

Technical design note

Project name	Land North of Rectory Farm, Yatton		
Design note title	Response to IDB Comments dated 15th May 2023		
Document reference	23257-HYD-XX-XX-TN-D-0002		
Author	Richard Hughes		
Revision	P02		
Date	7 July 2023	Approved	✓

1. Introduction

A consultation response dated the 4th May 2023 has been received from the Somerset Drainage Boards Consortium (IDB) in connection with planning application reference 23/P/0664/OUT for the above site.

The IDB has currently raised an objection in relation to surface water discharge rates to the existing rhyme system. Subsequently a further set of comments dated the 15th June 2023 have also been received which, whilst not raising any further objections made several observations and requests for further information. The comments were accompanied by an annotated plan.

A site meeting was held with the IDB on the 3rd July 2023 to discuss the various matters further.

This Technical Note seeks to address the items raised in relation to Drainage Strategy with a view to satisfying the IDB for the purposes of the Outline Application.

A copy of the above IDB responses is included in Appendix A of this Technical Note for reference.

2. Responses

2.1 Response dated 4th May 2023

2.1.1 Discharge Rates

The proposed discharge rate was based on the IDB advice “*With this in mind, the Board would prefer any increase in volume of attenuation to be provided in features directly hydraulically connected to Board’s Rhyme network or the upsizing of smaller rhynes. This could include wetlands or two stage channels. This is on the understanding that it is located close to the development, there is a suitable and modelled form of conveyance and water quality has been dealt with through suitable mitigation measures. If this is not feasible then any discharge into the Board’s District must be no more than 2 litres per second per impermeable hectare.*”

As the attenuation basins are directly connected to the existing rhynes we had taken the approach that discharge rates could be based on QBAR values rather than 2 l/s/ha. However, taking on board your comment, the calculations have been amended to the latter requirement and I attach copies of the revised calculations. It should be noted that the basins are designed for the worst

case scenario of being tide locked and therefore the change in discharge rate results in very little change to the stored volumes and water levels.

2.1.2 Design Events

The revised calculations show that the proposed drainage systems have been design for the 1 in 100 year storm event plus an allowance for climate change of +40%. A copy of these calculations is included in Appendix B of this Technical Note.

2.1.3 Surcharge, Flooding and Overland Flow Routes

The attached calculations demonstrate that there is no flooding in the Q00 +40% climate change allowance event. Exceedance flow routes are shown on drawing no. 23257-HYD-XX-XX-DR-D-2004-PO1 included in Appendix C.

2.1.4 Adoption and Maintenance

The proposed adoption and maintenance responsibilities for the drainage systems are set out in sections 3.2.21 and 3.2.22 of the Drainage Strategy report.

2.1.5 Access Routes and Maintenance Areas

We have produced an additional plan showing the proposed rhyne maintenance strips and the points of access from the road network – drawing no. 23257-HYD-XX-X-DR-D-2005-PO1 included in Appendix C.

2.1.6 No Interruption to Existing Land Drainage Flow Routes

As shown on the Drainage Strategy plan, included in the Drainage Strategy report, all existing rhynes will be retained with any highway crossing being culverted. This will ensure that flows within the rhynes will be maintained uninterrupted throughout the development area, including those areas that are to be raised. The Gov.UK surface water mapping indicates that there is no medium or high risk surface flooding within the site or the surrounding areas, other than within the rhyne channels themselves. For the low risk scenario, some minor, (less than 300mm depth), of surface flooding is shown but these are associated with localised depressions rather than flow routes.

On this basis, the raising of the land will not affect existing surface water drainage and the new drainage systems will direct flows within the development area to the new attenuation basins which will provide the required storage volumes, and will not increase the risk of surface water flooding elsewhere.

2.2 Response dated 15th June 2023

2.2.1 The various observations raised by the IDB are reproduced with our responses highlighted in blue. The location points are taken from the plan annotated by the IDB as attached in Appendix A.

AA The length of watercourse between the two points indicated runs southwards and cannot be accessed from the East side. The proposed access requires extending accordingly to ensure clear discharge path for the SW outfall.

As noted during the site meeting with the IDB, the section of watercourse AA is a shallow ditch which is located at the foot of a new gabion wall associated with the new development immediately to the east.

The ditch is not maintained by the IDB and is therefore assumed to be the responsibility of others. As discussed with the IDB on site, a note has been added to the Drainage Strategy drawing to the effect that an access strip will be provided with the width to be agreed with the relevant stakeholders.

B The IDB SW pipeline may be situated further from the boundary than indicated on dwg 2002 and has a concrete outfall into the IDB rhyne at its N end and two screened connections from SW drains and the boundary ditch along the existing development to the East. The pipe run is to agricultural standard and this, the outfall and connections should remain accessible and safeguarded from interference. The integrity of the pipeline with an extra 2 or 3m of surcharge should be checked.

As discussed on site with the IDB, the existing pipeline may lie within the proposed easement. Should the pipeline in fact lie further into the site, this will be re-laid to ensure that it is within the easement strip to ensure that it is outside of the development area and the opportunity will be taken to ensure that the pipe is of sufficient strength.

Where the IDB pipeline enters the head of the E-W rhyne a town outfall may require a headwall depending on ground level proposals.

It is not intended to make any level changes in this area so there should be no need to alter any existing headwalls, unless required for realignment as noted above. The planning layout indicates a new footpath link at this point which may affect any structure that is already there however, if any amendments are required, these can be dealt with them at the Reserved Matters stage.

The structures are not apparent on the Hydrock survey sheets.

It is possible that the structures may be quite small and not apparent in the heavy undergrowth. Further investigations can be carried out during the detailed design stage.

The IDB pipeline and existing ditch along the western boundary of the existing development captures and routes away town surface water which previously caused parts of the eastern edge of the proposal fields to remain permanently wet. A section of the boundary has no positive drainage at present and to ensure that the ground raising does not obstruct the ground water further land drainage measures may be required. A plan and sections through the Eastern boundary showing proposed ground levels, boundary treatment and drainage details is required to assess this.

A set of cross-sections have been prepared along the boundary to the north and south of West Road and are attached in Appendix D of this Technical Note. Where a ditch does exist, this will lie outside of the development boundary and will be unaffected and any runoff can discharge to this ditch. Where there is no positive drainage, a shallow swale can be created to direct any surface water to existing ditches both north and south.

Any existing connections from the development to the east will be maintained.

BC This length is IDB adopted and maintained. A sketch cross section of the proposed arrangement has been provided but the width between the tops of the slopes (approx 32m?) does not appear to be replicated on the plans of watercourse

The tops of the 1 in 3 slopes at the rear of the easement widths are coincident with the edge of the development proposals – see attached sketch in Appendix E. The width across the top of the slopes will vary depending on the difference in ground level and therefore is a typical arrangement.

C-D-E This length of watercourse has previously been maintained by the farmer in liaison with the Board. It routes surface water from the southern part of the site to the head of the IDB system at F. Access strip will be required from D to E which owing to mature trees along the SW side of the ditch will need to be along the NW side, currently and proposed to remain as open field. Any tree planting should be a min of 9m from the watercourse.

As discussed during the recent meeting with the IDB on site, maintenance access can be achieved from the north-west side of the ditch between points d and E. There are no proposals to plant any new trees between points D and E.

Between E and F it is understood a culvert connects to the NE railway ditch, conveying SW to the head of the IDB viewed rhyme system which terminates her at the West side of the railway embankment. Details are not known but it is probable reconstruction will be required. It is possible that the adjacent St Modwen site will also require this culvert to be effective. There is a separate brick culvert under the railway embankment which is kept clear by the IDB.

There are no proposals for development works in this area, other than the construction of a new footpath link which would need a new culvert where it crosses any rhynes.

The developer is willing to agree with the IDB any reasonable improvement works to the existing culvert which can be discussed at the Reserved Matters stage.

As the section CDE also serves third party interests it may be appropriate for the IDB to adopt this, once the developer has brought the complete length up to adoptable standard. I have inspected this and could provide a specification, including bed levels etc. If adopted a wider access strip would be required between C and D and extended from D to E, but this could be along the West side from C to D which is clear of the housing zone.

Following the joint site visit with the IDB, it is noted that the IDB would accept an alternative maintenance strip on the western side if they were to adopt it, but in any event a workable maintenance strip has been provided for on the eastern side.

We are grateful for the IDB's position on points C-D however, for the time being, we are not assuming that they will take on the maintenance of the unviewed rhynes. This can be revisited at RM stage if it suits all parties.

Will the manure heaps be removed?

All such features will be removed at an early stage of the development works.

None of the remaining ditches serves third party developed land so that responsibility for maintenance could remain with the developer.

The Developer has no objection to this arrangement.

E-F The existing connection here involves the railway culvert and a further gateway culvert (????). If present the latter may require replacement.

The Developer is willing to discuss such remedial works during the Reserved Matters stage.

G-G-G Need to ascertain whether these are connected into the railway ditch and if so whether they require to be effective, or does the water flow eastwards.

These points were inspected with the IDB during the joint site inspection and it has been confirmed that there are existing culvers present.

H-H There is a ditch along this boundary cut by the former farmer. It abuts the Rectory F Modwen site. It is likely to be connected to the length HD but this needs to be investigated and if not, a connection should be established. The functionality of this drainage route needs to be maintained and responsibility for its maintenance established – ie St Modwen or Persimmon? It does not take water from existing development at its East end. We will be liaising with Modwen’s engineers on their proposed arrangements.

The ditch line HH is believed to be within the St Modwen site boundary however this would need to be confirmed by reference to Land Registry plans. The current proposals show a maintenance strip on the northern side, within the Persimmon development, in order to provide access.

If the ditch does not connect to the length HD this can be readily provided and exact details can be agreed with the IDB at the appropriate Reserved Matters stage.

J The proposed invert levels of the 3 pond outfall structures are below penning level – this is not acceptable and I think would preclude adoption by Wessex Water. Recommended minimum 4.85m AOD (150mm above SPL)

The pond invert levels are all well above the penning level however, the outfall headwall levels where they discharge to the ditches would be below this level as the existing ground/bank levels are between 5.0m and 5.5m. As discussed on site with the IDB, the outfall levels will be lifted to 4.85m and the ground levels lifted locally to provide a minimum cover.

L My records show an extra outlet here.

Reference to the Wessex Water record plans show three private surface water outfalls in this area but no adoptable outfalls. It is not intended to carry out any works to the existing ditches in this area and the existing outfalls will be maintained.

A copy of the Wessex Water plan is included in Appendix F.

M How will these ditches be maintained – the indicated tree planting is in places too close for machine access. Although not previously cleaned on a regular basis all minor farm ditches on low lying ground such as this require occasional attention to maintain conveyance and prevent the zone becoming swamp.

The proposed tree planting on the drainage plan is indicative only at this stage. The Landscape Masterplan shows the tree planting at a significant distance from the ditches and there will be no new trees within 9m of the bank.

N Is this area to be left “as is”?

The area at location N will be allotments. There are no proposals for any buildings.

General Points

The ground is to be raised to about 8m AOD – almost 3m of fill. This raises several issues:

The angle of the slopes down to the access strips – 1 in 3. Have settlement and stability calculations been undertaken? If not, has allowance been made should slopes prove to be too steep? Any flattening should not be accommodated by narrowing of the access strips.

No detailed geotechnical designs at this stage as this is only an Outline Application. All necessary investigations and calculations will be carried out at the Reserved Matters stage. If required, soil reinforcement methods will be used to ensure the stability of the slopes. There will be no intention to encroach into the easement strips.

The distance between the watercourses and the top of the slopes appears to be inadequate to accommodate the 6m / 9m accesses strips and the 1 in 3 slopes. Cross sections needed.

A typical cross-section is attached in Appendix E. Additional cross-sections will be prepared at the Reserved Matters stage when a more detailed planning layout will be available.

To avoid waterlogging at the toe of the fill slopes the access strips should have a 150mm crossfall towards the watercourses. This allowance may need to increase to accommodate any anticipated compression in the existing ground.

We have already assumed a nominal fall across the easement strips of 1 in 40 towards the watercourses.

New culverts – IL should be 150mm below bed level to encourage habitat continuity.

The typical cross-section in Appendix E has been amended to show this requirement.

3. Summary

- 3.1 A number of points relating to the drainage were addressed in the original Drainage Strategy report which formed part of the planning application. Additional relevant drawings and calculations have been attached to this Technical Note for clarification on certain points.
- 3.2 Several of the items raised will be points of detailed design to be addressed when the layout is finalised. These can readily be resolved at the Reserved Matters stage.
- 3.3 A meeting was held on site with the IDB subsequent to the issue of the comments and a number of the issues raised were agreed, as set out in the responses above.

APPENDIX A

IDB COMMENTS

Letter dated 4th May 2023

Schedule of comments dated 15th June 2023

IDB Annotated Plan

Our Ref: VM/KW

Your Ref: 23/P/0664/OUT

Date: 04 May 2023

Development Management
Development and Environment
Post Point 15
North Somerset Council
Town Hall
Walliscote Grove Road
Weston-super-Mare
BS23 1UJ

Dear Sir or Madam,

Land to North Of Rectory Farm

Thank you for referring the above application

The Internal drainage Board OBJECTS to the proposed development, as the proposed discharge rate, from the development area within the site, does not meet our requirement

Any outflow from the site must be limited to 2 l/s/ha of impermeable area and not Q_{bar} of 4.1 l/s/ha. This is due to the sensitive nature of the receiving watercourse. The attenuation volume therefore needs to be revised taking into account a discharge rate of 2 l/s/ha.

Part of the site is shown to be at risk of surface water flooding. The site currently provides some storage for surface water. We need to understand the impact of the development on the surface water flooding. The current drainage of the land should not be interrupted as a result of the development. Ideally, we would not want to see any land raised within area that are currently at risk of SW flooding.

There are 2 viewed rhynes on the site and several ordinary watercourses. We note the master plans aims to provide a 9 m easement on both side of the viewed rhynes and 6 m easement on both sides of the ordinary watercourses. We will also need a safe mean to access the easement from the site entrance or an alternative access gate.

In order for us to remove our objection, the developer needs to design the surface water drainage network to meet the following criteria:

1. Any outflow from the site must be limited to Greenfield run-off rates or 2 l/s/ha of impermeable area from the development for all return periods up to and including the 1 in 100 year storm.
2. The surface water drainage system must incorporate enough attenuation to deal with the surface water run-off from the site up to the critical 1 in a 100-year flood event, including an allowance for climate change for the lifetime of the development. Drainage calculations must be included to demonstrate this (e.g. Windes or similar sewer modelling package calculations that include the necessary attenuation volume).
3. If there is any surcharge and flooding from the system, overland flood flow routes and "collection" areas on site (e.g. car parks, landscaping) must be shown on a drawing. The run-off from the site during a 1 in 100 year storm plus an allowance for climate change must be contained on the site and must not reach unsafe depths on site.
4. The adoption and maintenance of the drainage system must be addressed and clearly stated.

Each Board is a statutory public body with responsibilities for flood protection, land drainage and the environment.
All are members of the Association of Drainage Authorities.

5. An access route and maintenance area should be clearly marked on a drawing
6. Provide evidence that the drainage of the land will not be interrupted as a result of the land raising

We would also like to remind the applicant that in addition to obtaining planning application, they will need to apply for land drainage consent for any work within 9 m of top of the bank of any viewed rhyne and watercourses. Details on how to apply for Land Drainage consent can be found on our website: <https://somerse排水boards.gov.uk/development-control-byelaws/land-drainage-consents/>

The Board would request that the following informative is added to any permission that is granted:

Informative: The applicant is advised that, prior to works commencing on site, Land Drainage Consent is required under section 23 and 66 of the Land Drainage Act 1991 from the Internal Drainage Board for any construction in, or within, 9m of a watercourse and for the introduction of additional flow into a watercourse in the Board's District (or from the Environment Agency for an EA Main River).

Any email correspondence relating to this consultation response should be sent to planning@somerse排水boards.co.uk

Yours Sincerely



Virginie Martin
Development Control Officer

cc. Mr R King, Operations Manager

**LAND NORTH OF RECTORY FARM DEVELOPMENT
FURTHER COMMENTS FROM NSLIDB CONSULTANT ENGINEER
15-06-2023**

Introduction

Please also refer to previously supplied comments re accesses, runoff calcs etc from IDB Develop Control Officer.

Detail Surface Water Drainage and Engineering Comments

Refer Hydrock Dwg 23257-HYD-XX-XX-DR-D-2001 rev PO5 annotated and labelled "DA1"

Taking the indicated items in order:

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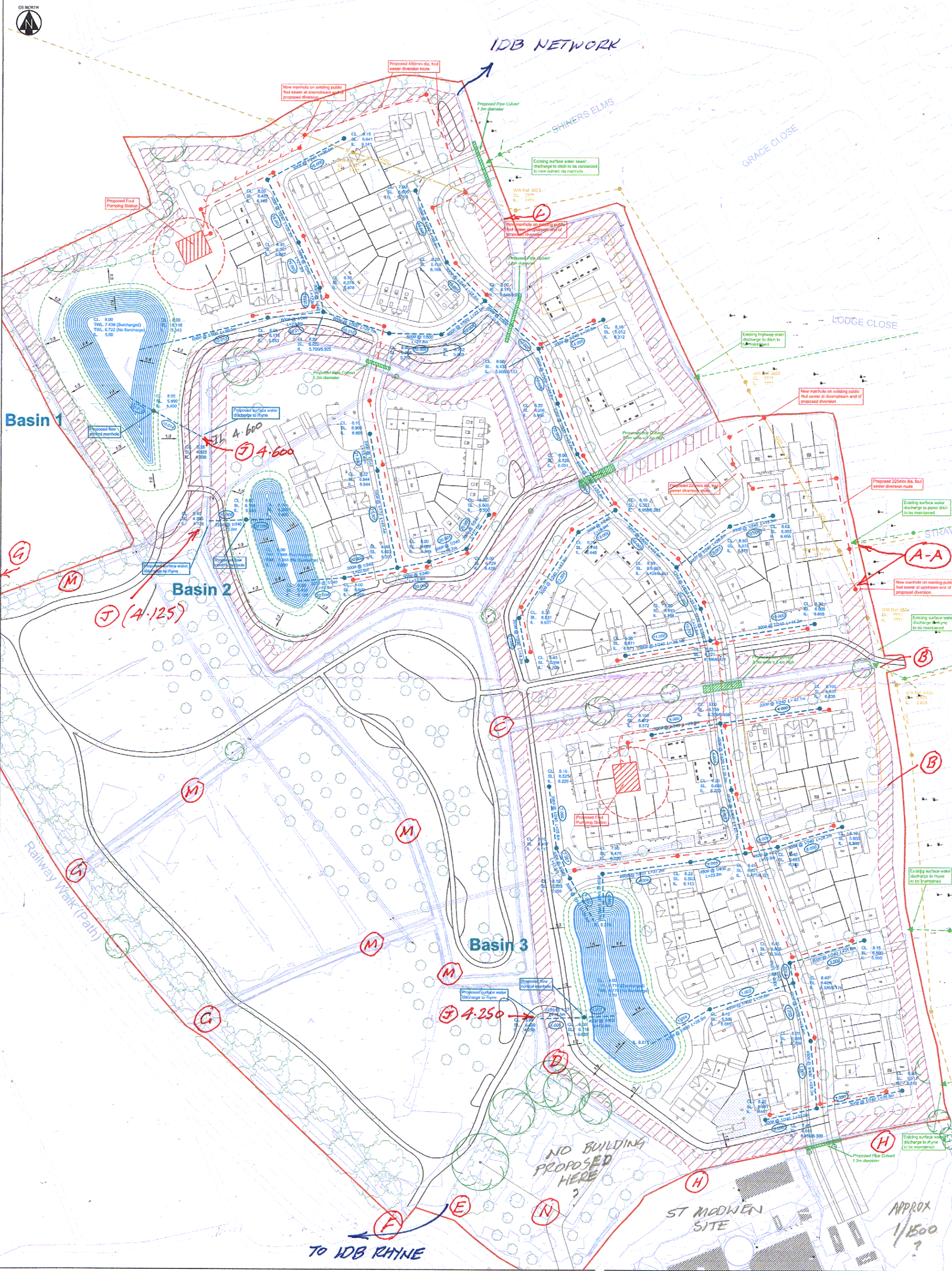
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V1

Dan Alsop Bsc, CEng, MICE

Consultant Engineer to the North Somerset Levels IDB



Key

- Existing public foul water sewer
- Existing public surface water sewer
- Proposed surface water sewer
- Proposed foul water sewer
- Proposed foul rising main
- Proposed rhyme crossing culvert
- Proposed attenuation basin
- Proposed rhyme assessment strips
- Proposed foul pumping station with 15m standoff zone
- Existing public foul water sewer to be abandoned and diverted

PL MIN A.70

DWG DA 1

REVISIONS

Rev	Date	Description	By	Chk	App
P01	23/04/23	Final Issue	...	...	...
P02	21/04/23	...	...	...	...
P03	20/04/23	...	...	...	...

Hydrock

OVER COURT BARRIS
OVER COURT
MANOR ROAD
BRISTOL
BS2 4GE
T: +44 (0) 1454 83333
E: h@hydrock.co.uk
W: hydrock.co.uk

PROJECT: PERSIMMON HOMES SEVERN VALLEY

TITLE
PROPOSED FOUL & SURFACE WATER DRAINAGE STRATEGY PLAN

STATUS DESCRIPTION
FOR APPROVAL

HYDROCK PROJECT NO.
23257-IOCB

SCALE @ A0
1:500

PROJECT
LAND AT RECTORY FARM (NORTH)
YATTON, NORTH SOMERSET

DRAWING NO.
23257-HYD-XX-DR-D-2001

STATUS
S2

REVISION
P05

APPENDIX B

Basin 1 Catchment Simulation Calculations – 2.0 l/s/ha (No Surcharge)

Basin 1 Catchment Simulation Calculations – 2.0 l/s/ha (Surcharged Outfall)

Basin 2 Catchment Simulation Calculations – 2.0 l/s/ha (No Surcharge)

Basin 2 Catchment Simulation Calculations – 2.0 l/s/ha (Surcharged Outfall)

Basin 3 Catchment Simulation Calculations – 2.0 l/s/ha (No Surcharge)

Basin 3 Catchment Simulation Calculations – 2.0 l/s/ha (Surcharged Outfall)

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.Land at Yatton
Catchments A+B+D @ 2 l/s/ha
No SurchargeDate 16/03/2023 12:30
File CATCHMENTS A+B+D.MDXDesigned by RJH
Checked by

Innovyze

Network 2018.1

Existing Network Details 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
10.000	44.200	0.184	240.2	0.081	4.00	0.0	0.600	o	300	Pipe/Conduit
11.000	36.100	0.150	240.7	0.066	4.00	0.0	0.600	o	300	Pipe/Conduit
10.001	13.800	0.028	492.9	0.026	0.00	0.0	0.600	o	525	Pipe/Conduit
10.002	20.200	0.040	505.0	0.038	0.00	0.0	0.600	o	525	Pipe/Conduit
12.000	18.500	0.077	240.3	0.035	5.00	0.0	0.600	o	300	Pipe/Conduit
12.001	28.200	0.118	239.0	0.052	0.00	0.0	0.600	o	300	Pipe/Conduit
10.003	34.900	0.070	498.6	0.064	0.00	0.0	0.600	o	525	Pipe/Conduit
13.000	18.200	0.075	242.7	0.033	5.00	0.0	0.600	o	300	Pipe/Conduit
13.001	43.800	0.183	239.3	0.080	0.00	0.0	0.600	o	300	Pipe/Conduit
13.002	18.000	0.075	240.0	0.033	0.00	0.0	0.600	o	300	Pipe/Conduit
10.004	28.400	0.057	498.2	0.052	0.00	0.0	0.600	o	600	Pipe/Conduit
10.005	22.700	0.045	504.4	0.042	0.00	0.0	0.600	o	600	Pipe/Conduit
10.006	24.200	0.048	504.2	0.044	0.00	0.0	0.600	o	600	Pipe/Conduit
14.000	30.500	0.127	240.2	0.056	5.00	0.0	0.600	o	300	Pipe/Conduit
10.007	30.200	0.060	503.3	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit
15.000	32.800	0.137	239.4	0.060	5.00	0.0	0.600	o	300	Pipe/Conduit
15.001	22.800	0.095	240.0	0.042	0.00	0.0	0.600	o	300	Pipe/Conduit
10.008	23.100	0.046	502.2	0.042	0.00	0.0	0.600	o	600	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
10.000	6.605	0.081	0.0	1.01	71.4
11.000	6.571	0.066	0.0	1.01	71.3
10.001	6.196	0.173	0.0	1.00	216.9
10.002	6.168	0.211	0.0	0.99	214.3
12.000	6.655	0.035	0.0	1.01	71.4
12.001	6.578	0.087	0.0	1.01	71.6
10.003	6.128	0.362	0.0	1.00	215.7
13.000	6.706	0.033	0.0	1.00	71.0
13.001	6.631	0.113	0.0	1.01	71.5
13.002	6.448	0.146	0.0	1.01	71.4
10.004	6.058	0.560	0.0	1.08	306.5
10.005	6.001	0.602	0.0	1.08	304.6
10.006	5.956	0.646	0.0	1.08	304.7
14.000	6.312	0.056	0.0	1.01	71.4
10.007	5.908	0.702	0.0	1.08	305.0
15.000	6.305	0.060	0.0	1.01	71.5
15.001	6.168	0.102	0.0	1.01	71.4
10.008	5.848	0.846	0.0	1.08	305.3

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.Land at Yatton
Catchments A+B+D @ 2 l/s/ha
No SurchargeDate 16/03/2023 12:30
File CATCHMENTS A+B+D.MDXDesigned by RJH
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Existing Network Details 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
10.009	21.800	0.044	495.5	0.041	0.00	0.0	0.600	o	600	Pipe/Conduit
10.010	29.100	0.058	501.7	0.053	0.00	0.0	0.600	o	600	Pipe/Conduit
16.000	36.500	0.152	240.1	0.067	5.00	0.0	0.600	o	300	Pipe/Conduit
16.001	29.300	0.122	240.2	0.054	0.00	0.0	0.600	o	300	Pipe/Conduit
16.002	21.300	0.089	239.3	0.039	0.00	0.0	0.600	o	300	Pipe/Conduit
16.003	12.800	0.053	241.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit
10.011	23.400	0.047	497.9	0.043	0.00	0.0	0.600	o	600	Pipe/Conduit
10.012	55.200	0.110	501.8	0.101	0.00	0.0	0.600	o	600	Pipe/Conduit
10.013	10.800	0.100	108.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit
10.014	22.600	0.800	28.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit

Network Results Table

PN	US/IL (m)	I.Area (ha)	Base Flow (l/s)	Vel (m/s)	Cap (l/s)
10.009	5.802	0.887	0.0	1.09	307.4
10.010	5.758	0.940	0.0	1.08	305.5
16.000	6.341	0.067	0.0	1.01	71.4
16.001	6.189	0.121	0.0	1.01	71.4
16.002	6.067	0.160	0.0	1.01	71.5
16.003	5.978	0.160	0.0	1.01	71.2
10.011	5.700	1.143	0.0	1.08	306.6
10.012	5.653	1.244	0.0	1.08	305.4
10.013	5.500	1.244	0.0	2.34	662.5
10.014	5.400	1.244	0.0	2.47	98.3

.	Land at Yatton
.	Catchments A+B+D @ 2 l/s/ha
.	No Surcharge
Date 16/03/2023 12:30	Designed by RJH
File CATCHMENTS A+B+D.MDX	Checked by
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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)
10.000	o	300	S20	8.300	6.605	1.395	Open Manhole	1200
11.000	o	300	S21/1	8.300	6.571	1.429	Open Manhole	1200
10.001	o	525	S21	8.200	6.196	1.479	Open Manhole	1800
10.002	o	525	S22	8.300	6.168	1.607	Open Manhole	1800
12.000	o	300	S23/2	8.620	6.655	1.665	Open Manhole	1200
12.001	o	300	S23/1	8.500	6.578	1.622	Open Manhole	1200
10.003	o	525	S23	8.350	6.128	1.697	Open Manhole	1800
13.000	o	300	S24/3	8.400	6.706	1.394	Open Manhole	1200
13.001	o	300	S24/2	8.300	6.631	1.369	Open Manhole	1500
13.002	o	300	S24/1	8.250	6.448	1.502	Open Manhole	1200
10.004	o	600	S24	8.100	6.058	1.442	Open Manhole	1800
10.005	o	600	S25	8.100	6.001	1.499	Open Manhole	1800
10.006	o	600	S26	8.200	5.956	1.644	Open Manhole	1800
14.000	o	300	S27/1	8.100	6.312	1.488	Open Manhole	1200
10.007	o	600	S27	8.000	5.908	1.492	Open Manhole	1800
15.000	o	300	S28/2	7.900	6.305	1.295	Open Manhole	1500
15.001	o	300	S28/1	8.200	6.168	1.732	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)
10.000	44.200	240.2	S21	8.200	6.421	1.479	Open Manhole	1800
11.000	36.100	240.7	S21	8.200	6.421	1.479	Open Manhole	1800
10.001	13.800	492.9	S22	8.300	6.168	1.607	Open Manhole	1800
10.002	20.200	505.0	S23	8.350	6.128	1.697	Open Manhole	1800
12.000	18.500	240.3	S23/1	8.500	6.578	1.622	Open Manhole	1200
12.001	28.200	239.0	S23	8.350	6.460	1.590	Open Manhole	1800
10.003	34.900	498.6	S24	8.100	6.058	1.517	Open Manhole	1800
13.000	18.200	242.7	S24/2	8.300	6.631	1.369	Open Manhole	1500
13.001	43.800	239.3	S24/1	8.250	6.448	1.502	Open Manhole	1200
13.002	18.000	240.0	S24	8.100	6.373	1.427	Open Manhole	1800
10.004	28.400	498.2	S25	8.100	6.001	1.499	Open Manhole	1800
10.005	22.700	504.4	S26	8.200	5.956	1.644	Open Manhole	1800
10.006	24.200	504.2	S27	8.000	5.908	1.492	Open Manhole	1800
14.000	30.500	240.2	S27	8.000	6.185	1.515	Open Manhole	1800
10.007	30.200	503.3	S28	8.000	5.848	1.552	Open Manhole	1800
15.000	32.800	239.4	S28/1	8.200	6.168	1.732	Open Manhole	1200
15.001	22.800	240.0	S28	8.000	6.073	1.627	Open Manhole	1800

.	Land at Yatton
.	Catchments A+B+D @ 2 l/s/ha
.	No Surchage
Date 16/03/2023 12:30	Designed by RJH
File CATCHMENTS A+B+D.MDX	Checked by
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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)
10.008	o	600	S28	8.000	5.848	1.552	Open Manhole	1800
10.009	o	600	S29	8.000	5.802	1.598	Open Manhole	1800
10.010	o	600	S30	8.000	5.758	1.642	Open Manhole	1800
16.000	o	300	S31/1	8.150	6.341	1.509	Open Manhole	1200
16.001	o	300	S31/2	8.000	6.189	1.511	Open Manhole	1200
16.002	o	300	S31/3	8.300	6.067	1.933	Open Manhole	1200
16.003	o	300	S31/4	8.350	5.978	2.072	Open Manhole	1200
10.011	o	600	S31	8.200	5.700	1.900	Open Manhole	1800
10.012	o	600	S32	8.000	5.653	1.747	Open Manhole	1800
10.013	o	600	S33	8.000	5.500	1.900	Open Manhole	1800
10.014	o	225	S34	8.000	5.400	2.375	Open Manhole	2100

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)
10.008	23.100	502.2	S29	8.000	5.802	1.598	Open Manhole	1800
10.009	21.800	495.5	S30	8.000	5.758	1.642	Open Manhole	1800
10.010	29.100	501.7	S31	8.200	5.700	1.900	Open Manhole	1800
16.000	36.500	240.1	S31/2	8.000	6.189	1.511	Open Manhole	1200
16.001	29.300	240.2	S31/3	8.300	6.067	1.933	Open Manhole	1200
16.002	21.300	239.3	S31/4	8.350	5.978	2.072	Open Manhole	1200
16.003	12.800	241.5	S31	8.200	5.925	1.975	Open Manhole	1800
10.011	23.400	497.9	S32	8.000	5.653	1.747	Open Manhole	1800
10.012	55.200	501.8	S33	8.000	5.543	1.857	Open Manhole	1800
10.013	10.800	108.0	S34	8.000	5.400	2.000	Open Manhole	2100
10.014	22.600	28.3		5.250	4.600	0.425	Open Manhole	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	0.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FEH D1 (1km)	0.362	Summer Storms	Yes	
Return Period (years)	100 D2 (1km)	0.381	Winter Storms	No	
FEH Rainfall Version	1999 D3 (1km)	0.330	Cv (Summer)	0.750	
Site Location	E (1km)	0.295	Cv (Winter)	0.840	
C (1km)	-0.028	F (1km)	2.426	Storm Duration (mins)	30

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Land at Yatton
Catchments A+B+D @ 2 l/s/ha
No Surcharge



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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S34, DS/PN: 10.014, Volume (m³): 11.5

Unit Reference MD-SHE-0060-2400-2300-2400
Design Head (m) 2.300
Design Flow (l/s) 2.4
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 60
Invert Level (m) 5.400
Minimum Outlet Pipe Diameter (mm) 75
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.300	2.4	Kick-Flo®	0.540	1.2
Flush-Flo™	0.263	1.5	Mean Flow over Head Range	-	1.8

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.3	0.800	1.5	2.000	2.2	4.000	3.1	7.000	4.0
0.200	1.5	1.000	1.6	2.200	2.3	4.500	3.3	7.500	4.1
0.300	1.5	1.200	1.8	2.400	2.4	5.000	3.4	8.000	4.3
0.400	1.5	1.400	1.9	2.600	2.5	5.500	3.6	8.500	4.4
0.500	1.4	1.600	2.0	3.000	2.7	6.000	3.7	9.000	4.5
0.600	1.3	1.800	2.1	3.500	2.9	6.500	3.9	9.500	4.6

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Land at Yatton
Catchments A+B+D @ 2 l/s/ha
No Surcharge



Date 16/03/2023 12:30
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Network 2018.1

Storage Structures for Storm

Tank or Pond Manhole: S33, DS/PN: 10.013

Invert Level (m) 5.500

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	501.0	1.200	1086.0	2.400	1762.0	3.600	1762.0	4.800	1762.0
0.200	583.0	1.400	1207.0	2.600	1762.0	3.800	1762.0	5.000	1762.0
0.400	671.0	1.600	1336.0	2.800	1762.0	4.000	1762.0		
0.600	765.0	1.800	1472.0	3.000	1762.0	4.200	1762.0		
0.800	865.0	2.000	1615.0	3.200	1762.0	4.400	1762.0		
1.000	972.0	2.200	1762.0	3.400	1762.0	4.600	1762.0		

.	Land at Yatton
.	Catchments A+B+D @ 2 l/s/ha
.	No Surcharge
Date 16/03/2023 12:30	Designed by RJH
File CATCHMENTS A+B+D.MDX	Checked by
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1 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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 F (1km) 2.426
 FEH Rainfall Version 1999 D2 (1km) 0.381 Cv (Summer) 0.750
 Site Location D3 (1km) 0.330 Cv (Winter) 0.840
 C (1km) -0.028 E (1km) 0.295

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
10.000	S20	15 Winter	1	+0%	100/15 Summer				6.685	-0.220
11.000	S21/1	15 Winter	1	+0%	100/15 Summer				6.643	-0.228
10.001	S21	15 Winter	1	+0%	100/15 Summer				6.370	-0.351
10.002	S22	15 Winter	1	+0%	100/15 Summer				6.350	-0.343
12.000	S23/2	15 Winter	1	+0%	100/15 Summer				6.709	-0.246
12.001	S23/1	15 Winter	1	+0%	100/15 Summer				6.655	-0.223
10.003	S23	15 Winter	1	+0%	100/15 Summer				6.327	-0.326
13.000	S24/3	15 Winter	1	+0%	100/15 Summer				6.762	-0.244
13.001	S24/2	15 Winter	1	+0%	100/15 Summer				6.718	-0.213
13.002	S24/1	15 Winter	1	+0%	100/15 Summer				6.550	-0.198
10.004	S24	15 Winter	1	+0%	100/15 Summer				6.281	-0.377
10.005	S25	15 Winter	1	+0%	100/15 Summer				6.233	-0.368
10.006	S26	15 Winter	1	+0%	100/15 Summer				6.190	-0.366
14.000	S27/1	15 Winter	1	+0%	100/15 Summer				6.377	-0.235
10.007	S27	15 Winter	1	+0%	100/15 Summer				6.146	-0.362
15.000	S28/2	15 Winter	1	+0%	100/15 Summer				6.372	-0.233
15.001	S28/1	15 Winter	1	+0%	100/15 Summer				6.255	-0.213
10.008	S28	15 Winter	1	+0%	100/15 Summer				6.097	-0.351
10.009	S29	15 Winter	1	+0%	100/15 Summer				6.051	-0.351
10.010	S30	15 Winter	1	+0%	30/2880 Winter				6.003	-0.355
16.000	S31/1	15 Winter	1	+0%	100/15 Summer				6.412	-0.229
16.001	S31/2	15 Winter	1	+0%	100/15 Summer				6.282	-0.207
16.002	S31/3	15 Winter	1	+0%	100/15 Summer				6.175	-0.192
16.003	S31/4	15 Winter	1	+0%	30/960 Winter				6.089	-0.189
10.011	S31	15 Winter	1	+0%	30/1440 Winter				5.944	-0.356
10.012	S32 2880	Winter	1	+0%	30/960 Winter				5.938	-0.315
10.013	S33 2880	Winter	1	+0%	30/240 Winter				5.938	-0.162
10.014	S34 2880	Winter	1	+0%	1/15 Winter				5.938	0.313

.	Land at Yatton
.	Catchments A+B+D @ 2 l/s/ha
.	No Surcharge
Date 16/03/2023 12:30	Designed by RJH
File CATCHMENTS A+B+D.MDX	Checked by



Innovyze Network 2018.1

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

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Cap.	Flow (l/s)	Overflow (l/s)		
10.000	S20	0.000	0.16	10.7		OK	
11.000	S21/1	0.000	0.13	8.7		OK	
10.001	S21	0.000	0.18	21.7		OK	
10.002	S22	0.000	0.16	23.9		OK	
12.000	S23/2	0.000	0.07	4.2		OK	
12.001	S23/1	0.000	0.15	9.7		OK	
10.003	S23	0.000	0.21	38.0		OK	
13.000	S24/3	0.000	0.06	4.0		OK	
13.001	S24/2	0.000	0.18	12.0		OK	
13.002	S24/1	0.000	0.25	15.3		OK	
10.004	S24	0.000	0.22	54.8		OK	
10.005	S25	0.000	0.25	55.6		OK	
10.006	S26	0.000	0.24	56.8		OK	
14.000	S27/1	0.000	0.11	6.8		OK	
10.007	S27	0.000	0.23	57.9		OK	
15.000	S28/2	0.000	0.11	7.2		OK	
15.001	S28/1	0.000	0.18	11.6		OK	
10.008	S28	0.000	0.28	64.8		OK	
10.009	S29	0.000	0.30	65.4		OK	
10.010	S30	0.000	0.27	67.0		OK	
16.000	S31/1	0.000	0.12	8.1		OK	
16.001	S31/2	0.000	0.21	13.5		OK	
16.002	S31/3	0.000	0.27	17.3		OK	
16.003	S31/4	0.000	0.30	17.3		OK	
10.011	S31	0.000	0.33	76.1		OK	
10.012	S32	0.000	0.03	7.2		OK	
10.013	S33	0.000	0.01	1.8		OK	
10.014	S34	0.000	0.02	1.5	SURCHARGED		

.	Land at Yatton
.	Catchments A+B+D @ 2 l/s/ha
.	No Surcharge
Date 16/03/2023 12:30	Designed by RJH
File CATCHMENTS A+B+D.MDX	Checked by



Innovyze Network 2018.1

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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 F (1km) 2.426
 FEH Rainfall Version 1999 D2 (1km) 0.381 Cv (Summer) 0.750
 Site Location D3 (1km) 0.330 Cv (Winter) 0.840
 C (1km) -0.028 E (1km) 0.295

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
10.000	S20	15 Winter	30	+0%	100/15 Summer				6.754	-0.151
11.000	S21/1	15 Winter	30	+0%	100/15 Summer				6.704	-0.167
10.001	S21	15 Winter	30	+0%	100/15 Summer				6.652	-0.069
10.002	S22	15 Winter	30	+0%	100/15 Summer				6.638	-0.055
12.000	S23/2	15 Winter	30	+0%	100/15 Summer				6.767	-0.188
12.001	S23/1	15 Winter	30	+0%	100/15 Summer				6.734	-0.144
10.003	S23	15 Winter	30	+0%	100/15 Summer				6.606	-0.047
13.000	S24/3	15 Winter	30	+0%	100/15 Summer				6.831	-0.175
13.001	S24/2	15 Winter	30	+0%	100/15 Summer				6.812	-0.119
13.002	S24/1	15 Winter	30	+0%	100/15 Summer				6.667	-0.081
10.004	S24	15 Winter	30	+0%	100/15 Summer				6.533	-0.125
10.005	S25	15 Winter	30	+0%	100/15 Summer				6.490	-0.111
10.006	S26	15 Winter	30	+0%	100/15 Summer				6.454	-0.102
14.000	S27/1	15 Winter	30	+0%	100/15 Summer				6.431	-0.181
10.007	S27	15 Winter	30	+0%	100/15 Summer				6.411	-0.097
15.000	S28/2	15 Winter	30	+0%	100/15 Summer				6.428	-0.177
15.001	S28/1	15 Winter	30	+0%	100/15 Summer				6.377	-0.091
10.008	S28	2880 Winter	30	+0%	100/15 Summer				6.359	-0.089
10.009	S29	2880 Winter	30	+0%	100/15 Summer				6.359	-0.043
10.010	S30	2880 Winter	30	+0%	30/2880 Winter				6.359	0.001
16.000	S31/1	15 Winter	30	+0%	100/15 Summer				6.471	-0.170
16.001	S31/2	15 Winter	30	+0%	100/15 Summer				6.378	-0.111
16.002	S31/3	2880 Winter	30	+0%	100/15 Summer				6.359	-0.008
16.003	S31/4	2880 Winter	30	+0%	30/960 Winter				6.358	0.080
10.011	S31	2880 Winter	30	+0%	30/1440 Winter				6.359	0.059
10.012	S32	2880 Winter	30	+0%	30/960 Winter				6.359	0.106
10.013	S33	2880 Winter	30	+0%	30/240 Winter				6.359	0.259
10.014	S34	2880 Winter	30	+0%	1/15 Winter				6.367	0.742

.	Land at Yatton
.	Catchments A+B+D @ 2 l/s/ha
.	No Surcharge
Date 16/03/2023 12:30	Designed by RJH
File CATCHMENTS A+B+D.MDX	Checked by
Innovyze	Network 2018.1



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

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)	Flow (l/s)		
10.000	S20	0.000	0.48		32.1	OK	
11.000	S21/1	0.000	0.40		26.4	OK	
10.001	S21	0.000	0.48		58.5	OK	
10.002	S22	0.000	0.45		67.4	OK	
12.000	S23/2	0.000	0.21		13.1	OK	
12.001	S23/1	0.000	0.51		33.3	OK	
10.003	S23	0.000	0.62		114.3	OK	
13.000	S24/3	0.000	0.20		12.4	OK	
13.001	S24/2	0.000	0.64		43.0	OK	
13.002	S24/1	0.000	0.88		54.1	OK	
10.004	S24	0.000	0.69		170.6	OK	
10.005	S25	0.000	0.76		170.3	OK	
10.006	S26	0.000	0.74		173.7	OK	
14.000	S27/1	0.000	0.32		20.9	OK	
10.007	S27	0.000	0.70		174.1	OK	
15.000	S28/2	0.000	0.34		22.4	OK	
15.001	S28/1	0.000	0.60		38.2	OK	
10.008	S28	0.000	0.04		8.8	OK	
10.009	S29	0.000	0.04		9.1	OK	
10.010	S30	0.000	0.04		9.4	SURCHARGED	
16.000	S31/1	0.000	0.38		24.9	OK	
16.001	S31/2	0.000	0.70		45.1	OK	
16.002	S31/3	0.000	0.03		1.7	OK	
16.003	S31/4	0.000	0.03		1.7	SURCHARGED	
10.011	S31	0.000	0.05		11.3	SURCHARGED	
10.012	S32	0.000	0.04		12.2	SURCHARGED	
10.013	S33	0.000	0.01		2.0	SURCHARGED	
10.014	S34	0.000	0.02		1.6	SURCHARGED	

.	Land at Yatton
.	Catchments A+B+D @ 2 l/s/ha
.	No Surcharge
Date 16/03/2023 12:30	Designed by RJH
File CATCHMENTS A+B+D.MDX	Checked by
Innovyze	Network 2018.1



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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 F (1km) 2.426
 FEH Rainfall Version 1999 D2 (1km) 0.381 Cv (Summer) 0.750
 Site Location D3 (1km) 0.330 Cv (Winter) 0.840
 C (1km) -0.028 E (1km) 0.295

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
10.000	S20	15 Winter	100	+40%	100/15 Summer				7.819	0.914
11.000	S21/1	15 Winter	100	+40%	100/15 Summer				7.810	0.939
10.001	S21	15 Winter	100	+40%	100/15 Summer				7.732	1.011
10.002	S22	15 Winter	100	+40%	100/15 Summer				7.710	1.017
12.000	S23/2	15 Winter	100	+40%	100/15 Summer				7.796	0.841
12.001	S23/1	15 Winter	100	+40%	100/15 Summer				7.777	0.899
10.003	S23	15 Winter	100	+40%	100/15 Summer				7.682	1.029
13.000	S24/3	15 Winter	100	+40%	100/15 Summer				7.870	0.864
13.001	S24/2	15 Winter	100	+40%	100/15 Summer				7.853	0.922
13.002	S24/1	15 Winter	100	+40%	100/15 Summer				7.735	0.987
10.004	S24	15 Winter	100	+40%	100/15 Summer				7.634	0.976
10.005	S25	15 Winter	100	+40%	100/15 Summer				7.578	0.977
10.006	S26	15 Winter	100	+40%	100/15 Summer				7.516	0.960
14.000	S27/1	15 Winter	100	+40%	100/15 Summer				7.520	0.908
10.007	S27	15 Winter	100	+40%	100/15 Summer				7.439	0.931
15.000	S28/2	15 Winter	100	+40%	100/15 Summer				7.492	0.887
15.001	S28/1	15 Winter	100	+40%	100/15 Summer				7.412	0.944
10.008	S28	15 Winter	100	+40%	100/15 Summer				7.329	0.881
10.009	S29	15 Winter	100	+40%	100/15 Summer				7.169	0.767
10.010	S30	15 Winter	100	+40%	30/2880 Winter				6.996	0.638
16.000	S31/1	15 Winter	100	+40%	100/15 Summer				7.343	0.702
16.001	S31/2	15 Winter	100	+40%	100/15 Summer				7.266	0.777
16.002	S31/3	15 Winter	100	+40%	100/15 Summer				7.091	0.724
16.003	S31/4	2880 Winter	100	+40%	30/960 Winter				6.925	0.647
10.011	S31	2880 Winter	100	+40%	30/1440 Winter				6.925	0.625
10.012	S32	4320 Winter	100	+40%	30/960 Winter				6.925	0.672
10.013	S33	4320 Winter	100	+40%	30/240 Winter				6.925	0.825
10.014	S34	4320 Winter	100	+40%	1/15 Winter				6.933	1.308

.	Land at Yatton
.	Catchments A+B+D @ 2 l/s/ha
.	No Surcharge
Date 16/03/2023 12:30	Designed by RJH
File CATCHMENTS A+B+D.MDX	Checked by
Innovyze	Network 2018.1



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

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
10.000	S20	0.000	0.95	63.1		SURCHARGED	
11.000	S21/1	0.000	0.78	51.1		SURCHARGED	
10.001	S21	0.000	0.89	107.9		SURCHARGED	
10.002	S22	0.000	0.82	122.3		SURCHARGED	
12.000	S23/2	0.000	0.39	24.1		SURCHARGED	
12.001	S23/1	0.000	0.93	60.1		SURCHARGED	
10.003	S23	0.000	1.10	203.6		SURCHARGED	
13.000	S24/3	0.000	0.36	22.1		SURCHARGED	
13.001	S24/2	0.000	1.19	79.4		SURCHARGED	
13.002	S24/1	0.000	1.55	95.0		SURCHARGED	
10.004	S24	0.000	1.26	311.2		SURCHARGED	
10.005	S25	0.000	1.44	321.4		SURCHARGED	
10.006	S26	0.000	1.41	329.3		SURCHARGED	
14.000	S27/1	0.000	0.62	40.5		SURCHARGED	
10.007	S27	0.000	1.41	350.3		SURCHARGED	
15.000	S28/2	0.000	0.63	41.1		SURCHARGED	
15.001	S28/1	0.000	1.02	64.2		SURCHARGED	
10.008	S28	0.000	1.77	402.5		SURCHARGED	
10.009	S29	0.000	1.86	413.0		SURCHARGED	
10.010	S30	0.000	1.71	423.0		SURCHARGED	
16.000	S31/1	0.000	0.72	47.5		SURCHARGED	
16.001	S31/2	0.000	1.30	84.4		SURCHARGED	
16.002	S31/3	0.000	1.74	109.5		SURCHARGED	
16.003	S31/4	0.000	0.05	3.0		SURCHARGED	
10.011	S31	0.000	0.09	20.8		SURCHARGED	
10.012	S32	0.000	0.06	16.2		SURCHARGED	
10.013	S33	0.000	0.01	2.4		SURCHARGED	
10.014	S34	0.000	0.02	2.0		SURCHARGED	

Existing Network Details 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
10.000	44.200	0.184	240.2	0.081	4.00	0.0	0.600	o	300	Pipe/Conduit
11.000	36.100	0.150	240.7	0.066	4.00	0.0	0.600	o	300	Pipe/Conduit
10.001	13.800	0.028	492.9	0.026	0.00	0.0	0.600	o	525	Pipe/Conduit
10.002	20.200	0.040	505.0	0.038	0.00	0.0	0.600	o	525	Pipe/Conduit
12.000	18.500	0.077	240.3	0.035	5.00	0.0	0.600	o	300	Pipe/Conduit
12.001	28.200	0.118	239.0	0.052	0.00	0.0	0.600	o	300	Pipe/Conduit
10.003	34.900	0.070	498.6	0.064	0.00	0.0	0.600	o	525	Pipe/Conduit
13.000	18.200	0.075	242.7	0.033	5.00	0.0	0.600	o	300	Pipe/Conduit
13.001	43.800	0.183	239.3	0.080	0.00	0.0	0.600	o	300	Pipe/Conduit
13.002	18.000	0.075	240.0	0.033	0.00	0.0	0.600	o	300	Pipe/Conduit
10.004	28.400	0.057	498.2	0.052	0.00	0.0	0.600	o	600	Pipe/Conduit
10.005	22.700	0.045	504.4	0.042	0.00	0.0	0.600	o	600	Pipe/Conduit
10.006	24.200	0.048	504.2	0.044	0.00	0.0	0.600	o	600	Pipe/Conduit
14.000	30.500	0.127	240.2	0.056	5.00	0.0	0.600	o	300	Pipe/Conduit
10.007	30.200	0.060	503.3	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit
15.000	32.800	0.137	239.4	0.060	5.00	0.0	0.600	o	300	Pipe/Conduit
15.001	22.800	0.095	240.0	0.042	0.00	0.0	0.600	o	300	Pipe/Conduit
10.008	23.100	0.046	502.2	0.042	0.00	0.0	0.600	o	600	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
10.000	6.605	0.081	0.0	1.01	71.4
11.000	6.571	0.066	0.0	1.01	71.3
10.001	6.196	0.173	0.0	1.00	216.9
10.002	6.168	0.211	0.0	0.99	214.3
12.000	6.655	0.035	0.0	1.01	71.4
12.001	6.578	0.087	0.0	1.01	71.6
10.003	6.128	0.362	0.0	1.00	215.7
13.000	6.706	0.033	0.0	1.00	71.0
13.001	6.631	0.113	0.0	1.01	71.5
13.002	6.448	0.146	0.0	1.01	71.4
10.004	6.058	0.560	0.0	1.08	306.5
10.005	6.001	0.602	0.0	1.08	304.6
10.006	5.956	0.646	0.0	1.08	304.7
14.000	6.312	0.056	0.0	1.01	71.4
10.007	5.908	0.702	0.0	1.08	305.0
15.000	6.305	0.060	0.0	1.01	71.5
15.001	6.168	0.102	0.0	1.01	71.4
10.008	5.848	0.846	0.0	1.08	305.3

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Land at Yatton
 Catchments A+B+D @ 2 l/s/ha
 Surcharged Outfall



Date 16/03/2023 11:57
 File CATCHMENTS A+B+D.MDX

Designed by RJH
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Existing Network Details 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
10.009	21.800	0.044	495.5	0.041	0.00	0.0	0.600	o	600	Pipe/Conduit
10.010	29.100	0.058	501.7	0.053	0.00	0.0	0.600	o	600	Pipe/Conduit
16.000	36.500	0.152	240.1	0.067	5.00	0.0	0.600	o	300	Pipe/Conduit
16.001	29.300	0.122	240.2	0.054	0.00	0.0	0.600	o	300	Pipe/Conduit
16.002	21.300	0.089	239.3	0.039	0.00	0.0	0.600	o	300	Pipe/Conduit
16.003	12.800	0.053	241.5	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit
10.011	23.400	0.047	497.9	0.043	0.00	0.0	0.600	o	600	Pipe/Conduit
10.012	55.200	0.110	501.8	0.101	0.00	0.0	0.600	o	600	Pipe/Conduit
10.013	10.800	0.100	108.0	0.000	0.00	0.0	0.600	o	600	Pipe/Conduit
10.014	22.600	0.800	28.3	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit

Network Results Table

PN	US/IL (m)	I.Area (ha)	Base Flow (l/s)	Vel (m/s)	Cap (l/s)
10.009	5.802	0.887	0.0	1.09	307.4
10.010	5.758	0.940	0.0	1.08	305.5
16.000	6.341	0.067	0.0	1.01	71.4
16.001	6.189	0.121	0.0	1.01	71.4
16.002	6.067	0.160	0.0	1.01	71.5
16.003	5.978	0.160	0.0	1.01	71.2
10.011	5.700	1.143	0.0	1.08	306.6
10.012	5.653	1.244	0.0	1.08	305.4
10.013	5.500	1.244	0.0	2.34	662.5
10.014	5.400	1.244	0.0	2.47	98.3

.	Land at Yatton
.	Catchments A+B+D @ 2 l/s/ha
.	Surcharged Outfall
Date 16/03/2023 11:57	Designed by RJH
File CATCHMENTS A+B+D.MDX	Checked by
Innovyze	Network 2018.1



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)
10.000	o	300	S20	8.300	6.605	1.395	Open Manhole	1200
11.000	o	300	S21/1	8.300	6.571	1.429	Open Manhole	1200
10.001	o	525	S21	8.200	6.196	1.479	Open Manhole	1800
10.002	o	525	S22	8.300	6.168	1.607	Open Manhole	1800
12.000	o	300	S23/2	8.620	6.655	1.665	Open Manhole	1200
12.001	o	300	S23/1	8.500	6.578	1.622	Open Manhole	1200
10.003	o	525	S23	8.350	6.128	1.697	Open Manhole	1800
13.000	o	300	S24/3	8.400	6.706	1.394	Open Manhole	1200
13.001	o	300	S24/2	8.300	6.631	1.369	Open Manhole	1500
13.002	o	300	S24/1	8.250	6.448	1.502	Open Manhole	1200
10.004	o	600	S24	8.100	6.058	1.442	Open Manhole	1800
10.005	o	600	S25	8.100	6.001	1.499	Open Manhole	1800
10.006	o	600	S26	8.200	5.956	1.644	Open Manhole	1800
14.000	o	300	S27/1	8.100	6.312	1.488	Open Manhole	1200
10.007	o	600	S27	8.000	5.908	1.492	Open Manhole	1800
15.000	o	300	S28/2	7.900	6.305	1.295	Open Manhole	1500
15.001	o	300	S28/1	8.200	6.168	1.732	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)
10.000	44.200	240.2	S21	8.200	6.421	1.479	Open Manhole	1800
11.000	36.100	240.7	S21	8.200	6.421	1.479	Open Manhole	1800
10.001	13.800	492.9	S22	8.300	6.168	1.607	Open Manhole	1800
10.002	20.200	505.0	S23	8.350	6.128	1.697	Open Manhole	1800
12.000	18.500	240.3	S23/1	8.500	6.578	1.622	Open Manhole	1200
12.001	28.200	239.0	S23	8.350	6.460	1.590	Open Manhole	1800
10.003	34.900	498.6	S24	8.100	6.058	1.517	Open Manhole	1800
13.000	18.200	242.7	S24/2	8.300	6.631	1.369	Open Manhole	1500
13.001	43.800	239.3	S24/1	8.250	6.448	1.502	Open Manhole	1200
13.002	18.000	240.0	S24	8.100	6.373	1.427	Open Manhole	1800
10.004	28.400	498.2	S25	8.100	6.001	1.499	Open Manhole	1800
10.005	22.700	504.4	S26	8.200	5.956	1.644	Open Manhole	1800
10.006	24.200	504.2	S27	8.000	5.908	1.492	Open Manhole	1800
14.000	30.500	240.2	S27	8.000	6.185	1.515	Open Manhole	1800
10.007	30.200	503.3	S28	8.000	5.848	1.552	Open Manhole	1800
15.000	32.800	239.4	S28/1	8.200	6.168	1.732	Open Manhole	1200
15.001	22.800	240.0	S28	8.000	6.073	1.627	Open Manhole	1800

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Land at Yatton
Catchments A+B+D @ 2 l/s/ha
Surcharged Outfall



Date 16/03/2023 11:57
File CATCHMENTS A+B+D.MDX

Designed by RJH
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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)
10.008	o	600	S28	8.000	5.848	1.552	Open Manhole	1800
10.009	o	600	S29	8.000	5.802	1.598	Open Manhole	1800
10.010	o	600	S30	8.000	5.758	1.642	Open Manhole	1800
16.000	o	300	S31/1	8.150	6.341	1.509	Open Manhole	1200
16.001	o	300	S31/2	8.000	6.189	1.511	Open Manhole	1200
16.002	o	300	S31/3	8.300	6.067	1.933	Open Manhole	1200
16.003	o	300	S31/4	8.350	5.978	2.072	Open Manhole	1200
10.011	o	600	S31	8.200	5.700	1.900	Open Manhole	1800
10.012	o	600	S32	8.000	5.653	1.747	Open Manhole	1800
10.013	o	600	S33	8.000	5.500	1.900	Open Manhole	1800
10.014	o	225	S34	8.000	5.400	2.375	Open Manhole	2100

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)
10.008	23.100	502.2	S29	8.000	5.802	1.598	Open Manhole	1800
10.009	21.800	495.5	S30	8.000	5.758	1.642	Open Manhole	1800
10.010	29.100	501.7	S31	8.200	5.700	1.900	Open Manhole	1800
16.000	36.500	240.1	S31/2	8.000	6.189	1.511	Open Manhole	1200
16.001	29.300	240.2	S31/3	8.300	6.067	1.933	Open Manhole	1200
16.002	21.300	239.3	S31/4	8.350	5.978	2.072	Open Manhole	1200
16.003	12.800	241.5	S31	8.200	5.925	1.975	Open Manhole	1800
10.011	23.400	497.9	S32	8.000	5.653	1.747	Open Manhole	1800
10.012	55.200	501.8	S33	8.000	5.543	1.857	Open Manhole	1800
10.013	10.800	108.0	S34	8.000	5.400	2.000	Open Manhole	2100
10.014	22.600	28.3		5.250	4.600	0.425	Open Manhole	0

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
10.014		5.250	4.600	0.000	0	0
Datum (m)		0.000	Offset (mins)		0	

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	7.900	13	7.900	25	7.900	37	7.900	49	7.900	61	7.900	73	7.900	85	7.900
2	7.900	14	7.900	26	7.900	38	7.900	50	7.900	62	7.900	74	7.900	86	7.900
3	7.900	15	7.900	27	7.900	39	7.900	51	7.900	63	7.900	75	7.900	87	7.900
4	7.900	16	7.900	28	7.900	40	7.900	52	7.900	64	7.900	76	7.900	88	7.900
5	7.900	17	7.900	29	7.900	41	7.900	53	7.900	65	7.900	77	7.900	89	7.900
6	7.900	18	7.900	30	7.900	42	7.900	54	7.900	66	7.900	78	7.900	90	7.900
7	7.900	19	7.900	31	7.900	43	7.900	55	7.900	67	7.900	79	7.900	91	7.900
8	7.900	20	7.900	32	7.900	44	7.900	56	7.900	68	7.900	80	7.900	92	7.900
9	7.900	21	7.900	33	7.900	45	7.900	57	7.900	69	7.900	81	7.900	93	7.900
10	7.900	22	7.900	34	7.900	46	7.900	58	7.900	70	7.900	82	7.900	94	7.900
11	7.900	23	7.900	35	7.900	47	7.900	59	7.900	71	7.900	83	7.900	95	7.900
12	7.900	24	7.900	36	7.900	48	7.900	60	7.900	72	7.900	84	7.900	96	7.900

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Land at Yatton
Catchments A+B+D @ 2 l/s/ha
Surcharged Outfall



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Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
9857	7.900	9885	7.900	9913	7.900	9941	7.900	9969	7.900	9997	7.900	10025	7.900
9858	7.900	9886	7.900	9914	7.900	9942	7.900	9970	7.900	9998	7.900	10026	7.900
9859	7.900	9887	7.900	9915	7.900	9943	7.900	9971	7.900	9999	7.900	10027	7.900
9860	7.900	9888	7.900	9916	7.900	9944	7.900	9972	7.900	10000	7.900	10028	7.900
9861	7.900	9889	7.900	9917	7.900	9945	7.900	9973	7.900	10001	7.900	10029	7.900
9862	7.900	9890	7.900	9918	7.900	9946	7.900	9974	7.900	10002	7.900	10030	7.900
9863	7.900	9891	7.900	9919	7.900	9947	7.900	9975	7.900	10003	7.900	10031	7.900
9864	7.900	9892	7.900	9920	7.900	9948	7.900	9976	7.900	10004	7.900	10032	7.900
9865	7.900	9893	7.900	9921	7.900	9949	7.900	9977	7.900	10005	7.900	10033	7.900
9866	7.900	9894	7.900	9922	7.900	9950	7.900	9978	7.900	10006	7.900	10034	7.900
9867	7.900	9895	7.900	9923	7.900	9951	7.900	9979	7.900	10007	7.900	10035	7.900
9868	7.900	9896	7.900	9924	7.900	9952	7.900	9980	7.900	10008	7.900	10036	7.900
9869	7.900	9897	7.900	9925	7.900	9953	7.900	9981	7.900	10009	7.900	10037	7.900
9870	7.900	9898	7.900	9926	7.900	9954	7.900	9982	7.900	10010	7.900	10038	7.900
9871	7.900	9899	7.900	9927	7.900	9955	7.900	9983	7.900	10011	7.900	10039	7.900
9872	7.900	9900	7.900	9928	7.900	9956	7.900	9984	7.900	10012	7.900	10040	7.900
9873	7.900	9901	7.900	9929	7.900	9957	7.900	9985	7.900	10013	7.900	10041	7.900
9874	7.900	9902	7.900	9930	7.900	9958	7.900	9986	7.900	10014	7.900	10042	7.900
9875	7.900	9903	7.900	9931	7.900	9959	7.900	9987	7.900	10015	7.900	10043	7.900
9876	7.900	9904	7.900	9932	7.900	9960	7.900	9988	7.900	10016	7.900	10044	7.900
9877	7.900	9905	7.900	9933	7.900	9961	7.900	9989	7.900	10017	7.900	10045	7.900
9878	7.900	9906	7.900	9934	7.900	9962	7.900	9990	7.900	10018	7.900	10046	7.900
9879	7.900	9907	7.900	9935	7.900	9963	7.900	9991	7.900	10019	7.900	10047	7.900
9880	7.900	9908	7.900	9936	7.900	9964	7.900	9992	7.900	10020	7.900	10048	7.900
9881	7.900	9909	7.900	9937	7.900	9965	7.900	9993	7.900	10021	7.900	10049	7.900
9882	7.900	9910	7.900	9938	7.900	9966	7.900	9994	7.900	10022	7.900	10050	7.900
9883	7.900	9911	7.900	9939	7.900	9967	7.900	9995	7.900	10023	7.900	10051	7.900
9884	7.900	9912	7.900	9940	7.900	9968	7.900	9996	7.900	10024	7.900	10052	7.900

Simulation Criteria for Storm

Volumetric Runoff Coeff 0.750 Additional Flow - % of Total Flow 0.000
Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 0.000
Hot Start (mins) 0 Inlet Coefficient 0.800
Hot Start Level (mm) 0 Flow per Person per Day (l/per/day) 0.000
Manhole Headloss Coeff (Global) 0.500 Run Time (mins) 60
Foul Sewage per hectare (l/s) 0.000 Output Interval (mins) 1

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 Summer Storms Yes
Return Period (years) 100 D2 (1km) 0.381 Winter Storms No
FEH Rainfall Version 1999 D3 (1km) 0.330 Cv (Summer) 0.750
Site Location E (1km) 0.295 Cv (Winter) 0.840
C (1km) -0.028 F (1km) 2.426 Storm Duration (mins) 30

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Land at Yatton
Catchments A+B+D @ 2 l/s/ha
Surcharged Outfall



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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S34, DS/PN: 10.014, Volume (m³): 11.5

Unit Reference MD-SHE-0060-2400-2300-2400
Design Head (m) 2.300
Design Flow (l/s) 2.4
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 60
Invert Level (m) 5.400
Minimum Outlet Pipe Diameter (mm) 75
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.300	2.4	Kick-Flo®	0.540	1.2
Flush-Flo™	0.263	1.5	Mean Flow over Head Range	-	1.8

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.3	0.800	1.5	2.000	2.2	4.000	3.1	7.000	4.0
0.200	1.5	1.000	1.6	2.200	2.3	4.500	3.3	7.500	4.1
0.300	1.5	1.200	1.8	2.400	2.4	5.000	3.4	8.000	4.3
0.400	1.5	1.400	1.9	2.600	2.5	5.500	3.6	8.500	4.4
0.500	1.4	1.600	2.0	3.000	2.7	6.000	3.7	9.000	4.5
0.600	1.3	1.800	2.1	3.500	2.9	6.500	3.9	9.500	4.6

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Land at Yatton
Catchments A+B+D @ 2 l/s/ha
Surcharged Outfall



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Storage Structures for Storm

Tank or Pond Manhole: S33, DS/PN: 10.013

Invert Level (m) 5.500

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	501.0	1.200	1086.0	2.400	1762.0	3.600	1762.0	4.800	1762.0
0.200	583.0	1.400	1207.0	2.600	1762.0	3.800	1762.0	5.000	1762.0
0.400	671.0	1.600	1336.0	2.800	1762.0	4.000	1762.0		
0.600	765.0	1.800	1472.0	3.000	1762.0	4.200	1762.0		
0.800	865.0	2.000	1615.0	3.200	1762.0	4.400	1762.0		
1.000	972.0	2.200	1762.0	3.400	1762.0	4.600	1762.0		

.	Land at Yatton
.	Catchments A+B+D @ 2 l/s/ha
.	Surcharged Outfall
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1 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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 F (1km) 2.426
 FEH Rainfall Version 1999 D2 (1km) 0.381 Cv (Summer) 0.750
 Site Location D3 (1km) 0.330 Cv (Winter) 0.840
 C (1km) -0.028 E (1km) 0.295

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
10.000	S20	15 Winter	1	+0%	100/15 Summer				6.685	-0.220
11.000	S21/1	15 Winter	1	+0%	100/15 Summer				6.643	-0.228
10.001	S21	10080 Winter	1	+0%	30/7200 Winter				6.415	-0.306
10.002	S22	10080 Winter	1	+0%	30/5760 Winter				6.415	-0.278
12.000	S23/2	15 Winter	1	+0%	100/15 Summer				6.709	-0.246
12.001	S23/1	15 Winter	1	+0%	100/15 Summer				6.655	-0.223
10.003	S23	10080 Winter	1	+0%	30/4320 Winter				6.415	-0.238
13.000	S24/3	15 Winter	1	+0%	100/15 Summer				6.762	-0.244
13.001	S24/2	15 Winter	1	+0%	100/15 Summer				6.718	-0.213
13.002	S24/1	15 Winter	1	+0%	30/7200 Winter				6.550	-0.198
10.004	S24	10080 Winter	1	+0%	30/5760 Winter				6.415	-0.243
10.005	S25	10080 Winter	1	+0%	30/4320 Winter				6.415	-0.186
10.006	S26	10080 Winter	1	+0%	30/2880 Winter				6.415	-0.141
14.000	S27/1	10080 Winter	1	+0%	30/4320 Winter				6.415	-0.197
10.007	S27	10080 Winter	1	+0%	30/2160 Winter				6.415	-0.093
15.000	S28/2	10080 Winter	1	+0%	30/4320 Winter				6.415	-0.190
15.001	S28/1	10080 Winter	1	+0%	30/2160 Winter				6.415	-0.053
10.008	S28	10080 Winter	1	+0%	30/2160 Winter				6.415	-0.033
10.009	S29	10080 Winter	1	+0%	1/10080 Winter				6.415	0.013
10.010	S30	10080 Winter	1	+0%	1/8640 Winter				6.415	0.057
16.000	S31/1	10080 Winter	1	+0%	30/4320 Winter				6.415	-0.226
16.001	S31/2	10080 Winter	1	+0%	30/2160 Winter				6.415	-0.074
16.002	S31/3	10080 Winter	1	+0%	1/8640 Winter				6.415	0.048
16.003	S31/4	10080 Winter	1	+0%	1/5760 Winter				6.415	0.137
10.011	S31	10080 Winter	1	+0%	1/7200 Winter				6.415	0.115
10.012	S32	10080 Winter	1	+0%	1/5760 Winter				6.415	0.162
10.013	S33	10080 Winter	1	+0%	1/2160 Winter				6.415	0.315
10.014	S34	10080 Winter	1	+0%	1/15 Winter				6.423	0.798

.	Land at Yatton
.	Catchments A+B+D @ 2 l/s/ha
.	Surcharged Outfall
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1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
10.000	S20	0.000	0.16		10.7	OK	
11.000	S21/1	0.000	0.13		8.7	OK	
10.001	S21	0.000	0.00		0.4	OK	
10.002	S22	0.000	0.00		0.5	OK	
12.000	S23/2	0.000	0.07		4.2	OK	
12.001	S23/1	0.000	0.15		9.7	OK	
10.003	S23	0.000	0.00		0.9	OK	
13.000	S24/3	0.000	0.06		4.0	OK	
13.001	S24/2	0.000	0.18		12.0	OK	
13.002	S24/1	0.000	0.25		15.3	OK	
10.004	S24	0.000	0.01		1.4	OK	
10.005	S25	0.000	0.01		1.5	OK	
10.006	S26	0.000	0.01		1.6	OK	
14.000	S27/1	0.000	0.00		0.1	OK	
10.007	S27	0.000	0.01		1.7	OK	
15.000	S28/2	0.000	0.00		0.2	OK	
15.001	S28/1	0.000	0.00		0.3	OK	
10.008	S28	0.000	0.01		2.0	OK	
10.009	S29	0.000	0.01		2.1	SURCHARGED	
10.010	S30	0.000	0.01		2.1	SURCHARGED	
16.000	S31/1	0.000	0.00		0.2	OK	
16.001	S31/2	0.000	0.00		0.3	OK	
16.002	S31/3	0.000	0.01		0.4	SURCHARGED	
16.003	S31/4	0.000	0.01		0.4	SURCHARGED	
10.011	S31	0.000	0.01		2.6	SURCHARGED	
10.012	S32	0.000	0.01		2.8	SURCHARGED	
10.013	S33	0.000	0.01		2.1	SURCHARGED	
10.014	S34	0.000	0.02		1.6	SURCHARGED	

.	Land at Yatton
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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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 F (1km) 2.426
 FEH Rainfall Version 1999 D2 (1km) 0.381 Cv (Summer) 0.750
 Site Location D3 (1km) 0.330 Cv (Winter) 0.840
 C (1km) -0.028 E (1km) 0.295

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
10.000	S20	10080 Winter	30	+0%	100/15 Summer				6.841	-0.064
11.000	S21/1	10080 Winter	30	+0%	100/15 Summer				6.841	-0.030
10.001	S21	10080 Winter	30	+0%	30/7200 Winter				6.841	0.120
10.002	S22	10080 Winter	30	+0%	30/5760 Winter				6.841	0.148
12.000	S23/2	10080 Winter	30	+0%	100/15 Summer				6.841	-0.114
12.001	S23/1	10080 Winter	30	+0%	100/15 Summer				6.841	-0.037
10.003	S23	10080 Winter	30	+0%	30/4320 Winter				6.841	0.188
13.000	S24/3	10080 Winter	30	+0%	100/15 Summer				6.841	-0.165
13.001	S24/2	10080 Winter	30	+0%	100/15 Summer				6.841	-0.090
13.002	S24/1	10080 Winter	30	+0%	30/7200 Winter				6.841	0.093
10.004	S24	10080 Winter	30	+0%	30/5760 Winter				6.841	0.183
10.005	S25	10080 Winter	30	+0%	30/4320 Winter				6.841	0.240
10.006	S26	10080 Winter	30	+0%	30/2880 Winter				6.841	0.285
14.000	S27/1	10080 Winter	30	+0%	30/4320 Winter				6.841	0.229
10.007	S27	10080 Winter	30	+0%	30/2160 Winter				6.841	0.333
15.000	S28/2	10080 Winter	30	+0%	30/4320 Winter				6.841	0.236
15.001	S28/1	10080 Winter	30	+0%	30/2160 Winter				6.841	0.373
10.008	S28	10080 Winter	30	+0%	30/2160 Winter				6.841	0.393
10.009	S29	10080 Winter	30	+0%	1/10080 Winter				6.841	0.439
10.010	S30	10080 Winter	30	+0%	1/8640 Winter				6.841	0.483
16.000	S31/1	10080 Winter	30	+0%	30/4320 Winter				6.841	0.200
16.001	S31/2	10080 Winter	30	+0%	30/2160 Winter				6.841	0.352
16.002	S31/3	10080 Winter	30	+0%	1/8640 Winter				6.842	0.475
16.003	S31/4	10080 Winter	30	+0%	1/5760 Winter				6.842	0.564
10.011	S31	10080 Winter	30	+0%	1/7200 Winter				6.842	0.542
10.012	S32	10080 Winter	30	+0%	1/5760 Winter				6.842	0.589
10.013	S33	10080 Winter	30	+0%	1/2160 Winter				6.842	0.742
10.014	S34	10080 Winter	30	+0%	1/15 Winter				6.849	1.224

.	Land at Yatton
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.	Surcharged Outfall
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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
10.000	S20	0.000	0.01	0.3		OK	
11.000	S21/1	0.000	0.00	0.3		OK	
10.001	S21	0.000	0.01	0.7		SURCHARGED	
10.002	S22	0.000	0.01	0.9		SURCHARGED	
12.000	S23/2	0.000	0.00	0.1		OK	
12.001	S23/1	0.000	0.01	0.4		OK	
10.003	S23	0.000	0.01	1.5		SURCHARGED	
13.000	S24/3	0.000	0.00	0.1		OK	
13.001	S24/2	0.000	0.01	0.5		OK	
13.002	S24/1	0.000	0.01	0.6		SURCHARGED	
10.004	S24	0.000	0.01	2.3		SURCHARGED	
10.005	S25	0.000	0.01	2.5		SURCHARGED	
10.006	S26	0.000	0.01	2.7		SURCHARGED	
14.000	S27/1	0.000	0.00	0.2		SURCHARGED	
10.007	S27	0.000	0.01	2.9		SURCHARGED	
15.000	S28/2	0.000	0.00	0.3		SURCHARGED	
15.001	S28/1	0.000	0.01	0.4		SURCHARGED	
10.008	S28	0.000	0.02	3.5		SURCHARGED	
10.009	S29	0.000	0.02	3.6		SURCHARGED	
10.010	S30	0.000	0.02	3.9		SURCHARGED	
16.000	S31/1	0.000	0.00	0.3		SURCHARGED	
16.001	S31/2	0.000	0.01	0.5		SURCHARGED	
16.002	S31/3	0.000	0.01	0.7		SURCHARGED	
16.003	S31/4	0.000	0.01	0.7		SURCHARGED	
10.011	S31	0.000	0.02	4.7		SURCHARGED	
10.012	S32	0.000	0.02	5.1		SURCHARGED	
10.013	S33	0.000	0.01	2.4		SURCHARGED	
10.014	S34	0.000	0.02	1.9		SURCHARGED	

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Land at Yatton
Catchments A+B+D @ 2 l/s/ha
Surcharged Outfall



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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 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 F (1km) 2.426
FEH Rainfall Version 1999 D2 (1km) 0.381 Cv (Summer) 0.750
Site Location D3 (1km) 0.330 Cv (Winter) 0.840
C (1km) -0.028 E (1km) 0.295

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
10.000	S20	15 Winter	100	+40%	100/15 Summer				7.819	0.914
11.000	S21/1	15 Winter	100	+40%	100/15 Summer				7.810	0.939
10.001	S21	15 Winter	100	+40%	30/7200 Winter				7.732	1.011
10.002	S22	15 Winter	100	+40%	30/5760 Winter				7.710	1.017
12.000	S23/2	15 Winter	100	+40%	100/15 Summer				7.796	0.841
12.001	S23/1	15 Winter	100	+40%	100/15 Summer				7.777	0.899
10.003	S23	15 Winter	100	+40%	30/4320 Winter				7.682	1.029
13.000	S24/3	15 Winter	100	+40%	100/15 Summer				7.870	0.864
13.001	S24/2	15 Winter	100	+40%	100/15 Summer				7.853	0.922
13.002	S24/1	15 Winter	100	+40%	30/7200 Winter				7.735	0.987
10.004	S24	15 Winter	100	+40%	30/5760 Winter				7.634	0.976
10.005	S25	15 Winter	100	+40%	30/4320 Winter				7.578	0.977
10.006	S26	15 Winter	100	+40%	30/2880 Winter				7.516	0.960
14.000	S27/1	15 Winter	100	+40%	30/4320 Winter				7.520	0.908
10.007	S27	15 Winter	100	+40%	30/2160 Winter				7.439	0.931
15.000	S28/2	15 Winter	100	+40%	30/4320 Winter				7.492	0.887
15.001	S28/1	10080 Winter	100	+40%	30/2160 Winter				7.438	0.970
10.008	S28	10080 Winter	100	+40%	30/2160 Winter				7.438	0.990
10.009	S29	10080 Winter	100	+40%	1/10080 Winter				7.438	1.036
10.010	S30	10080 Winter	100	+40%	1/8640 Winter				7.438	1.080
16.000	S31/1	10080 Winter	100	+40%	30/4320 Winter				7.438	0.797
16.001	S31/2	10080 Winter	100	+40%	30/2160 Winter				7.438	0.949
16.002	S31/3	10080 Winter	100	+40%	1/8640 Winter				7.439	1.072
16.003	S31/4	10080 Winter	100	+40%	1/5760 Winter				7.439	1.161
10.011	S31	10080 Winter	100	+40%	1/7200 Winter				7.439	1.139
10.012	S32	10080 Winter	100	+40%	1/5760 Winter				7.439	1.186
10.013	S33	10080 Winter	100	+40%	1/2160 Winter				7.439	1.339
10.014	S34	10080 Winter	100	+40%	1/15 Winter				7.445	1.820

.	Land at Yatton
.	Catchments A+B+D @ 2 l/s/ha
.	Surcharged Outfall
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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
10.000	S20	0.000	0.95	63.1		SURCHARGED	
11.000	S21/1	0.000	0.78	51.1		SURCHARGED	
10.001	S21	0.000	0.89	107.9		SURCHARGED	
10.002	S22	0.000	0.82	122.3		SURCHARGED	
12.000	S23/2	0.000	0.39	24.1		SURCHARGED	
12.001	S23/1	0.000	0.93	60.1		SURCHARGED	
10.003	S23	0.000	1.10	203.6		SURCHARGED	
13.000	S24/3	0.000	0.36	22.1		SURCHARGED	
13.001	S24/2	0.000	1.19	79.4		SURCHARGED	
13.002	S24/1	0.000	1.55	95.0		SURCHARGED	
10.004	S24	0.000	1.26	311.2		SURCHARGED	
10.005	S25	0.000	1.44	321.4		SURCHARGED	
10.006	S26	0.000	1.41	329.3		SURCHARGED	
14.000	S27/1	0.000	0.62	40.5		SURCHARGED	
10.007	S27	0.000	1.41	350.3		SURCHARGED	
15.000	S28/2	0.000	0.63	41.1		SURCHARGED	
15.001	S28/1	0.000	0.01	0.7		SURCHARGED	
10.008	S28	0.000	0.03	5.8		SURCHARGED	
10.009	S29	0.000	0.03	6.1		SURCHARGED	
10.010	S30	0.000	0.03	6.4		SURCHARGED	
16.000	S31/1	0.000	0.01	0.5		SURCHARGED	
16.001	S31/2	0.000	0.01	0.8		SURCHARGED	
16.002	S31/3	0.000	0.02	1.1		SURCHARGED	
16.003	S31/4	0.000	0.02	1.1		SURCHARGED	
10.011	S31	0.000	0.03	7.8		SURCHARGED	
10.012	S32	0.000	0.03	8.5		SURCHARGED	
10.013	S33	0.000	0.01	2.7		SURCHARGED	
10.014	S34	0.000	0.03	2.3		SURCHARGED	

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.Land at Yatton
Catchment C @ 2.0 l/s/ha
No SurchargeDate 16/03/2023 15:12
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Existing Network Details 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
20.000	17.100	0.071	240.8	0.066	4.00	0.0	0.600	o	300	Pipe/Conduit
20.001	16.700	0.070	238.6	0.064	0.00	0.0	0.600	o	300	Pipe/Conduit
20.002	13.400	0.056	239.3	0.049	0.00	0.0	0.600	o	300	Pipe/Conduit
21.000	13.400	0.056	239.3	0.049	4.00	0.0	0.600	o	300	Pipe/Conduit
21.001	41.400	-0.012	-3450.0	0.175	0.00	0.0	0.600	o	375	Pipe/Conduit
20.003	22.600	0.056	403.6	0.091	0.00	0.0	0.600	o	525	Pipe/Conduit
20.004	19.500	0.049	398.0	0.078	0.00	0.0	0.600	o	525	Pipe/Conduit
20.005	10.300	0.050	206.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit
20.006	15.600	1.725	9.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
20.000	6.500	0.066	0.0	1.01	71.3
20.001	6.429	0.130	0.0	1.01	71.6
20.002	6.359	0.179	0.0	1.01	71.5
21.000	6.572	0.049	0.0	1.01	71.5
21.001	6.441	0.224	0.0	0.00	0.0
20.003	6.153	0.494	0.0	1.11	240.0
20.004	6.097	0.572	0.0	1.12	241.7
20.005	5.900	0.572	0.0	1.09	77.2
20.006	5.850	0.572	0.0	4.38	174.1

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Land at Yatton
Catchment C @ 2.0 l/s/ha
No Surcharge



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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)
20.000	o	300	S40	8.000	6.500	1.200	Open Manhole	1200
20.001	o	300	S41	8.000	6.429	1.271	Open Manhole	1200
20.002	o	300	S42	8.000	6.359	1.341	Open Manhole	1200
21.000	o	300	S43/1	8.100	6.572	1.228	Open Manhole	1200
21.001	o	375	S43/2	8.220	6.441	1.404	Open Manhole	1500
20.003	o	525	S43	8.000	6.153	1.322	Open Manhole	1800
20.004	o	525	S44	8.000	6.097	1.378	Open Manhole	1800
20.005	o	300	S45	8.000	5.900	1.800	Open Manhole	1200
20.006	o	225	S46	8.000	5.850	1.925	Open Manhole	2100

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)
20.000	17.100	240.8	S41	8.000	6.429	1.271	Open Manhole	1200
20.001	16.700	238.6	S42	8.000	6.359	1.341	Open Manhole	1200
20.002	13.400	239.3	S43	8.000	6.303	1.397	Open Manhole	1800
21.000	13.400	239.3	S43/2	8.220	6.516	1.404	Open Manhole	1500
21.001	41.400	-3450.0	S43	8.000	6.453	1.172	Open Manhole	1800
20.003	22.600	403.6	S44	8.000	6.097	1.378	Open Manhole	1800
20.004	19.500	398.0	S45	8.000	6.048	1.427	Open Manhole	1200
20.005	10.300	206.0	S46	8.000	5.850	1.850	Open Manhole	2100
20.006	15.600	9.0		5.450	4.125	1.100	Open Manhole	0

Simulation Criteria for Storm

Volumetric Runoff Coeff 0.750 Additional Flow - % of Total Flow 0.000
Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 0.000
Hot Start (mins) 0 Inlet Coefficient 0.800
Hot Start Level (mm) 0 Flow per Person per Day (l/per/day) 0.000
Manhole Headloss Coeff (Global) 0.500 Run Time (mins) 60
Foul Sewage per hectare (l/s) 0.000 Output Interval (mins) 1

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 Summer Storms Yes
Return Period (years) 100 D2 (1km) 0.381 Winter Storms No
FEH Rainfall Version 1999 D3 (1km) 0.330 Cv (Summer) 0.750
Site Location E (1km) 0.295 Cv (Winter) 0.840
C (1km) -0.028 F (1km) 2.426 Storm Duration (mins) 30

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Land at Yatton
 Catchment C @ 2.0 l/s/ha
 No Surcharge



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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S46, DS/PN: 20.006, Volume (m³): 8.1

Unit Reference MD-SHE-0035-7000-1500-7000
 Design Head (m) 1.500
 Design Flow (l/s) 0.7
 Flush-Flo™ Calculated
 Objective Minimise upstream storage
 Application Surface
 Sump Available Yes
 Diameter (mm) 35
 Invert Level (m) 5.850
 Minimum Outlet Pipe Diameter (mm) 75
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	0.7	Kick-Flo®	0.312	0.4
Flush-Flo™	0.154	0.4	Mean Flow over Head Range	-	0.5

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.4	0.800	0.5	2.000	0.8	4.000	1.1	7.000	1.4
0.200	0.4	1.000	0.6	2.200	0.8	4.500	1.1	7.500	1.4
0.300	0.4	1.200	0.6	2.400	0.9	5.000	1.2	8.000	1.5
0.400	0.4	1.400	0.7	2.600	0.9	5.500	1.3	8.500	1.5
0.500	0.4	1.600	0.7	3.000	1.0	6.000	1.3	9.000	1.6
0.600	0.5	1.800	0.8	3.500	1.0	6.500	1.4	9.500	1.6

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 Land at Yatton
 Catchment C @ 2.0 l/s/ha
 No Surcharge



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Storage Structures for Storm

Tank or Pond Manhole: S45, DS/PN: 20.005

Invert Level (m) 5.900

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	98.0	1.200	532.0	2.400	912.0	3.600	912.0	4.800	912.0
0.200	154.0	1.400	621.0	2.600	912.0	3.800	912.0	5.000	912.0
0.400	218.0	1.600	714.0	2.800	912.0	4.000	912.0		
0.600	290.0	1.800	811.0	3.000	912.0	4.200	912.0		
0.800	366.0	2.000	912.0	3.200	912.0	4.400	912.0		
1.000	447.0	2.200	912.0	3.400	912.0	4.600	912.0		

.	Land at Yatton
.	Catchment C @ 2.0 l/s/ha
.	No Surcharge
Date 16/03/2023 15:12	Designed by RJH
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1 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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 F (1km) 2.426
 FEH Rainfall Version 1999 D2 (1km) 0.381 Cv (Summer) 0.750
 Site Location D3 (1km) 0.330 Cv (Winter) 0.840
 C (1km) -0.028 E (1km) 0.295

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

								Water	Surcharged	
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)
20.000	S40	4320 Winter	1	+0%	30/15 Summer				6.581	-0.219
20.001	S41	4320 Winter	1	+0%	30/15 Summer				6.581	-0.148
20.002	S42	4320 Winter	1	+0%	30/15 Summer				6.581	-0.078
21.000	S43/1	15 Winter	1	+0%	30/15 Summer				6.654	-0.218
21.001	S43/2	15 Winter	1	+0%	30/15 Summer				6.636	-0.180
20.003	S43	4320 Winter	1	+0%	30/180 Winter				6.581	-0.097
20.004	S44	4320 Winter	1	+0%	30/120 Winter				6.581	-0.041
20.005	S45	4320 Winter	1	+0%	1/60 Summer				6.581	0.381
20.006	S46	4320 Winter	1	+0%	1/15 Summer				6.580	0.505

		Flooded		Pipe		Level	
PN	US/MH Name	Volume (m³)	Flow / Overflow Cap.	Flow (l/s)	Overflow (l/s)	Status	Exceeded
20.000	S40	0.000	0.00		0.3	OK	
20.001	S41	0.000	0.01		0.6	OK	
20.002	S42	0.000	0.01		0.8	OK	
21.000	S43/1	0.000	0.11		6.4	OK	
21.001	S43/2	0.000	0.47		24.5	OK	
20.003	S43	0.000	0.01		2.2	OK	
20.004	S44	0.000	0.01		2.4	OK	
20.005	S45	0.000	0.01		0.5	SURCHARGED	
20.006	S46	0.000	0.00		0.5	SURCHARGED	

.	Land at Yatton
.	Catchment C @ 2.0 l/s/ha
.	No Surcharge
Date 16/03/2023 15:12	Designed by RJH
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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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 F (1km) 2.426
 FEH Rainfall Version 1999 D2 (1km) 0.381 Cv (Summer) 0.750
 Site Location D3 (1km) 0.330 Cv (Winter) 0.840
 C (1km) -0.028 E (1km) 0.295

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

								Water	Surcharged	
PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Level (m)	Depth (m)
20.000	S40	4320 Winter	30	+0%	30/15 Summer				7.009	0.209
20.001	S41	4320 Winter	30	+0%	30/15 Summer				7.009	0.280
20.002	S42	4320 Winter	30	+0%	30/15 Summer				7.009	0.350
21.000	S43/1	4320 Winter	30	+0%	30/15 Summer				7.009	0.137
21.001	S43/2	4320 Winter	30	+0%	30/15 Summer				7.009	0.193
20.003	S43	4320 Winter	30	+0%	30/180 Winter				7.009	0.331
20.004	S44	4320 Winter	30	+0%	30/120 Winter				7.009	0.387
20.005	S45	4320 Winter	30	+0%	1/60 Summer				7.009	0.809
20.006	S46	4320 Winter	30	+0%	1/15 Summer				7.009	0.934

		Flooded		Pipe			
PN	US/MH Name	Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)	Pipe Status	Level Exceeded	
20.000	S40	0.000	0.01	0.5	SURCHARGED		
20.001	S41	0.000	0.02	1.0	SURCHARGED		
20.002	S42	0.000	0.02	1.4	SURCHARGED		
21.000	S43/1	0.000	0.01	0.4	SURCHARGED		
21.001	S43/2	0.000	0.03	1.8	SURCHARGED		
20.003	S43	0.000	0.02	4.0	SURCHARGED		
20.004	S44	0.000	0.02	4.5	SURCHARGED		
20.005	S45	0.000	0.01	0.6	SURCHARGED		
20.006	S46	0.000	0.00	0.6	SURCHARGED		

.	Land at Yatton
.	Catchment C @ 2.0 l/s/ha
.	No Surcharge
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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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 F (1km) 2.426
 FEH Rainfall Version 1999 D2 (1km) 0.381 Cv (Summer) 0.750
 Site Location D3 (1km) 0.330 Cv (Winter) 0.840
 C (1km) -0.028 E (1km) 0.295

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

US/MH		Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged
PN	Name								Level (m)	Depth (m)
20.000	S40	15 Winter	100	+40%	30/15 Summer				7.782	0.982
20.001	S41	15 Winter	100	+40%	30/15 Summer				7.703	0.974
20.002	S42	5760 Winter	100	+40%	30/15 Summer				7.528	0.869
21.000	S43/1	15 Winter	100	+40%	30/15 Summer				7.674	0.802
21.001	S43/2	15 Winter	100	+40%	30/15 Summer				7.597	0.781
20.003	S43	5760 Winter	100	+40%	30/180 Winter				7.528	0.850
20.004	S44	5760 Winter	100	+40%	30/120 Winter				7.528	0.906
20.005	S45	5760 Winter	100	+40%	1/60 Summer				7.528	1.328
20.006	S46	5760 Winter	100	+40%	1/15 Summer				7.528	1.453

PN	US/MH Name	Flooded		Pipe		Level Exceeded
		Volume (m³)	Flow / Overflow Cap. (l/s)	Flow (l/s)	Status	
20.000	S40	0.000	0.85	51.7	FLOOD RISK	
20.001	S41	0.000	1.68	102.5	FLOOD RISK	
20.002	S42	0.000	0.03	1.9	SURCHARGED	
21.000	S43/1	0.000	0.66	39.0	SURCHARGED	
21.001	S43/2	0.000	3.40	175.9	SURCHARGED	
20.003	S43	0.000	0.03	5.3	SURCHARGED	
20.004	S44	0.000	0.03	6.2	SURCHARGED	
20.005	S45	0.000	0.01	0.7	SURCHARGED	
20.006	S46	0.000	0.00	0.7	SURCHARGED	

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Land at Yatton
Catchment C @ 2.0 l/s/ha
Surcharged Outfall



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Existing Network Details 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
20.000	17.100	0.071	240.8	0.066	4.00	0.0	0.600	o	300	Pipe/Conduit
20.001	16.700	0.070	238.6	0.064	0.00	0.0	0.600	o	300	Pipe/Conduit
20.002	13.400	0.056	239.3	0.049	0.00	0.0	0.600	o	300	Pipe/Conduit
21.000	13.400	0.056	239.3	0.049	4.00	0.0	0.600	o	300	Pipe/Conduit
21.001	41.400	-0.012	-3450.0	0.175	0.00	0.0	0.600	o	375	Pipe/Conduit
20.003	22.600	0.056	403.6	0.091	0.00	0.0	0.600	o	525	Pipe/Conduit
20.004	19.500	0.049	398.0	0.078	0.00	0.0	0.600	o	525	Pipe/Conduit
20.005	10.300	0.050	206.0	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit
20.006	15.600	1.725	9.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
20.000	6.500	0.066	0.0	1.01	71.3
20.001	6.429	0.130	0.0	1.01	71.6
20.002	6.359	0.179	0.0	1.01	71.5
21.000	6.572	0.049	0.0	1.01	71.5
21.001	6.441	0.224	0.0	0.00	0.0
20.003	6.153	0.494	0.0	1.11	240.0
20.004	6.097	0.572	0.0	1.12	241.7
20.005	5.900	0.572	0.0	1.09	77.2
20.006	5.850	0.572	0.0	4.38	174.1

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Land at Yatton
Catchment C @ 2.0 l/s/ha
Surcharged Outfall



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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)
20.000	o	300	S40	8.000	6.500	1.200	Open Manhole	1200
20.001	o	300	S41	8.000	6.429	1.271	Open Manhole	1200
20.002	o	300	S42	8.000	6.359	1.341	Open Manhole	1200
21.000	o	300	S43/1	8.100	6.572	1.228	Open Manhole	1200
21.001	o	375	S43/2	8.220	6.441	1.404	Open Manhole	1500
20.003	o	525	S43	8.000	6.153	1.322	Open Manhole	1800
20.004	o	525	S44	8.000	6.097	1.378	Open Manhole	1800
20.005	o	300	S45	8.000	5.900	1.800	Open Manhole	1200
20.006	o	225	S46	8.000	5.850	1.925	Open Manhole	2100

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)
20.000	17.100	240.8	S41	8.000	6.429	1.271	Open Manhole	1200
20.001	16.700	238.6	S42	8.000	6.359	1.341	Open Manhole	1200
20.002	13.400	239.3	S43	8.000	6.303	1.397	Open Manhole	1800
21.000	13.400	239.3	S43/2	8.220	6.516	1.404	Open Manhole	1500
21.001	41.400	-3450.0	S43	8.000	6.453	1.172	Open Manhole	1800
20.003	22.600	403.6	S44	8.000	6.097	1.378	Open Manhole	1800
20.004	19.500	398.0	S45	8.000	6.048	1.427	Open Manhole	1200
20.005	10.300	206.0	S46	8.000	5.850	1.850	Open Manhole	2100
20.006	15.600	9.0		5.450	4.125	1.100	Open Manhole	0

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
20.006		5.450	4.125	0.000	0	0

Datum (m) 0.000 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	7.900	17	7.900	33	7.900	49	7.900	65	7.900	81	7.900	97	7.900
2	7.900	18	7.900	34	7.900	50	7.900	66	7.900	82	7.900	98	7.900
3	7.900	19	7.900	35	7.900	51	7.900	67	7.900	83	7.900	99	7.900
4	7.900	20	7.900	36	7.900	52	7.900	68	7.900	84	7.900	100	7.900
5	7.900	21	7.900	37	7.900	53	7.900	69	7.900	85	7.900	101	7.900
6	7.900	22	7.900	38	7.900	54	7.900	70	7.900	86	7.900	102	7.900
7	7.900	23	7.900	39	7.900	55	7.900	71	7.900	87	7.900	103	7.900
8	7.900	24	7.900	40	7.900	56	7.900	72	7.900	88	7.900	104	7.900
9	7.900	25	7.900	41	7.900	57	7.900	73	7.900	89	7.900	105	7.900
10	7.900	26	7.900	42	7.900	58	7.900	74	7.900	90	7.900	106	7.900
11	7.900	27	7.900	43	7.900	59	7.900	75	7.900	91	7.900	107	7.900
12	7.900	28	7.900	44	7.900	60	7.900	76	7.900	92	7.900	108	7.900
13	7.900	29	7.900	45	7.900	61	7.900	77	7.900	93	7.900	109	7.900
14	7.900	30	7.900	46	7.900	62	7.900	78	7.900	94	7.900	110	7.900
15	7.900	31	7.900	47	7.900	63	7.900	79	7.900	95	7.900	111	7.900
16	7.900	32	7.900	48	7.900	64	7.900	80	7.900	96	7.900	112	7.900

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Land at Yatton
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Surcharged Outfall



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Surcharged Outfall Details for Storm

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
9889	7.900	9913	7.900	9937	7.900	9961	7.900	9985	7.900	10009	7.900	10033	7.900
9890	7.900	9914	7.900	9938	7.900	9962	7.900	9986	7.900	10010	7.900	10034	7.900
9891	7.900	9915	7.900	9939	7.900	9963	7.900	9987	7.900	10011	7.900	10035	7.900
9892	7.900	9916	7.900	9940	7.900	9964	7.900	9988	7.900	10012	7.900	10036	7.900
9893	7.900	9917	7.900	9941	7.900	9965	7.900	9989	7.900	10013	7.900	10037	7.900
9894	7.900	9918	7.900	9942	7.900	9966	7.900	9990	7.900	10014	7.900	10038	7.900
9895	7.900	9919	7.900	9943	7.900	9967	7.900	9991	7.900	10015	7.900	10039	7.900
9896	7.900	9920	7.900	9944	7.900	9968	7.900	9992	7.900	10016	7.900	10040	7.900
9897	7.900	9921	7.900	9945	7.900	9969	7.900	9993	7.900	10017	7.900	10041	7.900
9898	7.900	9922	7.900	9946	7.900	9970	7.900	9994	7.900	10018	7.900	10042	7.900
9899	7.900	9923	7.900	9947	7.900	9971	7.900	9995	7.900	10019	7.900	10043	7.900
9900	7.900	9924	7.900	9948	7.900	9972	7.900	9996	7.900	10020	7.900	10044	7.900
9901	7.900	9925	7.900	9949	7.900	9973	7.900	9997	7.900	10021	7.900	10045	7.900
9902	7.900	9926	7.900	9950	7.900	9974	7.900	9998	7.900	10022	7.900	10046	7.900
9903	7.900	9927	7.900	9951	7.900	9975	7.900	9999	7.900	10023	7.900	10047	7.900
9904	7.900	9928	7.900	9952	7.900	9976	7.900	10000	7.900	10024	7.900	10048	7.900
9905	7.900	9929	7.900	9953	7.900	9977	7.900	10001	7.900	10025	7.900	10049	7.900
9906	7.900	9930	7.900	9954	7.900	9978	7.900	10002	7.900	10026	7.900	10050	7.900
9907	7.900	9931	7.900	9955	7.900	9979	7.900	10003	7.900	10027	7.900	10051	7.900
9908	7.900	9932	7.900	9956	7.900	9980	7.900	10004	7.900	10028	7.900	10052	7.900
9909	7.900	9933	7.900	9957	7.900	9981	7.900	10005	7.900	10029	7.900	10053	7.900
9910	7.900	9934	7.900	9958	7.900	9982	7.900	10006	7.900	10030	7.900	10054	7.900
9911	7.900	9935	7.900	9959	7.900	9983	7.900	10007	7.900	10031	7.900	10055	7.900
9912	7.900	9936	7.900	9960	7.900	9984	7.900	10008	7.900	10032	7.900	10056	7.900

Simulation Criteria for Storm

Volumetric Runoff Coeff 0.750 Additional Flow - % of Total Flow 0.000
Areal Reduction Factor 1.000 MADD Factor * 10m³/ha Storage 0.000
Hot Start (mins) 0 Inlet Coefficient 0.800
Hot Start Level (mm) 0 Flow per Person per Day (l/per/day) 0.000
Manhole Headloss Coeff (Global) 0.500 Run Time (mins) 60
Foul Sewage per hectare (l/s) 0.000 Output Interval (mins) 1

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 Summer Storms Yes
Return Period (years) 100 D2 (1km) 0.381 Winter Storms No
FEH Rainfall Version 1999 D3 (1km) 0.330 Cv (Summer) 0.750
Site Location E (1km) 0.295 Cv (Winter) 0.840
C (1km) -0.028 F (1km) 2.426 Storm Duration (mins) 30

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Land at Yatton
Catchment C @ 2.0 l/s/ha
Surcharged Outfall



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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S46, DS/PN: 20.006, Volume (m³): 8.1

Unit Reference MD-SHE-0035-7000-1500-7000
Design Head (m) 1.500
Design Flow (l/s) 0.7
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 35
Invert Level (m) 5.850
Minimum Outlet Pipe Diameter (mm) 75
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.500	0.7	Kick-Flo®	0.312	0.4
Flush-Flo™	0.154	0.4	Mean Flow over Head Range	-	0.5

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.4	0.800	0.5	2.000	0.8	4.000	1.1	7.000	1.4
0.200	0.4	1.000	0.6	2.200	0.8	4.500	1.1	7.500	1.4
0.300	0.4	1.200	0.6	2.400	0.9	5.000	1.2	8.000	1.5
0.400	0.4	1.400	0.7	2.600	0.9	5.500	1.3	8.500	1.5
0.500	0.4	1.600	0.7	3.000	1.0	6.000	1.3	9.000	1.6
0.600	0.5	1.800	0.8	3.500	1.0	6.500	1.4	9.500	1.6

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 Surcharged Outfall



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Storage Structures for Storm

Tank or Pond Manhole: S45, DS/PN: 20.005

Invert Level (m) 5.900

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	98.0	1.200	532.0	2.400	912.0	3.600	912.0	4.800	912.0
0.200	154.0	1.400	621.0	2.600	912.0	3.800	912.0	5.000	912.0
0.400	218.0	1.600	714.0	2.800	912.0	4.000	912.0		
0.600	290.0	1.800	811.0	3.000	912.0	4.200	912.0		
0.800	366.0	2.000	912.0	3.200	912.0	4.400	912.0		
1.000	447.0	2.200	912.0	3.400	912.0	4.600	912.0		

.	Land at Yatton
.	Catchment C @ 2.0 l/s/ha
.	Surcharged Outfall
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1 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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 F (1km) 2.426
 FEH Rainfall Version 1999 D2 (1km) 0.381 Cv (Summer) 0.750
 Site Location D3 (1km) 0.330 Cv (Winter) 0.840
 C (1km) -0.028 E (1km) 0.295

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
20.000	S40	10080	Winter	1	+0% 1/4320	Winter			7.010	0.210
20.001	S41	10080	Winter	1	+0% 1/2880	Winter			7.010	0.281
20.002	S42	10080	Winter	1	+0% 1/2160	Winter			7.010	0.351
21.000	S43/1	10080	Winter	1	+0% 1/5760	Winter			7.010	0.138
21.001	S43/2	10080	Winter	1	+0% 1/4320	Winter			7.010	0.194
20.003	S43	10080	Winter	1	+0% 1/2160	Winter			7.010	0.332
20.004	S44	10080	Winter	1	+0% 1/1440	Winter			7.010	0.388
20.005	S45	10080	Winter	1	+0% 1/60	Summer			7.010	0.810
20.006	S46	10080	Winter	1	+0% 1/15	Summer			7.010	0.935

PN	US/MH Name	Flooded		Pipe		Level Exceeded
		Volume (m³)	Flow / Overflow Cap. (l/s)	Flow (l/s)	Status	
20.000	S40	0.000	0.00	0.2	SURCHARGED	
20.001	S41	0.000	0.01	0.3	SURCHARGED	
20.002	S42	0.000	0.01	0.5	SURCHARGED	
21.000	S43/1	0.000	0.00	0.1	SURCHARGED	
21.001	S43/2	0.000	0.01	0.6	SURCHARGED	
20.003	S43	0.000	0.01	1.2	SURCHARGED	
20.004	S44	0.000	0.01	1.4	SURCHARGED	
20.005	S45	0.000	0.01	0.6	SURCHARGED	
20.006	S46	0.000	0.00	0.6	SURCHARGED	

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Land at Yatton
 Catchment C @ 2.0 l/s/ha
 Surcharged Outfall



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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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 F (1km) 2.426
 FEH Rainfall Version 1999 D2 (1km) 0.381 Cv (Summer) 0.750
 Site Location D3 (1km) 0.330 Cv (Winter) 0.840
 C (1km) -0.028 E (1km) 0.295

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
20.000	S40	10080 Winter	30	+0%	1/4320 Winter				7.396	0.596
20.001	S41	10080 Winter	30	+0%	1/2880 Winter				7.396	0.667
20.002	S42	10080 Winter	30	+0%	1/2160 Winter				7.396	0.737
21.000	S43/1	10080 Winter	30	+0%	1/5760 Winter				7.396	0.524
21.001	S43/2	10080 Winter	30	+0%	1/4320 Winter				7.396	0.580
20.003	S43	10080 Winter	30	+0%	1/2160 Winter				7.396	0.718
20.004	S44	10080 Winter	30	+0%	1/1440 Winter				7.396	0.774
20.005	S45	10080 Winter	30	+0%	1/60 Summer				7.396	1.196
20.006	S46	10080 Winter	30	+0%	1/15 Summer				7.396	1.321

PN	US/MH Name	Flooded		Pipe		Level Exceeded
		Volume (m³)	Flow / Overflow Cap. (l/s)	Flow (l/s)	Status	
20.000	S40	0.000	0.00	0.3	SURCHARGED	
20.001	S41	0.000	0.01	0.5	SURCHARGED	
20.002	S42	0.000	0.01	0.7	SURCHARGED	
21.000	S43/1	0.000	0.00	0.2	SURCHARGED	
21.001	S43/2	0.000	0.02	0.9	SURCHARGED	
20.003	S43	0.000	0.01	2.0	SURCHARGED	
20.004	S44	0.000	0.01	2.3	SURCHARGED	
20.005	S45	0.000	0.01	0.7	SURCHARGED	
20.006	S46	0.000	0.00	0.7	SURCHARGED	

.	Land at Yatton
.	Catchment C @ 2.0 l/s/ha
.	Surcharged Outfall
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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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 F (1km) 2.426
 FEH Rainfall Version 1999 D2 (1km) 0.381 Cv (Summer) 0.750
 Site Location D3 (1km) 0.330 Cv (Winter) 0.840
 C (1km) -0.028 E (1km) 0.295

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
20.000	S40	10080	Winter	100	+40% 1/4320	Winter			7.885	1.085
20.001	S41	10080	Winter	100	+40% 1/2880	Winter			7.885	1.156
20.002	S42	10080	Winter	100	+40% 1/2160	Winter			7.885	1.226
21.000	S43/1	10080	Winter	100	+40% 1/5760	Winter			7.885	1.013
21.001	S43/2	10080	Winter	100	+40% 1/4320	Winter			7.885	1.069
20.003	S43	10080	Winter	100	+40% 1/2160	Winter			7.885	1.207
20.004	S44	10080	Winter	100	+40% 1/1440	Winter			7.885	1.263
20.005	S45	10080	Winter	100	+40% 1/60	Summer			7.885	1.685
20.006	S46	10080	Winter	100	+40% 1/15	Summer			7.885	1.810

PN	US/MH Name	Flooded		Pipe		Level Exceeded
		Volume (m³)	Flow / Overflow Cap. (l/s)	Flow (l/s)	Status	
20.000	S40	0.000	0.01	0.5	FLOOD RISK	
20.001	S41	0.000	0.01	0.9	FLOOD RISK	
20.002	S42	0.000	0.02	1.2	FLOOD RISK	
21.000	S43/1	0.000	0.01	0.3	FLOOD RISK	
21.001	S43/2	0.000	0.03	1.6	SURCHARGED	
20.003	S43	0.000	0.02	3.4	FLOOD RISK	
20.004	S44	0.000	0.02	3.9	FLOOD RISK	
20.005	S45	0.000	0.01	0.8	FLOOD RISK	
20.006	S46	0.000	0.01	0.8	FLOOD RISK	

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Land at Yatton
Catchment E @ 2.0 l/s/ha
No Surcharge



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Existing Network Details 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
1.000	36.500	0.152	240.1	0.086	4.00	0.0	0.600	o	300	Pipe/Conduit
2.000	22.000	0.092	239.1	0.040	5.00	0.0	0.600	o	300	Pipe/Conduit
1.001	28.000	0.070	400.0	0.058	0.00	0.0	0.600	o	450	Pipe/Conduit
1.002	25.400	0.063	403.2	0.055	0.00	0.0	0.600	o	450	Pipe/Conduit
3.000	31.800	0.132	240.9	0.066	4.00	0.0	0.600	o	300	Pipe/Conduit
3.001	10.100	0.042	240.5	0.022	0.00	0.0	0.600	o	300	Pipe/Conduit
1.003	36.600	0.091	402.2	0.076	0.00	0.0	0.600	o	450	Pipe/Conduit
1.004	28.500	0.072	395.8	0.059	0.00	0.0	0.600	o	450	Pipe/Conduit
4.000	42.100	0.176	239.2	0.059	4.00	0.0	0.600	o	300	Pipe/Conduit
5.000	29.200	0.113	258.4	0.060	4.00	0.0	0.600	o	300	Pipe/Conduit
4.001	28.200	0.070	402.9	0.056	0.00	0.0	0.600	o	450	Pipe/Conduit
4.002	27.100	0.068	398.5	0.056	0.00	0.0	0.600	o	450	Pipe/Conduit
6.000	28.200	0.117	241.0	0.058	4.00	0.0	0.600	o	300	Pipe/Conduit
6.001	13.800	0.062	222.6	0.029	0.00	0.0	0.600	o	300	Pipe/Conduit
4.003	23.300	0.058	401.7	0.049	0.00	0.0	0.600	o	450	Pipe/Conduit
4.004	37.200	0.093	400.0	0.077	0.00	0.0	0.600	o	450	Pipe/Conduit
4.005	18.600	0.046	404.3	0.039	0.00	0.0	0.600	o	450	Pipe/Conduit
7.000	25.900	0.108	239.8	0.034	5.00	0.0	0.600	o	300	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	6.611	0.086	0.0	1.01	71.4
2.000	6.551	0.040	0.0	1.01	71.6
1.001	6.309	0.184	0.0	1.01	160.7
1.002	6.239	0.239	0.0	1.01	160.0
3.000	6.500	0.066	0.0	1.01	71.3
3.001	6.368	0.088	0.0	1.01	71.4
1.003	6.176	0.403	0.0	1.01	160.2
1.004	6.085	0.462	0.0	1.02	161.5
4.000	6.635	0.059	0.0	1.01	71.5
5.000	6.572	0.060	0.0	0.97	68.8
4.001	6.309	0.175	0.0	1.01	160.1
4.002	6.239	0.231	0.0	1.01	161.0
6.000	6.500	0.058	0.0	1.01	71.3
6.001	6.383	0.087	0.0	1.05	74.2
4.003	6.171	0.367	0.0	1.01	160.3
4.004	6.113	0.444	0.0	1.01	160.7
4.005	6.020	0.483	0.0	1.00	159.8
7.000	6.225	0.034	0.0	1.01	71.5

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Land at Yatton
Catchment E @ 2.0 l/s/ha
No Surcharge



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Existing Network Details 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
7.001	13.900	0.058	239.7	0.029	0.00	0.0	0.600	o	300	Pipe/Conduit
7.002	20.500	0.085	241.2	0.069	0.00	0.0	0.600	o	300	Pipe/Conduit
1.005	12.500	0.031	403.2	0.000	4.00	0.0	0.600	o	450	Pipe/Conduit
1.006	18.500	1.219	15.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
7.001	6.117	0.063	0.0	1.01	71.5
7.002	6.059	0.132	0.0	1.01	71.3
1.005	5.500	1.077	0.0	1.01	160.0
1.006	5.469	1.077	0.0	5.24	833.3

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Land at Yatton
Catchment E @ 2.0 l/s/ha
No Surcharge



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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)
1.000	o	300	S1	8.200	6.611	1.289	Open Manhole	1200
2.000	o	300	S2/1	8.200	6.551	1.349	Open Manhole	1200
1.001	o	450	S2	8.000	6.309	1.241	Open Manhole	1200
1.002	o	450	S3	8.200	6.239	1.511	Open Manhole	1200
3.000	o	300	S4/2	8.150	6.500	1.350	Open Manhole	1200
3.001	o	300	S4/1	8.450	6.368	1.782	Open Manhole	1200
1.003	o	450	S4	8.400	6.176	1.774	Open Manhole	1200
1.004	o	450	S5	8.100	6.085	1.565	Open Manhole	1200
4.000	o	300	S5	8.100	6.635	1.165	Open Manhole	1200
5.000	o	300	S6/1	8.100	6.572	1.228	Open Manhole	1200
4.001	o	450	S6	8.000	6.309	1.241	Open Manhole	1200
4.002	o	450	S7	8.200	6.239	1.511	Open Manhole	1200
6.000	o	300	S8/1	8.100	6.500	1.300	Open Manhole	1200
6.001	o	300	S8/2	8.400	6.383	1.717	Open Manhole	1200
4.003	o	450	S8	8.450	6.171	1.829	Open Manhole	1200
4.004	o	450	S9	8.220	6.113	1.657	Open Manhole	1200
4.005	o	450	S10	7.900	6.020	1.430	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)
1.000	36.500	240.1	S2	8.000	6.459	1.241	Open Manhole	1200
2.000	22.000	239.1	S2	8.000	6.459	1.241	Open Manhole	1200
1.001	28.000	400.0	S3	8.200	6.239	1.511	Open Manhole	1200
1.002	25.400	403.2	S4	8.400	6.176	1.774	Open Manhole	1200
3.000	31.800	240.9	S4/1	8.450	6.368	1.782	Open Manhole	1200
3.001	10.100	240.5	S4	8.400	6.326	1.774	Open Manhole	1200
1.003	36.600	402.2	S5	8.100	6.085	1.565	Open Manhole	1200
1.004	28.500	395.8	S11	8.000	6.013	1.537	Open Manhole	1200
4.000	42.100	239.2	S6	8.000	6.459	1.241	Open Manhole	1200
5.000	29.200	258.4	S6	8.000	6.459	1.241	Open Manhole	1200
4.001	28.200	402.9	S7	8.200	6.239	1.511	Open Manhole	1200
4.002	27.100	398.5	S8	8.450	6.171	1.829	Open Manhole	1200
6.000	28.200	241.0	S8/2	8.400	6.383	1.717	Open Manhole	1200
6.001	13.800	222.6	S8	8.450	6.321	1.829	Open Manhole	1200
4.003	23.300	401.7	S9	8.220	6.113	1.657	Open Manhole	1200
4.004	37.200	400.0	S10	7.900	6.020	1.430	Open Manhole	1200
4.005	18.600	404.3	S11	8.000	5.974	1.576	Open Manhole	1200

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Land at Yatton
Catchment E @ 2.0 l/s/ha
No Surcharge



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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)
7.000	o	300	S11/1	8.100	6.225	1.575	Open Manhole	1200
7.001	o	300	S11/2	8.100	6.117	1.683	Open Manhole	1200
7.002	o	300	s11/3	8.100	6.059	1.741	Open Manhole	1200
1.005	o	450	S11	8.000	5.500	2.050	Open Manhole	1200
1.006	o	450	S12	8.000	5.469	2.081	Open Manhole	2100

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)
7.000	25.900	239.8	S11/2	8.100	6.117	1.683	Open Manhole	1200
7.001	13.900	239.7	s11/3	8.100	6.059	1.741	Open Manhole	1200
7.002	20.500	241.2	S11	8.000	5.974	1.726	Open Manhole	1200
1.005	12.500	403.2	S12	8.000	5.469	2.081	Open Manhole	2100
1.006	18.500	15.2		5.000	4.250	0.300	Open Manhole	0

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.006		5.000	4.250	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	0.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FEH D1 (1km)	0.362	Summer Storms	Yes	
Return Period (years)	100 D2 (1km)	0.381	Winter Storms	No	
FEH Rainfall Version	1999 D3 (1km)	0.330	Cv (Summer)	0.750	
Site Location	E (1km)	0.295	Cv (Winter)	0.840	
C (1km)	-0.028	F (1km)	2.426	Storm Duration (mins)	30

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Land at Yatton
Catchment E @ 2.0 l/s/ha
No Surcharge



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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S12, DS/PN: 1.006, Volume (m³): 10.5

Unit Reference MD-SHE-0054-2000-2500-2000
Design Head (m) 2.500
Design Flow (l/s) 2.0
Flush-Flo™ Calculated
Objective Minimise upstream storage
Application Surface
Sump Available Yes
Diameter (mm) 54
Invert Level (m) 5.469
Minimum Outlet Pipe Diameter (mm) 75
Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.500	2.0	Kick-Flo®	0.484	1.0
Flush-Flo™	0.239	1.2	Mean Flow over Head Range	-	1.4

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.0	0.800	1.2	2.000	1.8	4.000	2.5	7.000	3.2
0.200	1.2	1.000	1.3	2.200	1.9	4.500	2.6	7.500	3.3
0.300	1.2	1.200	1.4	2.400	2.0	5.000	2.8	8.000	3.4
0.400	1.1	1.400	1.5	2.600	2.0	5.500	2.9	8.500	3.5
0.500	1.0	1.600	1.6	3.000	2.2	6.000	3.0	9.000	3.6
0.600	1.1	1.800	1.7	3.500	2.3	6.500	3.1	9.500	3.7

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Land at Yatton
Catchment E @ 2.0 l/s/ha
No Surcharge



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Storage Structures for Storm

Tank or Pond Manhole: S11, DS/PN: 1.005

Invert Level (m) 5.500

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	292.0	1.200	987.0	2.400	1681.0	3.600	1681.0	4.800	1681.0
0.200	397.0	1.400	1118.0	2.600	1681.0	3.800	1681.0	5.000	1681.0
0.400	507.0	1.600	1252.0	2.800	1681.0	4.000	1681.0		
0.600	621.0	1.800	1391.0	3.000	1681.0	4.200	1681.0		
0.800	739.0	2.000	1533.0	3.200	1681.0	4.400	1681.0		
1.000	861.0	2.200	1681.0	3.400	1681.0	4.600	1681.0		



1 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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 F (1km) 2.426
 FEH Rainfall Version 1999 D2 (1km) 0.381 Cv (Summer) 0.750
 Site Location D3 (1km) 0.330 Cv (Winter) 0.840
 C (1km) -0.028 E (1km) 0.295

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water	Surcharged
									Level (m)	Depth (m)
1.000	S1	15 Winter	1	+0%	100/15 Summer				6.694	-0.217
2.000	S2/1	15 Winter	1	+0%	100/15 Summer				6.607	-0.244
1.001	S2	15 Winter	1	+0%	100/15 Summer				6.448	-0.311
1.002	S3	15 Winter	1	+0%	100/15 Summer				6.397	-0.292
3.000	S4/2	15 Winter	1	+0%	100/15 Summer				6.572	-0.228
3.001	S4/1	15 Winter	1	+0%	100/15 Summer				6.458	-0.210
1.003	S4	15 Winter	1	+0%	100/15 Summer				6.350	-0.276
1.004	S5	15 Winter	1	+0%	30/2880 Winter				6.267	-0.268
4.000	S5	15 Winter	1	+0%	100/15 Summer				6.703	-0.232
5.000	S6/1	15 Winter	1	+0%	100/15 Summer				6.643	-0.229
4.001	S6	15 Winter	1	+0%	100/15 Summer				6.446	-0.313
4.002	S7	15 Winter	1	+0%	100/15 Summer				6.396	-0.293
6.000	S8/1	15 Winter	1	+0%	100/15 Summer				6.568	-0.232
6.001	S8/2	15 Winter	1	+0%	100/15 Summer				6.467	-0.216
4.003	S8	15 Winter	1	+0%	100/15 Summer				6.351	-0.270
4.004	S9	15 Winter	1	+0%	100/15 Summer				6.295	-0.268
4.005	S10	15 Winter	1	+0%	30/15 Winter				6.214	-0.256
7.000	S11/1	15 Winter	1	+0%	30/2880 Winter				6.275	-0.250
7.001	S11/2	15 Winter	1	+0%	30/960 Winter				6.191	-0.226
7.002	s11/3	15 Winter	1	+0%	30/600 Winter				6.156	-0.203
1.005	S11	4320 Winter	1	+0%	1/480 Winter				6.139	0.189
1.006	S12	4320 Winter	1	+0%	1/360 Winter				6.180	0.261

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m³)	Flow / Cap. (l/s)	Overflow (l/s)	Flow (l/s)		
1.000	S1	0.000	0.17		11.3	OK	
2.000	S2/1	0.000	0.08		4.9	OK	

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 Land at Yatton
 Catchment E @ 2.0 l/s/ha
 No Surcharge



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

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
1.001	S2	0.000	0.16	22.0		OK	
1.002	S3	0.000	0.20	26.4		OK	
3.000	S4/2	0.000	0.13	8.6		OK	
3.001	S4/1	0.000	0.19	10.7		OK	
1.003	S4	0.000	0.30	42.4		OK	
1.004	S5	0.000	0.34	47.3		OK	
4.000	S5	0.000	0.12	7.8		OK	
5.000	S6/1	0.000	0.13	7.9		OK	
4.001	S6	0.000	0.15	21.2		OK	
4.002	S7	0.000	0.19	25.4		OK	
6.000	S8/1	0.000	0.12	7.6		OK	
6.001	S8/2	0.000	0.17	10.5		OK	
4.003	S8	0.000	0.29	38.9		OK	
4.004	S9	0.000	0.31	44.6		OK	
4.005	S10	0.000	0.39	47.2		OK	
7.000	S11/1	0.000	0.06	4.1		OK	
7.001	S11/2	0.000	0.12	7.1		OK	
7.002	s11/3	0.000	0.23	14.2		OK	
1.005	S11	0.000	0.02	1.9		SURCHARGED	
1.006	S12	0.000	0.00	1.2		SURCHARGED	

.	Land at Yatton
.	Catchment E @ 2.0 l/s/ha
.	No Surcharge
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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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 F (1km) 2.426
 FEH Rainfall Version 1999 D2 (1km) 0.381 Cv (Summer) 0.750
 Site Location D3 (1km) 0.330 Cv (Winter) 0.840
 C (1km) -0.028 E (1km) 0.295

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	S1	15 Winter	30	+0%	100/15 Summer				6.767	-0.144
2.000	S2/1	15 Winter	30	+0%	100/15 Summer				6.680	-0.171
1.001	S2	15 Winter	30	+0%	100/15 Summer				6.664	-0.095
1.002	S3	15 Winter	30	+0%	100/15 Summer				6.611	-0.078
3.000	S4/2	15 Winter	30	+0%	100/15 Summer				6.634	-0.166
3.001	S4/1	15 Winter	30	+0%	100/15 Summer				6.579	-0.089
1.003	S4	15 Winter	30	+0%	100/15 Summer				6.561	-0.065
1.004	S5	4320 Winter	30	+0%	30/2880 Winter				6.560	0.025
4.000	S5	15 Winter	30	+0%	100/15 Summer				6.776	-0.159
5.000	S6/1	15 Winter	30	+0%	100/15 Summer				6.774	-0.098
4.001	S6	15 Winter	30	+0%	100/15 Summer				6.759	0.000
4.002	S7	15 Winter	30	+0%	100/15 Summer				6.689	0.000
6.000	S8/1	15 Winter	30	+0%	100/15 Summer				6.682	-0.118
6.001	S8/2	15 Winter	30	+0%	100/15 Summer				6.664	-0.019
4.003	S8	15 Winter	30	+0%	100/15 Summer				6.621	0.000
4.004	S9	4320 Winter	30	+0%	100/15 Summer				6.561	-0.002
4.005	S10	4320 Winter	30	+0%	30/15 Winter				6.560	0.090
7.000	S11/1	4320 Winter	30	+0%	30/2880 Winter				6.560	0.035
7.001	S11/2	4320 Winter	30	+0%	30/960 Winter				6.560	0.143
7.002	s11/3	4320 Winter	30	+0%	30/600 Winter				6.560	0.201
1.005	S11	4320 Winter	30	+0%	1/480 Winter				6.560	0.610
1.006	S12	5760 Winter	30	+0%	1/360 Winter				6.590	0.671

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap. (l/s)	Pipe Overflow (l/s)	Status	Level Exceeded
1.000	S1	0.000	0.52	34.3	OK	
2.000	S2/1	0.000	0.24	14.9	OK	

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

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
1.001	S2	0.000	0.47	64.6		OK	
1.002	S3	0.000	0.58	78.5		OK	
3.000	S4/2	0.000	0.41	26.5		OK	
3.001	S4/1	0.000	0.58	32.6		OK	
1.003	S4	0.000	0.91	128.3		OK	
1.004	S5	0.000	0.03	3.7		SURCHARGED	
4.000	S5	0.000	0.35	23.4		OK	
5.000	S6/1	0.000	0.39	24.2		OK	
4.001	S6	0.000	0.45	61.8		OK	
4.002	S7	0.000	0.52	71.7		OK	
6.000	S8/1	0.000	0.36	23.5		OK	
6.001	S8/2	0.000	0.53	32.5		OK	
4.003	S8	0.000	0.83	110.1		OK	
4.004	S9	0.000	0.02	3.5		OK	
4.005	S10	0.000	0.03	3.7		SURCHARGED	
7.000	S11/1	0.000	0.00	0.3		SURCHARGED	
7.001	S11/2	0.000	0.01	0.5		SURCHARGED	
7.002	s11/3	0.000	0.02	1.0		SURCHARGED	
1.005	S11	0.000	0.02	2.4		SURCHARGED	
1.006	S12	0.000	0.00	1.4		SURCHARGED	

.	Land at Yatton
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.	No Surcharge
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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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 F (1km) 2.426
 FEH Rainfall Version 1999 D2 (1km) 0.381 Cv (Summer) 0.750
 Site Location D3 (1km) 0.330 Cv (Winter) 0.840
 C (1km) -0.028 E (1km) 0.295

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surchage	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	S1	15 Winter	100	+40%	100/15 Summer				7.563	0.652
2.000	S2/1	15 Winter	100	+40%	100/15 Summer				7.504	0.653
1.001	S2	15 Winter	100	+40%	100/15 Summer				7.421	0.662
1.002	S3	15 Winter	100	+40%	100/15 Summer				7.353	0.664
3.000	S4/2	15 Winter	100	+40%	100/15 Summer				7.408	0.608
3.001	S4/1	15 Winter	100	+40%	100/15 Summer				7.320	0.652
1.003	S4	15 Winter	100	+40%	100/15 Summer				7.246	0.620
1.004	S5	7200 Winter	100	+40%	30/2880 Winter				7.108	0.573
4.000	S5	15 Winter	100	+40%	100/15 Summer				7.642	0.707
5.000	S6/1	15 Winter	100	+40%	100/15 Summer				7.636	0.764
4.001	S6	15 Winter	100	+40%	100/15 Summer				7.557	0.798
4.002	S7	15 Winter	100	+40%	100/15 Summer				7.499	0.810
6.000	S8/1	15 Winter	100	+40%	100/15 Summer				7.566	0.766
6.001	S8/2	15 Winter	100	+40%	100/15 Summer				7.483	0.800
4.003	S8	15 Winter	100	+40%	100/15 Summer				7.401	0.780
4.004	S9	15 Winter	100	+40%	100/15 Summer				7.183	0.620
4.005	S10	7200 Winter	100	+40%	30/15 Winter				7.108	0.638
7.000	S11/1	7200 Winter	100	+40%	30/2880 Winter				7.108	0.583
7.001	S11/2	7200 Winter	100	+40%	30/960 Winter				7.108	0.691
7.002	s11/3	7200 Winter	100	+40%	30/600 Winter				7.108	0.749
1.005	S11	7200 Winter	100	+40%	1/480 Winter				7.108	1.158
1.006	S12	5760 Winter	100	+40%	1/360 Winter				7.141	1.222

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap. (l/s)	Pipe Overflow Flow (l/s)	Pipe Status	Level Exceeded
1.000	S1	0.000	1.00	65.8	SURCHARGED	
2.000	S2/1	0.000	0.47	29.6	SURCHARGED	

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

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
1.001	S2	0.000	0.99	135.9		SURCHARGED	
1.002	S3	0.000	1.28	172.2		SURCHARGED	
3.000	S4/2	0.000	0.77	50.2		SURCHARGED	
3.001	S4/1	0.000	1.17	65.4		SURCHARGED	
1.003	S4	0.000	2.00	282.8		SURCHARGED	
1.004	S5	0.000	0.03	4.3		SURCHARGED	
4.000	S5	0.000	0.64	42.8		SURCHARGED	
5.000	S6/1	0.000	0.71	44.1		SURCHARGED	
4.001	S6	0.000	0.92	125.8		SURCHARGED	
4.002	S7	0.000	1.18	161.8		SURCHARGED	
6.000	S8/1	0.000	0.66	42.3		SURCHARGED	
6.001	S8/2	0.000	1.00	61.2		SURCHARGED	
4.003	S8	0.000	1.89	251.2		SURCHARGED	
4.004	S9	0.000	2.10	297.8		SURCHARGED	
4.005	S10	0.000	0.04	4.4		SURCHARGED	
7.000	S11/1	0.000	0.00	0.3		SURCHARGED	
7.001	S11/2	0.000	0.01	0.6		SURCHARGED	
7.002	s11/3	0.000	0.02	1.2		SURCHARGED	
1.005	S11	0.000	0.02	2.1		SURCHARGED	
1.006	S12	0.000	0.00	1.6		SURCHARGED	

Existing Network Details 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
1.000	36.500	0.152	240.1	0.086	4.00	0.0	0.600	o	300	Pipe/Conduit
2.000	22.000	0.092	239.1	0.040	5.00	0.0	0.600	o	300	Pipe/Conduit
1.001	28.000	0.070	400.0	0.058	0.00	0.0	0.600	o	450	Pipe/Conduit
1.002	25.400	0.063	403.2	0.055	0.00	0.0	0.600	o	450	Pipe/Conduit
3.000	31.800	0.132	240.9	0.066	4.00	0.0	0.600	o	300	Pipe/Conduit
3.001	10.100	0.042	240.5	0.022	0.00	0.0	0.600	o	300	Pipe/Conduit
1.003	36.600	0.091	402.2	0.076	0.00	0.0	0.600	o	450	Pipe/Conduit
1.004	28.500	0.072	395.8	0.059	0.00	0.0	0.600	o	450	Pipe/Conduit
4.000	42.100	0.176	239.2	0.059	4.00	0.0	0.600	o	300	Pipe/Conduit
5.000	29.200	0.113	258.4	0.060	4.00	0.0	0.600	o	300	Pipe/Conduit
4.001	28.200	0.070	402.9	0.056	0.00	0.0	0.600	o	450	Pipe/Conduit
4.002	27.100	0.068	398.5	0.056	0.00	0.0	0.600	o	450	Pipe/Conduit
6.000	28.200	0.117	241.0	0.058	4.00	0.0	0.600	o	300	Pipe/Conduit
6.001	13.800	0.062	222.6	0.029	0.00	0.0	0.600	o	300	Pipe/Conduit
4.003	23.300	0.058	401.7	0.049	0.00	0.0	0.600	o	450	Pipe/Conduit
4.004	37.200	0.093	400.0	0.077	0.00	0.0	0.600	o	450	Pipe/Conduit
4.005	18.600	0.046	404.3	0.039	0.00	0.0	0.600	o	450	Pipe/Conduit
7.000	25.900	0.108	239.8	0.034	5.00	0.0	0.600	o	300	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	6.611	0.086	0.0	1.01	71.4
2.000	6.551	0.040	0.0	1.01	71.6
1.001	6.309	0.184	0.0	1.01	160.7
1.002	6.239	0.239	0.0	1.01	160.0
3.000	6.500	0.066	0.0	1.01	71.3
3.001	6.368	0.088	0.0	1.01	71.4
1.003	6.176	0.403	0.0	1.01	160.2
1.004	6.085	0.462	0.0	1.02	161.5
4.000	6.635	0.059	0.0	1.01	71.5
5.000	6.572	0.060	0.0	0.97	68.8
4.001	6.309	0.175	0.0	1.01	160.1
4.002	6.239	0.231	0.0	1.01	161.0
6.000	6.500	0.058	0.0	1.01	71.3
6.001	6.383	0.087	0.0	1.05	74.2
4.003	6.171	0.367	0.0	1.01	160.3
4.004	6.113	0.444	0.0	1.01	160.7
4.005	6.020	0.483	0.0	1.00	159.8
7.000	6.225	0.034	0.0	1.01	71.5

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 Surcharged Outfall



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Existing Network Details 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
7.001	13.900	0.058	239.7	0.029	0.00	0.0	0.600	o	300	Pipe/Conduit
7.002	20.500	0.085	241.2	0.069	0.00	0.0	0.600	o	300	Pipe/Conduit
1.005	12.500	0.031	403.2	0.000	4.00	0.0	0.600	o	450	Pipe/Conduit
1.006	18.500	1.219	15.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
7.001	6.117	0.063	0.0	1.01	71.5
7.002	6.059	0.132	0.0	1.01	71.3
1.005	5.500	1.077	0.0	1.01	160.0
1.006	5.469	1.077	0.0	5.24	833.3

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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)
1.000	o	300	S1	8.200	6.611	1.289	Open Manhole	1200
2.000	o	300	S2/1	8.200	6.551	1.349	Open Manhole	1200
1.001	o	450	S2	8.000	6.309	1.241	Open Manhole	1200
1.002	o	450	S3	8.200	6.239	1.511	Open Manhole	1200
3.000	o	300	S4/2	8.150	6.500	1.350	Open Manhole	1200
3.001	o	300	S4/1	8.450	6.368	1.782	Open Manhole	1200
1.003	o	450	S4	8.400	6.176	1.774	Open Manhole	1200
1.004	o	450	S5	8.100	6.085	1.565	Open Manhole	1200
4.000	o	300	S5	8.100	6.635	1.165	Open Manhole	1200
5.000	o	300	S6/1	8.100	6.572	1.228	Open Manhole	1200
4.001	o	450	S6	8.000	6.309	1.241	Open Manhole	1200
4.002	o	450	S7	8.200	6.239	1.511	Open Manhole	1200
6.000	o	300	S8/1	8.100	6.500	1.300	Open Manhole	1200
6.001	o	300	S8/2	8.400	6.383	1.717	Open Manhole	1200
4.003	o	450	S8	8.450	6.171	1.829	Open Manhole	1200
4.004	o	450	S9	8.220	6.113	1.657	Open Manhole	1200
4.005	o	450	S10	7.900	6.020	1.430	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)
1.000	36.500	240.1	S2	8.000	6.459	1.241	Open Manhole	1200
2.000	22.000	239.1	S2	8.000	6.459	1.241	Open Manhole	1200
1.001	28.000	400.0	S3	8.200	6.239	1.511	Open Manhole	1200
1.002	25.400	403.2	S4	8.400	6.176	1.774	Open Manhole	1200
3.000	31.800	240.9	S4/1	8.450	6.368	1.782	Open Manhole	1200
3.001	10.100	240.5	S4	8.400	6.326	1.774	Open Manhole	1200
1.003	36.600	402.2	S5	8.100	6.085	1.565	Open Manhole	1200
1.004	28.500	395.8	S11	8.000	6.013	1.537	Open Manhole	1200
4.000	42.100	239.2	S6	8.000	6.459	1.241	Open Manhole	1200
5.000	29.200	258.4	S6	8.000	6.459	1.241	Open Manhole	1200
4.001	28.200	402.9	S7	8.200	6.239	1.511	Open Manhole	1200
4.002	27.100	398.5	S8	8.450	6.171	1.829	Open Manhole	1200
6.000	28.200	241.0	S8/2	8.400	6.383	1.717	Open Manhole	1200
6.001	13.800	222.6	S8	8.450	6.321	1.829	Open Manhole	1200
4.003	23.300	401.7	S9	8.220	6.113	1.657	Open Manhole	1200
4.004	37.200	400.0	S10	7.900	6.020	1.430	Open Manhole	1200
4.005	18.600	404.3	S11	8.000	5.974	1.576	Open Manhole	1200

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Land at Yatton
Catchment E @ 2.0 l/s/ha
Surcharged Outfall



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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)
7.000	o	300	S11/1	8.100	6.225	1.575	Open Manhole	1200
7.001	o	300	S11/2	8.100	6.117	1.683	Open Manhole	1200
7.002	o	300	s11/3	8.100	6.059	1.741	Open Manhole	1200
1.005	o	450	S11	8.000	5.500	2.050	Open Manhole	1200
1.006	o	450	S12	8.000	5.469	2.081	Open Manhole	2100

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)
7.000	25.900	239.8	S11/2	8.100	6.117	1.683	Open Manhole	1200
7.001	13.900	239.7	s11/3	8.100	6.059	1.741	Open Manhole	1200
7.002	20.500	241.2	S11	8.000	5.974	1.726	Open Manhole	1200
1.005	12.500	403.2	S12	8.000	5.469	2.081	Open Manhole	2100
1.006	18.500	15.2		5.000	4.250	0.300	Open Manhole	0

Surcharged Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.006		5.000	4.250	0.000	0	0

Datum (m) 0.000 Offset (mins) 0

Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	7.900	27	7.900	53	7.900	79	7.900	105	7.900	131	7.900	157	7.900	183	7.900
2	7.900	28	7.900	54	7.900	80	7.900	106	7.900	132	7.900	158	7.900	184	7.900
3	7.900	29	7.900	55	7.900	81	7.900	107	7.900	133	7.900	159	7.900	185	7.900
4	7.900	30	7.900	56	7.900	82	7.900	108	7.900	134	7.900	160	7.900	186	7.900
5	7.900	31	7.900	57	7.900	83	7.900	109	7.900	135	7.900	161	7.900	187	7.900
6	7.900	32	7.900	58	7.900	84	7.900	110	7.900	136	7.900	162	7.900	188	7.900
7	7.900	33	7.900	59	7.900	85	7.900	111	7.900	137	7.900	163	7.900	189	7.900
8	7.900	34	7.900	60	7.900	86	7.900	112	7.900	138	7.900	164	7.900	190	7.900
9	7.900	35	7.900	61	7.900	87	7.900	113	7.900	139	7.900	165	7.900	191	7.900
10	7.900	36	7.900	62	7.900	88	7.900	114	7.900	140	7.900	166	7.900	192	7.900
11	7.900	37	7.900	63	7.900	89	7.900	115	7.900	141	7.900	167	7.900	193	7.900
12	7.900	38	7.900	64	7.900	90	7.900	116	7.900	142	7.900	168	7.900	194	7.900
13	7.900	39	7.900	65	7.900	91	7.900	117	7.900	143	7.900	169	7.900	195	7.900
14	7.900	40	7.900	66	7.900	92	7.900	118	7.900	144	7.900	170	7.900	196	7.900
15	7.900	41	7.900	67	7.900	93	7.900	119	7.900	145	7.900	171	7.900	197	7.900
16	7.900	42	7.900	68	7.900	94	7.900	120	7.900	146	7.900	172	7.900	198	7.900
17	7.900	43	7.900	69	7.900	95	7.900	121	7.900	147	7.900	173	7.900	199	7.900
18	7.900	44	7.900	70	7.900	96	7.900	122	7.900	148	7.900	174	7.900	200	7.900
19	7.900	45	7.900	71	7.900	97	7.900	123	7.900	149	7.900	175	7.900	201	7.900
20	7.900	46	7.900	72	7.900	98	7.900	124	7.900	150	7.900	176	7.900	202	7.900
21	7.900	47	7.900	73	7.900	99	7.900	125	7.900	151	7.900	177	7.900	203	7.900
22	7.900	48	7.900	74	7.900	100	7.900	126	7.900	152	7.900	178	7.900	204	7.900
23	7.900	49	7.900	75	7.900	101	7.900	127	7.900	153	7.900	179	7.900	205	7.900
24	7.900	50	7.900	76	7.900	102	7.900	128	7.900	154	7.900	180	7.900	206	7.900
25	7.900	51	7.900	77	7.900	103	7.900	129	7.900	155	7.900	181	7.900	207	7.900
26	7.900	52	7.900	78	7.900	104	7.900	130	7.900	156	7.900	182	7.900	208	7.900

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Catchment E @ 2.0 l/s/ha
Surcharged Outfall



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Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	0.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FEH D1 (1km)	0.362	Summer Storms	Yes
Return Period (years)	100 D2 (1km)	0.381	Winter Storms	No
FEH Rainfall Version	1999 D3 (1km)	0.330	Cv (Summer)	0.750
Site Location	E (1km)	0.295	Cv (Winter)	0.840
	C (1km) -0.028	F (1km) 2.426	Storm Duration (mins)	30

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Online Controls for Storm

Hydro-Brake® Optimum Manhole: S12, DS/PN: 1.006, Volume (m³): 10.5

Unit Reference MD-SHE-0054-2000-2500-2000
 Design Head (m) 2.500
 Design Flow (l/s) 2.0
 Flush-Flo™ Calculated
 Objective Minimise upstream storage
 Application Surface
 Sump Available Yes
 Diameter (mm) 54
 Invert Level (m) 5.469
 Minimum Outlet Pipe Diameter (mm) 75
 Suggested Manhole Diameter (mm) 1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.500	2.0	Kick-Flo®	0.484	1.0
Flush-Flo™	0.239	1.2	Mean Flow over Head Range	-	1.4

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.0	0.800	1.2	2.000	1.8	4.000	2.5	7.000	3.2
0.200	1.2	1.000	1.3	2.200	1.9	4.500	2.6	7.500	3.3
0.300	1.2	1.200	1.4	2.400	2.0	5.000	2.8	8.000	3.4
0.400	1.1	1.400	1.5	2.600	2.0	5.500	2.9	8.500	3.5
0.500	1.0	1.600	1.6	3.000	2.2	6.000	3.0	9.000	3.6
0.600	1.1	1.800	1.7	3.500	2.3	6.500	3.1	9.500	3.7

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Storage Structures for Storm

Tank or Pond Manhole: S11, DS/PN: 1.005

Invert Level (m) 5.500

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	292.0	1.200	987.0	2.400	1681.0	3.600	1681.0	4.800	1681.0
0.200	397.0	1.400	1118.0	2.600	1681.0	3.800	1681.0	5.000	1681.0
0.400	507.0	1.600	1252.0	2.800	1681.0	4.000	1681.0		
0.600	621.0	1.800	1391.0	3.000	1681.0	4.200	1681.0		
0.800	739.0	2.000	1533.0	3.200	1681.0	4.400	1681.0		
1.000	861.0	2.200	1681.0	3.400	1681.0	4.600	1681.0		

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1 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 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 F (1km) 2.426
FEH Rainfall Version 1999 D2 (1km) 0.381 Cv (Summer) 0.750
Site Location D3 (1km) 0.330 Cv (Winter) 0.840
C (1km) -0.028 E (1km) 0.295

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	S1	10080 Winter	1	+0%	1/8640 Summer				7.067	0.156
2.000	S2/1	10080 Winter	1	+0%	1/7200 Winter				7.067	0.216
1.001	S2	10080 Winter	1	+0%	1/7200 Summer				7.067	0.308
1.002	S3	10080 Winter	1	+0%	1/5760 Summer				7.067	0.378
3.000	S4/2	10080 Winter	1	+0%	1/7200 Summer				7.067	0.267
3.001	S4/1	10080 Winter	1	+0%	1/5760 Summer				7.067	0.399
1.003	S4	10080 Winter	1	+0%	1/5760 Summer				7.067	0.441
1.004	S5	10080 Winter	1	+0%	1/4320 Summer				7.067	0.532
4.000	S5	10080 Winter	1	+0%	1/8640 Winter				7.067	0.132
5.000	S6/1	10080 Winter	1	+0%	1/8640 Summer				7.067	0.195
4.001	S6	10080 Winter	1	+0%	1/7200 Summer				7.067	0.308
4.002	S7	10080 Winter	1	+0%	1/5760 Summer				7.067	0.378
6.000	S8/1	10080 Winter	1	+0%	1/7200 Summer				7.067	0.267
6.001	S8/2	10080 Winter	1	+0%	1/5760 Summer				7.067	0.384
4.003	S8	10080 Winter	1	+0%	1/4320 Winter				7.067	0.446
4.004	S9	10080 Winter	1	+0%	1/4320 Summer				7.067	0.504
4.005	S10	10080 Winter	1	+0%	1/4320 Summer				7.067	0.597
7.000	S11/1	10080 Winter	1	+0%	1/4320 Summer				7.067	0.542
7.001	S11/2	10080 Winter	1	+0%	1/2880 Summer				7.067	0.650
7.002	s11/3	10080 Winter	1	+0%	1/2160 Winter				7.067	0.708
1.005	S11	10080 Winter	1	+0%	1/360 Winter				7.067	1.117
1.006	S12	10080 Winter	1	+0%	1/360 Summer				7.101	1.182

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap. (l/s)	Pipe Overflow (l/s)	Pipe Status	Level Exceeded
1.000	S1	0.000	0.00	0.2	SURCHARGED	
2.000	S2/1	0.000	0.00	0.1	SURCHARGED	

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

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
1.001	S2	0.000	0.00	0.5		SURCHARGED	
1.002	S3	0.000	0.00	0.6		SURCHARGED	
3.000	S4/2	0.000	0.00	0.2		SURCHARGED	
3.001	S4/1	0.000	0.00	0.2		SURCHARGED	
1.003	S4	0.000	0.01	1.0		SURCHARGED	
1.004	S5	0.000	0.01	1.1		SURCHARGED	
4.000	S5	0.000	0.00	0.1		SURCHARGED	
5.000	S6/1	0.000	0.00	0.2		SURCHARGED	
4.001	S6	0.000	0.00	0.4		SURCHARGED	
4.002	S7	0.000	0.00	0.6		SURCHARGED	
6.000	S8/1	0.000	0.00	0.1		SURCHARGED	
6.001	S8/2	0.000	0.00	0.2		SURCHARGED	
4.003	S8	0.000	0.01	0.9		SURCHARGED	
4.004	S9	0.000	0.01	1.1		SURCHARGED	
4.005	S10	0.000	0.01	1.1		SURCHARGED	
7.000	S11/1	0.000	0.00	0.1		SURCHARGED	
7.001	S11/2	0.000	0.00	0.2		SURCHARGED	
7.002	s11/3	0.000	0.00	0.3		SURCHARGED	
1.005	S11	0.000	0.01	1.3		SURCHARGED	
1.006	S12	0.000	0.00	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 0.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 F (1km) 2.426
FEH Rainfall Version 1999 D2 (1km) 0.381 Cv (Summer) 0.750
Site Location D3 (1km) 0.330 Cv (Winter) 0.840
C (1km) -0.028 E (1km) 0.295

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

Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) SurchARGE	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	S1	10080 Winter	30	+0%	1/8640 Summer				7.394	0.483
2.000	S2/1	10080 Winter	30	+0%	1/7200 Winter				7.394	0.543
1.001	S2	10080 Winter	30	+0%	1/7200 Summer				7.394	0.635
1.002	S3	10080 Winter	30	+0%	1/5760 Summer				7.394	0.705
3.000	S4/2	10080 Winter	30	+0%	1/7200 Summer				7.394	0.594
3.001	S4/1	10080 Winter	30	+0%	1/5760 Summer				7.394	0.726
1.003	S4	10080 Winter	30	+0%	1/5760 Summer				7.394	0.768
1.004	S5	10080 Winter	30	+0%	1/4320 Summer				7.395	0.860
4.000	S5	10080 Winter	30	+0%	1/8640 Winter				7.394	0.459
5.000	S6/1	10080 Winter	30	+0%	1/8640 Summer				7.394	0.522
4.001	S6	10080 Winter	30	+0%	1/7200 Summer				7.394	0.635
4.002	S7	10080 Winter	30	+0%	1/5760 Summer				7.394	0.705
6.000	S8/1	10080 Winter	30	+0%	1/7200 Summer				7.394	0.594
6.001	S8/2	10080 Winter	30	+0%	1/5760 Summer				7.394	0.711
4.003	S8	10080 Winter	30	+0%	1/4320 Winter				7.394	0.773
4.004	S9	10080 Winter	30	+0%	1/4320 Summer				7.395	0.832
4.005	S10	10080 Winter	30	+0%	1/4320 Summer				7.395	0.925
7.000	S11/1	10080 Winter	30	+0%	1/4320 Summer				7.395	0.870
7.001	S11/2	10080 Winter	30	+0%	1/2880 Summer				7.395	0.978
7.002	s11/3	10080 Winter	30	+0%	1/2160 Winter				7.395	1.036
1.005	S11	10080 Winter	30	+0%	1/360 Winter				7.395	1.445
1.006	S12	10080 Winter	30	+0%	1/360 Summer				7.428	1.509

PN	US/MH Name	Flooded Volume (m ³)	Flow / Cap. (l/s)	Pipe Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1	0.000	0.01	0.4		SURCHARGED	
2.000	S2/1	0.000	0.00	0.2		SURCHARGED	

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

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
1.001	S2	0.000	0.01	0.8		SURCHARGED	
1.002	S3	0.000	0.01	1.0		SURCHARGED	
3.000	S4/2	0.000	0.00	0.3		SURCHARGED	
3.001	S4/1	0.000	0.01	0.4		SURCHARGED	
1.003	S4	0.000	0.01	1.7		SURCHARGED	
1.004	S5	0.000	0.01	1.9		SURCHARGED	
4.000	S5	0.000	0.00	0.2		SURCHARGED	
5.000	S6/1	0.000	0.00	0.3		SURCHARGED	
4.001	S6	0.000	0.01	0.7		SURCHARGED	
4.002	S7	0.000	0.01	1.0		SURCHARGED	
6.000	S8/1	0.000	0.00	0.2		SURCHARGED	
6.001	S8/2	0.000	0.01	0.4		SURCHARGED	
4.003	S8	0.000	0.01	1.5		SURCHARGED	
4.004	S9	0.000	0.01	1.9		SURCHARGED	
4.005	S10	0.000	0.02	2.0		SURCHARGED	
7.000	S11/1	0.000	0.00	0.1		SURCHARGED	
7.001	S11/2	0.000	0.00	0.3		SURCHARGED	
7.002	s11/3	0.000	0.01	0.5		SURCHARGED	
1.005	S11	0.000	0.01	0.9		SURCHARGED	
1.006	S12	0.000	0.00	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 0.000
 Hot Start Level (mm) 0 Inlet Coefficient 0.800
 Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
 Foul Sewage per hectare (l/s) 0.000

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

Synthetic Rainfall Details

Rainfall Model FEH D1 (1km) 0.362 F (1km) 2.426
 FEH Rainfall Version 1999 D2 (1km) 0.381 Cv (Summer) 0.750
 Site Location D3 (1km) 0.330 Cv (Winter) 0.840
 C (1km) -0.028 E (1km) 0.295

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

Profile(s) Summer and Winter
 Duration(s) (mins) 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960,
 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
 Return Period(s) (years) 1, 30, 100
 Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)	Surcharged Depth (m)
1.000	S1	10080 Winter	100	+40%	1/8640 Summer				7.862	0.951
2.000	S2/1	10080 Winter	100	+40%	1/7200 Winter				7.862	1.011
1.001	S2	10080 Winter	100	+40%	1/7200 Summer				7.862	1.103
1.002	S3	10080 Winter	100	+40%	1/5760 Summer				7.862	1.173
3.000	S4/2	10080 Winter	100	+40%	1/7200 Summer				7.862	1.062
3.001	S4/1	10080 Winter	100	+40%	1/5760 Summer				7.862	1.194
1.003	S4	10080 Winter	100	+40%	1/5760 Summer				7.862	1.236
1.004	S5	10080 Winter	100	+40%	1/4320 Summer				7.862	1.327
4.000	S5	10080 Winter	100	+40%	1/8640 Winter				7.862	0.927
5.000	S6/1	10080 Winter	100	+40%	1/8640 Summer				7.862	0.990
4.001	S6	10080 Winter	100	+40%	1/7200 Summer				7.862	1.103
4.002	S7	10080 Winter	100	+40%	1/5760 Summer				7.862	1.173
6.000	S8/1	10080 Winter	100	+40%	1/7200 Summer				7.862	1.062
6.001	S8/2	10080 Winter	100	+40%	1/5760 Summer				7.862	1.179
4.003	S8	10080 Winter	100	+40%	1/4320 Winter				7.862	1.241
4.004	S9	10080 Winter	100	+40%	1/4320 Summer				7.862	1.299
4.005	S10	10080 Winter	100	+40%	1/4320 Summer				7.862	1.392
7.000	S11/1	10080 Winter	100	+40%	1/4320 Summer				7.862	1.337
7.001	S11/2	10080 Winter	100	+40%	1/2880 Summer				7.862	1.445
7.002	s11/3	10080 Winter	100	+40%	1/2160 Winter				7.862	1.503
1.005	S11	10080 Winter	100	+40%	1/360 Winter				7.862	1.912
1.006	S12	10080 Winter	100	+40%	1/360 Summer				7.895	1.976

PN	US/MH Name	Flooded Volume (m³)	Flow / Cap. (l/s)	Pipe Overflow (l/s)	Pipe Status	Level Exceeded
1.000	S1	0.000	0.01	0.6	SURCHARGED	
2.000	S2/1	0.000	0.00	0.3	SURCHARGED	

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.
.
Land at Yatton
Catchment E @ 2.0 l/s/ha
Surcharged Outfall



Date 12/05/2023 17:58
File Catchment E_V5.MDX

Designed by RJH
Checked by

Innovyze

Network 2018.1

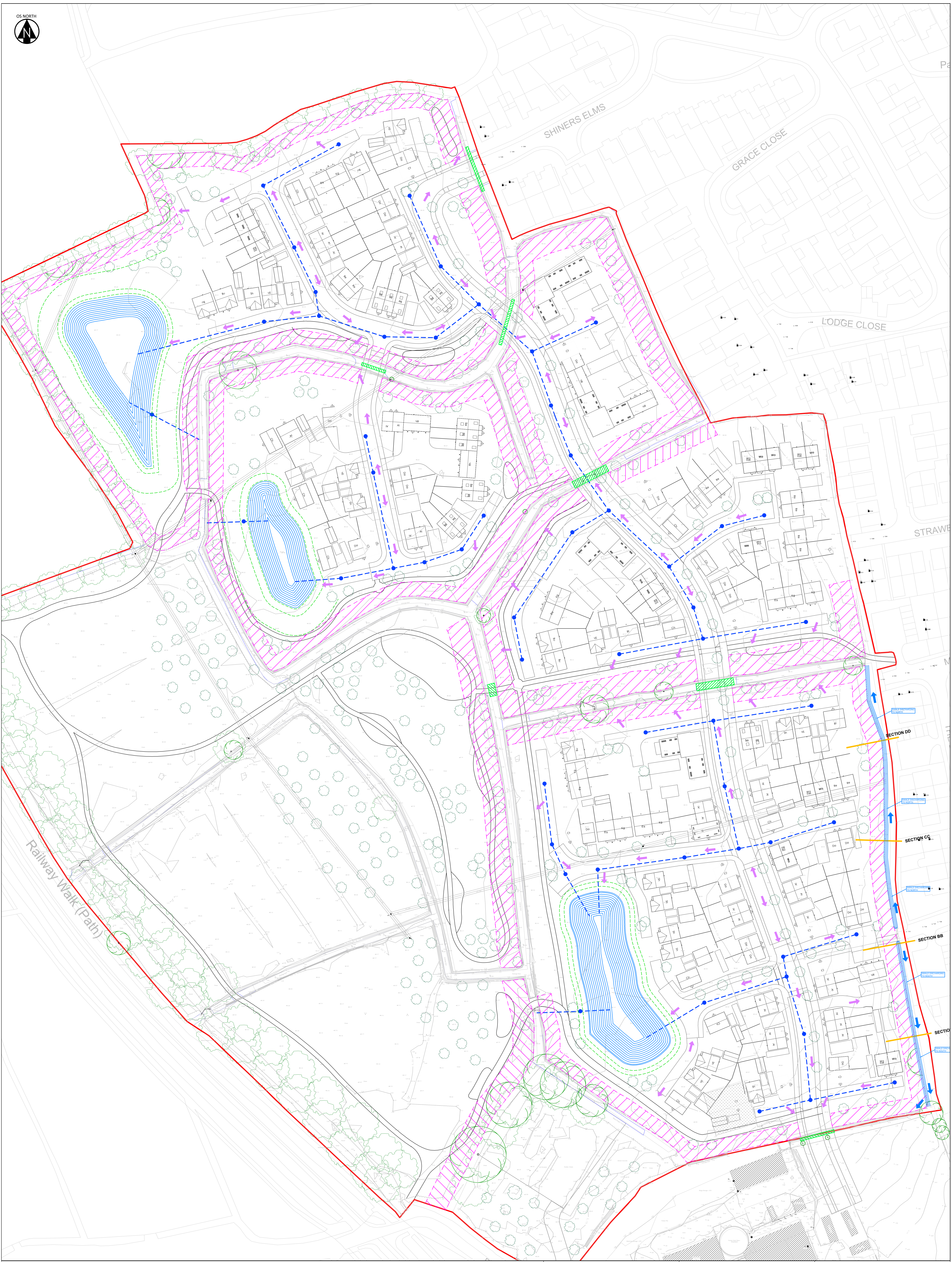
100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flooded		Pipe		Status	Level Exceeded
		Volume (m ³)	Flow / Overflow Cap. (l/s)	Flow (l/s)			
1.001	S2	0.000	0.01	1.3		FLOOD RISK	
1.002	S3	0.000	0.01	1.6		SURCHARGED	
3.000	S4/2	0.000	0.01	0.5		FLOOD RISK	
3.001	S4/1	0.000	0.01	0.6		SURCHARGED	
1.003	S4	0.000	0.02	2.8		SURCHARGED	
1.004	S5	0.000	0.02	3.2		FLOOD RISK	
4.000	S5	0.000	0.01	0.4		FLOOD RISK	
5.000	S6/1	0.000	0.01	0.4		FLOOD RISK	
4.001	S6	0.000	0.01	1.2		FLOOD RISK	
4.002	S7	0.000	0.01	1.6		SURCHARGED	
6.000	S8/1	0.000	0.01	0.4		FLOOD RISK	
6.001	S8/2	0.000	0.01	0.6		SURCHARGED	
4.003	S8	0.000	0.02	2.5		SURCHARGED	
4.004	S9	0.000	0.02	3.0		SURCHARGED	
4.005	S10	0.000	0.03	3.3		FLOOD RISK	
7.000	S11/1	0.000	0.00	0.2		FLOOD RISK	
7.001	S11/2	0.000	0.01	0.4		FLOOD RISK	
7.002	s11/3	0.000	0.01	0.9		FLOOD RISK	
1.005	S11	0.000	0.01	1.1		FLOOD RISK	
1.006	S12	0.000	0.00	0.0		FLOOD RISK	

APPENDIX C

Drawing No. 23257-HYD-XX-XX-DR-D-2004-P02 - Exceedance Flow Routes

Drawing No. 23257-HYD-XX-XX-DR-D-2005-P03 - Rhyne Access Routes



- Key**
- Exceedance flow route
 - Proposed surface water sewer
 - Proposed rhyne crossing culvert
 - Proposed attenuation basin
 - Proposed rhyne easement strips

REVISIONS

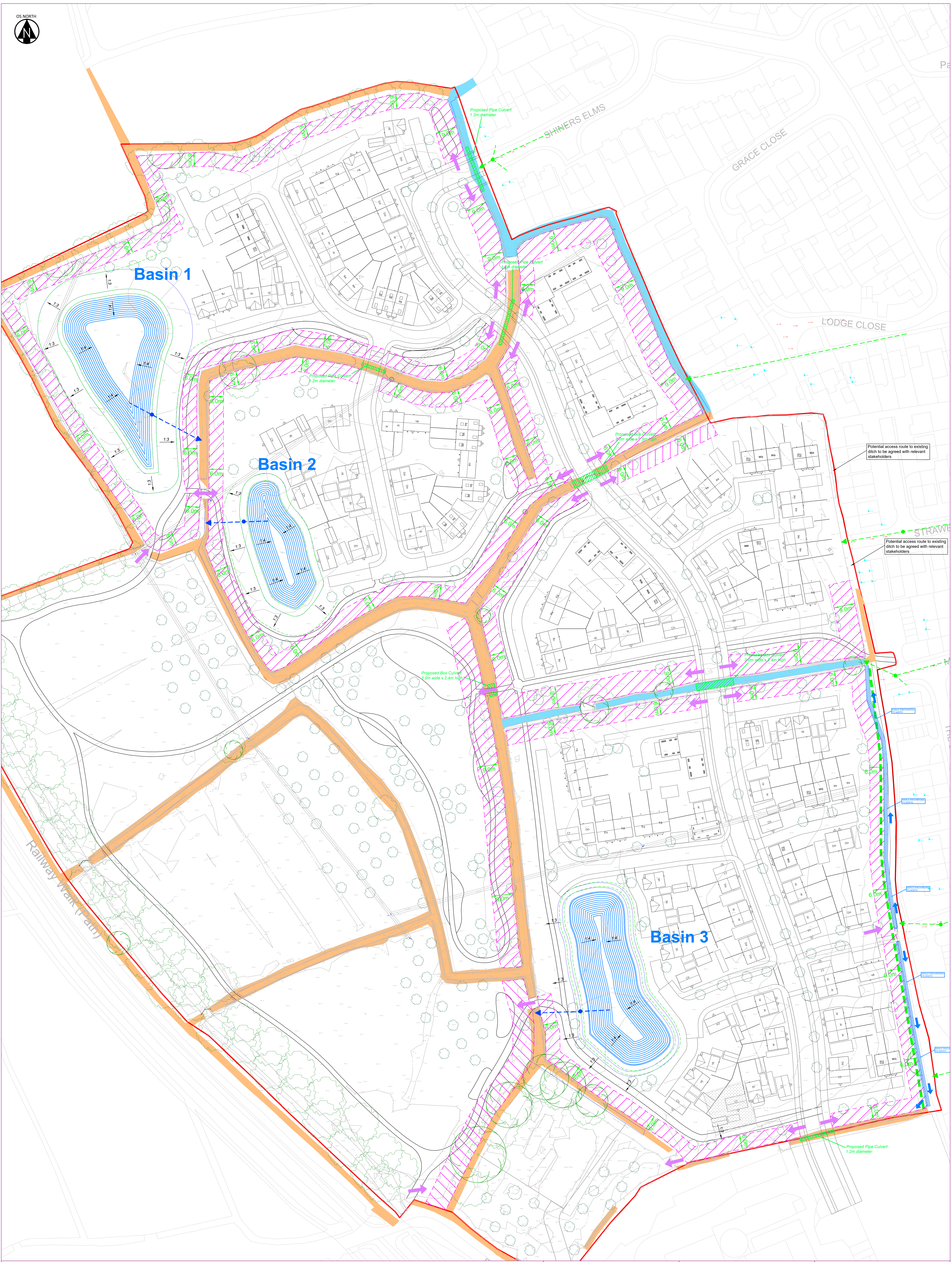
Rev	Date	Description	By	Chk	App
P02	06/07/23	Rhyne easement strips amended	RJH		
P01	16/03/23	First Issue	RJH		

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CLIENT
PERSIMMON HOMES SEVERN VALLEY

PROJECT
**LAND AT RECTORY FARM (NORTH)
 YATTON, NORTH SOMERSET**

TITLE POST-DEVELOPMENT SURFACE WATER EXCEEDANCE FLOW ROUTES		SCALE @ A0 1 : 500	STATUS S2
HYDROCK PROJECT NO. 23257-IOCB	PROJECT CODE ORIGINATOR/DATE/LEVEL/TYPE/ROLE/NUMBER 23257-HYD-XX-DR-D-2004	REVISION P02	



Key

- Existing piped ditch/rhyne
- Proposed rhyne crossing culvert
- Proposed attenuation basin
- Proposed rhyne easement strips
- Proposed access points to rhyne easement strips
- IDB Viewed Rhyne
- Ordinary Watercourse

REVISIONS

Rev	Date	Description	By	Chk	App
P01	06/07/23	Easement strips amended.	RJH		
P02	30/05/23	Easement width dimensions added.	RJH		
P01	12/05/23	First issue.	RJH		

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PERSIMMON HOMES SEVERN VALLEY

PROJECT
LAND AT RECTORY FARM (NORTH)
YATTON, NORTH SOMERSET

TITLE
RHYNE MAINTENANCE STRIPS
AND ACCESS POINTS

HYDROCK PROJECT NO.
23257-IOCB

SCALE @ A0
1 : 500

STATUS DESCRIPTION
FOR APPROVAL

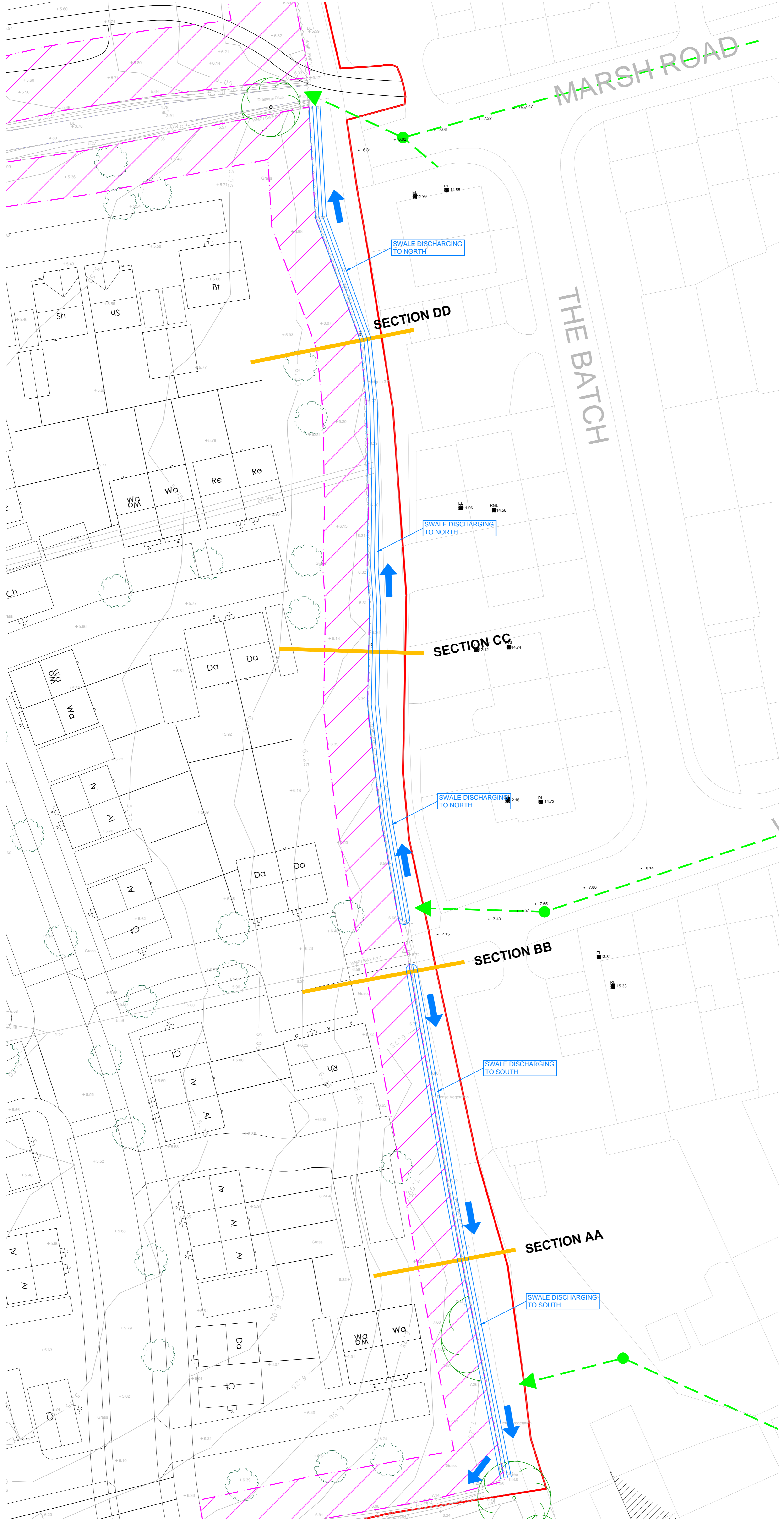
STATUS
S2

REVISION
P03

DRAWING NO. (PROJECT CODE ORIGINATOR.DWG LEVEL TYPE ROLE NUMBER)
23257-HYD-XX-XX-DR-D-2005

APPENDIX D

Point B - Cross Section Locations
Cross Sections



MARSH ROAD

THE BATCH

SECTION DD

SECTION CC

SECTION BB

SECTION AA

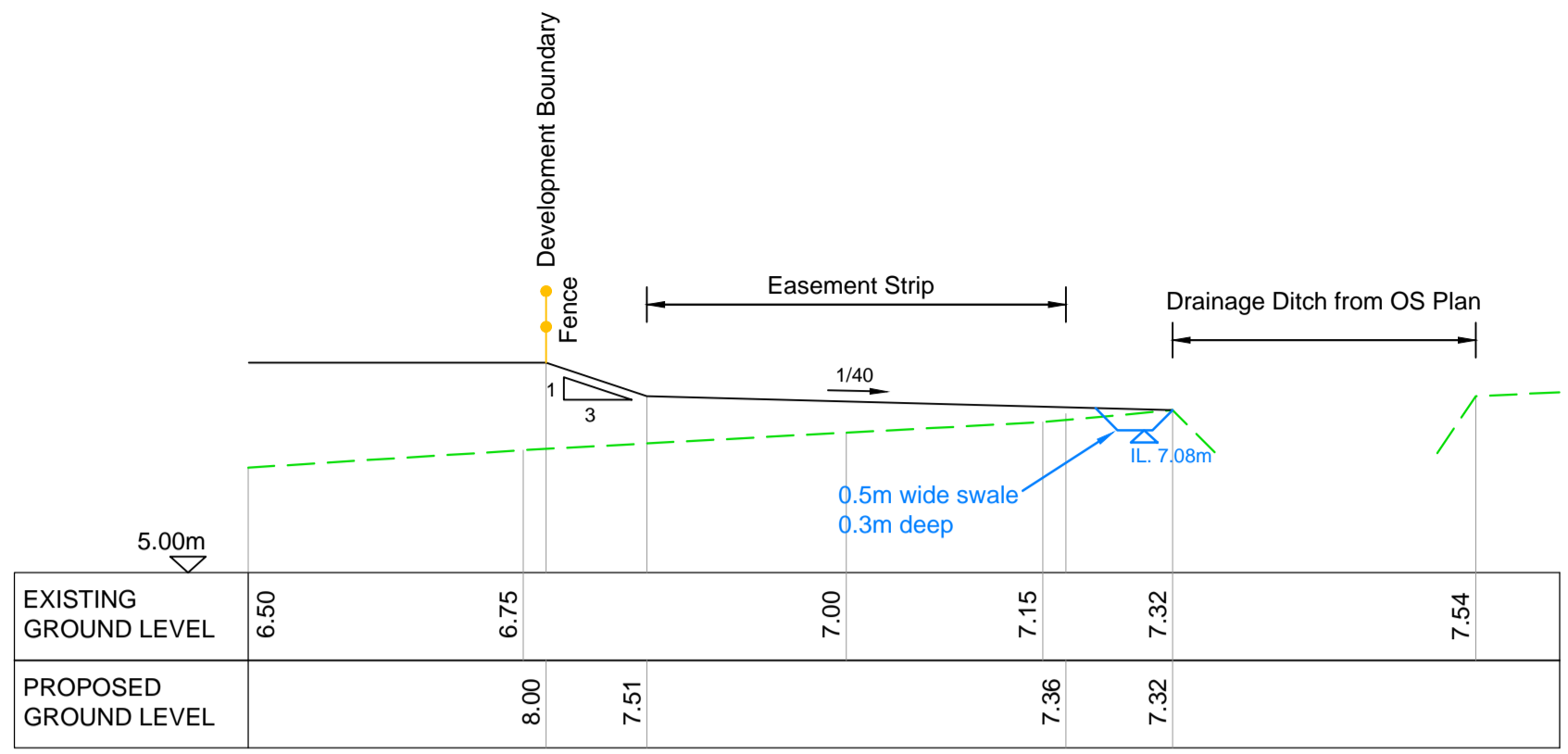
SWALE DISCHARGING TO NORTH

SWALE DISCHARGING TO NORTH

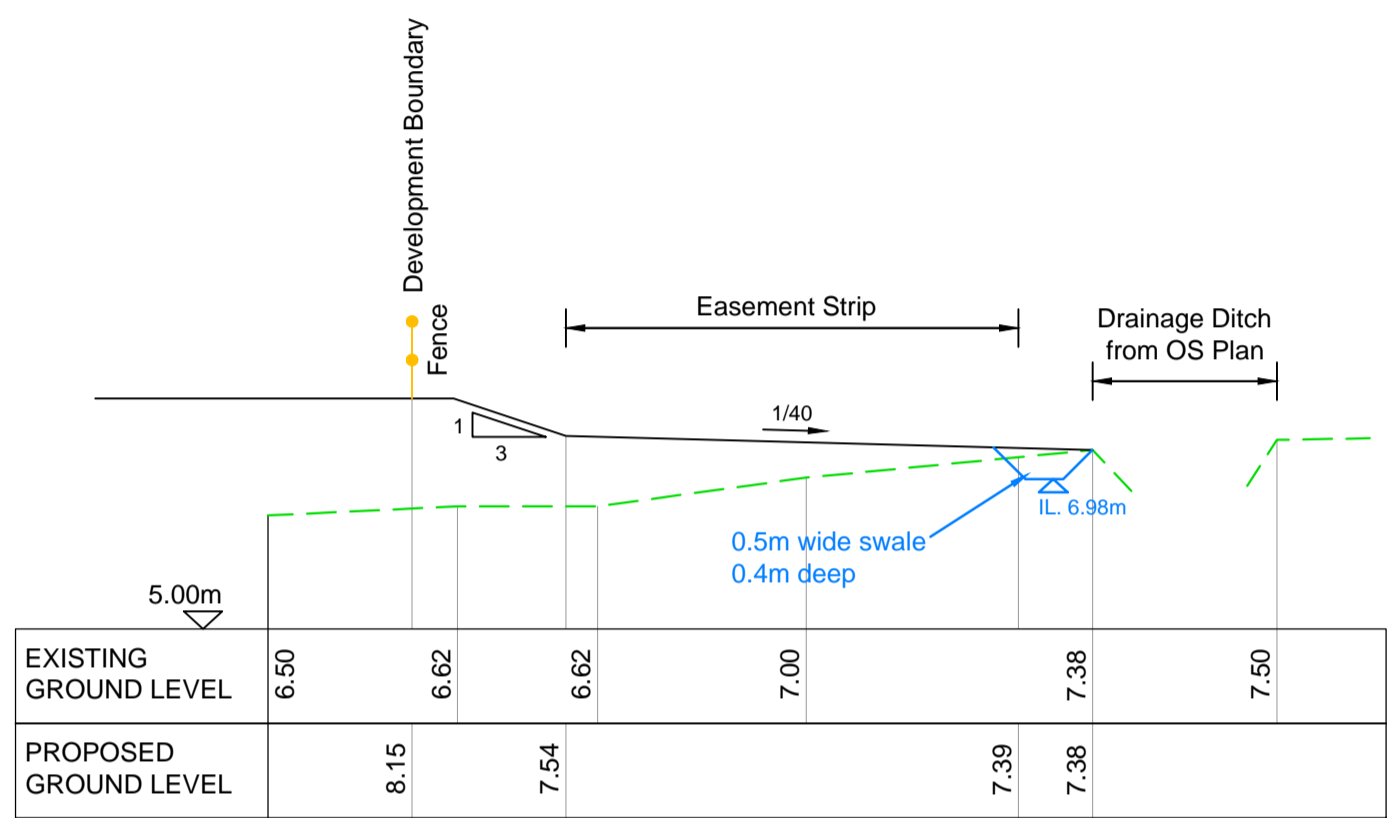
SWALE DISCHARGING TO NORTH

SWALE DISCHARGING TO SOUTH

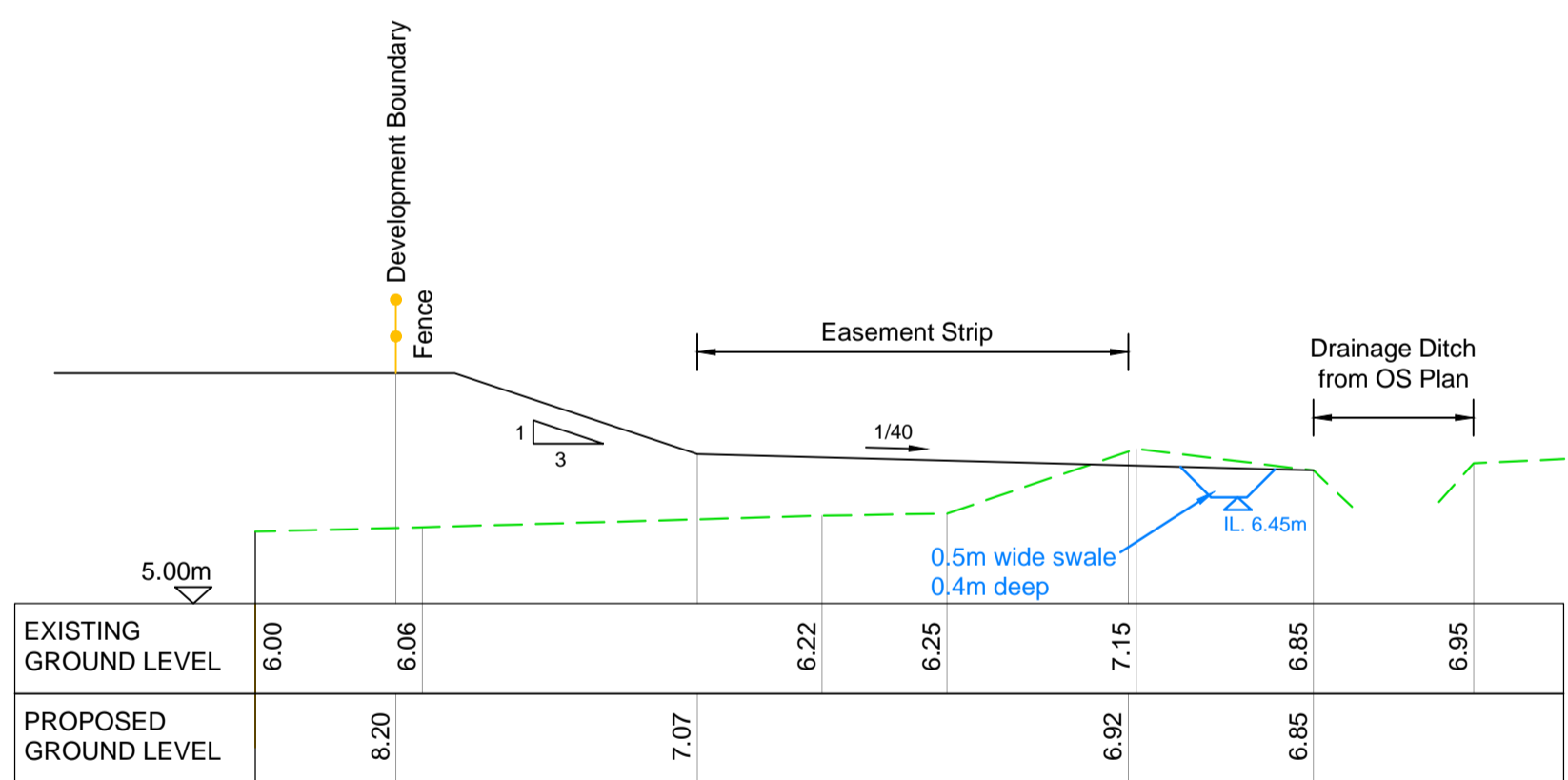
SWALE DISCHARGING TO SOUTH



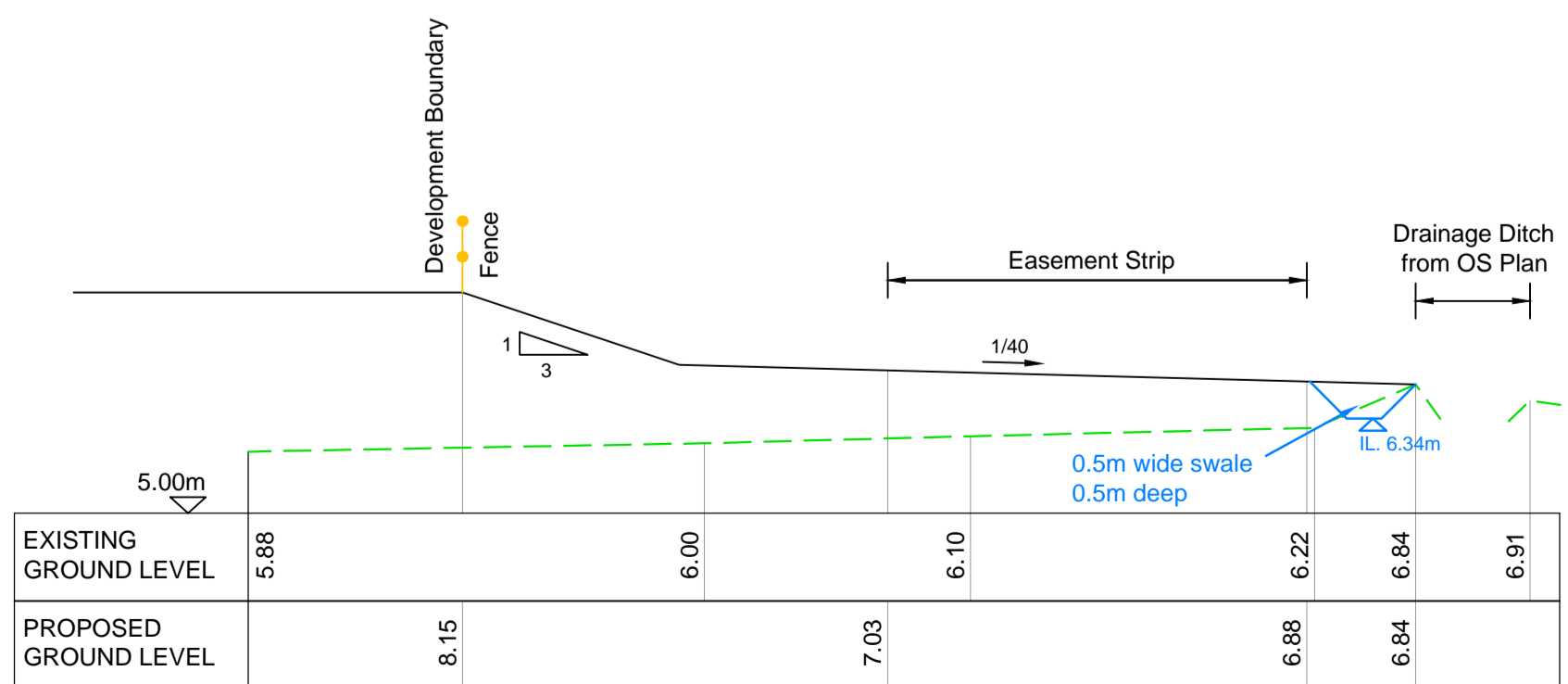
SECTION AA



SECTION BB



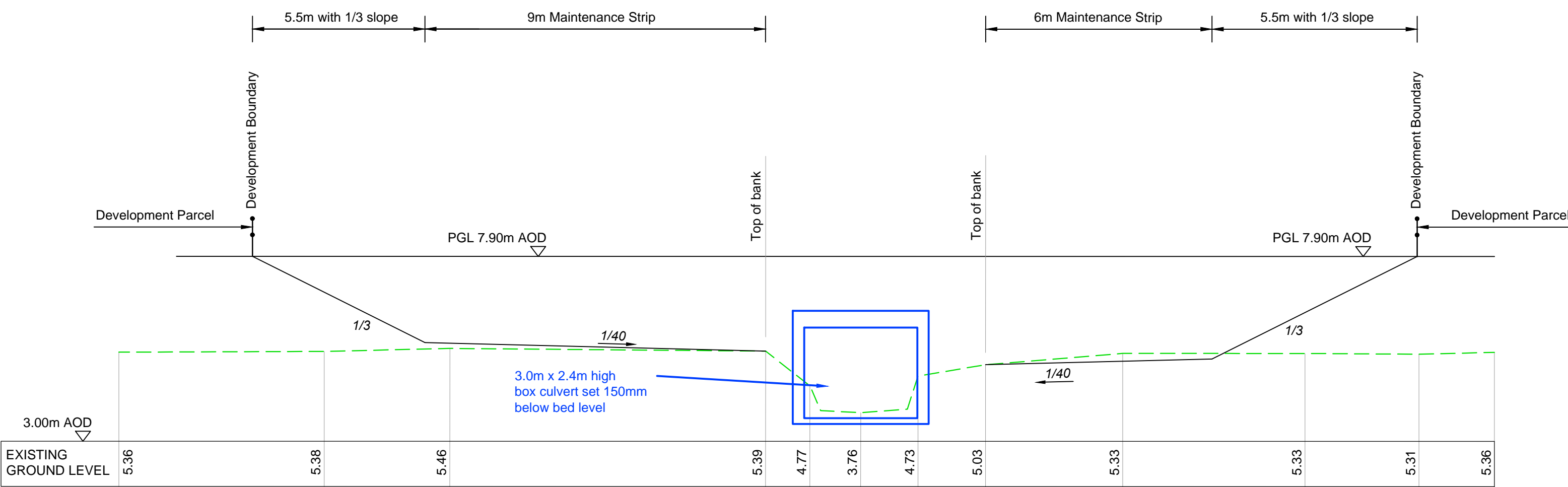
SECTION CC



SECTION DD

APPENDIX E

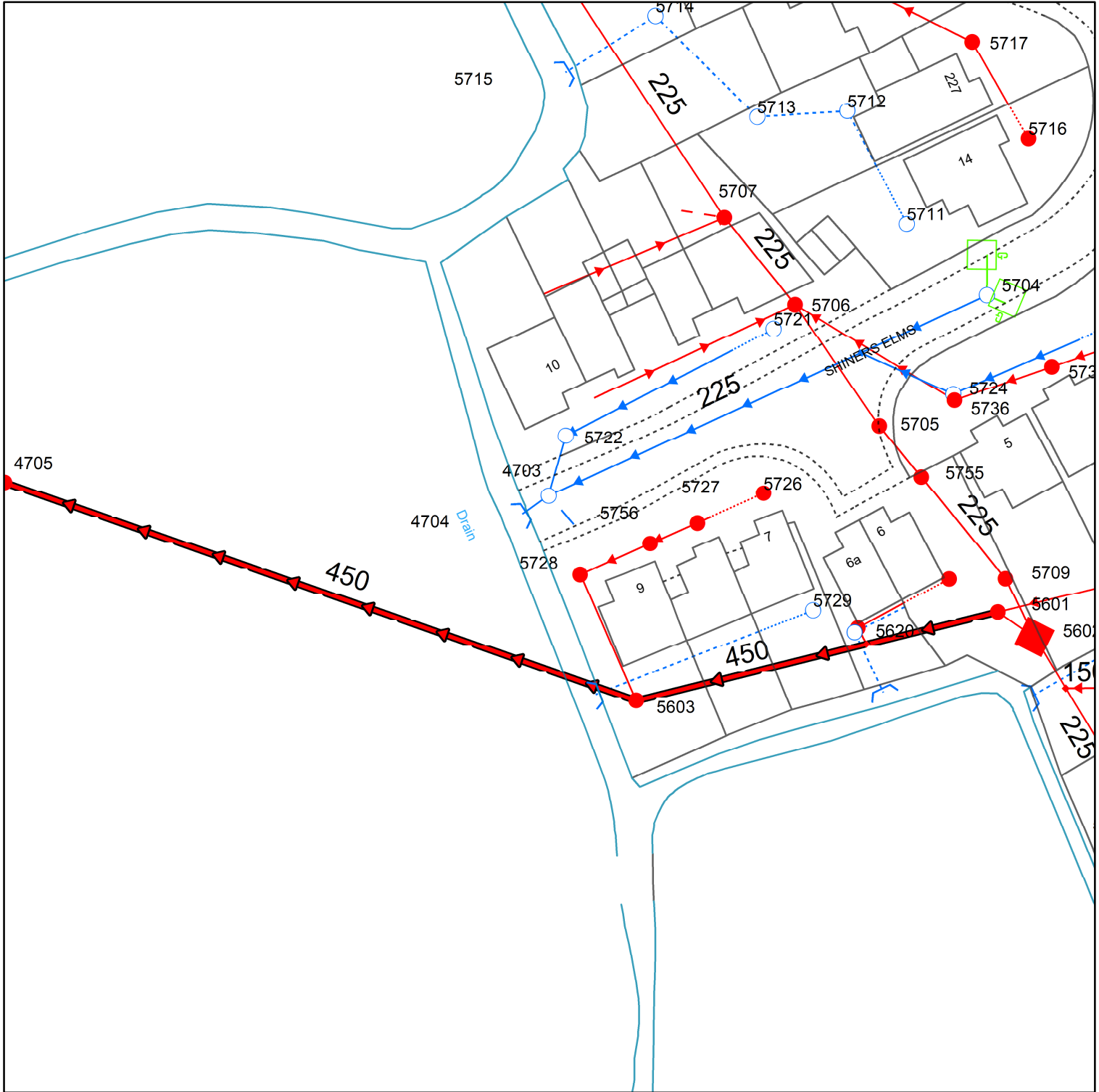
Typical Rhyne Crossing and Maintenance Strip Cross Section



APPENDIX F

Point L - Wessex Water Sewer Map

Wessex Water Network Map



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WATER MAINS	SEWERS	STRATEGIC PUBLIC	PRIVATE	SECTION 104	OTHER WESSEX PIPES	NON-WESSEX / UNKNOWN
<ul style="list-style-type: none"> Distribution Washout Raw Water Abandoned Private 	<ul style="list-style-type: none"> Foul Surface Combined Abandoned <p>Colours generally indicate the use of the sewer/drain (i.e Red - Foul, Dark Blue - Surface, Magenta - Combined/Dual Use, Light Green - Highway Drain, Mid Green - Overflow).</p> <p>Some styles of line and symbol are shown on the key in sample/typical colours.</p>	<ul style="list-style-type: none"> Public Sewer Private Sewer Abandoned 	<ul style="list-style-type: none"> Private Sewer Abandoned 	<ul style="list-style-type: none"> Section 104 Abandoned 	<ul style="list-style-type: none"> Rising Mains Standby Rising Mains EDM Effluent Disposal Overflow Syphon 	<ul style="list-style-type: none"> Private Rising Mains Culverted Watercourse Highway Drain Use Unknown Status Unknown
FITTINGS	STRUCTURES	OTHER STRUCTURES				
<ul style="list-style-type: none"> Hydrant Other 	<ul style="list-style-type: none"> Manhole - Foul Manhole - Surface Manhole - Combined Inlet Outfall Lamphole Bifurcation - Foul Bifurcation - Surface Bifurcation - Combined Combined Sewage Overflow 	<ul style="list-style-type: none"> Chamber Tunnel Interceptor Attenuation Tank Storage Tank 	<ul style="list-style-type: none"> Pumping Station - Surface Pumping Stn - Foul/Combined Gully Vent Column Rodding Eye Catchpit Flushing Chamber Soakaway Non Return Valve Air Valve Hatch Box Washout 			
<p>Information in this map is provided for identification purposes only. No warranty as to accuracy is given or implied. The precise route of pipe work may not exactly match that shown. Wessex Water does not accept liability for inaccuracies. Sewers and lateral drains adopted by Wessex Water under the Water Industry (Schemes for Adoption of Private Sewers) Regulations 2011 are to be plotted over time and may not yet be shown. In carrying out any works, you accept liability for the cost of any repairs to Wessex Water apparatus damaged as a result of your works. You are advised to commence excavations using hand tools only. Mechanical digging equipment should not be used until pipe work has been precisely located. If you are considering any form of building works and pipe work is shown within the boundary of your property or a property to be purchased (or very close by) a surveyor should plot its exact position prior to commencing works or purchase. If you are proposing to build over or near Wessex Water's apparatus you should contact the Developer Services Team, tel: 01225 526333 or e-mail: developer.enquiries@wessexwater.co.uk to discuss your proposals. Details of assets within Wessex Water's land ownership are unavailable through this service.</p>						
<p>Date: 31/10/2022</p> <p>Centre: 342499, 165706</p> <p>Scale: 1:625 (when printed at A4 size)</p>						