TN03 – RFI Response to LLFA

Site: Land north of East Street, Rusper, West Sussex

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Approved by: Neil Jaques

Date: 21st May 2025

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1.0 Introduction

1.1 Planning application DC/25/0523 pertains to the full planning application for the erection of 18no. 2-, 3- and 4-bedroom dwellings (including 6no. affordable units) on the land north of East Street in Rusper, West Sussex.

1.2 Motion developed a Flood Risk Assessment (FRA) and Drainage Strategy to support the planning application. This FRA and Drainage Strategy has been reviewed by West Sussex County Council (WSCC) as the Lead Local Flood Authority (LLFA) for the Rusper and Horsham area.

1.3 The LLFA have raised a holding objection to the development and the FRA and Drainage Strategy, pending the provision of further information, which is required to demonstrate that the application is in accordance with NPPF, it's PPG, and Policy 38 in Horsham District's Planning Framework.

1.4 The LLFA's objection can be viewed in full in Appendix A of this technical note, but, in summary there seven points that the LLFA have request further information (RFI) upon, which are listed, below:

1.) *We require further information regarding the onward connections of the watercourse and drainage networks.*

2.) *Please can the Applicant confirm what the drainage crossing the site serves, in order for us to determine how this should be managed on site.*

3.) *In addition to the above we require further details of the watercourse intended to be utilised for the site's surface water discharge. Please can we be provided with a plan showing how it connects to the wider system locally, including the proposed connection location and outfall design.*

4.) *We will require the surcharged outfall to ditch calculations to demonstrate the impact a surcharged outfall would have on the required levels of storage needed on site. It should be noted that permission to cross and discharge on third party land will be required.*

5.) *With reference to ensuring safe access and egress from the site, we would ask that the FRA is updated using the latest Environment Agency Flood Map for Planning (updated March 2025). The Horsham SFRA advises that the 1:1000 event can be utilised in lieu of 1:100 plus climate change data being available. Please provide details as to how any flood risk to the site entrance will be mitigated.*

6.) *Page 3 of Appendix K (MicroDrainage modelling outputs) states a winter CV value of 0.84, please amend to 1 as has been correctly used elsewhere in the calculations.*

7.) *It is noted that the Applicant intends to tank their permeable paving attenuation storage. Unless groundwater ingress is a concern, we would recommend that this is left unlined in order to allow any infiltration benefit that may be possible. We acknowledge this will not be significant due to the soil profile and underlying geology on site, however it still may provide an opportunity to reduce discharge offsite.*

1.5 This Technical Note will provide the additional information and make amendments to information already submitted, as requested by the LLFA, which will enable them to remove their holding objection and the application to move forward.

1.6 Each of the seven objection points will be dealt with in turn in the following section.

2.0 Discussion

We require further information regarding the onward connections of the watercourse and drainage networks.

2.1 To assist the LLFA in their understanding of the ongoing connectivity of the watercourse that the development is proposing to discharge to, we have prepared a plan showing the full pathway of the ordinary watercourse prior to its confluence with the nearest main river.

2.2 LiDAR data in the FRA and Drainage Strategy to show the initial incised channel and location of the drainage ditch relative to the site, shortly after which and to the east Ordnance Survey (OS) Mapping indicates the watercourse. The presence of the watercourse on OS mapping demonstrates the watercourses' significance and the fact that it must have an element of year-round baseflow.

2.3 Therefore, in terms of ongoing connectivity, the chosen outfall location and the drainage ditch are part of the wider hydraulic network and, for complete clarity, we have drawn up a plan that can be viewed in Appendix B that shows the full course of the drainage ditch and ordinary watercourse from the site (Location 'A') through to its confluence with the nearest designated Main River (Location 'B'), which is the River Mole.

2.4 Prior to the ordinary watercourse's confluence with the River Mole, we understand that the ordinary watercourse is known as the 'Rusperhouse Gill'.

2.5 With the information provided, we trust that comfort is provided regarding the ongoing connectivity of the drainage ditch and ordinary watercourse system that has been targeted as the development's surface water outfall location.

Please can the Applicant confirm what the drainage crossing the site serves, in order for us to determine how this should be managed on site.

2.6 A surface water pipe traverses the site from west to east, with three access chambers being present within the site. This pipe continues off-site to the east under the adjacent access track prior to outfalling to the drainage ditch to the east that is to be used as the site's drainage outfall.

2.7 As part of site investigations, the chambers for this drain were opened and found to be completely silted up, to the extent that they were unable to convey flow. This was shown within the appendices of the FRA and Drainage Strategy. Additionally, where the pipe exits the site to the eastern boundary, it was excavated and found to have partially collapsed.

2.8 The site investigations didn't indicate that the silted and collapsed pipe was carrying any flow, or that there was any surcharging with surface water due to the poor condition of the pipe. As such, it is understood that the pipe is an item of legacy infrastructure that is no longer serving the site or neighbouring land.

2.9 Notwithstanding this, it is intended to divert the drainage pipe through the site, and to maintain its connection to the drainage ditch, but it will not connect to, nor form part of the site's drainage strategy because it does not serve the site. Therefore, if the drainage pipe is still required, the diversion will remove the silted and damaged sections of the pipe, restoring its function, and the diversion will maintain any presumed rights of drainage already in place.

In addition to the above we require further details of the watercourse intended to be utilised for the site's surface water discharge. Please can we be provided with a plan showing how it connects to the wider system locally, including the proposed connection location and outfall design.

2.10 The ongoing connectivity and a plan showing how it connects to the wider system has been provided, above, in Paragraphs 2.1 – 2.5 and is shown in the plan in Appendix B of this technical note.

2.11 The connection location is shown in the Drainage Strategy plan in Appendix J of the Drainage Strategy report and indicated by the location of the drainage ditch shown in the LiDAR plan in Figure 2.1 of the Drainage Strategy report. We trust that this is sufficient, alongside the evidence of connectivity to the wider hydraulic network and the River Mole for the LLFA to be satisfied that the outfall is accessible and suitable for the discharge of surface water from the site.

2.12 With regards to the outfall design, because the outflow from the drainage system is very low flow (no more than 2.9 l/s) and the drainage ditch is small-scale hydraulic feature, it is proposed to build an informal headwall structure using concrete sandbags. This will be sensitive to the rural location (as opposed to a pre-cast concrete headwall structure) and will be simple to construct. It is proposed to build the headwall in accordance with WSCC's approved standard details for 'Headwall Detail for pipe sizes up to 600mm diam. (Concrete Bagwork)' which is in WSCC drawing S278/38/23 Rev A.

We will require the surcharged outfall to ditch calculations to demonstrate the impact a surcharged outfall would have on the required levels of storage needed on site. It should be noted that permission to cross and discharge on third party land will be required.

2.13 The MicroDrainage Network hydraulic model has been re-run with a surcharged outfall. This has not changed the ability of the drainage strategy to discharge surface water without flooding, and the updated MicroDrainage results are appended to this document in Appendix C. This is because the outfall level is 107.5 mAOD and the surcharged level is 108.5 mAOD, which is well below the level of the SuDS basin.

2.14 We note the requirement for permission to cross 3rd party land. This is in place, and, because of the local topography and existing drainage regime, the development site has a right to drain to the neighbouring land because that is where surface water from the currently drains to.

With reference to ensuring safe access and egress from the site, we would ask that the FRA is updated using the latest Environment Agency Flood Map for Planning (updated March 2025). The Horsham SFRA advises that the 1:1000 event can be utilised in lieu of 1:100 plus climate change data being available. Please provide details as to how any flood risk to the site entrance will be mitigated.

2.15 The new NaFRA Flood Map and Risk of Flooding from Surface Water (RoFSW) outlines are included for the 1 in 1,000-year (low risk) surface water flood event, in Figure 2.1 on the next page:

Figure 2.1 – 1 in 1,000-year Surface Water Flood Extent

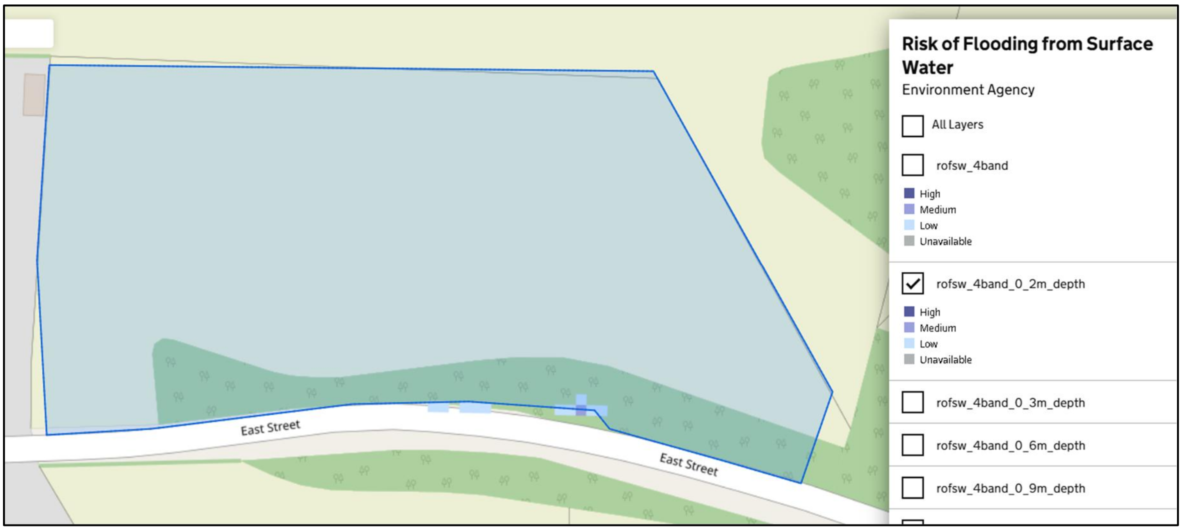
2.16 It can be seen that in the 1 in 1,000-year surface water flood event that there is only a narrow area of flood risk on the site's southern boundary. This does not conflict with the proposed SuDS features but it crosses the proposed location of the access to the site.

2.17 To investigate whether this could preclude safe access and egress, the full dataset was reviewed to understand the depths of flooding that could be expected, and what flood hazard is attributed to this.

2.18 The RoFSW mapping provides data on predicted flood depths for different return periods. The categories of flood depth are 0.2m, 0.3m, 0.6m, 0.9m and 1.2m.

2.19 As shown in Figure 2.2 below, flooding of up 0.2m (20cm) would only be anticipated in the 'low' risk (1 in 1,000-year) surface water flood event and the extent of this depth of flooding is very small and isolated. This indicates that it would not preclude safe access and egress to and from the site.

Figure 2.2 – Extent of Surface Water Flooding up to 0.2m in the 1 in 1,000-year event



2.20 To confirm this, Flood Hazard in these areas has been investigated and discussed, below.

Flood Hazard and Safe Access and Egress

2.21 The R&D Technical Report FD2320/TR2, which was a joint publication between Defra and the Environment Agency (EA) provides a framework and guidance for assessing and managing flood risk for new development and, more specifically, presents a robust method for assessing the conditions that constitute safe access and egress, which can be applied at the site-specific scale, i.e. as part of an FRA.

2.22 FD2320/TR2 considers a safe access or egress route to be one that is safe for use by occupiers without the intervention of the emergency services or others.

2.23 A dry route is safe for all, including people and vehicles. However, FD2320/TR2 states that "*if a dry route for people is not possible, a route for people where the flood hazard (in terms of depth and velocity of flooding) is low and should not cause a risk to people*" would constitute a safe access.

2.24 It is in this context that the access and egress to the land north of East Street, Rusper, has been assessed and, as recommended by FD2320/TR2, the 'Intermediate Approach' to the assessment of Flood Hazard has been used, which is required where access and egress may not be dry.

2.25 The 'Intermediate Approach' to Flood Hazard is laid out within FD2321/TR1 'The Flood Risks to People Methodology' and discussed in the Supplementary Note to Operating Authorities. The method for calculating Flood Hazard is:

<u>Flood Hazard</u>

The Flood Hazard rating is calculated using the following equation:

$$HR = d \times (v + 0.5) + DF$$

Where,
HR = (flood) hazard rating:
d = depth of flooding (m);
v = velocity of floodwaters (m/sec); and
DF = debris factor calculated using Table A.1

Table A.1 Guidance on debris factors for different flood depths, velocities and dominant land uses

Depths	Pasture/Arable	Woodland	Urban
0 to 0.25 m	0	0	0
0.25 to 0.75 m	0	0.5	1
d>0.75 m and/or v>2	0.5	1	1

Ref: FD2321/TR1 Table 3.1

2.26 If this calculation is applied to the land north of East Street, Rusper, the values for d, v, and DF are:

- d = 0.2 (max)
- v = Assumed at 1.0 m/s, although this is unlikely noting the very shallow flood depths.
- DF = 0 (zero) as per Table A.1 for all land uses where flooding is less than 0.25m deep.

2.27 Thus, the hazard calculation (HR) for land north of East Street, Rusper, is:

$$HR = 0.2 \times (1.0 + 0.5) + 0$$

$$HR = 0.3$$

2.28 This HR value can be applied to Figure 3.2 of FD2321/TR1 and Figure 2.3 (next page), which is the categorisation of Flood Hazard.

Figure 3.2 of FD2321/TR1

Velocity \ Depth	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50
0.00	0.13	0.25	0.38	0.50	0.63	0.75	0.88	1.00	1.13	1.25
0.50	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.25	2.50
1.00	0.38	0.75	1.13	1.50	1.88	2.25	2.63	3.00	3.38	3.75
1.50	0.50	1.00	1.50	2.00	2.50	3.00	3.50	4.00	4.50	5.00
2.00	0.63	1.25	1.88	2.50	3.13	3.75	4.38	5.00	5.63	6.25
2.50	0.75	1.50	2.25	3.00	3.75	4.50	5.25	6.00	6.75	7.50
3.00	0.88	1.75	2.63	3.50	4.38	5.25	6.13	7.00	7.88	8.75
3.50	1.00	2.00	3.00	4.00	5.00	6.00	7.00	8.00	9.00	10.00
4.00	1.13	2.25	3.38	4.50	5.63	6.75	7.88	9.00	10.13	11.25
4.50	1.25	2.50	3.75	5.00	6.25	7.50	8.75	10.00	11.25	12.50
5.00	1.38	2.75	4.13	5.50	6.88	8.25	9.63	11.00	12.38	13.75

Figure 2.3 - Categorisation of Flood Hazard

Flood Hazard Rating (HR)	Colour Code	Hazard to People Classification
Less than 0.75		Very low hazard - Caution
0.75 to 1.25		Danger for some – includes children, the elderly and the infirm
1.25 to 2.0		Danger for most – includes the general public
More than 2.0		Danger for all – includes the emergency services

2.29 As can be seen from Figure 3.2, a HR score of 0.3 is Very Low Risk and below the lowest categorised hazard class (by 50%). As such, the flood hazard to the access/egress from the site to East Street is very low and only caution needs to be expressed. This accords with FD2320/TR2 and the fact that "*a route for people where the flood hazard (in terms of depth and velocity of flooding) is low and should not cause a risk to people*" would constitute a safe access.

2.30 Therefore, the very small area of surface water flood risk shown on the site boundary is of no consequence to the development, and safe access and egress can be achieved in the 1 in 1,000-year (design) surface water flood event due to the Very Low Hazard associated with this isolated and shallow area of flood risk.

Page 3 of Appendix K (MicroDrainage modelling outputs) states a winter CV value of 0.84, please amend to 1 as has been correctly used elsewhere in the calculations.

2.31 This has been done and can be seen in the updated MicroDrainage calculations included in Appendix C of this technical note.

It is noted that the Applicant intends to tank their permeable paving attenuation storage. Unless groundwater ingress is a concern, we would recommend that this is left unlined in order to allow any infiltration benefit that may be possible. We acknowledge this will not be significant due to the soil profile and underlying geology on site, however it still may provide an opportunity to reduce discharge offsite.

2.32 Groundwater ingress is not a concern, and although meaningful infiltration is not expected and has not been relied upon in the drainage strategy design, we are happy to follow the LLFA's recommendation and line the permeable paving with geotextile (rather than geomembrane) so that small amount of infiltration may occur if ground conditions allow it.

3.0 Summary

3.1 This technical note has provided the information requested by the LLFA to remove their holding objection to DC/25/0523.

3.2 We have updated the MicroDrainage hydraulic model to incorporate the surcharged outfall and CV value of one in the winter synthetic rainfall information. The drainage strategy still functions and can attenuate and discharge the 1 in 100-year + 45% rainfall event without flooding.

3.3 The information provided supports the FRA and Drainage Strategy's robust approach to the management of surface water, and the that proposed outfall is connected to the wider hydraulic network with ongoing connectivity.

3.4 The new NaFRA Flood Map and the RoFSW have been reviewed, and the 1 in 1,000-year surface water flood extent (used as a proxy for the future 1 in 100-year surface water flood extent) and its associated flood hazard are not enough to deny the site safe access and egress. Therefore, surface water cannot be of concern to the proposed development, now or in the future.

3.5 The LLFA's recommendations regarding not lining the attenuation features is noted, as is their comment on 3rd party permissions to cross land with drainage infrastructure. This permission is in place, and the site has permissive rights to drain to the drainage ditch. The site already benefits from a historical drainage connection to the ditch via the drainage pipe that crosses the site.

3.6 With regards to this pipe, it is completely silted up and partially collapsed. It is understood to be a piece of legacy infrastructure and no longer in use (as evidenced by its incapacity to function), but notwithstanding this, it will be diverted across the site and its connection to the ditch preserved.

3.7 We trust that the LLFA now have the required information to remove their holding objection to application DC/25/0523.

Appendix A

LLFA RFI and Holding Objection

Ground Floor
Northleigh
County Hall
Chichester
West Sussex
PO19 1RH

Lead Local Flood Authority

Giles Holbrook
Development Control
Horsham District Council
Albery House
Springfield Road
Horsham
RH12 2GB

Date 1st May 2025

Dear Giles,

RE: **DC/25/0523 - Land North of East Street Rusper West Sussex**

Thank you for your consultation of the above application, received on 10 April 2025. We have reviewed the submitted documentation and wish to make the following comments.

This is a full planning application for the erection of 18no. 2, 3 and 4 bedroom dwellings, (including 6no. affordable housing units), together with access from East Street, vehicle and cycle parking, landscaping and open space, and sustainable drainage.

At present we **object** to this planning application as we have insufficient information to demonstrate the application is in accordance with NPPF, PPG Flood Risk and Coastal Change and Policy 38 in Horsham District Planning Framework.

Please can the Applicant provide the following:

1) We require further information regarding the onward connections of the watercourse and drainage networks. Please can the Applicant confirm what the drainage crossing the site serves, in order for us to determine how this should be managed on site.
2) In addition to the above we require further details of the watercourse intended to be utilised for the site's surface water discharge. Please can we be provided with a plan showing how it connects to the wider system locally, including the proposed connection location and outfall design. We will require the surcharged outfall to ditch calculations to demonstrate the impact a surcharged outfall would have on the required levels of storage needed on site. It should be noted that permission to cross and discharge on third party land will be required.
3) With reference to ensuring safe access and egress from the site, we would ask that the FRA is updated using the latest Environment Agency Flood Map for

Planning (updated March 2025). The Horsham SFRA advises that the 1:1000 event can be utilised in lieu of 1:100 plus climate change data being available. Please provide details as to how any flood risk to the site entrance will be mitigated.

4) Page 3 of Appendix K (MicroDrainage modelling outputs) states a winter CV value of 0.84, please amend to 1 as has been correctly used elsewhere in the calculations.
5) It is noted that the Applicant intends to tank their permeable paving attenuation storage. Unless groundwater ingress is a concern, we would recommend that this is left unlined in order to allow any infiltration benefit that may be possible. We acknowledge this will not be significant due to the soil profile and underlying geology on site, however it still may provide an opportunity to reduce discharge offsite.

Upon receipt of the above we will be able to review the application in full and comment further.

Yours sincerely,

Flood Risk Management Team
FRM@westsussex.gov.uk

Annex

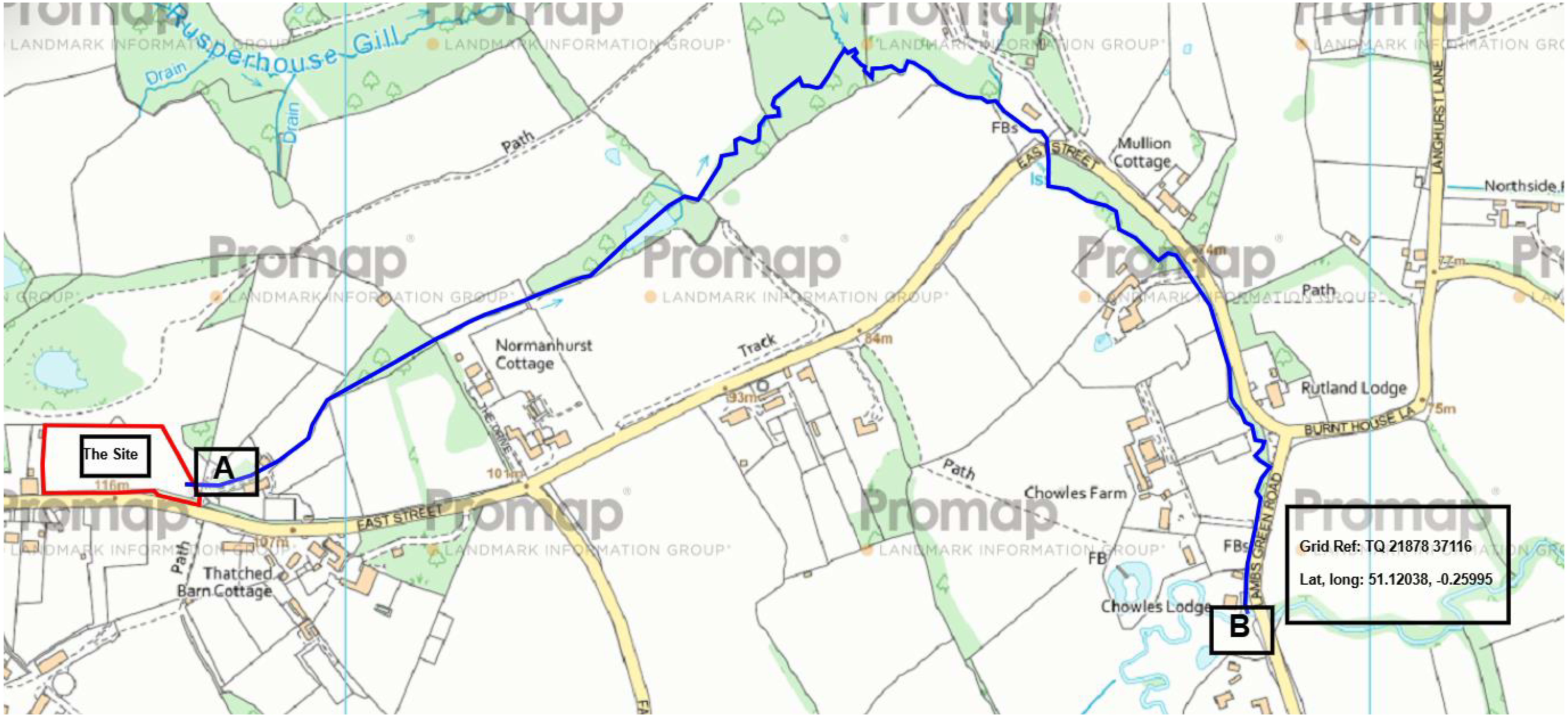
The following document(s) have been reviewed, which have been submitted to support the application;

- Flood Risk Assessment and Drainage Strategy dated 12/02/2025 Final B Phil Allen MCIWEM C.WEM

Appendix B

Details of Ongoing Connectivity of Drainage Ditch

LAND AT EAST STREET RUSPER- SURFACE WATER DRAINAGE PLAN



Appendix C

Updated MicroDrainage Results

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100	Volumetric Runoff Coeff.	1.000
		PIMP (%)	100
FEH Rainfall Version	2013	Add Flow / Climate Change (%)	0
Site Location	GB 521150 137750 TQ 21150 37750	Minimum Backdrop Height (m)	0.200
Data Type	Catchment	Maximum Backdrop Height (m)	1.500
Maximum Rainfall (mm/hr)	550	Min Design Depth for Optimisation (m)	0.300
Maximum Time of Concentration (mins)	30	Min Vel for Auto Design only (m/s)	1.00
Foul Sewage (l/s/ha)	0.000	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.351	4-8	0.042

Total Area Contributing (ha) = 0.393

Total Pipe Volume (m³) = 3.286

Network Design Table for Storm

- Indicates pipe length does not match coordinates
« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	2.443	0.039	63.3	0.000	15.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	5.241#	1.420	3.7	0.044	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	3.031	0.052	58.3	0.000	15.00	0.0	0.600	o	100	Pipe/Conduit	
2.001	13.110	1.400	9.4	0.145	0.00	0.0	0.600	o	150	Pipe/Conduit	
3.000	3.024	0.052	58.2	0.000	15.00	0.0	0.600	o	100	Pipe/Conduit	
3.001	8.996	0.224	40.2	0.097	0.00	0.0	0.600	o	150	Pipe/Conduit	
2.002	18.328	1.621	11.3	0.020	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.003	7.230#	2.417	3.0	0.041	0.00	0.0	0.600	o	225	Pipe/Conduit	
2.004	7.900#	0.118	66.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.002	4.000#	0.040	100.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	93.03	15.03	113.209	0.000	0.0	0.0	0.0	1.27	22.4	0.0
1.001	92.98	15.05	113.170	0.044	0.0	0.0	0.0	5.28	93.4	14.8
2.000	92.97	15.05	117.722	0.000	0.0	0.0	0.0	1.01	7.9	0.0
2.001	92.78	15.12	117.670	0.145	0.0	0.0	0.0	3.31	58.5	48.6
3.000	92.97	15.05	116.472	0.000	0.0	0.0	0.0	1.01	7.9	0.0
3.001	92.69	15.14	116.420	0.097	0.0	0.0	0.0	1.59	28.1«	32.5
2.002	92.46	15.22	116.121	0.262	0.0	0.0	0.0	3.91	155.6	87.5
2.003	92.41	15.24	114.500	0.303	0.0	0.0	0.0	7.62	303.0	101.1
2.004	92.09	15.34	111.158	0.303	0.0	0.0	0.0	1.23	21.8«	101.1
1.002	91.94	15.40	111.040	0.347	0.0	0.0	0.0	1.31	52.0«	115.2

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
4.000	1.903	0.033	58.2	0.000	15.00	0.0	0.600	o	100	Pipe/Conduit	
4.001	11.616	0.720	16.1	0.046	0.00	0.0	0.600	o	150	Pipe/Conduit	
4.002	36.000#	2.200	16.4	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.003	30.593	3.500	8.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
4.000	93.03	15.03	114.203	0.000	0.0	0.0	0.0	1.01	7.9	0.0
4.001	92.80	15.11	114.170	0.046	0.0	0.0	0.0	2.52	44.5	15.4
4.002	92.08	15.35	113.200	0.046	0.0	0.0	0.0	2.50	44.2	15.4
1.003	91.50	15.54	111.000	0.393	0.0	0.0	0.0	3.43	60.6«	129.9

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.000	0.000	0.000
1.001	-	-	100	0.044	0.044	0.044
2.000	-	-	100	0.000	0.000	0.000
2.001	-	-	100	0.145	0.145	0.145
3.000	-	-	100	0.000	0.000	0.000
3.001	-	-	100	0.097	0.097	0.097
2.002	-	-	100	0.020	0.020	0.020
2.003	-	-	100	0.041	0.041	0.041
2.004	-	-	100	0.000	0.000	0.000
1.002	-	-	100	0.000	0.000	0.000
4.000	-	-	100	0.000	0.000	0.000
4.001	-	-	100	0.046	0.046	0.046
4.002	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
				Total 0.393	Total 0.393	Total 0.393

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)
1.003	Outfall	108.500	107.500	107.500	0	0

Datum (m) 107.500 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)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1	1.000	43	1.000	85	1.000	127	1.000	169	1.000	211	1.000	253	1.000	295	1.000	337	1.000	379	1.000
2	1.000	44	1.000	86	1.000	128	1.000	170	1.000	212	1.000	254	1.000	296	1.000	338	1.000	380	1.000
3	1.000	45	1.000	87	1.000	129	1.000	171	1.000	213	1.000	255	1.000	297	1.000	339	1.000	381	1.000
4	1.000	46	1.000	88	1.000	130	1.000	172	1.000	214	1.000	256	1.000	298	1.000	340	1.000	382	1.000
5	1.000	47	1.000	89	1.000	131	1.000	173	1.000	215	1.000	257	1.000	299	1.000	341	1.000	383	1.000
6	1.000	48	1.000	90	1.000	132	1.000	174	1.000	216	1.000	258	1.000	300	1.000	342	1.000	384	1.000
7	1.000	49	1.000	91	1.000	133	1.000	175	1.000	217	1.000	259	1.000	301	1.000	343	1.000	385	1.000
8	1.000	50	1.000	92	1.000	134	1.000	176	1.000	218	1.000	260	1.000	302	1.000	344	1.000	386	1.000
9	1.000	51	1.000	93	1.000	135	1.000	177	1.000	219	1.000	261	1.000	303	1.000	345	1.000	387	1.000
10	1.000	52	1.000	94	1.000	136	1.000	178	1.000	220	1.000	262	1.000	304	1.000	346	1.000	388	1.000
11	1.000	53	1.000	95	1.000	137	1.000	179	1.000	221	1.000	263	1.000	305	1.000	347	1.000	389	1.000
12	1.000	54	1.000	96	1.000	138	1.000	180	1.000	222	1.000	264	1.000	306	1.000	348	1.000	390	1.000
13	1.000	55	1.000	97	1.000	139	1.000	181	1.000	223	1.000	265	1.000	307	1.000	349	1.000	391	1.000
14	1.000	56	1.000	98	1.000	140	1.000	182	1.000	224	1.000	266	1.000	308	1.000	350	1.000	392	1.000
15	1.000	57	1.000	99	1.000	141	1.000	183	1.000	225	1.000	267	1.000	309	1.000	351	1.000	393	1.000
16	1.000	58	1.000	100	1.000	142	1.000	184	1.000	226	1.000	268	1.000	310	1.000	352	1.000	394	1.000
17	1.000	59	1.000	101	1.000	143	1.000	185	1.000	227	1.000	269	1.000	311	1.000	353	1.000	395	1.000
18	1.000	60	1.000	102	1.000	144	1.000	186	1.000	228	1.000	270	1.000	312	1.000	354	1.000	396	1.000
19	1.000	61	1.000	103	1.000	145	1.000	187	1.000	229	1.000	271	1.000	313	1.000	355	1.000	397	1.000
20	1.000	62	1.000	104	1.000	146	1.000	188	1.000	230	1.000	272	1.000	314	1.000	356	1.000	398	1.000
21	1.000	63	1.000	105	1.000	147	1.000	189	1.000	231	1.000	273	1.000	315	1.000	357	1.000	399	1.000
22	1.000	64	1.000	106	1.000	148	1.000	190	1.000	232	1.000	274	1.000	316	1.000	358	1.000	400	1.000
23	1.000	65	1.000	107	1.000	149	1.000	191	1.000	233	1.000	275	1.000	317	1.000	359	1.000	401	1.000
24	1.000	66	1.000	108	1.000	150	1.000	192	1.000	234	1.000	276	1.000	318	1.000	360	1.000	402	1.000
25	1.000	67	1.000	109	1.000	151	1.000	193	1.000	235	1.000	277	1.000	319	1.000	361	1.000	403	1.000
26	1.000	68	1.000	110	1.000	152	1.000	194	1.000	236	1.000	278	1.000	320	1.000	362	1.000	404	1.000
27	1.000	69	1.000	111	1.000	153	1.000	195	1.000	237	1.000	279	1.000	321	1.000	363	1.000	405	1.000
28	1.000	70	1.000	112	1.000	154	1.000	196	1.000	238	1.000	280	1.000	322	1.000	364	1.000	406	1.000
29	1.000	71	1.000	113	1.000	155	1.000	197	1.000	239	1.000	281	1.000	323	1.000	365	1.000	407	1.000
30	1.000	72	1.000	114	1.000	156	1.000	198	1.000	240	1.000	282	1.000	324	1.000	366	1.000	408	1.000
31	1.000	73	1.000	115	1.000	157	1.000	199	1.000	241	1.000	283	1.000	325	1.000	367	1.000	409	1.000
32	1.000	74	1.000	116	1.000	158	1.000	200	1.000	242	1.000	284	1.000	326	1.000	368	1.000	410	1.000
33	1.000	75	1.000	117	1.000	159	1.000	201	1.000	243	1.000	285	1.000	327	1.000	369	1.000	411	1.000
34	1.000	76	1.000	118	1.000	160	1.000	202	1.000	244	1.000	286	1.000	328	1.000	370	1.000	412	1.000
35	1.000	77	1.000	119	1.000	161	1.000	203	1.000	245	1.000	287	1.000	329	1.000	371	1.000	413	1.000
36	1.000	78	1.000	120	1.000	162	1.000	204	1.000	246	1.000	288	1.000	330	1.000	372	1.000	414	1.000
37	1.000	79	1.000	121	1.000	163	1.000	205	1.000	247	1.000	289	1.000	331	1.000	373	1.000	415	1.000
38	1.000	80	1.000	122	1.000	164	1.000	206	1.000	248	1.000	290	1.000	332	1.000	374	1.000	416	1.000
39	1.000	81	1.000	123	1.000	165	1.000	207	1.000	249	1.000	291	1.000	333	1.000	375	1.000	417	1.000
40	1.000	82	1.000	124	1.000	166	1.000	208	1.000	250	1.000	292	1.000	334	1.000	376	1.000	418	1.000
41	1.000	83	1.000	125	1.000	167	1.000	209	1.000	251	1.000	293	1.000	335	1.000	377	1.000	419	1.000
42	1.000	84	1.000	126	1.000	168	1.000	210	1.000	252	1.000	294	1.000	336	1.000	378	1.000	420	1.000

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)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
421	1.000	497	1.000	573	1.000	649	1.000	725	1.000	801	1.000	877	1.000	953	1.000	1029	1.000	1105	1.000
422	1.000	498	1.000	574	1.000	650	1.000	726	1.000	802	1.000	878	1.000	954	1.000	1030	1.000	1106	1.000
423	1.000	499	1.000	575	1.000	651	1.000	727	1.000	803	1.000	879	1.000	955	1.000	1031	1.000	1107	1.000
424	1.000	500	1.000	576	1.000	652	1.000	728	1.000	804	1.000	880	1.000	956	1.000	1032	1.000	1108	1.000
425	1.000	501	1.000	577	1.000	653	1.000	729	1.000	805	1.000	881	1.000	957	1.000	1033	1.000	1109	1.000
426	1.000	502	1.000	578	1.000	654	1.000	730	1.000	806	1.000	882	1.000	958	1.000	1034	1.000	1110	1.000
427	1.000	503	1.000	579	1.000	655	1.000	731	1.000	807	1.000	883	1.000	959	1.000	1035	1.000	1111	1.000
428	1.000	504	1.000	580	1.000	656	1.000	732	1.000	808	1.000	884	1.000	960	1.000	1036	1.000	1112	1.000
429	1.000	505	1.000	581	1.000	657	1.000	733	1.000	809	1.000	885	1.000	961	1.000	1037	1.000	1113	1.000
430	1.000	506	1.000	582	1.000	658	1.000	734	1.000	810	1.000	886	1.000	962	1.000	1038	1.000	1114	1.000
431	1.000	507	1.000	583	1.000	659	1.000	735	1.000	811	1.000	887	1.000	963	1.000	1039	1.000	1115	1.000
432	1.000	508	1.000	584	1.000	660	1.000	736	1.000	812	1.000	888	1.000	964	1.000	1040	1.000	1116	1.000
433	1.000	509	1.000	585	1.000	661	1.000	737	1.000	813	1.000	889	1.000	965	1.000	1041	1.000	1117	1.000
434	1.000	510	1.000	586	1.000	662	1.000	738	1.000	814	1.000	890	1.000	966	1.000	1042	1.000	1118	1.000
435	1.000	511	1.000	587	1.000	663	1.000	739	1.000	815	1.000	891	1.000	967	1.000	1043	1.000	1119	1.000
436	1.000	512	1.000	588	1.000	664	1.000	740	1.000	816	1.000	892	1.000	968	1.000	1044	1.000	1120	1.000
437	1.000	513	1.000	589	1.000	665	1.000	741	1.000	817	1.000	893	1.000	969	1.000	1045	1.000	1121	1.000
438	1.000	514	1.000	590	1.000	666	1.000	742	1.000	818	1.000	894	1.000	970	1.000	1046	1.000	1122	1.000
439	1.000	515	1.000	591	1.000	667	1.000	743	1.000	819	1.000	895	1.000	971	1.000	1047	1.000	1123	1.000
440	1.000	516	1.000	592	1.000	668	1.000	744	1.000	820	1.000	896	1.000	972	1.000	1048	1.000	1124	1.000
441	1.000	517	1.000	593	1.000	669	1.000	745	1.000	821	1.000	897	1.000	973	1.000	1049	1.000	1125	1.000
442	1.000	518	1.000	594	1.000	670	1.000	746	1.000	822	1.000	898	1.000	974	1.000	1050	1.000	1126	1.000
443	1.000	519	1.000	595	1.000	671	1.000	747	1.000	823	1.000	899	1.000	975	1.000	1051	1.000	1127	1.000
444	1.000	520	1.000	596	1.000	672	1.000	748	1.000	824	1.000	900	1.000	976	1.000	1052	1.000	1128	1.000
445	1.000	521	1.000	597	1.000	673	1.000	749	1.000	825	1.000	901	1.000	977	1.000	1053	1.000	1129	1.000
446	1.000	522	1.000	598	1.000	674	1.000	750	1.000	826	1.000	902	1.000	978	1.000	1054	1.000	1130	1.000
447	1.000	523	1.000	599	1.000	675	1.000	751	1.000	827	1.000	903	1.000	979	1.000	1055	1.000	1131	1.000
448	1.000	524	1.000	600	1.000	676	1.000	752	1.000	828	1.000	904	1.000	980	1.000	1056	1.000	1132	1.000
449	1.000	525	1.000	601	1.000	677	1.000	753	1.000	829	1.000	905	1.000	981	1.000	1057	1.000	1133	1.000
450	1.000	526	1.000	602	1.000	678	1.000	754	1.000	830	1.000	906	1.000	982	1.000	1058	1.000	1134	1.000
451	1.000	527	1.000	603	1.000	679	1.000	755	1.000	831	1.000	907	1.000	983	1.000	1059	1.000	1135	1.000
452	1.000	528	1.000	604	1.000	680	1.000	756	1.000	832	1.000	908	1.000	984	1.000	1060	1.000	1136	1.000
453	1.000	529	1.000	605	1.000	681	1.000	757	1.000	833	1.000	909	1.000	985	1.000	1061	1.000	1137	1.000
454	1.000	530	1.000	606	1.000	682	1.000	758	1.000	834	1.000	910	1.000	986	1.000	1062	1.000	1138	1.000
455	1.000	531	1.000	607	1.000	683	1.000	759	1.000	835	1.000	911	1.000	987	1.000	1063	1.000	1139	1.000
456	1.000	532	1.000	608	1.000	684	1.000	760	1.000	836	1.000	912	1.000	988	1.000	1064	1.000	1140	1.000
457	1.000	533	1.000	609	1.000	685	1.000	761	1.000	837	1.000	913	1.000	989	1.000	1065	1.000	1141	1.000
458	1.000	534	1.000	610	1.000	686	1.000	762	1.000	838	1.000	914	1.000	990	1.000	1066	1.000	1142	1.000
459	1.000	535	1.000	611	1.000	687	1.000	763	1.000	839	1.000	915	1.000	991	1.000	1067	1.000	1143	1.000
460	1.000	536	1.000	612	1.000	688	1.000	764	1.000	840	1.000	916	1.000	992	1.000	1068	1.000	1144	1.000
461	1.000	537	1.000	613	1.000	689	1.000	765	1.000	841	1.000	917	1.000	993	1.000	1069	1.000	1145	1.000
462	1.000	538	1.000	614	1.000	690	1.000	766	1.000	842	1.000	918	1.000	994	1.000	1070	1.000	1146	1.000
463	1.000	539	1.000	615	1.000	691	1.000	767	1.000	843	1.000	919	1.000	995	1.000	1071	1.000	1147	1.000
464	1.000	540	1.000	616	1.000	692	1.000	768	1.000	844	1.000	920	1.000	996	1.000	1072	1.000	1148	1.000
465	1.000	541	1.000	617	1.000	693	1.000	769	1.000	845	1.000	921	1.000	997	1.000	1073	1.000	1149	1.000
466	1.000	542	1.000	618	1.000	694	1.000	770	1.000	846	1.000	922	1.000	998	1.000	1074	1.000	1150	1.000
467	1.000	543	1.000	619	1.000	695	1.000	771	1.000	847	1.000	923	1.000	999	1.000	1075	1.000	1151	1.000
468	1.000	544	1.000	620	1.000	696	1.000	772	1.000	848	1.000	924	1.000	1000	1.000	1076	1.000	1152	1.000
469	1.000	545	1.000	621	1.000	697	1.000	773	1.000	849	1.000	925	1.000	1001	1.000	1077	1.000	1153	1.000
470	1.000	546	1.000	622	1.000	698	1.000	774	1.000	850	1.000	926	1.000	1002	1.000	1078	1.000	1154	1.000
471	1.000	547	1.000	623	1.000	699	1.000	775	1.000	851	1.000	927	1.000	1003	1.000	1079	1.000	1155	1.000
472	1.000	548	1.000	624	1.000	700	1.000	776	1.000	852	1.000	928	1.000	1004	1.000	1080	1.000	1156	1.000
473	1.000	549	1.000	625	1.000	701	1.000	777	1.000	853	1.000	929	1.000	1005	1.000	1081	1.000	1157	1.000
474	1.000	550	1.000	626	1.000	702	1.000	778	1.000	854	1.000	930	1.000	1006	1.000	1082	1.000	1158	1.000
475	1.000	551	1.000	627	1.000	703	1.000	779	1.000	855	1.000	931	1.000	1007	1.000	1083	1.000	1159	1.000
476	1.000	552	1.000	628	1.000	704	1.000	780	1.000	856	1.000	932	1.000	1008	1.000	1084	1.000	1160	1.000
477	1.000	553	1.000	629	1.000	705	1.000	781	1.000	857	1.000	933	1.000	1009	1.000	1085	1.000	1161	1.000
478	1.000	554	1.000	630	1.000	706	1.000	782	1.000	858	1.000	934	1.000	1010	1.000	1086	1.000	1162	1.000
479	1.000	555	1.000	631	1.000	707	1.000	783	1.000	859	1.000	935	1.000	1011	1.000	1087	1.000	1163	1.000
480	1.000	556	1.000	632	1.000	708	1.000	784	1.000	860	1.000	936	1.000	1012	1.000	1088	1.000	1164	1.000
481	1.000	557	1.000	633	1.000	709	1.000	785	1.000	861	1.000	937	1.000	1013	1.000	1089	1.000	1165	1.000
482	1.000	558	1.000	634	1.000	710	1.000	786	1.000	862	1.000	938	1.000	1014	1.000	1090	1.000	1166	1.000
483	1.000	559	1.000	635	1.000	711	1.000	787	1.000	863	1.000	939	1.000	1015	1.000	1091	1.000	1167	1.000
484	1.000	560	1.000	636	1.000	712	1.000	788	1.000	864	1.000	940	1.000	1016	1.000	1092	1.000	1168	1.000
485	1.000	561	1.000	637	1.000	713	1.000	789	1.000	865	1.000	941	1.000	1017	1.000	1093	1.000	1169	1.000
486	1.000	562	1.000	638	1.000	714	1.000	790	1.000	866	1.000	942	1.000	1018	1.000	1094	1.000	1170	1.000
487	1.000	563	1.000	639	1.000	715	1.000	791	1.000	867	1.000	943	1.000	1019	1.000	1095	1.000	1171	1.000
488	1.000	564	1.000	640	1.000	716	1.000	792	1.000	868	1.000	944	1.000	1020	1.000	1096	1.000	1172	1.000
489	1.000	565	1.000	641	1.000	717	1.000	793	1.000	869	1.000	945	1.000	1021	1.000	1097	1.000	1173	1.000
490	1.000	566	1.000	642	1.000	718	1.000	794	1.000	870	1.000	946	1.000	1022	1.000	1098	1.000	1174	1.000
491	1.000	567	1.000	643	1.000	719	1.000	795	1.000	871	1.000	947	1.000	1023	1.000	1099	1.000	1175	1.000
492	1.000	568	1.000	644	1.000	720	1.000	796	1.000	872	1.000	948	1.000	1024	1.000	1100	1.000	1176	1.000
493	1.000	569	1.000	645	1.000	721	1.000	797	1.000	873	1.000	949	1.000	1025	1.000	1101	1.000	1177	1.000
494	1.000	570	1.000	646	1.000	722	1.000	798	1.000	874	1.000	950	1.000	1026	1.000	1102	1.000	1178	1.000
495	1.000	571	1.000	647	1.000	723	1.000	799	1.000	875	1.000	951	1.000	1027	1.000	1103	1.000	1179	1.000
496	1.000	572	1.000	648	1.000	724	1.000	800	1.000	876	1.000	952	1.000	1028	1.000	1104	1.000	1180	1.000

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)	Time (mins)	Depth (m)	Time (mins)	Depth (m)	Time (mins)	Depth (m)
1181	1.000	1207	1.000	1233	1.000	1259	1.000	1285	1.000	1311	1.000	1337	1.000	1363	1.000	1389	1.000	1415	1.000
1182	1.000	1208	1.000	1234	1.000	1260	1.000	1286	1.000	1312	1.000	1338	1.000	1364	1.000	1390	1.000	1416	1.000
1183	1.000	1209	1.000	1235	1.000	1261	1.000	1287	1.000	1313	1.000	1339	1.000	1365	1.000	1391	1.000	1417	1.000
1184	1.000	1210	1.000	1236	1.000	1262	1.000	1288	1.000	1314	1.000	1340	1.000	1366	1.000	1392	1.000	1418	1.000
1185	1.000	1211	1.000	1237	1.000	1263	1.000	1289	1.000	1315	1.000	1341	1.000	1367	1.000	1393	1.000	1419	1.000
1186	1.000	1212	1.000	1238	1.000	1264	1.000	1290	1.000	1316	1.000	1342	1.000	1368	1.000	1394	1.000	1420	1.000
1187	1.000	1213	1.000	1239	1.000	1265	1.000	1291	1.000	1317	1.000	1343	1.000	1369	1.000	1395	1.000	1421	1.000
1188	1.000	1214	1.000	1240	1.000	1266	1.000	1292	1.000	1318	1.000	1344	1.000	1370	1.000	1396	1.000	1422	1.000
1189	1.000	1215	1.000	1241	1.000	1267	1.000	1293	1.000	1319	1.000	1345	1.000	1371	1.000	1397	1.000	1423	1.000
1190	1.000	1216	1.000	1242	1.000	1268	1.000	1294	1.000	1320	1.000	1346	1.000	1372	1.000	1398	1.000	1424	1.000
1191	1.000	1217	1.000	1243	1.000	1269	1.000	1295	1.000	1321	1.000	1347	1.000	1373	1.000	1399	1.000	1425	1.000
1192	1.000	1218	1.000	1244	1.000	1270	1.000	1296	1.000	1322	1.000	1348	1.000	1374	1.000	1400	1.000	1426	1.000
1193	1.000	1219	1.000	1245	1.000	1271	1.000	1297	1.000	1323	1.000	1349	1.000	1375	1.000	1401	1.000	1427	1.000
1194	1.000	1220	1.000	1246	1.000	1272	1.000	1298	1.000	1324	1.000	1350	1.000	1376	1.000	1402	1.000	1428	1.000
1195	1.000	1221	1.000	1247	1.000	1273	1.000	1299	1.000	1325	1.000	1351	1.000	1377	1.000	1403	1.000	1429	1.000
1196	1.000	1222	1.000	1248	1.000	1274	1.000	1300	1.000	1326	1.000	1352	1.000	1378	1.000	1404	1.000	1430	1.000
1197	1.000	1223	1.000	1249	1.000	1275	1.000	1301	1.000	1327	1.000	1353	1.000	1379	1.000	1405	1.000	1431	1.000
1198	1.000	1224	1.000	1250	1.000	1276	1.000	1302	1.000	1328	1.000	1354	1.000	1380	1.000	1406	1.000	1432	1.000
1199	1.000	1225	1.000	1251	1.000	1277	1.000	1303	1.000	1329	1.000	1355	1.000	1381	1.000	1407	1.000	1433	1.000
1200	1.000	1226	1.000	1252	1.000	1278	1.000	1304	1.000	1330	1.000	1356	1.000	1382	1.000	1408	1.000	1434	1.000
1201	1.000	1227	1.000	1253	1.000	1279	1.000	1305	1.000	1331	1.000	1357	1.000	1383	1.000	1409	1.000	1435	1.000
1202	1.000	1228	1.000	1254	1.000	1280	1.000	1306	1.000	1332	1.000	1358	1.000	1384	1.000	1410	1.000	1436	1.000
1203	1.000	1229	1.000	1255	1.000	1281	1.000	1307	1.000	1333	1.000	1359	1.000	1385	1.000	1411	1.000	1437	1.000
1204	1.000	1230	1.000	1256	1.000	1282	1.000	1308	1.000	1334	1.000	1360	1.000	1386	1.000	1412	1.000	1438	1.000
1205	1.000	1231	1.000	1257	1.000	1283	1.000	1309	1.000	1335	1.000	1361	1.000	1387	1.000	1413	1.000	1439	1.000
1206	1.000	1232	1.000	1258	1.000	1284	1.000	1310	1.000	1336	1.000	1362	1.000	1388	1.000	1414	1.000	1440	1.000

Simulation Criteria for Storm

Volumetric Runoff Coeff	1.000	Manhole Headloss Coeff (Global)	0.500	Inlet Coeffiecient	0.800
Areal Reduction Factor	1.000	Foul Sewage per hectare (l/s)	0.000	Flow per Person per Day (l/per/day)	0.000
Hot Start (mins)	0	Additional Flow - % of Total Flow	0.000	Run Time (mins)	60
Hot Start Level (mm)	0	MADD Factor * 10m³/ha Storage	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	6	Number of Storage Structures	6	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH	Summer Storms	No
Return Period (years)	100	Winter Storms	Yes
FEH Rainfall Version	2013	Cv (Summer)	1.000
Site Location	GB 521150 137750 TQ 21150 37750	Cv (Winter)	1.000
Data Type	Catchment	Storm Duration (mins)	30

Online Controls for Storm

Orifice Manhole: 11, DS/PN: 1.001, Volume (m³): 0.7

Diameter (m) 0.026 Discharge Coefficient 0.600 Invert Level (m) 113.170

Orifice Manhole: 2, DS/PN: 2.001, Volume (m³): 0.7

Diameter (m) 0.036 Discharge Coefficient 0.600 Invert Level (m) 117.670

Orifice Manhole: 9, DS/PN: 3.001, Volume (m³): 0.7

Diameter (m) 0.040 Discharge Coefficient 0.600 Invert Level (m) 116.420

Hydro-Brake® Optimum Manhole: 5, DS/PN: 2.004, Volume (m³): 2.5

Unit Reference	MD-SHE-0070-2700-1600-2700	Sump Available	Yes
Design Head (m)	1.600	Diameter (mm)	70
Design Flow (l/s)	2.7	Invert Level (m)	111.158
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	100
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.600	2.7	Kick-Flo®	0.626	1.8
Flush-Flo™	0.307	2.2	Mean Flow over Head Range	-	2.1

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.8	0.600	1.9	1.600	2.7	2.600	3.4	5.000	4.6	7.500	5.5
0.200	2.1	0.800	2.0	1.800	2.8	3.000	3.6	5.500	4.8	8.000	5.7
0.300	2.2	1.000	2.2	2.000	3.0	3.500	3.9	6.000	5.0	8.500	5.9
0.400	2.2	1.200	2.4	2.200	3.1	4.000	4.1	6.500	5.2	9.000	6.0
0.500	2.1	1.400	2.5	2.400	3.3	4.500	4.4	7.000	5.4	9.500	6.2

Orifice Manhole: 13, DS/PN: 4.001, Volume (m³): 0.7

Diameter (m) 0.025 Discharge Coefficient 0.600 Invert Level (m) 114.170

Hydro-Brake® Optimum Manhole: 7, DS/PN: 1.003, Volume (m³): 1.4

Unit Reference	MD-SHE-0087-2900-0600-2900	Sump Available	Yes
Design Head (m)	0.600	Diameter (mm)	87
Design Flow (l/s)	2.9	Invert Level (m)	111.000
Flush-Flo™	Calculated	Minimum Outlet Pipe Diameter (mm)	100
Objective	Minimise upstream storage	Suggested Manhole Diameter (mm)	1200
Application	Surface		

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.600	2.9	Kick-Flo®	0.409	2.4
Flush-Flo™	0.181	2.9	Mean Flow over Head Range	-	2.5

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)	Depth (m)	Flow (l/s)
0.100	2.6	0.600	2.9	1.600	4.6	2.600	5.7	5.000	7.8	7.500	9.5
0.200	2.9	0.800	3.3	1.800	4.8	3.000	6.1	5.500	8.1	8.000	9.8
0.300	2.8	1.000	3.7	2.000	5.1	3.500	6.6	6.000	8.5	8.500	10.1
0.400	2.5	1.200	4.0	2.200	5.3	4.000	7.0	6.500	8.8	9.000	10.4
0.500	2.7	1.400	4.3	2.400	5.5	4.500	7.4	7.000	9.1	9.500	10.7

Storage Structures for Storm

Complex Manhole: 11, DS/PN: 1.001

Cellular Storage

Invert Level (m) 113.170 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	110.0	110.0	0.200	110.0	120.2	0.201	0.0	120.2

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	50.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	113.170	Depression Storage (mm)	5
Max Percolation (l/s)	30.6	Width (m)	5.5	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	20.0	Cap Volume Depth (m)	0.230

Complex Manhole: 2, DS/PN: 2.001

Cellular Storage

Invert Level (m) 117.670 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	470.0	470.0	0.300	470.0	504.2	0.301	0.0	504.2

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	50.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	117.970	Depression Storage (mm)	5
Max Percolation (l/s)	130.6	Width (m)	10.0	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	47.0	Cap Volume Depth (m)	0.130

Complex Manhole: 9, DS/PN: 3.001

Cellular Storage

Invert Level (m) 116.420 Infiltration Coefficient Side (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Base (m/hr) 0.00000 Safety Factor 2.0

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	300.0	300.0	0.200	300.0	316.0	0.201	0.0	316.0

Porous Car Park

Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.30	Slope (1:X)	50.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	116.620	Depression Storage (mm)	5
Max Percolation (l/s)	83.3	Width (m)	10.0	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	30.0	Cap Volume Depth (m)	0.230