RLRE Consulting Engineers

Stanton under Bardon - Phase 2

Flood Risk Technical Note & Drainage Strategy

Stanton under Bardon - Phase 2

Flood Risk Technical Note

& Drainage Strategy

For

Allison Homes

27 Jun 2025
REV: P01
P25-518
25518-RLL-25-XX-RP-C-0001

Document History

Prepared by	:	William James
Position	:	Project Engineer
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Position	:	Regional Director
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Revision	:	P01

Revision	Date	Comment	Editor	Checked by
P01	27/06/25	Draft	WJ	PS

Executive Summary

Client	Allison Homes
Planning Authority	Hinckley and Bosworth Borough Council
Lead Local Flood Authority (LLFA)	Leicestershire County Council
Local Sewerage Undertaker	Severn Trent Water
Location	OS GR: E: 446746; N: 310007, Meadow Lane, Stanton-under-Bardon Postcode: LE67 9TL.
Site area	0.88ha
Current land use	Greenfield – consists of open fields and a manège (riding school)
Development Proposals	Demolition of existing buildings and erection of Phase 2 of the development which consists of circa 27 dwellings (Class C3).
Flood Zone (Tidal/Fluvial)	Flood Zone 1 – Low risk
Pluvial Flood Risk	Low risk
Groundwater Flood Risk	Low risk
Infrastructure Flood Risk	Low risk
Existing Surface Water Drainage Regime	Due to the greenfield nature of the site, the existing drainage regime is considered to be limited infiltration before flowing off site to the watercourse adjacent to the eastern boundary.
Existing Foul Water Drainage Regime	Due to the nature of the site the is no foul drainage.
Climate Change Allowance	40%
Proposed Surface Water Strategy	It is proposed that the site will drain via gravity to the south where flows will be directed to the existing attenuation basin within Phase 1. It is noted that

	there is an offline below ground geo-cellular storage tank within the site that will store additional volume.
Proposed Foul Water Strategy	Foul flows will connect to the existing Phase 1 development foul sewer network at manhole F1.

Contents

Appendices

Appendix A - Proposed Site Layout
Appendix B - Topographical Survey
Appendix C - Drainage Strategy Plan
Appendix D - Hydraulic Modelling Results

1 Introduction

1.1 Terms of Reference

1.1.1 Rodgers Leask Ltd has been commissioned by Allison Homes to prepare a Flood Risk Technical Note and Drainage Strategy for the proposed development at Meadow Lane, Stanton-under-Bardon.

1.1.2 This report has been commissioned in support of a planning application to the Local Planning Authority. The application is for the demolition of existing buildings and erection of Phase 2 of the development which consists of circa 27 dwellings (Class C3). A copy of the proposed site layout can be found in **Appendices**

1.1.4 Appendix A.

1.1.5 This report is to solely address the flood risk and drainage for Phase 2 of the development and should be read in conjunction with the Flood Risk Assessment (ref: LE21474-SUB-LE-GEN-XX-RP-CE-FRA01-P1) produced by Link Engineering for Phase 1 to the south of the site.

1.1.6 Leicestershire County Council are the Lead Local Flood Authority (LLFA), responsible for flooding matters in the region. The LLFA have produced a checklist and associated guidance to aid the drainage design of the development and requirements of a planning application. This document has been reviewed as part of the preparation of this report.

1.1.7 The Environment Agency website has been consulted regarding the Flood Zone and the risk of flooding of the site.

1.1.8 This report has been produced on behalf of the client, and no responsibility is accepted to any third party for all or any part. This report should not be relied upon or transferred to any other parties without the express written authorisation of Rodgers Leask Ltd.

1.2 Legislation and Guidance

1.2.1 This report has been prepared in accordance with the Department for Communities and Local Government (DCLG) National Planning Policy Guidance, and the publication 'National Planning Policy Framework' published 27th March 2012, updated most recently on 7th February 2025.

1.2.2 Planning Practice Guidance was published on 29th November 2016 (updated on 14th February 2024). It contains guidance on Flood Risk and Coastal Change.

1.2.3 The latest version of Planning Policy Statement 25 was released on the 29th March 2010 and is now superseded by the NPPF.

1.2.4 NPPF can be downloaded free of charge from the internet at the following link:

http://www.communities.gov.uk/documents/planningandbuilding/pdf/2116950.pdf

1.3 Approach to the Technical Note

1.3.1 This technical note seeks to consider the risks of flooding both to the site and to the wider area as a consequence of the development proposal. This also requires an assessment of the development constraints of the site and the opportunities offered by the existing infrastructure and natural environment in order to propose a strategy by which the site can be developed both economically and

sustainably. This technical note draws upon our investigations regarding the local area.

1.4 Project Team Experience

1.4.1 This report has been prepared by William James, an Engineer with 3 years' experience in the industry and checked by Peter Sparham, a Regional Director with over 20 years' experience in civil engineering and the preparation of Flood Risk Assessments and technical notes.

1.5 Documents Reviewed

- Topographical Survey Drawing, dated 03/01/24.
- British Geological Survey website accessed on 26/05/2025.
- Environment Agency website accessed on 26/05/2025.
- LLFA checklist and LLFA checklist guidance dated October 2018.
- Phase 1 Flood Risk Assessment (ref: LE21474-SUB-LE-GEN-XX-RP-CE-FRA01-P1) dated March 2022.

2 Background Information

2.1 Site Location, Description and Details

2.1.1 Figure 2.1 below indicates the location of the site.

Figure 2.1 Meadow Lane, Stanton-under-Bardon – Site Location Plan

2.1.2 The site, as outlined above in Figure 2.1, has an overall area of approximately 0.88ha and is located off Meadow Lane, Stanton-under-Bardon and is centred at OS GR: E: 446746; N: 310007, with the postcode of LE67 9TL.

2.1.3 The site is bounded by Phase 1 of the development to the south, existing residential dwellings to the west, with agricultural fields and public open space to the north and east of the site.

2.1.4 The site current consists of fields and a manège.

2.1.5 A number of large trees exist along the site boundaries. The majority of the trees are to be retained and are incorporated into the development proposals.

2.1.6 Access to the site is proposed via a highway from Phase 1 of the development from the south of the site.

2.1.7 A topographical survey of the site area has been undertaken and is included in **Appendix B.**

2.1.8 The site generally falls from north west to south east, with levels varying between 167.31 metres above ordnance datum (m AOD) in the far west of the site to

158.72m AOD. It is noted that the parcel to the far west has a higher elevation than the surrounding levels within the site.

2.2 Ground Conditions

2.2.1 A review of the British Geological Survey's Geology Viewer map indicates that the bedrock of the site wholly Edwalton Member – Mudstone. The mapping also shows that there is a superficial deposit of Alluvium – clay, silt, sand and gravel along the eastern boundary and watercourse.

2.2.2 A review of the British Geological Survey's GeoIndex Onshore map indicates that no public borehole records are available within the site boundary, or a relevant radius of the boundary.

2.2.3 A review of Defra's Magic Map data indicates that the site is not located in a Groundwater Source Protection Zone (GSPZ) and is not in a Drinking Water Safeguard Zone.

2.3 Drainage Catchment Context

2.3.1 The site is located within the catchment area of the Rothley Brook, which is located approximately 1.98km to southeast of the site.

2.3.2 The topographical survey does indicate there to be a watercourse adjacent to the eastern site boundary.

2.3.3 There are proposed 300mm diameter surface water and 150mm diameter foul sewers located to the south of the site that are to serve Phase 1 of the development.

2.3.4 Based on the above assessment of the existing flow regime the evidence would indicate that the site currently drains via limited infiltration before flowing eastward to the watercourse via the fall of the natural topography. The proposed drainage strategy for the site should therefore look to mimic this arrangement to reduce the risk of increasing flood risk offsite.

3 Assessment of Flood Risk

3.1 Flood Risk from Fluvial/ Tidal Sources

3.1.1 The site lies in Flood Zone 1 where flooding from rivers and the sea is very unlikely. There is less than a 0.1 per cent (1 in 1000) chance of flooding occurring from fluvial sources in any given year.

Figure 3.1 EA Flood Map for Planning

3.1.2 As such the site is not considered to be at risk of flooding from fluvial sources.

3.2 Development Description and Planning Context

3.2.1 The development proposals are for a residential development of 27 dwellings, including access roads, soft landscaping, and surface water attenuation features. A proposed site layout is included in **Appendices**

3.2.3 Appendix A**.** The design life of the proposed development is considered to be 100 years due to its residential nature.

3.2.4 In accordance with the NPPF Annex 3 Flood Risk Vulnerability Classification (shown below in Figure 3.2), the vulnerability of the development is deemed 'More Vulnerable'.

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.

Figure 3.2 Extract from NPPF Annex 3 "Flood Risk Vulnerability Classification".

3.2.5 Table 2 of the NPPF Planning Practice Guidance (extract below in Figure 3.3) indicates the compatibility of vulnerability classes and flood zones. All forms of development are appropriate in Flood Zone 1 and therefore the proposed development is considered acceptable. [Update red indicator box in figure as appropriate]

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test required	✓	✓	✓
Zone 3a †	Exception Test required †	X	Exception Test required	✓	✓
Zone 3b *	Exception Test required *	X	X	X	✓ *

Figure 3.3 Extract of Table 2 of the NPPF Planning Practice Guidance

3.3 Sequential and Exception Tests

3.3.1 The sequential test is a risk-based assessment within the National Planning Policy Framework which is designed to identify vulnerable types of development and location within areas classified as having low probability of flooding based on the development requirements and available local sites.

3.3.2 As the proposed site is located entirely in Flood Zone 1, it is already located in the lowest probably flood risk zone and therefore the sequential test is passed. As per Figure 3.3 no exception test is required for the site.

3.4 Flood Risk from Pluvial Sources (Surface Water)

3.4.1 A review of the Environment Agency's online flood mapping indicates the vast majority of the site is at very low risk of flooding, less than 1 in 1000 (0.1%).

3.4.2 Mapping of the extent of surface water flood risk is shown in Figure 3.4.

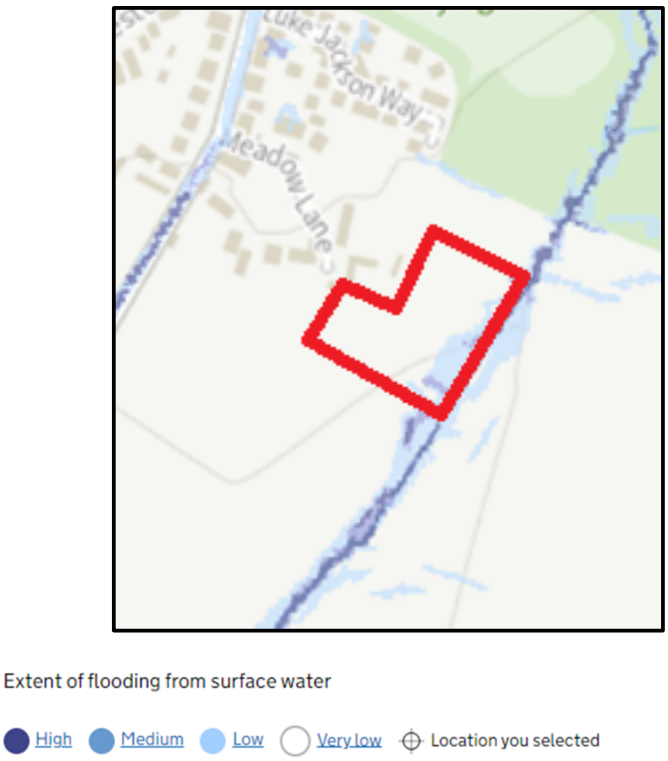


Figure 3.4 EA Surface Water Flood Risk Map

3.4.3 There is a minor amount of medium to low surface water flood risk indicated on the EA mapping, which is attributed to the adjacent watercourse.

3.4.4 All development is proposed outside of the flood extents and therefore the flood risk from pluvial sources is therefore considered to be low.

3.5 Flood Risk from Ground Water

3.5.1 The FRA for Phase 1 of the development refers to the Bosworth Borough Council Level 1 Strategic Flood Risk Assessment (SFRA). The report states that the site is located within an area that has no greater than 50% susceptibility to groundwater flooding.

3.5.2 It is noted that this mapping comprises 1km^2 cells which does not offer a high degree of accuracy and should therefore only be used for high level guidance. Further to this the site is located within the same 1km square as a watercourse which will likely alter the susceptibility percentage.

3.5.3 Based on the available data and the topography of the site, the flood risk to the site from groundwater sources is considered to be low.

3.6 Flood Risk from Infrastructure

3.6.1 The Environment Agency's online flood mapping shows that the site is outside of the area at risk of flooding from reservoirs. An extract of the mapping is shown in Figure 3.5 below.

Figure 3.5 EA Reservoir Flood Risk Map

3.6.2 The nearest Severn Trent Water assets are located within Main Street. It is noted that there are proposed sewers which are associated with Phase 1 of the development.

3.6.3 A review of the topographical levels shows that main street and Phase 1 of the development are located lower than that of those in the site. Any flooding occurring within these areas is unlikely to affect the development.

3.6.4 Given the nature of foul water flows the risk of surcharge and subsequent flooding is considered to be low however, as a mitigation measure to further minimise the risk the site layout has been designed to ensure that flows surcharging from manholes would remain either within the carriageway of proposed roads or directed across soft landscaping and away from properties.

3.6.5 Based on the above, the site is not considered to be at low risk of flooding from the failure of infrastructure.

4 Surface Water Drainage Strategy

4.1 Hierarchy of drainage

4.1.1 In accordance with National Planning Policy Guidance, surface water run-off should be discharged from sites as high up the following hierarchy as practically possible:

1. Discharge into the ground.
2. Discharge to a watercourse
3. Discharge to a surface water sewer
4. Discharge to a combined water sewer

4.1.2 Based on the ground conditions, the proximity of a watercourse and the drainage strategy for Phase 1 of the development; it is understood that infiltration is not a viable method of discharge.

4.1.3 It is therefore proposed that the drainage for this site will connect to the drainage that serves the Phase 1 development and utilise the same outfall to the watercourse located adjacent to the site. No increase in outflow of surface water from the Phase 1 flow control will occur as a result of connecting the Phase 2 development.

4.2 Design considerations

4.2.1 The proposed surface water drainage system has been designed to accommodate the 1 in 2-year rainfall event without any surcharging of the primary conveyancing sewer system.

4.2.2 The proposed surface water drainage system has been designed to accommodate the 1 in 30-year rainfall event without any surface water flooding.

4.2.3 The proposed system has also been designed to accommodate the 1 in 100 year plus climate change storm event on site without flooding any buildings.

4.2.4 Given the residential nature of the proposals a 100-year lifespan is considered applicable to the development.

4.2.5 The climate change allowance has been obtained from the Defra Hydrology Data Explorer. The site falls within the Medway Management Catchment. The 1% AEP upper end allowance for the 2070's epoch, applicable to the development proposals due to the 100-year design life, is 40%. Environment Agency guidance

indicates that the highest value should be used so the 40% climate change allowance has been taken to inform the surface water drainage design.

4.2.6 A 10% allowance for urban creep has been applied to the non-adoptable impermeable areas. This is to provide resilience to the system performance should the urbanisation of proposed soft landscaped areas occur in the future.

4.3 Description of Proposed SuDS

4.3.1 The proposed surface water network consists of a single catchment and is proposed to outfall into the drainage network that serves Phase 1 of the development.

4.3.2 The majority of the flows will attenuate within the attenuation basin within Phase 1; however, due to pipe capacity, additional storage is provided within Phase 2 in the form of a below ground geo-cellular storage tank. This tank has a footprint of 82.5m^2 and a depth of 0.8m which results in an attenuation volume of 66m^3.

4.3.3 A copy of the proposed drainage strategy plan indicating the schematic surface water sewer design and SuDS features can be found in **Appendix C**.

4.4 Water Quantity

4.4.1 The proposed surface water system has been designed to incorporate sufficient attenuation to accommodate rainfall events up to and including the 1 in 100-year plus 40% climate change event. This will minimise the risk flooding within the site and will not exacerbate flood risk to adjacent and downstream properties.

4.4.2 Surface water network modelling has been undertaken to determine the quantity of attenuation required and assess the performance of the system. A full set of the modelling results can be found in **Appendix D**.

4.4.3 The modelling has been based on impermeable areas measured from the site proposals. A summary table of the modelling results can be found in Table 1 below.

SuDS Feature	Imp Area (ha)	Infiltration Area (m^2)	Attenuation Volume (m^3)
Below Ground Geo-Cellular Storage Tank	-	-	66
Phase 1 Attenuation Pond	0.48	-	930
Total	**0.48ha**		**930**

Table 1 – Attenuation Volume Summary

4.4.4 The attenuation pond has been designed with 1 in 3 side slopes and a maximum design water depth of 2.0m. A freeboard above the maximum water level of 0.30m has been allowed for. A maintenance path has been allowed for around the perimeter of the basin.

4.5 Water Quality

4.5.1 To manage the water quality of surface water discharged from the proposed development site and reduce the pollution risk to the receiving watercourse, a water quality assessment has been undertaken.

4.5.2 The three step simple index approach, as outlined in 'The SuDS Manual' Ciria C753 Box 26.2 has been used within this report. This methodology assesses the pollution hazard of the surface water runoff, the treatment provided by the proposed SuDS and the resulting acceptability of the runoff discharged offsite.

4.5.3 Step 1 requires pollution hazard indices to be assigned for the proposed land use as defined in Table 26.2 of Ciria C753. The most onerous proposed land use for the development site has been assessed to be '*individual driveways, residential car parks, low traffic roads and non-residential car parks with infrequent change (schools/offices)*.' The commensurate pollution hazard indices are set out in Table 2.

Land Use	Pollution Hazard Level	Total Suspended Solids	Metals	Hydro-carbons
Residential highways and parking	Low	0.5	0.4	0.4

Table 2 – Pollution hazard indices

4.5.4 Step 2 requires an assessment of the SuDS pollution mitigation index which is compared with the pollution hazard index from step 1. Where flows pass through more than one feature the mitigation index of subsequent SuDS features is halved. These have been set out in Table 3.

SuDS Feature or treatment train	Total Suspended Solids	Metals	Hydro-carbons
Phase 1 Attenuation Pond	0.7	0.7	0.5
Greater than or equal to hazard index?	*Yes*	*Yes*	*Yes*

Table 3 – Pollution mitigation indices

4.5.5 As all treatment combinations provide mitigation indices greater than the hazard indices the proposed surface water drainage strategy is considered to provide sufficient water quality treatment for both catchments prior to disposal off site.

4.6 Proposed Development Levels

4.6.1 It is recommended that FFLs across the site are set a minimum of 150mm above proposed ground levels to provide resilience to surface water flooding.

4.7 Exceedance Flows

4.7.1 The effects of flooding caused by extreme rainfall events beyond those that have been reasonably allowed for, or caused by a blockage, can be mitigated by utilising roads and public open space to retain and direct surface water away from dwellings.

4.7.2 Exceedance routing is shown on the drainage plan that is included in **Appendix C**. This shows the routing to follow the highway to the Phase 1 attenuation pond.

5 Foul Water Drainage Strategy

5.1.1 As stated in Section 2.3, a 150mm diameter foul water sewer is present south of the site and is associated with Phase 1 of the development. In addition to this there is a foul water sewer within Main Street.

5.1.2 It is proposed that foul flows from the site will outfall via gravity to the 150mm foul sewer within Phase 1 development, which ultimately outfalls into the pumping station located adjacent to Thornton Lane. The Phase 1 sewers have been sized to accommodate the foul flows from the development in Phase 2.

5.1.3 A copy of the proposed drainage strategy plan indicating the schematic foul water sewer design and outfall points can be found in **Appendix C**.

6 Drainage Maintenance

6.1 Adoption and Responsibilities

6.1.1 It is proposed for all foul water and surface water sewers are to be offered for adoption by Severn Trent Water under a Section 104 application.

6.1.2 The below ground offline attenuation tank will remain private unless otherwise agreed between Severn Trent Water, the LLFA and the Client. A suitable maintenance company should be appointed to monitor and maintain the private SuDS features.

6.2 Maintenance Requirements

6.2.1 To promote the functioning of the SuDS system in perpetuity a robust inspection and maintenance regime must be adhered to. This should be based on recommendations in Ciria 753.

6.2.2 The maintenance and inspection regime for the geocellular below ground storage tank should include, but not be limited to:

- Remove debris from catchment surface – Monthly.
- Remove debris/sediment from the pre-treatment structure – Annually, or as required.
- Inspect/check all inlets, outlets, and vents to ensure they are in good condition and operating at intended – Annually.
- Survey inside of the tank for sediment build-up and remove if necessary – Every 5 years or as required.

7 Mitigation and Management of Residual Risks

7.1 Access to and Egress from the site

7.1.1 Access to and egress from the site can be taken from the south to the Phase 1 development. This is located within Flood Zone 1 and therefore considered to provide safe and suitable access to and from the site during flood events.

7.2 Finished Floor Levels (FFLs)

7.2.1 It is recommended that FFLs across the site are set a minimum of 150mm above proposed ground levels to provide resilience to surface water flooding.

8 Conclusion

8.1.1 The proposed surface water drainage strategy has been designed in accordance with the drainage hierarchy and best practice.

8.1.2 Surface water run-off from the proposed development will be discharged into the Phase 1 development network and outfall to the watercourse via an attenuation basin. It is noted that additional storage will be provided with an offline below ground geo-cellular storage tank.

8.1.3 An assessment of the pollution risk of the development and the treatment methods proposed has been undertaken in line with C753 guidance. This indicates the proposed drainage strategy will adequately treat surface water discharge from the site.

8.1.4 All means of flood risk at the site have been assessed and it has been demonstrated that the site is at low risk of flooding.

8.1.5 The site has also been assessed to not increase flood risk to adjacent land following development, subject to the outlined drainage strategy being implemented which manages and mitigates the increase in impermeable area that the development will result in.

Appendices

Appendix A - Proposed Site Layout

Open Market

House Type	SQFT	Bed	Storey	No.	Total SQFT
Danbury	756	2	2	3	2,268
Lynford	958	3	2	4	3,832
Oxford	982	3	2	5	4,910
Eltham	1,240	4	2	3	3,720
Northam	1,376	4	2	2	2,752
Oakham	1,421	4	2	2	2,842
0	0	0	0	0	0
				19	20324

Affordable

House Type	SQFT	Bed	Storey	No.	Total SQFT
Loxley	855	2	2	7	5985
Morley	1001	3	2	1	1001
Oatley	1001	3	2	1	1001
				9	7987
				28	**28311**

SITE AREA	=	0.00	acres (gross)
	=	1.79	acres (nett)

SITE DENSITY	=	15.66	units/acre
	=	15,834	ft2/acre

Notes

1. Levels and dimensions are shown for illustration purposes only.
2. See landscape masterplan for the proposed on-plot and public open space landscaping as well as details of trees and other vegetation to be removed.
3. See materials plan and boundary treatments and external materials plan for details of construction materials and boundary treatments.

Key

- Planning red line
- ✱ Affordable housing
- # Shared ownership
- PROW Public right of way
- BCP Bin collection point
- Bin storage
- RPA Root protection area
- Street tree
- Street tree with preservation order
- Tarmac unadopted shared private drive
- Block paving
- Grasscrete
- Privately maintained front garden
- \ R / Retaining Wall

Boundary Features:

- Feather edge fence
- AF Acoustic timber fence
- BW Brick wall
- PR Post and rail
- MR Metal railings
- KR Timber knee rail
- VF Venetian fence

Utilities:

- O – V Overhead HV/LV powerline
- V Underground HV/LV cable
- GAS Gas main
- ES Sewer
- RM Rising Main
- Easement

Abbreviations:

SS Sub Station
PS Pump Station
VP Visitor Parking

rev	date	comment(s)	name
–			

es
Court
Business
ıgton
Tel: 01332 43902

ALLISON HOMES

status: DRAFT

project: Stanton Under Bardon 2

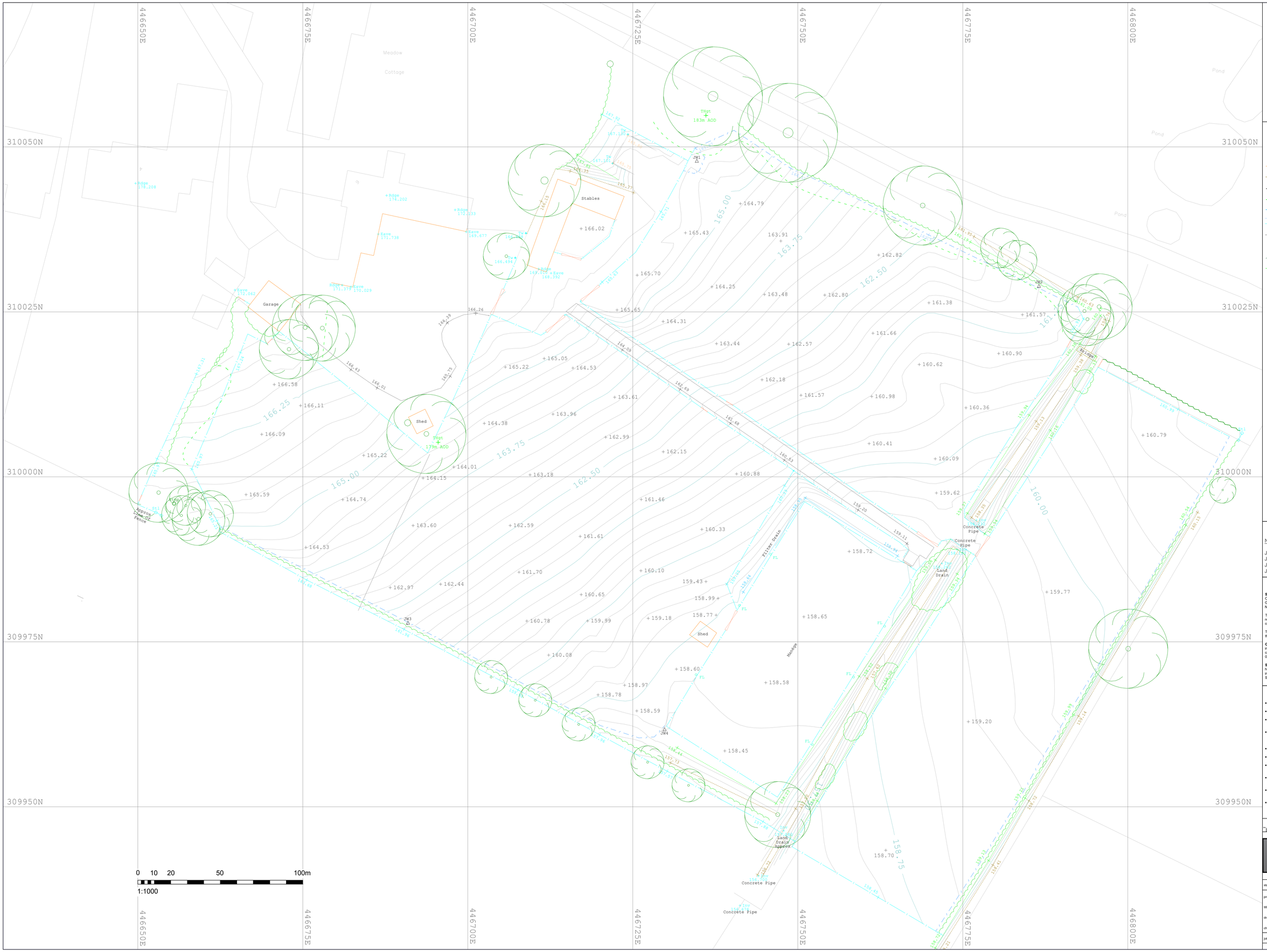
title: SITE LAYOUT

approved: – date: 16/06/2025

drawn: JL scale @ A2: 1:500

drawing no: M0006/001 revision: Rev –

Appendix B - Topographical Survey



N

LEGEND

- Building Line
- Bottom of Bank
- Edge Of Concrete
- Canopy
- Drainage Detail
- Fence
- Footpath
- Gate
- Edge of Hedge
- Top of Bank
- FL — Floodlight
- INV — Invert level
- TW — Top Of Wall
- Tree
- Tree Trunk
- THgt — Tree Height
- ST1 — Stile
- Survey Station

Stations

Name	Easting	Northing	Level
JW1	446734.704	310047.901	165.781
JW2	446786.542	310028.942	161.533
JW3	446690.937	309977.909	162.303
JW4	446729.817	309961.750	158.700

Survey Details:

Survey Grid: This survey has been orientated to the Ordnance Survey (O.S) National Grid (OSGB36) via a Global Position System (GPS) and the O.S. Active Network (OS Net).

The survey is to a Local Planar Grid (Scale Factor 1) in relation to OS National Grid North using a point of origin central to the survey.

True O.S coordinates can be calculated by scaling around the centre point using a scale factor of: **0.9996126808**

Coordinate System: The coordinate system used for the installation of primary control is OSGB36. This was calculated using the OSTN15 transformation model on the 02.01.25 using Leica Smartnet.

Survey Level Datum: Calculated from GPS derived heights using the OSGM15 Transformation Geoid Model in relation to Ordnance Survey Newlyn using Leica Smartnet.

General Notes:

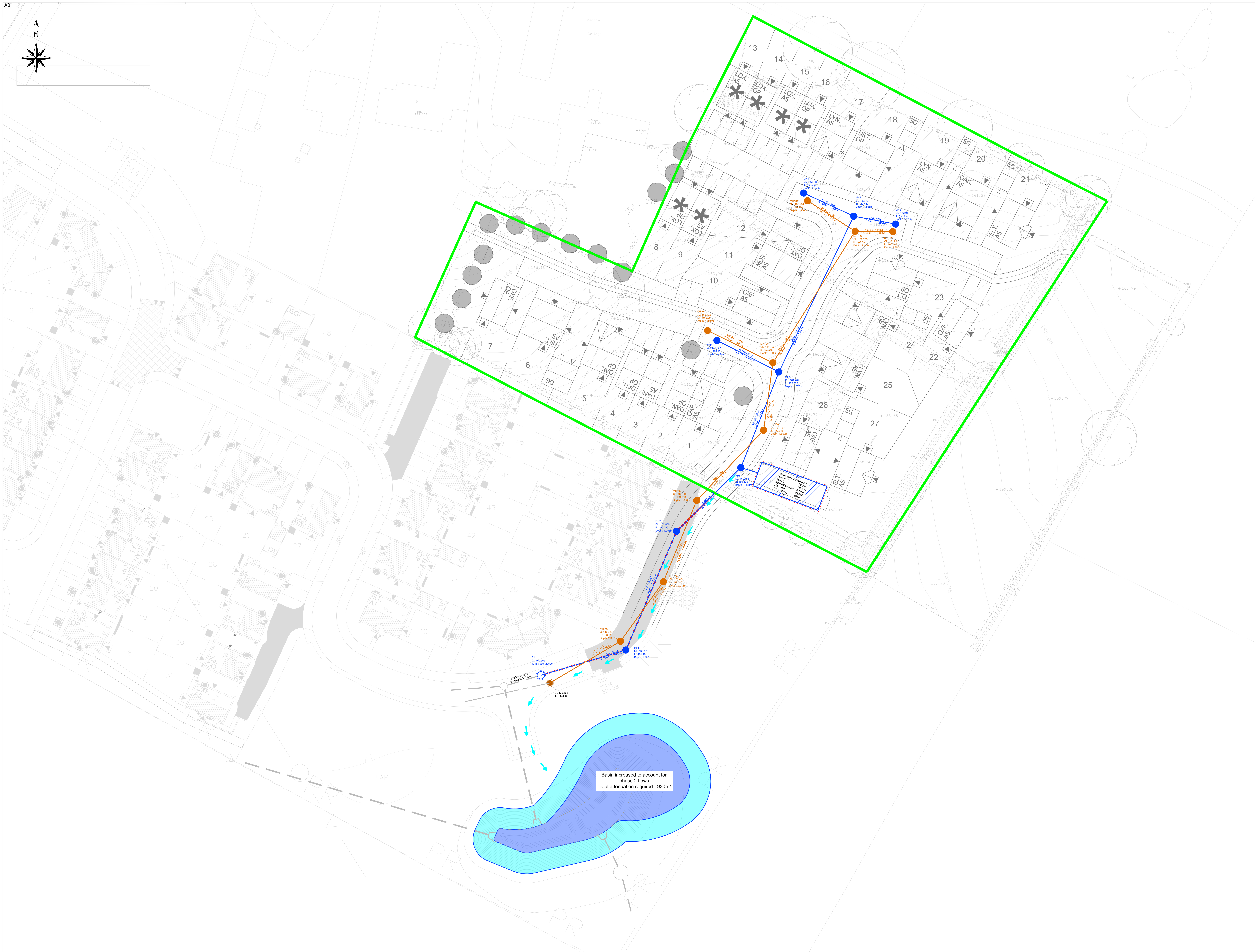
- Physical features present in the vicinity of boundaries may not represent legally conveyed ownership.
- Some features may have been obscured at the time of survey. (Parked cars, Dense Vegetation, etc.)
- The background OS Tile may be inaccurate and incomplete - JW Geomatics are not responsible for this data.
- The plan should only be used for it's original intentions - JW Geomatics are not responsible for any mistakes arising from the supply of this plan to third parties.
- All critical dimensions should be check on site prior to construction.
- Unless otherwise specified, features such as road line markings & hedge centrelines are indicative only.
- Unless specified in the preliminary deliverables, tree heights, trunk diameters, fence heights and wall heights are not measured.
- Canopy spread is measured at ground level where possible – The "Tree" legend-detail denotes an approximate spread.
- Only trees over 3m in height are surveyed with a "trunk" however large Hedges may also have multiple trunks - canopy spread surveyed instead.
- The "Top Of Kerb" is not shown as a poly-line - observations taken on all differently sized kerbs, please use the 3D DXF for level data.

no.	date	comment(s)	name

JW GEOMATICS
Surveying & Site Engineering Solutions

status:	For Information
project:	Stanton-Under-Bardon, Markfield
title:	Topographical Survey - SF1
drawn:	JW — date: 03.01.24
checked:	JW — scale @ A1: 1:250
job no:	JWG-AH4 — drg no: JWG-AH4-001

Appendix C - Drainage Strategy Plan



GENERAL NOTES

1. DO NOT SCALE.
2. This drawing is to be read in conjunction with all other relevant drawings and details.
3. Should there be any conflict between the details indicated on this drawing and those on other drawings the Engineer should be informed PRIOR to construction on site.
4. Until technical approval has been obtained from the relevant Authority, it should be understood that all drawings issued are Preliminary and NOT for construction. Should the Contractor commence site works prior to such approval being provided it is entirely at their own risk.
5. Sketch proposals are for illustrative purposes only and as such are subject to detailed site investigation including ground conditions, contaminants, drainage, design and planning / density negotiations.
6. All dimensions are in metres unless otherwise stated.
7. The Rodgers Leask Designer's Risk Assessment(s) for this project must be reviewed PRIOR to the commencement of any works on site.
8. Topographical information used taken from JW GEOMATICS drawing JWG-AH4-001 dated 03.01.24
9. Site Layout information used taken from ALLISON HOMES drawing M0006/001 dated 16.06.25
10. Phase one drainage information taken from BMc Engineering drawing 24005-BMC-25-CC-DR-C-500 Rev P09 dated 24.04.25

KEY:

- Development Boundary
- S104 Foul Water Sewer
- S104 PCC Foul Water Manhole (Size varies - refer to manhole schedule)
- Concrete bed and surround required
- S104 Storm Water Sewer
- S104 Storm Water Manhole (Size varies - refer to manhole schedule)
- Below ground attenuation
- Proposed phase one attenuation extents
- Overland flood arrow

Health and safety symbols refer to reference numbers indicated on Designers Risk Assessment number: 23XXX-RLL-23-XX-HS-C-0001

Health & Safety Information Key

- Used to provide design specific safety information that may not be obvious to a competent contractor but may be useful
- Used to restrict/prevent a possible action, e.g. stop construction traffic from entering an area
- Used to warn of significant design hazards, adding recommendations
- Used to encourage a positive action, e.g. use of robust protection for inspection chambers

Rev	Date	Amendments	By	Chk

Consulting Engineers

Client

ALLISON HOMES

Project

MAIN STREET
STANTON UNDER BARDON
PHASE 2

Drawing Title

DRAINAGE STRATEGY

Status

PRELIMINARY

Scale	Drawn	Checked	Date
As Shown @ A0	EH	PS	27/06/25

Drawing Number	Revision
25518-RLL-25-XX-DR-C-2500	P01

BIM Drawing Reference

25518-RLL-25-XX-DR-C-2500

Scale Bar

1:250 2 4 6 8 10 12 14 16 18

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Appendix D - Hydraulic Modelling Results

Design Settings

Rainfall Methodology	FSR	Maximum Time of Concentration (mins)	30.00
Return Period (years)	100	Maximum Rainfall (mm/hr)	50.0
Additional Flow (%)	40	Minimum Velocity (m/s)	1.00
FSR Region	England and Wales	Connection Type	Level Soffits
M5-60 (mm)	20.000	Minimum Backdrop Height (m)	0.200
Ratio-R	0.400	Preferred Cover Depth (m)	1.200
CV	0.750	Include Intermediate Ground	✓
Time of Entry (mins)	5.00	Enforce best practice design rules	x

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)
S1L	0.017	5.00	165.000	450	446567.352	310029.082	1.350
S1	0.030	5.00	164.893	1200	446570.505	310034.186	1.725
S2			165.629	1200	446587.138	310023.913	2.576
S3	0.017	5.00	165.424	1200	446594.767	310009.925	2.465
S4	0.016	5.00	164.763	1200	446593.461	309993.083	1.903
S5	0.016	5.00	164.103	1200	446637.208	309972.578	1.527
S6L	0.105	5.00	164.500	450	446647.415	309964.142	1.650
S6	0.020	5.00	164.103	1200	446641.841	309961.210	1.725
S7L	0.047	5.00	162.950	450	446625.942	309939.776	1.350
S7	0.013	5.00	162.839	1500	446631.442	309937.380	1.725
S8	0.019	5.00	162.357	1200	446633.065	309929.036	1.725
S9L	0.034	5.00	161.950	450	446645.185	309926.758	1.500
S9			161.682	1200	446644.221	309922.363	1.725
S10			161.118	1200	446657.263	309919.500	1.725
S11L	0.102	5.00	160.500	450	446688.505	309927.040	1.400
S11	0.010	5.00	160.413	1500	446677.294	309922.761	1.483
S12	0.041	5.00	160.782	1500	446669.318	309920.398	2.200
HW1			157.975	1200	446676.195	309891.709	1.484
S13L	0.068	5.00	163.250	450	446573.828	309969.225	1.400
S13	0.048	5.00	163.111	1500	446579.305	309966.776	1.425
S14L	0.104	5.00	161.600	600	446560.465	309939.338	1.425
S14	0.039	5.00	161.465	1500	446565.942	309936.889	1.425
S15L	0.055	5.00	161.675	450	446571.136	309933.002	1.700
S15			161.025	1200	446569.092	309928.439	1.700
S16L	0.047	5.00	161.150	450	446615.067	309910.376	1.450
S16			160.675	1200	446612.735	309904.042	1.800
HW2			157.975	1200	446666.215	309888.224	1.484
1	0.086	5.00	162.716	1200	446734.086	310026.934	1.350
2	0.073	5.00	162.017	1200	446753.974	310020.223	1.425
3	0.113	5.00	162.323	1200	446745.336	310022.865	1.866
4	0.119	5.00	162.307	1200	446715.350	309995.091	1.425
5	0.015	5.00	161.707	1200	446727.618	309989.041	1.707
6	0.056	5.00	160.768	1200	446720.514	309967.611	1.368
7	0.018	5.00	160.505	1200	446706.620	309953.859	1.255
8			160.472	1200	446695.934	309928.210	1.322
HW3		5.00	157.975	1200	446691.086	309887.372	1.500
S17 FCU			158.375	2700	446694.580	309880.175	2.275
HW4			155.580	1200	446696.787	309871.760	0.350
Depth/Area 1		5.00	160.900		446731.065	309966.829	1.450

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
S1L	S1L	S1	5.999	0.600	163.650	163.243	0.407	14.7	150	5.04	50.0
1.000	S1	S2	19.550	0.600	163.168	163.053	0.115	170.0	225	5.36	50.0
1.001	S2	S3	15.933	0.600	163.053	162.959	0.094	169.5	225	5.63	50.0
1.002	S3	S4	16.893	0.600	162.959	162.860	0.099	170.6	225	5.91	50.0
1.003	S4	S5	48.314	0.600	162.860	162.576	0.284	170.1	225	6.72	50.0
1.004	S5	S6	12.276	0.600	162.576	162.418	0.158	77.7	225	6.85	50.0
S6L	S6L	S6	6.298	0.600	162.850	162.453	0.397	15.9	150	5.04	50.0
1.005	S6	S7	26.000	0.600	162.378	161.114	1.264	20.6	225	7.00	50.0
S7L	S7L	S7	5.999	0.600	161.600	161.189	0.411	14.6	150	5.04	50.0
1.006	S7	S8	8.500	0.600	161.114	160.632	0.482	17.6	225	7.05	50.0
1.007	S8	S9	12.999	0.600	160.632	159.957	0.675	19.3	225	7.12	50.0
S9L	S9L	S9	4.499	0.600	160.450	160.032	0.418	10.8	150	5.02	50.0
1.008	S9	S10	13.353	0.600	159.957	159.393	0.564	23.7	225	7.20	50.0
1.009	S10	S12	12.088	0.600	159.393	158.657	0.736	16.4	225	7.27	50.0
S11L	S11L	S11	12.000	0.600	159.100	158.930	0.170	70.6	300	6.75	50.0
2.000	S11	S12	8.319	0.600	158.930	158.582	0.348	23.9	300	6.79	50.0
1.010	S12	HW1	29.502	0.600	158.582	156.700	1.882	15.7	300	7.39	50.0
S13L	S13L	S13	6.000	0.600	161.850	161.761	0.089	67.4	150	5.08	50.0
3.000	S13	S14	32.738	0.600	161.686	160.040	1.646	19.9	225	5.27	50.0
S14L	S14L	S14	6.000	0.600	160.175	160.040	0.135	44.4	225	5.05	50.0
3.001	S14	S15	9.018	0.600	160.040	159.400	0.640	14.1	225	5.31	50.0
S15L	S15L	S15	5.000	0.600	159.975	159.475	0.500	10.0	150	5.03	50.0
3.002	S15	S16	49.999	0.600	159.325	158.875	0.450	111.1	300	5.87	50.0
S16L	S16L	S16	6.750	0.600	159.700	159.025	0.675	10.0	150	5.04	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
S1L	2.637	46.6	3.2	1.200	1.500	0.017	0.0	27	1.519
1.000	1.000	39.7	8.9	1.500	2.351	0.047	0.0	73	0.811
1.001	1.001	39.8	8.9	2.351	2.240	0.047	0.0	73	0.812
1.002	0.998	39.7	12.1	2.240	1.678	0.064	0.0	86	0.881
1.003	0.999	39.7	15.2	1.678	1.302	0.080	0.0	96	0.933
1.004	1.485	59.0	18.2	1.302	1.460	0.096	0.0	86	1.312
S6L	2.541	44.9	19.9	1.500	1.500	0.105	0.0	70	2.468
1.005	2.898	115.2	41.9	1.500	1.500	0.221	0.0	94	2.673
S7L	2.650	46.8	8.9	1.200	1.500	0.047	0.0	44	2.047
1.006	3.130	124.5	53.3	1.500	1.500	0.281	0.0	102	3.008
1.007	2.995	119.1	56.9	1.500	1.500	0.300	0.0	109	2.961
S9L	3.088	54.6	6.5	1.350	1.500	0.034	0.0	35	2.087
1.008	2.700	107.4	63.4	1.500	1.500	0.334	0.0	124	2.807
1.009	3.244	129.0	63.4	1.500	1.900	0.334	0.0	111	3.229
S11L	1.873	132.4	110.4	1.100	1.183	0.582	0.0	210	2.087
2.000	3.229	228.2	112.3	1.183	1.900	0.592	0.0	149	3.216
1.010	3.990	282.0	183.5	1.900	0.975	0.967	0.0	177	4.239
S13L	1.226	21.7	12.9	1.250	1.200	0.068	0.0	83	1.279
3.000	2.947	117.2	22.0	1.200	1.200	0.116	0.0	65	2.269
S14L	1.967	78.2	19.7	1.200	1.200	0.104	0.0	77	1.647
3.001	3.504	139.3	49.1	1.200	1.400	0.259	0.0	92	3.204
S15L	3.204	56.6	10.4	1.550	1.400	0.055	0.0	44	2.458
3.002	1.491	105.4	59.6	1.400	1.500	0.314	0.0	161	1.534
S16L	3.204	56.6	8.9	1.300	1.500	0.047	0.0	40	2.347

Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
3.005	S16	HW2	55.770	0.600	158.875	156.700	2.175	25.6	300	6.17	50.0
10.000	1	3	11.963	0.600	161.366	160.607	0.759	15.8	150	5.08	50.0
11.000	2	3	9.033	0.600	160.592	160.532	0.060	150.6	225	5.14	50.0
10.001	3	5	38.244	0.600	160.457	160.000	0.457	83.7	300	5.51	50.0
12.000	4	5	13.563	0.600	160.882	160.075	0.807	16.8	225	5.07	50.0
10.002	5	6	10.484	0.600	160.000	159.400	0.600	17.5	300	5.56	50.0
10.003	6	7	35.953	0.600	159.400	159.250	0.150	239.7	300	6.15	50.0
10.004	7	8	23.754	0.600	159.250	159.150	0.100	237.5	300	6.54	50.0
1.011	HW3	S17 FCU	8.000	0.600	156.475	156.100	0.375	21.3	225	5.05	50.0
1.012	S17 FCU	HW4	8.700	0.600	156.100	155.230	0.870	10.0	225	5.08	50.0
5.005	8	S11L	7.521	0.600	159.150	159.100	0.050	150.4	300	6.64	50.0
8.000	Depth/Area 1	6	10.580	0.600	159.450	159.400	0.050	211.6	300	5.16	50.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)	Pro Depth (mm)	Pro Velocity (m/s)
3.005	3.117	220.3	68.5	1.500	0.975	0.361	0.0	115	2.763
10.000	2.550	45.1	16.3	1.200	1.566	0.086	0.0	62	2.349
11.000	1.063	42.3	13.9	1.200	1.566	0.073	0.0	88	0.953
10.001	1.720	121.5	51.6	1.566	1.407	0.272	0.0	136	1.651
12.000	3.207	127.5	22.6	1.200	1.407	0.119	0.0	64	2.433
10.002	3.779	267.1	77.0	1.407	1.068	0.406	0.0	110	3.282
10.003	1.011	71.5	87.7	1.068	0.955	0.462	0.0	300	1.024
10.004	1.016	71.8	91.1	0.955	1.022	0.480	0.0	300	1.029
1.011	2.845	113.1	0.0	1.275	2.050	0.000	0.0	0	0.000
1.012	4.161	165.5	0.0	2.050	0.125	0.000	0.0	0	0.000
5.005	1.279	90.4	91.1	1.022	1.100	0.480	0.0	249	1.449
8.000	1.077	76.1	0.0	1.150	1.068	0.000	0.0	0	0.000

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
S1L	5.999	14.7	150	Circular_Default Sewer Type	165.000	163.650	1.200	164.893	163.243	1.500
1.000	19.550	170.0	225	Circular_Default Sewer Type	164.893	163.168	1.500	165.629	163.053	2.351
1.001	15.933	169.5	225	Circular_Default Sewer Type	165.629	163.053	2.351	165.424	162.959	2.240
1.002	16.893	170.6	225	Circular_Default Sewer Type	165.424	162.959	2.240	164.763	162.860	1.678
1.003	48.314	170.1	225	Circular_Default Sewer Type	164.763	162.860	1.678	164.103	162.576	1.302
1.004	12.276	77.7	225	Circular_Default Sewer Type	164.103	162.576	1.302	164.103	162.418	1.460
S6L	6.298	15.9	150	Circular_Default Sewer Type	164.500	162.850	1.500	164.103	162.453	1.500
1.005	26.000	20.6	225	Circular_Default Sewer Type	164.103	162.378	1.500	162.839	161.114	1.500

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
S1L	S1L	450	Manhole	Adoptable	S1	1200	Manhole	Adoptable
1.000	S1	1200	Manhole	Adoptable	S2	1200	Manhole	Adoptable
1.001	S2	1200	Manhole	Adoptable	S3	1200	Manhole	Adoptable
1.002	S3	1200	Manhole	Adoptable	S4	1200	Manhole	Adoptable
1.003	S4	1200	Manhole	Adoptable	S5	1200	Manhole	Adoptable
1.004	S5	1200	Manhole	Adoptable	S6	1200	Manhole	Adoptable
S6L	S6L	450	Manhole	Adoptable	S6	1200	Manhole	Adoptable
1.005	S6	1200	Manhole	Adoptable	S7	1500	Manhole	Adoptable

Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
S7L	5.999	14.6	150	Circular_Default Sewer Type	162.950	161.600	1.200	162.839	161.189	1.500
1.006	8.500	17.6	225	Circular_Default Sewer Type	162.839	161.114	1.500	162.357	160.632	1.500
1.007	12.999	19.3	225	Circular_Default Sewer Type	162.357	160.632	1.500	161.682	159.957	1.500
S9L	4.499	10.8	150	Circular_Default Sewer Type	161.950	160.450	1.350	161.682	160.032	1.500
1.008	13.353	23.7	225	Circular_Default Sewer Type	161.682	159.957	1.500	161.118	159.393	1.500
1.009	12.088	16.4	225	Circular_Default Sewer Type	161.118	159.393	1.500	160.782	158.657	1.900
S11L	12.000	70.6	300	Circular_Default Sewer Type	160.500	159.100	1.100	160.413	158.930	1.183
2.000	8.319	23.9	300	Circular_Default Sewer Type	160.413	158.930	1.183	160.782	158.582	1.900
1.010	29.502	15.7	300	Circular_Default Sewer Type	160.782	158.582	1.900	157.975	156.700	0.975
S13L	6.000	67.4	150	Circular_Default Sewer Type	163.250	161.850	1.250	163.111	161.761	1.200
3.000	32.738	19.9	225	Circular_Default Sewer Type	163.111	161.686	1.200	161.465	160.040	1.200
S14L	6.000	44.4	225	Circular_Default Sewer Type	161.600	160.175	1.200	161.465	160.040	1.200
3.001	9.018	14.1	225	Circular_Default Sewer Type	161.465	160.040	1.200	161.025	159.400	1.400
S15L	5.000	10.0	150	Circular_Default Sewer Type	161.675	159.975	1.550	161.025	159.475	1.400
3.002	49.999	111.1	300	Circular_Default Sewer Type	161.025	159.325	1.400	160.675	158.875	1.500
S16L	6.750	10.0	150	Circular_Default Sewer Type	161.150	159.700	1.300	160.675	159.025	1.500
3.005	55.770	25.6	300	Circular_Default Sewer Type	160.675	158.875	1.500	157.975	156.700	0.975
10.000	11.963	15.8	150	Circular_Default Sewer Type	162.716	161.366	1.200	162.323	160.607	1.566
11.000	9.033	150.6	225	Circular_Default Sewer Type	162.017	160.592	1.200	162.323	160.532	1.566
10.001	38.244	83.7	300	Circular_Default Sewer Type	162.323	160.457	1.566	161.707	160.000	1.407
12.000	13.563	16.8	225	Circular_Default Sewer Type	162.307	160.882	1.200	161.707	160.075	1.407
10.002	10.484	17.5	300	Circular_Default Sewer Type	161.707	160.000	1.407	160.768	159.400	1.068
10.003	35.953	239.7	300	Circular_Default Sewer Type	160.768	159.400	1.068	160.505	159.250	0.955
10.004	23.754	237.5	300	Circular_Default Sewer Type	160.505	159.250	0.955	160.472	159.150	1.022
1.011	8.000	21.3	225	Circular_Default Sewer Type	157.975	156.475	1.275	158.375	156.100	2.050

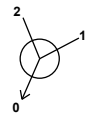
Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
S7L	S7L	450	Manhole	Adoptable	S7	1500	Manhole	Adoptable
1.006	S7	1500	Manhole	Adoptable	S8	1200	Manhole	Adoptable
1.007	S8	1200	Manhole	Adoptable	S9	1200	Manhole	Adoptable
S9L	S9L	450	Manhole	Adoptable	S9	1200	Manhole	Adoptable
1.008	S9	1200	Manhole	Adoptable	S10	1200	Manhole	Adoptable
1.009	S10	1200	Manhole	Adoptable	S12	1500	Manhole	Adoptable
S11L	S11L	450	Manhole	Adoptable	S11	1500	Manhole	Adoptable
2.000	S11	1500	Manhole	Adoptable	S12	1500	Manhole	Adoptable
1.010	S12	1500	Manhole	Adoptable	HW1	1200	Manhole	Adoptable
S13L	S13L	450	Manhole	Adoptable	S13	1500	Manhole	Adoptable
3.000	S13	1500	Manhole	Adoptable	S14	1500	Manhole	Adoptable
S14L	S14L	600	Manhole	Adoptable	S14	1500	Manhole	Adoptable
3.001	S14	1500	Manhole	Adoptable	S15	1200	Manhole	Adoptable
S15L	S15L	450	Manhole	Adoptable	S15	1200	Manhole	Adoptable
3.002	S15	1200	Manhole	Adoptable	S16	1200	Manhole	Adoptable
S16L	S16L	450	Manhole	Adoptable	S16	1200	Manhole	Adoptable
3.005	S16	1200	Manhole	Adoptable	HW2	1200	Manhole	Adoptable
10.000	1	1200	Manhole	Adoptable	3	1200	Manhole	Adoptable
11.000	2	1200	Manhole	Adoptable	3	1200	Manhole	Adoptable
10.001	3	1200	Manhole	Adoptable	5	1200	Manhole	Adoptable
12.000	4	1200	Manhole	Adoptable	5	1200	Manhole	Adoptable
10.002	5	1200	Manhole	Adoptable	6	1200	Manhole	Adoptable
10.003	6	1200	Manhole	Adoptable	7	1200	Manhole	Adoptable
10.004	7	1200	Manhole	Adoptable	8	1200	Manhole	Adoptable
1.011	HW3	1200	Manhole	Adoptable	S17 FCU	2700	Manhole	Adoptable

Pipeline Schedule

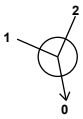
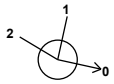
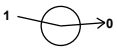
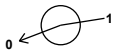
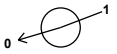
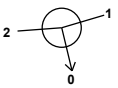
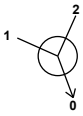
Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.012	8.700	10.0	225	Circular_Default Sewer Type	158.375	156.100	2.050	155.580	155.230	0.125
5.005	7.521	150.4	300	Circular_Default Sewer Type	160.472	159.150	1.022	160.500	159.100	1.100
8.000	10.580	211.6	300	Circular_Default Sewer Type	160.900	159.450	1.150	160.768	159.400	1.068

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.012	S17 FCU	2700	Manhole	Adoptable	HW4	1200	Manhole	Adoptable
5.005	8	1200	Manhole	Adoptable	S11L	450	Manhole	Adoptable
8.000	Depth/Area 1		Junction		6	1200	Manhole	Adoptable

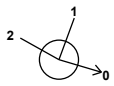
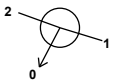
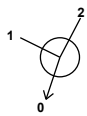
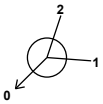
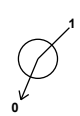
Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S1L	446567.352	310029.082	165.000	1.350	450	 0	S1L	163.650	150
S1	446570.505	310034.186	164.893	1.725	1200	1  0	S1L 1.000	163.243 163.168	150 225
S2	446587.138	310023.913	165.629	2.576	1200	1  0	1.000 1.001	163.053 163.053	225 225
S3	446594.767	310009.925	165.424	2.465	1200	1  0	1.001 1.002	162.959 162.959	225 225
S4	446593.461	309993.083	164.763	1.903	1200	1  0	1.002 1.003	162.860 162.860	225 225
S5	446637.208	309972.578	164.103	1.527	1200	1  0	1.003 1.004	162.576 162.576	225 225
S6L	446647.415	309964.142	164.500	1.650	450	 0	S6L	162.850	150
S6	446641.841	309961.210	164.103	1.725	1200	1  2 0	S6L 1.004 1.005	162.453 162.418 162.378	150 225 225
S7L	446625.942	309939.776	162.950	1.350	450	 0	S7L	161.600	150

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S7	446631.442	309937.380	162.839	1.725	1500	 1 2 0	S7L 1.005 1.006	161.189 161.114 161.114	150 225 225
S8	446633.065	309929.036	162.357	1.725	1200	 1 0	1.006 1.007	160.632 160.632	225 225
S9L	446645.185	309926.758	161.950	1.500	450	 0	S9L	160.450	150
S9	446644.221	309922.363	161.682	1.725	1200	 1 2 0	S9L 1.007 1.008	160.032 159.957 159.957	150 225 225
S10	446657.263	309919.500	161.118	1.725	1200	 1 0	1.008 1.009	159.393 159.393	225 225
S11L	446688.505	309927.040	160.500	1.400	450	 1 0	5.005 S11L	159.100 159.100	300 300
S11	446677.294	309922.761	160.413	1.483	1500	 1 0	S11L 2.000	158.930 158.930	300 300
S12	446669.318	309920.398	160.782	2.200	1500	 1 2 0	2.000 1.009 1.010	158.582 158.657 158.582	300 225 300
HW1	446676.195	309891.709	157.975	1.484	1200	 1	1.010	156.700	300
S13L	446573.828	309969.225	163.250	1.400	450	 0	S13L	161.850	150
S13	446579.305	309966.776	163.111	1.425	1500	 1 0	S13L 3.000	161.761 161.686	150 225
S14L	446560.465	309939.338	161.600	1.425	600	 0	S14L	160.175	225
S14	446565.942	309936.889	161.465	1.425	1500	 1 2 0	S14L 3.000 3.001	160.040 160.040 160.040	225 225 225

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
S15L	446571.136	309933.002	161.675	1.700	450	 0	S15L	159.975	150
S15	446569.092	309928.439	161.025	1.700	1200	 1	S15L	159.475	150
						2	3.001	159.400	225
						0	3.002	159.325	300
S16L	446615.067	309910.376	161.150	1.450	450	 0	S16L	159.700	150
S16	446612.735	309904.042	160.675	1.800	1200	 1	S16L	159.025	150
						2	3.002	158.875	300
						0	3.005	158.875	300
HW2	446666.215	309888.224	157.975	1.484	1200	 1	3.005	156.700	300
1	446734.086	310026.934	162.716	1.350	1200	 0	10.000	161.366	150
2	446753.974	310020.223	162.017	1.425	1200	 0	11.000	160.592	225
3	446745.336	310022.865	162.323	1.866	1200	1	11.000	160.532	225
						 2	10.000	160.607	150
						0	10.001	160.457	300
4	446715.350	309995.091	162.307	1.425	1200	 0	12.000	160.882	225
5	446727.618	309989.041	161.707	1.707	1200	1	12.000	160.075	225
						 2	10.001	160.000	300
						0	10.002	160.000	300
6	446720.514	309967.611	160.768	1.368	1200	1	8.000	159.400	300
						 2	10.002	159.400	300
						0	10.003	159.400	300
7	446706.620	309953.859	160.505	1.255	1200	1	10.003	159.250	300
						 0	10.004	159.250	300
8	446695.934	309928.210	160.472	1.322	1200	1	10.004	159.150	300
						 0	5.005	159.150	300

Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
HW3	446691.086	309887.372	157.975	1.500	1200	 0	1.011	156.475	225
S17 FCU	446694.580	309880.175	158.375	2.275	2700	1	1.011	156.100	225
						 0	1.012	156.100	225
HW4	446696.787	309871.760	155.580	0.350	1200	 1	1.012	155.230	225
Depth/Area 1	446731.065	309966.829	160.900	1.450		0	8.000	159.450	300

Simulation Settings

Rainfall Methodology	FSR	Analysis Speed	Detailed
Rainfall Events	Singular	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	20.000	Additional Storage (m³/ha)	0.0
Ratio-R	0.400	Starting Level (m)	
Summer CV	0.750	Check Discharge Rate(s)	x
Winter CV	0.840	Check Discharge Volume	x

Storm Durations

30	60	120	180	240	360	480	600	720	960	1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	40	0	0

Node S17 FCU Online Hydro-Brake® Control

Flap Valve	x	Objective	(HE) Minimise upstream storage
Replaces Downstream Link	✓	Sump Available	✓
Invert Level (m)	156.100	Product Number	CTL-SHE-0135-9700-1575-9700
Design Depth (m)	1.575	Min Outlet Diameter (m)	0.150
Design Flow (l/s)	9.7	Min Node Diameter (mm)	0

Node HW1 Online Orifice Control

Flap Valve	x	Invert Level (m)	156.491	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.375		

Node HW2 Online Orifice Control

Flap Valve	x	Invert Level (m)	156.491	Discharge Coefficient	0.600
Replaces Downstream Link	x	Diameter (m)	0.450		

Node HW3 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Main Channel Length (m)	16.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	156.475	Main Channel Slope (1:X)	1000.0
Safety Factor	2.0	Time to half empty (mins)		Main Channel n	0.020

Inlets

HW2 | HW1

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	500.0	0.0	0.400	599.6	0.0	0.800	708.3	0.0	1.200	826.1	0.0
0.100	524.1	0.0	0.500	626.0	0.0	0.900	736.9	0.0	1.300	856.9	0.0
0.200	548.7	0.0	0.600	652.9	0.0	1.000	766.1	0.0	1.400	888.3	0.0
0.300	573.9	0.0	0.700	680.3	0.0	1.100	795.8	0.0	1.500	920.3	0.0

Node Depth/Area 1 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	159.450
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	10

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	82.5	82.5	0.800	82.5	108.3	0.801	0.0	108.3

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	S1L	18	163.672	0.022	2.0	0.0035	0.0000	OK
30 minute summer	S1	18	163.226	0.058	5.6	0.0659	0.0000	OK
30 minute summer	S2	18	163.111	0.058	5.6	0.0652	0.0000	OK
30 minute summer	S3	18	163.028	0.068	7.6	0.0774	0.0000	OK
30 minute summer	S4	19	162.935	0.075	9.4	0.0853	0.0000	OK
30 minute summer	S5	19	162.645	0.069	11.0	0.0784	0.0000	OK
30 minute summer	S6L	18	162.910	0.060	12.6	0.0095	0.0000	OK
30 minute summer	S6	18	162.449	0.071	25.4	0.0806	0.0000	OK
30 minute summer	S7L	18	161.637	0.037	5.6	0.0059	0.0000	OK
30 minute summer	S7	18	161.199	0.085	32.5	0.1506	0.0000	OK
30 minute summer	S8	18	160.718	0.086	34.5	0.0972	0.0000	OK
30 minute summer	S9L	18	160.480	0.030	4.1	0.0047	0.0000	OK
30 minute summer	S9	18	160.058	0.101	38.5	0.1144	0.0000	OK
30 minute summer	S10	18	159.484	0.091	38.3	0.1029	0.0000	OK
30 minute summer	S11L	18	159.242	0.142	49.6	0.0225	0.0000	OK
30 minute summer	S11	18	159.036	0.105	50.6	0.1864	0.0000	OK
30 minute summer	S12	19	158.707	0.125	93.4	0.2208	0.0000	OK
30 minute summer	HW1	19	156.806	0.315	93.8	0.3562	0.0000	OK
30 minute summer	S13L	18	161.920	0.070	8.2	0.0112	0.0000	OK
30 minute summer	S13	18	161.738	0.052	14.0	0.0925	0.0000	OK
30 minute summer	S14L	18	160.241	0.066	12.5	0.0187	0.0000	OK
30 minute summer	S14	18	160.119	0.079	31.2	0.1400	0.0000	OK
30 minute summer	S15L	18	160.012	0.037	6.6	0.0059	0.0000	OK
30 minute summer	S15	18	159.457	0.132	37.8	0.1493	0.0000	OK
30 minute summer	S16L	18	159.734	0.033	5.6	0.0053	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	S1L	S1L	S1	2.0	1.287	0.043	0.0093	
30 minute summer	S1	1.000	S2	5.6	0.694	0.141	0.1580	
30 minute summer	S2	1.001	S3	5.6	0.614	0.140	0.1451	
30 minute summer	S3	1.002	S4	7.5	0.691	0.189	0.1839	
30 minute summer	S4	1.003	S5	9.3	0.848	0.235	0.5323	
30 minute summer	S5	1.004	S6	11.0	1.105	0.187	0.1225	
30 minute summer	S6L	S6L	S6	12.6	2.053	0.281	0.0387	
30 minute summer	S6	1.005	S7	25.3	2.061	0.219	0.3192	
30 minute summer	S7L	S7L	S7	5.6	1.718	0.120	0.0196	
30 minute summer	S7	1.006	S8	32.2	2.329	0.259	0.1177	
30 minute summer	S8	1.007	S9	34.4	2.208	0.289	0.2029	
30 minute summer	S9L	S9L	S9	4.1	1.746	0.075	0.0106	
30 minute summer	S9	1.008	S10	38.3	2.373	0.357	0.2158	
30 minute summer	S10	1.009	S12	38.2	2.691	0.296	0.1717	
30 minute summer	S11L	S11L	S11	49.4	1.810	0.373	0.3290	
30 minute summer	S11	2.000	S12	50.5	2.031	0.221	0.2072	
30 minute summer	S12	1.010	HW1	93.8	3.506	0.332	0.7892	
30 minute summer	HW1	Flow through Pond	HW3	81.2	0.077	0.001	79.8399	
30 minute summer	S13L	S13L	S13	8.2	1.077	0.378	0.0457	
30 minute summer	S13	3.000	S14	14.0	1.452	0.119	0.3185	
30 minute summer	S14L	S14L	S14	12.5	1.136	0.160	0.0665	
30 minute summer	S14	3.001	S15	31.2	2.666	0.224	0.1056	
30 minute summer	S15L	S15L	S15	6.6	2.046	0.117	0.0161	
30 minute summer	S15	3.002	S16	37.8	1.589	0.359	1.1964	
30 minute summer	S16L	S16L	S16	5.6	1.982	0.099	0.0191	

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	S16	18	158.966	0.091	43.4	0.1029	0.0000	OK
120 minute winter	HW2	118	156.709	0.218	16.6	0.2470	0.0000	OK
30 minute summer	1	18	161.417	0.051	10.3	0.0577	0.0000	OK
30 minute summer	2	18	160.666	0.074	8.8	0.0836	0.0000	OK
30 minute summer	3	18	160.569	0.112	32.7	0.1268	0.0000	OK
30 minute summer	4	18	160.935	0.053	14.3	0.0599	0.0000	OK
30 minute summer	5	18	160.087	0.086	48.8	0.0978	0.0000	OK
30 minute winter	6	19	159.557	0.157	50.1	0.1774	0.0000	OK
30 minute summer	7	18	159.414	0.164	38.2	0.1854	0.0000	OK
30 minute summer	8	19	159.303	0.153	37.8	0.1734	0.0000	OK
120 minute winter	HW3	118	156.708	0.233	44.2	0.2638	0.0000	SURCHARGED
120 minute winter	S17 FCU	118	156.704	0.604	19.2	3.4585	0.0000	SURCHARGED
30 minute summer	HW4	1	155.230	0.000	9.7	0.0000	0.0000	OK
30 minute winter	Depth/Area 1	23	159.535	0.085	16.4	6.9732	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	S16	3.005	HW2	42.8	2.414	0.194	0.9892	
120 minute winter	HW2	Flow through Pond	HW3	44.2	0.052	0.001	118.7846	
30 minute summer	1	10.000	3	10.3	2.010	0.229	0.0613	
30 minute summer	2	11.000	3	8.8	0.812	0.208	0.0979	
30 minute summer	3	10.001	5	32.7	1.609	0.269	0.7800	
30 minute summer	4	12.000	5	14.3	2.075	0.112	0.0935	
30 minute summer	5	10.002	6	48.8	1.831	0.183	0.2821	
30 minute winter	6	10.003	7	36.3	0.952	0.508	1.3722	
30 minute summer	7	10.004	8	37.8	1.008	0.527	0.8972	
30 minute summer	8	5.005	S11L	38.0	1.133	0.420	0.2591	
120 minute winter	HW3	1.011	S17 FCU	19.2	0.926	0.169	0.3182	
120 minute winter	S17 FCU	Hydro-Brake®	HW4	9.7				171.5
30 minute winter	Depth/Area 1	8.000	6	-16.4	-0.864	-0.215	0.2565	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	S1L	18	163.685	0.035	5.0	0.0056	0.0000	OK
30 minute summer	S1	18	163.263	0.095	13.8	0.1077	0.0000	OK
30 minute summer	S2	18	163.149	0.096	13.8	0.1082	0.0000	OK
30 minute summer	S3	18	163.075	0.116	18.8	0.1313	0.0000	OK
30 minute summer	S4	18	162.986	0.126	23.4	0.1426	0.0000	OK
30 minute summer	S5	19	162.694	0.118	27.6	0.1333	0.0000	OK
30 minute summer	S6L	18	162.959	0.109	30.9	0.0173	0.0000	OK
30 minute summer	S6	18	162.498	0.119	63.5	0.1351	0.0000	OK
30 minute summer	S7L	17	161.659	0.059	13.8	0.0093	0.0000	OK
30 minute summer	S7	18	161.270	0.156	80.9	0.2755	0.0000	OK
30 minute summer	S8	18	160.789	0.156	86.1	0.1770	0.0000	OK
30 minute summer	S9L	18	160.494	0.044	10.0	0.0069	0.0000	OK
30 minute summer	S9	18	160.157	0.200	95.8	0.2261	0.0000	OK
30 minute summer	S10	18	159.562	0.169	95.3	0.1908	0.0000	OK
30 minute summer	S11L	18	159.334	0.234	105.7	0.0372	0.0000	OK
30 minute summer	S11	18	159.104	0.174	107.9	0.3074	0.0000	OK
30 minute summer	S12	19	158.789	0.207	214.0	0.3660	0.0000	OK
30 minute summer	HW1	19	157.213	0.722	213.7	0.8166	0.0000	OK
30 minute summer	S13L	18	161.985	0.135	20.0	0.0215	0.0000	OK
30 minute summer	S13	18	161.769	0.083	34.1	0.1462	0.0000	OK
30 minute summer	S14L	18	160.291	0.116	30.6	0.0329	0.0000	OK
30 minute summer	S14	18	160.173	0.133	76.2	0.2351	0.0000	OK
30 minute summer	S15L	17	160.033	0.058	16.2	0.0092	0.0000	OK
30 minute summer	S15	18	159.560	0.235	92.4	0.2656	0.0000	OK
30 minute summer	S16L	18	159.755	0.055	13.8	0.0087	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	S1L	S1L	S1	5.0	1.661	0.107	0.0181	
30 minute summer	S1	1.000	S2	13.8	0.861	0.347	0.3132	
30 minute summer	S2	1.001	S3	13.8	0.752	0.347	0.2925	
30 minute summer	S3	1.002	S4	18.7	0.858	0.471	0.3677	
30 minute summer	S4	1.003	S5	23.1	1.055	0.582	1.0587	
30 minute summer	S5	1.004	S6	27.6	1.391	0.468	0.2439	
30 minute summer	S6L	S6L	S6	30.9	2.476	0.688	0.0784	
30 minute summer	S6	1.005	S7	63.3	2.486	0.549	0.6599	
30 minute summer	S7L	S7L	S7	13.8	2.023	0.295	0.0478	
30 minute summer	S7	1.006	S8	80.5	2.738	0.647	0.2500	
30 minute summer	S8	1.007	S9	85.8	2.549	0.721	0.4340	
30 minute summer	S9L	S9L	S9	10.0	1.827	0.183	0.0448	
30 minute summer	S9	1.008	S10	95.3	2.743	0.887	0.4623	
30 minute summer	S10	1.009	S12	94.9	3.249	0.736	0.3532	
30 minute summer	S11L	S11L	S11	105.0	2.060	0.793	0.6083	
30 minute summer	S11	2.000	S12	107.1	2.569	0.469	0.3905	
30 minute summer	S12	1.010	HW1	213.7	3.474	0.758	1.8040	
30 minute summer	HW1	Flow through Pond	HW3	176.2	0.096	0.002	216.6714	
30 minute summer	S13L	S13L	S13	20.0	1.283	0.923	0.0929	
30 minute summer	S13	3.000	S14	34.1	1.814	0.291	0.6165	
30 minute summer	S14L	S14L	S14	30.6	1.360	0.391	0.1353	
30 minute summer	S14	3.001	S15	76.2	2.910	0.547	0.2462	
30 minute summer	S15L	S15L	S15	16.2	2.396	0.286	0.0410	
30 minute summer	S15	3.002	S16	92.5	1.933	0.878	2.3665	
30 minute summer	S16L	S16L	S16	13.8	2.507	0.244	0.0372	

Results for 30 year Critical Storm Duration. Lowest mass balance: 99.94%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	S16	18	159.026	0.151	106.3	0.1707	0.0000	OK
240 minute winter	HW2	240	157.114	0.623	23.1	0.7051	0.0000	OK
30 minute summer	1	18	161.453	0.087	25.3	0.0987	0.0000	OK
30 minute summer	2	18	160.716	0.124	21.5	0.1405	0.0000	OK
30 minute summer	3	18	160.646	0.189	80.0	0.2138	0.0000	OK
30 minute summer	4	17	160.968	0.086	35.0	0.0973	0.0000	OK
30 minute summer	5	18	160.157	0.157	119.5	0.1780	0.0000	OK
30 minute winter	6	22	159.737	0.336	122.7	0.3805	0.0000	SURCHARGED
30 minute summer	7	18	159.546	0.296	76.3	0.3351	0.0000	OK
30 minute summer	8	18	159.412	0.262	76.5	0.2964	0.0000	OK
240 minute winter	HW3	240	157.114	0.639	47.0	0.7231	0.0000	SURCHARGED
240 minute winter	S17 FCU	240	157.111	1.011	21.4	5.7912	0.0000	SURCHARGED
30 minute summer	HW4	1	155.230	0.000	9.7	0.0000	0.0000	OK
30 minute winter	Depth/Area 1	22	159.738	0.288	50.1	23.7887	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	S16	3.005	HW2	105.5	3.051	0.479	1.9289	
240 minute winter	HW2	Flow through Pond	HW3	47.0	0.048	0.001	365.5844	
30 minute summer	1	10.000	3	25.3	2.498	0.562	0.1211	
30 minute summer	2	11.000	3	21.5	1.009	0.509	0.1926	
30 minute summer	3	10.001	5	80.1	1.900	0.659	1.6097	
30 minute summer	4	12.000	5	35.0	2.614	0.275	0.1835	
30 minute summer	5	10.002	6	119.2	2.257	0.446	0.5654	
30 minute winter	6	10.003	7	74.6	1.059	1.043	2.5265	
30 minute summer	7	10.004	8	76.5	1.173	1.066	1.6098	
30 minute summer	8	5.005	S11L	76.6	1.398	0.847	0.4674	
240 minute winter	HW3	1.011	S17 FCU	21.4	0.935	0.189	0.3182	
240 minute winter	S17 FCU	Hydro-Brake®	HW4	9.7				227.0
30 minute winter	Depth/Area 1	8.000	6	-50.1	-1.119	-0.658	0.7404	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.64%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	S1L	17	163.696	0.046	9.2	0.0073	0.0000	OK
30 minute summer	S1	21	163.664	0.496	25.4	0.5611	0.0000	SURCHARGED
30 minute summer	S2	21	163.644	0.591	25.5	0.6687	0.0000	SURCHARGED
30 minute summer	S3	21	163.623	0.664	33.1	0.7515	0.0000	SURCHARGED
30 minute summer	S4	21	163.583	0.723	40.3	0.8174	0.0000	SURCHARGED
30 minute summer	S5	20	163.448	0.872	46.5	0.9859	0.0000	SURCHARGED
30 minute summer	S6L	19	164.025	1.175	56.5	0.1868	0.0000	SURCHARGED
30 minute summer	S6	20	163.392	1.014	91.2	1.1464	0.0000	SURCHARGED
30 minute summer	S7L	20	162.735	1.135	25.3	0.1804	0.0000	FLOOD RISK
30 minute summer	S7	20	162.645	1.531	114.7	2.7055	0.0000	FLOOD RISK
30 minute summer	S8	20	162.144	1.512	111.3	1.7102	0.0000	FLOOD RISK
30 minute summer	S9L	20	161.414	0.964	18.3	0.1532	0.0000	SURCHARGED
30 minute summer	S9	20	161.378	1.421	120.3	1.6070	0.0000	SURCHARGED
30 minute winter	S10	23	160.430	1.037	117.5	1.1731	0.0000	SURCHARGED
30 minute winter	S11L	23	160.063	0.963	131.3	0.1532	0.0000	SURCHARGED
30 minute winter	S11	23	159.824	0.894	132.7	1.5790	0.0000	SURCHARGED
30 minute winter	S12	23	159.623	1.041	255.9	1.8394	0.0000	SURCHARGED
30 minute winter	HW1	25	157.733	1.242	253.2	1.4043	0.0000	OK
30 minute summer	S13L	18	162.280	0.430	36.6	0.0683	0.0000	SURCHARGED
30 minute summer	S13	19	161.816	0.130	62.5	0.2292	0.0000	OK
30 minute summer	S14L	19	161.135	0.960	56.0	0.2716	0.0000	SURCHARGED
30 minute summer	S14	19	161.035	0.995	134.6	1.7581	0.0000	SURCHARGED
30 minute summer	S15L	19	160.400	0.425	29.6	0.0676	0.0000	SURCHARGED
30 minute summer	S15	19	160.225	0.900	152.2	1.0184	0.0000	SURCHARGED
30 minute summer	S16L	18	159.779	0.079	25.3	0.0126	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	S1L	S1L	S1	9.2	1.777	0.197	0.0653	
30 minute summer	S1	1.000	S2	25.5	0.967	0.642	0.7775	
30 minute summer	S2	1.001	S3	23.9	0.817	0.600	0.6337	
30 minute summer	S3	1.002	S4	31.7	0.942	0.800	0.6719	
30 minute summer	S4	1.003	S5	40.3	1.108	1.013	1.9215	
30 minute summer	S5	1.004	S6	50.2	1.481	0.851	0.4882	
30 minute summer	S6L	S6L	S6	51.0	2.895	1.135	0.1109	
30 minute summer	S6	1.005	S7	87.1	2.495	0.756	1.0340	
30 minute summer	S7L	S7L	S7	21.1	2.010	0.451	0.1056	
30 minute summer	S7	1.006	S8	101.3	2.730	0.814	0.3381	
30 minute summer	S8	1.007	S9	107.3	2.698	0.901	0.5170	
30 minute summer	S9L	S9L	S9	15.9	1.759	0.292	0.0792	
30 minute summer	S9	1.008	S10	119.1	2.995	1.109	0.5311	
30 minute winter	S10	1.009	S12	117.3	3.242	0.910	0.4808	
30 minute winter	S11L	S11L	S11	129.8	2.096	0.980	0.8450	
30 minute winter	S11	2.000	S12	128.9	2.815	0.565	0.5858	
30 minute winter	S12	1.010	HW1	253.2	3.596	0.898	2.0775	
30 minute winter	HW1	Flow through Pond	HW3	226.8	0.119	0.003	462.6590	
30 minute summer	S13L	S13L	S13	36.6	2.077	1.687	0.1046	
30 minute summer	S13	3.000	S14	61.4	1.861	0.524	1.0388	
30 minute summer	S14L	S14L	S14	52.3	1.430	0.669	0.2386	
30 minute summer	S14	3.001	S15	125.9	3.166	0.904	0.3587	
30 minute summer	S15L	S15L	S15	27.1	2.348	0.478	0.0880	
30 minute summer	S15	3.002	S16	149.3	2.279	1.417	3.0104	
30 minute summer	S16L	S16L	S16	25.3	2.886	0.447	0.0592	

Results for 100 year +40% CC Critical Storm Duration. Lowest mass balance: 99.64%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	S16	19	159.075	0.200	172.5	0.2266	0.0000	OK
480 minute winter	HW2	472	157.661	1.170	24.6	1.3235	0.0000	OK
30 minute summer	1	19	162.335	0.969	46.3	1.0960	0.0000	SURCHARGED
30 minute summer	2	19	161.547	0.955	39.3	1.0805	0.0000	SURCHARGED
30 minute summer	3	19	161.482	1.025	136.0	1.1596	0.0000	SURCHARGED
30 minute summer	4	19	161.047	0.165	64.1	0.1866	0.0000	OK
30 minute winter	5	22	160.959	0.959	186.4	1.0842	0.0000	SURCHARGED
30 minute winter	6	22	160.768	1.368	209.8	1.5472	3.2337	FLOOD
30 minute winter	7	23	160.438	1.188	105.4	1.3436	0.0000	FLOOD RISK
30 minute winter	8	23	160.182	1.032	105.8	1.1666	0.0000	FLOOD RISK
480 minute winter	HW3	472	157.661	1.186	49.3	1.3416	0.0000	SURCHARGED
480 minute winter	S17 FCU	472	157.657	1.557	19.0	8.9145	0.0000	SURCHARGED
30 minute summer	HW4	1	155.230	0.000	9.7	0.0000	0.0000	OK
30 minute winter	Depth/Area 1	23	160.775	1.325	137.4	66.0413	0.0000	FLOOD RISK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	S16	3.005	HW2	172.5	3.187	0.783	3.3008	
480 minute winter	HW2	Flow through Pond	HW3	49.3	0.035	0.001	769.8333	
30 minute summer	1	10.000	3	41.7	2.609	0.926	0.2106	
30 minute summer	2	11.000	3	35.7	0.990	0.845	0.3593	
30 minute summer	3	10.001	5	132.7	1.906	1.092	2.6931	
30 minute summer	4	12.000	5	62.7	2.578	0.491	0.4813	
30 minute winter	5	10.002	6	182.6	2.593	0.684	0.7383	
30 minute winter	6	10.003	7	103.8	1.475	1.453	2.5318	
30 minute winter	7	10.004	8	105.8	1.502	1.474	1.6727	
30 minute winter	8	5.005	S11L	105.9	1.520	1.171	0.5296	
480 minute winter	HW3	1.011	S17 FCU	19.0	0.885	0.168	0.3182	
480 minute winter	S17 FCU	Hydro-Brake®	HW4	9.7				381.8
30 minute winter	Depth/Area 1	8.000	6	-137.4	-1.951	-1.805	0.7450	

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