

Land Off Mill Lane South Shields

FRA & DS Report

Issue Date:
4th December 2025

Report Number:
25041-01

Client:
Story Homes

Revision:
B

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Revision	Date	Comments	Prepared by	Checked by
-	14.11.25	Initial issue	AT	PB
A	19.11.25	Amended to suit client comments	AT	PB
B	04.12.25	Job title renamed	AT	AT

Executive Summary

Site Location	The site is a 10.5Ha greenfield site located off Lizard Lane, South Shields, South Tyneside, SR6 7LS. The topographical survey indicates that site levels peak at the north western boundary at 42.53m AOD and fall towards a low spot adjacent to the eastern boundary at 29.39m AOD.
Site Proposals	Site proposals show a residential development of 205 plots and associated infrastructure.
Ground Conditions	A Geo-Environmental Assessment by Intelligent Ground Solutions indicate the site is “underlain by Glaciofluvial Deposits in the east and Devensian Till in the west” and “groundwater was not encountered”. “Two of the three soakaway infiltration tests failed” and “the site is underlain by Dolomite Limestone bedrock”.
Nearest Watercourse	The nearest watercourse is an unnamed ditch c.1.9km away to the south located off a residential estate in South Bents. The nearest body of water is the North Sea, c.550m away to the east.
Nearest Surface Water Sewer	The nearest surface sewer is located within White Rocks Grove c.100m to the east of the site.
Nearest Combined Sewer	The nearest foul water sewer is located within White Rocks Grove c.100m to the east of the site.
Nearest Foul Water Sewer	The nearest combined sewer is located within the A183.
Flood Zone	EA flood maps indicate that the development boundary is located entirely within an area classified as a Flood Zone 1 .
Surface Water Flooding	‘High and medium risk’ mapping indicate an area of flooding located at the low point of the site, adjacent to the eastern boundary. ‘Low risk’ mapping indicates a surface water flood route flowing through the site. The proposed development is to maintain and not obstruct the existing surface water flood route so it can return to its predevelopment condition once off site. Proposed site levels will allow the flood flow route to be diverted via highways, shared drives and plot rear gardens. Proposed plot finished floor level’s will be raised above the level which flooding spills off site and plots will be raised above the flood route diversion. Therefore, the surface water flood risk to plots will be alleviated and can be considered low .
Ground Water	The site is underlain by clays with impeded drainage characteristics and as such, the risk of ground water flooding is considered low .
Surface Water Discharge Rate	The discharge rate should be restricted to 17 litres/sec peak discharge for all events up to and including the 100-year event with a 45% allowance for climate change and 10% urban creep.
SUDS	1 Detention basin. 1 Vortex flow control. Private drives should discharge to permeable paving providing one source of treatment.

The above summary should not be used in isolation and reference should be made to the full report.

1. Introduction

Coast Consulting Engineers have been commissioned by Story Homes to assess the flood risk associated with a proposed development off Lizard Lane, South Shields, South Tyneside, SR6 7LS. The Flood Risk Assessment is reviewed in accordance with the National Planning Policy Framework (NPPF) for Development and Flood Risk. In conjunction with assessing the site for flood risk, a proposed drainage strategy has been prepared.

This site-specific Flood Risk Assessment (FRA) has been undertaken to determine the risk of flooding to the proposed development from all sources in accordance with the National Planning Policy Framework (NPPF) and to assess the flood risk to others as a result of the development. The assessment will recommend how the risk can be managed in line with planning policy requirements.

One of the key aims of the National Planning Policy Framework (NPPF) is to ensure that flood risk is considered at all stages of the planning process to avoid inappropriate development in areas at risk of flooding and to direct development away from areas at highest risk. Where new development is necessary in such areas, the policy aims to make it safe without increasing flood risk elsewhere and where possible, reducing flood risk overall.

1.1 National Planning Policy Framework (NPPF)

The NPPF requires that:

- A site-specific flood risk assessment must demonstrate that the development will be safe for its lifetime taking account the vulnerability of its users, without increasing flood risk elsewhere, and where possible, will reduce flood risk overall.
- A site-specific flood risk assessment is required for proposals greater than 1 ha in size in a Flood Zone 1; all proposals for new development in Flood Zones 2 and 3, or in an area within Flood Zone 1 which has critical drainage problems (as identified in the Strategic Flood Risk Assessment).

The following definitions for flood zones are derived from NPPF:

FLOOD ZONE 1:

This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).

FLOOD ZONE 2:

This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% – 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% – 0.1%) in any year.

FLOOD ZONE 3:

This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

In addition to the risk of flooding from rivers or sea, consideration must also be given to surface water flooding, flooding due to ground water and flooding from artificial sources such as sewer failure or overtopping of reservoirs.

2. Site Location, Topographical Features and Proposals

The site is a 10.5Ha greenfield site located off Lizard Lane, South Shields, South Tyneside, SR6 7LS and c.600m north of Whitburn village centre. Adjacent to the northern boundary is Kitchener Road and the eastern boundary is bound by the A183. Adjacent to the southern boundary is Marsden Primary School and an existing residential estate, the western boundary is bound by Lizard Lane.

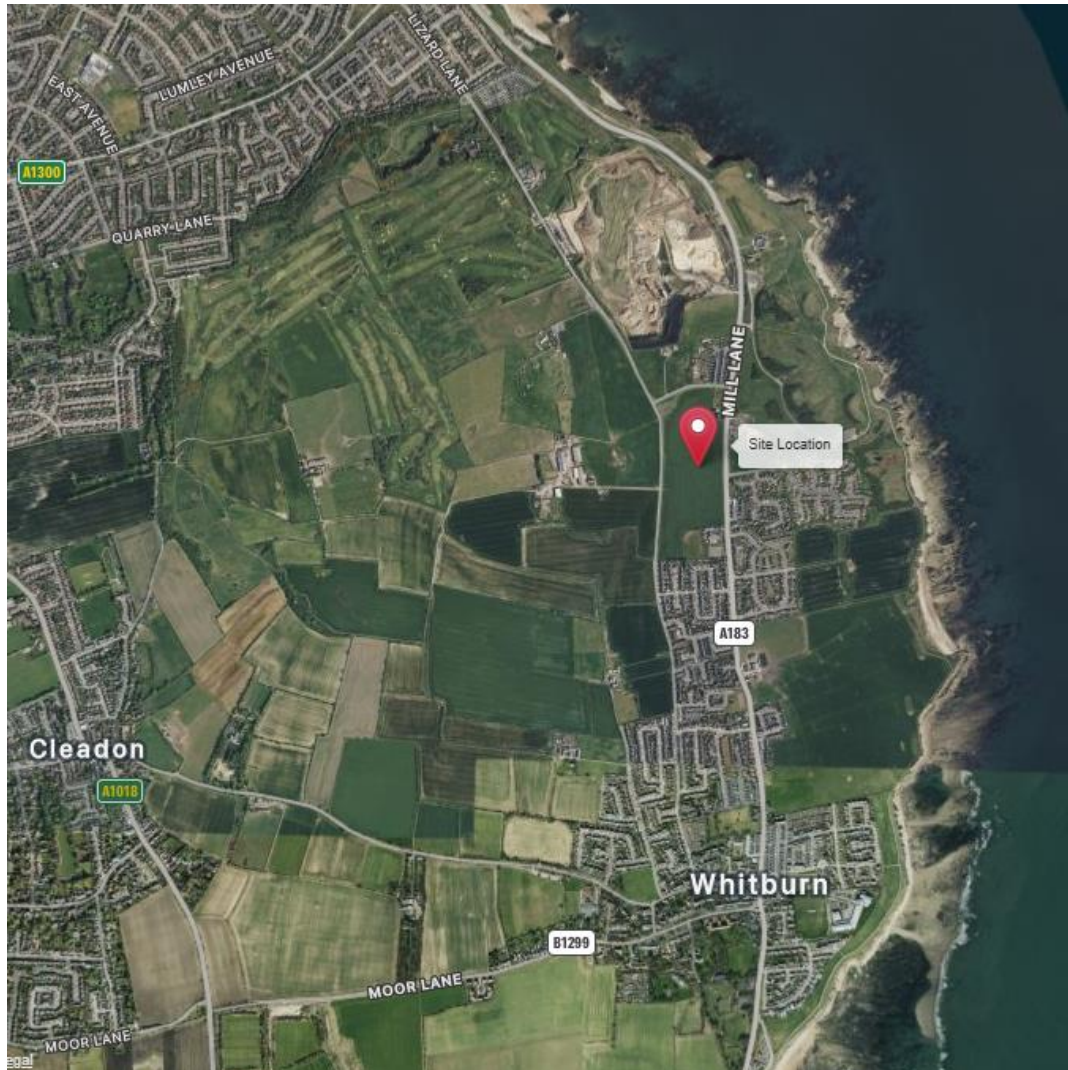


Figure 2.1 – Site location Plan.

The topographical survey indicates that site levels peak at the north western boundary at 42.53m AOD and fall towards a low spot adjacent to the eastern boundary at 29.39m AOD. Refer to Appendix A.

In June 2025, a Geo-Environmental Assessment was undertaken by Intelligent Ground Solutions, report reference: 25/4660.A.1. The report “recorded a limited thickness of Made Ground, which is in turn underlain by Glaciofluvial Deposits in the east and Devensian Till in the west with bedrock of the Roker Formation. Groundwater was not encountered

during the intrusive works or the monitoring visits undertaken in the installed standpipes.” Also, “two of the three soakaway infiltration tests failed”.

2.1 Development Proposals

The proposed scheme is a residential development comprising of 205 properties with associated garages, gardens and parking. Vehicular access to the development will be via a new junction to the A183. Refer to Appendix B.

2.2 Existing Watercourses

The Environment Agency’s Statutory Main River Map shows that the nearest main river is the River Don c.4.7km away to the southwest. The nearest watercourse is an unnamed ditch c.1.9km away to the south located off a residential estate in South Bents. There are no nearby watercourses within the vicinity of the site as shown within figure 2.2.

The nearest body of water is the North Sea, c.550m away to the east.

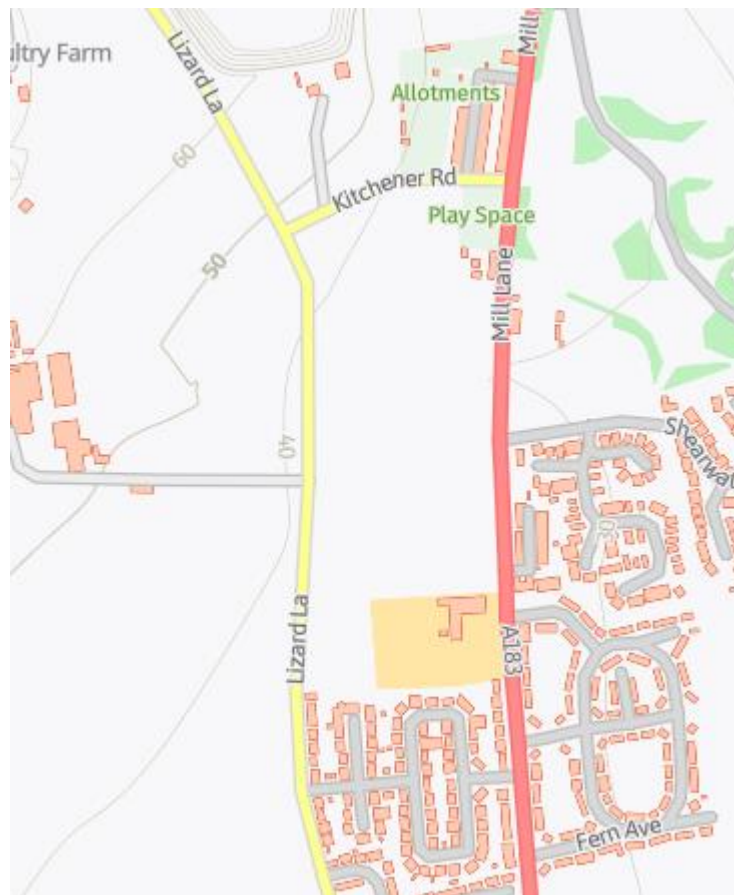


Figure 2.2 – Environment Agency’s Statutory Main River Map.

2.3 Existing Sewers

Existing sewer records were obtained from Northumbrian Water Ltd (NWL) and show there are no existing sewers within the site boundary. The nearest surface and foul water sewers

are located within White Rocks Grove c.100m to the east of the site. The nearest combined sewer is located within the A183. Refer to Appendix C.

3. Potential Sources of Flooding and Proposed Mitigation

As required by the National Planning Policy Framework (NPPF) and Technical Guidance to the NPPF, each potential source of flooding needs to be considered; rivers and sea, land, groundwater, sewers and artificial sources (such as reservoirs and canals). Consideration also needs to be given to the flood risk vulnerability classification for this type of development.

3.1.1 Flood Risk from Rivers and Seas

Environment Agency flood maps have been acquired to assist with this assessment. The flood maps indicate that the development boundary is located entirely within an area classified as a **Flood Zone 1**. Land located within a flood zone 1 is defined as having less than a 1 in 1,000 annual probability of river flooding (low risk). Environment Agency maps also confirm that the site does not lie within an area served by their flood warning scheme. Refer to the extract below which identifies the Flood Zones within and in proximity to the development site. The site is not considered to be at risk of flooding from rivers or sea. Refer to figure 3.1 below.

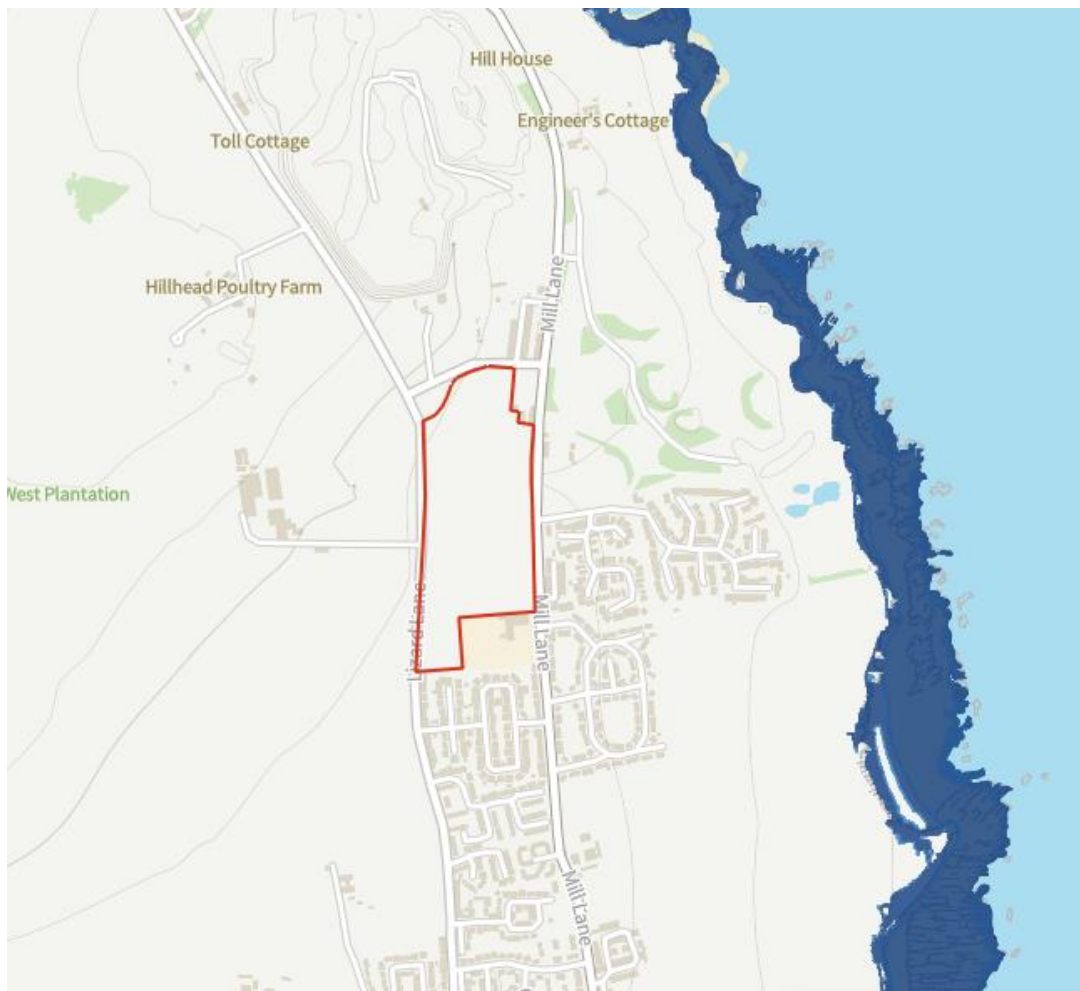


Figure 3.1 – Flood zone map.

3.2 Flood Risk Vulnerability Classification

Annex 3 of the National Planning Policy Framework (2024) states the following with respect to flood risk vulnerability classification.

3.2.1 More vulnerable

- Hospitals.
- Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels.
- **Buildings used for dwelling houses**, student halls of residence, drinking establishments, nightclubs and hotels.
- Non-residential uses for health services, nurseries and educational establishments.
- Landfill and sites used for waste management facilities for hazardous waste.
- Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan

Table 3 of the Technical Guidance to the National Planning Policy Framework states the following with respect to appropriate land uses:

Table 3: flood risk vulnerability and flood zone 'compaibility'

Flood Risk Vulnerability Classification (See Table 2)	Essential Infrastructure	Water Compatible	Highly Vulnerable	More Vulnerable	Less Vulnerable
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	✓	Exception Test required	✓	✓
Zone 3a	Exception Test required	✓	x	Exception Test required	✓
Zone 3b functional floodplain	Exception Test required	✓	x	x	x

Key: ✓ Development is appropriate.
x Development should not be permitted.

An exception test will not be required in this instance as development is located outside of a flood zone 2 or flood zone 3. **The development is considered appropriate in land classified as a flood zone 1.**

3.3 Surface Water Flood Risk

The Environment Agency **'high and medium risk'** flood maps indicate an area of surface water flooding located at the low point of the site, adjacent to the eastern boundary. The **'low risk'** flood map indicates surface water flooding entering the site at the southwestern boundary from Lizard Lane and flows off site in an easterly direction to Marsden Primary School. The flooding at the school enters the site at the southern boundary, flows north to the low point where it amasses, and then flows east off site in line with existing topography. Additionally, two small isolated areas at the site midpoint and at the western boundary are identified on the **'low risk'** map. It should be noted that **'low risk'** flood maps represent a 1 in 1000 annual likelihood risk of flooding.

The proposed development is to maintain and not obstruct the existing surface water flood route so it can return to its predevelopment condition once off site. Proposed site levels will allow the flood flow route to be diverted upon entering the site via highways, shared drives and plot rear gardens to the SuDS detention basin. As the surface water flood levels rise, the ponding within the basin will spill over the eastern boundary to return to its original flow route path.

Proposed plot finished floor level's will be raised by minimum 300mm above the level at which flooding spills off site over the eastern boundary and plots will be raised above the proposed level of the flood route diversion. Therefore, the surface water flood risk to plots will be alleviated and can be considered **low**. The installation of a positive surface water drainage system will reduce or eliminate occurrences of standing water.



Figure 3.2 – Extent of 'High Risk' surface water flooding.

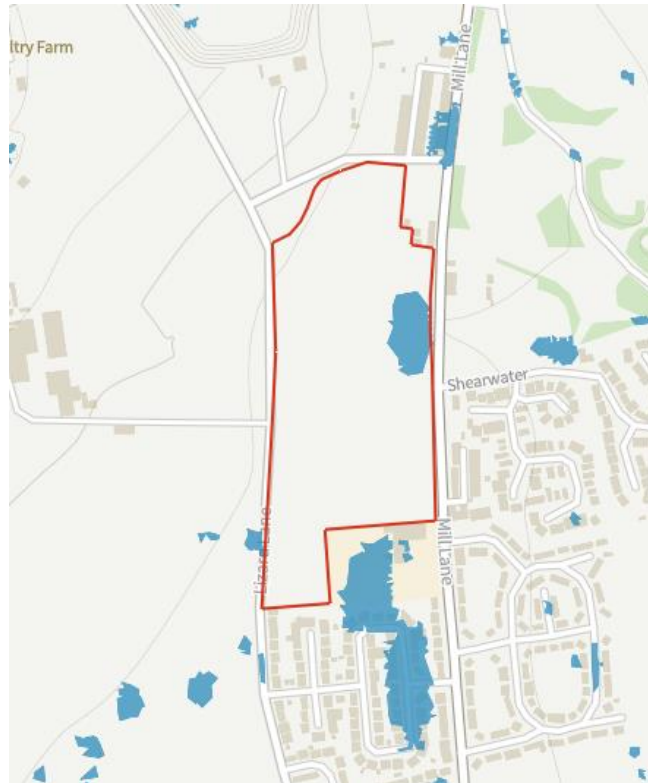


Figure 3.3 – Extent of 'Medium Risk' surface water flooding.

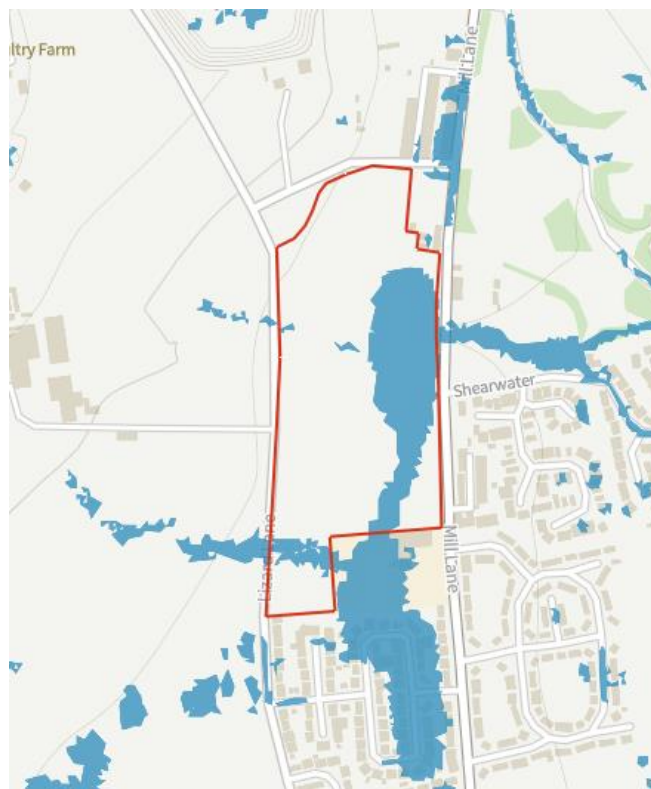


Figure 3.4 – Extent of 'Low Risk' surface water flooding.

3.4 Ground Water Flood Risk

Flooding due to ground water occurs when the levels of water below the ground rise and emanate above finished ground level. This occurs more frequently when the site is underlain by a permeable strata. The site is underlain by clays with impeded drainage characteristics and the Geo-Environmental Assessment did not encounter groundwater, therefore **the risk of ground water flooding is considered low.**

3.5 Reservoir Flood Risk

Artificial sources of flood risk such as man-made ponds or reservoirs can cause a potential risk of flooding. Environment Agency flood risk mapping shows there is **no risk from reservoir flooding to the site,** indicated in figure 3.5 below.



Figure 3.5 – Reservoir flood risk map.

4. Surface Water Disposal

Part H of the Building Regulations 2010 provides a recommended hierarchy for surface water disposal:

1. By infiltration
2. To watercourse
3. To sewer

4.1 Infiltration

As noted earlier, the site is “underlain by Glaciofluvial Deposits in the east and Devensian Till” and “two of the three soakaway infiltration tests failed” therefore soakaway drainage is not considered appropriate.

4.2 Watercourse

The Environment Agency’s Statutory Main River Map shows that the nearest main river is the River Don c.4.7km away to the southwest. The nearest watercourse is an unnamed ditch c.1.9km away to the south located off a residential estate in South Bents.

Due to the watercourse being a great distance away and the need to cross third-party land, discharge to watercourse is not considered feasible.

4.3 Sewer

There are no existing sewers within the site boundary. The nearest surface sewer is located within White Rocks Grove c.100m to the east of the site, and the nearest combined sewer is located within the A183.

It is proposed to discharge the surface water drainage to an existing NWL surface water manhole 7304, located within White Rocks Gove and the proposed location of discharge is in line with the NWL Pre Planning Enquiry response. Refer to Appendix D.

4.4 Discharge Rate Proposals

In accordance with North East Lead Local Flood Authority policy, post-development surface water discharge should be restricted to either the equivalent Qbar greenfield peak rate or, to rates no more than the 1 in 1 and 1 in 100 year greenfield runoff rate, both calculated using the total site area excluding any significant areas of public open space. Greenfield runoff rates have been calculated in line with IH124 method for 1Ha using greenfield runoff estimation tool on HR Wallingford website <https://www.uksuds.com> and results are summarised in figure 4.1.

Greenfield runoff

Method

Method	IH124	
 IH124		
	<u>My value</u>	
SAAR (mm)	620	mm
How should SPR be derived?	WRAP soil type	
WRAP soil type	2	
SPR	0.3	
QBar (IH124) (l/s)	1.6	l/s

Figure 4.1 – Greenfield runoff rates.

The site area is 10.5Ha, this has been multiplied with QBar for 1Ha (1.6l/s) to generate a total site discharge rate of 17l/s and NWL have confirmed acceptance of the proposed rate. Refer to Appendix D.

4.5 SUDS Techniques

In line with National Planning Policy, SUDS techniques are to be utilised as part of the design of the surface water network. The applicable techniques and the benefits that they bring to the development are outlined below.

- Detention basin: One online detention basin will be installed for the residential development to contain flows up to and including the 100 year event with a 45% allowance for climate change and an additional 10% increase in impermeable areas due to urban creep. Detention basins are effective in peak flow reduction, water quality treatment in the settlement of solids and have good amenity and ecological potential.
- Flow control: A vortex flow control for each network will be utilised for the development catchment areas to restrict flows to predevelopment greenfield rates.
- Permeable paving is proposed to private driveways and shared private driveways. Permeable paving is effective in slowing run off rates and removal of pollutants. The permeable surfacing will be Type B (partial infiltration) to give surface water a opportunity to infiltrate but given the expected poor infiltration, a connector drain should be installed.

4.6 Water Quality Treatment

SuDS provided are used to mitigate against pollution from runoff of different land types within the development proposals. An assessment of the suitability of SuDS proposed has been undertaken utilising the Simple Index Approach published by CIRIA and HR Wallingford. The pollution hazard level varies between land types, figure 4.2 shows the proposed mitigation of detention basins and permeable paving has greater mitigation indices therefore providing adequate water treatment.

Pollution Hazard Indices				
Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Hydrocarbons
Residential Roof	Very Low	0.2	0.2	0.05
Residential Parking	Low	0.5	0.4	0.4
Low Traffic Highways	Low	0.5	0.4	0.4
Mitigation Indices				
Detention Basins		0.5	0.5	0.6
Permeable Paving		0.7	0.6	0.7

Figure 4.2 – Pollution hazard matrix based on SIA.

4.7 Surface Water Flood Flow Path

As mentioned in chapter 3, the surface water flood flow path is being maintained and levels have been directed to the SuDS detention basin. The top level of the basin is 31.400m AOD with 1 in 4 gradient embankments back to proposed site levels and the low point on the boundary is 32.710m AOD located at the southern end of the existing wall. When the basin fills up, it will spill over the top of the eastern site boundary at 32.710m AOD and so plots adjacent to the basin have a minimum floor level of 33.075m AOD to ensure they are not at risk of flooding from overland flows and a freeboard of 300mm has been applied. Refer to Appendix E.

The existing surface water flood flow path has potential to find its way into the combined sewer via the road gullies in A183. The proposed development will provide betterment to the combined sewer by capturing some of the surface water flooding within the positive drainage system on site and discharging it at a restricted rate into the surface water public sewer.

5. Foul Water

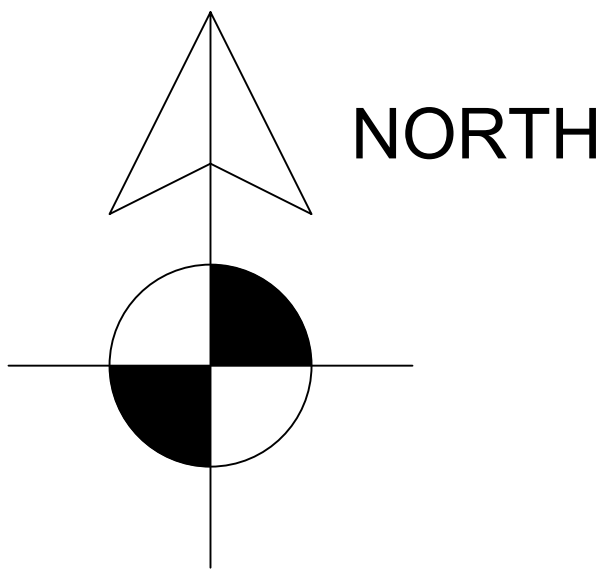
A PPE was submitted to NWL and a response has been received. The response dated 28th May 2025 and valid for one year states “the foul flows can discharge without restriction into the 300mm diameter combined sewer to the east of the site via manhole 6301.” Refer to Appendix D.

6. References

The following reference documents have been used in the preparation of this report.

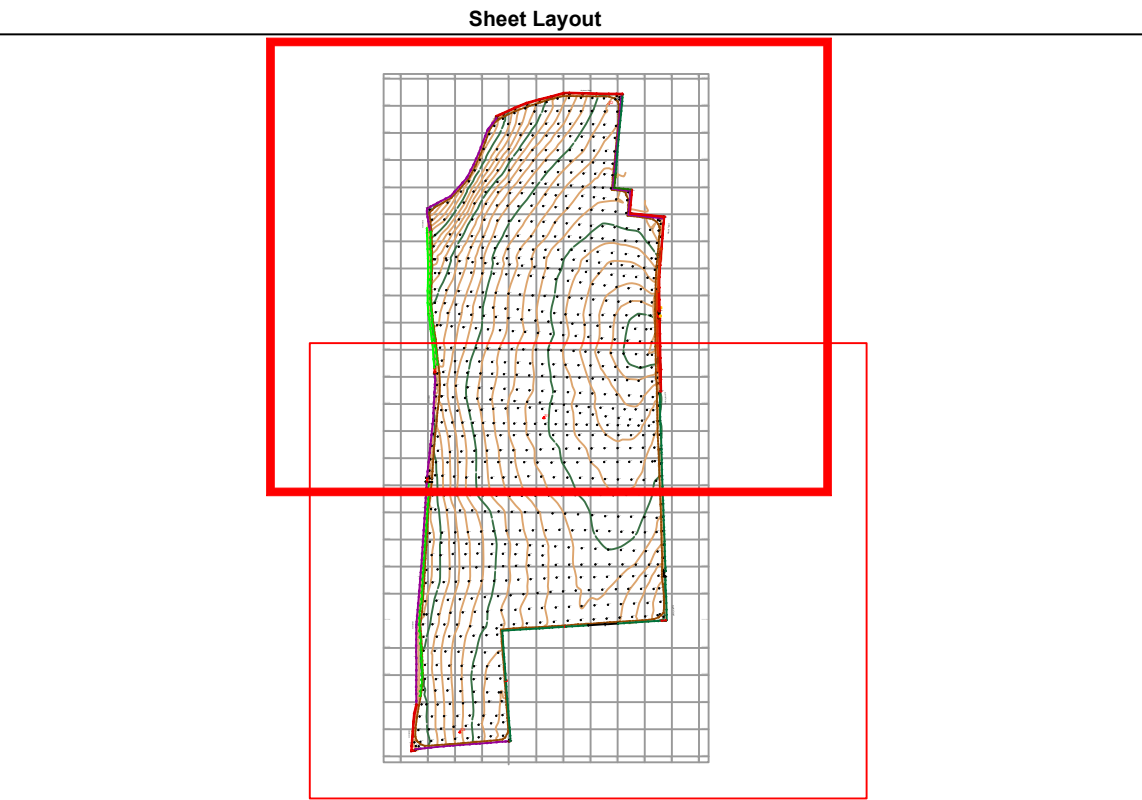
- National Planning Policy Framework (2024).
- Technical Guidance to the National Planning Policy Framework.
- Environment Agency online flood maps.
- Building Regulations Document H (2010).
- The SuDS Manual CIRIA C753.
- Non-statutory technical standards for sustainable drainage – LASOO.
- North-East Lead Local Flood Authorities Sustainable Drainage Local Standards

Appendix A – Topographical Survey



Legend			
Topographical Line Features			
Building Line	Edge of Grass	Road Sign	
Building Open Sided	Edge of Stone	Retaining Wall	
Bottom of Bank	Edge of Tackle	Street Furniture	
Cliff Face	Footpath	Sign Post	
Drainage Channel	Hedge (centre & width)	Top of Bank	
Concrete	Kerb Channel	Track	
Concrete Edge	Kerb Top	Utility Box	
Creeper	Level Change	Vegetation Edge	
Change of Surface	Overground Pipe	Wall	
Drain Leaking	Ramp Edge	Water Line	
Ditch Base	Road Channel		
Drain Top			
Edge of Block Pavement			
Edge of Steel			
Fence Types		Utility Features	
Barbed Wire	Chain Link	Cable TV	Combined Sewer
Close Board	Knee Rail	Electric	Foul Sewer
Open Board	Palisade	GPR Detection	Storm Sewer
Post/Wire	Post/Wire	Telephone	Unknown Utility
Wire Mesh	Unspecified		Valve
Abbreviations		Utility Abbreviations	
BL Building Line	FP Fence Post	RDL Ridge Level	EOT End of trace
BM Benchmark	GP Gas Post	RS Road Sign	EOR End of route
BO Bulb	GV Gas Valve	RS Road Sign	EUD Empty utility duct
CTV Cable TV	GU Gully	SS Stop Cook	UTS Unable to locate
DO Door	IC Inspection Cover	SP Sign Post	UTL Unable to Lift
DP Down Pipe	L Invert Level	SV Stop Valve	UTT Unable to trace
EAL Easement Level	LC Lamp Column	TS Top of Fence Level	
EP Electricity Pylon	LEP Lamp/Electric Pole	TH Threshold Level	
ES Earth Road	LFP Lamp Post	TL Top of Rail Level	
EPY Electricity Pylon	MH Manhole	WL Water Level	
FI Fire Hydrant	OH Overhead	WM Water Meter	
FL Floor Level	PO Post	VP Vent Pipe	

Station Coordinates			
Name	Easting	Northing	Height
S1	440557.016	563362.221	32.623
S2	440616.241	563651.261	34.543
S3	440479.577	563072.343	38.637



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No.	Description	Date	By

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Grid Reference System & Orientation
Survey coordinates are oriented to Ordnance Survey National Grid (OSGB36) Plane Grid System, using OSTN15 transformation, established by GNSS observations tied to Ordnance Survey OSNET at station ST, via VRG corrections service.
The remainder of the survey is at a scale factor of 1.0 plane grid, so co-ordinates shown are not true OS coordinates, which have a scale factor applied.

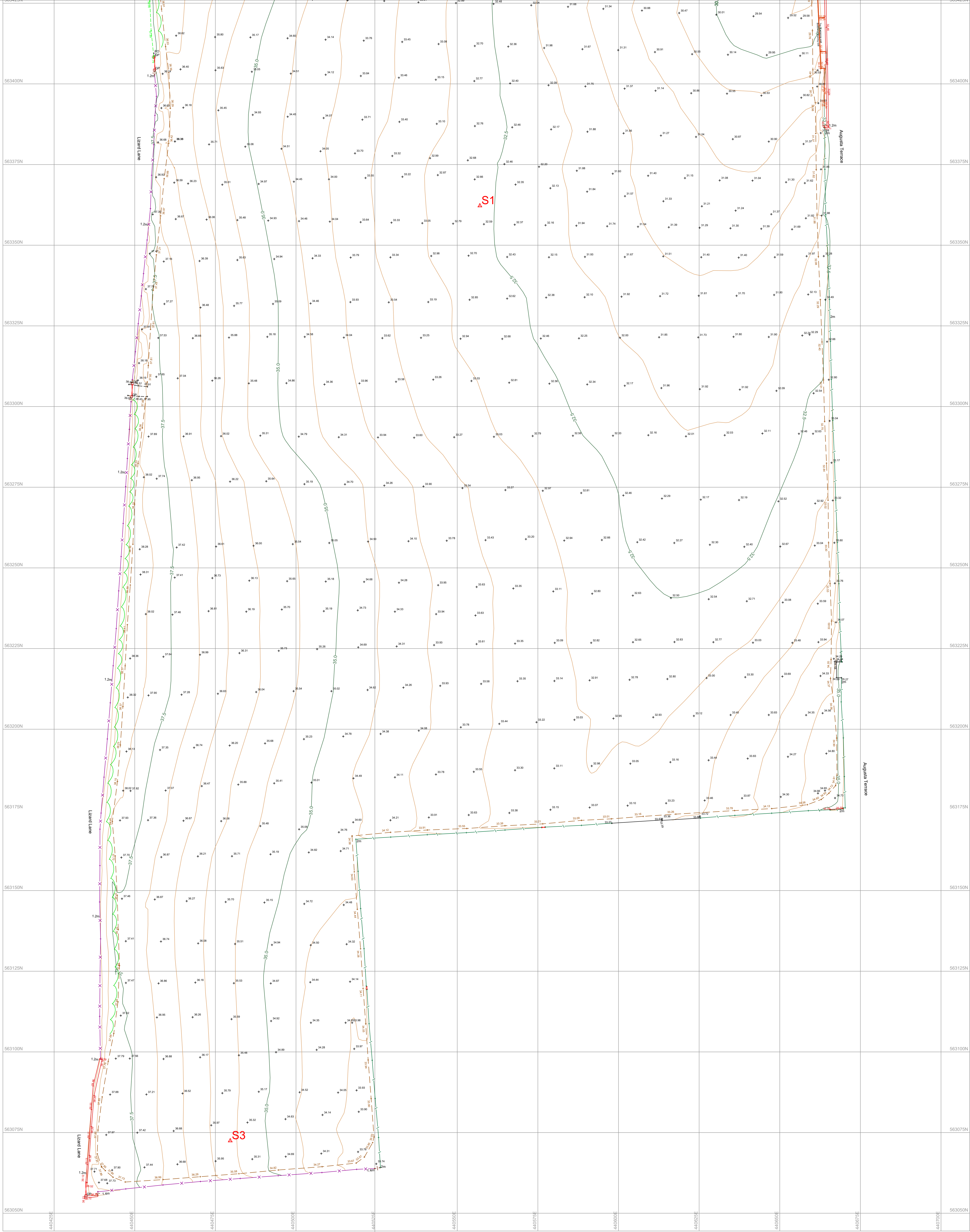
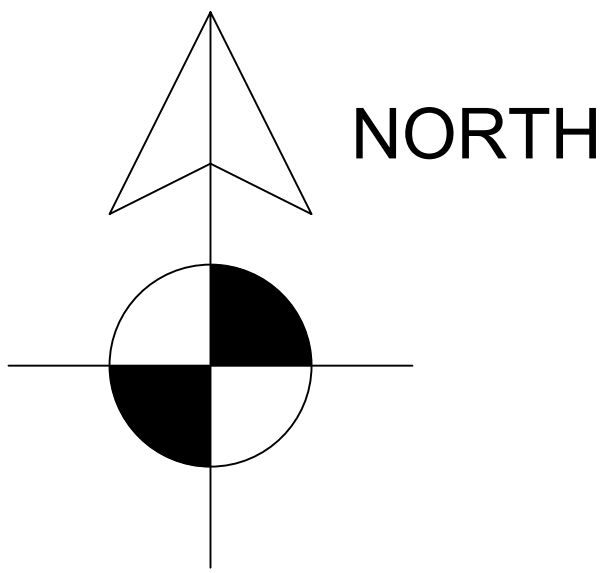
Height Datum
Elevations are to Ordnance Datum Newlyn (ODN) using OSGM15 geoid model via OSNET.
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Client	Story Homes
Site	Lizard Lane, Whitburn
Drawing Title	Topographical Survey

Surveyed By	CB JW	Drawn By	JW	QA By	CM
Scale	1:500 @ A0	Date	22 Nov 2024		
Drawing No.	1941-1	Rev No.	A	Sheet No.	1 OF 2



Legend			
Topographical Line Features			
Building Line	Edge of Grass	Road Sign	
Bottom of Bank	Edge of Stone	Retaining Wall	
Cliff Face	Edge of Tackle	Street Furniture	
Drainage Channel	Footpath	Sign Post	
Concrete	Hedge (centre & width)	Track	
Crested Edge	Kerb (centre & width)	Utility Box	
Change of Surface	Kerb Top	Vegetation Edge	
Drain Leaking & Ditch Base	Level Edge	Wall	
Overground Pipe	Ramp Edge	Water Line	
Edge of Block Pav.	Ramp Edge		
Edge of Steel	Road Channel		
Fence Types		Symbols	
Barbed Wire	Cable TV	Electricity Pylon	
Chain Link	Combined Sewer		
Close Board	Electric	Telephone Mast	
Knee Rail	Foot Sewer		
Open Board	Gas	Shrub/Bush	
Palisade	GPR Detection	Tree	
Post/Wire	Telephone		
Rating	Storm Sewer		
Wire Mesh	Unknown Utility		
Unspecified	Water Line		
Abbreviations			
BL Building Line	FP Fence Post	RDL Ridge Level	EOT End of trace
BM Benchmark	GP Gas Post	RS Road Sign	EOR End of route
BO Bulb	GV Gas Valve	RS Road Sign	EUD Empty utility duct
CTV Cable TV	GP Gas Post	SS Stop Sign	UTS Unable to locate
DO Door	IC Inspection Cover	SP Sign Post	UTL Unable to Lift
DP Down Pipe	L Invert Level	SV Stop Valve	UTT Unable to trace
EAL Easement	LC Lamp Column	TS Top of Fence Level	
EP Earth Road	LEP Lamp/Electric Pole	TH Threshold Level	
EPY Electricity Pylon	L.P. Lamp Post	TL Top of Wall Level	
FI Fire Hydrant	MH Manhole	WL Water Level	
FL Floor Level	OH Overhead	WM Water Meter	
	PO Post	VP Vent Pipe	

Station Coordinates			
STATION CO-ORDINATES			
Name	Easting	Northing	Height
S1	440557.016	563362.221	32.623
S2	440616.241	563551.261	34.543
S3	440475.577	563072.343	35.657



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Castle Eden, Co. Durham, TS27 4SD

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Client	Story Homes
Site	Lizard Lane, Whitburn
Drawing Title	Topographical Survey

Surveyed By	CB JW	Drawn By	JW	QA By	CM
Scale	1:500 @ A0	Date	22 Nov 2024		
Drawing No.	1941-1	Rev No.	A	Sheet No.	2 OF 2

Appendix B – Architectural Layout



Site Boundaries:

Site Planning Boundary

Affordable Units:

Denotes Rented Social Landlord (RSL) Unit (41 No.)

Denotes Discount Market Value (DMV) Unit (21 No.)

Denotes First Homes (FH) Unit (20 No.)

Visitor Parking:

VP Denotes VP Bay (69 No.)

Bedrooms:

Denotes 1-Bedroom Unit

Denotes 2-Bedroom Unit

Denotes 3-Bedroom Unit

Denotes 4-Bedroom Unit

Denotes 5-Bedroom Unit

Other information:

Denotes Existing Tree Groups

Denotes SuDs Feature

DEVELOPMENT
MILL LANE, WHITBURN

DRAWING
PROPOSED SITE PLAN

DRAWN BY	DR	DATE	07.10.2025
CHECKED BY	-	SCALE	1:1000 @A1
DWG PACK	PLN	DRAWING NUMBER	MLLN.PLN.02
Revisions	Notes	Date	
P1	Initial Issue for Planning Submission	07.10.2025	

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Business Park, Newcastle Upon Tyne, NE4 7YL
Tel 0191 226 7260

HOUSETYPE SCHEDULE OF ACCOMMODATION

SITE NAME										REV.	P1
MILL LANE, WHITBURN										REF.	MLN/SCH/AS
REF.	HOUSETYPE	COMPLIANCE	CONFIG.	PARKING	SQ. FT.	RSL NO.	FH NO.	DMV NO.	OM NO.	TOT. SQ. FT.	
1 BEDROOM RANGE											
BLD	Bedford	M4(2) - GF ONLY	1 Bed Apartment	Front Parking	624	8				4992	
2 BEDROOM RANGE											
BFD	Branford	M4(2)	2 Bed Semi/Terraced	Front Parking	758	14	3			12903	
NFD	Newford	M4(3)	2 Bed Semi Bungalow	Front Parking	777	10				7770	
BOW	Bowcastle	M4(2)	2 Bed Semi	Front Parking	759		3	2		2277	
3 BEDROOM RANGE											
FFD	Fulford	M4(2)	3 Bed Semi/Terraced	Front Parking	906	14	15			26804	
HAI	Hullin	M4(2)	3 Bed Semi/Terraced	Front Parking	995		3	8		8955	
ASD	Ashford	M4(2)	3 Bed Detached	Integ Single Garage	1060				13	13780	
MYD	Mayford	M4(2)	3 Bed Semi	Front Parking	1079				14	15106	
4 BEDROOM RANGE											
SKD	Skiddaw	M4(2)	4 Bed Semi/Terraced	Front Parking	1359			6		8154	
RFD	Rushford	M4(2)	4 Bed Semi	Front Parking	1409				14	19726	
CFD	Clifford	M4(2)	4 Bed Detached	Integ Single Garage	1360				17	23120	
WFD	Westford	M4(2)	4 Bed Detached	Detached Single Garage	1435			8		13480	
LFD	Linford	M4(2)	4 Bed Detached	Integ Single Garage	1536				20	30720	
HFD	Hartford	M4(2)	4 Bed Detached	Integ Single Garage	1622				20	32440	
5 BEDROOM RANGE											
CND	Cranford	M4(2)	5 Bed Detached	Integ Large Garage	1961				17	33337	
TOTAL AFFORDABLE AND OPEN MARKET UNITS					46	20	16	123			
TOTAL UNITS AND SQ. FT.								205		251634	

Appendix C – NWL Sewer Maps

Appendix D – NWL Pre Planning Enquiry Responses

Direct Line: 07596315994
Email: developmentenquiries@nwl.co.uk
Our Ref: 337283

Wednesday, 28 May 2025

Coast Consulting Engineers
7 Silverton Court
Cramlington
NE23 7RY

Dear Paul,

Re: Pre-Planning Enquiry – East of Lizard Lane

Further to the Point of Connection Application for the above site, received May 7th 2025, we are now able to provide the following response.

We have based our response on the information in your application and accompanying correspondence. Therefore, should any of the information now be different, then you must ensure that you inform us of any changes as further Network Modelling may be required and our response may also change, leading to this response being invalid.

Northumbrian Water assesses the impact of the proposed development on our assets and assesses the capacity within our networks to accommodate and treat the anticipated flows arising from the development. We do not therefore offer comment on aspects of planning applications that are outside of our area of control.

Enclosed in this response is a scaled plan showing the **approximate** position of the water and sewerage networks within the vicinity of this site.

We have changed the way contractors and developers can access our assets.

Historically only our own staff and framework contractors could access our sewerage network. As of 1st January 2018, we are allowing third party contractors to access our sewer network on a site by site basis, subject to certain conditions.

Further information (including how to apply) is available from our web site - <https://www.nwl.co.uk/services/developers/developer-sewerage-services/>

Also enclosed is our extract showing locations within the approximate vicinity of this site that have, from our records, experienced flooding. This has been provided to demonstrate the known flood risks within the vicinity which have been considered as part of our assessment on this enquiry.

We have also carried out a review of your application and can confirm the following:

Sewerage and Sewage Treatment

Northumbrian Water would ask that you please separate the foul and surface water flows in accordance with Part H of the Building Regulations prior to the final connection to the public sewer.

All new connections to the public sewerage system must first be approved through the Section 106 of the Water Industry Act 1991 process prior to construction.

Should you decide to proceed with this development, a fully completed Sewer Connection application form will be required. These are available to download from the following link:

<https://www.nwl.co.uk/services/developers/developer-sewerage-services/new-sewer-connections-s106/>

- Foul Water Discharge

The foul flows can discharge without restriction into the **300mm** diameter **combined** public sewer to the east of the site via manhole **6301**.

- Surface Water Discharge

No surface water flow from the proposed development will be allowed to connect into the existing public sewerage system unless it is proven that the alternative options which are listed within Part H of the Building Regulations 2003 are not available:

Rainwater from a system provided pursuant to sub-paragraphs (1) or (2) shall discharge to one of the following, listed in order of priority –

(a) an adequate soakaway or some other adequate infiltration system; or, where that is not reasonably practicable,

(b) a watercourse; or, where that is not reasonably practicable,

(c) a sewer.

If the more sustainable options prove to be unfeasible, a restricted surface water flow of **17 l/sec** would be permitted to discharge into the **225mm** diameter **surface water** public sewer to the east of the site within White Rocks via manhole **7304**. Any excess in flows must be attenuated on site.

- For Information

The Lead Local Flood Authority may require surface water flows to discharge at a different rate to that which has been agreed by Northumbrian Water. As the statutory consultee on flood risk and drainage matters, they have the authority to do so therefore, we suggest that you contact them to discuss this in further detail.

Written approval for all individual connections (direct or indirect) to the public sewerage system should be obtained through the Section 106 process, following completion of the detailed drainage design and before the commencement of any drainage works on site.

- Storm Overflows

We have identified that there are **2** storm overflows downstream of your proposed development.

Attached is a copy of the Drainage and Waste Water Management Plan (DWMP) for the drainage area your proposed development sits within. This plan shows the location of the storm overflows within the catchment and their current investment status as part of our storm overflow discharge reduction plan.

If you require further information regarding any potential impact your proposed development may have on spill frequencies, please contact us to discuss how this could be provided.

- Sewage Treatment Capacity

The Sewage Treatment Works to which this development finally discharges to is **Hendon** and these works are able to accept the additional flows.

Please note that this response is valid for 1 year only and you should resubmit your proposals should this period lapse prior to your development beginning.

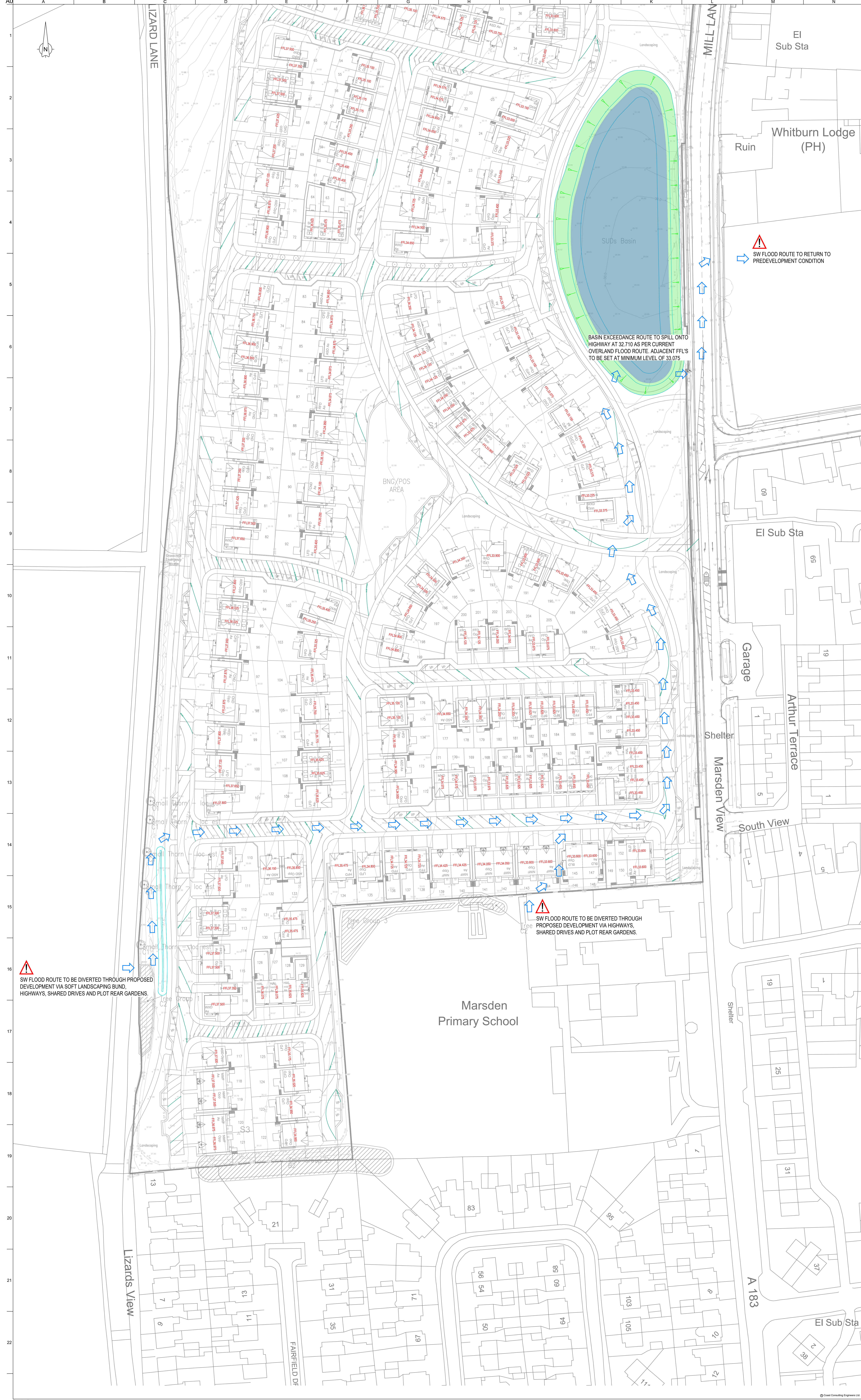
Should you require any further assistance or information, then please do not hesitate to contact me at developmentenquiries@nwl.co.uk or alternatively on 07596315994, please quote our reference number above in any future correspondence.

Yours sincerely,

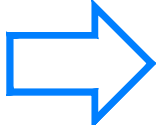


Laura Roberts
Technical Support Advisor
Developer Services

Appendix E – Drainage Proposals



KEY

 SW FLOOD FLOW ROUTE

 SW FLOOD ROUTE TO RETURN TO PREDEVELOPMENT CONDITION

BASIN EXCEEDANCE ROUTE TO SPILL ONTO HIGHWAY AT 32.710 AS PER CURRENT OVERLAND FLOOD ROUTE. ADJACENT FFL'S TO BE SET AT MINIMUM LEVEL OF 33.075

SW FLOOD ROUTE TO BE DIVERTED THROUGH PROPOSED DEVELOPMENT VIA HIGHWAYS, SHARED DRIVES AND PLOT REAR GARDENS.

SW FLOOD ROUTE TO BE DIVERTED THROUGH PROPOSED DEVELOPMENT VIA SOFT LANDSCAPING BUND, HIGHWAYS, SHARED DRIVES AND PLOT REAR GARDENS.

P4	04.12.25	Levels amended adjacent to plot 103. Drawing job title renamed	AT	PB	PB
P3	14.11.25	Amended to suit revised route of flood path showing off site	AT	PB	PB
P2	27.10.25	Amended to suit revised layout	AT	PB	PB
P1	11.09.25	Preliminary Issue	AT	PB	PB
Issue	Date	Description	By	Chkd	Appd



7 Silchester Court, Northumberland Business Park, NE22 7RY
0191 9577879
Client

STORY HOMES
NORTH EAST

Job Title
LAND OFF MILL LANE
SOUTH SHIELDS

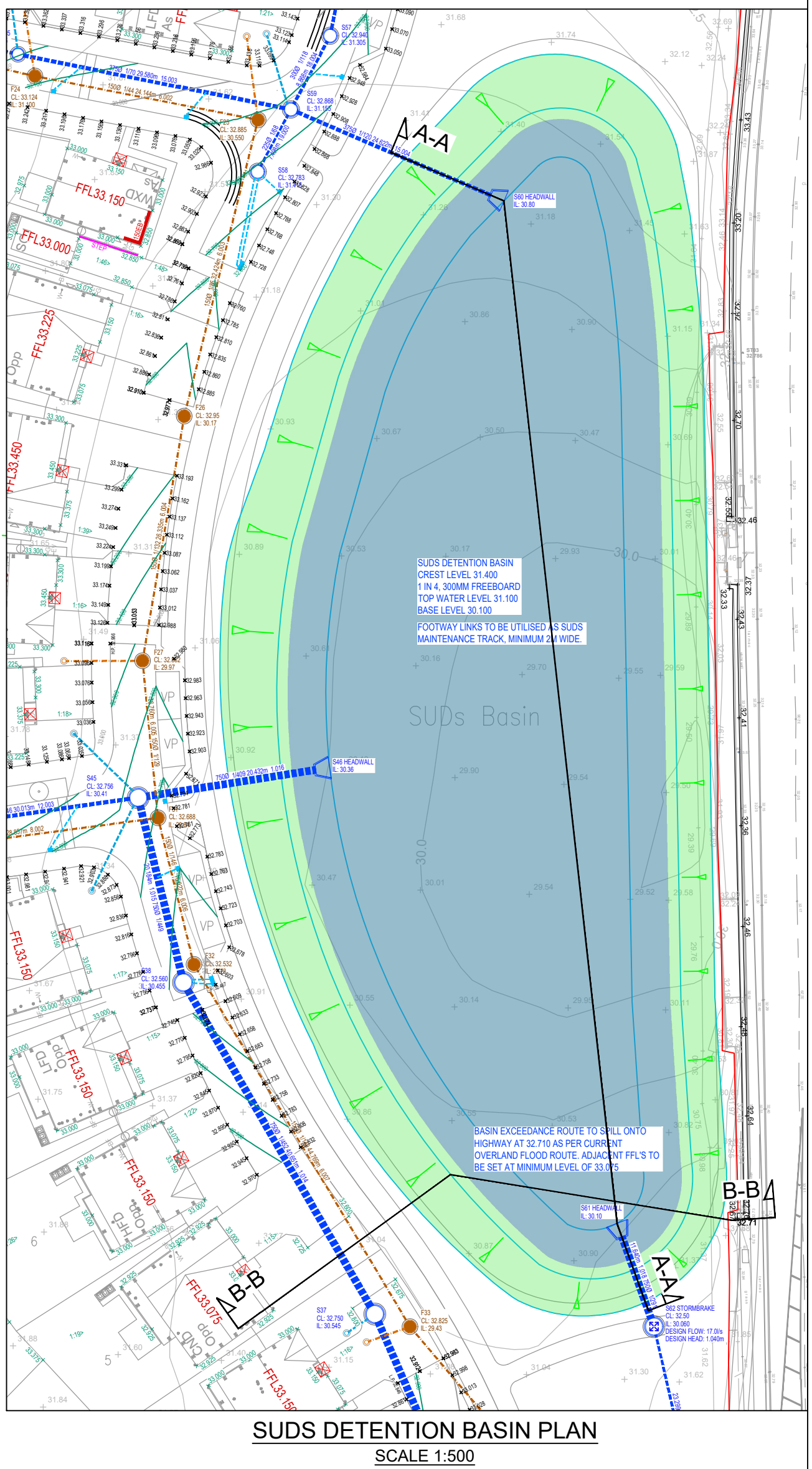
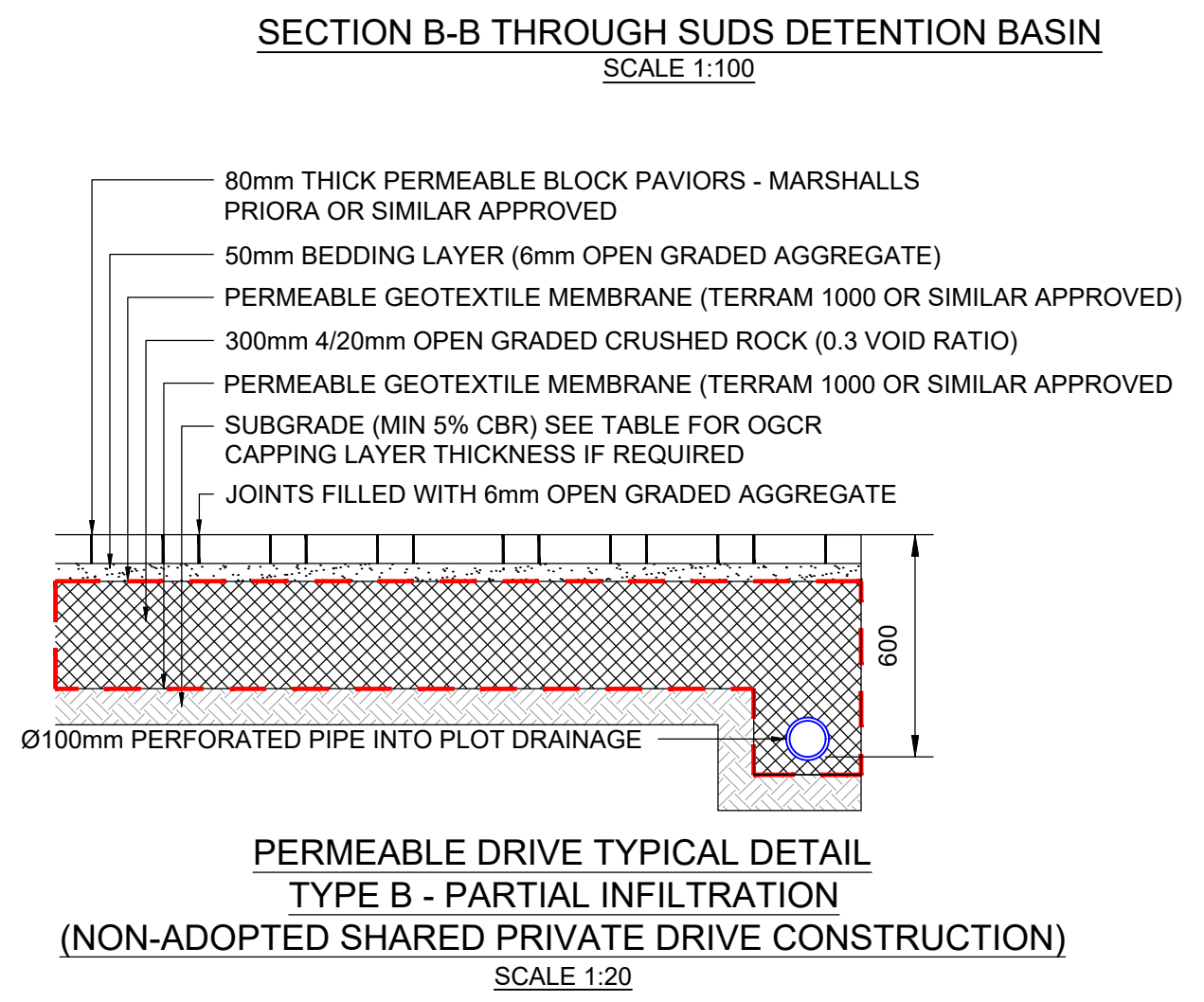
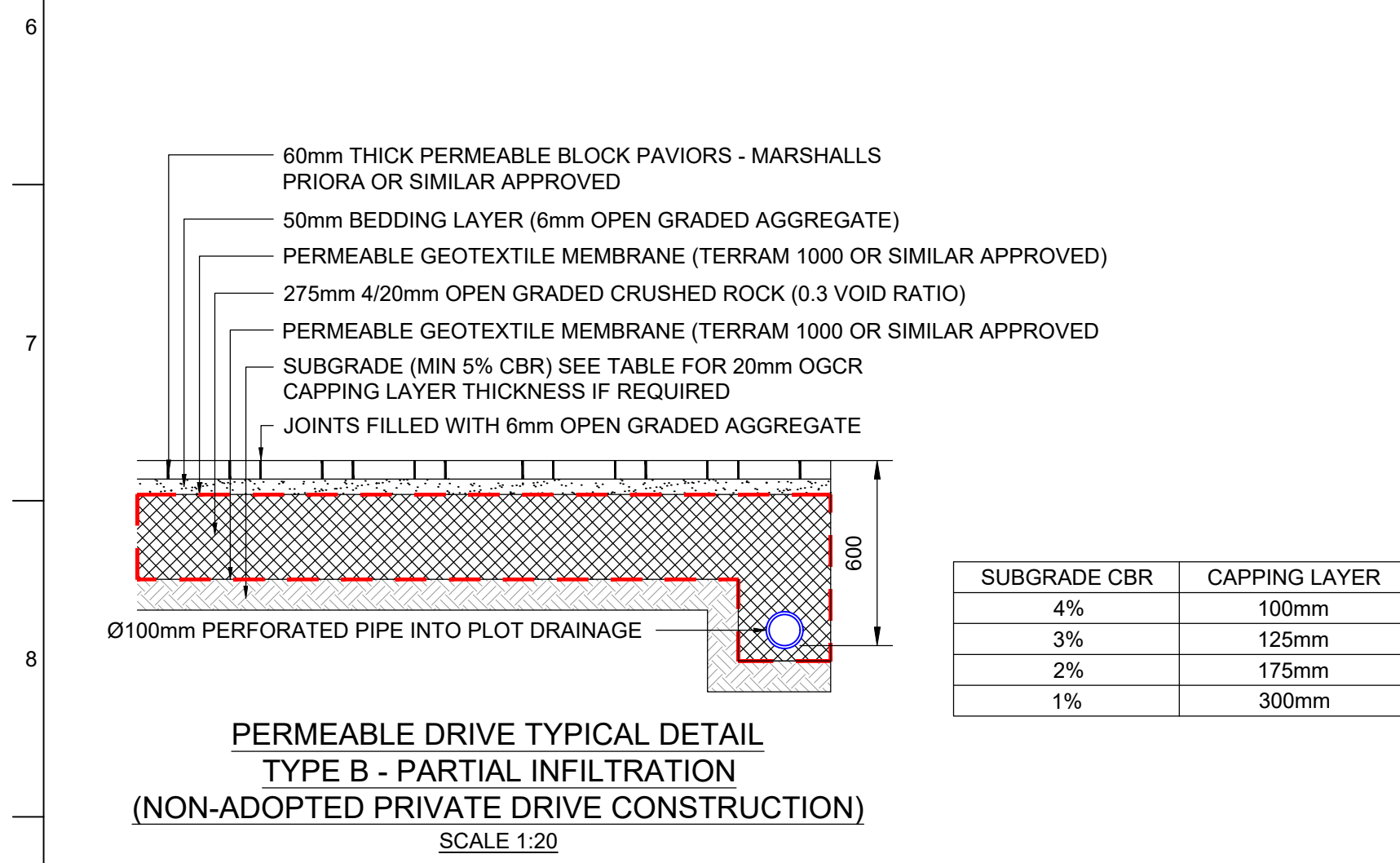
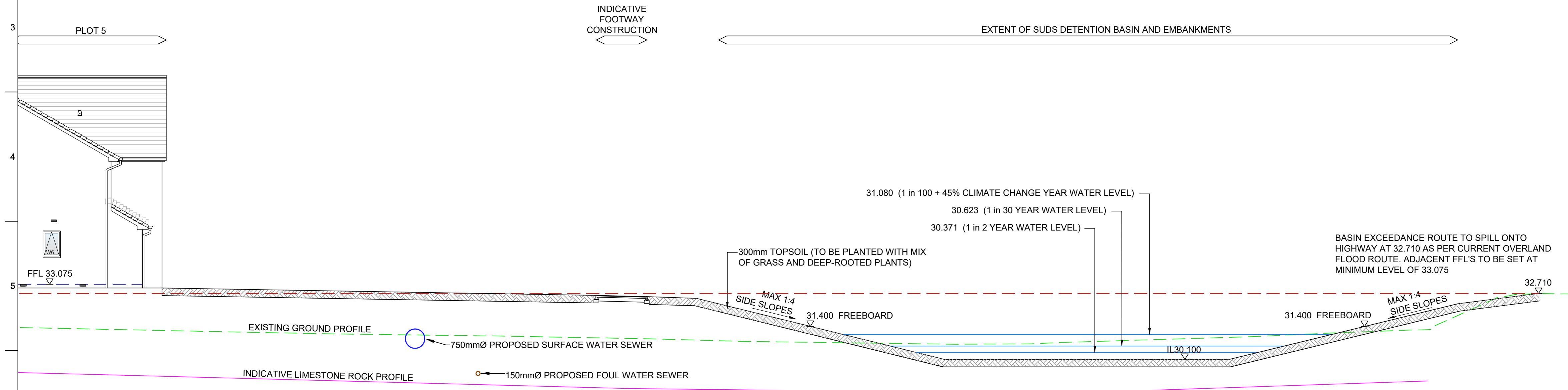
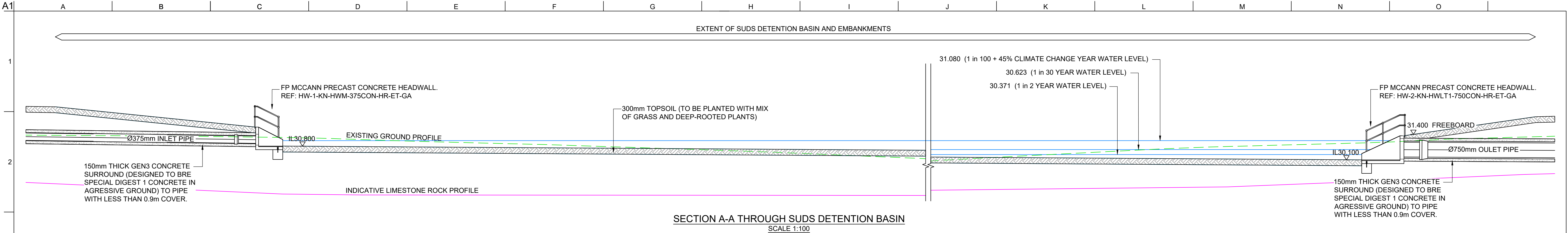
Drawing Title
SURFACE WATER FLOOD ROUTE
DIVERSION

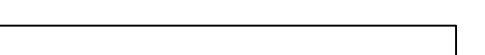
Scale of A0
1:500

Drawing Status
PRELIMINARY

Job No	Drawing No	Issue
25041	207	P4

© Coast Consulting Engineers Ltd



							 7 Silvertown Court, Northumberland Business Park, NE23 7RY 0191 5977879	Client STORY HOMES		Drawing Title SUDS SECTIONS		
P3		04.12.25	Drawing job title renamed	AT	PB	PB				Scale at A1 AS SHOWN		
P2		19.11.25	Section amended to show plot 5	AT	PB	PB		Job Title LAND OFF MILL LANE SOUTH SHIELDS		Drawing Status PRELIMINARY		
P1		14.11.25	Preliminary Issue	AT	PB	PB				Job No 25041		
Issue		Date	Description	By	Chkd	Appd				Drawing No 95		Issue P3

Appendix F – Surface Water Drainage Calculations

Network Details

Manhole Schedule

Manhole	Catchment Area (ha)	Diameter (m)	Type	CL (m)	IL (m)	Depth To Soffit (m)	Easting (m)	Northing (m)
S1	0.041	1.350	Type C	37.648	36.298	1.200	440454.024	563107.336
S2	0.053	1.350	Type C	37.478	36.128	1.200	440456.048	563124.521
S3	0.030	1.350	Type C	37.551	35.955	1.371	440455.465	563116.636
S4	0.030	1.350	Type C	36.302	34.874	1.203	440482.392	563114.646
S5	0.154	1.350	Type C	34.643	33.213	1.205	440515.831	563112.077
S6	0.030	1.350	Type C	34.696	33.030	1.291	440515.427	563117.093
S7	0.081	1.350	Type B	35.145	32.770	1.925	440512.238	563160.137
S9	0.097	1.350	Type C	37.732	36.150	1.432	440455.982	563206.024
S8	0.063	1.350	Type C	37.637	36.156	1.331	440455.986	563188.187
S10	0.061	1.350	Type C	37.641	35.985	1.431	440455.984	563197.105
S11	0.034	1.350	Type B	35.420	32.645	2.325	440510.741	563199.204
S12	0.140	1.350	Type C	35.008	33.305	1.478	440529.764	563212.802
S13	0.045	1.350	Type B	34.936	32.590	1.896	440530.256	563199.952
S14	0.143	1.350	Type C	33.898	32.248	1.200	440576.198	563201.713
S15	0.256	1.500	Unknown	33.124	31.109	1.340	440631.268	563203.823
S16	0.031	1.800	Unknown	33.006	30.960	1.296	440655.764	563204.762
S17	0.079	1.200	Type B	34.222	32.345	1.577	440560.182	563261.660
S18	0.234	1.350	Type C	33.148	31.400	1.298	440612.194	563263.654
S19	0.058	1.800	Unknown	32.922	30.835	1.337	440653.446	563265.235
S20	0.013	1.800	Unknown	32.954	30.815	1.389	440653.149	563273.357
S21	0.073	1.350	Type C	37.758	36.305	1.303	440462.927	563318.583
S22	0.091	1.350	Type C	37.950	36.365	1.435	440461.510	563299.564
S23	0.028	1.350	Type C	37.857	36.160	1.472	440462.192	563308.727
S24	0.030	1.350	Type C	36.505	34.945	1.335	440491.481	563306.544
S25	0.014	1.350	Type C	35.330	33.690	1.415	440515.564	563301.858
S26	0.060	1.350	Type C	34.902	33.280	1.397	440527.274	563261.684
S27	0.026	1.350	Type C	34.797	33.170	1.402	440526.049	563272.459
S28	0.092	1.350	Type C	34.512	32.879	1.333	440531.740	563295.371
S29	0.115	1.350	Type B	34.262	32.296	1.741	440536.261	563401.782
S30	0.157	1.350	Type B	34.052	32.090	1.662	440543.164	563381.886
S31	0.030	1.350	Type B	33.800	31.783	1.567	440556.152	563360.104
S32	0.102	1.500	Unknown	33.565	31.483	1.482	440571.701	563343.964
S33	0.136	1.500	Type B	33.302	31.090	1.612	440593.716	563328.459
S34	0.050	1.500	Unknown	33.035	31.030	1.405	440617.793	563319.374
S35	0.104	1.800	Type B	32.950	30.695	1.580	440640.733	563315.867
S36	0.000	1.800	Type B	33.200	30.645	1.805	440642.635	563337.339
S37	0.102	1.800	Unknown	32.750	30.545	1.455	440625.525	563376.463
S38	0.117	1.800	Unknown	32.560	30.455	1.355	440605.196	563411.666
S39	0.150	1.350	Type C	36.782	35.357	1.200	440473.213	563422.119
S40	0.110	1.350	Type C	36.997	35.647	1.200	440475.314	563442.701
S41	0.062	1.350	Type C	36.890	35.170	1.420	440474.465	563432.749
S42	0.066	1.200	Type B	34.660	32.725	1.710	440533.462	563441.173
S43	0.090	1.500	Type B	34.530	32.485	1.745	440532.797	563428.070
S44	0.032	1.350	Type C	33.128	31.361	1.392	440570.696	563427.030
S45	0.072	1.800	Type B	32.756	30.410	1.671	440600.407	563431.274
S46 - HW	0.000	1.800	Unknown	31.800	30.365	0.685	440620.734	563434.469
S47	0.076	1.350	Type C	37.930	36.404	1.376	440492.842	563549.177
S48	0.062	1.350	Type C	37.670	36.320	1.200	440485.434	563525.341
S49	0.058	1.350	Type C	37.750	36.135	1.390	440488.741	563535.401
S50	0.181	1.350	Type C	34.708	32.925	1.483	440545.025	563493.224
S51	0.045	1.200	Type B	34.493	32.300	1.893	440551.996	563518.188
S52	0.115	1.350	Type C	33.205	31.575	1.255	440587.618	563510.193
S53	0.125	1.350	Type C	34.122	32.670	1.227	440594.454	563583.128
S54	0.029	1.350	Type C	33.560	32.070	1.265	440610.415	563570.881
S55	0.019	1.350	Type C	33.308	31.880	1.203	440621.980	563549.787
S56	0.009	1.350	Type C	33.109	31.515	1.294	440624.189	563528.878
S57	0.015	1.350	Type C	32.940	31.305	1.335	440620.781	563512.163
S58	0.070	1.350	Type C	32.783	31.415	1.143	440613.087	563497.718
S59	0.086	1.350	Type C	32.868	31.155	1.338	440616.612	563504.336
S60 - HW	0.000	1.500	Unknown	32.525	30.800	1.200	440639.239	563494.626
S61 - HW	0.000	1.800	Unknown	31.800	30.100	1.025	440651.255	563386.102
S62	0.000	1.800	Type B	32.500	30.060	2.215	440655.172	563375.140
S63	0.000	1.200	Type B	33.000	29.910	2.865	440660.381	563352.432
S64	0.000	1.200	Type B	31.769	29.620	1.924	440707.823	563358.788

Manhole Schedule

Manhole	Catchment Area (ha)	Diameter (m)	Type	CL (m)	IL (m)	Depth To Soffit (m)	Easting (m)	Northing (m)
S65	0.000	1.350	Type C	29.407	28.090	1.092	440774.459	563370.927
S66	0.000	1.350	Type C	29.033	27.970	0.838	440782.455	563353.671
S67	0.000	1.350	Type C	29.426	27.805	1.396	440767.987	563330.588
7304 EXIST	0.000	1.350	Type C	29.485	27.775	1.485	440767.410	563325.890

Pipe Schedule

Pipe Number	US Manhole	US IL (m)	DS Manhole	DS IL (m)	Shape	Dimension (m)	Length (m)	Gradient (1:x)	Roughness (mm)	US Depth To Soffit (m)	DS Depth To Soffit (m)
1.000	S1	36.298	S3	36.030	Circ	0.15mØ	9.412	35.1	0.600	1.200	1.371
2.000	S2	36.128	S3	36.030	Circ	0.15mØ	7.906	81.0	0.600	1.200	1.371
1.001	S3	35.955	S4	34.874	Circ	0.225mØ	27.001	25.0	0.600	1.371	1.203
1.002	S4	34.874	S6	33.180	Circ	0.225mØ	33.125	19.6	0.600	1.203	1.291
3.000	S5	33.213	S6	33.180	Circ	0.225mØ	5.032	152.0	0.600	1.205	1.291
1.003	S6	33.030	S7	32.845	Circ	0.375mØ	43.162	233.3	0.600	1.291	1.925
1.004	S7	32.770	S11	32.645	Circ	0.45mØ	39.095	312.8	0.600	1.925	2.325
4.000	S9	36.150	S10	36.060	Circ	0.15mØ	8.919	99.1	0.600	1.432	1.431
5.000	S8	36.156	S10	36.060	Circ	0.15mØ	8.919	93.2	0.600	1.331	1.431
4.001	S10	35.985	S11	32.870	Circ	0.225mØ	54.797	17.6	0.600	1.431	2.325
1.005	S11	32.645	S13	32.590	Circ	0.45mØ	19.530	355.1	0.600	2.325	1.896
6.000	S12	33.305	S13	32.815	Circ	0.225mØ	12.860	26.2	0.600	1.478	1.896
1.006	S13	32.590	S14	32.248	Circ	0.45mØ	45.976	134.5	0.600	1.896	1.200
1.007	S14	32.248	S15	31.334	Circ	0.45mØ	55.110	60.3	0.600	1.200	1.340
1.008	S15	31.109	S16	31.035	Circ	0.675mØ	24.514	330.4	0.600	1.340	1.296
1.009	S16	30.960	S19	30.835	Circ	0.75mØ	60.517	484.1	0.600	1.296	1.337
7.000	S17	32.345	S18	31.550	Circ	0.3mØ	52.051	65.5	0.600	1.577	1.298
7.001	S18	31.400	S19	31.135	Circ	0.45mØ	41.282	155.9	0.600	1.298	1.337
1.010	S19	30.835	S20	30.815	Circ	0.75mØ	8.128	406.4	0.600	1.337	1.389
1.011	S20	30.815	S35	30.695	Circ	0.75mØ	44.285	369.0	0.600	1.389	1.505
8.000	S21	36.305	S23	36.235	Circ	0.15mØ	9.884	141.2	0.600	1.303	1.472
9.000	S22	36.365	S23	36.235	Circ	0.15mØ	9.188	70.7	0.600	1.435	1.472
8.001	S23	36.160	S24	34.945	Circ	0.225mØ	29.370	24.2	0.600	1.472	1.335
8.002	S24	34.945	S25	33.690	Circ	0.225mØ	24.534	19.5	0.600	1.335	1.415
8.003	S25	33.690	S28	32.954	Circ	0.225mØ	17.429	23.7	0.600	1.415	1.333
10.000	S26	33.280	S27	33.170	Circ	0.225mØ	10.844	98.6	0.600	1.397	1.402
10.001	S27	33.170	S28	32.954	Circ	0.225mØ	23.608	109.4	0.600	1.402	1.333
8.004	S28	32.879	S32	31.783	Circ	0.3mØ	62.914	57.4	0.600	1.333	1.482
11.000	S29	32.296	S30	32.165	Circ	0.225mØ	21.059	161.4	0.600	1.741	1.662
11.001	S30	32.090	S31	31.933	Circ	0.3mØ	25.360	161.4	0.600	1.662	1.567
11.002	S31	31.783	S32	31.633	Circ	0.45mØ	22.412	149.5	0.600	1.567	1.482
8.005	S32	31.483	S33	31.090	Circ	0.6mØ	26.927	68.5	0.600	1.482	1.612
8.006	S33	31.090	S34	31.030	Circ	0.6mØ	25.734	428.9	0.600	1.612	1.405
8.007	S34	31.030	S35	30.770	Circ	0.6mØ	23.207	89.3	0.600	1.405	1.580
1.012	S35	30.695	S36	30.645	Circ	0.75mØ	21.556	431.1	0.600	1.505	1.805
1.013	S36	30.645	S37	30.545	Circ	0.75mØ	42.702	427.0	0.600	1.805	1.455
1.014	S37	30.545	S38	30.455	Circ	0.75mØ	40.651	451.7	0.600	1.455	1.355
1.015	S38	30.455	S45	30.410	Circ	0.75mØ	20.184	448.5	0.600	1.355	1.596
12.000	S39	35.357	S41	35.245	Circ	0.225mØ	10.704	95.2	0.600	1.200	1.420
13.000	S40	35.647	S41	35.320	Circ	0.15mØ	9.988	30.5	0.600	1.200	1.420
12.001	S41	35.170	S43	32.485	Circ	0.3mØ	58.520	21.8	0.600	1.420	1.745
14.000	S42	32.725	S43	32.560	Circ	0.225mØ	13.120	79.5	0.600	1.710	1.745
12.002	S43	32.485	S44	31.436	Circ	0.3mØ	37.913	36.1	0.600	1.745	1.392
12.003	S44	31.361	S45	30.710	Circ	0.375mØ	30.013	46.1	0.600	1.392	1.671
1.016	S45	30.410	S46 - HW	30.365	Circ	0.75mØ	20.577	457.3	0.600	1.596	0.685
1.017	S46 - HW	30.365	S61 - HW	30.100	Circ	0.75mØ	57.191	215.8	0.600	0.685	0.950
15.000	S47	36.404	S49	36.210	Circ	0.15mØ	14.373	74.0	0.600	1.376	1.390
16.000	S48	36.320	S49	36.210	Circ	0.15mØ	10.590	96.0	0.600	1.200	1.390
15.001	S49	36.135	S51	32.375	Circ	0.225mØ	65.556	17.4	0.600	1.390	1.893
17.000	S50	32.925	S51	32.300	Circ	0.3mØ	25.919	41.5	0.600	1.483	1.893
15.002	S51	32.300	S52	31.650	Circ	0.3mØ	36.508	56.2	0.600	1.893	1.255
15.003	S52	31.575	S59	31.155	Circ	0.375mØ	29.580	70.4	0.600	1.255	1.338
18.000	S53	32.670	S54	32.070	Circ	0.225mØ	20.118	33.5	0.600	1.227	1.265
18.001	S54	32.070	S55	31.880	Circ	0.225mØ	24.057	126.6	0.600	1.265	1.203
18.002	S55	31.880	S56	31.590	Circ	0.225mØ	21.025	72.5	0.600	1.203	1.294
18.003	S56	31.515	S57	31.305	Circ	0.3mØ	17.059	81.2	0.600	1.294	1.335
18.004	S57	31.305	S59	31.230	Circ	0.3mØ	8.868	118.2	0.600	1.335	1.338

Pipe Schedule

Pipe Number	US Manhole	US IL (m)	DS Manhole	DS IL (m)	Shape	Dimension (m)	Length (m)	Gradient (1:x)	Roughness (mm)	US Depth To Soffit (m)	DS Depth To Soffit (m)
19.000	S58	31.415	S59	31.305	Circ	0.225mØ	7.498	68.2	0.600	1.143	1.338
15.004	S59	31.155	S60 - HW	30.950	Circ	0.375mØ	24.622	120.1	0.600	1.338	1.200
15.005	S60 - HW	30.800	S61 - HW	30.250	Circ	0.525mØ	109.187	198.5	0.600	1.200	1.025
1.018	S61 - HW	30.100	S62	30.060	Circ	0.75mØ	11.640	291.0	0.600	0.950	1.690
1.019	S62	30.060	S63	29.910	Circ	0.225mØ	23.299	155.3	0.600	2.215	2.865
1.020	S63	29.910	S64	29.620	Circ	0.225mØ	47.865	165.1	0.600	2.865	1.924
1.021	S64	29.620	S65	28.090	Circ	0.225mØ	67.733	44.3	0.600	1.924	1.092
1.022	S65	28.090	S66	27.970	Circ	0.225mØ	19.019	158.5	0.600	1.092	0.838
1.023	S66	27.970	S67	27.805	Circ	0.225mØ	27.242	165.1	0.600	0.838	1.396
1.024	S67	27.805	7304 EXIST	27.775	Circ	0.225mØ	4.733	160.4	0.600	1.396	1.485

Outfall Details

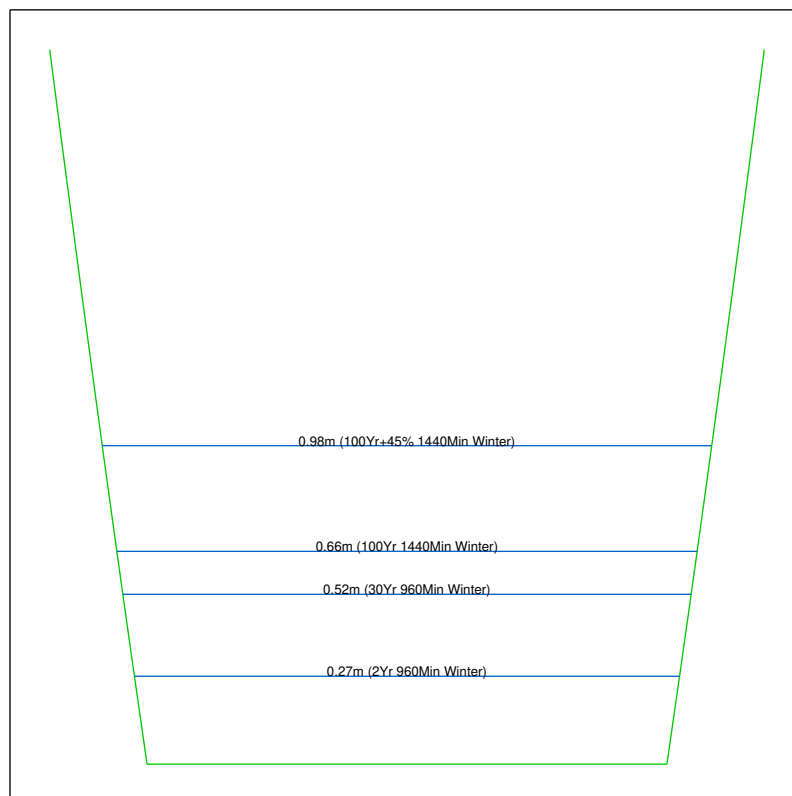
Outfall Manhole 7304 EXIST MH : Free Discharge

Flow Control Details

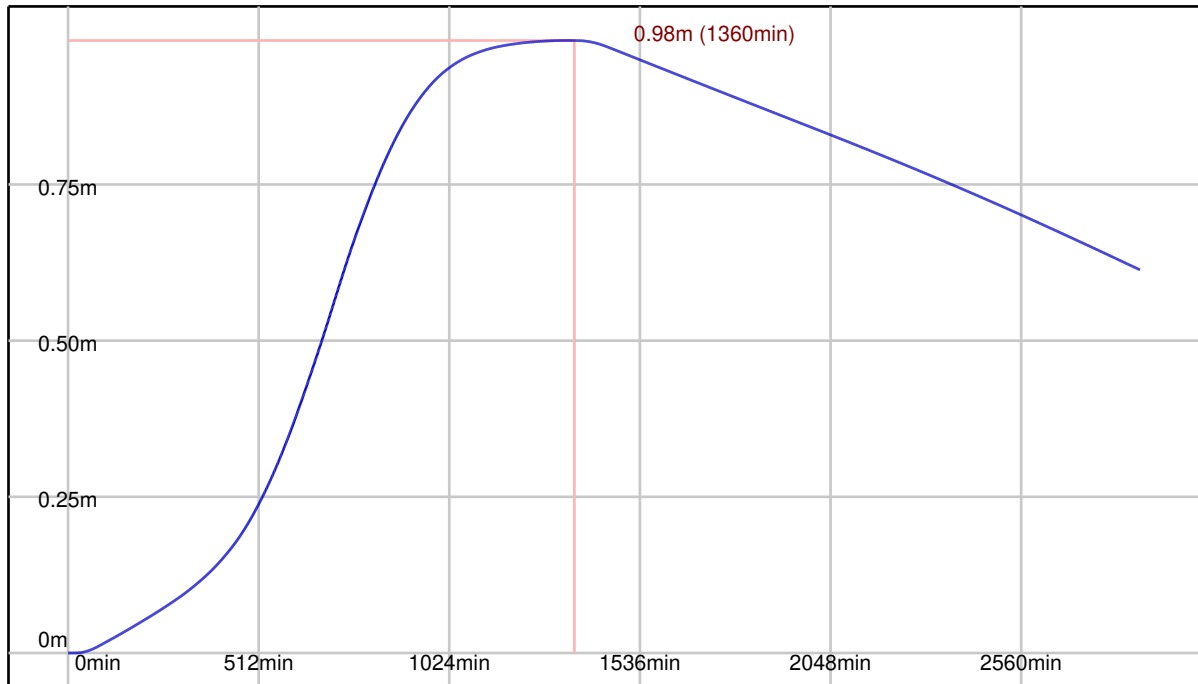
Pond Structure at Manhole S61 - HW

Pond Invert (m)	Max Depth (m)	Volume To Water Level (m3)	Water Level (m)	Freeboard (m)	Infil Base (m/hr)	Infil Side (m/hr)	Safety Factor
30.100	2.200	3267.453	31.100	1.200	0.00000000	0.00000000	2.00

Pond Depth/Area Diagram at S61 - HW



Pond at S61 - HW (100Yr+45% 1440Min Winter)

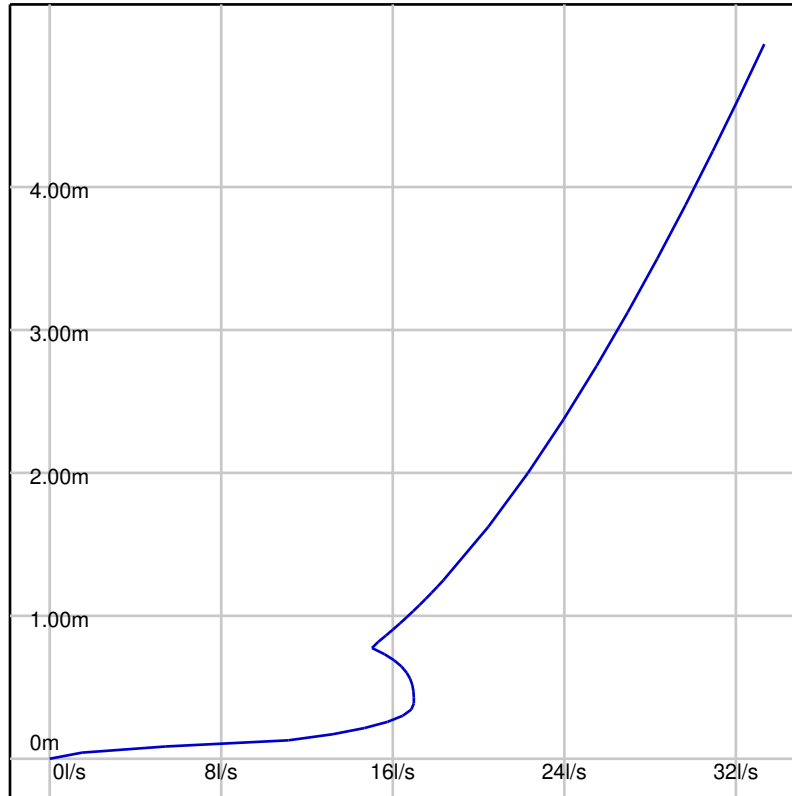


Controls within Manhole S62

StormBrake Control at Manhole S62

Model Ref	Design Depth (m)	Design Flow (l/s)	Depth Above Invert (m)	FF Head (m)	FF Flow (l/s)	KF Head (m)	KF Flow (l/s)
FPM-SB1-01040-01700-1100	1.040	17.000	0.000	0.387	16.984	0.778	14.986

StormBrake Control at S62



Simulation Settings

FEH2022 (point): Filename=FEH_Point_Descriptors_440560_563383_v5_0_1.xml

Summer (Cv: 0.75), Winter (Cv: 0.84)

Global Time of Entry: 5.0 mins

Durations (mins): 15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440

Return Periods (yrs) + Climate Change: (2, +0%), (30, +0%), (100, +0%), (100, +45%)

Simulated Rainfall Events

Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %	Storm	Average Intensity (mm/hr)	Runoff Continuity %	Flow Continuity %
2Yr 15Min Winter	26.400	0.00	-0.23	100Yr 15Min Summer	90.092	0.00	-0.09
2Yr 15Min Summer	26.400	0.00	-0.26	100Yr 15Min Winter	90.092	0.00	-0.16
2Yr 30Min Winter	17.200	0.00	-0.14	100Yr 30Min Summer	60.395	0.00	-0.06
2Yr 30Min Summer	17.200	0.00	-0.18	100Yr 30Min Winter	60.395	0.00	-0.08
2Yr 60Min Winter	10.900	0.00	-0.09	100Yr 60Min Summer	38.797	0.00	-0.09
2Yr 60Min Summer	10.900	0.00	-0.12	100Yr 60Min Winter	38.797	0.00	-0.08
2Yr 120Min Summer	7.650	0.00	-0.06	100Yr 120Min Summer	22.687	0.00	-0.07
2Yr 120Min Winter	7.650	0.00	-0.06	100Yr 120Min Winter	22.687	0.00	-0.07
2Yr 180Min Summer	6.148	0.00	-0.06	100Yr 180Min Summer	16.472	0.00	-0.07
2Yr 180Min Winter	6.148	0.00	-0.06	100Yr 180Min Winter	16.472	0.00	-0.06
2Yr 240Min Summer	5.106	0.00	-0.05	100Yr 240Min Summer	13.269	0.00	-0.06
2Yr 240Min Winter	5.106	0.00	-0.05	100Yr 240Min Winter	13.269	0.00	-0.05
2Yr 360Min Summer	3.949	0.00	-0.04	100Yr 360Min Summer	9.678	0.00	-0.06
2Yr 360Min Winter	3.949	0.00	-0.04	100Yr 360Min Winter	9.678	0.00	-0.05
2Yr 480Min Summer	3.273	0.00	-0.03	100Yr 480Min Summer	7.725	0.00	-0.05
2Yr 480Min Winter	3.273	0.00	-0.03	100Yr 480Min Winter	7.725	0.00	-0.04
2Yr 600Min Summer	2.801	0.00	-0.02	100Yr 600Min Summer	6.496	0.00	-0.05
2Yr 600Min Winter	2.801	0.00	-0.03	100Yr 600Min Winter	6.496	0.00	-0.04
2Yr 720Min Winter	2.453	0.00	-0.02	100Yr 720Min Summer	5.641	0.00	-0.04
2Yr 720Min Summer	2.453	0.00	-0.02	100Yr 720Min Winter	5.641	0.00	-0.04
2Yr 960Min Summer	1.991	0.00	-0.02	100Yr 960Min Summer	4.523	0.00	-0.03
2Yr 960Min Winter	1.991	0.00	-0.02	100Yr 960Min Winter	4.523	0.00	-0.03
2Yr 1440Min Summer	1.477	0.00	-0.01	100Yr 1440Min Summer	3.340	0.00	-0.01
2Yr 1440Min Winter	1.477	0.00	-0.01	100Yr 1440Min Winter	3.340	0.00	-0.02
30Yr 15Min Summer	70.877	0.00	-0.17	100Yr+45% 15Min Summer	130.634	0.00	-0.23
30Yr 15Min Winter	70.877	0.00	-0.19	100Yr+45% 15Min Winter	130.634	0.00	-0.23
30Yr 30Min Summer	47.143	0.00	-0.14	100Yr+45% 30Min Summer	87.572	0.00	-0.14
30Yr 30Min Winter	47.143	0.00	-0.13	100Yr+45% 30Min Winter	87.572	0.00	-0.11
30Yr 60Min Summer	30.013	0.00	-0.09	100Yr+45% 60Min Summer	56.256	0.00	-0.08
30Yr 60Min Winter	30.013	0.00	-0.08	100Yr+45% 60Min Winter	56.256	0.00	-0.04
30Yr 120Min Winter	18.005	0.00	-0.08	100Yr+45% 120Min Summer	32.896	0.00	-0.03
30Yr 120Min Summer	18.005	0.00	-0.08	100Yr+45% 120Min Winter	32.896	0.00	0.02
30Yr 180Min Summer	13.254	0.00	-0.07	100Yr+45% 180Min Summer	23.884	0.00	-0.01
30Yr 180Min Winter	13.254	0.00	-0.07	100Yr+45% 180Min Winter	23.884	0.00	0.05
30Yr 240Min Summer	10.708	0.00	-0.07	100Yr+45% 240Min Summer	19.239	0.00	-0.00
30Yr 240Min Winter	10.708	0.00	-0.07	100Yr+45% 240Min Winter	19.239	0.00	0.09
30Yr 360Min Summer	7.873	0.00	-0.06	100Yr+45% 360Min Summer	14.034	0.00	0.01
30Yr 360Min Winter	7.873	0.00	-0.06	100Yr+45% 360Min Winter	14.034	0.00	0.10
30Yr 480Min Summer	6.315	0.00	-0.05	100Yr+45% 480Min Summer	11.201	0.00	0.01
30Yr 480Min Winter	6.315	0.00	-0.05	100Yr+45% 480Min Winter	11.201	0.00	0.10
30Yr 600Min Winter	5.315	0.00	-0.04	100Yr+45% 600Min Summer	9.419	0.00	0.00
30Yr 600Min Summer	5.315	0.00	-0.05	100Yr+45% 600Min Winter	9.419	0.00	0.09
30Yr 720Min Summer	4.612	0.00	-0.04	100Yr+45% 720Min Summer	8.180	0.00	-0.01
30Yr 720Min Winter	4.612	0.00	-0.04	100Yr+45% 720Min Winter	8.180	0.00	0.07
30Yr 960Min Summer	3.688	0.00	-0.03	100Yr+45% 960Min Summer	6.558	0.00	-0.02
30Yr 960Min Winter	3.688	0.00	-0.03	100Yr+45% 960Min Winter	6.558	0.00	0.03
30Yr 1440Min Summer	2.700	0.00	-0.01	100Yr+45% 1440Min Winter	4.842	0.00	-0.01
30Yr 1440Min Winter	2.700	0.00	-0.01	100Yr+45% 1440Min Summer	4.842	0.00	-0.03

Simulation Results

Return Period Yrs: 2.0

Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	15 min Winter	8	36.339	0.041	4.961		OK
S2	15 min Winter	8	36.186	0.058	6.448		OK
S3	15 min Winter	8	36.012	0.057	14.888		OK
S4	15 min Winter	9	34.933	0.059	17.841		OK
S5	15 min Winter	8	33.317	0.104	18.832		OK
S6	15 min Winter	9	33.170	0.140	39.490		OK
S7	15 min Winter	9	32.927	0.157	49.678		OK
S9	15 min Winter	8	36.238	0.088	11.872		OK
S8	15 min Winter	8	36.223	0.067	7.692		OK
S10	15 min Winter	8	36.055	0.070	26.766		OK
S11	15 min Winter	9	32.846	0.201	79.818		OK
S12	15 min Winter	8	33.367	0.062	17.065		OK
S13	15 min Winter	9	32.776	0.186	101.674		OK
S14	15 min Winter	9	32.408	0.160	118.163		OK
S15	15 min Winter	9	31.347	0.238	145.661		OK
S16	15 min Winter	10	31.217	0.257	146.239		OK
S17	15 min Winter	9	32.397	0.052	9.077		OK
S18	15 min Winter	8	31.513	0.113	37.690		OK
S19	15 min Winter	10	31.123	0.288	188.650		OK
S20	15 min Winter	10	31.107	0.292	189.531		OK
S21	15 min Winter	8	36.387	0.082	8.898		OK
S22	15 min Winter	8	36.441	0.076	11.117		OK
S23	15 min Winter	8	36.230	0.070	23.083		OK
S24	15 min Winter	8	35.017	0.072	26.586		OK
S25	15 min Winter	9	33.768	0.078	27.814		OK
S26	15 min Winter	8	33.336	0.056	7.313		OK
S27	15 min Winter	8	33.238	0.068	10.399		OK
S28	15 min Winter	9	32.997	0.118	48.857		OK
S29	15 min Winter	8	32.385	0.089	14.055		OK
S30	15 min Winter	8	32.215	0.125	32.893		OK
S31	15 min Winter	9	31.893	0.110	35.710		OK
S32	15 min Winter	9	31.618	0.135	97.273		OK
S33	15 min Winter	9	31.313	0.223	113.108		OK
S34	15 min Winter	9	31.194	0.164	121.748		OK
S35	15 min Winter	10	31.070	0.375	311.025		OK
S36	15 min Winter	10	31.023	0.378	310.628		OK
S37	15 min Winter	11	30.930	0.385	316.237		OK
S38	15 min Winter	11	30.848	0.393	329.394		OK
S39	15 min Winter	8	35.447	0.090	18.235		OK
S40	15 min Winter	8	35.714	0.067	13.408		OK
S41	15 min Winter	8	35.251	0.081	38.895		OK
S42	15 min Winter	8	32.780	0.055	7.984		OK
S43	15 min Winter	9	32.597	0.112	55.622		OK
S44	15 min Winter	9	31.475	0.114	60.409		OK
S45	15 min Winter	11	30.802	0.392	383.045		OK
S46 - HW	15 min Winter	11	30.712	0.347	375.983		OK
S47	15 min Winter	8	36.474	0.070	9.264		OK
S48	15 min Winter	8	36.387	0.067	7.558		OK
S49	15 min Winter	9	36.200	0.065	22.729		OK
S50	15 min Winter	8	32.996	0.071	22.088		OK
S51	15 min Winter	9	32.418	0.118	49.348		OK
S52	15 min Winter	9	31.705	0.130	63.413		OK
S53	15 min Winter	8	32.732	0.062	15.212		OK
S54	15 min Winter	8	32.168	0.098	18.612		OK
S55	15 min Winter	9	31.969	0.089	20.367		OK
S56	15 min Winter	9	31.599	0.084	21.709		OK
S57	15 min Winter	9	31.408	0.103	23.524		OK
S58	15 min Winter	8	31.470	0.055	8.533		OK
S59	15 min Winter	9	31.356	0.201	105.340		OK

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S60 - HW	15 min Winter	10	30.993	0.193	99.764		OK
S61 - HW	960 min Winter	719	30.371	0.271	14.695		OK
S62	960 min Winter	801	30.404	0.344	15.046		Surcharged
S63	960 min Winter	774	30.007	0.097	14.633		OK
S64	960 min Winter	720	29.686	0.066	14.787		OK
S65	960 min Winter	718	28.182	0.092	14.783		OK
S66	960 min Winter	719	28.063	0.093	14.783		OK
S67	960 min Winter	720	27.897	0.092	14.783		OK
7304 EXIST MH	960 min Winter	720	27.868	0.092	14.783		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Winter	8	S1	S3	0.041	1.258	4.903	0.163	OK
2.000	15 min Winter	8	S2	S3	0.058	1.001	6.364	0.323	OK
1.001	15 min Winter	8	S3	S4	0.058	1.823	14.768	0.141	OK
1.002	15 min Winter	9	S4	S6	0.059	2.174	18.136	0.153	OK
3.000	15 min Winter	8	S5	S6	0.104	1.040	18.676	0.445	OK
1.003	15 min Winter	9	S6	S7	0.140	1.071	40.372	0.310	OK
1.004	15 min Winter	9	S7	S11	0.179	0.843	49.677	0.273	OK
4.000	15 min Winter	8	S9	S10	0.088	1.084	11.710	0.657	OK
5.000	15 min Winter	8	S8	S10	0.067	0.997	7.584	0.413	OK
4.001	15 min Winter	8	S10	S11	0.070	2.508	26.246	0.211	OK
1.005	15 min Winter	9	S11	S13	0.193	1.231	80.278	0.471	OK
6.000	15 min Winter	8	S12	S13	0.062	1.915	16.935	0.166	OK
1.006	15 min Winter	9	S13	S14	0.173	1.808	101.688	0.365	OK
1.007	15 min Winter	9	S14	S15	0.160	2.312	116.272	0.279	OK
1.008	15 min Winter	9	S15	S16	0.236	1.303	144.540	0.282	OK
1.009	15 min Winter	10	S16	S19	0.272	1.032	149.570	0.268	OK
7.000	15 min Winter	9	S17	S18	0.052	1.130	9.310	0.068	OK
7.001	15 min Winter	9	S18	S19	0.113	1.191	37.073	0.144	OK
1.010	15 min Winter	10	S19	S20	0.290	1.205	188.252	0.309	OK
1.011	15 min Winter	10	S20	S35	0.334	1.010	188.357	0.294	OK
8.000	15 min Winter	8	S21	S23	0.082	0.884	8.747	0.588	OK
9.000	15 min Winter	8	S22	S23	0.076	1.215	10.984	0.520	OK
8.001	15 min Winter	8	S23	S24	0.071	2.126	22.917	0.216	OK
8.002	15 min Winter	9	S24	S25	0.075	2.284	26.298	0.223	OK
8.003	15 min Winter	9	S25	S28	0.078	2.298	28.105	0.262	OK
10.000	15 min Winter	8	S26	S27	0.062	0.809	7.242	0.138	OK
10.001	15 min Winter	9	S27	S28	0.068	0.997	10.182	0.205	OK
8.004	15 min Winter	9	S28	S32	0.118	1.907	49.328	0.336	OK
11.000	15 min Winter	8	S29	S30	0.089	0.939	13.755	0.338	OK
11.001	15 min Winter	9	S30	S31	0.125	1.169	32.275	0.370	OK
11.002	15 min Winter	9	S31	S32	0.110	1.201	36.238	0.137	OK
8.005	15 min Winter	9	S32	S33	0.179	1.373	97.448	0.117	OK
8.006	15 min Winter	9	S33	S34	0.194	1.487	115.969	0.351	OK
8.007	15 min Winter	10	S34	S35	0.228	1.499	119.469	0.164	OK
1.012	15 min Winter	10	S35	S36	0.376	1.399	310.628	0.525	OK
1.013	15 min Winter	11	S36	S37	0.381	1.381	308.999	0.520	OK
1.014	15 min Winter	11	S37	S38	0.389	1.388	321.100	0.555	OK
1.015	15 min Winter	11	S38	S45	0.392	1.418	331.792	0.572	OK
12.000	15 min Winter	8	S39	S41	0.090	1.224	18.042	0.339	OK
13.000	15 min Winter	8	S40	S41	0.067	1.745	13.295	0.412	OK
12.001	15 min Winter	8	S41	S43	0.096	1.968	38.501	0.161	OK
14.000	15 min Winter	8	S42	S43	0.055	1.035	7.879	0.135	OK
12.002	15 min Winter	9	S43	S44	0.112	2.347	56.767	0.306	OK
12.003	15 min Winter	9	S44	S45	0.114	2.155	60.910	0.206	OK
1.016	15 min Winter	11	S45	S46 - HW	0.369	1.771	375.983	0.654	OK
1.017	15 min Winter	12	S46 - HW	S61 - HW	0.192	4.328	383.071	0.456	OK
15.000	15 min Winter	8	S47	S49	0.069	1.139	9.117	0.442	OK
16.000	15 min Winter	8	S48	S49	0.067	0.981	7.441	0.411	OK
15.001	15 min Winter	9	S49	S51	0.065	2.428	23.158	0.185	OK
17.000	15 min Winter	8	S50	S51	0.095	1.149	21.912	0.127	OK
15.002	15 min Winter	9	S51	S52	0.118	1.933	50.154	0.338	OK
15.003	15 min Winter	9	S52	S59	0.166	1.361	63.701	0.267	OK

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
18.000	15 min Winter	8	S53	S54	0.080	1.190	15.101	0.168	OK
18.001	15 min Winter	8	S54	S55	0.093	1.172	18.270	0.396	OK
18.002	15 min Winter	9	S55	S56	0.089	1.408	20.710	0.339	OK
18.003	15 min Winter	9	S56	S57	0.094	1.158	21.777	0.177	OK
18.004	15 min Winter	9	S57	S59	0.114	1.054	23.645	0.232	OK
19.000	15 min Winter	8	S58	S59	0.055	1.116	8.450	0.134	OK
15.004	15 min Winter	9	S59	S60 - HW	0.201	1.757	106.021	0.582	OK
15.005	15 min Winter	10	S60 - HW	S61 - HW	0.193	1.436	103.388	0.301	OK
1.018	960 min Winter	823	S61 - HW	S62	0.305	0.324	49.769	0.069	OK
1.019	960 min Winter	792	S62	S63	0.095	0.966	15.428	0.371	OK
1.020	960 min Winter	722	S63	S64	0.081	1.146	14.790	0.367	OK
1.021	960 min Winter	720	S64	S65	0.079	1.189	14.786	0.189	OK
1.022	960 min Winter	718	S65	S66	0.093	0.957	14.784	0.359	OK
1.023	960 min Winter	719	S66	S67	0.093	0.955	14.783	0.367	OK
1.024	960 min Winter	720	S67	7304 EXIST	0.092	0.960	14.783	0.362	OK

Return Period Yrs: 30.0

Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	15 min Winter	8	36.367	0.069	13.328		OK
S2	15 min Winter	8	36.235	0.107	17.324		OK
S3	15 min Winter	8	36.051	0.096	40.043		OK
S4	15 min Winter	8	34.975	0.100	49.528		OK
S5	15 min Winter	8	33.410	0.197	50.595		OK
S6	15 min Winter	8	33.281	0.251	109.053		OK
S7	15 min Winter	9	33.076	0.306	133.512		OK
S9	15 min Winter	9	36.470	0.320	30.023		Surcharged
S8	15 min Winter	8	36.292	0.137	20.663		OK
S10	15 min Winter	8	36.105	0.120	70.431		OK
S11	15 min Winter	9	33.023	0.378	214.235		OK
S12	15 min Winter	8	33.410	0.105	45.847		OK
S13	15 min Winter	9	32.934	0.344	271.367		OK
S14	15 min Winter	9	32.533	0.284	314.527		OK
S15	15 min Winter	10	31.561	0.452	372.349		OK
S16	15 min Winter	11	31.546	0.586	328.587		OK
S17	15 min Winter	8	32.431	0.086	25.870		OK
S18	15 min Winter	8	31.593	0.193	101.729		OK
S19	15 min Winter	11	31.517	0.682	414.662		OK
S20	15 min Winter	11	31.511	0.696	437.133		OK
S21	15 min Winter	8	36.531	0.226	23.906		Surcharged
S22	15 min Winter	8	36.608	0.243	29.866		Surcharged
S23	15 min Winter	9	36.281	0.121	60.384		OK
S24	15 min Winter	9	35.069	0.124	69.905		OK
S25	15 min Winter	9	33.827	0.137	74.592		OK
S26	15 min Winter	8	33.377	0.097	19.649		OK
S27	15 min Winter	8	33.289	0.119	27.973		OK
S28	15 min Winter	9	33.097	0.217	130.274		OK
S29	15 min Winter	8	32.462	0.166	37.757		OK
S30	15 min Winter	8	32.327	0.237	88.582		OK
S31	15 min Winter	8	31.968	0.185	96.770		OK
S32	15 min Winter	9	31.714	0.231	260.171		OK
S33	15 min Winter	10	31.503	0.413	275.457		OK
S34	15 min Winter	10	31.479	0.449	282.390		OK
S35	15 min Winter	11	31.469	0.774	718.399		Surcharged
S36	15 min Winter	11	31.403	0.758	728.011		Surcharged
S37	15 min Winter	11	31.276	0.731	751.146		OK
S38	15 min Winter	10	31.157	0.702	768.707		OK
S39	15 min Winter	8	35.524	0.167	48.990		OK
S40	15 min Winter	9	35.832	0.185	33.907		Surcharged
S41	15 min Winter	8	35.306	0.136	102.954		OK
S42	15 min Winter	8	32.819	0.094	21.449		OK
S43	15 min Winter	8	32.688	0.203	153.640		OK
S44	15 min Winter	9	31.555	0.194	160.532		OK
S45	15 min Winter	10	31.090	0.680	937.945		OK
S46 - HW	15 min Winter	10	30.979	0.614	942.185		OK
S47	15 min Winter	9	36.592	0.188	23.426		Surcharged
S48	15 min Winter	8	36.456	0.136	20.304		OK
S49	15 min Winter	9	36.245	0.110	61.146		OK
S50	15 min Winter	8	33.044	0.119	59.339		OK
S51	15 min Winter	9	32.518	0.218	131.631		OK
S52	15 min Winter	9	31.871	0.296	168.901		OK
S53	15 min Winter	8	32.775	0.105	40.869		OK
S54	15 min Winter	8	32.259	0.189	50.081		OK
S55	15 min Winter	9	32.045	0.165	54.637		OK
S56	15 min Winter	9	31.769	0.254	57.936		OK
S57	15 min Winter	9	31.741	0.436	59.882		Surcharged
S58	15 min Winter	9	31.727	0.312	21.577		Surcharged
S59	15 min Winter	9	31.716	0.561	273.738		Surcharged
S60 - HW	15 min Winter	10	31.140	0.340	268.881		OK
S61 - HW	960 min Winter	785	30.623	0.523	17.722		OK
S62	960 min Winter	800	30.699	0.639	24.178		Surcharged
S63	240 min Winter	191	30.014	0.104	16.983		OK

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S64	240 min Winter	192	29.691	0.071	16.983		OK
S65	240 min Winter	192	28.190	0.100	16.983		OK
S66	240 min Winter	193	28.071	0.101	16.983		OK
S67	240 min Winter	193	27.905	0.100	16.983		OK
7304 EXIST MH	240 min Winter	193	27.875	0.100	16.983		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Winter	8	S1	S3	0.069	1.654	13.212	0.439	OK
2.000	15 min Winter	8	S2	S3	0.107	1.266	17.105	0.867	OK
1.001	15 min Winter	8	S3	S4	0.098	2.394	39.802	0.381	OK
1.002	15 min Winter	8	S4	S6	0.101	2.846	48.964	0.414	OK
3.000	15 min Winter	8	S5	S6	0.192	1.393	50.266	1.197	OK
1.003	15 min Winter	9	S6	S7	0.247	1.410	108.545	0.833	OK
1.004	15 min Winter	9	S7	S11	0.342	1.033	133.787	0.736	OK
4.000	15 min Winter	9	S9	S10	0.150	1.738	30.713	1.724	Surcharged
5.000	15 min Winter	8	S8	S10	0.133	1.222	20.247	1.102	OK
4.001	15 min Winter	9	S10	S11	0.136	3.147	69.907	0.561	OK
1.005	15 min Winter	9	S11	S13	0.361	1.565	214.141	1.257	OK
6.000	15 min Winter	9	S12	S13	0.110	2.514	45.580	0.447	OK
1.006	15 min Winter	9	S13	S14	0.314	2.278	270.325	0.971	OK
1.007	15 min Winter	9	S14	S15	0.284	2.965	312.677	0.750	OK
1.008	15 min Winter	11	S15	S16	0.480	1.706	387.689	0.755	OK
1.009	15 min Winter	11	S16	S19	0.634	1.144	363.567	0.651	OK
7.000	15 min Winter	8	S17	S18	0.086	1.507	25.099	0.183	OK
7.001	15 min Winter	10	S18	S19	0.273	1.494	99.969	0.387	OK
1.010	15 min Winter	11	S19	S20	0.689	1.297	440.982	0.723	OK
1.011	15 min Winter	12	S20	S35	0.723	1.105	445.188	0.695	OK
8.000	15 min Winter	9	S21	S23	0.143	1.330	23.081	1.551	OK
9.000	15 min Winter	9	S22	S23	0.146	1.642	28.827	1.364	OK
8.001	15 min Winter	9	S23	S24	0.122	2.747	60.626	0.571	OK
8.002	15 min Winter	9	S24	S25	0.131	2.939	70.277	0.595	OK
8.003	15 min Winter	9	S25	S28	0.140	2.910	74.897	0.698	OK
10.000	15 min Winter	8	S26	S27	0.108	1.035	19.492	0.373	OK
10.001	15 min Winter	9	S27	S28	0.130	1.224	27.575	0.556	OK
8.004	15 min Winter	9	S28	S32	0.217	2.400	131.650	0.896	OK
11.000	15 min Winter	8	S29	S30	0.164	1.196	37.169	0.912	OK
11.001	15 min Winter	8	S30	S31	0.233	1.484	86.978	0.998	OK
11.002	15 min Winter	9	S31	S32	0.184	1.584	97.110	0.368	OK
8.005	15 min Winter	10	S32	S33	0.317	1.811	260.477	0.313	OK
8.006	15 min Winter	10	S33	S34	0.431	1.818	302.501	0.916	OK
8.007	15 min Winter	10	S34	S35	0.524	1.591	306.965	0.421	OK
1.012	15 min Winter	11	S35	S36	0.750	1.683	728.011	1.230	Surcharged
1.013	15 min Winter	11	S36	S37	0.740	1.664	731.807	1.230	OK
1.014	15 min Winter	11	S37	S38	0.715	1.764	753.782	1.304	OK
1.015	15 min Winter	11	S38	S45	0.691	1.885	782.353	1.349	OK
12.000	15 min Winter	8	S39	S41	0.166	1.538	48.485	0.911	OK
13.000	15 min Winter	9	S40	S41	0.150	2.087	34.218	1.059	Surcharged
12.001	15 min Winter	8	S41	S43	0.169	2.501	102.876	0.430	OK
14.000	15 min Winter	8	S42	S43	0.111	1.203	21.291	0.365	OK
12.002	15 min Winter	9	S43	S44	0.202	2.983	150.760	0.813	OK
12.003	15 min Winter	10	S44	S45	0.279	2.669	160.988	0.545	OK
1.016	15 min Winter	10	S45	S46 - HW	0.647	2.326	942.185	1.640	OK
1.017	960 min Winter	790	S46 - HW	S61 - HW	0.390	1.246	77.081	0.092	OK
15.000	15 min Winter	9	S47	S49	0.144	1.370	23.844	1.155	OK
16.000	15 min Winter	8	S48	S49	0.132	1.206	19.847	1.097	OK
15.001	15 min Winter	9	S49	S51	0.127	2.873	61.498	0.491	OK
17.000	15 min Winter	8	S50	S51	0.168	1.463	58.996	0.341	OK
15.002	15 min Winter	9	S51	S52	0.219	2.411	133.330	0.898	OK
15.003	15 min Winter	9	S52	S59	0.335	1.630	167.709	0.703	OK
18.000	15 min Winter	8	S53	S54	0.147	1.487	40.649	0.451	OK
18.001	15 min Winter	8	S54	S55	0.176	1.467	49.016	1.064	OK
18.002	15 min Winter	9	S55	S56	0.172	1.755	55.255	0.905	OK
18.003	15 min Winter	10	S56	S57	0.277	1.286	55.207	0.448	OK

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
18.004	15 min Winter	11	S57	S59	0.300	1.065	61.796	0.606	Surcharged
19.000	15 min Winter	9	S58	S59	0.225	1.161	20.606	0.327	OK
15.004	15 min Winter	9	S59	S60 - HW	0.364	2.463	269.617	1.479	OK
15.005	15 min Winter	10	S60 - HW	S61 - HW	0.339	1.830	269.180	0.785	OK
1.018	960 min Winter	800	S61 - HW	S62	0.581	0.395	119.917	0.166	OK
1.019	240 min Winter	191	S62	S63	0.102	0.979	16.983	0.409	OK
1.020	240 min Winter	192	S63	S64	0.087	1.189	16.983	0.421	OK
1.021	240 min Winter	192	S64	S65	0.085	1.233	16.983	0.217	OK
1.022	240 min Winter	193	S65	S66	0.100	0.993	16.983	0.413	OK
1.023	240 min Winter	193	S66	S67	0.100	0.991	16.983	0.422	OK
1.024	240 min Winter	193	S67	7304 EXIST	0.100	0.997	16.983	0.415	OK

Return Period Yrs: 100.0

Climate Change %: 0

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	15 min Winter	8	36.378	0.080	16.946		OK
S2	15 min Winter	8	36.265	0.137	22.026		OK
S3	15 min Winter	8	36.064	0.109	50.799		OK
S4	15 min Winter	8	34.989	0.115	62.884		OK
S5	15 min Winter	8	33.460	0.247	64.329		Surcharged
S6	15 min Winter	9	33.356	0.326	133.956		OK
S7	15 min Winter	9	33.218	0.448	163.473		OK
S9	15 min Winter	9	36.630	0.480	38.150		Surcharged
S8	15 min Winter	8	36.375	0.219	26.273		Surcharged
S10	15 min Winter	9	36.124	0.139	88.386		OK
S11	15 min Winter	9	33.129	0.484	265.516		Surcharged
S12	15 min Winter	8	33.426	0.121	58.293		OK
S13	15 min Winter	9	33.016	0.426	337.618		OK
S14	15 min Winter	10	32.601	0.353	375.071		OK
S15	15 min Winter	11	31.964	0.855	400.876		Surcharged
S16	15 min Winter	11	31.925	0.965	406.819		Surcharged
S17	15 min Winter	8	32.443	0.098	32.893		OK
S18	15 min Winter	11	31.872	0.472	77.129		Surcharged
S19	15 min Winter	11	31.867	1.032	519.085		Surcharged
S20	15 min Winter	11	31.854	1.039	533.158		Surcharged
S21	15 min Winter	9	36.633	0.328	28.593		Surcharged
S22	15 min Winter	9	36.765	0.400	35.722		Surcharged
S23	15 min Winter	9	36.301	0.141	76.651		OK
S24	15 min Winter	9	35.090	0.145	88.687		OK
S25	15 min Winter	9	33.853	0.163	94.541		OK
S26	15 min Winter	8	33.393	0.113	24.983		OK
S27	15 min Winter	8	33.310	0.140	35.593		OK
S28	15 min Winter	9	33.169	0.290	165.198		OK
S29	15 min Winter	9	32.578	0.282	45.161		Surcharged
S30	15 min Winter	9	32.419	0.329	107.650		Surcharged
S31	15 min Winter	9	31.992	0.209	120.879		OK
S32	15 min Winter	11	31.820	0.337	246.619		OK
S33	15 min Winter	11	31.852	0.762	291.624		Surcharged
S34	15 min Winter	11	31.818	0.788	309.250		Surcharged
S35	15 min Winter	11	31.781	1.086	875.439		Surcharged
S36	15 min Winter	11	31.686	1.041	876.847		Surcharged
S37	15 min Winter	11	31.490	0.945	898.734		Surcharged
S38	15 min Winter	11	31.295	0.840	925.368		Surcharged
S39	15 min Winter	8	35.577	0.220	62.289		OK
S40	15 min Winter	9	36.063	0.415	43.086		Surcharged
S41	15 min Winter	9	35.325	0.155	128.785		OK
S42	15 min Winter	8	32.835	0.110	27.272		OK
S43	15 min Winter	9	32.730	0.245	189.892		OK
S44	15 min Winter	9	31.593	0.232	205.018		OK
S45	15 min Winter	10	31.189	0.779	1095.538		Surcharged
S46 - HW	15 min Winter	11	31.051	0.686	1101.608		OK
S47	15 min Winter	9	36.751	0.347	29.769		Surcharged
S48	15 min Winter	9	36.545	0.225	24.285		Surcharged
S49	15 min Winter	9	36.262	0.127	77.245		OK
S50	15 min Winter	8	33.061	0.136	75.447		OK
S51	15 min Winter	10	32.788	0.488	146.106		Surcharged
S52	15 min Winter	10	32.140	0.565	189.806		Surcharged
S53	15 min Winter	9	32.796	0.126	48.883		OK
S54	15 min Winter	10	32.492	0.422	51.417		Surcharged
S55	15 min Winter	10	32.247	0.367	60.104		Surcharged
S56	15 min Winter	10	31.974	0.459	63.228		Surcharged
S57	15 min Winter	10	31.920	0.615	68.342		Surcharged
S58	15 min Winter	10	31.901	0.486	22.907		Surcharged
S59	15 min Winter	10	31.887	0.732	311.428		Surcharged
S60 - HW	15 min Winter	10	31.176	0.376	312.482		OK
S61 - HW	1440 min Winter	1161	30.755	0.655	17.953		OK
S62	960 min Winter	838	30.796	0.736	12.010		Surcharged
S63	120 min Winter	85	30.014	0.104	16.983		OK

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S64	180 min Summer	129	29.691	0.071	16.983		OK
S65	180 min Summer	130	28.190	0.100	16.983		OK
S66	180 min Summer	131	28.071	0.101	16.983		OK
S67	180 min Summer	131	27.905	0.100	16.983		OK
7304 EXIST MH	180 min Summer	131	27.875	0.100	16.983		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Winter	8	S1	S3	0.080	1.756	16.806	0.559	OK
2.000	15 min Winter	8	S2	S3	0.135	1.290	21.627	1.097	OK
1.001	15 min Winter	8	S3	S4	0.112	2.546	50.518	0.484	OK
1.002	15 min Winter	9	S4	S6	0.145	2.767	62.286	0.527	OK
3.000	15 min Winter	8	S5	S6	0.214	1.637	63.961	1.523	OK
1.003	15 min Winter	9	S6	S7	0.349	1.409	134.681	1.033	OK
1.004	15 min Winter	10	S7	S11	0.449	1.042	163.714	0.901	OK
4.000	15 min Winter	9	S9	S10	0.150	2.209	39.036	2.192	Surcharged
5.000	15 min Winter	8	S8	S10	0.145	1.455	25.403	1.383	OK
4.001	15 min Winter	9	S10	S11	0.182	3.138	88.808	0.713	OK
1.005	15 min Winter	9	S11	S13	0.438	1.679	264.913	1.555	OK
6.000	15 min Winter	9	S12	S13	0.159	2.557	58.090	0.570	OK
1.006	15 min Winter	9	S13	S14	0.380	2.343	334.855	1.203	OK
1.007	15 min Winter	10	S14	S15	0.401	3.013	389.474	0.934	OK
1.008	15 min Winter	10	S15	S16	0.675	1.719	457.233	0.891	Surcharged
1.009	15 min Winter	10	S16	S19	0.750	1.165	442.200	0.792	Surcharged
7.000	15 min Winter	10	S17	S18	0.194	1.609	32.004	0.233	OK
7.001	15 min Winter	10	S18	S19	0.450	1.513	128.573	0.498	OK
1.010	15 min Winter	11	S19	S20	0.750	1.313	529.955	0.869	Surcharged
1.011	15 min Winter	11	S20	S35	0.750	1.219	538.474	0.841	Surcharged
8.000	15 min Winter	9	S21	S23	0.147	1.668	29.316	1.970	OK
9.000	15 min Winter	9	S22	S23	0.150	2.069	36.563	1.730	Surcharged
8.001	15 min Winter	9	S23	S24	0.143	2.896	76.897	0.724	OK
8.002	15 min Winter	9	S24	S25	0.154	3.084	89.057	0.754	OK
8.003	15 min Winter	9	S25	S28	0.189	2.906	94.844	0.884	OK
10.000	15 min Winter	8	S26	S27	0.126	1.080	24.809	0.474	OK
10.001	15 min Winter	9	S27	S28	0.175	1.228	35.392	0.713	OK
8.004	15 min Winter	9	S28	S32	0.288	2.450	161.267	1.098	OK
11.000	15 min Winter	9	S29	S30	0.225	1.173	46.154	1.133	OK
11.001	15 min Winter	9	S30	S31	0.277	1.600	109.168	1.252	OK
11.002	15 min Winter	9	S31	S32	0.209	1.677	121.623	0.461	OK
8.005	15 min Winter	11	S32	S33	0.469	1.895	320.749	0.385	OK
8.006	15 min Winter	9	S33	S34	0.600	1.937	348.676	1.056	Surcharged
8.007	15 min Winter	10	S34	S35	0.600	1.606	337.651	0.463	Surcharged
1.012	15 min Winter	11	S35	S36	0.750	1.985	876.847	1.481	Surcharged
1.013	15 min Winter	11	S36	S37	0.750	1.979	874.141	1.470	Surcharged
1.014	15 min Winter	12	S37	S38	0.750	2.037	899.718	1.556	Surcharged
1.015	15 min Winter	12	S38	S45	0.750	2.097	926.532	1.597	Surcharged
12.000	15 min Winter	8	S39	S41	0.210	1.580	60.965	1.145	OK
13.000	15 min Winter	9	S40	S41	0.150	2.477	43.776	1.355	Surcharged
12.001	15 min Winter	9	S41	S43	0.200	2.577	128.834	0.539	OK
14.000	15 min Winter	8	S42	S43	0.140	1.211	27.254	0.468	OK
12.002	15 min Winter	9	S43	S44	0.272	3.066	192.602	1.039	OK
12.003	15 min Winter	9	S44	S45	0.303	2.636	204.488	0.692	OK
1.016	15 min Winter	11	S45	S46 - HW	0.718	2.560	1101.608	1.917	OK
1.017	1440 min Winter	1163	S46 - HW	S61 - HW	0.523	1.166	69.798	0.083	OK
15.000	15 min Winter	9	S47	S49	0.147	1.695	29.815	1.444	OK
16.000	15 min Winter	9	S48	S49	0.144	1.427	24.908	1.376	OK
15.001	15 min Winter	9	S49	S51	0.176	2.794	77.517	0.619	OK
17.000	15 min Winter	8	S50	S51	0.218	1.529	75.053	0.434	OK
15.002	15 min Winter	10	S51	S52	0.300	2.422	152.042	1.024	Surcharged
15.003	15 min Winter	10	S52	S59	0.375	1.734	191.464	0.803	Surcharged
18.000	15 min Winter	9	S53	S54	0.175	1.576	51.707	0.574	OK
18.001	15 min Winter	8	S54	S55	0.225	1.459	58.024	1.259	OK
18.002	15 min Winter	10	S55	S56	0.225	1.768	60.381	0.989	OK
18.003	15 min Winter	11	S56	S57	0.300	1.267	64.740	0.525	Surcharged

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
18.004	15 min Winter	12	S57	S59	0.300	1.089	72.629	0.712	Surcharged
19.000	15 min Winter	9	S58	S59	0.225	1.184	26.059	0.414	OK
15.004	15 min Winter	10	S59	S60 - HW	0.375	2.829	312.482	1.714	Surcharged
15.005	15 min Winter	11	S60 - HW	S61 - HW	0.376	1.872	310.620	0.906	OK
1.018	960 min Winter	838	S61 - HW	S62	0.694	0.395	116.795	0.162	OK
1.019	480 min Summer	278	S62	S63	0.102	0.978	16.983	0.409	OK
1.020	180 min Summer	129	S63	S64	0.087	1.189	16.983	0.421	OK
1.021	180 min Summer	130	S64	S65	0.085	1.233	16.983	0.217	OK
1.022	180 min Summer	130	S65	S66	0.100	0.993	16.983	0.413	OK
1.023	180 min Summer	131	S66	S67	0.100	0.991	16.983	0.422	OK
1.024	180 min Summer	131	S67	7304 EXIST	0.100	0.997	16.983	0.415	OK

Return Period Yrs: 100.0

Climate Change %: 45

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S1	15 min Winter	8	36.400	0.102	24.539		OK
S2	15 min Winter	9	36.411	0.284	30.083		Surcharged
S3	15 min Winter	8	36.091	0.136	72.660		OK
S4	15 min Winter	9	35.036	0.162	88.261		OK
S5	15 min Winter	10	34.286	1.073	73.413		Surcharged
S6	15 min Winter	11	34.208	1.178	130.553		Surcharged
S7	15 min Winter	11	34.027	1.257	166.800		Surcharged
S9	15 min Winter	9	37.076	0.926	55.388		Surcharged
S8	15 min Winter	9	36.582	0.426	35.883		Surcharged
S10	15 min Winter	10	36.295	0.310	111.203		Surcharged
S11	15 min Winter	11	33.934	1.289	291.173		Surcharged
S12	15 min Winter	11	33.902	0.597	48.980		Surcharged
S13	15 min Winter	11	33.791	1.201	354.022		Surcharged
S14	15 min Winter	11	33.284	1.036	403.430		Surcharged
S15	15 min Winter	11	32.500	1.391	490.654		Surcharged
S16	15 min Winter	11	32.444	1.484	498.050		Surcharged
S17	15 min Winter	8	32.464	0.119	47.631		OK
S18	15 min Winter	11	32.392	0.992	111.725		Surcharged
S19	15 min Winter	11	32.361	1.526	622.437		Surcharged
S20	15 min Winter	11	32.343	1.528	621.012		Surcharged
S21	15 min Winter	9	36.932	0.627	41.512		Surcharged
S22	15 min Winter	9	37.171	0.806	51.862		Surcharged
S23	15 min Winter	10	36.491	0.331	97.019		Surcharged
S24	15 min Winter	11	35.535	0.590	102.575		Surcharged
S25	15 min Winter	11	34.585	0.895	109.246		Surcharged
S26	15 min Winter	11	33.953	0.673	20.992		Surcharged
S27	15 min Winter	11	33.937	0.767	30.725		Surcharged
S28	15 min Winter	11	33.856	0.977	171.727		Surcharged
S29	15 min Winter	9	33.020	0.724	65.567		Surcharged
S30	15 min Winter	10	32.752	0.662	132.025		Surcharged
S31	15 min Winter	11	32.452	0.669	122.329		Surcharged
S32	15 min Winter	11	32.429	0.945	329.998		Surcharged
S33	15 min Winter	11	32.376	1.286	376.799		Surcharged
S34	15 min Winter	11	32.310	1.280	393.493		Surcharged
S35	15 min Winter	11	32.245	1.550	1045.268		Surcharged
S36	15 min Winter	11	32.111	1.466	1038.524		Surcharged
S37	15 min Winter	11	31.847	1.302	1067.852		Surcharged
S38	15 min Winter	11	31.580	1.125	1101.910		Surcharged
S39	15 min Winter	8	35.773	0.416	90.198		Surcharged
S40	15 min Winter	9	36.667	1.020	62.553		Surcharged
S41	15 min Winter	9	35.367	0.197	183.966		OK
S42	15 min Winter	10	33.488	0.763	31.123		Surcharged
S43	15 min Winter	10	33.443	0.958	242.259		Surcharged
S44	15 min Winter	11	31.840	0.479	239.344		Surcharged
S45	15 min Winter	11	31.437	1.027	1363.107		Surcharged
S46 - HW	15 min Winter	11	31.217	0.852	1358.464		Surcharged
S47	15 min Winter	9	37.167	0.763	43.218		Surcharged
S48	15 min Winter	9	36.783	0.463	35.257		Surcharged
S49	15 min Winter	9	36.312	0.177	111.163		OK
S50	15 min Winter	10	33.890	0.965	86.100		Surcharged
S51	15 min Winter	10	33.757	1.457	208.187		Surcharged
S52	15 min Winter	10	32.671	1.096	251.024		Surcharged
S53	15 min Winter	10	33.462	0.792	59.300		Surcharged
S54	15 min Winter	10	33.215	1.145	73.040		Surcharged
S55	15 min Winter	11	32.812	0.932	73.566		Surcharged
S56	15 min Winter	11	32.377	0.862	79.250		Surcharged
S57	15 min Winter	10	32.293	0.988	83.701		Surcharged
S58	15 min Winter	10	32.273	0.858	33.261		Surcharged
S59	15 min Winter	10	32.246	1.091	402.956		Surcharged
S60 - HW	15 min Winter	11	31.286	0.486	397.881		OK
S61 - HW	1440 min Winter	1344	31.081	0.981	15.758		Surcharged
S62	1440 min Winter	1363	31.099	1.039	18.106		Surcharged
S63	60 min Winter	39	30.014	0.104	16.982		OK

Manholes

Manhole	Critical Storm	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Flood (m3)	Status
S64	720 min Winter	340	29.691	0.071	16.983		OK
S65	720 min Winter	341	28.190	0.100	16.983		OK
S66	720 min Winter	342	28.071	0.101	16.983		OK
S67	720 min Winter	342	27.905	0.100	16.983		OK
7304 EXIST MH	720 min Winter	342	27.875	0.100	16.983		Outfall

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
1.000	15 min Winter	8	S1	S3	0.102	1.903	24.332	0.809	OK
2.000	15 min Winter	9	S2	S3	0.150	1.742	30.789	1.561	Surcharged
1.001	15 min Winter	9	S3	S4	0.149	2.728	72.176	0.691	OK
1.002	15 min Winter	9	S4	S6	0.194	2.781	87.410	0.740	OK
3.000	15 min Winter	8	S5	S6	0.225	2.145	85.302	2.031	OK
1.003	15 min Winter	9	S6	S7	0.375	1.471	162.495	1.246	Surcharged
1.004	15 min Winter	8	S7	S11	0.450	1.132	180.089	0.991	OK
4.000	15 min Winter	9	S9	S10	0.150	3.152	55.702	3.127	Surcharged
5.000	15 min Winter	9	S8	S10	0.150	2.058	36.376	1.980	Surcharged
4.001	15 min Winter	9	S10	S11	0.225	3.257	124.286	0.997	OK
1.005	15 min Winter	8	S11	S13	0.450	1.834	291.697	1.712	OK
6.000	15 min Winter	9	S12	S13	0.225	2.528	79.888	0.784	OK
1.006	15 min Winter	8	S13	S14	0.450	2.283	363.133	1.305	OK
1.007	30 min Summer	16	S14	S15	0.450	2.971	404.290	0.970	OK
1.008	15 min Winter	8	S15	S16	0.675	1.756	527.595	1.028	Surcharged
1.009	15 min Winter	10	S16	S19	0.750	1.183	496.567	0.890	Surcharged
7.000	15 min Winter	8	S17	S18	0.210	1.701	47.057	0.342	OK
7.001	15 min Winter	9	S18	S19	0.450	1.566	164.382	0.636	OK
1.010	15 min Winter	10	S19	S20	0.750	1.418	626.510	1.027	Surcharged
1.011	15 min Winter	11	S20	S35	0.750	1.397	617.174	0.964	Surcharged
8.000	15 min Winter	9	S21	S23	0.150	2.346	41.459	2.786	Surcharged
9.000	15 min Winter	9	S22	S23	0.150	2.930	51.778	2.450	Surcharged
8.001	15 min Winter	9	S23	S24	0.225	2.998	107.401	1.011	OK
8.002	15 min Winter	8	S24	S25	0.225	3.094	110.474	0.935	OK
8.003	15 min Winter	8	S25	S28	0.225	2.881	109.662	1.022	OK
10.000	15 min Winter	8	S26	S27	0.225	1.094	33.537	0.641	OK
10.001	15 min Winter	14	S27	S28	0.225	1.233	42.347	0.854	OK
8.004	15 min Winter	11	S28	S32	0.300	2.430	171.800	1.170	Surcharged
11.000	15 min Winter	9	S29	S30	0.225	1.654	65.764	1.614	OK
11.001	15 min Winter	9	S30	S31	0.300	2.166	151.613	1.739	Surcharged
11.002	15 min Winter	9	S31	S32	0.450	1.724	163.342	0.619	OK
8.005	15 min Winter	9	S32	S33	0.600	1.903	363.083	0.436	Surcharged
8.006	15 min Winter	10	S33	S34	0.600	1.948	396.883	1.202	Surcharged
8.007	15 min Winter	10	S34	S35	0.600	1.673	407.873	0.560	Surcharged
1.012	15 min Winter	10	S35	S36	0.750	2.372	1047.825	1.770	Surcharged
1.013	15 min Winter	11	S36	S37	0.750	2.336	1032.131	1.735	Surcharged
1.014	15 min Winter	14	S37	S38	0.750	2.423	1070.292	1.851	Surcharged
1.015	15 min Winter	14	S38	S45	0.750	2.532	1118.530	1.928	Surcharged
12.000	15 min Winter	8	S39	S41	0.225	2.232	88.728	1.667	OK
13.000	15 min Winter	9	S40	S41	0.150	3.518	62.168	1.924	Surcharged
12.001	15 min Winter	9	S41	S43	0.249	2.951	183.912	0.769	OK
14.000	15 min Winter	9	S42	S43	0.225	1.214	32.463	0.557	OK
12.002	15 min Winter	10	S43	S44	0.300	3.418	241.595	1.303	Surcharged
12.003	15 min Winter	10	S44	S45	0.375	2.650	248.875	0.843	Surcharged
1.016	15 min Winter	11	S45	S46 - HW	0.750	3.075	1358.464	2.364	Surcharged
1.017	1440 min Winter	1357	S46 - HW	S61 - HW	0.734	1.285	99.297	0.118	OK
15.000	15 min Winter	9	S47	S49	0.150	2.406	42.521	2.059	Surcharged
16.000	15 min Winter	9	S48	S49	0.150	2.034	35.944	1.986	Surcharged
15.001	15 min Winter	9	S49	S51	0.201	2.955	110.134	0.880	OK
17.000	15 min Winter	8	S50	S51	0.300	1.553	95.287	0.551	Surcharged
15.002	15 min Winter	11	S51	S52	0.300	2.785	196.828	1.326	Surcharged
15.003	15 min Winter	10	S52	S59	0.375	2.241	247.565	1.038	Surcharged
18.000	15 min Winter	8	S53	S54	0.225	1.694	64.533	0.716	OK
18.001	15 min Winter	10	S54	S55	0.225	1.761	70.002	1.519	OK
18.002	15 min Winter	11	S55	S56	0.225	1.917	76.206	1.248	OK
18.003	15 min Winter	12	S56	S57	0.300	1.255	82.897	0.672	Surcharged

Conduits

Pipe No.	Critical Storm	Peak (mins)	US Manhole	DS Manhole	Flow Depth (m)	Max Velocity (m/s)	Max Flow (l/s)	Flow / Capacity	Status
18.004	15 min Winter	15	S57	S59	0.300	1.373	97.031	0.951	Surcharged
19.000	15 min Winter	8	S58	S59	0.225	1.160	37.787	0.600	OK
15.004	15 min Winter	10	S59	S60 - HW	0.375	3.614	399.107	2.189	Surcharged
15.005	15 min Winter	12	S60 - HW	S61 - HW	0.454	1.993	392.699	1.145	OK
1.018	1440 min Winter	825	S61 - HW	S62	0.750	0.355	120.369	0.167	Surcharged
1.019	240 min Winter	124	S62	S63	0.102	0.974	16.983	0.409	OK
1.020	720 min Winter	340	S63	S64	0.087	1.189	16.983	0.421	OK
1.021	720 min Winter	341	S64	S65	0.085	1.233	16.983	0.217	OK
1.022	720 min Winter	341	S65	S66	0.100	0.993	16.983	0.413	OK
1.023	720 min Winter	342	S66	S67	0.100	0.991	16.983	0.422	OK
1.024	720 min Winter	342	S67	7304 EXIST	0.100	0.997	16.983	0.415	OK



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