.406	34.1	5248.5	O K
480 min Winter	121.143	1.443	34.1	5418.8	O K
600 min Winter	121.165	1.465	34.1	5518.5	O K
720 min Winter	121.177	1.477	34.1	5572.6	O K
960 min Winter	121.182	1.482	34.1	5595.8	O K
1440 min Winter	121.152	1.452	34.1	5461.7	O K
2160 min Winter	121.083	1.383	34.1	5146.9	O K
2880 min Winter	121.012	1.312	34.1	4832.4	O K
4320 min Winter	120.857	1.157	34.1	4160.3	O K
5760 min Winter	120.674	0.974	34.1	3407.3	O K
7200 min Winter	120.493	0.793	34.1	2698.7	O K
8640 min Winter	120.336	0.636	34.1	2112.8	O K
10080 min Winter	120.203	0.503	34.1	1635.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
360 min Winter	14.528	0.0	5294.5	362
480 min Winter	11.570	0.0	5340.3	478
600 min Winter	9.690	0.0	5299.1	594
720 min Winter	8.380	0.0	5249.9	708
960 min Winter	6.658	0.0	5148.5	934
1440 min Winter	4.807	0.0	4950.4	1362
2160 min Winter	3.465	0.0	8184.1	1700
2880 min Winter	2.744	0.0	8603.9	2168
4320 min Winter	1.973	0.0	8992.6	3080
5760 min Winter	1.559	0.0	9927.2	3928
7200 min Winter	1.298	0.0	10331.1	4688
8640 min Winter	1.118	0.0	10660.8	5368
10080 min Winter	0.985	0.0	10926.5	6048

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.404	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 7.920

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	1.980	4	8	1.980	8	12	1.980	12	16	1.980

Model Details

Storage is Online Cover Level (m) 121.500

Tank or Pond Structure

Invert Level (m) 119.700

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	3000.0	0.600	3610.8	1.200	4278.1	1.800	5001.9	2.400	5782.3
0.100	3097.9	0.700	3718.1	1.300	4394.8	1.900	5128.1	2.500	5917.9
0.200	3197.3	0.800	3826.9	1.400	4513.1	2.000	5255.8		
0.300	3298.3	0.900	3937.3	1.500	4632.9	2.100	5385.1		
0.400	3400.9	1.000	4049.4	1.600	4754.4	2.200	5515.9		
0.500	3505.0	1.100	4162.9	1.700	4877.4	2.300	5648.3		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0244-3410-1500-3410
Design Head (m)	1.500
Design Flow (l/s)	34.1
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	244
Invert Level (m)	119.700
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	34.1	Kick-Flo®	1.032	28.5
Flush-Flo™	0.474	34.1	Mean Flow over Head Range	-	29.1

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)	Depth (m)	Flow (l/s)
0.100	8.0	0.800	32.6	2.000	39.1	4.000	54.7	7.000	71.8
0.200	24.8	1.000	29.5	2.200	41.0	4.500	57.9	7.500	74.2
0.300	32.9	1.200	30.6	2.400	42.7	5.000	60.9	8.000	76.6
0.400	33.9	1.400	33.0	2.600	44.4	5.500	63.8	8.500	78.9
0.500	34.0	1.600	35.2	3.000	47.6	6.000	66.6	9.000	81.1
0.600	33.8	1.800	37.2	3.500	51.3	6.500	69.2	9.500	83.3

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	121.347	0.547	2.0	71.7	O K
30 min Summer	121.455	0.655	2.0	93.7	O K
60 min Summer	121.547	0.747	2.0	115.0	O K
120 min Summer	121.622	0.822	2.0	133.9	O K
180 min Summer	121.654	0.854	2.0	142.4	O K
240 min Summer	121.669	0.869	2.0	146.5	O K
360 min Summer	121.679	0.879	2.0	149.3	O K
480 min Summer	121.676	0.876	2.0	148.6	O K
600 min Summer	121.667	0.867	2.0	146.0	O K
720 min Summer	121.656	0.856	2.0	143.1	O K
960 min Summer	121.635	0.835	2.0	137.4	O K
1440 min Summer	121.597	0.797	2.0	127.4	O K
2160 min Summer	121.543	0.743	2.0	114.0	O K
2880 min Summer	121.490	0.690	2.0	101.5	O K
4320 min Summer	121.376	0.576	2.0	77.3	O K
5760 min Summer	121.239	0.439	2.0	52.6	O K
7200 min Summer	121.130	0.330	2.0	36.0	O K
8640 min Summer	121.045	0.245	2.0	24.7	O K
10080 min Summer	120.984	0.184	1.9	17.6	O K
15 min Winter	121.393	0.593	2.0	80.7	O K
30 min Winter	121.507	0.707	2.0	105.3	O K
60 min Winter	121.605	0.805	2.0	129.5	O K
120 min Winter	121.687	0.887	2.0	151.5	O K
180 min Winter	121.723	0.923	2.0	161.9	Flood Risk
240 min Winter	121.741	0.941	2.0	167.3	Flood Risk

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	138.634	0.0	74.1	30
30 min Summer	90.866	0.0	97.1	44
60 min Summer	56.713	0.0	121.5	74
120 min Summer	34.190	0.0	146.5	132
180 min Summer	25.088	0.0	161.3	190
240 min Summer	20.020	0.0	171.6	248
360 min Summer	14.528	0.0	186.8	364
480 min Summer	11.570	0.0	198.3	482
600 min Summer	9.690	0.0	207.6	584
720 min Summer	8.380	0.0	215.4	630
960 min Summer	6.658	0.0	228.2	754
1440 min Summer	4.807	0.0	247.0	1016
2160 min Summer	3.465	0.0	267.5	1432
2880 min Summer	2.744	0.0	282.4	1844
4320 min Summer	1.973	0.0	304.5	2648
5760 min Summer	1.559	0.0	321.0	3344
7200 min Summer	1.298	0.0	334.2	3968
8640 min Summer	1.118	0.0	345.2	4664
10080 min Summer	0.985	0.0	354.6	5256
15 min Winter	138.634	0.0	83.0	30
30 min Winter	90.866	0.0	108.7	44
60 min Winter	56.713	0.0	136.1	72
120 min Winter	34.190	0.0	164.1	130
180 min Winter	25.088	0.0	180.6	186
240 min Winter	20.020	0.0	192.2	244

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
360 min Winter	121.756	0.956	2.1	171.9	Flood Risk
480 min Winter	121.759	0.959	2.1	172.6	Flood Risk
600 min Winter	121.753	0.953	2.1	171.0	Flood Risk
720 min Winter	121.744	0.944	2.0	168.1	Flood Risk
960 min Winter	121.718	0.918	2.0	160.5	Flood Risk
1440 min Winter	121.672	0.872	2.0	147.4	O K
2160 min Winter	121.600	0.800	2.0	128.1	O K
2880 min Winter	121.524	0.724	2.0	109.4	O K
4320 min Winter	121.339	0.539	2.0	70.2	O K
5760 min Winter	121.137	0.337	2.0	36.9	O K
7200 min Winter	121.000	0.200	2.0	19.4	O K
8640 min Winter	120.927	0.127	1.8	11.5	O K
10080 min Winter	120.891	0.091	1.7	8.0	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
360 min Winter	14.528	0.0	209.2	358
480 min Winter	11.570	0.0	222.1	472
600 min Winter	9.690	0.0	232.5	582
720 min Winter	8.380	0.0	241.3	688
960 min Winter	6.658	0.0	255.5	798
1440 min Winter	4.807	0.0	276.3	1092
2160 min Winter	3.465	0.0	299.6	1548
2880 min Winter	2.744	0.0	316.3	1996
4320 min Winter	1.973	0.0	341.0	2820
5760 min Winter	1.559	0.0	359.6	3408
7200 min Winter	1.298	0.0	374.3	3968
8640 min Winter	1.118	0.0	386.6	4584
10080 min Winter	0.985	0.0	397.2	5144

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.404	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.286

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.072	4	8	0.072	8	12	0.071	12	16	0.071

Model Details

Storage is Online Cover Level (m) 122.000

Tank or Pond Structure

Invert Level (m) 120.800

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	80.0	1.200	383.3	2.400	912.9	3.600	1668.6	4.800	2650.5
0.200	114.8	1.400	455.9	2.600	1023.1	3.800	1816.5	5.000	2836.2
0.400	156.0	1.600	534.7	2.800	1139.6	4.000	1970.8		
0.600	203.4	1.800	619.8	3.000	1262.5	4.200	2131.3		
0.800	257.1	2.000	711.2	3.200	1391.6	4.400	2298.1		
1.000	317.1	2.200	808.9	3.400	1526.9	4.600	2471.2		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0069-2000-0900-2000
Design Head (m)	0.900
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	69
Invert Level (m)	120.800
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.900	2.0	Kick-Flo®	0.568	1.6
Flush-Flo™	0.278	2.0	Mean Flow over Head Range	-	1.8

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)	Depth (m)	Flow (l/s)
0.100	1.7	0.800	1.9	2.000	2.9	4.000	4.0	7.000	5.2
0.200	2.0	1.000	2.1	2.200	3.0	4.500	4.2	7.500	5.3
0.300	2.0	1.200	2.3	2.400	3.1	5.000	4.4	8.000	5.5
0.400	1.9	1.400	2.4	2.600	3.2	5.500	4.6	8.500	5.7
0.500	1.8	1.600	2.6	3.000	3.5	6.000	4.8	9.000	5.8
0.600	1.7	1.800	2.7	3.500	3.7	6.500	5.0	9.500	6.0

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	124.287	0.487	2.0	90.2	O K
30 min Summer	124.393	0.593	2.0	118.0	O K
60 min Summer	124.487	0.687	2.0	145.4	O K
120 min Summer	124.566	0.766	2.0	170.7	O K
180 min Summer	124.603	0.803	2.0	183.1	O K
240 min Summer	124.623	0.823	2.0	189.9	O K
360 min Summer	124.642	0.842	2.0	196.7	O K
480 min Summer	124.648	0.848	2.0	199.0	O K
600 min Summer	124.647	0.847	2.0	198.6	O K
720 min Summer	124.642	0.842	2.0	196.6	O K
960 min Summer	124.625	0.825	2.0	190.7	O K
1440 min Summer	124.593	0.793	2.0	179.7	O K
2160 min Summer	124.549	0.749	2.0	165.0	O K
2880 min Summer	124.507	0.707	2.0	151.6	O K
4320 min Summer	124.422	0.622	2.0	126.3	O K
5760 min Summer	124.321	0.521	2.0	98.8	O K
7200 min Summer	124.225	0.425	2.0	75.5	O K
8640 min Summer	124.143	0.343	2.0	57.6	O K
10080 min Summer	124.075	0.275	2.0	43.9	O K
15 min Winter	124.331	0.531	2.0	101.3	O K
30 min Winter	124.444	0.644	2.0	132.5	O K
60 min Winter	124.544	0.744	2.0	163.6	O K
120 min Winter	124.631	0.831	2.0	192.7	O K
180 min Winter	124.671	0.871	2.0	207.3	O K
240 min Winter	124.694	0.894	2.0	215.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	138.634	0.0	91.9	30
30 min Summer	90.866	0.0	120.2	45
60 min Summer	56.713	0.0	151.5	74
120 min Summer	34.190	0.0	182.6	132
180 min Summer	25.088	0.0	201.0	192
240 min Summer	20.020	0.0	213.8	250
360 min Summer	14.528	0.0	232.6	368
480 min Summer	11.570	0.0	246.9	484
600 min Summer	9.690	0.0	258.4	602
720 min Summer	8.380	0.0	267.9	720
960 min Summer	6.658	0.0	283.1	840
1440 min Summer	4.807	0.0	296.3	1090
2160 min Summer	3.465	0.0	333.7	1492
2880 min Summer	2.744	0.0	352.4	1908
4320 min Summer	1.973	0.0	379.8	2732
5760 min Summer	1.559	0.0	400.7	3472
7200 min Summer	1.298	0.0	417.1	4184
8640 min Summer	1.118	0.0	430.8	4848
10080 min Summer	0.985	0.0	442.5	5544
15 min Winter	138.634	0.0	102.9	30
30 min Winter	90.866	0.0	134.2	44
60 min Winter	56.713	0.0	169.6	72
120 min Winter	34.190	0.0	204.5	130
180 min Winter	25.088	0.0	225.0	188
240 min Winter	20.020	0.0	239.4	246

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

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
360 min Winter	124.718	0.918	2.0	224.7	Flood Risk
480 min Winter	124.728	0.928	2.0	228.7	Flood Risk
600 min Winter	124.731	0.931	2.0	229.7	Flood Risk
720 min Winter	124.728	0.928	2.0	228.7	Flood Risk
960 min Winter	124.715	0.915	2.0	223.5	Flood Risk
1440 min Winter	124.676	0.876	2.0	209.1	O K
2160 min Winter	124.621	0.821	2.0	189.4	O K
2880 min Winter	124.564	0.764	2.0	169.9	O K
4320 min Winter	124.442	0.642	2.0	132.1	O K
5760 min Winter	124.282	0.482	2.0	89.2	O K
7200 min Winter	124.141	0.341	2.0	57.1	O K
8640 min Winter	124.033	0.233	2.0	36.1	O K
10080 min Winter	123.962	0.162	1.9	23.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
360 min Winter	14.528	0.0	260.4	360
480 min Winter	11.570	0.0	276.2	476
600 min Winter	9.690	0.0	288.7	588
720 min Winter	8.380	0.0	298.7	700
960 min Winter	6.658	0.0	310.4	914
1440 min Winter	4.807	0.0	302.4	1150
2160 min Winter	3.465	0.0	373.8	1608
2880 min Winter	2.744	0.0	394.6	2072
4320 min Winter	1.973	0.0	425.3	2952
5760 min Winter	1.559	0.0	448.8	3696
7200 min Winter	1.298	0.0	467.1	4328
8640 min Winter	1.118	0.0	482.5	4928
10080 min Winter	0.985	0.0	495.7	5464

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Shortest Storm (mins)	15
Ratio R	0.404	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.357

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.090	4	8	0.089	8	12	0.089	12	16	0.089

Model Details

Storage is Online Cover Level (m) 125.000

Tank or Pond Structure

Invert Level (m) 123.800

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	130.0	1.200	485.6	2.400	1067.4	3.600	1875.4	4.800	2909.6
0.200	173.6	1.400	566.9	2.600	1186.4	3.800	2032.1	5.000	3103.9
0.400	223.4	1.600	654.4	2.800	1311.6	4.000	2195.0		
0.600	279.5	1.800	748.2	3.000	1443.1	4.200	2364.2		
0.800	341.9	2.000	848.3	3.200	1580.9	4.400	2539.7		
1.000	410.6	2.200	954.7	3.400	1725.0	4.600	2721.5		

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0069-2000-0900-2000
Design Head (m)	0.900
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	69
Invert Level (m)	123.800
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.900	2.0	Kick-Flo®	0.568	1.6
Flush-Flo™	0.278	2.0	Mean Flow over Head Range	-	1.8

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)	Depth (m)	Flow (l/s)
0.100	1.7	0.800	1.9	2.000	2.9	4.000	4.0	7.000	5.2
0.200	2.0	1.000	2.1	2.200	3.0	4.500	4.2	7.500	5.3
0.300	2.0	1.200	2.3	2.400	3.1	5.000	4.4	8.000	5.5
0.400	1.9	1.400	2.4	2.600	3.2	5.500	4.6	8.500	5.7
0.500	1.8	1.600	2.6	3.000	3.5	6.000	4.8	9.000	5.8
0.600	1.7	1.800	2.7	3.500	3.7	6.500	5.0	9.500	6.0

Appendix C – Surface Water Drainage Strategy

Reference	Title
HPH-HYD-XX-XX-DR-C-2200	Surface Water Drainage Strategy

OS NORTH

HYDROBRAKE FLOW CONTROL SERVING PARCEL 19 TO DISCHARGE TO EXISTING NETWORK IMPERMEABLE AREA 0.58 ha DISCHARGE RATE 2.5 l/s

CELLULAR STORAGE TANK SERVING PARCEL 19 MAX CAPACITY 500 m³

HYDROBRAKE FLOW CONTROL SERVING RESIDENTIAL PARCEL 40 IMPERMEABLE AREA 0.325 ha DISCHARGE RATE 2.0 l/s

ATTENUATION BASIN SERVING RESIDENTIAL PARCEL 40. MAX CAPACITY 1195 m³

HYDROBRAKE FLOW CONTROL SERVING PARCEL 20 TO DISCHARGE TO EXISTING NETWORK IMPERMEABLE AREA 0.50 ha DISCHARGE RATE 2.15 l/s

CELLULAR STORAGE TANK SERVING PARCEL 20 MAX CAPACITY 400 m³

ATTENUATION BASIN SERVING PARCEL 10. MAX CAPACITY 3249 m³

HYDROBRAKE FLOW CONTROL SERVING PARCEL 10 TO DISCHARGE TO EXISTING NETWORK IMPERMEABLE AREA 2.99 ha DISCHARGE RATE 12.8 l/s

PARCEL 10 DISCHARGE LOCATION

PARCEL 16 DISCHARGE LOCATION

ATTENUATION BASIN SERVING PARCEL 16 MAX CAPACITY 5704 m³

HYDROBRAKE FLOW CONTROL SERVING PARCEL 16 AND INDOOR IMPERMEABLE AREA 5.07 ha DISCHARGE RATE 21.8 l/s

ATTENUATION BASIN SERVING RESIDENTIAL PARCEL 39. MAX CAPACITY 234 m³

HYDROBRAKE FLOW CONTROL SERVING RESIDENTIAL PARCEL 39 IMPERMEABLE AREA 0.26 ha DISCHARGE RATE 2.0 l/s

ATTENUATION BASIN SERVING PARCEL 17. MAX CAPACITY 1924 m³

HYDROBRAKE FLOW CONTROL SERVING PARCEL 17 TO DISCHARGE TO EXISTING BROOK IMPERMEABLE AREA 1.69 ha DISCHARGE RATE 7.2 l/s

PARCEL 39, 20, 40, 19 & 13 DISCHARGE LOCATION

ATTENUATION BASIN SERVING PARCEL 13. MAX. CAPACITY 697 m³

HYDROBRAKE FLOW CONTROL SERVING PARCEL 13 TO DISCHARGE TO EXISTING NETWORK IMPERMEABLE AREA 0.325 ha DISCHARGE RATE 2 l/s

PARCEL 17 DISCHARGE LOCATION

ATTENUATION BASIN SERVING PARCEL 23. MAX CAPACITY 4361m³

HYDROBRAKE FLOW CONTROL SERVING PARCEL 23 TO DISCHARGE TO EXISTING BROOK IMPERMEABLE AREA 7.2 ha DISCHARGE RATE 34.1 l/s

ATTENUATION BASIN SERVING RESIDENTIAL PHASE 23. MAX CAPACITY 5395m³

ATTENUATION BASIN SERVING PARCEL 11, 12 & 21. MAX CAPACITY 7339m³

HYDROBRAKE FLOW CONTROL SERVING PARCEL 11,12 AND 21 IMPERMEABLE AREA 7.34HA. DISCHARGE RATE 31.6 L/S

PARCEL 11, 12 & 21 DISCHARGE LOCATION

DAY CARE NURSERY 17/01680/F TEMPORARY APPLICATION PERMITTED FOR 10 YEARS

LAND SOUTH OF CAMP ROAD 16/02446/F NOT YET DETERMINED

PYE HOMES 15/05037/F NOT YET DETERMINED

FILMING AREA

FLYING FIELD PARK 20.5HA

CONTROL TOWER PARK 3.9HA

CORE VISITOR DESTINATION AREA 3.6HA

EDUCATIONAL SITE WITH POTENTIAL EARLY YEARS PROVISION (AGE TBC) 2.4HA

CREATIVE CITY 11.1HA

CAR PROCESSING HARDSTANDING AREA 20.3HA

COMMERCIAL 2.3HA

SPORTS PARK 4.2HA

AREA OF FUTURE RESIDENTIAL DEVELOPMENT WITHIN POLICY VILLAGES 5

SEWAGE TREATMENT WORKS

SEWAGE TREATMENT WORKS IMPROVEMENTS

WALK/CYCLE ROUTE THROUGH PARK (APPROX. 1KM)

SECURITY ENTRANCE TO FLYING FIELD COMMERCIAL

TEMPORARY SET CONSTRUCTION/EVENT PARKING ALONG TAXIWAY

PROPOSED ROUTE FOR THE AVES DITCH FOOTPATH/BRIDLEWAY ROUTE

APPROVED ROUTE FOR THE PORTWAY FOOTPATH/BRIDLEWAY ROUTE

PROPOSED HEDGEROW WITH TREES ON WESTERN SIDE OF PORTWAY

PROPOSED SCREENING

CAR PROCESSING ACCESS

UPPER HEYFORD

CHILGROVE DRIVE

FENCE DIVIDING CREATIVE CITY & COMMERCIAL

LEIGHMERE FARM

HEYFORD PARK FREE SCHOOL

CL124.50 IL122.70

CL125.75 IL124.00

CL124.10 IL119.64

CL122.73 IL118.49

CL119.00 IL117.20

CL115.91 IL114.41

CL121.65 IL120.15

CL122.39 IL121.50

ADDITIONAL RESIDENTIAL PROVISION

DORCHESTER LAND PART OF THIS APPLICATION

SURFACE WATER SEWER LEGEND

- 23 Proposed Phase number
- Proposed Surface Water Sewer
- Existing Watercourse
- Parcel Boundary
- Proposed Cellular Storage Tank
- Proposed Attenuation Basin

NOTES

1.- Discharge rate based on QBAR greenfield discharge rate of 4.3 l/s/ha.
2.- Discharge rate based on assumption that gross area is 65% impermeable for residential and and 90% for Mixed Use, Village Centre and Indoor Sport.
3.- Impermeable areas for residential use quoted include additional 10% impermeable area for urban creep.

REV	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
P05	SM	06/07/20	SM	06/07/20	SM	06/07/20
Added parcel boundaries						
P04	RFS	26.03.20	SM	26.03.20	SM	26.03.20
Drainage strategy amended						
P03	RFS	04.03.20	SM	04.03.20	SM	04.03.20
P02	RFS	02.10.17	SM	02.10.17	SM	02.10.17
OS map added. Attenuation basin note from phase 11 and 12 amended. Phase 23 attenuation basin resized.						
P01	RFS	28.09.17	SM	28.09.17	SM	29.09.17
First issue						

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CLIENT
DORCHESTER LIVING

PROJECT
HEYFORD PARK

TITLE
SURFACE WATER DRAINAGE STRATEGY PLAN

HYDROCK PROJECT NO.
C-04583-C

SCALE @ A1
1:5000

PURPOSE OF ISSUE
SUITABLE FOR INFORMATION

STATUS
S2

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)
HPH-HYD-XX-XX-DR-C-2200

REVISION
P05

Appendix D – Exceedance Flow Routes

Reference	Title
HPH-HYD-XX-XX-DR-C-2204	Exceedance Flow Routes

OS NORTH

27 WEST
FILMING AREA

27 EAST
FILMING AREA

TREE BELT PLANTING ALONG SECTION OF RE-ALIGNED AVES DITCH

PROPOSED ROUTE FOR THE AVES DITCH FOOTPATH/BRIDLEWAY ROUTE

TEMPORARY SET CONSTRUCTION/EVENT PARKING ALONG TAXIWAY

24

WALK/CYCLE ROUTE THROUGH PARK (APPROX. 1KM)

SECURITY ENTRANCE TO FLYING FIELD COMMERCIAL

APPROVED ROUTE FOR THE PORTWAY FOOTPATH/BRIDLEWAY ROUTE

PROPOSED HEDGEROW WITH TREES ON WESTERN SIDE OF PORTWAY

FLYING FIELD PARK
20.5HA
28

30
CONTROL TOWER PARK
3.9HA

29
CORE VISITOR DESTINATION AREA
3.6HA

EDUCATIONAL SITE WITH POTENTIAL EARLY YEARS PROVISION (AGE TBC)
2.4HA
31

CREATIVE CITY
11.1HA
22

23

21

PROPOSED SCREENING

CAR PROCESSING ACCESS

25
CAR PROCESSING HARDSTANDING AREA
20.3HA

12
EAST

12
WEST

FENCE DIVIDING CREATIVE CITY & COMMERCIAL

COMMERCIAL
2.3HA

UPPER HEYFORD

DAY CARE NURSERY
17/01680/F
TEMPORARY APPLICATION PERMITTED FOR 10 YEARS

10

19

11

40

20

15
AREA OF FUTURE RESIDENTIAL DEVELOPMENT WITHIN POLICY VILLAGES 5

CHILGROVE DRIVE
33

13

PYE HOMES
15/05037/F
NOT YET DETERMINED

CAMP ROAD

32
EAST

LAND SOUTH OF CAMP ROAD
16/02446/F
NOT YET DETERMINED

39

38

32
WEST

17

34

SPORTS PARK
4.2HA
18

16

SEWAGE TREATMENT WORKS

SEWAGE TREATMENT WORKS IMPROVEMENTS
36

HEYFORD RESIDENTIAL PROVISION

DORCHESTER LAND PART OF THIS APPLICATION

LEGEND
- Exceedance Flow Routes
- Parcel Boundaries
- Potential Sacrificial Areas

NOTES
1.- Discharge rate based on QBAR greenfield discharge rate of 4.3 l/s/ha.
2.- Discharge rate based on assumption that gross area is 65% impermeable for residential and and 90% for Mixed Use, Village Centre and Indoor Sport.
3.- Impermeable areas for residential use quoted include additional 10% impermeable area for urban creep.

REV	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
P01	RFS	02.07.20	SM	02.07.20	SM	02.07.20
First issue						

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CLIENT
DORCHESTER LIVING

PROJECT
HEYFORD PARK

TITLE
SURFACE WATER DRAINAGE STRATEGY EXCEEDANCE ROUTES

HYDROCK PROJECT NO.
C-04583-C

SCALE @ A1
1:5000

PURPOSE OF ISSUE
SUITABLE FOR INFORMATION

STATUS
S2

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER)
HPH-HYD-XX-XX-DR-C-2204

REVISION
P01

Appendix E – Foul Drainage Strategy

Reference	Title
HPH-HYD-XX-XX-DR-C-2202	Foul Drainage Strategy

OS NORTH

PROPOSED FOUL GRAVITY SEWER SERVING 115 PLOTS FROM PHASE 21 AT FLOW OF 5.3 L/S

PROPOSED FOUL GRAVITY SEWER SERVING 163 PLOTS FROM PHASE 21 AT FLOW OF 7.5 L/S

PROPOSED FOUL GRAVITY SEWER SERVING 60 EXTRA CARE DWELLINGS FROM PHASE 19 AT 2.78 L/S

EXISTING FOUL SEWER SERVING PHASE 20 AT FLOW OF 0.158 L/S. MEDICAL CENTRE - 670 m^2 - 0.066 L/S. RETAIL SPACE - 929 m^2 - 0.092 L/S. SUBJECT TO CAPACITY AND CONDITIONS

PROPOSED FOUL SEWER SERVING 118 DWELLINGS FROM PHASE 10 AT FLOW OF 5.4 L/S.

PROPOSED FOUL SEWER SERVING 13 DWELLINGS FROM PARCEL 39 AT FLOW OF 0.6L/S.

PROPOSED FOUL SEWER SERVING 178 DWELLINGS FROM PHASE 16 AT FLOW OF 8.5 L/S.

PROPOSED PUMPING STATION SERVING PARCEL 10,& 16. ACCUMULATIVE PEAK FLOW OF 14.25 L/S.

PROPOSED RISING MAIN SERVING TO DISCHARGE TO PROPOSED PUMPING STATION.

PROPOSED PUMPING STATION OBTAINED FROM WOODS HARDWICK DRAWING REFERENCE 'HEYF/5/149A'

PROPOSED RISING MAIN OBTAINED FROM WOODS HARDWICK DRAWING REFERENCE 'HEYF/5/149A'

PROPOSED FOUL GRAVITY SEWER SERVING VILLAGE CENTRE OBTAINED FROM WOODS HARDWICK DRAWING REFERENCE 'HEYF/5/149A' TO BE DIVERTED. FLOW TO BE DETERMINED. SUBJECT TO CAPACITY AND CONDITIONS

PROPOSED FOUL SEWER OBTAINED FROM WOODS HARDWICK DRAWING REFERENCE 'HEYF/5/149A' TO BE RETAINED.

PROPOSED FOUL SEWER SERVING 27 DWELLINGS FROM PARCEL 40 AT FLOW OF 1.2L/S.

EXISTING FOUL SEWER TO BE RETAINED. SUBJECT TO CAPACITY AND CONDITIONS.

PROPOSED FOUL SEWER OBTAINED FROM WOODS HARDWICK DRAWING REFERENCE 'HEYF/5/149A' TO BE DIVERTED.

PROPOSED FOUL SEWER SERVING 62 DWELLINGS FROM PHASE 17 AT FLOW OF 2.9 L/S.

EXISTING TREATMEN PLANT.

PROPOSED PUMPING STATION SERVING PHASE 23. 400 PLOTS DISCHARGING AT 18.52 L/S TO PUMPING STATION.

PROPOSED RISING SERVING PHASE 23

EXISTING FOUL GRAVITY SEWER TO BE UPGRADED TO SERVE PHASES 11, 12, 21 AND 23. SUBJECT TO CAPACITY AND CONDITIONS. ACCUMULATIVE PEAK FLOW OF 34.56 L/S.

EXISTING PUMPING STATION TO BE UPGRADED TO SERVE PHASES 11, 12, 21 AND 23. SUBJECT TO CAPACITY AND CONDITIONS.

PROPOSED FOUL GRAVITY SEWER SERVING 70 DWELLINGS FROM PHASE 11 AT FLOW OF 2.78 L/S

PROPOSED FOUL GRAVITY SEWER SERVING 5 DWELLINGS FROM PHASE 13 AT FLOW OF 0.23 L/S

FOUL WATER SEWER LEGEND

- 23 — Proposed Phase number
- Proposed Foul Water Sewer
- Existing Foul Water Sewer (Subject to condition and capacity)
- Existing Foul Water Sewer to be diverted
- Proposed Rising Main
- Existing Rising Main
- Proposed Pumping Station
- Existing Pumping Station
- CL118.71 IL117.835 — Proposed Cover level and Invert level obtained from Woods Hardwick drawing
- CL117.90 — Cover level based on survey information

NOTES
1.- Confirmation of capacity at existing foul treatment plant required for parcels 11 to 23.
2.- Condition and route of existing sewers to be confirmed.
3.- Residential flows based on 4000l/s/dwelling as specified in SFA 7th Edition.
4.- Medical centre, retail space and changing facilities flows based on Plumbing Engineering Services Design Guide.

REV	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
P03	RFS	04/03/20 20	SM	04/03/20 20	SM	04/03/20 20
P02	RFS	16:04:18	SM	16:04:18	SM	16:04:18
Updated Masterplan to layout Rev Y						
P01	RFS	02.10.17	SM	02.10.17	SM	02.10.17
First issue						

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CLIENT: DORCHESTER LIVING

PROJECT: HEYFORD PARK

TITLE: FOUL WATER DRAINAGE STRATEGY PLAN

HYDROCK PROJECT NO.: C-04583-C

SCALE @ A1: 1:5000

PURPOSE OF ISSUE: SUITABLE FOR INFORMATION

STATUS: S2

DRAWING NO. (PROJECT CODE-ORGINATOR-ZONE-LEVEL-TYPE-ROLE-NUMBER): HPH-HYD-XX-XX-DR-C-2202

REVISION: P3