WEST OXFORDSHIRE DISTRICT COUNCIL

Friday, 2 February 2024

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UPLANDS AREA PLANNING SUB-COMMITTEE

You are summoned to a meeting of the Uplands Area Planning Sub-Committee which will be held in Council Chamber, Council Offices, Woodgreen, Witney, Oxfordshire OX28 1NB on **Monday, 12 February 2024 at 2.00 pm.**

Giles Hughes
Chief Executive

To: Members of the Uplands Area Planning Sub-Committee

Councillors: Julian Cooper (Chair), Rizvana Poole (Vice-Chair), Alaa Al-Yousuf, Lidia Arciszewska, Hugo Ashton, Andrew Beaney, Jeff Haine, David Jackson, Rosie Pearson, Dean Temple and Mark Walker

Recording of Proceedings – The law allows the public proceedings of Council, Executive, and Committee Meetings to be recorded, which includes filming as well as audio-recording. Photography is also permitted. By participating in this meeting, you are consenting to be filmed.

As a matter of courtesy, if you intend to record any part of the proceedings please let the Democratic Services officers know prior to the start of the meeting.

AGENDA

1. **Apologies for Absence and Temporary Appointments**
   To note any apologies for absence and temporary appointments.

2. **Declarations of Interest**
   To receive any declarations from Members of the Committee on any items to be considered at the meeting.

3. **Minutes of Previous Meeting** (Pages 5 - 8)
   To approve the minutes of the meeting held on Monday 15 January 2024.

4. **Applications for Development** (Pages 9 - 44)
   Purpose:
   To consider applications for development, details of which are set out in the attached schedule.

   Recommendation:
   That the applications be determined in accordance with the recommendations of the Business Manager – Development Management.

Page	Application No.	Address	Planning Officer
11-20	23/01184/FUL	Coopers Croft Barn, Priory Road, Chipping Norton.	James Nelson
21-28	23/01402/FUL	Woodstock Bowls And Tennis Club, Cadogan Park, Woodstock.	Sarah Hegerty
29-35	23/02188/LBC	The Great Barn, 14 Home Farm Close, Shipton-under-Wychwood.	Tara Hayek
36-44	23/02653/FUL	Stonesfield Sports And Social Club, Field Close, Stonesfield.	James Nelson

4.1 23/01184/FUL Coopers Croft Barn, Priory Road, Chipping Norton.

4.2 23/01402/FUL Woodstock Bowls And Tennis Club, Cadogan Park, Woodstock.

4.3 23/02188/LBC The Great Barn, 14 Home Farm Close, Shipton-under-Wychwood.

4.4 23/02653/FUL Stonesfield Sports And Social Club, Field Close, Stonesfield.

5. **Outline Planning Application 23/01504/OUT** (Pages 45 - 316)

Purpose:

To consider the additional technical note submitted on Flood Risk & Drainage and to confirm whether refusal reason 3 on flood risk attached to application 23/01504/OUT should still be pursued at the forth coming Appeal Inquiry.

Recommendation:

That the Sub-Committee resolves to:

1. Agree not to pursue refusal reason 3 on flood risk grounds at the Appeal Inquiry.

6. **Applications Determined under Delegated Powers** (Pages 317 - 330)

Purpose:

To inform the Sub-Committee of applications determined under delegated powers and any appeal decisions.

Recommendation:

That the reports be noted.

7. **Appeal Decisions** (Pages 331 - 332)

Purpose:

To inform the Sub-Committee of any appeal decisions.

Recommendation:

That the reports be noted.

(END)

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WEST OXFORDSHIRE DISTRICT COUNCIL

Minutes of the meeting of the
Uplands Area Planning Sub-Committee
Held in the Committee Room 1, Council Offices, Woodgreen, Witney, Oxfordshire OX28 1NB at 2.00 pm on **Monday, 15 January 2024**

PRESENT

Councillors: Julian Cooper (Chair), , Alaa Al-Yousuf, Hugo Ashton, Andrew Beaney, Jeff Haine, David Jackson, Rosie Pearson, Tim Sumner, Dean Temple, Mark Walker and Tim Sumner

Officers: Officers: Andrew Brown (Business Manager, Democratic Services), Max Thompson (Senior Democratic Services Officer), James Nelson (Planning Officer), and Stephanie Eldridge (Principal Planner).

Other Councillors in attendance: Nil.

117 Apologies for Absence and Temporary Appointments

Apologies for Absence were received from Councillors Rizvana Poole and Lidia Arciszewska.

Councillor Tim Sumner substituted for Councillor Lidia Arciszewska.

118 Declarations of Interest

Councillor Julian Cooper stated that he knew personally of the applicant relating to application 23/02890/FUL – 1 Upper Brook Hill, Woodstock. Councillor Cooper further stated that he would leave the room whilst the application was considered by the Sub-Committee.

There were no other Declarations of Interest made by members of the Sub-Committee.

119 Minutes of Previous Meeting

Councillor Julian Cooper proposed from the Chair that the minutes of the previous meeting, held on Monday 11 December 2023, be agreed by the Sub-Committee as a true and accurate record.

This was seconded by Councillor Jeff Haine and was put to a vote.

There were 8 votes in favour, 0 votes against, and 2 abstentions. The vote was carried.

The Sub-Committee **Resolved** to:

Agree the minutes of the previous meeting, held on Monday 11 December 2023, as a true and accurate record.

120 Election of Vice-Chair

Owing to apologies given by Councillor Rizvana Poole, and ahead of leaving the room, Councillor Julian Cooper presided over the election of a Member to preside for the following agenda item.

Councillor Julian Cooper proposed from the Chair that Councillor Jeff Haine be elected to preside over the following agenda item, when Councillor Cooper would be out of the room.

This was seconded by Councillor Andrew Beaney, was put to a vote, and was unanimously agreed by the Sub-Committee.

The Sub-Committee **Resolved** to:

Elect Councillor Jeff Haine to preside over the following agenda item in the absence of the Chair and Vice-Chair.

121 **Application for Development - 23/02890/FUL - 1 Upper Brook Hill, Woodstock.**

Councillor Jeff Haine took up the position of Chair to preside over the application for development, in the absence of the Chair and Vice-Chair and having been elected by the Committee to preside for this agenda item.

James Nelson, Planning Officer, introduced the application, for the proposed construction of a single dwelling, together with associated works.

The Planning Officer drew the Sub-Committee's attention to the additional representations report, which had been circulated prior to the meeting.

Dennis Allen addressed the Sub-Committee as the applicant.

The Planning Officer continued with their presentation, which clarified the following points:

- In line with WODC Local Plan Policy H2 the new dwelling would be permitted as it was in accordance with other policies particularly OS2 and as a result the principle of the development on this site was acceptable.
- Scale and Design of the dwelling complimented the parent dwelling above the site. The upper floor had a smaller footprint than the ground floor. The design was not considered bulky or the site over developed;
- Conservation Area - There was no harm to the heritage and designated assets. There were no planning harms in relation to highways and ecology matters. The site came within the Woodstock conservation area and was beside locally listed cottages. The site and design would complement nearby contemporary developments;.
- Flooding Risks were considered low as the site was located in Flood Zone 1. The Drainage Officer had requested that the applicant show how surface drainage water would be managed and how this would impact on third parties. As per the officer's report this would be covered by a pre-commencement surface water drainage condition.
- Amenity of Neighbouring Properties –. The site was set back and did not materially impact amenities or local properties and did not overlook or cause loss of light. A condition for a Traffic Management plan was included in the officer's report to help mitigate the disturbance to neighbours whilst the site was under construction;
- Efficient Use of Land – The parking space and refuse storage site was integrated into the design. The design was not considered bulky or over developed. The Planning Officer recommended the application for approval.

The Chair then invited the Sub-Committee to discuss the application, which raised the following points:

- Members raised concerns regarding the size and scale of the development when viewing the building next to the parent building and felt that it could be seen as

overbearing. The Planning Officer confirmed to differentiate between the two buildings different coloured renders would be used. The massing had been reduced as the site had been cut into the hill. The Conservation Officer had worked with the applicant through the pre-application process to address any conservation design concerns. The Conservation Officer had found no to harm to the character and conservation within the area;

- Comments received from Woodstock Town Council – The proposed dwelling was considered to not be in keeping with other dwellings within the locality of the proposed site, however due to the parent building and other more modern buildings in the area it did reflect the heritage and more modern designs nearby.
- Use of staircase to the left of the proposed site – The stairs would provide access to a private amenity space within the site of the proposed dwelling site. There would be no loss of biodiversity as the amenity grassland was of low ecological value;
- Flooding concerns were covered by a standard condition.
- Proximity of the dwelling to the road line – highways had been consulted and had raised no objections;
- Locally Listed Buildings – Woodstock was a traditional town, however it had allowed previous applications with more contemporary modern designs which was reflected in the surrounding area.

Councillor Dean Temple proposed that the application approved, in line with officer recommendations. This was seconded by Councillor Rosie Pearson, was put to a vote, and was agreed unanimously by the Sub-Committee.

The Sub-Committee **Resolved** to:

1. Approve the application, in line with officer recommendations.

Councillor Julian Cooper returned to the room and retook the position of Chair for the remainder of the meeting.

122 Applications Determined under Delegated Powers

The report giving details of applications determined under delegated powers was received and noted by the Sub-Committee.

Page 35; Application 16 – Councillor Walker requested feedback on why the application was refused. Stephanie Eldridge, Principle Planner confirmed that the information would be reported back to the next Sub-Committee.

123 Appeal Decisions

The report giving details of an application in the Woodstock area taken to appeal was received, explained by the Principal Planner, and noted by the Sub-Committee.

The Meeting closed at 2.35pm.

CHAIR

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WEST OXFORDSHIRE DISTRICT COUNCIL

UPLANDS AREA PLANNING SUB-COMMITTEE

Date: 12th February 2024

REPORT OF THE BUSINESS MANAGER-DEVELOPMENT MANAGEMENT

WEST OXFORDSHIRE
DISTRICT COUNCIL

Purpose:

To consider applications for development details of which are set out in the following pages.

Recommendations:
To determine the applications in accordance with the recommendations of the Business Manager. The recommendations contained in the following pages are all subject to amendments in the light of observations received between the preparation of the reports etc and the date of the meeting.

List of Background Papers

All documents, including forms, plans, consultations and representations on each application, but excluding any document, which in the opinion of the 'proper officer' discloses exempt information as defined in Section 1001 of the Local Government Act 1972.

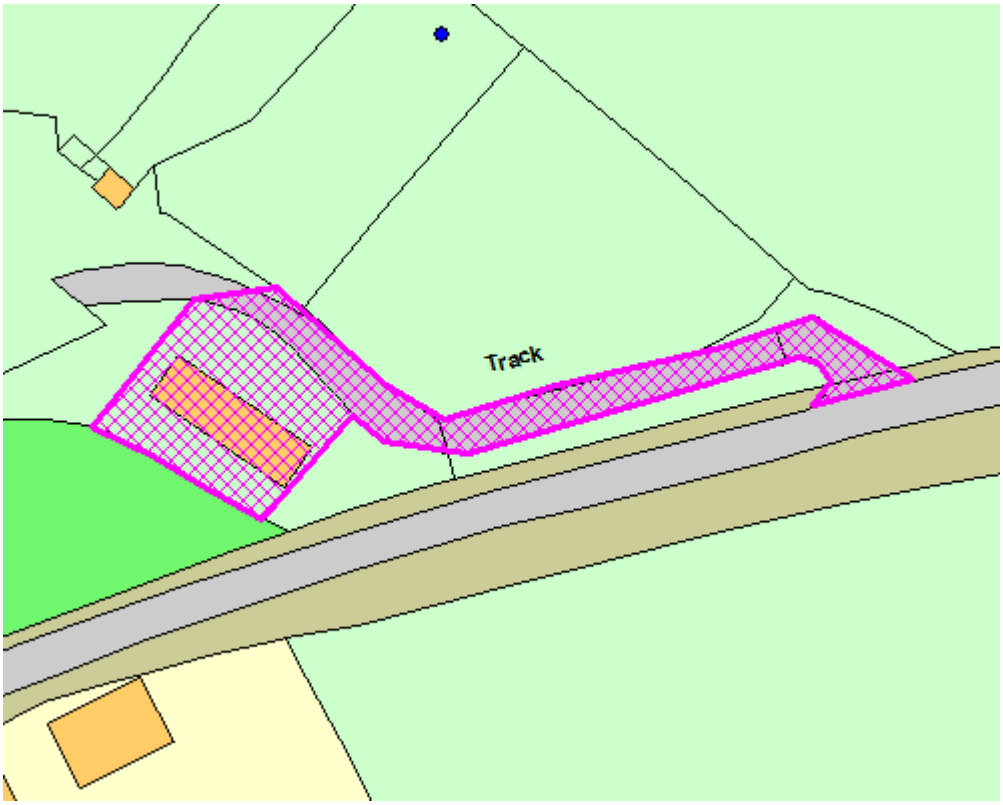
Please note that:

1. Observations received after the reports in this schedule were prepared will be summarised in a document which will be published late on the last working day before the meeting and available at the meeting or from www.westoxon.gov.uk/meetings

Item	Application Number	Address	Officer
11-20	23/01184/FUL	Coopers Croft Barn Priory Road	James Nelson
21-28	23/01402/FUL	Woodstock Bowls And Tennis Club Cadogan Park	Sarah Hegerty
29-35	23/02188/LBC	The Great Barn 14 Home Farm Close	Tara Hayek
36-44	23/02653/FUL	Stonesfield Sports And Social Club Field Close	James Nelson

Application Number	23/01184/FUL
Site Address	Coopers Croft Barn Priory Road Heythrop Chipping Norton Oxfordshire OX7 5TA
Date	31st January 2024
Officer	James Nelson
Officer Recommendations	Approve
Parish	Over Norton Parish Council
Grid Reference	433390 E 228270 N
Committee Date	12th February 2024

Location Map



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Application Details:
Temporary siting of a mobile home for farm worker (retrospective) (amended plans).

Applicant Details:
K Cooper
c/o JPPC Chartered Town Planners
Bagley Croft
Hinksey Hill
Oxford
OX1 5BD

1 CONSULTATIONS

Parish Council	Over Norton PC - no comments received
OCC Highways	Oxfordshire County Council, as the Local Highways Authority, hereby notify the District Planning Authority that they do not object to the granting of planning permission, subject to the following condition • G28 parking as plan
Env Health - Uplands	No objection.
District Ecologist	This is a retrospective application, so it is not clear whether biodiversity was a constraint to the development and an ecological survey would not be able to identify if there had been any ecological constraints. Therefore, I have no objections and no further comments to make.
WODC Drainage	No Comment Received.
Parish Council	No Comment Received.
WODC Business Development	I have reviewed this application and consider that there is adequate justification for a dwelling on the site. The applicant is building an agricultural business which involves farming several different parcels of land. The application site acts as the base for the contracting business but also as the 'home farm' for the livestock enterprises. The livestock enterprises are commercial in scale and the need to be on site at critical times creates a functional need for a dwelling on site. This application has my full support from the business development perspective.

2 REPRESENTATIONS

2.1 No third-party comments have been received.

3 APPLICANTS CASE

3.1 The application is supported by a Planning Statement, the key points of which are summarised below.

3.2 'The proposed dwelling is to be provided in the mobile home which is already on-site, having first been introduced as a farm office and welfare building. Planning permission was not required for its original siting as this agricultural use did not involve a material change of use of the land.

3.3 However, the applicant is aware planning permission will be required if a worker is to reside in the mobile home, thus we make this application. The applicant seeks planning permission for a limited period to allow the business to be established and economic viability demonstrated before a permanent dwelling might be considered.

3.4 This application is made by Mr Cooper who owns the application site which is the operating base for his farming company. The applicant farms an area of around 370 acres of grassland made up of land in his ownership and that farmed under agricultural rental agreements.

3.5 The application site is to the north of Priory Road, Heythrop with the mobile home nestled against mature trees to the southwestern corner of the site. The land benefits from existing access to Priory Road.

3.6 This submission includes a Business Plan from Ceres Rural which sets out the viability of the livestock enterprise and its requirement for a full-time resident worker. For the avoidance of doubt, we confirm the applicant only seeks permission to use the mobile home as a dwelling for a temporary period (two years) while the enterprises which are reliant upon it become established. Following the 'proving period' an application would be made for a permanent dwelling, which the Council could then support as part of a proven business.

3.7 In summary, the proposed use of the mobile home as a dwelling for a farm worker for a temporary period is supported in principle by policy H2 of the WOLP and is actively supported by E2 which seeks a prosperous rural economy.

3.8 The temporary use is aligned with the general principles for development set out at WOLP policy OS2 and so should not cause harm to local amenity or the character of the area. It will allow the profitability of enterprises which necessitate the home to be proven, following which a permanent dwelling of suitable design could be supported by the Council.

3.9 In view of the proposal's alignment with Development Plan policy the presumption in favour of sustainable development, as expressed at paragraph 11 of the NPPF, states that planning permission should be granted without delay. We respectfully request that this application be approved.'

3.10 A Business Plan produced by Ceres Rural is also provided in support for the scheme.

4 PLANNING POLICIES

OS1NEW Presumption in favour of sustainable development
OS2NEW Locating development in the right places
H2NEW Delivery of new homes
T2NEW Highway improvement schemes
T4NEW Parking provision
EH2 Landscape character
The National Planning Policy framework (NPPF) is also a material planning consideration.

5 PLANNING ASSESSMENT

Background

5.1 This application seeks consent for the temporary siting of a mobile home for farm worker at Coopers Croft Barn, Priory Road, Heythrop. The application is retrospective as the mobile home is in situ. The applicant states that the mobile home was installed initially as a 'farm office and welfare building' but is now required to provide residential accommodation.

5.2 The application is associated with a small parcel of land (circa 4.5 acres) including yard and buildings, known as Coopers Croft Barn which occupies an open countryside location approximately 1.5km from the small village of Heythrop and 1.45km north east of Chipping Norton. The applicant has developed a farm contracting business, entered into contract farming arrangements, conducts arable farming operations and also commenced livestock rearing at Coopers Croft Barn. The applicant seeks to grow this latter aspect of the business, to which this application relates, as the applicant seeking to establish an essential need for a dwelling on site to enable further development of the business.

5.3 Amended plans have been submitted and consulted on as the plans as submitted did not accurately reflect the site boundary, this has since been rectified.

5.4 The application is heard by this Committee due to councillor call in.

Relevant Planning History

05/1282/P/FP- Erection of stables and tack room. Refused, appeal allowed.
20/03123/PDET28- Construction of new agricultural storage building. Prior Approval Not Required.
22/00966/PDET28- Erection of agricultural store and workshop. Prior Approval Not Required.

Development Plan

5.5 In October 2023 the Levelling-Up and Regeneration Act ("LURA") received royal ascent. The LURA replaces Section 38(6) of the Planning and Compulsory Purchase Act 2004 in favour of new Section 38(5A) - (5C) which states:

(5A) For the purposes of any area in England, subsections (5B) and (5C) apply if, for the purposes of any determination to be made under the planning Acts, regard is to be had to—

a) the development plan, and
b) any national development management policies.

(5B) Subject to subsections (5) and (5C), the determination must be made in accordance with the development plan and any national development management policies, unless material considerations strongly indicate otherwise.

(5C) If to any extent the development plan conflicts with a national development management policy, the conflict must be resolved in favour of the national development management policy.

5.6 The amended legislation gives statutory weight to 'national development management policies' (which do not form part of the development plan) and states that material considerations must 'strongly' outweigh the development plan and any national development management policies to warrant departure. Subsection 5C outlines that where the development plan conflicts with a national development management policy, national policy should take precedence.

5.7 In this case, the development plan is the West Oxfordshire Local Plan 2031 ('the WOLP').

5.8 Section 38ZA clarifies the meaning of "national development management policy" as:

(1) A "national development management policy" is a policy (however expressed) of the Secretary of State in relation to the development or use of land in England, or any part of England, which the Secretary of State by direction designates as a national development management policy.

5.9 At this time, no national development management policies have been adopted and as such, the application should be determined in accordance with the WOLP unless material considerations strongly indicate otherwise.

5.10 Given the nature of the proposal, officers consider that the WOLP polices identified in Section 4 of this report are most relevant in this case.

National Policy/Guidance

5.11 The National Planning Policy Framework ('NPPF') sets out the Government's planning policies and how these are expected to be applied. The NPPF advices that the purpose of the planning system is to contribute to the achievement of sustainable development and sets out that there are three dimensions to sustainable development: economic, social and environmental. In essence, the economic role should contribute to building a strong, responsive and competitive economy; the social role should support strong, vibrant and healthy communities; and the environmental role should contribute to protecting and enhancing the natural, built and historic environment. These roles should not be undertaken in isolation, because they are mutually dependant.

5.12 At the heart of the NPPF is a presumption in favour of sustainable development and paragraph 11 advises that for decision-making this means approving development proposals that accord with an up-to-date development plan without delay.

5.13 Officers consider that the proposal would lead to the provision of an isolated home (for a temporary period) in the open countryside for the purposes of the NPPF. Paragraph 84 seeks to resist the development of isolated homes in the countryside other than in certain circumstances, including where:

'There is an essential need for a rural worker, including those taking majority control of a farm business, to live permanently at or near their place of work in the countryside'.

5.14 Paragraph 88 relates to 'supporting a prosperous rural economy' and is clear that:

'Planning policies and decisions should enable:

a) the sustainable growth and expansion of all types of business in rural areas, both through conversion of existing buildings and well-designed, beautiful new buildings;

b) the development and diversification of agricultural and other land-based rural businesses'.

5.15 Taking into account planning policy, history, other material considerations and the representations of interested parties your officers are of the opinion that the key considerations for the application are:

- Principle of development;
- Justification for farm workers dwelling;
- Landscape and visual impact; and
- Highways

5.16 Each will be considered in the following sections of this report.

Principle of development

5.17 WOLP Policy OS2 sets out the general spatial strategy in the District and identifies a hierarchy of settlements for new development and draws a distinction between 'main service centres, rural service centres and villages' and 'small villages, hamlets and open countryside'. The application site occupies a distinctly rural location separate from any defined settlement and therefore officers consider that the site occupies an open countryside location for the purposes of Policy OS2.

5.18 Policy OS2 sets out that development in such locations 'will be limited to that which requires and is appropriate for a rural location and which respects the intrinsic character of the area. Proposals for residential development will be considered under policy H2'.

5.19 The general principles of OS2 are applicable to all new development, those considered relevant in this case are that all development should:

- 'Be of a proportionate and appropriate scale to its context having regard to the potential cumulative impact of development in the locality;
- Form a logical complement to the existing scale and pattern of development and/or the character of the area;
- Be compatible with adjoining uses and not have a harmful impact on the amenity of existing occupants;
- Be provided with safe vehicular access and safe and convenient pedestrian access to supporting services and facilities; and
- Conserve and enhance the natural, historic and built environment'.

5.20 Policy H2 relates to the delivery of new homes and adopts a restrictive approach to the provision of new dwellings in small villages, hamlets and open countryside. H2 outlines that new dwellings in such locations will only be permitted where they comply with the general principles set out in Policy OS2 and in an exhaustive list of circumstances including:

'Where there is an essential operational or other specific local need that cannot be met in any other way, including the use of existing buildings. Where appropriate, new homes provided (other than replacement dwellings) will be controlled by an occupancy condition linked to the operational need'.

5.21 This requirement echoes the provisions of NPPF paragraph 84.

5.22 Therefore, in order for the principle of development to be acceptable in accordance with WOLP Policies OS2 and H2 as well as NPPF paragraph 84, the application must demonstrate that there is an essential operational or other specific local need for residential accommodation on the site that cannot be met in any other way as well as comply with the general principles of OS2. This will be fully assessed in the following sections of this report.

Justification for farm workers dwelling

5.23 As outlined above, Policy H2 is clear that in order for the principle of development to be acceptable, the applicant must demonstrate an essential operational need for on-site residential accommodation to support the agricultural use of the wider site which cannot be met in any other way, including through the re-use of existing buildings. The wider agricultural unit contains two newly constructed agricultural buildings (see above planning history) as well as a timber stable building and no existing dwellings. The application makes clear that the two existing barns are required for agricultural purposes and the timber stable building is not considered suitable for habitation. Officers are therefore satisfied that there are no existing buildings or dwellings within the unit that could be adapted for occupation by a farm worker.

5.24 The proposal is therefore required to demonstrate that there is an essential operational or other specific local need for on-site accommodation that cannot be met in any other way. In order to seek to demonstrate this need, the application has been supplemented with a Business Plan, with a further addendum submitted in November. The Business Plan indicates that the livestock enterprise is projected to expand over the coming years and as such, on-site accommodation will be required to support the rearing of livestock. As the operation is expected to scale up in future years, the application is put forward on the basis that a 'proving period' is necessary to allow further establishment of the business whilst allowing the Local Planning Authority to review the essential needs case upon the expiration of a temporary consent. Officers summarise the existing and proposed livestock enterprises below.

Calves

5.25 The applicant states that young bull and heifer calves are purchased and reared through to about 12-month-old stores before sale. It is understood that about 30 are currently reared per annum, which are turned out to graze at around 4 months, allowing the current covered yard to house calves at different ages. The applicant indicates that the calf rearing operation could rise to 90pa based upon the existing capacity of the site. An intention for this figure to rise to c120pa has been expressed although this would be reliant upon further building space which has not been proposed/consented.

Pigs

5.26 The applicant owns two rare breed Oxford Sandy and Black sows which are kept in the woodland area of the site. Each sow currently have two farrowings each per year producing c8-10 piglets at a time. Once the offspring reach pork weight, they are slaughtered and processed with pork products are currently sold through Diddly Squat farm shop. No plans for expansion of this aspect of the business are indicated.

Poultry

5.27 The Business Plan states that an existing chicken enterprise will be turned over to free range turkeys (c100) for Christmas 2024. No indication of future expansion of the turkey enterprise is outlined.

Other agricultural operations

5.28 The applicant is engaged in contract farming for a range of local farms totalling over c2,000 acres of arable land. The applicant also rents 261 acres of arable land, farmed for mostly Winter Wheat and Spring Barley. Whilst the Business Plan indicates that the location of the site is well-placed to service the various local farms subject to contracts with the applicant, officers do not consider that this provides justification for on-site accommodation as similar convenience could be achieved through existing properties in settlements such as Chipping Norton. The applicant's case is therefore wholly reliant upon the livestock element of the business, in officer's view.

Assessment of need

5.29 The Local Planning Authority have commissioned an independent assessment ('the independent assessment') of the application by 'Fox Rural' to assist in the assessment of the application. The independent assessment has found that there is, on balance, an established essential need for the stationing of a temporary mobile home at Coopers Croft Barn. Your officers consider that the application has demonstrated that there is an intention and ability to develop the livestock enterprise at the site, particularly regarding the number of calves to be reared, which could be increased to 90pa based upon existing capacity, and expansion of the poultry operation. In terms of the need for on-site accommodation, the case presented is largely on the basis of a need to deal quickly with emergency animal welfare issues that could arise at any hour. In this regard, given the calves will be reared in three batches per annum, there would be at least 30 calves on site under three months old for the majority of the year. The independent assessment commissioned outlines that at the point of arrival (2-3 weeks) calves require close observation with pneumonia and diarrhoea being the most common causes of mortality. Close scrutiny is required to enable early treatment and the independent assessment confirms a requirement at times to be on hand during the night. The number of calves proposed leads the independent assessment to conclude that a farm worker should be located within 'easy access' of the site.

5.30 In terms of pigs and turkeys, there will be four farrowings per year, with on hand intervention during and immediately after farrowing a likely scenario, which can often take place at night. In terms of turkeys, close monitoring is required for the 'first few weeks' after hatching. Therefore, the need for on-site accommodation relating to this aspects of the business appears somewhat intermittent over the year.

5.31 Security benefits of on-site accommodation are also cited, whilst this is recognised by officers, it is likely that technological solutions and monitoring could achieve this benefit and it is therefore afforded limited weight.

5.32 The independent assessment concludes that 'on balance, especially bearing in mind the proposed expansion of the calf rearing, there is considered to be a functional requirement for there to be somebody within easy access of the yard.'

5.33 The application is also required to demonstrate that the underlying business can demonstrate future financial viability in order to meet the tests of Policy H2 and NPPF Paragraph 84, as supplemented by the Planning Practice Guidance (Reference ID: 67-010-20190722) which requires that decision makers have 'confidence that the enterprise will remain viable for the foreseeable future'.

5.34 In this regard, the independent assessment outlines that the submitted budget in the Business Plan is optimistic and somewhat simplistic in its assumptions and therefore, the budget would need paring back significantly to produce a more realistic profit margin. However, it concludes that it is very likely that there will be sufficient profit margin based on the applicant's predictions to support a worker on a minimum wage (c£20,000). Given that the indicated figures are projections as opposed to established and proven data, officers conclude that a temporary consent would recognise that the applicant has demonstrated an essential need for an agricultural worker based on the projected expansion of the operation but allow time for a 'proving period' whereby the essential need can be re-evaluated based upon the performance of the business in the coming years.

Landscape and visual impact

5.35 The application site is not located within any areas of landscape designation however, WOLP Policy EH2 is relevant which states:

'The quality, character and distinctiveness of West Oxfordshire's natural environment, including its landscape, cultural and historic value, tranquillity, geology, countryside, soil and biodiversity, will be conserved and enhanced. New development should conserve and, where possible, enhance the intrinsic character, quality and distinctive natural and man-made features of the local landscape'.

5.36 The unit is sited in the south western portion of the agricultural land parcel, screened in views from the adjacent road by an existing stable block and mature woodland and contextualised by recently constructed agricultural barns. Whilst the unit is not considered suitable for permanent retention due to its utilitarian character and appearance, officers consider that given its modest scale and discrete siting in close proximity to existing structures, it retention on a temporary two year basis would not give rise to significant landscape and visual impacts.

Highways

5.37 WOLP Policy T2 states that:

'All development will be required to demonstrate safe access and an acceptable degree of impact on the local highway network'.

5.38 In this regard, the existing access would be unaffected by the proposal and the wider site contains significant areas of hardstanding to serve as a parking area. Further, the Highways Authority have confirmed no objection to the proposal. As such, officers consider that a neutral impact in highways terms would result from the application.

Recommendation

5.39 In light of this assessment, the proposal is considered to accord with West Oxfordshire Local Plan 2031 Policies OS1, OS2, H2, T2, T4 and EH2 and the NPPF 2023. The application is therefore

recommended for conditional approval subject to the conditions as set out in Section 6 of this report.

6 CONDITIONS

1. The development shall be carried out in accordance with the plan(s) accompanying the application as modified by the revised plan(s) deposited on 28.07.2023.

REASON: The application details have been amended by the submission of revised details.

2. That the temporary residential unit hereby permitted shall be removed from the land in its entirety within two years from the date of this grant of planning permission.

REASON: The permission is for a temporary period only as the essential operational need to live on the land in accordance with local plan policy and paragraph 84 of the NPPF is not yet definitively proven but may be evidenced over the next two year time frame given the business plan submitted with the application.

3. The occupation of the mobile home shall be limited to a person solely or mainly working, or last working, in the locality in agriculture, or a widow or widower of such a person, and to any resident dependants.

REASON: Permission is granted only because of the agricultural need for the mobile home.

4. The number of caravans/mobile homes sited on the land shall not exceed one at any given time.

REASON: To safeguard the character and appearance of the area and prevent additional residential occupation on the land.

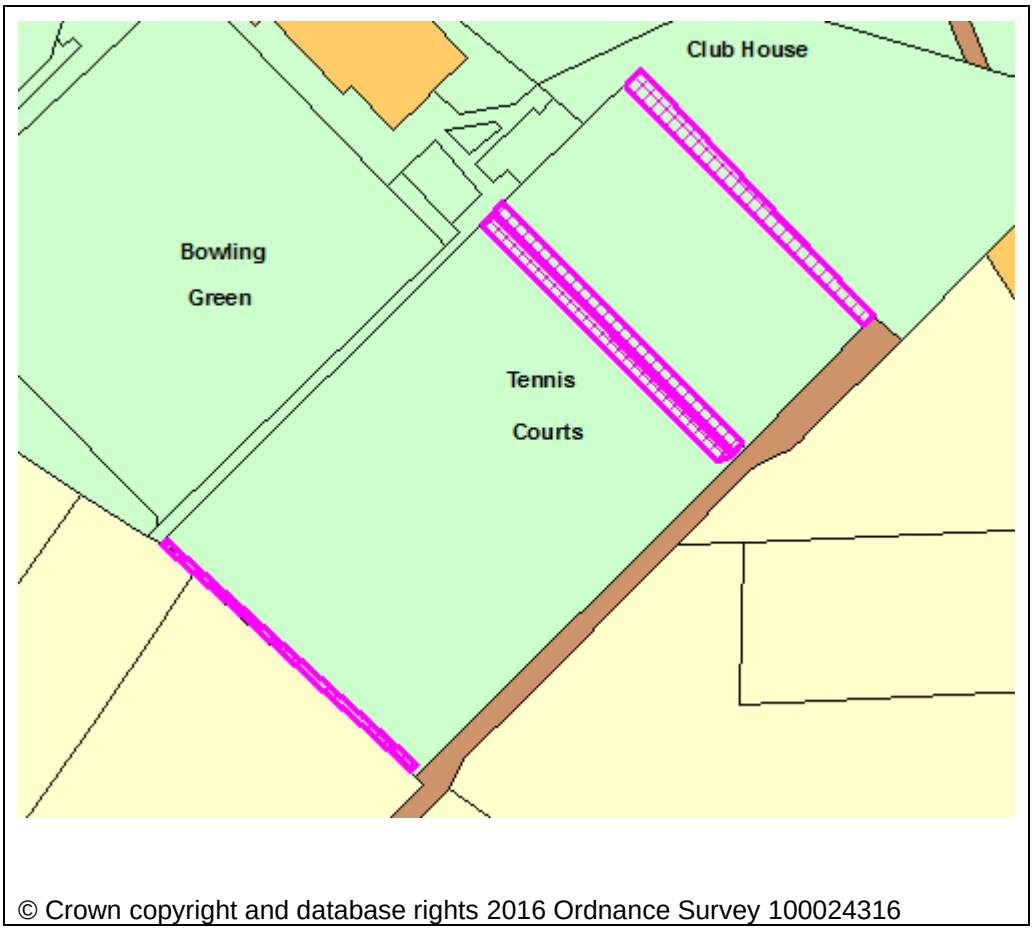
Notes to applicant

1. The applicant is advised that the recommendation to support this mobile home was on balance. It should not therefore be assumed that when the temporary period has expired that a permanent dwelling would be supported or that a further temporary consent would be supported. In that regard the profitability of the farming enterprise, the extent of land under the applicants control and ownership and the farming operations being undertaken will be material in assessing whether a further residential consent would be allowed. Furthermore, if a permanent residential dwelling is to be supported the size of the dwelling will be dictated by the extent of profitability of the farming enterprise.

Contact Officer: James Nelson
Telephone Number: 01993 861712
Date: 31st January 2024

Application Number	23/01402/FUL
Site Address	Woodstock Bowls And Tennis Club Cadogan Park Woodstock Oxfordshire OX20 1UW
Date	31st January 2024
Officer	Sarah Hegerty
Officer Recommendations	Approve
Parish	Woodstock Parish Council
Grid Reference	444879 E 216679 N
Committee Date	12th February 2024

Location Map



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Application Details:
Installation of sports lighting to serve a block of three tennis courts and a separately enclosed single tennis court.

Applicant Details:
Mr Nigel Bryant
Woodstock Bowls And Tennis Club
Cadogan Park
Woodstock
Oxfordshire
OX20 1UW

1 CONSULTATIONS

Parish Council	The Town Council would like to request that a condition be applied to any planning permission to prevent the lighting from be used after 8.30pm (20.30). The Town Council would also like to point out that the site is now identified in the recent Woodstock Neighbourhood Plan as a Green Space.
OCC Highways	Oxfordshire County Council, as the Local Highways Authority, hereby notify the District Planning Authority that they do not object to the granting of planning permission
District Ecologist	A PEA will be required, guidance from Natural England makes it clear that an ecological report should be requested when a proposal includes the use of flood lighting close to habitats that bats tend to use. Therefore, a preliminary ecological appraisal will need to be undertaken to assess the habitat suitability for bats. This information will be required to inform the number of bat activity transect surveys required to achieve a reasonable survey effort. Until a PEA is submitted I won't be able to assess the potential impacts to bats.
Env Health - Uplands	Mr ERS Pollution Consultation No objection but I would ask that the proposed cut-off time of 21:30 is enforced by way of a condition attached to any consent granted.
District Ecologist	Acceptable subject to the following conditions and informative. Section 5.1, 5.2 and 5.4 of the consultancy report make recommendations for precautionary working for nesting birds, as well as recommendations for bats and lighting. Details of the lighting plans are also deemed sufficient, therefore the above compliance condition is recommended to ensure that all recommendations and plans are adhered to. Section 5.3.1 of the consultancy report makes recommendations for bat enhancement features, such as the installation of 2F Schwegler Bat Boxes located on separate trees around the site, however, these recommendations have not been supported by any plans, therefore the above enhancement condition has been recommended.

2 REPRESENTATIONS

2.1 20 Objection comments have been received and have been summarised below (the full comments can be viewed online)

- Amenity impacts (Noise and Light)
- Increase in Traffic
- Will affect local ecology

2.2 64 Supporting comments have been made which are summarised below (the full comments can be viewed online)

- Will help promote a healthy lifestyle
- Benefits Local Community
- More sustainable then travelling to other facilities

3 APPLICANT'S CASE

3.1 The Tennis Club is LTA affiliated and has four all-weather artificial grass courts.
These are arranged as a separately enclosed block of three courts and an enclosed single court.

3.2 The thriving and inclusive tennis club has a membership of over 300, of all ages and abilities. The club has over 100 junior members.

3.3 The club enters adult teams in the Oxfordshire Leagues, both Winter and Summer, and usually runs four Ladies teams, four Men's teams and at least three Mixed. The club also enters junior teams in several age-groups in the Oxfordshire Junior Leagues.
It has social tennis sessions every week, on Tuesday and Sunday afternoons in winter and Sunday afternoons and Tuesday and Thursday evenings in summer.

3.4 The club has regular Family Nights when parents and their children can meet and play, but without lights these are limited to the summer months.
It has a vibrant, high-quality coaching programme for both juniors and adults, but without lights this cannot operate effectively for a large part of the year.
During the autumn and winter months when the days are short, the time available for coaching is limited. The club currently has to rent courts at nearby clubs which do have lighting provision, but this is at extra cost and considerable inconvenience to the parents living in Woodstock and surrounding villages, as they have to travel 5-10 miles by car. With the installation of court lights at Woodstock, coaching sessions could continue after sunset, allowing for greater flexibility in players' and parents' scheduling. This would be especially beneficial for parents who have other siblings and other commitments such as swimming, hockey or football.
Court lights would enable us to offer a progressive, inclusive and sustainable coaching programme not only for our members but in local schools.
The club already has excellent working relationships with Woodstock Primary School and The Marlborough Secondary School, but can operate properly only for part of the year. Court lighting would enable the coaching programme to further strengthen these working relationships with the two local schools in the town.

3.5 Moreover, court lighting would allow Woodstock Tennis Club to grow the game and increase year-round participation in both the social and competitive strands. We all know the benefits that sport, particularly tennis, can bring in terms of physical and mental health. Increasing the autumn and winter hours would benefit not only the coaching programme. It would also benefit the many players who,

because of working hours and commitments, are able only to participate in the evenings, not just in terms of attending coaching, but by involvement in all other activities at the club: match practice, social play etc. The club has therefore had a desire for a number of years to extend playing hours, especially as the club is now enjoying a marked increase in membership.

4 PLANNING POLICIES

OS2NEW Locating development in the right places
OS4NEW High quality design
E5NEW Local services and community facilities
WOODNP Woodstock Neighbourhood Plan
DESGUI West Oxfordshire Design Guide
The National Planning Policy framework (NPPF) is also a material planning consideration.

5 PLANNING ASSESSMENT

5.1 The application seeks permission for Installation of sports lighting to serve a block of three tennis courts and a separately enclosed single tennis court.

Background Information

5.2 The application is brought before Members of the Uplands Area Sub Committee after being called in by Cllr Cooper and Cllr Poskitt.

5.3 The site is located in a residential area of Woodstock and is surrounded on all side by residential dwellings. The site is also identified within the Woodstock Neighbourhood Plan (WNP) as a Designated Local Green Space.

5.4Taking into account planning policy, other material considerations and the representations of interested parties your officers are of the opinion that the key considerations of the application are:

- Impact on neighbouring amenity
- Impacts on Biodiversity

Principle

5.5 In October 2023 the Levelling-Up and Regeneration Act ("LURA") received royal ascent. The LURA replaces Section 38(6) of the Planning and Compulsory Purchase Act 2004 in favour of new Section 38(5A) - (5C) which states:

(5A) For the purposes of any area in England, subsections (5B) and (5C) apply if, for the purposes of any determination to be made under the planning Acts, regard is to be had to—

a) the development plan, and
b) any national development management policies.

(5B) Subject to subsections (5) and (5C), the determination must be made in accordance with the development plan and any national development management policies, unless material considerations strongly indicate otherwise.

(5C) If to any extent the development plan conflicts with a national development management policy, the conflict must be resolved in favour of the national development management policy.

5.6 The amended legislation gives statutory weight to 'national development management policies' (which do not form part of the development plan) and states that material considerations must 'strongly' outweigh the development plan and any national development management policies to warrant departure. Subsection 5C outlines that where the development plan conflicts with a national development management policy, national policy should take precedence.

5.7 In this case, the development plan is comprised of the West Oxfordshire Local Plan 2031 ('the WOLP') and Woodstock Neighbourhood Plan ('WNP').

5.8 Section 38ZA clarifies the meaning of "national development management policy" as:

(1) A "national development management policy" is a policy (however expressed) of the Secretary of State in relation to the development or use of land in England, or any part of England, which the Secretary of State by direction designates as a national development management policy.

5.9 At this time, no national development management policies have been adopted and as such, the application should be determined in accordance with the WOLP and CNP unless material considerations strongly indicate otherwise.

National Policy/Guidance

5.10 The National Planning Policy Framework ('NPPF') sets out the Government's planning policies and how these are expected to be applied. The NPPF advices that the purpose of the planning system is to contribute to the achievement of sustainable development and sets out that there are three dimensions to sustainable development: economic, social and environmental. In essence, the economic role should contribute to building a strong, responsive and competitive economy; the social role should support strong, vibrant and healthy communities; and the environmental role should contribute to protecting and enhancing the natural, built and historic environment. These roles should not be undertaken in isolation, because they are mutually dependant.

5.11 At the heart of the NPPF is a presumption in favour of sustainable development and paragraph 11 advices that for decision-making this means approving development proposals that accord with an up-to-date development plan without delay

The Development Plan

5.12 The Settlement hierarchy within the supporting text of OS2 identifies Woodstock as a Rural Service Centre.

5.13 Policy OS2 of the WOLP states that along with compliance with the general principles of development:
"Woodstock is suitable for a reasonable scale of development, whilst protecting its important historic character and the setting of Blenheim Palace, in order to deliver affordable housing, enhance local services and reinforce its role as a service centre."

5.14 Similarly Policy E5 of the WOLP seeks to support the development and retention of local services and community facilities to meet local needs and to promote social wellbeing, interests, interaction and healthy inclusive communities. Further, section 8 of the NPPF (Promoting healthy and safe communities) encourages social interaction and the enabling and support of healthy lifestyles. Paragraph 102 states:
Access to a network of high quality open spaces and opportunities for sport and physical activity is important for the health and well-being of communities, and can deliver wider benefits for nature and support efforts to address climate change.

5.15 As noted above, Woodstock Neighbourhood Plan also identifies this area as a Local Green Space within Policy WNDP1.
It states that *Vital green space near the heart of the town. It provides well-kept facilities and recreation for both young and old. It also act as a local social venue*" and it continues in paragraph 4.10 "*Such spaces are important for maintaining community well-being and should be protected.*"

5.16Whilst the introduction of sports lighting into the space is development, it is not in a form that diminishes or encroaches into the open space of the site. The lighting is considered to improve the facilities and would make them available in the darker months which is a benefit and enhancement to the local community.

5.17 Officers therefore consider the principle of development to be acceptable.

Impact on Neighbouring Amenity

5.18 The proposed lighting is to be situated on the existing fencing surrounding the tennis courts. This differs from the usual pole mounted flood lighting found in other places within the district.
The properties to the south east and south west of the site whose rear boundary adjoin the Tennis courts are considered to have the most impacts as a result of the proposal. The boundary treatments along the rear boundaries of the properties vary however are primarily mature tree's, hedges, bushes, fences or a combination of.

5.19 The individual light bars are 3.8m in length and are arranged in a line of eight bars each side of the single court and the block of three courts.

5.20 The light bars are affixed to the fence posts by means of brackets. The light bars are angled downwards to minimize observers' view of the lighting source. There are two high-ball lighting units on each side to enable players to view balls which are lobbed during play.
In regards to noise and light impacts, whilst officers agree that the introduction of lights around the court will make them more visible within the winter months to the surrounding properties, it is not to such a degree that it will negatively impact on the residential amenity of these dwellings. Also given that the courts already exist, and the number is remaining consistent the level of use (and noise associated with said use) will remain steady albeit all year round as opposed to only during the lighter summer months.

5.21 Environmental Health Officers were also consulted as part of the application process and have raised no objection subject to a time restriction condition.

5.22 In regards to parking at the site, the size and number of the courts is not changing therefore the demand for parking remains unchanged. There are a certain number of players at a time that can be

accommodated in the playing area and whilst the introduction of lights increases the amount of time throughout the year that the courts can be used the level of parking remains consistent.
In addition given the sites sustainable location within the Town of Woodstock there are plenty of opportunities to walk or cycle to the site.

5.23 County Highways raise no objection to the proposal.

5.24 Officers therefore consider the proposed lighting is acceptable in this regard.

Biodiversity

5.25 The site is surrounded by mature tree lines and hedgerows which have potential for specifically Bat and Bird use which could be disrupted by the use of lighting. Following consultation with the Biodiversity Officer additional information was submitted to address the concerns raised. It has subsequently been concluded that subject to condition the application is acceptable.

Conclusion

5.26 In light of this assessment, this proposal is considered acceptable and in accordance with policies OS2, OS4, E5 and T4 of the adopted Local Plan 2031, relevant sections of the Woodstock Neighbourhood Plan and the NPPF and West Oxfordshire Design Guide 2016.

6 CONDITIONS

1. The development hereby permitted shall be begun before the expiration of three years from the date of this permission.

REASON: To comply with the requirements of Section 91 of the Town & Country Planning Act 1990 as amended by Section 51 of the Planning and Compulsory Purchase Act, 2004.

2. That the development be carried out in accordance with the approved plans and submitted lighting details listed below.

REASON: For the avoidance of doubt as to what is permitted.

3. The development shall be completed in accordance with the recommendations in Section 5.1, 5.2 and 5.4 of the consultancy report (Bat Emergency Survey Rev A, ASW Ecology Ltd, October 2023) and lighting plans (Overspill Drawing No. 005, E.T.C. Sports Surfaces, 29th April 2023; Double Tweener Data Pack, May 2023 and Single Tweener Data Pack, May 2023). All the recommendations shall be implemented in full, according to the timescales laid out in the recommendations, unless otherwise agreed in writing by the Local Planning Authority, and thereafter permanently retained.

REASON: To ensure that bats and nesting birds are protected in accordance with The Conservation of Habitats and Species Regulations 2017 (as amended), the Wildlife and Countryside Act 1981 (as amended), Circular 06/2005, paragraphs 180, 185 and 186 of the National Planning Policy Framework, Policy EH3 of the West Oxfordshire District Local Plan 2011-2031, and in order for the Council to comply with Part 3 of the Natural Environment and Rural Communities Act 2006.

4. Before development takes place, details of the provision of externally mounted roosting opportunities for bats (five bat boxes affixed to suitably mature trees on site, positioned no lower than 6m above ground level on south/south-westerly and north/north westerly aspects to create a variety of microclimates) shall be submitted to the local planning authority for approval. The details shall include a drawing showing the types of features, their locations within the site and their positions on the elevations of the building, and a timetable for their provision. The approved details shall be implemented before the development hereby approved is first brought into use and thereafter permanently retained.

REASON: To provide additional habitat for roosting bats as a biodiversity enhancement, in accordance with paragraphs 180, 185 and 186 of the National Planning Policy Framework, Policy EH3 of the West Oxfordshire District Local Plan 2011-2031, and Section 40 of the Natural Environment and Rural Communities Act 2006.

5. The sports lighting hereby permitted shall only be illuminated in the months January to March and September to December until a time of 2130 hrs and turned off when not in use. The lighting must not be used in the months April to August.

REASON: To safeguard living conditions in nearby properties and to ensure that bats and nesting birds are protected in accordance with The Conservation of Habitats and Species Regulations 2017 (as amended), the Wildlife and Countryside Act 1981 (as amended), Circular 06/2005, paragraphs 180, 185 and 186 of the National Planning Policy Framework, Policy EH3 of the West Oxfordshire District Local Plan 2011-2031, and in order for the Council to comply with Part 3 of the Natural Environment and Rural Communities Act 2006.

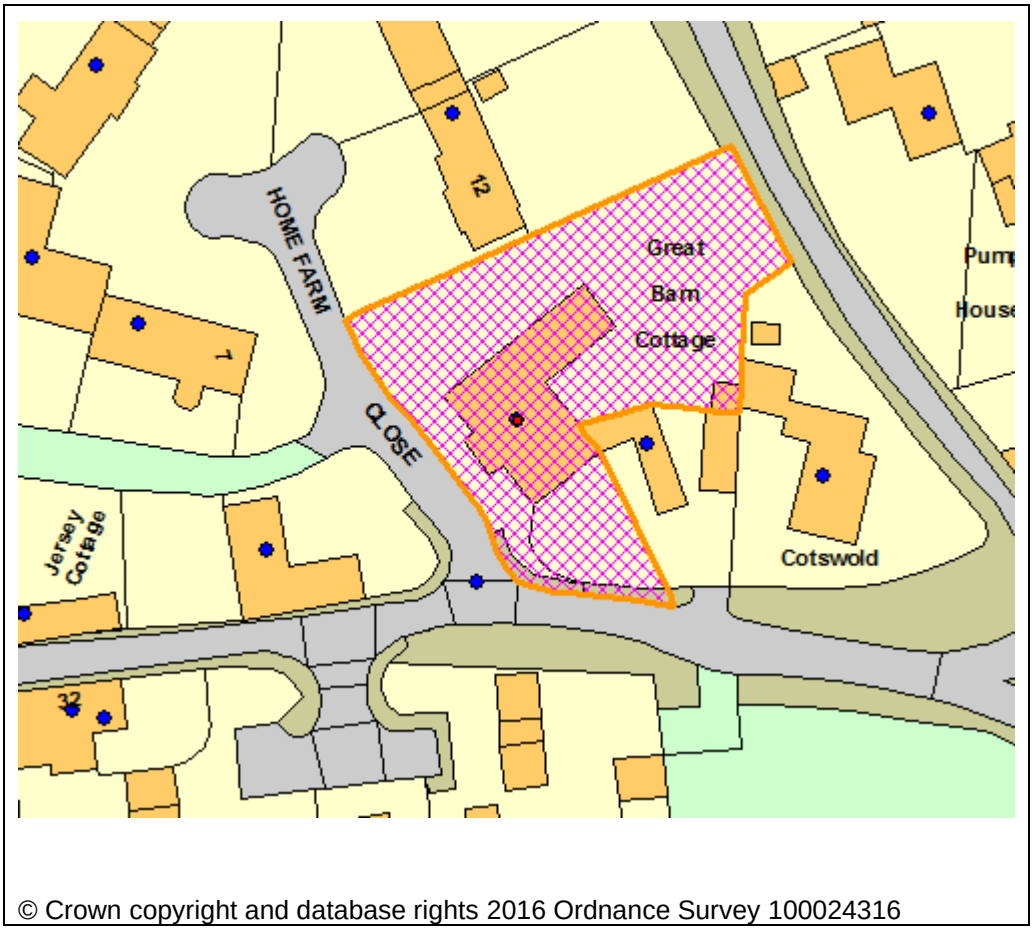
Notes to the applicant

1. If a protected species (such as any bat, great crested newt, dormouse, badger, reptile, barn owl or any nesting bird) is discovered using a feature on site that would be affected by the development or related works all activity which might affect the species at the locality should cease. If the discovery can be dealt with satisfactorily by the implementation of biodiversity mitigation measures that have already been drawn up by your ecological advisor and approved by the Local Planning Authority then these should be implemented. Otherwise a suitably experienced ecologist should be contacted and the situation assessed before works can proceed. This action is necessary to avoid possible prosecution and ensure compliance with the Wildlife & Countryside Act 1981 (as amended), the Conservation of Habitats and Species Regulations 2017 (as amended), the Protection of Badgers Act 1992 and the Wild Mammals Act 1996. This advice note should be passed on to any persons or contractors carrying out the development/works.

Contact Officer: Sarah Hegerty
Telephone Number: 01993 861713
Date: 31st January 2024

Application Number	23/02188/LBC
Site Address	The Great Barn 14 Home Farm Close Shipton Under Wychwood Chipping Norton Oxfordshire OX7 6EH
Date	31st January 2024
Officer	Tara Hayek
Officer Recommendations	Refuse
Parish	Shipton Under Wychwood Parish Council
Grid Reference	428011 E 217412 N
Committee Date	12th February 2024

Location Map



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Application Details:
Internal and external alterations to replace all casement windows, the dining room door and lounge double door with flush heritage casement windows and doors

Applicant Details:
Mr N Bowman
The Great Barn
14 Home Farm Close
Shipton Under Wychwood
Chipping Norton
Oxfordshire
OX7 6EH

1 CONSULTATIONS

Parish Council	The application is for the replacement of rotting frames with replacements identical to a neighbour. Shipton under Wychwood Parish Council has no objection to this.

2 REPRESENTATIONS

2.1 No third party representataions have been received in respect of this application.

3 APPLICANT'S CASE

3.1 The Design and Heritage Statement is summarised as follows:

The Grade 2 listed building is a barn about 80 yards north east of Home Farmhouse, Plum Lane, Shipton under Wychwood. The barn is in Home Farm Close which is a development of 7 houses built in the 1980's plus the barn which was converted to residential use at that time. All the houses (including the barn) have the same type of window which were installed when the properties were built or have windows which have been upgraded to the type proposed.

The design principle applied is that the windows should be exactly as approved when the property was converted but give the best environmental benefit to the property and therefore have the least environmental impact long term.

The barn was obviously built for agricultural purposes originally and did not have windows and so it is not possible to say how the new windows (or the existing windows) take into account the historic importance of the building. There is to be no significant change to the existing windows and so the works will not have any significant impact on the character of the building.

4 PLANNING POLICIES

EH10 Conservation Areas
DESGUI West Oxfordshire Design Guide
EH11 Listed Buildings
The National Planning Policy framework (NPPF) is also a material planning consideration.

5 PLANNING ASSESSMENT

Background Information

5.1 The application seeks listed building consent for internal and external alterations to replace all casement windows, the dining room door and lounge double door with flush uPVC casement windows and doors at the Great Barn, Home Farm Close, Shipton Under Wychwood.

5.2 The site is a Grade II listed building within the Shipton Under Wychwood Conservation Area.

5.3 The application is before the Sub-Committee as the Parish Councils comments are in opposition to the case officers recommendation.

5.4 Planning History:

An application to convert the barn was approved in 1988.

19/02967/PREAPP - Remove and replace front screen (window/door). The councils response was as follows:
"Having had the opportunity to assess your application I can confirm that Listed Building Consent would be required. In regard to principle, the replacement of the windows with oak panels could be supported however, the removal of these windows would have an impact on the light available to the property. Furthermore, I would suggest that the door is relocated so that it is coordinated with the existing studs.

21/00038/PREAPP - To replace front screen, window and door in oak. The councils response was as follows:
This joinery is relatively recent and relates to the conversion. The existing joinery to the windows isn't ideal - there are unbalanced storm casements - so this may offer an opportunity for betterment. The proposals for the main screen are OK, but I can't find anything on the other windows. They need to tell us exactly what the new joinery for the windows will be, including elevations and sectional details, and they need to supply good clear photos of each element they are changing.

21/00823/LBC: A subsequent application was approved for Internal and external alterations to replace front screen of property including installation of new front door in oak.

5.5 Taking into account planning policy, other material considerations and the representations of interested parties your officers are of the opinion that the key considerations of the application are:

- Impact on the Heritage Asset

Impact on the Heritage Asset

5.6 Great Barn is a grade II listed Cotswold barn dating Late C18: list-entry-1284319. *The barn is about 80 yards north-east of Home Farmhouse. Rubble with Cotswold stone roof. Projecting gabled entry with flanking catslide sections; cambered lintel to entry. Five bays, tie beam and collar roof, butt and part-trenched purlins. Triangular vents in east gable.* The Local Planning Authority is therefore statutorily required to have special regard to the desirability of preserving the building, its setting, and any features of special architectural or historic interest it may possess, in accordance with Section 66 of the Planning (Listed Building and Conservation Areas) Act 1990.

5.7 Section 16 of the National Planning Policy Framework (NPPF) states that in determining applications, local planning authorities should take account of the desirability of sustaining or enhancing the significance of heritage assets. In particular, paragraph 205 states that when considering the impact of a proposed development on the significance of a designated heritage asset - such as a Listed Building, or Conservation Area - great weight should be given to the asset's conservation (and the more important the asset, the greater the weight should be). Any harm to, or loss of, the significance of a designated heritage asset (from its alteration or destruction, or from development within its setting), should require clear and convincing justification (paragraph 206). Paragraph 208 states that where a development proposal will lead to less than substantial harm to the significance of a designated heritage asset, this harm should be weighed against the public benefits of the proposal, where appropriate, securing its optimal viable use.

5.8 There is no heritage statement with this application assessing the impact of the proposal on the significance of the listed building. Under Para 200. of the NPPF it states 'that in determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where necessary.'

5.9 Notwithstanding, the Barn has been identified as having historic (illustrative and evidential) and architectural significance.

5.10 In previous pre-application discussions the applicant has proposed oak windows/doors. And, in 2021 listed building consent application was approved for new oak doors to the replace the front screen.

5.11 The current application proposes a different material: uPVC, as opposed to oak.

5.12 While your officers note that the 1980s window are in a poor condition and the double-glazing has blown, and replacement would be acceptable, the proposed replacement to uPVC windows are not considered to be appropriate for this listed building.

5.13 The proposal would add modern plastic window frames to a historic 18th century barn. In advice from most of the up-to-date heritage guidance (some of which is mentioned below), when undertaking barn conversions, especially listed building - it specifies that timber or metal windows should be used; these materials are more traditional and were available in the 18th century and are much more compatible and sustainable than plastic windows.

5.14 In this case, the proposal to replace the current windows with uPVC is insupportable because it would harm not preserve the character and significance (that consists of historic (illustrative and evidential) and architectural significance) of this listed building.

5.15 Furthermore, another factor which is now gathering momentum in today's climate crisis is the use of sustainable materials - especially where it relates to the longevity of our listed buildings. And, therefore, as well as conservation issues relating to character and significance of heritage assets, we now find ourselves determining proposals based on their sustainability and lifetime of materials.

5.16 Overall, timber is a preferable option. Timber is known for its strength and durability when it's in use- and even though it requires a little more time and effort to keep it in good condition, it will still last a long time and has an inherent warmth that makes it great for insulation purposes. It is also not only highly renewable and sustainable, but also incredibly recyclable. There are no harmful substances or toxic chemicals released into the environment when recycling timber and it is a lot easier to work with than uPVC.

5.17 Our Design Guidance for Greener Traditional Buildings states:

The form and appearance of uPVC windows is seldom appropriate for traditional buildings, and never appropriate for Listed Buildings. In addition to aesthetic considerations, uPVC windows utilise considerable energy in their manufacture; and whilst they require minimal initial maintenance, when they do degrade they usually cannot be repaired, and must be scrapped. In contrast, well-designed traditional windows, made with timber from sustainable sources, have a virtually unlimited life if properly maintained. Even if an ideal re-decoration schedule is not maintained, as a last resort it is always possible to piece in a new sill, an individual frame or even a whole sash or casement without discarding the whole window.

5.18 The Council's Design Guidance for the Conversion of Agricultural Buildings under the section for material states:

Materials:

- Existing traditional materials should be retained and re-used;
- Artificial slates and tiles, reconstituted stone, concrete, aluminium and plastic should not generally be used.

5.19 The Council's Design Guidance for Windows and Doors states:

Traditional window designs are fundamental to the character of local buildings. Wood is the traditional material for windows. Modern substitutes, such as uPVC and aluminium do not look the same and have poor environmental consequences. European hardwoods, such as oak and elm, were usually left to weather naturally; while softwoods such as pine (popular in the C19 and C20) were traditionally painted. Timber stains and varnishes are modern introductions and are not traditional finishes for period joinery.

5.20 As a general principle, where double-glazing is deemed acceptable, the closer the double-glazed window accords visually with a traditional single glazed window, the better:

- The window should be of timber, the joinery detailed to match traditional window types;
- The double-glazing should be as thin as possible (c.12mm or less) ideally with black spacer bars between the sheets of glass;
- The window should have properly detailed glazing bars (with the glazing bars framing up the individual panes of glass, rather than sandwiching unbroken sheets of glazing, or being sandwiched between unbroken sheets of glazing).

5.21 Historic England's guidance on 'Traditional Windows and Doors' has a section on why plastic (PVC-u) windows are unsuitable which is consistent with your officers advice above.

Conclusion

5.22 In general, a good quality well maintained timber window could last for c.150 years or more compared to the 30-40 years lifespan of a uPVC. This is proven in our historic window (casements and sashes) all across the District. We are now seeing many applications for the replacement of modern plastic double glazing windows only 20, 30 or 40 years after their first installations.

5.23 We have a duty to preserve the character, integrity and significance of our listed buildings and ensure their longevity. Therefore, we need to ensure that their fabric and materials are also durable, and that the replacement materials uphold the character, integrity and significance into the future. Therefore, we need to ensure that the materials that we replace are traditional, appropriate, compatible and have a long a life as possible.

5.24 Overall, the proposed works would have a negative impact on heritage significance; replacing the current windows with uPVC would not preserve the character, integrity and significance (that consists of historic (illustrative and evidential) and architectural significance) of this listed building.

5.25 The proposal would be considered to have a high level of less than substantial harm to this listed building and it is not considered to be a heritage (public) benefit [it is a private benefit] and the listed building's optimum viable use is not at risk and not dependent on this proposal.

5.26 Therefore, the works proposed would not preserve the essential special architectural and historic interest of the listed building in accordance with Section 16(2) of the 1990 Act. The significance of the designated heritage asset would not be sustained, in accordance with Section 16 of the NPPF.

5.27 Further, as the Barn in within Shipton Under Wychwood Conservation Area, and the proposed changes are considered to have a deleterious impact on the appearance of the Conservation Area and would not uphold the special qualities and historic context of the Conservation Area in accordance with section 72(1) of the Planning (Listed Buildings and Conservation Areas) Act 1990 and Section 16 of the NPPF.

5.28 The proposal is contrary to legislation, NPPF Section 16, LP policies EH9, EH10, EH11 and WODC Design guidance and is recommended for refusal.

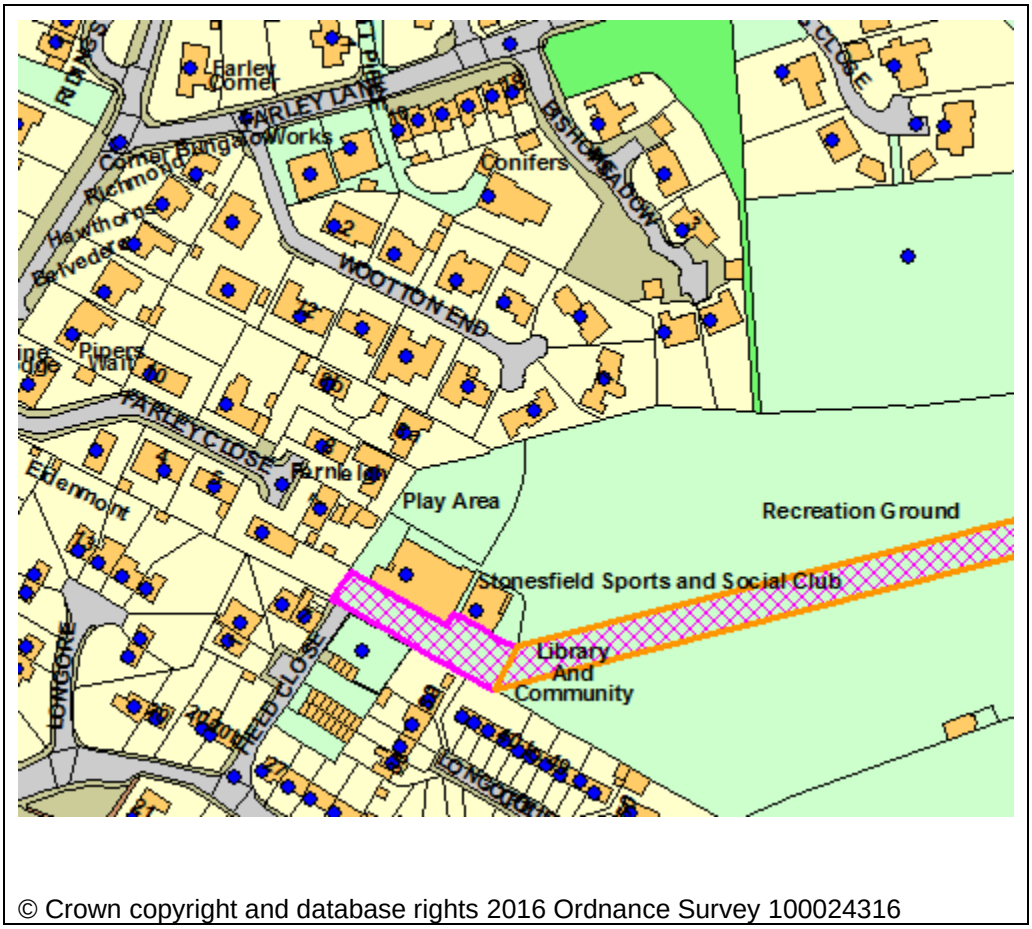
6 REASONS FOR REFUSAL

1. The proposed replacement windows, by reason of their uPVC material, would fail to preserve the character, integrity and significance (that consists of historic (illustrative and evidential) and architectural significance) of the heritage asset. Further, the proposed changes are considered to have a deleterious impact on the appearance of the Conservation Area and would not uphold the special qualities and historic context of the Conservation Area. The proposal is considered to have a high level of less than substantial harm to the heritage assets and there are no heritage or wider public benefits [it is a private benefit] and the listed building's optimum viable use is not at risk and not dependent on this proposal. The development is therefore contrary to the provisions of sections 16(2) and 72(1) of the Planning (Listed Buildings and Conservation Areas) Act 1990, Section 16 of the NPPF, policies EH9, EH10, EH11 of the West Oxfordshire Local Plan 2031 and the WODC Design Guide.

Contact Officer: Tara Hayek
Telephone Number: 01993 861666
Date: 31st January 2024

Application Number	23/02653/FUL
Site Address	Stonesfield Sports And Social Club Field Close Stonesfield Witney Oxfordshire OX29 8EF
Date	31st January 2024
Officer	James Nelson
Officer Recommendations	Approve
Parish	Stonesfield Parish Council
Grid Reference	439542 E 217582 N
Committee Date	12th February 2024

Location Map



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Application Details:
Erection of 6 no. lighting columns with 6 no. floodlighting illuminaires with associated works.

Applicant Details:
Mr Tacon
Field Close
Stonesfield
Oxfordshire
OX29 8HA

1 CONSULTATIONS

Env Health Noise And Amenity	No objection.
Sport England South East	Sport England raises no objection to the application because it is considered to accord with exception 2 of our Playing Fields Policy and paragraph 99 of the NPPF.
WODC - Sports	No objection.
Parish Council	No Comment Received.
District Ecologist	In terms of impacts to biodiversity, as there are currently floodlights that will be illuminating areas of hedgerow and treelines surrounding the courts, it is felt that in this instance, the use of new floodlights would not result in any adverse impacts on nocturnal wildlife using the site, and I therefore have no further comments to make.

2 REPRESENTATIONS

2.1 Five third party comments have been received, four in support of the scheme and one, albeit nuanced, objection.

2.2 The support comments make the following points:

- Increase the availability of local sports facility/promote active lifestyle;
- Allow working people to use the courts year-round; and
- Minimal light spill/impacts on landscape/ecology

2.3 The objection comment expresses support for the principle of development but raises concerns relating to the impact on dark skies and biodiversity. The comment recommends reducing the colour temperature from 4000K to 2700K and restricting the operating hours to 8pm as opposed to 10pm.

3 APPLICANTS CASE

3.1 The applicant has submitted a Design and Access Statement in support of their case, the key points of which are summarised below.

3.2 'The existing facility comprises 2no tennis courts owned and operated by Stonesfield Tennis Club and an adjacent multi-use games area (MUGA) owned and operated Stonesfield Playing Field Association CIO the freehold owners of the entire playing field.

3.3 This application seeks permission for new floodlighting for two tennis courts. The proposed lighting system features 8 metre high lighting columns, to allowing the aiming angles of the Luminaires to remain as low as possible. This creates a far more pleasant playing experience for the end user, is compliant to LTA lighting criteria, whilst minimising Light spill to the surrounding area.

3.4 The state of the art Philips Internal Integral Louvre technology has been implemented into the Lighting design to ensure the lighting cut off is at maximum effect. The submission includes some information, including photos of similar installations to demonstrate the control of light spillage possible.

3.5 The lighting impact report submitted with this application goes into more detail on this matter. The proposed floodlighting columns are to be galvanised steel. Details of the columns are provided with this submission, together with details of the Floodlighting fixtures. The size of the club with approx. 40 adult members and 50 families means the Lawn Tennis Association have recommended that the courts are floodlit. Currently from mid-September to end of March the courts are only usable in the day. Members with full time jobs are therefore only able to use the facilities at the weekend. Lights will significantly increase the availability of the courts for members during the Winter months.

3.6 The floodlights are proposed to be used on weeknight and weekend evenings when required from dusk until 10pm and in winter month mornings from 7am when required.

3.7 The replacement flood lighting will assist in the accessibility of the site in terms of a significant improvement in the functionality of the facility. This will benefit players and spectators and the visually impaired as well as the able-bodied. The system has a safe egress feature in which a single fitting stays on for an extra 5 minutes so that the courts can be safely exited in the dark.

3.8 The proposed lighting is discretely located and has been designed to minimise its impact. The lighting design has been carefully considered to avoid obtrusive light spillage. As such the means of lighting is appropriate, unobtrusively located and does not result in excessive levels of light. The lighting will not have a detrimental impact on the local amenity, character of the settlement or wider countryside.'

4 PLANNING POLICIES

OS1NEW Presumption in favour of sustainable development
OS2NEW Locating development in the right places
OS4NEW High quality design
E5NEW Local services and community facilities
EH1 Cotswolds AONB
EH3 Biodiversity and Geodiversity
EH8 Environmental protection
DESGUI West Oxfordshire Design Guide
The National Planning Policy framework (NPPF) is also a material planning consideration.

5 PLANNING ASSESSMENT

Background

5.1 This application seeks consent for the erection of 6 no. lighting columns with 6 no. floodlighting luminaires with associated works at Stonesfield Sports and Social Club, Field Close, Stonesfield.

5.2 The application site comprises the western two of three existing hard surfaced tennis courts at Stonesfield Sports and Social Club as well as associated access and parking, which would be unaffected by the proposal. The courts lie in the eastern portion of the recreation ground and are partially enclosed by a bund and planting.

5.3 The application site lies within the Cotswolds National Landscape ('CNL').

5.4 The application is brought before Members due to the height of the proposed floodlight masts (8 metres).

Relevant Planning History

W81/0466- Construction of 2 hard tennis courts and netting surround.
W96/0202- Construct extension to existing tennis courts to form third court with chain link fence.

Development Plan

5.5 In October 2023 the Levelling-Up and Regeneration Act ("LURA") received royal ascent. The LURA replaces Section 38(6) of the Planning and Compulsory Purchase Act 2004 in favour of new Section 38(5A) - (5C) which states:

(5A) For the purposes of any area in England, subsections (5B) and (5C) apply if, for the purposes of any determination to be made under the planning Acts, regard is to be had to—

a) the development plan, and
b) any national development management policies.

(5B) Subject to subsections (5) and (5C), the determination must be made in accordance with the development plan and any national development management policies, unless material considerations strongly indicate otherwise.

(5C) If to any extent the development plan conflicts with a national development management policy, the conflict must be resolved in favour of the national development management policy.

5.6 The amended legislation gives statutory weight to 'national development management policies' (which do not form part of the development plan) and states that material considerations must 'strongly' outweigh the development plan and any national development management policies to warrant departure. Subsection 5C outlines that where the development plan conflicts with a national development management policy, national policy should take precedence.

5.7 In this case, the development plan is the West Oxfordshire Local Plan 2031 ('the WOLP').

5.8 Section 38ZA clarifies the meaning of "national development management policy" as:

(1) A "national development management policy" is a policy (however expressed) of the Secretary of State in relation to the development or use of land in England, or any part of England, which the Secretary of State by direction designates as a national development management policy.

5.9 At this time, no national development management policies have been adopted and as such, the application should be determined in accordance with the WOLP unless material considerations strongly indicate otherwise.

5.10 Given the nature of the proposal, officers consider that the WOLP polices identified in Section 4 of this report are most relevant in this case.

National Policy/Guidance

5.11 The National Planning Policy Framework ('NPPF') sets out the Government's planning policies and how these are expected to be applied. The NPPF advices that the purpose of the planning system is to contribute to the achievement of sustainable development and sets out that there are three dimensions to sustainable development: economic, social and environmental. In essence, the economic role should contribute to building a strong, responsive and competitive economy; the social role should support strong, vibrant and healthy communities; and the environmental role should contribute to protecting and enhancing the natural, built and historic environment. These roles should not be undertaken in isolation, because they are mutually dependant.

5.12 At the heart of the NPPF is a presumption in favour of sustainable development and paragraph 11 advices that for decision-making this means approving development proposals that accord with an up-to-date development plan without delay.

5.13 Section 8 of the NPPF relates to 'promoting healthy and safe communities' and outlines at paragraph 96 that:

'Planning policies and decisions should aim to achieve healthy, inclusive and safe places and beautiful buildings which:

c) enable and support healthy lifestyles, especially where this would address identified local health and well-being needs - for example through the provision of safe and accessible green infrastructure, sports facilities, local shops, access to healthier food, allotments and layouts that encourage walking and cycling.'

5.14 The NPPF continues at paragraph 97 that:

'To provide the social, recreational and cultural facilities and services the community needs, planning policies and decisions should:

a) plan positively for the provision and use of shared spaces, community facilities (such as local shops, meeting places, sports venues, open space, cultural buildings, public houses and places of worship) and other local services to enhance the sustainability of communities and residential environments;

b) take into account and support the delivery of local strategies to improve health, social and cultural well-being for all sections of the community;

c) guard against the unnecessary loss of valued facilities and services, particularly where this would reduce the community's ability to meet its day-to-day needs;

d) ensure that established shops, facilities and services are able to develop and modernise, and are retained for the benefit of the community'.

5.15 Paragraph 102 outlines that: 'access to a network of high quality open spaces and opportunities for sport and physical activity is important for the health and well-being of communities', paragraph 103 seeks to resists the loss of open space, sports and recreational buildings and land.

5.16 Section 15 (conserving and enhancing the natural environment) is also directly relevant in this case. Paragraph 180 outlines that 'planning policies and decisions should contribute to and enhance the natural and local environment', with paragraph 182 stating:

'Great weight should be given to conserving and enhancing landscape and scenic beauty in National Parks, the Broads and Areas of Outstanding Natural Beauty which have the highest status of protection in relation to these issues'.

5.17 Taking into account planning policy, history, other material considerations and the representations of interested parties your officers are of the opinion that the key considerations for the application are:

- Principle of development;
- Landscape and Visual Impact;
- Ecology

5.18 Each will be considered in the following sections of this report.

Principle of development

5.19 WOLP Policy OS2 sets out the general spatial strategy in the District and identifies a hierarchy of settlements for new development, which seeks to steer a significant proportion of future development in the 'main service centres' of Witney, Carterton and Chipping Norton. It takes a hierarchical approach as set out in table 4b, which categories Stonesfield as a 'village' which:

'Are suitable for limited development which respects the village character and local distinctiveness and would help to maintain the vitality of these communities.'

5.20 All applications are expected to comply with the general principles of OS2 notable in this case are that development should:

- As far as is reasonably possible protect or enhance the local landscape and the setting of the settlement/s;
- Be provided with safe vehicular access and safe and convenient pedestrian access to supporting services and facilities;
- Conserve and enhance the natural, historic and built environment; and
- In the AONB, give great weight to conserving landscape and scenic beauty.

5.21 Policy E5 states:

'The Council will support the development and retention of local services and community facilities to meet local needs and to promote social wellbeing, interests, interaction and healthy inclusive communities.'

5.22 The supporting text to Policy E5 confirms that outdoor sports and leisure facilities should be regarded as 'essential local services' (paragraph 6.65).

5.23 The proposal would enable year-round use of the existing courts, which officers consider would represent the development of a local service in accordance with Policy E5. Officers therefore consider that the provision of floodlighting to support the established use of the site as a sports club adjacent to the village would represent limited development to help maintain the vitality of village services subject to the consideration of landscape/visual and ecological impacts of the scheme against the WOLP and relevant material considerations.

Landscape and Visual Impact

5.24 The site is located within the CNL, which is of national importance for its landscape and scenic beauty. Section 85 of the Countryside and Rights of Way (CROW) Act 2000 states that relevant authorities have a statutory duty to conserve and enhance the natural beauty of the AONB. The impact of the application against WOLP Policy EH1 and NPPF paragraph 182 must also be considered. Policy EH1 reads:

"In determining development proposals within the Cotswolds Area of Outstanding Natural Beauty (AONB) and proposals which would affect its setting, great weight will be given to conserving and enhancing the areas natural beauty, landscape and countryside, including its wildlife and heritage. This will include consideration of any harm to the contribution that the settlement makes to the scenic beauty of the AONB".

5.25 The CNL Management Plan 2023-2025 ('the MP') recognises that 'light pollution' of the night sky is an intrusion into the countryside at night, which can have harmful effects on the health of people and wildlife. Policy CE5 of the MP states that 'proposals that are likely to impact on the dark skies of the Cotswolds National Landscape should have regard to these dark skies, by seeking to avoid and where avoiding is not possible, minimise light pollution... proposals that are likely to impact on the dark skies of the CNL should have regard to recognised standards and guidance, in particular, that published by the Institution of Lighting Professionals and the Commission for Dark Skies.'

5.26 In addition, Policy OS4 is relevant and outlines that:

'High design quality is central to the strategy for West Oxfordshire. New development should respect the historic, architectural and landscape character of the locality'.

5.27 WOLP Policy EH8 (environmental protection) must also be considered with regard to the proposed floodlighting, it sets out in relation to artificial light:

'The installation of external lighting and lighting proposals for new buildings, particularly those in remote rural locations, will only be permitted where:

- the means of lighting is appropriate, unobtrusively sited and would not result in excessive levels of light;
- the elevations of buildings, particularly roofs, are designed to limit light spill;
- the proposal would not have a detrimental effect on local amenity, character of a settlement or wider countryside, intrinsically dark landscapes or nature conservation.'

5.28 The application site is located at the eastern end of the wider recreation ground and is bounded on three sides (north, east and west) by bunding and mature screening vegetation, with a further strong belt of planting running to the south and east of the site. To the north of the site lies 'North Farm', a farm complex comprising large farmhouse, yard and agricultural buildings, with the built up area of the village lying to the north west, west and south west. To the east of the site lies open countryside. Approximately 40m south of the courts (but within the wider recreation ground) a 15m telecoms pole is sited.

5.29 The proposed floodlighting comprises six steel columns of 8m in height, positioned to illuminate two of the three existing tennis courts. The height of the columns as well as use of an integrated louvre system has been designed to allow the aiming angles of the Luminaires to remain as low as possible, thereby reducing light spill outside of the courts. This has been illustrated in the submitted light spill plans as well as lighting design report submitted with the application, which demonstrates a sharp drop in illumination beyond the bounds of the courts. The application also indicates that the proposed lighting scheme has been designed to meet the minimum requirements of the Lawn Tennis Association with regard to light levels.

5.30 Therefore, officers consider that the proposed design has demonstrated that appropriate measures would be undertaken to ensure that light spillage as a result of the installation would be kept to a minimum through their proposed height, direction of illumination and use of louvres to restrict spill. Whilst the proposal would lead to the introduction of additional artificial light in the area and therefore result in a localised adverse impact upon landscape character, the floodlights would be contained within a relatively strong landscape structure provided by existing landscaping and owing to the topography of the area, would not be prominent in long views. Therefore, subject to the restrictive conditions set out in Section 6 of this report, officers are satisfied that the application has demonstrated that landscape and visual effects have been minimised as a result of the siting and design of the proposals and would not adversely affect the setting of the settlement. The proposal is therefore considered to have minimised light pollution in accordance with MP Policy CE5, WOLP Policies OS4, EH1 and EH8.

Ecological Impact

5.31 Policy EH3 relates to biodiversity and geodiversity and states:

'The biodiversity of West Oxfordshire shall be protected and enhanced to achieve an overall net gain in biodiversity and minimise impacts on geodiversity'.

5.32 The application has been subject to consultation with the Local Planning Authority's Biodiversity Officer. Whilst the application site does not contain any existing lighting, correspondence with the applicant indicates that the wider recreation ground has been served by floodlighting serving the adjacent football ground for up to 30 years and as a result, the Biodiversity Officer has indicated that areas of hedgerow and treelines surrounding the courts would have been previously illuminated by artificial lighting and as such, the application would not result in any adverse impacts on nocturnal wildlife using the site. As a result, a neutral biodiversity impact is identified.

Planning Balance and Recommendation

5.33 The application would result in a material improvement to the accessibility and availability of recreation facilities in the village, in accordance with WOLP Polices OS2 and E5 as well as Section 8 of the NPPF. The existing club is comprised of around 40 adult members with 50 family memberships

and the representations of interested parties indicates that during winter months, the facility is not available for many working members, other than on weekends, due to light conditions. The proposal would therefore materially improve the provision of local services and facilities within the village, which officers consider should weight strongly in favour of the application given the local and national policy provisions as set out above. In addition, officers are satisfied that the location, design and existing screening of the proposed floodlighting would ensure that the increase in artificial lighting would be well contained to the application site, which clearly displays the characteristics of a sports facility. In light of this assessment, the proposal is considered to accord with West Oxfordshire Local Plan 2031 Policies OS1, OS2, OS4, E5, EH1, EH3 and EH8 and the NPPF 2023. The application is therefore recommended for conditional approval subject to the conditions as set out in the following section of this report.

6 CONDITIONS

1. The development hereby permitted shall be begun before the expiration of three years from the date of this permission.

REASON: To comply with the requirements of Section 91 of the Town & Country Planning Act 1990 as amended by Section 51 of the Planning and Compulsory Purchase Act, 2004.

2. That the development be carried out in accordance with the approved plans listed below.

REASON: For the avoidance of doubt as to what is permitted.

3. The floodlights hereby permitted shall not be used outside the following times: 0700 hours to 2200 hours Monday to Saturday and 0800 hours to 2100 hours on Sundays.

REASON: In order to protect local landscape character and prevent unnecessary electricity usage.

4. The floodlights hereby approved shall not have an intensity greater than indicated on Plan No. STC S1 as submitted with the application at any time.

REASON: In order to protect local landscape character.

5. The floodlights hereby approved shall not be used until they have been painted or otherwise finished externally in a colour and finish that has been agreed in writing by the LPA.

REASON: In order to protect local landscape character.

6. The floodlights hereby approved shall not be used until they have been fitted with a system to ensure that they are automatically switched off if there has been no use of the tennis court they primarily light for a period of ten minutes or more.

REASON: In order to protect local landscape character.

Contact Officer: James Nelson
Telephone Number: 01993 861712
Date: 31st January 2024

WEST OXFORDSHIRE DISTRICT COUNCIL	**WEST OXFORDSHIRE DISTRICT COUNCIL**
Name and date of Committee	**UPLANDS AREA PLANNING SUB-COMMITTEE – MONDAY 12 FEBRUARY 2024.**
Subject	**OUTLINE PLANNING APPLICATION 23/01504/OUT**
Wards affected	Ascott and Shipton
Accountable member	Cllr Julian Cooper, Chair of Uplands Area Planning Sub-Committee Email: julian.cooper@westoxon.gov.uk
Report Author	Joan Desmond, Principal Planner (Development Management) Email: democratic.services@westoxon.gov.uk
Purpose	To consider the additional technical note submitted on Flood Risk & Drainage and to confirm whether refusal reason 3 on flood risk attached to application 23/01504/OUT should still be pursued at the forth coming Appeal Inquiry.
Annexes	Annex A - TECHNICAL NOTE: FLOOD RISK & DRAINAGE
Recommendation(s)	That the Sub-Committee resolves to: 1. Agree not to pursue refusal reason 3 on flood risk grounds at the Appeal Inquiry.
Corporate priorities	N/A
Key Decision	N/A
Exempt	NO
Consultees/ Consultation	Shared Lead Flood Risk Management Officer, Development Management

1. EXECUTIVE SUMMARY

1.1 Outline planning permission for the development of up to 40 residential dwellings was refused in August 2023 (Ref: 23/01504/OUT). The application was refused on 4 grounds including an additional reason (3) imposed by Members on flood risk grounds.

1.2 An appeal has been lodged against the refusal and is subject of a Public Inquiry commencing in February 2024 (Appeal reference APP/D3125/W/23/333208). The appellant has indicated that they will be seeking a partial application for costs at the Appeal Inquiry as it is considered that this matter could be addressed by condition.

1.3 In seeking to avoid the partial application for costs, the appellant has submitted a Technical Note on Flood Risk and Drainage which provides further information in relation to groundwater flood risk and surface water drainage.

1.4 The Council's Shared Lead Flood Risk Management Officer has considered the Technical Note and has indicated that drainage matters could be resolved via condition.

2. BACKGROUND

2.1 Members may recall that outline planning permission with all matters reserved (except for access) for the development of up to 40 residential dwellings (C3 use), including 50% affordable housing, with vehicular access from London Lane. Provision of associated public open space, alongside landscaping, drainage infrastructure, and associated works was refused at the meeting of the Uplands Area Planning Sub-Committee in August 2023 (Ref: 23/01504/OUT).

2.2 The application was refused on 4 grounds including an additional reason (3) imposed by Members based on flood risk grounds. Refusal reason 3 states as follows:

2.3 'The proposed development would fail to adequately manage flood risk resulting from the many springs surrounding the village and existing poor surface water drainage resulting in an increased risk of flooding in conflict with Policies OS2, OS3, H2, EH7, EH8 and BC1 of the adopted West Oxfordshire Local Plan 2031 and the relevant paragraphs of the NPPF.'

3. PUBLIC INQUIRY APPEAL

1.1 An appeal has been lodged against the refusal of outline planning permission which is subject of a Public Inquiry commencing in February 2024. The appellant has indicated that they will be seeking a partial application for costs at the Appeal Inquiry as it is considered that matters relating to flood risk and drainage could be addressed by condition.

1.2 In seeking to avoid the partial application for costs, the appellant has submitted a Technical Note on Flood Risk and Drainage which provides further information in relation to groundwater flood risk and surface water drainage. The note focuses on providing a detailed assessment of flood risk resulting from the springs surrounding the village and demonstrating robust strategies for the disposal of surface water run-off from the development that would not increase flood risk. The Technical Note concludes that there is no evidence that the development would fail to adequately manage flood risk resulting from

the springs surrounding the village and existing poor surface water drainage. It concludes that the site would be properly drained and there would in fact be a betterment for the local community. It identifies that there are four options available for the disposal of surface water run-off from the proposed development that are all technically feasible, deliverable within the land available, and would reduce not increase flood risk overall, thereby providing betterment to the existing situation. All options would be capable of being addressed via the approval of reserved matters and secured by planning condition.

1.3 The Council's Shared Lead Flood Risk Management Officer has considered the Technical Note and has indicated that whilst drainage problems are recognised in the area, the submitted Technical Note has indicated a number of possible options to deal with drainage matters and this issue could be address via an appropriately worded condition. The detailed comments of the Flood Risk Management Officer will be reported to Members at Committee.

2. ALTERNATIVE OPTIONS

2.1 To continue to pursue refusal reason 3 at the forth coming Appeal Inquiry.

3. FINANCIAL IMPLICATIONS

3.1 The decision not to pursue refusal reason 3 at the Appeal Inquiry is likely to avoid the risk of a partial application for costs at the Appeal Inquiry.

4. LEGAL IMPLICATIONS

4.1 N/A

5. RISK ASSESSMENT

5.1 The decision to not pursue refusal reason 3 at the Appeal Inquiry is likely to avoid the risk of a partial application for costs at the Appeal Inquiry.

6. EQUALITIES IMPACT

6.1 The report raises no specific equality implications for any specific group/protected characteristic.

7. CLIMATE AND ECOLOGICAL EMERGENCIES IMPLICATIONS

7.1 The Technical Note concludes that there is no evidence that the development would fail to adequately manage flood risk resulting from the springs surrounding the village and existing poor surface water drainage.

8. BACKGROUND PAPERS

8.1 None

(END)

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TECHNICAL NOTE

FLOOD RISK & DRAINAGE

Land West of London Lane, Ascott-under-Wychwood, Oxfordshire, OX7 6AB

Prepared for: Obsidian Strategic Asset Management Limited
Ref: 020_8211067_JB_Flood_Risk_&_Drainage

Document History

Issue	Date	Description	Prepared By	Checked By
1	17 Jan 24	First Draft	J Birch	C Salt
2	22 Jan 24	Minor Amendments for Issue to LPA / LLFA	J Birch	C Salt

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Appendix D: Topographical Survey
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Appendix F: BGS Infiltration SuDS GeoReport
Appendix G: Existing Drainage Catchment Areas & Brownfield Run-off Rate Calculations
Appendix H: Statement to LPA by Chris Badger, Former Tenant Farmer at Crown Farm
Appendix I: Location of Watercourses, Springs & Ponds in Vicinity of Site
Appendix J: Approved Drainage Design for Foresters Court, London Lane
Appendix K: Areas Susceptible to Groundwater Flooding (ASTGWF) Map
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Appendix O: Option 2 – Surface Water Drainage Strategy & Calculations
Appendix P: Option 3 – Surface Water Drainage Strategy & Calculations
Appendix Q: Option 4 – Surface Water Drainage Strategy & Calculations

1.0 Introduction

1.1 This Technical Note has been prepared by Glanville Consultants on behalf of Obsidian Strategic Asset Management to provide further information in relation to groundwater flood risk and surface water drainage in connection with a proposed residential development on land west of London Lane, Ascott-under-Wychwood, Oxfordshire. A location plan for the site is provided at **Appendix A**.

1.2 Outline planning permission was sought from West Oxfordshire District Council (WODC), as Local Planning Authority (LPA) by Obsidian Strategic Asset Management under application reference 23/01504/OUT. It follows that the final drainage details will be a reserved matter, should outline consent be granted. Further, the details of the final drainage scheme can be secured by a negatively worded Grampian condition. At no stage have the LPA required that the final drainage scheme should be determined at this stage. Accordingly, it is considered that it is only the principle of development (and access) which is the subject of determination. The Appellant need only demonstrate that the site can be appropriately drained in principle, with the details to be secured by condition.

1.3 The description of development is as follows and the concept masterplan as submitted for illustrative purposes is provided at **Appendix B**:

'*Outline planning application with all matters reserved (except for access) for the development of up to 40 residential dwellings (C3 use), including 50% affordable housing, with vehicular access from London Lane. Provision of associated public open space, alongside landscaping, drainage infrastructure, and associated works*.'

1.4 Glanville Consultants prepared a Flood Risk Assessment to accompany the planning application (report reference 010_8211067_BW_Flood_Risk_Assessment, Issue 2, dated 5 May 2023). It concluded that the proposed development would not be at an unacceptable risk from any potential source of flooding and would not increase flood risk elsewhere. It also demonstrated that suitable strategies for the disposal of foul and surface water from the proposed development could be provided.

1.5 In its consultation response as Lead Local Flood Authority (LLFA) and statutory consultee on the planning application dated 28 June 2023, Oxfordshire County Council (OCC) raised no objection, subject to standard conditions relating to the detailed design of the drainage system, the provision of as-built information (plans and photographs) and confirmation of contact details for any appointed management company being attached to any permission granted. A copy of the LLFA's consultation response is provided at **Appendix C**.

1.6 WODC Officers recommended the application be refused for four reasons, none of which related to flood risk or drainage. Accordingly, at the time of the determination, there were no outstanding requests for further information regarding flooding and/or no extant criticisms of the scope, method, assessment, or conclusions of the Flood Risk Assessment. Rather, this issue was agreed between the technical experts and the LPA's Case Officer.

1.7 Further, at no stage has the LPA exercised its statutory powers to require that any of the reserved matters, such as the drainage solution, require determination at the outline stage. This remains the case in the light of the Council's Statement of Case.

1.8 Nonetheless, during the Planning Committee Meeting an additional reason for refusal relating to flooding and drainage was raised by a Member of the Planning Committee (without supporting technical justification) and the application was refused. Reason for refusal 3 (RfR 3) relates to flooding and drainage, and is worded as follows:

'*The proposed development would fail to adequately manage flood risk resulting from the many springs surrounding the village and existing poor surface water drainage resulting in an increased risk of flooding in conflict with Policies OS2, OS3, H2, EH7, EH8 and BC1 of the adopted West Oxfordshire Local Plan 2031 and the relevant paragraphs of the NPPF*.'

1.9 Obsidian Strategic Asset Management has appealed against the decision by WODC to refuse planning permission and a public inquiry is scheduled for late February / early March 2024 (appeal reference APP/D3125/W/23/333208).

1.10 This Technical Note has been prepared following discussions with WODC, as LPA, and OCC, as LLFA, to provide further information in respect of flood risk and drainage with a view to addressing RfR 3 ahead of the inquiry. This is a matter which can and should be addressed at the reserved matters approval (RMA) stage and secured by condition. The purpose of this Technical Note is to seek to reach agreement with the Council on this point and to avoid a partial application for costs (as I am instructed that it is unreasonable to refuse a scheme where the issue could be addressed by condition).

1.11 The note focuses on providing a detailed assessment of flood risk resulting from the springs surrounding the village and demonstrating robust strategies for the disposal of surface water run-off from the development that would not increase flood risk. Rather, there would be betterment and a benefit to weigh in the planning balance. There would also be compliance with national and local policy.

2.0 Site Location and Context

2.1 The site is located at Crown Farm in Ascott-under-Wychwood and consists of a stable yard and adjoining paddocks. A topographical survey is provided at **Appendix D**. Levels on-site generally fall from higher ground in the south to lower ground in the north.

Ground Conditions

2.2 Geological maps published by the British Geological Survey (BGS) shows the site is underlain by a range of soil types. The south-eastern half of the site is underlain by mudstone bedrock, with no superficial deposits recorded. A large part of the north-western half of the site is underlain by siltstone and mudstone bedrock, again with no superficial deposits recorded. Land along the north-western boundary of the site and further to the north-west is underlain by mudstone bedrock with superficial River Terrace Deposits of sand and gravel recorded. The higher ground immediately to the south-east of the site is underlain by limestone bedrock. A plan showing the geological mapping is provided at **Appendix E**.

2.3 The BGS publishes Infiltration SuDS GeoReports which provide detailed information relating to infiltration based sustainable drainage systems (SuDS). An Infiltration SuDS GeoReport was obtained for the site to provide an initial assessment of the suitability of the site for infiltration SuDS and is provided at Appendix C of the Flood Risk Assessment and provided at **Appendix F** of this report for ease of reference.

2.4 Mapping provided within Part 1 of the GeoReport confirms the following:

- The ground underlying the site provides opportunities for bespoke infiltration SuDS. The subsurface is potentially suitable although the design will be influenced by the ground conditions.
- Ground instability problems may be present or anticipated, but increased infiltration is unlikely to result in ground instability.
- The groundwater is not expected to be especially vulnerable to contamination.

2.5 Part 2 of the GeoReport provides more detailed data that confirms the following:

- Groundwater is likely to be less than 3m below the ground surface for at least part of the year.
- Superficial deposits in the north-western part of the site are likely to be free draining, with permeability assessed as being in the high to very high range.
- Bedrock deposits through the central part of the site and in the far northern corner are likely to be free draining, with permeability assessed as being in the low to moderate range.
- Increased infiltration is unlikely to result in subsidence.
- Increased infiltration is unlikely to lead to slope instability.

Existing Drainage Regime

2.6 A sizeable part of the site is previously developed and comprises large agricultural barns with access roads and external hardstanding areas. Most of the downpipes and guttering on the existing barns discharge run-off from the large roof areas onto the ground surface and drain overland from south to north following the prevailing topography. Some of this run-off discharges overland and off-site via the farm's main access road towards Heritage Lane / Church View / The Green to the north where there is little evidence of a positive surface water or highway drainage system to dispose of this run-off effectively.

2.7 Several inspection chambers exist in the northern part of the stable yard that provide evidence of a below ground drainage system that discharges to ground via a French drain / linear soakaway located in the adjacent paddock at the northern end of the site. Run-off from the stable yard can also enter this drainage system overland and is then routed via a drainage channel and cut-out in the masonry wall that separates the yard from the adjoining paddock to the north-east. The French drain / linear soakaway can be observed on site and is identified on the topographical survey and shown on the plan provided at **Appendix G**.

2.8 It is evident that the existing drainage system has not been well maintained and is in a poor state of repair. This will inevitably affect the performance of the drainage system and could lead to more regular exceedance of the system. There is no reason to assume that this will change in the absence of planning permission being granted.

2.9 A plan showing the existing drainage catchment areas on the site is provided at **Appendix G**. This shows that the existing impermeable area extends to around 0.52Ha. Also shown on this plan are existing flow paths for overland flow and exceedance events. The brownfield run-off rates for the existing impermeable areas within the appeal site boundary have been calculated as follows, increasing for various return period rainfall events (refer to **Appendix G** for calculations):

1 in 1 year	= 18.2 l/s
1 in 2 year (QBAR)	= 23.0 l/s
1 in 30 year	= 43.8 l/s
1 in 100 year	= 57.7 l/s

2.10 Third party correspondence received by the Planning Inspectorate in respect of the appeal include representations via Ascott-under-Wychwood Parish Council and Mr Chris Badger, former tenant farmer at Crown Farm. Mr Badger's statement, provided at **Appendix H**, confirms that there are no springs in the field and suggests that the pond (described further below in paragraph 2.18), just above the top farm building is full of water during the winter months with the overflow going into a stone drain and then into the main drain taking water from the indoor school, around the building and into the village by the main entrance to the farm. He refers to surface water coming down the unnamed road from Leafield, crossing the B3347 and then heading down the track in the direction of Crown Farm (called New Road), through to the farm buildings and finishing up by the Crown Barn boundary. He also refers to problems due to a lack of maintenance of this existing drainage system. Mr Badger confirms that he dug a trench across the field that he filled with shingle (i.e. the French drain / linear soakaway referenced above) and this works in normal conditions but overflows in extreme conditions.

2.11 Mr Badger's comments do not raise any new issues and support the view that the lack of effective drainage on the appeal site currently leads to overland surface water flows entering the village via the main access to the farm and that, where one exists, the drainage system on site is poorly maintained and ineffective.

2.12 The run-off rates for the overland flow that originates from within the appeal site and discharges off-site via the access to the farm and towards Heritage Lane / Church View / The Green to the north has been calculated as follows for various return period rainfall events based on the contributing area of 0.11Ha shown on the drawing and calculations at **Appendix G**:

1 in 1 year	= 3.9 l/s
1 in 2 year (QBAR)	= 4.9 l/s
1 in 30 year	= 9.3 l/s
1 in 100 year	= 12.2 l/s

2.13 The run-off rates from the existing roof and hardstanding areas that discharges on-site via the French drain / linear soakaway located in the paddock at the northern end of the site have been calculated as follows for various return period rainfall events based on the contributing area of 0.41Ha shown on the drawing and calculations at **Appendix G**:

1 in 1 year	= 14.3 l/s
1 in 2 year (QBAR)	= 18.1 l/s
1 in 30 year	= 34.5 l/s
1 in 100 year	= 45.5 l/s

2.14 Flows into the French drain / linear soakaway are unrestricted and no storage is provided other than a nominal volume in the voids of the shingle that was used to backfill the trench. Mr Badger notes that the French drain / linear soakaway overflows in extreme conditions. Any exceedance flows from the linear soakaway located in the paddock at the northern end of the appeal site are directed off-site towards the lower-lying properties on the south side of The Green, as indicated by the blue arrows on the drawing at **Appendix G**. The path of groundwater movement, which tends to travel from high to low ground, would also be directed towards these properties and ultimately the River Evenlode further to the north.

2.15 There is also an area of gravel surfacing located between the main part of the site and London Lane that has been used for the storage of construction materials during the construction of the adjacent Foresters Court development. Any run-off from this area would discharge off-site to London Lane.

Watercourses, Springs & Ponds

2.16 A plan showing relevant watercourses, springs and ponds in the vicinity of the site is provided at **Appendix I**, as described below.

2.17 The closest watercourse designated as a main river by the Environment Agency is the River Evenlode, located some 370m west of the site. The closest ordinary watercourse is Colwell Brook which can be found approximately 200m south-west of the site. The Colwell Brook flows south-westwards and then turns north-westwards before joining the River Evenlode just to the north of Shipton Road. The Colwell Brook is culverted under Shipton Road.

2.18 A small pond exists on the site, immediately to the south of the existing stable yard which may be fed by groundwater but is dry for part of the year. This pond is to be retained with the proposals and is shown to be located within an open space area at the south-western end of the development.

2.19 The Ordnance Survey map of the local area shows two springs located relatively close to the site, one some 200m to the south-west, close to the south-eastern end of Dawls Close, and the other a similar distance to the east, on the opposite side of London Lane. All these springs feed watercourses that discharge into the River Evenlode located in the valley on the north side of the village of Ascott-under-Wychwood.

2.20 The topographical survey (provided at **Appendix D**) confirms ground levels in the vicinity of the nearest spring located 200m to the south-west of the site are around 99m AOD, with the watercourse that flows downstream from this point located in a pronounced ditch at a lower level, and ground levels fall away from this point in a westerly direction towards Shipton Road and the River Evenlode beyond.

2.21 Ground levels in the vicinity of the spring just to the east of London Road appear to be between 100m AOD and 105m AOD according to contours on Ordnance Survey mapping and a watercourse is shown to flow downstream from this point as the ground falls away north-westwards towards High Street and the railway line beyond providing a direct route from the spring to the lower lying ground to the north.

2.22 There is a pond indicated to the front of existing properties on the west side of London Road (18, 20 and 20a) immediately to the south of and at a higher elevation than the newly constructed development of five dwellings at Foresters Court (application reference 17/01067/FUL). It is understood that this pond may also be spring-fed and the proposed drainage design for the development at Foresters Court includes a swale across the site's frontage with London Lane that is stated as being designed to convey flows from the spring in a safe manner northwards towards lower lying ground. A drawing showing the drainage design for this development that was approved by the LPA via the discharge of Condition 10 (drainage) is provided at **Appendix J**.

2.23 The springs and ponds described above are located close to the change in geology between the more freely draining limestone bedrock underlying the higher ground to the south of the appeal site and the less permeable mudstone bedrock that underlies most of the site, or where the more permeable superficial deposits of River Terrace Deposits are located. These conditions are where groundwater is more likely to emerge as it rises to the surface through the permeable subsoil following prolonged periods of wet weather.

3.0 Flood Risk from Springs (Groundwater)

Overview

3.1 The entire site is located within Flood Zone 1, and so is not at risk of fluvial flooding. It is also not at risk of surface water flooding, sewer flooding, or flooding for artificial sources. This is not in dispute.

3.2 Flood risk resulting from springs surrounding the village (i.e. groundwater flood risk) is the only source of flooding referenced in RfR 3. Flood risk from this source has been assessed in detail, as described in this section.

Groundwater Flood Risk

3.3 The West Oxfordshire District Council (WODC) Level 1 Strategic Flood Risk Assessment (SFRA) states at paragraph 4.3.1 that in broad terms there is limited potential for groundwater flooding in the central and northern part of the district where Ascott-under-Wychwood lies. The potential for groundwater flooding is greater in Carterton, Witney, Eynsham and Woodstock where the underlying geological conditions are more permeable.

3.4 At paragraph 4.3.2, the SFRA states that groundwater flooding usually occurs in low lying areas underlain by permeable rock and aquifers that allow groundwater to rise to the surface through the permeable subsoil following long periods of wet weather. Low lying areas may be more susceptible to groundwater flooding because the water table is usually at a much shallower depth and groundwater paths tend to travel from high to low ground.

3.5 The Areas Susceptible to Groundwater Flooding (ASTGWF) map for the West Oxfordshire area is included as Figure 6 at Appendix B of the SFRA and is provided at **Appendix K** of this report. This map divides the district into 1km squares and indicates the proportion of each square that is susceptible to groundwater flood emergence. The mapping indicates the site is within an area where less than 25% of the area is susceptible to groundwater flooding and is therefore at low risk.

3.6 The 1km squares immediately to the west and north are indicated to be in the medium risk category where between 25% and 50% of the area of each 1km square is susceptible to groundwater flooding. These areas correspond more closely with lower lying areas of the village that are at risk of fluvial flooding from the River Evenlode and where some of the springs surrounding the village are located, as described in Section 2.

3.7 The locations of the springs and ponds shown on the plan at **Appendix I** coincide with the change in geology between the more freely draining limestone bedrock underlying the higher ground to the south of the site and the less permeable mudstone bedrock that underlies most of the site where groundwater is more likely to emerge.

3.8 No springs are identified as located within the boundary of the site but as noted in Section 2, three springs are located close to the site, one around 200m to the south-west, and the other two a similar distance to the east, on opposite sides of London Lane. These springs either feed watercourses that discharge into the River Evenlode on the north side of the village of Ascott-under-Wychwood or result in overland flow on London Lane such that any exceedance flows from these sources would be directed away from the site. Therefore, the development is not at risk of flooding from these springs.

3.9 Although not indicated as a spring on the published mapping, the small pond within the site, which is dry for part of the year, may be fed by groundwater. There is potential for this pond to overtop after a prolonged period of rainfall, which would result in overland flow off-site via the farm's main access road towards Heritage Lane / Church View / The Green to the north.

3.10 The pond is located at a higher elevation than the proposed built development, suggesting that should any groundwater emergence from the pond occur it could affect the development.

3.11 The pond is to be retained with the proposals, but no additional inflows will be introduced, so any flood risk from the pond that exists will not be exacerbated by the development. Rather, any groundwater emergence will be actively managed such that there will be betterment. Should groundwater emerge above the development, from the pond or from the higher ground more generally, any exceedance flows would be collected by the development's surface water drainage system and flow routes would be maintained through the development. Therefore, exceedance flows from the pond which flow towards Heritage Lane / Church View / The Green to the north (as discussed in paragraph 2.6) would no longer exist post-development, thereby providing betterment to the existing situation.

3.12 In accordance with standard construction practice, finished floor levels of the new dwellings will be typically elevated around 300mm above natural ground level and external hardstanding areas will be designed to fall away from building entrances so any exceedance flows will be directed away from the dwellings. No basements are proposed, which are particularly susceptible to high groundwater levels as they are situated below ground level.

3.13 As such, it can be demonstrated that the development is not at risk of groundwater flooding and any residual risk can be mitigated by the development's detailed design.

3.14 As described in Section 2, surface water run-off from the existing buildings and hardstanding areas on site is not well managed currently. There is limited chance of this changing in the future, without this development. Most of the gutters and downpipes on the existing buildings discharge run-off from the large roof areas onto the ground surface and drain overland from south to north following the prevailing topography. Some of this run-off discharges overland and off-site via the farm's main access road towards Heritage Lane / Church View / The Green to the north, where there is little evidence of a positive surface water or highway drainage system to dispose of this run-off effectively.

3.15 Other areas on the site currently drain overland or via a rudimentary system that intercepts flows along the site's northern boundary and discharges via a French drain / linear soakaway in the paddock to the north-east corner of the site. This system falls well below modern design standards and is poorly maintained. Mr Badger, former tenant farmer at Crown Farm has stated that this soakaway works in normal conditions but overflows in extreme conditions. Any exceedance flows from this linear soakaway are directed off-site towards the lower-lying properties on the south side of The Green. The path of groundwater movement, which tends to travel from high to low ground, would also be directed towards these properties.

3.16 An effective surface water drainage system will be introduced as part of the development. As described in Section 4, run-off can be managed effectively by infiltration or by a combination of infiltration and the highly restricted discharge of surface water to a watercourse or sewer. The system will prevent the run-off that currently discharges overland and off-site via the farm's main access road towards Heritage Lane / Church View / The Green to the north, thereby reducing flood risk off-site.

3.17 In contrast to the existing drainage regime on the site, the surface water drainage system for the development will be designed and constructed to modern standards and be able to accommodate run-off from all rainfall events up to and including the 1 in 100 year storm (the design rainfall event), with an additional 40% allowance for the future effects of climate change.

3.18 Storage to cater for excess rainfall will ensure the proposed drainage system does not exceed capacity, after detailed assessment at the RMA stage. For example, the provision of storage within the basin proposed at the northern end of the site will reduce the risk of an exceedance event occurring that currently results in flows off-site towards the lower-lying properties on the south side of The Green, thereby reducing flood risk off-site and providing betterment to the existing situation.

3.19 Therefore, the development proposals will manage the disposal of surface water much more effectively than the current situation and reduce the risk of flooding both on- and off-site, providing betterment to the existing situation, so there will be a positive impact as a result of the proposals.

3.20 On this basis, it can be concluded that the proposed development would not fail to adequately manage flood risk resulting from the springs surrounding the village and existing poor surface water drainage resulting in an increased risk of flooding as suggested by RfR 3.

4.0 Surface Water Drainage

4.1 As described in Section 2, the appeal site is partially previously developed and includes several large agricultural buildings and associated external hardstanding areas. The existing impermeable area within the site extends to around 0.52Ha as shown on the drawing at **Appendix G**. The brownfield run-off rates for the existing impermeable areas have been calculated for various return period rainfall events and are summarised in paragraph 2.9.

4.2 The proposed development will increase the impermeable area on site to 0.73Ha, an increase of 0.21Ha or 40% compared with the existing situation.

4.3 The proposed developable area within the red line boundary of the site, excluding the large open spaces, extends to 1.34Ha in total. The equivalent greenfield run-off rates for the developable area have been calculated as follows for various return period rainfall events:

1 in 1 year	= 5.4 l/s
1 in 2 year (QBAR)	= 6.4 l/s
1 in 30 year	= 14.5 l/s
1 in 100 year	= 20.3 l/s

4.4 In contrast to the existing situation, an effective drainage system designed to modern standards will be designed and constructed to manage the disposal of surface water from the development effectively by catering for all flows up to the 1 in 100 year +40% climate change storm (the design rainfall event). Appropriate pollution control and maintenance measures will also be incorporated.

4.5 The surface water drainage strategy presented in the Flood Risk Assessment submitted with the planning application proposed disposal via infiltration with all surface water to be discharged to the underlying soils. A plan illustrating this outline strategy is provided at Appendix H of the Flood Risk Assessment and is also provided at **Appendix L** of this document for ease of reference. The strategy proposed employs an infiltration and storage basin in the northern corner of the development, with additional storage provided through permeable paving with deepened sub-base beneath access roads and hardstanding areas upstream of the basin.

4.6 In its consultation response as LLFA dated 28 June 2023 (see **Appendix C**), OCC raised no objection to the proposed development, subject to standard conditions relating to the detailed design of the surface water drainage system, the provision of as-built information (plans and photographs) and confirmation of contact details for any appointed management company being attached to any permission granted. As such, approval of the detailed design and construction of the proposed surface water drainage system can be secured and controlled through submission of information to discharge planning conditions in line with the two draft conditions suggested by OCC.

4.7 Nevertheless, the infiltration-based strategy proposed previously has been reviewed and updated, and alternative strategies have been considered to demonstrate that there are other effective means of draining surface water from the development.

4.8 The options demonstrate that, regardless of the results of further infiltration testing and modelling that will take place at the approval of reserved matters stage to inform the final drainage design, there is an acceptable drainage solution, in principle, which complies with national and local planning policy.

4.9 Part H of the Buildings Regulations: Drainage and Waste Disposal establishes a hierarchy for surface water disposal, which encourages a SuDS based approach. The hierarchy is that surface run-off must be discharged to one or more of the following in order of priority:

- an adequate soakaway or some other adequate infiltration system; or, where not reasonably practicable,
- a watercourse; or, where not reasonably practicable,
- a sewer.

4.10 It is important to note that this is just a hierarchy. It does not mean or imply that any option is unacceptable per se. Rather, it needs to be demonstrated that a higher priority is not feasible/deliverable before relying on a lower priority.

4.11 On this basis, the following options have been considered in order of preference/hierarchy for the disposal of surface water run-off from the proposed development, as described in detail further below:

- Option 1 - 100% disposal via infiltration;
- Option 2 - Hybrid solution with part infiltration and part discharge to a watercourse;
- Option 3 - 100% discharge to a watercourse; and
- Option 4 - 100% discharge to a sewer.

Option 1 - 100% Disposal via Infiltration

4.12 Based on published information regarding the geological context of the site and surrounding area, infiltration drainage techniques are considered a suitable and effective method for disposing of surface water run-off generated by the development and will be confirmed in due course by the results of soakage testing to BRE Digest 365 'Soakaway Design' and groundwater monitoring, the scope of which can be controlled by condition. Disposal of surface water in this way is the preferred means, if conditions allow, in accordance with the drainage hierarchy stipulated by Building Regulations and other relevant guidance.

4.13 The surface water drainage strategy presented in the Flood Risk Assessment that accompanied the planning application was developed following an assessment of the suitability of ground conditions on site for disposal via infiltration based on the available evidence (as described in Section 2) but in the absence at that time of an intrusive site investigation because it was not considered to be proportionate or necessary at outline application stage by either the Appellant, Glanville, the LLFA or LPA Officers. Indeed, it was not requested by Members of the Planning Committee (who could have deferred the decision for such an assessment to be submitted if this was the concern).

4.14 An infiltration rate of 1 x 10^{-5}m/s was assumed at that time, based on test results from an adjacent development, as described in paragraphs 6.7 and 6.8 of the Flood Risk Assessment.

4.15 For robustness, the proposed infiltration-based surface water drainage strategy has been reviewed and updated assuming a much lower infiltration rate of 5 x 10^{-6}m/s should, in the event, soakage testing confirm infiltration is a feasible means of disposal but infiltration rates, in practice, are lower than expected.

4.16 A drawing illustrating the revised surface water drainage strategy for Option 1 and the supporting calculations are provided at **Appendix M**. Each infiltration component (basin and geocellular soakaways) would be able to discharge from full to half-full in a reasonable time, as advised by guidance in the SuDS Manual, so the risk of them not being able to manage a subsequent rainfall event would be minimised. A freeboard of 300mm would be achieved for the basin during the design rainfall event, again in accordance with relevant guidance, which will provide resilience in terms of additional storage capacity to accommodate subsequent rainfall events or greater rainfall volumes from more onerous events than the design rainfall event.

4.17 This strategy option would prevent the uncontrolled run-off that currently discharges overland and off-site via the farm's main access road towards Heritage Lane / Church View / The Green to the north (refer to paragraph 2.12 for run-off rates). It would also reduce significantly the risk of an exceedance event occurring that results in flows off-site towards the lower-lying properties on the south side of The Green. Therefore, the proposals will not exacerbate any pre-existing problems in the village related to poor surface water drainage and will provide betterment in this respect due to the reduction in likelihood of overland flows occurring off-site through improvements to the management of surface water on-site.

4.18 Whilst an infiltration-based solution is considered viable and hierarchically preferable, given the lay concerns that have been raised leading to RfR 3, and the need for this to be confirmed through comprehensive intrusive ground investigations at the appropriate time, consideration has been given to alternative means of disposal of surface water to demonstrate that there are other effective means of draining the development in the event that ground conditions are not as expected, based on the available evidence, and a different drainage solution is required.

Option 2 - Hybrid Solution with Part Infiltration and Part Discharge to a Watercourse

4.19 As the most suitable alternative to 100% disposal via infiltration, a hybrid solution has been developed that would discharge some surface water run-off to ground via infiltration and the remainder at a highly restricted rate to a watercourse (the Colwell Brook) around 200m to the south-west. This watercourse is within land controlled by the appellant, as shown by the red line on the plan provided at **Appendix N**, and therefore it would be possible to provide a drainage outfall in this direction and secure the provision of associated infrastructure via condition or an obligation in the Section 106 agreement.

4.20 Ground levels within the developable area relative to the outfall point are such that a gravity discharge would be feasible from a large proportion of the development, with only the lowest lying parts of the development discharging via infiltration, as shown on the plan provided at **Appendix O**. Of the total impermeable area of area 0.73Ha, 0.43Ha would discharge via infiltration and the remaining 0.30Ha would discharge via the watercourse. However, the proportions could be varied to respond to changes in infiltration rates and/or groundwater levels, if necessary. The equivalent greenfield run-off rates these two catchments have been calculated as set out below for various return period rainfall events based on the contributing developable areas of 0.83Ha and 0.51Ha, respectively.

Via infiltration (0.83Ha):		Via watercourse (0.51Ha):	
1 in 1 year	= 3.3 l/s	1 in 1 year	= 2.1 l/s
1 in 2 year (QBAR)	= 4.0 l/s	1 in 2 year (QBAR)	= 2.4 l/s
1 in 30 year	= 9.0 l/s	1 in 30 year	= 5.5 l/s
1 in 100 year	= 12.6 l/s	1 in 100 year	= 7.7 l/s

4.21 Option 2 has been assessed on the basis that the infiltration basin would remain the same size and shape as in Option 1 and therefore provide the same storage volume. An infiltration rate of 5 x 10^{-6}m/s has also been assumed, the same as for Option 1. However, as much less of the development's impermeable area would drain in this direction with Option 2 (0.43Ha compared with 0.73Ha) there would be flexibility to alter the design of the basin, in terms of its area and/or depth, if required, to respond to changes in infiltration rates and/or groundwater levels should they prove to be different to those based on the available evidence. Any such changes could be dealt with through the approval of reserved matters, when layout is considered in detail, and through the discharge of planning conditions.

4.22 With Option 2, it is proposed that discharge to the watercourse would be restricted to a rate of 1.0l/s for all return periods, which would be lower than the equivalent greenfield run-off rates for the catchment as presented in paragraph 4.20. This restriction would be achieved through a flow control device (e.g. Hydro International's Hydro-Brake vortex flow control, or similar) with attenuation storage provided upstream of the flow control chamber within an open basin, below ground storage, or a combination of the two (the strategy presents two sub-options), to accommodate all flows up to the 1 in 100 year +40% climate change design rainfall event in accordance with current guidance.

4.23 A drawing illustrating this alternative strategy (Option 2) and the supporting calculations are provided at **Appendix O**. Again, the calculations demonstrate that each storage component would be able to discharge from full to half-full in a reasonable time, so they would be able to accommodate a subsequent rainfall event. A freeboard of 300mm could be achieved for both basins during the design rainfall event that would provide additional storage capacity to accommodate subsequent rainfall events or greater rainfall volumes from more onerous events than the design rainfall event.

4.24 Such a hybrid strategy would provide flexibility and resilience should comprehensive intrusive site investigations demonstrate that ground conditions prevent a drainage solution that is entirely reliant on infiltration.

4.25 Like the preferred option, this alternative proposal would also remove the run-off that currently discharges overland and off-site via the farm's main access road towards Heritage Lane / Church View / The Green to the north and provide significant betterment in this respect. It would also reduce the risk of an exceedance event occurring that results in flows off-site towards the lower-lying properties on the south side of The Green.

4.26 The discharge rate of surface water flows diverted towards the watercourse with this alternative strategy (fixed at 1.0l/s for all return periods) would be significantly lower than the equivalent greenfield run-off rates, as presented in paragraph 4.20, and significantly lower than the uncontrolled overland flow rates that occur off-site via the farm's main access road, as presented in paragraph 2.12, which increase markedly during higher-order rainfall events.

4.27 Flows off-site in either direction – to the north via the farm's main access road or to the watercourse to the south-west – would ultimately discharge to the River Evenlode so this alternative strategy would decrease not increase flood risk overall when compared with the existing situation as flows off-site would be managed much more effectively and beneficially through the controlled, slow release of surface water and the temporary storage of surface water on-site to accommodate the design rainfall event.

Option 3 - 100% Discharge to a Watercourse

4.28 If, following the completion of comprehensive intrusive site investigations, ground conditions prove to be entirely unsuitable for any infiltration-based drainage strategy, there would be the option of discharging all surface water from the development to the watercourse following the route described above for Option 2. In this case the impermeable area discharging to the watercourse would be 0.73Ha and the equivalent greenfield run-off rates would be as presented in paragraph 4.3.

4.29 With some of the proposed development located at a lower elevation than the proposed discharge point, it would be necessary for surface water to be collected in the storage basin proposed at the northern end of the site and then pumped to a high point in the topography located at the north-western end of the open space area proposed west of the built development, within the red line boundary of the appeal site.

4.30 The plan provided at **Appendix P** shows the indicative location of the proposed pumping station, close to the northern storage basin, which would be largely located below ground with only a small control kiosk visible above ground. This could be appropriately screened by contextually appropriate planting (if necessary) and would not have any material visual impact.

4.31 Ultimately, discharge to the watercourse would be restricted to a low rate of 2.0l/s for all return periods with Option 3 and by the same control method with attenuation storage similarly provided upstream of the flow control chamber within an open basin, below ground storage, or a combination of the two (the strategy presents two sub-options), to accommodate all flows up to the 1 in 100 year +40% climate change design rainfall event in accordance with current guidance.

4.32 A drawing illustrating this alternative strategy (Option 3) and the supporting calculations are provided at **Appendix P**, which demonstrate that each storage component would be able to discharge from full to half-full in a reasonable time, so they would be able to accommodate a subsequent rainfall event, and a freeboard of 300mm can be achieved for the basins during the design rainfall event that will provide additional storage capacity. The storage basin proposed at the northern end of the site would provide both attenuation storage and the emergency storage required by current guidance to prevent flooding in the unlikely event of pump failure.

4.33 Like the previous options, Option 3 would also remove the run-off that currently discharges overland and off-site via the farm's main access road towards Heritage Lane / Church View / The Green to the north and provide significant betterment in this respect. It would also reduce the risk of an exceedance event occurring that results in flows off-site towards the lower-lying properties on the south side of The Green. This would improve the current situation.

4.34 The discharge rate of flows diverted towards the watercourse with this alternative strategy (fixed at 2.0l/s for all return periods) would be significantly lower than the equivalent greenfield run-off rates, as presented in paragraph 4.20, and significantly lower than the uncontrolled overland flow rates that occur off-site via the farm's main access road, as presented in paragraph 2.12, which increase markedly during higher-order rainfall events.

4.35 Flows off-site in either direction – to the north via the farm's main access road or to the watercourse to the south-west – would ultimately discharge to the River Evenlode so this alternative strategy would decrease not increase flood risk overall when compared with the existing situation as flows off-site would be managed much more effectively and beneficially through the controlled, slow release of surface water and the temporary storage of surface water on-site to accommodate the design rainfall event.

Option 4 – 100% Discharge to a Sewer

4.36 A fourth option involving the discharge to a sewer would be technically feasible but would be considered only as a fall-back in the unlikely event that the three hierarchically preferable options described above could not be delivered.

4.37 There are no surface water sewers nearby but there is a public foul water sewer in London Lane maintained by Thames Water as local sewerage authority, which would enable a connection to be provided from the development.

4.38 In this case the impermeable area discharging to the sewer would be 0.73Ha and the equivalent greenfield run-off rates would be as presented in paragraph 4.3.

4.39 This option would discharge surface water at a restricted rate of 3.5l/s for all return periods to the Thames Water foul sewer and attenuation storage would be provide through a basin located at the northern end of the site, with additional storage provided within permeable paving with deepened sub-base beneath access roads and hardstanding areas upstream of the basin, and a box culvert beneath the section of the access road immediately prior to London Lane. This discharge rate is the minimum that would enable the required storage volume to be accommodated within the illustrative masterplan.

4.40 A drawing illustrating this alternative strategy (Option 4) and the supporting calculations are provided at **Appendix Q**. Again, the calculations demonstrate that each storage component would be able to discharge from full to half-full in a reasonable time, so they would be able to accommodate a subsequent rainfall event. A freeboard of 300mm could be achieved for the storage basin during the design rainfall event that would provide additional storage capacity to accommodate subsequent rainfall events or greater rainfall volumes from more onerous events than the design rainfall event.

4.41 Again, like the previous options, Option 4 would also remove the run-off that currently discharges overland and off-site via the farm's main access road towards Heritage Lane / Church View / The Green to the north and provide significant betterment in this respect. It would also reduce the risk of an exceedance event occurring that results in flows off-site towards the lower-lying properties on the south side of The Green.

4.42 The discharge rate of flows diverted towards the sewer with this alternative strategy (fixed at 3.5l/s for all return periods) would be significantly lower than the equivalent greenfield run-off rates, as presented in paragraph 4.3, and significantly lower than the uncontrolled overland flow rates that occur off-site via the farm's main access road, as presented in paragraph 2.12, which increase markedly during higher-order rainfall events.

4.43 Although at the bottom of the drainage hierarchy, the newly constructed dwellings at Foresters Court on the west side of London Lane (application ref. 17/01067/FUL) discharge surface water to this foul sewer at a restricted rate, as agreed with Thames Water and approved by the Local Planning Authority through the discharge of the associated planning condition (Condition 10) so there is a precedent locally for this strategy option, which has been considered to be appropriate and acceptable by the LLFA, the LPA and Thames Water. A drawing showing the drainage design for this development that was approved by the LPA via the discharge of Condition 10 (drainage) is provided at **Appendix J**.

Pollution Control Measures

4.44 With all strategy options, pollution control measures as part of a robust treatment train would be provided to minimise the transmission of any pollutants collected by run-off flowing over hard paved areas to the receiving infiltration features and/or watercourse. Pollution control measures are described and assessed in paragraphs 6.12 to 6.15 and Tables 1 and 2 of the Flood Risk Assessment submitted with the planning application.

Future Management & Maintenance

4.45 With all options, any drainage infrastructure located within individual property boundaries would be owned by the property owner who would also have maintenance responsibility. It is envisaged that the surface water drainage system that serves more than one property would be maintained by a private management company. Details of the proposed maintenance arrangements and a schedule for the maintenance of the various drainage components proposed is provided in paragraphs 6.16 to 6.18 and Table 3 of the Flood Risk Assessment.

4.46 In contrast to the site's existing drainage system that is poorly maintained and ineffective, the system serving the new development will be properly and regularly maintained to ensure it will function as required and this could be controlled by condition.

Summary

4.47 In summary, it has been demonstrated that various options are available for the disposal of surface water run-off from the proposed development that are all technically feasible, deliverable within the land available, and able to be addressed via the approval of reserved matters and secured by condition. Flows off-site would be managed much more effectively and beneficially through the controlled, slow release of surface water and the temporary storage of surface water on-site to accommodate the design rainfall event.

4.48 All four options would remove the run-off that currently discharges overland and off-site via the farm's main access road towards Heritage Lane / Church View / The Green to the north and provide betterment in terms of the discharge rate off-site, either to a watercourse (Options 2 and 3) or sewer (Option 4) that would be fixed for all return periods, lower than that which occurs off-site currently and lower than the equivalent greenfield run-off rates, which increase markedly during higher-order rainfall events. All options would also reduce the risk of an exceedance event occurring that results in flows off-site towards the lower-lying properties on the south side of The Green. Therefore, all four strategies would reduce not increase flood risk overall and provide significant betterment. Table 1 on page 18 provides a summary of discharge rates to aid comparison.

4.49 The strategy option drawings presented at **Appendices M, O, P** and **Q** show that there would be very little difference between the options in terms of what would be visible above ground. Options 2 and 3 would require additional surface water storage to be provided prior to the proposed outfalls to the watercourse to enable the discharge off-site to be restricted to the very low rates proposed. This storage could be provided below ground in geocellular storage crates or above ground in a storage basin similar to that proposed with all options in the northern corner of the site (depending on the preference of the LPA and LLFA). Option 3 would require a pumping station located close to the northern storage basin, which would be largely below ground with only a small control kiosk visible above ground and could be screened by planting, if necessary. Option 4 would be very similar to Option 1 with the additional storage required provided below ground within a box culvert located beneath the section of the access road immediately prior to London Lane.

4.50 The land use planning implications of the changes and additions required to implement the different alternative drainage strategy options have been considered in terms of impacts on landscape, built heritage and archaeology and no adverse impacts have been identified.

4.51 With all options, at the detailed design stage, further SuDS features, such as permeable paving within driveways and/or raingardens, bio-retention areas and tree pits, could be incorporated into the design of the proposed drainage scheme to provide additional surface water storage and further treatment of surface water flows to prevent pollution.

Table 1: Comparison of Discharge Rates (l/s)

Option	Description / Discharge Method	Existing Discharge Rate Off-Site [1]				Existing Greenfield Run-off Rate				Proposed Discharge Rate Off-Site [2]		
		1 in 1 year	QBAR	1 in 30 year	1 in 100 year	1 in 1 year	QBAR	1 in 30 year	1 in 100 year	QBAR	1 in 30 year	1 in 100 year
1	100% infiltration	3.9	4.9	9.3	12.2	0.0	0.0	0.0	0.0	0.0		
2	Hybrid - infiltration & watercourse					2.1	2.4	5.5	7.7	1.0		
3	100% watercourse					5.4	6.4	14.5	20.3	2.0		
4	100% sewer									3.5		

[1] *via overland flow onto Heritage Lane / Church View / The Green*
[2] *for proposed catchment discharging off-site only*

Note:

1. The existing discharge rate off-site via Heritage Lane / Church View / The Green increases progressively with higher order rainfall events, from 3.9l/s during the 1 in 1 year rainfall event up to 12.2l/s for the 1 in 100 year rainfall event.

2. In future, with the development, no discharge of surface water would occur off-site with Option 1 (100% infiltration).

3. Discharge rates off-site for other options would be fixed for all return period rainfall events – i.e. fixed at 1.0l/s for Option 2 (hybrid infiltration/watercourse), 2.0l/s for Option 3 (100% watercourse) and 3.5l/s for Option 4 (100% sewer). All the proposed discharge rates for all rainfall events are lower than the existing discharge rate off-site via Heritage Lane / Church View / The Green for the 1 in 1 year rainfall event.

4. Discharge rates off-site for Options 2, 3 and 4 in all rainfall events are lower than the corresponding existing greenfield run-off rate for the contributing area for the 1 in 1 year rainfall event.

5.0 Summary & Conclusion

5.1 This Technical Note has been prepared by Glanville Consultants on behalf of Obsidian Strategic Asset Management to provide further information in relation to groundwater flood risk and surface water drainage in connection with a proposed residential development on land west of London Lane, Ascott-under-Wychwood, Oxfordshire.

5.2 The key points presented in this Technical Note can be summarised as follows:

a) The Lead Local Flood Authority, Oxfordshire County Council, raised no objection to the proposed development on flood risk or drainage grounds, subject to standard conditions relating to the detailed design and construction of the surface water drainage system.

b) West Oxfordshire District Council Officers recommended the application be refused for four reasons, none of which related to flood risk or drainage but during the Planning Committee Meeting an additional reason for refusal relating to flooding and drainage which states that the proposed development would fail to adequately manage flood risk resulting from the many springs surrounding the village and existing poor surface water drainage resulting in an increased risk of flooding (Reason for Refusal 3 – RfR 3).

c) A sizeable part of the appeal site is previously developed and comprises large agricultural barns with access roads and external hardstanding areas.

d) Some of the surface water run-off from the site currently discharges overland and off-site via the farm's main access road towards Heritage Lane / Church View / The Green to the north where there is little evidence of a drainage system that will dispose of this run-off effectively. Surface water run-off from other areas of the site is currently discharged to ground by infiltration via a rudimentary drainage system not constructed to modern standards that has not been well maintained. Any exceedance flows from this system are currently directed off-site towards the lower-lying properties on the south side of The Green. Therefore, it is evident that surface water disposal from the site is not currently controlled or managed effectively and there is a risk that flooding occurs off-site as a result.

e) Three springs are located close to the site, one around 200m to the south-west, and the other two a similar distance to the east, on opposite sides of London Lane. These springs either feed watercourses that discharge into the River Evenlode on the north side of the village or result in overland flow on London Lane such that any exceedance flows from these sources would be directed away from the site. Therefore, the development is not at risk of flooding from these springs.

f) There is a small pond within the appeal site, which is dry for part of the year and may be fed by groundwater. There is potential for this pond to overtop when groundwater levels rise after a prolonged period of rainfall, which would contribute to the overland flow that currently occurs off-site to the north via the farm's main access road.

g) The pond is to be retained with the proposals, but no additional inflows will be introduced, so any flood risk from the pond will not be exacerbated by the development. Should groundwater emerge above the development, from the existing pond or from the higher ground more generally, any exceedance flows would be collected by the proposed surface water drainage system and flow routes would be maintained through the development.

h) To mitigate the risk of flooding from groundwater, finished floor levels of the new dwellings would be typically elevated around 300mm above natural ground level and external hardstanding areas would fall away from building entrances so any exceedance flows would be directed away from the dwellings. No basements are proposed, which are particularly susceptible to high groundwater levels. As such, the development is not at risk of groundwater flooding and any residual risk can be adequately mitigated by the development's detailed design.

i) The introduction of a surface water drainage system for the development, which would be designed and constructed to modern standards and controlled by planning condition, would improve significantly upon the poor existing drainage arrangements for the site, manage the disposal of surface water much more effectively, and reduce the risk of flooding overall.

j) The entirely infiltration-based surface water drainage strategy presented in the Flood Risk Assessment that accompanied the planning application was developed following an assessment of the suitability of ground conditions on site for disposal via infiltration based on the available evidence but in the absence at that time of an intrusive site investigation because it was not considered to be proportionate or necessary at outline application stage.

k) The surface water drainage strategy previously proposed has been reviewed and updated using a much lower infiltration rate for robustness should, in the event, soakage testing confirm infiltration is a feasible means of disposal but infiltration rates, in practice, are lower than expected.

l) Whilst an entirely infiltration-based strategy is considered viable and is hierarchically preferable, alternative means of disposal have been considered to robustly demonstrate that that there would be other effective means of draining surface water from the development should ground conditions prevent a drainage solution that is entirely reliant on infiltration, thereby providing flexibility and resilience.

m) The following options have been considered in order of preference for the disposal of surface water run-off from the proposed development:

Option 1 - 100% disposal via infiltration;
Option 2 - Hybrid solution with part infiltration and part discharge to a watercourse;
Option 3 - 100% discharge to a watercourse; and
Option 4 - 100% discharge to a sewer.

n) It has been demonstrated that all these options are technically feasible, deliverable within the land available, and able to be addressed via the approval of reserved matters and secured by condition.

o) All four options would ensure that surface water would be managed much more effectively and beneficially than the situation currently through the controlled, slow release and temporary storage of surface water with the new drainage system designed to accommodate the design rainfall event (i.e. the 1 in 100 year +40% climate change event) without the risk of flooding.

p) Discharge off-site via the watercourse (Options 2 and 3) or sewer (Option 4) would be restricted to a very low rate that would be fixed for all rainfall events. This discharge rate would be lower than the equivalent greenfield run-off rates for the catchment and lower than that from the uncontrolled overland flows that currently occur off-site via the farm's main access road, which increase markedly during higher-order rainfall events.

q) All four strategy options would reduce the risk of an exceedance event occurring that results in flows off-site towards the lower-lying properties on the south side of The Green.

r) All four options would reduce, not increase flood risk overall, and provide betterment to the existing situation.

s) Control measures to prevent pollution of the receiving infiltration features, and underlying groundwater resource, and/or watercourses would be provided as part of a robust treatment train.

t) In contrast to the site's existing drainage system that is poorly maintained and ineffective, the system serving the new development will be properly and regularly maintained to ensure it will function as required and this could be controlled by condition.

u) At the detailed design stage, further SuDS features, such as permeable paving within driveways and/or raingardens, bio-retention areas and tree pits, could be incorporated into the proposed drainage scheme to allow for additional storage and treatment of surface water flows.

Conclusion

5.3 There is no evidence that the development would fail to adequately manage flood risk resulting from the springs surrounding the village and existing poor surface water drainage. On the contrary, the site would be properly drained and there would be a betterment for the local community.

5.4 There are four options available for the disposal of surface water run-off from the proposed development that are all technically feasible, deliverable within the land available, and would reduce not increase flood risk overall, thereby providing betterment to the existing situation. All options would be capable of being addressed via the approval of reserved matters and secured by planning condition.

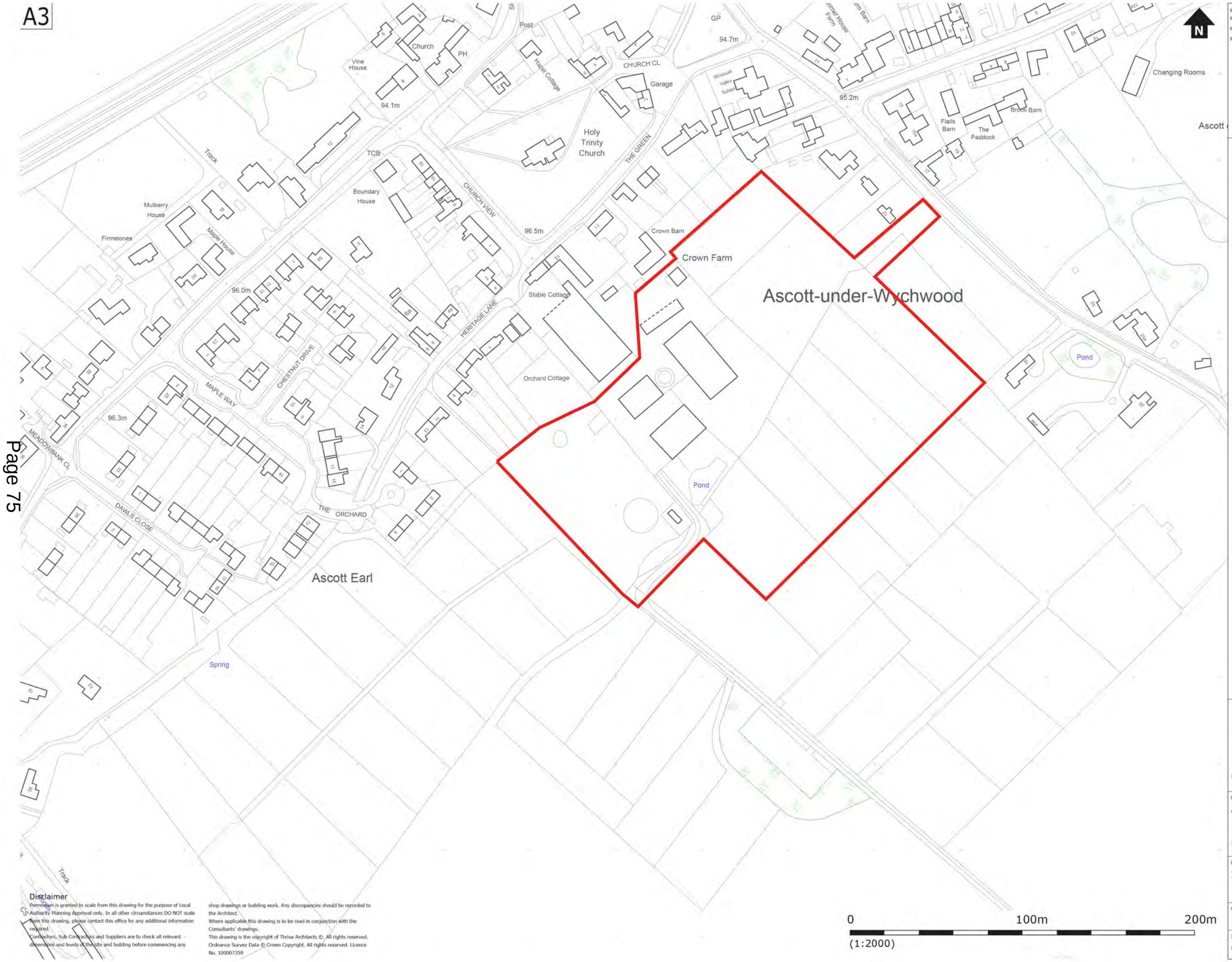
5.5 Therefore, it is concluded that there are no flood risk or drainage related reasons why the appeal scheme should not be allowed.

Appendices

Appendix A

Location Plan

A3



REV	DESCRIPTION	DATE	AUTHOR	CHK'D
P01	Preliminary Issue	12.09.22	IO	GR
P02	Red line boundary updated	17.10.22	IO	GR
P03	Red line boundary updated	02.11.22	IO	IO

0 100m 200m

(1:2000)

thrive. architects
Romsey Office
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PROJECT
Ascott under Wychwood

For: Obsidian Strategic

DRAWING
Site Location Plan

SCALE	DATE	AUTHOR	CHK'D
1:2000 @ A3	12.09.22	IO	GR

JOB NO.	DRAWING NO.	REV
OBSI180824	SLP_01	P03

Disclaimer

Permission is granted to scale from this drawing for the purpose of Local Authority Planning Approval only. In all other circumstances DO NOT scale from this drawing, please contact this office for any additional information required.

Contractors, Sub Contractors and Suppliers are to check all relevant dimensions and levels of the site and building before commencing any shop drawings or building work. Any discrepancies should be recorded to the Architect.

Where applicable this drawing is to be read in conjunction with the Consultants' drawings.

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Appendix B

Concept Masterplan

A3

Disclaimer

0 100m 200m

(1:2000)

REV	DESCRIPTION	DATE	AUTHOR	CHK'D
P01	Preliminary Issue	29.06.2022	IO	GR
P02	General Update	01.07.2022	IO	GR
P03	Pre-app Issue	14.09.2022	IO	GR
P04	Redline update. General amendments	17.10.2022	IO	GR
P05	Playground area and POS updated	19.10.22	IO	GR
P06	Redline update	02.11.22	IO	IO
P07	Layout Update	20.02.23	GR/jd	
P08	Layout Update	08.03.23	IO	GR
P09	Layout update to increase back gardens backing onto northern boundary	20.03.23	GR/IO	GR
P10	Layout update	19.04.23	GR/IO	GR

- Site Boundary
- Main Vehicular access/egress
- Pedestrian access to existing PROW
- Improved cycle/pedestrian connectivity
- Existing Vegetation
- Proposed Vegetation
- Proposed Development Plots
- Public Open Space
- Shared Surface
- Potential location of Playground Area or Outdoor Sport Pitches TBC
- Primary route
- Private driveways
- Existing PROW
- Proposed SuDS
- Existing Stone Wall

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PROJECT
Ascott under Wychwood

For: Obsidian Strategic

DRAWING
Concept Masterplan

SCALE	DATE	AUTHOR	CHK'D
1:2000 @ A3	10.06.22	IO	GR

JOB NO.	DRAWING NO.	REV
OBSI180824	CMP_01	P10

Appendix C

Lead Local Flood Authority's Consultation Response

Application no: 23/01504/OUT
Location: Land West Of London Lane Ascott Under Wychwood

Lead Local Flood Authority

Recommendation:

No Objection Subject to Conditions

Condition
The approved drainage system shall be implemented in accordance with the approved Detailed Design prior to the use of the building commencing:

Document
Floor Risk Assessment
Ref: 010_8211067_BW_Flood_Risk_Assessment
Issue 2: 05 May 2023

Drawing
Outline Surface Water Drainage Strategy
Drawing No: 8211067-SK03, P1

All relevant Hydraulic calculations produced via Microdrainage
File 8211067 - OUTLINE SW STR. Date 05/05/2023

Reason:
To ensure that the principles of sustainable drainage are incorporated into this proposal.

Condition:
Prior to first occupation, a record of the installed SuDS and site wide drainage scheme shall be submitted to and approved in writing by the Local Planning Authority for deposit with the Lead Local Flood Authority Asset Register. The details shall include:

(a) As built plans in both .pdf and .shp file format;

(b) Photographs to document each key stage of the drainage system when installed on site;

(c) Photographs to document the completed installation of the drainage structures on site;

(d) The name and contact details of any appointed management company information

Officer's Name: Shada Hasan
Officer's Title: LLFA Engineer
Date:28/06/2023

Appendix D

Topographical Survey

N

Station Information:

Station	Easting (m)	Northing (m)	Level (m)
S1	430061.476	218544.509	99.211
S2	430097.949	218508.343	102.318
S3	430153.394	218435.609	103.988
S4	430115.441	218536.617	100.672
S5	430151.503	218568.452	100.276
S6	430114.294	218392.401	105.632
S7	430290.894	218625.135	97.812
S8	430350.271	218569.482	101.164
S9	429941.235	218446.625	100.811
S10	429915.450	218473.591	100.035

OS Note:

This survey has been orientated to the Ordnance Survey (O.S) National Grid OSGB36(15) via Global Navigation Satellite Systems (GNSS) and the O.S. Active Network (OS Net).

A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN15GB & OSGM15GB transformation models.

The survey has been correlated to this point and a further one or more OSGB36 (15) points established to create a true O.S. bearing for angle orientation.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.

Please refer to Survey Station Table to enable establishment of the on-site grid and datum.

Legend:

Buildings; Wall; Kerb line; Line marking; Hedge; Drop kerb; Centre line; Top of bank; Fence; 100.000 Station Level; Tree / Bush / Sapling; Area of Undergrowth; Woodland; R Ridge Level; E Eaves Level; F Flat Roof Level; Gate

Fence types: WM; MF; IRW; PW; PR; CL; WPF; EP

Overhead Cable; Composite edge; Tarmac edge; Grass verge; Cenral/Overhang; Hedge; Bottom of bank; Station and Name

IC	Inspection chamber	Bo	Bollard
Pipe	Pipe invert	IB	Illuminated bollard
Gy	Gully	Bin	Rubbish bin
Bg	Back gully	Vp	Vent pipe
Dp	Down pipe	Gil	Ground light
Pipe	Pipe above ground	Lbox	Letter box
MH	Manhole	Stmp	Tree Stump
WL	Water level	Sy	Site
Fl	Flood light	IFL	Internal floor level
Lp	Lamp post	THL	Threshold level
Tp	Telegraph post	Sp	Sign post
Ep	Electricity post	TH	Trashole
Tl	Traffic light	BH	Borehole
Bus	Bus stop	Elec	Electric
Sv	Stop valve	BT	British Telecom
St	Stop tap	Cbox	Control box
Er	Earth rod	Tl	Tactile
Wm	Water meter	BP	Brick paved
Gas	Gas valve	CPS	Concrete paving slabs
Av	Air valve	CVR	Cover
ICU	Unidentified inspection	Rwall	Retaining wall
Ww	Wash out	TWL	Top of Wall Level
Re	Rodding eye	TCL	Tree canopy level
BB	Belisha beacon	G	Girth
CTV	Cable tv	MG	Multi girth
MkV	Marker post	IC	Inspection chamber
GmkV	Gas marker post	CL	Cover level
So	Soffit	IL	Invert level
Fh	Fire hydrant	UTR	Unable to raise

Rev	Date	Description	Drawn	Ch. Red.
1	5.4.22	Additional survey added	ER	GH13452

greenhatch group

- Topographical Surveys
- Site Engineering
- Utility / CCTV Surveys
- Measured Building Surveys
- 3D Laser Scanning
- Revit & BIM Models

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Newcastle: 24 Riverside Studios, Amethyst Road, Newcastle Bus. Park, Newcastle-U-Tyne, NE4 7YL, t. (01912) 736391

London: 07, Cornwall Terrace Mews, Regents Park, London, NW1 5LL, t. (02072) 241806

CLIENT
Obsidian Strategic Asset Management Ltd

PROJECT
Ascott-under-Wychwood, West Oxfordshire, OX7 6AU

TITLE
Topographical Survey

SCALE	DATE
A1@ 1: 1000	01.02.22
DRAWN: ER	QUALITY REF: GH12817

Level datum	See note
Grid orientation	See note
Job number	42917
Drawing No.	Rev.
42917_T	1

Comments
This plan should only be used for its original purpose. Greenhatch Group accepts no responsibility for this plan if supplied to any party other than the original client.

All dimensions should be checked on site prior to design and construction.

Drainage information (where applicable) has been visually inspected from the surface and therefore should be treated as approximate only.

Notes:

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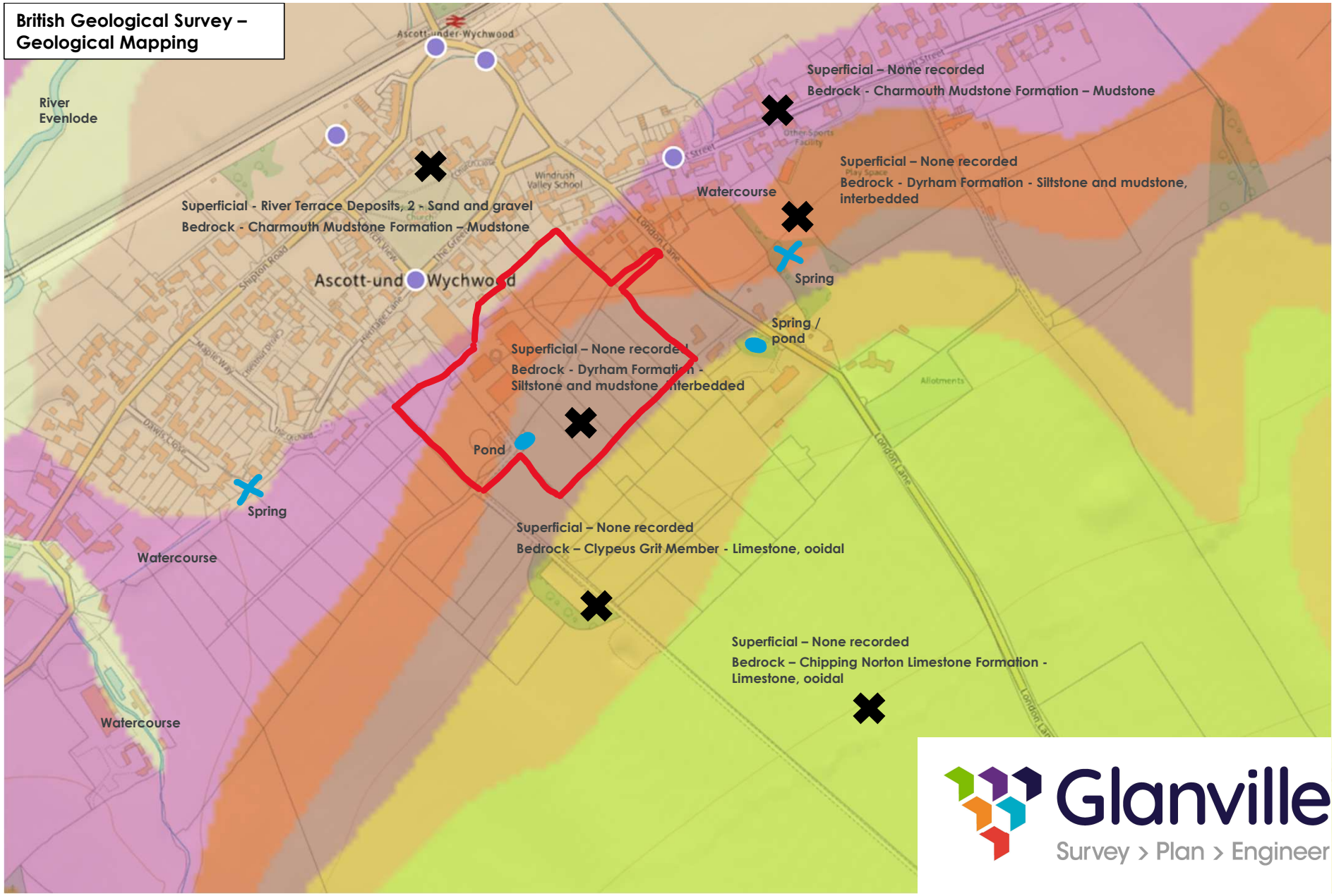
Appendix E

Geological Mapping


British Geological Survey – Geological Mapping
River Evenlode
Superficial – None recorded
Bedrock - Charmouth Mudstone Formation – Mudstone
Superficial - River Terrace Deposits, 2 - Sand and gravel
Bedrock - Charmouth Mudstone Formation – Mudstone
Watercourse
Superficial – None recorded
Bedrock - Dyrham Formation - Siltstone and mudstone, interbedded
Spring
Spring / pond
Superficial – None recorded
Bedrock - Dyrham Formation - Siltstone and mudstone, interbedded
Pond
Spring
Watercourse
Superficial – None recorded
Bedrock – Clypeus Grit Member - Limestone, ooidal
Superficial – None recorded
Bedrock – Chipping Norton Limestone Formation - Limestone, ooidal
Watercourse
Glanville
Survey > Plan > Engineer

Appendix F

BGS Infiltration SuDS GeoReport

GeoReports

British Geological Survey

Debbie Wigston
Glanville Consultants Ltd
Unit 3
Grovelands Business Centre
Boundary Way
Hemel Hempstead Industrial Estate
Hemel Hempstead
HP2 7TE

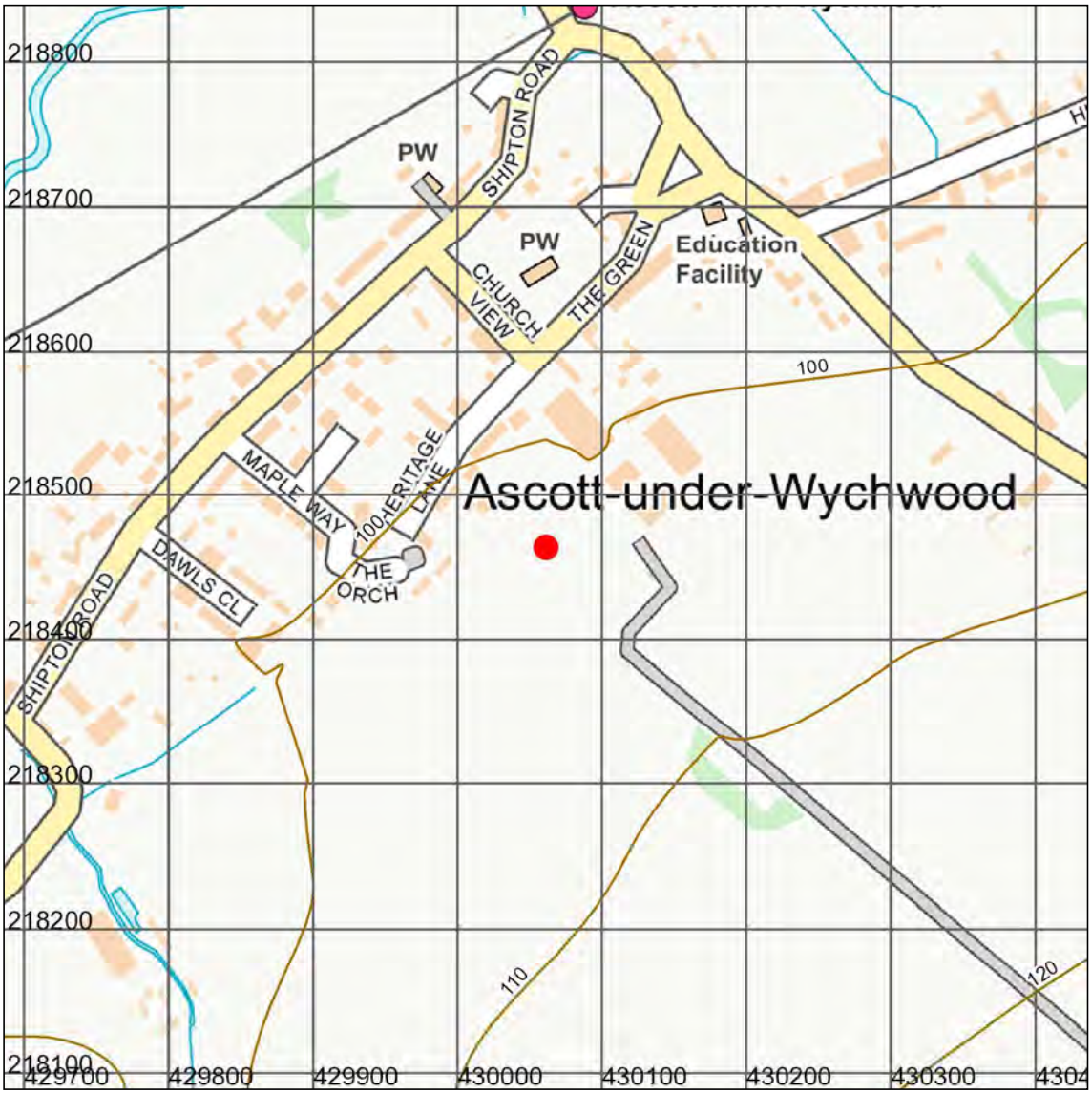
Infiltration SuDS GeoReport:

This report provides information on the suitability of the subsurface for the installation of infiltration sustainable drainage systems (SuDS). It provides information on the properties of the subsurface with respect to significant constraints, drainage, ground stability and groundwater quality protection.

Report Id: ***BGS_324503/31783***

Client reference: 8211067

Search location



Contains OS data © Crown Copyright and database right 2022. OS OpenMap Local: Scale: 1:5 000 (1cm = 50 m)
Search location indicated in red

Point centred at: 430061,218464

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Assessment for an infiltration sustainable drainage system

Introduction

Sustainable drainage systems (SuDS) are drainage solutions that manage the volume and quality of surface water close to where it falls as rain. They aim to reduce flow rates to rivers, increase local water storage capacity and reduce the transport of pollutants to the water environment. There are four main types of SuDS, which are often designed to be used in sequence. They comprise:

- **source control:** systems that control the rate of runoff
- **pre-treatment:** systems that remove sediments and pollutants
- **retention:** systems that delay the discharge of water by providing surface storage
- **infiltration:** systems that mimic natural recharge to the ground.

This report focuses on infiltration SuDS. It provides subsurface information on the properties of the ground with respect to drainage, ground stability and groundwater quality protection. It is intended principally for those involved in the preliminary assessment of the suitability of the ground for infiltration SuDS, and those involved in assessing proposals from others for sustainable drainage, but it may also be useful to help house-holders judge whether or not further professional advice should be sought. If in doubt, users should consult a suitably-qualified professional about the results in this report before making any decisions based upon it.

This GeoReport is structured in two parts:

- **Part 1. Summary data**.

  Comprises three maps that summarise the data contained within Part 2.

- **Part 2. Detailed data**.

  Comprises a further 24 maps in four thematic sections:

  - **Very significant constraints.** Maps highlight areas where infiltration may result in adverse impacts due to factors including: ground instability (soluble rocks, non-coal shallow mining and landslide hazards); persistent shallow groundwater, or the presence of made ground, which may represent a ground stability or contamination hazard.
  - **Drainage potential**. Maps indicate the drainage potential of the ground, by considering subsurface permeability, depth to groundwater and the presence of floodplain deposits.
  - **Ground stability**. Maps indicate the presence of hazards that have the potential to cause ground instability resulting in damage to some buildings and structures, if water is infiltrated to the ground.
  - **Groundwater protection**. Maps provide key indicators to help determine whether the groundwater may be susceptible to deterioration in quality as a result of infiltration.

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This report considers the suitability of the subsurface for the installation of infiltration SuDS, such as soakaways, infiltration basins or permeable pavements. It provides subsurface data to indicate whether, and which type of infiltration system may be appropriate. It does not state that infiltration SuDS are, or are not, appropriate as this is highly dependent on the design of the individual system. This report therefore describes the subsurface conditions at the site, allowing the reader to determine the suitability of the site for infiltration SuDS.

The map and text data in this report is similar to that provided in the '*Infiltration SuDS Map: Detailed*' national map product. For further information about the data, consult the '*User Guide for the Infiltration SuDS Map: Detailed*', available from http://nora.nerc.ac.uk/16618/.

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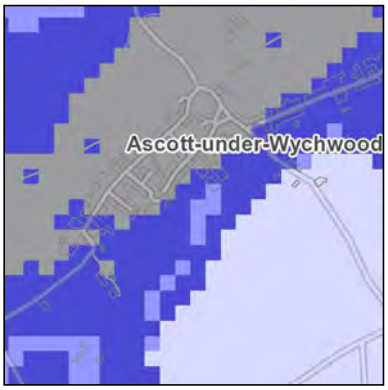
PART 1: SUMMARY DATA

This section provides a summary of the data.

In terms of the drainage potential, is the ground suitable for infiltration SuDS?



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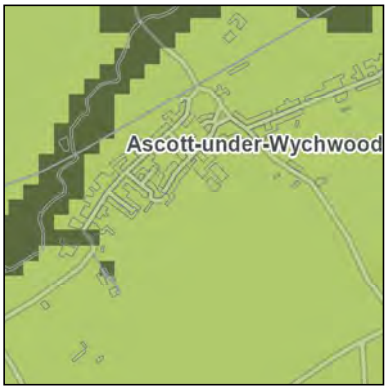
- Highly compatible for infiltration SuDS. The subsurface is likely to be suitable for free-draining infiltration SuDS.
- Probably compatible for infiltration SuDS. The subsurface is probably suitable although the design may be influenced by the ground conditions.
- Opportunities for bespoke infiltration SuDS. The subsurface is potentially suitable although the design will be influenced by the ground conditions.
- Very significant constraints are indicated. There is a very significant potential for one or more hazards associated with infiltration.

Is ground instability likely to be a problem?



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- Increased infiltration is very unlikely to result in ground instability.
- Ground instability problems may be present or anticipated, but increased infiltration is unlikely to result in ground instability.
- Ground instability problems are probably present. Increased infiltration may result in ground instability.
- There is a very significant potential for one or more geohazards associated with infiltration.

Is the groundwater susceptible to deterioration in quality?

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- The groundwater is not expected to be especially vulnerable to contamination.
- The groundwater may be vulnerable to contamination.
- The groundwater is likely to be vulnerable to contaminants.
- Made ground is present at the surface. Infiltration may increase the possibility of remobilising pollutants.

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PART 2: DETAILED DATA

This section provides further information about the properties of the ground and will help assess the suitability of the ground for infiltration SuDS.

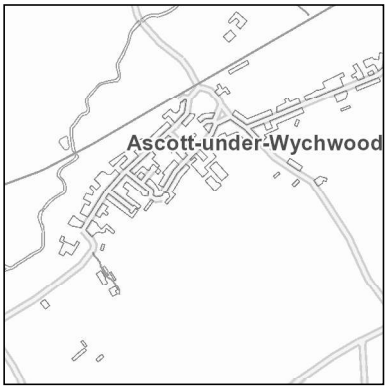
Section 1. Very significant constraints

Where maps are overlain by grey polygons, geological or hydrogeological hazards may exist that could be made worse by infiltration. The following hazards are considered:

- soluble rocks
- landslides
- shallow mining
- shallow groundwater
- made ground

For more information read ‘Explanation of terms’ at the end of this report.

Soluble rock hazard



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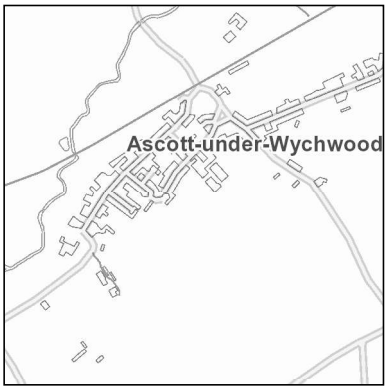
■ Very significant soluble rock hazard.

Soluble rocks are present with a very significant possibility of localised subsidence that could be initiated or made worse by infiltration. The site investigation should consider whether the potential for or the consequences of subsidence as a result of infiltration are significant.

☐ Very significant soluble rock hazards are not present; however this hazard may still need to be considered. See Part 3.

Landslide hazard



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■ Very significant landslide hazard.

Slope instability problems are almost certainly present and may be active. An increase in moisture content as a result of infiltration may cause the slope to fail. The site investigation should consider whether the potential for or the consequences of landslide as a result of infiltration are significant.

☐ Very significant landslide hazards are not present; however this hazard may still need to be considered. See Part 3.

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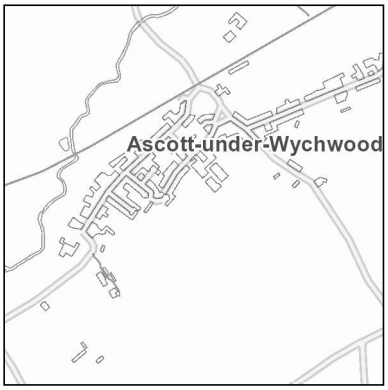
Shallow mining hazard



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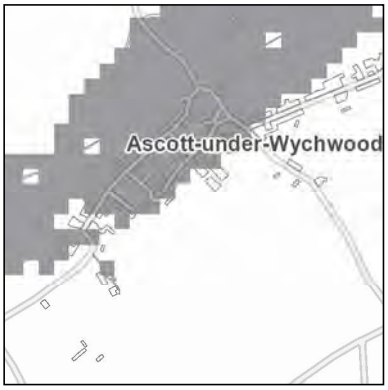
■ Very significant mining hazard.

Shallow mining is likely to be present with a very significant possibility of localised subsidence that could be initiated or made worse by increased infiltration. Also, infiltration may increase the possibility of remobilising pollutants. The site investigation should consider whether the potential for or consequences of subsidence and/or remobilisation of pollutants as a result of infiltration are significant.

☐ Very significant mining hazards are not present; however this hazard may still need to be considered. See Part 3.

Persistent shallow groundwater



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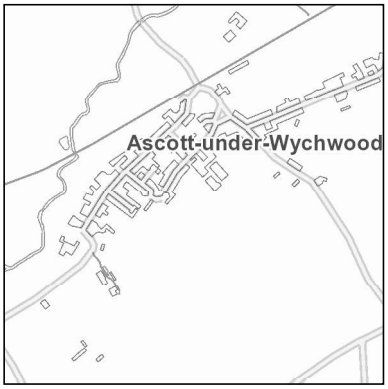
■ Very high likelihood of persistent or seasonally shallow groundwater.

Persistent or seasonally shallow groundwater is likely to be present. Infiltration may increase the likelihood of soakaway inundation, or groundwater emergence at the surface. The site investigation should consider whether the potential for or the consequences of groundwater level rise as a result of infiltration are significant.

☐ See Part 2 for the likely depth to water table.

Made ground



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■ Made ground present.

Made ground is present at the surface. Infiltration may affect ground stability or increase the possibility of remobilising pollutants. The site investigation should consider whether the potential for or consequences of ground instability and/or pollutant leaching as a result of infiltration are significant.

☐ None recorded

Section 2. Drainage potential

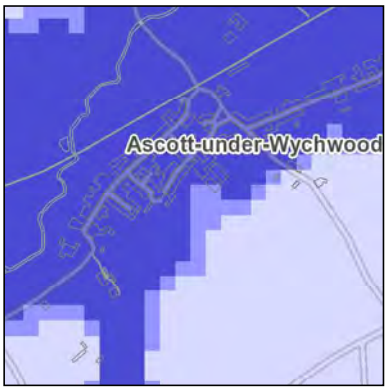
The following pages contain maps that will help you assess the drainage potential of the ground by considering the:

- depth to water table
- permeability of the superficial deposits
- thickness of the superficial deposits
- permeability of the bedrock
- presence of floodplains

Superficial deposits are not present everywhere and therefore some areas of the *superficial deposit permeability* map may not be coloured. Where this is the case, the *bedrock permeability* map shows the likely permeability of the ground. Superficial deposits in some places are very thin and hence in these places you may wish to consider both the permeability of the superficial deposits and the permeability of the bedrock. The *superficial thickness* map will tell you whether the superficial deposits are thin (< 3 m thick) or thick (>3 m). Where they are over 3 m thick, the permeability of the bedrock may not be relevant.

For more information read 'Explanation of terms' at the end of this report.

Depth to groundwater table



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Groundwater is likely to be **more than 5 m** below the ground surface throughout the year.

Groundwater is likely to be between **3 and 5 m** below the ground surface for at least part of the year.

Groundwater is likely to be **less than 3 m** below the ground surface for at least part of the year.

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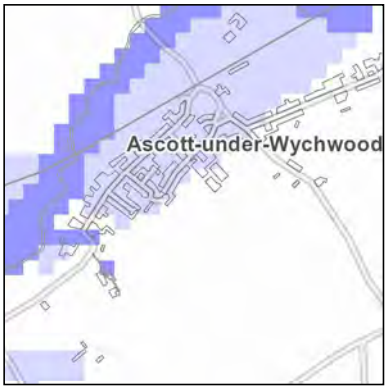
Superficial deposit permeability



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Superficial deposits are likely to be **free-draining**.

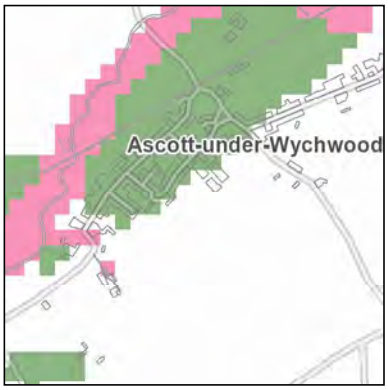
The superficial deposit permeability is **spatially variable**, but likely to permit moderate infiltration.

Superficial deposits are likely to be **poorly draining**.

These maps show the permeability range that is summarised above.

- Very Low
- Low
- Moderate
- High
- Very High

Minimum



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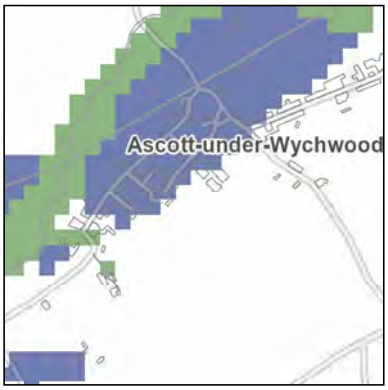
Maximum



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Superficial deposit thickness

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The thickness of superficial deposits is **< 3 m** and hence the permeability of the ground may be dependent on both the superficial deposits (where present) and underlying bedrock (see below).

The thickness of superficial deposits is **> 3 m** and hence the permeability of the superficial deposits is likely to determine the permeability of the ground.

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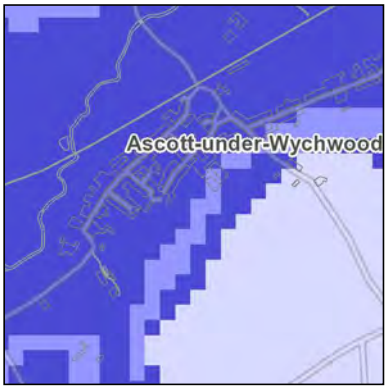
Bedrock permeability



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Bedrock deposits are likely to be **free-draining**.

The bedrock permeability is **spatially variable**, but likely to permit moderate infiltration.

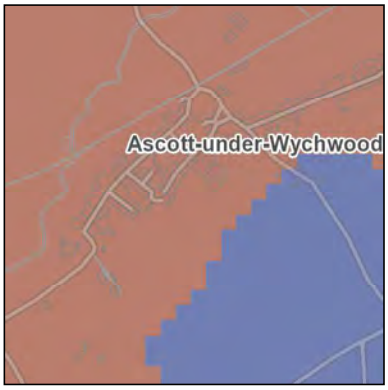
Bedrock deposits are likely to be **poorly draining**.

These maps show the permeability range that is summarised above.

Key

- Very Low
- Low
- Moderate
- High
- Very High

Minimum



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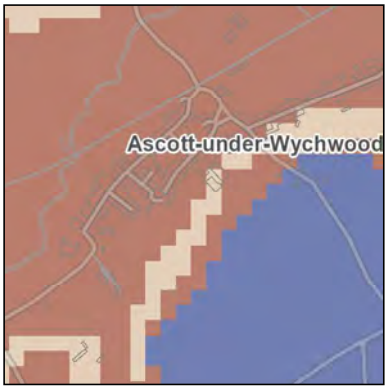
Maximum



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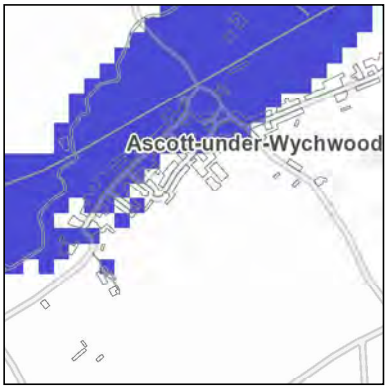
Geological indicators of flooding



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Superficial floodplain deposits or low-lying coastal areas have been identified. Groundwater levels may rise in response to high river or tide levels, potentially causing inundation of subsurface infiltration SuDS.

Section 3. Ground stability

The following pages contain maps that will help you assess whether infiltration may impact the stability of the ground. They consider hazards associated with:

- soluble rocks
- landslides
- shallow mining
- running sands
- swelling clays
- compressible ground, and
- collapsible ground

In the following maps, geohazards that are identified in green are unlikely to prevent infiltration SuDS from being installed, but they should be considered during design. For more information read ‘Explanation of terms’ at the end of this report.

Soluble rocks

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	Increased infiltration is unlikely to result in subsidence.
	Increased infiltration is unlikely to cause localised subsidence, but potential impacts should be considered.
	Increased infiltration may result in localised subsidence. The potential for or the consequences of subsidence associated with soluble rocks should be considered.
	Very significant possibility of localised subsidence that could be initiated or made worse by infiltration.

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Landslides

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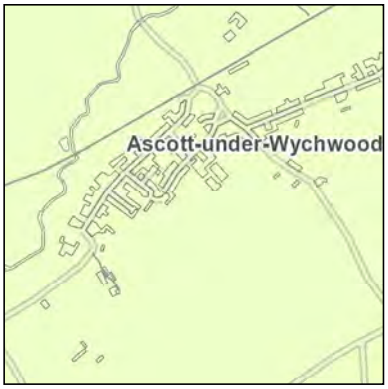
- Increased infiltration is unlikely to lead to slope instability.
- Slope instability problems may be present or anticipated, but increased infiltration is unlikely to cause instability
- Slope instability problems are probably present or have occurred in the past, and increased infiltration may result in slope instability.
- Slope instability problems are almost certainly present and may be active. An increase in moisture content as a result of infiltration may cause the slope to fail.

Shallow mining



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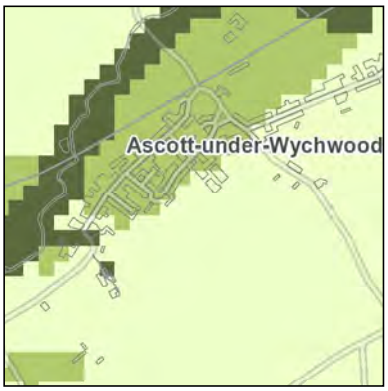
- Increased infiltration is unlikely to lead to subsidence.
- Shallow mining is possibly present. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
- Shallow mining could be present with a significant possibility that localised subsidence could be initiated or made worse by increased infiltration.
- Shallow mining is likely to be present, with a very significant possibility that localised subsidence may be initiated or made worse by increased infiltration.

Running sand



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- Increased infiltration is unlikely to cause ground collapse associated with running sands.
- Running sand is possibly present. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
- Significant possibility for running sand problems. Increased infiltration may result in a geohazard.

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Swelling clays

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- Increased infiltration is unlikely to cause shrink-swell ground movement.
- Ground is susceptible to shrink-swell ground movement. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
- Ground is susceptible to shrink-swell ground movement. Increased infiltration may result in a geohazard.

Compressible ground

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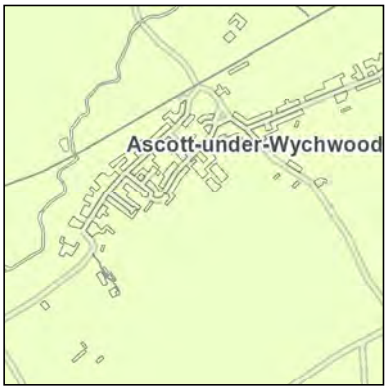
- Increased infiltration is unlikely to lead to ground compression.
- Compressibility and uneven settlement hazards are probably present. Increased infiltration may result in a geohazard.

Collapsible ground



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- Increased infiltration is unlikely to result in subsidence.
- Deposits with potential to collapse when loaded and saturated are possibly present in places. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
- Deposits with potential to collapse when loaded and saturated are probably present in places. Increased infiltration may result in a geohazard.

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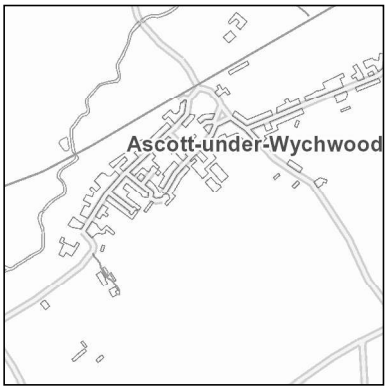
Section 4. Groundwater quality protection

The following pages contain maps showing some of the information required to ensure the protection of groundwater quality. Data presented includes:

- groundwater source protection zones (Environment Agency data)
- predominant flow mechanism
- made ground

For more information read 'Explanation of terms' at the end of this report.

Groundwater source protection zones



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Derived in part from Source Protection Zone data provided under licence from the Environment Agency © Environment Agency 2022.

- Groundwater is not within a source protection zone.
- Source protection zone IV
- Source protection zone III
- Source protection zone II
- Source protection zone I

Predominant flow mechanism

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- Water is likely to percolate through the unsaturated zone to the groundwater through either the pore space in granular media or through porespace and fractures; these processes have some potential for contaminant removal and breakdown.
- Water is likely to percolate through the unsaturated zone to the groundwater through fractures, a process which has little potential for contaminant removal and breakdown.

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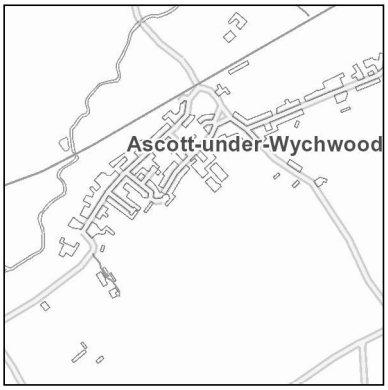
Made ground



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Made ground is present at the surface. Infiltration may increase the possibility of remobilising pollutants.

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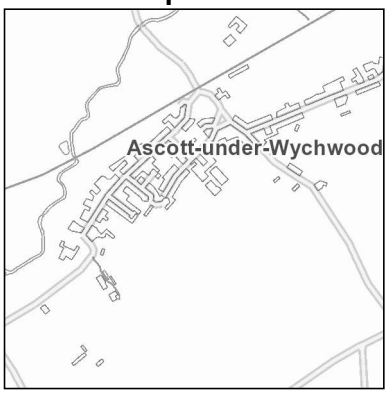
Section 5. Geological Maps

The following maps show the artificial, superficial and bedrock geology within the area of interest.

Artificial deposits



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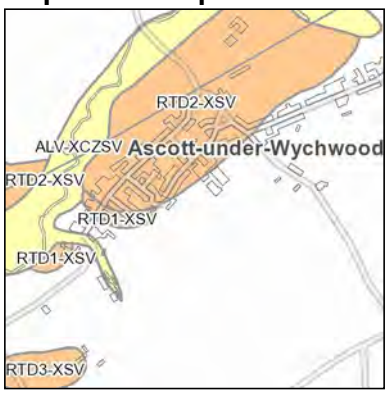
Superficial deposits



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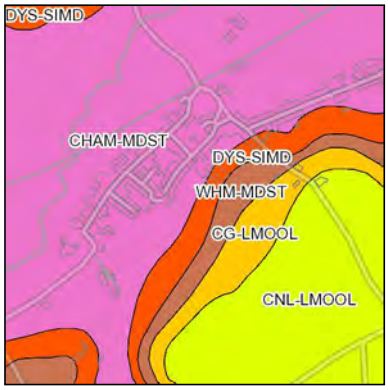
Bedrock



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Fault

Coal, ironstone or mineral vein

Note: Faults and Coals, ironstone & mineral veins are shown for illustration and to aid interpretation of the map. Not all such features are shown and their absence on the map face does not necessarily mean that none are present

Key to Artificial deposits:
No deposits recorded by BGS in the search area

Key to Superficial deposits:

Map colour	Computer Code	Rock name	Rock type
	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
	RTD1-XSV	RIVER TERRACE DEPOSITS, 1	SAND AND GRAVEL
	RTD2-XSV	RIVER TERRACE DEPOSITS, 2	SAND AND GRAVEL
	RTD3-XSV	RIVER TERRACE DEPOSITS, 3	SAND AND GRAVEL

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Key to Bedrock geology:

Map colour	Computer Code	Rock name	Rock type
	CNL-LMOOL	CHIPPING NORTON LIMESTONE FORMATION	LIMESTONE, OOIDAL
	TY-LMOOL	TAYNTON LIMESTONE FORMATION	LIMESTONE, OOIDAL
	CG-LMOOL	CLYPEUS GRIT MEMBER	LIMESTONE, OOIDAL
	WHM-MDST	WHITBY MUDSTONE FORMATION	MUDSTONE
	DYS-SIMD	DYRHAM FORMATION	SILTSTONE AND MUDSTONE, INTERBEDDED
	CHAM-MDST	CHARMOUTH MUDSTONE FORMATION	MUDSTONE

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Limitations of this report:

- This report is concerned with the potential for infiltration-to-the-ground to be used as a SuDS technique at the site described. It only considers the subsurface beneath the search area and does NOT consider potential surface or subsurface impacts outside of that area.
- This report is NOT an alternative for an on-site investigation or soakaway test, which might reach a different conclusion.
- This report must NOT be used to justify disposal of foul waste or grey water.
- This report is based on and limited to an interpretation of the records held by the British Geological Survey (BGS) at the time the search is performed. The datasets used (with the exception of that showing depth to water table) are based on 1:50 000 digital geological maps and not site-specific data.
- Other more specific and detailed ground instability information for the site may be held by BGS, and an assessment of this could result in a modified assessment.
- To interpret the maps correctly, the report must be viewed and printed in colour.
- The search does NOT consider the suitability of sites with regard to:
    - previous land use,
    - potential for, or presence of contaminated land
    - presence of perched water tables
    - shallow mining hazards relating to coal mining. Searches of coal mining should be carried out via The Coal Authority Mine Reports Service: www.coalminingreports.co.uk.
    - made ground, where not recorded
    - proximity to landfill sites (searches for landfill sites or contaminated land should be carried out through consultation with local authorities/Environment Agency)
    - zones around private water supply boreholes that are susceptible to groundwater contamination.
- This report is supplied in accordance with the GeoReports Terms & Conditions available separately, and the copyright restrictions described at the end of this report

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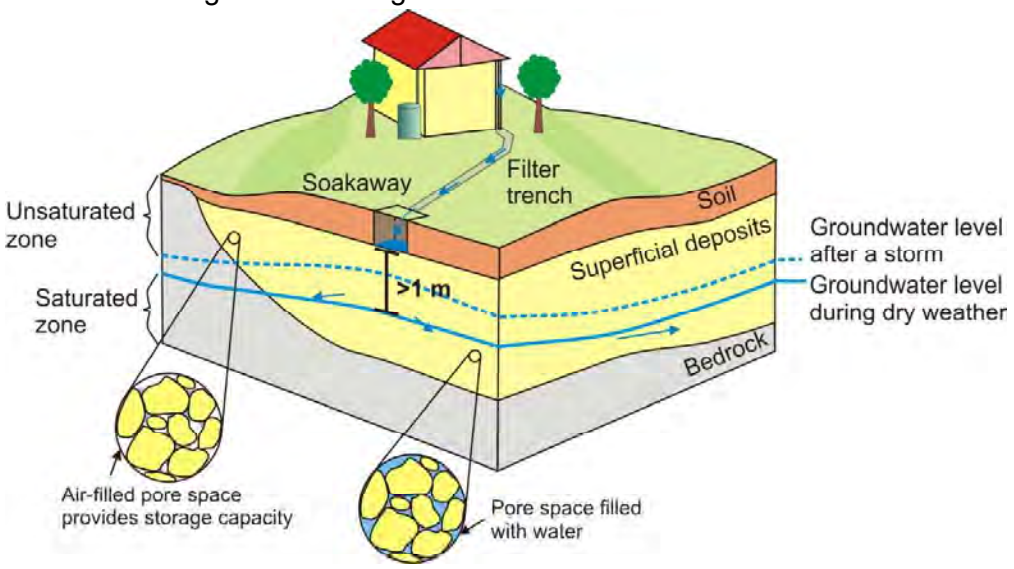
Explanation of terms

Depth to groundwater

In the shallow subsurface, the ground is commonly unsaturated with respect to water. Air fills the spaces within the soil and the underlying superficial deposits and bedrock. At some depth below the ground surface, there is a level below which these spaces are full of water. This level is known as the groundwater level, and the water below it is termed the groundwater. When water is infiltrated, the groundwater level may rise temporarily. To ensure that there is space in the unsaturated zone to accommodate this, there should be a minimum thickness of 1 m between the base of the infiltration system and the water table. An estimate of the *depth to groundwater* is therefore useful in determining whether the ground is suitable for infiltration.



Groundwater flooding

Groundwater flooding occurs when a rise in groundwater level results in very shallow groundwater or the emergence of groundwater at the surface. If infiltration systems are installed in areas that are susceptible to groundwater flooding, it is possible that the system could become inundated. The susceptibility map seeks to identify areas where the geological conditions and water tables indicate that groundwater level rise could occur under certain circumstances. A high susceptibility to groundwater flooding classification does not mean that groundwater flooding has ever occurred in the past, or will do so in the future as the susceptibility maps do not contain information on how often flooding may occur. The susceptibility maps are designed for planning; identifying areas where groundwater flooding might be an issue that needs to be taken into account.

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Geological indicators of flooding

In floodplain deposits, groundwater level can be influenced by the water level in the adjacent river. Groundwater level may increase during periods of fluvial flood and therefore this should be taken into account when designing infiltration systems on such deposits. The *geological indicators of flooding* dataset shows where there is geological evidence (floodplain deposits) that flooding has occurred in the past.

For further information on flood-risk, the likely frequency of its recurrence in relation to any proposed development of the site, and the status of any flood prevention measures in place, you are advised to contact the local office of the Environment Agency (England and Wales) at www.environment-agency.gov.uk/ or the Scottish Environment Protection Agency (Scotland) at www.sepa.org.uk.

Artificial ground

Artificial ground comprises deposits and excavations that have been created or modified by human activity. It includes ground that is worked (quarries and road cuttings), infilled (back-filled quarries), landscaped (surface re-shaping), disturbed (near surface mineral workings) or classified as made ground (embankments and spoil heaps). The composition and properties of artificial ground are often unknown. In particular, the permeability and chemical composition of the artificial ground should be determined to ensure that the ground will drain and that any contaminants present will not be remobilised.

Superficial permeability

Superficial deposits are those geological deposits that were formed during the most recent period of geological time (as old as 2.6 million years before present). They generally comprise relatively thin deposits of gravel, sand, silt and clay and are present beneath the pedological soil in patches or larger spreads over much of Britain. The ease with which water can percolate through these deposits is controlled by their permeability and varies widely depending on their composition. Those deposits comprising clays and silts are less permeable and thus infiltration is likely to be slow, such that water may pool on the surface. In comparison, deposits comprising sands and gravels are more permeable allowing water to percolate freely.

Bedrock permeability

Bedrock forms the main mass of rock forming the Earth. It is present everywhere, commonly beneath superficial deposits. Where the superficial deposits are thin or absent, the ease with which water will percolate into the ground depends on the permeability of the bedrock.

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Natural ground instability

Natural ground instability refers to the propensity for upward, lateral or downward movement of the ground that can be caused by a number of natural geological hazards (e.g. ground dissolution/compressible ground). Some movements associated with particular hazards may be gradual and of millimetre or centimetre scale, whilst others may be sudden and of metre or tens of metres scale. Significant natural ground instability has the potential to cause damage to buildings and structures, especially when the drainage characteristics of a site are altered. It should be noted, however, that many buildings, particularly more modern ones, are built to such a standard that they can remain unaffected in areas of significant ground movement.

Shrink-swell

A shrinking and swelling clay changes volume significantly according to how much water it contains. All clay deposits change volume as their water content varies, typically swelling in winter and shrinking in summer, but some do so to a greater extent than others. Contributory circumstances could include drought, leaking service pipes, tree roots drying-out the ground or changes to local drainage patterns, such as the creation of soakaways. Shrinkage may remove support from the foundations of buildings and structures, whereas clay expansion may lead to uplift (heave) or lateral stress on part or all of a structure; any such movements may cause cracking and distortion.

Landslides (slope stability)

A landslide is a relatively rapid outward and downward movement of a mass of ground on a slope, due to the force of gravity. A slope is under stress from gravity but will not move if its strength is greater than this stress. If the balance is altered so that the stress exceeds the strength, then movement will occur. The stability of a slope can be reduced by removing ground at the base of the slope, by placing material on the slope, especially at the top, or by increasing the water content of the materials forming the slope. Increase in subsurface water content beneath a soakaway could increase susceptibility to landslide hazards. The assessment of landslide hazard refers to the stability of the present land surface. It does not encompass a consideration of the stability of excavations.

Soluble rocks (dissolution)

Some rocks are soluble in water and can be progressively removed by the flow of water through the ground. This process tends to create cavities, potentially leading to the collapse of overlying materials and possibly subsidence at the surface. The release of water into the subsurface from infiltration systems may increase the dissolution of rock or destabilise material above or within a cavity. Dissolution cavities may create a pathway for rapid transport of contaminated water to an aquifer or water course.

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Compressible ground

Many ground materials contain water-filled pores (the spaces between solid particles). Ground is compressible if a building (or other load) can cause the water in the pore space to be squeezed out, causing the ground to decrease in thickness. If ground is extremely compressible the building may sink. If the ground is not uniformly compressible, different parts of the building may sink by different amounts, possibly causing tilting, cracking or distortion. The compressibility of the ground may alter as a result of changes in subsurface water content caused by the release of water from soakaways.

Collapsible deposits

Collapsible ground comprises certain fine-grained materials with large pore spaces (the spaces between solid particles). It can collapse when it becomes saturated by water and/or a building (or other structure) places too great a load on it. If the material below a building collapses it may cause the building to sink. If the collapsible ground is variable in thickness or distribution, different parts of the building may sink by different amounts, possibly causing tilting, cracking or distortion. The subsurface underlying a soakaway will experience an increase in water content that may affect the stability of the ground. This hazard is most likely to be encountered only in parts of southern England.

Running sand

Running sand conditions occur when loosely-packed sand, saturated with water, flows into an excavation, borehole or other type of void. The pressure of the water filling the spaces between the sand grains reduces the contact between the grains and they are carried along by the flow. This can lead to subsidence of the surrounding ground. Running sand is potentially hazardous during the drainage system installation. During installation, excavation of the ground may create a space into which sand can flow, potentially causing subsidence of surrounding ground.

Shallow mining hazards (non coal)

Current or past underground mining for coal or for other commodities can give rise to cavities at shallow or intermediate depths, which may cause fracturing, general settlement, or the formation of crown-holes in the ground above. Spoil from mineral workings may also present a pollution hazard. The release of water into the subsurface from soakaways may destabilise material above or within a cavity. Cavities arising as a consequence of mining may also create a pathway for rapid transport of contaminated water to an aquifer or watercourse. The mining hazards map is derived from the geological map and considers the potential for subsidence associated with mining on the basis of geology type. Therefore if mining is known to occur within a certain rock, the map will highlight the potential for a hazard within the area covered by that geology.

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For more information regarding underground and opencast **coal mining**, the location of mine entries (shafts and adits) and matters relating to subsidence or other ground movement induced by **coal mining** please contact the Coal Authority, Mining Reports, 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG; telephone 0845 762 6848 or at www.coal.gov.uk**.** For more information regarding other types of mining (i.e. non-coal), please contact the British Geological Survey.

Groundwater source protection zones

In England and Wales, the Environment Agency has defined areas around wells, boreholes and springs that are used for the abstraction of public drinking water as source protection zones. In conjunction with Groundwater Protection Policy the zones are used to restrict activities that may impact groundwater quality, thereby preventing pollution of underlying aquifers, such that drinking water quality is upheld. The Environment Agency can provide advice on the location and implications of source protection zones in your area (www.environment-agency.gov.uk/)

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Appendix G

Existing Drainage Catchment Areas & Brownfield Run-off Rate Calculations

N

Existing French drain / infiltration trench serving stable yard. Exceedance flows from feature discharge off-site towards properties on The Green.

Culvert/cut-out of masonary wall to allow surface water run-off to enter ex. french drain. Culvert Ø: 0.60m

French drain

French drain

Dished kerb channel used along foot of masonary wall to direct collected run-off to ex. French drain.

Gravel yard area has been used for storage of construction materials and other site equipment for neighbouring development throughout construction phase. Run-off generated within this area discharges off-site to London Lane.

Hardstanding area within remaining on-site catchment discharges across site towards ex. French drain.

General direction of fall in topography directs large volume of greenfield run-off northwards/towards London Lane.

Approx. 1095 m^2 of impermeable area currently discharges off-site directly overland towards Heritage Lane / Church View / The Green. Peak Discharge Rate for 1% AEP Storm: 12.2 l/s

Tree line helps direct run-off in this area towards ex. stable yard and French drain.

Combination of concrete, hardstanding materials and compacted earth access track does not benefit from positive drainage system and, as such, discharge run-off from catchment across land

Existing Pond.

Guttering and downpipes on exiting structure damaged and therefore discharging run-off directly overland.

10.0 0.0 10.0 20.0 30.0 40.0 50.0

Scale = 1:500 @ A1

NOTES

1. Dimensions not to be scaled from this drawing for construction purposes.
2. This drawing should be read in conjunction with the associated Flood Risk Assessment and all relevant standards.
3. Sewer runs and SuDS features are indictive only for preliminary design purposes and are subject to detailed design. All levels shown in meters AOD.
4. Site Layout taken from Thrive Architects drawing OBSI180824 CMP_01 P10, dated June 2022.
5. Topographical levels taken from Greenhatch group drawing 42917_T1, dated February 2022.

KEY

- Existing Structures Draining On-site: Roof Area = 2045m^2
- Existing Hardstanding/Compacted Areas Draining On-site: Impermeable Area = 2031m^2
- Existing Hardstanding/Compacted Areas Draining Off-site: Impermeable Area = 1095m^2

Total Impermeable Area = 5171m^2

- Existing Gravel/Construction Storage Areas: Semi-Permeable Area = 1083m^2
- Existing Run-off Flow Path - Retained On-site
- Existing Run-off Flow Path - Flows Off-site
- Topographical Direction of Fall
- Exceedance Flow Route - Existing French Drain

Rev.	Description	Date	Chkd
P3	Issued with Technical Note.	18/01/24 SM	JB/CS
P2	Updated for Appeal.	09/01/24 SM	JB
P1	Produced for Planning.	13/10/2023 JD	JB

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Client :
Obsidian Strategic Asset Management

Project :
Land off London Lane,
Ascott-under-Wychwood

Title :
Existing Impermeable Areas & Drainage Regime

Project Engineer :	S McNair	Scale :	1:500 @ A1
Project Director :	J Birch	Date :	January 2024
Status :	PLANNING		

Drawing No. 8211067 - SK07 Rev P3

General Inputs

Site Location	Ascott-under-Wychwood OFF-SITE DISCHARGE
Hydrological Region	6
SAAR (mm)	750
Soil Type	
SPR	0.45
M5-60 (mm)	19.8
r	0.35
Total impermeable area (m^2)	1095
Runoff coefficient	1
Total site area (m^2)	13390
$QBAR_{rural}$ (l/s)	**6.4**

Rainfall Calculation

Method: *Wall. procedure* *Z1 * M5-60* *Wall. procedure* *Z2 * M5-D* *M100-D / D* *D * Q_{BAR}*

1 in 1 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 1)	M1-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	0.64	12.672	12.672	**3.9**

1 in 2 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 2)	M2-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	0.81	16.038	16.038	**4.9**

1 in 30 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 30)	M30-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	1.54	30.492	30.492	**9.3**

1 in 100 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 100)	M100-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	2.03	40.194	40.194	**12.2**

General Inputs

Site Location	Ascott-under-Wychwood ON-SITE DISCHARGE
Hydrological Region	6
SAAR (mm)	750
Soil Type	
SPR	0.45
M5-60 (mm)	19.8
r	0.35
Total impermeable area (m^2)	4076
Runoff coefficient	1
Total site area (m^2)	13390
$QBAR_{rural}$ (l/s)	**6.4**

Rainfall Calculation

Method: *Wall. procedure* *Z1 * M5-60* *Wall. procedure* *Z2 * M5-D* *M100-D / D* *D * Q_{BAR}*

1 in 1 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 1)	M1-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	0.64	12.672	12.672	**14.3**

1 in 2 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 2)	M2-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	0.81	16.038	16.038	**18.2**

1 in 30 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 30)	M30-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	1.54	30.492	30.492	**34.5**

1 in 100 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 100)	M100-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	2.03	40.194	40.194	**45.5**

General Inputs

Site Location	Ascott-under-Wychwood ENTIRE BF AREA
Hydrological Region	6
SAAR (mm)	750
Soil Type	
SPR	0.45
M5-60 (mm)	19.8
r	0.35
Total impermeable area (m^2)	5171
Runoff coefficient	1
Total site area (m^2)	13390
$QBAR_{rural}$ (l/s)	**6.4**

Rainfall Calculation

Method: *Wall. procedure* | *Z1 * M5-60* | *Wall. procedure* | *Z2 * M5-D* | *M100-D / D* | *D * Q_{BAR}*

1 in 1 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 1)	M1-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	0.64	12.672	12.672	**18.2**

1 in 2 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 2)	M2-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	0.81	16.038	16.038	**23.0**

1 in 30 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 30)	M30-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	1.54	30.492	30.492	**43.8**

1 in 100 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 100)	M100-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	2.03	40.194	40.194	**57.7**

Appendix H

Statement to LPA by Chris Badger, Former Tenant Farmer at Crown Farm

APPENDIX 4

Statement to the LPA by Chris Badger, former tenant farmer at Crown Farm.

"As far as water is concerned, I believe there are two problems; the first, where the planning application is proposed is very wet especially in the winter months. When I had the livery at the farm we would not put horses out in this field between November and March. There are places that hold water permanently through a normal winter. There are no springs erupting in the field itself, but I believe there are some underground. The pond just above the top building at Crown Farm is full of water during the winter months with the overflow going into a stone drain then into the main drain taking the water from the indoor school, around the building and into the village by the main entrance to the farm.

The second water problem is water coming down the Leafield Road crossing the B4437 and then heading down the road in the direction of the farm (called New Road), down through to farm buildings and finishing up by Crown Barn boundary.

When I was at the farm, I put a bump in the road to divert the water coming down New Road, around the outdoor school and into the brash ground. However, I also kept the ditches on the roadside verges clear thus minimising the water coming from Fairspear. This obviously must be maintained which is not happening today. Also, I put in a soakaway pit just above Crown Barn House to try and alleviate any problems in extreme conditions.

Over the years, the pit silted up so before I moved to 3 The Green, I dug a trench across the field and filled it with shingle to help delay any silting up. The trench then continued to a soakaway just above my neighbour John Cull at 1 The Green. This does work in normal conditions but in extreme conditions, even this overflows.

As a result of localised flooding and to prevent water entering homes:

- *7 The Green has a pump*
- *The Green has sandbags*
- *3 The Green has a pump*
- *1 The Green has a pump*

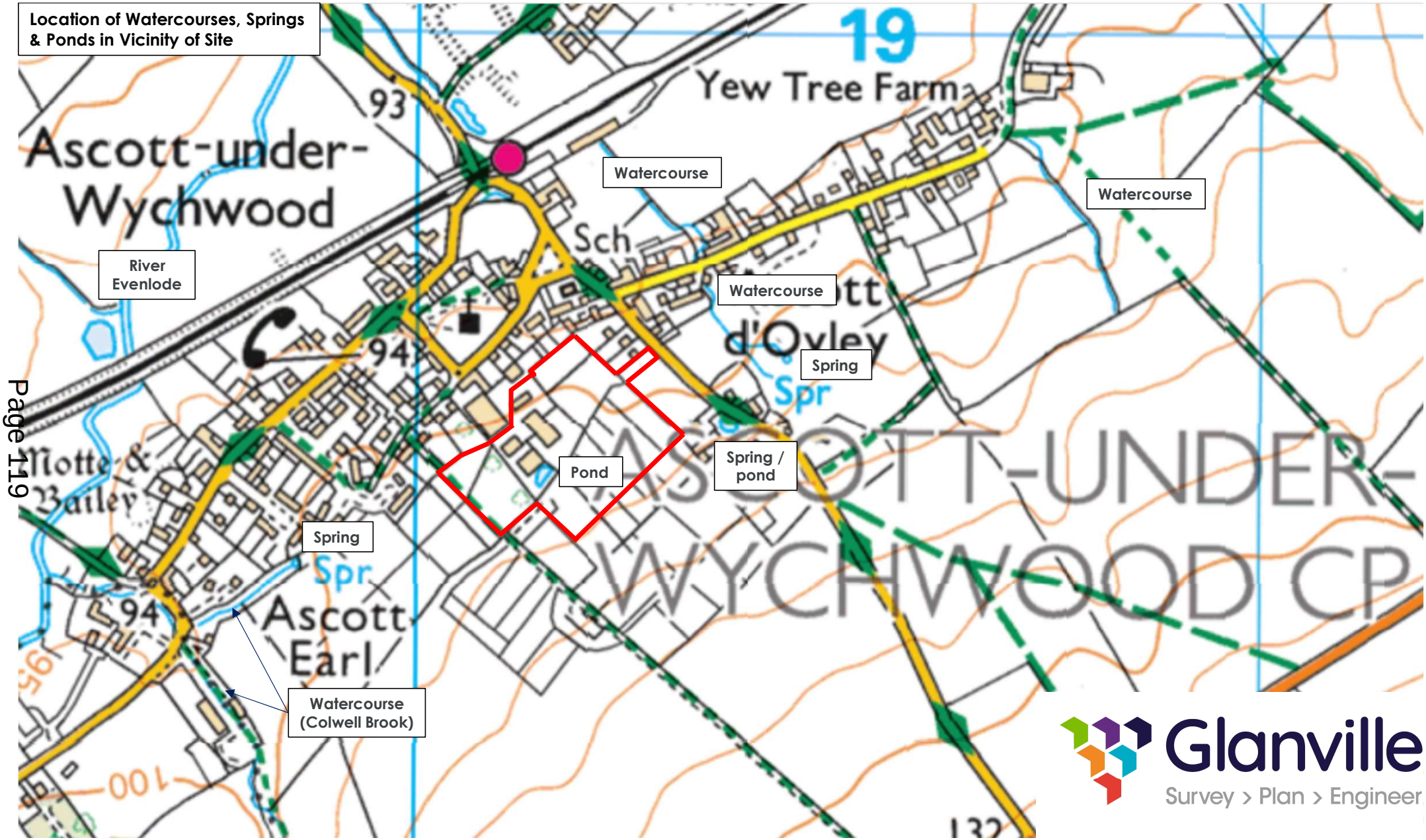
These are the precautions we need to take to pump excess water heading for the houses and divert towards the area of the Village Green.

This only goes to prove a water drainage problem exists as maintenance of the roadside verges does not really exist as does the hump in New Road. Any blockages that occur i.e., guttering overflow, drains blocked only add to the situation. Therefore, there is a huge concern with more tarmac and roof water adding to our problems. In simple terms, water only knows one way to go, and that increasingly looks like a one way route through our houses.

Chris Badger – 3 The Green (previously Crown Farm)"

Appendix I

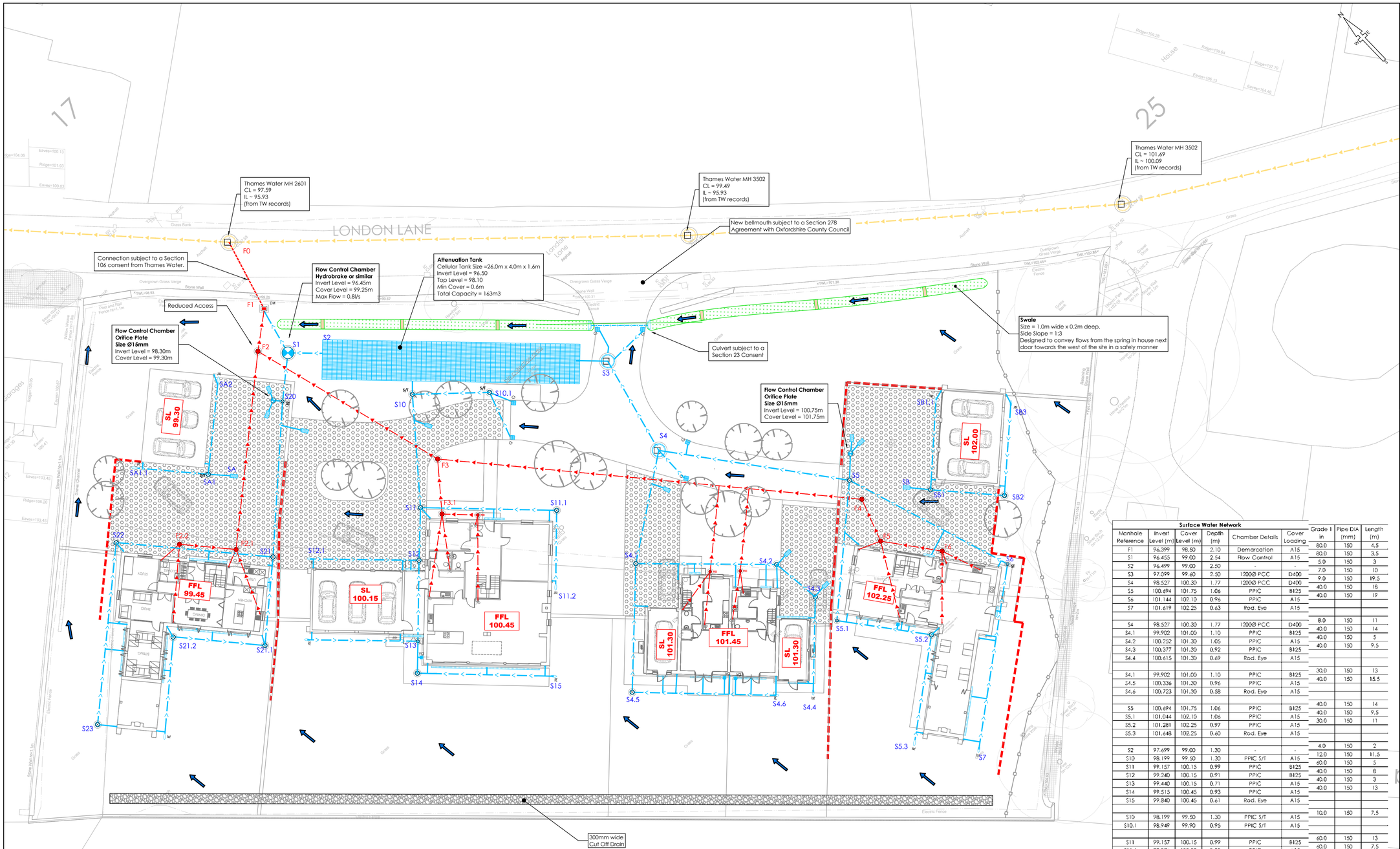
Location of Watercourses, Springs & Ponds in Vicinity of Site



Glanville
Survey > Plan > Engineer

Appendix J

Approved Drainage Design for Foresters Court, London Lane



Drainage Key

Sewers

	Foul water drain (private/non adoptable)
	Surface water drain (private/non adoptable)
	Existing foul water sewer (Adopted)
	Existing combined water sewer (Adopted)
	Proposed combined water sewer (Adoptable)

Chamber Key

FW/SW

FW / SW	Mini access chamber (mac) - 300mmØ
	PPIC - 475mmØ*
	P.C.C. units/brick*
DM	Adoptable demarcation manhole within 1m of boundary
	Manhole Depth: 1.25m to 1.5m* Depth: 1.55m to 3.0m*

* General note
(Refer to standard details & longitudinal sections for chamber sizes. Size may need to increase dependant on number of incoming pipes/size of incoming pipes)

	Surface water rodding eye
	Rain water down pipe (roddable access)
	Soil vent pipe/soil stack
ST	Silt Trap (ST) with removable silt bucket
S1/F1	Manhole reference number
YG	Yard gully (150mm - 200mmØ trapped)
G	Road gully (trapped) D400
FG	Floor gully (trapped)
S	Surface water sump unit
	Linear drainage channel
	Cellular storage (refer to drawing for sizes)
	RWP cellular discharge/collection unit
	Headwall
	Tree root protection zone (RPZ)
	Impermeable barrier to stop lateral movement of water
FFL XX.XX	Finished Floor Level (FFL)
	Permeable Gravel
	Flood exceedance routing

Surface Water Network

Manhole Reference	Invert Level (m)	Cover Level (m)	Depth (m)	Chamber Details	Cover Loading	Grade 1 in	Pipe DIA (mm)	Length (m)
F1	96.399	98.50	2.10	Demarcation	A15	80.0	150	4.5
S1	96.455	99.00	2.54	Flow Control	A15	80.0	150	3.5
S2	96.499	99.00	2.50	-	-	5.0	150	3
S3	97.099	99.60	2.50	1200Ø PCC	D400	7.0	150	10
S4	98.527	100.30	1.77	1200Ø PCC	D400	9.0	150	19.5
S5	100.694	101.75	1.06	PPIC	B125	40.0	150	18
S6	101.144	102.10	0.96	PPIC	A15	40.0	150	19
S7	101.619	102.25	0.63	Rod. Eye	A15			
						8.0	150	11
S4	98.527	100.30	1.77	1200Ø PCC	D400	40.0	150	14
S4.1	99.902	101.00	1.10	PPIC	B125	40.0	150	5
S4.2	100.252	101.30	1.05	PPIC	A15	40.0	150	9.5
S4.3	100.377	101.30	0.92	PPIC	B125			
S4.4	100.615	101.30	0.69	Rod. Eye	A15			
						30.0	150	13
S4.1	99.902	101.00	1.10	PPIC	B125	40.0	150	15.5
S4.5	100.336	101.30	0.96	PPIC	A15			
S4.6	100.723	101.30	0.58	Rod. Eye	A15			
						40.0	150	14
S5	100.694	101.75	1.06	PPIC	B125	40.0	150	9.5
S5.1	101.044	102.10	1.06	PPIC	A15	30.0	150	11
S5.2	101.281	102.25	0.97	PPIC	A15			
S5.3	101.648	102.25	0.60	Rod. Eye	A15			
						4.0	150	2
S2	97.699	99.00	1.30	-	-	12.0	150	11.5
S10	98.199	99.50	1.30	PPIC S/T	A15	60.0	150	5
S11	99.157	100.15	0.99	PPIC	B125	40.0	150	8
S12	99.240	100.15	0.91	PPIC	B125	40.0	150	3
S13	99.440	100.15	0.71	PPIC	A15	40.0	150	13
S14	99.515	100.45	0.93	PPIC	A15			
S15	99.840	100.45	0.61	Rod. Eye	A15			
						10.0	150	7.5
S10	98.199	99.50	1.30	PPIC S/T	A15			
S10.1	98.949	99.90	0.95	PPIC S/T	A15			
						60.0	150	13
S11	99.157	100.15	0.99	PPIC	B125	60.0	150	7.5
S11.1	99.374	100.30	0.93	PPIC	A15			
S11.2	99.499	100.30	0.80	Rod. Eye	A15			
						40.0	150	10.5
S12	99.240	100.15	0.91	PPIC	B125			
S12.1	99.503	100.15	0.65	Rod. Eye	B125			
						4.0	150	5
S1	96.455	99.00	2.54	Flow Control	A15	40.0	150	16
S20	97.705	99.30	1.59	PPIC	B125	60.0	150	16
S21	98.105	99.30	1.19	PPIC	B125	60.0	150	19
S22	98.372	99.30	0.93	PPIC	B125			
S23	98.688	99.30	0.61	PPIC	A15			
						60.0	150	9
S21	98.105	99.30	1.19	PPIC	B125	60.0	150	9
S21.1	98.255	99.30	1.04	PPIC	A15	60.0	150	10
S21.2	98.405	99.30	0.89	PPIC	A15			
S21.3	98.572	99.30	0.73	Rod. Eye	A15			
						80.0	100	2
SA	98.750	99.30	0.55	-	-	80.0	100	9.5
SA1	98.775	99.30	0.52	PPIC S/T	B125			
SA2	98.894	99.30	0.41	Rod. Eye	B125			
			0.00			80.0	100	7
SA1	98.775	99.30	0.52	PPIC S/T	B125			
SA1.1	98.863	99.30	0.44	Rod. Eye	B125			
						80.0	100	2
SB	101.350	101.90	0.55	-	-	80.0	100	7
SB1	101.375	102.00	0.63	PPIC S/T	B125	80.0	100	9.5
SB2	101.463	102.50	1.04	PPIC	A15			
SB3	101.581	102.50	0.92	Rod. Eye	A15			
						80.0	100	9
SB1	101.375	102.00	0.63	PPIC S/T	B125			
SB1.1	101.488	102.00	0.51	Rod. Eye	B125			

Foul Water Network

Manhole Reference	Invert Level (m)	Cover Level (m)	Depth (m)	Chamber Details	Cover Loading	Grade 1 in	Pipe DIA (mm)	Length (m)
F0	95.930	97.59	1.66	Existing	-	16.0	150	7.5
F1	96.399	98.50	2.10	Demarcation	A15	5.0	100	4
F2	97.249	99.00	1.75	PPIC	A15	12.0	100	21
F3	98.999	100.10	1.10	PPIC	A15	25.0	100	43
F4	100.719	101.75	1.03	PPIC	B125	7.0	100	4.5
F5	101.362	102.25	0.89	PPIC	B125	60.0	100	6.5
F6	101.470	102.25	0.78	PPIC	B125			
						15.0	100	20
F2	97.249	99.00	1.75	PPIC	A15	30.0	100	5
F2.1	98.582	99.45	0.87	PPIC	B125			
F2.2	98.749	99.45	0.70	PPIC	B125			
						15.0	100	5.5
F3	98.999	100.10	1.10	PPIC	A15			
F3.1	99.365	100.20	0.83	PPIC	B125			

CDM RESIDUAL RISK ITEM
Existing services likely within working area.
Danger to site personnel and general public

CDM RESIDUAL RISK ITEM
Contact with waste water when making drainage connections.
Risk of infection from Weils disease etc.

CDM RESIDUAL RISK ITEM
Works within confined spaces.

DESIGNER NOTE
Groundwater was not found within 20m during the investigation carried out by GIS Southern in November 2019. Only seepage was found in two locations at depths of 1.85m and 1.90m. The results of the permeability testing indicate very low values with insufficient data to allow calculation of an infiltration rate.

DESIGNER NOTE
CBR value between of 2.5% taken from site investigation Report Ref S.5429 undertaken by GIS Southern in November 2019

DESIGNER NOTE
SuDS features sized for a 1 in 100 year event + 40% Climate Change

DESIGNER NOTE
Access to existing inspection chambers to be maintained

DESIGNER NOTE
SVP's and RWP's locations subject to confirmation from the Architect.

REV	REVISION DETAILS	DATE	DRAWN BY
P03	Threshold channels and external taps added.	20/01/21	MBD
P02	Updated with latest plans. Drainage amended to suit	19/01/21	AC
P01	Initial issue	20/11/20	MBD

CLIENT: Kingerlee Homes

ORIGINATOR: SWJ

PROJECT: 5 Units London Lane Ascott Under Wychwood

TITLE: Drainage Design

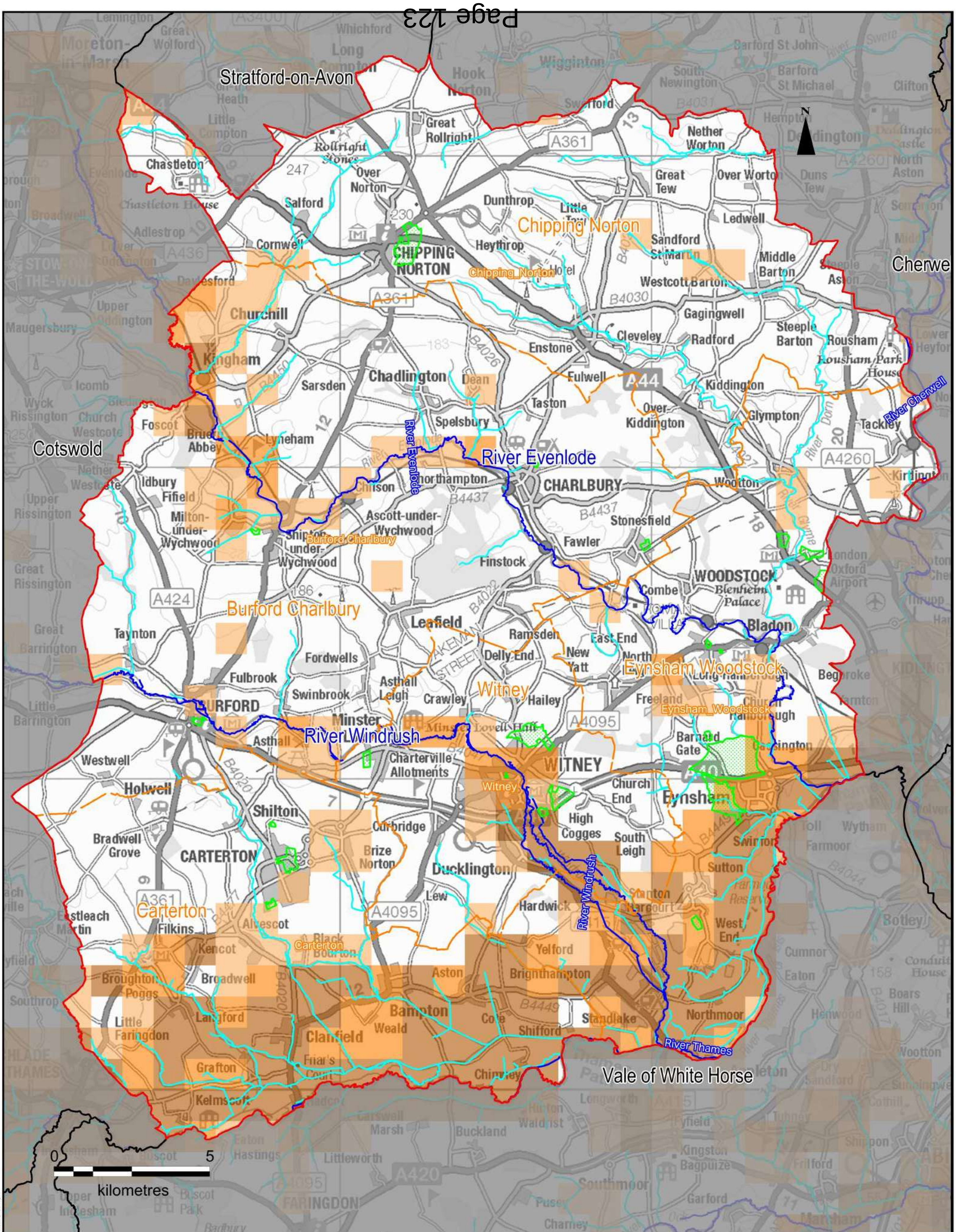
SCALE	DRAWN	CHECKED	APPROVED
1:200 @A1	AC	MBD	RJW

PROJECT	ORIGINATOR	ZONE	LEVEL	TYPE	ROLE	DOC NO
01255	SWJ	XX	XX	DR	C	0200

JOB NO.	PURPOSE OF ISSUE	STATUS:	REVISION:
01255	FOR INFORMATION	S2	P03

Appendix K

Areas Susceptible to Groundwater Flooding (ASTGWF) Map



LEGEND

- West Oxfordshire District Boundary
- LP Potential Development Sites
- West Oxfordshire Sub-boundaries
- Main Rivers
- Ordinary Watercourses

Areas Susceptible to Groundwater Flooding

< 25%	(2142)
>= 25% <50%	(594)
>= 50% <75%	(353)
>= 75%	(427)

Notes

The 1:50,000 scale digital map data is generalised and the geological interpretation should be used only as a guide to the geology at a local level, not as a site-specific geological plan based on detailed site investigations.

Intended Use

This map is intended to provide a strategic overview of susceptibility to groundwater flooding and should not be used to assess flood risk for individual properties.

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Revision Details	SEB / EC	Nov 2016	Suffix

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Scale at A3: 1:110,000

Drawn	SEB	Checked	SL
Approved	EC	Date	November 2016

Purpose of Issue: FINAL ISSUE

Project Title: WEST OXFORDSHIRE COUNCIL STRATEGIC FLOOD RISK ASSESSMENT

Drawing Title: AREAS SUSCEPTIBLE TO GROUNDWATER FLOODING (ASTGWF)

AECOM Internal Project No. 60505363

Client: WEST OXFORDSHIRE DISTRICT COUNCIL

AECOM
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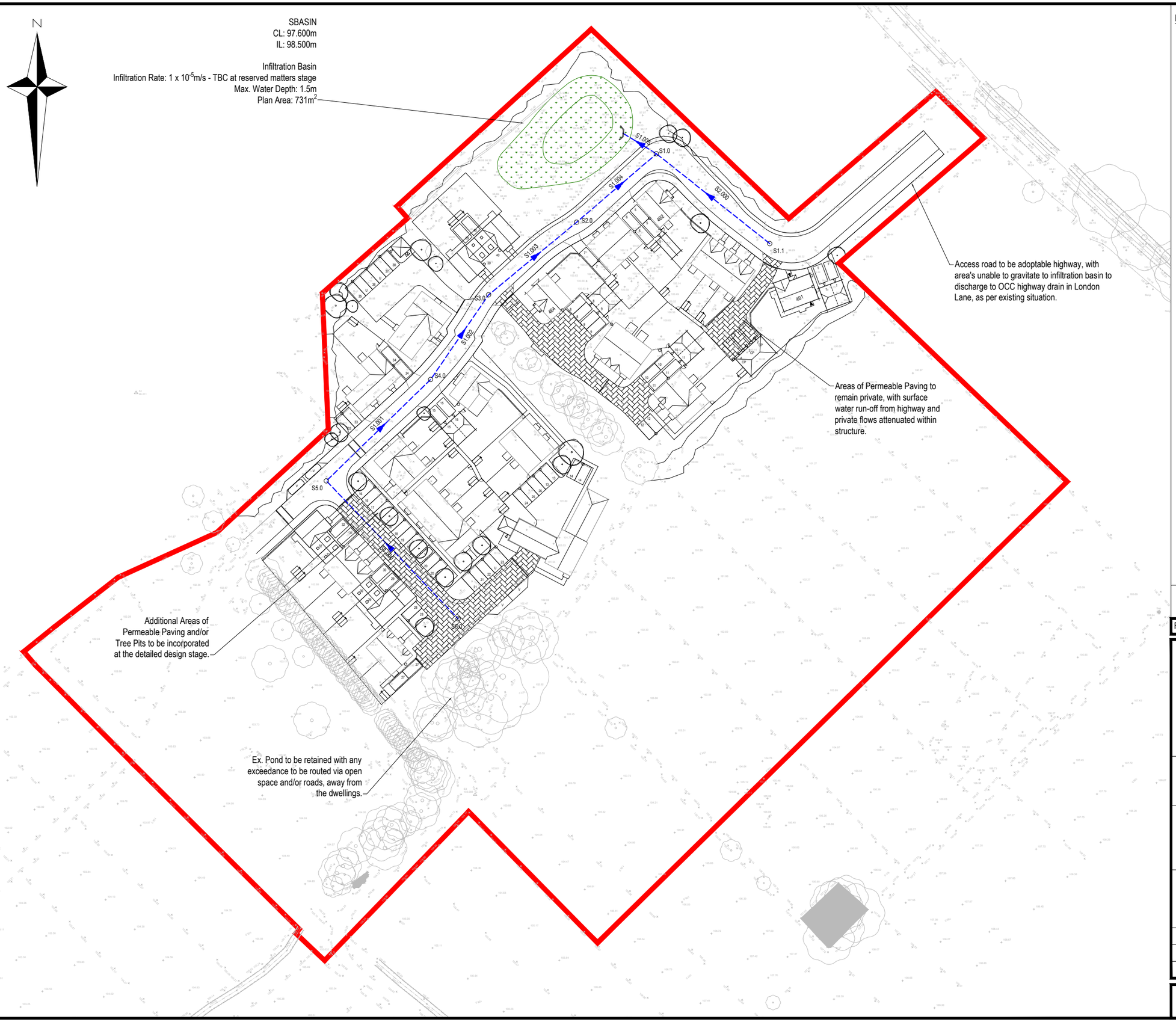
Drawing Number: FIGURE 6

Rev: 02

N:\Water\Current Projects\60505363 WODC SFRA update\06 GIS\WOR

Appendix L

Outline Surface Water Drainage Strategy & Calculations



NOTES

1. Dimensions not to be scaled from this drawing for construction purposes.
2. This drawing should be read in conjunction with the associated Flood Risk Assessment and all relevant standards.
3. Sewer runs and SuDS features are indictive only for preliminary design purposes and are subject to detailed design. All levels shown in meters AOD.
4. Site Layout taken from Thrive Architects drawing OBSI180824 CMP_01 P10, dated June 2022.
5. Topographical levels taken from Greenhatch group drawing 42917_T1, dated February 2022.

KEY

- Surface Water Sewer
- Surface Water Manhole
- Headwall
- S2.000 — MicroDrainage Pipe Reference Direction of Flow
- Proposed Permeable Paving with Deepened Porous Sub-base
- Infiltration Basin

Rev.	Description	Date	Chkd
P1	Issued to Client.	05/05/2023 SM	JB

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62 Foxhall Road, Didcot
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Tel: (01235) 515550 Fax: (01235) 817799
postbox@glanvillegroup.com www.glanvillegroup.com

Client :
Obsidian Strategic Asset Management

Project :
Land off London Lane,
Ascott-under-Wychwood

Title :
Outline Surface Water Drainage Strategy

Project Engineer :	S McNair	Scale :	1:1000 @ A3
Project Director :	J Birch	Date :	May 2023
Status :	PRELIMINARY		

Drawing No. 8211067 - SK03 Rev P1

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	51.779	0.885	58.5	0.073	10.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	39.335	0.675	58.3	0.139	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	27.886	0.475	58.7	0.112	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	30.953	0.530	58.4	0.161	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	28.496	0.985	28.9	0.054	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.000	39.237	0.350	112.1	0.089	10.00	0.0	0.600	o	150	Pipe/Conduit	
S1.005	14.566	0.100	145.7	0.083	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.006	6.055	0.105	57.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	10.66	101.100	0.073	0.0	0.0	0.0	1.32	23.3	11.9
S1.001	50.00	11.04	100.140	0.212	0.0	0.0	0.0	1.72	68.3	34.4
S1.002	50.00	11.31	99.465	0.324	0.0	0.0	0.0	1.71	68.0	52.6
S1.003	50.00	11.56	98.915	0.485	0.0	0.0	0.0	2.06	145.7	78.8
S1.004	50.00	11.72	98.385	0.539	0.0	0.0	0.0	2.93	207.4	87.6
S2.000	50.00	10.69	97.900	0.089	0.0	0.0	0.0	0.95	16.8	14.5
S1.005	50.00	11.91	97.400	0.711	0.0	0.0	0.0	1.30	91.9«	115.5
S1.006	50.00	11.96	95.800	0.711	0.0	0.0	0.0	2.07	146.6	115.5

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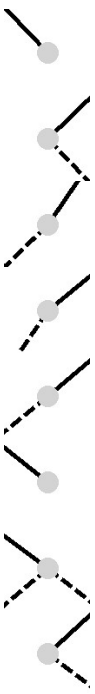
Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S6.0	102.500	1.400	Open Manhole	1200	S1.000	101.100	150				
S5.0	101.500	1.360	Open Manhole	1200	S1.001	100.140	225	S1.000	100.215	150	
S4.0	101.400	1.935	Open Manhole	1200	S1.002	99.465	225	S1.001	99.465	225	
S3.0	101.300	2.385	Open Manhole	1200	S1.003	98.915	300	S1.002	98.990	225	
S2.0	99.750	1.365	Open Manhole	1200	S1.004	98.385	300	S1.003	98.385	300	
S1.1	99.300	1.400	Open Manhole	1200	S2.000	97.900	150				
S1.0	98.600	1.200	Open Manhole	1200	S1.005	97.400	300	S1.004	97.400	300	
								S2.000	97.550	150	
SBASIN	97.600	1.800	Open Manhole	1200	S1.006	95.800	300	S1.005	97.300	300	1500
S	99.000	3.305	Open Manhole	150		OUTFALL		S1.006	95.695	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S6.0	430148.840	218483.280	430148.840	218483.280	Required	
S5.0	430113.034	218520.684	430113.034	218520.684	Required	
S4.0	430141.304	218548.035	430141.304	218548.035	Required	
S3.0	430157.023	218571.069	430157.023	218571.069	Required	
S2.0	430180.928	218590.732	430180.928	218590.732	Required	
S1.1	430233.377	218584.951	430233.377	218584.951	Required	
S1.0	430202.578	218609.260	430202.578	218609.260	Required	
SBASIN	430190.912	218617.982	430190.912	218617.982	Required	



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Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S	430195.367	218622.083			No Entry	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	150	S6.0	102.500	101.100	1.250	Open Manhole	1200
S1.001	o	225	S5.0	101.500	100.140	1.135	Open Manhole	1200
S1.002	o	225	S4.0	101.400	99.465	1.710	Open Manhole	1200
S1.003	o	300	S3.0	101.300	98.915	2.085	Open Manhole	1200
S1.004	o	300	S2.0	99.750	98.385	1.065	Open Manhole	1200
S2.000	o	150	S1.1	99.300	97.900	1.250	Open Manhole	1200
S1.005	o	300	S1.0	98.600	97.400	0.900	Open Manhole	1200
S1.006	o	300	SBASIN	97.600	95.800	1.500	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	51.779	58.5	S5.0	101.500	100.215	1.135	Open Manhole	1200
S1.001	39.335	58.3	S4.0	101.400	99.465	1.710	Open Manhole	1200
S1.002	27.886	58.7	S3.0	101.300	98.990	2.085	Open Manhole	1200
S1.003	30.953	58.4	S2.0	99.750	98.385	1.065	Open Manhole	1200
S1.004	28.496	28.9	S1.0	98.600	97.400	0.900	Open Manhole	1200
S2.000	39.237	112.1	S1.0	98.600	97.550	0.900	Open Manhole	1200
S1.005	14.566	145.7	SBASIN	97.600	97.300	0.000	Open Manhole	1200
S1.006	6.055	57.7	S	99.000	95.695	3.005	Open Manhole	150

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.073	0.073	0.073
1.001	-	-	100	0.139	0.139	0.139
1.002	-	-	100	0.112	0.112	0.112
1.003	-	-	100	0.161	0.161	0.161
1.004	-	-	100	0.054	0.054	0.054
2.000	-	-	100	0.089	0.089	0.089
1.005	-	-	100	0.083	0.083	0.083
1.006	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.711	0.711	0.711

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.006	S	99.000	95.695	95.695	150	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.900	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 4 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 430500 218950 SP 30500 18950
C (1km)	-0.019
D1 (1km)	0.352
D2 (1km)	0.281
D3 (1km)	0.278
E (1km)	0.277
F (1km)	2.498
Summer Storms	Yes

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Synthetic Rainfall Details

Winter Storms	Yes
Cv (Summer)	0.900
Cv (Winter)	0.840
Storm Duration (mins)	30

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Online Controls for Storm

Weir Manhole: SBASIN, DS/PN: S1.006, Volume (m³): 3.0

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 97.600

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Storage Structures for Storm

Porous Car Park Manhole: S5.0, DS/PN: S1.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	49.0
Max Percolation (l/s)	65.3	Slope (1:X)	50.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	100.140	Cap Volume Depth (m)	0.600

Porous Car Park Manhole: S3.0, DS/PN: S1.003

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.2
Membrane Percolation (mm/hr)	1000	Length (m)	49.0
Max Percolation (l/s)	57.2	Slope (1:X)	50.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	98.915	Cap Volume Depth (m)	0.600

Porous Car Park Manhole: S1.1, DS/PN: S2.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	3.6
Membrane Percolation (mm/hr)	1000	Length (m)	28.0
Max Percolation (l/s)	28.0	Slope (1:X)	50.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	97.900	Cap Volume Depth (m)	0.600

Infiltration Basin Manhole: SBASIN, DS/PN: S1.006

Invert Level (m)	95.800	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.03600	Porosity	1.00
Infiltration Coefficient Side (m/hr)	0.03600		

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	222.0	1.800	598.8

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 4 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

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

PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S6.0	60 minute 2 year Summer I+0%	60	102.500	101.152	-0.098	0.000
S1.001	S5.0	60 minute 2 year Summer I+0%	60	101.500	100.221	-0.144	0.000
S1.002	S4.0	60 minute 2 year Summer I+0%	60	101.400	99.569	-0.121	0.000
S1.003	S3.0	60 minute 2 year Summer I+0%	60	101.300	99.030	-0.185	0.000
S1.004	S2.0	60 minute 2 year Summer I+0%	60	99.750	98.486	-0.199	0.000
S2.000	S1.1	60 minute 2 year Summer I+0%	60	99.300	97.970	-0.080	0.000
S1.005	S1.0	60 minute 2 year Summer I+0%	60	98.600	97.602	-0.098	0.000
S1.006	SBASIN	480 minute 2 year Winter I+0%	480	97.600	96.305	0.205	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Infil. Flow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S6.0	0.26			0.053	7.454		5.9	OK
S1.001	S5.0	0.27		0.0	0.320	20.466	10	17.6	OK
S1.002	S4.0	0.43			0.152	31.874		27.4	OK
S1.003	S3.0	0.31		0.0	0.547	47.289	10	41.2	OK
S1.004	S2.0	0.24			0.154	52.773		45.8	OK
S2.000	S1.1	0.44		0.0	0.205	8.602	10	7.2	OK
S1.005	S1.0	0.77			0.352	69.803		59.3	OK
S1.006	SBASIN	0.00		2.1	134.000	0.000	624	0.0	SURCHARGED

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 4 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

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

PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S6.0	60 minute 30 year Summer I+0%	60	102.500	101.186	-0.064	0.000
S1.001	S5.0	60 minute 30 year Summer I+0%	60	101.500	100.280	-0.085	0.000
S1.002	S4.0	60 minute 30 year Summer I+0%	60	101.400	99.758	0.068	0.000
S1.003	S3.0	60 minute 30 year Summer I+0%	60	101.300	99.117	-0.098	0.000
S1.004	S2.0	60 minute 30 year Summer I+0%	60	99.750	98.556	-0.129	0.000
S2.000	S1.1	60 minute 30 year Summer I+0%	60	99.300	98.152	0.102	0.000
S1.005	S1.0	60 minute 30 year Summer I+0%	60	98.600	97.938	0.238	0.000
S1.006	SBASIN	480 minute 30 year Winter I+0%	480	97.600	96.723	0.623	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Infil. Flow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S6.0	0.62			0.091	17.864		14.1	OK
S1.001	S5.0	0.68		0.0	0.879	50.706	10	43.9	OK
S1.002	S4.0	1.08			0.721	78.130		68.1	SURCHARGED
S1.003	S3.0	0.77		0.0	1.572	116.516	10	102.8	OK
S1.004	S2.0	0.61			0.368	129.762		114.4	OK
S2.000	S1.1	1.07		0.0	1.988	21.263	8	17.4	SURCHARGED
S1.005	S1.0	1.86			1.923	171.376		143.0	SURCHARGED
S1.006	SBASIN	0.00		3.0	281.020	0.000	944	0.0	SURCHARGED

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

Simulation Criteria

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

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 4 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

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

PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S6.0	60 minute 100 year Summer I+40%	60	102.500	101.674	0.424	0.000
S1.001	S5.0	60 minute 100 year Summer I+40%	60	101.500	100.697	0.332	0.000
S1.002	S4.0	60 minute 100 year Summer I+40%	60	101.400	100.319	0.629	0.000
S1.003	S3.0	60 minute 100 year Summer I+40%	60	101.300	99.405	0.190	0.000
S1.004	S2.0	60 minute 100 year Summer I+40%	60	99.750	98.869	0.184	0.000
S2.000	S1.1	60 minute 100 year Winter I+40%	60	99.300	98.549	0.499	0.000
S1.005	S1.0	60 minute 100 year Summer I+40%	60	98.600	98.223	0.523	0.000
S1.006	SBASIN	960 minute 100 year Winter I+40%	960	97.600	97.294	1.194	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Infil. Flow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S6.0	1.05			0.644	32.851		23.8	SURCHARGED
S1.001	S5.0	0.98		0.0	12.185	94.233	10	63.4	SURCHARGED
S1.002	S4.0	1.38			2.456	144.650		87.5	SURCHARGED
S1.003	S3.0	1.03		0.0	8.786	216.093	8	136.1	SURCHARGED
S1.004	S2.0	0.81			1.850	240.414		152.3	SURCHARGED
S2.000	S1.1	1.42		0.0	11.815	44.354	12	23.1	SURCHARGED
S1.005	S1.0	2.50			2.907	317.335		191.8	SURCHARGED
S1.006	SBASIN	0.00		4.3	541.475	0.000	1312	0.0	SURCHARGED

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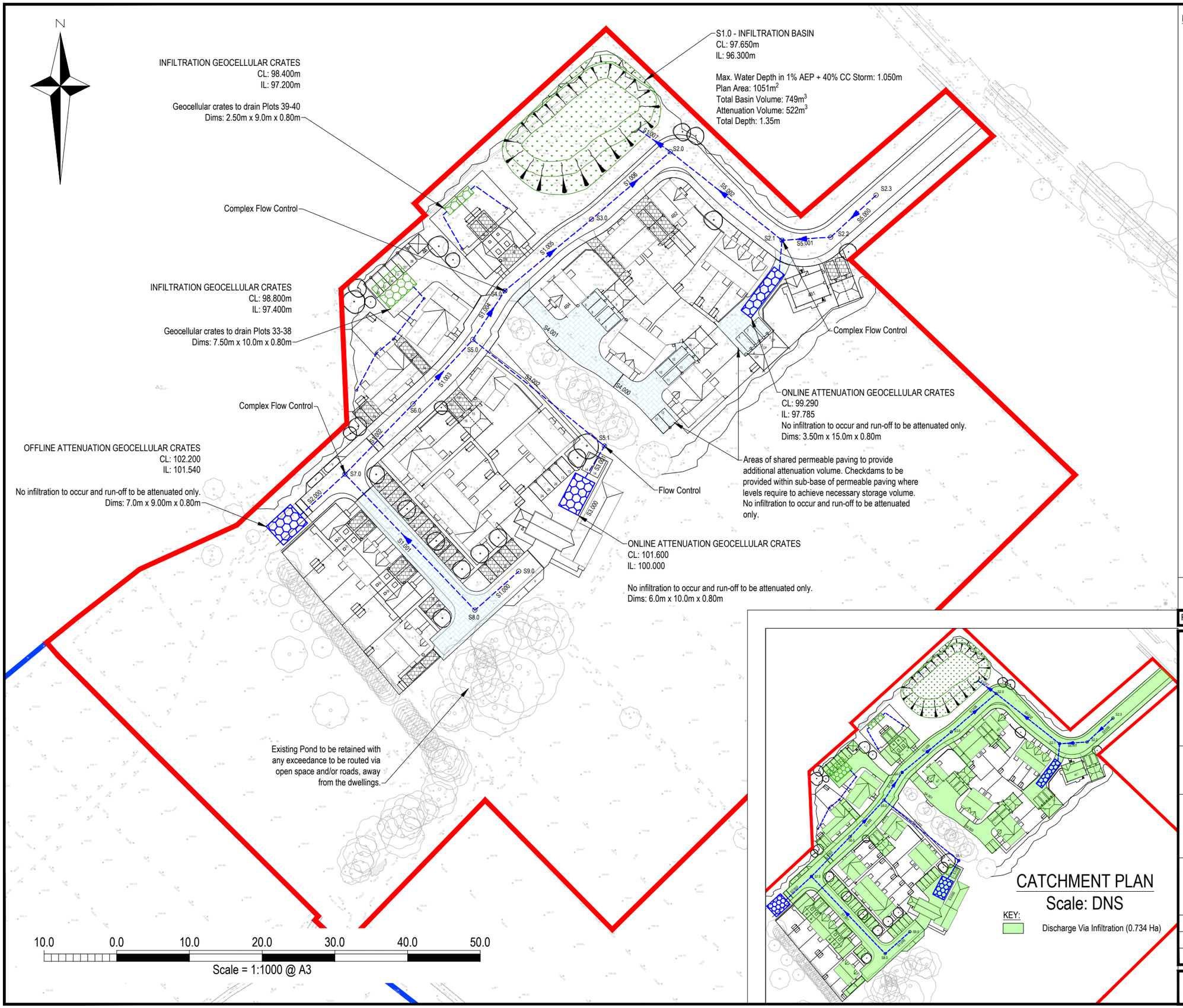
Appendix M

Option 1 – Surface Water Drainage Strategy & Calculations



NOTES

1. Dimensions not to be scaled from this drawing for construction purposes.
2. This drawing should be read in conjunction with the associated Flood Risk Assessment and all relevant standards.
3. All drainage features are indictive only for preliminary design purposes and are subject to detailed design. All levels shown in meters AOD.
4. Site Layout taken from Thrive Architects drawing OBSI180824 CMP_01 P10, dated June 2022.
5. Topographical levels taken from Greenhatch group drawing 42917_T1, dated February 2022.

KEY

- Application Boundary
- Land Under Applicant's Control
- Surface Water Sewer
- Manhole Chamber
- Flow Control Chamber
- Headwall
- S2.000 — MicroDrainage Pipe Reference Direction of Flow
- Infiltration Basin
- Geocellular Crates (Infiltration)
- Proposed Permeable Paving with Deepened Porous Sub-base (Attenuation only)
- Geocellular Crates (Attenuation Only)
- Private Parking Area (Attenuation only)

Rev.	Description	Date	Chkd
P3	Issued with Technical Note.	18/01/2024 SM	JB/CS

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Client :
Obsidian Strategic Asset Management

Project :
Land off London Lane,
Ascott-under-Wychwood

Title :
Outline Surface Water Drainage Strategy
Option 1 - 100% Infiltration

Project Engineer :	S McNair	Scale :	1:1000 @ A3
Project Director :	J Birch	Date :	January 2024
Status :	PLANNING		

Drawing No. 8211067 - SK03 Rev P3

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	1.339	Urban	0.000
SAAR (mm)	750	Region Number	Region 6

Results l/s

QBAR Rural	6.4
QBAR Urban	6.4
Q100 years	20.3
Q1 year	5.4
Q30 years	14.5
Q100 years	20.3

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.900
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	150	S9.0	102.200	100.800	1.250	Open Manhole	1200
S1.001	o	150	S8.0	102.550	100.650	1.750	Open Manhole	1200
S2.000	o	150	S7.1	102.200	100.400	1.650	Open Manhole	1200
S1.002	o	225	S7.0	101.550	100.215	1.110	Open Manhole	1200
S1.003	o	225	S6.0	101.200	100.080	0.895	Open Manhole	1200
S3.000	o	150	SDummy	103.000	102.000	0.850	Open Manhole	300
S3.001	o	150	S5.2	101.600	100.000	1.450	Open Manhole	1200
S3.002	o	150	S5.1	101.600	99.930	1.520	Open Manhole	1200
S1.004	o	225	S5.0	100.700	99.535	0.940	Open Manhole	1200
S4.000	o	150	S4.2	101.350	100.150	1.050	Open Manhole	1200
S4.001	o	150	S4.1	101.300	99.960	1.190	Open Manhole	1200
S1.005	o	225	S4.0	100.600	99.450	0.925	Open Manhole	1200
S1.006	o	225	S3.0	99.900	98.435	1.240	Open Manhole	1200
S5.000	o	150	S2.3	99.000	97.950	0.900	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	21.113	140.8	S8.0	102.550	100.650	1.750	Open Manhole	1200
S1.001	53.934	149.8	S7.0	101.550	100.290	1.110	Open Manhole	1200
S2.000	16.941	154.0	S7.0	101.550	100.290	1.110	Open Manhole	1200
S1.002	29.878	221.3	S6.0	101.200	100.080	0.895	Open Manhole	1200
S1.003	22.354	41.0	S5.0	100.700	99.535	0.940	Open Manhole	1200
S3.000	11.174	5.6	S5.2	101.600	100.000	1.450	Open Manhole	1200
S3.001	9.699	138.6	S5.1	101.600	99.930	1.520	Open Manhole	1200
S3.002	47.265	147.7	S5.0	100.700	99.610	0.940	Open Manhole	1200
S1.004	17.460	205.4	S4.0	100.600	99.450	0.925	Open Manhole	1200
S4.000	27.305	143.7	S4.1	101.300	99.960	1.190	Open Manhole	1200
S4.001	23.523	54.1	S4.0	100.600	99.525	0.925	Open Manhole	1200
S1.005	24.370	24.0	S3.0	99.900	98.435	1.240	Open Manhole	1200
S1.006	32.737	32.1	S2.0	98.600	97.415	0.960	Open Manhole	1200
S5.000	20.012	148.2	S2.2	99.400	97.815	1.435	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S5.001	o	150	S2.2	99.400	97.815	1.435	Open Manhole	1200
S5.002	o	150	S2.1	99.290	97.785	1.355	Open Manhole	1200
S1.007	o	300	S2.0	98.600	97.340	0.960	Open Manhole	1200
S1.008	o	150	S1	97.650	96.300	1.200	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S5.001	3.995	133.2	S2.1	99.290	97.785	1.355	Open Manhole	1200
S5.002	43.624	147.9	S2.0	98.600	97.490	0.960	Open Manhole	1200
S1.007	8.143	203.6	S1	97.650	97.300	0.050	Open Manhole	1200
S1.008	15.567	103.8	S	100.000	96.150	3.700	Open Manhole	150

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.018	0.018	0.018
1.001	-	-	100	0.010	0.010	0.010
2.000	-	-	100	0.040	0.040	0.040
1.002	-	-	100	0.102	0.102	0.102
1.003	-	-	100	0.039	0.039	0.039
3.000	-	-	100	0.000	0.000	0.000
3.001	-	-	100	0.061	0.061	0.061
3.002	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.049	0.049	0.049
4.000	-	-	100	0.020	0.020	0.020
4.001	-	-	100	0.048	0.048	0.048
1.005	-	-	100	0.029	0.029	0.029
1.006	-	-	100	0.019	0.019	0.019
5.000	-	-	100	0.042	0.042	0.042
5.001	-	-	100	0.032	0.032	0.032
5.002	-	-	100	0.050	0.050	0.050
1.007	-	-	100	0.113	0.113	0.113
1.008	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.672	0.672	0.672

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.008	S	100.000	96.150	96.150	150	0

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Online Controls for Storm

Complex Manhole: S7.0, DS/PN: S1.002, Volume (m³): 2.7

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0067-2000-0985-2000
Design Head (m)	0.985
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	67
Invert Level (m)	100.215
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.985	2.0
Flush-Flo™	0.295	2.0
Kick-Flo®	0.601	1.6
Mean Flow over Head Range	-	1.7

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.7	1.200	2.2	3.000	3.3	7.000	5.0
0.200	1.9	1.400	2.3	3.500	3.6	7.500	5.1
0.300	2.0	1.600	2.5	4.000	3.8	8.000	5.3
0.400	1.9	1.800	2.6	4.500	4.0	8.500	5.4
0.500	1.8	2.000	2.8	5.000	4.2	9.000	5.6
0.600	1.6	2.200	2.9	5.500	4.4	9.500	5.7
0.800	1.8	2.400	3.0	6.000	4.6		
1.000	2.0	2.600	3.1	6.500	4.8		

Weir

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 101.200

Hydro-Brake® Optimum Manhole: S5.2, DS/PN: S3.001, Volume (m³): 2.0

Unit Reference	MD-SCU-0032-1000-0800-1000
Design Head (m)	0.800
Design Flow (l/s)	1.0
Flush-Flo™	Calculated

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Hydro-Brake® Optimum Manhole: S5.2, DS/PN: S3.001, Volume (m³): 2.0

Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	32
Invert Level (m)	100.000
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	1.0
Flush-Flo™	0.047	0.3
Kick-Flo®	0.047	0.3
Mean Flow over Head Range	-	0.7

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.4	1.200	1.2	3.000	1.8	7.000	2.7
0.200	0.5	1.400	1.3	3.500	2.0	7.500	2.8
0.300	0.6	1.600	1.4	4.000	2.1	8.000	2.9
0.400	0.7	1.800	1.4	4.500	2.2	8.500	3.0
0.500	0.8	2.000	1.5	5.000	2.3	9.000	3.1
0.600	0.9	2.200	1.6	5.500	2.4	9.500	3.1
0.800	1.0	2.400	1.6	6.000	2.5		
1.000	1.1	2.600	1.7	6.500	2.6		

Complex Manhole: S4.0, DS/PN: S1.005, Volume (m³): 2.3

Hydro-Brake® Optimum

Unit Reference	MD-SCU-0100-8000-0600-8000
Design Head (m)	0.600
Design Flow (l/s)	8.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	100
Invert Level (m)	99.450
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.600	8.0
Flush-Flo™	0.128	4.3

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Hydro-Brake® Optimum

Control Points	Head (m)	Flow (l/s)
Kick-Flo®	0.150	4.2
Mean Flow over Head Range	-	5.3

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)
0.100	3.6	1.200	11.1	3.000	17.2	7.000	25.8
0.200	4.8	1.400	11.9	3.500	18.5	7.500	26.7
0.300	5.8	1.600	12.7	4.000	19.7	8.000	27.6
0.400	6.6	1.800	13.4	4.500	20.9	8.500	28.4
0.500	7.3	2.000	14.1	5.000	21.9	9.000	29.3
0.600	8.0	2.200	14.8	5.500	23.0	9.500	30.1
0.800	9.2	2.400	15.4	6.000	24.0		
1.000	10.2	2.600	16.0	6.500	24.8		

Weir

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 100.050

Complex Manhole: S2.1, DS/PN: S5.002, Volume (m³): 1.8

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0049-1000-0800-1000
Design Head (m)	0.800
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	49
Invert Level (m)	97.785
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	1.0
Flush-Flo™	0.215	0.9
Kick-Flo®	0.437	0.8
Mean Flow over Head Range	-	0.8

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

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Hydro-Brake® Optimum

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.8	1.200	1.2	3.000	1.8	7.000	2.7
0.200	0.9	1.400	1.3	3.500	1.9	7.500	2.8
0.300	0.9	1.600	1.4	4.000	2.1	8.000	2.9
0.400	0.8	1.800	1.4	4.500	2.2	8.500	2.9
0.500	0.8	2.000	1.5	5.000	2.3	9.000	3.0
0.600	0.9	2.200	1.6	5.500	2.4	9.500	3.1
0.800	1.0	2.400	1.6	6.000	2.5		
1.000	1.1	2.600	1.7	6.500	2.6		

Weir

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 98.585

Weir Manhole: S1, DS/PN: S1.008, Volume (m³): 2.0

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 97.650

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Storage Structures for Storm

Cellular Storage Manhole: S7.1, DS/PN: S2.000

Invert Level (m) 100.540 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	63.0	63.0	0.900	0.0	88.6
0.800	63.0	88.6			

Porous Car Park Manhole: S7.0, DS/PN: S1.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	3.8
Membrane Percolation (mm/hr)	1000	Length (m)	37.7
Max Percolation (l/s)	39.8	Slope (1:X)	50.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	100.215	Cap Volume Depth (m)	0.500

Cellular Storage Manhole: S5.2, DS/PN: S3.001

Invert Level (m) 100.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	60.0	60.0	0.900	0.0	87.2
0.800	60.0	87.2			

Porous Car Park Manhole: S4.2, DS/PN: S4.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	25.5
Max Percolation (l/s)	34.0	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	100.150	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: S4.1, DS/PN: S4.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	27.0
Max Percolation (l/s)	18.8	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	99.960	Cap Volume Depth (m)	0.500

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Porous Car Park Manhole: S4.0, DS/PN: S1.005

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.7
Membrane Percolation (mm/hr)	1000	Length (m)	15.0
Max Percolation (l/s)	23.8	Slope (1:X)	20.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	99.450	Cap Volume Depth (m)	0.500

Cellular Storage Manhole: S2.1, DS/PN: S5.002

Invert Level (m)	97.785	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	52.5	52.5	0.900	0.0	82.1
0.800	52.5	82.1			

Infiltration Basin Manhole: S1, DS/PN: S1.008

Invert Level (m)	96.300	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.01800	Porosity	1.00
Infiltration Coefficient Side (m/hr)	0.01800		

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	373.6	1.050	620.6	1.350	702.6

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	8
Number of Online Controls	5	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S9.0	60 minute 2 year Summer I+0%	102.200	100.830	-0.120	0.000	0.09
S1.001	S8.0	60 minute 2 year Summer I+0%	102.550	100.688	-0.112	0.000	0.14
S2.000	S7.1	120 minute 2 year Winter I+0%	102.200	100.656	0.106	0.000	0.10
S1.002	S7.0	120 minute 2 year Winter I+0%	101.550	100.654	0.214	0.000	0.06
S1.003	S6.0	60 minute 2 year Summer I+0%	101.200	100.120	-0.185	0.000	0.07
S3.000	SDummy	60 minute 2 year Summer I+0%	103.000	102.000	-0.150	0.000	0.00
S3.001	S5.2	360 minute 2 year Winter I+0%	101.600	100.146	-0.004	0.000	0.04
S3.002	S5.1	120 minute 2 year Winter I+0%	101.600	99.979	-0.101	0.000	0.04
S1.004	S5.0	120 minute 2 year Winter I+0%	100.700	99.976	0.216	0.000	0.17
S4.000	S4.2	120 minute 2 year Winter I+0%	101.350	100.173	-0.127	0.000	0.06
S4.001	S4.1	60 minute 2 year Summer I+0%	101.300	100.002	-0.108	0.000	0.17
S1.005	S4.0	120 minute 2 year Winter I+0%	100.600	99.967	0.292	0.000	0.08
S1.006	S3.0	60 minute 2 year Winter I+0%	99.900	98.481	-0.179	0.000	0.09
S5.000	S2.3	240 minute 2 year Winter I+0%	99.000	98.086	-0.014	0.000	0.10
S5.001	S2.2	240 minute 2 year Winter I+0%	99.400	98.085	0.120	0.000	0.21
S5.002	S2.1	240 minute 2 year Winter I+0%	99.290	98.084	0.149	0.000	0.06
S1.007	S2.0	60 minute 2 year Summer I+0%	98.600	97.456	-0.184	0.000	0.31

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

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S9.0		0.028		1.2	OK
S1.001	S8.0		0.061		2.0	OK
S2.000	S7.1		7.228	72	1.4	SURCHARGED
S1.002	S7.0		6.993	124	2.0	SURCHARGED
S1.003	S6.0		0.092		5.4	OK
S3.000	SDummy		0.000		0.0	OK
S3.001	S5.2		8.509	240	0.5	OK
S3.002	S5.1		0.078		0.5	OK
S1.004	S5.0		1.687		5.6	SURCHARGED
S4.000	S4.2		0.868	56	0.8	OK
S4.001	S4.1		0.915	26	3.9	OK
S1.005	S4.0		6.109	44	7.5	SURCHARGED
S1.006	S3.0		0.054		8.2	OK
S5.000	S2.3		0.148		1.4	OK
S5.001	S2.2		0.613		2.3	SURCHARGED
S5.002	S2.1		15.278	220	0.9	SURCHARGED
S1.007	S2.0		0.132		18.3	OK

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

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.008	S1	960 minute 2 year Winter I+0%	97.650	96.636	0.186	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.008	S1		138.042	1056	0.0	SURCHARGED

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	8
Number of Online Controls	5	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S9.0	60 minute 10 year Summer I+0%	102.200	100.839	-0.111	0.000	0.15
S1.001	S8.0	120 minute 10 year Winter I+0%	102.550	100.824	0.024	0.000	0.15
S2.000	S7.1	120 minute 10 year Winter I+0%	102.200	100.822	0.272	0.000	0.10
S1.002	S7.0	120 minute 10 year Winter I+0%	101.550	100.821	0.381	0.000	0.06
S1.003	S6.0	60 minute 10 year Summer I+0%	101.200	100.131	-0.174	0.000	0.12
S3.000	SDummy	60 minute 10 year Summer I+0%	103.000	102.000	-0.150	0.000	0.00
S3.001	S5.2	240 minute 10 year Winter I+0%	101.600	100.241	0.091	0.000	0.04
S3.002	S5.1	60 minute 10 year Winter I+0%	101.600	100.101	0.021	0.000	0.05
S1.004	S5.0	60 minute 10 year Winter I+0%	100.700	100.101	0.341	0.000	0.37
S4.000	S4.2	60 minute 10 year Winter I+0%	101.350	100.186	-0.114	0.000	0.13
S4.001	S4.1	60 minute 10 year Winter I+0%	101.300	100.106	-0.004	0.000	0.25
S1.005	S4.0	60 minute 10 year Winter I+0%	100.600	100.079	0.404	0.000	0.18
S1.006	S3.0	60 minute 10 year Winter I+0%	99.900	98.508	-0.152	0.000	0.23
S5.000	S2.3	240 minute 10 year Winter I+0%	99.000	98.314	0.214	0.000	0.15
S5.001	S2.2	240 minute 10 year Winter I+0%	99.400	98.312	0.347	0.000	0.33
S5.002	S2.1	240 minute 10 year Winter I+0%	99.290	98.311	0.376	0.000	0.06
S1.007	S2.0	60 minute 10 year Winter I+0%	98.600	97.503	-0.137	0.000	0.56

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

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S9.0		0.039		2.2	OK
S1.001	S8.0		0.407		2.1	SURCHARGED
S2.000	S7.1		17.320	152	1.4	SURCHARGED
S1.002	S7.0		12.026	200	2.0	SURCHARGED
S1.003	S6.0		0.122		8.6	OK
S3.000	SDummy		0.000		0.0	OK
S3.001	S5.2		14.037	264	0.6	SURCHARGED
S3.002	S5.1		0.307		0.7	SURCHARGED
S1.004	S5.0		2.133		11.9	SURCHARGED
S4.000	S4.2		1.344	28	1.8	OK
S4.001	S4.1		3.282	28	5.8	OK
S1.005	S4.0		8.221	50	17.9	SURCHARGED
S1.006	S3.0		0.088		19.8	OK
S5.000	S2.3		0.406		2.0	SURCHARGED
S5.001	S2.2		0.889		3.5	SURCHARGED
S5.002	S2.1		26.896	304	0.9	SURCHARGED
S1.007	S2.0		0.210		32.4	OK

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

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.008	S1	1440 minute 10 year Winter I+0%	97.650	96.794	0.344	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.008	S1		211.171	1392	0.0	SURCHARGED

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	8
Number of Online Controls	5	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S9.0	240 minute 30 year Winter I+0%	102.200	100.968	0.018	0.000	0.09
S1.001	S8.0	240 minute 30 year Winter I+0%	102.550	100.967	0.167	0.000	0.12
S2.000	S7.1	240 minute 30 year Winter I+0%	102.200	100.966	0.416	0.000	0.10
S1.002	S7.0	240 minute 30 year Winter I+0%	101.550	100.964	0.524	0.000	0.06
S1.003	S6.0	60 minute 30 year Summer I+0%	101.200	100.157	-0.148	0.000	0.14
S3.000	SDummy	60 minute 30 year Summer I+0%	103.000	102.000	-0.150	0.000	0.00
S3.001	S5.2	240 minute 30 year Winter I+0%	101.600	100.325	0.175	0.000	0.05
S3.002	S5.1	60 minute 30 year Summer I+0%	101.600	100.136	0.056	0.000	0.06
S1.004	S5.0	60 minute 30 year Summer I+0%	100.700	100.137	0.377	0.000	0.60
S4.000	S4.2	60 minute 30 year Winter I+0%	101.350	100.194	-0.106	0.000	0.19
S4.001	S4.1	60 minute 30 year Winter I+0%	101.300	100.149	0.039	0.000	0.36
S1.005	S4.0	60 minute 30 year Summer I+0%	100.600	100.099	0.424	0.000	0.30
S1.006	S3.0	60 minute 30 year Summer I+0%	99.900	98.532	-0.128	0.000	0.37
S5.000	S2.3	360 minute 30 year Winter I+0%	99.000	98.507	0.407	0.000	0.14
S5.001	S2.2	360 minute 30 year Winter I+0%	99.400	98.505	0.540	0.000	0.32
S5.002	S2.1	360 minute 30 year Winter I+0%	99.290	98.504	0.569	0.000	0.07
S1.007	S2.0	60 minute 30 year Summer I+0%	98.600	97.577	-0.063	0.000	0.93

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

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S9.0		0.185		1.3	SURCHARGED
S1.001	S8.0		0.705		1.7	SURCHARGED
S2.000	S7.1		26.122	224	1.4	SURCHARGED
S1.002	S7.0		16.276	276	2.0	SURCHARGED
S1.003	S6.0		0.192		10.5	OK
S3.000	SDummy		0.000		0.0	OK
S3.001	S5.2		18.916	292	0.7	SURCHARGED
S3.002	S5.1		0.377		0.8	SURCHARGED
S1.004	S5.0		2.230		19.4	SURCHARGED
S4.000	S4.2		1.655	28	2.7	OK
S4.001	S4.1		4.299	28	8.3	SURCHARGED
S1.005	S4.0		8.585	54	29.0	SURCHARGED
S1.006	S3.0		0.120		32.3	OK
S5.000	S2.3		0.624		2.0	SURCHARGED
S5.001	S2.2		1.107		3.5	SURCHARGED
S5.002	S2.1		36.714		1.0	SURCHARGED
S1.007	S2.0		0.403		54.1	OK

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

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.008	S1	1440 minute 30 year Winter I+0%	97.650	96.909	0.459	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.008	S1		268.466	1776	0.0	SURCHARGED

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	8
Number of Online Controls	5	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S9.0	60 minute 100 year Winter I+40%	102.200	101.347	0.397	0.000	0.36
S1.001	S8.0	60 minute 100 year Winter I+40%	102.550	101.321	0.521	0.000	0.50
S2.000	S7.1	240 minute 100 year Winter I+40%	102.200	101.244	0.694	0.000	0.25
S1.002	S7.0	120 minute 100 year Winter I+40%	101.550	101.232	0.792	0.000	0.39
S1.003	S6.0	60 minute 100 year Summer I+40%	101.200	100.291	-0.014	0.000	0.24
S3.000	SDummy	60 minute 100 year Summer I+40%	103.000	102.000	-0.150	0.000	0.00
S3.001	S5.2	360 minute 100 year Winter I+40%	101.600	100.642	0.492	0.000	0.07
S3.002	S5.1	60 minute 100 year Summer I+40%	101.600	100.249	0.169	0.000	0.07
S1.004	S5.0	60 minute 100 year Summer I+40%	100.700	100.254	0.494	0.000	1.14
S4.000	S4.2	60 minute 100 year Winter I+40%	101.350	100.283	-0.017	0.000	0.46
S4.001	S4.1	60 minute 100 year Summer I+40%	101.300	100.269	0.159	0.000	0.56
S1.005	S4.0	60 minute 100 year Summer I+40%	100.600	100.136	0.461	0.000	0.61
S1.006	S3.0	60 minute 100 year Summer I+40%	99.900	98.586	-0.074	0.000	0.78
S5.000	S2.3	60 minute 100 year Winter I+40%	99.000	98.769	0.669	0.000	0.83
S5.001	S2.2	60 minute 100 year Winter I+40%	99.400	98.689	0.724	0.000	1.78
S5.002	S2.1	120 minute 100 year Winter I+40%	99.290	98.631	0.696	0.000	1.38
S1.007	S2.0	60 minute 100 year Summer I+40%	98.600	97.800	0.160	0.000	1.94

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

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S9.0		0.613		5.1	SURCHARGED
S1.001	S8.0		1.106		7.0	SURCHARGED
S2.000	S7.1		43.105	352	3.3	SURCHARGED
S1.002	S7.0		22.240	412	12.7	SURCHARGED
S1.003	S6.0		0.948		17.5	OK
S3.000	SDummy		0.000		0.0	OK
S3.001	S5.2		37.352		0.9	SURCHARGED
S3.002	S5.1		0.505		1.0	SURCHARGED
S1.004	S5.0		2.453		36.8	SURCHARGED
S4.000	S4.2		5.033	16	6.5	OK
S4.001	S4.1		7.044	28	12.9	SURCHARGED
S1.005	S4.0		9.271	62	60.0	SURCHARGED
S1.006	S3.0		0.211		67.3	OK
S5.000	S2.3		0.920		11.3	FLOOD RISK
S5.001	S2.2		1.315		19.3	SURCHARGED
S5.002	S2.1		42.303	472	19.5	SURCHARGED
S1.007	S2.0		1.419		113.0	SURCHARGED

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

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.008	S1	2160 minute 100 year Winter I+40%	97.650	97.337	0.887	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.008	S1		509.641	2544	0.0	SURCHARGED

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Summary of Results for 2160 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)
S1.008	S1	97.650	97.498	1.048	0.000	0.00		613.207	2616	0.0

PN	US/MH Name	Status
S1.008	S1	FLOOD RISK

Input Hydrograph Manhole S1, DS/PN S1.008 (Storm)
2160 minute 100 year Winter
Input Hydrograph Type: User Defined

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
24	0.0	672	0.0	1320	0.0	1968	0.0	2616	0.0	3264	0.0
48	0.0	696	0.0	1344	0.0	1992	0.0	2640	0.0	3288	0.0
72	0.0	720	0.0	1368	0.0	2016	0.0	2664	0.0	3312	0.0
96	0.0	744	0.0	1392	0.0	2040	0.0	2688	0.0	3336	0.0
120	0.0	768	0.0	1416	0.0	2064	0.0	2712	0.0	3360	0.0
144	0.0	792	0.0	1440	0.0	2088	0.0	2736	0.0	3384	0.0
168	0.0	816	0.0	1464	0.0	2112	0.0	2760	0.0	3408	0.0
192	0.0	840	0.0	1488	0.0	2136	0.0	2784	0.0	3432	0.0
216	0.0	864	0.0	1512	0.0	2160	0.0	2808	0.0	3456	0.0
240	0.0	888	0.0	1536	0.0	2184	0.0	2832	0.0	3480	0.0
264	0.0	912	0.0	1560	0.0	2208	0.0	2856	0.0	3504	0.0
288	0.0	936	0.0	1584	0.0	2232	0.0	2880	0.0	3528	0.0
312	0.0	960	0.0	1608	0.0	2256	0.0	2904	0.0	3552	0.0
336	0.0	984	0.0	1632	0.0	2280	0.0	2928	0.0	3576	0.0
360	0.0	1008	0.0	1656	0.0	2304	0.0	2952	0.0	3600	0.0
384	0.0	1032	0.0	1680	0.0	2328	0.0	2976	0.0	3624	0.1
408	0.0	1056	0.0	1704	0.0	2352	0.0	3000	0.0	3648	0.2
432	0.0	1080	0.0	1728	0.0	2376	0.0	3024	0.0	3672	0.4
456	0.0	1104	0.0	1752	0.0	2400	0.0	3048	0.0	3696	0.5
480	0.0	1128	0.0	1776	0.0	2424	0.0	3072	0.0	3720	0.8
504	0.0	1152	0.0	1800	0.0	2448	0.0	3096	0.0	3744	1.2
528	0.0	1176	0.0	1824	0.0	2472	0.0	3120	0.0	3768	1.3
552	0.0	1200	0.0	1848	0.0	2496	0.0	3144	0.0	3792	1.4
576	0.0	1224	0.0	1872	0.0	2520	0.0	3168	0.0	3816	1.4
600	0.0	1248	0.0	1896	0.0	2544	0.0	3192	0.0	3840	1.5
624	0.0	1272	0.0	1920	0.0	2568	0.0	3216	0.0	3864	1.5
648	0.0	1296	0.0	1944	0.0	2592	0.0	3240	0.0	3888	1.5

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Input Hydrograph Manhole S1, DS/PN S1.008 (Storm)
2160 minute 100 year Winter
Input Hydrograph Type: User Defined

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
3912	1.6	5064	1.1	6216	0.0	7368	0.0	8520	0.0	9672	0.0
3936	1.7	5088	0.8	6240	0.0	7392	0.0	8544	0.0	9696	0.0
3960	1.9	5112	0.6	6264	0.0	7416	0.0	8568	0.0	9720	0.0
3984	2.1	5136	0.4	6288	0.0	7440	0.0	8592	0.0	9744	0.0
4008	2.3	5160	0.3	6312	0.0	7464	0.0	8616	0.0	9768	0.0
4032	2.6	5184	0.3	6336	0.0	7488	0.0	8640	0.0	9792	0.0
4056	2.9	5208	0.2	6360	0.0	7512	0.0	8664	0.0	9816	0.0
4080	3.3	5232	0.2	6384	0.0	7536	0.0	8688	0.0	9840	0.0
4104	3.7	5256	0.1	6408	0.0	7560	0.0	8712	0.0	9864	0.0
4128	4.2	5280	0.1	6432	0.0	7584	0.0	8736	0.0	9888	0.0
4152	4.9	5304	0.1	6456	0.0	7608	0.0	8760	0.0	9912	0.0
4176	5.4	5328	0.1	6480	0.0	7632	0.0	8784	0.0	9936	0.0
4200	5.9	5352	0.1	6504	0.0	7656	0.0	8808	0.0	9960	0.0
4224	6.3	5376	0.1	6528	0.0	7680	0.0	8832	0.0	9984	0.0
4248	6.6	5400	0.0	6552	0.0	7704	0.0	8856	0.0	10008	0.0
4272	6.7	5424	0.0	6576	0.0	7728	0.0	8880	0.0	10032	0.0
4296	7.0	5448	0.0	6600	0.0	7752	0.0	8904	0.0	10056	0.0
4320	7.3	5472	0.0	6624	0.0	7776	0.0	8928	0.0	10080	0.0
4344	7.4	5496	0.0	6648	0.0	7800	0.0	8952	0.0	10104	0.0
4368	7.4	5520	0.0	6672	0.0	7824	0.0	8976	0.0	10128	0.0
4392	7.4	5544	0.0	6696	0.0	7848	0.0	9000	0.0	10152	0.0
4416	7.2	5568	0.0	6720	0.0	7872	0.0	9024	0.0	10176	0.0
4440	7.0	5592	0.0	6744	0.0	7896	0.0	9048	0.0	10200	0.0
4464	6.8	5616	0.0	6768	0.0	7920	0.0	9072	0.0	10224	0.0
4488	6.5	5640	0.0	6792	0.0	7944	0.0	9096	0.0	10248	0.0
4512	6.3	5664	0.0	6816	0.0	7968	0.0	9120	0.0	10272	0.0
4536	6.1	5688	0.0	6840	0.0	7992	0.0	9144	0.0	10296	0.0
4560	5.5	5712	0.0	6864	0.0	8016	0.0	9168	0.0	10320	0.0
4584	4.9	5736	0.0	6888	0.0	8040	0.0	9192	0.0	10344	0.0
4608	4.1	5760	0.0	6912	0.0	8064	0.0	9216	0.0	10368	0.0
4632	3.8	5784	0.0	6936	0.0	8088	0.0	9240	0.0	10392	0.0
4656	3.5	5808	0.0	6960	0.0	8112	0.0	9264	0.0	10416	0.0
4680	3.2	5832	0.0	6984	0.0	8136	0.0	9288	0.0	10440	0.0
4704	3.0	5856	0.0	7008	0.0	8160	0.0	9312	0.0	10464	0.0
4728	2.8	5880	0.0	7032	0.0	8184	0.0	9336	0.0	10488	0.0
4752	2.7	5904	0.0	7056	0.0	8208	0.0	9360	0.0	10512	0.0
4776	2.5	5928	0.0	7080	0.0	8232	0.0	9384	0.0	10536	0.0
4800	2.5	5952	0.0	7104	0.0	8256	0.0	9408	0.0	10560	0.0
4824	2.4	5976	0.0	7128	0.0	8280	0.0	9432	0.0	10584	0.0
4848	2.4	6000	0.0	7152	0.0	8304	0.0	9456	0.0	10608	0.0
4872	2.4	6024	0.0	7176	0.0	8328	0.0	9480	0.0	10632	0.0
4896	2.3	6048	0.0	7200	0.0	8352	0.0	9504	0.0	10656	0.0
4920	2.3	6072	0.0	7224	0.0	8376	0.0	9528	0.0	10680	0.0
4944	2.2	6096	0.0	7248	0.0	8400	0.0	9552	0.0	10704	0.0
4968	2.2	6120	0.0	7272	0.0	8424	0.0	9576	0.0	10728	0.0
4992	2.1	6144	0.0	7296	0.0	8448	0.0	9600	0.0	10752	0.0
5016	1.8	6168	0.0	7320	0.0	8472	0.0	9624	0.0	10776	0.0
5040	1.5	6192	0.0	7344	0.0	8496	0.0	9648	0.0	10800	0.0

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Input Hydrograph Manhole S1, DS/PN S1.008 (Storm)
2160 minute 100 year Winter
Input Hydrograph Type: User Defined

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
10824	0.0	11304	0.0	11784	0.0	12264	0.0	12744	0.0	13224	0.0
10848	0.0	11328	0.0	11808	0.0	12288	0.0	12768	0.0	13248	0.0
10872	0.0	11352	0.0	11832	0.0	12312	0.0	12792	0.0	13272	0.0
10896	0.0	11376	0.0	11856	0.0	12336	0.0	12816	0.0	13296	0.0
10920	0.0	11400	0.0	11880	0.0	12360	0.0	12840	0.0	13320	0.0
10944	0.0	11424	0.0	11904	0.0	12384	0.0	12864	0.0	13344	0.0
10968	0.0	11448	0.0	11928	0.0	12408	0.0	12888	0.0	13368	0.0
10992	0.0	11472	0.0	11952	0.0	12432	0.0	12912	0.0	13392	0.0
11016	0.0	11496	0.0	11976	0.0	12456	0.0	12936	0.0	13416	0.0
11040	0.0	11520	0.0	12000	0.0	12480	0.0	12960	0.0	13440	0.0
11064	0.0	11544	0.0	12024	0.0	12504	0.0	12984	0.0	13464	0.0
11088	0.0	11568	0.0	12048	0.0	12528	0.0	13008	0.0	13488	0.0
11112	0.0	11592	0.0	12072	0.0	12552	0.0	13032	0.0	13512	0.0
11136	0.0	11616	0.0	12096	0.0	12576	0.0	13056	0.0	13536	0.0
11160	0.0	11640	0.0	12120	0.0	12600	0.0	13080	0.0	13560	0.0
11184	0.0	11664	0.0	12144	0.0	12624	0.0	13104	0.0	13584	0.0
11208	0.0	11688	0.0	12168	0.0	12648	0.0	13128	0.0	13608	0.0
11232	0.0	11712	0.0	12192	0.0	12672	0.0	13152	0.0	13632	0.0
11256	0.0	11736	0.0	12216	0.0	12696	0.0	13176	0.0	13656	0.0
11280	0.0	11760	0.0	12240	0.0	12720	0.0	13200	0.0	13680	0.0

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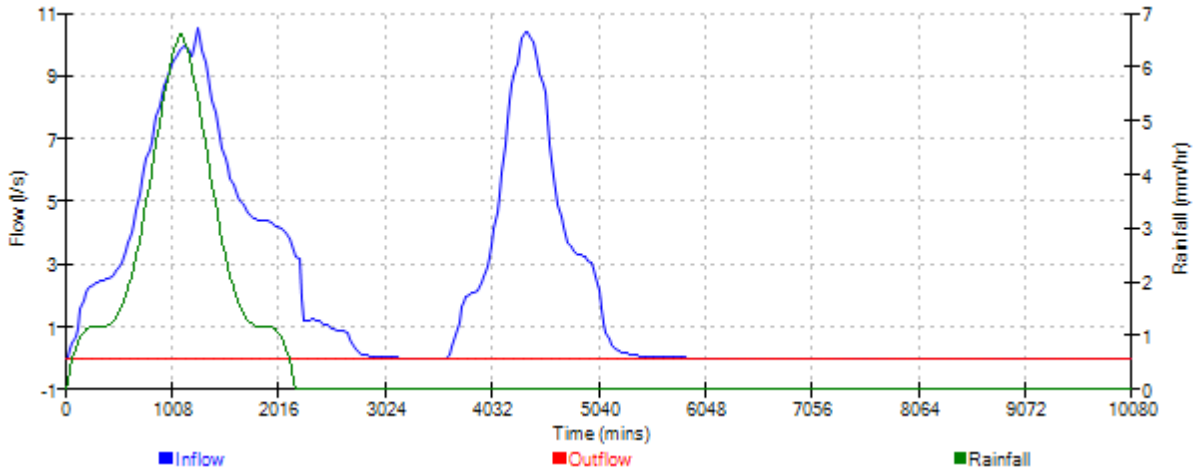
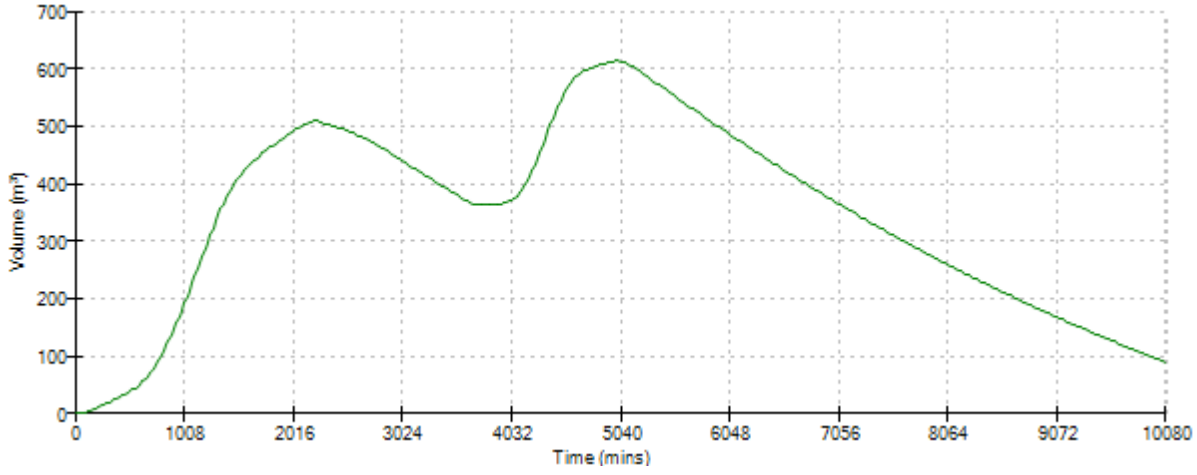
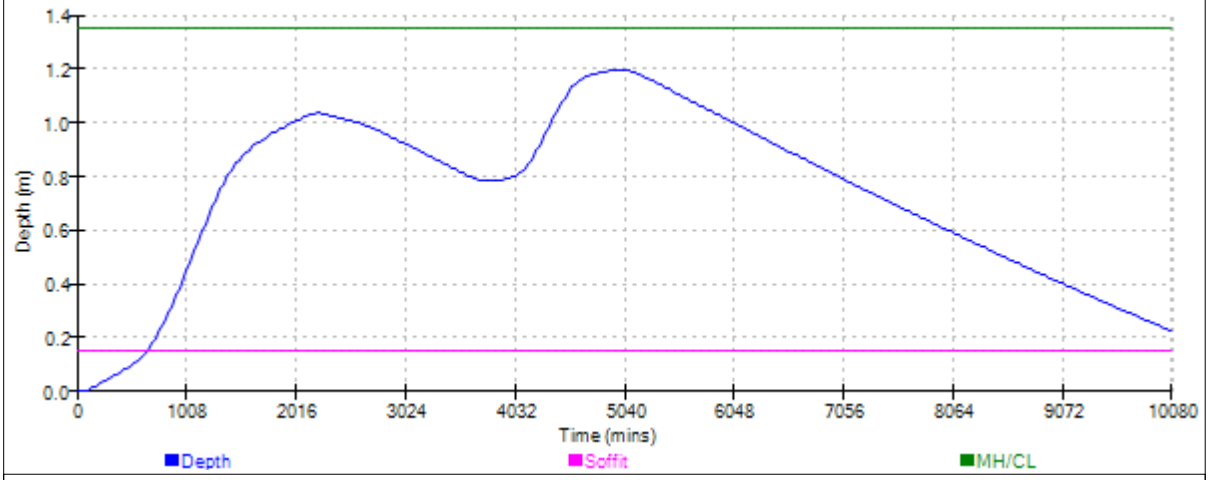
Graphs for Pipe S1.008 US/MH S1 (Storm)
2160 minute 100 year Winter
Status: FLOOD RISK







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

Half Drain Time : 1893 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
60 min Summer	97.807	0.407	0.2	29.0	O K
120 min Summer	97.884	0.484	0.2	34.5	O K
180 min Summer	97.933	0.533	0.2	38.0	O K
240 min Summer	97.968	0.568	0.2	40.5	O K
360 min Summer	98.012	0.612	0.2	43.6	O K
480 min Summer	98.036	0.636	0.2	45.3	O K
600 min Summer	98.049	0.649	0.2	46.3	O K
720 min Summer	98.055	0.655	0.2	46.7	O K
960 min Summer	98.055	0.655	0.2	46.6	O K
1440 min Summer	98.028	0.628	0.2	44.7	O K
2160 min Summer	97.985	0.585	0.2	41.7	O K
2880 min Summer	97.950	0.550	0.2	39.2	O K
4320 min Summer	97.894	0.494	0.2	35.2	O K
5760 min Summer	97.851	0.451	0.2	32.2	O K
60 min Winter	97.857	0.457	0.2	32.5	O K
120 min Winter	97.944	0.544	0.2	38.8	O K
180 min Winter	98.001	0.601	0.2	42.8	O K
240 min Winter	98.041	0.641	0.2	45.7	O K
360 min Winter	98.092	0.692	0.2	49.3	O K
480 min Winter	98.122	0.722	0.3	51.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
60 min Summer	60.004	0.0	72
120 min Summer	36.232	0.0	130
180 min Summer	26.997	0.0	190
240 min Summer	21.858	0.0	250
360 min Summer	16.102	0.0	368
480 min Summer	12.880	0.0	486
600 min Summer	10.784	0.0	606
720 min Summer	9.303	0.0	724
960 min Summer	7.328	0.0	962
1440 min Summer	5.190	0.0	1396
2160 min Summer	3.663	0.0	1712
2880 min Summer	2.865	0.0	2080
4320 min Summer	2.038	0.0	2896
5760 min Summer	1.612	0.0	3696
60 min Winter	60.004	0.0	70
120 min Winter	36.232	0.0	128
180 min Winter	26.997	0.0	186
240 min Winter	21.858	0.0	246
360 min Winter	16.102	0.0	362
480 min Winter	12.880	0.0	478

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
600 min Winter	98.139	0.739	0.3	52.6	O K
720 min Winter	98.148	0.748	0.3	53.3	O K
960 min Winter	98.152	0.752	0.3	53.6	O K
1440 min Winter	98.131	0.731	0.3	52.1	O K
2160 min Winter	98.079	0.679	0.2	48.4	O K
2880 min Winter	98.037	0.637	0.2	45.4	O K
4320 min Winter	97.963	0.563	0.2	40.1	O K
5760 min Winter	97.900	0.500	0.2	35.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
600 min Winter	10.784	0.0	596
720 min Winter	9.303	0.0	710
960 min Winter	7.328	0.0	940
1440 min Winter	5.191	0.0	1384
2160 min Winter	3.663	0.0	1964
2880 min Winter	2.865	0.0	2224
4320 min Winter	2.038	0.0	3124
5760 min Winter	1.612	0.0	4032

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	60
Longest Storm (mins)	5760
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.066

Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)	Time (mins) From:	To:	Area (ha)
0	4	0.022	4	8	0.022	8	12	0.022

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Model Details

Storage is Online Cover Level (m) 98.800

Cellular Storage Structure

Invert Level (m) 97.400 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.01800 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.01800

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	75.0	75.0	0.900	0.0	103.0
0.800	75.0	103.0			

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Summary of Results for 30 year Return Period

Half Drain Time : 1062 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
60 min Summer	97.618	0.218	0.2	15.5	O K
120 min Summer	97.661	0.261	0.2	18.6	O K
180 min Summer	97.685	0.285	0.2	20.3	O K
240 min Summer	97.702	0.302	0.2	21.5	O K
360 min Summer	97.720	0.320	0.2	22.8	O K
480 min Summer	97.728	0.328	0.2	23.4	O K
600 min Summer	97.730	0.330	0.2	23.5	O K
720 min Summer	97.729	0.329	0.2	23.4	O K
960 min Summer	97.721	0.321	0.2	22.9	O K
1440 min Summer	97.703	0.303	0.2	21.6	O K
2160 min Summer	97.678	0.278	0.2	19.8	O K
2880 min Summer	97.656	0.256	0.2	18.3	O K
4320 min Summer	97.620	0.220	0.2	15.7	O K
5760 min Summer	97.591	0.191	0.2	13.6	O K
60 min Winter	97.645	0.245	0.2	17.5	O K
120 min Winter	97.694	0.294	0.2	20.9	O K
180 min Winter	97.722	0.322	0.2	23.0	O K
240 min Winter	97.741	0.341	0.2	24.3	O K
360 min Winter	97.764	0.364	0.2	25.9	O K
480 min Winter	97.775	0.375	0.2	26.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
60 min Summer	32.620	0.0	70
120 min Summer	19.975	0.0	130
180 min Summer	14.907	0.0	188
240 min Summer	12.068	0.0	248
360 min Summer	8.898	0.0	366
480 min Summer	7.129	0.0	484
600 min Summer	5.980	0.0	602
720 min Summer	5.169	0.0	720
960 min Summer	4.089	0.0	844
1440 min Summer	2.917	0.0	1084
2160 min Summer	2.081	0.0	1476
2880 min Summer	1.643	0.0	1880
4320 min Summer	1.188	0.0	2688
5760 min Summer	0.953	0.0	3464
60 min Winter	32.620	0.0	70
120 min Winter	19.975	0.0	128
180 min Winter	14.907	0.0	184
240 min Winter	12.068	0.0	242
360 min Winter	8.898	0.0	358
480 min Winter	7.129	0.0	474

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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
600 min Winter	97.779	0.379	0.2	27.0	O K
720 min Winter	97.780	0.380	0.2	27.0	O K
960 min Winter	97.773	0.373	0.2	26.6	O K
1440 min Winter	97.749	0.349	0.2	24.9	O K
2160 min Winter	97.717	0.317	0.2	22.6	O K
2880 min Winter	97.686	0.286	0.2	20.4	O K
4320 min Winter	97.632	0.232	0.2	16.5	O K
5760 min Winter	97.587	0.187	0.2	13.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
600 min Winter	5.980	0.0	588
720 min Winter	5.169	0.0	700
960 min Winter	4.089	0.0	916
1440 min Winter	2.917	0.0	1154
2160 min Winter	2.081	0.0	1604
2880 min Winter	1.643	0.0	2052
4320 min Winter	1.188	0.0	2904
5760 min Winter	0.953	0.0	3704

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	60
Longest Storm (mins)	5760
Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.066

Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)
0	4	0.022	4	8	0.022	8	12	0.022

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Model Details

Storage is Online Cover Level (m) 98.800

Cellular Storage Structure

Invert Level (m) 97.400 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.01800 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.01800

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	75.0	75.0	0.900	0.0	103.0
0.800	75.0	103.0			

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

Half Drain Time : 1554 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
60 min Summer	97.631	0.431	0.1	9.2	O K
120 min Summer	97.711	0.511	0.1	10.9	O K
180 min Summer	97.762	0.562	0.1	12.0	O K
240 min Summer	97.798	0.598	0.1	12.8	O K
360 min Summer	97.841	0.641	0.1	13.7	O K
480 min Summer	97.864	0.664	0.1	14.2	O K
600 min Summer	97.875	0.675	0.1	14.4	O K
720 min Summer	97.879	0.679	0.1	14.5	O K
960 min Summer	97.872	0.672	0.1	14.4	O K
1440 min Summer	97.841	0.641	0.1	13.7	O K
2160 min Summer	97.798	0.598	0.1	12.8	O K
2880 min Summer	97.761	0.561	0.1	12.0	O K
4320 min Summer	97.703	0.503	0.1	10.7	O K
5760 min Summer	97.657	0.457	0.1	9.8	O K
60 min Winter	97.683	0.483	0.1	10.3	O K
120 min Winter	97.775	0.575	0.1	12.3	O K
180 min Winter	97.833	0.633	0.1	13.5	O K
240 min Winter	97.874	0.674	0.1	14.4	O K
360 min Winter	97.925	0.725	0.1	15.5	O K
480 min Winter	97.953	0.753	0.1	16.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
60 min Summer	60.004	0.0	70
120 min Summer	36.232	0.0	130
180 min Summer	26.997	0.0	190
240 min Summer	21.858	0.0	248
360 min Summer	16.102	0.0	368
480 min Summer	12.880	0.0	486
600 min Summer	10.784	0.0	604
720 min Summer	9.303	0.0	724
960 min Summer	7.328	0.0	960
1440 min Summer	5.190	0.0	1222
2160 min Summer	3.663	0.0	1584
2880 min Summer	2.865	0.0	1992
4320 min Summer	2.038	0.0	2812
5760 min Summer	1.612	0.0	3632
60 min Winter	60.004	0.0	70
120 min Winter	36.232	0.0	128
180 min Winter	26.997	0.0	186
240 min Winter	21.858	0.0	244
360 min Winter	16.102	0.0	360
480 min Winter	12.880	0.0	476

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
600 min Winter	97.968	0.768	0.1	16.4	O K
720 min Winter	97.975	0.775	0.1	16.6	O K
960 min Winter	97.973	0.773	0.1	16.5	O K
1440 min Winter	97.942	0.742	0.1	15.9	O K
2160 min Winter	97.889	0.689	0.1	14.7	O K
2880 min Winter	97.843	0.643	0.1	13.7	O K
4320 min Winter	97.763	0.563	0.1	12.0	O K
5760 min Winter	97.696	0.496	0.1	10.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
600 min Winter	10.784	0.0	592
720 min Winter	9.303	0.0	706
960 min Winter	7.328	0.0	932
1440 min Winter	5.191	0.0	1356
2160 min Winter	3.663	0.0	1684
2880 min Winter	2.865	0.0	2140
4320 min Winter	2.038	0.0	3036
5760 min Winter	1.612	0.0	3920

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	60
Longest Storm (mins)	5760
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.021

Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)
0	4	0.007	4	8	0.007	8	12	0.007

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Model Details

Storage is Online Cover Level (m) 98.400

Cellular Storage Structure

Invert Level (m) 97.200 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.01800 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.01800

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	22.5	22.5	0.900	0.0	40.9
0.800	22.5	40.9			

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Summary of Results for 30 year Return Period

Half Drain Time : 969 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
60 min Summer	97.431	0.231	0.1	4.9	O K
120 min Summer	97.476	0.276	0.1	5.9	O K
180 min Summer	97.501	0.301	0.1	6.4	O K
240 min Summer	97.518	0.318	0.1	6.8	O K
360 min Summer	97.536	0.336	0.1	7.2	O K
480 min Summer	97.544	0.344	0.1	7.3	O K
600 min Summer	97.545	0.345	0.1	7.4	O K
720 min Summer	97.542	0.342	0.1	7.3	O K
960 min Summer	97.534	0.334	0.1	7.1	O K
1440 min Summer	97.515	0.315	0.1	6.7	O K
2160 min Summer	97.489	0.289	0.1	6.2	O K
2880 min Summer	97.467	0.267	0.1	5.7	O K
4320 min Summer	97.429	0.229	0.1	4.9	O K
5760 min Summer	97.399	0.199	0.1	4.3	O K
60 min Winter	97.459	0.259	0.1	5.5	O K
120 min Winter	97.511	0.311	0.1	6.6	O K
180 min Winter	97.540	0.340	0.1	7.3	O K
240 min Winter	97.560	0.360	0.1	7.7	O K
360 min Winter	97.582	0.382	0.1	8.2	O K
480 min Winter	97.593	0.393	0.1	8.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
60 min Summer	32.620	0.0	70
120 min Summer	19.975	0.0	128
180 min Summer	14.907	0.0	188
240 min Summer	12.068	0.0	246
360 min Summer	8.898	0.0	364
480 min Summer	7.129	0.0	482
600 min Summer	5.980	0.0	602
720 min Summer	5.169	0.0	704
960 min Summer	4.089	0.0	806
1440 min Summer	2.917	0.0	1048
2160 min Summer	2.081	0.0	1456
2880 min Summer	1.643	0.0	1856
4320 min Summer	1.188	0.0	2680
5760 min Summer	0.953	0.0	3464
60 min Winter	32.620	0.0	70
120 min Winter	19.975	0.0	126
180 min Winter	14.907	0.0	184
240 min Winter	12.068	0.0	242
360 min Winter	8.898	0.0	358
480 min Winter	7.129	0.0	472

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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
600 min Winter	97.596	0.396	0.1	8.5	O K
720 min Winter	97.595	0.395	0.1	8.4	O K
960 min Winter	97.586	0.386	0.1	8.3	O K
1440 min Winter	97.562	0.362	0.1	7.7	O K
2160 min Winter	97.527	0.327	0.1	7.0	O K
2880 min Winter	97.495	0.295	0.1	6.3	O K
4320 min Winter	97.440	0.240	0.1	5.1	O K
5760 min Winter	97.395	0.195	0.1	4.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
600 min Winter	5.980	0.0	584
720 min Winter	5.169	0.0	694
960 min Winter	4.089	0.0	904
1440 min Winter	2.917	0.0	1120
2160 min Winter	2.081	0.0	1580
2880 min Winter	1.643	0.0	2024
4320 min Winter	1.188	0.0	2864
5760 min Winter	0.953	0.0	3688

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	60
Longest Storm (mins)	5760
Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.021

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.007	4	8	0.007	8	12	0.007

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Model Details

Storage is Online Cover Level (m) 98.400

Cellular Storage Structure

Invert Level (m) 97.200 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.01800 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.01800

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	22.5	22.5	0.900	0.0	40.9
0.800	22.5	40.9			

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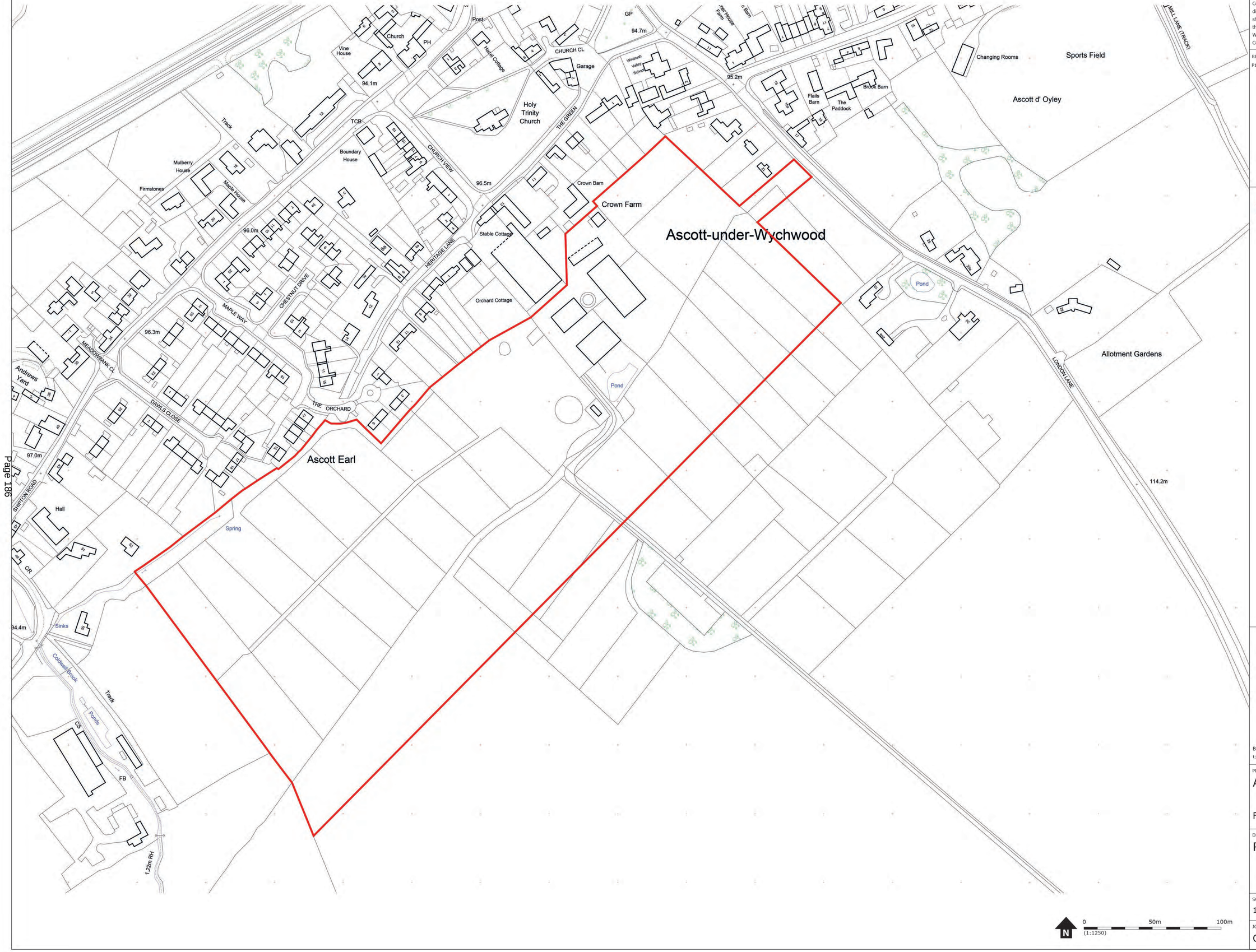
Appendix N

Land Controlled by Appellant

A1



NOTES

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Licence No. 100007359. DO NOT scale from this drawing.
Contractors, Sub-contractors and suppliers are to check all relevant dimensions and levels of the site and building before commencing any shop drawings or building work. Any discrepancies should be recorded to the Architect.
Where applicable this drawing is to be read in conjunction with the Consultants' drawings.

REV	DESCRIPTION	DATE	AUTHOR	CHK'D
P1	Preliminary Issue	30/07/19	GR/SWD	GR

KEY

Site Boundary

thrive. architects
Romsey Office
Building 300, The Grange, Romsey Road, Michelmersh, SO51 0AE
t: 01794 367703 f: 01794 367276 www.thrivearchitects.co.uk

PROJECT
Ascott Under Wychwood

For: Obsidian Strategic AA Limited

DRAWING
Red Line Plan - 01

SCALE	DATE	AUTHOR	CHK'D
1:1250 @ A1	30/07/19	GR/SWD	GR

JOB NO.	DRAWING NO.	REV
OBSI180824	RLP-01	P1

Appendix O

Option 2 – Surface Water Drainage Strategy & Calculations

Discharge from South-west of site to Coldwell Brook, which is located within land under the current applicant's control.

Outfall from site to Coldwell Brook within land under applicant's control.

Additional SuDS features could be provided within additional land under the applicant's control, including an attenuation basin and/or a swale.

STORAGE OPTION 2B

ATTENUATION BASIN
CL: 98.100m (Min.)
IL: 97.100m

Attenuation Basin to be provided within land under applicant's control as alternative to geocellular crates in south-west corner of application boundary.
Max. Water Depth in 1% AEP + 40% CC Storm: 0.70m
Plan Area: 693m²
Total Depth: 1.00m

INSET
Scale: 1:1000

S1.0 - INFILTRATION BASIN
CL: 97.650m
IL: 96.300m

Max. Water Depth in 1% AEP + 40% CC Storm: 1.050m
Plan Area: 1051m²
Attenuation Volume: 522m³
Total Depth: 1.35m

INFILTRATION GEOCELLULAR CRATES
CL: 98.400m
IL: 97.200m

Geocellular crates to drain Plots 39-40
Dims: 2.50m x 9.0m x 0.80m

INFILTRATION GEOCELLULAR CRATES
CL: 98.800m
IL: 97.400m

Geocellular crates to drain Plots 33-38
Dims: 7.50m x 10.0m x 0.80m

Complex Flow Control

ONLINE ATTENUATION GEOCELLULAR CRATES
CL: 99.250
IL: 97.785
No infiltration to occur and run-off to be attenuated only.
Dims: 3.50m x 15.0m x 0.80m

Areas of shared permeable paving to provide additional attenuation volume. Checkdams to be provided within sub-base of permeable paving where levels require to achieve necessary storage volume.
No Infiltration to occur and run-off to be attenuated only.

STORAGE OPTION 2A

ATTENUATION GEOCELLULAR CRATES
CL: 102.350
IL: 99.050

No infiltration to occur and run-off to be attenuated only.
Dims: 13.0m x 17.00m x 1.20m

Flow Control (If Required)

Existing Pond to be retained with any exceedance to be routed via open space and/or roads, away from the dwellings.

10.0 0.0 10.0 20.0 30.0 40.0 50.0
Scale = 1:500 @ A1

N

NOTES

1. Dimensions not to be scaled from this drawing for construction purposes.
2. This drawing should be read in conjunction with the associated Flood Risk Assessment and all relevant standards.
3. All drainage features are indictive only for preliminary design purposes and are subject to detailed design. All levels shown in meters AOD.
4. Site Layout taken from Thrive Architects drawing OBSI180824 CMP_01 P10, dated June 2022.
5. Topographical levels taken from Greenhatch group drawing 42917_T1, dated February 2022.

KEY

- Application Boundary
- Land Under Applicant's Control
- Surface Water Sewer
- Surface Water Sewer Alternative Route
- Manhole Chamber
- Flow Control Chamber
- Headwall
- S2.000 — MicroDrainage Pipe Reference Direction of Flow
- Infiltration Basin
- Geocellular Crates (Infiltration)
- Proposed Permeable Paving with Deepened Porous Sub-base (Attenuation only)
- Geocellular Crates (Attenuation Only)
- Private Parking Area (Attenuation Only)
- Attenuation Basin

CATCHMENT PLAN
Scale: DNS

KEY:
- Discharge Via Infiltration (0.430 Ha)
- Discharge Via Watercourse (0.304 Ha)

Rev.	Description	Date	Chkd
P2	Issued with Technical Note.	18/01/2024 SM	JB/CS

Glanville
Cornerstone House
62 Foxhall Road, Didcot
Oxon, OX11 7AD
Tel: (01235) 515550 Fax: (01235) 817799
postbox@glanvillegroup.com www.glanvillegroup.com

Client :
Obsidian Strategic Asset Management

Project :
Land off London Lane
Ascott-under-Wychwood

Title :
Outline Surface Water Drainage Strategy
Option 2 - Hybrid Infiltration and Discharge to Watercourse

Project Engineer :	S McNair	Scale :	1:500 @ A1
Project Director :	J Birch	Date :	January 2024
Status :	PLANNING		

Drawing No. 8211067 - SK08 Rev P2

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	0.830	Urban	0.000
SAAR (mm)	750	Region Number	Region 6

Results l/s

QBAR Rural	4.0
QBAR Urban	4.0
Q100 years	12.6
Q1 year	3.4
Q30 years	9.0
Q100 years	12.6

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ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	0.510	Urban	0.000
SAAR (mm)	750	Region Number	Region 6

Results l/s

QBAR Rural	2.4
QBAR Urban	2.4
Q100 years	7.7
Q1 year	2.1
Q30 years	5.5
Q100 years	7.7

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.900
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S3.000	o	225	S5.0	100.700	99.535	0.940	Open Manhole	1200
S4.000	o	150	S4.2	101.350	100.150	1.050	Open Manhole	1200
S4.001	o	150	S4.1	101.300	99.960	1.190	Open Manhole	1200
S3.001	o	225	S4.0	100.600	99.450	0.925	Open Manhole	1200
S3.002	o	225	S3.0	99.900	98.435	1.240	Open Manhole	1200
S5.000	o	150	S2.3	99.000	97.950	0.900	Open Manhole	1200
S5.001	o	150	S2.2	99.400	97.815	1.435	Open Manhole	1200
S5.002	o	150	S2.1	99.290	97.785	1.355	Open Manhole	1200
S3.003	o	300	S2.0	98.600	97.340	0.960	Open Manhole	1200
S3.004	o	150	S1	97.650	96.300	1.200	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S3.000	17.460	205.4	S4.0	100.600	99.450	0.925	Open Manhole	1200
S4.000	27.305	143.7	S4.1	101.300	99.960	1.190	Open Manhole	1200
S4.001	23.523	54.1	S4.0	100.600	99.525	0.925	Open Manhole	1200
S3.001	24.370	24.0	S3.0	99.900	98.435	1.240	Open Manhole	1200
S3.002	32.737	32.1	S2.0	98.600	97.415	0.960	Open Manhole	1200
S5.000	20.072	148.7	S2.2	99.400	97.815	1.435	Open Manhole	1200
S5.001	3.995	133.2	S2.1	99.290	97.785	1.355	Open Manhole	1200
S5.002	43.624	147.9	S2.0	98.600	97.490	0.960	Open Manhole	1200
S3.003	8.143	203.6	S1	97.650	97.300	0.050	Open Manhole	1200
S3.004	15.567	103.8	S	100.000	96.150	3.700	Open Manhole	150

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
3.000	-	-	100	0.019	0.019	0.019
4.000	-	-	100	0.020	0.020	0.020
4.001	-	-	100	0.048	0.048	0.048
3.001	-	-	100	0.029	0.029	0.029
3.002	-	-	100	0.019	0.019	0.019
5.000	-	-	100	0.042	0.042	0.042
5.001	-	-	100	0.032	0.032	0.032
5.002	-	-	100	0.050	0.050	0.050
3.003	-	-	100	0.113	0.113	0.113
3.004	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.372	0.372	0.372

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S3.004	S	100.000	96.150	96.150	150	0

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Online Controls for Storm

Complex Manhole: S4.0, DS/PN: S3.001, Volume (m³): 2.3

Hydro-Brake® Optimum

Unit Reference	MD-SCU-0100-8000-0600-8000
Design Head (m)	0.600
Design Flow (l/s)	8.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	100
Invert Level (m)	99.450
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.600	8.0
Flush-Flo™	0.128	4.3
Kick-Flo®	0.150	4.2
Mean Flow over Head Range	-	5.3

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)
0.100	3.6	1.200	11.1	3.000	17.2	7.000	25.8
0.200	4.8	1.400	11.9	3.500	18.5	7.500	26.7
0.300	5.8	1.600	12.7	4.000	19.7	8.000	27.6
0.400	6.6	1.800	13.4	4.500	20.9	8.500	28.4
0.500	7.3	2.000	14.1	5.000	21.9	9.000	29.3
0.600	8.0	2.200	14.8	5.500	23.0	9.500	30.1
0.800	9.2	2.400	15.4	6.000	24.0		
1.000	10.2	2.600	16.0	6.500	24.8		

Weir

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 100.050

Complex Manhole: S2.1, DS/PN: S5.002, Volume (m³): 1.8

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Hydro-Brake® Optimum

Unit Reference	MD-SHE-0049-1000-0800-1000
Design Head (m)	0.800
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	49
Invert Level (m)	97.785
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	1.0
Flush-Flo™	0.215	0.9
Kick-Flo®	0.437	0.8
Mean Flow over Head Range	-	0.8

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)
0.100	0.8	1.200	1.2	3.000	1.8	7.000	2.7
0.200	0.9	1.400	1.3	3.500	1.9	7.500	2.8
0.300	0.9	1.600	1.4	4.000	2.1	8.000	2.9
0.400	0.8	1.800	1.4	4.500	2.2	8.500	2.9
0.500	0.8	2.000	1.5	5.000	2.3	9.000	3.0
0.600	0.9	2.200	1.6	5.500	2.4	9.500	3.1
0.800	1.0	2.400	1.6	6.000	2.5		
1.000	1.1	2.600	1.7	6.500	2.6		

Weir

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 98.585

Weir Manhole: S1, DS/PN: S3.004, Volume (m³): 2.0

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 97.650

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Storage Structures for Storm

Porous Car Park Manhole: S4.2, DS/PN: S4.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	25.5
Max Percolation (l/s)	34.0	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	100.150	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: S4.1, DS/PN: S4.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	27.0
Max Percolation (l/s)	18.8	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	99.960	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: S4.0, DS/PN: S3.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.7
Membrane Percolation (mm/hr)	1000	Length (m)	15.0
Max Percolation (l/s)	23.8	Slope (1:X)	20.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	99.450	Cap Volume Depth (m)	0.500

Cellular Storage Manhole: S2.1, DS/PN: S5.002

Invert Level (m)	97.785	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	52.5	52.5	0.900	0.0	82.1
0.800	52.5	82.1			

Infiltration Basin Manhole: S1, DS/PN: S3.004

Invert Level (m)	96.300	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.01800	Porosity	1.00
Infiltration Coefficient Side (m/hr)	0.01800		

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	373.6	1.050	620.6	1.350	702.6

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	5
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S3.000	S5.0	60 minute 2 year Winter I+0%	100.700	99.676	-0.084	0.000	0.03
S4.000	S4.2	120 minute 2 year Winter I+0%	101.350	100.173	-0.127	0.000	0.06
S4.001	S4.1	60 minute 2 year Summer I+0%	101.300	100.002	-0.108	0.000	0.17
S3.001	S4.0	60 minute 2 year Winter I+0%	100.600	99.673	-0.002	0.000	0.05
S3.002	S3.0	60 minute 2 year Summer I+0%	99.900	98.474	-0.186	0.000	0.07
S5.000	S2.3	240 minute 2 year Winter I+0%	99.000	98.086	-0.014	0.000	0.10
S5.001	S2.2	240 minute 2 year Winter I+0%	99.400	98.085	0.120	0.000	0.21
S5.002	S2.1	240 minute 2 year Winter I+0%	99.290	98.084	0.149	0.000	0.06
S3.003	S2.0	60 minute 2 year Summer I+0%	98.600	97.449	-0.191	0.000	0.29
S3.004	S1	960 minute 2 year Winter I+0%	97.650	96.460	0.010	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S3.000	S5.0		0.153		1.1	OK

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

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S4.000	S4.2		0.870	56	0.8	OK
S4.001	S4.1		0.916	26	3.9	OK
S3.001	S4.0		1.673	16	5.0	OK
S3.002	S3.0		0.044		6.0	OK
S5.000	S2.3		0.149		1.4	OK
S5.001	S2.2		0.615		2.3	SURCHARGED
S5.002	S2.1		15.291	212	0.9	SURCHARGED
S3.003	S2.0		0.121		16.6	OK
S3.004	S1		62.674	576	0.0	SURCHARGED

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	5
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S3.000	S5.0	60 minute 10 year Winter I+0%	100.700	99.937	0.177	0.000	0.06
S4.000	S4.2	60 minute 10 year Winter I+0%	101.350	100.186	-0.114	0.000	0.13
S4.001	S4.1	60 minute 10 year Summer I+0%	101.300	100.021	-0.089	0.000	0.35
S3.001	S4.0	60 minute 10 year Winter I+0%	100.600	99.934	0.259	0.000	0.07
S3.002	S3.0	60 minute 10 year Summer I+0%	99.900	98.484	-0.176	0.000	0.10
S5.000	S2.3	240 minute 10 year Winter I+0%	99.000	98.314	0.214	0.000	0.15
S5.001	S2.2	240 minute 10 year Winter I+0%	99.400	98.313	0.348	0.000	0.33
S5.002	S2.1	240 minute 10 year Winter I+0%	99.290	98.312	0.377	0.000	0.06
S3.003	S2.0	60 minute 10 year Summer I+0%	98.600	97.492	-0.148	0.000	0.49
S3.004	S1	1440 minute 10 year Winter I+0%	97.650	96.536	0.086	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S3.000	S5.0		0.449		1.9	SURCHARGED

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

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S4.000	S4.2		1.344	28	1.8	OK
S4.001	S4.1		1.347	26	8.0	OK
S3.001	S4.0		5.484	24	7.2	SURCHARGED
S3.002	S3.0		0.057		8.9	OK
S5.000	S2.3		0.406		2.0	SURCHARGED
S5.001	S2.2		0.891		3.5	SURCHARGED
S5.002	S2.1		26.903		0.9	SURCHARGED
S3.003	S2.0		0.192		28.7	OK
S3.004	S1		94.405	816	0.0	SURCHARGED

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	5
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S3.000	S5.0	60 minute 30 year Winter I+0%	100.700	100.063	0.303	0.000	0.09
S4.000	S4.2	60 minute 30 year Winter I+0%	101.350	100.194	-0.106	0.000	0.19
S4.001	S4.1	60 minute 30 year Winter I+0%	101.300	100.087	-0.023	0.000	0.42
S3.001	S4.0	60 minute 30 year Winter I+0%	100.600	100.058	0.383	0.000	0.10
S3.002	S3.0	60 minute 30 year Summer I+0%	99.900	98.488	-0.172	0.000	0.13
S5.000	S2.3	360 minute 30 year Winter I+0%	99.000	98.506	0.406	0.000	0.14
S5.001	S2.2	360 minute 30 year Winter I+0%	99.400	98.505	0.540	0.000	0.32
S5.002	S2.1	360 minute 30 year Winter I+0%	99.290	98.504	0.569	0.000	0.07
S3.003	S2.0	60 minute 30 year Summer I+0%	98.600	97.520	-0.120	0.000	0.65
S3.004	S1	960 minute 30 year Winter I+0%	97.650	96.599	0.149	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S3.000	S5.0		0.592		2.8	SURCHARGED

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

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S4.000	S4.2		1.655	28	2.7	OK
S4.001	S4.1		2.826	20	9.7	OK
S3.001	S4.0		7.846	32	9.5	SURCHARGED
S3.002	S3.0		0.063		10.9	OK
S5.000	S2.3		0.624		2.0	SURCHARGED
S5.001	S2.2		1.108		3.5	SURCHARGED
S5.002	S2.1		36.706		1.0	SURCHARGED
S3.003	S2.0		0.238		37.6	OK
S3.004	S1		121.293	1264	0.0	SURCHARGED

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	5
Number of Online Controls	3	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S3.000	S5.0	60 minute 100 year Summer I+40%	100.700	100.104	0.344	0.000	0.18
S4.000	S4.2	60 minute 100 year Winter I+40%	101.350	100.252	-0.048	0.000	0.45
S4.001	S4.1	60 minute 100 year Winter I+40%	101.300	100.227	0.117	0.000	0.56
S3.001	S4.0	60 minute 100 year Summer I+40%	100.600	100.094	0.419	0.000	0.27
S3.002	S3.0	60 minute 100 year Summer I+40%	99.900	98.533	-0.127	0.000	0.37
S5.000	S2.3	60 minute 100 year Winter I+40%	99.000	98.769	0.669	0.000	0.83
S5.001	S2.2	60 minute 100 year Winter I+40%	99.400	98.689	0.724	0.000	1.78
S5.002	S2.1	120 minute 100 year Winter I+40%	99.290	98.631	0.696	0.000	1.38
S3.003	S2.0	60 minute 100 year Summer I+40%	98.600	97.681	0.041	0.000	1.28
S3.004	S1	960 minute 100 year Winter I+40%	97.650	96.884	0.434	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S3.000	S5.0		0.638		5.8	SURCHARGED

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

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S4.000	S4.2		3.845	16	6.3	OK
S4.001	S4.1		6.110	24	12.9	SURCHARGED
S3.001	S4.0		8.499	46	26.2	SURCHARGED
S3.002	S3.0		0.121		31.9	OK
S5.000	S2.3		0.920		11.3	FLOOD RISK
S5.001	S2.2		1.316		19.3	SURCHARGED
S5.002	S2.1		42.303		19.5	SURCHARGED
S3.003	S2.0		0.847		74.4	SURCHARGED
S3.004	S1		255.977	1952	0.0	SURCHARGED

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

Half Drain Time : 1893 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
60 min Summer	97.807	0.407	0.2	29.0	O K
120 min Summer	97.884	0.484	0.2	34.5	O K
180 min Summer	97.933	0.533	0.2	38.0	O K
240 min Summer	97.968	0.568	0.2	40.5	O K
360 min Summer	98.012	0.612	0.2	43.6	O K
480 min Summer	98.036	0.636	0.2	45.3	O K
600 min Summer	98.049	0.649	0.2	46.3	O K
720 min Summer	98.055	0.655	0.2	46.7	O K
960 min Summer	98.055	0.655	0.2	46.6	O K
1440 min Summer	98.028	0.628	0.2	44.7	O K
2160 min Summer	97.985	0.585	0.2	41.7	O K
2880 min Summer	97.950	0.550	0.2	39.2	O K
4320 min Summer	97.894	0.494	0.2	35.2	O K
5760 min Summer	97.851	0.451	0.2	32.2	O K
60 min Winter	97.857	0.457	0.2	32.5	O K
120 min Winter	97.944	0.544	0.2	38.8	O K
180 min Winter	98.001	0.601	0.2	42.8	O K
240 min Winter	98.041	0.641	0.2	45.7	O K
360 min Winter	98.092	0.692	0.2	49.3	O K
480 min Winter	98.122	0.722	0.3	51.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
60 min Summer	60.004	0.0	72
120 min Summer	36.232	0.0	130
180 min Summer	26.997	0.0	190
240 min Summer	21.858	0.0	250
360 min Summer	16.102	0.0	368
480 min Summer	12.880	0.0	486
600 min Summer	10.784	0.0	606
720 min Summer	9.303	0.0	724
960 min Summer	7.328	0.0	962
1440 min Summer	5.190	0.0	1396
2160 min Summer	3.663	0.0	1712
2880 min Summer	2.865	0.0	2080
4320 min Summer	2.038	0.0	2896
5760 min Summer	1.612	0.0	3696
60 min Winter	60.004	0.0	70
120 min Winter	36.232	0.0	128
180 min Winter	26.997	0.0	186
240 min Winter	21.858	0.0	246
360 min Winter	16.102	0.0	362
480 min Winter	12.880	0.0	478

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
600 min Winter	98.139	0.739	0.3	52.6	O K
720 min Winter	98.148	0.748	0.3	53.3	O K
960 min Winter	98.152	0.752	0.3	53.6	O K
1440 min Winter	98.131	0.731	0.3	52.1	O K
2160 min Winter	98.079	0.679	0.2	48.4	O K
2880 min Winter	98.037	0.637	0.2	45.4	O K
4320 min Winter	97.963	0.563	0.2	40.1	O K
5760 min Winter	97.900	0.500	0.2	35.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
600 min Winter	10.784	0.0	596
720 min Winter	9.303	0.0	710
960 min Winter	7.328	0.0	940
1440 min Winter	5.191	0.0	1384
2160 min Winter	3.663	0.0	1964
2880 min Winter	2.865	0.0	2224
4320 min Winter	2.038	0.0	3124
5760 min Winter	1.612	0.0	4032

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	60
Longest Storm (mins)	5760
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.066

Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)
0	4	0.022	4	8	0.022	8	12	0.022

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Model Details

Storage is Online Cover Level (m) 98.800

Cellular Storage Structure

Invert Level (m) 97.400 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.01800 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.01800

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	75.0	75.0	0.900	0.0	103.0
0.800	75.0	103.0			

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Summary of Results for 30 year Return Period

Half Drain Time : 1062 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
60 min Summer	97.618	0.218	0.2	15.5	O K
120 min Summer	97.661	0.261	0.2	18.6	O K
180 min Summer	97.685	0.285	0.2	20.3	O K
240 min Summer	97.702	0.302	0.2	21.5	O K
360 min Summer	97.720	0.320	0.2	22.8	O K
480 min Summer	97.728	0.328	0.2	23.4	O K
600 min Summer	97.730	0.330	0.2	23.5	O K
720 min Summer	97.729	0.329	0.2	23.4	O K
960 min Summer	97.721	0.321	0.2	22.9	O K
1440 min Summer	97.703	0.303	0.2	21.6	O K
2160 min Summer	97.678	0.278	0.2	19.8	O K
2880 min Summer	97.656	0.256	0.2	18.3	O K
4320 min Summer	97.620	0.220	0.2	15.7	O K
5760 min Summer	97.591	0.191	0.2	13.6	O K
60 min Winter	97.645	0.245	0.2	17.5	O K
120 min Winter	97.694	0.294	0.2	20.9	O K
180 min Winter	97.722	0.322	0.2	23.0	O K
240 min Winter	97.741	0.341	0.2	24.3	O K
360 min Winter	97.764	0.364	0.2	25.9	O K
480 min Winter	97.775	0.375	0.2	26.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
60 min Summer	32.620	0.0	70
120 min Summer	19.975	0.0	130
180 min Summer	14.907	0.0	188
240 min Summer	12.068	0.0	248
360 min Summer	8.898	0.0	366
480 min Summer	7.129	0.0	484
600 min Summer	5.980	0.0	602
720 min Summer	5.169	0.0	720
960 min Summer	4.089	0.0	844
1440 min Summer	2.917	0.0	1084
2160 min Summer	2.081	0.0	1476
2880 min Summer	1.643	0.0	1880
4320 min Summer	1.188	0.0	2688
5760 min Summer	0.953	0.0	3464
60 min Winter	32.620	0.0	70
120 min Winter	19.975	0.0	128
180 min Winter	14.907	0.0	184
240 min Winter	12.068	0.0	242
360 min Winter	8.898	0.0	358
480 min Winter	7.129	0.0	474

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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
600 min Winter	97.779	0.379	0.2	27.0	O K
720 min Winter	97.780	0.380	0.2	27.0	O K
960 min Winter	97.773	0.373	0.2	26.6	O K
1440 min Winter	97.749	0.349	0.2	24.9	O K
2160 min Winter	97.717	0.317	0.2	22.6	O K
2880 min Winter	97.686	0.286	0.2	20.4	O K
4320 min Winter	97.632	0.232	0.2	16.5	O K
5760 min Winter	97.587	0.187	0.2	13.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
600 min Winter	5.980	0.0	588
720 min Winter	5.169	0.0	700
960 min Winter	4.089	0.0	916
1440 min Winter	2.917	0.0	1154
2160 min Winter	2.081	0.0	1604
2880 min Winter	1.643	0.0	2052
4320 min Winter	1.188	0.0	2904
5760 min Winter	0.953	0.0	3704

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	60
Longest Storm (mins)	5760
Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.066

Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)
0	4	0.022	4	8	0.022	8	12	0.022

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Model Details

Storage is Online Cover Level (m) 98.800

Cellular Storage Structure

Invert Level (m) 97.400 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.01800 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.01800

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	75.0	75.0	0.900	0.0	103.0
0.800	75.0	103.0			

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

Half Drain Time : 1554 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
60 min Summer	97.631	0.431	0.1	9.2	O K
120 min Summer	97.711	0.511	0.1	10.9	O K
180 min Summer	97.762	0.562	0.1	12.0	O K
240 min Summer	97.798	0.598	0.1	12.8	O K
360 min Summer	97.841	0.641	0.1	13.7	O K
480 min Summer	97.864	0.664	0.1	14.2	O K
600 min Summer	97.875	0.675	0.1	14.4	O K
720 min Summer	97.879	0.679	0.1	14.5	O K
960 min Summer	97.872	0.672	0.1	14.4	O K
1440 min Summer	97.841	0.641	0.1	13.7	O K
2160 min Summer	97.798	0.598	0.1	12.8	O K
2880 min Summer	97.761	0.561	0.1	12.0	O K
4320 min Summer	97.703	0.503	0.1	10.7	O K
5760 min Summer	97.657	0.457	0.1	9.8	O K
60 min Winter	97.683	0.483	0.1	10.3	O K
120 min Winter	97.775	0.575	0.1	12.3	O K
180 min Winter	97.833	0.633	0.1	13.5	O K
240 min Winter	97.874	0.674	0.1	14.4	O K
360 min Winter	97.925	0.725	0.1	15.5	O K
480 min Winter	97.953	0.753	0.1	16.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
60 min Summer	60.004	0.0	70
120 min Summer	36.232	0.0	130
180 min Summer	26.997	0.0	190
240 min Summer	21.858	0.0	248
360 min Summer	16.102	0.0	368
480 min Summer	12.880	0.0	486
600 min Summer	10.784	0.0	604
720 min Summer	9.303	0.0	724
960 min Summer	7.328	0.0	960
1440 min Summer	5.190	0.0	1222
2160 min Summer	3.663	0.0	1584
2880 min Summer	2.865	0.0	1992
4320 min Summer	2.038	0.0	2812
5760 min Summer	1.612	0.0	3632
60 min Winter	60.004	0.0	70
120 min Winter	36.232	0.0	128
180 min Winter	26.997	0.0	186
240 min Winter	21.858	0.0	244
360 min Winter	16.102	0.0	360
480 min Winter	12.880	0.0	476

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
600 min Winter	97.968	0.768	0.1	16.4	O K
720 min Winter	97.975	0.775	0.1	16.6	O K
960 min Winter	97.973	0.773	0.1	16.5	O K
1440 min Winter	97.942	0.742	0.1	15.9	O K
2160 min Winter	97.889	0.689	0.1	14.7	O K
2880 min Winter	97.843	0.643	0.1	13.7	O K
4320 min Winter	97.763	0.563	0.1	12.0	O K
5760 min Winter	97.696	0.496	0.1	10.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
600 min Winter	10.784	0.0	592
720 min Winter	9.303	0.0	706
960 min Winter	7.328	0.0	932
1440 min Winter	5.191	0.0	1356
2160 min Winter	3.663	0.0	1684
2880 min Winter	2.865	0.0	2140
4320 min Winter	2.038	0.0	3036
5760 min Winter	1.612	0.0	3920

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	60
Longest Storm (mins)	5760
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.021

Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)
0	4	0.007	4	8	0.007	8	12	0.007

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Model Details

Storage is Online Cover Level (m) 98.400

Cellular Storage Structure

Invert Level (m) 97.200 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.01800 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.01800

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	22.5	22.5	0.900	0.0	40.9
0.800	22.5	40.9			

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Summary of Results for 30 year Return Period

Half Drain Time : 969 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
60 min Summer	97.431	0.231	0.1	4.9	O K
120 min Summer	97.476	0.276	0.1	5.9	O K
180 min Summer	97.501	0.301	0.1	6.4	O K
240 min Summer	97.518	0.318	0.1	6.8	O K
360 min Summer	97.536	0.336	0.1	7.2	O K
480 min Summer	97.544	0.344	0.1	7.3	O K
600 min Summer	97.545	0.345	0.1	7.4	O K
720 min Summer	97.542	0.342	0.1	7.3	O K
960 min Summer	97.534	0.334	0.1	7.1	O K
1440 min Summer	97.515	0.315	0.1	6.7	O K
2160 min Summer	97.489	0.289	0.1	6.2	O K
2880 min Summer	97.467	0.267	0.1	5.7	O K
4320 min Summer	97.429	0.229	0.1	4.9	O K
5760 min Summer	97.399	0.199	0.1	4.3	O K
60 min Winter	97.459	0.259	0.1	5.5	O K
120 min Winter	97.511	0.311	0.1	6.6	O K
180 min Winter	97.540	0.340	0.1	7.3	O K
240 min Winter	97.560	0.360	0.1	7.7	O K
360 min Winter	97.582	0.382	0.1	8.2	O K
480 min Winter	97.593	0.393	0.1	8.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
60 min Summer	32.620	0.0	70
120 min Summer	19.975	0.0	128
180 min Summer	14.907	0.0	188
240 min Summer	12.068	0.0	246
360 min Summer	8.898	0.0	364
480 min Summer	7.129	0.0	482
600 min Summer	5.980	0.0	602
720 min Summer	5.169	0.0	704
960 min Summer	4.089	0.0	806
1440 min Summer	2.917	0.0	1048
2160 min Summer	2.081	0.0	1456
2880 min Summer	1.643	0.0	1856
4320 min Summer	1.188	0.0	2680
5760 min Summer	0.953	0.0	3464
60 min Winter	32.620	0.0	70
120 min Winter	19.975	0.0	126
180 min Winter	14.907	0.0	184
240 min Winter	12.068	0.0	242
360 min Winter	8.898	0.0	358
480 min Winter	7.129	0.0	472

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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
600 min Winter	97.596	0.396	0.1	8.5	O K
720 min Winter	97.595	0.395	0.1	8.4	O K
960 min Winter	97.586	0.386	0.1	8.3	O K
1440 min Winter	97.562	0.362	0.1	7.7	O K
2160 min Winter	97.527	0.327	0.1	7.0	O K
2880 min Winter	97.495	0.295	0.1	6.3	O K
4320 min Winter	97.440	0.240	0.1	5.1	O K
5760 min Winter	97.395	0.195	0.1	4.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
600 min Winter	5.980	0.0	584
720 min Winter	5.169	0.0	694
960 min Winter	4.089	0.0	904
1440 min Winter	2.917	0.0	1120
2160 min Winter	2.081	0.0	1580
2880 min Winter	1.643	0.0	2024
4320 min Winter	1.188	0.0	2864
5760 min Winter	0.953	0.0	3688

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	60
Longest Storm (mins)	5760
Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.021

Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)
0	4	0.007	4	8	0.007	8	12	0.007

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Model Details

Storage is Online Cover Level (m) 98.400

Cellular Storage Structure

Invert Level (m) 97.200 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.01800 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.01800

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	22.5	22.5	0.900	0.0	40.9
0.800	22.5	40.9			

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

Half Drain Time : 2257 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control Σ (l/s)	Max Outflow (l/s)	Max Volume (m³)	Status
60 min Summer	99.678	0.628	0.0	0.8	0.8	131.8	O K
120 min Summer	99.797	0.747	0.0	0.9	0.9	156.9	O K
180 min Summer	99.875	0.825	0.0	0.9	0.9	173.2	O K
240 min Summer	99.930	0.880	0.0	0.9	0.9	184.7	O K
360 min Summer	99.999	0.949	0.0	1.0	1.0	199.3	O K
480 min Summer	100.039	0.989	0.0	1.0	1.0	207.7	O K
600 min Summer	100.062	1.012	0.0	1.0	1.0	212.5	O K
720 min Summer	100.074	1.024	0.0	1.0	1.0	215.0	O K
960 min Summer	100.077	1.027	0.0	1.0	1.0	215.5	O K
1440 min Summer	100.042	0.992	0.0	1.0	1.0	208.3	O K
2160 min Summer	99.968	0.918	0.0	0.9	0.9	192.6	O K
2880 min Summer	99.909	0.859	0.0	0.9	0.9	180.4	O K
4320 min Summer	99.833	0.783	0.0	0.9	0.9	164.4	O K
5760 min Summer	99.779	0.729	0.0	0.9	0.9	153.1	O K
60 min Winter	99.755	0.705	0.0	0.9	0.9	148.0	O K
120 min Winter	99.891	0.841	0.0	0.9	0.9	176.6	O K
180 min Winter	99.979	0.929	0.0	0.9	0.9	195.1	O K
240 min Winter	100.042	0.992	0.0	1.0	1.0	208.4	O K
360 min Winter	100.124	1.074	0.0	1.0	1.0	225.5	O K
480 min Winter	100.172	1.122	0.0	1.0	1.0	235.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Summer	60.004	0.0	123.6	72
120 min Summer	36.232	0.0	127.1	130
180 min Summer	26.997	0.0	131.2	190
240 min Summer	21.858	0.0	135.6	250
360 min Summer	16.102	0.0	141.3	368
480 min Summer	12.880	0.0	144.8	488
600 min Summer	10.784	0.0	146.9	606
720 min Summer	9.303	0.0	148.3	726
960 min Summer	7.328	0.0	149.5	964
1440 min Summer	5.190	0.0	149.0	1440
2160 min Summer	3.663	0.0	271.0	1824
2880 min Summer	2.865	0.0	267.0	2196
4320 min Summer	2.038	0.0	255.6	2988
5760 min Summer	1.612	0.0	348.0	3816
60 min Winter	60.004	0.0	125.5	70
120 min Winter	36.232	0.0	131.6	128
180 min Winter	26.997	0.0	138.2	186
240 min Winter	21.858	0.0	142.9	246
360 min Winter	16.102	0.0	148.8	362
480 min Winter	12.880	0.0	152.3	480

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
600 min Winter	100.201	1.151	0.0	1.0	1.0	241.6	O K
720 min Winter	100.217	1.167	0.0	1.0	1.0	245.1	O K
960 min Winter	100.228	1.178	0.0	1.0	1.0	247.3	O K
1440 min Winter	100.205	1.155	0.0	1.0	1.0	242.4	O K
2160 min Winter	100.134	1.084	0.0	1.0	1.0	227.7	O K
2880 min Winter	100.064	1.014	0.0	1.0	1.0	213.0	O K
4320 min Winter	99.962	0.912	0.0	0.9	0.9	191.4	O K
5760 min Winter	99.886	0.836	0.0	0.9	0.9	175.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
600 min Winter	10.784	0.0	154.4	596
720 min Winter	9.303	0.0	155.7	712
960 min Winter	7.328	0.0	156.6	942
1440 min Winter	5.191	0.0	155.1	1392
2160 min Winter	3.663	0.0	281.8	2024
2880 min Winter	2.865	0.0	281.0	2288
4320 min Winter	2.038	0.0	271.1	3208
5760 min Winter	1.612	0.0	389.9	4144

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	60
Longest Storm (mins)	5760
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.300

Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)
0	4	0.100	4	8	0.100	8	12	0.100

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Model Details

Storage is Online Cover Level (m) 102.350

Cellular Storage Structure

Invert Level (m) 99.050 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	221.0	221.0	1.300	0.0	293.0
1.200	221.0	293.0			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0045-1000-1200-1000
Design Head (m)	1.200
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	45
Invert Level (m)	98.915
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	1.0
Flush-Flo™	0.196	0.7
Kick-Flo®	0.398	0.6
Mean Flow over Head Range	-	0.8

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)
0.100	0.7	1.200	1.0	3.000	1.5	7.000	2.2
0.200	0.7	1.400	1.1	3.500	1.6	7.500	2.3
0.300	0.7	1.600	1.1	4.000	1.7	8.000	2.4
0.400	0.6	1.800	1.2	4.500	1.8	8.500	2.4
0.500	0.7	2.000	1.3	5.000	1.9	9.000	2.5
0.600	0.7	2.200	1.3	5.500	2.0	9.500	2.6
0.800	0.8	2.400	1.4	6.000	2.1		
1.000	0.9	2.600	1.4	6.500	2.2		

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

Half Drain Time : 2242 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
60 min Summer	97.504	0.404	0.0	1.0	1.0	131.5	O K
120 min Summer	97.572	0.472	0.0	1.0	1.0	156.5	O K
180 min Summer	97.614	0.514	0.0	1.0	1.0	172.6	O K
240 min Summer	97.643	0.543	0.0	1.0	1.0	183.9	O K
360 min Summer	97.679	0.579	0.0	1.0	1.0	198.2	O K
480 min Summer	97.699	0.599	0.0	1.0	1.0	206.2	O K
600 min Summer	97.710	0.610	0.0	1.0	1.0	210.6	O K
720 min Summer	97.715	0.615	0.0	1.0	1.0	212.8	O K
960 min Summer	97.715	0.615	0.0	1.0	1.0	213.0	O K
1440 min Summer	97.696	0.596	0.0	1.0	1.0	205.2	O K
2160 min Summer	97.657	0.557	0.0	1.0	1.0	189.3	O K
2880 min Summer	97.625	0.525	0.0	1.0	1.0	176.8	O K
4320 min Summer	97.578	0.478	0.0	1.0	1.0	158.7	O K
5760 min Summer	97.541	0.441	0.0	1.0	1.0	144.8	O K
60 min Winter	97.548	0.448	0.0	1.0	1.0	147.7	O K
120 min Winter	97.623	0.523	0.0	1.0	1.0	176.1	O K
180 min Winter	97.669	0.569	0.0	1.0	1.0	194.5	O K
240 min Winter	97.702	0.602	0.0	1.0	1.0	207.5	O K
360 min Winter	97.743	0.643	0.0	1.0	1.0	224.3	O K
480 min Winter	97.766	0.666	0.0	1.0	1.0	234.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Summer	60.004	0.0	134.8	72
120 min Summer	36.232	0.0	154.3	130
180 min Summer	26.997	0.0	153.9	190
240 min Summer	21.858	0.0	152.9	250
360 min Summer	16.102	0.0	151.7	368
480 min Summer	12.880	0.0	151.1	488
600 min Summer	10.784	0.0	150.8	606
720 min Summer	9.303	0.0	150.6	726
960 min Summer	7.328	0.0	150.4	964
1440 min Summer	5.190	0.0	149.9	1442
2160 min Summer	3.663	0.0	296.6	1860
2880 min Summer	2.865	0.0	294.5	2224
4320 min Summer	2.038	0.0	271.1	3028
5760 min Summer	1.612	0.0	348.1	3864
60 min Winter	60.004	0.0	151.0	70
120 min Winter	36.232	0.0	153.9	128
180 min Winter	26.997	0.0	152.7	188
240 min Winter	21.858	0.0	152.0	246
360 min Winter	16.102	0.0	151.9	362
480 min Winter	12.880	0.0	152.4	480

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
600 min Winter	97.780	0.680	0.0	1.0	1.0	239.8	O K
720 min Winter	97.788	0.688	0.0	1.0	1.0	243.1	O K
960 min Winter	97.791	0.691	0.0	1.0	1.0	244.7	O K
1440 min Winter	97.778	0.678	0.0	1.0	1.0	238.9	O K
2160 min Winter	97.740	0.640	0.0	1.0	1.0	223.2	O K
2880 min Winter	97.701	0.601	0.0	1.0	1.0	207.2	O K
4320 min Winter	97.642	0.542	0.0	1.0	1.0	183.7	O K
5760 min Winter	97.592	0.492	0.0	1.0	1.0	164.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
600 min Winter	10.784	0.0	153.3	596
720 min Winter	9.303	0.0	154.3	714
960 min Winter	7.328	0.0	155.8	944
1440 min Winter	5.191	0.0	155.7	1396
2160 min Winter	3.663	0.0	306.5	2036
2880 min Winter	2.865	0.0	299.1	2336
4320 min Winter	2.038	0.0	279.3	3244
5760 min Winter	1.612	0.0	389.8	4160

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	60
Longest Storm (mins)	5760
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.300

Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)	Time From: (mins)	To:	Area (ha)
0	4	0.100	4	8	0.100	8	12	0.100

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Model Details

Storage is Online Cover Level (m) 98.100

Infiltration Basin Structure

Invert Level (m) 97.100 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	287.1	0.700	427.1	1.000	495.6

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0050-1000-0750-1000
Design Head (m)	0.750
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	50
Invert Level (m)	97.050
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.750	1.0
Flush-Flo™	0.222	1.0
Kick-Flo®	0.445	0.8
Mean Flow over Head Range	-	0.9

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)
0.100	0.9	1.200	1.2	3.000	1.9	7.000	2.8
0.200	1.0	1.400	1.3	3.500	2.0	7.500	2.9
0.300	0.9	1.600	1.4	4.000	2.1	8.000	2.9
0.400	0.9	1.800	1.5	4.500	2.3	8.500	3.0
0.500	0.8	2.000	1.6	5.000	2.4	9.000	3.1
0.600	0.9	2.200	1.6	5.500	2.5	9.500	3.2
0.800	1.0	2.400	1.7	6.000	2.6		
1.000	1.1	2.600	1.7	6.500	2.7		

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Appendix P

Option 3 – Surface Water Drainage Strategy & Calculations

INSET
Scale: 1:1000

CATCHMENT PLAN
Scale: DNS

N

NOTES

1. Dimensions not to be scaled from this drawing for construction purposes.
2. This drawing should be read in conjunction with the associated Flood Risk Assessment and all relevant standards.
3. All drainage features are indictive only for preliminary design purposes and are subject to detailed design. All levels shown in meters AOD.
4. Site Layout taken from Thrive Architects drawing OBSI180824 CMP_01 P10, dated June 2022.
5. Topographical levels taken from Greenhatch group drawing 42917_T1, dated February 2022.

KEY

- Application Boundary
- Land Under Applicant's Control
- Surface Water Sewer
- Surface Water Rising Main
- Surface Water Sewer Alternative Route
- Manhole Chamber
- Flow Control Chamber
- Headwall
- MicroDrainage Pipe Reference Direction of Flow
- Proposed Permeable Paving with Deepened Porous Sub-base (Attenuation only)
- SuDS Basin (Attenuation Only)
- Geocellular Crates (Attenuation Only)
- Private Parking Area (Attenuation Only)

Rev.	Description	Date	Chkd
P2	Issued with Technical Note.	18/01/2024 SM	JB/CS

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Client :
Obsidian Strategic Asset Management

Project :
Land off London Lane
Ascott-under-Wychwood

Title :
Outline Surface Water Drainage Strategy
Option 3 - Discharge to Watercourse

Project Engineer :	S McNair	Scale :	1:500 @ A1
Project Director :	J Birch	Date :	January 2024
Status :	PLANNING		

Drawing No. 8211067 - SK09 Rev P2

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	1.339	Urban	0.000
SAAR (mm)	750	Region Number	Region 6

Results l/s

QBAR Rural	6.4
QBAR Urban	6.4
Q100 years	20.3
Q1 year	5.4
Q30 years	14.5
Q100 years	20.3

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.900
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	21.113	0.150	140.8	0.018	15.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	53.934	0.360	149.8	0.010	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	29.878	0.135	221.3	0.102	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	22.354	0.545	41.0	0.039	0.00	0.0	0.600	o	225	Pipe/Conduit	
S2.000	11.174	2.000	5.6	0.000	15.00	0.0	0.600	o	150	Pipe/Conduit	
S2.001	9.699	0.070	138.6	0.061	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	15.42	100.800	0.018	0.0	0.0	0.0	0.85	14.9	2.9
S1.001	50.00	16.51	100.650	0.028	0.0	0.0	0.0	0.82	14.5	4.5
S1.002	50.00	17.08	100.215	0.130	0.0	0.0	0.0	0.87	34.8	21.1
S1.003	50.00	17.27	100.080	0.169	0.0	0.0	0.0	2.05	81.5	27.5
S2.000	50.00	15.04	102.000	0.000	0.0	0.0	0.0	4.29	75.9	0.0
S2.001	50.00	15.23	100.000	0.061	0.0	0.0	0.0	0.85	15.1	9.9

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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S2.002	47.265	0.320	147.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.004	17.460	0.085	205.4	0.069	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.000	27.305	0.190	143.7	0.020	15.00	0.0	0.600	o	150	Pipe/Conduit	
S3.001	23.523	0.435	54.1	0.048	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.005	24.370	1.015	24.0	0.115	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.006	32.737	1.020	32.1	0.040	0.00	0.0	0.600	o	225	Pipe/Conduit	
S4.000	19.908	0.135	147.5	0.042	15.00	0.0	0.600	o	150	Pipe/Conduit	
S4.001	3.995	0.030	133.2	0.032	0.00	0.0	0.600	o	150	Pipe/Conduit	
S4.002	43.624	0.295	147.9	0.050	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.007	8.143	0.040	203.6	0.113	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.008	15.567	0.150	103.8	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S2.002	50.00	16.19	99.930	0.061	0.0	0.0	0.0	0.82	14.6	9.9
S1.004	50.00	17.59	99.535	0.299	0.0	0.0	0.0	0.91	36.1«	48.6
S3.000	50.00	15.54	100.150	0.020	0.0	0.0	0.0	0.84	14.8	3.2
S3.001	50.00	15.83	99.960	0.068	0.0	0.0	0.0	1.37	24.2	11.0
S1.005	50.00	17.74	99.450	0.482	0.0	0.0	0.0	2.68	106.6	78.3
S1.006	50.00	17.97	98.435	0.522	0.0	0.0	0.0	2.32	92.1	84.8
S4.000	50.00	15.40	97.950	0.042	0.0	0.0	0.0	0.83	14.6	6.8
S4.001	50.00	15.48	97.815	0.074	0.0	0.0	0.0	0.87	15.4	12.0
S4.002	50.00	16.36	97.785	0.124	0.0	0.0	0.0	0.82	14.6«	20.1
S1.007	50.00	18.10	97.340	0.759	0.0	0.0	0.0	1.10	77.6«	123.3
S1.008	50.00	18.36	96.300	0.759	0.0	0.0	0.0	0.99	17.4«	123.3

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	150	S9.0	102.200	100.800	1.250	Open Manhole	1200
S1.001	o	150	S8.0	102.550	100.650	1.750	Open Manhole	1200
S1.002	o	225	S7.0	101.550	100.215	1.110	Open Manhole	1200
S1.003	o	225	S6.0	101.200	100.080	0.895	Open Manhole	1200
S2.000	o	150	SDummy	103.000	102.000	0.850	Open Manhole	300
S2.001	o	150	S5.2	101.600	100.000	1.450	Open Manhole	1200
S2.002	o	150	S5.1	101.600	99.930	1.520	Open Manhole	1200
S1.004	o	225	S5.0	100.700	99.535	0.940	Open Manhole	1200
S3.000	o	150	S4.2	101.350	100.150	1.050	Open Manhole	1200
S3.001	o	150	S4.1	101.300	99.960	1.190	Open Manhole	1200
S1.005	o	225	S4.0	100.600	99.450	0.925	Open Manhole	1200
S1.006	o	225	S3.0	99.900	98.435	1.240	Open Manhole	1200
S4.000	o	150	S2.3	99.000	97.950	0.900	Open Manhole	1200
S4.001	o	150	S2.2	99.400	97.815	1.435	Open Manhole	1200
S4.002	o	150	S2.1	99.290	97.785	1.355	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	21.113	140.8	S8.0	102.550	100.650	1.750	Open Manhole	1200
S1.001	53.934	149.8	S7.0	101.550	100.290	1.110	Open Manhole	1200
S1.002	29.878	221.3	S6.0	101.200	100.080	0.895	Open Manhole	1200
S1.003	22.354	41.0	S5.0	100.700	99.535	0.940	Open Manhole	1200
S2.000	11.174	5.6	S5.2	101.600	100.000	1.450	Open Manhole	1200
S2.001	9.699	138.6	S5.1	101.600	99.930	1.520	Open Manhole	1200
S2.002	47.265	147.7	S5.0	100.700	99.610	0.940	Open Manhole	1200
S1.004	17.460	205.4	S4.0	100.600	99.450	0.925	Open Manhole	1200
S3.000	27.305	143.7	S4.1	101.300	99.960	1.190	Open Manhole	1200
S3.001	23.523	54.1	S4.0	100.600	99.525	0.925	Open Manhole	1200
S1.005	24.370	24.0	S3.0	99.900	98.435	1.240	Open Manhole	1200
S1.006	32.737	32.1	S2.0	98.600	97.415	0.960	Open Manhole	1200
S4.000	19.908	147.5	S2.2	99.400	97.815	1.435	Open Manhole	1200
S4.001	3.995	133.2	S2.1	99.290	97.785	1.355	Open Manhole	1200
S4.002	43.624	147.9	S2.0	98.600	97.490	0.960	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.007	o	300	S2.0	98.600	97.340	0.960	Open Manhole	1200
S1.008	o	150	S1	97.650	96.300	1.200	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.007	8.143	203.6	S1	97.650	97.300	0.050	Open Manhole	1200
S1.008	15.567	103.8	S	100.000	96.150	3.700	Open Manhole	150

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.018	0.018	0.018
1.001	-	-	100	0.010	0.010	0.010
1.002	-	-	100	0.102	0.102	0.102
1.003	-	-	100	0.039	0.039	0.039
2.000	-	-	100	0.000	0.000	0.000
2.001	-	-	100	0.061	0.061	0.061
2.002	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.069	0.069	0.069
3.000	-	-	100	0.020	0.020	0.020
3.001	-	-	100	0.048	0.048	0.048
1.005	-	-	100	0.115	0.115	0.115
1.006	-	-	100	0.040	0.040	0.040
4.000	-	-	100	0.042	0.042	0.042
4.001	-	-	100	0.032	0.032	0.032
4.002	-	-	100	0.050	0.050	0.050
1.007	-	-	100	0.113	0.113	0.113
1.008	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.759	0.759	0.759

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.008	S	100.000	96.150	96.150	150	0

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Online Controls for Storm

Complex Manhole: S7.0, DS/PN: S1.002, Volume (m³): 2.4

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0106-5000-0985-5000
Design Head (m)	0.985
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	106
Invert Level (m)	100.215
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.985	5.0
Flush-Flo™	0.291	5.0
Kick-Flo®	0.631	4.1
Mean Flow over Head Range	-	4.3

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)
0.100	3.6	1.200	5.5	3.000	8.4	7.000	12.6
0.200	4.9	1.400	5.9	3.500	9.1	7.500	13.0
0.300	5.0	1.600	6.3	4.000	9.6	8.000	13.4
0.400	4.9	1.800	6.6	4.500	10.2	8.500	13.8
0.500	4.7	2.000	7.0	5.000	10.7	9.000	14.2
0.600	4.3	2.200	7.3	5.500	11.2	9.500	14.6
0.800	4.5	2.400	7.6	6.000	11.7		
1.000	5.0	2.600	7.9	6.500	12.2		

Weir

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 100.950

Hydro-Brake® Optimum Manhole: S5.2, DS/PN: S2.001, Volume (m³): 2.0

Unit Reference	MD-SCU-0032-1000-0800-1000
Design Head (m)	0.800
Design Flow (l/s)	1.0
Flush-Flo™	Calculated

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Hydro-Brake® Optimum Manhole: S5.2, DS/PN: S2.001, Volume (m³): 2.0

Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	32
Invert Level (m)	100.000
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	1.0
Flush-Flo™	0.047	0.3
Kick-Flo®	0.047	0.3
Mean Flow over Head Range	-	0.7

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.4	1.200	1.2	3.000	1.8	7.000	2.7
0.200	0.5	1.400	1.3	3.500	2.0	7.500	2.8
0.300	0.6	1.600	1.4	4.000	2.1	8.000	2.9
0.400	0.7	1.800	1.4	4.500	2.2	8.500	3.0
0.500	0.8	2.000	1.5	5.000	2.3	9.000	3.1
0.600	0.9	2.200	1.6	5.500	2.4	9.500	3.1
0.800	1.0	2.400	1.6	6.000	2.5		
1.000	1.1	2.600	1.7	6.500	2.6		

Complex Manhole: S2.1, DS/PN: S4.002, Volume (m³): 1.8

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0049-1000-0800-1000
Design Head (m)	0.800
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	49
Invert Level (m)	97.785
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	1.0
Flush-Flo™	0.215	0.9

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Hydro-Brake® Optimum

Control Points	Head (m)	Flow (l/s)
Kick-Flo®	0.437	0.8
Mean Flow over Head Range	-	0.8

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)
0.100	0.8	1.200	1.2	3.000	1.8	7.000	2.7
0.200	0.9	1.400	1.3	3.500	1.9	7.500	2.8
0.300	0.9	1.600	1.4	4.000	2.1	8.000	2.9
0.400	0.8	1.800	1.4	4.500	2.2	8.500	2.9
0.500	0.8	2.000	1.5	5.000	2.3	9.000	3.0
0.600	0.9	2.200	1.6	5.500	2.4	9.500	3.1
0.800	1.0	2.400	1.6	6.000	2.5		
1.000	1.1	2.600	1.7	6.500	2.6		

Weir

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 98.585

Hydro-Brake® Optimum Manhole: S1, DS/PN: S1.008, Volume (m³): 2.0

Unit Reference	MD-SCU-0075-6000-1050-6000
Design Head (m)	1.050
Design Flow (l/s)	6.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	75
Invert Level (m)	96.300
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.050	6.0
Flush-Flo™	0.102	2.2
Kick-Flo®	0.113	2.2
Mean Flow over Head Range	-	4.1

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

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Hydro-Brake® Optimum Manhole: S1, DS/PN: S1.008, Volume (m³): 2.0

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.2	1.200	6.4	3.000	9.9	7.000	14.8
0.200	2.8	1.400	6.9	3.500	10.6	7.500	15.3
0.300	3.4	1.600	7.3	4.000	11.3	8.000	15.8
0.400	3.8	1.800	7.7	4.500	12.0	8.500	16.2
0.500	4.2	2.000	8.1	5.000	12.6	9.000	16.7
0.600	4.6	2.200	8.5	5.500	13.2	9.500	17.1
0.800	5.3	2.400	8.9	6.000	13.7		
1.000	5.9	2.600	9.2	6.500	14.3		

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Storage Structures for Storm

Porous Car Park Manhole: S7.0, DS/PN: S1.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	3.8
Membrane Percolation (mm/hr)	1000	Length (m)	37.7
Max Percolation (l/s)	39.8	Slope (1:X)	50.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	100.215	Cap Volume Depth (m)	0.500

Cellular Storage Manhole: S5.2, DS/PN: S2.001

Invert Level (m)	100.000	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	60.0	60.0	0.900	0.0	87.2
0.800	60.0	87.2			

Porous Car Park Manhole: S4.2, DS/PN: S3.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	25.5
Max Percolation (l/s)	34.0	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	100.150	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: S4.1, DS/PN: S3.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	27.0
Max Percolation (l/s)	18.8	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	99.960	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: S4.0, DS/PN: S1.005

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.7
Membrane Percolation (mm/hr)	1000	Length (m)	15.0
Max Percolation (l/s)	23.8	Slope (1:X)	20.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	99.450	Cap Volume Depth (m)	0.500

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Cellular Storage Manhole: S2.1, DS/PN: S4.002

Invert Level (m) 97.785 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	52.5	52.5	0.900	0.0	82.1
0.800	52.5	82.1			

Infiltration Basin Manhole: S1, DS/PN: S1.008

Invert Level (m) 96.300 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	373.6	1.050	620.6	1.350	702.6

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	7
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S9.0	60 minute 2 year Summer I+0%	102.200	100.830	-0.120	0.000	0.09
S1.001	S8.0	60 minute 2 year Summer I+0%	102.550	100.688	-0.112	0.000	0.14
S1.002	S7.0	60 minute 2 year Winter I+0%	101.550	100.529	0.089	0.000	0.15
S1.003	S6.0	60 minute 2 year Summer I+0%	101.200	100.130	-0.175	0.000	0.11
S2.000	SDummy	60 minute 2 year Summer I+0%	103.000	102.000	-0.150	0.000	0.00
S2.001	S5.2	360 minute 2 year Winter I+0%	101.600	100.146	-0.004	0.000	0.04
S2.002	S5.1	360 minute 2 year Winter I+0%	101.600	99.948	-0.132	0.000	0.03
S1.004	S5.0	60 minute 2 year Summer I+0%	100.700	99.641	-0.119	0.000	0.45
S3.000	S4.2	120 minute 2 year Winter I+0%	101.350	100.173	-0.127	0.000	0.06
S3.001	S4.1	60 minute 2 year Summer I+0%	101.300	100.002	-0.108	0.000	0.17
S1.005	S4.0	60 minute 2 year Summer I+0%	100.600	99.533	-0.142	0.000	0.29
S1.006	S3.0	60 minute 2 year Summer I+0%	99.900	98.530	-0.130	0.000	0.37
S4.000	S2.3	240 minute 2 year Winter I+0%	99.000	98.086	-0.014	0.000	0.10
S4.001	S2.2	240 minute 2 year Winter I+0%	99.400	98.085	0.120	0.000	0.21
S4.002	S2.1	240 minute 2 year Winter I+0%	99.290	98.084	0.149	0.000	0.06
S1.007	S2.0	60 minute 2 year Summer I+0%	98.600	97.532	-0.108	0.000	0.73
S1.008	S1	480 minute 2 year Winter I+0%	97.650	96.576	0.126	0.000	0.20

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

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S9.0		0.028		1.2	OK
S1.001	S8.0		0.061		2.0	OK
S1.002	S7.0		3.578	18	5.0	SURCHARGED
S1.003	S6.0		0.119		8.3	OK
S2.000	SDummy		0.000		0.0	OK
S2.001	S5.2		8.506	240	0.5	OK
S2.002	S5.1		0.022		0.5	OK
S1.004	S5.0		0.148		14.6	OK
S3.000	S4.2		0.870	56	0.8	OK
S3.001	S4.1		0.916	26	3.9	OK
S1.005	S4.0		0.311	16	28.3	OK
S1.006	S3.0		0.116		31.8	OK
S4.000	S2.3		0.148		1.4	OK
S4.001	S2.2		0.611		2.3	SURCHARGED
S4.002	S2.1		15.273	212	0.9	SURCHARGED
S1.007	S2.0		0.257		42.4	OK
S1.008	S1		111.654	472	3.2	SURCHARGED

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	7
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S9.0	60 minute 10 year Winter I+0%	102.200	100.841	-0.109	0.000	0.15
S1.001	S8.0	60 minute 10 year Winter I+0%	102.550	100.829	0.029	0.000	0.22
S1.002	S7.0	60 minute 10 year Winter I+0%	101.550	100.815	0.375	0.000	0.15
S1.003	S6.0	60 minute 10 year Summer I+0%	101.200	100.139	-0.166	0.000	0.16
S2.000	SDummy	60 minute 10 year Summer I+0%	103.000	102.000	-0.150	0.000	0.00
S2.001	S5.2	360 minute 10 year Winter I+0%	101.600	100.236	0.086	0.000	0.04
S2.002	S5.1	360 minute 10 year Winter I+0%	101.600	99.949	-0.131	0.000	0.04
S1.004	S5.0	60 minute 10 year Summer I+0%	100.700	99.682	-0.078	0.000	0.73
S3.000	S4.2	60 minute 10 year Winter I+0%	101.350	100.186	-0.114	0.000	0.13
S3.001	S4.1	60 minute 10 year Summer I+0%	101.300	100.021	-0.089	0.000	0.35
S1.005	S4.0	60 minute 10 year Summer I+0%	100.600	99.567	-0.108	0.000	0.51
S1.006	S3.0	60 minute 10 year Summer I+0%	99.900	98.572	-0.088	0.000	0.65
S4.000	S2.3	240 minute 10 year Winter I+0%	99.000	98.314	0.214	0.000	0.15
S4.001	S2.2	240 minute 10 year Winter I+0%	99.400	98.313	0.348	0.000	0.33
S4.002	S2.1	240 minute 10 year Winter I+0%	99.290	98.312	0.377	0.000	0.06
S1.007	S2.0	60 minute 10 year Summer I+0%	98.600	97.686	0.046	0.000	1.31
S1.008	S1	480 minute 10 year Winter I+0%	97.650	96.710	0.260	0.000	0.24

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

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S9.0		0.041		2.2	OK
S1.001	S8.0		0.424		3.2	SURCHARGED
S1.002	S7.0		11.590	38	5.0	SURCHARGED
S1.003	S6.0		0.145		11.7	OK
S2.000	SDummy		0.000		0.0	OK
S2.001	S5.2		13.722	300	0.6	SURCHARGED
S2.002	S5.1		0.025		0.6	OK
S1.004	S5.0		0.289		23.5	OK
S3.000	S4.2		1.344	28	1.8	OK
S3.001	S4.1		1.347	26	8.0	OK
S1.005	S4.0		0.548	10	49.8	OK
S1.006	S3.0		0.187		56.5	OK
S4.000	S2.3		0.406		2.0	SURCHARGED
S4.001	S2.2		0.888		3.5	SURCHARGED
S4.002	S2.1		26.911		0.9	SURCHARGED
S1.007	S2.0		0.871		76.4	SURCHARGED
S1.008	S1		171.732	624	3.9	SURCHARGED

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	7
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S9.0	60 minute 30 year Winter I+0%	102.200	101.016	0.066	0.000	0.19
S1.001	S8.0	60 minute 30 year Winter I+0%	102.550	101.004	0.204	0.000	0.25
S1.002	S7.0	60 minute 30 year Winter I+0%	101.550	100.972	0.532	0.000	0.33
S1.003	S6.0	60 minute 30 year Summer I+0%	101.200	100.146	-0.159	0.000	0.19
S2.000	SDummy	60 minute 30 year Summer I+0%	103.000	102.000	-0.150	0.000	0.00
S2.001	S5.2	240 minute 30 year Winter I+0%	101.600	100.317	0.167	0.000	0.05
S2.002	S5.1	240 minute 30 year Winter I+0%	101.600	99.951	-0.129	0.000	0.05
S1.004	S5.0	60 minute 30 year Summer I+0%	100.700	99.710	-0.050	0.000	0.93
S3.000	S4.2	60 minute 30 year Winter I+0%	101.350	100.194	-0.106	0.000	0.19
S3.001	S4.1	60 minute 30 year Summer I+0%	101.300	100.034	-0.076	0.000	0.48
S1.005	S4.0	60 minute 30 year Summer I+0%	100.600	99.590	-0.085	0.000	0.67
S1.006	S3.0	60 minute 30 year Summer I+0%	99.900	98.604	-0.056	0.000	0.87
S4.000	S2.3	360 minute 30 year Winter I+0%	99.000	98.507	0.407	0.000	0.14
S4.001	S2.2	360 minute 30 year Winter I+0%	99.400	98.505	0.540	0.000	0.32
S4.002	S2.1	360 minute 30 year Winter I+0%	99.290	98.504	0.569	0.000	0.07
S1.007	S2.0	60 minute 30 year Summer I+0%	98.600	97.763	0.123	0.000	1.75
S1.008	S1	480 minute 30 year Winter I+0%	97.650	96.826	0.376	0.000	0.27

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

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S9.0		0.239		2.6	SURCHARGED
S1.001	S8.0		0.746		3.5	SURCHARGED
S1.002	S7.0		16.234	56	10.7	SURCHARGED
S1.003	S6.0		0.161		13.9	OK
S2.000	SDummy		0.000		0.0	OK
S2.001	S5.2		18.457		0.7	SURCHARGED
S2.002	S5.1		0.028		0.7	OK
S1.004	S5.0		0.387		29.9	OK
S3.000	S4.2		1.655	28	2.7	OK
S3.001	S4.1		1.634	24	11.1	OK
S1.005	S4.0		0.766	10	65.7	OK
S1.006	S3.0		0.243		74.9	OK
S4.000	S2.3		0.624		2.0	SURCHARGED
S4.001	S2.2		1.105		3.5	SURCHARGED
S4.002	S2.1		36.715		1.0	SURCHARGED
S1.007	S2.0		1.243		101.8	SURCHARGED
S1.008	S1		226.766	744	4.3	SURCHARGED

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	7
Number of Online Controls	4	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S9.0	60 minute 100 year Winter I+40%	102.200	101.326	0.376	0.000	0.38
S1.001	S8.0	60 minute 100 year Winter I+40%	102.550	101.300	0.500	0.000	0.52
S1.002	S7.0	60 minute 100 year Winter I+40%	101.550	101.209	0.769	0.000	0.97
S1.003	S6.0	60 minute 100 year Winter I+40%	101.200	100.425	0.120	0.000	0.53
S2.000	SDummy	60 minute 100 year Summer I+40%	103.000	102.000	-0.150	0.000	0.00
S2.001	S5.2	360 minute 100 year Winter I+40%	101.600	100.627	0.477	0.000	0.07
S2.002	S5.1	60 minute 100 year Summer I+40%	101.600	100.304	0.224	0.000	0.16
S1.004	S5.0	60 minute 100 year Summer I+40%	100.700	100.309	0.549	0.000	1.58
S3.000	S4.2	60 minute 100 year Summer I+40%	101.350	100.216	-0.084	0.000	0.39
S3.001	S4.1	60 minute 100 year Summer I+40%	101.300	100.189	0.079	0.000	0.82
S1.005	S4.0	60 minute 100 year Summer I+40%	100.600	100.088	0.413	0.000	0.93
S1.006	S3.0	60 minute 100 year Summer I+40%	99.900	99.272	0.612	0.000	1.16
S4.000	S2.3	60 minute 100 year Winter I+40%	99.000	98.804	0.704	0.000	0.83
S4.001	S2.2	60 minute 100 year Winter I+40%	99.400	98.739	0.774	0.000	1.78
S4.002	S2.1	60 minute 100 year Winter I+40%	99.290	98.693	0.758	0.000	1.31
S1.007	S2.0	60 minute 100 year Summer I+40%	98.600	97.929	0.289	0.000	2.47
S1.008	S1	480 minute 100 year Winter I+40%	97.650	97.268	0.818	0.000	0.36

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

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S9.0		0.589		5.3	SURCHARGED
S1.001	S8.0		1.081		7.3	SURCHARGED
S1.002	S7.0		21.621	50	31.7	SURCHARGED
S1.003	S6.0		1.498		39.4	SURCHARGED
S2.000	SDummy		0.000		0.0	OK
S2.001	S5.2		36.468		0.9	SURCHARGED
S2.002	S5.1		0.568		2.2	SURCHARGED
S1.004	S5.0		2.521		50.9	SURCHARGED
S3.000	S4.2		2.478	24	5.6	OK
S3.001	S4.1		5.240	10	18.8	SURCHARGED
S1.005	S4.0		8.389	10	91.6	SURCHARGED
S1.006	S3.0		1.594		100.2	SURCHARGED
S4.000	S2.3		0.961		11.3	FLOOD RISK
S4.001	S2.2		1.370		19.3	SURCHARGED
S4.002	S2.1		42.633		18.6	SURCHARGED
S1.007	S2.0		1.887		143.7	SURCHARGED
S1.008	S1		467.652	1032	5.8	SURCHARGED

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Summary of Results for 480 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)
S1.008	S1	97.650	97.267	0.817	0.000	0.36		467.072	2392	5.8

PN	US/MH Name	Status
S1.008	S1	SURCHARGED

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Rainfall Hyetograph for 480 minute 100 year Winter (Storm)

Time (mins)	Rain (mm/hr)	Time (mins)	Rain (mm/hr)	Time (mins)	Rain (mm/hr)	Time (mins)	Rain (mm/hr)	Time (mins)	Rain (mm/hr)
8	0.654	104	4.568	200	17.636	296	16.006	392	4.297
16	1.880	112	4.937	208	19.024	304	14.544	400	4.163
24	2.781	120	5.427	216	20.319	312	13.103	408	4.101
32	3.446	128	6.147	224	21.589	320	11.549	416	4.091
40	3.799	136	6.940	232	22.491	328	10.257	424	4.100
48	4.000	144	7.862	240	23.141	336	9.061	432	4.089
56	4.089	152	9.061	248	23.141	344	7.862	440	4.000
64	4.100	160	10.257	256	22.491	352	6.940	448	3.799
72	4.091	168	11.549	264	21.589	360	6.147	456	3.446
80	4.101	176	13.103	272	20.319	368	5.427	464	2.781
88	4.163	184	14.544	280	19.024	376	4.937	472	1.880
96	4.297	192	16.006	288	17.636	384	4.568	480	0.654

Input Hydrograph Manhole S1, DS/PN S1.008 (Storm)

480 minute 100 year Winter

Input Hydrograph Type: User Defined

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
8	0.0	240	0.0	472	0.0	704	0.0	936	0.0	1168	0.0
16	0.0	248	0.0	480	0.0	712	0.0	944	0.0	1176	0.0
24	0.0	256	0.0	488	0.0	720	0.0	952	0.0	1184	0.0
32	0.0	264	0.0	496	0.0	728	0.0	960	0.0	1192	0.0
40	0.0	272	0.0	504	0.0	736	0.0	968	0.0	1200	0.0
48	0.0	280	0.0	512	0.0	744	0.0	976	0.0	1208	0.0
56	0.0	288	0.0	520	0.0	752	0.0	984	0.0	1216	0.0
64	0.0	296	0.0	528	0.0	760	0.0	992	0.0	1224	0.0
72	0.0	304	0.0	536	0.0	768	0.0	1000	0.0	1232	0.0
80	0.0	312	0.0	544	0.0	776	0.0	1008	0.0	1240	0.0
88	0.0	320	0.0	552	0.0	784	0.0	1016	0.0	1248	0.0
96	0.0	328	0.0	560	0.0	792	0.0	1024	0.0	1256	0.0
104	0.0	336	0.0	568	0.0	800	0.0	1032	0.0	1264	0.0
112	0.0	344	0.0	576	0.0	808	0.0	1040	0.0	1272	0.0
120	0.0	352	0.0	584	0.0	816	0.0	1048	0.0	1280	0.0
128	0.0	360	0.0	592	0.0	824	0.0	1056	0.0	1288	0.0
136	0.0	368	0.0	600	0.0	832	0.0	1064	0.0	1296	0.0
144	0.0	376	0.0	608	0.0	840	0.0	1072	0.0	1304	0.0
152	0.0	384	0.0	616	0.0	848	0.0	1080	0.0	1312	0.0
160	0.0	392	0.0	624	0.0	856	0.0	1088	0.0	1320	0.0
168	0.0	400	0.0	632	0.0	864	0.0	1096	0.0	1328	0.0
176	0.0	408	0.0	640	0.0	872	0.0	1104	0.0	1336	0.0
184	0.0	416	0.0	648	0.0	880	0.0	1112	0.0	1344	0.0
192	0.0	424	0.0	656	0.0	888	0.0	1120	0.0	1352	0.0
200	0.0	432	0.0	664	0.0	896	0.0	1128	0.0	1360	0.0
208	0.0	440	0.0	672	0.0	904	0.0	1136	0.0	1368	0.0
216	0.0	448	0.0	680	0.0	912	0.0	1144	0.0	1376	0.0
224	0.0	456	0.0	688	0.0	920	0.0	1152	0.0	1384	0.0
232	0.0	464	0.0	696	0.0	928	0.0	1160	0.0	1392	0.0

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Input Hydrograph Manhole S1, DS/PN S1.008 (Storm)
480 minute 100 year Winter
Input Hydrograph Type: User Defined

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
1400	0.0	1728	0.0	2056	4.2	2384	3.7	2712	1.1	3040	0.1
1408	0.0	1736	0.0	2064	4.5	2392	3.6	2720	1.1	3048	0.1
1416	0.0	1744	0.0	2072	4.9	2400	3.6	2728	1.1	3056	0.1
1424	0.0	1752	0.0	2080	5.4	2408	3.2	2736	1.1	3064	0.1
1432	0.0	1760	0.0	2088	6.0	2416	2.2	2744	1.1	3072	0.1
1440	0.0	1768	0.0	2096	6.9	2424	1.5	2752	1.1	3080	0.1
1448	0.0	1776	0.0	2104	8.0	2432	1.4	2760	1.1	3088	0.0
1456	0.0	1784	0.0	2112	9.8	2440	1.4	2768	1.0	3096	0.0
1464	0.0	1792	0.0	2120	11.6	2448	1.4	2776	1.0	3104	0.0
1472	0.0	1800	0.0	2128	13.7	2456	1.4	2784	1.0	3112	0.0
1480	0.0	1808	0.0	2136	15.9	2464	1.4	2792	0.9	3120	0.0
1488	0.0	1816	0.0	2144	18.5	2472	1.4	2800	0.9	3128	0.0
1496	0.0	1824	0.0	2152	21.3	2480	1.4	2808	0.8	3136	0.0
1504	0.0	1832	0.0	2160	24.3	2488	1.4	2816	0.7	3144	0.0
1512	0.0	1840	0.0	2168	25.3	2496	1.4	2824	0.7	3152	0.0
1520	0.0	1848	0.0	2176	23.7	2504	1.3	2832	0.6	3160	0.0
1528	0.0	1856	0.0	2184	21.6	2512	1.3	2840	0.6	3168	0.0
1536	0.0	1864	0.0	2192	19.4	2520	1.3	2848	0.5	3176	0.0
1544	0.0	1872	0.0	2200	17.3	2528	1.3	2856	0.4	3184	0.0
1552	0.0	1880	0.0	2208	14.8	2536	1.3	2864	0.4	3192	0.0
1560	0.0	1888	0.0	2216	12.2	2544	1.3	2872	0.3	3200	0.0
1568	0.0	1896	0.0	2224	10.4	2552	1.3	2880	0.3	3208	0.0
1576	0.0	1904	0.0	2232	8.9	2560	1.3	2888	0.3	3216	0.0
1584	0.0	1912	0.0	2240	7.8	2568	1.3	2896	0.3	3224	0.0
1592	0.0	1920	0.0	2248	7.0	2576	1.2	2904	0.2	3232	0.0
1600	0.0	1928	0.6	2256	6.5	2584	1.2	2912	0.2	3240	0.0
1608	0.0	1936	1.0	2264	6.0	2592	1.2	2920	0.2	3248	0.0
1616	0.0	1944	1.2	2272	5.6	2600	1.2	2928	0.2	3256	0.0
1624	0.0	1952	1.6	2280	5.3	2608	1.2	2936	0.2	3264	0.0
1632	0.0	1960	1.8	2288	5.1	2616	1.2	2944	0.2	3272	0.0
1640	0.0	1968	2.4	2296	4.9	2624	1.2	2952	0.1	3280	0.0
1648	0.0	1976	2.5	2304	4.7	2632	1.2	2960	0.1	3288	0.0
1656	0.0	1984	2.6	2312	4.6	2640	1.2	2968	0.1	3296	0.0
1664	0.0	1992	2.7	2320	4.4	2648	1.1	2976	0.1	3304	0.0
1672	0.0	2000	2.9	2328	4.3	2656	1.1	2984	0.1	3312	0.0
1680	0.0	2008	3.1	2336	4.2	2664	1.1	2992	0.1	3320	0.0
1688	0.0	2016	3.2	2344	4.1	2672	1.1	3000	0.1	3328	0.0
1696	0.0	2024	3.4	2352	4.0	2680	1.1	3008	0.1	3336	0.0
1704	0.0	2032	3.6	2360	3.9	2688	1.1	3016	0.1	3344	0.0
1712	0.0	2040	3.8	2368	3.8	2696	1.1	3024	0.1	3352	0.0
1720	0.0	2048	4.0	2376	3.7	2704	1.1	3032	0.1	3360	0.0

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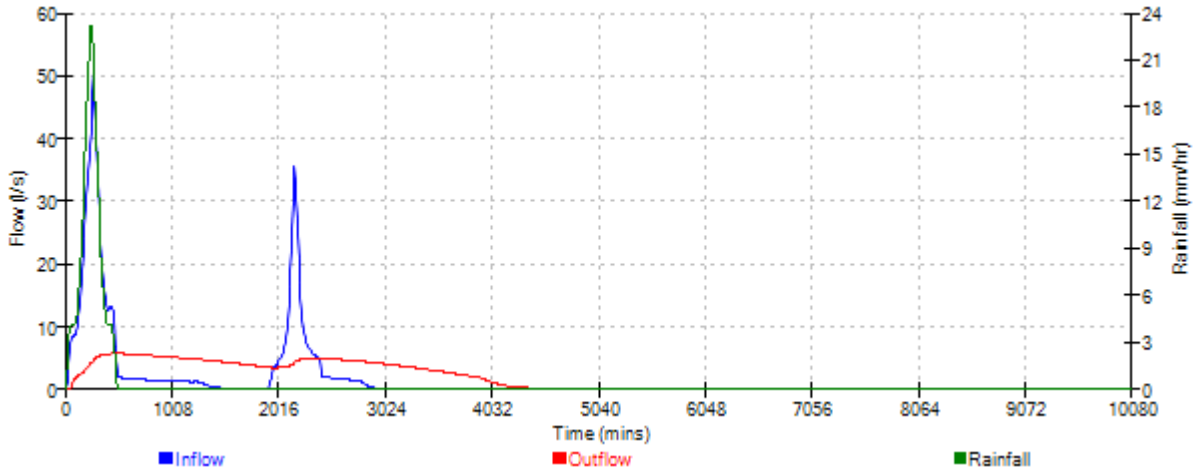
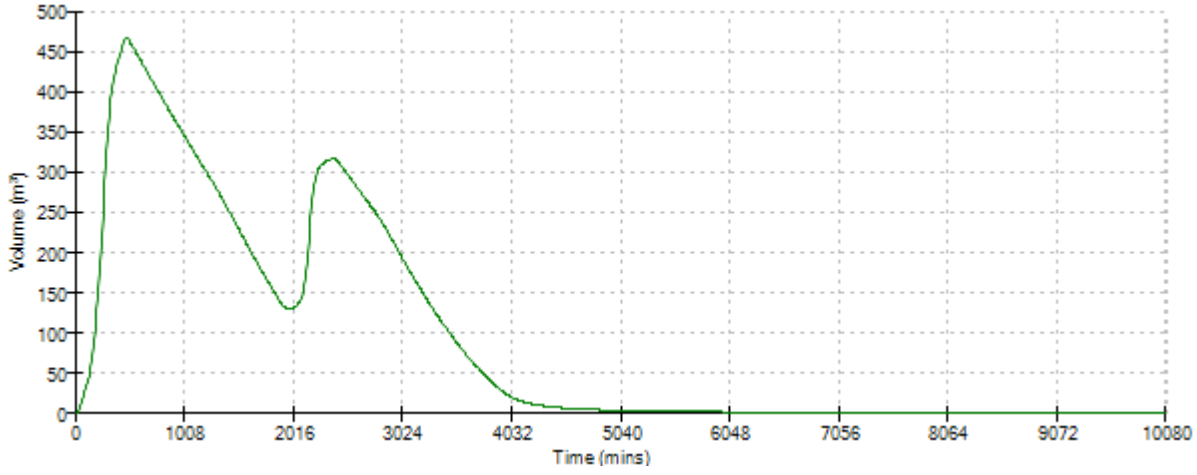
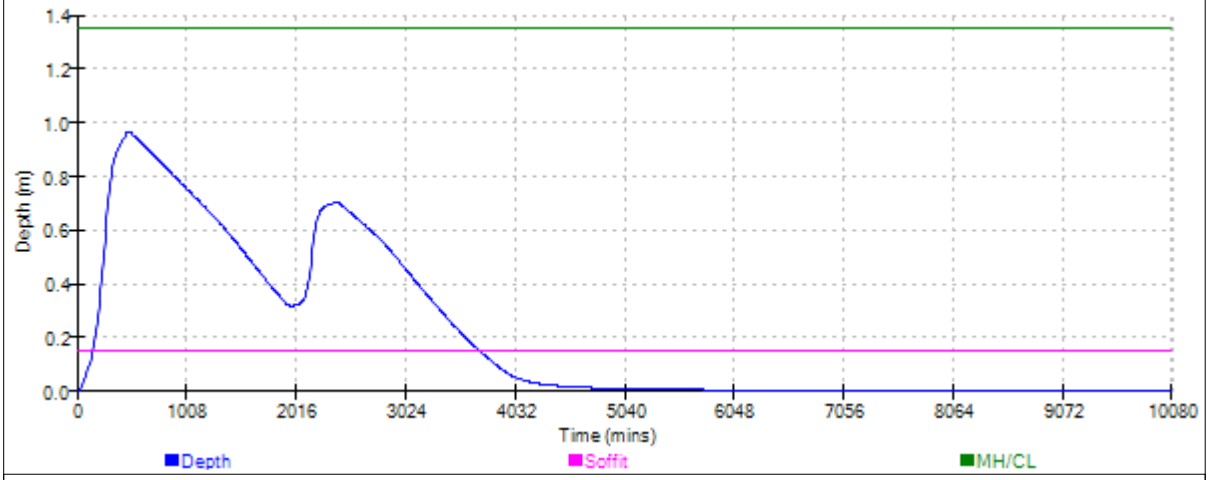
Graphs for Pipe S1.008 US/MH S1 (Storm)
480 minute 100 year Winter
Status: SURCHARGED







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Summary of Results for Input Hydrograph

Half Drain Time : 1536 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
Input Hydrograph	101.708	0.808	0.0	2.0	2.0	359.1	O K

Storm Event	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
Input Hydrograph	0.0	459.0	2544

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Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
8	0.0	408	5.7	808	5.4	1208	4.9	1608	4.2	2008	3.3
16	0.0	416	5.7	816	5.4	1216	4.9	1616	4.2	2016	3.3
24	0.0	424	5.7	824	5.4	1224	4.9	1624	4.1	2024	3.3
32	0.0	432	5.7	832	5.4	1232	4.8	1632	4.1	2032	3.2
40	0.1	440	5.7	840	5.4	1240	4.8	1640	4.1	2040	3.2
48	0.3	448	5.7	848	5.4	1248	4.8	1648	4.1	2048	3.2
56	0.5	456	5.8	856	5.3	1256	4.8	1656	4.1	2056	3.2
64	0.8	464	5.8	864	5.3	1264	4.8	1664	4.1	2064	3.2
72	1.1	472	5.8	872	5.3	1272	4.8	1672	4.0	2072	3.1
80	1.4	480	5.8	880	5.3	1280	4.8	1680	4.0	2080	3.1
88	1.6	488	5.8	888	5.3	1288	4.8	1688	4.0	2088	3.1
96	1.8	496	5.8	896	5.3	1296	4.8	1696	4.0	2096	3.1
104	2.0	504	5.8	904	5.3	1304	4.7	1704	4.0	2104	3.1
112	2.2	512	5.7	912	5.3	1312	4.7	1712	4.0	2112	3.0
120	2.2	520	5.7	920	5.3	1320	4.7	1720	3.9	2120	3.0
128	2.2	528	5.7	928	5.2	1328	4.7	1728	3.9	2128	3.0
136	2.3	536	5.7	936	5.2	1336	4.7	1736	3.9	2136	3.0
144	2.4	544	5.7	944	5.2	1344	4.7	1744	3.9	2144	3.0
152	2.5	552	5.7	952	5.2	1352	4.7	1752	3.9	2152	3.0
160	2.6	560	5.7	960	5.2	1360	4.7	1760	3.9	2160	2.9
168	2.8	568	5.7	968	5.2	1368	4.6	1768	3.8	2168	2.9
176	2.9	576	5.7	976	5.2	1376	4.6	1776	3.8	2176	2.9
184	3.1	584	5.7	984	5.2	1384	4.6	1784	3.8	2184	2.9
192	3.2	592	5.7	992	5.2	1392	4.6	1792	3.8	2192	2.9
200	3.4	600	5.6	1000	5.2	1400	4.6	1800	3.8	2200	2.8
208	3.5	608	5.6	1008	5.1	1408	4.6	1808	3.8	2208	2.8
216	3.7	616	5.6	1016	5.1	1416	4.6	1816	3.7	2216	2.8
224	3.8	624	5.6	1024	5.1	1424	4.5	1824	3.7	2224	2.8
232	4.0	632	5.6	1032	5.1	1432	4.5	1832	3.7	2232	2.7
240	4.1	640	5.6	1040	5.1	1440	4.5	1840	3.7	2240	2.7
248	4.3	648	5.6	1048	5.1	1448	4.5	1848	3.7	2248	2.7
256	4.4	656	5.6	1056	5.1	1456	4.5	1856	3.6	2256	2.7
264	4.6	664	5.6	1064	5.1	1464	4.5	1864	3.6	2264	2.7
272	4.7	672	5.6	1072	5.1	1472	4.4	1872	3.6	2272	2.6
280	4.9	680	5.6	1080	5.1	1480	4.4	1880	3.6	2280	2.6
288	5.0	688	5.5	1088	5.0	1488	4.4	1888	3.6	2288	2.6
296	5.1	696	5.5	1096	5.0	1496	4.4	1896	3.6	2296	2.6
304	5.2	704	5.5	1104	5.0	1504	4.4	1904	3.5	2304	2.6
312	5.2	712	5.5	1112	5.0	1512	4.4	1912	3.5	2312	2.5
320	5.3	720	5.5	1120	5.0	1520	4.4	1920	3.5	2320	2.5
328	5.4	728	5.5	1128	5.0	1528	4.3	1928	3.5	2328	2.5
336	5.4	736	5.5	1136	5.0	1536	4.3	1936	3.5	2336	2.5
344	5.5	744	5.5	1144	5.0	1544	4.3	1944	3.4	2344	2.5
352	5.5	752	5.5	1152	5.0	1552	4.3	1952	3.4	2352	2.4
360	5.5	760	5.5	1160	4.9	1560	4.3	1960	3.4	2360	2.4
368	5.6	768	5.5	1168	4.9	1568	4.3	1968	3.4	2368	2.4
376	5.6	776	5.4	1176	4.9	1576	4.2	1976	3.4	2376	2.4
384	5.6	784	5.4	1184	4.9	1584	4.2	1984	3.4	2384	2.4
392	5.6	792	5.4	1192	4.9	1592	4.2	1992	3.3	2392	2.3
400	5.6	800	5.4	1200	4.9	1600	4.2	2000	3.3	2400	2.3

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Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
2408	2.3	2488	2.2	2568	1.8	2648	1.3	2728	0.9	2808	0.6
2416	2.3	2496	2.2	2576	1.8	2656	1.3	2736	0.8	2816	0.6
2424	2.2	2504	2.2	2584	1.7	2664	1.2	2744	0.8	2824	0.6
2432	2.2	2512	2.2	2592	1.7	2672	1.2	2752	0.8	2832	0.5
2440	2.2	2520	2.1	2600	1.6	2680	1.1	2760	0.7	2840	0.5
2448	2.2	2528	2.1	2608	1.6	2688	1.1	2768	0.7	2848	0.5
2456	2.2	2536	2.0	2616	1.5	2696	1.0	2776	0.7	2856	0.5
2464	2.2	2544	2.0	2624	1.5	2704	1.0	2784	0.7	2864	0.5
2472	2.2	2552	1.9	2632	1.4	2712	0.9	2792	0.6	2872	0.4
2480	2.2	2560	1.9	2640	1.4	2720	0.9	2800	0.6	2880	0.4

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Model Details

Storage is Online Cover Level (m) 102.100

Cellular Storage Structure

Invert Level (m) 100.900 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	468.0	468.0	0.900	0.0	537.6
0.800	468.0	537.6			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0070-2000-0805-2000
Design Head (m)	0.805
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	70
Invert Level (m)	100.895
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.805	2.0
Flush-Flo™	0.242	2.0
Kick-Flo®	0.510	1.6
Mean Flow over Head Range	-	1.7

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.8	1.200	2.4	3.000	3.7	7.000	5.4
0.200	2.0	1.400	2.6	3.500	3.9	7.500	5.6
0.300	2.0	1.600	2.7	4.000	4.2	8.000	5.8
0.400	1.9	1.800	2.9	4.500	4.4	8.500	6.0
0.500	1.7	2.000	3.0	5.000	4.6	9.000	6.1
0.600	1.8	2.200	3.2	5.500	4.9	9.500	6.3
0.800	2.0	2.400	3.3	6.000	5.1		
1.000	2.2	2.600	3.4	6.500	5.3		

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Summary of Results for Input Hydrograph

Half Drain Time : 2389 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
Input Hydrograph	101.741	0.841	0.0	2.0	2.0	561.8	O K

Storm Event	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
Input Hydrograph	0.0	1003.7	3896

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Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
8	0.0	408	5.7	808	5.4	1208	4.9	1608	4.2	2008	3.5
16	0.0	416	5.7	816	5.4	1216	4.9	1616	4.2	2016	3.5
24	0.0	424	5.7	824	5.4	1224	4.9	1624	4.1	2024	3.5
32	0.0	432	5.7	832	5.4	1232	4.8	1632	4.1	2032	3.5
40	0.1	440	5.7	840	5.4	1240	4.8	1640	4.1	2040	3.5
48	0.3	448	5.7	848	5.3	1248	4.8	1648	4.1	2048	3.5
56	0.5	456	5.8	856	5.3	1256	4.8	1656	4.1	2056	3.5
64	0.8	464	5.8	864	5.3	1264	4.8	1664	4.1	2064	3.5
72	1.1	472	5.8	872	5.3	1272	4.8	1672	4.0	2072	3.5
80	1.3	480	5.8	880	5.3	1280	4.8	1680	4.0	2080	3.6
88	1.6	488	5.8	888	5.3	1288	4.8	1688	4.0	2088	3.6
96	1.8	496	5.8	896	5.3	1296	4.7	1696	4.0	2096	3.6
104	2.0	504	5.8	904	5.3	1304	4.7	1704	4.0	2104	3.6
112	2.2	512	5.7	912	5.3	1312	4.7	1712	4.0	2112	3.7
120	2.2	520	5.7	920	5.3	1320	4.7	1720	3.9	2120	3.7
128	2.2	528	5.7	928	5.2	1328	4.7	1728	3.9	2128	3.8
136	2.3	536	5.7	936	5.2	1336	4.7	1736	3.9	2136	3.9
144	2.4	544	5.7	944	5.2	1344	4.7	1744	3.9	2144	4.0
152	2.5	552	5.7	952	5.2	1352	4.7	1752	3.9	2152	4.1
160	2.6	560	5.7	960	5.2	1360	4.6	1760	3.9	2160	4.2
168	2.8	568	5.7	968	5.2	1368	4.6	1768	3.8	2168	4.3
176	2.9	576	5.7	976	5.2	1376	4.6	1776	3.8	2176	4.4
184	3.1	584	5.7	984	5.2	1384	4.6	1784	3.8	2184	4.5
192	3.2	592	5.7	992	5.2	1392	4.6	1792	3.8	2192	4.6
200	3.4	600	5.6	1000	5.2	1400	4.6	1800	3.8	2200	4.7
208	3.5	608	5.6	1008	5.1	1408	4.6	1808	3.8	2208	4.7
216	3.7	616	5.6	1016	5.1	1416	4.5	1816	3.7	2216	4.8
224	3.8	624	5.6	1024	5.1	1424	4.5	1824	3.7	2224	4.8
232	4.0	632	5.6	1032	5.1	1432	4.5	1832	3.7	2232	4.8
240	4.1	640	5.6	1040	5.1	1440	4.5	1840	3.7	2240	4.9
248	4.3	648	5.6	1048	5.1	1448	4.5	1848	3.7	2248	4.9
256	4.4	656	5.6	1056	5.1	1456	4.5	1856	3.6	2256	4.9
264	4.6	664	5.6	1064	5.1	1464	4.5	1864	3.6	2264	4.9
272	4.7	672	5.6	1072	5.1	1472	4.4	1872	3.6	2272	4.9
280	4.9	680	5.6	1080	5.1	1480	4.4	1880	3.6	2280	4.9
288	5.0	688	5.5	1088	5.0	1488	4.4	1888	3.6	2288	4.9
296	5.1	696	5.5	1096	5.0	1496	4.4	1896	3.6	2296	4.9
304	5.2	704	5.5	1104	5.0	1504	4.4	1904	3.5	2304	4.9
312	5.2	712	5.5	1112	5.0	1512	4.4	1912	3.5	2312	4.9
320	5.3	720	5.5	1120	5.0	1520	4.4	1920	3.5	2320	4.9
328	5.4	728	5.5	1128	5.0	1528	4.3	1928	3.5	2328	5.0
336	5.4	736	5.5	1136	5.0	1536	4.3	1936	3.5	2336	5.0
344	5.5	744	5.5	1144	5.0	1544	4.3	1944	3.5	2344	5.0
352	5.5	752	5.5	1152	5.0	1552	4.3	1952	3.5	2352	5.0
360	5.5	760	5.5	1160	4.9	1560	4.3	1960	3.5	2360	5.0
368	5.6	768	5.4	1168	4.9	1568	4.3	1968	3.4	2368	5.0
376	5.6	776	5.4	1176	4.9	1576	4.2	1976	3.4	2376	5.0
384	5.6	784	5.4	1184	4.9	1584	4.2	1984	3.4	2384	5.0
392	5.6	792	5.4	1192	4.9	1592	4.2	1992	3.5	2392	5.0
400	5.6	800	5.4	1200	4.9	1600	4.2	2000	3.5	2400	5.0

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Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
2408	5.0	2808	4.5	3208	3.7	3608	2.7	4008	1.3	4408	0.2
2416	5.0	2816	4.5	3216	3.7	3616	2.7	4016	1.3	4416	0.2
2424	5.0	2824	4.5	3224	3.6	3624	2.7	4024	1.2	4424	0.2
2432	4.9	2832	4.4	3232	3.6	3632	2.7	4032	1.2	4432	0.2
2440	4.9	2840	4.4	3240	3.6	3640	2.6	4040	1.1	4440	0.2
2448	4.9	2848	4.4	3248	3.6	3648	2.6	4048	1.1	4448	0.2
2456	4.9	2856	4.4	3256	3.6	3656	2.6	4056	1.0	4456	0.2
2464	4.9	2864	4.4	3264	3.6	3664	2.6	4064	1.0	4464	0.2
2472	4.9	2872	4.4	3272	3.5	3672	2.6	4072	1.0	4472	0.2
2480	4.9	2880	4.4	3280	3.5	3680	2.5	4080	0.9	4480	0.2
2488	4.9	2888	4.3	3288	3.5	3688	2.5	4088	0.9	4488	0.2
2496	4.9	2896	4.3	3296	3.5	3696	2.5	4096	0.8	4496	0.2
2504	4.9	2904	4.3	3304	3.5	3704	2.5	4104	0.8	4504	0.2
2512	4.9	2912	4.3	3312	3.4	3712	2.4	4112	0.8	4512	0.2
2520	4.8	2920	4.3	3320	3.4	3720	2.4	4120	0.8	4520	0.2
2528	4.8	2928	4.3	3328	3.4	3728	2.4	4128	0.7	4528	0.2
2536	4.8	2936	4.3	3336	3.4	3736	2.4	4136	0.7	4536	0.2
2544	4.8	2944	4.2	3344	3.4	3744	2.4	4144	0.7	4544	0.2
2552	4.8	2952	4.2	3352	3.3	3752	2.3	4152	0.6	4552	0.2
2560	4.8	2960	4.2	3360	3.3	3760	2.3	4160	0.6	4560	0.2
2568	4.8	2968	4.2	3368	3.3	3768	2.3	4168	0.6	4568	0.1
2576	4.8	2976	4.2	3376	3.3	3776	2.3	4176	0.6	4576	0.1
2584	4.8	2984	4.2	3384	3.3	3784	2.3	4184	0.6	4584	0.1
2592	4.8	2992	4.1	3392	3.3	3792	2.2	4192	0.5	4592	0.1
2600	4.8	3000	4.1	3400	3.2	3800	2.2	4200	0.5	4600	0.1
2608	4.7	3008	4.1	3408	3.2	3808	2.2	4208	0.5	4608	0.1
2616	4.7	3016	4.1	3416	3.2	3816	2.2	4216	0.5	4616	0.1
2624	4.7	3024	4.1	3424	3.2	3824	2.2	4224	0.5	4624	0.1
2632	4.7	3032	4.1	3432	3.2	3832	2.2	4232	0.5	4632	0.1
2640	4.7	3040	4.0	3440	3.1	3840	2.2	4240	0.4	4640	0.1
2648	4.7	3048	4.0	3448	3.1	3848	2.2	4248	0.4	4648	0.1
2656	4.7	3056	4.0	3456	3.1	3856	2.2	4256	0.4	4656	0.1
2664	4.7	3064	4.0	3464	3.1	3864	2.2	4264	0.4	4664	0.1
2672	4.7	3072	4.0	3472	3.1	3872	2.2	4272	0.4	4672	0.1
2680	4.6	3080	4.0	3480	3.0	3880	2.2	4280	0.4	4680	0.1
2688	4.6	3088	3.9	3488	3.0	3888	2.1	4288	0.4	4688	0.1
2696	4.6	3096	3.9	3496	3.0	3896	2.1	4296	0.4	4696	0.1
2704	4.6	3104	3.9	3504	3.0	3904	2.0	4304	0.3	4704	0.1
2712	4.6	3112	3.9	3512	3.0	3912	2.0	4312	0.3	4712	0.1
2720	4.6	3120	3.9	3520	2.9	3920	1.9	4320	0.3	4720	0.1
2728	4.6	3128	3.9	3528	2.9	3928	1.8	4328	0.3	4728	0.1
2736	4.6	3136	3.8	3536	2.9	3936	1.8	4336	0.3	4736	0.1
2744	4.6	3144	3.8	3544	2.9	3944	1.7	4344	0.3	4744	0.1
2752	4.6	3152	3.8	3552	2.9	3952	1.7	4352	0.3	4752	0.1
2760	4.5	3160	3.8	3560	2.8	3960	1.6	4360	0.3	4760	0.1
2768	4.5	3168	3.8	3568	2.8	3968	1.6	4368	0.3	4768	0.1
2776	4.5	3176	3.7	3576	2.8	3976	1.5	4376	0.3	4776	0.1
2784	4.5	3184	3.7	3584	2.8	3984	1.5	4384	0.3	4784	0.1
2792	4.5	3192	3.7	3592	2.8	3992	1.4	4392	0.2	4792	0.1
2800	4.5	3200	3.7	3600	2.7	4000	1.4	4400	0.2	4800	0.1

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Input Hydrograph

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4808	0.1	5208	0.0	5608	0.0	6008	0.0	6408	0.0	6808	0.0
4816	0.1	5216	0.0	5616	0.0	6016	0.0	6416	0.0	6816	0.0
4824	0.1	5224	0.0	5624	0.0	6024	0.0	6424	0.0	6824	0.0
4832	0.1	5232	0.0	5632	0.0	6032	0.0	6432	0.0	6832	0.0
4840	0.1	5240	0.0	5640	0.0	6040	0.0	6440	0.0	6840	0.0
4848	0.1	5248	0.0	5648	0.0	6048	0.0	6448	0.0	6848	0.0
4856	0.1	5256	0.0	5656	0.0	6056	0.0	6456	0.0	6856	0.0
4864	0.1	5264	0.0	5664	0.0	6064	0.0	6464	0.0	6864	0.0
4872	0.1	5272	0.0	5672	0.0	6072	0.0	6472	0.0	6872	0.0
4880	0.1	5280	0.0	5680	0.0	6080	0.0	6480	0.0	6880	0.0
4888	0.1	5288	0.0	5688	0.0	6088	0.0	6488	0.0	6888	0.0
4896	0.1	5296	0.0	5696	0.0	6096	0.0	6496	0.0	6896	0.0
4904	0.1	5304	0.0	5704	0.0	6104	0.0	6504	0.0	6904	0.0
4912	0.1	5312	0.0	5712	0.0	6112	0.0	6512	0.0	6912	0.0
4920	0.1	5320	0.0	5720	0.0	6120	0.0	6520	0.0	6920	0.0
4928	0.1	5328	0.0	5728	0.0	6128	0.0	6528	0.0	6928	0.0
4936	0.1	5336	0.0	5736	0.0	6136	0.0	6536	0.0	6936	0.0
4944	0.1	5344	0.0	5744	0.0	6144	0.0	6544	0.0	6944	0.0
4952	0.1	5352	0.0	5752	0.0	6152	0.0	6552	0.0	6952	0.0
4960	0.1	5360	0.0	5760	0.0	6160	0.0	6560	0.0	6960	0.0
4968	0.1	5368	0.0	5768	0.0	6168	0.0	6568	0.0	6968	0.0
4976	0.1	5376	0.0	5776	0.0	6176	0.0	6576	0.0	6976	0.0
4984	0.1	5384	0.0	5784	0.0	6184	0.0	6584	0.0	6984	0.0
4992	0.1	5392	0.0	5792	0.0	6192	0.0	6592	0.0	6992	0.0
5000	0.1	5400	0.0	5800	0.0	6200	0.0	6600	0.0	7000	0.0
5008	0.1	5408	0.0	5808	0.0	6208	0.0	6608	0.0	7008	0.0
5016	0.1	5416	0.0	5816	0.0	6216	0.0	6616	0.0	7016	0.0
5024	0.1	5424	0.0	5824	0.0	6224	0.0	6624	0.0	7024	0.0
5032	0.1	5432	0.0	5832	0.0	6232	0.0	6632	0.0	7032	0.0
5040	0.1	5440	0.0	5840	0.0	6240	0.0	6640	0.0	7040	0.0
5048	0.1	5448	0.0	5848	0.0	6248	0.0	6648	0.0	7048	0.0
5056	0.1	5456	0.0	5856	0.0	6256	0.0	6656	0.0	7056	0.0
5064	0.1	5464	0.0	5864	0.0	6264	0.0	6664	0.0	7064	0.0
5072	0.1	5472	0.0	5872	0.0	6272	0.0	6672	0.0	7072	0.0
5080	0.1	5480	0.0	5880	0.0	6280	0.0	6680	0.0	7080	0.0
5088	0.1	5488	0.0	5888	0.0	6288	0.0	6688	0.0	7088	0.0
5096	0.0	5496	0.0	5896	0.0	6296	0.0	6696	0.0	7096	0.0
5104	0.0	5504	0.0	5904	0.0	6304	0.0	6704	0.0	7104	0.0
5112	0.0	5512	0.0	5912	0.0	6312	0.0	6712	0.0	7112	0.0
5120	0.0	5520	0.0	5920	0.0	6320	0.0	6720	0.0	7120	0.0
5128	0.0	5528	0.0	5928	0.0	6328	0.0	6728	0.0	7128	0.0
5136	0.0	5536	0.0	5936	0.0	6336	0.0	6736	0.0	7136	0.0
5144	0.0	5544	0.0	5944	0.0	6344	0.0	6744	0.0	7144	0.0
5152	0.0	5552	0.0	5952	0.0	6352	0.0	6752	0.0	7152	0.0
5160	0.0	5560	0.0	5960	0.0	6360	0.0	6760	0.0	7160	0.0
5168	0.0	5568	0.0	5968	0.0	6368	0.0	6768	0.0	7168	0.0
5176	0.0	5576	0.0	5976	0.0	6376	0.0	6776	0.0	7176	0.0
5184	0.0	5584	0.0	5984	0.0	6384	0.0	6784	0.0	7184	0.0
5192	0.0	5592	0.0	5992	0.0	6392	0.0	6792	0.0	7192	0.0
5200	0.0	5600	0.0	6000	0.0	6400	0.0	6800	0.0	7200	0.0

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Input Hydrograph

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

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Input Hydrograph

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

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Model Details

Storage is Online Cover Level (m) 102.100

Cellular Storage Structure

Invert Level (m) 100.900 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	715.5	715.5	0.900	0.0	801.1
0.800	715.5	801.1			

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0070-2000-0805-2000
Design Head (m)	0.805
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	70
Invert Level (m)	100.895
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.805	2.0
Flush-Flo™	0.242	2.0
Kick-Flo®	0.510	1.6
Mean Flow over Head Range	-	1.7

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.8	1.200	2.4	3.000	3.7	7.000	5.4
0.200	2.0	1.400	2.6	3.500	3.9	7.500	5.6
0.300	2.0	1.600	2.7	4.000	4.2	8.000	5.8
0.400	1.9	1.800	2.9	4.500	4.4	8.500	6.0
0.500	1.7	2.000	3.0	5.000	4.6	9.000	6.1
0.600	1.8	2.200	3.2	5.500	4.9	9.500	6.3
0.800	2.0	2.400	3.3	6.000	5.1		
1.000	2.2	2.600	3.4	6.500	5.3		

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Summary of Results for Input Hydrograph

Half Drain Time : 1563 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
Input Hydrograph	97.728	0.628	0.0	2.0	2.0	371.2	O K

Storm Event	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
Input Hydrograph	0.0	442.2	2592

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Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
8	0.0	408	5.7	808	5.4	1208	4.9	1608	4.2	2008	3.3
16	0.0	416	5.7	816	5.4	1216	4.9	1616	4.2	2016	3.3
24	0.0	424	5.7	824	5.4	1224	4.9	1624	4.1	2024	3.3
32	0.0	432	5.7	832	5.4	1232	4.8	1632	4.1	2032	3.2
40	0.1	440	5.7	840	5.4	1240	4.8	1640	4.1	2040	3.2
48	0.3	448	5.7	848	5.4	1248	4.8	1648	4.1	2048	3.2
56	0.5	456	5.8	856	5.3	1256	4.8	1656	4.1	2056	3.2
64	0.8	464	5.8	864	5.3	1264	4.8	1664	4.1	2064	3.2
72	1.1	472	5.8	872	5.3	1272	4.8	1672	4.0	2072	3.1
80	1.4	480	5.8	880	5.3	1280	4.8	1680	4.0	2080	3.1
88	1.6	488	5.8	888	5.3	1288	4.8	1688	4.0	2088	3.1
96	1.8	496	5.8	896	5.3	1296	4.8	1696	4.0	2096	3.1
104	2.0	504	5.8	904	5.3	1304	4.7	1704	4.0	2104	3.1
112	2.2	512	5.7	912	5.3	1312	4.7	1712	4.0	2112	3.0
120	2.2	520	5.7	920	5.3	1320	4.7	1720	3.9	2120	3.0
128	2.2	528	5.7	928	5.2	1328	4.7	1728	3.9	2128	3.0
136	2.3	536	5.7	936	5.2	1336	4.7	1736	3.9	2136	3.0
144	2.4	544	5.7	944	5.2	1344	4.7	1744	3.9	2144	3.0
152	2.5	552	5.7	952	5.2	1352	4.7	1752	3.9	2152	3.0
160	2.6	560	5.7	960	5.2	1360	4.7	1760	3.9	2160	2.9
168	2.8	568	5.7	968	5.2	1368	4.6	1768	3.8	2168	2.9
176	2.9	576	5.7	976	5.2	1376	4.6	1776	3.8	2176	2.9
184	3.1	584	5.7	984	5.2	1384	4.6	1784	3.8	2184	2.9
192	3.2	592	5.7	992	5.2	1392	4.6	1792	3.8	2192	2.9
200	3.4	600	5.6	1000	5.2	1400	4.6	1800	3.8	2200	2.8
208	3.5	608	5.6	1008	5.1	1408	4.6	1808	3.8	2208	2.8
216	3.7	616	5.6	1016	5.1	1416	4.6	1816	3.7	2216	2.8
224	3.8	624	5.6	1024	5.1	1424	4.5	1824	3.7	2224	2.8
232	4.0	632	5.6	1032	5.1	1432	4.5	1832	3.7	2232	2.7
240	4.1	640	5.6	1040	5.1	1440	4.5	1840	3.7	2240	2.7
248	4.3	648	5.6	1048	5.1	1448	4.5	1848	3.7	2248	2.7
256	4.4	656	5.6	1056	5.1	1456	4.5	1856	3.6	2256	2.7
264	4.6	664	5.6	1064	5.1	1464	4.5	1864	3.6	2264	2.7
272	4.7	672	5.6	1072	5.1	1472	4.4	1872	3.6	2272	2.6
280	4.9	680	5.6	1080	5.1	1480	4.4	1880	3.6	2280	2.6
288	5.0	688	5.5	1088	5.0	1488	4.4	1888	3.6	2288	2.6
296	5.1	696	5.5	1096	5.0	1496	4.4	1896	3.6	2296	2.6
304	5.2	704	5.5	1104	5.0	1504	4.4	1904	3.5	2304	2.6
312	5.2	712	5.5	1112	5.0	1512	4.4	1912	3.5	2312	2.5
320	5.3	720	5.5	1120	5.0	1520	4.4	1920	3.5	2320	2.5
328	5.4	728	5.5	1128	5.0	1528	4.3	1928	3.5	2328	2.5
336	5.4	736	5.5	1136	5.0	1536	4.3	1936	3.5	2336	2.5
344	5.5	744	5.5	1144	5.0	1544	4.3	1944	3.4	2344	2.5
352	5.5	752	5.5	1152	5.0	1552	4.3	1952	3.4	2352	2.4
360	5.5	760	5.5	1160	4.9	1560	4.3	1960	3.4	2360	2.4
368	5.6	768	5.5	1168	4.9	1568	4.3	1968	3.4	2368	2.4
376	5.6	776	5.4	1176	4.9	1576	4.2	1976	3.4	2376	2.4
384	5.6	784	5.4	1184	4.9	1584	4.2	1984	3.4	2384	2.4
392	5.6	792	5.4	1192	4.9	1592	4.2	1992	3.3	2392	2.3
400	5.6	800	5.4	1200	4.9	1600	4.2	2000	3.3	2400	2.3

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Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
2408	2.3	2488	2.2	2568	1.8	2648	1.3	2728	0.9	2808	0.6
2416	2.3	2496	2.2	2576	1.8	2656	1.3	2736	0.8	2816	0.6
2424	2.2	2504	2.2	2584	1.7	2664	1.2	2744	0.8	2824	0.6
2432	2.2	2512	2.2	2592	1.7	2672	1.2	2752	0.8	2832	0.5
2440	2.2	2520	2.1	2600	1.6	2680	1.1	2760	0.7	2840	0.5
2448	2.2	2528	2.1	2608	1.6	2688	1.1	2768	0.7	2848	0.5
2456	2.2	2536	2.0	2616	1.5	2696	1.0	2776	0.7	2856	0.5
2464	2.2	2544	2.0	2624	1.5	2704	1.0	2784	0.7	2864	0.5
2472	2.2	2552	1.9	2632	1.4	2712	0.9	2792	0.6	2872	0.4
2480	2.2	2560	1.9	2640	1.4	2720	0.9	2800	0.6	2880	0.4

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Model Details

Storage is Online Cover Level (m) 98.300

Infiltration Basin Structure

Invert Level (m) 97.100 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	512.0	0.900	751.5	1.200	841.5

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0068-2000-0905-2000
Design Head (m)	0.905
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	68
Invert Level (m)	97.095
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.905	2.0
Flush-Flo™	0.276	2.0
Kick-Flo®	0.567	1.6
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)
0.100	1.7	1.200	2.3	3.000	3.5	7.000	5.2
0.200	2.0	1.400	2.4	3.500	3.7	7.500	5.3
0.300	2.0	1.600	2.6	4.000	4.0	8.000	5.5
0.400	1.9	1.800	2.7	4.500	4.2	8.500	5.6
0.500	1.8	2.000	2.9	5.000	4.4	9.000	5.8
0.600	1.7	2.200	3.0	5.500	4.6	9.500	6.0
0.800	1.9	2.400	3.1	6.000	4.8		
1.000	2.1	2.600	3.2	6.500	5.0		

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Summary of Results for Input Hydrograph

Half Drain Time : 2461 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Control (l/s)	Max Σ Outflow (l/s)	Max Volume (m³)	Status
Input Hydrograph	97.997	0.897	0.0	2.0	2.0	563.0	O K

Storm Event	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
Input Hydrograph	0.0	1005.1	3904

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Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
8	0.0	408	5.7	808	5.4	1208	4.9	1608	4.2	2008	3.5
16	0.0	416	5.7	816	5.4	1216	4.9	1616	4.2	2016	3.5
24	0.0	424	5.7	824	5.4	1224	4.9	1624	4.1	2024	3.5
32	0.0	432	5.7	832	5.4	1232	4.8	1632	4.1	2032	3.5
40	0.1	440	5.7	840	5.4	1240	4.8	1640	4.1	2040	3.5
48	0.3	448	5.7	848	5.3	1248	4.8	1648	4.1	2048	3.5
56	0.5	456	5.8	856	5.3	1256	4.8	1656	4.1	2056	3.5
64	0.8	464	5.8	864	5.3	1264	4.8	1664	4.1	2064	3.5
72	1.1	472	5.8	872	5.3	1272	4.8	1672	4.0	2072	3.5
80	1.3	480	5.8	880	5.3	1280	4.8	1680	4.0	2080	3.6
88	1.6	488	5.8	888	5.3	1288	4.8	1688	4.0	2088	3.6
96	1.8	496	5.8	896	5.3	1296	4.7	1696	4.0	2096	3.6
104	2.0	504	5.8	904	5.3	1304	4.7	1704	4.0	2104	3.6
112	2.2	512	5.7	912	5.3	1312	4.7	1712	4.0	2112	3.7
120	2.2	520	5.7	920	5.3	1320	4.7	1720	3.9	2120	3.7
128	2.2	528	5.7	928	5.2	1328	4.7	1728	3.9	2128	3.8
136	2.3	536	5.7	936	5.2	1336	4.7	1736	3.9	2136	3.9
144	2.4	544	5.7	944	5.2	1344	4.7	1744	3.9	2144	4.0
152	2.5	552	5.7	952	5.2	1352	4.7	1752	3.9	2152	4.1
160	2.6	560	5.7	960	5.2	1360	4.6	1760	3.9	2160	4.2
168	2.8	568	5.7	968	5.2	1368	4.6	1768	3.8	2168	4.3
176	2.9	576	5.7	976	5.2	1376	4.6	1776	3.8	2176	4.4
184	3.1	584	5.7	984	5.2	1384	4.6	1784	3.8	2184	4.5
192	3.2	592	5.7	992	5.2	1392	4.6	1792	3.8	2192	4.6
200	3.4	600	5.6	1000	5.2	1400	4.6	1800	3.8	2200	4.7
208	3.5	608	5.6	1008	5.1	1408	4.6	1808	3.8	2208	4.7
216	3.7	616	5.6	1016	5.1	1416	4.5	1816	3.7	2216	4.8
224	3.8	624	5.6	1024	5.1	1424	4.5	1824	3.7	2224	4.8
232	4.0	632	5.6	1032	5.1	1432	4.5	1832	3.7	2232	4.8
240	4.1	640	5.6	1040	5.1	1440	4.5	1840	3.7	2240	4.9
248	4.3	648	5.6	1048	5.1	1448	4.5	1848	3.7	2248	4.9
256	4.4	656	5.6	1056	5.1	1456	4.5	1856	3.6	2256	4.9
264	4.6	664	5.6	1064	5.1	1464	4.5	1864	3.6	2264	4.9
272	4.7	672	5.6	1072	5.1	1472	4.4	1872	3.6	2272	4.9
280	4.9	680	5.6	1080	5.1	1480	4.4	1880	3.6	2280	4.9
288	5.0	688	5.5	1088	5.0	1488	4.4	1888	3.6	2288	4.9
296	5.1	696	5.5	1096	5.0	1496	4.4	1896	3.6	2296	4.9
304	5.2	704	5.5	1104	5.0	1504	4.4	1904	3.5	2304	4.9
312	5.2	712	5.5	1112	5.0	1512	4.4	1912	3.5	2312	4.9
320	5.3	720	5.5	1120	5.0	1520	4.4	1920	3.5	2320	4.9
328	5.4	728	5.5	1128	5.0	1528	4.3	1928	3.5	2328	5.0
336	5.4	736	5.5	1136	5.0	1536	4.3	1936	3.5	2336	5.0
344	5.5	744	5.5	1144	5.0	1544	4.3	1944	3.5	2344	5.0
352	5.5	752	5.5	1152	5.0	1552	4.3	1952	3.5	2352	5.0
360	5.5	760	5.5	1160	4.9	1560	4.3	1960	3.5	2360	5.0
368	5.6	768	5.4	1168	4.9	1568	4.3	1968	3.4	2368	5.0
376	5.6	776	5.4	1176	4.9	1576	4.2	1976	3.4	2376	5.0
384	5.6	784	5.4	1184	4.9	1584	4.2	1984	3.4	2384	5.0
392	5.6	792	5.4	1192	4.9	1592	4.2	1992	3.5	2392	5.0
400	5.6	800	5.4	1200	4.9	1600	4.2	2000	3.5	2400	5.0

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Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
2408	5.0	2808	4.5	3208	3.7	3608	2.7	4008	1.3	4408	0.2
2416	5.0	2816	4.5	3216	3.7	3616	2.7	4016	1.3	4416	0.2
2424	5.0	2824	4.5	3224	3.6	3624	2.7	4024	1.2	4424	0.2
2432	4.9	2832	4.4	3232	3.6	3632	2.7	4032	1.2	4432	0.2
2440	4.9	2840	4.4	3240	3.6	3640	2.6	4040	1.1	4440	0.2
2448	4.9	2848	4.4	3248	3.6	3648	2.6	4048	1.1	4448	0.2
2456	4.9	2856	4.4	3256	3.6	3656	2.6	4056	1.0	4456	0.2
2464	4.9	2864	4.4	3264	3.6	3664	2.6	4064	1.0	4464	0.2
2472	4.9	2872	4.4	3272	3.5	3672	2.6	4072	1.0	4472	0.2
2480	4.9	2880	4.4	3280	3.5	3680	2.5	4080	0.9	4480	0.2
2488	4.9	2888	4.3	3288	3.5	3688	2.5	4088	0.9	4488	0.2
2496	4.9	2896	4.3	3296	3.5	3696	2.5	4096	0.8	4496	0.2
2504	4.9	2904	4.3	3304	3.5	3704	2.5	4104	0.8	4504	0.2
2512	4.9	2912	4.3	3312	3.4	3712	2.4	4112	0.8	4512	0.2
2520	4.8	2920	4.3	3320	3.4	3720	2.4	4120	0.8	4520	0.2
2528	4.8	2928	4.3	3328	3.4	3728	2.4	4128	0.7	4528	0.2
2536	4.8	2936	4.3	3336	3.4	3736	2.4	4136	0.7	4536	0.2
2544	4.8	2944	4.2	3344	3.4	3744	2.4	4144	0.7	4544	0.2
2552	4.8	2952	4.2	3352	3.3	3752	2.3	4152	0.6	4552	0.2
2560	4.8	2960	4.2	3360	3.3	3760	2.3	4160	0.6	4560	0.2
2568	4.8	2968	4.2	3368	3.3	3768	2.3	4168	0.6	4568	0.1
2576	4.8	2976	4.2	3376	3.3	3776	2.3	4176	0.6	4576	0.1
2584	4.8	2984	4.2	3384	3.3	3784	2.3	4184	0.6	4584	0.1
2592	4.8	2992	4.1	3392	3.3	3792	2.2	4192	0.5	4592	0.1
2600	4.8	3000	4.1	3400	3.2	3800	2.2	4200	0.5	4600	0.1
2608	4.7	3008	4.1	3408	3.2	3808	2.2	4208	0.5	4608	0.1
2616	4.7	3016	4.1	3416	3.2	3816	2.2	4216	0.5	4616	0.1
2624	4.7	3024	4.1	3424	3.2	3824	2.2	4224	0.5	4624	0.1
2632	4.7	3032	4.1	3432	3.2	3832	2.2	4232	0.5	4632	0.1
2640	4.7	3040	4.0	3440	3.1	3840	2.2	4240	0.4	4640	0.1
2648	4.7	3048	4.0	3448	3.1	3848	2.2	4248	0.4	4648	0.1
2656	4.7	3056	4.0	3456	3.1	3856	2.2	4256	0.4	4656	0.1
2664	4.7	3064	4.0	3464	3.1	3864	2.2	4264	0.4	4664	0.1
2672	4.7	3072	4.0	3472	3.1	3872	2.2	4272	0.4	4672	0.1
2680	4.6	3080	4.0	3480	3.0	3880	2.2	4280	0.4	4680	0.1
2688	4.6	3088	3.9	3488	3.0	3888	2.1	4288	0.4	4688	0.1
2696	4.6	3096	3.9	3496	3.0	3896	2.1	4296	0.4	4696	0.1
2704	4.6	3104	3.9	3504	3.0	3904	2.0	4304	0.3	4704	0.1
2712	4.6	3112	3.9	3512	3.0	3912	2.0	4312	0.3	4712	0.1
2720	4.6	3120	3.9	3520	2.9	3920	1.9	4320	0.3	4720	0.1
2728	4.6	3128	3.9	3528	2.9	3928	1.8	4328	0.3	4728	0.1
2736	4.6	3136	3.8	3536	2.9	3936	1.8	4336	0.3	4736	0.1
2744	4.6	3144	3.8	3544	2.9	3944	1.7	4344	0.3	4744	0.1
2752	4.6	3152	3.8	3552	2.9	3952	1.7	4352	0.3	4752	0.1
2760	4.5	3160	3.8	3560	2.8	3960	1.6	4360	0.3	4760	0.1
2768	4.5	3168	3.8	3568	2.8	3968	1.6	4368	0.3	4768	0.1
2776	4.5	3176	3.7	3576	2.8	3976	1.5	4376	0.3	4776	0.1
2784	4.5	3184	3.7	3584	2.8	3984	1.5	4384	0.3	4784	0.1
2792	4.5	3192	3.7	3592	2.8	3992	1.4	4392	0.2	4792	0.1
2800	4.5	3200	3.7	3600	2.7	4000	1.4	4400	0.2	4800	0.1

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Input Hydrograph

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
4808	0.1	5208	0.0	5608	0.0	6008	0.0	6408	0.0	6808	0.0
4816	0.1	5216	0.0	5616	0.0	6016	0.0	6416	0.0	6816	0.0
4824	0.1	5224	0.0	5624	0.0	6024	0.0	6424	0.0	6824	0.0
4832	0.1	5232	0.0	5632	0.0	6032	0.0	6432	0.0	6832	0.0
4840	0.1	5240	0.0	5640	0.0	6040	0.0	6440	0.0	6840	0.0
4848	0.1	5248	0.0	5648	0.0	6048	0.0	6448	0.0	6848	0.0
4856	0.1	5256	0.0	5656	0.0	6056	0.0	6456	0.0	6856	0.0
4864	0.1	5264	0.0	5664	0.0	6064	0.0	6464	0.0	6864	0.0
4872	0.1	5272	0.0	5672	0.0	6072	0.0	6472	0.0	6872	0.0
4880	0.1	5280	0.0	5680	0.0	6080	0.0	6480	0.0	6880	0.0
4888	0.1	5288	0.0	5688	0.0	6088	0.0	6488	0.0	6888	0.0
4896	0.1	5296	0.0	5696	0.0	6096	0.0	6496	0.0	6896	0.0
4904	0.1	5304	0.0	5704	0.0	6104	0.0	6504	0.0	6904	0.0
4912	0.1	5312	0.0	5712	0.0	6112	0.0	6512	0.0	6912	0.0
4920	0.1	5320	0.0	5720	0.0	6120	0.0	6520	0.0	6920	0.0
4928	0.1	5328	0.0	5728	0.0	6128	0.0	6528	0.0	6928	0.0
4936	0.1	5336	0.0	5736	0.0	6136	0.0	6536	0.0	6936	0.0
4944	0.1	5344	0.0	5744	0.0	6144	0.0	6544	0.0	6944	0.0
4952	0.1	5352	0.0	5752	0.0	6152	0.0	6552	0.0	6952	0.0
4960	0.1	5360	0.0	5760	0.0	6160	0.0	6560	0.0	6960	0.0
4968	0.1	5368	0.0	5768	0.0	6168	0.0	6568	0.0	6968	0.0
4976	0.1	5376	0.0	5776	0.0	6176	0.0	6576	0.0	6976	0.0
4984	0.1	5384	0.0	5784	0.0	6184	0.0	6584	0.0	6984	0.0
4992	0.1	5392	0.0	5792	0.0	6192	0.0	6592	0.0	6992	0.0
5000	0.1	5400	0.0	5800	0.0	6200	0.0	6600	0.0	7000	0.0
5008	0.1	5408	0.0	5808	0.0	6208	0.0	6608	0.0	7008	0.0
5016	0.1	5416	0.0	5816	0.0	6216	0.0	6616	0.0	7016	0.0
5024	0.1	5424	0.0	5824	0.0	6224	0.0	6624	0.0	7024	0.0
5032	0.1	5432	0.0	5832	0.0	6232	0.0	6632	0.0	7032	0.0
5040	0.1	5440	0.0	5840	0.0	6240	0.0	6640	0.0	7040	0.0
5048	0.1	5448	0.0	5848	0.0	6248	0.0	6648	0.0	7048	0.0
5056	0.1	5456	0.0	5856	0.0	6256	0.0	6656	0.0	7056	0.0
5064	0.1	5464	0.0	5864	0.0	6264	0.0	6664	0.0	7064	0.0
5072	0.1	5472	0.0	5872	0.0	6272	0.0	6672	0.0	7072	0.0
5080	0.1	5480	0.0	5880	0.0	6280	0.0	6680	0.0	7080	0.0
5088	0.1	5488	0.0	5888	0.0	6288	0.0	6688	0.0	7088	0.0
5096	0.0	5496	0.0	5896	0.0	6296	0.0	6696	0.0	7096	0.0
5104	0.0	5504	0.0	5904	0.0	6304	0.0	6704	0.0	7104	0.0
5112	0.0	5512	0.0	5912	0.0	6312	0.0	6712	0.0	7112	0.0
5120	0.0	5520	0.0	5920	0.0	6320	0.0	6720	0.0	7120	0.0
5128	0.0	5528	0.0	5928	0.0	6328	0.0	6728	0.0	7128	0.0
5136	0.0	5536	0.0	5936	0.0	6336	0.0	6736	0.0	7136	0.0
5144	0.0	5544	0.0	5944	0.0	6344	0.0	6744	0.0	7144	0.0
5152	0.0	5552	0.0	5952	0.0	6352	0.0	6752	0.0	7152	0.0
5160	0.0	5560	0.0	5960	0.0	6360	0.0	6760	0.0	7160	0.0
5168	0.0	5568	0.0	5968	0.0	6368	0.0	6768	0.0	7168	0.0
5176	0.0	5576	0.0	5976	0.0	6376	0.0	6776	0.0	7176	0.0
5184	0.0	5584	0.0	5984	0.0	6384	0.0	6784	0.0	7184	0.0
5192	0.0	5592	0.0	5992	0.0	6392	0.0	6792	0.0	7192	0.0
5200	0.0	5600	0.0	6000	0.0	6400	0.0	6800	0.0	7200	0.0

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Input Hydrograph

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

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Input Hydrograph

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

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Model Details

Storage is Online Cover Level (m) 98.300

Infiltration Basin Structure

Invert Level (m) 97.100 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 1.00
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	512.0	0.900	751.5	1.200	841.5

Hydro-Brake® Optimum Outflow Control

Unit Reference	MD-SHE-0068-2000-0905-2000
Design Head (m)	0.905
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	68
Invert Level (m)	97.095
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.905	2.0
Flush-Flo™	0.276	2.0
Kick-Flo®	0.567	1.6
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)
0.100	1.7	1.200	2.3	3.000	3.5	7.000	5.2
0.200	2.0	1.400	2.4	3.500	3.7	7.500	5.3
0.300	2.0	1.600	2.6	4.000	4.0	8.000	5.5
0.400	1.9	1.800	2.7	4.500	4.2	8.500	5.6
0.500	1.8	2.000	2.9	5.000	4.4	9.000	5.8
0.600	1.7	2.200	3.0	5.500	4.6	9.500	6.0
0.800	1.9	2.400	3.1	6.000	4.8		
1.000	2.1	2.600	3.2	6.500	5.0		

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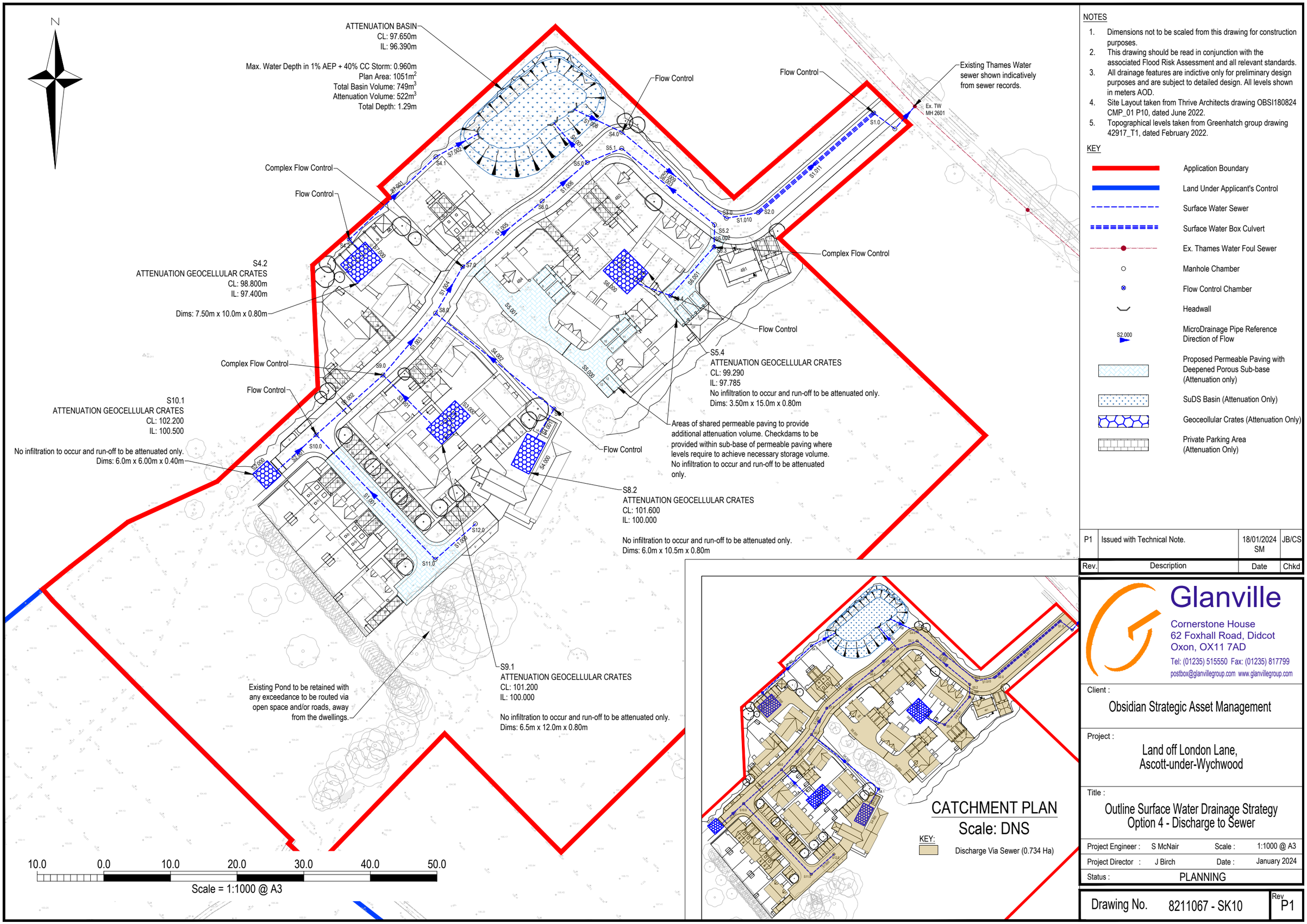
Appendix Q

Option 4 – Surface Water Drainage Strategy & Calculations



NOTES

1. Dimensions not to be scaled from this drawing for construction purposes.
2. This drawing should be read in conjunction with the associated Flood Risk Assessment and all relevant standards.
3. All drainage features are indictive only for preliminary design purposes and are subject to detailed design. All levels shown in meters AOD.
4. Site Layout taken from Thrive Architects drawing OBSI180824 CMP_01 P10, dated June 2022.
5. Topographical levels taken from Greenhatch group drawing 42917_T1, dated February 2022.

KEY

- Application Boundary
- Land Under Applicant's Control
- Surface Water Sewer
- Surface Water Box Culvert
- Ex. Thames Water Foul Sewer
- Manhole Chamber
- Flow Control Chamber
- Headwall
- S2.000 — MicroDrainage Pipe Reference Direction of Flow
- Proposed Permeable Paving with Deepened Porous Sub-base (Attenuation only)
- SuDS Basin (Attenuation Only)
- Geoceollular Crates (Attenuation Only)
- Private Parking Area (Attenuation Only)

Rev.	Description	Date	Chkd
P1	Issued with Technical Note.	18/01/2024 SM	JB/CS

CATCHMENT PLAN
Scale: DNS
KEY:
Discharge Via Sewer (0.734 Ha)

Glanville
Cornerstone House
62 Foxhall Road, Didcot
Oxon, OX11 7AD
Tel: (01235) 515550 Fax: (01235) 817799
postbox@glanvillegroup.com www.glanvillegroup.com

Client :
Obsidian Strategic Asset Management

Project :
Land off London Lane,
Ascott-under-Wychwood

Title :
Outline Surface Water Drainage Strategy
Option 4 - Discharge to Sewer

Project Engineer :	S McNair	Scale :	1:1000 @ A3
Project Director :	J Birch	Date :	January 2024
Status :	PLANNING		

Drawing No. 8211067 - SK10 Rev P1

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	1.339	Urban	0.000
SAAR (mm)	750	Region Number	Region 6

Results l/s

QBAR Rural	6.4
QBAR Urban	6.4
Q100 years	20.3
Q1 year	5.4
Q30 years	14.5
Q100 years	20.3

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.900
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

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PIPELINE SCHEDULES for Storm

Upstream Manhole

- Indicates pipe length does not match coordinates

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	150	S12.0	102.200	101.000	1.050	Open Manhole	1200
S1.001	o	150	S11.0	102.550	100.630	1.770	Open Manhole	1200
S2.000	o	150	SDUMMY10.1	104.000	103.000	0.850	Open Manhole	1200
S2.001	o	150	S10.1	102.200	100.500	1.550	Open Manhole	1200
S1.002	o	225	S10.0	101.550	99.905	1.420	Open Manhole	1200
S3.000	o	150	SDUMMY9.1	103.000	101.500	1.350	Open Manhole	1200
S3.001	o	150	S9.1	101.200	100.000	1.050	Open Manhole	1200
S1.003	o	225	S9.0	101.200	99.785	1.190	Open Manhole	1200
S4.000	o	150	SDUMMY8.2	103.000	102.000	0.850	Open Manhole	300
S4.001	o	150	S8.2	101.600	100.200	1.250	Open Manhole	1200
S4.002	o	150	S8.1	101.600	100.130	1.320	Open Manhole	1200
S1.004	o	225	S8.0	100.550	99.410	0.915	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	16.108	43.5	S11.0	102.550	100.630	1.770	Open Manhole	1200
S1.001	51.732	79.6	S10.0	101.550	99.980	1.420	Open Manhole	1200
S2.000	7.301	2.9	S10.1	102.200	100.500	1.550	Open Manhole	1200
S2.001	16.077	30.9	S10.0	101.550	99.980	1.420	Open Manhole	1200
S1.002	26.871	223.9	S9.0	101.200	99.785	1.190	Open Manhole	1200
S3.000	6.273	4.2	S9.1	101.200	100.000	1.050	Open Manhole	1200
S3.001	20.784	148.5	S9.0	101.200	99.860	1.190	Open Manhole	1200
S1.003	24.326	64.9	S8.0	100.550	99.410	0.915	Open Manhole	1200
S4.000	11.743	6.5	S8.2	101.600	100.200	1.250	Open Manhole	1200
S4.001	10.372	148.2	S8.1	101.600	100.130	1.320	Open Manhole	1200
S4.002	45.703	70.9	S8.0	100.550	99.485	0.915	Open Manhole	1200
S1.004	16.170	215.6	S7.0	100.600	99.335	1.040	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S5.000	o	150	S7.2	101.350	100.120	1.080	Open Manhole	1200
S5.001	o	150	S7.1	101.300	99.930	1.220	Open Manhole	1200
S1.005	o	225	S7.0	100.600	99.335	1.040	Open Manhole	1200
S1.006	o	225	S6.0	99.750	98.550	0.975	Open Manhole	1200
S6.000	o	150	SDUMMY5.4	102.000	101.000	0.850	Open Manhole	1200
S6.001	o	150	S5.4	100.350	98.505	1.695	Open Manhole	1200
S6.002	o	150	S5.3	99.500	98.370	0.980	Open Manhole	1200
S6.003	o	150	S5.2	99.250	98.325	0.775	Open Manhole	1200
S6.004	o	225	S5.1	98.750	98.050	0.475	Open Manhole	1200
S1.007	o	300	S5.0	99.100	97.825	0.975	Open Manhole	1200
S7.000	o	150	SDUMMY4.2	100.000	99.000	0.850	Open Manhole	1200
S7.001	o	150	S4.2	98.550	97.220	1.180	Open Manhole	1200
S7.002	o	150	S4.1	98.100	96.980	0.970	Open Manhole	1200
S1.008	o	300	SBASIN	97.650	96.390	0.960	Open Manhole	1200
S1.009	o	300	S4.0	98.600	96.340	1.960	Open Manhole	1200
S1.010	o	300	S3.0	99.290	96.200	2.790	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S5.000	27.305	143.7	S7.1	101.300	99.930	1.220	Open Manhole	1200
S5.001	22.547	43.8	S7.0	100.600	99.415	1.035	Open Manhole	1200
S1.005	31.002	39.5	S6.0	99.750	98.550	0.975	Open Manhole	1200
S1.006	17.788	27.4	S5.0	99.100	97.900	0.975	Open Manhole	1200
S6.000	9.600	3.8	S5.4	100.350	98.505	1.695	Open Manhole	1200
S6.001	19.611	145.3	S5.3	99.500	98.370	0.980	Open Manhole	1200
S6.002	6.681	148.5	S5.2	99.250	98.325	0.775	Open Manhole	1200
S6.003	36.045	147.1	S5.1	98.750	98.080	0.520	Open Manhole	1200
S6.004	11.207	106.7	S5.0	99.100	97.945	0.930	Open Manhole	1200
S1.007	15.504#	10.8	SBASIN	97.650	96.390	0.960	Open Manhole	1200
S7.000	8.002	4.5	S4.2	98.550	97.220	1.180	Open Manhole	1200
S7.001	35.872	149.5	S4.1	98.100	96.980	0.970	Open Manhole	1200
S7.002	14.493#	32.9	SBASIN	97.650	96.540	0.960	Open Manhole	1200
S1.008	15.000#	300.0	S4.0	98.600	96.340	1.960	Open Manhole	1200
S1.009	40.645	290.3	S3.0	99.290	96.200	2.790	Open Manhole	1200
S1.010	9.661	276.0	S2.0	99.400	96.165	2.935	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.011	800 []	300	S2.0	99.400	96.165	2.435	Open Manhole	1200
S1.012	o	150	S1.0	98.180	96.010	2.020	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.011	45.810	295.5	S1.0	98.180	96.010	1.370	Open Manhole	1200
S1.012	12.295	153.7	S	97.600	95.930	1.520	Open Manhole	150

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.018	0.018	0.018
1.001	-	-	100	0.010	0.010	0.010
2.000	-	-	100	0.000	0.000	0.000
2.001	-	-	100	0.022	0.022	0.022
1.002	-	-	100	0.119	0.119	0.119
3.000	-	-	100	0.000	0.000	0.000
3.001	-	-	100	0.022	0.022	0.022
1.003	-	-	100	0.028	0.028	0.028
4.000	-	-	100	0.000	0.000	0.000
4.001	-	-	100	0.065	0.065	0.065
4.002	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.039	0.039	0.039
5.000	-	-	100	0.010	0.010	0.010
5.001	-	-	100	0.014	0.014	0.014
1.005	-	-	100	0.029	0.029	0.029
1.006	-	-	100	0.019	0.019	0.019
6.000	-	-	100	0.000	0.000	0.000
6.001	-	-	100	0.072	0.072	0.072
6.002	-	-	100	0.033	0.033	0.033
6.003	-	-	100	0.017	0.017	0.017
6.004	-	-	100	0.053	0.053	0.053
1.007	-	-	100	0.060	0.060	0.060
7.000	-	-	100	0.000	0.000	0.000
7.001	-	-	100	0.066	0.066	0.066
7.002	-	-	100	0.021	0.021	0.021
1.008	-	-	100	0.000	0.000	0.000
1.009	-	-	100	0.000	0.000	0.000
1.010	-	-	100	0.000	0.000	0.000
1.011	-	-	100	0.000	0.000	0.000
1.012	-	-	100	0.042	0.042	0.042
				Total	Total	Total
				0.759	0.759	0.759

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.012	S	97.600	95.930	95.930	150	0

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S10.1, DS/PN: S2.001, Volume (m³): 2.0

Unit Reference	MD-SCU-0032-1000-0800-1000
Design Head (m)	0.800
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	32
Invert Level (m)	100.500
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	1.0
Flush-Flo™	0.047	0.3
Kick-Flo®	0.047	0.3
Mean Flow over Head Range	-	0.7

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.4	1.200	1.2	3.000	1.8	7.000	2.7
0.200	0.5	1.400	1.3	3.500	2.0	7.500	2.8
0.300	0.6	1.600	1.4	4.000	2.1	8.000	2.9
0.400	0.7	1.800	1.4	4.500	2.2	8.500	3.0
0.500	0.8	2.000	1.5	5.000	2.3	9.000	3.1
0.600	0.9	2.200	1.6	5.500	2.4	9.500	3.1
0.800	1.0	2.400	1.6	6.000	2.5		
1.000	1.1	2.600	1.7	6.500	2.6		

Hydro-Brake® Optimum Manhole: S9.1, DS/PN: S3.001, Volume (m³): 1.4

Unit Reference	MD-SCU-0033-1000-0700-1000
Design Head (m)	0.700
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	33
Invert Level (m)	100.000
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

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Hydro-Brake® Optimum Manhole: S9.1, DS/PN: S3.001, Volume (m³): 1.4

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.700	1.0
Flush-Flo™	0.049	0.3
Kick-Flo®	0.049	0.3
Mean Flow over Head Range	-	0.7

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.4	1.200	1.3	3.000	1.9	7.000	2.9
0.200	0.6	1.400	1.4	3.500	2.1	7.500	3.0
0.300	0.7	1.600	1.5	4.000	2.2	8.000	3.1
0.400	0.8	1.800	1.5	4.500	2.3	8.500	3.2
0.500	0.9	2.000	1.6	5.000	2.5	9.000	3.3
0.600	0.9	2.200	1.7	5.500	2.6	9.500	3.4
0.800	1.1	2.400	1.8	6.000	2.7		
1.000	1.2	2.600	1.8	6.500	2.8		

Complex Manhole: S9.0, DS/PN: S1.003, Volume (m³): 3.0

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0073-2000-0600-2000
Design Head (m)	0.600
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	73
Invert Level (m)	99.785
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.600	2.0
Flush-Flo™	0.177	2.0
Kick-Flo®	0.397	1.7
Mean Flow over Head Range	-	1.7

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

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Hydro-Brake® Optimum

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.9	1.200	2.7	3.000	4.2	7.000	6.3
0.200	2.0	1.400	2.9	3.500	4.5	7.500	6.5
0.300	1.9	1.600	3.1	4.000	4.8	8.000	6.7
0.400	1.7	1.800	3.3	4.500	5.1	8.500	6.9
0.500	1.8	2.000	3.5	5.000	5.3	9.000	7.1
0.600	2.0	2.200	3.6	5.500	5.6	9.500	7.3
0.800	2.3	2.400	3.8	6.000	5.8		
1.000	2.5	2.600	3.9	6.500	6.0		

Weir

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 100.385

Hydro-Brake® Optimum Manhole: S8.2, DS/PN: S4.001, Volume (m³): 1.8

Unit Reference	MD-SCU-0032-1000-0800-1000
Design Head (m)	0.800
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	32
Invert Level (m)	100.200
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	1.0
Flush-Flo™	0.047	0.3
Kick-Flo®	0.047	0.3
Mean Flow over Head Range	-	0.7

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.4	1.200	1.2	3.000	1.8	7.000	2.7
0.200	0.5	1.400	1.3	3.500	2.0	7.500	2.8
0.300	0.6	1.600	1.4	4.000	2.1	8.000	2.9
0.400	0.7	1.800	1.4	4.500	2.2	8.500	3.0
0.500	0.8	2.000	1.5	5.000	2.3	9.000	3.1
0.600	0.9	2.200	1.6	5.500	2.4	9.500	3.1
0.800	1.0	2.400	1.6	6.000	2.5		
1.000	1.1	2.600	1.7	6.500	2.6		

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Complex Manhole: S7.0, DS/PN: S1.005, Volume (m³): 2.4

Hydro-Brake® Optimum

Unit Reference	MD-SCU-0086-5000-0400-5000
Design Head (m)	0.400
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	86
Invert Level (m)	99.335
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.400	5.0
Flush-Flo™	0.113	3.0
Kick-Flo®	0.129	3.0
Mean Flow over Head Range	-	3.3

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)
0.100	2.9	1.200	8.4	3.000	12.9	7.000	19.5
0.200	3.6	1.400	9.0	3.500	13.9	7.500	20.2
0.300	4.4	1.600	9.6	4.000	14.8	8.000	20.9
0.400	5.0	1.800	10.1	4.500	15.6	8.500	21.6
0.500	5.5	2.000	10.6	5.000	16.5	9.000	22.2
0.600	6.0	2.200	11.1	5.500	17.3	9.500	22.8
0.800	6.9	2.400	11.6	6.000	18.1		
1.000	7.7	2.600	12.1	6.500	18.8		

Weir

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 99.735

Hydro-Brake® Optimum Manhole: S5.4, DS/PN: S6.001, Volume (m³): 2.2

Unit Reference	MD-SCU-0031-1000-0875-1000
Design Head (m)	0.875
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	31

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Hydro-Brake® Optimum Manhole: S5.4, DS/PN: S6.001, Volume (m³): 2.2

Invert Level (m)	98.505
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.875	1.0
Flush-Flo™	0.046	0.3
Kick-Flo®	0.046	0.3
Mean Flow over Head Range	-	0.7

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.4	1.200	1.2	3.000	1.8	7.000	2.6
0.200	0.5	1.400	1.2	3.500	1.9	7.500	2.7
0.300	0.6	1.600	1.3	4.000	2.0	8.000	2.8
0.400	0.7	1.800	1.4	4.500	2.1	8.500	2.9
0.500	0.8	2.000	1.5	5.000	2.2	9.000	2.9
0.600	0.8	2.200	1.5	5.500	2.3	9.500	3.0
0.800	1.0	2.400	1.6	6.000	2.4		
1.000	1.1	2.600	1.6	6.500	2.5		

Complex Manhole: S5.3, DS/PN: S6.002, Volume (m³): 1.6

Hydro-Brake® Optimum

Unit Reference	MD-SCU-0033-1000-0700-1000
Design Head (m)	0.700
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	33
Invert Level (m)	98.370
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.700	1.0
Flush-Flo™	0.049	0.3
Kick-Flo®	0.049	0.3
Mean Flow over Head Range	-	0.7

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

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Hydro-Brake® Optimum

Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.4	1.200	1.3	3.000	1.9	7.000	2.9
0.200	0.6	1.400	1.4	3.500	2.1	7.500	3.0
0.300	0.7	1.600	1.5	4.000	2.2	8.000	3.1
0.400	0.8	1.800	1.5	4.500	2.3	8.500	3.2
0.500	0.9	2.000	1.6	5.000	2.5	9.000	3.3
0.600	0.9	2.200	1.7	5.500	2.6	9.500	3.4
0.800	1.1	2.400	1.8	6.000	2.7		
1.000	1.2	2.600	1.8	6.500	2.8		

Weir

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 99.070

Hydro-Brake® Optimum Manhole: S4.2, DS/PN: S7.001, Volume (m³): 1.6

Unit Reference	MD-SCU-0032-1000-0800-1000
Design Head (m)	0.800
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	32
Invert Level (m)	97.220
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	1.0
Flush-Flo™	0.047	0.3
Kick-Flo®	0.047	0.3
Mean Flow over Head Range	-	0.7

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.4	0.800	1.0	2.000	1.5	4.000	2.1
0.200	0.5	1.000	1.1	2.200	1.6	4.500	2.2
0.300	0.6	1.200	1.2	2.400	1.6	5.000	2.3
0.400	0.7	1.400	1.3	2.600	1.7	5.500	2.4
0.500	0.8	1.600	1.4	3.000	1.8	6.000	2.5
0.600	0.9	1.800	1.4	3.500	2.0	6.500	2.6

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Hydro-Brake® Optimum Manhole: S4.2, DS/PN: S7.001, Volume (m³): 1.6

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
7.000	2.7	8.000	2.9	9.000	3.1		
7.500	2.8	8.500	3.0	9.500	3.1		

Hydro-Brake® Optimum Manhole: SBASIN, DS/PN: S1.008, Volume (m³): 2.7

Unit Reference	MD-SHE-0089-3500-0960-3500
Design Head (m)	0.960
Design Flow (l/s)	3.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	89
Invert Level (m)	96.390
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.960	3.5
Flush-Flo™	0.288	3.5
Kick-Flo®	0.609	2.8
Mean Flow over Head Range	-	3.1

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)
0.100	2.8	1.200	3.9	3.000	5.9	7.000	8.9
0.200	3.4	1.400	4.2	3.500	6.4	7.500	9.2
0.300	3.5	1.600	4.4	4.000	6.8	8.000	9.4
0.400	3.4	1.800	4.7	4.500	7.2	8.500	9.7
0.500	3.3	2.000	4.9	5.000	7.6	9.000	10.0
0.600	2.9	2.200	5.1	5.500	7.9	9.500	10.3
0.800	3.2	2.400	5.4	6.000	8.2		
1.000	3.6	2.600	5.6	6.500	8.6		

Hydro-Brake® Optimum Manhole: S1.0, DS/PN: S1.012, Volume (m³): 11.3

Unit Reference	MD-SHE-0084-3500-1340-3500
Design Head (m)	1.340
Design Flow (l/s)	3.5
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	84

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Hydro-Brake® Optimum Manhole: S1.0, DS/PN: S1.012, Volume (m³): 11.3

Invert Level (m)	96.010
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.340	3.5
Flush-Flo™	0.369	3.3
Kick-Flo®	0.748	2.7
Mean Flow over Head Range	-	3.0

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)
0.100	2.5	1.200	3.3	3.000	5.1	7.000	7.6
0.200	3.1	1.400	3.6	3.500	5.5	7.500	7.8
0.300	3.3	1.600	3.8	4.000	5.8	8.000	8.1
0.400	3.3	1.800	4.0	4.500	6.1	8.500	8.3
0.500	3.3	2.000	4.2	5.000	6.5	9.000	8.5
0.600	3.1	2.200	4.4	5.500	6.8	9.500	8.8
0.800	2.8	2.400	4.6	6.000	7.0		
1.000	3.1	2.600	4.8	6.500	7.3		

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Storage Structures for Storm

Cellular Storage Manhole: S10.1, DS/PN: S2.001

Invert Level (m) 100.500 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	36.0	36.0	0.500	0.0	45.6
0.400	36.0	45.6			

Porous Car Park Manhole: S10.0, DS/PN: S1.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	3.8
Membrane Percolation (mm/hr)	1000	Length (m)	37.7
Max Percolation (l/s)	39.8	Slope (1:X)	80.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	100.550	Cap Volume Depth (m)	0.600

Cellular Storage Manhole: S9.1, DS/PN: S3.001

Invert Level (m) 100.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	78.0	78.0	0.900	0.0	107.6
0.800	78.0	107.6			

Cellular Storage Manhole: S8.2, DS/PN: S4.001

Invert Level (m) 100.200 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	63.0	63.0	0.900	0.0	89.4
0.800	63.0	89.4			

Porous Car Park Manhole: S7.2, DS/PN: S5.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	25.5
Max Percolation (l/s)	34.0	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	100.120	Cap Volume Depth (m)	0.500

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Porous Car Park Manhole: S7.1, DS/PN: S5.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	2.5
Membrane Percolation (mm/hr)	1000	Length (m)	27.0
Max Percolation (l/s)	18.8	Slope (1:X)	0.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	99.930	Cap Volume Depth (m)	0.500

Porous Car Park Manhole: S7.0, DS/PN: S1.005

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.7
Membrane Percolation (mm/hr)	1000	Length (m)	15.0
Max Percolation (l/s)	23.8	Slope (1:X)	20.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	99.420	Cap Volume Depth (m)	0.500

Cellular Storage Manhole: S5.4, DS/PN: S6.001

Invert Level (m)	98.505	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	90.0	90.0	0.900	0.0	120.4
0.800	90.0	120.4			

Porous Car Park Manhole: S5.3, DS/PN: S6.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.1
Membrane Percolation (mm/hr)	1000	Length (m)	45.0
Max Percolation (l/s)	51.3	Slope (1:X)	23.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	98.600	Cap Volume Depth (m)	0.500

Cellular Storage Manhole: S4.2, DS/PN: S7.001

Invert Level (m)	97.220	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	80.0	80.0	0.900	0.0	108.8
0.800	80.0	108.8			

Infiltration Basin Manhole: SBASIN, DS/PN: S1.008

Invert Level (m)	96.390	Infiltration Coefficient Side (m/hr)	0.00000
Infiltration Coefficient Base (m/hr)	0.00000	Safety Factor	2.0

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Infiltration Basin Manhole: SBASIN, DS/PN: S1.008

Porosity 1.00

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	405.0	0.960	636.5	1.260	719.6

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	10	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	OFF		

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S12.0	60 minute 2 year Summer I+0%	102.200	101.021	-0.129	0.000	0.05
S1.001	S11.0	60 minute 2 year Summer I+0%	102.550	100.662	-0.118	0.000	0.10
S2.000	SDUMMY10.1	60 minute 2 year Summer I+0%	104.000	103.000	-0.150	0.000	0.00
S2.001	S10.1	240 minute 2 year Winter I+0%	102.200	100.565	-0.085	0.000	0.01
S1.002	S10.0	60 minute 2 year Summer I+0%	101.550	100.448	0.318	0.000	0.37
S3.000	SDUMMY9.1	60 minute 2 year Summer I+0%	103.000	101.500	-0.150	0.000	0.00
S3.001	S9.1	480 minute 2 year Winter I+0%	101.200	100.137	-0.013	0.000	0.03
S1.003	S9.0	60 minute 2 year Winter I+0%	101.200	100.422	0.412	0.000	0.20
S4.000	SDUMMY8.2	60 minute 2 year Summer I+0%	103.000	102.000	-0.150	0.000	0.00
S4.001	S8.2	360 minute 2 year Winter I+0%	101.600	100.351	0.001	0.000	0.04
S4.002	S8.1	360 minute 2 year Winter I+0%	101.600	100.146	-0.134	0.000	0.02
S1.004	S8.0	60 minute 2 year Winter I+0%	100.550	99.794	0.159	0.000	0.45
S5.000	S7.2	240 minute 2 year Winter I+0%	101.350	100.132	-0.138	0.000	0.02
S5.001	S7.1	60 minute 2 year Winter I+0%	101.300	99.948	-0.132	0.000	0.03
S1.005	S7.0	60 minute 2 year Winter I+0%	100.600	99.767	0.207	0.000	0.22
S1.006	S6.0	60 minute 2 year Winter I+0%	99.750	98.618	-0.157	0.000	0.20
S6.000	SDUMMY5.4	60 minute 2 year Summer I+0%	102.000	101.000	-0.150	0.000	0.00

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

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S12.0		0.018		1.2	OK
S1.001	S11.0		0.037		2.0	OK
S2.000	SDUMMY10.1		0.000		0.0	OK
S2.001	S10.1		2.308	112	0.3	OK
S1.002	S10.0		1.337	38	11.8	SURCHARGED
S3.000	SDUMMY9.1		0.000		0.0	OK
S3.001	S9.1		10.294	240	0.5	OK
S1.003	S9.0		2.081		12.2	SURCHARGED
S4.000	SDUMMY8.2		0.000		0.0	OK
S4.001	S8.2		9.211	258	0.5	SURCHARGED
S4.002	S8.1		0.019		0.5	OK
S1.004	S8.0		1.361		14.1	SURCHARGED
S5.000	S7.2		0.449	64	0.2	OK
S5.001	S7.1		0.388	30	0.9	OK
S1.005	S7.0		3.337	40	16.9	SURCHARGED
S1.006	S6.0		0.089		18.1	OK
S6.000	SDUMMY5.4		0.000		0.0	OK

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

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S6.001	S5.4	360 minute 2 year Winter I+0%	100.350	98.669	0.014	0.000	0.03
S6.002	S5.3	120 minute 2 year Summer I+0%	99.500	98.755	0.235	0.000	0.06
S6.003	S5.2	60 minute 2 year Summer I+0%	99.250	98.364	-0.111	0.000	0.15
S6.004	S5.1	60 minute 2 year Summer I+0%	98.750	98.109	-0.166	0.000	0.16
S1.007	S5.0	60 minute 2 year Winter I+0%	99.100	97.887	-0.238	0.000	0.10
S7.000	SDUMMY4.2	60 minute 2 year Summer I+0%	100.000	99.000	-0.150	0.000	0.00
S7.001	S4.2	360 minute 2 year Winter I+0%	98.550	97.348	-0.022	0.000	0.03
S7.002	S4.1	60 minute 2 year Summer I+0%	98.100	97.007	-0.123	0.000	0.07
S1.008	SBASIN	960 minute 2 year Winter I+0%	97.650	96.584	-0.106	0.000	0.06
S1.009	S4.0	960 minute 2 year Winter I+0%	98.600	96.399	-0.241	0.000	0.05
S1.010	S3.0	960 minute 2 year Winter I+0%	99.290	96.373	-0.127	0.000	0.06
S1.011	S2.0	960 minute 2 year Winter I+0%	99.400	96.370	-0.595	0.000	0.02
S1.012	S1.0	960 minute 2 year Winter I+0%	98.180	96.369	0.209	0.000	0.26

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S6.001	S5.4		14.179	354	0.4	SURCHARGED
S6.002	S5.3		1.097	32	0.8	SURCHARGED
S6.003	S5.2		0.055		2.1	OK
S6.004	S5.1		0.080		6.7	OK
S1.007	S5.0		0.065		27.3	OK
S7.000	SDUMMY4.2		0.000		0.0	OK
S7.001	S4.2		9.833	282	0.4	OK
S7.002	S4.1		0.042		2.1	OK
S1.008	SBASIN		82.848	528	3.3	OK
S1.009	S4.0		0.155		3.3	OK
S1.010	S3.0		1.056		3.3	OK
S1.011	S2.0		0.577		3.2	OK
S1.012	S1.0		3.130		3.3	SURCHARGED

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	10	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	OFF		

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S12.0	60 minute 10 year Summer I+0%	102.200	101.030	-0.120	0.000
S1.001	S11.0	60 minute 10 year Summer I+0%	102.550	100.673	-0.107	0.000
S2.000	SDUMMY10.1	60 minute 10 year Summer I+0%	104.000	103.000	-0.150	0.000
S2.001	S10.1	120 minute 10 year Winter I+0%	102.200	100.610	-0.040	0.000
S1.002	S10.0	60 minute 10 year Summer I+0%	101.550	100.593	0.463	0.000
S3.000	SDUMMY9.1	60 minute 10 year Summer I+0%	103.000	101.500	-0.150	0.000
S3.001	S9.1	960 minute 10 year Winter I+0%	101.200	100.217	0.067	0.000
S1.003	S9.0	60 minute 10 year Summer I+0%	101.200	100.532	0.522	0.000
S4.000	SDUMMY8.2	60 minute 10 year Summer I+0%	103.000	102.000	-0.150	0.000
S4.001	S8.2	360 minute 10 year Winter I+0%	101.600	100.443	0.093	0.000
S4.002	S8.1	360 minute 10 year Winter I+0%	101.600	100.147	-0.133	0.000
S1.004	S8.0	60 minute 10 year Summer I+0%	100.550	99.880	0.245	0.000
S5.000	S7.2	120 minute 10 year Winter I+0%	101.350	100.140	-0.130	0.000
S5.001	S7.1	60 minute 10 year Summer I+0%	101.300	99.958	-0.122	0.000
S1.005	S7.0	60 minute 10 year Summer I+0%	100.600	99.799	0.239	0.000
S1.006	S6.0	60 minute 10 year Summer I+0%	99.750	98.658	-0.117	0.000
S6.000	SDUMMY5.4	60 minute 10 year Summer I+0%	102.000	101.000	-0.150	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S12.0	0.09		0.028		2.2	OK
S1.001	S11.0	0.18		0.052		3.5	OK
S2.000	SDUMMY10.1	0.00		0.000		0.0	OK
S2.001	S10.1	0.01		3.888	116	0.4	OK
S1.002	S10.0	0.69		1.844	38	22.2	SURCHARGED
S3.000	SDUMMY9.1	0.00		0.000		0.0	OK
S3.001	S9.1	0.04		16.316	352	0.6	SURCHARGED
S1.003	S9.0	0.43		2.206		25.8	SURCHARGED
S4.000	SDUMMY8.2	0.00		0.000		0.0	OK
S4.001	S8.2	0.05		14.812	312	0.6	SURCHARGED
S4.002	S8.1	0.03		0.021		0.6	OK
S1.004	S8.0	1.03		1.725		32.3	SURCHARGED
S5.000	S7.2	0.04		0.743	52	0.6	OK
S5.001	S7.1	0.08		0.613	32	2.0	OK
S1.005	S7.0	0.50		3.798	44	38.7	SURCHARGED
S1.006	S6.0	0.46		0.147		41.5	OK
S6.000	SDUMMY5.4	0.00		0.000		0.0	OK

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

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S6.001	S5.4	360 minute 10 year Winter I+0%	100.350	98.777	0.122	0.000	0.04
S6.002	S5.3	60 minute 10 year Winter I+0%	99.500	98.956	0.436	0.000	0.07
S6.003	S5.2	60 minute 10 year Summer I+0%	99.250	98.378	-0.097	0.000	0.26
S6.004	S5.1	60 minute 10 year Summer I+0%	98.750	98.135	-0.140	0.000	0.30
S1.007	S5.0	60 minute 10 year Summer I+0%	99.100	97.921	-0.204	0.000	0.22
S7.000	SDUMMY4.2	60 minute 10 year Summer I+0%	100.000	99.000	-0.150	0.000	0.00
S7.001	S4.2	360 minute 10 year Winter I+0%	98.550	97.423	0.053	0.000	0.04
S7.002	S4.1	60 minute 10 year Summer I+0%	98.100	97.017	-0.113	0.000	0.14
S1.008	SBASIN	960 minute 10 year Winter I+0%	97.650	96.697	0.007	0.000	0.06
S1.009	S4.0	960 minute 10 year Winter I+0%	98.600	96.524	-0.116	0.000	0.05
S1.010	S3.0	960 minute 10 year Winter I+0%	99.290	96.520	0.020	0.000	0.06
S1.011	S2.0	960 minute 10 year Winter I+0%	99.400	96.518	-0.447	0.000	0.02
S1.012	S1.0	960 minute 10 year Winter I+0%	98.180	96.516	0.356	0.000	0.26

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S6.001	S5.4		23.607	426	0.5	SURCHARGED
S6.002	S5.3		2.770	30	0.9	SURCHARGED
S6.003	S5.2		0.078		3.6	OK
S6.004	S5.1		0.118		12.7	OK
S1.007	S5.0		0.103		62.9	OK
S7.000	SDUMMY4.2		0.000		0.0	OK
S7.001	S4.2		15.675	348	0.5	SURCHARGED
S7.002	S4.1		0.063		4.0	OK
S1.008	SBASIN		135.153	624	3.3	SURCHARGED
S1.009	S4.0		0.691		3.3	OK
S1.010	S3.0		2.682		3.2	SURCHARGED
S1.011	S2.0		0.973		3.2	OK
S1.012	S1.0		5.270		3.3	SURCHARGED

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	10	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	OFF		

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S12.0	60 minute 30 year Summer I+0%	102.200	101.034	-0.116	0.000
S1.001	S11.0	60 minute 30 year Summer I+0%	102.550	100.738	-0.042	0.000
S2.000	SDUMMY10.1	60 minute 30 year Summer I+0%	104.000	103.000	-0.150	0.000
S2.001	S10.1	120 minute 30 year Winter I+0%	102.200	100.655	0.005	0.000
S1.002	S10.0	60 minute 30 year Summer I+0%	101.550	100.694	0.564	0.000
S3.000	SDUMMY9.1	60 minute 30 year Summer I+0%	103.000	101.500	-0.150	0.000
S3.001	S9.1	960 minute 30 year Winter I+0%	101.200	100.273	0.123	0.000
S1.003	S9.0	60 minute 30 year Summer I+0%	101.200	100.604	0.594	0.000
S4.000	SDUMMY8.2	60 minute 30 year Summer I+0%	103.000	102.000	-0.150	0.000
S4.001	S8.2	240 minute 30 year Winter I+0%	101.600	100.526	0.176	0.000
S4.002	S8.1	240 minute 30 year Winter I+0%	101.600	100.148	-0.132	0.000
S1.004	S8.0	60 minute 30 year Summer I+0%	100.550	99.943	0.308	0.000
S5.000	S7.2	60 minute 30 year Winter I+0%	101.350	100.146	-0.124	0.000
S5.001	S7.1	60 minute 30 year Summer I+0%	101.300	99.964	-0.116	0.000
S1.005	S7.0	60 minute 30 year Summer I+0%	100.600	99.813	0.253	0.000
S1.006	S6.0	60 minute 30 year Summer I+0%	99.750	98.676	-0.099	0.000
S6.000	SDUMMY5.4	60 minute 30 year Summer I+0%	102.000	101.000	-0.150	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S12.0	0.12		0.033		3.0	OK
S1.001	S11.0	0.25		0.141		4.8	OK
S2.000	SDUMMY10.1	0.00		0.000		0.0	OK
S2.001	S10.1	0.02		5.459	132	0.5	SURCHARGED
S1.002	S10.0	0.87		2.957	10	27.9	SURCHARGED
S3.000	SDUMMY9.1	0.00		0.000		0.0	OK
S3.001	S9.1	0.05		20.519	384	0.6	SURCHARGED
S1.003	S9.0	0.54		2.287		32.1	SURCHARGED
S4.000	SDUMMY8.2	0.00		0.000		0.0	OK
S4.001	S8.2	0.05		19.880		0.7	SURCHARGED
S4.002	S8.1	0.03		0.023		0.7	OK
S1.004	S8.0	1.30		1.946		40.6	SURCHARGED
S5.000	S7.2	0.07		0.987	32	1.0	OK
S5.001	S7.1	0.12		0.745	32	3.0	OK
S1.005	S7.0	0.64		4.003	44	49.4	SURCHARGED
S1.006	S6.0	0.60		0.186		53.4	OK
S6.000	SDUMMY5.4	0.00		0.000		0.0	OK

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

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S6.001	S5.4	360 minute 30 year Winter I+0%	100.350	98.874	0.219	0.000	0.04
S6.002	S5.3	60 minute 30 year Winter I+0%	99.500	99.075	0.555	0.000	0.13
S6.003	S5.2	60 minute 30 year Summer I+0%	99.250	98.386	-0.089	0.000	0.33
S6.004	S5.1	60 minute 30 year Summer I+0%	98.750	98.150	-0.125	0.000	0.40
S1.007	S5.0	60 minute 30 year Summer I+0%	99.100	97.936	-0.189	0.000	0.29
S7.000	SDUMMY4.2	60 minute 30 year Summer I+0%	100.000	99.000	-0.150	0.000	0.00
S7.001	S4.2	360 minute 30 year Winter I+0%	98.550	97.491	0.121	0.000	0.04
S7.002	S4.1	60 minute 30 year Summer I+0%	98.100	97.024	-0.106	0.000	0.19
S1.008	SBASIN	960 minute 30 year Winter I+0%	97.650	96.819	0.129	0.000	0.06
S1.009	S4.0	960 minute 30 year Winter I+0%	98.600	96.674	0.034	0.000	0.05
S1.010	S3.0	960 minute 30 year Winter I+0%	99.290	96.670	0.170	0.000	0.06
S1.011	S2.0	960 minute 30 year Winter I+0%	99.400	96.668	-0.297	0.000	0.02
S1.012	S1.0	960 minute 30 year Winter I+0%	98.180	96.667	0.507	0.000	0.26

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S6.001	S5.4		31.962	516	0.6	SURCHARGED
S6.002	S5.3		4.308	40	1.6	SURCHARGED
S6.003	S5.2		0.092		4.7	OK
S6.004	S5.1		0.140		17.0	OK
S1.007	S5.0		0.125		82.3	OK
S7.000	SDUMMY4.2		0.000		0.0	OK
S7.001	S4.2		20.938	384	0.6	SURCHARGED
S7.002	S4.1		0.075		5.3	OK
S1.008	SBASIN		195.176	928	3.3	SURCHARGED
S1.009	S4.0		1.308		3.3	SURCHARGED
S1.010	S3.0		3.306		3.2	SURCHARGED
S1.011	S2.0		1.162		3.2	OK
S1.012	S1.0		7.452		3.3	SURCHARGED

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

Simulation Criteria

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

Number of Input Hydrographs	0	Number of Storage Structures	11
Number of Online Controls	10	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	ON
Analysis Timestep	Fine	Inertia Status	ON
DTS Status	OFF		

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S12.0	60 minute 100 year Summer I+40%	102.200	101.109	-0.041	0.000
S1.001	S11.0	60 minute 100 year Summer I+40%	102.550	101.087	0.307	0.000
S2.000	SDUMMY10.1	60 minute 100 year Summer I+40%	104.000	103.000	-0.150	0.000
S2.001	S10.1	120 minute 100 year Winter I+40%	102.200	100.817	0.167	0.000
S1.002	S10.0	60 minute 100 year Summer I+40%	101.550	100.975	0.845	0.000
S3.000	SDUMMY9.1	60 minute 100 year Summer I+40%	103.000	101.500	-0.150	0.000
S3.001	S9.1	2160 minute 100 year Winter I+40%	101.200	100.409	0.259	0.000
S1.003	S9.0	60 minute 100 year Summer I+40%	101.200	100.808	0.798	0.000
S4.000	SDUMMY8.2	60 minute 100 year Summer I+40%	103.000	102.000	-0.150	0.000
S4.001	S8.2	360 minute 100 year Winter I+40%	101.600	100.845	0.495	0.000
S4.002	S8.1	360 minute 100 year Winter I+40%	101.600	100.150	-0.130	0.000
S1.004	S8.0	60 minute 100 year Summer I+40%	100.550	100.130	0.495	0.000
S5.000	S7.2	60 minute 100 year Winter I+40%	101.350	100.161	-0.109	0.000
S5.001	S7.1	60 minute 100 year Summer I+40%	101.300	99.980	-0.100	0.000
S1.005	S7.0	60 minute 100 year Summer I+40%	100.600	99.842	0.282	0.000
S1.006	S6.0	60 minute 100 year Summer I+40%	99.750	98.723	-0.052	0.000
S6.000	SDUMMY5.4	60 minute 100 year Summer I+40%	102.000	101.000	-0.150	0.000

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

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S12.0	0.23		0.118		5.8	OK
S1.001	S11.0	0.42		0.758		8.2	SURCHARGED
S2.000	SDUMMY10.1	0.00		0.000		0.0	OK
S2.001	S10.1	0.02		11.198	176	0.7	SURCHARGED
S1.002	S10.0	1.30		10.612	10	41.7	SURCHARGED
S3.000	SDUMMY9.1	0.00		0.000		0.0	OK
S3.001	S9.1	0.05		30.774	576	0.7	SURCHARGED
S1.003	S9.0	0.79		2.518		46.9	SURCHARGED
S4.000	SDUMMY8.2	0.00		0.000		0.0	OK
S4.001	S8.2	0.07		39.380	444	0.9	SURCHARGED
S4.002	S8.1	0.04		0.027		0.9	OK
S1.004	S8.0	1.90		2.414		59.5	SURCHARGED
S5.000	S7.2	0.17		1.562	28	2.4	OK
S5.001	S7.1	0.24		1.088	30	6.1	OK
S1.005	S7.0	0.99		4.468	46	76.7	SURCHARGED
S1.006	S6.0	0.94		0.290		84.0	OK
S6.000	SDUMMY5.4	0.00		0.000		0.0	OK

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

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S6.001	S5.4	480 minute 100 year Winter I+40%	100.350	99.202	0.547	0.000
S6.002	S5.3	60 minute 100 year Summer I+40%	99.500	99.180	0.660	0.000
S6.003	S5.2	60 minute 100 year Summer I+40%	99.250	98.457	-0.018	0.000
S6.004	S5.1	60 minute 100 year Summer I+40%	98.750	98.202	-0.073	0.000
S1.007	S5.0	60 minute 100 year Summer I+40%	99.100	97.975	-0.150	0.000
S7.000	SDUMMY4.2	60 minute 100 year Summer I+40%	100.000	99.000	-0.150	0.000
S7.001	S4.2	360 minute 100 year Winter I+40%	98.550	97.755	0.385	0.000
S7.002	S4.1	1440 minute 100 year Winter I+40%	98.100	97.241	0.111	0.000
S1.008	SBASIN	1440 minute 100 year Winter I+40%	97.650	97.238	0.548	0.000
S1.009	S4.0	1440 minute 100 year Winter I+40%	98.600	97.076	0.436	0.000
S1.010	S3.0	1440 minute 100 year Winter I+40%	99.290	97.072	0.572	0.000
S1.011	S2.0	1440 minute 100 year Winter I+40%	99.400	97.070	0.105	0.000
S1.012	S1.0	1440 minute 100 year Winter I+40%	98.180	97.068	0.908	0.000

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S6.001	S5.4	0.05		60.444	816	0.7	SURCHARGED
S6.002	S5.3	0.75		5.903	46	9.2	SURCHARGED
S6.003	S5.2	0.99		0.207		14.0	OK
S6.004	S5.1	0.75		0.297		32.0	OK
S1.007	S5.0	0.49		0.196		139.3	OK
S7.000	SDUMMY4.2	0.00		0.000		0.0	OK
S7.001	S4.2	0.06		41.322	498	0.8	SURCHARGED
S7.002	S4.1	0.04		0.737		1.3	SURCHARGED
S1.008	SBASIN	0.06		427.752	1944	3.3	SURCHARGED
S1.009	S4.0	0.05		1.802		3.3	SURCHARGED
S1.010	S3.0	0.06		3.768		3.2	SURCHARGED
S1.011	S2.0	0.02		1.616		3.2	SURCHARGED
S1.012	S1.0	0.26		10.022		3.3	SURCHARGED

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Summary of Results for 1440 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status ON
Analysis Timestep Fine Inertia Status ON
DTS Status OFF

PN	US/MH Name	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)
S1.008	SBASIN	97.650	97.272	0.582	0.000	0.06		448.390	1608	3.3
S1.009	S4.0	98.600	97.098	0.458	0.000	0.05		1.827		3.3
S1.010	S3.0	99.290	97.093	0.593	0.000	0.06		3.793		3.2
S1.011	S2.0	99.400	97.091	0.126	0.000	0.02		1.640		3.2
S1.012	S1.0	98.180	97.090	0.930	0.000	0.26		10.046		3.3

PN	US/MH Name	Status
S1.008	SBASIN	SURCHARGED
S1.009	S4.0	SURCHARGED
S1.010	S3.0	SURCHARGED
S1.011	S2.0	SURCHARGED
S1.012	S1.0	SURCHARGED

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Rainfall Hyetograph for 1440 minute 100 year Winter (Storm)

Time (mins)	Rain (mm/hr)	Time (mins)	Rain (mm/hr)	Time (mins)	Rain (mm/hr)	Time (mins)	Rain (mm/hr)	Time (mins)	Rain (mm/hr)
24	0.264	312	1.841	600	7.107	888	6.450	1176	1.732
48	0.758	336	1.990	624	7.667	912	5.861	1200	1.678
72	1.121	360	2.187	648	8.188	936	5.281	1224	1.652
96	1.389	384	2.477	672	8.700	960	4.654	1248	1.649
120	1.531	408	2.797	696	9.064	984	4.133	1272	1.652
144	1.612	432	3.168	720	9.325	1008	3.651	1296	1.648
168	1.648	456	3.651	744	9.325	1032	3.168	1320	1.612
192	1.652	480	4.133	768	9.064	1056	2.797	1344	1.531
216	1.649	504	4.654	792	8.700	1080	2.477	1368	1.389
240	1.652	528	5.281	816	8.188	1104	2.187	1392	1.121
264	1.678	552	5.861	840	7.667	1128	1.990	1416	0.758
288	1.732	576	6.450	864	7.107	1152	1.841	1440	0.264

Input Hydrograph Manhole SBASIN, DS/PN S1.008 (Storm)
1440 minute 100 year Winter
Input Hydrograph Type: User Defined

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
16	0.0	480	0.0	944	0.0	1408	0.0	1872	0.0	2336	0.0
32	0.0	496	0.0	960	0.0	1424	0.0	1888	0.0	2352	0.0
48	0.0	512	0.0	976	0.0	1440	0.0	1904	0.0	2368	0.0
64	0.0	528	0.0	992	0.0	1456	0.0	1920	0.0	2384	0.0
80	0.0	544	0.0	1008	0.0	1472	0.0	1936	0.0	2400	0.0
96	0.0	560	0.0	1024	0.0	1488	0.0	1952	0.0	2416	0.0
112	0.0	576	0.0	1040	0.0	1504	0.0	1968	0.0	2432	0.0
128	0.0	592	0.0	1056	0.0	1520	0.0	1984	0.0	2448	0.0
144	0.0	608	0.0	1072	0.0	1536	0.0	2000	0.0	2464	0.0
160	0.0	624	0.0	1088	0.0	1552	0.0	2016	0.0	2480	0.0
176	0.0	640	0.0	1104	0.0	1568	0.0	2032	0.0	2496	0.0
192	0.0	656	0.0	1120	0.0	1584	0.0	2048	0.0	2512	0.0
208	0.0	672	0.0	1136	0.0	1600	0.0	2064	0.0	2528	0.0
224	0.0	688	0.0	1152	0.0	1616	0.0	2080	0.0	2544	0.0
240	0.0	704	0.0	1168	0.0	1632	0.0	2096	0.0	2560	0.0
256	0.0	720	0.0	1184	0.0	1648	0.0	2112	0.0	2576	0.0
272	0.0	736	0.0	1200	0.0	1664	0.0	2128	0.0	2592	0.0
288	0.0	752	0.0	1216	0.0	1680	0.0	2144	0.0	2608	0.0
304	0.0	768	0.0	1232	0.0	1696	0.0	2160	0.0	2624	0.0
320	0.0	784	0.0	1248	0.0	1712	0.0	2176	0.0	2640	0.0
336	0.0	800	0.0	1264	0.0	1728	0.0	2192	0.0	2656	0.0
352	0.0	816	0.0	1280	0.0	1744	0.0	2208	0.0	2672	0.0
368	0.0	832	0.0	1296	0.0	1760	0.0	2224	0.0	2688	0.0
384	0.0	848	0.0	1312	0.0	1776	0.0	2240	0.0	2704	0.0
400	0.0	864	0.0	1328	0.0	1792	0.0	2256	0.0	2720	0.0
416	0.0	880	0.0	1344	0.0	1808	0.0	2272	0.0	2736	0.0
432	0.0	896	0.0	1360	0.0	1824	0.0	2288	0.0	2752	0.0
448	0.0	912	0.0	1376	0.0	1840	0.0	2304	0.0	2768	0.0
464	0.0	928	0.0	1392	0.0	1856	0.0	2320	0.0	2784	0.0

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Input Hydrograph Manhole SBASIN, DS/PN S1.008 (Storm)
1440 minute 100 year Winter
Input Hydrograph Type: User Defined

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
2800	0.0	3136	2.2	3472	7.1	3808	2.8	4144	0.8	4480	0.2
2816	0.0	3152	2.3	3488	6.4	3824	2.8	4160	0.8	4496	0.2
2832	0.0	3168	2.5	3504	5.8	3840	2.7	4176	0.7	4512	0.2
2848	0.0	3184	2.7	3520	5.3	3856	2.1	4192	0.7	4528	0.2
2864	0.0	3200	3.0	3536	5.0	3872	1.7	4208	0.6	4544	0.2
2880	0.0	3216	3.3	3552	4.9	3888	1.7	4224	0.6	4560	0.1
2896	0.4	3232	3.8	3568	4.8	3904	1.6	4240	0.6	4576	0.1
2912	0.6	3248	4.4	3584	4.5	3920	1.6	4256	0.5	4592	0.1
2928	0.6	3264	5.1	3600	4.4	3936	1.5	4272	0.5	4608	0.1
2944	0.8	3280	5.7	3616	4.2	3952	1.5	4288	0.5	4624	0.1
2960	1.0	3296	6.2	3632	3.7	3968	1.4	4304	0.4	4640	0.1
2976	1.0	3312	6.9	3648	3.6	3984	1.4	4320	0.4	4656	0.1
2992	1.1	3328	7.7	3664	3.4	4000	1.3	4336	0.4	4672	0.1
3008	1.2	3344	8.5	3680	3.4	4016	1.3	4352	0.4	4688	0.1
3024	1.3	3360	9.8	3696	3.3	4032	1.2	4368	0.3	4704	0.1
3040	1.4	3376	11.6	3712	3.2	4048	1.2	4384	0.3	4720	0.1
3056	1.5	3392	11.2	3728	3.1	4064	1.1	4400	0.3	4736	0.1
3072	1.6	3408	9.9	3744	3.1	4080	1.0	4416	0.3	4752	0.1
3088	1.8	3424	9.0	3760	3.0	4096	1.0	4432	0.3	4768	0.1
3104	1.9	3440	8.4	3776	3.0	4112	0.9	4448	0.3	4784	0.1
3120	2.0	3456	7.7	3792	2.9	4128	0.9	4464	0.2	4800	0.1

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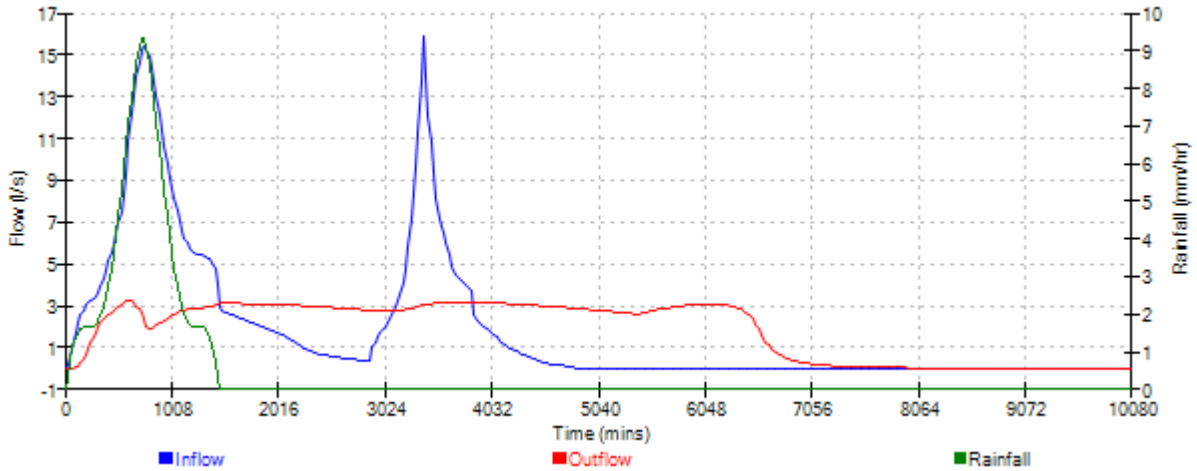
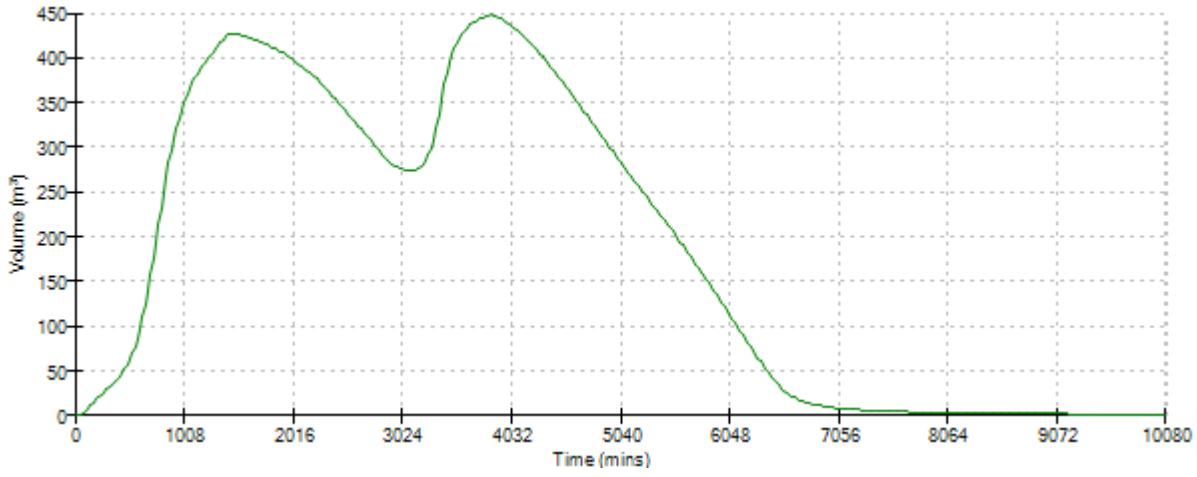
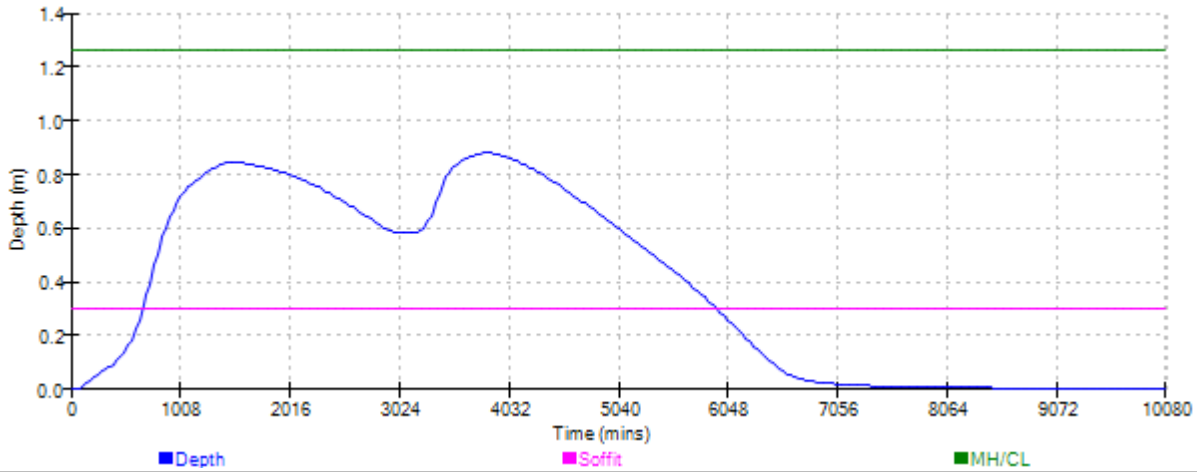
Graphs for Pipe S1.008 US/MH SBASIN (Storm)
1440 minute 100 year Winter
Status: SURCHARGED







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Graphs for Pipe S1.009 US/MH S4.0 (Storm)
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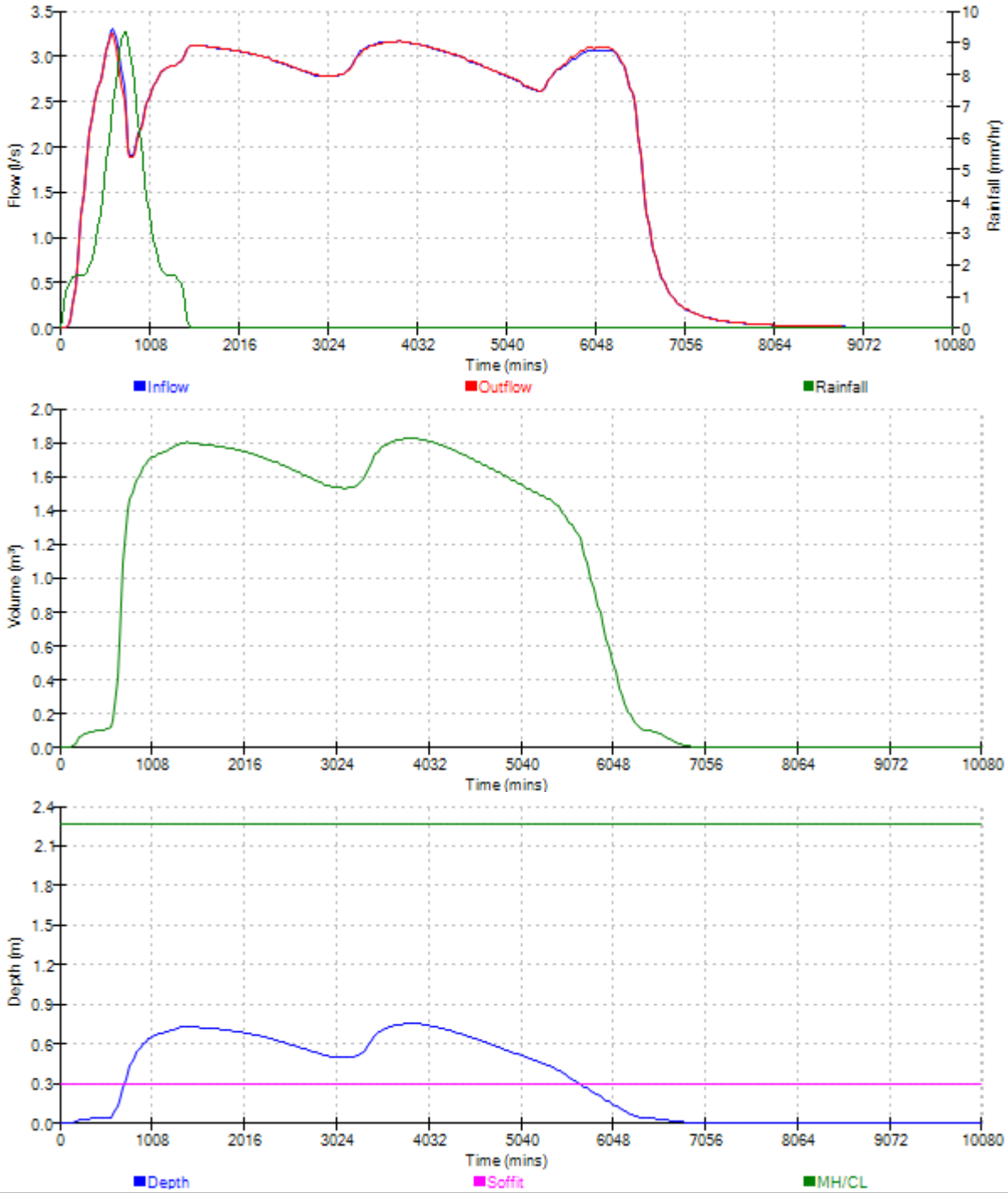

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Graphs for Pipe S1.010 US/MH S3.0 (Storm)
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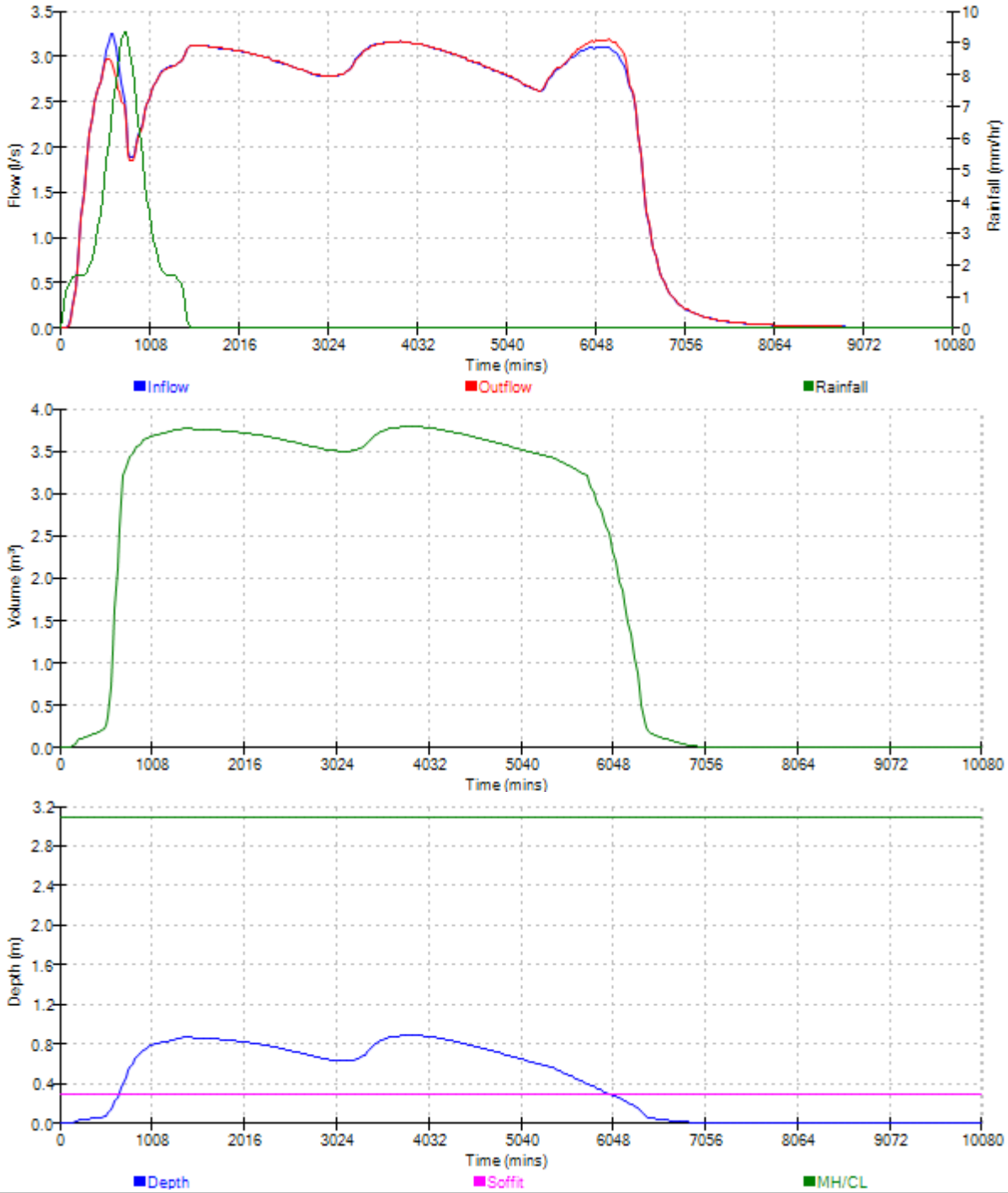

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Graphs for Pipe S1.011 US/MH S2.0 (Storm)
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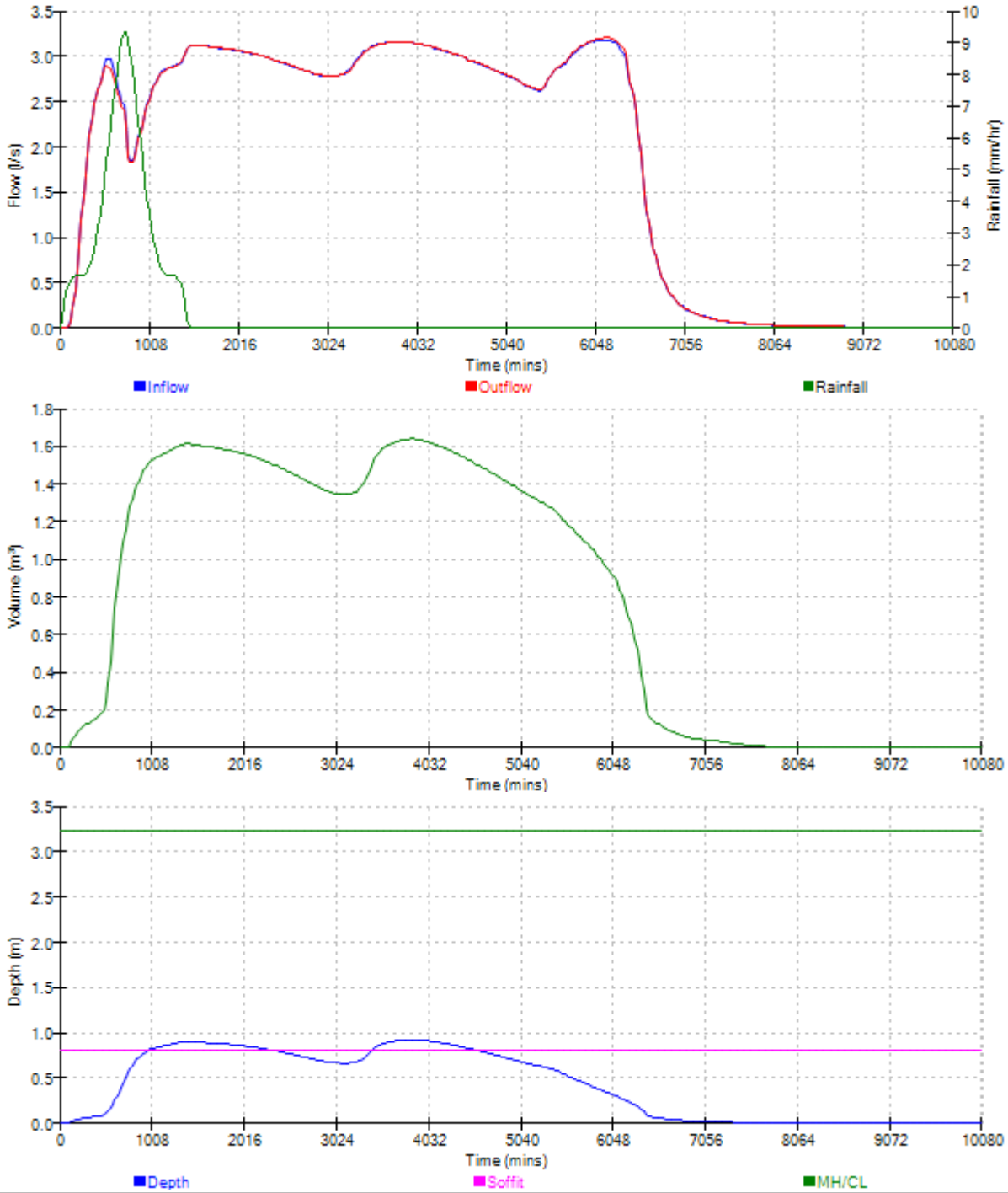

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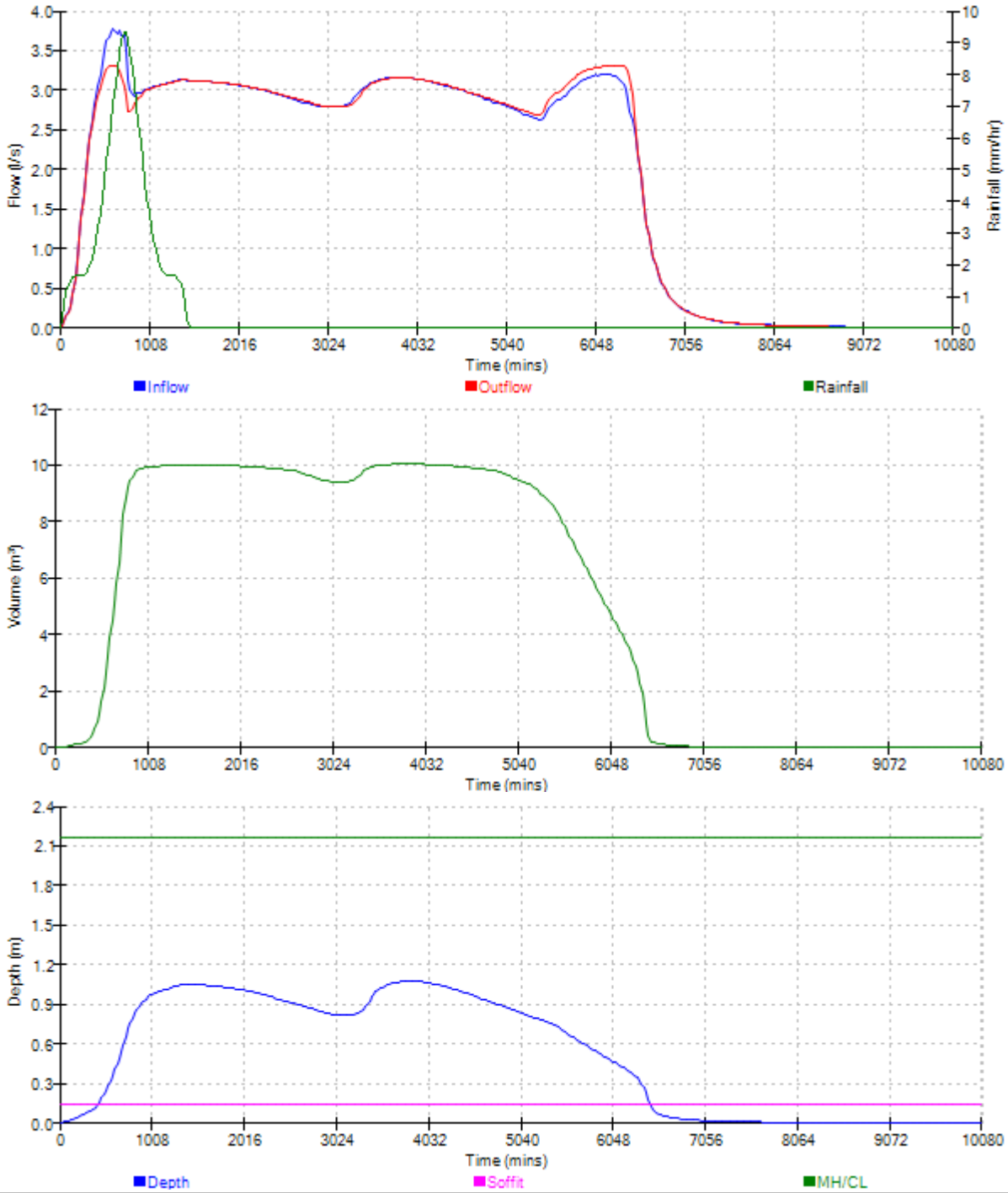
Graphs for Pipe S1.012 US/MH S1.0 (Storm)
1440 minute 100 year Winter
Status: SURCHARGED



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Glanville
Survey > Plan > Engineer

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West Oxfordshire District Council – DELEGATED ITEMS

Application Types Key

Suffix		Suffix	
ADV	Advertisement Consent	LBC	Listed Building Consent
CC3REG	County Council Regulation 3	LBD	Listed Building Consent - Demolition
CC4REG	County Council Regulation 4	OUT	Outline Application
CM	County Matters	RES	Reserved Matters Application
FUL	Full Application	S73	Removal or Variation of Condition/s
HHD	Householder Application	POB	Discharge of Planning Obligation/s
CLP	Certificate of Lawfulness Proposed	CLE	Certificate of Lawfulness Existing
CLASSM	Change of Use – Agriculture to Commercial	CND	Discharge of Conditions
		PDET28	Agricultural Prior Approval
HAZ	Hazardous Substances Application	PN56	Change of Use Agriculture to Dwelling
PN42	Householder Application under Permitted Development legislation.	POROW	Creation or Diversion of Right of Way
		TCA	Works to Trees in a Conservation Area
PNT	Telecoms Prior Approval	TPO	Works to Trees subject of a Tree Preservation Order
NMA	Non Material Amendment		
WDN	Withdrawn	FDO	Finally Disposed Of

Decision Code	Description	Decision Code	Description
APP	Approve	RNO	Raise no objection
REF	Refuse	ROB	Raise Objection
P1REQ	Prior Approval Required	P2NRQ	Prior Approval Not Required
P3APP	Prior Approval Approved	P3REF	Prior Approval Refused
P4APP	Prior Approval Approved	P4REF	Prior Approval Refused

West Oxfordshire District Council – DELEGATED ITEMS
Week Ending 5th January 2024

	Application Number.	Ward.	Decision.
1.	**23/02104/HHD**	The Bartons	APP

Demolition of oil store building, erection of a single storey side extension, demolition of rebuild of garage and internal alterations (amended plans).
Worton House Over Worton Chipping Norton
Mr M Hewett

2. **23/02105/LBC** The Bartons APP

Demolition of oil store building, erection of a single storey side extension, demolition of rebuild of garage and internal alterations (amended plans).
Worton House Over Worton Chipping Norton
Mr M Hewett

3. **23/02178/LBC** Charlbury and Finstock WDN
Affecting a Conservation Area

Internal and external alterations including works to fenestration and improved access
Corner House Market Street Charlbury
Trustees Of The Corner House And Memorial Hall

4. **23/02189/FUL** Woodstock and Bladon APP
Affecting a Conservation Area

Replacement of the existing lead roofs on the nave and isles with an insulated roof comprising of tern coated stainless steel.
St Mary Magdalene Church Park Street Woodstock
Mr Aidan Salter

5. **23/02316/HHD** Stonesfield and Tackley APP

External alterations including removal of conservatory, erection of single storey link extension, alterations to fenestration and alterations to roof (amended plans)
The Chequers Park Road Over Kiddington
Mr M Fielden

6. **23/02317/LBC** Stonesfield and Tackley APP

Internal and external alterations including removal of conservatory, erection of single storey link extension, alterations to fenestration and alterations to roof (amended plans)
The Chequers Park Road Over Kiddington
Mr M Fielden

7. **23/02435/OUT** Chipping Norton APP

Outline planning application to demolish the existing cottage and erect a two-storey detached dwelling, with garage for two cars and annexe above, outdoor swimming pool and a garden office pod in rear garden (with all matters reserved)
Ash Tree Farm Cottage Burford Road Chipping Norton
Ms Marissa Yeoman

8. **23/02485/CND** Freeland and Hanborough APP

Discharge of conditions 11 (Construction Method Statement) 13 (full surface water drainage plan) and 14 (details of boundary treatment) of Planning Permission 20/01937/FUL (amended)
Park House Park Lane Long Hanborough
Mr And Mrs McGovern

9. **23/02622/HHD** Burford APP
Affecting a Conservation Area

Construction of a single storey extension and erection of garden wall and gate to west elevation (amended plans)
214 The Hill Burford Oxfordshire
Mr Anthony Corner

10. **23/02776/HHD** Chipping Norton APP
Affecting a Conservation Area

Replace four existing timber windows in front elevation with UPVC windows.
1 Burford Road Chipping Norton Oxfordshire
Mr George Barrow

11. **23/02749/CND** Woodstock and Bladon APP

Discharge of conditions 9 (details of bat roosting and nesting opportunities) 12 (ecology report) and 15 (site wide drainage details) of Planning Permission 20/02600/FUL
Bladon Chains Caravan Park Bladon Woodstock
Vanbrugh Unit Trust

12. **23/02816/CND** The Bartons APP
Affecting a Conservation Area

Discharge of condition 6 (details of the method and timescale for the removal of the existing storage area) of Planning Permission 23/00915/FUL
Sports Ground And Premises Sandford Park Ledwell Road
Mr Jim Howe

13. **23/02820/HHD** Charlbury and Finstock APP
Affecting a Conservation Area

Erection of first floor and single storey rear extensions (part retrospective).
Stable Cottage 2 Hixet Wood Charlbury
Mr C Bennett

14. **23/02828/HHD** Kingham, Rollright and Enstone APP

Affecting a Conservation Area

Replace existing conservatory with a single storey rear extension (amended plans)
Byways Barn High Street Great Rollright
Mr And Mrs Davies

15. **23/02832/HHD** Kingham, Rollright and Enstone APP

Affecting a Conservation Area

Erection of rear and side single storey wraparound extension, replacement front porch and rendering of exterior walls (part retrospective)
Appletree House Main Street Over Norton
Mr Charlie Drury

16. **23/02845/HHD** Stonesfield and Tackley APP

Affecting a Conservation Area

Erection of a single storey detached outbuilding
4 The Cottages Churchfields Stonesfield
Mr And Mrs David Weston

17. **23/02860/HHD** Chipping Norton APP

Conversion of one half of adjoining double garage into a habitable room.
82 Evans Way Chipping Norton Oxfordshire
Mrs Chloe Siddall

18. **23/02864/FUL** Burford REF

Affecting a Conservation Area

Change of Use of land from domestic to holiday letting and siting of 1 no. shepherds Hut with associated works.
Land North Of Hollyhock Cottage Witney Street Burford
Mrs Amadea West

19. **23/02871/CLP** Chipping Norton APP
Affecting a Conservation Area

Certificate of Lawfulness to ascertain commencement of development and therefore, confirm planning permission 19/03318/FUL (change of use and extension of vacant bank building to Class C1 boutique hotel and restaurant, including excavation of rear garden, reconfiguration of interiors and provision of soft and hard landscaping) is extant.
18 - 19 Market Place Chipping Norton Oxfordshire
Mr Keith Strudley

20. **23/02875/HHD** Woodstock and Bladon APP

Proposed rear and side single storey extension internal alterations and alterations of fenestration
Milverton 81 New Road Woodstock
Mr & Mrs Philpott

21. **23/02909/FUL** Freeland and Hanborough APP

Erection of a building for the garaging of fairground vehicles.
1 Cuckoo Wood Caravan Park Eynsham Road Freeland
Mr James Irvin

22. **23/02912/FUL** Chadlington and Churchill APP

Construction of detached Victorian style glasshouse.
Chadlington Church Of England Primary School Church Road Chadlington
Ms Bertie Hornibrook, Head Teacher

23. **23/02916/HHD** Charlbury and Finstock REF
Affecting a Conservation Area

Erection of a detached garage/workshop
8 Wards Lane Finstock Chipping Norton
Mr J Woollard

24. **23/02920/S73** Milton Under Wychwood APP

Variation of Condition 2 of Planning Permission 23/00603/FUL to provide separate carport
The Homestead Frog Lane Milton Under Wychwood
Jones

25. **23/02924/HHD** Charlbury and Finstock APP
Affecting a Conservation Area

Replacement of existing windows
Thornycroft Woodstock Road Charlbury
Valerie Diederichs

26. **23/02931/FUL** Milton Under Wychwood APP

Demolition and replacement of existing dwelling. Erection of detached garage and log store. Alterations to access. All associated landscaping works and other operations (amended plans).
Altarnun Fifield Chipping Norton
Mr and Mrs Potter

27. **23/02943/CND** Woodstock and Bladon APP

Discharge of condition 6 (details of integrated bat roosting and nesting opportunities) of Planning Permission 23/01186/FUL
31 Oxford Road Woodstock Oxfordshire
Hardip Boparai

28. **23/02954/CND** Hailey, Minster Lovell and Leafield APP
Affecting a Conservation Area

Discharge of condition 11 (full surface water drainage scheme) of Planning Permission 22/00571/FUL
49 Lower End Leafield Witney
Mr Rhys Jenkins

29. **23/02955/LBC** Kingham, Rollright and Enstone APP
Affecting a Conservation Area

Replacement of 3 windows and repair 1 window
Garden House West Street Kingham
Mr And Mrs G Linton

30. **23/02968/FUL** Burford APP
Affecting a Conservation Area

Retrospective installation of an external entry door with a side window, leading into the flat's kitchen.
Flat 31 Lower High Street Burford
Ms L Newland

31. **23/02969/LBC** Burford APP
Affecting a Conservation Area

Internal and external alterations to install an external entry door with a side window, leading into the flat's kitchen. (Retrospective).
Flat 31 Lower High Street Burford
Ms L Newland

32. **23/02997/FUL** Charlbury and Finstock WDN
Affecting a Conservation Area

Internal and external alterations including single storey rear extension and redesign of kitchen layout
The Bull Inn Sheep Street Charlbury
Mr R Squire

33. **23/02998/LBC** Charlbury and Finstock WDN
Affecting a Conservation Area

Internal and external alterations including single storey rear extension and redesign of kitchen layout
The Bull Inn Sheep Street Charlbury
Mr R Squire

34. **23/03006/HHD** Ascott and Shipton APP
Affecting a Conservation Area

Installation of 16 roof-mounted solar PV panels, to the front and side roof slopes together with a home battery with inverter in the integral garage.
Hillside Upper End Shipton Under Wychwood
Dr Peter Cross

35. **23/03012/CND** Ascott and Shipton APP
Affecting a Conservation Area

Discharge of Condition 5 (full surface water drainage scheme) of Planning Permission 23/02212/HHD
Sunnyside Upper End Shipton Under Wychwood
Bealby

36. **23/03013/HHD** Ascott and Shipton APP
Affecting a Conservation Area

Conversion of an existing open porch into an enclosed porch and addition of 25 solar panels to the roof slopes. (amended description)
Sunnyside Upper End Shipton Under Wychwood
Mr Bealby

37. **23/03029/HHD** Chipping Norton APP

Conversion of detached garage to create annex
16 Park Road Chipping Norton Oxfordshire
Mr Salman Ahmed

38. **23/03014/HHD** Kingham, Rollright and Enstone APP
Affecting a Conservation Area

Demolition of existing garage,link and rear extension. Erection of a replacement garage with living space above and link to dwelling and construction of a single storey rear extension
Top End Chapel Lane Kingham
Mr C Ross

39. **23/03018/HHD** Eynsham and Cassington APP

Replacement staircase to annex (Retrospective) (amended)
Annexe Tyne Cottage 46A Old Witney Road
Mr K Barrass

40. **23/03022/LBC** Charlbury and Finstock WDN
Affecting a Conservation Area

Alterations to pub garden and car park (part retrospective)
The Bull Inn Sheep Street Charlbury
Mr J De Klee

41. **23/03025/HHD** Ascott and Shipton APP
Affecting a Conservation Area

Alterations including erection of single storey rear side extension, proposed garage conversion, addition of 5 skylights, proposed heat pump unit and replacement windows
Meadow View Cottage Upper End Shipton Under Wychwood
Mr D Griffiths

42. **23/03036/HHD** Hailey, Minster Lovell and Leafield APP

Erection of a pergola to front elevation (retrospective)
Woodland View Akeman Street Ramsden
Mr A Crowther

43. **23/03048/HHD** Woodstock and Bladon APP
Affecting a Conservation Area

Conversion of part of garage to create studio/gym.
Vine Cottage 125 Manor Road Woodstock
Mr Neil Cooper

44. **23/03051/HHD** Ascott and Shipton APP
Affecting a Conservation Area

Erection of single storey side and rear extensions
Nutberry Hill Mawles Lane Shipton Under Wychwood
Mrs L Batty

45. **23/03053/HHD** Milton Under Wychwood APP

Erection of two storey extension, removal of front canopy porch and alterations to front of garage
14 Poplar Farm Close Milton Under Wychwood Chipping Norton
Mr And Mrs Smith

46. **23/03054/S73** Chipping Norton APP

Variation of condition 2 of Planning Permission 22/00583/FUL to amend the garage design and add solar panels
Hunters Retreat Kennels Lane Chipping Norton
Mr Ben Ricketts

47. **23/03057/LBC** Stonesfield and Tackley APP

Installation of new air conditioning system
Glympton Park House Glympton Woodstock
Mr R Mills

48. **23/03099/HHD** Charlbury and Finstock APP
Affecting a Conservation Area

Erection of single storey side extension to existing garage outbuilding
Little Paddock 34 Elm Crescent Charlbury
Ms Watson

49. **23/03104/HHD** Charlbury and Finstock APP
Affecting a Conservation Area

Erection of pre-fabricated timber barbeque lodge
Rose Villa 8 School Road Finstock
Mrs Karen Smith

50. **23/03105/HHD** Freeland and Hanborough APP

Proposed single storey link extension
7 Millwood Vale Long Hanborough Witney
Mr Nick Taylor

51. **23/03110/HHD** Charlbury and Finstock APP
Affecting a Conservation Area

Erection of single storey front and rear extensions
8 Elm Crescent Charlbury Chipping Norton
Mr And Mrs S Robertson

52. **23/03112/HHD** Charlbury and Finstock APP
Affecting a Conservation Area

Create level terrace and parking area on redundant sloping driveway (retrospective) (amended scheme)
14 Hill Close Charlbury Chipping Norton
Ms Elaine Kazimierczuk

53. **23/03130/CND** The Bartons APP
Affecting a Conservation Area

Discharge of conditions 2 (schedule of materials) and 11 (details of windows and doors) of Planning Permission 22/01800/S73
Manor Farm Barns North Street Middle Barton
Mr David Cheyne

54. **23/03131/CND** The Bartons APP
Affecting a Conservation Area

Discharge of conditions 3 (schedule of materials) and 10 (details of windows and doors) of Planning Permission 22/03329/FUL
Manor Farm Barns North Street Middle Barton
Mr David Cheyne

55. **23/03135/CND** Milton Under Wychwood APP

Discharge of condition 3 (details of hedgehog box) of Planning Permission 23/02002/HHD (retrospective)
1 Forest Close Milton Under Wychwood Chipping Norton
Mr And Mrs R Llamas

56. **23/03147/CND** Burford APP
Affecting a Conservation Area

Discharge of condition 2 (details of windows and doors) of Listed Building Consent 22/01702/LBC
Lloyds TSB Bank Sheep Street Burford
Mr Peter Whatey

57. **23/03168/HHD** Woodstock and Bladon APP

Installation of a glazed roof lantern within flat roof of existing garage (part retrospective)
34 Westland Way Woodstock Oxfordshire
Mr Dan Woodcock

58. **23/03174/S73** Burford APP

Variation of condition 2 (approved plans) of Planning Permission 22/02732/FUL to reduce the size of the proposed dwelling
Tadpole Farm Taynton Burford
Mr & Mrs James Bainbridge

59. **23/03203/HHD** Burford REF

Erection of a two storey side and single storey extensions along with the extension of an existing outbuilding with storage and home office area.
4 Manor Farm Cottages Upper End Fulbrook
Mr Phillip Hall

60. **23/03206/FUL** Kingham, Rollright and Enstone APP

Alterations including proposed single storey extension and creation of first floor accommodation to Teeny Barn, amendments to landscaping scheme
Soho Farmhouse Great Tew Chipping Norton
Soho House UK Limited

61. **23/03233/FUL** Stonesfield and Tackley APP

Proposed extension of plant enclosure, erection of additional acoustic enclosure
Glympton Park House Glympton Woodstock
Mr R Mills

62. **23/03237/NMA** Hailey, Minster Lovell and Leafield APP

Affecting a Conservation Area

Alterations to existing property to include erection of single storey front extension and two storey and first floor rear extensions. Construction of a new dwelling together with associated works and provision of new vehicular accesses to serve existing and new house (Non-material amendment to allow changes to materials of exterior walls)
49 Lower End Leafield Witney
Mr Rhys Jenkins

63. **23/03243/CND** Kingham, Rollright and Enstone APP

Affecting a Conservation Area

Discharge of conditions 4 (details of external windows and doors) and 7 (full surface water drainage scheme) of Planning Permission 22/03004/FUL
Laburnham Cottage The Green Over Norton
Mr T Mcfarlane

64. **23/03253/HHD** Charlbury and Finstock APP

Affecting a Conservation Area

Conversion of attic into habitable accommodation.
4 Hone Court Charlbury Chipping Norton
Ms R Lunney

65. **23/03260/FUL** Kingham, Rollright and Enstone APP

Alterations to courtyard buildings including single storey extensions (part retrospective)
Soho Farmhouse Great Tew Chipping Norton
Soho House UK Limited

66. **23/03262/CLASSR** Chadlington and Churchill P3APP

Conversion of redundant agricultural barn into an 8 Suite hotel with associated parking, reception and Stores and Meeting Room.
Barn At Ryehill Farm Kingham Oxfordshire
C/O Agent

67. **23/03268/HHD** Woodstock and Bladon APP

Change of external materials to dwellinghouse and detached garage (retrospective)
17 Green Lane Woodstock Oxfordshire
Mr. J Jennings

68. **23/03284/CND** Burford APP
Affecting a Conservation Area

Discharge of condition 12 (details of SuDS) of Planning Permission 20/00303/FUL
Land West Of Shilton Road Burford
Ms Joanne Nayler

69. **23/03307/CLP** Kingham, Rollright and Enstone WDN
Affecting a Conservation Area

Pre-fabricated school outbuilding for learning purposes
Kingham County Primary School The Green Kingham
Mr Nicholas Prockter

70. **23/03364/CLP** Kingham, Rollright and Enstone APP

Certificate of Lawfulness (Construct new electical substation building, including redirection of underground electrical cables and associated works).
Kingham Hill School Kingham Hill Kingham
Mr Jason Buckingham

71. **23/03380/NMA** Burford APP
Affecting a Conservation Area

Erection of two storey and first floor extensions (non-material amendment to update the approved floor plans).
Hilltop House 208 The Hill Burford
Mr And Mrs Leccisotti

72. **23/03408/PDET28** Chadlington and Churchill P2NRQ

Construction of an agricultural grain store.
Curdle Hill Farmhouse Chipping Norton Road Chadlington
Diddly Squat Farm

73. **24/00091/CND** Woodstock and Bladon APP

Discharge of condition 11 (Archaeological Written Scheme of Investigation) of Planning Permission 21/00189/FUL
Land North Of Hill Rise Woodstock
Mr Mark Utting

Appeal Decisions

Reference: APP/D3125/D/23/3320035

Site Address: Over Worton, Chipping Norton, OX7 7ER

The development proposed is described as proposed extensions and alterations with associated access and landscaping works.

Appeal Dismissed.

You can click on the appeal number to view the Inspectors decision.

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