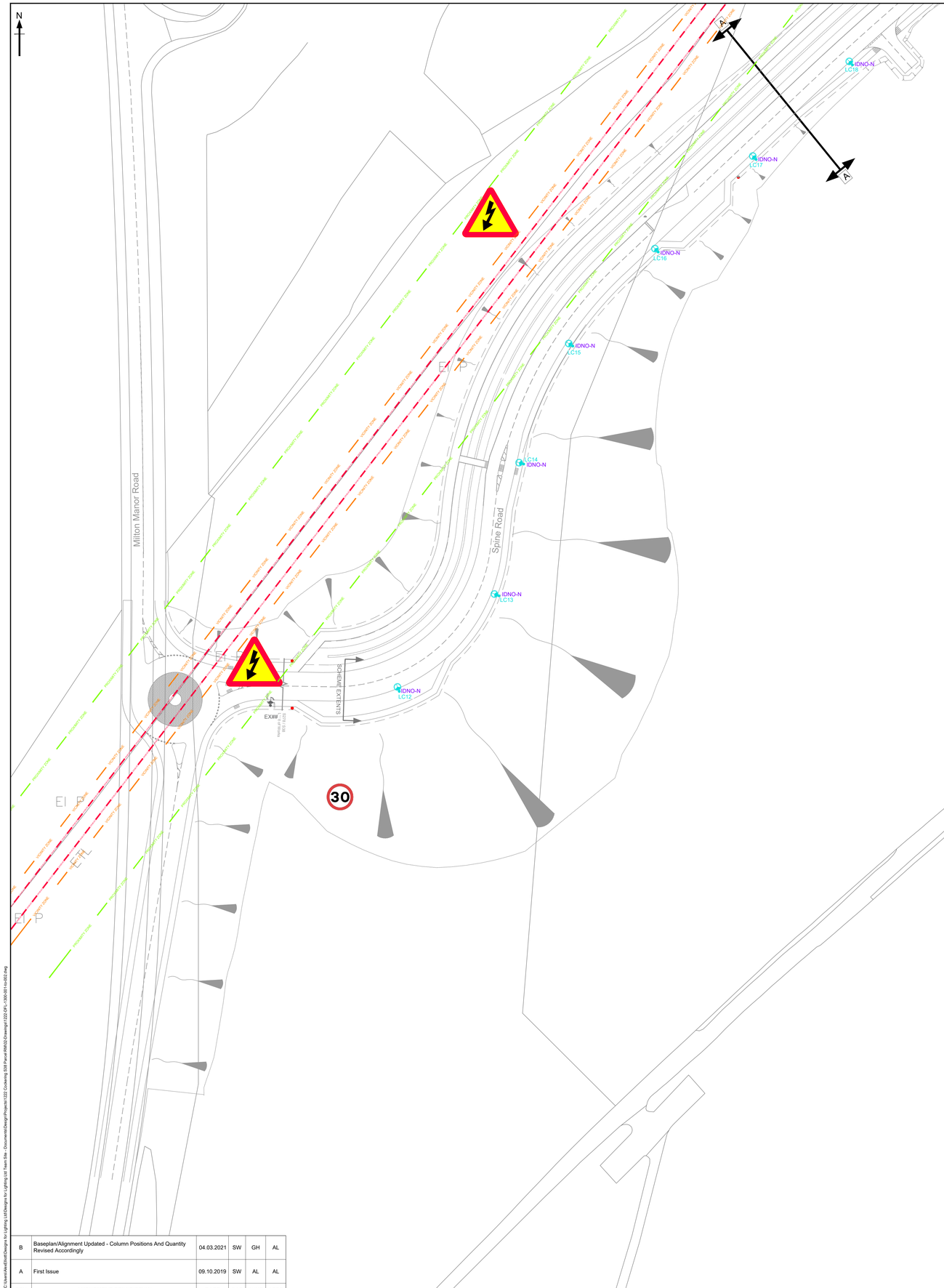
Appendix C Street Lighting Layout and Design



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VICINITY ZONE	VICINITY ZONE.
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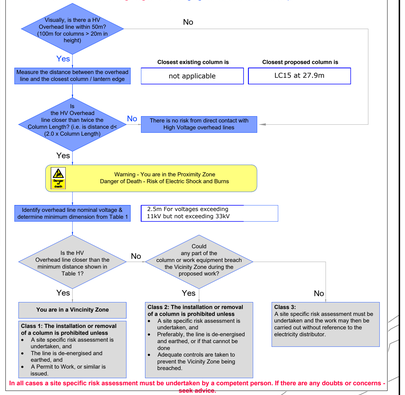

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		TO BE INSTALLED AS PART OF ADJACENT S278 SCHEME.
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1	DCU	PROPOSED DATA COLLECTION UNIT TO BE INSTALLED ON LIGHTING COLUMN LC23.

DESIGNER NOTES:

LIGHTING CLASS FOR SPINE ROAD TO BS5489-1 P2 WITH S/P RATIO 1.64
LIGHTING LEVELS [LUX]: EMIN = 1.61, EAVE = 8.06 TO 12.09

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REV	AMENDMENT DESCRIPTION	DATE	CAD	CHKD	APPD
B	Baseplan/Alignment Updated - Column Positions And Quantity Revised Accordingly	04.03.2021	SW	GH	AL
A	First Issue	09.10.2019	SW	AL	AL

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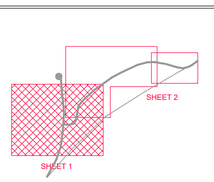


LOCATION PLAN - N.T.S.

DESIGNERS
BOUYGUES ENERGIES & SERVICES
Kent • London • Welwyn Garden City
Contact: Stefan Stratta +44 (0)7909 008643
stefan.stratta@bouygues-es.co.uk

WORKING IN PARTNERSHIP WITH

DESIGNERS
DFL LIGHTING DESIGN·ELECTRICAL·SMART CITIES· ENERGY REDUCTION·LIGHTING IMPACT
Designs for Lighting Ltd
17/18 City Business Centre
Winchester, Hampshire, SO23 7TA
Tel: 01962 855080
Email: info@dfl-uk.com

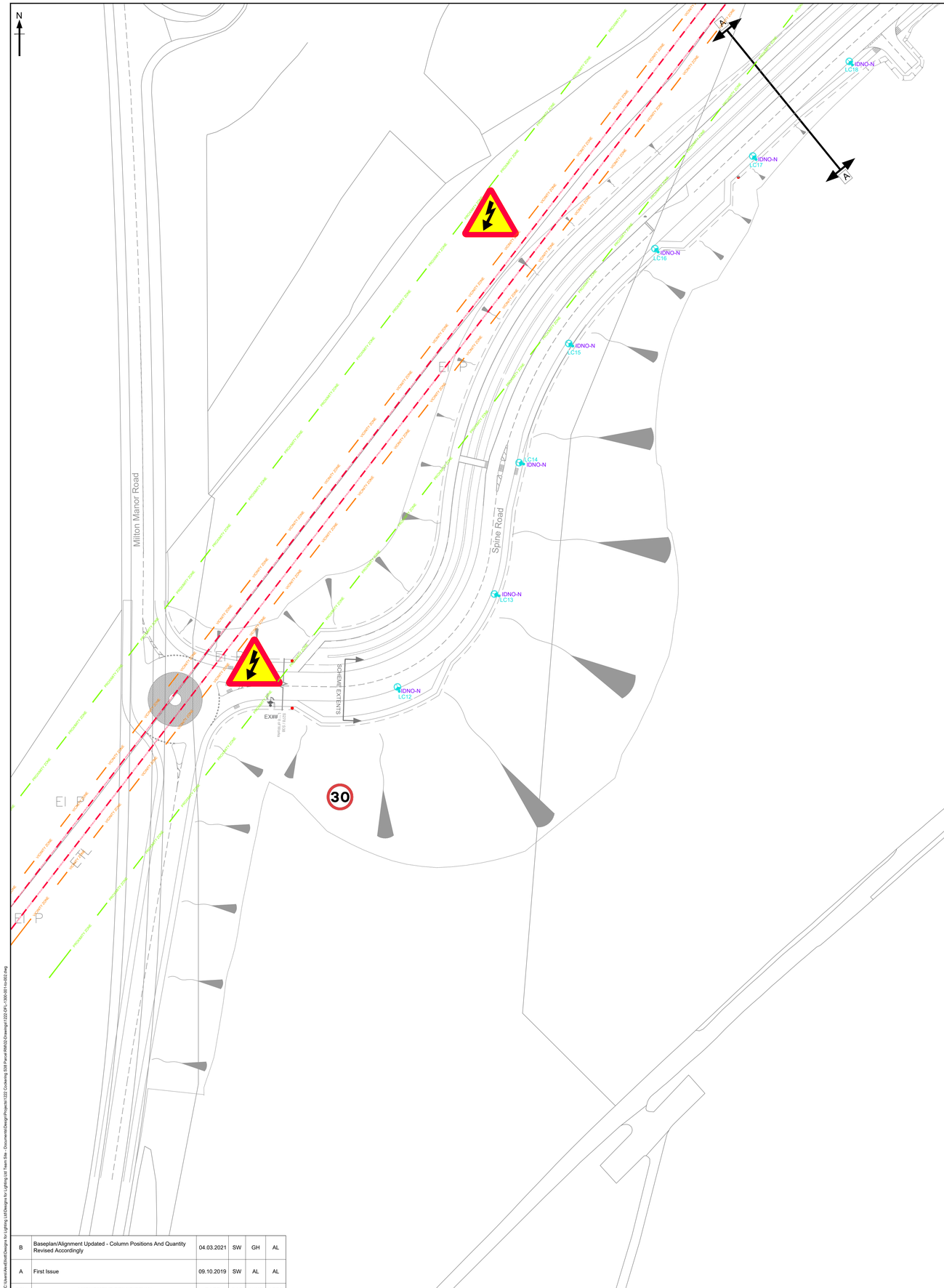
PROJECT
COCKERING ROAD
CANTERBURY S38

DRAWING TITLE
LIGHTING LAYOUT

DESIGNED	CAD	CHECKED	APPROVED
AE	SW	AL	AL

JOB NUMBER / DRAWING NUMBER	SHEET	REVISION
1222-DFL-1300-001	1 of 2	P02

JOB NUMBER	SCALE	SHEET SIZE
1222	1:500	A0



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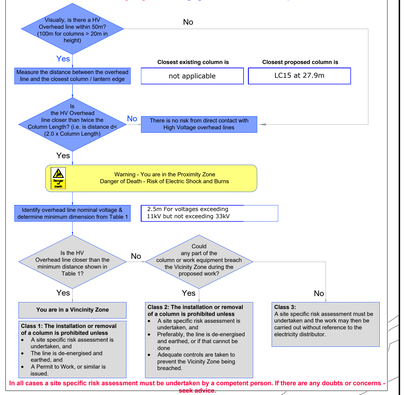

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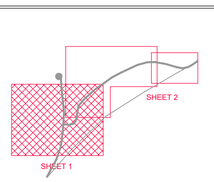

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PROJECT
COCKERING ROAD
CANTERBURY S38

DRAWING TITLE
LIGHTING LAYOUT

DESIGNED	CAD	CHECKED	APPROVED
AE	SW	AL	AL

JOB NUMBER / DRAWING NUMBER	SHEET	REVISION
1222-DFL-1300-001	1 of 2	P02

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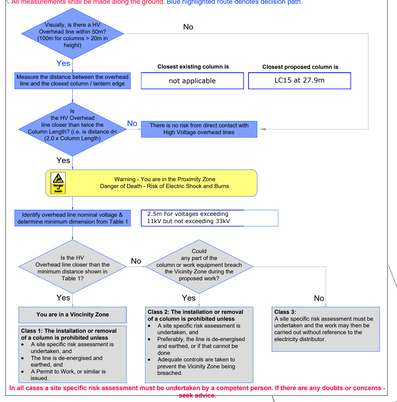

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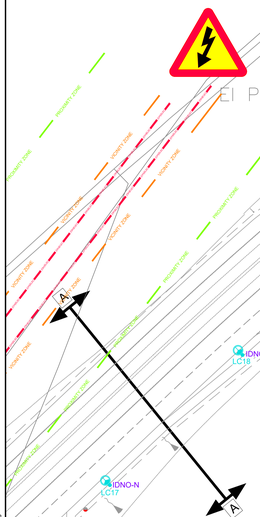

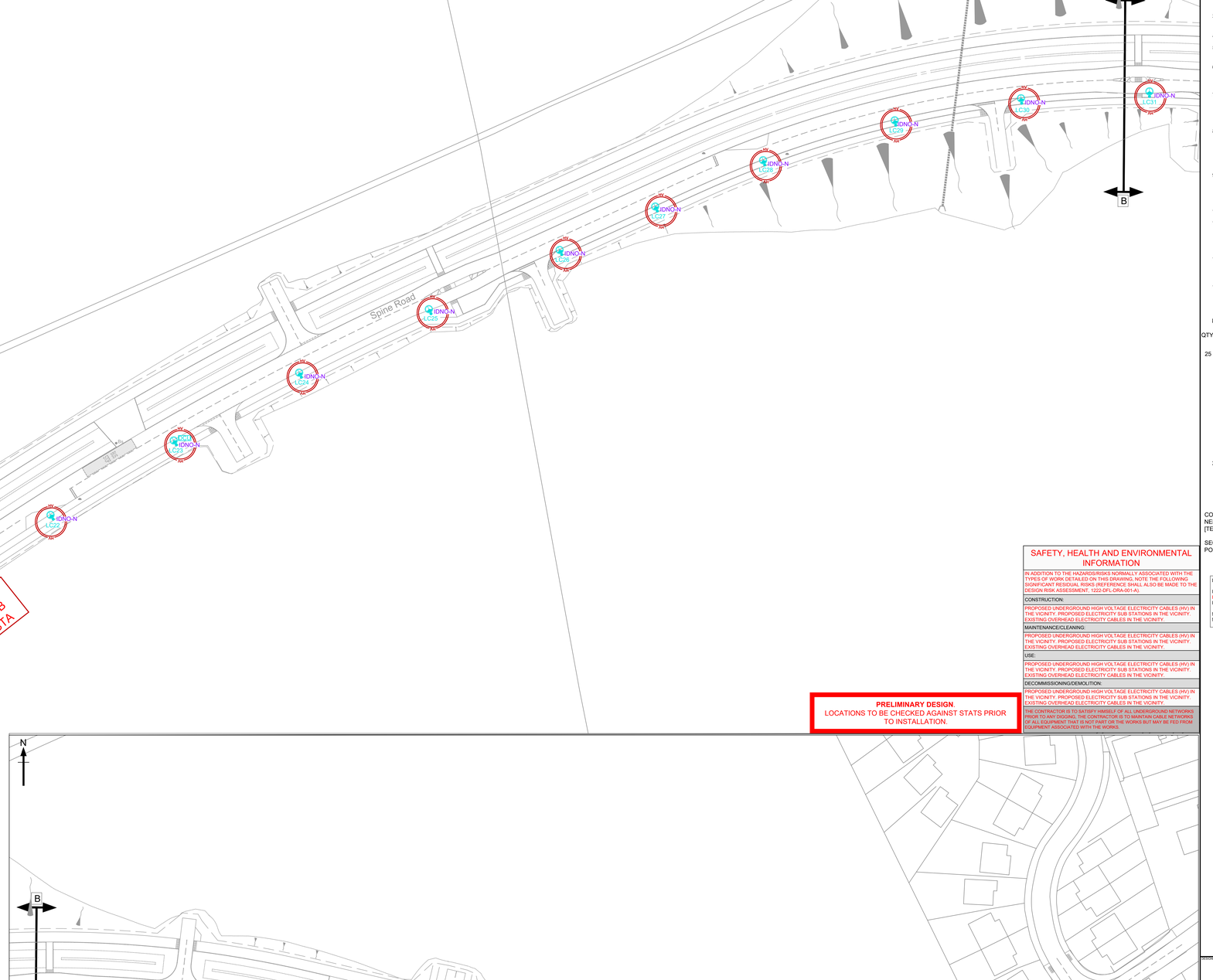

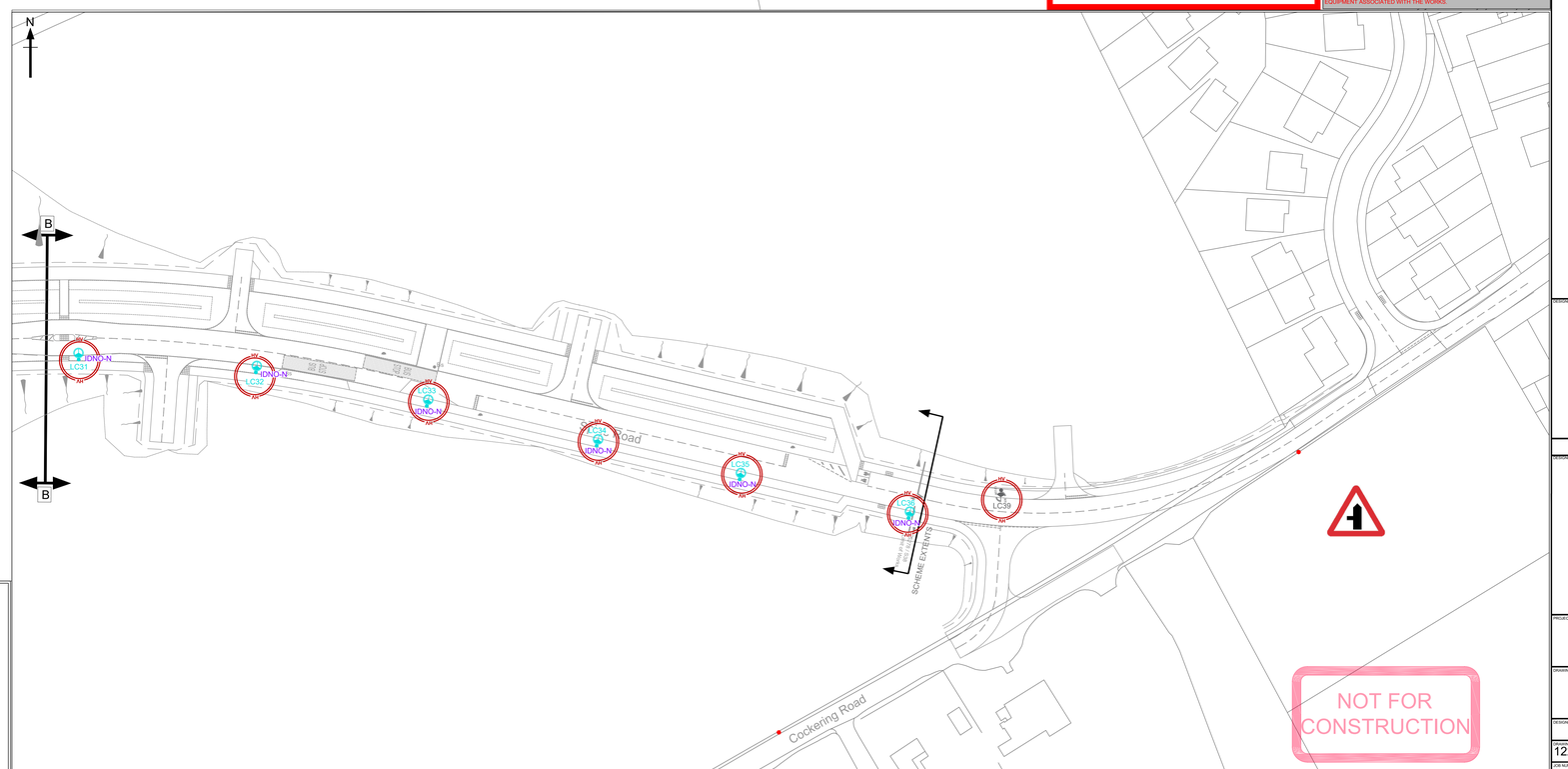

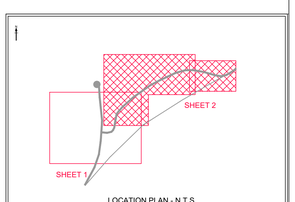

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PROJECT
COCKERING ROAD
CANTERBURY, S38

DRAWING TITLE
LIGHTING LAYOUT

DESIGNED	DRN	CHECKED	APPROVED
AE	SW	AL	AL

DRAWING NUMBER	SHEET	REVISION
1222-DFL-1300-002	2 of 2	P02

JOB NUMBER	SCALE	SHEET SIZE
1222	1:500	A0

DATE: **2 March 2021**

DESIGNER: **F Wolcz**

PROJECT No: **1222**

PROJECT NAME: **Cockering Road S38**

Location: Cockering Road, Thanington, Kent
Environmental Zone: E2

Design Class [Spine Road]:P2 with S/P ratio 1.64 [Required Illuminance levels] (lux)

Eav min	Eav max	Emin
8.06	12.09	1.61

1222-DFL-LC-001 B

PREPARED BY:

Designs for Lighting Ltd
17 City Business Centre
Hyde Street
Winchester
SO23 7TA
E-mail: alex@dfl-uk.com
Website: www.Designsforlighting.co.uk
Twitter: @Designs4Light

Layout Report

General Data

Dimensions in Metres Angles in Degrees

Calculation Grids

ID	Grid Name	X	Y	X' Length	Y' Length	X' Spacing	Y' Spacing
1	Grid 1 - Class P2	612188.00	155737.00	325.00	375.00	1.50	1.50
2	Grid 2 - Class P2	612513.00	156023.00	325.00	250.00	1.50	1.50
3	Grid 3 - Class P2	612838.00	156132.19	374.00	210.00	1.50	1.50

Luminaires

Luminaire B Data

Supplier	C U Phosco
Type	P863-32-C2-NW-F0600-60W
Lamp(s)	740P NW
Lamp Flux (klm)	7.70
File Name	P863-32-C2-NW-F0600-60W.ies
Maintenance Factor	0.83
Lum. Int. Class	G5
Lamp S/P Ratio	1.64
No. in Project	25

Luminaire M Data

Supplier	C U Phosco
Type	P863-32-R3-NW-F0400-41W
Lamp(s)	740P NW
Lamp Flux (klm)	5.19
File Name	P863-32-R3-NW-F0400-41W.ies
Maintenance Factor	0.83
Lum. Int. Class	G3
Lamp S/P Ratio	1.64
No. in Project	1

Luminaire N Data

Supplier	C U Phosco
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Lamp(s)	740P NW
Lamp Flux (klm)	7.70
File Name	P863-32-C2-NW-F0600-60W.ies
Maintenance Factor	0.83
Lum. Int. Class	G5
Lamp S/P Ratio	1.64
No. in Project	1

Layout

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
7	B	612274.88	155803.79	8.00	113.00	5.00	0.00	0.45			
8	B	612306.48	155834.14	8.00	158.00	5.00	0.00	0.45			
9	B	612314.37	155875.99	8.00	163.00	5.00	0.00	0.45			
10	B	612329.95	155913.42	8.00	150.00	5.00	0.00	0.45			
11	B	612357.09	155943.31	8.00	134.00	5.00	0.00	0.45			
12	B	612388.16	155972.68	8.00	136.00	5.00	0.00	0.45			
13	B	612418.75	156002.69	8.00	137.00	5.00	0.00	0.45			
14	B	612450.86	156030.68	8.00	130.00	5.00	0.00	0.45			

Layout Continued

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
15	B	612479.91	156053.93	8.00	128.00	5.00	0.00	0.45			
16	B	612514.18	156079.08	8.00	124.00	5.00	0.00	0.45			
17	B	612549.90	156102.93	8.00	122.00	5.00	0.00	0.45			
18	B	612586.65	156125.13	8.00	124.00	5.00	0.00	0.45			
19	B	612623.97	156145.33	8.00	116.00	5.00	0.00	0.45			
20	N	613090.12	156199.01	8.00	264.00	5.00	0.00	0.45			
21	B	612662.68	156164.30	8.00	116.00	5.00	0.00	0.45			
22	B	612701.69	156181.95	8.00	115.00	5.00	0.00	0.45			
23	B	612730.21	156194.94	8.00	115.00	5.00	0.00	0.45			
24	B	612762.27	156208.70	8.00	109.00	5.00	0.00	0.45			
25	B	612801.38	156220.56	8.00	102.00	5.00	0.00	0.45			
27	B	612838.98	156227.14	8.00	98.00	5.00	0.00	0.45			
28	B	612877.13	156229.16	8.00	91.00	5.00	0.00	0.45			
29	B	612918.04	156226.20	8.00	81.00	5.00	0.00	0.45			
30	B	612996.72	156209.27	8.00	77.00	5.00	0.00	0.45			
31	B	612957.50	156218.44	8.00	77.00	5.00	0.00	0.45			
32	B	613029.74	156201.50	8.00	79.00	5.00	0.00	0.45			
33	B	613068.74	156192.59	8.00	77.00	5.00	0.00	0.45			
43	M	612233.92	155799.32	10.00	85.00	0.00	0.00	0.45			

DATE: 2 March 2021 DESIGNER: F Wolcz

PROJECT No: 1222 PROJECT NAME: Cockering Road S38

Horizontal Illuminance (lux)

Grid 1 - Class P2

Results

Eav	11.34
Emin	1.61
Emax	35.16
Emin/Emax	0.05
Emin/Eav	0.14

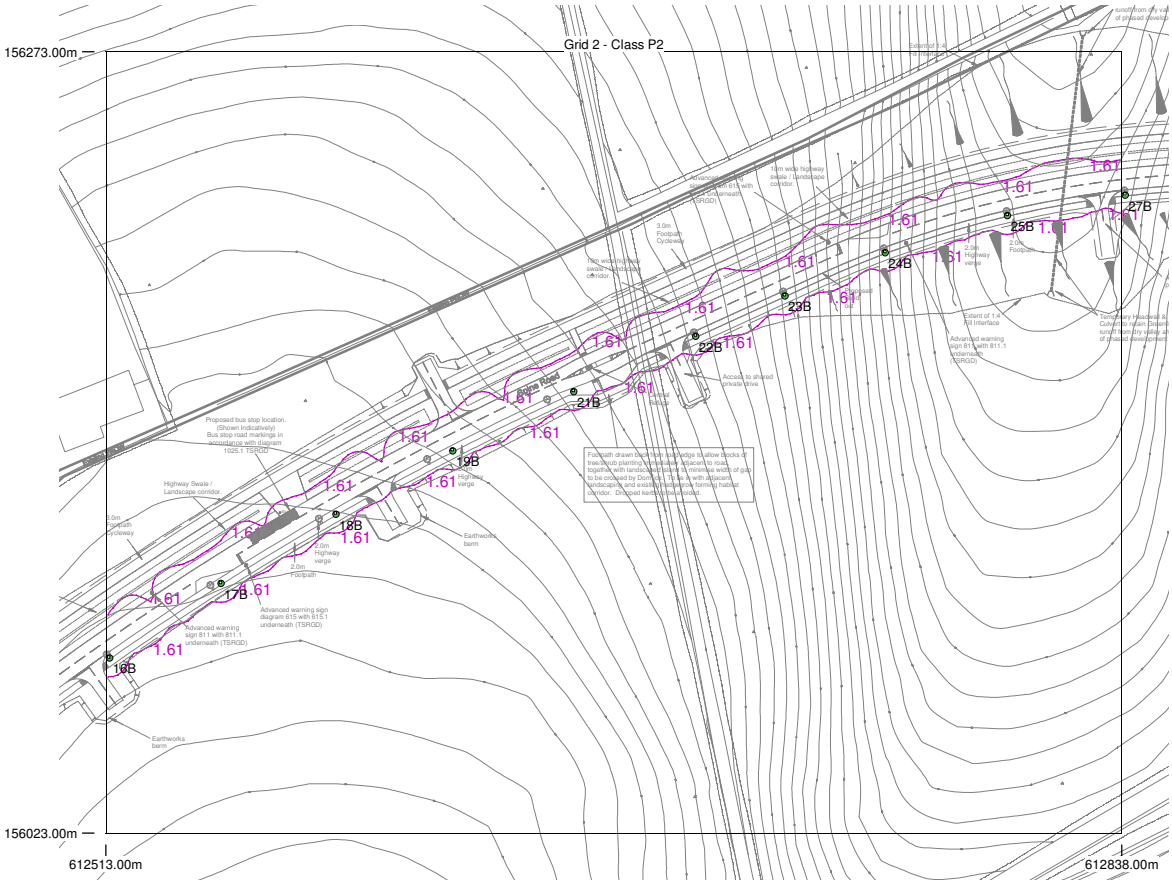
B158928172

DATE: 2 March 2021 DESIGNER: F Wolcz

PROJECT No: 1222 PROJECT NAME: Cockering Road S38

Horizontal Illuminance (lux)

Grid 2 - Class P2

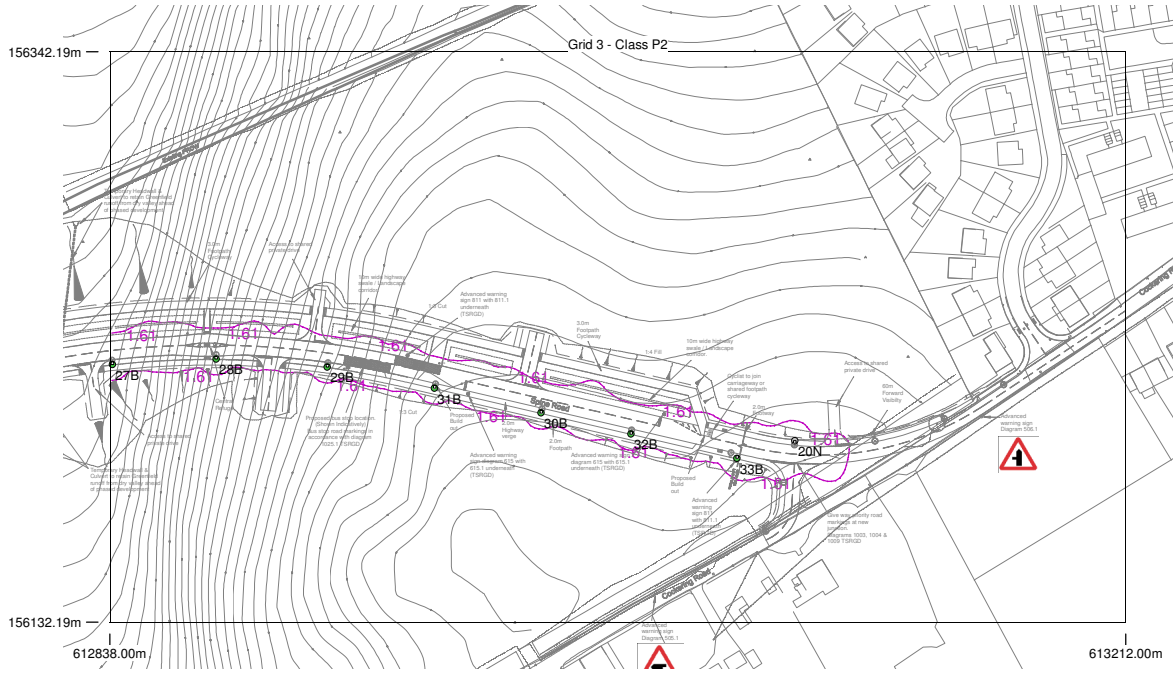


Results

Eav	11.66
Emin	1.61
Emax	35.19
Emin/Emax	0.05
Emin/Eav	0.14

Horizontal Illuminance (lux)

Grid 3 - Class P2



Results

Eav	11.96
Emin	1.91
Emax	36.58
Emin/Emax	0.05
Emin/Eav	0.16

Lighting Units Design Risk Assessment.

DFL Designers have, in accordance with CDM regulations, identified site-specific hazards/risks that are not normally associated with these types of works, endeavoured to eliminate or reduce these hazards/risks for construction, maintenance, and decommissioning of the Lighting Units, as far as reasonably practicable. All works should be carried out by qualified and competent persons in accordance with, but not limited to, G39 Working in the Vicinity of DNO Equipment, Working at height regulations, electricity at work regulations, safe digging practices hsg47 Avoiding danger from underground services and Code of Practice for Electrical Safety in Highway Electrical Operations.

DRA01

Applies to: Design, Installation, maintenance and de-commissioning of Lighting Units.

Client	**BOUYGUES E&S**	**SCHEME**	**1222 - Cockering Road (S38) - Rev A**	**Assessed By**	**A ELLIOTT**	**Date**	**08.10.2019**
				Checked By	**A LONGMAN**	**Date**	**10.10.2019**
				Approved By	**A LONGMAN**	**Date**	**10.10.2019**

Legend - Major Site specific, Safety, Health and Environmental Hazards –

Will any of the following hazards affect Main Contractor/Sub Contractor, client's staff, general public or affect the environment?

Use "Risk Rating"(RR) matrix to assess each hazard and indicate level of risk i.e.;

L = 1- 4, M = 5 – 10, H = 15 - 30 or **VH** = **50**, in space next to each hazard.

Risk Rating (RR) Matrix - Indicate L, M, H, or VH in box.

L = Likelihood, Multiply by S = Severity, for Risk Rating (RR).

1 Unlikely to be affected.	**1 Minor First Aid Injury Only.**
2 May be affected.	**2 Hospital Treatment & Off Work.**
3 Occasionally affected.	**5 Some Disability - Long absence.**
5 Likely to be affected.	**10 Permanent Disability/Death.**

Hazards/Risk, Identified. (Safety, Health & Environmental).	**`At Risk**			**Assessment of risk before Design.**			**Actions taken at the Design Stage, to identify site-specific Hazards/Risks, eliminate or reduce these Hazards/Risks for Construction, Maintenance, and Decommissioning of the Lighting Units, as far as reasonably practicable.**	**Assessment of risk after design.**			**Addendum sheet required?**	
	Main Contractor / Sub C	**Users**	**Environ /ment.**	**L**	**S**	**RR**		**L**	**S**	**RR**	**NO**	**YES (See addendum sheet).**
Overhead High Voltage Electricity Cables (O/H HV) in the vicinity.	✓			**3**	**10**	**H**	**Lighting Units have been designed away from Overhead HV Cables, Vicinity and Proximity Zones, where reasonably practicable.** **It is not reasonably practicable to design Lighting Units LC15 and LC16 away from Overhead HV Cables, Vicinity and Proximity Zones and therefore remain close to the Overhead HV Cables, Vicinity and Proximity Zones.** **Relevant Overhead HV Cables, Vicinity and Proximity Zones, have been indicated on this Scheme's drawing.** **Lighting Units located in compliance with G39, CDM and ILP guidelines.** **Distribution Overhead HV Network Owner has been consulted.**	**1**	**10**	**M**		**Consultation essential with the asset protection team.** **See HV network correspondence email.**

Lighting Units Design Risk Assessment.

Client	BOUYGUES E&S	SCHEME	1222 - Cockering Road (S38) - Rev A	Assessed By	A ELLIOTT	Date	08.10.2019
				Checked By	A LONGMAN	Date	10.10.2019
				Approved By	A LONGMAN	Date	10.10.2019

Hazards/Risk, Identified. (Safety, Health & Environmental).	`At Risk			Assessment of risk before Design.			Actions taken at the Design Stage, to identify site-specific Hazards/Risks, eliminate or reduce these Hazards/Risks for Construction, Maintenance, and Decommissioning of the Lighting Units, as far as reasonably practicable.	Assessment of risk after design.			Addendum sheet required?	
	Main Contractor / Sub C	Users	Environ /ment.	L	S	RR		L	S	RR	NO	YES (See addendum sheet).
Electrical Sub Stations in the vicinity.	✓		✓	3	10	H	Lighting Units have been designed away from Electrical Sub Stations, where reasonably practicable. It is not reasonably practicable to design Lighting Units LC21 away from Electrical Sub Stations and therefore remains close to the Electrical Sub Stations. Relevant Electrical Sub Stations have been indicated on this scheme's drawing.	1	10	M		(See HV/LV network maps).
Underground High Voltage Electricity Cables (HV) in the vicinity.	✓			3	10	H	Lighting Units have been designed away from the proposed Underground HV Cables, where reasonably practicable. It is not reasonably practicable to design Lighting Units LC20 to LC36 INCLUSIVE away from Underground HV Cables and therefore remain close to the vicinity of Underground HV Cables. Relevant Lighting Units in the vicinity of Underground HV Cables have been indicated on this scheme's drawing.	1	10	M		(See HV network maps Appendix A).
Passive Safe Equipment.		✓		3	10	H	Passive Safety Flowchart Technical Report 30 (TR30) has been used within the design stage. However due to the road characteristics and following the guidance from TR30, Passive Safe Equipment would be non-beneficial due to *the presence of buildings and industrial units that will be built.*.	1	10	M	✓	

Lighting Units Design Risk Assessment.

Client	**BOUYGUES E&S**	**SCHEME**	**1222 - Cockering Road (S38) - Rev A**	**Assessed By**	**A ELLIOTT**	**Date**	**08.10.2019**
				Checked By	**A LONGMAN**	**Date**	**10.10.2019**
				Approved By	**A LONGMAN**	**Date**	**10.10.2019**

Hazards/Risk, Identified. (Safety, Health & Environmental).	`At Risk			Assessment of risk before Design.			Actions taken at the Design Stage, to identify site-specific Hazards/Risks, eliminate or reduce these Hazards/Risks for Construction, Maintenance, and Decommissioning of the Lighting Units, as far as reasonably practicable.	Assessment of risk after design.			Addendum sheet required?	
	Main Contractor / Sub C	Users	Environ /ment.	L	S	RR		L	S	RR	NO	YES (See addendum sheet).
Visual impact / light pollution / intrusion.		✓	✓	1	2	L	**Wherever reasonably practicable Lighting Units have been designed to be in keeping with the road characteristics, reduce light pollution, glare and light intrusion.**	1	1	L	✓	

Prepared by: PAS	Uncontrolled if printed. Document Owner: Paul Southcombe.		*Rev: 05*
Approved by: A Longman	Approval Date: 11th January 2016.	Issue Date: 11th January 2016.	Review Date: 1st Jan 2020

Legend - Major Site specific, Safety, Health and Environmental Hazards –

Will any of the following hazards affect Main Contractor/Sub Contractor, client's staff, general public or affect the environment?

Use "Risk Rating"(RR) matrix to assess each hazard and indicate level of risk i.e.;

L **= 1- 4,** M **= 5 – 10,** H **= 15 - 30** or VH = **50**, in space next to each hazard.

Risk Rating (RR) Matrix - Indicate L, M, H, or VH in box.

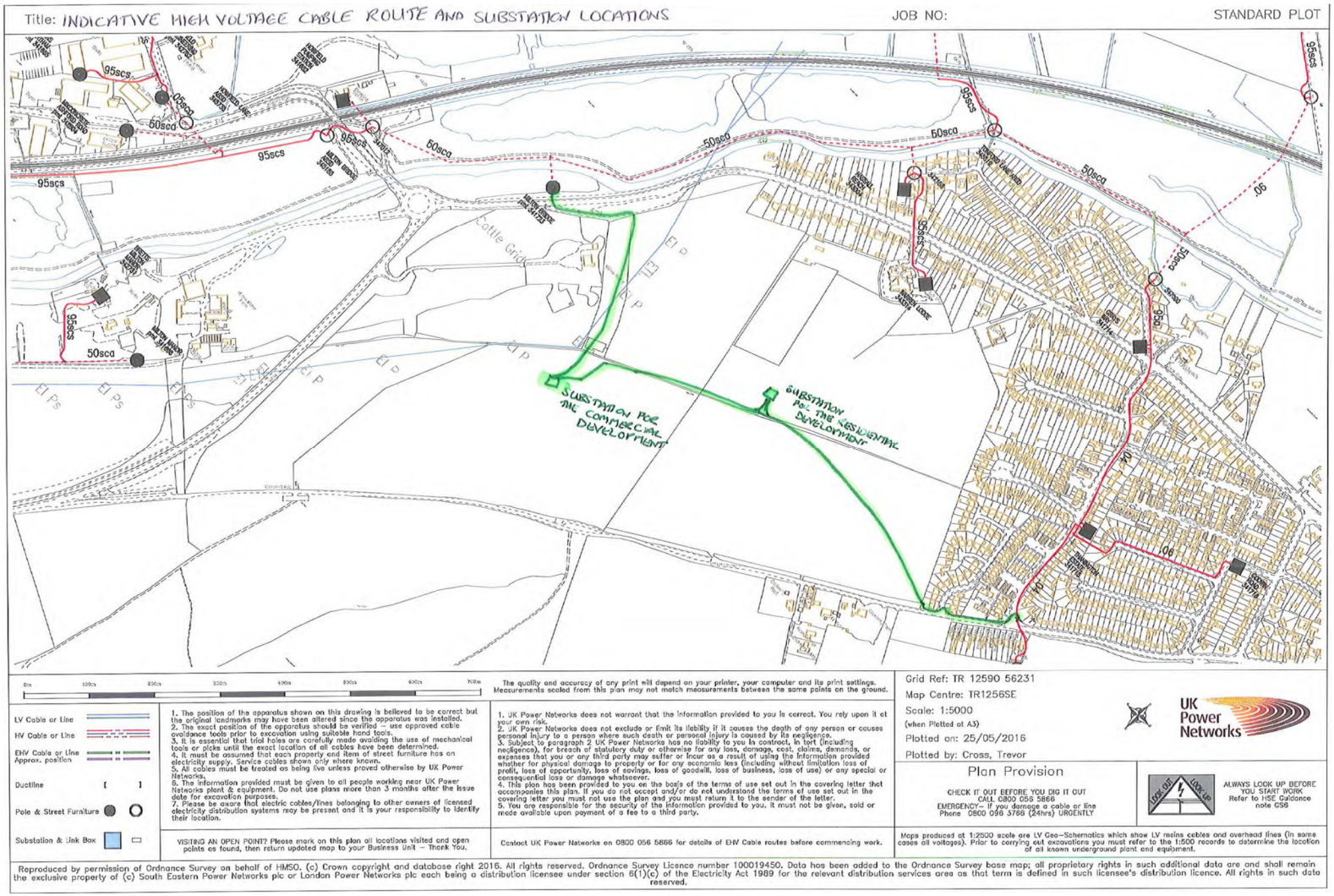
L = Likelihood, Multiply by S = Severity, for Risk Rating (RR).

1 Unlikely to be affected.	**1 Minor First Aid Injury Only.**
2 May be affected.	**2 Hospital Treatment & Off Work.**
3 Occasionally affected.	**5 Some Disability - Long absence.**
5 Likely to be affected.	**10 Permanent Disability/Death.**

Declaration: I the undersigned have read and understood the hazards / risks identified in this Scheme's Design Risk Assessment.

Construction Manager (sign): **(Print):** **Date:** / /

APPENDIX A


Title: INDICATIVE HIGH VOLTAGE CABLE ROUTE AND SUBSTATION LOCATIONS
JOB NO:
STANDARD PLOT
SUBSTATION FOR THE COMMERCIAL DEVELOPMENT
SUBSTATION FOR THE RESIDENTIAL DEVELOPMENT
Grid Ref: TR 12590 56231
Map Centre: TR1256SE
Scale: 1:5000
(when Plotted at A3)
Plotted on: 25/05/2016
Plotted by: Cross, Trevor
Plan Provision
UK Power Networks
LV Cable or Line
HV Cable or Line
EHV Cable or Line
Ductline
Pole & Street Furniture
Substation & Link Box
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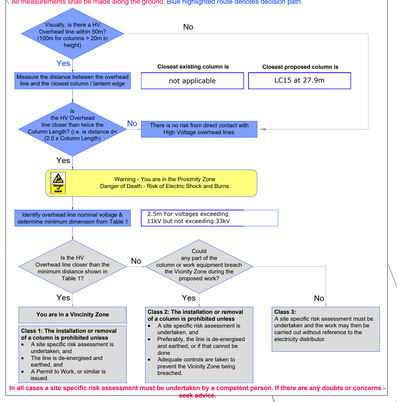
N

WARNING HAZARDS KEY

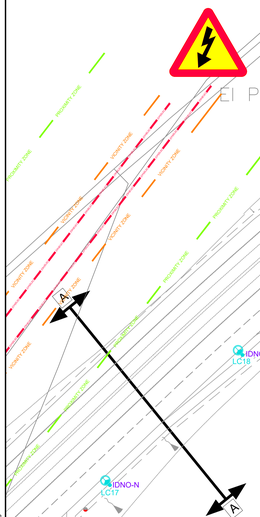
SYMBOL	DESCRIPTION
	OHV POWER CABLES ARE PRESENT IN THIS AREA. HV CABLE POWER RATING AND SAFE WORKING DISTANCE IS TO BE CONFIRMED WITH THE POWER LINE OWNER PRIOR TO WORKS.
	HIGH VOLTAGE UNDERGROUND ELECTRICITY CABLES IN THE VICINITY OF COLUMN.
PROXIMITY ZONE	PROXIMITY ZONE.
VICINITY ZONE	VICINITY ZONE.
	33kV HIGH VOLTAGE OVERHEAD ELECTRIC CABLE - LIVE.

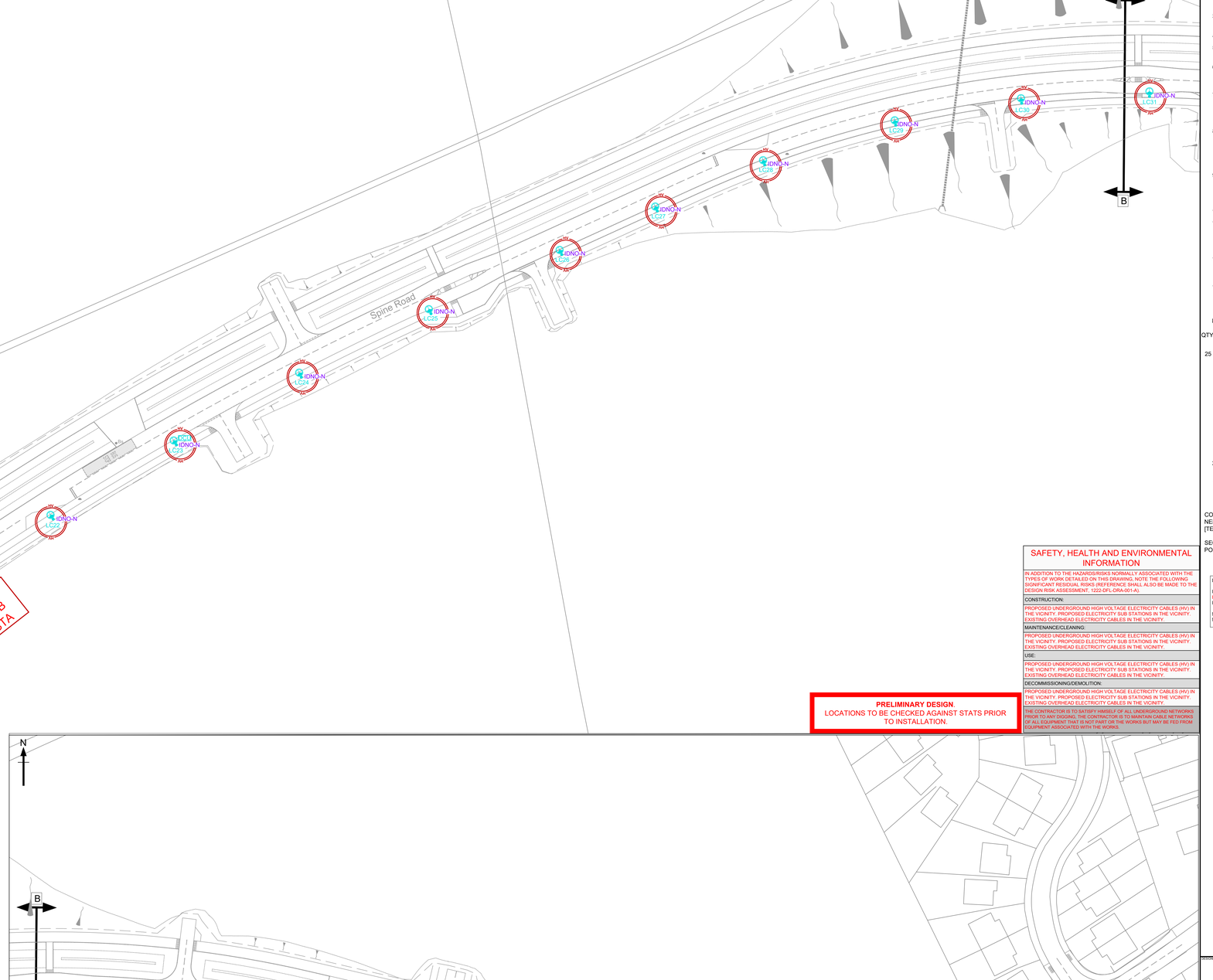
PRELIMINARY ON-SITE ASSESSMENT FOR PLANNING OR OPERATIONAL PURPOSES, IN THE PROXIMITY TO HIGH VOLTAGE OVERHEAD CABLES ON WOODEN POLES.

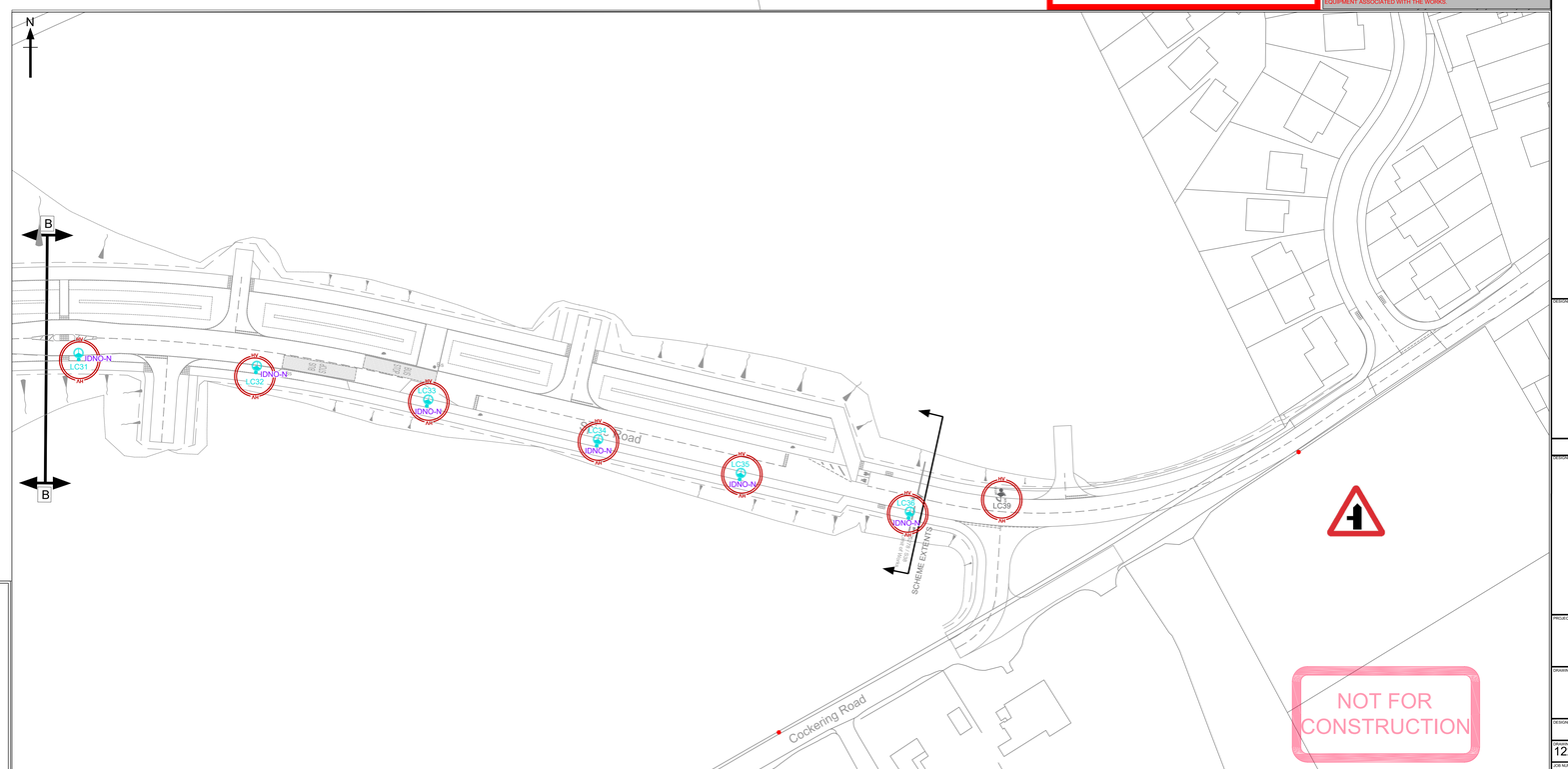
At the location of installation or removal of a column or other street furniture:
All measurements shall be made along the ground. Blue highlighted route denotes decision path.

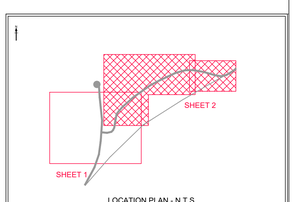


In all cases a site specific risk assessment must be undertaken by a competent person. If there are any doubts or concerns - seek advice.









LOCATION PLAN - N.T.S.

REV	AMENDMENT DESCRIPTION	DATE	CAD	CHKD	APPD
B	Baseplans/Alignment Updated - Column Positions And Quantity Revised Accordingly	04.03.2021	SW	GH	AL
A	First Issue	09.10.2019	SW	AL	AL

Notes

1. THIS IS AN AUTOCAD DRAWING AND SHOULD NOT BE AMENDED BY HAND.
2. THE EXISTING LOCATIONS ARE APPROXIMATE AND THEIR ACCURACY CANNOT BE GUARANTEED.
3. ALL DIMENSIONS IN METRES UNLESS OTHERWISE STATED.
4. THIS DRAWING MUST NOT BE SCALED.
5. DRAWING TO BE READ IN CONJUNCTION WITH OTHER CONTRACT DOCUMENTS.
6. COLUMN LOCATIONS TO BE CHECKED AGAINST UTILITY DRAWINGS FOR CONFLICTS BY A COMPETENT ENGINEER.
7. CONTRACTOR SHOULD SATISFY THEMSELVES THAT ANY UTILITY DRAWINGS AFFECTING THE SCHEME ARE ACCURATE AND UP TO DATE PRIOR TO COMMENCEMENT.
8. ALL LIGHTING INSTALLATIONS AND EQUIPMENT TO BE TO KENT COUNTY COUNCIL ADOPTABLE STANDARDS. REFERENCE SHOULD BE MADE TO KENT COUNTY COUNCIL "STREET LIGHTING LIST OF APPROVED APPARATUS".
9. COLUMNS ARE TO BE POSITIONED AT THE BACK OF THE VERGE/FOOTWAY UNLESS SPECIFIED ON THE DRAWING. NO CLOSER THAN 600MM FROM THE KERB LINE TO THE FACE OF THE COLUMN.
10. NO COLUMNS IN SHARED SPACES.
11. COLUMN NUMBERING SHOWN IS FOR REFERENCE PURPOSES ONLY. FINAL NUMBERING SHOULD BE AGREED WITH KENT COUNTY COUNCIL BEFORE CONSTRUCTION.
12. CONTROL: ALL LANTERNS TO BE FITTED WITH 7 PIN NEMA SOCKET AND BE CONTROLLED BY CMS [TELEMATICS WIRELESS]
13. SECONDARY ISOLATOR: CHARLES ENDIRECT DOUBLE POLE ISOLATOR [LSI RANGE] WITH HRC FUSE.

KEY PROPOSED

QTY.	SYMBOL	DESCRIPTION
25		PROPOSED 8.0M GALVANISED STEEL ROAD LIGHTING COLUMN TO KCC COASTAL SPECIFICATION AND POST TOP MOUNTED CU PHOSCO P863 LANTERN WITH 32 LED [CLO], 4000K, F0600mA DRIVER, 60W, OPTIC C2, 7.70KLM OUTPUT. LANTERN TO BE INSTALLED AT 5 DEGREES AND CONTROLLED BY CMS (SEE NOTE 12) REF: **P863_32_C2_NW_F0600_60W**
		TO BE INSTALLED AS PART OF ADJACENT S278 SCHEME.
25	IDNO-N	EXISTING iDNO SUPPLY - GTC
1	DCU	PROPOSED DATA COLLECTION UNIT TO BE INSTALLED ON LIGHTING COLUMN LC23.

CONTROL: ALL LANTERNS TO BE FITTED WITH 7 PIN NEMA SOCKET AND BE CONTROLLED BY CMS [TELEMATICS WIRELESS]

SECONDARY ISOLATOR: CHARLES ENDIRECT DOUBLE POLE ISOLATOR [LSI RANGE] WITH HRC FUSE.

DESIGNER NOTES:

LIGHTING CLASS FOR SPINE ROAD TO BS5489-1 P2 WITH S/P RATIO 1.64.
LIGHTING LEVELS [LUX]: EMIN = 1.61, EAVE = 8.06 TO 12.09

MAINTENANCE FACTOR FOR P863, P862 AND P852K 0.83.
MAINTENANCE FACTOR FOR P852K [CONTRIBUTION] 0.77.

SAFETY, HEALTH AND ENVIRONMENTAL INFORMATION

IN ADDITION TO THE HAZARDS/RISKS NORMALLY ASSOCIATED WITH THE TYPES OF WORK DETAILED ON THIS DRAWING, NOTE THE FOLLOWING SIGNIFICANT RESIDUAL RISKS (REFERENCE SHALL ALSO BE MADE TO THE DESIGN RISK ASSESSMENT, 1222-DFL-DRA-001A).

CONSTRUCTION:
PROPOSED UNDERGROUND HIGH VOLTAGE ELECTRICITY CABLES (HV) IN THE VICINITY. PROPOSED ELECTRICITY SUB STATIONS IN THE VICINITY. EXISTING OVERHEAD ELECTRICITY CABLES IN THE VICINITY.

MAINTENANCE/CLEANING:
PROPOSED UNDERGROUND HIGH VOLTAGE ELECTRICITY CABLES (HV) IN THE VICINITY. PROPOSED ELECTRICITY SUB STATIONS IN THE VICINITY. EXISTING OVERHEAD ELECTRICITY CABLES IN THE VICINITY.

USE:
PROPOSED UNDERGROUND HIGH VOLTAGE ELECTRICITY CABLES (HV) IN THE VICINITY. PROPOSED ELECTRICITY SUB STATIONS IN THE VICINITY. EXISTING OVERHEAD ELECTRICITY CABLES IN THE VICINITY.

DECOMMISSIONING/DEMOLITION:
PROPOSED UNDERGROUND HIGH VOLTAGE ELECTRICITY CABLES (HV) IN THE VICINITY. PROPOSED ELECTRICITY SUB STATIONS IN THE VICINITY. EXISTING OVERHEAD ELECTRICITY CABLES IN THE VICINITY.

THE CONTRACTOR IS TO SATISFY HIMSELF OF ALL UNDERGROUND NETWORKS PRIOR TO ANY DIGGING, THE CONTRACTOR IS TO MAINTAIN CABLE NETWORKS OF ALL EQUIPMENT THAT IS NOT PART OR THE WORKS BUT MAY BE FED FROM EQUIPMENT ASSOCIATED WITH THE WORKS.

PRELIMINARY DESIGN
LOCATIONS TO BE CHECKED AGAINST STATS PRIOR TO INSTALLATION.

NOT FOR CONSTRUCTION

DESIGNED BY
BOUYGUES ENERGIES & SERVICES
Kent • London • Welwyn Garden City
Contact: Stefan Stratta +44 (0)7909 008643
stefan.stratta@bouygues-es.co.uk

WORKING IN PARTNERSHIP WITH

DESIGNED BY
DFL LIGHTING DESIGN | ELECTRICAL | SMART CITIES | ENERGY REDUCTION | LIGHTING IMPACT
Designs for Lighting Ltd
17/18 City Business Centre
Winchester, Hampshire, SO23 7TA
Tel: 01962 855080
Email: info@dfl-uk.com

PROJECT
COCKERING ROAD
CANTERBURY, S38

DRAWING TITLE
LIGHTING LAYOUT

DESIGNED	DRN	CHECKED	APPROVED
AE	SW	AL	AL

DRAWING NUMBER	SHEET	REVISION
1222-DFL-1300-002	2 of 2	P02

JOB NUMBER	SCALE	SHEET SIZE
1222	1:500	A0

DATE: **2 March 2021**

DESIGNER: **F Wolcz**

PROJECT No: **1222**

PROJECT NAME: **Cockering Road S38**

Location: Cockering Road, Thanington, Kent
Environmental Zone: E2

Design Class [Spine Road]:P2 with S/P ratio 1.64 [Required Illuminance levels] (lux)

Eav min	Eav max	Emin
8.06	12.09	1.61

1222-DFL-LC-001 B

PREPARED BY:

Designs for Lighting Ltd
17 City Business Centre
Hyde Street
Winchester
SO23 7TA
E-mail: alex@dfl-uk.com
Website: www.Designsforlighting.co.uk
Twitter: @Designs4Light

Layout Report

General Data

Dimensions in Metres Angles in Degrees

Calculation Grids

ID	Grid Name	X	Y	X' Length	Y' Length	X' Spacing	Y' Spacing
1	Grid 1 - Class P2	612188.00	155737.00	325.00	375.00	1.50	1.50
2	Grid 2 - Class P2	612513.00	156023.00	325.00	250.00	1.50	1.50
3	Grid 3 - Class P2	612838.00	156132.19	374.00	210.00	1.50	1.50

Luminaires

Luminaire B Data

Supplier	C U Phosco
Type	P863-32-C2-NW-F0600-60W
Lamp(s)	740P NW
Lamp Flux (klm)	7.70
File Name	P863-32-C2-NW-F0600-60W.ies
Maintenance Factor	0.83
Lum. Int. Class	G5
Lamp S/P Ratio	1.64
No. in Project	25

Luminaire M Data

Supplier	C U Phosco
Type	P863-32-R3-NW-F0400-41W
Lamp(s)	740P NW
Lamp Flux (klm)	5.19
File Name	P863-32-R3-NW-F0400-41W.ies
Maintenance Factor	0.83
Lum. Int. Class	G3
Lamp S/P Ratio	1.64
No. in Project	1

Luminaire N Data

Supplier	C U Phosco
Type	P863-32-C2-NW-F0600-60W
Lamp(s)	740P NW
Lamp Flux (klm)	7.70
File Name	P863-32-C2-NW-F0600-60W.ies
Maintenance Factor	0.83
Lum. Int. Class	G5
Lamp S/P Ratio	1.64
No. in Project	1

Layout

ID	Type	X	Y	Height	Angle	Tilt	Cant	Out-reach	Target X	Target Y	Target Z
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13	B	612418.75	156002.69	8.00	137.00	5.00	0.00	0.45			
14	B	612450.86	156030.68	8.00	130.00	5.00	0.00	0.45			

Layout Continued

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19	B	612623.97	156145.33	8.00	116.00	5.00	0.00	0.45			
20	N	613090.12	156199.01	8.00	264.00	5.00	0.00	0.45			
21	B	612662.68	156164.30	8.00	116.00	5.00	0.00	0.45			
22	B	612701.69	156181.95	8.00	115.00	5.00	0.00	0.45			
23	B	612730.21	156194.94	8.00	115.00	5.00	0.00	0.45			
24	B	612762.27	156208.70	8.00	109.00	5.00	0.00	0.45			
25	B	612801.38	156220.56	8.00	102.00	5.00	0.00	0.45			
27	B	612838.98	156227.14	8.00	98.00	5.00	0.00	0.45			
28	B	612877.13	156229.16	8.00	91.00	5.00	0.00	0.45			
29	B	612918.04	156226.20	8.00	81.00	5.00	0.00	0.45			
30	B	612996.72	156209.27	8.00	77.00	5.00	0.00	0.45			
31	B	612957.50	156218.44	8.00	77.00	5.00	0.00	0.45			
32	B	613029.74	156201.50	8.00	79.00	5.00	0.00	0.45			
33	B	613068.74	156192.59	8.00	77.00	5.00	0.00	0.45			
43	M	612233.92	155799.32	10.00	85.00	0.00	0.00	0.45			

DATE: 2 March 2021 DESIGNER: F Wolcz

PROJECT No: 1222 PROJECT NAME: Cockering Road S38

Horizontal Illuminance (lux)

Grid 1 - Class P2

Results

Eav	11.34
Emin	1.61
Emax	35.16
Emin/Emax	0.05
Emin/Eav	0.14

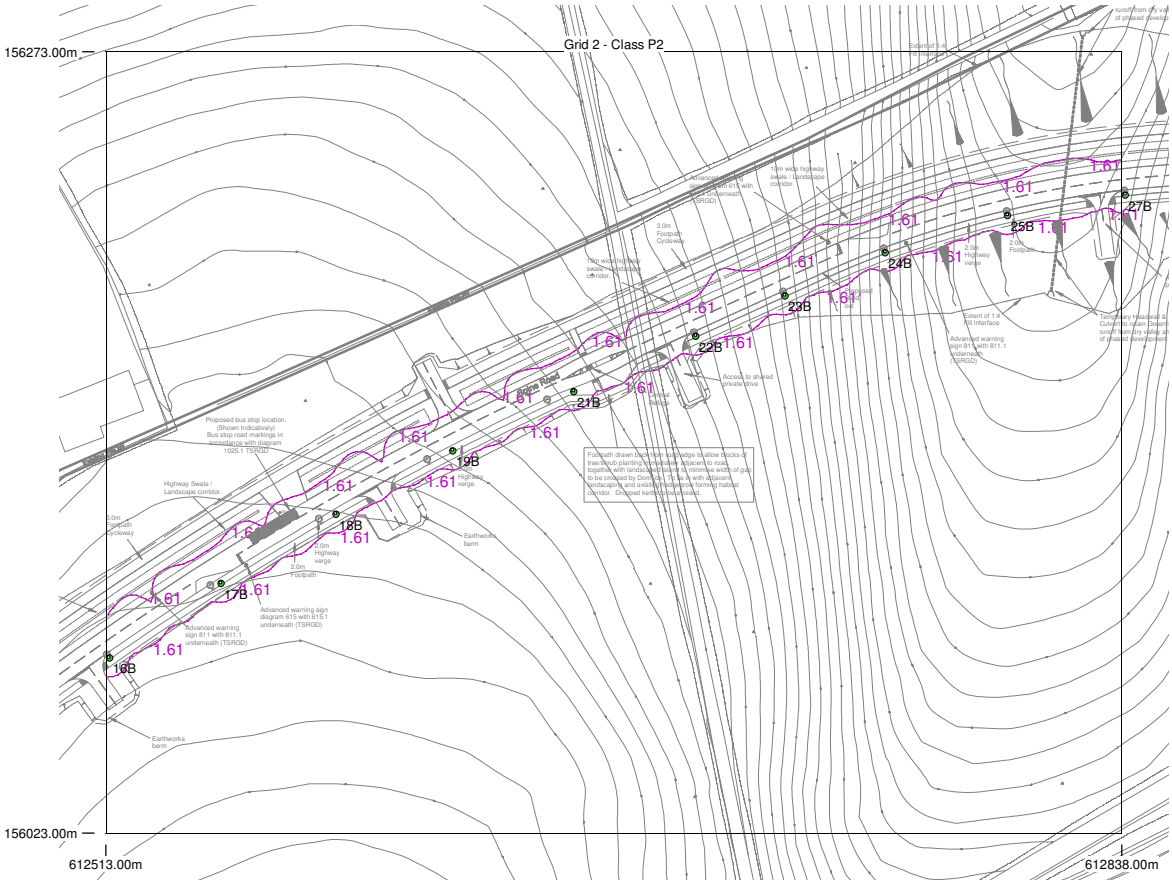
B158928172

DATE: 2 March 2021 DESIGNER: F Wolcz

PROJECT No: 1222 PROJECT NAME: Cockering Road S38

Horizontal Illuminance (lux)

Grid 2 - Class P2

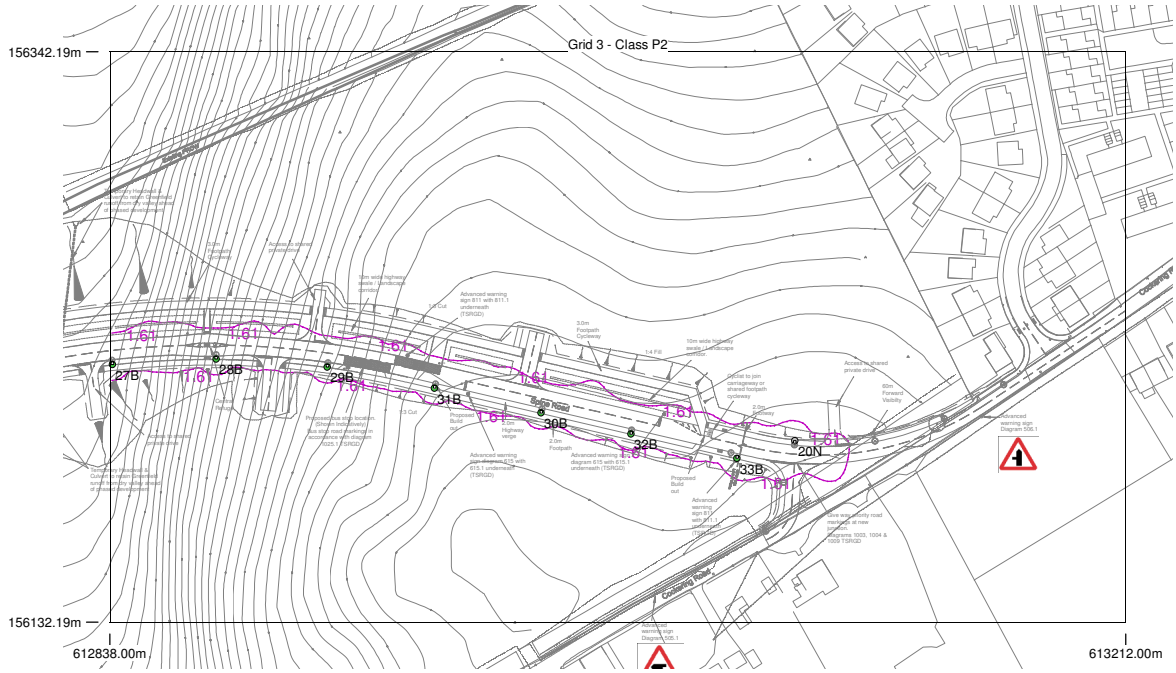


Results

Eav	11.66
Emin	1.61
Emax	35.19
Emin/Emax	0.05
Emin/Eav	0.14

Horizontal Illuminance (lux)

Grid 3 - Class P2



Results

Eav	11.96
Emin	1.91
Emax	36.58
Emin/Emax	0.05
Emin/Eav	0.16

Lighting Units Design Risk Assessment.

DFL Designers have, in accordance with CDM regulations, identified site-specific hazards/risks that are not normally associated with these types of works, endeavoured to eliminate or reduce these hazards/risks for construction, maintenance, and decommissioning of the Lighting Units, as far as reasonably practicable. All works should be carried out by qualified and competent persons in accordance with, but not limited to, G39 Working in the Vicinity of DNO Equipment, Working at height regulations, electricity at work regulations, safe digging practices hsg47 Avoiding danger from underground services and Code of Practice for Electrical Safety in Highway Electrical Operations.

DRA01

Applies to: Design, Installation, maintenance and de-commissioning of Lighting Units.

Client	**BOUYGUES E&S**	**SCHEME**	**1222 - Cockering Road (S38) - Rev A**	**Assessed By**	**A ELLIOTT**	**Date**	**08.10.2019**
				Checked By	**A LONGMAN**	**Date**	**10.10.2019**
				Approved By	**A LONGMAN**	**Date**	**10.10.2019**

Legend - Major Site specific, Safety, Health and Environmental Hazards –

Will any of the following hazards affect Main Contractor/Sub Contractor, client's staff, general public or affect the environment?

Use "Risk Rating"(RR) matrix to assess each hazard and indicate level of risk i.e.;

L = 1- 4, M = 5 – 10, H = 15 - 30 or **VH** = **50**, in space next to each hazard.

Risk Rating (RR) Matrix - Indicate L, M, H, or VH in box.

L = Likelihood, Multiply by S = Severity, for Risk Rating (RR).

1 Unlikely to be affected.	**1 Minor First Aid Injury Only.**
2 May be affected.	**2 Hospital Treatment & Off Work.**
3 Occasionally affected.	**5 Some Disability - Long absence.**
5 Likely to be affected.	**10 Permanent Disability/Death.**

Hazards/Risk, Identified. (Safety, Health & Environmental).	**`At Risk**			**Assessment of risk before Design.**			**Actions taken at the Design Stage, to identify site-specific Hazards/Risks, eliminate or reduce these Hazards/Risks for Construction, Maintenance, and Decommissioning of the Lighting Units, as far as reasonably practicable.**	**Assessment of risk after design.**			**Addendum sheet required?**	
	Main Contractor / Sub C	**Users**	**Environ /ment.**	**L**	**S**	**RR**		**L**	**S**	**RR**	**NO**	**YES (See addendum sheet).**
Overhead High Voltage Electricity Cables (O/H HV) in the vicinity.	✓			**3**	**10**	**H**	**Lighting Units have been designed away from Overhead HV Cables, Vicinity and Proximity Zones, where reasonably practicable.** **It is not reasonably practicable to design Lighting Units LC15 and LC16 away from Overhead HV Cables, Vicinity and Proximity Zones and therefore remain close to the Overhead HV Cables, Vicinity and Proximity Zones.** **Relevant Overhead HV Cables, Vicinity and Proximity Zones, have been indicated on this Scheme's drawing.** **Lighting Units located in compliance with G39, CDM and ILP guidelines.** **Distribution Overhead HV Network Owner has been consulted.**	**1**	**10**	**M**		**Consultation essential with the asset protection team.** **See HV network correspondence email.**

Lighting Units Design Risk Assessment.

Client	BOUYGUES E&S	SCHEME	1222 - Cockering Road (S38) - Rev A	Assessed By	A ELLIOTT	Date	08.10.2019
				Checked By	A LONGMAN	Date	10.10.2019
				Approved By	A LONGMAN	Date	10.10.2019

Hazards/Risk, Identified. (Safety, Health & Environmental).	`At Risk			Assessment of risk before Design.			Actions taken at the Design Stage, to identify site-specific Hazards/Risks, eliminate or reduce these Hazards/Risks for Construction, Maintenance, and Decommissioning of the Lighting Units, as far as reasonably practicable.	Assessment of risk after design.			Addendum sheet required?	
	Main Contractor / Sub C	Users	Environ /ment.	L	S	RR		L	S	RR	NO	YES (See addendum sheet).
Electrical Sub Stations in the vicinity.	✓		✓	3	10	H	Lighting Units have been designed away from Electrical Sub Stations, where reasonably practicable. It is not reasonably practicable to design Lighting Units LC21 away from Electrical Sub Stations and therefore remains close to the Electrical Sub Stations. Relevant Electrical Sub Stations have been indicated on this scheme's drawing.	1	10	M		(See HV/LV network maps).
Underground High Voltage Electricity Cables (HV) in the vicinity.	✓			3	10	H	Lighting Units have been designed away from the proposed Underground HV Cables, where reasonably practicable. It is not reasonably practicable to design Lighting Units LC20 to LC36 INCLUSIVE away from Underground HV Cables and therefore remain close to the vicinity of Underground HV Cables. Relevant Lighting Units in the vicinity of Underground HV Cables have been indicated on this scheme's drawing.	1	10	M		(See HV network maps Appendix A).
Passive Safe Equipment.		✓		3	10	H	Passive Safety Flowchart Technical Report 30 (TR30) has been used within the design stage. However due to the road characteristics and following the guidance from TR30, Passive Safe Equipment would be non-beneficial due to *the presence of buildings and industrial units that will be built.*.	1	10	M	✓	

Lighting Units Design Risk Assessment.

Client	**BOUYGUES E&S**	**SCHEME**	**1222 - Cockering Road (S38) - Rev A**	**Assessed By**	**A ELLIOTT**	**Date**	**08.10.2019**
				Checked By	**A LONGMAN**	**Date**	**10.10.2019**
				Approved By	**A LONGMAN**	**Date**	**10.10.2019**

Hazards/Risk, Identified. (Safety, Health & Environmental).	`At Risk			Assessment of risk before Design.			Actions taken at the Design Stage, to identify site-specific Hazards/Risks, eliminate or reduce these Hazards/Risks for Construction, Maintenance, and Decommissioning of the Lighting Units, as far as reasonably practicable.	Assessment of risk after design.			Addendum sheet required?	
	Main Contractor / Sub C	Users	Environ /ment.	L	S	RR		L	S	RR	NO	YES (See addendum sheet).
Visual impact / light pollution / intrusion.		✓	✓	1	2	L	**Wherever reasonably practicable Lighting Units have been designed to be in keeping with the road characteristics, reduce light pollution, glare and light intrusion.**	1	1	L	✓	

Prepared by: PAS	Uncontrolled if printed. Document Owner: Paul Southcombe.		*Rev: 05*
Approved by: A Longman	Approval Date: 11th January 2016.	Issue Date: 11th January 2016.	Review Date: 1st Jan 2020

Legend - Major Site specific, Safety, Health and Environmental Hazards –

Will any of the following hazards affect Main Contractor/Sub Contractor, client's staff, general public or affect the environment?

Use "Risk Rating"(RR) matrix to assess each hazard and indicate level of risk i.e.;

L **= 1- 4,** M **= 5 – 10,** H **= 15 - 30** or VH = **50**, in space next to each hazard.

Risk Rating (RR) Matrix - Indicate L, M, H, or VH in box.

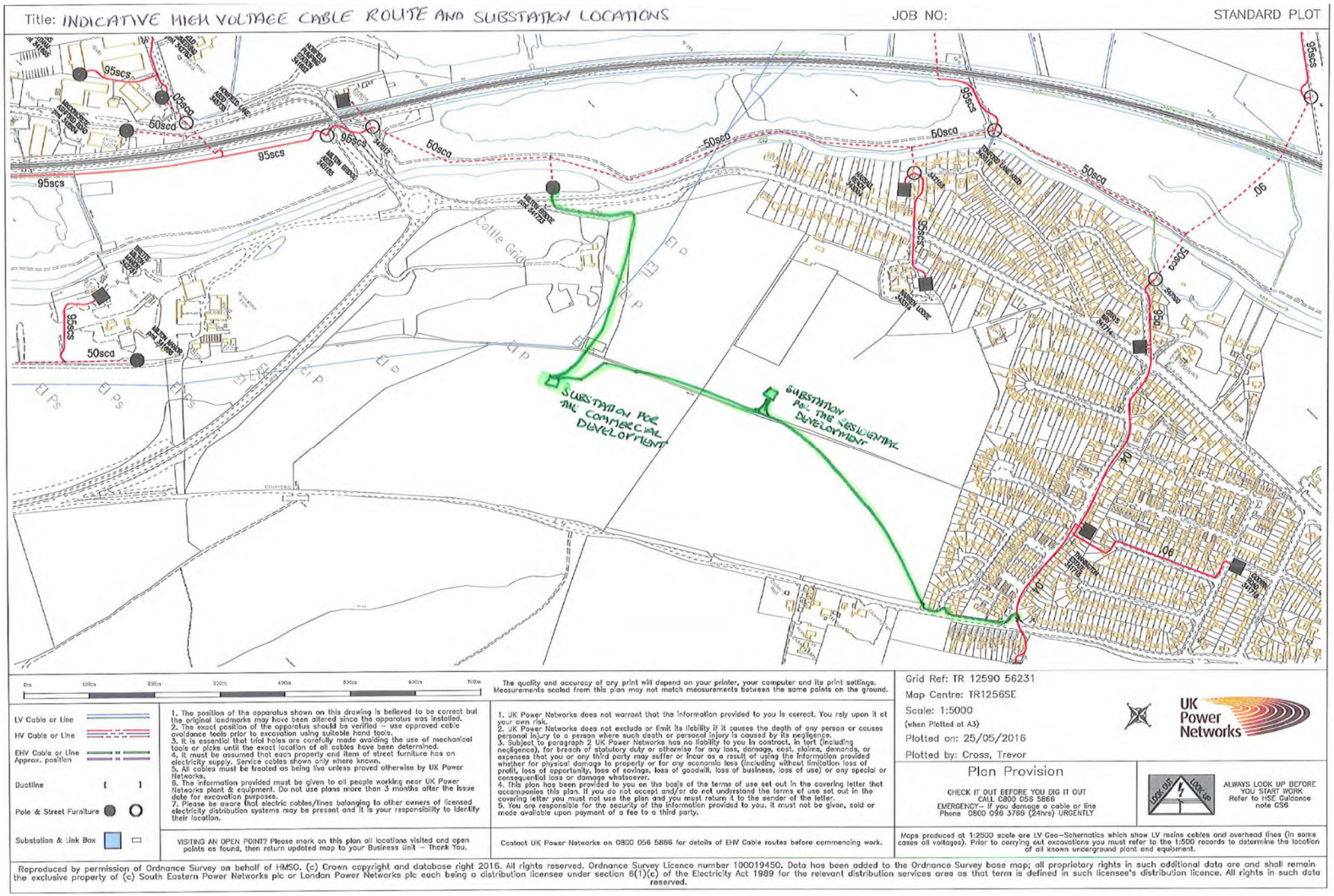
L = Likelihood, Multiply by S = Severity, for Risk Rating (RR).

1 Unlikely to be affected.	**1 Minor First Aid Injury Only.**
2 May be affected.	**2 Hospital Treatment & Off Work.**
3 Occasionally affected.	**5 Some Disability - Long absence.**
5 Likely to be affected.	**10 Permanent Disability/Death.**

Declaration: I the undersigned have read and understood the hazards / risks identified in this Scheme's Design Risk Assessment.

Construction Manager (sign): **(Print):** **Date:** / /

APPENDIX A


Title: INDICATIVE HIGH VOLTAGE CABLE ROUTE AND SUBSTATION LOCATIONS
JOB NO:
STANDARD PLOT
SUBSTATION FOR THE COMMERCIAL DEVELOPMENT
SUBSTATION FOR THE RESIDENTIAL DEVELOPMENT
Grid Ref: TR 12590 56231
Map Centre: TR1256SE
Scale: 1:5000
(when Plotted at A3)
Plotted on: 25/05/2016
Plotted by: Cross, Trevor
Plan Provision
UK Power Networks
LV Cable or Line
HV Cable or Line
EHV Cable or Line
Ductline
Pole & Street Furniture
Substation & Link Box
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Appendix D Hydraulic Calculations

Time Area Diagram for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	1.155	4-8	4.331	8-12	1.591	12-16	0.001

Total Area Contributing (ha) = 7.078

Total Pipe Volume (m^3) = 945.772

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

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

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	31.990	1.500	21.3	0.050	5.00	0.0	0.600		o	225	Pipe/Conduit	
1.001	42.330	2.150	19.7	0.030	0.00	0.0	0.600		o	225	Pipe/Conduit	
1.002	36.164	0.152	237.9	0.073	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.003	8.806	0.037	238.0	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.004	18.188	0.060	303.1	0.074	0.00	0.0	0.600		o	375	Pipe/Conduit	
1.005	36.031	0.529	68.1	0.029	0.00	0.0	0.600		o	375	Pipe/Conduit	
2.000	20.330	0.120	169.4	0.046	5.00	0.0	0.600		o	225	Pipe/Conduit	
1.006	32.059	0.972	33.0	0.085	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.007	30.726	0.100	307.3	0.076	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.008	33.089	0.109	303.6	0.026	0.00	0.0	0.600		o	525	Pipe/Conduit	
1.009	6.309	0.023	274.3	0.020	0.00	0.0	0.600		o	525	Pipe/Conduit	
3.000	50.749	0.784	64.7	0.136	5.00	0.0	0.045	4 \=/		600	1:4 Swale	
3.001	16.398	0.682	24.0	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
3.002	22.160	0.092	240.9	0.175	0.00	0.0	0.600		o	300	Pipe/Conduit	
3.003	11.164	0.047	237.5	0.000	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)
1.000	50.00	5.19	43.325	0.050	0.0	0.0	0.0	2.85	113.2	6.8
1.001	50.00	5.43	41.825	0.080	0.0	0.0	0.0	2.96	117.8	10.8
1.002	50.00	6.02	39.600	0.153	0.0	0.0	0.0	1.01	71.7	20.7
1.003	50.00	6.16	39.448	0.153	0.0	0.0	0.0	1.01	71.7	20.7
1.004	50.00	6.46	39.336	0.227	0.0	0.0	0.0	1.04	114.4	30.7
1.005	50.00	6.73	39.276	0.256	0.0	0.0	0.0	2.20	242.8	34.7
2.000	50.00	5.34	39.017	0.046	0.0	0.0	0.0	1.00	39.8	6.2
1.006	50.00	6.88	38.672	0.387	0.0	0.0	0.0	3.55	564.6	52.4
1.007	50.00	7.32	37.700	0.463	0.0	0.0	0.0	1.15	183.6	62.7
1.008	50.00	7.75	37.525	0.489	0.0	0.0	0.0	1.28	277.1	66.2
1.009	50.00	7.83	37.416	0.509	0.0	0.0	0.0	1.35	291.7	68.9
3.000	50.00	6.44	45.582	0.136	0.0	0.0	0.0	0.59	105.7	18.4
3.001	50.00	6.57	43.898	0.136	0.0	0.0	0.0	2.06	36.4	18.4
3.002	50.00	6.94	41.716	0.311	0.0	0.0	0.0	1.01	71.3	42.1
3.003	50.00	7.12	41.624	0.311	0.0	0.0	0.0	1.02	71.8	42.1

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
4.000	19.769	0.083	238.2	0.066	5.00	0.0	0.600		o	300	Pipe/Conduit	
3.004	32.824	0.820	40.0	0.043	0.00	0.0	0.600		o	300	Pipe/Conduit	
3.005	39.748	1.339	29.7	0.041	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.010	61.037	1.218	50.1	0.111	0.00	0.0	0.600		o	525	Pipe/Conduit	
5.000	27.942	0.500	55.9	0.051	5.00	0.0	0.600		o	225	Pipe/Conduit	
5.001	23.082	1.850	12.5	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
1.011	83.985	3.900	21.5	0.075	0.00	0.0	0.600		o	525	Pipe/Conduit	
6.000	22.135	0.132	167.7	0.028	5.00	0.0	0.600		o	225	Pipe/Conduit	
6.001	28.190	0.267	105.6	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
6.002	45.324	1.589	28.5	0.065	0.00	0.0	0.600		o	225	Pipe/Conduit	
7.000	24.145	0.092	262.4	0.109	5.00	0.0	0.600		o	375	Pipe/Conduit	
7.001	19.599	0.115	170.4	0.061	0.00	0.0	0.600		o	450	Pipe/Conduit	
6.003	28.610	0.119	240.4	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)
4.000	50.00	5.32	41.660	0.066	0.0	0.0	0.0	1.01	71.7	8.9
3.004	50.00	7.34	41.577	0.420	0.0	0.0	0.0	2.49	176.2	56.9
3.005	50.00	7.57	40.757	0.461	0.0	0.0	0.0	2.90	204.7	62.4
1.010	50.00	8.15	37.393	1.081	0.0	0.0	0.0	3.17	686.2	146.4
5.000	50.00	5.27	40.075	0.051	0.0	0.0	0.0	1.75	69.7	6.9
5.001	50.00	5.37	38.325	0.051	0.0	0.0	0.0	3.72	148.1	6.9
1.011	50.00	8.44	31.825	1.207	0.0	0.0	0.0	4.84	1048.2	163.4
6.000	50.00	5.37	41.262	0.028	0.0	0.0	0.0	1.01	40.0	3.8
6.001	50.00	5.74	41.130	0.028	0.0	0.0	0.0	1.27	50.6	3.8
6.002	50.00	6.04	40.863	0.093	0.0	0.0	0.0	2.46	97.8	12.6
7.000	50.00	5.36	39.331	0.109	0.0	0.0	0.0	1.11	123.0	14.8
7.001	50.00	5.57	39.164	0.170	0.0	0.0	0.0	1.55	247.2	23.0
6.003	50.00	6.41	39.049	0.263	0.0	0.0	0.0	1.31	207.8	35.6

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
8.000	23.309	0.550	42.4	0.052	5.00	0.0	0.600		o	225	Pipe/Conduit	
8.001	16.503	0.500	33.0	0.107	0.00	0.0	0.600		o	300	Pipe/Conduit	
8.002	13.819	0.210	65.8	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
8.003	35.478	0.840	42.2	0.078	0.00	0.0	0.600		o	300	Pipe/Conduit	
6.004	28.715	0.411	69.9	0.109	0.00	0.0	0.600		o	450	Pipe/Conduit	
6.005	22.850	0.441	51.8	0.103	0.00	0.0	0.600		o	450	Pipe/Conduit	
6.006	40.973	0.479	85.5	0.124	0.00	0.0	0.600		o	450	Pipe/Conduit	
6.007	23.391	0.700	33.4	0.075	0.00	0.0	0.600		o	450	Pipe/Conduit	
6.008	12.186#	0.375	32.5	0.014	0.00	0.0	0.600		o	450	Pipe/Conduit	
9.000	16.605	0.099	167.7	0.026	5.00	0.0	0.600		o	225	Pipe/Conduit	
9.001	22.013	0.092	239.3	0.091	0.00	0.0	0.600		o	300	Pipe/Conduit	
9.002	17.408	0.073	238.5	0.046	0.00	0.0	0.600		o	300	Pipe/Conduit	
10.000	8.894	0.451	19.7	0.028	5.00	0.0	0.600		o	225	Pipe/Conduit	
10.001	24.975	1.262	19.8	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
9.003	26.400	0.943	28.0	0.073	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)
8.000	50.00	5.19	41.255	0.052	0.0	0.0	0.0	2.02	80.1	7.0
8.001	50.00	5.29	40.630	0.159	0.0	0.0	0.0	2.75	194.1	21.5
8.002	50.00	5.41	40.130	0.159	0.0	0.0	0.0	1.94	137.2	21.5
8.003	50.00	5.66	39.920	0.237	0.0	0.0	0.0	2.43	171.5	32.1
6.004	50.00	6.60	38.930	0.609	0.0	0.0	0.0	2.43	387.3	82.5
6.005	50.00	6.74	38.519	0.712	0.0	0.0	0.0	2.83	450.0	96.4
6.006	50.00	7.05	38.078	0.836	0.0	0.0	0.0	2.20	349.8	113.2
6.007	50.00	7.16	36.275	0.911	0.0	0.0	0.0	3.53	560.9	123.4
6.008	50.00	7.22	35.575	0.925	0.0	0.0	0.0	3.58	568.8	125.3
9.000	50.00	5.27	38.484	0.026	0.0	0.0	0.0	1.01	40.0	3.5
9.001	50.00	5.64	38.310	0.117	0.0	0.0	0.0	1.01	71.5	15.8
9.002	50.00	5.92	38.218	0.163	0.0	0.0	0.0	1.01	71.7	22.1
10.000	50.00	5.05	40.718	0.028	0.0	0.0	0.0	2.96	117.7	3.8
10.001	50.00	5.19	40.267	0.028	0.0	0.0	0.0	2.95	117.5	3.8
9.003	50.00	6.07	38.145	0.264	0.0	0.0	0.0	2.98	210.9	35.7

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
11.000	19.821	0.749	26.5	0.145	5.00	0.0	0.600		o	225	Pipe/Conduit	
11.001	29.271	0.462	63.4	0.086	0.00	0.0	0.600		o	300	Pipe/Conduit	
12.000	17.354	0.103	168.5	0.099	5.00	0.0	0.600		o	300	Pipe/Conduit	
11.002	20.801	0.087	239.1	0.033	0.00	0.0	0.600		o	450	Pipe/Conduit	
9.004	23.539	0.098	240.2	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
9.005	27.386	0.854	32.1	0.093	0.00	0.0	0.600		o	450	Pipe/Conduit	
9.006	26.730#	0.900	29.7	0.078	0.00	0.0	0.600		o	450	Pipe/Conduit	
13.000	10.744	0.107	100.4	0.083	5.00	0.0	0.600		o	225	Pipe/Conduit	
13.001	20.480	0.205	99.9	0.026	0.00	0.0	0.600		o	225	Pipe/Conduit	
13.002	64.351	2.876	22.4	0.018	0.00	0.0	0.600		o	225	Pipe/Conduit	
13.003	18.152#	1.000	18.2	0.079	0.00	0.0	0.600		o	225	Pipe/Conduit	
14.000	35.234	0.352	100.1	0.096	5.00	0.0	0.600		o	225	Pipe/Conduit	
14.001	37.306	0.373	100.0	0.064	0.00	0.0	0.600		o	225	Pipe/Conduit	
14.002	18.222#	1.195	15.2	0.048	0.00	0.0	0.600		o	225	Pipe/Conduit	
6.009	38.168	0.094	406.0	0.000	0.00	0.0	0.600		o	600	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)
11.000	50.00	5.13	38.575	0.145	0.0	0.0	0.0	2.55	101.5	19.6
11.001	50.00	5.38	37.751	0.231	0.0	0.0	0.0	1.98	139.9	31.3
12.000	50.00	5.24	37.392	0.099	0.0	0.0	0.0	1.21	85.4	13.4
11.002	50.00	5.64	37.139	0.363	0.0	0.0	0.0	1.31	208.4	49.2
9.004	50.00	6.37	37.052	0.627	0.0	0.0	0.0	1.31	207.9	84.9
9.005	50.00	6.50	36.954	0.720	0.0	0.0	0.0	3.60	572.6	97.5
9.006	50.00	6.62	36.100	0.798	0.0	0.0	0.0	3.74	595.1	108.1
13.000	50.00	5.14	40.563	0.083	0.0	0.0	0.0	1.30	51.9	11.2
13.001	50.00	5.40	40.456	0.109	0.0	0.0	0.0	1.31	52.0	14.8
13.002	50.00	5.78	40.251	0.127	0.0	0.0	0.0	2.78	110.5	17.2
13.003	50.00	5.88	36.200	0.206	0.0	0.0	0.0	3.09	122.7	27.9
14.000	50.00	5.45	37.120	0.096	0.0	0.0	0.0	1.31	52.0	13.0
14.001	50.00	5.92	36.768	0.160	0.0	0.0	0.0	1.31	52.0	21.7
14.002	50.00	6.02	36.395	0.208	0.0	0.0	0.0	3.37	133.9	28.2
6.009	50.00	7.75	35.000	2.137	0.0	0.0	0.0	1.20	339.9	289.4

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
15.000	34.893	1.760	19.8	0.106	5.00	0.0		0.045	4 \=/	600	1:4 Swale	
15.001	6.800	0.400	17.0	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
15.002	47.142	2.830	16.7	0.127	0.00	0.0		0.045	4 \=/	600	1:4 Swale	
15.003	12.815	0.076	168.6	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
15.004	53.640	3.292	16.3	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
16.000	9.805	0.041	239.1	0.140	5.00	0.0	0.600		o	300	Pipe/Conduit	
15.005	49.647	0.621	79.9	0.000	0.00	0.0	0.600		o	375	Pipe/Conduit	
17.000	18.651	0.980	19.0	0.068	5.00	0.0		0.045	4 \=/	600	1:4 Swale	
17.001	13.629	0.820	16.6	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
17.002	30.315	1.760	17.2	0.109	0.00	0.0		0.045	4 \=/	600	1:4 Swale	
17.003	17.049	1.000	17.0	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
17.004	28.107	1.660	16.9	0.097	0.00	0.0		0.045	4 \=/	600	1:4 Swale	
17.005	7.800	0.420	18.6	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
17.006	30.458	1.180	25.8	0.084	0.00	0.0		0.045	4 \=/	600	1:4 Swale	
17.007	29.952	0.074	404.8	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
18.000	11.854	0.119	99.6	0.108	5.00	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)
15.000	50.00	5.55	45.160	0.106	0.0	0.0	0.0	1.06	190.9	14.4
15.001	50.00	5.59	43.400	0.106	0.0	0.0	0.0	2.46	43.4	14.4
15.002	50.00	6.27	43.000	0.233	0.0	0.0	0.0	1.16	208.3	31.6
15.003	50.00	6.49	39.270	0.233	0.0	0.0	0.0	1.00	39.9	31.6
15.004	50.00	6.76	39.194	0.233	0.0	0.0	0.0	3.26	129.5	31.6
16.000	50.00	5.16	35.868	0.140	0.0	0.0	0.0	1.01	71.6	19.0
15.005	50.00	7.17	35.752	0.373	0.0	0.0	0.0	2.03	224.0	50.5
17.000	50.00	5.29	44.200	0.068	0.0	0.0	0.0	1.08	194.9	9.2
17.001	50.00	5.38	43.220	0.068	0.0	0.0	0.0	2.48	43.9	9.2
17.002	50.00	5.82	42.400	0.177	0.0	0.0	0.0	1.14	204.9	24.0
17.003	50.00	5.91	40.640	0.177	0.0	0.0	0.0	3.18	126.6	24.0
17.004	50.00	6.32	39.640	0.274	0.0	0.0	0.0	1.15	206.6	37.1
17.005	50.00	6.36	37.980	0.274	0.0	0.0	0.0	3.67	259.1	37.1
17.006	50.00	6.90	37.560	0.358	0.0	0.0	0.0	0.93	167.3	48.5
17.007	50.00	7.40	35.129	0.358	0.0	0.0	0.0	1.00	159.7	48.5
18.000	50.00	5.15	35.400	0.108	0.0	0.0	0.0	1.31	52.1	14.6

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
19.000	10.759	0.119	90.4	0.072	5.00	0.0	0.600		o	225	Pipe/Conduit	
6.010	35.938	2.995	12.0	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
1.012	22.761	0.285	79.9	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
1.013	6.608#	0.083	79.6	0.000	0.00	0.0	0.600		o	600	Pipe/Conduit	
1.014	4.923	0.179	27.5	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
1.015	63.196	2.538	24.9	0.000	0.00	0.0		0.045	4 \=/	600	1:4 Swale	
1.016	7.303#	0.073	100.0	2.823	0.00	0.0	0.600		o	675	Pipe/Conduit	
1.017	6.000	0.327	18.3	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.018	22.169	0.862	25.7	0.000	0.00	0.0		0.045	4 \=/	600	1:4 Swale	
1.019	22.169	0.861	25.7	0.000	0.00	0.0		0.045	4 \=/	600	1:4 Swale	
1.020	24.350	0.778	31.3	0.000	0.00	0.0		0.045	4 \=/	600	1:4 Swale	
1.021	24.350	0.778	31.3	0.000	0.00	0.0		0.045	4 \=/	600	1:4 Swale	
1.022	24.350	0.779	31.3	0.000	0.00	0.0		0.045	4 \=/	600	1:4 Swale	
1.023	11.444	0.786	14.6	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
19.000	50.00	5.13	35.400	0.072	0.0	0.0	0.0	1.38	54.7	9.7
6.010	50.00	7.95	31.145	3.048	0.0	0.0	0.0	2.92	51.7«	412.7
1.012	50.00	8.58	26.985	4.255	0.0	0.0	0.0	2.73	771.0	576.2
1.013	50.00	8.62	26.700	4.255	0.0	0.0	0.0	2.73	772.2	576.2
1.014	50.00	8.66	26.617	4.255	0.0	0.0	0.0	2.50	99.6«	576.2
1.015	50.00	9.77	26.438	4.255	0.0	0.0	0.0	0.95	170.4«	576.2
1.016	50.00	9.81	23.900	7.078	0.0	0.0	0.0	2.62	937.8«	958.4
1.017	50.00	9.84	23.827	7.078	0.0	0.0	0.0	3.69	260.7«	958.4
1.018	50.00	10.24	23.500	7.078	0.0	0.0	0.0	0.93	167.6«	958.4
1.019	50.00	10.64	22.638	7.078	0.0	0.0	0.0	0.93	167.5«	958.4
1.020	50.00	11.12	21.777	7.078	0.0	0.0	0.0	0.84	152.0«	958.4
1.021	50.00	11.60	20.999	7.078	0.0	0.0	0.0	0.84	152.0«	958.4
1.022	50.00	12.08	20.221	7.078	0.0	0.0	0.0	0.84	152.1«	958.4
1.023	50.00	12.13	19.442	7.078	0.0	0.0	0.0	3.45	137.1«	958.4

Online Controls for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

Hydro-Brake® Optimum Manhole: S52-Control, DS/PN: 6.010, Volume (m³): 34.2

Unit Reference	MD-SHE-0115-1220-5155-1220
Design Head (m)	5.155
Design Flow (l/s)	12.2
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	115
Invert Level (m)	31.145
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	5.155	12.2
Flush-Flo™	0.494	7.3
Kick-Flo®	1.030	5.7
Mean Flow over Head Range	-	8.8

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	4.0	1.200	6.1	3.000	9.4	7.000	14.1
0.200	6.4	1.400	6.6	3.500	10.1	7.500	14.6
0.300	7.0	1.600	7.0	4.000	10.8	8.000	15.0
0.400	7.2	1.800	7.4	4.500	11.4	8.500	15.5
0.500	7.3	2.000	7.8	5.000	12.0	9.000	15.9
0.600	7.2	2.200	8.1	5.500	12.6	9.500	16.3
0.800	6.9	2.400	8.5	6.000	13.1		
1.000	5.9	2.600	8.8	6.500	13.6		

Hydro-Brake® Optimum Manhole: S54-Control, DS/PN: 1.014, Volume (m³): 4.0

Unit Reference	MD-SHE-0181-1700-1280-1700
Design Head (m)	1.280
Design Flow (l/s)	17.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	181
Invert Level (m)	26.617
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Hydro-Brake® Optimum Manhole: S54-Control, DS/PN: 1.014, Volume (m³): 4.0

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.280	17.0
Flush-Flo™	0.392	17.0
Kick-Flo®	0.860	14.1
Mean Flow over Head Range	-	14.6

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	6.4	1.200	16.5	3.000	25.5	7.000	38.4
0.200	15.8	1.400	17.7	3.500	27.5	7.500	39.7
0.300	16.8	1.600	18.9	4.000	29.3	8.000	40.9
0.400	17.0	1.800	20.0	4.500	31.0	8.500	42.2
0.500	16.8	2.000	21.0	5.000	32.6	9.000	43.3
0.600	16.5	2.200	22.0	5.500	34.2	9.500	44.5
0.800	15.1	2.400	22.9	6.000	35.6		
1.000	15.1	2.600	23.8	6.500	37.0		

Hydro-Brake® Optimum Manhole: S55-Control, DS/PN: 1.017, Volume (m³): 6.2

Unit Reference	MD-SHE-0226-2830-1373-2830
Design Head (m)	1.373
Design Flow (l/s)	28.3
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	226
Invert Level (m)	23.827
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	1800

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.373	28.3
Flush-Flo™	0.434	28.3
Kick-Flo®	0.949	23.7
Mean Flow over Head Range	-	24.2

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	7.6	0.300	27.6	0.500	28.2	0.800	26.5
0.200	22.5	0.400	28.3	0.600	27.8	1.000	24.3

Hydro-Brake® Optimum Manhole: S55-Control, DS/PN: 1.017, Volume (m³): 6.2

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
1.200	26.5	2.400	37.0	5.000	52.7	8.000	66.2
1.400	28.6	2.600	38.4	5.500	55.2	8.500	68.2
1.600	30.4	3.000	41.2	6.000	57.6	9.000	70.1
1.800	32.2	3.500	44.4	6.500	59.9	9.500	72.0
2.000	33.9	4.000	47.3	7.000	62.0		
2.200	35.5	4.500	50.1	7.500	64.2		

Complex Manhole: Swale-3, DS/PN: 1.019, Volume (m³): 39.0

Weir

Discharge Coef 0.544 Width (m) 5.000 Invert Level (m) 22.638

Pipe

Diameter (m)	0.150	Roughness k (mm)	0.600
Section Type	Pipe/Conduit	Entry Loss Coefficient	0.500
Slope (1:X)	100.0	Coefficient of Contraction	0.600
Length (m)	1.000	Upstream Invert Level (m)	22.638

Complex Manhole: Swale-4, DS/PN: 1.020, Volume (m³): 39.0

Weir

Discharge Coef 0.544 Width (m) 5.000 Invert Level (m) 21.777

Pipe

Diameter (m)	0.150	Roughness k (mm)	0.600
Section Type	Pipe/Conduit	Entry Loss Coefficient	0.500
Slope (1:X)	100.0	Coefficient of Contraction	0.600
Length (m)	1.000	Upstream Invert Level (m)	21.777

Complex Manhole: Swale-5, DS/PN: 1.021, Volume (m³): 42.9

Weir

Discharge Coef 0.544 Width (m) 5.000 Invert Level (m) 20.999

Pipe

Diameter (m)	0.150	Length (m)	1.000
Section Type	Pipe/Conduit	Roughness k (mm)	0.600
Slope (1:X)	100.0	Entry Loss Coefficient	0.500

Pipe

Coefficient of Contraction 0.600 Upstream Invert Level (m) 20.999

Complex Manhole: Swale-6, DS/PN: 1.022, Volume (m³): 42.9

Weir

Discharge Coef 0.544 Width (m) 5.000 Invert Level (m) 20.221

Pipe

Diameter (m)	0.150	Roughness k (mm)	0.600
Section Type	Pipe/Conduit	Entry Loss Coefficient	0.500
Slope (1:X)	100.0	Coefficient of Contraction	0.600
Length (m)	1.000	Upstream Invert Level (m)	20.221

Complex Manhole: Sw-Outlet, DS/PN: 1.023, Volume (m³): 42.9

Weir

Discharge Coef 0.544 Width (m) 5.000 Invert Level (m) 19.442

Pipe

Diameter (m)	0.150	Roughness k (mm)	0.600
Section Type	Pipe/Conduit	Entry Loss Coefficient	0.500
Slope (1:X)	100.0	Coefficient of Contraction	0.600
Length (m)	1.000	Upstream Invert Level (m)	19.442

Storage Structures for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

Tank or Pond Manhole: Basin-1, DS/PN: 6.009

Invert Level (m) 35.000

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1154.7	1.600	2428.0

Swale Manhole: HSw-7, DS/PN: 16.000

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	59.4
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	16.7
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	36.860	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.6	Include Swale Volume	Yes

Swale Manhole: HSw-16, DS/PN: 18.000

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	46.0
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	58.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	36.000	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.6	Include Swale Volume	Yes

Swale Manhole: HSw-17, DS/PN: 19.000

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	29.1
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	77.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	36.000	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.6	Include Swale Volume	Yes

Tank or Pond Manhole: Basin-2, DS/PN: 1.013

Invert Level (m) 26.700

Tank or Pond Manhole: Basin-2, DS/PN: 1.013

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	521.6	1.400	1147.2

Tank or Pond Manhole: Basin-3, DS/PN: 1.016

Invert Level (m) 23.900

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1234.6	1.600	2163.9

Volume Summary (Static)

Length Calculations based on True Length

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)
1.000	S1	1.612	1.224	0.000	2.836
1.001	S2	1.612	1.635	0.000	3.247
1.002	S3	1.696	2.471	0.000	4.168
1.003	S4	2.971	0.532	0.000	3.503
1.004	S5	4.258	1.860	0.000	6.118
1.005	S6	3.752	3.830	0.000	7.582
2.000	S7	1.612	0.758	0.000	2.369
1.006	S8	2.897	4.884	0.000	7.781
1.007	S9	2.362	4.660	0.000	7.022
1.008	S10	5.787	6.838	0.000	12.626
1.009	S11	7.168	1.041	0.000	8.209
3.000	HSw-1	0.000	90.808	0.000	90.808
3.001	HSw-2	0.540	0.274	0.000	0.814
3.002	S12	3.393	1.482	0.000	4.874
3.003	S13	2.884	0.704	0.000	3.588
4.000	S14	1.935	1.313	0.000	3.248
3.004	S15	2.604	2.235	0.000	4.839
3.005	S16	2.519	2.714	0.000	5.233
1.010	S17	7.576	12.888	0.000	20.464
5.000	S18	1.612	1.063	0.000	2.675
5.001	S19	3.025	0.864	0.000	3.889
1.011	S20	12.679	17.856	0.000	30.535
6.000	S24A	1.612	0.832	0.000	2.444
6.001	S24	2.585	1.073	0.000	3.659
6.002	S25	1.781	1.751	0.000	3.533
7.000	S26	2.254	2.518	0.000	4.772
7.001	S27	2.853	2.902	0.000	5.755
6.003	S28	2.784	4.336	0.000	7.120
8.000	S21	1.763	0.879	0.000	2.642
8.001	S22	1.916	1.082	0.000	2.998
8.002	S22A	2.022	0.892	0.000	2.914
8.003	S23	1.856	2.418	0.000	4.274
6.004	S29	2.561	4.352	0.000	6.913
6.005	S30	2.720	3.419	0.000	6.139
6.006	S31	3.012	6.302	0.000	9.313
6.007	S32	4.330	3.505	0.000	7.835
6.008	S33	2.465	1.711	0.000	4.176
9.000	S34A	1.612	0.613	0.000	2.224
9.001	S34	2.592	1.471	0.000	4.063
9.002	S35	2.642	1.146	0.000	3.788
10.000	S36	1.612	0.306	0.000	1.918
10.001	S37	1.612	0.945	0.000	2.557
9.003	S38	2.582	1.776	0.000	4.358
11.000	S39A	1.612	0.740	0.000	2.352
11.001	S39	1.943	1.979	0.000	3.922
12.000	S40	1.855	1.137	0.000	2.991
11.002	S41	2.376	3.094	0.000	5.470
9.004	S42	2.899	3.529	0.000	6.428

Volume Summary (Static)

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)
9.005	S43	3.931	4.141	0.000	8.071
9.006	S44	5.668	4.025	0.000	9.693
13.000	S45	1.614	0.379	0.000	1.993
13.001	S46	1.715	0.767	0.000	2.481
13.002	S47	2.156	2.511	0.000	4.667
13.003	S48	2.941	0.668	0.000	3.609
14.000	S49	1.838	1.353	0.000	3.191
14.001	S50	2.511	1.436	0.000	3.946
14.002	S51	1.880	0.671	0.000	2.551
6.009	Basin-1	2.827	10.325	2803.786	2816.939
15.000	HSw-3	0.000	62.267	0.000	62.267
15.001	HSw-4	0.216	0.110	0.000	0.326
15.002	HSw-5	0.216	83.776	0.000	83.992
15.003	HSw-6	0.539	0.474	0.000	1.013
15.004	CP1	1.561	2.082	0.000	3.643
16.000	HSw-7	0.895	0.619	6.613	8.128
15.005	CP2	2.183	5.309	0.000	7.492
17.000	HSw-8	0.000	33.572	0.000	33.572
17.001	HSw-9	0.000	0.241	0.000	0.241
17.002	HSw-10	0.000	54.027	0.000	54.027
17.003	HSw-11	0.216	0.654	0.000	0.870
17.004	HSw-12	0.216	50.053	0.000	50.269
17.005	HSw-13	0.000	0.551	0.000	0.551
17.006	HSw-14	0.000	53.474	0.000	53.474
17.007	HSw-15	3.271	4.501	0.000	7.772
18.000	HSw-16	0.547	0.422	22.968	23.937
19.000	HSw-17	0.547	0.379	28.228	29.154
6.010	S52-Control	13.245	0.606	0.000	13.851
1.012	S53	4.091	6.011	0.000	10.102
1.013	Basin-2	2.474	1.444	1139.763	1143.682
1.014	S54-Control	2.532	0.166	0.000	2.698
1.015	Swale-1	0.000	112.403	0.000	112.403
1.016	Basin-3	2.827	2.023	2684.260	2689.111
1.017	S55-Control	4.130	0.337	0.000	4.467
1.018	Swale-2	0.273	38.689	0.000	38.963
1.019	Swale-3	0.273	38.689	0.000	38.963
1.020	Swale-4	0.273	42.615	0.000	42.888
1.021	Swale-5	0.273	42.615	0.000	42.888
1.022	Swale-6	0.273	42.615	0.000	42.888
1.023	Sw-Outlet	0.273	0.418	0.000	0.691
Total		202.767	924.062	6685.619	7812.448

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

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	6
Number of Online Controls	8	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.420
Region	England and Wales	Cv (Summer)	0.790
M5-60 (mm)	26.250	Cv (Winter)	0.830

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	S1	15 Summer	1	+0%					43.370
1.001	S2	15 Summer	1	+0%					41.878
1.002	S3	15 Summer	1	+0%	30/15 Summer				39.731
1.003	S4	15 Summer	1	+0%	30/15 Summer				39.592
1.004	S5	15 Summer	1	+0%	30/15 Summer				39.498
1.005	S6	15 Summer	1	+0%					39.384
2.000	S7	15 Summer	1	+0%					39.092
1.006	S8	15 Summer	1	+0%					38.777
1.007	S9	15 Summer	1	+0%	30/15 Summer				37.913
1.008	S10	15 Winter	1	+0%	30/15 Summer				37.744
1.009	S11	15 Winter	1	+0%	30/15 Summer				37.663
3.000	HSw-1	15 Summer	1	+0%					45.653
3.001	HSw-2	15 Summer	1	+0%	30/15 Summer				43.998
3.002	S12	15 Summer	1	+0%	30/15 Summer				41.930
3.003	S13	15 Summer	1	+0%	30/15 Summer				41.850
4.000	S14	15 Summer	1	+0%	30/15 Summer				41.759
3.004	S15	15 Summer	1	+0%	30/15 Summer				41.717
3.005	S16	15 Summer	1	+0%	100/15 Summer				40.890

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1	-0.180	0.000	0.09		9.5	OK	
1.001	S2	-0.172	0.000	0.13		14.3	OK	
1.002	S3	-0.169	0.000	0.39		25.6	OK	
1.003	S4	-0.156	0.000	0.46		25.1	OK	
1.004	S5	-0.213	0.000	0.38		35.6	OK	
1.005	S6	-0.267	0.000	0.18		40.1	OK	
2.000	S7	-0.150	0.000	0.24		8.6	OK	
1.006	S8	-0.345	0.000	0.12		59.9	OK	
1.007	S9	-0.237	0.000	0.45		70.8	OK	
1.008	S10	-0.306	0.000	0.31		73.3	OK	
1.009	S11	-0.278	0.000	0.45		75.2	OK	
3.000	HSw-1	-0.529	0.000	0.01		25.9	OK	
3.001	HSw-2	-0.050	0.000	0.77		26.0	OK	
3.002	S12	-0.086	0.000	0.84		52.9	OK	
3.003	S13	-0.074	0.000	0.91		52.4	OK	
4.000	S14	-0.201	0.000	0.20		12.2	OK	
3.004	S15	-0.160	0.000	0.44		70.3	OK	
3.005	S16	-0.167	0.000	0.40		76.3	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.010	S17	15 Winter	1	+0%				
5.000	S18	15 Summer	1	+0%				
5.001	S19	15 Summer	1	+0%				
1.011	S20	15 Winter	1	+0%				
6.000	S24A	15 Summer	1	+0%				
6.001	S24	15 Summer	1	+0%				
6.002	S25	15 Summer	1	+0%				
7.000	S26	15 Summer	1	+0%	100/15 Summer			
7.001	S27	15 Summer	1	+0%	100/15 Summer			
6.003	S28	15 Summer	1	+0%	100/15 Summer			
8.000	S21	15 Summer	1	+0%				
8.001	S22	15 Summer	1	+0%	100/15 Summer			
8.002	S22A	15 Summer	1	+0%	100/15 Summer			
8.003	S23	15 Summer	1	+0%	100/15 Summer			
6.004	S29	15 Summer	1	+0%	100/15 Summer			
6.005	S30	15 Winter	1	+0%	30/15 Summer			
6.006	S31	15 Summer	1	+0%	30/15 Summer			
6.007	S32	15 Summer	1	+0%	100/15 Summer			
6.008	S33	15 Summer	1	+0%	30/15 Summer			
9.000	S34A	15 Summer	1	+0%	100/15 Summer			
9.001	S34	15 Summer	1	+0%	30/15 Summer			
9.002	S35	15 Summer	1	+0%	30/15 Summer			
10.000	S36	15 Summer	1	+0%				
10.001	S37	15 Summer	1	+0%				
9.003	S38	15 Summer	1	+0%	100/15 Summer			
11.000	S39A	15 Summer	1	+0%	100/15 Summer			
11.001	S39	15 Summer	1	+0%	30/15 Summer			
12.000	S40	15 Summer	1	+0%	30/15 Summer			
11.002	S41	15 Summer	1	+0%	30/15 Summer			
9.004	S42	15 Summer	1	+0%	30/15 Summer			
9.005	S43	15 Summer	1	+0%				
9.006	S44	15 Summer	1	+0%	100/15 Summer			
13.000	S45	15 Summer	1	+0%	30/15 Summer			
13.001	S46	15 Summer	1	+0%	30/15 Summer			
13.002	S47	15 Summer	1	+0%				
13.003	S48	15 Summer	1	+0%	100/15 Summer			
14.000	S49	15 Summer	1	+0%	30/15 Summer			
14.001	S50	15 Summer	1	+0%	30/15 Summer			
14.002	S51	15 Summer	1	+0%	100/15 Summer			
6.009	Basin-1	360 Winter	1	+0%	30/60 Summer			
15.000	HSw-3	15 Summer	1	+0%				
15.001	HSw-4	15 Summer	1	+0%	30/15 Summer			
15.002	HSw-5	15 Summer	1	+0%				
15.003	HSw-6	15 Summer	1	+0%	1/15 Summer			
15.004	CP1	15 Summer	1	+0%	100/15 Summer			
16.000	HSw-7	15 Summer	1	+0%	30/15 Summer			
15.005	CP2	15 Summer	1	+0%	30/15 Summer			
17.000	HSw-8	15 Summer	1	+0%				

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.010	S17	37.575	-0.343	0.000	0.26		162.3	OK	
5.000	S18	40.133	-0.167	0.000	0.15		9.6	OK	
5.001	S19	38.365	-0.185	0.000	0.07		9.6	OK	
1.011	S20	31.977	-0.373	0.000	0.18		180.0	OK	
6.000	S24A	41.319	-0.168	0.000	0.14		5.2	OK	
6.001	S24	41.180	-0.175	0.000	0.11		5.3	OK	
6.002	S25	40.925	-0.163	0.000	0.16		15.4	OK	
7.000	S26	39.444	-0.262	0.000	0.19		20.4	OK	
7.001	S27	39.284	-0.330	0.000	0.16		30.1	OK	
6.003	S28	39.203	-0.296	0.000	0.25		44.9	OK	
8.000	S21	41.310	-0.170	0.000	0.13		9.9	OK	
8.001	S22	40.711	-0.219	0.000	0.16		27.0	OK	
8.002	S22A	40.230	-0.200	0.000	0.24		26.8	OK	
8.003	S23	40.022	-0.198	0.000	0.25		39.1	OK	
6.004	S29	39.099	-0.281	0.000	0.30		100.5	OK	
6.005	S30	38.691	-0.278	0.000	0.31		114.6	OK	
6.006	S31	38.285	-0.243	0.000	0.43		132.9	OK	
6.007	S32	36.448	-0.277	0.000	0.31		143.6	OK	
6.008	S33	35.781	-0.244	0.000	0.42		146.5	OK	
9.000	S34A	38.540	-0.169	0.000	0.14		4.9	OK	
9.001	S34	38.425	-0.185	0.000	0.31		19.2	OK	
9.002	S35	38.356	-0.162	0.000	0.43		26.4	OK	
10.000	S36	40.752	-0.191	0.000	0.06		5.3	OK	
10.001	S37	40.299	-0.193	0.000	0.05		5.3	OK	
9.003	S38	38.242	-0.203	0.000	0.23		42.9	OK	
11.000	S39A	38.659	-0.141	0.000	0.30		27.5	OK	
11.001	S39	37.869	-0.182	0.000	0.32		41.1	OK	
12.000	S40	37.495	-0.197	0.000	0.26		18.6	OK	
11.002	S41	37.354	-0.235	0.000	0.38		64.6	OK	
9.004	S42	37.308	-0.194	0.000	0.61		105.8	OK	
9.005	S43	37.106	-0.298	0.000	0.25		119.1	OK	
9.006	S44	36.257	-0.293	0.000	0.26		130.3	OK	
13.000	S45	40.657	-0.131	0.000	0.36		15.7	OK	
13.001	S46	40.559	-0.122	0.000	0.42		19.8	OK	
13.002	S47	40.322	-0.154	0.000	0.21		22.8	OK	
13.003	S48	36.288	-0.137	0.000	0.32		35.1	OK	
14.000	S49	37.215	-0.130	0.000	0.37		18.0	OK	
14.001	S50	36.891	-0.102	0.000	0.57		27.9	OK	
14.002	S51	36.478	-0.142	0.000	0.29		35.2	OK	
6.009	Basin-1	35.394	-0.206	0.000	0.04		10.8	OK	
15.000	HSw-3	45.206	-0.554	0.000	0.00		20.1	OK	
15.001	HSw-4	43.480	-0.070	0.000	0.54		20.0	OK	
15.002	HSw-5	43.064	-0.536	0.000	0.01		40.0	OK	
15.003	HSw-6	39.517	0.022	0.000	1.17		40.3	SURCHARGED	
15.004	CP1	39.282	-0.137	0.000	0.33		40.6	OK	
16.000	HSw-7	36.015	-0.153	0.000	0.48		26.5	OK	
15.005	CP2	35.898	-0.229	0.000	0.32		66.2	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
17.000	HSw-8	44.236	-0.564	0.000	0.00		12.9	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
17.001	HSw-9	15 Summer	1	+0%	100/15 Summer			
17.002	HSw-10	15 Summer	1	+0%				
17.003	HSw-11	15 Summer	1	+0%	100/15 Summer			
17.004	HSw-12	15 Summer	1	+0%				
17.005	HSw-13	15 Summer	1	+0%	100/15 Summer			
17.006	HSw-14	15 Summer	1	+0%				
17.007	HSw-15	15 Winter	1	+0%	1/15 Summer			
18.000	HSw-16	15 Winter	1	+0%	1/15 Summer			
19.000	HSw-17	15 Winter	1	+0%	1/15 Winter			
6.010	S52-Control	15 Winter	1	+0%	1/15 Summer			
1.012	S53	15 Winter	1	+0%	100/15 Summer			
1.013	Basin-2	240 Winter	1	+0%	30/60 Winter			
1.014	S54-Control	240 Winter	1	+0%	1/15 Summer			
1.015	Swale-1	240 Winter	1	+0%				
1.016	Basin-3	600 Winter	1	+0%	30/120 Summer			
1.017	S55-Control	600 Winter	1	+0%	1/30 Winter			
1.018	Swale-2	960 Summer	1	+0%				
1.019	Swale-3	720 Summer	1	+0%				
1.020	Swale-4	120 Summer	1	+0%				
1.021	Swale-5	1440 Winter	1	+0%				
1.022	Swale-6	1440 Winter	1	+0%				
1.023	Sw-Outlet	1440 Winter	1	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
17.001	HSw-9	43.276	-0.094	0.000	0.29		12.8	OK*	
17.002	HSw-10	42.456	-0.544	0.000	0.01		30.2	OK	
17.003	HSw-11	40.720	-0.145	0.000	0.27		30.0	OK	
17.004	HSw-12	39.708	-0.532	0.000	0.01		45.3	OK	
17.005	HSw-13	38.089	-0.191	0.000	0.28		45.6	OK*	
17.006	HSw-14	37.646	-0.514	0.000	0.02		58.8	OK	
17.007	HSw-15	35.628	0.049	0.000	0.40		54.9	SURCHARGED	
18.000	HSw-16	35.638	0.013	0.000	0.45		20.1	SURCHARGED	
19.000	HSw-17	35.626	0.001	0.000	0.29		13.4	SURCHARGED	
6.010	S52-Control	35.607	4.312	0.000	0.23		11.4	SURCHARGED	
1.012	S53	27.233	-0.352	0.000	0.36		191.9	OK	
1.013	Basin-2	27.054	-0.246	0.000	0.05		18.2	OK	
1.014	S54-Control	27.051	0.209	0.000	0.28		17.0	SURCHARGED	
1.015	Swale-1	26.483	-0.555	0.000	0.00		17.0	OK	
1.016	Basin-3	24.286	-0.289	0.000	0.07		30.5	OK	
1.017	S55-Control	24.280	0.153	0.000	0.20		28.2	SURCHARGED	
1.018	Swale-2	23.560	-0.540	0.000	0.01		28.2	OK	
1.019	Swale-3	22.660	-0.578	0.000	0.01		28.2	OK	
1.020	Swale-4	21.799	-0.578	0.000	0.01		28.2	OK	
1.021	Swale-5	21.021	-0.578	0.000	0.01		28.2	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.022	Swale-6	20.243	-0.578	0.000	0.01		28.2	OK	
1.023	Sw-Outlet	19.464	-0.203	0.000	0.24		28.2	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

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	6
Number of Online Controls	8	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.420
Region	England and Wales	Cv (Summer)	0.790
M5-60 (mm)	26.250	Cv (Winter)	0.830

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	S1	15 Summer	30	+0%					43.396
1.001	S2	15 Summer	30	+0%					41.916
1.002	S3	15 Summer	30	+0%	30/15 Summer				39.984
1.003	S4	15 Summer	30	+0%	30/15 Summer				39.795
1.004	S5	15 Winter	30	+0%	30/15 Summer				39.717
1.005	S6	15 Summer	30	+0%					39.469
2.000	S7	15 Summer	30	+0%					39.142
1.006	S8	15 Summer	30	+0%					38.857
1.007	S9	15 Summer	30	+0%	30/15 Summer				38.204
1.008	S10	15 Summer	30	+0%	30/15 Summer				38.054
1.009	S11	15 Summer	30	+0%	30/15 Summer				37.943
3.000	HSw-1	15 Summer	30	+0%					45.698
3.001	HSw-2	15 Summer	30	+0%	30/15 Summer				44.989
3.002	S12	15 Summer	30	+0%	30/15 Summer				42.696
3.003	S13	15 Summer	30	+0%	30/15 Summer				42.288
4.000	S14	15 Summer	30	+0%	30/15 Summer				42.114
3.004	S15	15 Summer	30	+0%	30/15 Summer				42.026
3.005	S16	15 Summer	30	+0%	100/15 Summer				41.027

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1	-0.154	0.000	0.22		23.2	OK	
1.001	S2	-0.134	0.000	0.35		38.7	OK	
1.002	S3	0.084	0.000	1.08		71.6	SURCHARGED	
1.003	S4	0.047	0.000	1.30		71.0	SURCHARGED	
1.004	S5	0.006	0.000	1.01		95.1	SURCHARGED	
1.005	S6	-0.182	0.000	0.50		108.9	OK	
2.000	S7	-0.100	0.000	0.58		21.1	OK	
1.006	S8	-0.265	0.000	0.34		166.9	OK	
1.007	S9	0.054	0.000	1.27		201.8	SURCHARGED	
1.008	S10	0.004	0.000	0.82		192.7	SURCHARGED	
1.009	S11	0.002	0.000	1.18		197.0	SURCHARGED	
3.000	HSw-1	-0.484	0.000	0.03		62.3	OK	
3.001	HSw-2	0.941	0.000	1.54		52.3	SURCHARGED	
3.002	S12	0.680	0.000	2.11		132.8	SURCHARGED	
3.003	S13	0.364	0.000	2.28		130.9	SURCHARGED	
4.000	S14	0.154	0.000	0.46		28.6	SURCHARGED	
3.004	S15	0.149	0.000	1.08		173.8	SURCHARGED	
3.005	S16	-0.030	0.000	0.99		189.0	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.010	S17	15 Summer	30	+0%				
5.000	S18	15 Summer	30	+0%				
5.001	S19	15 Summer	30	+0%				
1.011	S20	15 Summer	30	+0%				
6.000	S24A	15 Summer	30	+0%				
6.001	S24	15 Summer	30	+0%				
6.002	S25	15 Summer	30	+0%				
7.000	S26	15 Summer	30	+0%	100/15 Summer			
7.001	S27	15 Summer	30	+0%	100/15 Summer			
6.003	S28	15 Summer	30	+0%	100/15 Summer			
8.000	S21	15 Summer	30	+0%				
8.001	S22	15 Summer	30	+0%	100/15 Summer			
8.002	S22A	15 Summer	30	+0%	100/15 Summer			
8.003	S23	15 Summer	30	+0%	100/15 Summer			
6.004	S29	15 Summer	30	+0%	100/15 Summer			
6.005	S30	15 Summer	30	+0%	30/15 Summer			
6.006	S31	15 Summer	30	+0%	30/15 Summer			
6.007	S32	15 Summer	30	+0%	100/15 Summer			
6.008	S33	15 Summer	30	+0%	30/15 Summer			
9.000	S34A	15 Summer	30	+0%	100/15 Summer			
9.001	S34	15 Summer	30	+0%	30/15 Summer			
9.002	S35	15 Summer	30	+0%	30/15 Summer			
10.000	S36	15 Summer	30	+0%				
10.001	S37	15 Summer	30	+0%				
9.003	S38	15 Summer	30	+0%	100/15 Summer			
11.000	S39A	15 Summer	30	+0%	100/15 Summer			
11.001	S39	15 Summer	30	+0%	30/15 Summer			
12.000	S40	15 Summer	30	+0%	30/15 Summer			
11.002	S41	15 Summer	30	+0%	30/15 Summer			
9.004	S42	15 Summer	30	+0%	30/15 Summer			
9.005	S43	15 Summer	30	+0%				
9.006	S44	15 Summer	30	+0%	100/15 Summer			
13.000	S45	15 Summer	30	+0%	30/15 Summer			
13.001	S46	15 Summer	30	+0%	30/15 Summer			
13.002	S47	15 Summer	30	+0%				
13.003	S48	15 Summer	30	+0%	100/15 Summer			
14.000	S49	15 Summer	30	+0%	30/15 Summer			
14.001	S50	15 Summer	30	+0%	30/15 Summer			
14.002	S51	15 Summer	30	+0%	100/15 Summer			
6.009	Basin-1	600 Winter	30	+0%	30/60 Summer			
15.000	HSw-3	15 Summer	30	+0%				
15.001	HSw-4	15 Summer	30	+0%	30/15 Summer			
15.002	HSw-5	15 Summer	30	+0%				
15.003	HSw-6	15 Summer	30	+0%	1/15 Summer			
15.004	CP1	15 Summer	30	+0%	100/15 Summer			
16.000	HSw-7	15 Summer	30	+0%	30/15 Summer			
15.005	CP2	15 Summer	30	+0%	30/15 Summer			
17.000	HSw-8	15 Summer	30	+0%				

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.010	S17	37.709	-0.209	0.000	0.66		412.4	OK	
5.000	S18	40.169	-0.131	0.000	0.36		23.5	OK	
5.001	S19	38.388	-0.162	0.000	0.17		23.4	OK	
1.011	S20	32.078	-0.272	0.000	0.47		453.9	OK	
6.000	S24A	41.355	-0.132	0.000	0.35		12.8	OK	
6.001	S24	41.210	-0.145	0.000	0.27		12.9	OK	
6.002	S25	40.975	-0.113	0.000	0.49		45.3	OK	
7.000	S26	39.515	-0.191	0.000	0.47		49.8	OK	
7.001	S27	39.394	-0.220	0.000	0.41		77.6	OK	
6.003	S28	39.355	-0.144	0.000	0.67		119.6	OK	
8.000	S21	41.344	-0.136	0.000	0.33		24.2	OK	
8.001	S22	40.778	-0.152	0.000	0.48		79.7	OK	
8.002	S22A	40.317	-0.113	0.000	0.70		79.6	OK	
8.003	S23	40.118	-0.102	0.000	0.76		120.1	OK	
6.004	S29	39.290	-0.090	0.000	0.84		279.0	OK	
6.005	S30	39.016	0.047	0.000	0.85		316.1	SURCHARGED	
6.006	S31	38.700	0.172	0.000	1.17		363.4	SURCHARGED	
6.007	S32	36.656	-0.069	0.000	0.84		390.3	OK	
6.008	S33	36.136	0.111	0.000	1.15		398.4	SURCHARGED	
9.000	S34A	38.659	-0.050	0.000	0.34		12.0	OK	
9.001	S34	38.637	0.027	0.000	0.86		54.0	SURCHARGED	
9.002	S35	38.554	0.036	0.000	1.24		76.2	SURCHARGED	
10.000	S36	40.773	-0.170	0.000	0.14		13.0	OK	
10.001	S37	40.319	-0.173	0.000	0.12		12.9	OK	
9.003	S38	38.326	-0.119	0.000	0.65		122.5	OK	
11.000	S39A	38.720	-0.080	0.000	0.73		67.3	OK	
11.001	S39	38.099	0.048	0.000	0.84		106.9	SURCHARGED	
12.000	S40	37.852	0.160	0.000	0.60		43.7	SURCHARGED	
11.002	S41	37.751	0.162	0.000	0.97		163.7	SURCHARGED	
9.004	S42	37.648	0.146	0.000	1.64		283.2	SURCHARGED	
9.005	S43	37.224	-0.180	0.000	0.66		321.2	OK	
9.006	S44	36.383	-0.167	0.000	0.70		352.7	OK	
13.000	S45	40.802	0.014	0.000	0.86		37.5	SURCHARGED	
13.001	S46	40.696	0.015	0.000	1.05		49.3	SURCHARGED	
13.002	S47	40.370	-0.106	0.000	0.54		57.7	OK	
13.003	S48	36.366	-0.059	0.000	0.88		97.1	OK	
14.000	S49	37.565	0.220	0.000	0.85		41.4	SURCHARGED	
14.001	S50	37.312	0.319	0.000	1.34		65.7	SURCHARGED	
14.002	S51	36.538	-0.082	0.000	0.71		85.8	OK	
6.009	Basin-1	35.880	0.280	0.000	0.04		11.6	SURCHARGED	
15.000	HSw-3	45.233	-0.527	0.000	0.01		49.2	OK	
15.001	HSw-4	43.712	0.162	0.000	1.19		43.8	FLOOD RISK	
15.002	HSw-5	43.106	-0.494	0.000	0.02		106.2	OK	
15.003	HSw-6	40.150	0.655	0.000	3.07		105.7	SURCHARGED	
15.004	CP1	39.355	-0.064	0.000	0.85		106.0	OK	
16.000	HSw-7	36.257	0.089	0.000	1.16		64.4	SURCHARGED	
15.005	CP2	36.215	0.088	0.000	0.81		168.3	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
17.000	HSw-8	44.259	-0.541	0.000	0.01		31.6	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
17.001	HSw-9	15 Summer	30	+0%	100/15 Summer			
17.002	HSw-10	15 Summer	30	+0%				
17.003	HSw-11	15 Summer	30	+0%	100/15 Summer			
17.004	HSw-12	15 Summer	30	+0%				
17.005	HSw-13	15 Summer	30	+0%	100/15 Summer			
17.006	HSw-14	15 Summer	30	+0%				
17.007	HSw-15	15 Summer	30	+0%	1/15 Summer			
18.000	HSw-16	15 Summer	30	+0%	1/15 Summer			
19.000	HSw-17	15 Summer	30	+0%	1/15 Winter			
6.010	S52-Control	600 Winter	30	+0%	1/15 Summer			
1.012	S53	600 Winter	30	+0%	100/15 Summer			
1.013	Basin-2	600 Winter	30	+0%	30/60 Winter			
1.014	S54-Control	600 Winter	30	+0%	1/15 Summer			
1.015	Swale-1	120 Winter	30	+0%				
1.016	Basin-3	720 Winter	30	+0%	30/120 Summer			
1.017	S55-Control	600 Winter	30	+0%	1/30 Winter			
1.018	Swale-2	180 Summer	30	+0%				
1.019	Swale-3	180 Winter	30	+0%				
1.020	Swale-4	240 Winter	30	+0%				
1.021	Swale-5	30 Winter	30	+0%				
1.022	Swale-6	60 Winter	30	+0%				
1.023	Sw-Outlet	240 Summer	30	+0%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
17.001	HSw-9	43.315	-0.055	0.000	0.71		31.3	OK*	
17.002	HSw-10	42.496	-0.504	0.000	0.02		87.9	OK	
17.003	HSw-11	40.791	-0.074	0.000	0.78		87.6	OK	
17.004	HSw-12	39.763	-0.477	0.000	0.03		137.7	OK	
17.005	HSw-13	38.193	-0.087	0.000	0.84		136.2	OK*	
17.006	HSw-14	37.714	-0.446	0.000	0.05		178.3	OK	
17.007	HSw-15	35.945	0.366	0.000	1.29		176.7	SURCHARGED	
18.000	HSw-16	36.055	0.430	0.000	1.27		56.5	SURCHARGED	
19.000	HSw-17	36.028	0.403	0.000	0.84		38.8	SURCHARGED	
6.010	S52-Control	35.878	4.583	0.000	0.23		11.7	SURCHARGED	
1.012	S53	27.518	-0.067	0.000	0.11		58.5	OK	
1.013	Basin-2	27.500	0.200	0.000	0.05		17.8	SURCHARGED	
1.014	S54-Control	27.518	0.676	0.000	0.28		17.0	SURCHARGED	
1.015	Swale-1	26.483	-0.555	0.000	0.00		17.0	OK	
1.016	Basin-3	24.745	0.170	0.000	0.07		34.7	SURCHARGED	
1.017	S55-Control	24.753	0.626	0.000	0.20		28.2	SURCHARGED	
1.018	Swale-2	23.560	-0.540	0.000	0.01		28.2	OK	
1.019	Swale-3	22.660	-0.578	0.000	0.01		28.2	OK	
1.020	Swale-4	21.799	-0.578	0.000	0.01		28.2	OK	
1.021	Swale-5	21.021	-0.578	0.000	0.01		28.2	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.022	Swale-6	20.243	-0.578	0.000	0.01		28.2	OK	
1.023	Sw-Outlet	19.464	-0.203	0.000	0.24		28.2	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

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	6
Number of Online Controls	8	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Ratio R	0.420
Region	England and Wales	Cv (Summer)	0.790
M5-60 (mm)	26.250	Cv (Winter)	0.830

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.000	S1	15 Summer	100	+20%					43.416
1.001	S2	15 Summer	100	+20%					41.944
1.002	S3	15 Summer	100	+20%	30/15 Summer				40.503
1.003	S4	15 Summer	100	+20%	30/15 Summer				40.028
1.004	S5	15 Summer	100	+20%	30/15 Summer				39.825
1.005	S6	15 Summer	100	+20%					39.542
2.000	S7	15 Summer	100	+20%					39.189
1.006	S8	15 Summer	100	+20%					38.973
1.007	S9	15 Summer	100	+20%	30/15 Summer				38.683
1.008	S10	15 Summer	100	+20%	30/15 Summer				38.292
1.009	S11	15 Summer	100	+20%	30/15 Summer				38.081
3.000	HSw-1	15 Summer	100	+20%					45.726
3.001	HSw-2	15 Summer	100	+20%	30/15 Summer				45.248
3.002	S12	15 Summer	100	+20%	30/15 Summer				44.194
3.003	S13	15 Summer	100	+20%	30/15 Summer				43.645
4.000	S14	15 Summer	100	+20%	30/15 Summer				43.357
3.004	S15	15 Summer	100	+20%	30/15 Summer				43.281
3.005	S16	15 Summer	100	+20%	100/15 Summer				41.827

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S1	-0.134	0.000	0.34		36.6	OK	
1.001	S2	-0.106	0.000	0.54		60.8	OK	
1.002	S3	0.603	0.000	1.70		112.6	SURCHARGED	
1.003	S4	0.280	0.000	2.06		112.7	SURCHARGED	
1.004	S5	0.114	0.000	1.73		163.7	SURCHARGED	
1.005	S6	-0.109	0.000	0.84		182.7	OK	
2.000	S7	-0.053	0.000	0.92		33.2	OK	
1.006	S8	-0.149	0.000	0.55		269.3	OK	
1.007	S9	0.533	0.000	1.94		307.2	SURCHARGED	
1.008	S10	0.242	0.000	1.36		319.2	SURCHARGED	
1.009	S11	0.140	0.000	1.96		327.6	SURCHARGED	
3.000	HSw-1	-0.456	0.000	0.04		97.5	OK	
3.001	HSw-2	1.200	0.000	1.66		56.1	FLOOD RISK	
3.002	S12	2.178	0.000	2.61		164.0	SURCHARGED	
3.003	S13	1.721	0.000	2.74		156.9	SURCHARGED	
4.000	S14	1.397	0.000	0.66		40.9	FLOOD RISK	
3.004	S15	1.404	0.000	1.33		214.3	SURCHARGED	
3.005	S16	0.770	0.000	1.24		236.0	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.010	S17	15 Summer	100	+20%				
5.000	S18	15 Summer	100	+20%				
5.001	S19	15 Summer	100	+20%				
1.011	S20	15 Summer	100	+20%				
6.000	S24A	15 Summer	100	+20%				
6.001	S24	15 Summer	100	+20%				
6.002	S25	15 Summer	100	+20%				
7.000	S26	15 Summer	100	+20%	100/15 Summer			
7.001	S27	15 Summer	100	+20%	100/15 Summer			
6.003	S28	15 Summer	100	+20%	100/15 Summer			
8.000	S21	15 Summer	100	+20%				
8.001	S22	15 Summer	100	+20%	100/15 Summer			
8.002	S22A	15 Summer	100	+20%	100/15 Summer			
8.003	S23	15 Summer	100	+20%	100/15 Summer			
6.004	S29	15 Summer	100	+20%	100/15 Summer			
6.005	S30	15 Summer	100	+20%	30/15 Summer			
6.006	S31	15 Summer	100	+20%	30/15 Summer			
6.007	S32	15 Summer	100	+20%	100/15 Summer			
6.008	S33	15 Summer	100	+20%	30/15 Summer			
9.000	S34A	15 Summer	100	+20%	100/15 Summer			
9.001	S34	15 Summer	100	+20%	30/15 Summer			
9.002	S35	15 Summer	100	+20%	30/15 Summer			
10.000	S36	15 Summer	100	+20%				
10.001	S37	15 Summer	100	+20%				
9.003	S38	15 Summer	100	+20%	100/15 Summer			
11.000	S39A	15 Summer	100	+20%	100/15 Summer			
11.001	S39	15 Summer	100	+20%	30/15 Summer			
12.000	S40	15 Summer	100	+20%	30/15 Summer			
11.002	S41	15 Summer	100	+20%	30/15 Summer			
9.004	S42	15 Summer	100	+20%	30/15 Summer			
9.005	S43	15 Summer	100	+20%				
9.006	S44	15 Summer	100	+20%	100/15 Summer			
13.000	S45	15 Summer	100	+20%	30/15 Summer			
13.001	S46	15 Summer	100	+20%	30/15 Summer			
13.002	S47	15 Summer	100	+20%				
13.003	S48	15 Summer	100	+20%	100/15 Summer			
14.000	S49	15 Summer	100	+20%	30/15 Summer			
14.001	S50	15 Summer	100	+20%	30/15 Summer			
14.002	S51	15 Summer	100	+20%	100/15 Summer			
6.009	Basin-1	720 Winter	100	+20%	30/60 Summer			
15.000	HSw-3	15 Summer	100	+20%				
15.001	HSw-4	15 Summer	100	+20%	30/15 Summer			
15.002	HSw-5	15 Summer	100	+20%				
15.003	HSw-6	15 Summer	100	+20%	1/15 Summer			
15.004	CP1	15 Summer	100	+20%	100/15 Summer			
16.000	HSw-7	15 Summer	100	+20%	30/15 Summer			
15.005	CP2	15 Summer	100	+20%	30/15 Summer			
17.000	HSw-8	15 Summer	100	+20%				

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.010	S17	37.829	-0.089	0.000	0.99		615.1	OK	
5.000	S18	40.198	-0.102	0.000	0.57		37.0	OK	
5.001	S19	38.405	-0.145	0.000	0.27		36.8	OK	
1.011	S20	32.156	-0.194	0.000	0.70		685.8	OK	
6.000	S24A	41.383	-0.104	0.000	0.55		20.1	OK	
6.001	S24	41.233	-0.122	0.000	0.43		20.2	OK	
6.002	S25	41.049	-0.039	0.000	0.76		70.7	OK	
7.000	S26	40.580	0.874	0.000	0.65		69.3	SURCHARGED	
7.001	S27	40.503	0.889	0.000	0.53		100.8	SURCHARGED	
6.003	S28	40.392	0.893	0.000	0.91		162.1	SURCHARGED	
8.000	S21	41.386	-0.094	0.000	0.52		38.0	OK	
8.001	S22	41.294	0.364	0.000	0.72		118.5	SURCHARGED	
8.002	S22A	41.097	0.667	0.000	0.93		105.9	SURCHARGED	
8.003	S23	40.944	0.724	0.000	0.97		153.1	SURCHARGED	
6.004	S29	40.290	0.910	0.000	1.09		359.6	SURCHARGED	
6.005	S30	39.808	0.839	0.000	1.11		413.4	SURCHARGED	
6.006	S31	39.241	0.713	0.000	1.55		482.1	SURCHARGED	
6.007	S32	37.494	0.769	0.000	1.13		524.5	SURCHARGED	
6.008	S33	36.551	0.526	0.000	1.55		536.6	SURCHARGED	
9.000	S34A	39.247	0.538	0.000	0.65		23.2	SURCHARGED	
9.001	S34	39.221	0.611	0.000	1.25		79.0	SURCHARGED	
9.002	S35	39.069	0.551	0.000	1.79		109.9	SURCHARGED	
10.000	S36	40.789	-0.154	0.000	0.22		20.5	OK	
10.001	S37	40.333	-0.159	0.000	0.19		20.3	OK	
9.003	S38	38.834	0.389	0.000	0.96		181.0	SURCHARGED	
11.000	S39A	39.635	0.835	0.000	1.07		97.8	SURCHARGED	
11.001	S39	38.803	0.752	0.000	1.17		148.9	SURCHARGED	
12.000	S40	38.237	0.545	0.000	0.93		67.9	SURCHARGED	
11.002	S41	38.140	0.551	0.000	1.40		235.9	SURCHARGED	
9.004	S42	37.957	0.455	0.000	2.39		412.4	SURCHARGED	
9.005	S43	37.365	-0.039	0.000	0.96		466.6	OK	
9.006	S44	36.574	0.024	0.000	1.01		507.1	SURCHARGED	
13.000	S45	41.234	0.446	0.000	1.36		59.4	SURCHARGED	
13.001	S46	41.039	0.358	0.000	1.65		77.6	SURCHARGED	
13.002	S47	40.411	-0.065	0.000	0.84		90.0	OK	
13.003	S48	37.188	0.763	0.000	1.32		145.0	SURCHARGED	
14.000	S49	38.721	1.376	0.000	1.26		61.9	FLOOD RISK	
14.001	S50	38.177	1.184	0.000	1.96		96.2	SURCHARGED	
14.002	S51	36.686	0.066	0.000	1.02		122.7	SURCHARGED	
6.009	Basin-1	36.310	0.710	0.000	0.04		12.8	FLOOD RISK	
15.000	HSw-3	45.253	-0.507	0.000	0.02		77.4	OK	
15.001	HSw-4	43.964	0.414	0.000	1.43		52.7	FLOOD RISK	
15.002	HSw-5	43.128	-0.472	0.000	0.03		151.0	OK	
15.003	HSw-6	40.686	1.191	0.000	3.60		124.0	FLOOD RISK	
15.004	CP1	39.736	0.317	0.000	1.01		125.3	SURCHARGED	
16.000	HSw-7	36.768	0.600	0.000	1.77		98.6	SURCHARGED	
15.005	CP2	36.610	0.483	0.000	1.05		217.5	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
17.000	HSw-8	44.273	-0.527	0.000	0.01		49.7	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
17.001	HSw-9	15 Summer	100	+20%	100/15 Summer			
17.002	HSw-10	15 Summer	100	+20%				
17.003	HSw-11	15 Summer	100	+20%	100/15 Summer			
17.004	HSw-12	15 Summer	100	+20%				
17.005	HSw-13	15 Summer	100	+20%	100/15 Summer			
17.006	HSw-14	15 Summer	100	+20%				
17.007	HSw-15	720 Winter	100	+20%	1/15 Summer			
18.000	HSw-16	720 Winter	100	+20%	1/15 Summer			
19.000	HSw-17	720 Winter	100	+20%	1/15 Winter			
6.010	S52-Control	720 Winter	100	+20%	1/15 Summer			
1.012	S53	480 Winter	100	+20%	100/15 Summer			
1.013	Basin-2	960 Winter	100	+20%	30/60 Winter			
1.014	S54-Control	960 Winter	100	+20%	1/15 Summer			
1.015	Swale-1	30 Winter	100	+20%				
1.016	Basin-3	960 Winter	100	+20%	30/120 Summer			
1.017	S55-Control	60 Winter	100	+20%	1/30 Winter			
1.018	Swale-2	15 Winter	100	+20%				
1.019	Swale-3	15 Winter	100	+20%				
1.020	Swale-4	15 Summer	100	+20%				
1.021	Swale-5	15 Summer	100	+20%				
1.022	Swale-6	30 Winter	100	+20%				
1.023	Sw-Outlet	30 Winter	100	+20%				

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
17.001	HSw-9	43.448	0.078	0.000	1.05		45.9	SURCHARGED*	
17.002	HSw-10	42.522	-0.478	0.000	0.03		133.6	OK	
17.003	HSw-11	41.022	0.157	0.000	1.08		121.7	FLOOD RISK	
17.004	HSw-12	39.786	-0.454	0.000	0.05		197.2	OK	
17.005	HSw-13	38.414	0.134	0.000	1.16		188.3	FLOOD RISK*	
17.006	HSw-14	37.743	-0.417	0.000	0.07		247.0	OK	
17.007	HSw-15	36.329	0.750	0.000	0.13		18.2	SURCHARGED	
18.000	HSw-16	36.303	0.678	0.000	0.12		5.3	FLOOD RISK	
19.000	HSw-17	36.302	0.677	0.000	0.08		3.5	FLOOD RISK	
6.010	S52-Control	36.326	5.031	0.000	0.24		12.2	FLOOD RISK	
1.012	S53	27.897	0.312	0.000	0.18		97.4	SURCHARGED	
1.013	Basin-2	27.864	0.564	0.000	0.06		21.0	FLOOD RISK	
1.014	S54-Control	27.878	1.036	0.000	0.28		17.0	FLOOD RISK	
1.015	Swale-1	26.483	-0.555	0.000	0.00		17.0	OK	
1.016	Basin-3	25.172	0.597	0.000	0.08		36.6	SURCHARGED	
1.017	S55-Control	25.238	1.111	0.000	0.20		28.2	FLOOD RISK	
1.018	Swale-2	23.560	-0.540	0.000	0.01		28.2	OK	
1.019	Swale-3	22.660	-0.578	0.000	0.01		28.2	OK	
1.020	Swale-4	21.799	-0.578	0.000	0.01		28.2	OK	
1.021	Swale-5	21.021	-0.578	0.000	0.01		28.2	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 SW Strategy Rev A - RM1-2 and Spine Rd.sws

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.022	Swale-6	20.243	-0.578	0.000	0.01		28.2	OK	
1.023	Sw-Outlet	19.464	-0.203	0.000	0.24		28.2	OK	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for 18-058 RM SW Strategy.sws

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	20.400	Add Flow / Climate Change (%)	0
Ratio R	0.420	Minimum Backdrop Height (m)	0.000
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	0.000
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.790	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Free Flowing Outfall Details for 18-058 RM SW Strategy.sws

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.010	Ditch Outfall	45.900	43.975	43.975	0	0

Online Controls for 18-058 RM SW Strategy.sws

Hydro-Brake® Optimum Manhole: S81-Control, DS/PN: 1.010, Volume (m³): 12.3

Unit Reference	MD-SHE-0152-1370-2056-1370
Design Head (m)	2.056
Design Flow (l/s)	13.7
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	152
Invert Level (m)	44.044
Minimum Outlet Pipe Diameter (mm)	225
Suggested Manhole Diameter (mm)	1500

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.056	13.7
Flush-Flo™	0.606	13.7
Kick-Flo®	1.250	10.8
Mean Flow over Head Range	-	12.0

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	5.5	1.200	11.4	3.000	16.4	7.000	24.6
0.200	11.3	1.400	11.4	3.500	17.6	7.500	25.4
0.300	12.6	1.600	12.2	4.000	18.8	8.000	26.2
0.400	13.3	1.800	12.9	4.500	19.9	8.500	27.0
0.500	13.6	2.000	13.5	5.000	20.9	9.000	27.7
0.600	13.7	2.200	14.1	5.500	21.9	9.500	28.5
0.800	13.5	2.400	14.7	6.000	22.8		
1.000	12.9	2.600	15.3	6.500	23.7		

Storage Structures for 18-058 RM SW Strategy.sws

Porous Car Park Manhole: S62, DS/PN: 2.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.2
Membrane Percolation (mm/hr)	1000	Length (m)	22.9
Max Percolation (l/s)	33.1	Slope (1:X)	80.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.32	Evaporation (mm/day)	3
Invert Level (m)	48.112	Cap Volume Depth (m)	0.350

Swale Manhole: HSw-26, DS/PN: 4.000

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	76.6
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	100.0
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	46.670	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.6	Include Swale Volume	Yes

Porous Car Park Manhole: S74, DS/PN: 6.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	8.2
Membrane Percolation (mm/hr)	1000	Length (m)	45.5
Max Percolation (l/s)	103.6	Slope (1:X)	100.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.32	Evaporation (mm/day)	3
Invert Level (m)	45.446	Cap Volume Depth (m)	0.750

Porous Car Park Manhole: S75, DS/PN: 7.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.8
Membrane Percolation (mm/hr)	1000	Length (m)	40.1
Max Percolation (l/s)	64.6	Slope (1:X)	250.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.32	Evaporation (mm/day)	3
Invert Level (m)	45.054	Cap Volume Depth (m)	0.750

Swale Manhole: HSw-29, DS/PN: 8.000

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Base Width (m)	0.6
Infiltration Coefficient Side (m/hr)	0.00000	Length (m)	41.0
Safety Factor	2.0	Side Slope (1:X)	4.0
Porosity	1.00	Slope (1:X)	100.0
Invert Level (m)	45.670	Cap Volume Depth (m)	0.000

Swale Manhole: HSw-29, DS/PN: 8.000

Cap Infiltration Depth (m) 0.600 Include Swale Volume Yes

Tank or Pond Manhole: Basin-Pond 4, DS/PN: 1.009

Invert Level (m) 44.700

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	1369.6	1.300	2957.2

Volume Summary (Static)

Length Calculations based on True Length

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)
1.000	S57	1.612	0.530	0.000	2.142
1.001	S58	1.612	0.613	0.000	2.225
1.002	S59	1.696	1.084	0.000	2.781
1.003	S60	2.254	5.732	0.000	7.987
1.004	S61	2.637	3.267	0.000	5.904
2.000	S62	2.254	1.134	12.950	16.339
2.001	S63	2.758	2.247	0.000	5.005
2.002	S64	3.266	3.026	0.000	6.293
1.005	S65	3.590	4.555	0.000	8.145
1.006	S66	2.638	1.436	0.000	4.074
1.007	S67	2.362	6.752	0.000	9.114
3.000	Employment	2.916	5.560	0.000	8.475
4.000	HSw-26	0.740	0.864	39.600	41.204
3.001	S68	2.739	339.599	0.000	342.338
3.002	Sw-13	0.095	147.101	0.000	147.196
1.008	Pond 4a	0.228	17.153	0.000	17.381
5.000	S69	2.601	0.602	0.000	3.203
5.001	S70	2.981	3.945	0.000	6.926
5.002	S71	2.152	2.308	0.000	4.461
5.003	S72	1.696	0.880	0.000	2.577
5.004	S73	1.696	1.442	0.000	3.138
6.000	S74	1.612	0.538	81.669	83.819
7.000	S75	2.681	2.304	55.819	60.804
6.001	S76	3.050	5.878	0.000	8.928
6.002	S77	5.233	6.066	0.000	11.299
5.005	S78	7.546	11.737	0.000	19.283
5.006	S79	5.819	4.197	0.000	10.016
5.007	S80	5.183	8.796	0.000	13.979
8.000	HSw-29	0.432	0.276	37.602	38.311
9.000	CP3	1.130	0.652	0.000	1.782
1.009	Basin-Pond 4	0.308	2.975	2747.033	2750.316
1.010	S81-Control	9.301	0.226	0.000	9.527
Total		86.819	593.477	2974.673	3654.969

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 RM SW Strategy.sws

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.500
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	6
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		FSR	Ratio R 0.420
Region	England and Wales	Cv (Summer)	0.790
M5-60 (mm)	26.250	Cv (Winter)	0.830

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	S57	15 Summer	1	+0%				
1.001	S58	15 Summer	1	+0%	100/15 Summer			
1.002	S59	15 Summer	1	+0%	100/15 Summer			
1.003	S60	15 Summer	1	+0%	30/15 Summer			
1.004	S61	15 Summer	1	+0%	100/15 Summer			
2.000	S62	15 Summer	1	+0%	30/15 Summer			
2.001	S63	15 Summer	1	+0%	30/15 Summer			
2.002	S64	15 Summer	1	+0%	30/15 Summer			
1.005	S65	15 Summer	1	+0%	30/15 Summer			
1.006	S66	15 Winter	1	+0%	30/15 Summer			
1.007	S67	15 Winter	1	+0%				
3.000	Employment	15 Summer	1	+0%	100/15 Summer			
4.000	HSw-26	15 Summer	1	+0%	30/15 Summer			
3.001	S68	15 Summer	1	+0%				
3.002	Sw-13	15 Summer	1	+0%				
1.008	Pond 4a	240 Winter	1	+0%				
5.000	S69	15 Summer	1	+0%	30/15 Summer			
5.001	S70	15 Summer	1	+0%	30/15 Summer			
5.002	S71	15 Summer	1	+0%	30/15 Summer			

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 RM SW Strategy.sws

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S57	50.017	-0.157	0.000	0.19		8.1	OK	
1.001	S58	49.894	-0.157	0.000	0.19		17.7	OK	
1.002	S59	49.194	-0.218	0.000	0.17		30.8	OK	
1.003	S60	48.555	-0.217	0.000	0.36		42.8	OK	
1.004	S61	48.273	-0.277	0.000	0.15		57.7	OK	
2.000	S62	47.169	-0.303	0.000	0.07		7.8	OK	
2.001	S63	47.140	-0.264	0.000	0.16		17.2	OK	
2.002	S64	47.092	-0.222	0.000	0.17		19.8	OK	
1.005	S65	47.072	-0.122	0.000	0.77		90.6	OK	
1.006	S66	46.859	-0.158	0.000	0.75		102.2	OK	
1.007	S67	46.688	-0.291	0.000	0.27		125.1	OK	
3.000	Employment	46.395	-0.245	0.000	0.42		131.1	OK	
4.000	HSw-26	46.123	-0.132	0.000	0.59		34.6	OK	
3.001	S68	45.967	-1.333	0.000	0.01		167.8	OK	
3.002	Sw-13	45.739	-0.486	0.000	0.04		164.0	OK	
1.008	Pond 4a	45.009	-1.127	0.000	0.01		73.6	OK	
5.000	S69	48.544	-0.181	0.000	0.28		17.0	OK	
5.001	S70	48.521	-0.147	0.000	0.50		40.1	OK	
5.002	S71	48.194	-0.139	0.000	0.55		48.3	OK	

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 RM SW Strategy.sws

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
5.003	S72	15 Summer	1	+0%	30/15 Summer			
5.004	S73	15 Summer	1	+0%				
6.000	S74	15 Summer	1	+0%	30/15 Summer			
7.000	S75	15 Summer	1	+0%	1/15 Summer			
6.001	S76	240 Winter	1	+0%	1/15 Summer			
6.002	S77	240 Winter	1	+0%	1/15 Summer			
5.005	S78	240 Winter	1	+0%	1/15 Summer			
5.006	S79	240 Winter	1	+0%	1/15 Summer			
5.007	S80	240 Winter	1	+0%	1/15 Summer			
8.000	HSw-29	15 Summer	1	+0%	30/15 Summer			
9.000	CP3	240 Winter	1	+0%	30/15 Summer			
1.009	Basin-Pond 4	240 Winter	1	+0%	1/15 Summer			
1.010	S81-Control	30 Summer	1	+0%	1/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
5.003	S72	47.921	-0.162	0.000	0.43		54.3	OK	
5.004	S73	47.624	-0.199	0.000	0.24		64.7	OK	
6.000	S74	45.080	-0.126	0.000	0.40		20.3	OK	
7.000	S75	45.025	0.003	0.000	0.13		18.3	SURCHARGED	
6.001	S76	45.014	0.022	0.000	0.05		9.0	SURCHARGED	
6.002	S77	45.014	0.092	0.000	0.06		12.0	SURCHARGED	
5.005	S78	45.014	0.164	0.000	0.15		33.0	SURCHARGED	
5.006	S79	45.012	0.298	0.000	0.20		37.8	SURCHARGED	
5.007	S80	45.011	0.348	0.000	0.24		44.2	SURCHARGED	
8.000	HSw-29	45.172	-0.048	0.000	0.79		19.7	OK	
9.000	CP3	45.009	-0.017	0.000	0.02		0.8	OK	
1.009	Basin-Pond 4	45.009	0.423	0.000	0.10		25.1	SURCHARGED	
1.010	S81-Control	45.117	0.848	0.000	0.37		13.7	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 RM SW Strategy.sws

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.500
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	6
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		FSR	Ratio R 0.420
Region	England and Wales	Cv (Summer)	0.790
M5-60 (mm)	26.250	Cv (Winter)	0.830

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	S57	15 Summer	30	+0%				
1.001	S58	15 Summer	30	+0%	100/15 Summer			
1.002	S59	15 Summer	30	+0%	100/15 Summer			
1.003	S60	15 Summer	30	+0%	30/15 Summer			
1.004	S61	15 Summer	30	+0%	100/15 Summer			
2.000	S62	15 Summer	30	+0%	30/15 Summer			
2.001	S63	15 Summer	30	+0%	30/15 Summer			
2.002	S64	15 Summer	30	+0%	30/15 Summer			
1.005	S65	15 Summer	30	+0%	30/15 Summer			
1.006	S66	15 Summer	30	+0%	30/15 Summer			
1.007	S67	15 Summer	30	+0%				
3.000	Employment	15 Summer	30	+0%	100/15 Summer			
4.000	HSw-26	15 Summer	30	+0%	30/15 Summer			
3.001	S68	15 Summer	30	+0%				
3.002	Sw-13	15 Summer	30	+0%				
1.008	Pond 4a	480 Winter	30	+0%				
5.000	S69	15 Summer	30	+0%	30/15 Summer			
5.001	S70	15 Summer	30	+0%	30/15 Summer			
5.002	S71	15 Summer	30	+0%	30/15 Summer			

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 RM SW Strategy.sws

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S57	50.059	-0.115	0.000	0.48		19.9	OK	
1.001	S58	49.947	-0.104	0.000	0.56		51.0	OK	
1.002	S59	49.263	-0.149	0.000	0.50		93.7	OK	
1.003	S60	48.820	0.048	0.000	1.08		129.5	SURCHARGED	
1.004	S61	48.359	-0.191	0.000	0.47		174.5	OK	
2.000	S62	48.160	0.688	0.000	0.22		23.4	SURCHARGED	
2.001	S63	48.159	0.755	0.000	0.39		42.8	SURCHARGED	
2.002	S64	48.090	0.776	0.000	0.45		51.5	SURCHARGED	
1.005	S65	47.994	0.800	0.000	2.05		240.9	SURCHARGED	
1.006	S66	47.203	0.186	0.000	1.95		267.0	SURCHARGED	
1.007	S67	46.821	-0.158	0.000	0.71		334.9	OK	
3.000	Employment	46.617	-0.023	0.000	1.00		312.8	OK	
4.000	HSw-26	46.304	0.049	0.000	1.46		85.3	SURCHARGED	
3.001	S68	46.089	-1.211	0.000	0.03		396.2	OK	
3.002	Sw-13	45.811	-0.414	0.000	0.10		391.5	OK	
1.008	Pond 4a	45.431	-0.705	0.000	0.01		88.8	OK	
5.000	S69	49.192	0.467	0.000	0.66		40.5	SURCHARGED	
5.001	S70	49.118	0.450	0.000	1.28		103.5	SURCHARGED	
5.002	S71	48.583	0.250	0.000	1.39		121.6	SURCHARGED	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 RM SW Strategy.sws

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
5.003	S72	15 Summer	30	+0%	30/15 Summer			
5.004	S73	15 Summer	30	+0%				
6.000	S74	30 Summer	30	+0%	30/15 Summer			
7.000	S75	30 Summer	30	+0%	1/15 Summer			
6.001	S76	30 Summer	30	+0%	1/15 Summer			
6.002	S77	30 Summer	30	+0%	1/15 Summer			
5.005	S78	15 Summer	30	+0%	1/15 Summer			
5.006	S79	480 Winter	30	+0%	1/15 Summer			
5.007	S80	480 Winter	30	+0%	1/15 Summer			
8.000	HSw-29	15 Summer	30	+0%	30/15 Summer			
9.000	CP3	480 Winter	30	+0%	30/15 Summer			
1.009	Basin-Pond 4	480 Winter	30	+0%	1/15 Summer			
1.010	S81-Control	120 Summer	30	+0%	1/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
5.003	S72	48.087	0.004	0.000	1.01		128.0	SURCHARGED	
5.004	S73	47.691	-0.132	0.000	0.59		158.5	OK	
6.000	S74	45.546	0.340	0.000	0.75		38.3	SURCHARGED	
7.000	S75	45.486	0.464	0.000	0.25		35.6	SURCHARGED	
6.001	S76	45.479	0.487	0.000	0.32		62.8	SURCHARGED	
6.002	S77	45.469	0.547	0.000	0.37		73.2	SURCHARGED	
5.005	S78	45.460	0.610	0.000	1.07		229.9	SURCHARGED	
5.006	S79	45.434	0.720	0.000	0.24		45.4	SURCHARGED	
5.007	S80	45.433	0.770	0.000	0.30		53.8	SURCHARGED	
8.000	HSw-29	45.792	0.572	0.000	1.59		39.7	SURCHARGED	
9.000	CP3	45.431	0.405	0.000	0.03		0.9	SURCHARGED	
1.009	Basin-Pond 4	45.431	0.845	0.000	0.10		24.2	SURCHARGED	
1.010	S81-Control	45.533	1.264	0.000	0.37		13.7	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 RM SW Strategy.sws

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.500
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	6
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		FSR	Ratio R 0.420
Region	England and Wales	Cv (Summer)	0.790
M5-60 (mm)	26.250	Cv (Winter)	0.830

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	S57	15 Summer	100	+20%				
1.001	S58	15 Summer	100	+20%	100/15 Summer			
1.002	S59	15 Summer	100	+20%	100/15 Summer			
1.003	S60	15 Summer	100	+20%	30/15 Summer			
1.004	S61	15 Summer	100	+20%	100/15 Summer			
2.000	S62	15 Winter	100	+20%	30/15 Summer			
2.001	S63	15 Winter	100	+20%	30/15 Summer			
2.002	S64	15 Summer	100	+20%	30/15 Summer			
1.005	S65	15 Summer	100	+20%	30/15 Summer			
1.006	S66	15 Summer	100	+20%	30/15 Summer			
1.007	S67	15 Summer	100	+20%				
3.000	Employment	15 Summer	100	+20%	100/15 Summer			
4.000	HSw-26	15 Summer	100	+20%	30/15 Summer			
3.001	S68	15 Summer	100	+20%				
3.002	Sw-13	15 Summer	100	+20%				
1.008	Pond 4a	960 Winter	100	+20%				
5.000	S69	15 Summer	100	+20%	30/15 Summer			
5.001	S70	15 Summer	100	+20%	30/15 Summer			
5.002	S71	15 Summer	100	+20%	30/15 Summer			

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 RM SW Strategy.sws

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	S57	50.172	-0.002	0.000	0.75		31.3	OK	
1.001	S58	50.113	0.062	0.000	0.86		77.9	SURCHARGED	
1.002	S59	49.837	0.425	0.000	0.73		135.6	SURCHARGED	
1.003	S60	49.581	0.809	0.000	1.48		177.6	SURCHARGED	
1.004	S61	49.140	0.590	0.000	0.62		232.3	SURCHARGED	
2.000	S62	48.592	1.120	0.000	0.67		72.1	FLOOD RISK	
2.001	S63	48.587	1.183	0.000	0.77		83.6	SURCHARGED	
2.002	S64	48.578	1.264	0.000	0.78		88.8	SURCHARGED	
1.005	S65	48.591	1.397	0.000	2.56		301.0	SURCHARGED	
1.006	S66	47.377	0.360	0.000	2.52		345.8	SURCHARGED	
1.007	S67	46.943	-0.036	0.000	1.00		468.5	OK	
3.000	Employment	47.278	0.638	0.000	1.57		491.1	SURCHARGED	
4.000	HSw-26	46.482	0.227	0.000	2.27		132.7	SURCHARGED	
3.001	S68	46.168	-1.132	0.000	0.05		613.1	OK	
3.002	Sw-13	45.861	-0.364	0.000	0.16		600.8	OK	
1.008	Pond 4a	45.782	-0.354	0.000	0.01		74.3	OK	
5.000	S69	50.714	1.989	0.000	1.03		63.2	FLOOD RISK	
5.001	S70	50.645	1.977	0.000	1.77		143.0	SURCHARGED	
5.002	S71	49.510	1.177	0.000	2.00		175.4	SURCHARGED	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 RM SW Strategy.sws

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
5.003	S72	15 Summer	100	+20%	30/15 Summer			
5.004	S73	15 Summer	100	+20%				
6.000	S74	30 Winter	100	+20%	30/15 Summer			
7.000	S75	30 Summer	100	+20%	1/15 Summer			
6.001	S76	30 Summer	100	+20%	1/15 Summer			
6.002	S77	30 Summer	100	+20%	1/15 Summer			
5.005	S78	15 Winter	100	+20%	1/15 Summer			
5.006	S79	960 Winter	100	+20%	1/15 Summer			
5.007	S80	960 Winter	100	+20%	1/15 Summer			
8.000	HSw-29	15 Winter	100	+20%	30/15 Summer			
9.000	CP3	960 Winter	100	+20%	30/15 Summer			
1.009	Basin-Pond 4	960 Winter	100	+20%	1/15 Summer			
1.010	S81-Control	120 Winter	100	+20%	1/15 Summer			

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
5.003	S72	48.471	0.388	0.000	1.55		196.2	SURCHARGED	
5.004	S73	47.751	-0.072	0.000	0.91		243.5	OK	
6.000	S74	45.890	0.684	0.000	0.87		44.0	SURCHARGED	
7.000	S75	45.927	0.905	0.000	0.34		48.9	FLOOD RISK	
6.001	S76	45.917	0.925	0.000	0.44		87.7	FLOOD RISK	
6.002	S77	45.921	0.999	0.000	0.48		95.6	SURCHARGED	
5.005	S78	45.943	1.093	0.000	1.32		283.7	SURCHARGED	
5.006	S79	45.784	1.070	0.000	0.20		37.9	SURCHARGED	
5.007	S80	45.783	1.120	0.000	0.25		45.2	SURCHARGED	
8.000	HSw-29	45.981	0.761	0.000	1.67		41.9	FLOOD RISK	
9.000	CP3	45.781	0.755	0.000	0.02		0.8	FLOOD RISK	
1.009	Basin-Pond 4	45.781	1.195	0.000	0.09		23.5	FLOOD RISK	
1.010	S81-Control	45.908	1.639	0.000	0.37		13.7	FLOOD RISK	

Time Area Diagram for 18-058 Spine Road - Milton Manor Outfall.sws

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.336	4-8	0.337	8-12	0.015

Total Area Contributing (ha) = 0.688

Total Pipe Volume (m^3) = 243.922

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for 18-058 Spine Road - Milton Manor Outfall.sws

- Indicates pipe length does not match coordinates

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	43.504	0.770	56.5	0.100	5.00	0.0		0.045	4 \=/	600	1:4 Swale	
1.001	43.503	2.250	19.3	0.111	0.00	0.0		0.045	4 \=/	600	1:4 Swale	
1.002	26.744	1.570	17.0	0.057	0.00	0.0		0.045	4 \=/	600	1:4 Swale	
1.003	9.955	0.550	18.1	0.023	0.00	0.0		0.045	4 \=/	600	1:4 Swale	
1.004	10.269	0.103	99.7	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.005	33.027	1.894	17.4	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
2.000	9.717	0.097	100.2	0.067	5.00	0.0	0.600		o	150	Pipe/Conduit	
1.006	40.444	2.335	17.3	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
3.000	10.214	0.102	100.1	0.092	5.00	0.0	0.600		o	150	Pipe/Conduit	
1.007	26.663	1.568	17.0	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
4.000	10.892	0.108	100.9	0.078	5.00	0.0	0.600		o	150	Pipe/Conduit	
1.008	48.954#	2.612	18.7	0.000	0.00	0.0	0.600		o	300	Pipe/Conduit	
1.009	33.330#	0.200	166.7	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)
1.000	50.00	6.15	46.670	0.100	0.0	0.0	0.0	0.63	113.1	13.5
1.001	50.00	6.83	45.900	0.211	0.0	0.0	0.0	1.07	193.3	28.6
1.002	50.00	7.22	43.650	0.268	0.0	0.0	0.0	1.14	206.0	36.3
1.003	50.00	7.37	42.080	0.291	0.0	0.0	0.0	1.11	199.8	39.4
1.004	50.00	7.48	40.780	0.291	0.0	0.0	0.0	1.57	111.3	39.4
1.005	50.00	7.62	40.677	0.291	0.0	0.0	0.0	3.78	267.4	39.4
2.000	50.00	5.16	39.030	0.067	0.0	0.0	0.0	1.00	17.7	9.1
1.006	50.00	7.80	38.783	0.358	0.0	0.0	0.0	3.80	268.3	48.5
3.000	50.00	5.17	36.700	0.092	0.0	0.0	0.0	1.00	17.7	12.5
1.007	50.00	7.92	35.730	0.450	0.0	0.0	0.0	3.83	270.8	60.9
4.000	50.00	5.18	34.470	0.078	0.0	0.0	0.0	1.00	17.7	10.6
1.008	50.00	8.14	34.162	0.528	0.0	0.0	0.0	3.65	257.9	71.5
1.009	50.00	8.49	31.050	0.528	0.0	0.0	0.0	1.57	250.0	71.5

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for 18-058 Spine Road - Milton Manor Outfall.sws

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
5.000	7.049	0.472	14.9	0.160	5.00	0.0	0.600		o	225	Pipe/Conduit	
5.001	13.321	0.033	403.7	0.000	0.00	0.0	0.600		o	450	Pipe/Conduit	
1.010	30.279	1.338	22.6	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	
1.011	13.542	0.882	15.4	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
5.000	50.00	5.03	31.530	0.160	0.0	0.0	0.0	3.40	135.3	21.7
5.001	50.00	5.26	30.883	0.160	0.0	0.0	0.0	1.01	159.9	21.7
1.010	50.00	8.68	30.850	0.688	0.0	0.0	0.0	2.76	109.8	93.2
1.011	50.00	8.74	29.512	0.688	0.0	0.0	0.0	3.36	133.5	93.2

Online Controls for 18-058 Spine Road - Milton Manor Outfall.sws

Hydro-Brake® Optimum Manhole: CP9-Ctrl, DS/PN: 1.010, Volume (m³): 9.6

Unit Reference	MD-SHE-0077-2800-1200-2800
Design Head (m)	1.200
Design Flow (l/s)	2.8
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	77
Invert Level (m)	30.850
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	2.8
Flush-Flo™	0.336	2.7
Kick-Flo®	0.683	2.2
Mean Flow over Head Range	-	2.4

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

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.1	1.200	2.8	3.000	4.3	7.000	6.4
0.200	2.6	1.400	3.0	3.500	4.6	7.500	6.6
0.300	2.7	1.600	3.2	4.000	4.9	8.000	6.8
0.400	2.7	1.800	3.4	4.500	5.2	8.500	7.0
0.500	2.6	2.000	3.5	5.000	5.4	9.000	7.2
0.600	2.4	2.200	3.7	5.500	5.7	9.500	7.3
0.800	2.3	2.400	3.8	6.000	5.9		
1.000	2.6	2.600	4.0	6.500	6.1		

Storage Structures for 18-058 Spine Road - Milton Manor Outfall.sws

Swale Manhole: HSw-22, DS/PN: 2.000

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	31.2
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	16.7
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	39.780	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.6	Include Swale Volume	Yes

Swale Manhole: HSw-23, DS/PN: 3.000

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	41.6
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	16.7
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	37.450	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.6	Include Swale Volume	Yes

Swale Manhole: HSw-24, DS/PN: 4.000

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	32.7
Infiltration Coefficient Side (m/hr)	0.00000	Side Slope (1:X)	4.0
Safety Factor	2.0	Slope (1:X)	16.7
Porosity	1.00	Cap Volume Depth (m)	0.000
Invert Level (m)	35.220	Cap Infiltration Depth (m)	0.000
Base Width (m)	0.6	Include Swale Volume	Yes

Tank or Pond Manhole: HW-Basin, DS/PN: 1.009

Invert Level (m) 31.050

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	304.2	1.300	812.8

Swale Manhole: HSw-25, DS/PN: 5.000

Warning:- Volume should always be included unless the upstream pipe is being used for storage and/or as a carrier

Infiltration Coefficient Base (m/hr) 0.00000 Infiltration Coefficient Side (m/hr) 0.00000

Swale Manhole: HSw-25, DS/PN: 5.000

Safety Factor	2.0	Side Slope (1:X)	4.0
Porosity	1.00	Slope (1:X)	16.7
Invert Level (m)	32.280	Cap Volume Depth (m)	0.000
Base Width (m)	0.6	Cap Infiltration Depth (m)	0.000
Length (m)	40.8	Include Swale Volume	Yes

Volume Summary (Static)

Length Calculations based on True Length

Pipe Number	USMH Name	Manhole Volume (m³)	Pipe Volume (m³)	Storage Structure Volume (m³)	Total Volume (m³)
1.000	HSw-26	0.216	77.227	0.000	77.443
1.001	HSw-18	0.216	77.225	0.000	77.441
1.002	HSw-19	0.216	47.059	0.000	47.275
1.003	HSw-20	0.216	16.704	0.000	16.920
1.004	HSw-21	0.759	0.657	0.000	1.416
1.005	CP4	1.622	2.250	0.000	3.872
2.000	HSw-22	0.486	0.156	6.613	7.255
1.006	CP5	1.788	2.774	0.000	4.562
3.000	HSw-23	0.486	0.165	6.613	7.264
1.007	CP6	3.370	1.800	0.000	5.170
4.000	HSw-24	0.486	0.177	6.613	7.276
1.008	CP7	2.747	3.370	0.000	6.117
1.009	HW-Basin	1.861	5.074	699.507	706.442
5.000	HSw-25	0.615	0.237	6.613	7.465
5.001	CP8	3.607	1.880	0.000	5.487
1.010	CP9-Ctrl	2.651	1.150	0.000	3.801
1.011	CP10	1.612	0.491	0.000	2.102
Total		22.954	238.396	725.959	987.309

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 Spine Road - Milton Manor Outfall.sws

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	5
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	FSR	Ratio R	0.420
Region	England and Wales	Cv (Summer)	0.790
M5-60 (mm)	26.250	Cv (Winter)	0.830

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	HSw-26	15 Summer	1	+0%				
1.001	HSw-18	15 Summer	1	+0%				
1.002	HSw-19	15 Summer	1	+0%				
1.003	HSw-20	15 Summer	1	+0%				
1.004	HSw-21	15 Summer	1	+0%	30/15 Summer			
1.005	CP4	15 Summer	1	+0%	100/15 Summer			
2.000	HSw-22	15 Summer	1	+0%	30/15 Summer			
1.006	CP5	15 Summer	1	+0%	100/15 Summer			
3.000	HSw-23	15 Summer	1	+0%	1/15 Summer			
1.007	CP6	15 Summer	1	+0%	100/15 Summer			
4.000	HSw-24	15 Summer	1	+0%	30/15 Summer			
1.008	CP7	15 Summer	1	+0%	30/15 Summer			
1.009	HW-Basin	360 Winter	1	+0%	30/30 Winter			
5.000	HSw-25	15 Summer	1	+0%	30/15 Summer			
5.001	CP8	360 Winter	1	+0%	1/240 Winter			
1.010	CP9-Ctrl	360 Winter	1	+0%	1/15 Summer			
1.011	CP10	480 Summer	1	+0%				

1 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 Spine Road - Milton Manor Outfall.sws

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	HSw-26	46.730	-0.540	0.000	0.01		18.7	OK	
1.001	HSw-18	45.963	-0.537	0.000	0.01		36.2	OK	
1.002	HSw-19	43.718	-0.532	0.000	0.01		45.1	OK	
1.003	HSw-20	42.152	-0.528	0.000	0.01		48.9	OK	
1.004	HSw-21	40.950	-0.130	0.000	0.61		49.0	OK	
1.005	CP4	40.768	-0.209	0.000	0.20		49.0	OK	
2.000	HSw-22	39.133	-0.047	0.000	0.81		12.7	OK	
1.006	CP5	38.884	-0.199	0.000	0.25		61.5	OK	
3.000	HSw-23	36.869	0.019	0.000	1.10		17.4	SURCHARGED	
1.007	CP6	35.847	-0.183	0.000	0.32		78.6	OK	
4.000	HSw-24	34.585	-0.035	0.000	0.93		14.8	OK	
1.008	CP7	34.290	-0.172	0.000	0.38		92.8	OK	
1.009	HW-Basin	31.352	-0.148	0.000	0.01		2.6	OK	
5.000	HSw-25	31.617	-0.138	0.000	0.31		30.4	OK	
5.001	CP8	31.351	0.018	0.000	0.04		4.4	SURCHARGED	
1.010	CP9-Ctrl	31.351	0.276	0.000	0.03		2.7	SURCHARGED	
1.011	CP10	29.535	-0.202	0.000	0.02		2.7	OK	

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 Spine Road - Milton Manor Outfall.sws

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	5
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	FSR	Ratio R	0.420
Region	England and Wales	Cv (Summer)	0.790
M5-60 (mm)	26.250	Cv (Winter)	0.830

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	HSw-26	15 Summer	30	+0%				
1.001	HSw-18	15 Summer	30	+0%				
1.002	HSw-19	15 Summer	30	+0%				
1.003	HSw-20	15 Summer	30	+0%				
1.004	HSw-21	15 Summer	30	+0%	30/15 Summer			
1.005	CP4	15 Summer	30	+0%	100/15 Summer			
2.000	HSw-22	15 Summer	30	+0%	30/15 Summer			
1.006	CP5	15 Summer	30	+0%	100/15 Summer			
3.000	HSw-23	15 Summer	30	+0%	1/15 Summer			
1.007	CP6	15 Summer	30	+0%	100/15 Summer			
4.000	HSw-24	15 Summer	30	+0%	30/15 Summer			
1.008	CP7	15 Summer	30	+0%	30/15 Summer			
1.009	HW-Basin	480 Winter	30	+0%	30/30 Winter			
5.000	HSw-25	15 Summer	30	+0%	30/15 Summer			
5.001	CP8	480 Winter	30	+0%	1/240 Winter			
1.010	CP9-Ctrl	480 Winter	30	+0%	1/15 Summer			
1.011	CP10	1440 Summer	30	+0%				

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 Spine Road - Milton Manor Outfall.sws

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	HSw-26	46.764	-0.506	0.000	0.02		45.7	OK	
1.001	HSw-18	46.009	-0.491	0.000	0.02		101.2	OK	
1.002	HSw-19	43.771	-0.479	0.000	0.03		129.8	OK	
1.003	HSw-20	42.208	-0.472	0.000	0.04		140.4	OK	
1.004	HSw-21	41.294	0.214	0.000	1.75		140.3	SURCHARGED	
1.005	CP4	40.842	-0.135	0.000	0.58		141.7	OK	
2.000	HSw-22	39.459	0.279	0.000	1.96		30.8	SURCHARGED	
1.006	CP5	38.968	-0.115	0.000	0.69		173.1	OK	
3.000	HSw-23	37.441	0.591	0.000	2.61		41.3	SURCHARGED	
1.007	CP6	35.948	-0.082	0.000	0.88		214.0	OK	
4.000	HSw-24	35.056	0.436	0.000	2.23		35.5	SURCHARGED	
1.008	CP7	34.539	0.077	0.000	1.01		245.5	SURCHARGED	
1.009	HW-Basin	31.738	0.238	0.000	0.02		4.4	SURCHARGED	
5.000	HSw-25	31.823	0.068	0.000	0.75		73.0	SURCHARGED	
5.001	CP8	31.791	0.458	0.000	0.07		7.3	SURCHARGED	
1.010	CP9-Ctrl	31.790	0.715	0.000	0.03		2.7	SURCHARGED	
1.011	CP10	29.535	-0.202	0.000	0.02		2.7	OK	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 Spine Road - Milton Manor Outfall.sws

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	5
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	FSR	Ratio R	0.420
Region	England and Wales	Cv (Summer)	0.790
M5-60 (mm)	26.250	Cv (Winter)	0.830

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

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	HSw-26	15 Summer	100	+20%				
1.001	HSw-18	15 Summer	100	+20%				
1.002	HSw-19	15 Summer	100	+20%				
1.003	HSw-20	15 Summer	100	+20%				
1.004	HSw-21	15 Summer	100	+20%	30/15 Summer			
1.005	CP4	15 Summer	100	+20%	100/15 Summer			
2.000	HSw-22	15 Summer	100	+20%	30/15 Summer			
1.006	CP5	15 Summer	100	+20%	100/15 Summer			
3.000	HSw-23	15 Summer	100	+20%	1/15 Summer			
1.007	CP6	15 Summer	100	+20%	100/15 Summer			
4.000	HSw-24	15 Summer	100	+20%	30/15 Summer			
1.008	CP7	15 Summer	100	+20%	30/15 Summer			
1.009	HW-Basin	960 Winter	100	+20%	30/30 Winter			
5.000	HSw-25	15 Summer	100	+20%	30/15 Summer			
5.001	CP8	60 Winter	100	+20%	1/240 Winter			
1.010	CP9-Ctrl	60 Winter	100	+20%	1/15 Summer			
1.011	CP10	960 Winter	100	+20%				

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for 18-058 Spine Road - Milton Manor Outfall.sws

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	HSw-26	46.791	-0.479	0.000	0.03		71.8	OK	
1.001	HSw-18	46.037	-0.463	0.000	0.04		159.4	OK	
1.002	HSw-19	43.800	-0.450	0.000	0.05		204.5	OK	
1.003	HSw-20	42.240	-0.440	0.000	0.06		221.3	OK	
1.004	HSw-21	41.751	0.671	0.000	2.74		220.5	SURCHARGED	
1.005	CP4	41.056	0.079	0.000	0.87		214.1	SURCHARGED	
2.000	HSw-22	40.085	0.905	0.000	2.79		43.9	FLOOD RISK	
1.006	CP5	39.642	0.559	0.000	0.96		240.2	SURCHARGED	
3.000	HSw-23	37.972	1.122	0.000	3.30		52.2	FLOOD RISK	
1.007	CP6	37.531	1.501	0.000	1.11		271.0	SURCHARGED	
4.000	HSw-24	35.773	1.153	0.000	3.20		50.8	FLOOD RISK	
1.008	CP7	35.580	1.118	0.000	1.20		290.4	SURCHARGED	
1.009	HW-Basin	32.054	0.554	0.000	0.02		4.5	FLOOD RISK	
5.000	HSw-25	32.304	0.549	0.000	1.18		114.1	SURCHARGED	
5.001	CP8	32.259	0.926	0.000	0.53		54.7	SURCHARGED	
1.010	CP9-Ctrl	32.224	1.149	0.000	0.03		2.7	FLOOD RISK	
1.011	CP10	29.536	-0.201	0.000	0.02		2.8	OK	