

CampbellReith
consulting engineers

Kilnwood Vale

Phase 4 Drainage Strategy

For
Crest Strategic Projects

Project No.
11950

Date
October 2023

Campbell Reith Hill LLP
Unit 5.03 HERE
470 Bath Road
Bristol BS4 3AP

T: +44 (0)117 916 1066
E: bristol@campbellreith.com
W: www.campbellreith.com

DOCUMENT HISTORY AND STATUS

Revision	Date	Purpose/ Status	File Ref	Author	Check	Review
P1	18/08/2023	Preliminary	11950-Phase 4 Drainage Report P1.docx	Nicholas Bond	Pete Tamblin	James Clay
P2	26/10/2023	Preliminary	11950-Phase 4 Drainage Report P2.docx	Nicholas Bond	Pete Tamblin	James Clay

This document has been prepared in accordance with the scope of Campbell Reith Hill LLP's (CampbellReith) appointment with its client and is subject to the terms of the appointment. It is addressed to and for the sole use and reliance of CampbellReith's client. CampbellReith accepts no liability for any use of this document other than by its client and only for the purposes, stated in the document, for which it was prepared and provided. No person other than the client may copy (in whole or in part) use or rely on the contents of this document, without the prior written permission of Campbell Reith Hill LLP. Any advice, opinions, or recommendations within this document should be read and relied upon only in the context of the document as a whole. The contents of this document are not to be construed as providing legal, business or tax advice or opinion.

© Campbell Reith Hill LLP 2023

Document Details

Last Saved	26/10/2023 10:01
Author	Nicholas Bond
Project Partner	James Clay
Project Number	11950
Project Name	Kilnwood Vale
Revision	P2
File Ref	11950-Phase 4&5 Drainage Report P1.docx

CONTENTS

1.0 Introduction 4
2.0 Phase 4 development 5
2.1 Existing Site 5
2.2 Proposed Development 5
3.0 Initial Drainage Design 7
3.1 Overall Drainage Design 7
3.2 Surface Water Drainage 7
4.0 Surface Water Drainage Design 8
4.1 Surface Water Runoff Rates 8
4.2 SuDS Features 8
4.3 Surface Water Design Parameters 8
4.4 Impermeable Areas 8
4.5 Proposed Surface Water Drainage Strategy 9
5.0 Foul Water Drainage Design 11
5.1 Foul Water Drainage 11
5.2 Foul Drainage Design Parameters 11
5.3 Proposed Foul Drainage Strategy 11
6.0 Conclusion 12

APPENDICES

Appendix 1 Location Plan 13
Appendix 2 Topographical Survey 14
Appendix 3 Proposed Development Plans 15
Appendix 4 Surface Water MicroDrainage Calculations 16
Appendix 5 Surface Water Catchment Plan 17
Appendix 6 Drainage Strategy 18
Appendix 7 Overland Flood Routes Plan 19

TABLES

Table 4.1 - Extract of Table 9 of FRA 8
Table 4.2 - Surface Water Impermeable Areas 9
Table 4.3 - Proposed Discharge Rates 10
Table 4.5 - Discharge Flow Controls Summary 10

FIGURES

Figure 2.1: Phase 4 & 5 Location Plan 5

1.0 INTRODUCTION

1.1.1 This report has been prepared by CampbellReith to support the Reserve Matters application for Phase 4 of the wider Kilnwood Vale site in Crawley, RH12 0AQ, in accordance with Outline Planning reference DC/15/2813. It provides the detailed design and calculations for the drainage infrastructure that is to be constructed within the Phase 4 section of works.

1.1.2 The detailed drainage design for Phase 4 has been developed based on the drainage strategy detailed in the CampbellReith report titled 'Kilnwood Vale site wide drainage strategy report' (revision D5, December 2016) that was presented as a part of the information used in discharging condition 22 of planning application reference DC/15/2813. Readers of this report should be acquainted with this document.

1.1.3 The Phase 4 portions are sited north of the existing railway line, which forms a natural break in the catchment areas. The phase will be connected to the main development via a new overbridge, providing road and pedestrian links as well as carrying the required services.

2.0 PHASE 4 DEVELOPMENT

2.1 Existing Site

2.1.1 The Phase 4 portion of the Kilnwood Vale development, herein referred to as “the site”, is located north of the existing Crawley to Horsham railway line. The site is centred on Grid Reference TQ 23208 35560. The nearest postcode is RH12 0AT. The site boundary encompasses an area of 16.88ha.

2.1.2 Refer to Figure 1 below and drawing 11950-KV-SK100 in Appendix 1, for a site location plan indicating the Phase 4 site in context of the full site-wide Kilnwood Vale development.

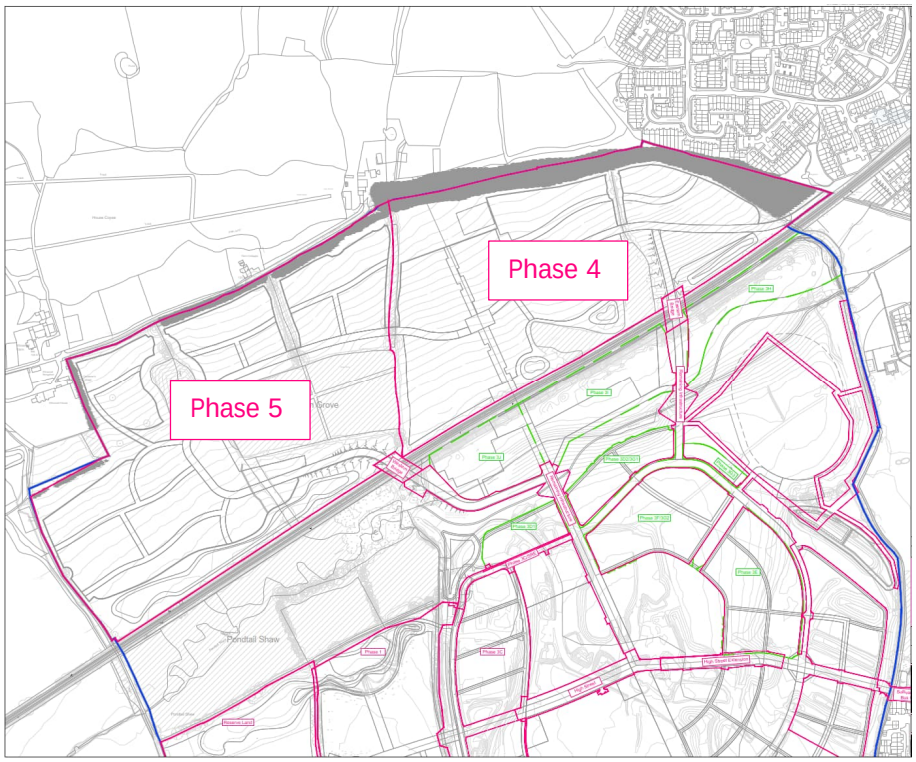


Figure 2.1: Phase 4 & 5 Location Plan

2.1.3 The existing site is entirely greenfield. The majority of the land is utilised for agricultural purposes. The remaining land is woodland, covering circa 4ha of the site.

2.1.4 As shown by the topographical survey undertaken by CD Surveys in March 2023, The site topography generally falls to the south, from circa 100mAOD along the northern boundary to circa 77mAOD along the railway.

2.1.5 Refer to Appendix 2 for the Topographical Survey.

2.2 Proposed Development

2.2.1 The site proposals include construction of 341 dwellings, predominantly detached and semi-detached houses with 34 apartment blocks. The development encompasses all associated primary and access roads, driveways, private gardens and public open spaces.

2.2.2 Refer to Appendix 3 for proposed the development masterplan.

2.2.3 Access to the site will be predominantly via a new railway bridge linking from the main Kilnwood vale development. The railway bridge is subject to a separate Reserve Matters application.

2.2.4 The Phase 4 proposed highway layout is shown on drawings 11950-CRH-4&5-XX-DR-C-5003, included in Appendix 3. The total length of road will be approximately 2.83km, with varying carriageway widths, predominantly 5.50m and 4.80m wide. Throughout the phase, there is a varying combination of verge widths (0m, 2m or 3m) and footway widths (0m, 2m or 3m if a shared footway/cycleway).

3.0 INITIAL DRAINAGE DESIGN

3.1 Overall Drainage Design

3.1.1 The overall foul and surface drainage strategy plans for the Kilnwood Vale site were developed as part of the CampbellReith report titled 'Kilnwood Vale Site Wide Drainage Strategy Report'. Due to the separated nature of Phase 4, no designs were progressed beyond the railway.

3.1.2 The extent of drainage design covered by this report is shown by the redline boundary of Phases 4 in Figure 2.1 on Page 5 and in Appendix 1.

3.2 Flood Risk

3.2.1 Flood Risk for the entire site was assessed as part of the Site Wide Flood Risk Assessment, as undertaken by SLR in July 2010. The report sets out that the site lies within Flood Zone 1, at low risk of fluvial flooding. The nearest local watercourse the Bewbush Brook is the most likely cause of fluvial flooding. The water levels from the Bewbush Brook are stated to remain 'in bank' for the for the 1% annual probability (1 in 100 year). The report also states that the land north of the railway may be at minor risk of overland flows from areas of higher ground. Other potential flooding sources have been considered within the report such as tidal flooding; groundwater flooding; existing infrastructure and artificial drainage. The development is considered to be at no risk from these sources.

3.3 Surface Water Drainage

3.3.1 Preliminary SuDS design was undertaken as part of the aforementioned Site Wide FRA. For Phase 4, the report sets out a network of three attenuation ponds situated along the low-lying southern boundary, with a fourth situated within Phase 5. The ponds are intended to collect and attenuate flows from across the site, before discharging at a controlled rate through existing railway culverts. Three of the four ponds are specified as having a permanent water level. The report comments that the design intends to maintain the existing hydrological regime either side of the railway to minimise impact.

4.0 SURFACE WATER DRAINAGE DESIGN

4.1 Surface Water Runoff Rates

4.1.1 The greenfield runoff rates were determined in the Site Wide Flood Risk Assessment, as undertaken by SLR in July 2010. An extract of information from page 24 of the FRA is reproduced in Table 4.1 below.

	Return Period (years)		
	2	30	100
Greenfield Runoff (l/s/ha)	4.8 l/s/ha	12.4 l/s/ha	17.4 l/s/ha
Catchment North of Railway – 39ha (l/s)	187.5 l/s	482.3 l/s	678.8 l/s
Catchment Phase 4 – 16.88ha (l/s)	81.024 l/s	209.3 l/s	293.7 l/s

Table 4.1 - Extract of Table 9 of FRA

4.1.2 In line with the Site Wide Drainage Strategy, all surface water within the Phase 4 site will be collected, attenuated and discharged to the Bewbush Brook watercourse, located south of the railway, at no higher than the above rates.

4.2 SuDS Features

4.2.1 In line with the approved FRA prepared by SLR, the primary SuDS features incorporated across the site are a number of large attenuation ponds with shallow side slopes. The FRA sets out three separate ponds to be included within Phase 4, with sufficient capacity to attenuate flows during rainfall events to maintain the greenfield runoff discharge rates.

4.2.2 Three proposed attenuation ponds are to have permanent water levels, to provide enhanced biodiversity and amenity value.

4.3 Surface Water Design Parameters

4.3.1 The surface water drainage design has been undertaken with MicroDrainage software. Calculations have used the FEH 2013 rainfall-runoff method. The surface roughness (Ks) value used in the design of surface water sewers is 0.6mm as stipulated in Sewers for Adoption. The full design criteria used for the modelling are included in the MicroDrainage calculations included in Appendix 4.

4.3.2 Refer to Appendix 4 for MicroDrainage calculations.

4.4 Impermeable Areas

4.4.1 Impervious areas are assumed to take up 60% of the total proposed development area. An additional 10% allowance has been incorporated to account for urban creep. The total impermeable areas split by the catchment for each pond are summarised in Table 4.2 below.

4.4.2 Refer to Appendix 5 for the full Contributing Areas plan.

Pond	Total Development Area (ha)	Total Impermeable Area (ha)	With 10% allowance for Urban Creep (ha)
N1 (Phase 4 portion)	2.09 ha	1.25 ha	1.38 ha
N2A	1.73 ha	1.04 ha	1.14 ha
N2B	1.54 ha	0.92 ha	1.02 ha
N3	3.80 ha	2.28 ha	2.51 ha
Total	9.16 ha	5.49 ha	6.05 ha

Table 4.2 - Surface Water Impermeable Areas

4.5 Proposed Surface Water Drainage Strategy

4.5.1 Flows will be collected from roofs by downpipes, and from impervious road areas by gullies & linear channels. Collected flows will be conveyed by gravity through an underground pipe network to the attenuation ponds located along the southern boundary, before discharging through existing railway culverts to infrastructure constructed as part of the main Kilnwood Vale development.

4.5.2 Refer to Appendix 6 for the proposed drainage strategy plans.

4.5.3 The surface water drainage calculations undertaken in MicroDrainage show that there is no surcharging in the 1 in 1 year flows in most of the pipes, and no flooding is expected in the sewers for rainfall events up to the 1 in 100 year storm event.

4.5.4 Under a 1 in 100 year +30% climate change event, there are 5 manholes that show flooding under intense winter rainfall. In all instances the flooding is below $10m^3$. As such, it is the expectation that the surface water will be directed at very shallow depths in road corridors as shown by the flood routes on drawings 11950-CRH-4&5-XX-DR-C-5056 to 5058. The overland flow generated is to be directed to the next gully with available capacity.

4.5.5 Refer to Appendix 4 for MicroDrainage calculations. Refer to Appendix 7 for the Overland Flood Routes plans.

4.5.6 All overland flows that pass through Phase 4 will be collected to one of four attenuation ponds, located at the lowest elevation along the southern edge of the site adjacent to the railway. The ponds will also serve to intercept any flows before reaching the railway.

4.5.7 The ponds have been sized with sufficient capacity to accommodate all flows collected during a 1 in 100 year +30% climate change storm whilst discharging at the greenfield runoff rate, as summarised in Table 4.3 on the next page.

Storm Event	Pond			
	N2A	N2B	N3	Total
1 in 2 year	5.0 l/s	5.8 l/s	11.9 l/s	22.7 l/s
1 in 30 year	12.0 l/s	12.5 l/s	28.8 l/s	53.3 l/s
1 in 100 year +30% cc	17.2 l/s	17.9 l/s	42.3 l/s	77.4 l/s

Table 4.3 - Proposed Discharge Rates

4.5.8 Discharge from the ponds will be controlled by Complex Flow Control devices. Each outfall is controlled by two Orifice Plates, placed at differing invert levels. The orifices have been sized to maintain the greenfield runoff rates as determined by the SLR FRA, whilst maintaining openings no smaller than 75mm to reduce the risk of blockages. A summary of the proposed outflow controls is included in Table 4.5 below.

Flow Control		Network		
		N2A	N2B	N3
Upper Control	Device	Orifice plate Diameter 75mm	Orifice plate Diameter 80mm	Orifice plate Diameter 129mm
	Invert Level	76.345m	76.211m	76.567m
Lower Control	Device	Hydrobrake MD-SHE-0114-5000-0400-5000	Orifice plate Diameter 75mm	Orifice plate Diameter 98mm
	Invert Level	76.000m	76.000m	76.300m

Table 4.4 - Discharge Flow Controls Summary

4.5.9 Discharged flows will be conveyed through further gravity pipes to existing culverts beneath the railway. Once south of the railway, flows will be conveyed by drainage infrastructure constructed as part of Phases 3DEFG, 3H, 3I & 3J, and the Remaining Infrastructure phase. This infrastructure conveys the flows away from the railway and discharges directly to the realigned Bewbush Brook. Refer to Section 15.3 of the Flood Risk Assessment, and the CampbellReith “Remaining Infrastructure Drainage Report” for more information.

5.0 FOUL WATER DRAINAGE DESIGN

5.1 Foul Water Drainage

5.1.1 The foul water infrastructure to serve Phase 4 will provide gravity connections from all plots. Flows will be collected at one of two pumping stations located at the lowest portion of the site, which will pump via rising mains over the proposed railway bridges into the drainage infrastructure constructed in the Remaining Infrastructure phase. Overall, 722 dwellings will be served by the foul water infrastructure across Phases 4 and 5, consisting of 635 houses and 87 apartments.

5.2 Foul Drainage Design Parameters

5.2.1 For all dwellings, the assumed discharge rate per person is 222 litres/day, with a peaking factor of 6 and assumed occupancy of 3 people per dwelling, in line with guidance.

5.2.2 The pipes have been sized to convey the peak foul water flow generated by the proposed development within the foul sewer catchment. All pipe gradients have been designed to achieve a self-cleansing velocity of 0.75m/s at one-third design flow or to satisfy the criterion of Sewers for Adoption which states that:

a) a 150 mm nominal internal diameter gravity sewer is laid to a gradient not flatter than 1:150 where there are at least ten dwelling units connected; or,

b) a sewer or lateral drain with a nominal internal diameter of 100 mm, or lateral drain serving ten or less properties is laid to a gradient not flatter than 1:80, where there is at least one WC connected and 1:40 if there is no WC connected.

5.2.3 The design has been verified that the pipes designed can convey the peak flows, and also either achieve the required self-cleansing velocity or satisfy the design guidance criterion.

5.3 Proposed Foul Drainage Strategy

5.3.1 Flows from all properties located within Phase 4 will be collected and conveyed by one of two underground gravity drainage networks. The eastern network collects from 188 houses, and heads east. The western network collects from the remainder of Phase 4 and heads west through Phase 5, serving a total of 447 houses and 87 flats, totalling 534 properties. At the lowest points of each network will be sited a pumping station, numbered PS4 and PS5 respectively. Each station will pump collected flows through a 160mm diameter rising main. The rising mains leave the site to the south.

5.3.2 Refer to Appendix 6 for the proposed Phase 4 drainage strategy plan.

5.3.3 Beyond the site boundary the Rising Mains cross over the railway, utilising the proposed road bridge structures. Beyond the bridges they connect to the Rising Mains and further gravity foul water drainage network constructed as part of the Remaining Infrastructure phase.

5.3.4 Refer to the CambellReith “Remaining Infrastructure Drainage Report” for further information regarding the off-site Rising Mains.

6.0 CONCLUSION

6.1.1 CampbellReith have been commissioned to provide a drainage strategy for the Phase 4 portion of the Kilnwood Vale residential development in Crawley, West Sussex.

6.1.2 The site is a 16.88ha greenfield site, with proposals to construct 341 dwellings and associated access road, private gardens and public open spaces.

6.1.3 CampbellReith have designed the foul and surface water networks in accordance with Design Construction Guidance.

6.1.4 Surface water calculations show that the proposed sewer network has adequate capacity to convey and discharge all storm water for events up to and including the 1 in 100 year event. At the 1 in 100 year +30% climate change event some flooding occurs at upstream portions of the network, where it is expected any excess surface water will be channelled by the roads to the nearest gully with capacity, or the attenuation ponds along the southern edge of the site.

6.1.5 The three attenuation ponds within the phase are shown to have sufficient capacity to store water up the 1 in 100 year +30% climate change storm event, whilst discharging flows at no higher than the greenfield runoff rate.

6.1.6 Foul water calculations show that the proposed sewer network have the capacity to convey the peak flows whilst achieving a self-cleansing velocity of 0.75m/s at one-third design flow or satisfying the criteria of Sewers for Adoption.

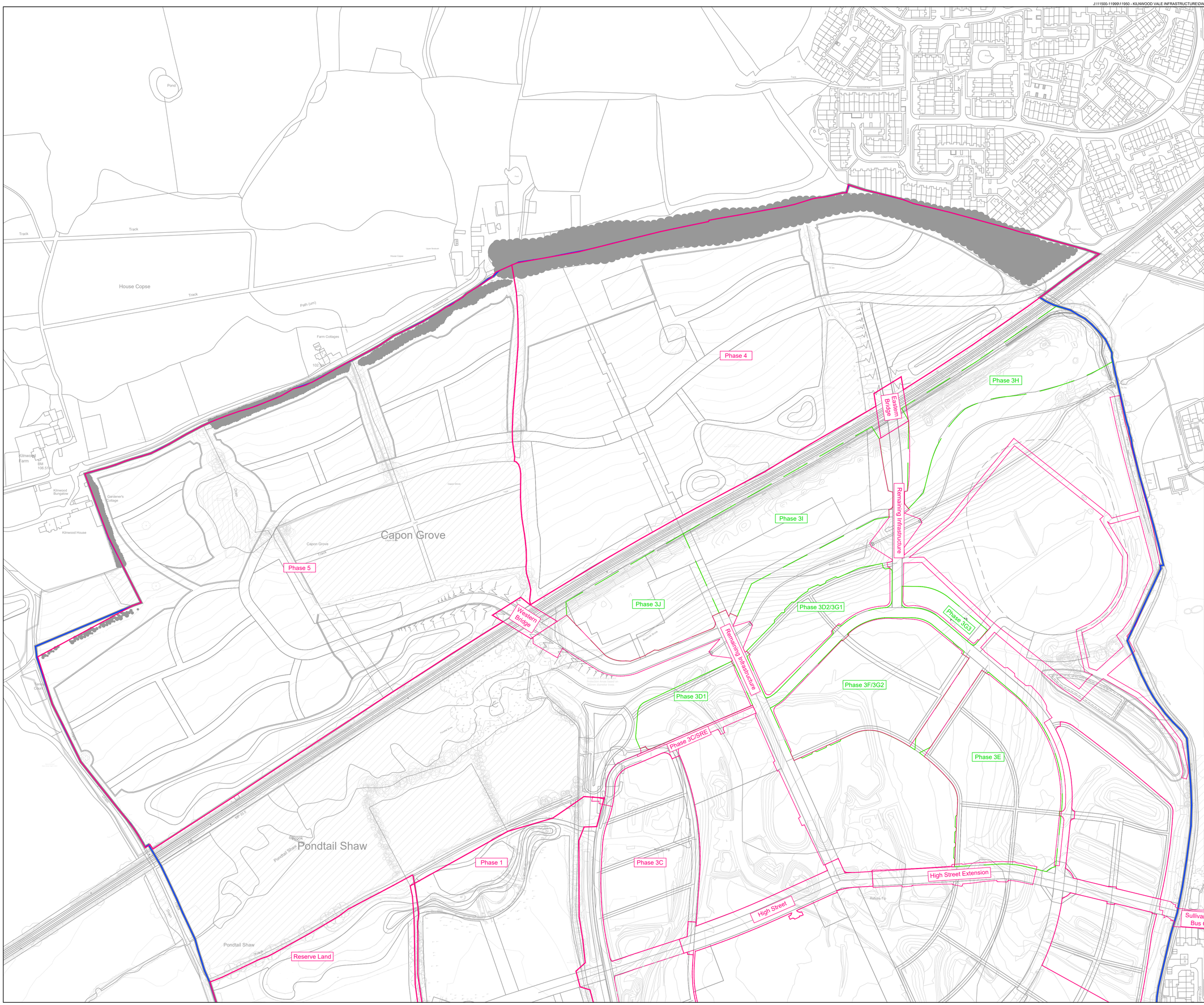


CampbellReith
consulting engineers

Appendix 1

Location Plan

11950-KV-SK100



Notes

1. Do not scale from this drawing on print or electronically. Work from figured dimensions only.
2. No deviation from the details on this drawing is allowed without CampbellReith's prior permission in writing.
3. Read this drawing with all Architect's, Service Engineer's and CampbellReith's relevant details, specifications and drawings.
4. All work is to be done in accordance with the relevant specifications issued by CampbellReith, British Standard Codes of Practice, Statutory Requirements and the Contract Documents.
5. Drawing revision:

   P: Preliminary — Evolving drawings for approvals, tenders, billings etc.

   C: Contractual — Drawings authorized and approved for stage completion i.e. Stage-Tender or Stage 5-Construction.

6. Drawing status:

   Work in progress
   S0 - Initial status
   Shared (Non-contractual)
   S1 - Suitable for coordination, **S2** - Suitable for information, **S3** - Suitable for review and comment, **S4** - Suitable for stage approval.
   Published (For contractors purposes)
   A1, An etc - Authorised and accepted ('n' relates to work stages)
   B1, Bn etc - Partial sign-off (with comments)
   CR - As constructed record document (Final Construction ONLY. Any deviations to that which is on site is not the liability of CampbellReith)

7. Work Stages:

   2 - Concept, **3** - Definition, **4** - Design, **5** - Build & commission, **6** - Handover

8. Only drawings with **revision Cn and status A5 to be used for Construction.**

LEGEND

- Overall Site Boundary
- Phase Boundary
- Sub Boundary

Rev	Description	Date	By
P1	Issued for information	15.08.23	NB

CampbellReith
consulting engineers

London 020 7340 1700 | Manchester 0161 819 3060
Surrey 01737 784 500 | Birmingham 01675 467 484
Bristol 0117 916 1066 | Dubai 00 971 4345 7088
www.campbellreith.com

Job Title
Kilnwood Vale, Crawley

Client
Crest Nicholson

Combined Redlines Sketch

Drawn by	Date made	Scale @ A1	Checked by	Suitability	CR Project
NB	14.08.23	1:2000		S1	11950

Project No.	Originator	Volume	Lvl/Loc	Type	Role	Number	Rev
11950	CRH	KV	XX	SK	C	200	P1

© CampbellReith Hill LLP 2022



CampbellReith
consulting engineers

Appendix 2

Topographical Survey

J:\11500-11999\11950 - KILNWOOD VALE INFRASTRUCTURE\DWGS\2-CIVILS\1-AUTOCAD\1-WORKING DRAWINGS\3-DRAWINGS\PHASE 4 AND 5\11950-CRH-4&5-XX-DR-C-4001-4003 TOPOGRAPHICAL SURVEY.DWG

N

Sheet 2

Sheet 3

Sheet 3
Inset 1

Sheet 3
Inset 1

Keyplan
Scale 1:10,000

Inset 1

Notes

1. Do not scale from this drawing on print or electronically. Work from figured dimensions only.
2. No deviation from the details on this drawing is allowed without CampbellReith's prior permission in writing.
3. Read this drawing with all Architect's, Service Engineer's and CampbellReith's relevant details, specifications and drawings.
4. All work is to be done in accordance with the relevant specifications issued by CampbellReith, British Standard Codes of Practice, Statutory Requirements and the Contract Documents.
5. Drawing revision:
   P: Preliminary Evolving drawings for approvals, tenders, billings etc.
   C: Contractual Drawings authorized and approved for stage completion i.e. Stage-Tender or Stage 5-Construction.
6. Dawing status:
   Work in progress
   S0 - Initial status
   Shared (Non-contractual)
   S1 - Suitable for coordination, **S2** - Suitable for information, **S3** - Suitable for review and comment, **S4** - Suitable for stage approval.
   Published (For contractors purposes)
   A1, An etc - Authorised and accepted ('n' relates to work stages)
   B1, Bn etc - Partial sign-off (with comments)
   CR - As constructed record document (Final Construction ONLY. Any deviations to that which is on site is not the liability of CampbellReith)
7. Work Stages:
   2 - Concept, **3** - Definition, **4** - Design, **5** - Build & commission, **6** - Handover
8. Only drawings with **revision Cn and status A5 to be used for Construction.**

Topographical Survey undertaken by CD Surveys.
Dated March 2023. Reference number CR2302046.

Rev	Description	Date	By
P1	Issued for Information	18.08.23	NB

Job Title: Kilnwood Vale, Phase 4

Client: Crest Nicholson

Topographical Survey
Sheet 3

Drawn by	Date made	Scale @ A0	Checked by	Suitability	CR Project
NB	18.08.23	1:500		S2	11950

CampbellReith
consulting engineers

London 020 7340 1700 | Manchester 0161 819 3060
Surrey 01737 784 500 | Birmingham 01675 467 484
Bristol 0117 916 1066 | Dubai 00 971 4345 7088
www.campbellreith.com

Project No.	Originator	Volume	Lvl/Loc	Type	Role	Number	Rev
11950	CRH	4&5	XX	DR	C	4003	P1

© CampbellReith Hill LLP 2022



CampbellReith
consulting engineers

Appendix 3

Proposed Development Plans

\\BRI-DATA\JOBS\11500-11999\11950 - KILNWOOD VALE INFRASTRUCTURE\DWGS\2-CIVIL S1\1-AUTOCAD-1-WORKING DRAWINGS\3-DRAWINGS\PHASE 4 AND S1\1950-CRH-4&5-XX-DR-C-5001-5003 - GENERAL ARRANGEMENT.DWG

Sheet 2

Sheet 3

Inset 1

Foul Pumping Station and Access

PUMPING STATION

Keyplan
Scale 1:10,000

Inset 1

Notes

1. Do not scale from this drawing on print or electronically. Work from figured dimensions only.
2. No deviation from the details on this drawing is allowed without CampbellReith's prior permission in writing.
3. Read this drawing with all Architect's, Service Engineer's and CampbellReith's relevant details, specifications and drawings.
4. All work is to be done in accordance with the relevant specifications issued by CampbellReith, British Standard Codes of Practice, Statutory Requirements and the Contract Documents.
5. Drawing revision:
   P: Preliminary — Evolving drawings for approvals, tenders, billings etc.
   C: Contractual — Drawings authorized and approved for stage completion i.e. Stage-Tender or Stage 5-Construction.
6. Drawing status:
   Work in progress
   S0 - Initial status
   Shared (Non-contractual)
   S1 - Suitable for coordination, **S2** - Suitable for information, **S3** - Suitable for review and comment, **S4** - Suitable for stage approval.
   Published (For contractors purposes)
   A1, An etc - Authorised and accepted ('n' relates to work stages)
   B1, Bn etc - Partial sign-off (with comments)
   CR - As constructed record document (Final Construction ONLY. Any deviations to that which is on site is not the liability of CampbellReith)
7. Work Stages:
   2 - Concept, **3** - Definition, **4** - Design, **5** - Build & commission, **6** - Handover
8. Only drawings with **revision Cn and status A5 to be used for Construction.**

Site Boundary

Rev	Description	Date	By
P2	Added Dimentions	18.08.23	PT
P1	Issued for Information	04.08.23	PT

Job Title: Kilnwood Vale, Phase 4

Client: Crest Nicholson

General Arrangement

Drawn by	Date made	Scale @ A0	Checked by	Suitability	CR Project
PT	01.08.23	1:500		S2	11950

CampbellReith consulting engineers

London 020 7340 1700 | Manchester 0161 819 3060
Surrey 01737 784 500 | Birmingham 01675 467 484
Bristol 0117 916 1066 | Dubai 00 971 4345 7088
www.campbellreith.com

Project No.	Originator	Volume	Lvl/Loc	Type	Role	Number	Rev
11950	CRH	4&5	XX	DR	C	5003	P2

© CampbellReith Hill LLP 2022



CampbellReith
consulting engineers

Appendix 4

Surface Water MicroDrainage Calculations


N3S42
S8.000
N3S43
S8.001
N3S44
S8.002
N3S45
S8.003
N3S46
S8.004
N3S47
S8.005
N3S48
S8.006
N3S49
S8.007
N3S50
S8.008
N3S51
S8.009
N3S52
S8.010
N3S53
S8.011
N3S54
S8.012
N3S55
S8.013
N3S56
S8.014
N3S57
S8.015
N3S58
S8.016
N3S59
S8.017
N3S60
S8.018
N3S61
S8.019
N3S62
S8.020
N3S63
S8.021
N3S64
S8.022
N3S65
S8.023
N3S66
S8.024
N3S67
S8.025
N3S68
S8.026
N3S69
S8.027
N3S70
S8.028
N3S71
S8.029
N3S72
S8.030
N3S73
S8.031
N3S74
S8.032
N3S75
S8.033
N3S76
S8.034
N3S77
S8.035
N3S78
S8.036
N3S79
S8.037
N3S80
S8.038
N3S81
S8.039
N3S82
S8.040
N3S83
S8.041
N3S84
S8.042
N3S85
S8.043
N3S86
S8.044
N3S87
S8.045
N3S88
S8.046
N3S89
S8.047
N3S90
S8.048
N3S91
S8.049
N3S92
S8.050
N3S93
S8.051
N3S94
S8.052
N3S95
S8.053
N3S96
S8.054
N3S97
S8.055
N3S98
S8.056
N3S99
S8.057
N3S100
S8.058
N3S101
S8.059
N3S102
S8.060
N3S103
S8.061
N3S104
S8.062
N3S105
S8.063
N3S106
S8.064
N3S107
S8.065
N3S108
S8.066
N3S109
S8.067
N3S110
S8.068
N3S111
S8.069
N3S112
S8.070
N3S113
S8.071
N3S114
S8.072
N3S115
S8.073
N3S116
S8.074
N3S117
S8.075
N3S118
S8.076
N3S119
S8.077
N3S120
S8.078
N3S121
S8.079
N3S122
S8.080
N3S123
S8.081
N3S124
S8.082
N3S125
S8.083
N3S126
S8.084
N3S127
S8.085
N3S128
S8.086
N3S129
S8.087
N3S130
S8.088
N3S131
S8.089
N3S132
S8.090
N3S133
S8.091
N3S134
S8.092
N3S135
S8.093
N3S136
S8.094
N3S137
S8.095
N3S138
S8.096
N3S139
S8.097
N3S140
S8.098
N3S141
S8.099
N3S142
S8.100
N3S143
S8.101
N3S144
S8.102
N3S145
S8.103
N3S146
S8.104
N3S147
S8.105
N3S148
S8.106
N3S149
S8.107
N3S150
S8.108
N3S151
S8.109
N3S152
S8.110
N3S153
S8.111
N3S154
S8.112
N3S155
S8.113
N3S156
S8.114
N3S157
S8.115
N3S158
S8.116
N3S159
S8.117
N3S160
S8.118
N3S161
S8.119
N3S162
S8.120
N3S163
S8.121
N3S164
S8.122
N3S165
S8.123
N3S166
S8.124
N3S167
S8.125
N3S168
S8.126
N3S169
S8.127
N3S170
S8.128
N3S171
S8.129
N3S172
S8.130
N3S173
S8.131
N3S174
S8.132
N3S175
S8.133
N3S176
S8.134
N3S177
S8.135
N3S178
S8.136
N3S179
S8.137
N3S180
S8.138
N3S181
S8.139
N3S182
S8.140
N3S183
S8.141
N3S184
S8.142
N3S185
S8.143
N3S186
S8.144
N3S187
S8.145
N3S188
S8.146
N3S189
S8.147
N3S190
S8.148
N3S191
S8.149
N3S192
S8.150
N3S193
S8.151
N3S194
S8.152
N3S195
S8.153
N3S196
S8.154
N3S197
S8.155
N3S198
S8.156
N3S199
S8.157
N3S200
S8.158
N3S201
S8.159
N3S202
S8.160
N3S203
S8.161
N3S204
S8.162
N3S205
S8.163
N3S206
S8.164
N3S207
S8.165
N3S208
S8.166
N3S209
S8.167
N3S210
S8.168
N3S211
S8.169
N3S212
S8.170
N3S213
S8.171
N3S214
S8.172
N3S215
S8.173
N3S216
S8.174
N3S217
S8.175
N3S218
S8.176
N3S219
S8.177
N3S220
S8.178
N3S221
S8.179
N3S222
S8.180
N3S223
S8.181
N3S224
S8.182
N3S225
S8.183
N3S226
S8.184
N3S227
S8.185
N3S228
S8.186
N3S229
S8.187
N3S230
S8.188
N3S231
S8.189
N3S232
S8.190
N3S233
S8.191
N3S234
S8.192
N3S235
S8.193
N3S236
S8.194
N3S237
S8.195
N3S238
S8.196
N3S239
S8.197
N3S240
S8.198
N3S241
S8.199
N3S242
S8.200
N3S243
S8.201
N3S244
S8.202
N3S245
S8.203
N3S246
S8.204
N3S247
S8.205
N3S248
S8.206
N3S249
S8.207
N3S250
S8.208
N3S251
S8.209
N3S252
S8.210
N3S253
S8.211
N3S254
S8.212
N3S255
S8.213
N3S256
S8.214
N3S257
S8.215
N3S258
S8.216
N3S259
S8.217
N3S260
S8.218
N3S261
S8.219
N3S262
S8.220
N3S263
S8.221
N3S264
S8.222
N3S265
S8.223
N3S266
S8.224
N3S267
S8.225
N3S268
S8.226
N3S269
S8.227
N3S270
S8.228
N3S271
S8.229
N3S272
S8.230
N3S273
S8.231
N3S274
S8.232
N3S275
S8.233
N3S276
S8.234
N3S277
S8.235
N3S278
S8.236
N3S279
S8.237
N3S280
S8.238
N3S281
S8.239
N3S282
S8.240
N3S283
S8.241
N3S284
S8.242
N3S285
S8.243
N3S286
S8.244
N3S287
S8.245
N3S288
S8.246
N3S289
S8.247
N3S290
S8.248
N3S291
S8.249
N3S292
S8.250
N3S293
S8.251
N3S294
S8.252
N3S295
S8.253
N3S296
S8.254
N3S297
S8.255
N3S298
S8.256
N3S299
S8.257
N3S300
S8.258
N3S301
S8.259
N3S302
S8.260
N3S303
S8.261
N3S304
S8.262
N3S305
S8.263
N3S306
S8.264
N3S307
S8.265
N3S308
S8.266
N3S309
S8.267
N3S310
S8.268
N3S311
S8.269
N3S312
S8.270
N3S313
S8.271
N3S314
S8.272
N3S315
S8.273
N3S316
S8.274
N3S317
S8.275
N3S318
S8.276
N3S319
S8.277
N3S320
S8.278
N3S321
S8.279
N3S322
S8.280
N3S323
S8.281
N3S324
S8.282
N3S325
S8.283
N3S326
S8.284
N3S327
S8.285
N3S328
S8.286
N3S329
S8.287
N3S330
S8.288
N3S331
S8.289
N3S332
S8.290
N3S333
S8.291
N3S334
S8.292
N3S335
S8.293
N3S336
S8.294
N3S337
S8.295
N3S338
S8.296
N3S339
S8.297
N3S340
S8.298
N3S341
S8.299
N3S342
S8.300
N3S343
S8.301
N3S344
S8.302
N3S345
S8.303
N3S346
S8.304
N3S347
S8.305
N3S348
S8.306
N3S349
S8.307
N3S350
S8.308
N3S351
S8.309
N3S352
S8.310
N3S353
S8.311
N3S354
S8.312
N3S355
S8.313
N3S356
S8.314
N3S357
S8.315
N3S358
S8.316
N3S359
S8.317
N3S360
S8.318
N3S361
S8.319
N3S362
S8.320
N3S363
S8.321
N3S364
S8.322
N3S365
S8.323
N3S366
S8.324
N3S367
S8.325
N3S368
S8.326
N3S369
S8.327
N3S370
S8.328
N3S371
S8.329
N3S372
S8.330
N3S373
S8.331
N3S374
S8.332
N3S375
S8.333
N3S376
S8.334
N3S377
S8.335
N3S378
S8.336
N3S379
S8.337
N3S380
S8.338
N3S381
S8.339
N3S382
S8.340
N3S383
S8.341
N3S384
S8.342
N3S385
S8.343
N3S386
S8.344
N3S387
S8.345
N3S388
S8.346
N3S389
S8.347
N3S390
S8.348
N3S391
S8.349
N3S392
S8.350
N3S393
S8.351
N3S394
S8.352
N3S395
S8.353
N3S396
S8.354
N3S397
S8.355
N3S398
S8.356
N3S399
S8.357
N3S400
S8.358
N3S401
S8.359
N3S402
S8.360
N3S403
S8.361
N3S404
S8.362
N3S405
S8.363
N3S406
S8.364
N3S407
S8.365
N3S408
S8.366
N3S409
S8.367
N3S410
S8.368
N3S411
S8.369
N3S412
S8.370
N3S413
S8.371
N3S414
S8.372
N3S415
S8.373
N3S416
S8.374
N3S417
S8.375
N3S418
S8.376
N3S419
S8.377
N3S420
S8.378
N3S421
S8.379
N3S422
S8.380
N3S423
S8.381
N3S424
S8.382
N3S425
S8.383
N3S426
S8.384
N3S427
S8.385
N3S428
S8.386
N3S429
S8.387
N3S430
S8.388
N3S431
S8.389
N3S432
S8.390
N3S433
S8.391
N3S434
S8.392
N3S435
S8.393
N3S436
S8.394
N3S437
S8.395
N3S438
S8.396
N3S439
S8.397
N3S440
S8.398
N3S441
S8.399
N3S442
S8.400
N3S443
S8.401
N3S444
S8.402
N3S445
S8.403
N3S446
S8.404
N3S447
S8.405
N3S448
S8.406
N3S449
S8.407
N3S450
S8.408
N3S451
S8.409
N3S452
S8.410
N3S453
S8.411
N3S454
S8.412
N3S455
S8.413
N3S456
S8.414
N3S457
S8.415
N3S458
S8.416
N3S459
S8.417
N3S460
S8.418
N3S461
S8.419
N3S462
S8.420
N3S463
S8.421
N3S464
S8.422
N3S465
S8.423
N3S466
S8.424
N3S467
S8.425
N3S468
S8.426
N3S469
S8.427
N3S470
S8.428
N3S471
S8.429
N3S472
S8.430
N3S473
S8.431
N3S474
S8.432
N3S475
S8.433
N3S476
S8.434
N3S477
S8.435
N3S478
S8.436
N3S479
S8.437
N3S480
S8.438
N3S481
S8.439
N3S482
S8.440
N3S483
S8.441
N3S484
S8.442
N3S485
S8.443
N3S486
S8.444
N3S487
S8.445
N3S488
S8.446
N3S489
S8.447
N3S490
S8.448
N3S491
S8.449
N3S492
S8.450
N3S493
S8.451
N3S494
S8.452
N3S495
S8.453
N3S496
S8.454
N3S497
S8.455
N3S498
S8.456
N3S499
S8.457
N3S500
S8.458
N3S501
S8.459
N3S502
S8.460
N3S503
S8.461
N3S504
S8.462
N3S505
S8.463
N3S506
S8.464
N3S507
S8.465
N3S508
S8.466
N3S509
S8.467
N3S510
S8.468
N3S511
S8.469
N3S512
S8.470
N3S513
S8.471
N3S514
S8.472
N3S515
S8.473
N3S516
S8.474
N3S517
S8.475
N3S518
S8.476
N3S519
S8.477
N3S520
S8.478
N3S521
S8.479
N3S522
S8.480
N3S523
S8.481
N3S524
S8.482
N3S525
S8.483
N3S526
S8.484
N3S527
S8.485
N3S528
S8.486
N3S529
S8.487
N3S530
S8.488
N3S531
S8.489
N3S532
S8.490
N3S533
S8.491
N3S534
S8.492
N3S535
S8.493
N3S536
S8.494
N3S537
S8.495
N3S538
S8.496
N3S539
S8.497
N3S540
S8.498
N3S541
S8.499
N3S542
S8.500
N3S543
S8.501
N3S544
S8.502
N3S545
S8.503
N3S546
S8.504
N3S547
S8.505
N3S548
S8.506
N3S549
S8.507
N3S550
S8.508
N3S551
S8.509
N3S552
S8.510
N3S553
S8.511
N3S554
S8.512
N3S555
S8.513
N3S556
S8.514
N3S557
S8.515
N3S558
S8.516
N3S559
S8.517
N3S560
S8.518
N3S561
S8.519
N3S562
S8.520
N3S563
S8.521
N3S564
S8.522
N3S565
S8.523
N3S566
S8.524
N3S567
S8.525
N3S568
S8.526
N3S569
S8.527
N3S570
S8.528
N3S571
S8.529
N3S572
S8.530
N3S573
S8.531
N3S574
S8.532
N3S575
S8.533
N3S576
S8.534
N3S577
S8.535
N3S578
S8.536
N3S579
S8.537
N3S580
S8.538
N3S581
S8.539
N3S582
S8.540
N3S583
S8.541
N3S584
S8.542
N3S585
S8.543
N3S586
S8.544
N3S587
S8.545
N3S588
S8.546
N3S589
S8.547
N3S590
S8.548
N3S591
S8.549
N3S592
S8.550
N3S593
S8.551
N3S594
S8.552
N3S595
S8.553
N3S596
S8.554
N3S597
S8.555
N3S598
S8.556
N3S599
S8.557
N3S600
S8.558
N3S601
S8.559
N3S602
S8.560
N3S603
S8.561
N3S604
S8.562
N3S605
S8.563
N3S606
S8.564
N3S607
S8.565
N3S608
S8.566
N3S609
S8.567
N3S610
S8.568
N3S611
S8.569
N3S612
S8.570
N3S613
S8.571
N3S614
S8.572
N3S615
S8.573
N3S616
S8.574
N3S617
S8.575
N3S618
S8.576
N3S619
S8.577
N3S620
S8.578
N3S621
S8.579
N3S622
S8.580
N3S623
S8.581
N3S624
S8.582
N3S625
S8.583
N3S626
S8.584
N3S627
S8.585
N3S628
S8.586
N3S629
S8.587
N3S630
S8.588
N3S631
S8.589
N3S632
S8.590
N3S633
S8.591
N3S634
S8.592
N3S635
S8.593
N3S636
S8.594
N3S637
S8.595
N3S638
S8.596
N3S639
S8.597
N3S640
S8.598
N3S641
S8.599
N3S642
S8.600
N3S643
S8.601
N3S644
S8.602
N3S645
S8.603
N3S646
S8.604
N3S647
S8.605
N3S648
S8.606
N3S649
S8.607
N3S650
S8.608
N3S651
S8.609
N3S652
S8.610
N3S653
S8.611
N3S654
S8.612
N3S655
S8.613
N3S656
S8.614
N3S657
S8.615
N3S658
S8.616
N3S659
S8.617
N3S660
S8.618
N3S661
S8.619
N3S662
S8.620
N3S663
S8.621
N3S664
S8.622
N3S665
S8.623
N3S666
S8.624
N3S667
S8.625
N3S668
S8.626
N3S669
S8.627
N3S670
S8.628
N3S671
S8.629
N3S672
S8.630
N3S673
S8.631
N3S674
S8.632
N3S675
S8.633
N3S676
S8.634
N3S677
S8.635
N3S678
S8.636
N3S679
S8.637
N3S680
S8.638
N3S681
S8.639
N3S682
S8.640
N3S683
S8.641
N3S684
S8.642
N3S685
S8.643
N3S686
S8.644
N3S687
S8.645
N3S688
S8.646
N3S689
S8.647
N3S690
S8.648
N3S691
S8.649
N3S692
S8.650
N3S693
S8.651
N3S694
S8.652
N3S695
S8.653
N3S696
S8.654
N3S697
S8.655
N3S698
S8.656
N3S699
S8.657
N3S700
S8.658
N3S701
S8.659
N3S702
S8.660
N3S703
S8.661
N3S704
S8.662
N3S705
S8.663
N3S706
S8.664
N3S707
S8.665
N3S708
S8.666
N3S709
S8.667
N3S710
S8.668
N3S711
S8.669
N3S712
S8.670
N3S713
S8.671
N3S714
S8.672
N3S715
S8.673
N3S716
S8.674
N3S717
S8.675
N3S718
S8.676
N3S719
S8.677
N3S720
S8.678
N3S721
S8.679
N3S722
S8.680
N3S723
S8.681
N3S724
S8.682
N3S725
S8.683
N3S726
S8.684
N3S727
S8.685
N3S728
S8.686
N3S729
S8.687
N3S730
S8.688
N3S731
S8.689
N3S732
S8.690
N3S733
S8.691
N3S734
S8.692
N3S735
S8.693
N3S736
S8.694
N3S737
S8.695
N3S738
S8.696
N3S739
S8.697
N3S740
S8.698
N3S741
S8.699
N3S742
S8.700
N3S743
S8.701
N3S744
S8.702
N3S745
S8.703
N3S746
S8.704
N3S747
S8.705
N3S748
S8.706
N3S749
S8.707
N3S750
S8.708
N3S751
S8.709
N3S752
S8.710
N3S753
S8.711
N3S754
S8.712
N3S755
S8.713
N3S756
S8.714
N3S757
S8.715
N3S758
S8.716
N3S759
S8.717
N3S760
S8.718
N3S761
S8.719
N3S762
S8.720
N3S763
S8.721
N3S764
S8.722
N3S765
S8.723
N3S766
S8.724
N3S767
S8.725
N3S768
S8.726
N3S769
S8.727
N3S770
S8.728
N3S771
S8.729
N3S772
S8.730
N3S773
S8.731
N3S774
S8.732
N3S775
S8.733
N3S776
S8.734
N3S777
S8.735
N3S778
S8.736
N3S779
S8.737
N3S780
S8.738
N3S781
S8.739
N3S782
S8.740
N3S783
S8.741
N3S784
S8.742
N3S785
S8.743
N3S786
S8.744
N3S787
S8.745
N3S788
S8.746
N3S789
S8.747
N3S790
S8.748
N3S791
S8.749
N3S792
S8.750
N3S793
S8.751
N3S794
S8.752
N3S795
S8.753
N3S796
S8.754
N3S797
S8.755
N3S798
S8.756
N3S799
S8.757
N3S800
S8.758
N3S801
S8.759
N3S802
S8.760
N3S803
S8.761
N3S804
S8.762
N3S805
S8.763
N3S806
S8.764
N3S807
S8.765
N3S808
S8.766
N3S809
S8.767
N3S810
S8.768
N3S811
S8.769
N3S812
S8.770
N3S813
S8.771
N3S814
S8.772
N3S815
S8.773
N3S816
S8.774
N3S817
S8.775
N3S818
S8.776
N3S819
S8.777
N3S820
S8.778
N3S821
S8.779
N3S822
S8.780
N3S823
S8.781
N3S824
S8.782
N3S825
S8.783
N3S826
S8.784
N3S827
S8.785
N3S828
S8.786
N3S829
S8.787
N3S830
S8.788
N3S831
S8.789
N3S832
S8.790
N3S833
S8.791
N3S834
S8.792
N3S835
S8.793
N3S836
S8.794
N3S837
S8.795
N3S838
S8.796
N3S839
S8.797
N3S840
S8.798
N3S841
S8.799
N3S842
S8.800
N3S843
S8.801
N3S844
S8.802
N3S845
S8.803
N3S846
S8.804
N3S847
S8.805
N3S848
S8.806
N3S849
S8.807
N3S850
S8.808
N3S851
S8.809
N3S852
S8.810
N3S853
S8.811
N3S854
S8.812
N3S855
S8.813
N3S856
S8.814
N3S857
S8.815
N3S858
S8.816
N3S859
S8.817
N3S860
S8.818
N3S861
S8.819
N3S862
S8.820
N3S863
S8.821
N3S864
S8.822
N3S865
S8.823
N3S866
S8.824
N3S867
S8.825
N3S868
S8.826
N3S869
S8.827
N3S870
S8.828
N3S871
S8.829
N3S872
S8.830
N3S873
S8.831
N3S874
S8.832
N3S875
S8.833
N3S876
S8.834
N3S877
S8.835
N3S878
S8.836
N3S879
S8.837
N3S880
S8.838
N3S881
S8.839
N3S882
S8.840
N3S883
S8.841
N3S884
S8.842
N3S885
S8.843
N3S886
S8.844
N3S887
S8.845
N3S888
S8.846
N3S889
S8.847
N3S890
S8.848
N3S891
S8.849
N3S892
S8.850
N3S893
S8.851
N3S894
S8.852
N3S895
S8.853
N3S896
S8.854
N3S897
S8.855
N3S898
S8.856
N3S899
S8.857
N3S900
S8.858
N3S901
S8.859
N3S902
S8.860
N3S903
S8.861
N3S904
S8.862
N3S905
S8.863
N3S906
S8.864
N3S907
S8.865
N3S908
S8.866
N3S909
S8.867
N3S910
S8.868
N3S911
S8.869
N3S912
S8.870
N3S913
S8.871
N3S914
S8.872
N3S915
S8.873
N3S916
S8.874
N3S917
S8.875
N3S918
S8.876
N3S919
S8.877
N3S920
S8.878
N3S921
S8.879
N3S922
S8.880
N3S923
S8.881
N3S924
S8.882
N3S925
S8.883
N3S926
S8.884
N3S927
S8.885
N3S928
S8.886
N3S929
S8.887
N3S930
S8.888
N3S931
S8.889
N3S932
S8.890
N3S933
S8.891
N3S934
S8.892
N3S935
S8.893
N3S936
S8.894
N3S937
S8.895
N3S938
S8.896
N3S939
S8.897
N3S940
S8.898
N3S941
S8.899
N3S942
S8.900
N3S943
S8.901
N3S944
S8.902
N3S945
S8.903
N3S946
S8.904
N3S947
S8.905
N3S948
S8.906
N3S949
S8.907
N3S950
S8.908
N3S951
S8.909
N3S952
S8.910
N3S953
S8.911
N3S954
S8.912
N3S955
S8.913
N3S956
S8.914
N3S957
S8.915
N3S958
S8.916
N3S959
S8.917
N3S960
S8.918
N3S961
S8.919
N3S962
S8.920
N3S963
S8.921
N3S964
S8.922
N3S965
S8.923
N3S966
S8.924
N3S967
S8.925
N3S968
S8.926
N3S969
S8.927
N3S970
S8.928
N3S971
S8.929
N3S972
S8.930
N3S973
S8.931
N3S974
S8.932
N3S975
S8.933
N3S976
S8.934
N3S977
S8.935
N3S978
S8.936
N3S979
S8.937
N3S980
S8.938
N3S981
S8.939
N3S982
S8.940
N3S983
S8.941
N3S984
S8.942
N3S985
S8.943
N3S986
S8.944
N3S987
S8.945
N3S988
S8.946
N3S989
S8.947
N3S990
S8.948
N3S991
S8.949
N3S992
S8.950
N3S993
S8.951
N3S994
S8.952
N3S995
S8.953
N3S996
S8.954
N3S997
S8.955
N3S998
S8.956
N3S999
S8.957
N3S1000
S8.958
N3S1001
S8.959
N3S1002
S8.960
N3S1003
S8.961
N3S1004
S8.962
N3S1005
S8.963
N3S1006
S8.964
N3S1007
S8.965
N3S1008
S8.966
N3S1009
S8.967
N3S1010
S8.968
N3S1011
S8.969
N3S1012
S8.970
N3S1013
S8.971
N3S1014
S8.972
N3S1015
S8.973
N3S1016
S8.974
N3S1017
S8.975
N3S1018
S8.976
N3S1019
S8.977
N3S1020
S8.978
N3S1021
S8.979
N3S1022
S8.980
N3S1023
S8.981
N3S1024
S8.982
N3S1025
S8.983
N3S1026
S8.984
N3S1027
S8.985
N3S1028
S8.986
N3S1029
S8.987
N3S1030
S8.988
N3S1031
S8.989
N3S1032
S8.990
N3S1033
S8.991
N3S1034
S8.992
N3S1035
S8.993
N3S1036
S8.994
N3S1037
S8.995
N3S1038
S8.996
N3S1039
S8.997
N3S1040
S8.998
N3S1041
S8.999
N3S1042
S8.1000
N3S1043
S8.1001
N3S1044
S8.1002
N3S1045
S8.1003
N3S1046
S8.1004
N3S1047
S8.1005
N3S1048
S8.1006
N3S1049
S8.1007
N3S1050
S8.1008
N3S1051
S8.1009
N3S1052
S8.1010
N3S1053
S8.1011
N3S1054
S8.1012
N3S1055
S8.1013
N3S1056
S8.1014
N3S1057
S8.1015
N3S1058
S8.1016
N3S1059
S8.1017
N3S1060
S8.1018
N3S1061
S8.1019
N3S1062
S8.1020
N3S1063
S8.1021
N3S1064
S8.1022
N3S1065
S8.1023
N3S1066
S8.1024
N3S1067
S8.1025
N3S1068
S8.1026
N3S1069
S8.1027
N3S1070
S8.1028
N3S1071
S8.1029
N3S1072
S8.1030
N3S1073
S8.1031
N3S1074
S8.1032
N3S1075
S8.1033
N3S1076
S8.1034
N3S1077
S8.1035
N3S1078
S8.1036
N3S1079
S8.1037
N3S1080
S8.1038
N3S1081
S8.1039
N3S1082
S8.1040
N3S1083
S8.1041
N3S1084
S8.1042
N3S1085
S8.1043
N3S1086
S8.1044
N3S1087
S8.1045
N3S1088
S8.1046
N3S1089
S8.1047
N3S1090
S8.1048
N3S1091
S8.1049
N3S1092
S8.1050
N3S1093
S8.1051
N3S1094
S8.1052
N3S1095
S8.1053
N3S1096
S8.1054
N3S1097
S8.1055
N3S1098
S8.1056
N3S1099
S8.1057
N3S1100
S8.1058
N3S1101
S8.1059
N3S1102
S8.1060
N3S1103
S8.1061
N3S1104
S8.1062
N3S1105
S8.1063
N3S1106
S8.1064
N3S1107
S8.1065
N3S1108
S8.1066
N3S1109
S8.1067
N3S1110
S8.1068
N3S1111
S8.1069
N3S1112
S8.1070
N3S1113
S8.1071
N3S1114
S8.1072
N3S1115
S8.1073
N3S1116
S8.1074
N3S1117
S8.1075
N3S1118
S8.1076
N3S1119
S8.1077
N3S1120
S8.1078
N3S1121
S8.1079
N3S1122
S8.1080
N3S1123
S8.1081
N3S1124
S8.1082
N3S1125
S8.1083
N3S1126
S8.1084
N3S1127
S8.1085
N3S1128
S8.1086
N3S1129
S8.1087
N3S1130
S8.1088
N3S1131
S8.1089
N3S1132
S8.1090
N3S1133
S8.1091
N3S1134
S8.1092
N3S1135
S8.1093
N3S1136
S8.1094
N3S1137
S8.1095
N3S1138
S8.1096
N3S1139
S8.1097
N3S1140
S8.1098
N3S1141
S8.1099
N3S1142
S8.1100
N3S1143
S8.1101
N3S1144
S8.1102
N3S1145
S8.1103
N3S1146
S8.1104
N3S1147
S8.1105
N3S1148
S8.1106
N3S1149
S8.1107
N3S1150
S8.1108
N3S1151
S8.1109
N3S1152
S8.1110
N3S1153
S8.1111
N3S1154
S8.1112
N3S1155
S8.1113
N3S1156
S8.1114
N3S1157
S8.1115
N3S1158
S8.1116
N3S1159
S8.1117
N3S1160
S8.1118
N3S1161
S8.1119
N3S1162
S8.1120
N3S1163
S8.1121
N3S1164
S8.1122
N3S1165
S8.1123
N3S1166
S8.1124
N3S1167
S8.1125
N3S1168
S8.1126
N3S1169
S8.1127
N3S1170
S8.1128
N3S1171
S8.1129
N3S1172
S8.1130
N3S1173
S8.1131
N3S1174
S8.1132
N3S1175
S8.1133
N3S1176
S8.1134
N3S1177
S8.1135
N3S1178
S8.1136
N3S1179
S8.1137
N3S1180
S8.1138
N3S1181
S8.1139
N3S1182
S8.1140
N3S1183
S8.1141
N3S1184
S8.1142
N3S1185
S8.1143
N3S1186
S8.1144
N3S1187
S8.1145
N3S1188
S8.1146
N3S1189
S8.1147
N3S1190
S8.1148
N3S1191
S8.1149
N3S1192
S8.1150
N3S1193
S8.1151
N3S1194
S8.1152
N3S1195
S8.1153
N3S1196
S8.1154
N3S1197
S8.1155
N3S1198
S8.1156
N3S1199
S8.1157
N3S1200
S8.1158
N3S1201
S8.1159
N3S1202
S8.1160
N3S1203
S8.1161
N3S1204
S8.1162
N3S1205
S8.1163
N3S1206
S8.1164
N3S1207
S8.1165
N3S1208
S8.1166
N3S1209
S8.1167
N3S1210
S8.1168
N3S1211
S8.1169
N3S1212
S8.1170
N3S1213
S8.1171
N3S1214
S8.1172
N3S1215
S8.1173
N3S1216
S8.1174
N3S1217
S8.1175
N3S1218
S8.1176
N3S1219
S8.1177
N3S1220
S8.1178
N3S1221
S8.1179
N3S1222
S8.1180
N3S1223
S8.1181
N3S1224
S8.1182
N3S1225
S8.1183
N3S1226
S8.1184
N3S1227
S8.1185
N3S1228
S8.1186
N3S1229
S8.1187
N3S1230
S8.1188
N3S1231
S8.1189
N3S1232
S8.1190
N3S1233
S8.1191
N3S1234
S8.1192
N3S1235
S8.1193
N3S1236
S8.1194
N3S1237
S8.1195
N3S1238
S8.1196
N3S1239
S8.1197
N3S1240
S8.1198
N3S1241
S8.1199
N3S1242
S8.1200
N3S1243
S8.1201
N3S1244
S8.1202
N3S1245
S8.1203
N3S1246
S8.1204
N3S1247
S8.1205
N3S1248
S8.1206
N3S1249
S8.1207
N3S1250
S8.1208
N3S1251
S8.1209
N3S1252
S8.1210
N3S1253
S8.1211
N3S1254
S8.1212
N3S1255
S8.1213
N3S1256
S8.1214
N3S1257
S8.1215
N3S1258
S8.1216
N3S1259
S8.1217
N3S1260
S8.1218
N3S1261
S8.1219
N3S1262
S8.1220
N3S1263
S8.1221
N3S1264
S8.1222
N3S1265
S8.1223
N3S1266
S8.1224
N3S1267
S8.1225
N3S1268
S8.1226
N3S1269
S8.1227
N3S1270
S8.1228
N3S1271
S8.1229
N3S1272
S8.1230
N3S1273
S8.1231
N3S1274
S8.1232
N3S1275
S8.1233
N3S1276
S8.1234
N3S1277
S8.1235
N3S1278
S8.1236
N3S1279
S8.1237
N3S1280
S8.1238
N3S1281
S8.1239
N3S1282
S8.1240
N3S1283
S8.1241
N3S1284
S8.1242
N3S1285
S8.1243
N3S1286
S8.1244
N3S1287
S8.1245
N3S1288
S8.1246
N3S1289
S8.1247
N3S1290
S8.1248
N3S1291
S8.1249
N3S1292
S8.1250
N3S1293
S8.1251
N3S1294
S8.1252
N3S1295
S8.1253
N3S1296
S8.1254
N3S1297
S8.1255
N3S1298
S8.1256
N3S1299
S8.1257
N3S1300
S8.1258
N3S1301
S8.1259
N3S1302
S8.1260
N3S1303
S8.1261
N3S1304
S8.1262
N3S1305
S8.1263
N3S1306
S8.1264
N3S1307
S8.1265
N3S1308
S8.1266
N3S1309
S8.1267
N3S1310
S8.1268
N3S1311
S8.1269
N3S1312
S8.1270
N3S1313
S8.1271
N3S1314
S8.1272
N3S1315
S8.1273
N3S1316
S8.1274
N3S1317
S8.1275
N3S1318
S8.1276
N3S1319
S8.1277
N3S1320
S8.1278
N3S1321
S8.1279
N3S1322
S8.1280
N3S1323
S8.1281
N3S1324
S8.1282
N3S1325
S8.1283
N3S1326
S8.1284
N3S1327
S8.1285
N3S1328
S8.1286
N3S1329
S8.1287
N3S1330
S8.1288
N3S1331
S8.1289
N3S1332
S8.1290
N3S1333
S8.1291
N3S1334
S8.1292
N3S1335
S8.1293
N3S1336
S8.1294
N3S1337
S8.1295
N3S1338
S8.1296
N3S1339
S8.1297
N3S1340
S8.1298
N3S1341
S8.1299
N3S1342
S8.1300
N3S1343
S8.1301
N3S1344
S8.1302
N3S1345
S8.1303
N3S1346
S8.1304
N3S1347
S8.1305
N3S1348
S8.1306
N3S1349
S8.1307
N3S1350
S8.1308
N3S1351
S8.1309
N3S1352
S8.1310
N3S1353
S8.1311
N3S1354
S8.1312
N3S1355
S8.1313
N3S1356
S8.1314
N3S1357
S8.1315
N3S1358
S8.1316
N3S1359
S8.1317
N3S1360
S8.1318
N3S1361
S8.1319
N3S1362
S8.1320
N3S1363
S8.1321
N3S1364
S8.1322
N3S1365
S8.1323
N3S1366
S8.1324
N3S1367
S8.1325
N3S1368
S8.1326
N3S1369
S8.1327
N3S1370
S8.1328
N3S1371
S8.1329
N3S1372
S8.1330
N3S1373
S8.1331
N3S1374
S8.1332
N3S1375
S8.1333
N3S1376
S8.1334
N3S1377
S8.1335
N3S1378
S8.1336
N3S1379
S8.1337
N3S1380
S8.1338
N3S1381
S8.1339
N3S1382
S8.1340
N3S1383
S8.1341
N3S1384
S8.1342
N3S1385
S8.1343
N3S1386
S8.1344
N3S1387
S8.1345
N3S1388
S8.1346
N3S1389
S8.1347
N3S1390
S8.1348
N3S1391
S8.1349
N3S1392
S8.1350
N3S1393
S8.1351
N3S1394
S8.1352
N3S1395
S8.1353
N3S1396
S8.1354
N3S1397
S8.1355
N3S1398
S8.1356
N3S1399
S8.1357
N3S1400
S8.1358
N3S1401
S8.1359
N3S1402
S8.1360
N3S1403
S8.1361
N3S1404
S8.1362
N3S1405
S8.1363
N3S1406
S8.1364
N3S1407
S8.1365
N3S1408
S8.1366
N3S1409
S8.1367
N3S1410
S8.1368
N3S1411
S8.1369
N3S1412
S8.1370
N3S1413
S8.1371
N3S1414
S8.1372
N3S1415
S8.1373
N3S1416
S8.1374
N3S1417
S8.1375
N3S1418
S8.1376
N3S1419
S8.1377
N3S1420
S8.1378
N3S1421
S8.1379
N3S1422
S8.1380
N3S1423
S8.1381
N3S1424
S8.1382
N3S1425
S8.1383
N3S1426
S8.1384
N3S1427
S8.1385
N3S1428
S8.1386
N3S1429
S8.1387
N3S1430
S8.1388
N3S1431
S8.1389
N3S1432
S8.1390
N3S1433
S8.1391
N3S1434
S8.1392
N3S1435
S8.1393
N3S1436
S8.1394
N3S1437
S8.1395
N3S1438
S8.1396
N3S1439
S8.1397
N3S1440
S8.1398
N3S1441
S8.1399
N3S1442
S8.1400
N3S1443
S8.1401
N3S1444
S8.1402
N3S1445
S8.1403
N3S1446
S8.1404
N3S1447
S8.1405
N3S1448
S8.1406
N3S1449
S8.1407
N3S1450
S8.1408
N3S1451
S8.1409
N3S1452
S8.1410
N3S1453
S8.1411
N3S1454
S8.1412
N3S1455
S8.1413
N3S1456
S8.1414
N3S1457
S8.1415
N3S1458
S8.1416
N3S1459
S8.1417
N3S1460
S8.1418
N3S1461
S8.1419
N3S1462
S8.1420
N3S1463
S8.1421
N3S1464
S8.1422
N3S1465
S8.1423
N3S1466
S8.1424
N3S1467
S8.1425
N3S1468
S8.1426
N3S1469
S8.1427
N3S1470
S8.1428
N3S1471
S8.1429
N3S1472
S8.1430
N3S1473
S8.1431
N3S1474
S8.1432
N3S1475
S8.1433
N3S1476
S8.1434
N3S1477
S8.1435
N3S1478
S8.1436
N3S1479
S8.1437
N3S1480
S8.1438
N3S1481
S8.1439
N3S1482
S8.1440
N3S1483
S8.1441
N3S1484
S8.1442
N3S1485
S8.1443
N3S1486
S8.1444
N3S1487
S8.1445
N3S1488
S8.1446
N3S1489
S8.1447
N3S1490
S8.1448
N3S1491
S8.1449
N3S1492
S8.1450
N3S1493
S8.1451
N3S1494
S8.1452
N3S1495
S8.1453
N3S1496
S8.1454
N3S1497
S8.1455
N3S1498
S8.1456
N3S1499
S8.1457
N3S1500
S8.1458
N3S1501
S8.1459
N3S1502
S8.1460
N3S1503
S8.1461
N3S1504
S8.1462
N3S1505
S8.1463
N3S1506
S8.1464
N3S1507
S8.1465
N3S1508
S8.1466
N3S1509
S8.1467
N3S1510
S8.1468
N3S1511
S8.1469
N3S1512
S8.1470
N3S1513
S8.1471
N3S1514
S8.1472
N3S1515
S8.1473
N3S1516
S8.1474
N3S1517
S8.1475
N3S1518
S8.1476
N3S1519
S8.1477
N3S1520
S8.1478
N3S1521
S8.1479
N3S1522
S8.1480
N3S1523
S8.1481
N3S1524
S8.1482
N3S1525
S8.1483
N3S1526
S8.1484
N3S1527
S8.1485
N3S1528
S8.1486
N3S1529
S8.1487
N3S1530
S8.1488
N3S1531
S8.1489
N3S1532
S8.1490
N3S

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for N2a Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 523900 135650 TQ 23900 35650
Data Type	Catchment
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.500
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for N2a Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.249	4-8	1.093	8-12	0.119

Total Area Contributing (ha) = 1.461

Total Pipe Volume (m³) = 62.548

Network Design Table for N2a Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S24.000	19.667	0.070	281.0	0.062	5.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S24.000	50.00	5.35	82.800	0.062	0.0	0.0	0.0	0.93	66.0	8.4

©1982-2020 Innovyze

Network Design Table for N2a Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S24.001	27.050	0.130	208.1	0.082	0.00	0.0	0.600	o	300	Pipe/Conduit	
S25.000	26.792	0.167	160.4	0.124	5.00	0.0	0.600	o	300	Pipe/Conduit	
S24.002	10.883	0.067	162.4	0.075	0.00	0.0	0.600	o	300	Pipe/Conduit	
S24.003	19.216	1.716	11.2	0.034	0.00	0.0	0.600	o	300	Pipe/Conduit	
S24.004	28.299	2.512	11.3	0.042	0.00	0.0	0.600	o	300	Pipe/Conduit	
S24.005	32.038	0.356	90.0	0.113	0.00	0.0	0.600	o	450	Pipe/Conduit	
S24.006	20.697	0.230	90.0	0.057	0.00	0.0	0.600	o	525	Pipe/Conduit	
S24.007	11.312	0.126	89.8	0.037	0.00	0.0	0.600	o	525	Pipe/Conduit	
S24.008	18.753	0.208	90.2	0.030	0.00	0.0	0.600	o	525	Pipe/Conduit	
S26.000	13.580	0.232	58.5	0.017	5.00	0.0	0.600	o	150	Pipe/Conduit	
S24.009	12.012	0.133	90.3	0.023	0.00	0.0	0.600	o	525	Pipe/Conduit	
S27.000	20.492	1.348	15.2	0.115	5.00	0.0	0.600	o	225	Pipe/Conduit	
S27.001	14.106	0.928	15.2	0.019	0.00	0.0	0.600	o	225	Pipe/Conduit	
S28.000	27.678	1.006	27.5	0.040	5.00	0.0	0.600	o	150	Pipe/Conduit	
S28.001	25.118	0.913	27.5	0.054	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S24.001	50.00	5.77	82.730	0.145	0.0	0.0	0.0	1.09	76.8	19.6
S25.000	50.00	5.36	82.900	0.124	0.0	0.0	0.0	1.24	87.6	16.7
S24.002	50.00	5.91	82.600	0.343	0.0	0.0	0.0	1.23	87.0	46.5
S24.003	50.00	5.98	82.533	0.378	0.0	0.0	0.0	4.72	333.9	51.1
S24.004	50.00	6.08	81.017	0.419	0.0	0.0	0.0	4.71	332.9	56.8
S24.005	50.00	6.33	78.505	0.532	0.0	0.0	0.0	2.14	341.0	72.0
S24.006	50.00	6.48	78.149	0.589	0.0	0.0	0.0	2.36	511.3	79.7
S24.007	50.00	6.56	77.919	0.626	0.0	0.0	0.0	2.36	511.9	84.8
S24.008	50.00	6.69	77.793	0.657	0.0	0.0	0.0	2.36	510.8	88.9
S26.000	50.00	5.17	77.768	0.017	0.0	0.0	0.0	1.32	23.3	2.3
S24.009	50.00	6.77	77.585	0.696	0.0	0.0	0.0	2.36	510.4	94.3
S27.000	50.00	5.10	84.780	0.115	0.0	0.0	0.0	3.37	134.1	15.6
S27.001	50.00	5.17	83.432	0.134	0.0	0.0	0.0	3.37	134.1	18.1
S28.000	50.00	5.24	84.424	0.040	0.0	0.0	0.0	1.93	34.1	5.4
S28.001	50.00	5.41	83.418	0.094	0.0	0.0	0.0	2.50	99.6	12.8

©1982-2020 Innovyze

Network Design Table for N2a Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S27.002	7.242	0.476	15.2	0.024	0.00	0.0	0.600	o	225	Pipe/Conduit	
S27.003	14.434	0.950	15.2	0.024	0.00	0.0	0.600	o	300	Pipe/Conduit	
S27.004	55.433	3.626	15.3	0.065	0.00	0.0	0.600	o	300	Pipe/Conduit	
S24.010	12.568	0.140	89.8	0.099	0.00	0.0	0.600	o	525	Pipe/Conduit	
S29.000	26.445	0.310	85.3	0.040	5.00	0.0	0.600	o	150	Pipe/Conduit	
S24.011	20.930	0.312	67.1	0.021	0.00	0.0	0.600	o	525	Pipe/Conduit	
S30.000	25.203	0.162	155.5	0.037	5.00	0.0	0.600	o	225	Pipe/Conduit	
S30.001	15.070	0.097	155.4	0.053	0.00	0.0	0.600	o	300	Pipe/Conduit	
S31.000	11.487	0.105	109.4	0.008	5.00	0.0	0.600	o	150	Pipe/Conduit	
S30.002	10.365	0.067	154.7	0.025	0.00	0.0	0.600	o	300	Pipe/Conduit	
S32.000	10.018	1.437	7.0	0.024	5.00	0.0	0.600	o	150	Pipe/Conduit	
S30.003	18.165	0.117	155.3	0.009	0.00	0.0	0.600	o	300	Pipe/Conduit	
S30.004	16.802	0.108	155.6	0.022	0.00	0.0	0.600	o	300	Pipe/Conduit	
S30.005	16.238	0.105	154.6	0.028	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S27.002	50.00	5.44	82.504	0.252	0.0	0.0	0.0	3.37	134.1	34.2
S27.003	50.00	5.50	82.028	0.276	0.0	0.0	0.0	4.05	286.5	37.4
S27.004	50.00	5.73	81.078	0.342	0.0	0.0	0.0	4.04	285.7	46.3
S24.010	50.00	6.86	77.452	1.137	0.0	0.0	0.0	2.36	511.9	154.0
S29.000	50.00	5.40	77.626	0.040	0.0	0.0	0.0	1.09	19.2	5.4
S24.011	50.00	6.99	76.312	1.198	0.0	0.0	0.0	2.74	592.7	162.3
S30.000	50.00	5.40	77.057	0.037	0.0	0.0	0.0	1.05	41.6	5.0
S30.001	50.00	5.60	76.895	0.090	0.0	0.0	0.0	1.26	89.0	12.1
S31.000	50.00	5.20	77.000	0.008	0.0	0.0	0.0	0.96	17.0	1.1
S30.002	50.00	5.74	76.798	0.123	0.0	0.0	0.0	1.26	89.2	16.6
S32.000	50.00	5.04	78.265	0.024	0.0	0.0	0.0	3.84	67.9	3.3
S30.003	50.00	5.98	76.828	0.156	0.0	0.0	0.0	1.26	89.0	21.1
S30.004	50.00	6.20	76.711	0.177	0.0	0.0	0.0	1.26	88.9	24.0
S30.005	50.00	6.42	76.603	0.206	0.0	0.0	0.0	1.26	89.2	27.8

©1982-2020 Innovyze

Network Design Table for N2a Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S30.006	41.755	0.269	155.2	0.022	0.00	0.0	0.600	o	300	Pipe/Conduit	
S33.000	17.612	0.264	66.8	0.025	5.00	0.0	0.600	o	150	Pipe/Conduit	
S33.001	8.991	0.135	66.6	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S33.002	11.535	0.173	66.7	0.010	0.00	0.0	0.600	o	150	Pipe/Conduit	
S30.007	37.003	0.229	161.6	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
S30.008	11.684	0.000	0.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S24.012	26.154	0.000	0.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S30.006	50.00	6.97	76.498	0.228	0.0	0.0	0.0	1.26	89.0	30.9
S33.000	50.00	5.24	76.800	0.025	0.0	0.0	0.0	1.23	21.8	3.3
S33.001	50.00	5.36	76.536	0.025	0.0	0.0	0.0	1.23	21.8	3.3
S33.002	50.00	5.52	76.401	0.035	0.0	0.0	0.0	1.23	21.8	4.7
S30.007	50.00	7.47	76.229	0.263	0.0	0.0	0.0	1.23	87.2	35.6
S30.008	50.00	8.59	76.000	0.263	0.0	0.0	0.0	0.17	19.1«	35.6
S24.012	50.00	10.83	76.000	1.461	0.0	0.0	0.0	0.19	31.0«	197.9

Free Flowing Outfall Details for N2a Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S24.012	N2A S41	77.000	76.000	76.000	0	0

Simulation Criteria for N2a Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

©1982-2020 Innovyze

Simulation Criteria for N2a Storm

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 523900 135650 TQ 23900 35650
Data Type	Catchment
Summer Storms	Yes
Winter Storms	No
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

©1982-2020 Innovyze

Online Controls for N2a Storm

Complex Manhole: N2A S157, DS/PN: S24.012, Volume (m³): 7.6

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0114-5000-0400-5000
Design Head (m)	0.400
Design Flow (l/s)	5.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	114
Invert Level (m)	76.000
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.400	5.0
Flush-Flo™	0.169	5.0
Kick-Flo®	0.312	4.5
Mean Flow over Head Range	-	4.0

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.0	1.200	8.3	3.000	12.9	7.000	19.5
0.200	5.0	1.400	9.0	3.500	13.9	7.500	20.2
0.300	4.6	1.600	9.6	4.000	14.8	8.000	20.9
0.400	5.0	1.800	10.1	4.500	15.6	8.500	21.5
0.500	5.5	2.000	10.6	5.000	16.4	9.000	22.1
0.600	6.0	2.200	11.1	5.500	17.3	9.500	22.7
0.800	6.9	2.400	11.6	6.000	18.0		
1.000	7.7	2.600	12.0	6.500	18.8		

Orifice

Diameter (m) 0.079 Discharge Coefficient 0.600 Invert Level (m) 76.345

©1982-2020 Innovyze

Storage Structures for N2a Storm

Tank or Pond Manhole: N2A S157, DS/PN: S24.012

Invert Level (m) 76.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	680.0	0.500	825.7	1.000	985.6

©1982-2020 Innovyze

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2a Storm

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 523900 135650 TQ 23900 35650
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 30

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)
S24.000	15 minute 2 year Winter I+0%	84.000	82.892	-0.208	0.000	0.099	9.7
S24.001	15 minute 2 year Winter I+0%	84.000	82.849	-0.181	0.000	0.417	20.4
S25.000	15 minute 2 year Winter I+0%	85.367	83.002	-0.198	0.000	0.110	19.5
S24.002	15 minute 2 year Winter I+0%	84.283	82.798	-0.102	0.000	1.023	49.6
S24.003	15 minute 2 year Winter I+0%	84.233	82.621	-0.212	0.000	0.189	53.9
S24.004	15 minute 2 year Winter I+0%	83.287	81.108	-0.209	0.000	0.425	59.0
S24.005	15 minute 2 year Winter I+0%	81.276	78.658	-0.297	0.000	0.240	73.6
S24.006	15 minute 2 year Winter I+0%	79.756	78.317	-0.357	0.000	0.632	81.0
S24.007	15 minute 2 year Winter I+0%	79.566	78.122	-0.322	0.000	0.866	86.2
S24.008	15 minute 2 year Winter I+0%	79.792	77.973	-0.345	0.000	0.669	90.0
S26.000	15 minute 2 year Winter I+0%	79.364	77.810	-0.108	0.000	0.006	2.8
S24.009	15 minute 2 year Winter I+0%	80.189	77.795	-0.315	0.000	1.219	94.8
S27.000	15 minute 2 year Winter I+0%	86.280	84.839	-0.166	0.000	0.061	18.5
S27.001	15 minute 2 year Winter I+0%	85.282	83.496	-0.161	0.000	0.074	20.8
S28.000	15 minute 2 year Winter I+0%	85.924	84.469	-0.105	0.000	0.006	6.5
S28.001	15 minute 2 year Winter I+0%	85.377	83.476	-0.167	0.000	0.017	13.8

©1982-2020 Innovyze

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2a Storm

PN	Status
S24.000	OK
S24.001	OK
S25.000	OK
S24.002	OK
S24.003	OK
S24.004	OK
S24.005	OK
S24.006	OK
S24.007	OK
S24.008	OK
S26.000	OK
S24.009	OK
S27.000	OK
S27.001	OK
S28.000	OK
S28.001	OK

©1982-2020 Innovyze

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2a Storm

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)
S27.002	15 minute 2 year Winter I+0%	84.634	82.603	-0.126	0.000	0.133	37.8
S27.003	15 minute 2 year Winter I+0%	84.125	82.113	-0.215	0.000	0.097	41.4
S27.004	15 minute 2 year Winter I+0%	83.702	81.166	-0.212	0.000	0.103	50.4
S24.010	15 minute 2 year Winter I+0%	80.217	77.728	-0.249	0.000	1.442	154.8
S29.000	15 minute 2 year Winter I+0%	78.826	77.688	-0.088	0.000	0.009	6.3
S24.011	15 minute 2 year Winter I+0%	79.795	76.537	-0.300	0.000	0.389	163.3
S30.000	15 minute 2 year Winter I+0%	78.257	77.116	-0.166	0.000	0.061	5.8
S30.001	15 minute 2 year Winter I+0%	78.390	76.987	-0.208	0.000	0.191	13.0
S31.000	15 minute 2 year Winter I+0%	78.500	77.029	-0.121	0.000	0.004	1.3
S30.002	15 minute 2 year Winter I+0%	78.741	76.950	-0.148	0.000	0.494	17.6
S32.000	15 minute 2 year Winter I+0%	79.756	78.290	-0.125	0.000	0.003	3.9
S30.003	15 minute 2 year Winter I+0%	79.252	76.938	-0.190	0.000	0.607	22.4
S30.004	15 minute 2 year Winter I+0%	78.832	76.831	-0.180	0.000	0.317	25.0
S30.005	15 minute 2 year Winter I+0%	78.504	76.731	-0.172	0.000	0.359	28.7
S30.006	15 minute 2 year Winter I+0%	78.192	76.625	-0.173	0.000	0.350	30.9
S33.000	15 minute 2 year Winter I+0%	78.000	76.845	-0.105	0.000	0.006	4.0
S33.001	15 minute 2 year Winter I+0%	78.000	76.582	-0.104	0.000	0.021	3.9
S33.002	15 minute 2 year Winter I+0%	78.239	76.455	-0.096	0.000	0.071	5.3
S30.007	960 minute 2 year Winter I+0%	78.990	76.405	-0.124	0.000	0.801	3.7
S30.008	960 minute 2 year Winter I+0%	77.300	76.403	0.028	0.000	2.840	3.5
S24.012	960 minute 2 year Winter I+0%	77.300	76.403	-0.047	0.000	300.967	5.0

PN	Status
S27.002	OK
S27.003	OK
S27.004	OK
S24.010	OK
S29.000	OK
S24.011	OK
S30.000	OK
S30.001	OK
S31.000	OK
S30.002	OK
S32.000	OK
S30.003	OK
S30.004	OK
S30.005	OK
S30.006	OK
S33.000	OK
S33.001	OK
S33.002	OK
S30.007	OK
S30.008	SURCHARGED
S24.012	OK

©1982-2020 Innovyze

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2a Storm

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 523900 135650 TQ 23900 35650
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 30

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)
S24.000	15 minute 30 year Winter I+0%	84.000	83.143	0.043	0.000	0.382	20.5
S24.001	15 minute 30 year Winter I+0%	84.000	83.121	0.091	0.000	1.728	46.8
S25.000	15 minute 30 year Winter I+0%	85.367	83.076	-0.124	0.000	0.193	43.0
S24.002	15 minute 30 year Winter I+0%	84.283	83.027	0.127	0.000	3.558	113.8
S24.003	15 minute 30 year Winter I+0%	84.233	82.671	-0.162	0.000	0.355	124.2
S24.004	15 minute 30 year Winter I+0%	83.287	81.160	-0.157	0.000	0.522	137.0
S24.005	15 minute 30 year Winter I+0%	81.276	78.756	-0.199	0.000	0.431	173.7
S24.006	15 minute 30 year Winter I+0%	79.756	78.421	-0.253	0.000	1.486	192.4
S24.007	15 minute 30 year Winter I+0%	79.566	78.286	-0.158	0.000	2.572	201.7
S24.008	15 minute 30 year Winter I+0%	79.792	78.246	-0.072	0.000	2.442	212.0
S26.000	15 minute 30 year Winter I+0%	79.364	78.191	0.273	0.000	0.066	5.6
S24.009	15 minute 30 year Winter I+0%	80.189	78.167	0.057	0.000	4.738	222.8
S27.000	15 minute 30 year Winter I+0%	86.280	84.871	-0.134	0.000	0.097	41.1
S27.001	15 minute 30 year Winter I+0%	85.282	83.533	-0.124	0.000	0.118	47.7
S28.000	15 minute 30 year Winter I+0%	85.924	84.494	-0.080	0.000	0.010	14.4
S28.001	15 minute 30 year Winter I+0%	85.377	83.514	-0.129	0.000	0.028	34.9

©1982-2020 Innovyze

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2a Storm

PN	Status
S24.000	SURCHARGED
S24.001	SURCHARGED
S25.000	OK
S24.002	SURCHARGED
S24.003	OK
S24.004	OK
S24.005	OK
S24.006	OK
S24.007	OK
S24.008	OK
S26.000	SURCHARGED
S24.009	SURCHARGED
S27.000	OK
S27.001	OK
S28.000	OK
S28.001	OK

©1982-2020 Innovyze

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2a Storm

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)
S27.002	15 minute 30 year Winter I+0%	84.634	82.679	-0.050	0.000	0.299	91.3
S27.003	15 minute 30 year Winter I+0%	84.125	82.165	-0.163	0.000	0.170	100.0
S27.004	15 minute 30 year Winter I+0%	83.702	81.223	-0.155	0.000	0.189	124.1
S24.010	15 minute 30 year Winter I+0%	80.217	78.040	0.063	0.000	3.698	355.4
S29.000	15 minute 30 year Winter I+0%	78.826	77.727	-0.049	0.000	0.015	14.1
S24.011	15 minute 30 year Winter I+0%	79.795	76.704	-0.133	0.000	0.684	376.6
S30.000	15 minute 30 year Winter I+0%	78.257	77.148	-0.134	0.000	0.098	12.9
S30.001	15 minute 30 year Winter I+0%	78.390	77.095	-0.100	0.000	0.709	30.8
S31.000	15 minute 30 year Winter I+0%	78.500	77.068	-0.082	0.000	0.010	2.8
S30.002	15 minute 30 year Winter I+0%	78.741	77.057	-0.041	0.000	1.108	41.1
S32.000	15 minute 30 year Winter I+0%	79.756	78.303	-0.112	0.000	0.005	8.6
S30.003	15 minute 30 year Winter I+0%	79.252	77.014	-0.114	0.000	0.880	52.8
S30.004	15 minute 30 year Winter I+0%	78.832	76.918	-0.093	0.000	0.795	60.7
S30.005	15 minute 30 year Winter I+0%	78.504	76.854	-0.049	0.000	1.006	68.5
S30.006	15 minute 30 year Winter I+0%	78.192	76.782	-0.016	0.000	1.158	70.8
S33.000	15 minute 30 year Winter I+0%	78.000	76.869	-0.081	0.000	0.010	8.8
S33.001	15 minute 30 year Winter I+0%	78.000	76.660	-0.026	0.000	0.075	8.7
S33.002	600 minute 30 year Winter I+0%	78.239	76.643	0.092	0.000	0.398	1.2
S30.007	600 minute 30 year Winter I+0%	78.990	76.642	0.113	0.000	3.094	8.5
S30.008	600 minute 30 year Winter I+0%	77.300	76.639	0.264	0.000	3.433	8.2
S24.012	600 minute 30 year Winter I+0%	77.300	76.638	0.188	0.000	499.156	12.0

PN	Status
S27.002	OK
S27.003	OK
S27.004	OK
S24.010	SURCHARGED
S29.000	OK
S24.011	OK
S30.000	OK
S30.001	OK
S31.000	OK
S30.002	OK
S32.000	OK
S30.003	OK
S30.004	OK
S30.005	OK
S30.006	OK
S33.000	OK
S33.001	OK
S33.002	SURCHARGED
S30.007	SURCHARGED
S30.008	SURCHARGED
S24.012	SURCHARGED

©1982-2020 Innovyze

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2a Storm

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 523900 135650 TQ 23900 35650
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 30

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)
S24.000	15 minute 100 year Winter I+30%	84.000	83.632	0.532	0.000	0.935	34.6
S24.001	15 minute 100 year Winter I+30%	84.000	83.565	0.535	0.000	2.244	77.2
S25.000	15 minute 100 year Winter I+30%	85.367	83.532	0.332	0.000	0.709	70.2
S24.002	15 minute 100 year Winter I+30%	84.283	83.397	0.497	0.000	4.532	188.4
S24.003	15 minute 100 year Winter I+30%	84.233	82.723	-0.110	0.000	0.558	207.0
S24.004	15 minute 100 year Winter I+30%	83.287	81.216	-0.101	0.000	0.627	229.5
S24.005	15 minute 100 year Winter I+30%	81.276	79.505	0.550	0.000	2.069	281.7
S24.006	15 minute 100 year Winter I+30%	79.756	79.174	0.500	0.000	6.672	304.2
S24.007	15 minute 100 year Winter I+30%	79.566	79.011	0.567	0.000	6.076	322.9
S24.008	15 minute 100 year Winter I+30%	79.792	78.830	0.512	0.000	3.947	338.0
S26.000	15 minute 100 year Winter I+30%	79.364	78.679	0.761	0.000	0.144	9.1
S24.009	15 minute 100 year Winter I+30%	80.189	78.635	0.525	0.000	5.891	357.3
S27.000	15 minute 100 year Winter I+30%	86.280	84.901	-0.104	0.000	0.132	68.1
S27.001	15 minute 100 year Winter I+30%	85.282	83.722	0.065	0.000	0.422	77.1
S28.000	15 minute 100 year Winter I+30%	85.924	84.520	-0.054	0.000	0.015	23.8
S28.001	15 minute 100 year Winter I+30%	85.377	83.656	0.013	0.000	0.113	55.7

©1982-2020 Innovyze

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2a Storm

PN	Status
S24.000	SURCHARGED
S24.001	SURCHARGED
S25.000	SURCHARGED
S24.002	SURCHARGED
S24.003	OK
S24.004	OK
S24.005	SURCHARGED
S24.006	SURCHARGED
S24.007	SURCHARGED
S24.008	SURCHARGED
S26.000	SURCHARGED
S24.009	SURCHARGED
S27.000	OK
S27.001	SURCHARGED
S28.000	OK
S28.001	SURCHARGED

©1982-2020 Innovyze

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2a Storm

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)
S27.002	15 minute 100 year Winter I+30%	84.634	83.310	0.581	0.000	2.014	145.5
S27.003	15 minute 100 year Winter I+30%	84.125	82.208	-0.120	0.000	0.234	158.7
S27.004	15 minute 100 year Winter I+30%	83.702	81.271	-0.107	0.000	0.268	194.8
S24.010	15 minute 100 year Winter I+30%	80.217	78.420	0.443	0.000	4.838	584.5
S29.000	15 minute 100 year Winter I+30%	78.826	77.965	0.189	0.000	0.053	23.2
S24.011	15 minute 100 year Winter I+30%	79.795	77.168	0.331	0.000	1.505	618.6
S30.000	15 minute 100 year Winter I+30%	78.257	77.793	0.511	0.000	0.826	16.4
S30.001	15 minute 100 year Winter I+30%	78.390	77.753	0.558	0.000	1.919	39.9
S31.000	15 minute 100 year Winter I+30%	78.500	77.663	0.513	0.000	0.105	3.9
S30.002	15 minute 100 year Winter I+30%	78.741	77.649	0.551	0.000	2.126	53.6
S32.000	15 minute 100 year Winter I+30%	79.756	78.314	-0.101	0.000	0.007	14.3
S30.003	15 minute 100 year Winter I+30%	79.252	77.563	0.435	0.000	1.658	67.7
S30.004	15 minute 100 year Winter I+30%	78.832	77.461	0.450	0.000	2.042	75.9
S30.005	15 minute 100 year Winter I+30%	78.504	77.351	0.448	0.000	1.943	87.5
S30.006	15 minute 100 year Winter I+30%	78.192	77.218	0.420	0.000	1.872	96.1
S33.000	15 minute 100 year Winter I+30%	78.000	77.096	0.146	0.000	0.046	13.9
S33.001	15 minute 100 year Winter I+30%	78.000	77.013	0.327	0.000	0.378	11.8
S33.002	720 minute 100 year Winter I+30%	78.239	76.993	0.442	0.000	0.808	1.5
S30.007	720 minute 100 year Winter I+30%	78.990	76.992	0.463	0.000	3.907	11.7
S30.008	720 minute 100 year Winter I+30%	77.300	76.988	0.613	0.000	3.932	11.6
S24.012	720 minute 100 year Winter I+30%	77.300	76.986	0.536	0.000	821.676	17.2

PN	Status
S27.002	SURCHARGED
S27.003	OK
S27.004	OK
S24.010	SURCHARGED
S29.000	SURCHARGED
S24.011	SURCHARGED
S30.000	SURCHARGED
S30.001	SURCHARGED
S31.000	SURCHARGED
S30.002	SURCHARGED
S32.000	OK
S30.003	SURCHARGED
S30.004	SURCHARGED
S30.005	SURCHARGED
S30.006	SURCHARGED
S33.000	SURCHARGED
S33.001	SURCHARGED
S33.002	SURCHARGED
S30.007	SURCHARGED
S30.008	SURCHARGED
S24.012	SURCHARGED

©1982-2020 Innovyze

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for N2 B Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 523900 135650 TQ 23900 35650
Data Type	Catchment
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.500
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for N2 B Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.000	4-8	0.147	8-12	0.894	12-16	0.047

Total Area Contributing (ha) = 1.088

Total Pipe Volume (m³) = 40.542

Network Design Table for N2 B Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S17.000	6.671	0.200	33.4	0.032	5.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S17.000	50.00	5.06	89.817	0.032	0.0	0.0	0.0	1.75	30.9	4.3

©1982-2020 Innovyze

Network Design Table for N2 B Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S17.001	14.157	0.425	33.3	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S17.002	5.131	0.155	33.1	0.032	0.00	0.0	0.600	o	150	Pipe/Conduit	
S17.003	11.367	0.348	32.7	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S17.004	8.905	0.152	58.6	0.025	0.00	0.0	0.600	o	150	Pipe/Conduit	
S18.000	13.718	0.082	166.7	0.046	5.00	0.0	0.600	o	150	Pipe/Conduit	
S17.005	17.811	0.743	24.0	0.039	0.00	0.0	0.600	o	225	Pipe/Conduit	
S17.006	16.094	0.162	99.2	0.028	0.00	0.0	0.600	o	300	Pipe/Conduit	
S19.000	7.548	0.888	8.5	0.032	5.00	0.0	0.600	o	150	Pipe/Conduit	
S17.007	15.571	0.716	21.7	0.037	0.00	0.0	0.600	o	300	Pipe/Conduit	
S17.008	14.016	0.936	15.0	0.039	0.00	0.0	0.600	o	300	Pipe/Conduit	
S17.009	14.059	0.937	15.0	0.038	0.00	0.0	0.600	o	300	Pipe/Conduit	
S17.010	14.738	0.873	16.9	0.043	0.00	0.0	0.600	o	300	Pipe/Conduit	
S17.011	8.490	0.095	89.6	0.025	0.00	0.0	0.600	o	375	Pipe/Conduit	
S20.000	17.736	0.980	18.1	0.028	5.00	0.0	0.600	o	150	Pipe/Conduit	
S20.001	40.209	0.800	50.3	0.095	0.00	0.0	0.600	o	225	Pipe/Conduit	
S17.012	14.548	0.390	37.3	0.020	0.00	0.0	0.600	o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S17.001	50.00	5.20	89.617	0.032	0.0	0.0	0.0	1.75	30.9	4.3
S17.002	50.00	5.25	89.192	0.064	0.0	0.0	0.0	1.76	31.0	8.7
S17.003	50.00	5.35	89.037	0.064	0.0	0.0	0.0	1.77	31.2	8.7
S17.004	50.00	5.47	88.689	0.089	0.0	0.0	0.0	1.32	23.3	12.1
S18.000	50.00	5.29	88.947	0.046	0.0	0.0	0.0	0.78	13.7	6.3
S17.005	50.00	5.58	88.537	0.175	0.0	0.0	0.0	2.68	106.7	23.7
S17.006	50.00	5.75	87.743	0.202	0.0	0.0	0.0	1.58	111.6	27.4
S19.000	50.00	5.04	88.469	0.032	0.0	0.0	0.0	3.48	61.5	4.3
S17.007	50.00	5.82	87.581	0.271	0.0	0.0	0.0	3.39	239.4	36.7
S17.008	50.00	5.88	86.864	0.310	0.0	0.0	0.0	4.08	288.7	42.0
S17.009	50.00	5.94	85.928	0.348	0.0	0.0	0.0	4.08	288.3	47.2
S17.010	50.00	6.00	84.992	0.392	0.0	0.0	0.0	3.85	271.8	53.0
S17.011	50.00	6.08	84.044	0.417	0.0	0.0	0.0	1.92	211.5	56.4
S20.000	50.00	5.12	86.004	0.028	0.0	0.0	0.0	2.38	42.0	3.8
S20.001	50.00	5.49	84.974	0.123	0.0	0.0	0.0	1.85	73.5	16.7
S17.012	50.00	6.16	84.174	0.560	0.0	0.0	0.0	2.97	328.6	75.8

©1982-2020 Innovyze

Network Design Table for N2 B Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S17.013	22.613	1.506	15.0	0.054	0.00	0.0	0.600	o	375	Pipe/Conduit	
S17.014	17.054	1.150	14.8	0.056	0.00	0.0	0.600	o	375	Pipe/Conduit	
S17.015	24.562	1.637	15.0	0.062	0.00	0.0	0.600	o	450	Pipe/Conduit	
S17.016	22.687	1.512	15.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S17.017	8.974	0.598	15.0	0.020	0.00	0.0	0.600	o	450	Pipe/Conduit	
S21.000	32.200	5.279	6.1	0.036	5.00	0.0	0.600	o	150	Pipe/Conduit	
S21.001	12.402	2.000	6.2	0.068	0.00	0.0	0.600	o	150	Pipe/Conduit	
S17.018	15.078	1.005	15.0	0.016	0.00	0.0	0.600	o	450	Pipe/Conduit	
S17.019	3.731	0.376	9.9	0.010	0.00	0.0	0.600	o	450	Pipe/Conduit	
S22.000	14.511	1.527	9.5	0.026	5.00	0.0	0.600	o	150	Pipe/Conduit	
S22.001	16.853	1.774	9.5	0.021	0.00	0.0	0.600	o	150	Pipe/Conduit	
S22.002	16.975	1.787	9.5	0.027	0.00	0.0	0.600	o	150	Pipe/Conduit	
S22.003	5.971	0.638	9.4	0.044	0.00	0.0	0.600	o	150	Pipe/Conduit	
S17.020	37.652	0.000	0.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	
S23.000	12.342	1.187	10.4	0.024	5.00	0.0	0.600	o	150	Pipe/Conduit	
S23.001	16.911	1.626	10.4	0.014	0.00	0.0	0.600	o	150	Pipe/Conduit	
S23.002	7.502	0.721	10.4	0.026	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S17.013	50.00	6.24	83.784	0.614	0.0	0.0	0.0	4.70	518.7	83.2
S17.014	50.00	6.30	82.278	0.670	0.0	0.0	0.0	4.73	522.0	90.7
S17.015	50.00	6.38	81.128	0.733	0.0	0.0	0.0	5.27	838.2	99.2
S17.016	50.00	6.45	79.491	0.733	0.0	0.0	0.0	5.27	838.0	99.2
S17.017	50.00	6.48	77.979	0.752	0.0	0.0	0.0	5.27	838.0	101.9
S21.000	50.00	5.13	83.300	0.036	0.0	0.0	0.0	4.11	72.6	4.9
S21.001	50.00	5.18	78.020	0.105	0.0	0.0	0.0	4.07	72.0	14.2
S17.018	50.00	6.52	77.381	0.873	0.0	0.0	0.0	5.27	838.1	118.2
S17.019	50.00	6.53	76.376	0.883	0.0	0.0	0.0	6.48	1031.0	119.6
S22.000	50.00	5.07	81.726	0.026	0.0	0.0	0.0	3.29	58.1	3.5
S22.001	50.00	5.16	80.200	0.047	0.0	0.0	0.0	3.29	58.1	6.4
S22.002	50.00	5.24	78.425	0.074	0.0	0.0	0.0	3.29	58.1	10.0
S22.003	50.00	5.28	76.638	0.118	0.0	0.0	0.0	3.31	58.6	16.0
S17.020	50.00	10.17	76.000	1.001	0.0	0.0	0.0	0.17	19.1«	135.5
S23.000	50.00	5.07	84.530	0.024	0.0	0.0	0.0	3.14	55.5	3.2
S23.001	50.00	5.16	83.343	0.037	0.0	0.0	0.0	3.14	55.5	5.1
S23.002	50.00	5.19	81.717	0.063	0.0	0.0	0.0	3.14	55.5	8.6

©1982-2020 Innovyze

Network Design Table for N2 B Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S23.003	17.843	1.716	10.4	0.005	0.00	0.0	0.600	o	150	Pipe/Conduit	
S23.004	34.346	3.280	10.5	0.019	0.00	0.0	0.600	o	150	Pipe/Conduit	
S23.005	37.124	0.000	0.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S17.021	33.061	0.000	0.0	0.000	0.00	0.0	0.600	o	375	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S23.003	50.00	5.29	80.996	0.068	0.0	0.0	0.0	3.14	55.5	9.2
S23.004	50.00	5.47	79.280	0.087	0.0	0.0	0.0	3.13	55.3	11.8
S23.005	50.00	10.52	76.000	0.087	0.0	0.0	0.0	0.12	4.9«	11.8
S17.021	50.00	13.71	76.000	1.088	0.0	0.0	0.0	0.17	19.1«	147.3

Free Flowing Outfall Details for N2 B Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S17.021	N2B38	77.300	76.000	76.000	0	0

Simulation Criteria for N2 B Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 523900 135650 TQ 23900 35650
Data Type	Catchment
Summer Storms	Yes
Winter Storms	No
Cv (Summer)	0.750

©1982-2020 Innovyze

Synthetic Rainfall Details

Cv (Winter)	0.840
Storm Duration (mins)	30

©1982-2020 Innovyze

Online Controls for N2 B Storm

Complex Manhole: N2B120, DS/PN: S17.021, Volume (m³): 7.3

Orifice

Diameter (m) 0.075 Discharge Coefficient 0.600 Invert Level (m) 76.000

Orifice

Diameter (m) 0.080 Discharge Coefficient 0.600 Invert Level (m) 76.211

©1982-2020 Innovyze

Storage Structures for N2 B Storm

Tank or Pond Manhole: N2B120, DS/PN: S17.021

Invert Level (m) 76.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	690.0	0.500	836.7	1.000	997.6

©1982-2020 Innovyze

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 B Storm

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 523900 135650 TQ 23900 35650
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 30

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)
S17.000	15 minute 2 year Winter I+0%	91.417	89.862	-0.105	0.000	0.006	5.1
S17.001	15 minute 2 year Winter I+0%	91.217	89.660	-0.107	0.000	0.012	5.0
S17.002	15 minute 2 year Winter I+0%	90.792	89.257	-0.085	0.000	0.020	9.4
S17.003	15 minute 2 year Winter I+0%	90.637	89.098	-0.089	0.000	0.071	9.5
S17.004	15 minute 2 year Winter I+0%	90.289	88.776	-0.063	0.000	0.106	13.0
S18.000	15 minute 2 year Winter I+0%	90.902	89.031	-0.066	0.000	0.089	7.3
S17.005	15 minute 2 year Winter I+0%	90.204	88.616	-0.146	0.000	0.105	25.6
S17.006	15 minute 2 year Winter I+0%	89.393	87.858	-0.185	0.000	0.131	29.4
S19.000	15 minute 2 year Winter I+0%	90.069	88.500	-0.119	0.000	0.004	5.1
S17.007	15 minute 2 year Winter I+0%	89.570	87.671	-0.210	0.000	0.166	39.3
S17.008	15 minute 2 year Winter I+0%	88.514	86.952	-0.213	0.000	0.107	44.6
S17.009	15 minute 2 year Winter I+0%	87.578	86.021	-0.208	0.000	0.109	49.6
S17.010	15 minute 2 year Winter I+0%	86.642	85.092	-0.200	0.000	0.119	55.2
S17.011	15 minute 2 year Winter I+0%	85.769	84.423	0.004	0.000	0.700	56.9
S20.000	15 minute 2 year Winter I+0%	87.604	86.038	-0.116	0.000	0.005	4.5
S20.001	15 minute 2 year Winter I+0%	86.624	85.051	-0.148	0.000	0.082	17.3

©1982-2020 Innovyze

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 B Storm

PN	Status
S17.000	OK
S17.001	OK
S17.002	OK
S17.003	OK
S17.004	OK
S18.000	OK
S17.005	OK
S17.006	OK
S19.000	OK
S17.007	OK
S17.008	OK
S17.009	OK
S17.010	OK
S17.011	SURCHARGED
S20.000	OK
S20.001	OK

©1982-2020 Innovyze

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 B Storm

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)
S17.012	15 minute 2 year Winter I+0%	85.674	84.318	-0.231	0.000	1.296	76.0
S17.013	15 minute 2 year Winter I+0%	85.284	83.894	-0.265	0.000	0.190	82.9
S17.014	15 minute 2 year Winter I+0%	83.778	82.396	-0.257	0.000	0.183	90.0
S17.015	15 minute 2 year Winter I+0%	82.628	81.240	-0.338	0.000	0.171	98.0
S17.016	15 minute 2 year Winter I+0%	82.948	79.604	-0.337	0.000	0.176	98.3
S17.017	15 minute 2 year Winter I+0%	84.813	78.125	-0.304	0.000	0.245	100.8
S21.000	15 minute 2 year Winter I+0%	86.921	83.329	-0.121	0.000	0.004	5.9
S21.001	15 minute 2 year Winter I+0%	84.949	78.069	-0.101	0.000	0.008	15.2
S17.018	15 minute 2 year Winter I+0%	84.883	77.520	-0.311	0.000	2.340	116.4
S17.019	15 minute 2 year Winter I+0%	84.721	76.581	-0.245	0.000	0.365	117.6
S22.000	15 minute 2 year Winter I+0%	83.326	81.754	-0.122	0.000	0.004	4.2
S22.001	15 minute 2 year Winter I+0%	83.703	80.236	-0.114	0.000	0.007	7.0
S22.002	15 minute 2 year Winter I+0%	84.115	78.470	-0.105	0.000	0.008	10.6
S22.003	15 minute 2 year Winter I+0%	84.551	76.699	-0.089	0.000	0.066	16.6
S17.020	15 minute 2 year Winter I+0%	84.554	76.562	0.187	0.000	1.162	131.5
S23.000	15 minute 2 year Winter I+0%	86.130	84.557	-0.123	0.000	0.004	3.8
S23.001	15 minute 2 year Winter I+0%	85.460	83.376	-0.117	0.000	0.006	5.7
S23.002	15 minute 2 year Winter I+0%	84.426	81.762	-0.105	0.000	0.009	9.1
S23.003	15 minute 2 year Winter I+0%	83.915	81.040	-0.106	0.000	0.008	9.7
S23.004	15 minute 2 year Winter I+0%	82.835	79.329	-0.101	0.000	0.053	12.4
S23.005	960 minute 2 year Winter I+0%	77.300	76.283	0.058	0.000	0.350	1.2
S17.021	960 minute 2 year Winter I+0%	77.300	76.281	-0.094	0.000	209.897	5.8

PN	Status
S17.012	OK
S17.013	OK
S17.014	OK
S17.015	OK
S17.016	OK
S17.017	OK
S21.000	OK
S21.001	OK
S17.018	OK
S17.019	OK
S22.000	OK
S22.001	OK
S22.002	OK
S22.003	OK
S17.020	SURCHARGED
S23.000	OK
S23.001	OK
S23.002	OK
S23.003	OK
S23.004	OK

©1982-2020 Innovyze

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 B Storm

PN	Status
S23.005	SURCHARGED
S17.021	OK

©1982-2020 Innovyze

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 B Storm

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 523900 135650 TQ 23900 35650
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 30

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)
S17.000	15 minute 30 year Winter I+0%	91.417	89.886	-0.081	0.000	0.010	11.3
S17.001	15 minute 30 year Winter I+0%	91.217	89.683	-0.084	0.000	0.020	11.2
S17.002	15 minute 30 year Winter I+0%	90.792	89.363	0.021	0.000	0.080	22.5
S17.003	15 minute 30 year Winter I+0%	90.637	89.229	0.042	0.000	0.264	22.1
S17.004	15 minute 30 year Winter I+0%	90.289	89.020	0.181	0.000	0.498	30.5
S18.000	15 minute 30 year Winter I+0%	90.902	89.150	0.053	0.000	0.224	16.3
S17.005	15 minute 30 year Winter I+0%	90.204	88.669	-0.093	0.000	0.193	60.0
S17.006	15 minute 30 year Winter I+0%	89.393	87.940	-0.103	0.000	0.255	69.7
S19.000	15 minute 30 year Winter I+0%	90.069	88.516	-0.103	0.000	0.007	11.4
S17.007	15 minute 30 year Winter I+0%	89.570	87.727	-0.154	0.000	0.379	93.8
S17.008	15 minute 30 year Winter I+0%	88.514	87.008	-0.156	0.000	0.201	107.7
S17.009	15 minute 30 year Winter I+0%	87.578	86.083	-0.146	0.000	0.205	121.3
S17.010	15 minute 30 year Winter I+0%	86.642	85.163	-0.129	0.000	0.232	136.7
S17.011	15 minute 30 year Winter I+0%	85.769	84.578	0.159	0.000	1.090	146.5
S20.000	15 minute 30 year Winter I+0%	87.604	86.056	-0.098	0.000	0.007	10.0
S20.001	15 minute 30 year Winter I+0%	86.624	85.108	-0.091	0.000	0.154	45.9

©1982-2020 Innovyze

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 B Storm

PN	Status
S17.000	OK
S17.001	OK
S17.002	SURCHARGED
S17.003	SURCHARGED
S17.004	SURCHARGED
S18.000	SURCHARGED
S17.005	OK
S17.006	OK
S19.000	OK
S17.007	OK
S17.008	OK
S17.009	OK
S17.010	OK
S17.011	SURCHARGED
S20.000	OK
S20.001	OK

©1982-2020 Innovyze

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 B Storm

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)
S17.012	15 minute 30 year Winter I+0%	85.674	84.434	-0.115	0.000	1.746	197.8
S17.013	15 minute 30 year Winter I+0%	85.284	83.971	-0.188	0.000	0.408	216.5
S17.014	15 minute 30 year Winter I+0%	83.778	82.481	-0.172	0.000	0.355	235.6
S17.015	15 minute 30 year Winter I+0%	82.628	81.318	-0.260	0.000	0.326	256.5
S17.016	15 minute 30 year Winter I+0%	82.948	79.681	-0.260	0.000	0.337	256.4
S17.017	15 minute 30 year Winter I+0%	84.813	78.403	-0.026	0.000	1.038	256.4
S21.000	15 minute 30 year Winter I+0%	86.921	83.344	-0.106	0.000	0.006	13.1
S21.001	15 minute 30 year Winter I+0%	84.949	78.678	0.508	0.000	0.165	37.3
S17.018	15 minute 30 year Winter I+0%	84.883	78.159	0.328	0.000	4.290	283.6
S17.019	15 minute 30 year Winter I+0%	84.721	77.819	0.993	0.000	4.238	286.6
S22.000	15 minute 30 year Winter I+0%	83.326	81.768	-0.108	0.000	0.006	9.3
S22.001	15 minute 30 year Winter I+0%	83.703	80.258	-0.092	0.000	0.011	17.2
S22.002	15 minute 30 year Winter I+0%	84.115	78.501	-0.074	0.000	0.015	27.4
S22.003	15 minute 30 year Winter I+0%	84.551	77.913	1.125	0.000	1.629	37.3
S17.020	15 minute 30 year Winter I+0%	84.554	77.560	1.185	0.000	2.688	314.1
S23.000	15 minute 30 year Winter I+0%	86.130	84.571	-0.109	0.000	0.006	8.4
S23.001	15 minute 30 year Winter I+0%	85.460	83.396	-0.097	0.000	0.010	13.7
S23.002	15 minute 30 year Winter I+0%	84.426	81.792	-0.075	0.000	0.015	23.4
S23.003	15 minute 30 year Winter I+0%	83.915	81.070	-0.076	0.000	0.015	25.1
S23.004	15 minute 30 year Winter I+0%	82.835	79.365	-0.065	0.000	0.095	32.4
S23.005	480 minute 30 year Winter I+0%	77.300	76.451	0.226	0.000	0.570	3.4
S17.021	480 minute 30 year Winter I+0%	77.300	76.448	0.073	0.000	344.105	12.5

PN	Status
S17.012	OK
S17.013	OK
S17.014	OK
S17.015	OK
S17.016	OK
S17.017	OK
S21.000	OK
S21.001	SURCHARGED
S17.018	SURCHARGED
S17.019	SURCHARGED
S22.000	OK
S22.001	OK
S22.002	OK
S22.003	SURCHARGED
S17.020	SURCHARGED
S23.000	OK
S23.001	OK
S23.002	OK
S23.003	OK
S23.004	OK

©1982-2020 Innovyze

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 B Storm

PN	Status
S23.005	SURCHARGED
S17.021	SURCHARGED

©1982-2020 Innovyze

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 B Storm

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 523900 135650 TQ 23900 35650
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 30

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)
S17.000	15 minute 100 year Winter I+30%	91.417	90.398	0.431	0.000	0.092	16.7
S17.001	15 minute 100 year Winter I+30%	91.217	90.314	0.547	0.000	0.220	16.7
S17.002	15 minute 100 year Winter I+30%	90.792	90.169	0.827	0.000	0.397	32.8
S17.003	15 minute 100 year Winter I+30%	90.637	89.889	0.702	0.000	1.034	32.2
S17.004	15 minute 100 year Winter I+30%	90.289	89.449	0.610	0.000	1.033	44.0
S18.000	15 minute 100 year Winter I+30%	90.902	89.385	0.288	0.000	0.489	26.7
S17.005	15 minute 100 year Winter I+30%	90.204	88.745	-0.017	0.000	0.338	90.7
S17.006	15 minute 100 year Winter I+30%	89.393	88.074	0.031	0.000	0.514	105.9
S19.000	15 minute 100 year Winter I+30%	90.069	88.531	-0.088	0.000	0.009	18.8
S17.007	15 minute 100 year Winter I+30%	89.570	87.773	-0.107	0.000	0.584	145.1
S17.008	15 minute 100 year Winter I+30%	88.514	87.055	-0.110	0.000	0.287	167.7
S17.009	15 minute 100 year Winter I+30%	87.578	86.337	0.109	0.000	0.703	186.3
S17.010	15 minute 100 year Winter I+30%	86.642	85.779	0.488	0.000	1.499	206.3
S17.011	15 minute 100 year Winter I+30%	85.769	85.045	0.626	0.000	2.264	219.0
S20.000	15 minute 100 year Winter I+30%	87.604	86.072	-0.082	0.000	0.010	16.6
S20.001	15 minute 100 year Winter I+30%	86.624	85.516	0.317	0.000	0.733	69.3

©1982-2020 Innovyze

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 B Storm

PN	Status
S17.000	SURCHARGED
S17.001	SURCHARGED
S17.002	SURCHARGED
S17.003	SURCHARGED
S17.004	SURCHARGED
S18.000	SURCHARGED
S17.005	OK
S17.006	SURCHARGED
S19.000	OK
S17.007	OK
S17.008	OK
S17.009	SURCHARGED
S17.010	SURCHARGED
S17.011	SURCHARGED
S20.000	OK
S20.001	SURCHARGED

©1982-2020 Innovyze

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 B Storm

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)
S17.012	15 minute 100 year Winter I+30%	85.674	84.725	0.176	0.000	2.732	296.3
S17.013	15 minute 100 year Winter I+30%	85.284	84.025	-0.134	0.000	0.607	322.9
S17.014	15 minute 100 year Winter I+30%	83.778	82.544	-0.109	0.000	0.514	352.2
S17.015	15 minute 100 year Winter I+30%	82.628	81.368	-0.210	0.000	0.444	385.5
S17.016	15 minute 100 year Winter I+30%	82.948	80.800	0.859	0.000	4.306	360.6
S17.017	15 minute 100 year Winter I+30%	84.813	80.391	1.962	0.000	6.839	362.7
S21.000	15 minute 100 year Winter I+30%	86.921	83.357	-0.093	0.000	0.008	21.6
S21.001	15 minute 100 year Winter I+30%	84.949	81.134	2.964	0.000	0.814	57.6
S17.018	15 minute 100 year Winter I+30%	84.883	79.972	2.141	0.000	7.066	410.6
S17.019	15 minute 100 year Winter I+30%	84.721	79.436	2.610	0.000	6.556	413.7
S22.000	15 minute 100 year Winter I+30%	83.326	81.781	-0.095	0.000	0.008	15.3
S22.001	15 minute 100 year Winter I+30%	83.703	80.761	0.411	0.000	0.167	26.8
S22.002	15 minute 100 year Winter I+30%	84.115	80.406	1.831	0.000	0.603	39.6
S22.003	15 minute 100 year Winter I+30%	84.551	79.569	2.781	0.000	3.595	56.1
S17.020	15 minute 100 year Winter I+30%	84.554	78.893	2.518	0.000	4.595	455.7
S23.000	15 minute 100 year Winter I+30%	86.130	84.584	-0.096	0.000	0.008	14.0
S23.001	15 minute 100 year Winter I+30%	85.460	83.413	-0.080	0.000	0.014	22.7
S23.002	15 minute 100 year Winter I+30%	84.426	81.821	-0.046	0.000	0.021	38.8
S23.003	15 minute 100 year Winter I+30%	83.915	81.099	-0.047	0.000	0.021	41.5
S23.004	15 minute 100 year Winter I+30%	82.835	79.609	0.179	0.000	0.410	50.9
S23.005	480 minute 100 year Winter I+30%	77.300	76.706	0.481	0.000	0.904	5.6
S17.021	480 minute 100 year Winter I+30%	77.300	76.702	0.327	0.000	562.895	17.9

PN	Status
S17.012	SURCHARGED
S17.013	OK
S17.014	OK
S17.015	OK
S17.016	SURCHARGED
S17.017	SURCHARGED
S21.000	OK
S21.001	SURCHARGED
S17.018	SURCHARGED
S17.019	SURCHARGED
S22.000	OK
S22.001	SURCHARGED
S22.002	SURCHARGED
S22.003	SURCHARGED
S17.020	SURCHARGED
S23.000	OK
S23.001	OK
S23.002	OK
S23.003	OK
S23.004	SURCHARGED

©1982-2020 Innovyze

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N2 B Storm

PN	Status
S23.005	SURCHARGED
S17.021	SURCHARGED

©1982-2020 Innovyze

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for N3 Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 523900 135650 TQ 23900 35650
Data Type	Catchment
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.750
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.500
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Time Area Diagram for N3 Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.020	4-8	0.174	8-12	1.980	12-16	0.264

Total Area Contributing (ha) = 2.439

Total Pipe Volume (m³) = 84.926

Network Design Table for N3 Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	10.220	0.373	27.4	0.021	5.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	5.09	91.694	0.021	0.0	0.0	0.0	1.93	34.1	2.8

©1982-2020 Innovyze

Network Design Table for N3 Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.001	13.622	0.497	27.4	0.022	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.002	13.620	0.497	27.4	0.026	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.003	14.313	0.522	27.4	0.022	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.004	13.801	0.504	27.4	0.023	0.00	0.0	0.600	o	150	Pipe/Conduit	
S2.000	9.577	0.182	52.6	0.023	5.00	0.0	0.600	o	150	Pipe/Conduit	
S2.001	12.776	0.242	52.7	0.021	0.00	0.0	0.600	o	150	Pipe/Conduit	
S2.002	11.018	0.209	52.7	0.022	0.00	0.0	0.600	o	150	Pipe/Conduit	
S2.003	13.834	0.263	52.6	0.018	0.00	0.0	0.600	o	150	Pipe/Conduit	
S2.004	12.083	0.228	53.0	0.027	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.005	8.751	0.319	27.4	0.007	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.006	31.296	1.142	27.4	0.020	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.007	11.908	0.435	27.4	0.043	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.000	13.003	0.340	38.2	0.020	5.00	0.0	0.600	o	150	Pipe/Conduit	
S3.001	12.996	0.340	38.2	0.025	0.00	0.0	0.600	o	150	Pipe/Conduit	
S3.002	6.628	0.174	38.1	0.053	0.00	0.0	0.600	o	225	Pipe/Conduit	
S3.003	17.423	0.457	38.1	0.034	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.008	17.041	0.622	27.4	0.029	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.001	50.00	5.21	91.321	0.043	0.0	0.0	0.0	1.93	34.1	5.8
S1.002	50.00	5.32	90.824	0.069	0.0	0.0	0.0	1.93	34.1	9.3
S1.003	50.00	5.45	90.327	0.090	0.0	0.0	0.0	1.93	34.1	12.2
S1.004	50.00	5.57	89.805	0.114	0.0	0.0	0.0	1.93	34.1	15.4
S2.000	50.00	5.11	90.425	0.023	0.0	0.0	0.0	1.39	24.6	3.1
S2.001	50.00	5.27	90.243	0.044	0.0	0.0	0.0	1.39	24.5	6.0
S2.002	50.00	5.40	90.000	0.066	0.0	0.0	0.0	1.39	24.5	8.9
S2.003	50.00	5.57	89.792	0.084	0.0	0.0	0.0	1.39	24.6	11.4
S2.004	50.00	5.71	89.529	0.111	0.0	0.0	0.0	1.38	24.5	15.0
S1.005	50.00	5.77	89.301	0.231	0.0	0.0	0.0	2.51	99.7	31.3
S1.006	50.00	5.98	88.982	0.251	0.0	0.0	0.0	2.51	99.8	34.0
S1.007	50.00	6.06	87.840	0.294	0.0	0.0	0.0	2.51	99.8	39.9
S3.000	50.00	5.13	88.716	0.020	0.0	0.0	0.0	1.63	28.9	2.6
S3.001	50.00	5.27	88.377	0.045	0.0	0.0	0.0	1.63	28.9	6.0
S3.002	50.00	5.32	88.036	0.098	0.0	0.0	0.0	2.13	84.5	13.3
S3.003	50.00	5.45	87.862	0.132	0.0	0.0	0.0	2.13	84.5	17.8
S1.008	50.00	6.17	87.405	0.455	0.0	0.0	0.0	2.51	99.8	61.6

©1982-2020 Innovyze

Network Design Table for N3 Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S4.000	16.561	0.602	27.5	0.050	5.00	0.0	0.600	o	225	Pipe/Conduit	
S4.001	23.864	0.868	27.5	0.050	0.00	0.0	0.600	o	225	Pipe/Conduit	
S4.002	12.975	0.471	27.5	0.047	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.009	8.398	0.306	27.4	0.021	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.010	16.772	0.612	27.4	0.051	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.011	18.132	0.662	27.4	0.029	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.012	16.348	0.597	27.4	0.053	0.00	0.0	0.600	o	300	Pipe/Conduit	
S5.000	40.083	1.882	21.3	0.085	5.00	0.0	0.600	o	150	Pipe/Conduit	
S1.013	45.654	1.666	27.4	0.135	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.014	27.443	1.002	27.4	0.093	0.00	0.0	0.600	o	450	Pipe/Conduit	
S6.000	14.328	1.897	7.6	0.026	5.00	0.0	0.600	o	150	Pipe/Conduit	
S6.001	13.617	1.801	7.6	0.018	0.00	0.0	0.600	o	150	Pipe/Conduit	
S6.002	12.049	1.574	7.7	0.025	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.015	26.870	0.981	27.4	0.019	0.00	0.0	0.600	o	450	Pipe/Conduit	
S7.000	13.751	1.432	9.6	0.028	5.00	0.0	0.600	o	150	Pipe/Conduit	
S7.001	10.452	1.089	9.6	0.020	0.00	0.0	0.600	o	150	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S4.000	50.00	5.11	88.724	0.050	0.0	0.0	0.0	2.50	99.6	6.8
S4.001	50.00	5.27	88.122	0.100	0.0	0.0	0.0	2.51	99.6	13.5
S4.002	50.00	5.36	87.254	0.146	0.0	0.0	0.0	2.50	99.5	19.8
S1.009	50.00	6.22	86.783	0.622	0.0	0.0	0.0	3.01	213.0	84.2
S1.010	50.00	6.31	86.477	0.673	0.0	0.0	0.0	3.02	213.1	91.1
S1.011	50.00	6.41	86.865	0.702	0.0	0.0	0.0	3.02	213.2	95.0
S1.012	50.00	6.50	85.203	0.755	0.0	0.0	0.0	3.02	213.2	102.2
S5.000	50.00	5.30	86.488	0.085	0.0	0.0	0.0	2.19	38.7	11.5
S1.013	50.00	6.69	84.606	0.975	0.0	0.0	0.0	3.90	619.6	132.0
S1.014	50.00	6.81	82.940	1.068	0.0	0.0	0.0	3.90	619.7	144.7
S6.000	50.00	5.06	87.210	0.026	0.0	0.0	0.0	3.69	65.2	3.5
S6.001	50.00	5.13	85.313	0.044	0.0	0.0	0.0	3.69	65.2	6.0
S6.002	50.00	5.18	83.512	0.069	0.0	0.0	0.0	3.66	64.8	9.4
S1.015	50.00	6.93	81.938	1.157	0.0	0.0	0.0	3.90	619.7	156.6
S7.000	50.00	5.07	87.287	0.028	0.0	0.0	0.0	3.27	57.8	3.8
S7.001	50.00	5.12	85.855	0.048	0.0	0.0	0.0	3.27	57.8	6.6

©1982-2020 Innovyze

Network Design Table for N3 Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S7.002	15.551	1.620	9.6	0.029	0.00	0.0	0.600	o	150	Pipe/Conduit	
S7.003	9.023	0.940	9.6	0.005	0.00	0.0	0.600	o	150	Pipe/Conduit	
S7.004	6.879	0.717	9.6	0.002	0.00	0.0	0.600	o	150	Pipe/Conduit	
S7.005	5.191	0.532	9.8	0.001	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.016	29.147	1.064	27.4	0.017	0.00	0.0	0.600	o	450	Pipe/Conduit	
S8.000	15.879	1.059	15.0	0.018	5.00	0.0	0.600	o	150	Pipe/Conduit	
S8.001	15.380	1.025	15.0	0.039	0.00	0.0	0.600	o	150	Pipe/Conduit	
S8.002	22.874	1.525	15.0	0.027	0.00	0.0	0.600	o	150	Pipe/Conduit	
S9.000	8.164	1.566	5.2	0.024	5.00	0.0	0.600	o	150	Pipe/Conduit	
S8.003	27.471	1.831	15.0	0.019	0.00	0.0	0.600	o	150	Pipe/Conduit	
S8.004	16.570	1.105	15.0	0.041	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.005	5.937	0.396	15.0	0.037	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.006	23.926	1.592	15.0	0.039	0.00	0.0	0.600	o	225	Pipe/Conduit	
S8.007	13.352	0.890	15.0	0.049	0.00	0.0	0.600	o	225	Pipe/Conduit	
S10.000	16.564	2.548	6.5	0.054	5.00	0.0	0.600	o	150	Pipe/Conduit	
S8.008	17.672	1.184	14.9	0.047	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S7.002	50.00	5.20	84.766	0.077	0.0	0.0	0.0	3.27	57.8	10.4
S7.003	50.00	5.25	83.146	0.082	0.0	0.0	0.0	3.27	57.8	11.1
S7.004	50.00	5.28	82.206	0.084	0.0	0.0	0.0	3.27	57.8	11.4
S7.005	50.00	5.31	81.489	0.085	0.0	0.0	0.0	3.24	57.3	11.5
S1.016	50.00	7.05	80.957	1.259	0.0	0.0	0.0	3.90	619.7	170.4
S8.000	50.00	5.10	90.500	0.018	0.0	0.0	0.0	2.61	46.2	2.4
S8.001	50.00	5.20	89.441	0.057	0.0	0.0	0.0	2.61	46.2	7.7
S8.002	50.00	5.35	88.416	0.084	0.0	0.0	0.0	2.61	46.2	11.3
S9.000	50.00	5.03	88.408	0.024	0.0	0.0	0.0	4.44	78.5	3.2
S8.003	50.00	5.52	86.851	0.127	0.0	0.0	0.0	2.61	46.2	17.2
S8.004	50.00	5.60	85.060	0.168	0.0	0.0	0.0	3.40	135.0	22.7
S8.005	50.00	5.63	83.955	0.205	0.0	0.0	0.0	3.40	135.1	27.7
S8.006	50.00	5.75	83.559	0.243	0.0	0.0	0.0	3.39	134.9	32.9
S8.007	50.00	5.81	81.967	0.292	0.0	0.0	0.0	3.40	135.0	39.6
S10.000	50.00	5.07	83.639	0.054	0.0	0.0	0.0	3.98	70.3	7.4
S8.008	50.00	5.89	81.077	0.394	0.0	0.0	0.0	4.09	289.1	53.4

©1982-2020 Innovyze

Network Design Table for N3 Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.017	45.848	1.673	27.4	0.069	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.018	5.331	0.195	27.3	0.056	0.00	0.0	0.600	o	450	Pipe/Conduit	
S11.000	19.283	1.321	14.6	0.035	5.00	0.0	0.600	o	150	Pipe/Conduit	
S11.001	15.778	1.081	14.6	0.016	0.00	0.0	0.600	o	150	Pipe/Conduit	
S11.002	14.114	0.953	14.8	0.030	0.00	0.0	0.600	o	150	Pipe/Conduit	
S1.019	23.787	0.868	27.4	0.006	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.020	24.213	0.857	28.3	0.014	0.00	0.0	0.600	o	450	Pipe/Conduit	
S1.021	66.490	0.000	0.0	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
S12.000	15.531	0.950	16.3	0.014	5.00	0.0	0.600	o	150	Pipe/Conduit	
S12.001	17.253	1.840	9.4	0.025	0.00	0.0	0.600	o	150	Pipe/Conduit	
S12.002	3.483	0.000	0.0	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
S13.000	12.125	2.021	6.0	0.022	5.00	0.0	0.600	o	150	Pipe/Conduit	
S13.001	14.425	2.404	6.0	0.025	0.00	0.0	0.600	o	150	Pipe/Conduit	
S13.002	12.540	2.126	5.9	0.025	0.00	0.0	0.600	o	225	Pipe/Conduit	
S14.000	9.868	0.085	116.7	0.027	5.00	0.0	0.600	o	225	Pipe/Conduit	
S14.001	15.888	0.106	149.9	0.021	0.00	0.0	0.600	o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.017	50.00	7.25	79.893	1.721	0.0	0.0	0.0	3.90	619.6	233.1
S1.018	50.00	7.27	78.220	1.777	0.0	0.0	0.0	3.90	620.3	240.6
S11.000	50.00	5.12	81.560	0.035	0.0	0.0	0.0	2.65	46.8	4.7
S11.001	50.00	5.22	80.239	0.051	0.0	0.0	0.0	2.65	46.8	6.9
S11.002	50.00	5.31	79.158	0.081	0.0	0.0	0.0	2.63	46.5	11.0
S1.019	50.00	7.37	78.205	1.864	0.0	0.0	0.0	3.90	619.6	252.4
S1.020	50.00	7.48	77.157	1.878	0.0	0.0	0.0	3.84	610.2	254.3
S1.021	50.00	13.17	76.300	1.878	0.0	0.0	0.0	0.19	31.0«	254.3
S12.000	50.00	5.10	80.738	0.014	0.0	0.0	0.0	2.50	44.2	1.9
S12.001	50.00	5.19	79.788	0.039	0.0	0.0	0.0	3.31	58.5	5.3
S12.002	50.00	5.82	76.300	0.039	0.0	0.0	0.0	0.09	1.6«	5.3
S13.000	50.00	5.05	88.229	0.022	0.0	0.0	0.0	4.14	73.2	3.0
S13.001	50.00	5.11	86.208	0.047	0.0	0.0	0.0	4.14	73.2	6.3
S13.002	50.00	5.15	83.804	0.072	0.0	0.0	0.0	5.42	215.6	9.7
S14.000	50.00	5.14	82.064	0.027	0.0	0.0	0.0	1.21	48.1	3.6
S14.001	50.00	5.38	81.958	0.048	0.0	0.0	0.0	1.07	42.4	6.4

©1982-2020 Innovyze

Network Design Table for N3 Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S14.002	12.736	0.085	149.8	0.026	0.00	0.0	0.600	o	225	Pipe/Conduit	
S14.003	12.023	0.080	150.3	0.018	0.00	0.0	0.600	o	225	Pipe/Conduit	
S13.003	19.214	0.331	58.0	0.017	0.00	0.0	0.600	o	225	Pipe/Conduit	
S13.004	31.178	0.538	58.0	0.038	0.00	0.0	0.600	o	225	Pipe/Conduit	
S13.005	12.737	0.220	58.0	0.022	0.00	0.0	0.600	o	225	Pipe/Conduit	
S15.000	13.906	0.695	20.0	0.051	5.00	0.0	0.600	o	150	Pipe/Conduit	
S13.006	12.641	0.075	167.9	0.031	0.00	0.0	0.600	o	225	Pipe/Conduit	
S13.007	20.322	0.121	167.9	0.055	0.00	0.0	0.600	o	225	Pipe/Conduit	
S13.008	21.731	0.187	116.2	0.042	0.00	0.0	0.600	o	225	Pipe/Conduit	
S13.009	21.486	1.066	20.2	0.032	0.00	0.0	0.600	o	225	Pipe/Conduit	
S16.000	12.627	0.606	20.8	0.030	5.00	0.0	0.600	o	150	Pipe/Conduit	
S16.001	9.832	0.168	58.5	0.020	0.00	0.0	0.600	o	225	Pipe/Conduit	
S16.002	10.990	0.187	58.8	0.005	0.00	0.0	0.600	o	225	Pipe/Conduit	
S13.010	17.877	0.173	103.5	0.016	0.00	0.0	0.600	o	300	Pipe/Conduit	
S13.011	48.415	0.000	0.0	0.000	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.022	13.079	0.000	0.0	0.000	0.00	0.0	0.600	o	525	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S14.002	50.00	5.58	81.852	0.074	0.0	0.0	0.0	1.07	42.4	10.0
S14.003	50.00	5.77	81.767	0.091	0.0	0.0	0.0	1.06	42.3	12.3
S13.003	50.00	5.96	81.678	0.180	0.0	0.0	0.0	1.72	68.4	24.4
S13.004	50.00	6.26	80.908	0.218	0.0	0.0	0.0	1.72	68.4	29.5
S13.005	50.00	6.38	80.587	0.239	0.0	0.0	0.0	1.72	68.4	32.4
S15.000	50.00	5.10	83.373	0.051	0.0	0.0	0.0	2.26	40.0	6.9
S13.006	50.00	6.59	80.354	0.322	0.0	0.0	0.0	1.01	40.0«	43.6
S13.007	50.00	6.93	80.279	0.377	0.0	0.0	0.0	1.01	40.0«	51.0
S13.008	50.00	7.23	80.158	0.419	0.0	0.0	0.0	1.21	48.2«	56.8
S13.009	50.00	7.35	79.971	0.451	0.0	0.0	0.0	2.93	116.4	61.1
S16.000	50.00	5.09	79.062	0.030	0.0	0.0	0.0	2.22	39.2	4.1
S16.001	50.00	5.19	78.457	0.050	0.0	0.0	0.0	1.71	68.1	6.7
S16.002	50.00	5.30	78.289	0.054	0.0	0.0	0.0	1.71	68.0	7.4
S13.010	50.00	7.54	77.977	0.522	0.0	0.0	0.0	1.55	109.2	70.6
S13.011	50.00	14.12	76.300	0.522	0.0	0.0	0.0	0.12	4.9«	70.6
S1.022	50.00	15.14	76.300	2.439	0.0	0.0	0.0	0.22	46.6«	330.2

©1982-2020 Innovyze

Area Summary for N3 Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	66	0.031	0.021	0.021
1.001	User	-	66	0.033	0.022	0.022
1.002	User	-	66	0.040	0.026	0.026
1.003	User	-	66	0.033	0.022	0.022
1.004	User	-	66	0.035	0.023	0.023
2.000	User	-	66	0.035	0.023	0.023
2.001	User	-	66	0.033	0.021	0.021
2.002	User	-	66	0.033	0.022	0.022
2.003	User	-	66	0.027	0.018	0.018
2.004	User	-	66	0.040	0.027	0.027
1.005	User	-	66	0.011	0.007	0.007
1.006	User	-	66	0.030	0.020	0.020
1.007	User	-	66	0.066	0.043	0.043
3.000	User	-	66	0.030	0.020	0.020
3.001	User	-	66	0.038	0.025	0.025
3.002	User	-	66	0.081	0.053	0.053
3.003	User	-	66	0.051	0.034	0.034
1.008	User	-	66	0.044	0.029	0.029
4.000	User	-	66	0.076	0.050	0.050
4.001	User	-	66	0.075	0.050	0.050
4.002	User	-	66	0.071	0.047	0.047
1.009	User	-	60	0.035	0.021	0.021
1.010	User	-	66	0.077	0.051	0.051
1.011	User	-	66	0.044	0.029	0.029
1.012	User	-	66	0.080	0.053	0.053
5.000	User	-	66	0.129	0.085	0.085
1.013	User	-	66	0.205	0.135	0.135
1.014	User	-	66	0.141	0.093	0.093
6.000	User	-	66	0.039	0.026	0.026
6.001	User	-	66	0.028	0.018	0.018
6.002	User	-	66	0.039	0.025	0.025
1.015	User	-	66	0.029	0.019	0.019
7.000	User	-	66	0.043	0.028	0.028
7.001	User	-	66	0.030	0.020	0.020
7.002	User	-	66	0.044	0.029	0.029
7.003	User	-	60	0.008	0.005	0.005
7.004	User	-	60	0.003	0.002	0.002
7.005	User	-	60	0.002	0.001	0.001
1.016	User	-	66	0.025	0.017	0.017
8.000	User	-	66	0.027	0.018	0.018
8.001	User	-	66	0.060	0.039	0.039
8.002	User	-	66	0.040	0.027	0.027
9.000	User	-	66	0.036	0.024	0.024
8.003	User	-	66	0.029	0.019	0.019
8.004	User	-	66	0.061	0.041	0.041
8.005	User	-	66	0.056	0.037	0.037
8.006	User	-	66	0.059	0.039	0.039
8.007	User	-	66	0.074	0.049	0.049
10.000	User	-	66	0.082	0.054	0.054
8.008	User	-	66	0.072	0.047	0.047

©1982-2020 Innovyze

Area Summary for N3 Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.017	User	-	66	0.104	0.069	0.069
1.018	User	-	66	0.084	0.056	0.056
11.000	User	-	66	0.053	0.035	0.035
11.001	User	-	66	0.025	0.016	0.016
11.002	User	-	66	0.045	0.030	0.030
1.019	User	-	66	0.009	0.006	0.006
1.020	User	-	66	0.021	0.014	0.014
1.021	-	-	100	0.000	0.000	0.000
12.000	User	-	66	0.021	0.014	0.014
12.001	User	-	66	0.038	0.025	0.025
12.002	-	-	100	0.000	0.000	0.000
13.000	User	-	66	0.034	0.022	0.022
13.001	User	-	66	0.037	0.025	0.025
13.002	User	-	66	0.038	0.025	0.025
14.000	User	-	66	0.041	0.027	0.027
14.001	User	-	66	0.031	0.021	0.021
14.002	User	-	66	0.039	0.026	0.026
14.003	User	-	66	0.027	0.018	0.018
13.003	User	-	66	0.026	0.017	0.017
13.004	User	-	66	0.057	0.038	0.038
13.005	User	-	66	0.033	0.022	0.022
15.000	User	-	66	0.077	0.051	0.051
13.006	User	-	66	0.047	0.031	0.031
13.007	User	-	66	0.084	0.055	0.055
13.008	User	-	66	0.064	0.042	0.042
13.009	User	-	60	0.054	0.032	0.032
16.000	User	-	66	0.045	0.030	0.030
16.001	User	-	66	0.030	0.020	0.020
16.002	User	-	66	0.007	0.005	0.005
13.010	User	-	66	0.024	0.016	0.016
13.011	-	-	100	0.000	0.000	0.000
1.022	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				3.704	2.439	2.439

Free Flowing Outfall Details for N3 Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.022	N3S	78.000	76.300	0.000	0	0

©1982-2020 Innovyze

Simulation Criteria for N3 Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

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

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 523900 135650 TQ 23900 35650
Data Type	Catchment
Summer Storms	Yes
Winter Storms	No
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

©1982-2020 Innovyze

Online Controls for N3 Storm

Complex Manhole: N3S83, DS/PN: S1.022, Volume (m³): 15.3

Orifice

Diameter (m) 0.098 Discharge Coefficient 0.600 Invert Level (m) 76.300

Orifice

Diameter (m) 0.129 Discharge Coefficient 0.600 Invert Level (m) 76.567

©1982-2020 Innovyze

Storage Structures for N3 Storm

Tank or Pond Manhole: N3S83, DS/PN: S1.022

Invert Level (m) 76.300

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1235.0	1.400	1813.6

©1982-2020 Innovyze

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N3 Storm

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 523900 135650 TQ 23900 35650
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 30

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)	Status
S1.000	15 minute 2 year Winter I+0%	93.194	91.727	-0.117	0.000	0.004	3.3	OK
S1.001	15 minute 2 year Winter I+0%	93.084	91.367	-0.104	0.000	0.012	6.3	OK
S1.002	15 minute 2 year Winter I+0%	92.951	90.882	-0.092	0.000	0.016	9.8	OK
S1.003	15 minute 2 year Winter I+0%	92.815	90.394	-0.083	0.000	0.019	12.7	OK
S1.004	15 minute 2 year Winter I+0%	92.701	89.882	-0.073	0.000	0.022	15.9	OK
S2.000	15 minute 2 year Winter I+0%	91.925	90.466	-0.109	0.000	0.006	3.7	OK
S2.001	15 minute 2 year Winter I+0%	92.025	90.299	-0.094	0.000	0.022	6.6	OK
S2.002	15 minute 2 year Winter I+0%	92.150	90.069	-0.081	0.000	0.028	9.4	OK
S2.003	15 minute 2 year Winter I+0%	92.271	89.871	-0.071	0.000	0.033	11.9	OK
S2.004	15 minute 2 year Winter I+0%	92.425	89.623	-0.056	0.000	0.125	15.6	OK
S1.005	15 minute 2 year Winter I+0%	92.546	89.401	-0.125	0.000	0.146	32.6	OK
S1.006	15 minute 2 year Winter I+0%	92.353	89.078	-0.129	0.000	0.118	35.3	OK
S1.007	15 minute 2 year Winter I+0%	91.101	87.950	-0.115	0.000	0.141	41.0	OK

©1982-2020 Innovyze

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N3 Storm

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)
S3.000	15 minute 2 year Winter I+0%	90.316	88.750	-0.116	0.000	0.033	3.1
S3.001	15 minute 2 year Winter I+0%	90.444	88.428	-0.099	0.000	0.063	6.5
S3.002	15 minute 2 year Winter I+0%	90.578	88.110	-0.151	0.000	0.091	13.7
S3.003	15 minute 2 year Winter I+0%	90.638	87.938	-0.149	0.000	0.096	18.3
S1.008	15 minute 2 year Winter I+0%	90.819	87.784	0.154	0.000	1.047	63.0
S4.000	15 minute 2 year Winter I+0%	91.315	88.770	-0.179	0.000	0.046	8.0
S4.001	15 minute 2 year Winter I+0%	91.605	88.183	-0.164	0.000	0.073	14.7
S4.002	15 minute 2 year Winter I+0%	91.264	87.512	0.033	0.000	0.433	21.2
S1.009	15 minute 2 year Winter I+0%	91.011	87.477	0.394	0.000	1.820	86.5
S1.010	15 minute 2 year Winter I+0%	90.517	87.275	0.498	0.000	1.406	93.2
S1.011	15 minute 2 year Winter I+0%	89.400	87.021	-0.144	0.000	2.402	96.8
S1.012	15 minute 2 year Winter I+0%	88.192	85.366	-0.137	0.000	0.179	103.1
S5.000	15 minute 2 year Winter I+0%	88.088	86.551	-0.087	0.000	0.009	13.5
S1.013	15 minute 2 year Winter I+0%	87.435	84.754	-0.302	0.000	0.292	131.3
S1.014	15 minute 2 year Winter I+0%	86.625	83.099	-0.291	0.000	0.317	142.5
S6.000	15 minute 2 year Winter I+0%	88.810	87.236	-0.124	0.000	0.003	4.1
S6.001	15 minute 2 year Winter I+0%	87.602	85.346	-0.117	0.000	0.006	6.6
S6.002	15 minute 2 year Winter I+0%	86.778	83.554	-0.108	0.000	0.007	10.0
S1.015	15 minute 2 year Winter I+0%	86.304	82.104	-0.284	0.000	0.343	153.5
S7.000	15 minute 2 year Winter I+0%	88.887	87.317	-0.120	0.000	0.004	4.6
S7.001	15 minute 2 year Winter I+0%	87.985	85.893	-0.112	0.000	0.007	7.3
S7.002	15 minute 2 year Winter I+0%	87.274	84.813	-0.103	0.000	0.009	11.1
S7.003	15 minute 2 year Winter I+0%	86.251	83.195	-0.101	0.000	0.009	11.8
S7.004	15 minute 2 year Winter I+0%	85.881	82.257	-0.099	0.000	0.054	12.1
S7.005	15 minute 2 year Winter I+0%	85.873	81.542	-0.097	0.000	0.057	12.4
S1.016	15 minute 2 year Winter I+0%	85.986	81.129	-0.278	0.000	0.361	166.7
S8.000	15 minute 2 year Winter I+0%	92.100	90.525	-0.125	0.000	0.003	2.8
S8.001	15 minute 2 year Winter I+0%	91.599	89.486	-0.105	0.000	0.009	8.2
S8.002	15 minute 2 year Winter I+0%	91.119	88.469	-0.097	0.000	0.012	11.8
S9.000	15 minute 2 year Winter I+0%	90.079	88.431	-0.127	0.000	0.003	3.9
S8.003	15 minute 2 year Winter I+0%	90.354	86.919	-0.082	0.000	0.084	18.2
S8.004	15 minute 2 year Winter I+0%	88.981	85.128	-0.157	0.000	0.126	23.7
S8.005	15 minute 2 year Winter I+0%	87.855	84.044	-0.136	0.000	0.103	28.9
S8.006	15 minute 2 year Winter I+0%	87.444	83.639	-0.145	0.000	0.092	34.1
S8.007	15 minute 2 year Winter I+0%	85.853	82.059	-0.133	0.000	0.107	40.8
S10.000	15 minute 2 year Winter I+0%	85.239	83.675	-0.114	0.000	0.005	8.8
S8.008	15 minute 2 year Winter I+0%	85.437	81.173	-0.204	0.000	0.115	55.6
S1.017	15 minute 2 year Winter I+0%	85.640	80.092	-0.251	0.000	0.480	227.4
S1.018	15 minute 2 year Winter I+0%	84.463	78.597	-0.073	0.000	1.178	232.6
S11.000	15 minute 2 year Winter I+0%	83.160	81.596	-0.114	0.000	0.005	5.6
S11.001	15 minute 2 year Winter I+0%	84.000	80.282	-0.107	0.000	0.009	7.8
S11.002	15 minute 2 year Winter I+0%	84.210	79.212	-0.096	0.000	0.012	11.8
S1.019	15 minute 2 year Winter I+0%	84.346	78.424	-0.231	0.000	1.035	242.9
S1.020	15 minute 2 year Winter I+0%	81.220	77.380	-0.227	0.000	0.320	244.9
S1.021	15 minute 2 year Winter I+0%	79.440	77.179	0.429	0.000	3.999	240.8
S12.000	15 minute 2 year Winter I+0%	82.338	80.761	-0.127	0.000	0.003	2.2
S12.001	15 minute 2 year Winter I+0%	81.388	79.820	-0.118	0.000	0.007	5.7

©1982-2020 Innovyze

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N3 Storm

PN	Status
S3.000	OK
S3.001	OK
S3.002	OK
S3.003	OK
S1.008	SURCHARGED
S4.000	OK
S4.001	OK
S4.002	SURCHARGED
S1.009	SURCHARGED
S1.010	SURCHARGED
S1.011	OK
S1.012	OK
S5.000	OK
S1.013	OK
S1.014	OK
S6.000	OK
S6.001	OK
S6.002	OK
S1.015	OK
S7.000	OK
S7.001	OK
S7.002	OK
S7.003	OK
S7.004	OK
S7.005	OK
S1.016	OK
S8.000	OK
S8.001	OK
S8.002	OK
S9.000	OK
S8.003	OK
S8.004	OK
S8.005	OK
S8.006	OK
S8.007	OK
S10.000	OK
S8.008	OK
S1.017	OK
S1.018	OK
S11.000	OK
S11.001	OK
S11.002	OK
S1.019	OK
S1.020	OK
S1.021	SURCHARGED
S12.000	OK

©1982-2020 Innovyze

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N3 Storm

PN	Status
S12.001	OK

©1982-2020 Innovyze

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N3 Storm

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)
S12.002	960 minute 2 year Winter I+0%	79.548	76.675	0.225	0.000	0.419	0.5
S13.000	15 minute 2 year Winter I+0%	89.829	88.251	-0.128	0.000	0.003	3.6
S13.001	15 minute 2 year Winter I+0%	89.022	86.240	-0.118	0.000	0.005	6.9
S13.002	15 minute 2 year Winter I+0%	88.068	83.838	-0.191	0.000	0.034	10.3
S14.000	15 minute 2 year Winter I+0%	83.883	82.113	-0.176	0.000	0.050	4.3
S14.001	15 minute 2 year Winter I+0%	84.558	82.025	-0.158	0.000	0.096	7.1
S14.002	15 minute 2 year Winter I+0%	85.592	81.935	-0.142	0.000	0.167	10.7
S14.003	15 minute 2 year Winter I+0%	86.433	81.861	-0.131	0.000	0.186	13.1
S13.003	15 minute 2 year Winter I+0%	87.260	81.779	-0.124	0.000	0.187	25.7
S13.004	15 minute 2 year Winter I+0%	86.306	81.018	-0.115	0.000	0.119	30.7
S13.005	15 minute 2 year Winter I+0%	84.745	80.825	0.013	0.000	1.257	30.7
S15.000	15 minute 2 year Winter I+0%	84.973	83.421	-0.102	0.000	0.007	8.2
S13.006	15 minute 2 year Winter I+0%	84.449	80.738	0.159	0.000	0.856	40.2
S13.007	15 minute 2 year Winter I+0%	83.804	80.635	0.131	0.000	0.852	46.4
S13.008	15 minute 2 year Winter I+0%	82.781	80.438	0.055	0.000	0.991	51.0
S13.009	15 minute 2 year Winter I+0%	81.696	80.086	-0.110	0.000	0.232	54.4
S16.000	15 minute 2 year Winter I+0%	80.662	79.099	-0.113	0.000	0.036	4.8
S16.001	15 minute 2 year Winter I+0%	80.057	78.512	-0.170	0.000	0.063	7.5
S16.002	15 minute 2 year Winter I+0%	80.101	78.346	-0.168	0.000	0.078	8.1
S13.010	15 minute 2 year Winter I+0%	80.630	78.157	-0.119	0.000	0.213	62.7
S13.011	15 minute 2 year Winter I+0%	79.529	77.305	0.780	0.000	1.131	61.5
S1.022	960 minute 2 year Winter I+0%	78.000	76.675	-0.150	0.000	500.477	12.1

PN	Status
S12.002	SURCHARGED
S13.000	OK
S13.001	OK
S13.002	OK
S14.000	OK
S14.001	OK
S14.002	OK
S14.003	OK
S13.003	OK
S13.004	OK
S13.005	SURCHARGED
S15.000	OK
S13.006	SURCHARGED
S13.007	SURCHARGED
S13.008	SURCHARGED
S13.009	OK
S16.000	OK
S16.001	OK
S16.002	OK

©1982-2020 Innovyze

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N3 Storm

PN	Status
S13.010	OK
S13.011	SURCHARGED
S1.022	OK

©1982-2020 Innovyze

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N3 Storm

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 523900 135650 TQ 23900 35650
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 30

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)
S1.000	15 minute 30 year Winter I+0%	93.194	91.744	-0.100	0.000	0.007	7.4
S1.001	15 minute 30 year Winter I+0%	93.084	91.397	-0.074	0.000	0.021	15.7
S1.002	15 minute 30 year Winter I+0%	92.951	91.193	0.219	0.000	0.194	23.8
S1.003	15 minute 30 year Winter I+0%	92.815	90.978	0.501	0.000	0.334	29.7
S1.004	15 minute 30 year Winter I+0%	92.701	90.589	0.634	0.000	0.369	35.9
S2.000	15 minute 30 year Winter I+0%	91.925	90.850	0.275	0.000	0.067	7.5
S2.001	15 minute 30 year Winter I+0%	92.025	90.829	0.436	0.000	0.254	13.4
S2.002	15 minute 30 year Winter I+0%	92.150	90.759	0.609	0.000	0.338	18.7
S2.003	15 minute 30 year Winter I+0%	92.271	90.627	0.685	0.000	0.319	24.3
S2.004	15 minute 30 year Winter I+0%	92.425	90.399	0.720	0.000	1.208	29.4
S1.005	15 minute 30 year Winter I+0%	92.546	90.059	0.533	0.000	1.273	63.1
S1.006	15 minute 30 year Winter I+0%	92.353	89.868	0.661	0.000	1.297	64.9
S1.007	15 minute 30 year Winter I+0%	91.101	89.321	1.256	0.000	2.867	74.5

©1982-2020 Innovyze

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N3 Storm

PN	Status
S1.000	OK
S1.001	OK
S1.002	SURCHARGED
S1.003	SURCHARGED
S1.004	SURCHARGED
S2.000	SURCHARGED
S2.001	SURCHARGED
S2.002	SURCHARGED
S2.003	SURCHARGED
S2.004	SURCHARGED
S1.005	SURCHARGED
S1.006	SURCHARGED
S1.007	SURCHARGED

©1982-2020 Innovyze

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N3 Storm

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)
S3.000	15 minute 30 year Winter I+0%	90.316	89.150	0.284	0.000	0.485	6.4
S3.001	15 minute 30 year Winter I+0%	90.444	89.131	0.604	0.000	1.057	12.9
S3.002	15 minute 30 year Winter I+0%	90.578	89.080	0.819	0.000	1.383	23.1
S3.003	15 minute 30 year Winter I+0%	90.638	89.058	0.971	0.000	1.563	33.1
S1.008	15 minute 30 year Winter I+0%	90.819	88.988	1.358	0.000	2.856	111.2
S4.000	15 minute 30 year Winter I+0%	91.315	88.793	-0.156	0.000	0.072	17.8
S4.001	15 minute 30 year Winter I+0%	91.605	88.305	-0.042	0.000	0.276	35.0
S4.002	15 minute 30 year Winter I+0%	91.264	88.201	0.722	0.000	1.911	46.9
S1.009	15 minute 30 year Winter I+0%	91.011	88.067	0.984	0.000	2.545	158.6
S1.010	15 minute 30 year Winter I+0%	90.517	87.667	0.890	0.000	1.849	171.8
S1.011	15 minute 30 year Winter I+0%	89.400	87.104	-0.061	0.000	2.497	179.8
S1.012	15 minute 30 year Winter I+0%	88.192	85.610	0.107	0.000	0.455	196.3
S5.000	15 minute 30 year Winter I+0%	88.088	86.591	-0.047	0.000	0.016	29.9
S1.013	15 minute 30 year Winter I+0%	87.435	84.830	-0.226	0.000	0.507	270.6
S1.014	15 minute 30 year Winter I+0%	86.625	83.188	-0.202	0.000	0.605	302.0
S6.000	15 minute 30 year Winter I+0%	88.810	87.249	-0.111	0.000	0.005	9.2
S6.001	15 minute 30 year Winter I+0%	87.602	85.366	-0.097	0.000	0.010	16.1
S6.002	15 minute 30 year Winter I+0%	86.778	83.582	-0.080	0.000	0.013	25.7
S1.015	15 minute 30 year Winter I+0%	86.304	82.272	-0.116	0.000	0.989	332.9
S7.000	15 minute 30 year Winter I+0%	88.887	87.331	-0.106	0.000	0.006	10.1
S7.001	15 minute 30 year Winter I+0%	87.985	85.916	-0.089	0.000	0.012	17.7
S7.002	15 minute 30 year Winter I+0%	87.274	84.845	-0.071	0.000	0.015	28.6
S7.003	15 minute 30 year Winter I+0%	86.251	83.230	-0.066	0.000	0.017	30.4
S7.004	15 minute 30 year Winter I+0%	85.881	82.293	-0.063	0.000	0.097	31.0
S7.005	15 minute 30 year Winter I+0%	85.873	82.095	0.456	0.000	0.753	31.0
S1.016	15 minute 30 year Winter I+0%	85.986	81.969	0.562	0.000	4.739	346.3
S8.000	15 minute 30 year Winter I+0%	92.100	90.538	-0.112	0.000	0.005	6.3
S8.001	15 minute 30 year Winter I+0%	91.599	89.516	-0.075	0.000	0.017	21.3
S8.002	15 minute 30 year Winter I+0%	91.119	88.511	-0.055	0.000	0.021	31.4
S9.000	15 minute 30 year Winter I+0%	90.079	88.443	-0.115	0.000	0.005	8.6
S8.003	15 minute 30 year Winter I+0%	90.354	87.130	0.129	0.000	0.377	45.4
S8.004	15 minute 30 year Winter I+0%	88.981	85.174	-0.111	0.000	0.188	60.1
S8.005	15 minute 30 year Winter I+0%	87.855	84.114	-0.066	0.000	0.205	74.0
S8.006	15 minute 30 year Winter I+0%	87.444	83.701	-0.083	0.000	0.176	88.4
S8.007	15 minute 30 year Winter I+0%	85.853	82.327	0.135	0.000	0.540	106.6
S10.000	15 minute 30 year Winter I+0%	85.239	83.695	-0.094	0.000	0.008	19.4
S8.008	15 minute 30 year Winter I+0%	85.437	81.913	0.536	0.000	1.411	140.9
S1.017	15 minute 30 year Winter I+0%	85.640	81.587	1.244	0.000	7.997	447.8
S1.018	15 minute 30 year Winter I+0%	84.463	80.543	1.873	0.000	10.395	453.0
S11.000	15 minute 30 year Winter I+0%	83.160	81.614	-0.096	0.000	0.008	12.4
S11.001	15 minute 30 year Winter I+0%	84.000	80.308	-0.081	0.000	0.015	18.5
S11.002	15 minute 30 year Winter I+0%	84.210	80.100	0.792	0.000	0.365	27.8
S1.019	15 minute 30 year Winter I+0%	84.346	79.896	1.241	0.000	3.538	471.2
S1.020	15 minute 30 year Winter I+0%	81.220	79.163	1.556	0.000	6.432	473.7
S1.021	15 minute 30 year Winter I+0%	79.440	78.415	1.665	0.000	6.656	459.9
S12.000	15 minute 30 year Winter I+0%	82.338	80.773	-0.115	0.000	0.005	5.0
S12.001	15 minute 30 year Winter I+0%	81.388	79.841	-0.097	0.000	0.012	14.6

©1982-2020 Innovyze

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N3 Storm

PN	Status
S3.000	SURCHARGED
S3.001	SURCHARGED
S3.002	SURCHARGED
S3.003	SURCHARGED
S1.008	SURCHARGED
S4.000	OK
S4.001	OK
S4.002	SURCHARGED
S1.009	SURCHARGED
S1.010	SURCHARGED
S1.011	OK
S1.012	SURCHARGED
S5.000	OK
S1.013	OK
S1.014	OK
S6.000	OK
S6.001	OK
S6.002	OK
S1.015	OK
S7.000	OK
S7.001	OK
S7.002	OK
S7.003	OK
S7.004	OK
S7.005	SURCHARGED
S1.016	SURCHARGED
S8.000	OK
S8.001	OK
S8.002	OK
S9.000	OK
S8.003	SURCHARGED
S8.004	OK
S8.005	OK
S8.006	OK
S8.007	SURCHARGED
S10.000	OK
S8.008	SURCHARGED
S1.017	SURCHARGED
S1.018	SURCHARGED
S11.000	OK
S11.001	OK
S11.002	SURCHARGED
S1.019	SURCHARGED
S1.020	SURCHARGED
S1.021	SURCHARGED
S12.000	OK

©1982-2020 Innovyze

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N3 Storm

PN	Status
S12.001	OK

©1982-2020 Innovyze

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N3 Storm

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)
S12.002	480 minute 30 year Winter I+0%	79.548	76.873	0.423	0.000	0.642	1.5
S13.000	15 minute 30 year Winter I+0%	89.829	88.264	-0.115	0.000	0.005	8.0
S13.001	15 minute 30 year Winter I+0%	89.022	86.260	-0.098	0.000	0.009	17.3
S13.002	15 minute 30 year Winter I+0%	88.068	83.861	-0.168	0.000	0.060	26.8
S14.000	15 minute 30 year Winter I+0%	83.883	82.710	0.421	0.000	0.725	8.7
S14.001	15 minute 30 year Winter I+0%	84.558	82.702	0.519	0.000	1.181	15.4
S14.002	15 minute 30 year Winter I+0%	85.592	82.684	0.607	0.000	1.520	23.2
S14.003	15 minute 30 year Winter I+0%	86.433	82.661	0.669	0.000	1.464	30.1
S13.003	15 minute 30 year Winter I+0%	87.260	82.625	0.722	0.000	1.672	45.7
S13.004	15 minute 30 year Winter I+0%	86.306	82.495	1.362	0.000	2.505	47.5
S13.005	15 minute 30 year Winter I+0%	84.745	82.220	1.408	0.000	3.278	53.4
S15.000	15 minute 30 year Winter I+0%	84.973	83.448	-0.075	0.000	0.011	18.3
S13.006	15 minute 30 year Winter I+0%	84.449	82.084	1.504	0.000	2.409	71.5
S13.007	15 minute 30 year Winter I+0%	83.804	81.765	1.261	0.000	2.130	85.1
S13.008	15 minute 30 year Winter I+0%	82.781	81.094	0.711	0.000	1.813	96.0
S13.009	15 minute 30 year Winter I+0%	81.696	80.152	-0.044	0.000	0.508	104.3
S16.000	15 minute 30 year Winter I+0%	80.662	79.142	-0.070	0.000	0.085	10.7
S16.001	15 minute 30 year Winter I+0%	80.057	79.120	0.438	0.000	0.935	18.1
S16.002	15 minute 30 year Winter I+0%	80.101	79.110	0.596	0.000	1.266	17.8
S13.010	15 minute 30 year Winter I+0%	80.630	79.098	0.822	0.000	1.725	108.5
S13.011	15 minute 30 year Winter I+0%	79.529	78.870	2.345	0.000	4.080	106.6
S1.022	480 minute 30 year Winter I+0%	78.000	76.872	0.047	0.000	782.723	28.8

PN	Status
S12.002	SURCHARGED
S13.000	OK
S13.001	OK
S13.002	OK
S14.000	SURCHARGED
S14.001	SURCHARGED
S14.002	SURCHARGED
S14.003	SURCHARGED
S13.003	SURCHARGED
S13.004	SURCHARGED
S13.005	SURCHARGED
S15.000	OK
S13.006	SURCHARGED
S13.007	SURCHARGED
S13.008	SURCHARGED
S13.009	OK
S16.000	OK
S16.001	SURCHARGED
S16.002	SURCHARGED

©1982-2020 Innovyze

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N3 Storm

PN	Status
S13.010	SURCHARGED
S13.011	SURCHARGED
S1.022	SURCHARGED

©1982-2020 Innovyze

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N3 Storm

Simulation Criteria

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

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

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 523900 135650 TQ 23900 35650
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 30

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)
S1.000	15 minute 100 year Winter I+30%	93.194	93.142	1.298	0.000	0.229	11.1
S1.001	15 minute 100 year Winter I+30%	93.084	93.085	1.614	0.602	1.052	18.6
S1.002	15 minute 100 year Winter I+30%	92.951	92.952	1.978	1.267	1.829	29.3
S1.003	15 minute 100 year Winter I+30%	92.815	92.815	2.338	0.006	0.633	32.7
S1.004	15 minute 100 year Winter I+30%	92.701	92.420	2.465	0.000	0.660	43.0
S2.000	15 minute 100 year Winter I+30%	91.925	91.929	1.354	4.738	4.968	25.3
S2.001	15 minute 100 year Winter I+30%	92.025	92.026	1.633	0.140	0.575	25.5
S2.002	15 minute 100 year Winter I+30%	92.150	92.086	1.936	0.000	0.549	26.1
S2.003	15 minute 100 year Winter I+30%	92.271	92.068	2.126	0.000	0.548	29.7
S2.004	15 minute 100 year Winter I+30%	92.425	91.941	2.262	0.000	2.953	36.3
S1.005	15 minute 100 year Winter I+30%	92.546	91.682	2.156	0.000	3.109	67.7
S1.006	15 minute 100 year Winter I+30%	92.353	91.487	2.280	0.000	3.128	73.5
S1.007	15 minute 100 year Winter I+30%	91.101	90.839	2.774	0.000	4.583	86.6

©1982-2020 Innovyze

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N3 Storm

PN	Status
S1.000	FLOOD RISK
S1.001	FLOOD
S1.002	FLOOD
S1.003	FLOOD
S1.004	FLOOD RISK
S2.000	FLOOD
S2.001	FLOOD
S2.002	FLOOD RISK
S2.003	FLOOD RISK
S2.004	SURCHARGED
S1.005	SURCHARGED
S1.006	SURCHARGED
S1.007	FLOOD RISK

©1982-2020 Innovyze

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N3 Storm

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)
S3.000	15 minute 100 year Winter I+30%	90.316	90.319	1.453	2.813	4.517	22.5
S3.001	15 minute 100 year Winter I+30%	90.444	90.444	1.917	0.006	2.542	27.5
S3.002	15 minute 100 year Winter I+30%	90.578	90.467	2.206	0.000	2.952	36.2
S3.003	15 minute 100 year Winter I+30%	90.638	90.452	2.365	0.000	3.139	43.0
S1.008	15 minute 100 year Winter I+30%	90.819	90.382	2.752	0.000	4.432	130.0
S4.000	15 minute 100 year Winter I+30%	91.315	89.571	0.622	0.000	0.952	24.5
S4.001	15 minute 100 year Winter I+30%	91.605	89.528	1.181	0.000	2.195	44.2
S4.002	15 minute 100 year Winter I+30%	91.264	89.324	1.845	0.000	3.237	63.6
S1.009	15 minute 100 year Winter I+30%	91.011	89.096	2.013	0.000	3.709	197.6
S1.010	15 minute 100 year Winter I+30%	90.517	88.492	1.715	0.000	2.782	217.0
S1.011	15 minute 100 year Winter I+30%	89.400	87.655	0.490	0.000	3.120	227.2
S1.012	15 minute 100 year Winter I+30%	88.192	86.735	1.232	0.000	2.410	244.4
S5.000	15 minute 100 year Winter I+30%	88.088	87.655	1.017	0.000	0.185	42.7
S1.013	15 minute 100 year Winter I+30%	87.435	85.761	0.705	0.000	3.111	362.3
S1.014	15 minute 100 year Winter I+30%	86.625	85.269	1.879	0.000	10.373	379.8
S6.000	15 minute 100 year Winter I+30%	88.810	87.261	-0.099	0.000	0.007	15.2
S6.001	15 minute 100 year Winter I+30%	87.602	85.384	-0.079	0.000	0.013	26.7
S6.002	15 minute 100 year Winter I+30%	86.778	85.159	1.497	0.000	0.466	40.1
S1.015	15 minute 100 year Winter I+30%	86.304	84.879	2.491	0.000	8.550	372.2
S7.000	15 minute 100 year Winter I+30%	88.887	87.345	-0.092	0.000	0.008	16.8
S7.001	15 minute 100 year Winter I+30%	87.985	85.937	-0.068	0.000	0.016	29.3
S7.002	15 minute 100 year Winter I+30%	87.274	85.682	0.766	0.000	0.281	44.6
S7.003	15 minute 100 year Winter I+30%	86.251	85.151	1.855	0.000	0.585	45.4
S7.004	15 minute 100 year Winter I+30%	85.881	84.885	2.529	0.000	3.170	37.9
S7.005	15 minute 100 year Winter I+30%	85.873	84.652	3.013	0.000	3.672	33.2
S1.016	15 minute 100 year Winter I+30%	85.986	84.436	3.029	0.000	9.100	387.8
S8.000	15 minute 100 year Winter I+30%	92.100	90.562	-0.088	0.000	0.009	10.4
S8.001	15 minute 100 year Winter I+30%	91.599	90.523	0.932	0.000	0.423	30.4
S8.002	15 minute 100 year Winter I+30%	91.119	90.082	1.516	0.000	0.528	41.4
S9.000	15 minute 100 year Winter I+30%	90.079	88.902	0.344	0.000	0.078	14.1
S8.003	15 minute 100 year Winter I+30%	90.354	88.864	1.863	0.000	2.800	56.8
S8.004	15 minute 100 year Winter I+30%	88.981	86.097	0.812	0.000	1.467	77.6
S8.005	15 minute 100 year Winter I+30%	87.855	85.786	1.606	0.000	2.676	89.7
S8.006	15 minute 100 year Winter I+30%	87.444	85.515	1.731	0.000	2.395	105.4
S8.007	15 minute 100 year Winter I+30%	85.853	84.799	2.607	0.000	4.101	114.9
S10.000	15 minute 100 year Winter I+30%	85.239	84.409	0.620	0.000	0.122	31.8
S8.008	15 minute 100 year Winter I+30%	85.437	84.207	2.830	0.000	4.296	155.2
S1.017	15 minute 100 year Winter I+30%	85.640	83.871	3.528	0.000	11.266	530.9
S1.018	15 minute 100 year Winter I+30%	84.463	82.360	3.690	0.000	12.996	544.0
S11.000	15 minute 100 year Winter I+30%	83.160	82.338	0.628	0.000	0.123	19.0
S11.001	15 minute 100 year Winter I+30%	84.000	82.183	1.794	0.000	0.641	23.5
S11.002	15 minute 100 year Winter I+30%	84.210	81.927	2.619	0.000	0.710	37.2
S1.019	15 minute 100 year Winter I+30%	84.346	81.424	2.769	0.000	5.724	574.1
S1.020	15 minute 100 year Winter I+30%	81.220	80.345	2.738	0.000	8.124	575.8
S1.021	15 minute 100 year Winter I+30%	79.440	79.240	2.490	0.000	7.838	567.1
S12.000	15 minute 100 year Winter I+30%	82.338	80.784	-0.104	0.000	0.006	8.2
S12.001	15 minute 100 year Winter I+30%	81.388	79.858	-0.080	0.000	0.016	24.1

©1982-2020 Innovyze

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N3 Storm

PN	Status
S3.000	FLOOD
S3.001	FLOOD
S3.002	FLOOD RISK
S3.003	FLOOD RISK
S1.008	SURCHARGED
S4.000	SURCHARGED
S4.001	SURCHARGED
S4.002	SURCHARGED
S1.009	SURCHARGED
S1.010	SURCHARGED
S1.011	SURCHARGED
S1.012	SURCHARGED
S5.000	SURCHARGED
S1.013	SURCHARGED
S1.014	SURCHARGED
S6.000	OK
S6.001	OK
S6.002	SURCHARGED
S1.015	SURCHARGED
S7.000	OK
S7.001	OK
S7.002	SURCHARGED
S7.003	SURCHARGED
S7.004	SURCHARGED
S7.005	SURCHARGED
S1.016	SURCHARGED
S8.000	OK
S8.001	SURCHARGED
S8.002	SURCHARGED
S9.000	SURCHARGED
S8.003	SURCHARGED
S8.004	SURCHARGED
S8.005	SURCHARGED
S8.006	SURCHARGED
S8.007	SURCHARGED
S10.000	SURCHARGED
S8.008	SURCHARGED
S1.017	SURCHARGED
S1.018	SURCHARGED
S11.000	SURCHARGED
S11.001	SURCHARGED
S11.002	SURCHARGED
S1.019	SURCHARGED
S1.020	SURCHARGED
S1.021	FLOOD RISK
S12.000	OK

©1982-2020 Innovyze

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N3 Storm

PN	Status
S12.001	OK

©1982-2020 Innovyze

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N3 Storm

PN	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Maximum Vol (m³)	Pipe Flow (l/s)
S12.002	480 minute 100 year Winter I+30%	79.548	77.188	0.738	0.000	0.998	2.5
S13.000	15 minute 100 year Winter I+30%	89.829	88.274	-0.105	0.000	0.006	13.2
S13.001	15 minute 100 year Winter I+30%	89.022	86.276	-0.082	0.000	0.012	28.6
S13.002	15 minute 100 year Winter I+30%	88.068	84.292	0.263	0.000	0.587	44.3
S14.000	15 minute 100 year Winter I+30%	83.883	83.892	1.603	9.223	11.229	47.5
S14.001	15 minute 100 year Winter I+30%	84.558	84.020	1.837	0.000	2.671	48.4
S14.002	15 minute 100 year Winter I+30%	85.592	84.140	2.063	0.000	3.166	52.8
S14.003	15 minute 100 year Winter I+30%	86.433	84.201	2.209	0.000	3.206	56.1
S13.003	15 minute 100 year Winter I+30%	87.260	84.231	2.328	0.000	3.763	59.4
S13.004	15 minute 100 year Winter I+30%	86.306	84.187	3.054	0.000	4.419	62.7
S13.005	15 minute 100 year Winter I+30%	84.745	83.995	3.183	0.000	5.286	66.6
S15.000	15 minute 100 year Winter I+30%	84.973	84.100	0.577	0.000	0.115	29.1
S13.006	15 minute 100 year Winter I+30%	84.449	83.853	3.274	0.000	4.641	81.0
S13.007	15 minute 100 year Winter I+30%	83.804	83.443	2.939	0.000	4.028	99.3
S13.008	15 minute 100 year Winter I+30%	82.781	82.539	2.156	0.000	3.448	112.2
S13.009	15 minute 100 year Winter I+30%	81.696	81.323	1.127	0.000	2.340	121.1
S16.000	15 minute 100 year Winter I+30%	80.662	80.025	0.813	0.000	1.083	16.3
S16.001	15 minute 100 year Winter I+30%	80.057	79.970	1.288	0.000	1.909	22.5
S16.002	15 minute 100 year Winter I+30%	80.101	79.950	1.436	0.000	2.216	20.9
S13.010	15 minute 100 year Winter I+30%	80.630	79.925	1.649	0.000	3.270	140.8
S13.011	30 minute 100 year Winter I+30%	79.529	79.533	3.008	4.274	9.098	120.5
S1.022	480 minute 100 year Winter I+30%	78.000	77.187	0.362	0.000	1262.626	42.4

PN	Status
S12.002	SURCHARGED
S13.000	OK
S13.001	OK
S13.002	SURCHARGED
S14.000	FLOOD
S14.001	SURCHARGED
S14.002	SURCHARGED
S14.003	SURCHARGED
S13.003	SURCHARGED
S13.004	SURCHARGED
S13.005	SURCHARGED
S15.000	SURCHARGED
S13.006	SURCHARGED
S13.007	SURCHARGED
S13.008	FLOOD RISK
S13.009	SURCHARGED
S16.000	SURCHARGED
S16.001	FLOOD RISK
S16.002	FLOOD RISK

©1982-2020 Innovyze

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for N3 Storm

PN	Status
S13.010	SURCHARGED
S13.011	FLOOD
S1.022	SURCHARGED

©1982-2020 Innovyze



CampbellReith
consulting engineers

Appendix 5

Surface Water Catchment Plan

Appendix

N

N1 Catchment
Total: 20875 m²
Imp: 12525 m²
Creep: 13778 m²

N2B Catchment
Total: 15385 m²
Imp: 9231 m²
Creep: 10154 m²

N2A Catchment
Total: 17331 m²
Imp: 10399 m²
Creep: 11438 m²

N3 Catchment
Total: 38018 m²
Imp: 22811 m²
Creep: 25092 m²

Sheet 2
Sheet 3
Sheet 3
Inset 1

0 10m 20m 30m 40m 50m
Scale 1:500

Keyplan
Scale 1:10,000

Inset 1

Notes

1. Do not scale from this drawing on print or electronically. Work from figured dimensions only.
2. No deviation from the details on this drawing is allowed without CampbellReith's prior permission in writing.
3. Read this drawing with all Architect's, Service Engineer's and CampbellReith's relevant details, specifications and drawings.
4. All work is to be done in accordance with the relevant specifications issued by CampbellReith, British Standard Codes of Practice, Statutory Requirements and the Contract Documents.
5. Drawing revision:
   P: Preliminary Evolving drawings for approvals, tenders, billings etc.
   C: Contractual Drawings authorized and approved for stage completion i.e. Stage-Tender or Stage 5-Construction.
6. Dawing status:
   Work in progress
   S0 - Initial status
   Shared (Non-contractual)
   S1 - Suitable for coordination, **S2** - Suitable for information, **S3** - Suitable for review and comment, **S4** - Suitable for stage approval.
   Published (For contractors purposes)
   A1, An etc - Authorised and accepted ('n' relates to work stages)
   B1, Bn etc - Partial sign-off (with comments)
   CR - As constructed record document (Final Construction ONLY. Any deviations to that which is on site is not the liability of CampbellReith)
7. Work Stages:
   2 - Concept, **3** - Definition, **4** - Design, **5** - Build & commission, **6** - Handover
8. Only drawings with **revision Cn and status A5 to be used for Construction.**

Site Boundary

Rev	Description	Date	By
P1	Issued for Information	14.09.23	PT

Job Title: Kilnwood Vale, Phase 4 - Alternative
Client: Crest Nicholson

Surface Water Contributing Areas Plan

Drawn by	Date made	Scale @ A0	Checked by	Suitability	CR Project
PT	01.08.23	1:500		S2	11950

Project No.	Originator	Volume	Lvl/Loc	Type	Role	Number	Rev
11950	CRH	4ALT	XX	DR	C	5055	P1

CampbellReith
consulting engineers
London 020 7340 1700 | Manchester 0161 819 3060
Surrey 01737 784 500 | Birmingham 01675 467 484
Bristol 0117 916 1066 | Dubai 00 971 4345 7088
www.campbellreith.com

© CampbellReith Hill LLP 2022



CampbellReith
consulting engineers

Appendix 6

Drainage Strategy

Appendix

N

Sheet 2

Sheet 3

Sheet 3
Inset 1

Sheet 3
Inset 1

Pond N3

Pond N2b

Pond N2a

Outfall To Culvert

Outfall To Culvert

Outfall To Culvert

Culvert Flows Under Railway

Culvert Flows Under Railway

Pumping Station PS6

Pumping station PS5a

Complex Flow Control
Flow restricted to 42.4l/s by twin orifice plate
Orifice size: 0.098m and 0.129m
Orifice head: 0.267m

Complex Flow Control
Flow restricted to 17.2l/s by twin orifice plate
Orifice size: 0.075m and 0.080m
Orifice head: 0.450m

Complex Flow Control
Flowrestricted to 17.2l/s by Hydrobrake and orifice plate
Orifice size: 0.075m
Orifice Head: 0.450m
Hydrobrake design code:MD-SHE-0114-5000-0400-5000

THE VIEWPOINT OPEN SPACE

VIEWPOINT SQUARE

PHASE 4 SURFACE

Keyplan
Scale 1:10,000

Inset 1

0 10m 20m 30m 40m 50m
Scale 1:500

Notes

1. Do not scale from this drawing on print or electronically. Work from figured dimensions only.
2. No deviation from the details on this drawing is allowed without CampbellReith's prior permission in writing.
3. Read this drawing with all Architect's, Service Engineer's and CampbellReith's relevant details, specifications and drawings.
4. All work is to be done in accordance with the relevant specifications issued by CampbellReith, British Standard Codes of Practice, Statutory Requirements and the Contract Documents.
5. Drawing revision:
   P: Preliminary Evolving drawings for approvals, tenders, billings etc.
   C: Contractual Drawings authorized and approved for stage completion i.e. Stage-Tender or Stage 5-Construction.
6. Dawing status:
   Work in progress
   S0 - Initial status
   Shared (Non-contractual)
   S1 - Suitable for coordination, **S2** - Suitable for information, **S3** - Suitable for review and comment, **S4** - Suitable for stage approval.
   Published (For contractors purposes)
   A1, An etc - Authorised and accepted ('n' relates to work stages)
   B1, Bn etc - Partial sign-off (with comments)
   CR - As constructed record document (Final Construction ONLY. Any deviations to that which is on site is not the liability of CampbellReith)
7. Work Stages:
   2 - Concept, **3** - Definition, **4** - Design, **5** - Build & commission, **6** - Handover
8. Only drawings with **revision Cn and status A5 to be used for Construction.**

Legend

- Proposed Surface Water Sewer
- Proposed Surface Water Manhole
- Proposed Surface Water Inspection Chamber
- Proposed Surface Water Gully
- Proposed Foul Water Sewer
- Proposed Foul Water Manhole
- Proposed Foul Water Inspection Chamber
- Proposed Headwall
- Proposed Foul Rising Main

Rev	Description	Date	By
P3	Scale Bar Added	08.09.23	PT
P2	Issued for Information	18.08.23	PT
P1	Issued for Information	04.08.23	PT

Job Title: Kilnwood Vale, Phase 4

Client: Crest Nicholson

Proposed Drainage Strategy

CampbellReith consulting engineers

London 020 7340 1700 | Manchester 0161 819 3060
Surrey 01737 784 500 | Birmingham 01675 467 484
Bristol 0117 916 1066 | Dubai 00 971 4345 7088
www.campbellreith.com

Drawn by	Date made	Scale @ A0	Checked by	Suitability	CR Project
PT	01.08.23	1:500		S2	11950

Project No.	Originator	Volume	Lvl/Loc	Type	Role	Number	Rev
11950	CRH	4&5	XX	DR	C	5052	P3

© CampbellReith Hill LLP 2022



CampbellReith
consulting engineers

Appendix 7

Overland Flood Routes Plan

J:\11500-11999\11950 - KILNWOOD VALE INFRASTRUCTURE\DWG\02-CIVIL\01-AUTOCAD\1-WORKING DRAWINGS\3-DRAWINGS\PHASE 4 AND 5\11950-CRH-4&5-XX-DR-C-5056-5058 OVERLAND FLOOD ROUTES.DWG

N

Sheet 2

Sheet 3

Sheet 3
Inset 1

Sheet 3
Inset 1

Keyplan
Scale 1:10,000

Inset 1

Notes

1. Do not scale from this drawing on print or electronically. Work from figured dimensions only.
2. No deviation from the details on this drawing is allowed without CampbellReith's prior permission in writing.
3. Read this drawing with all Architect's, Service Engineer's and CampbellReith's relevant details, specifications and drawings.
4. All work is to be done in accordance with the relevant specifications issued by CampbellReith, British Standard Codes of Practice, Statutory Requirements and the Contract Documents.
5. Drawing revision:
   P: Preliminary Evolving drawings for approvals, tenders, billings etc.
   C: Contractual Drawings authorized and approved for stage completion i.e. Stage-Tender or Stage 5-Construction.
6. Dawing status:
   Work in progress
   S0 - Initial status
   Shared (Non-contractual)
   S1 - Suitable for coordination, **S2** - Suitable for information, **S3** - Suitable for review and comment, **S4** - Suitable for stage approval.
   Published (For contractors purposes)
   A1, An etc - Authorised and accepted ('n' relates to work stages)
   B1, Bn etc - Partial sign-off (with comments)
   CR - As constructed record document (Final Construction ONLY. Any deviations to that which is on site is not the liability of CampbellReith)
7. Work Stages:
   2 - Concept, **3** - Definition, **4** - Design, **5** - Build & commission, **6** - Handover
8. Only drawings with **revision Cn and status A5 to be used for Construction.**

Legend
- Existing Contours
- Proposed Contours
- Proposed Surface Water Drainage
- Proposed Manhole at risk of flooding during 1:100yr + 30%cc storm event
- Proposed Overland Flood Route

Rev	Description	Date	By
P1	Issued for Information	18.08.23	PT

Job Title: Kilnwood Vale, Phase 4

Client: Crest Nicholson

Proposed Overland Flood Route Sheet 3

Drawn by	Date made	Scale @ A1	Checked by	Suitability	CR Project
PT	17.08.23	1:500		S2	11950

CampbellReith
consulting engineers

London 020 7340 1700 | Manchester 0161 819 3060
Surrey 01737 784 500 | Birmingham 01675 467 484
Bristol 0117 916 1066 | Dubai 00 971 4345 7088
www.campbellreith.com

Project No.	Originator	Volume	Lvl/Loc	Type	Role	Number	Rev
11950	CRH	4&5	XX	DR	C	5058	P1

© CampbellReith Hill LLP 2022

London

15 Bermondsey Square
London
SE1 3UN

T: +44 (0)20 7340 1700
E: london@campbellreith.com

Birmingham

Chantry House
High Street, Coleshill
Birmingham B46 3BP

T: +44 (0)1675 467 484
E: birmingham@campbellreith.com

Bristol

Unit 5.03,
HERE,
470 Bath Road,
Bristol BS4 3AP

T: +44 (0)117 916 1066
E: bristol@campbellreith.com

Manchester

No. 1 Marsden Street
Manchester
M2 1HW

T: +44 (0)161 819 3060
E: manchester@campbellreith.com

Campbell Reith Hill LLP. Registered in England & Wales. Limited Liability Partnership No OC300082
A list of Members is available at our Registered Office at: 15 Bermondsey Square, London, SE1 3UN
VAT No 974 8892 43