

Flood Risk Assessment & Preliminary Foul & Surface Water Drainage Strategy

1.0 Introduction

- 1.1 Following instructions from Portal Construction, Design Coordination Ltd have undertaken an initial assessment of flooding and drainage issues in relation to a proposed redevelopment site located at Bryn Lane for the construction of 2 No industrial units and associated parking and service yards within a development site on Bryn Lane in Wrexham LL13 9UT.
- 1.2 The site is located in an existing industrial developed area.
- 1.3 The Local Authority is Wrexham County Borough Council, and the wastewater undertaker is Welsh Water.
- 1.4 The comments given in this report and recommendations made are based in the information that could be obtained from reasonably accessible sources and site visits.
- 1.5 Detailed discussions are still to be held with Welsh Water in regard to the outline proposal to make the connection for the foul wastewater to the existing unmapped foul drain to the other side of the road as shown on the plans.
- 1.6 Due to the current ground conditions on site being clay the proposed surface water generated from the site will be retained on site within a below ground storm water attenuation tank, fitted with a flow control device to limit the flow to a maximum pass forward rate of 2 l/s for each unit up to and including the 1 in 100 + 40 % Climate change allowance. The redeveloped site will be connected to the existing surface water drainage holding tank on site.
- 1.7 The proposed site has existing ponds and water courses to part of the perimeter for which the proposal will be to discharge the controlled flows into these by way of constructing headwalls or similar prior to discharge.

2.0 Drainage Hierarchy

- 2.1 Current guidance looks to outline all new developments must consider the how they will deal with their surface water drainage and follow the standard rules for such discharge in the following order of priority :
 - 2.1.1 Infiltration – Into the ground by way of soakaway or similar
 - 2.1.2 Surface Water Body – Discharge the surface water generated into a surface water water course or similar existing feature
 - 2.1.3 Existing surface water sewer or highway drain
 - 2.1.4 Existing combined sewer

3.0 Site Flood Risk

- 3.1** The existing site is located on Bryn Lane, Wrexham Industrial Estate LL13 9UT and is located within an area defined as being in a flood risk zone 1 an area with a low probability of flooding from rivers and sea.
- 3.2** A review of the information in relation to both the risk associated with flooding from surface water and reservoirs also show the site as being in a low risk area.

4.0 Existing Drainage

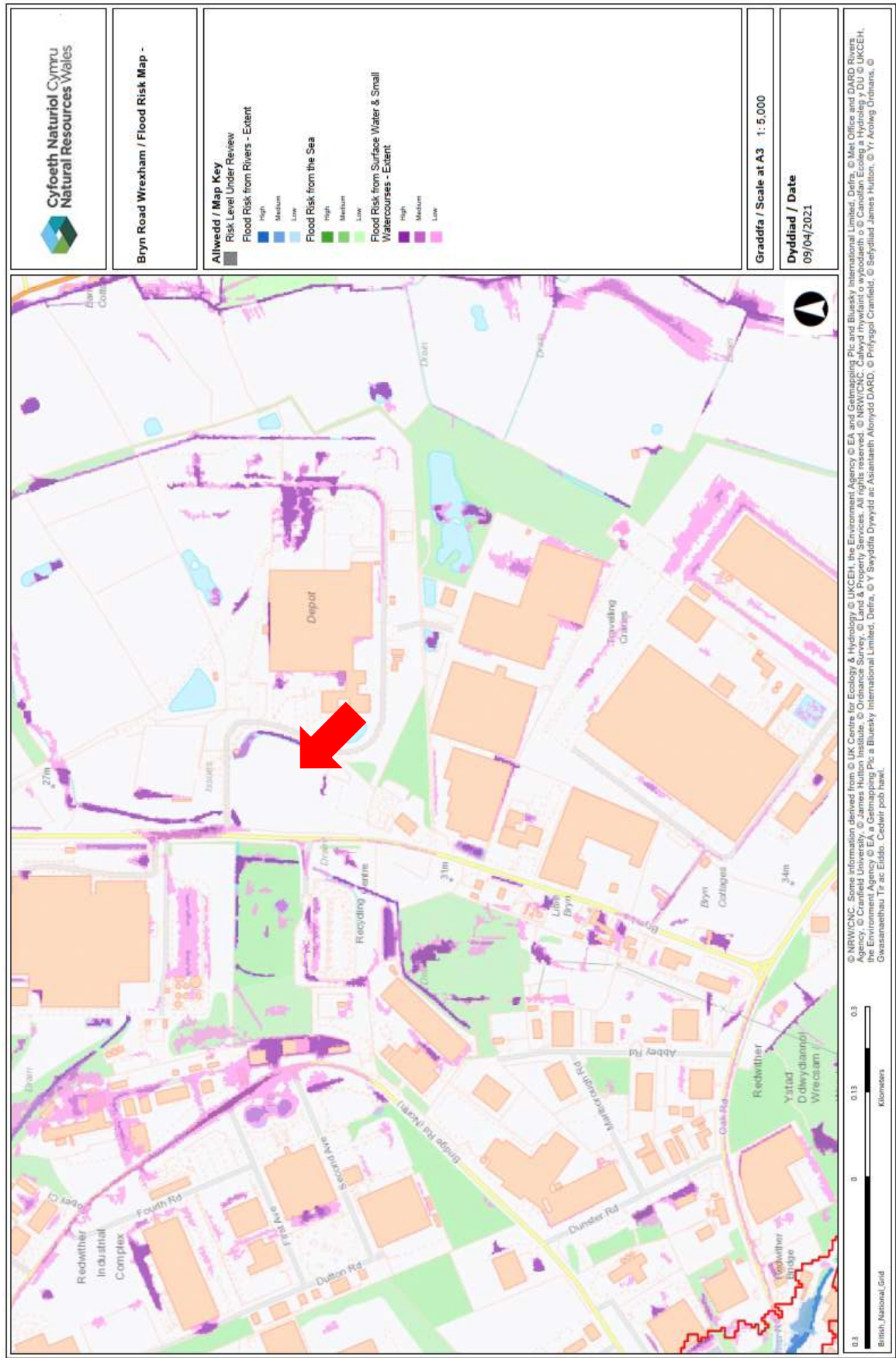
- 4.1** The existing site is currently vacant with some existing stoned up areas.
- 4.2** The site currently has existing surface water features for which it is proposed to be used for the new connection within the site.
- 4.3** The ground conditions on site are believed to be firm clay at relatively shallow depths and as such the use of infiltration (soakaways) is extremely unlikely to be a viable option. The adjacent site looks to have undertaken such tests on site and the results were found to demonstrate the ground conditions being unsuitable for such.
- 4.4** There are existing water courses within the land immediately around the site so the use of attenuation with a control outflow of 2 l/s for each unit is to be adopted as the drainage strategy for the site redevelopment.
- 4.5** A review of the sewer records for the area only indicate the site as having existing private combined sewers within which will be used for the discharge of foul drainage subject to agreement with Welsh Water.

5.0 Proposed Drainage

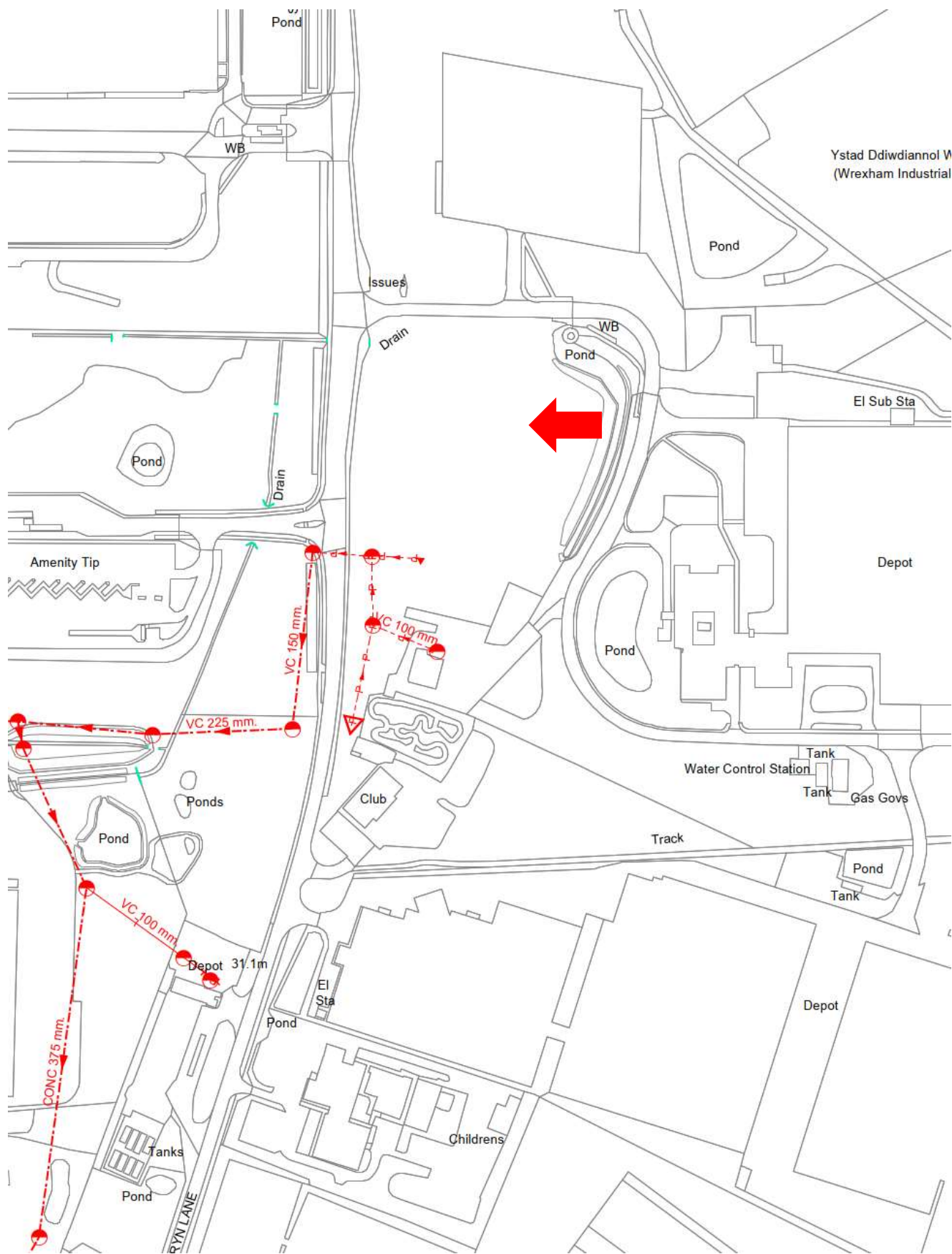
- 5.1** The development proposal is to therefore attenuate the flow of surface water generated from the site to a control flow of 2 l/s for storm events up to and including the 1 in 100 + 40% Climate change event whilst no flooding will occur to buildings on site or to buildings or land off site.
- 5.2** All below ground drainage will be designed to accommodate the 1 in 30 year event with no flooding occurring on site or surcharging within the system.
- 5.3** The use of shallow flooding or car park areas will be permitted for exceedances above the 1 in 30 year event so long as they can demonstrate that no flooding will occur of site.

6.0 Conclusion

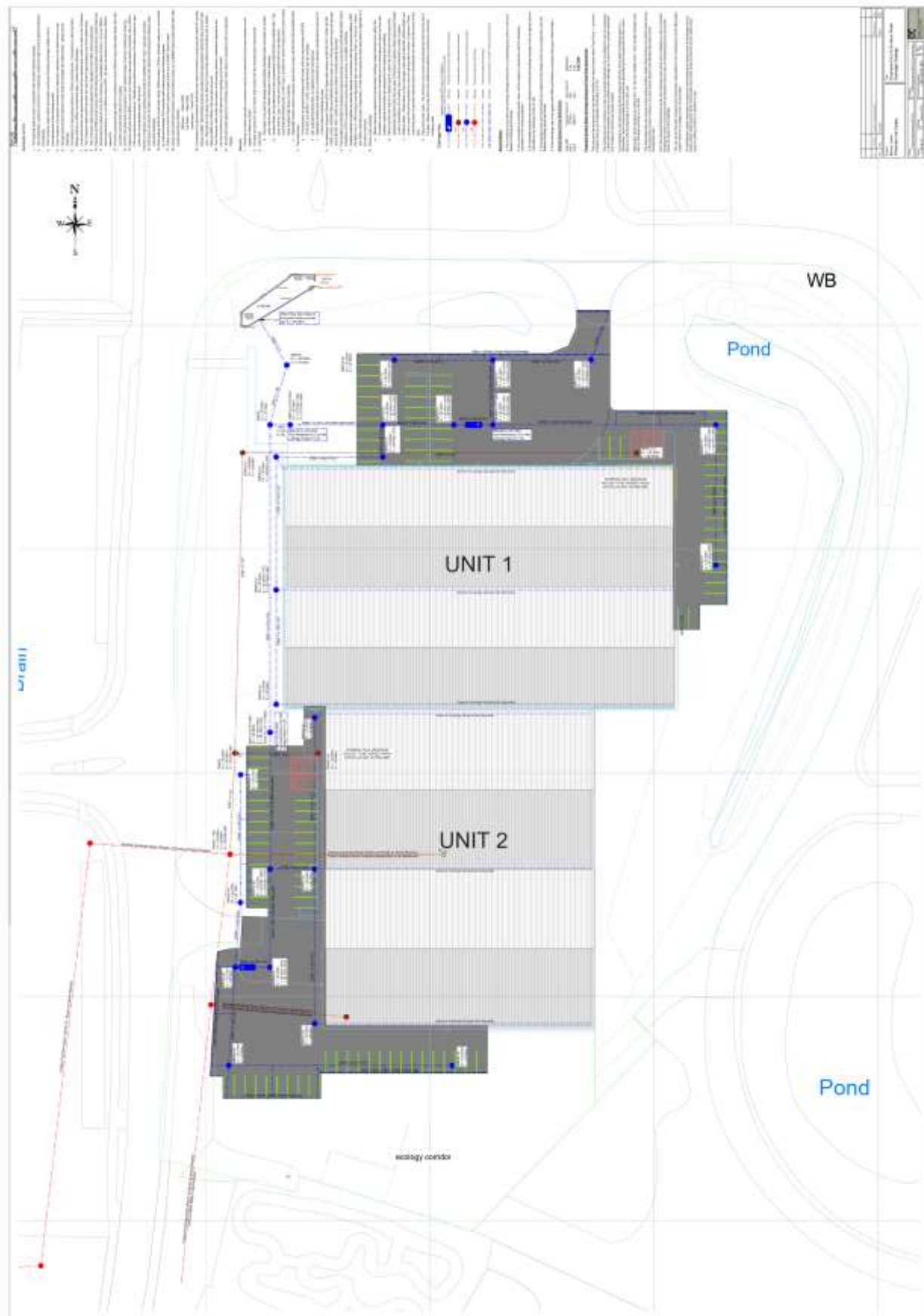
- 6.1** The site has available surface water drainage options available based on the current surface water courses to the perimeter of the site which will be utilised to discharge the surface water at a controlled rate as soakways are unlikely to be viable due to the ground conditions.
- 6.2** The development proposal looks to use either oversized pipes or stormwater attenuation tanks (tubosider helibore pipes) to generate the required storage volume whilst limiting the flow from each unit site to 2 l/s.
- 6.3** The maintenance strategy for the proposed attenuation tank system allows full access into the tank for periodic inspections and maintenance in the way of any silt removal should this be required.
- 6.4** Whilst infiltration tests have not been carried out on site the proposal is based on the information reviewed from site other local investigation data and knowledge of the surrounding area ground conditions encountered.



Appendix B – Sewer Records Extract



Appendix C – Proposed Site Drainage Layout



Appendix E – Surface Water Drainage Calculations

		Design Coordination Limited 200 Broomhead Road, Meck, Wrexham, Merseyside, CH47 0NF T: 07913 777001 E: designcoordinationltd@gmail.com	Job No. 1431-23
			Sheet no. 1
			Date 30/03/23
			By MDJ
Project Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design	Checked 	Reviewed 	
Title Surface Water Drainage Design - 1 in 30 + 0% Climate Change Allowance			

Using in-line restrictors
 Return period = 30 yrs
 Climate change factor = 0

PEAK hydrograph values printed
 Storm duration = 15 mins
 No offline storage

Mean rain intens. 63.00 mm/hr
 Storm profile = Summer
 Using FSR data

Peak rain intens. 246.96 mm/hr
 Sample period = 7.5 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY L/s	RATE FLOW L/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW L/s	FLOODED VOL m³	DRAINED AREA (m²) x FACTOR	STATUS
1	I	1.01 SMO01-U1	90.5	34.9	300	1200	29.30	29.42	30.50	0.39	0.12	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	104.8	375	1200	29.06	29.28	30.50	0.64	0.23	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	139.7	375	1200	28.85	29.08	30.50	0.62	0.22	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	139.7	600	1200	28.56	28.63	30.50	0.10	0.09	0.00	0.000	4694	OK
5	B	2.01 SMO05-U1	90.8	14.2	300	1200	29.15	29.22	30.35	0.16	0.07	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	21.2	450	1200	28.79	28.86	30.35	0.09	0.07	0.00	0.000	712	OK
7	S1	3.01 SMO10-U1	89.9	23.2	300	1200	28.92	29.01	30.15	0.26	0.09	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	22.4	300	1200	28.92	29.01	30.15	0.25	0.09	0.00	0.000	753	OK
9	S1	3.02 SMO09-U1	246.5	45.6	450	1200	28.62	28.73	30.15	0.18	0.11	0.00	0.000	1531	OK
10	B	2.03 SMO08-U1	5.0	5.0	300	1200	28.54	28.56	30.35	1.00	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	66.8	600	1200	28.09	28.21	30.35	0.14	0.12	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	211.4	600	1200	28.01	28.28	30.35	0.43	0.27	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Using in-line restrictors
 Return period = 30 yrs
 Climate change factor = 0

PEAK hydrograph values printed
 Storm duration = 15 mins
 No offline storage

Mean rain intens. 63.00 mm/hr
 Storm profile = Winter
 Using FSR data

Peak rain intens. 157.50 mm/hr
 Sample period = 7.5 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY L/s	RATE FLOW L/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW L/s	FLOODED VOL m³	DRAINED AREA (m²) x FACTOR	STATUS
1	I	1.01 SMO01-U1	90.5	22.3	300	1200	29.30	29.39	30.50	0.25	0.09	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	66.8	375	1200	29.06	29.22	30.50	0.41	0.16	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	89.1	375	1200	28.85	29.01	30.50	0.40	0.16	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	89.1	600	1200	28.56	28.62	30.50	0.06	0.07	0.00	0.000	4694	OK
5	B	2.01 SMO05-U1	90.8	9.1	300	1200	29.15	29.20	30.35	0.10	0.05	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	13.5	450	1200	28.79	28.84	30.35	0.06	0.05	0.00	0.000	712	OK
7	S1	3.01 SMO10-U1	89.9	14.8	300	1200	28.92	28.99	30.15	0.16	0.07	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	14.3	300	1200	28.92	28.99	30.15	0.16	0.07	0.00	0.000	753	OK
9	S1	3.02 SMO09-U1	246.5	29.1	450	1200	28.62	28.71	30.15	0.12	0.08	0.00	0.000	1531	OK
10	B	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	42.6	600	1200	28.09	28.18	30.35	0.09	0.09	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	136.7	600	1200	28.01	28.21	30.35	0.28	0.19	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Using in-line restrictors
 Return period = 30 yrs
 Climate change factor = 0

PEAK hydrograph values printed
 Storm duration = 30 mins
 No offline storage

Mean rain intens. 43.00 mm/hr
 Storm profile = Summer
 Using FSR data

Peak rain intens. 168.56 mm/hr
 Sample period = 15.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY L/s	RATE FLOW L/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW L/s	FLOODED VOL m³	DRAINED AREA (m²) x FACTOR	STATUS
1	I	1.01 SMO01-U1	90.5	23.6	300	1200	29.30	29.39	30.50	0.26	0.09	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	70.8	375	1200	29.06	29.22	30.50	0.43	0.17	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	94.4	375	1200	28.85	29.02	30.50	0.42	0.16	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	94.4	600	1200	28.56	28.63	30.50	0.07	0.07	0.00	0.000	4694	OK
5	B	2.01 SMO05-U1	90.8	9.6	300	1200	29.15	29.20	30.35	0.11	0.05	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	14.3	450	1200	28.79	28.84	30.35	0.06	0.05	0.00	0.000	712	OK
7	S1	3.01 SMO10-U1	89.9	15.6	300	1200	28.92	28.99	30.15	0.17	0.07	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	15.1	300	1200	28.92	28.99	30.15	0.17	0.07	0.00	0.000	753	OK
9	S1	3.02 SMO09-U1	246.5	30.8	450	1200	28.62	28.71	30.15	0.12	0.08	0.00	0.000	1531	OK
10	B	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	45.1	600	1200	28.09	28.18	30.35	0.09	0.09	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	144.5	600	1200	28.01	28.22	30.35	0.30	0.20	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

MasterDrain
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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 30 mins
No offline storageMean rain intens. 43.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 107.50 mm/hr
Sample period = 15.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMO01-U1	90.5	15.0	300	1200	29.30	29.37	30.50	0.17	0.07	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	45.2	375	1200	29.06	29.18	30.50	0.28	0.12	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	60.2	375	1200	28.85	28.97	30.50	0.27	0.12	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	60.2	600	1200	28.56	28.61	30.50	0.04	0.05	0.00	0.000	4694	OK
5	M	2.01 SMO06-U1	90.8	6.1	300	1200	29.15	29.19	30.35	0.07	0.04	0.00	0.000	479	OK
6	M	2.02 SMO07-U1	228.4	9.1	450	1200	28.79	28.83	30.35	0.04	0.04	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	10.0	300	1200	28.92	28.97	30.15	0.11	0.05	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	9.7	300	1200	28.92	28.97	30.15	0.11	0.05	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	19.6	450	1200	28.62	28.69	30.15	0.08	0.06	0.00	0.000	1531	OK
10	M	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	M	2.04 SMO05-U1	487.8	28.8	600	1200	28.09	28.16	30.35	0.06	0.07	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	94.0	600	1200	28.01	28.16	30.35	0.19	0.15	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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1Date
30/03/23By
MDJ

Checked

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 45 mins
No offline storageMean rain intens. 33.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 129.36 mm/hr
Sample period = 22.5 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMO01-U1	90.5	18.4	300	1200	29.30	29.38	30.50	0.20	0.08	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	55.2	375	1200	29.06	29.19	30.50	0.34	0.14	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	73.6	375	1200	28.85	28.99	30.50	0.33	0.14	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	73.6	600	1200	28.56	28.62	30.50	0.05	0.06	0.00	0.000	4694	OK
5	M	2.01 SMO06-U1	90.8	7.5	300	1200	29.15	29.19	30.35	0.08	0.04	0.00	0.000	479	OK
6	M	2.02 SMO07-U1	228.4	11.2	450	1200	28.79	28.83	30.35	0.05	0.04	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	12.2	300	1200	28.92	28.98	30.15	0.14	0.06	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	11.8	300	1200	28.92	28.98	30.15	0.13	0.06	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	24.0	450	1200	28.62	28.70	30.15	0.10	0.07	0.00	0.000	1531	OK
10	M	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	M	2.04 SMO05-U1	487.8	35.2	600	1200	28.09	28.17	30.35	0.07	0.08	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	113.8	600	1200	28.01	28.19	30.35	0.23	0.17	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 45 mins
No offline storageMean rain intens. 33.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 82.50 mm/hr
Sample period = 22.5 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMO01-U1	90.5	11.7	300	1200	29.30	29.36	30.50	0.13	0.06	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	35.2	375	1200	29.06	29.16	30.50	0.21	0.10	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	46.9	375	1200	28.85	28.95	30.50	0.21	0.10	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	46.9	600	1200	28.56	28.60	30.50	0.03	0.04	0.00	0.000	4694	OK
5	M	2.01 SMO06-U1	90.8	4.8	300	1200	29.15	29.18	30.35	0.05	0.03	0.00	0.000	479	OK
6	M	2.02 SMO07-U1	228.4	7.1	450	1200	28.79	28.82	30.35	0.03	0.03	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	7.8	300	1200	28.92	28.96	30.15	0.09	0.04	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	7.5	300	1200	28.92	28.96	30.15	0.08	0.04	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	15.3	450	1200	28.62	28.68	30.15	0.04	0.05	0.00	0.000	1531	OK
10	M	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	M	2.04 SMO05-U1	487.8	22.4	600	1200	28.09	28.15	30.35	0.05	0.06	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	74.4	600	1200	28.01	28.14	30.35	0.15	0.13	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

MasterDrain
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Reviewed

Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 60 mins
No offline storageMean rain intens. 28.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 103.76 mm/hr
Sample period = 30.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/lxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) : x FACTOR	STATUS
1	I	1.01 SMO01-U1	90.3	15.3	300	1200	29.30	29.37	30.50	0.17	0.07	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	45.9	375	1200	29.06	29.18	30.50	0.28	0.12	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	61.2	375	1200	28.85	28.98	30.50	0.27	0.12	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	61.2	600	1200	28.56	28.61	30.50	0.04	0.05	0.00	0.000	4694	OK
5	B	2.01 SMO04-U1	90.8	6.3	300	1200	29.15	29.19	30.35	0.07	0.04	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	9.3	450	1200	28.79	28.83	30.35	0.04	0.04	0.00	0.000	712	OK
7	S1	3.01 SMO10-U1	89.9	10.2	300	1200	28.92	28.97	30.15	0.11	0.05	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	9.8	300	1200	28.92	28.97	30.15	0.11	0.05	0.00	0.000	753	OK
9	S1	3.02 SMO09-U1	246.3	20.0	450	1200	28.62	28.69	30.15	0.08	0.06	0.00	0.000	1531	OK
10	B	2.03 SMO09-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	29.3	600	1200	28.09	28.16	30.35	0.06	0.07	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	95.5	600	1200	28.01	28.16	30.35	0.20	0.15	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

MasterDrain
SWDesign Coordination Limited
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30/03/23By
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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 60 mins
No offline storageMean rain intens. 28.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 70.00 mm/hr
Sample period = 30.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/lxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) : x FACTOR	STATUS
1	I	1.01 SMO01-U1	90.3	9.8	300	1200	29.30	29.35	30.50	0.11	0.05	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	29.3	375	1200	29.06	29.14	30.50	0.18	0.09	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	39.1	375	1200	28.85	28.94	30.50	0.17	0.09	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	39.1	600	1200	28.56	28.59	30.50	0.03	0.04	0.00	0.000	4694	OK
5	B	2.01 SMO04-U1	90.8	4.0	300	1200	29.15	29.18	30.35	0.04	0.03	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	5.9	450	1200	28.79	28.82	30.35	0.03	0.03	0.00	0.000	712	OK
7	S1	3.01 SMO10-U1	89.9	6.5	300	1200	28.92	28.96	30.15	0.07	0.04	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	6.3	300	1200	28.92	28.96	30.15	0.07	0.04	0.00	0.000	753	OK
9	S1	3.02 SMO09-U1	246.3	12.7	450	1200	28.62	28.67	30.15	0.05	0.05	0.00	0.000	1531	OK
10	B	2.03 SMO09-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	18.7	600	1200	28.09	28.14	30.35	0.04	0.05	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	62.7	600	1200	28.01	28.13	30.35	0.13	0.11	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 120 mins
No offline storageMean rain intens. 17.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 66.66 mm/hr
Sample period = 60.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/lxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) : x FACTOR	STATUS
1	I	1.01 SMO01-U1	90.3	9.7	300	1200	29.30	29.35	30.50	0.11	0.05	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	29.0	375	1200	29.06	29.14	30.50	0.18	0.09	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	38.6	375	1200	28.85	28.94	30.50	0.17	0.09	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	38.6	600	1200	28.56	28.59	30.50	0.03	0.04	0.00	0.000	4694	OK
5	B	2.01 SMO04-U1	90.8	3.9	300	1200	29.15	29.18	30.35	0.04	0.03	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	5.9	450	1200	28.79	28.82	30.35	0.03	0.03	0.00	0.000	712	OK
7	S1	3.01 SMO10-U1	89.9	6.4	300	1200	28.92	28.96	30.15	0.07	0.04	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	6.2	300	1200	28.92	28.96	30.15	0.07	0.04	0.00	0.000	753	OK
9	S1	3.02 SMO09-U1	246.3	12.6	450	1200	28.62	28.67	30.15	0.05	0.05	0.00	0.000	1531	OK
10	B	2.03 SMO09-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	18.5	600	1200	28.09	28.14	30.35	0.04	0.05	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	62.1	600	1200	28.01	28.13	30.35	0.13	0.11	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 120 mins
No offline storageMean rain intens. 17.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 42.50 mm/hr
Sample period = 60.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) : x FACTOR	STATUS
1	I	1.01 SMO01-U1	90.5	6.2	300	1200	29.30	29.34	30.50	0.07	0.04	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	18.5	375	1200	29.06	29.12	30.50	0.11	0.06	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	24.6	375	1200	28.85	28.92	30.50	0.11	0.06	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	24.6	600	1200	28.56	28.58	30.50	0.02	0.03	0.00	0.000	4694	OK
5	M	2.01 SMO06-U1	90.8	2.5	300	1200	29.15	29.17	30.35	0.03	0.02	0.00	0.000	479	OK
6	M	2.02 SMO07-U1	228.4	3.7	450	1200	28.79	28.81	30.35	0.02	0.02	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	4.1	300	1200	28.92	28.95	30.15	0.05	0.03	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	4.0	300	1200	28.92	28.95	30.15	0.04	0.03	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	8.0	450	1200	28.62	28.66	30.15	0.03	0.03	0.00	0.000	1531	OK
10	M	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	M	2.04 SMO05-U1	487.8	11.8	600	1200	28.09	28.13	30.35	0.02	0.04	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	41.4	600	1200	28.01	28.10	30.35	0.08	0.08	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 180 mins
No offline storageMean rain intens. 13.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 50.96 mm/hr
Sample period = 90.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) : x FACTOR	STATUS
1	I	1.01 SMO01-U1	90.5	7.3	300	1200	29.30	29.34	30.50	0.08	0.04	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	21.9	375	1200	29.06	29.13	30.50	0.13	0.07	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	29.2	375	1200	28.85	28.93	30.50	0.13	0.07	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	29.2	600	1200	28.56	28.59	30.50	0.02	0.03	0.00	0.000	4694	OK
5	M	2.01 SMO06-U1	90.8	3.0	300	1200	29.15	29.17	30.35	0.03	0.02	0.00	0.000	479	OK
6	M	2.02 SMO07-U1	228.4	4.4	450	1200	28.79	28.81	30.35	0.02	0.02	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	4.8	300	1200	28.92	28.95	30.15	0.05	0.03	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	4.7	300	1200	28.92	28.95	30.15	0.05	0.03	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	9.5	450	1200	28.62	28.66	30.15	0.04	0.04	0.00	0.000	1531	OK
10	M	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	M	2.04 SMO05-U1	487.8	13.9	600	1200	28.09	28.14	30.35	0.03	0.04	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	48.1	600	1200	28.01	28.11	30.35	0.10	0.09	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 180 mins
No offline storageMean rain intens. 13.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 32.50 mm/hr
Sample period = 90.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) : x FACTOR	STATUS
1	I	1.01 SMO01-U1	90.5	4.6	300	1200	29.30	29.33	30.50	0.05	0.03	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	14.0	375	1200	29.06	29.11	30.50	0.09	0.05	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	18.6	375	1200	28.85	28.91	30.50	0.08	0.05	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	18.6	600	1200	28.56	28.58	30.50	0.01	0.02	0.00	0.000	4694	OK
5	M	2.01 SMO06-U1	90.8	1.9	300	1200	29.15	29.17	30.35	0.02	0.02	0.00	0.000	479	OK
6	M	2.02 SMO07-U1	228.4	2.8	450	1200	28.79	28.81	30.35	0.01	0.02	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	3.1	300	1200	28.92	28.94	30.15	0.03	0.02	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	3.0	300	1200	28.92	28.94	30.15	0.03	0.02	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	6.1	450	1200	28.62	28.63	30.15	0.02	0.03	0.00	0.000	1531	OK
10	M	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	M	2.04 SMO05-U1	487.8	8.9	600	1200	28.09	28.13	30.35	0.02	0.03	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	32.5	600	1200	28.01	28.09	30.35	0.07	0.07	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design
Title
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 240 mins
No offline storageMean rain intens. 11.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 43.12 mm/hr
Sample period = 120.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) % FACTOR	STATUS
1	T	1.01 SMO01-U1	90.5	5.9	300	1200	29.30	29.34	30.50	0.07	0.04	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	17.8	375	1200	29.06	29.12	30.50	0.11	0.06	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	23.8	375	1200	28.85	28.92	30.50	0.11	0.06	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	23.8	600	1200	28.56	28.58	30.50	0.02	0.03	0.00	0.000	4694	OK
5	B	2.01 SMO04-U1	90.8	2.4	300	1200	29.15	29.17	30.35	0.03	0.02	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	3.6	450	1200	28.79	28.81	30.35	0.02	0.02	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	3.9	300	1200	28.92	28.95	30.15	0.04	0.03	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	3.8	300	1200	28.92	28.95	30.15	0.04	0.03	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	7.8	450	1200	28.62	28.66	30.15	0.03	0.03	0.00	0.000	1531	OK
10	B	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	11.4	600	1200	28.09	28.13	30.35	0.02	0.04	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	40.1	600	1200	28.01	28.10	30.35	0.08	0.08	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Project
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Title
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 240 mins
No offline storageMean rain intens. 11.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 27.50 mm/hr
Sample period = 120.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) % FACTOR	STATUS
1	T	1.01 SMO01-U1	90.5	3.8	300	1200	29.30	29.33	30.50	0.04	0.03	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	11.4	375	1200	29.06	29.10	30.50	0.07	0.05	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	15.2	375	1200	28.85	28.90	30.50	0.07	0.04	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	15.2	600	1200	28.56	28.58	30.50	0.01	0.02	0.00	0.000	4694	OK
5	B	2.01 SMO04-U1	90.8	1.5	300	1200	29.15	29.16	30.35	0.02	0.01	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	2.3	450	1200	28.79	28.80	30.35	0.01	0.01	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	2.5	300	1200	28.92	28.94	30.15	0.03	0.02	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	2.4	300	1200	28.92	28.94	30.15	0.03	0.02	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	4.9	450	1200	28.62	28.65	30.15	0.02	0.02	0.00	0.000	1531	OK
10	B	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	7.2	600	1200	28.09	28.12	30.35	0.01	0.03	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	27.4	600	1200	28.01	28.08	30.35	0.06	0.06	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design
Title
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 360 mins
No offline storageMean rain intens. 8.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 31.36 mm/hr
Sample period = 180.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) % FACTOR	STATUS
1	T	1.01 SMO01-U1	90.5	4.4	300	1200	29.30	29.33	30.50	0.05	0.03	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	13.3	375	1200	29.06	29.11	30.50	0.08	0.05	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	17.7	375	1200	28.85	28.91	30.50	0.08	0.05	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	17.7	600	1200	28.56	28.58	30.50	0.01	0.02	0.00	0.000	4694	OK
5	B	2.01 SMO04-U1	90.8	1.8	300	1200	29.15	29.17	30.35	0.02	0.02	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	2.7	450	1200	28.79	28.81	30.35	0.01	0.02	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	2.9	300	1200	28.92	28.94	30.15	0.03	0.02	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	2.8	300	1200	28.92	28.94	30.15	0.03	0.02	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	5.8	450	1200	28.62	28.63	30.15	0.02	0.03	0.00	0.000	1531	OK
10	B	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	8.5	600	1200	28.09	28.12	30.35	0.02	0.03	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	31.2	600	1200	28.01	28.09	30.35	0.06	0.07	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design
Title
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 340 mins
No offline storageMean rain intens. 8.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 20.00 mm/hr
Sample period = 180.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/lxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMO01-U1	90.5	2.8	300	1200	29.30	29.32	30.50	0.03	0.02	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	8.5	375	1200	29.06	29.09	30.50	0.05	0.04	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	11.3	375	1200	28.85	28.89	30.50	0.05	0.04	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	11.3	600	1200	28.56	28.57	30.50	0.01	0.02	0.00	0.000	4694	OK
5	B	2.01 SMO06-U1	90.8	1.2	300	1200	29.15	29.16	30.35	0.01	0.01	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	1.7	450	1200	28.79	28.80	30.35	0.01	0.01	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	1.9	300	1200	28.92	28.94	30.15	0.02	0.02	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	1.8	300	1200	28.92	28.94	30.15	0.02	0.02	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	3.7	450	1200	28.62	28.64	30.15	0.01	0.02	0.00	0.000	1531	OK
10	B	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	5.4	600	1200	28.09	28.12	30.35	0.01	0.02	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	21.7	600	1200	28.01	28.07	30.35	0.04	0.05	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design
Title
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 720 mins
No offline storageMean rain intens. 5.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 19.60 mm/hr
Sample period = 360.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/lxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMO01-U1	90.5	2.7	300	1200	29.30	29.32	30.50	0.03	0.02	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	8.0	375	1200	29.06	29.09	30.50	0.05	0.04	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	10.7	375	1200	28.85	28.89	30.50	0.05	0.04	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	10.7	600	1200	28.56	28.57	30.50	0.01	0.02	0.00	0.000	4694	OK
5	B	2.01 SMO06-U1	90.8	1.1	300	1200	29.15	29.16	30.35	0.01	0.01	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	1.6	450	1200	28.79	28.80	30.35	0.01	0.01	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	1.8	300	1200	28.92	28.94	30.15	0.02	0.02	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	1.7	300	1200	28.92	28.94	30.15	0.02	0.02	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	3.3	450	1200	28.62	28.64	30.15	0.01	0.02	0.00	0.000	1531	OK
10	B	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	5.1	600	1200	28.09	28.12	30.35	0.01	0.02	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	20.9	600	1200	28.01	28.07	30.35	0.04	0.05	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design
Title
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 720 mins
No offline storageMean rain intens. 5.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 12.50 mm/hr
Sample period = 360.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/lxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMO01-U1	90.5	1.7	300	1200	29.30	29.32	30.50	0.02	0.02	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	5.1	375	1200	29.06	29.08	30.50	0.03	0.03	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	6.8	375	1200	28.85	28.88	30.50	0.03	0.03	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	6.8	600	1200	28.56	28.57	30.50	0.00	0.01	0.00	0.000	4694	OK
5	B	2.01 SMO06-U1	90.8	0.7	300	1200	29.15	29.16	30.35	0.01	0.01	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	1.0	450	1200	28.79	28.80	30.35	0.00	0.01	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	1.1	300	1200	28.92	28.93	30.15	0.01	0.01	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	1.1	300	1200	28.92	28.93	30.15	0.01	0.01	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	2.2	450	1200	28.62	28.64	30.15	0.01	0.01	0.00	0.000	1531	OK
10	B	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	3.3	600	1200	28.09	28.11	30.35	0.01	0.02	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	10.1	600	1200	28.01	28.05	30.35	0.02	0.03	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK



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Job No. 1431-23
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Project Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design
Title Surface Water Drainage Design - 1 in 30 + 0% Climate Change Allowance

By MDJ
Checked
Reviewed

Using in-line restrictors
Return period = 30 yrs
Climate change factor = 0

PEAR hydrograph values printed
Storm duration = 1440 mins
No offline storage

Mean rain intensity: 3.00 mm/hr
Storm profile = Summer
Using FBR data

Peak rain intensity: 11.76 mm/hr
Sample period = 720.0 secs.

Entry No.	SECT. No.	MANHOLE REF.	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LAW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMH01-U1	90.5	1.6	300	1200	29.30	29.31	30.50	0.02	0.01	0.00	0.000	1173	OK
2	I	1.02 SMH02-U1	164.1	4.8	375	1200	29.06	29.08	30.50	0.03	0.03	0.00	0.000	3521	OK
3	I	1.03 SMH03-U1	225.1	6.5	375	1200	28.85	28.88	30.50	0.03	0.03	0.00	0.000	4694	OK
4	I	1.04 SMH04-U1	1439.3	4.5	400	1200	28.54	28.57	30.50	0.00	0.01	0.00	0.000	4694	OK
5	B	2.01 SMH06-U1	90.8	0.7	300	1200	29.13	29.14	30.35	0.01	0.01	0.00	0.000	479	OK
6	B	2.02 SMH07-U1	228.4	1.0	450	1200	28.79	28.80	30.35	0.00	0.01	0.00	0.000	712	OK
7	B1	3.01 SMH10-U1	89.9	1.1	300	1200	28.92	28.93	30.15	0.01	0.01	0.00	0.000	778	OK
8	B2	4.01 SMH11-U1	89.9	1.0	300	1200	28.92	28.93	30.15	0.01	0.01	0.00	0.000	753	OK
9	B1	3.02 SMH09-U1	246.5	2.1	450	1200	28.62	28.64	30.15	0.01	0.01	0.00	0.000	1531	OK
10	B	2.03 SMH08-U1	143.4	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMH05-U1	487.8	3.1	400	1200	28.09	28.11	30.35	0.01	0.01	0.00	0.000	2244	OK
12	I	1.05 SMH12-U1	489.1	9.5	600	1200	28.01	28.05	30.35	0.02	0.03	0.00	0.000	6938	OK
13	I	1.06 SMH13-U1	34.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK



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Job No. 1431-23
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Date 30/03/23

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Project Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design
Title Surface Water Drainage Design - 1 in 30 + 0% Climate Change Allowance

By MDJ
Checked
Reviewed

Using in-line restrictors
Return period = 30 yrs
Climate change factor = 0

PEAR hydrograph values printed
Storm duration = 1440 mins
No offline storage

Mean rain intensity: 3.00 mm/hr
Storm profile = Winter
Using FBR data

Peak rain intensity: 7.50 mm/hr
Sample period = 720.0 secs.

Entry No.	SECT. No.	MANHOLE REF.	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LAW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMH01-U1	90.5	1.0	300	1200	29.30	29.31	30.50	0.01	0.01	0.00	0.000	1173	OK
2	I	1.02 SMH02-U1	164.1	3.1	375	1200	29.06	29.07	30.50	0.02	0.02	0.00	0.000	3521	OK
3	I	1.03 SMH03-U1	225.1	4.1	375	1200	28.85	28.87	30.50	0.02	0.02	0.00	0.000	4694	OK
4	I	1.04 SMH04-U1	1439.3	4.1	400	1200	28.54	28.56	30.50	0.00	0.01	0.00	0.000	4694	OK
5	B	2.01 SMH06-U1	90.8	0.4	300	1200	29.13	29.14	30.35	0.00	0.01	0.00	0.000	479	OK
6	B	2.02 SMH07-U1	228.4	0.6	450	1200	28.79	28.80	30.35	0.00	0.01	0.00	0.000	712	OK
7	B1	3.01 SMH10-U1	89.9	0.7	300	1200	28.92	28.93	30.15	0.01	0.01	0.00	0.000	778	OK
8	B2	4.01 SMH11-U1	89.9	0.7	300	1200	28.92	28.93	30.15	0.01	0.01	0.00	0.000	753	OK
9	B1	3.02 SMH09-U1	246.5	1.3	450	1200	28.62	28.64	30.15	0.01	0.01	0.00	0.000	1531	OK
10	B	2.03 SMH08-U1	143.4	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMH05-U1	487.8	2.0	400	1200	28.09	28.11	30.35	0.00	0.01	0.00	0.000	2244	OK
12	I	1.05 SMH12-U1	489.1	6.1	600	1200	28.01	28.04	30.35	0.01	0.02	0.00	0.000	6938	OK
13	I	1.06 SMH13-U1	34.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK



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Job No. 1431-23
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Project Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design
Title Surface Water Drainage Design - 1 in 30 + 0% Climate Change Allowance

By MDJ
Checked
Reviewed

Notes

Printout headings:

- | | | |
|---|--|--|
| 1) Entry no - position in file | 2) Section no - pipe identifier | 3) Manhole ref - Manhole identifier |
| 4) Pipe cap - full bore capacity of that pipe | 5) Rate of flow - calculated flow rate (l/s) ± = flow restrictor | 6) Pipe diam - outlet pipe diameter (mm) |
| 7) Chamber diam - chamber diam. at base of MH | 8) Invert level - invert level of manhole | 9) Water level - calculated peak water level |
| 10) Grnd level - ground / cover level | 11) Surch. fract - calc flow/pipe capacity | 12) Surch. depth - surcharge level above sufft |
| 13) Overflow - surcharged flow rate (l/s) | 14) Flooded vol - volume of water above cover | 15) Upstrm Vol - upstream pipe vol to previous manhole(s) |
| 16) Status - OK - outlet not surcharged | 17) Status - Surcharged - outlet surcharged | 18) Status - Warning - water level within 299mm of cover level |
| 19) Status - Flooded - cover over-topped | 20) § against diameter indicates throttle pipe used. | |

Title box

Hydrograph data

- | | | |
|---|--------------------------------------|--|
| 1) Ret. period - that used to calculate profile | 2) Duration - length of storm (mins) | 3) Profile - either Winter (75%) or Summer (50%) |
|---|--------------------------------------|--|

Flow restrictors

- | | |
|------------------------------|-----------------------------|
| Manhole reference - SMH08-U1 | Restrictor flowrate - 5 l/s |
| Manhole reference - SMH13-U1 | Restrictor flowrate - 2 l/s |

Flood volumes

Check that the upstream storage of the manhole is adequate to take the flood volume - see Upstrm Vol above.

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 15 mins
No offline storageMean rain intens. 114.00 mm/hr
Storm profile = Summer
Using FBR dataPeak rain intens. 446.88 mm/hr
Sample period = 7.5 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²) : x FACTOR	STATUS
1	I	1.01 SMO01-U1	90.3	43.0	300	1200	29.30	29.50	30.50	0.70	0.20	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	189.1	375	1200	29.06	29.40	30.50	1.15	0.54	25.03	0.000	3521	Surch.
3	I	1.03 SMO03-U1	225.1	252.1	375	1200	28.85	29.41	30.50	1.12	0.55	26.96	0.000	4694	Surch.
4	I	1.04 SMO04-U1	1439.3	252.1	600	1200	28.56	28.63	30.50	0.18	0.14	0.00	0.000	4694	OK
5	B	2.01 SMO04-U1	90.8	25.7	300	1200	29.15	29.25	30.35	0.28	0.10	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	38.3	450	1200	28.79	28.89	30.35	0.17	0.10	0.00	0.000	712	OK
7	S1	3.01 SMO10-U1	89.9	41.8	300	1200	28.92	29.06	30.15	0.47	0.14	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	40.5	300	1200	28.92	29.06	30.15	0.45	0.14	0.00	0.000	753	OK
9	S1	3.02 SMO09-U1	246.5	82.2	450	1200	28.62	28.79	30.15	0.33	0.17	0.00	0.000	1531	OK
10	B	2.03 SMO09-U1	5.0	5.0	300	1200	28.54	28.56	30.35	1.00	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	120.5	600	1200	28.09	28.27	30.35	0.25	0.18	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	377.6	600	1200	28.01	28.45	30.35	0.77	0.43	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 40 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 15 mins
No offline storageMean rain intens. 114.00 mm/hr
Storm profile = Winter
Using FBR dataPeak rain intens. 285.00 mm/hr
Sample period = 7.5 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²) : x FACTOR	STATUS
1	I	1.01 SMO01-U1	90.3	40.2	300	1200	29.30	29.44	30.50	0.44	0.14	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	120.6	375	1200	29.06	29.31	30.50	0.74	0.26	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	160.8	375	1200	28.85	29.11	30.50	0.71	0.25	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	160.8	600	1200	28.56	28.66	30.50	0.11	0.10	0.00	0.000	4694	OK
5	B	2.01 SMO04-U1	90.8	16.4	300	1200	29.15	29.22	30.35	0.18	0.07	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	24.4	450	1200	28.79	28.86	30.35	0.11	0.07	0.00	0.000	712	OK
7	S1	3.01 SMO10-U1	89.9	26.6	300	1200	28.92	29.02	30.15	0.30	0.10	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	25.8	300	1200	28.92	29.02	30.15	0.29	0.10	0.00	0.000	753	OK
9	S1	3.02 SMO09-U1	246.5	52.5	450	1200	28.62	28.75	30.15	0.21	0.12	0.00	0.000	1531	OK
10	B	2.03 SMO09-U1	5.0	5.0	300	1200	28.54	28.56	30.35	1.00	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	76.9	600	1200	28.09	28.23	30.35	0.16	0.13	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	242.6	600	1200	28.01	28.31	30.35	0.50	0.30	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 30 mins
No offline storageMean rain intens. 78.00 mm/hr
Storm profile = Summer
Using FBR dataPeak rain intens. 305.76 mm/hr
Sample period = 15.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²) : x FACTOR	STATUS
1	I	1.01 SMO01-U1	90.3	43.0	300	1200	29.30	29.44	30.50	0.48	0.14	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	129.1	375	1200	29.06	29.33	30.50	0.79	0.28	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	172.2	375	1200	28.85	29.12	30.50	0.76	0.27	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	172.2	600	1200	28.56	28.66	30.50	0.12	0.11	0.00	0.000	4694	OK
5	B	2.01 SMO04-U1	90.8	17.6	300	1200	29.15	29.23	30.35	0.19	0.08	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	26.1	450	1200	28.79	28.87	30.35	0.11	0.08	0.00	0.000	712	OK
7	S1	3.01 SMO10-U1	89.9	28.5	300	1200	28.92	29.03	30.15	0.32	0.11	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	27.6	300	1200	28.92	29.02	30.15	0.31	0.10	0.00	0.000	753	OK
9	S1	3.02 SMO09-U1	246.5	54.2	450	1200	28.62	28.75	30.15	0.23	0.13	0.00	0.000	1531	OK
10	B	2.03 SMO09-U1	5.0	5.0	300	1200	28.54	28.56	30.35	1.00	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	82.3	600	1200	28.09	28.23	30.35	0.17	0.14	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	259.5	600	1200	28.01	28.33	30.35	0.53	0.32	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAR hydrograph values printed
Storm duration = 30 mins
No offline storageMean rain intens. 78.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 195.00 mm/hr
Sample period = 15.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMO01-U1	90.5	27.4	300	1200	29.30	29.40	30.50	0.30	0.10	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	82.4	375	1200	29.06	29.24	30.50	0.50	0.19	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	109.8	375	1200	28.85	29.04	30.50	0.49	0.18	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	109.8	600	1200	28.56	28.63	30.50	0.08	0.08	0.00	0.000	4694	OK
5	M	2.01 SMO06-U1	90.8	11.2	300	1200	29.15	29.20	30.35	0.12	0.05	0.00	0.000	479	OK
6	M	2.02 SMO07-U1	228.4	16.7	450	1200	28.79	28.85	30.35	0.07	0.06	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	18.2	300	1200	28.92	29.00	30.15	0.20	0.08	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	17.6	300	1200	28.92	29.00	30.15	0.20	0.08	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	35.8	450	1200	28.62	28.72	30.15	0.15	0.09	0.00	0.000	1531	OK
10	M	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	M	2.04 SMO05-U1	487.8	52.5	600	1200	28.09	28.19	30.35	0.11	0.10	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	167.3	600	1200	28.01	28.24	30.35	0.34	0.22	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAR hydrograph values printed
Storm duration = 45 mins
No offline storageMean rain intens. 61.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 239.12 mm/hr
Sample period = 22.5 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMO01-U1	90.5	33.7	300	1200	29.30	29.42	30.50	0.37	0.12	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	101.2	375	1200	29.06	29.28	30.50	0.42	0.22	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	134.9	375	1200	28.85	29.07	30.50	0.60	0.22	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	134.9	600	1200	28.56	28.63	30.50	0.09	0.09	0.00	0.000	4694	OK
5	M	2.01 SMO06-U1	90.8	13.8	300	1200	29.15	29.21	30.35	0.15	0.06	0.00	0.000	479	OK
6	M	2.02 SMO07-U1	228.4	20.5	450	1200	28.79	28.86	30.35	0.09	0.07	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	22.4	300	1200	28.92	29.01	30.15	0.25	0.09	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	21.6	300	1200	28.92	29.01	30.15	0.24	0.09	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	44.0	450	1200	28.62	28.73	30.15	0.18	0.11	0.00	0.000	1531	OK
10	M	2.03 SMO08-U1	5.0	5.0	300	1200	28.54	28.56	30.35	1.00	0.02	0.00	0.000	2244	OK
11	M	2.04 SMO05-U1	487.8	64.5	600	1200	28.09	28.21	30.35	0.13	0.12	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	204.3	600	1200	28.01	28.28	30.35	0.42	0.26	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAR hydrograph values printed
Storm duration = 45 mins
No offline storageMean rain intens. 61.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 152.50 mm/hr
Sample period = 22.5 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMO01-U1	90.5	21.5	300	1200	29.30	29.39	30.50	0.24	0.09	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	64.5	375	1200	29.06	29.21	30.50	0.39	0.16	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	86.0	375	1200	28.85	29.01	30.50	0.38	0.15	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	86.0	600	1200	28.56	28.62	30.50	0.06	0.07	0.00	0.000	4694	OK
5	M	2.01 SMO06-U1	90.8	8.8	300	1200	29.15	29.20	30.35	0.10	0.05	0.00	0.000	479	OK
6	M	2.02 SMO07-U1	228.4	13.1	450	1200	28.79	28.84	30.35	0.06	0.05	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	14.3	300	1200	28.92	28.99	30.15	0.16	0.07	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	13.8	300	1200	28.92	28.98	30.15	0.15	0.06	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	28.1	450	1200	28.62	28.70	30.15	0.11	0.08	0.00	0.000	1531	OK
10	M	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	M	2.04 SMO05-U1	487.8	41.1	600	1200	28.09	28.18	30.35	0.08	0.08	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	132.1	600	1200	28.01	28.21	30.35	0.27	0.19	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 40 mins
No offline storageMean rain intens. 51.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 199.92 mm/hr
Sample period = 30.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) : x FACTOR	STATUS
1	I	1.01 SMO01-U1	90.5	28.1	300	1200	29.30	29.40	30.50	0.31	0.10	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	84.4	375	1200	29.06	29.25	30.50	0.51	0.19	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	112.5	375	1200	28.85	29.04	30.50	0.50	0.19	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	112.5	600	1200	28.56	28.64	30.50	0.08	0.08	0.00	0.000	4694	OK
5	M	2.01 SMO06-U1	90.8	11.5	300	1200	29.15	29.21	30.35	0.13	0.06	0.00	0.000	479	OK
6	M	2.02 SMO07-U1	228.4	17.1	450	1200	28.79	28.85	30.35	0.07	0.06	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	18.7	300	1200	28.92	29.00	30.15	0.21	0.08	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	18.1	300	1200	28.92	29.00	30.15	0.20	0.08	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	36.7	450	1200	28.62	28.72	30.15	0.15	0.09	0.00	0.000	1531	OK
10	M	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	M	2.04 SMO05-U1	487.8	53.8	600	1200	28.09	28.20	30.35	0.11	0.10	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	171.3	600	1200	28.01	28.24	30.35	0.35	0.23	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 60 mins
No offline storageMean rain intens. 51.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 127.50 mm/hr
Sample period = 30.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) : x FACTOR	STATUS
1	I	1.01 SMO01-U1	90.5	17.9	300	1200	29.30	29.38	30.50	0.20	0.08	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	53.8	375	1200	29.06	29.19	30.50	0.33	0.14	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	71.8	375	1200	28.85	28.99	30.50	0.32	0.13	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	71.8	600	1200	28.56	28.61	30.50	0.05	0.06	0.00	0.000	4694	OK
5	M	2.01 SMO06-U1	90.8	7.3	300	1200	29.15	29.19	30.35	0.08	0.04	0.00	0.000	479	OK
6	M	2.02 SMO07-U1	228.4	10.9	450	1200	28.79	28.83	30.35	0.05	0.04	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	11.9	300	1200	28.92	28.98	30.15	0.13	0.06	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	11.5	300	1200	28.92	28.98	30.15	0.13	0.06	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	23.4	450	1200	28.62	28.69	30.15	0.09	0.07	0.00	0.000	1531	OK
10	M	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	M	2.04 SMO05-U1	487.8	34.3	600	1200	28.09	28.17	30.35	0.07	0.08	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	111.1	600	1200	28.01	28.18	30.35	0.23	0.17	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 120 mins
No offline storageMean rain intens. 32.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 125.44 mm/hr
Sample period = 60.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) : x FACTOR	STATUS
1	I	1.01 SMO01-U1	90.5	17.8	300	1200	29.30	29.38	30.50	0.20	0.08	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	53.3	375	1200	29.06	29.19	30.50	0.33	0.14	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	71.1	375	1200	28.85	28.99	30.50	0.32	0.13	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	71.1	600	1200	28.56	28.61	30.50	0.05	0.06	0.00	0.000	4694	OK
5	M	2.01 SMO06-U1	90.8	7.3	300	1200	29.15	29.19	30.35	0.08	0.04	0.00	0.000	479	OK
6	M	2.02 SMO07-U1	228.4	10.8	450	1200	28.79	28.83	30.35	0.05	0.04	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	11.8	300	1200	28.92	28.98	30.15	0.13	0.06	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	11.4	300	1200	28.92	28.98	30.15	0.13	0.06	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	23.2	450	1200	28.62	28.69	30.15	0.09	0.07	0.00	0.000	1531	OK
10	M	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	M	2.04 SMO05-U1	487.8	34.0	600	1200	28.09	28.17	30.35	0.07	0.07	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	110.1	600	1200	28.01	28.18	30.35	0.23	0.17	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 120 mins
No offline storageMean rain intens. 32.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 80.00 mm/hr
Sample period = 60.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY L/s	RATE FLOW L/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW L/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMO01-U1	90.5	11.3	300	1200	29.30	29.36	30.50	0.13	0.06	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	34.0	375	1200	29.06	29.15	30.50	0.21	0.10	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	45.4	375	1200	28.85	28.95	30.50	0.20	0.10	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	45.4	600	1200	28.56	28.60	30.50	0.03	0.04	0.00	0.000	4694	OK
5	B	2.01 SMO04-U1	90.8	4.6	300	1200	29.15	29.18	30.35	0.05	0.03	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	6.9	450	1200	28.79	28.82	30.35	0.03	0.03	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	7.5	300	1200	28.92	28.96	30.15	0.08	0.04	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	7.3	300	1200	28.92	28.96	30.15	0.08	0.04	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	14.8	450	1200	28.62	28.68	30.15	0.04	0.05	0.00	0.000	1531	OK
10	B	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	21.7	600	1200	28.09	28.15	30.35	0.04	0.05	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	72.0	600	1200	28.01	28.14	30.35	0.15	0.12	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 120 mins
No offline storageMean rain intens. 32.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 80.00 mm/hr
Sample period = 60.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY L/s	RATE FLOW L/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW L/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMO01-U1	90.5	11.3	300	1200	29.30	29.36	30.50	0.13	0.06	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	34.0	375	1200	29.06	29.15	30.50	0.21	0.10	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	45.4	375	1200	28.85	28.95	30.50	0.20	0.10	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	45.4	600	1200	28.56	28.60	30.50	0.03	0.04	0.00	0.000	4694	OK
5	B	2.01 SMO04-U1	90.8	4.6	300	1200	29.15	29.18	30.35	0.05	0.03	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	6.9	450	1200	28.79	28.82	30.35	0.03	0.03	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	7.5	300	1200	28.92	28.96	30.15	0.08	0.04	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	7.3	300	1200	28.92	28.96	30.15	0.08	0.04	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	14.8	450	1200	28.62	28.68	30.15	0.04	0.05	0.00	0.000	1531	OK
10	B	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	21.7	600	1200	28.09	28.15	30.35	0.04	0.05	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	72.0	600	1200	28.01	28.14	30.35	0.15	0.12	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 180 mins
No offline storageMean rain intens. 24.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 94.08 mm/hr
Sample period = 90.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY L/s	RATE FLOW L/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW L/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMO01-U1	90.5	13.4	300	1200	29.30	29.36	30.50	0.15	0.06	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	40.2	375	1200	29.06	29.17	30.50	0.24	0.11	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	53.6	375	1200	28.85	28.96	30.50	0.24	0.11	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	53.6	600	1200	28.56	28.60	30.50	0.04	0.05	0.00	0.000	4694	OK
5	B	2.01 SMO04-U1	90.8	5.5	300	1200	29.15	29.18	30.35	0.06	0.03	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	8.1	450	1200	28.79	28.83	30.35	0.04	0.04	0.00	0.000	712	OK
7	SI	3.01 SMO10-U1	89.9	8.9	300	1200	28.92	28.97	30.15	0.10	0.05	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	8.6	300	1200	28.92	28.97	30.15	0.10	0.05	0.00	0.000	753	OK
9	SI	3.02 SMO09-U1	246.5	17.5	450	1200	28.62	28.68	30.15	0.07	0.06	0.00	0.000	1531	OK
10	B	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	25.6	600	1200	28.09	28.16	30.35	0.05	0.06	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	84.2	600	1200	28.01	28.15	30.35	0.17	0.14	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 180 mins
No offline storageMean rain intens. 24.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 60.00 mm/hr
Sample period = 90.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY	RATE FLOW	PIPE SIZE	CHAMBER DIAM/LxW	INVERT LEVEL	WATER LEVEL	GRND LEVEL	SURCHARGE	EXCESS FLOW	FLOODED VOL	DRAINED AREA	STATUS
			l/s	l/s	mm	mm	m	m	m	Fract	Depth	l/s	m ²	1/N FACTOR
1	I	1.01 SMO01-U1	90.5	8.5	300	1200	29.30	29.35	30.50	0.09	0.05	0.00	0.000	1173 OK
2	I	1.02 SMO02-U1	164.1	25.6	375	1200	29.06	29.14	30.50	0.16	0.08	0.00	0.000	3521 OK
3	I	1.03 SMO03-U1	225.1	34.2	375	1200	28.85	28.93	30.50	0.15	0.08	0.00	0.000	4694 OK
4	I	1.04 SMO04-U1	1439.3	34.2	600	1200	28.56	28.59	30.50	0.02	0.04	0.00	0.000	4694 OK
5	M	2.01 SMO06-U1	90.8	3.5	300	1200	29.15	29.17	30.35	0.04	0.02	0.00	0.000	479 OK
6	M	2.02 SMO07-U1	228.4	5.2	450	1200	28.79	28.82	30.35	0.02	0.03	0.00	0.000	712 OK
7	RI	3.01 SMO10-U1	89.9	5.7	300	1200	28.92	28.95	30.15	0.06	0.03	0.00	0.000	778 OK
8	RI	4.01 SMO11-U1	89.9	5.5	300	1200	28.92	28.95	30.15	0.06	0.03	0.00	0.000	753 OK
9	SI	3.02 SMO09-U1	246.5	11.1	450	1200	28.62	28.67	30.15	0.05	0.04	0.00	0.000	1531 OK
10	M	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244 OK
11	M	2.04 SMO05-U1	487.8	16.3	400	1200	28.09	28.14	30.35	0.03	0.05	0.00	0.000	2244 OK
12	I	1.05 SMO12-U1	489.1	55.5	600	1200	28.01	28.12	30.35	0.11	0.10	0.00	0.000	6938 OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938 OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 240 mins
No offline storageMean rain intens. 20.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 78.40 mm/hr
Sample period = 120.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY	RATE FLOW	PIPE SIZE	CHAMBER DIAM/LxW	INVERT LEVEL	WATER LEVEL	GRND LEVEL	SURCHARGE	EXCESS FLOW	FLOODED VOL	DRAINED AREA	STATUS
			l/s	l/s	mm	mm	m	m	m	Fract	Depth	l/s	m ²	1/N FACTOR
1	I	1.01 SMO01-U1	90.5	10.9	300	1200	29.30	29.35	30.50	0.12	0.05	0.00	0.000	1173 OK
2	I	1.02 SMO02-U1	164.1	32.6	375	1200	29.06	29.15	30.50	0.20	0.10	0.00	0.000	3521 OK
3	I	1.03 SMO03-U1	225.1	43.5	375	1200	28.85	28.95	30.50	0.19	0.09	0.00	0.000	4694 OK
4	I	1.04 SMO04-U1	1439.3	43.5	600	1200	28.56	28.60	30.50	0.03	0.04	0.00	0.000	4694 OK
5	M	2.01 SMO06-U1	90.8	4.4	300	1200	29.15	29.18	30.35	0.05	0.03	0.00	0.000	479 OK
6	M	2.02 SMO07-U1	228.4	6.6	450	1200	28.79	28.82	30.35	0.03	0.03	0.00	0.000	712 OK
7	RI	3.01 SMO10-U1	89.9	7.2	300	1200	28.92	28.96	30.15	0.08	0.04	0.00	0.000	778 OK
8	RI	4.01 SMO11-U1	89.9	7.0	300	1200	28.92	28.96	30.15	0.08	0.04	0.00	0.000	753 OK
9	SI	3.02 SMO09-U1	246.5	14.2	450	1200	28.62	28.67	30.15	0.06	0.05	0.00	0.000	1531 OK
10	M	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244 OK
11	M	2.04 SMO05-U1	487.8	20.8	400	1200	28.09	28.15	30.35	0.04	0.05	0.00	0.000	2244 OK
12	I	1.05 SMO12-U1	489.1	69.3	600	1200	28.01	28.14	30.35	0.14	0.12	0.00	0.000	6938 OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938 OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 240 mins
No offline storageMean rain intens. 20.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 50.00 mm/hr
Sample period = 120.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY	RATE FLOW	PIPE SIZE	CHAMBER DIAM/LxW	INVERT LEVEL	WATER LEVEL	GRND LEVEL	SURCHARGE	EXCESS FLOW	FLOODED VOL	DRAINED AREA	STATUS
			l/s	l/s	mm	mm	m	m	m	Fract	Depth	l/s	m ²	1/N FACTOR
1	I	1.01 SMO01-U1	90.5	6.9	300	1200	29.30	29.34	30.50	0.08	0.04	0.00	0.000	1173 OK
2	I	1.02 SMO02-U1	164.1	20.8	375	1200	29.06	29.12	30.50	0.13	0.07	0.00	0.000	3521 OK
3	I	1.03 SMO03-U1	225.1	27.7	375	1200	28.85	28.92	30.50	0.12	0.07	0.00	0.000	4694 OK
4	I	1.04 SMO04-U1	1439.3	27.7	600	1200	28.56	28.59	30.50	0.02	0.03	0.00	0.000	4694 OK
5	M	2.01 SMO06-U1	90.8	2.8	300	1200	29.15	29.17	30.35	0.03	0.02	0.00	0.000	479 OK
6	M	2.02 SMO07-U1	228.4	4.2	450	1200	28.79	28.81	30.35	0.02	0.02	0.00	0.000	712 OK
7	RI	3.01 SMO10-U1	89.9	4.6	300	1200	28.92	28.95	30.15	0.05	0.03	0.00	0.000	778 OK
8	RI	4.01 SMO11-U1	89.9	4.5	300	1200	28.92	28.95	30.15	0.05	0.03	0.00	0.000	753 OK
9	SI	3.02 SMO09-U1	246.5	9.0	450	1200	28.62	28.66	30.15	0.04	0.04	0.00	0.000	1531 OK
10	M	2.03 SMO08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244 OK
11	M	2.04 SMO05-U1	487.8	13.3	400	1200	28.09	28.13	30.35	0.03	0.04	0.00	0.000	2244 OK
12	I	1.05 SMO12-U1	489.1	46.0	600	1200	28.01	28.11	30.35	0.09	0.09	0.00	0.000	6938 OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938 OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 360 mins
No offline storageMean rain intens. 15.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 58.80 mm/hr
Sample period = 180.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/lxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²) :x FACTOR	STATUS
1	T	1.01 SMO01-U1	90.5	8.0	300	1200	29.30	29.34	30.50	0.09	0.04	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	24.2	375	1200	29.06	29.13	30.50	0.15	0.08	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	32.2	375	1200	28.85	28.93	30.50	0.14	0.08	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	32.2	600	1200	28.56	28.59	30.50	0.02	0.03	0.00	0.000	4694	OK
5	B	2.01 SMO04-U1	90.8	3.3	300	1200	29.15	29.17	30.35	0.04	0.02	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	4.9	450	1200	28.79	28.82	30.35	0.02	0.03	0.00	0.000	712	OK
7	S1	3.01 SMO10-U1	89.9	5.3	300	1200	28.92	28.95	30.15	0.06	0.03	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	5.2	300	1200	28.92	28.95	30.15	0.06	0.03	0.00	0.000	753	OK
9	S1	3.02 SMO09-U1	246.5	10.5	450	1200	28.62	28.66	30.15	0.04	0.04	0.00	0.000	1531	OK
10	B	2.03 SMO09-U1	143.6	5.0	300	1200	28.94	28.96	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	15.4	600	1200	28.09	28.14	30.35	0.03	0.04	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	52.6	600	1200	28.01	28.11	30.35	0.11	0.10	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 720 mins
No offline storageMean rain intens. 15.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 37.50 mm/hr
Sample period = 180.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/lxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²) :x FACTOR	STATUS
1	T	1.01 SMO01-U1	90.5	5.1	300	1200	29.30	29.33	30.50	0.06	0.03	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	15.4	375	1200	29.06	29.11	30.50	0.09	0.06	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	20.5	375	1200	28.85	28.91	30.50	0.09	0.06	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	20.5	600	1200	28.56	28.58	30.50	0.01	0.03	0.00	0.000	4694	OK
5	B	2.01 SMO04-U1	90.8	2.1	300	1200	29.15	29.17	30.35	0.02	0.02	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	3.1	450	1200	28.79	28.81	30.35	0.01	0.02	0.00	0.000	712	OK
7	S1	3.01 SMO10-U1	89.9	3.4	300	1200	28.92	28.94	30.15	0.04	0.02	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	3.3	300	1200	28.92	28.94	30.15	0.04	0.02	0.00	0.000	753	OK
9	S1	3.02 SMO09-U1	246.5	6.7	450	1200	28.62	28.65	30.15	0.03	0.03	0.00	0.000	1531	OK
10	B	2.03 SMO09-U1	143.6	5.0	300	1200	28.94	28.96	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	9.8	600	1200	28.09	28.13	30.35	0.02	0.03	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	35.4	600	1200	28.01	28.09	30.35	0.07	0.08	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK

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Project
Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 720 mins
No offline storageMean rain intens. 9.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 35.28 mm/hr
Sample period = 360.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/lxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²) :x FACTOR	STATUS
1	T	1.01 SMO01-U1	90.5	4.8	300	1200	29.30	29.33	30.50	0.05	0.03	0.00	0.000	1173	OK
2	I	1.02 SMO02-U1	164.1	14.4	375	1200	29.06	29.11	30.50	0.09	0.05	0.00	0.000	3521	OK
3	I	1.03 SMO03-U1	225.1	19.2	375	1200	28.85	28.91	30.50	0.09	0.05	0.00	0.000	4694	OK
4	I	1.04 SMO04-U1	1439.3	19.2	600	1200	28.56	28.58	30.50	0.01	0.02	0.00	0.000	4694	OK
5	B	2.01 SMO04-U1	90.8	2.0	300	1200	29.15	29.17	30.35	0.02	0.02	0.00	0.000	479	OK
6	B	2.02 SMO07-U1	228.4	2.9	450	1200	28.79	28.81	30.35	0.01	0.02	0.00	0.000	712	OK
7	S1	3.01 SMO10-U1	89.9	3.2	300	1200	28.92	28.94	30.15	0.04	0.02	0.00	0.000	778	OK
8	S2	4.01 SMO11-U1	89.9	3.1	300	1200	28.92	28.94	30.15	0.03	0.02	0.00	0.000	753	OK
9	S1	3.02 SMO09-U1	246.5	6.3	450	1200	28.62	28.65	30.15	0.03	0.03	0.00	0.000	1531	OK
10	B	2.03 SMO09-U1	143.6	5.0	300	1200	28.94	28.96	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMO05-U1	487.8	9.2	600	1200	28.09	28.13	30.35	0.02	0.03	0.00	0.000	2244	OK
12	I	1.05 SMO12-U1	489.1	33.4	600	1200	28.01	28.09	30.35	0.07	0.07	0.00	0.000	6938	OK
13	I	1.06 SMO13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK



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Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design

Surface Water Drainage Design - 1 in 100 + 40% Climate Change Allowance

Using in-line restrictors
Return period = 100 yrs
Climate change factor = 40

PEAK hydrograph values printed
Storm duration = 1440 mins
No offline storage

Mean rain intens. 5.00 mm/hr
Storm profile = Summer
Using FSR data

Peak rain intens. 19.60 mm/hr
Sample period = 720.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMH01-U1	90.5	2.9	300	1200	29.30	29.32	30.50	0.03	0.02	0.00	0.000	1173	OK
2	I	1.02 SMH02-U1	164.1	8.6	375	1200	29.06	29.09	30.50	0.05	0.04	0.00	0.000	3521	OK
3	I	1.03 SMH03-U1	225.1	11.4	375	1200	28.85	28.89	30.50	0.05	0.04	0.00	0.000	4694	OK
4	I	1.04 SMH04-U1	1439.3	11.4	600	1200	28.56	28.57	30.50	0.01	0.02	0.00	0.000	4694	OK
5	B	2.01 SMH06-U1	90.8	1.2	300	1200	29.15	29.16	30.35	0.01	0.01	0.00	0.000	479	OK
6	B	2.02 SMH07-U1	228.4	1.7	450	1200	28.79	28.80	30.35	0.01	0.01	0.00	0.000	712	OK
7	B1	3.01 SMH10-U1	89.9	1.9	300	1200	28.92	28.94	30.15	0.02	0.02	0.00	0.000	778	OK
8	B2	4.01 SMH11-U1	89.9	1.8	300	1200	28.92	28.94	30.15	0.02	0.02	0.00	0.000	753	OK
9	B1	3.02 SMH09-U1	246.5	3.7	450	1200	28.62	28.63	30.15	0.02	0.02	0.00	0.000	1531	OK
10	B	2.03 SMH08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMH05-U1	487.8	5.5	600	1200	28.09	28.12	30.35	0.01	0.02	0.00	0.000	2244	OK
12	I	1.05 SMH12-U1	489.1	21.9	600	1200	28.01	28.07	30.35	0.04	0.05	0.00	0.000	6938	OK
13	I	1.06 SMH13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK



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Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design

Surface Water Drainage Design - 1 in 100 + 40% Climate Change Allowance

Using in-line restrictors
Return period = 100 yrs
Climate change factor = 40

PEAK hydrograph values printed
Storm duration = 1440 mins
No offline storage

Mean rain intens. 5.00 mm/hr
Storm profile = Winter
Using FSR data

Peak rain intens. 12.50 mm/hr
Sample period = 720.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMH01-U1	90.5	1.8	300	1200	29.30	29.32	30.50	0.02	0.02	0.00	0.000	1173	OK
2	I	1.02 SMH02-U1	164.1	5.5	375	1200	29.06	29.08	30.50	0.03	0.03	0.00	0.000	3521	OK
3	I	1.03 SMH03-U1	225.1	7.3	375	1200	28.85	28.88	30.50	0.03	0.03	0.00	0.000	4694	OK
4	I	1.04 SMH04-U1	1439.3	7.3	600	1200	28.56	28.57	30.50	0.01	0.01	0.00	0.000	4694	OK
5	B	2.01 SMH06-U1	90.8	0.7	300	1200	29.15	29.16	30.35	0.01	0.01	0.00	0.000	479	OK
6	B	2.02 SMH07-U1	228.4	1.1	450	1200	28.79	28.80	30.35	0.00	0.01	0.00	0.000	712	OK
7	B1	3.01 SMH10-U1	89.9	1.2	300	1200	28.92	28.93	30.15	0.01	0.01	0.00	0.000	778	OK
8	B2	4.01 SMH11-U1	89.9	1.2	300	1200	28.92	28.93	30.15	0.01	0.01	0.00	0.000	753	OK
9	B1	3.02 SMH09-U1	246.5	2.4	450	1200	28.62	28.64	30.15	0.01	0.01	0.00	0.000	1531	OK
10	B	2.03 SMH08-U1	143.6	5.0	300	1200	28.54	28.56	30.35	0.03	0.02	0.00	0.000	2244	OK
11	B	2.04 SMH05-U1	487.8	3.5	600	1200	28.09	28.11	30.35	0.01	0.02	0.00	0.000	2244	OK
12	I	1.05 SMH12-U1	489.1	10.8	600	1200	28.01	28.05	30.35	0.02	0.03	0.00	0.000	6938	OK
13	I	1.06 SMH13-U1	36.4	2.0	150	1500	27.91	27.93	30.35	0.05	0.02	0.00	0.000	6938	OK



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Unit 1 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design

Surface Water Drainage Design - 1 in 100 + 40% Climate Change Allowance

Notes

Printout headings:

- | | | |
|---|--|--|
| 1) Entry no - position in file | 2) Section no - pipe identifier | 3) Manhole ref - Manhole identifier |
| 4) Pipe cap - full bore capacity of that pipe | 5) Rate of flow - calculated flow rate (l/s) § = flow restrictor | 6) Pipe diam - outlet pipe diameter (mm) |
| 7) Chamber diam - chamber diam. at base of MH | 8) Invert level - invert level of manhole | 9) Water level - calculated peak water level |
| 10) Grnd level - ground / cover level | 11) Surch. fract - calc. flow/pipe capacity | 12) Surch. depth - surcharge level above sufft |
| 13) Overflow - surcharged flow rate (l/s) | 14) Flooded vol - volume of water above cover | 15) Upstrm Vol - upstream pipe vol to previous manhole(s) |
| 16) Status - OK - outlet not surcharged | 17) Status - Surcharged - outlet surcharged | 18) Status - Warning - water level within 299mm of cover level |
| 19) Status - Flooded - cover over-topped | 20) § against diameter indicates throttle pipe used. | |

Title box

Hydrograph data

- | | | |
|---|--------------------------------------|--|
| 1) Ret. period - that used to calculate profile | 2) Duration - length of storm (mins) | 3) Profile - either Winter (75%) or Summer (50%) |
|---|--------------------------------------|--|

Flow restrictors

- | | |
|------------------------------|-----------------------------|
| Manhole reference - SMH08-U1 | Restrictor flowrate - 5 l/s |
| Manhole reference - SMH13-U1 | Restrictor flowrate - 2 l/s |

Flood volumes

Check that the upstream storage of the manhole is adequate to take the flood volume - see Upstrm Vol above.

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 15 mins
No offline storageMean rain intens. 63.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 246.96 mm/hr
Sample period = 7.5 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) : x FACTOR	STATUS
1	I	1.01 SMO04-U2	42.4	18.4	225	1050	29.40	29.50	30.27	0.43	0.10	0.00	0.000	618	OK
2	I	1.02 SMO05-U2	89.9	39.5	300	1200	29.07	29.20	30.27	0.44	0.14	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	20.9	225	1050	29.42	29.52	30.27	0.40	0.10	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	20.9	225	1200	29.14	29.23	30.27	0.40	0.10	0.00	0.000	703	OK
5	I	1.03 SMO06-U2	169.8	60.4	300	1200	28.92	29.04	30.27	0.36	0.12	0.00	0.000	2031	OK
6	I	1.04 SMO09-U2	485.3	60.4	600	1200	28.44	28.55	30.33	0.12	0.11	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	33.3	300	1200	28.99	29.10	30.50	0.37	0.12	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	33.3	300	1200	28.99	29.10	30.50	0.36	0.12	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	133.2	375	1200	28.75	28.97	30.50	0.60	0.22	0.00	0.000	4476	OK
10	I	1.05 SMO10-U2	480.5	193.6	600	1500	28.33	28.59	30.33	0.40	0.26	0.00	0.000	6508	OK
11	I	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	I	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 15 mins
No offline storageMean rain intens. 63.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 157.50 mm/hr
Sample period = 7.5 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) : x FACTOR	STATUS
1	I	1.01 SMO04-U2	42.4	11.7	225	1050	29.40	29.47	30.27	0.28	0.07	0.00	0.000	618	OK
2	I	1.02 SMO05-U2	89.9	25.2	300	1200	29.07	29.16	30.27	0.28	0.10	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	13.3	225	1050	29.42	29.49	30.27	0.26	0.07	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	13.3	225	1200	29.14	29.20	30.27	0.26	0.07	0.00	0.000	703	OK
5	I	1.03 SMO06-U2	169.8	38.5	300	1200	28.92	29.00	30.27	0.23	0.08	0.00	0.000	2031	OK
6	I	1.04 SMO09-U2	485.3	38.5	600	1200	28.44	28.52	30.33	0.08	0.08	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	21.2	300	1200	28.99	29.07	30.50	0.23	0.09	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	21.2	300	1200	28.99	29.07	30.50	0.23	0.09	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	84.9	375	1200	28.75	28.91	30.50	0.38	0.15	0.00	0.000	4476	OK
10	I	1.05 SMO10-U2	480.5	123.5	600	1500	28.33	28.51	30.33	0.26	0.18	0.00	0.000	6508	OK
11	I	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	I	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 30 mins
No offline storageMean rain intens. 43.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 168.56 mm/hr
Sample period = 15.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) : x FACTOR	STATUS
1	I	1.01 SMO04-U2	42.4	12.4	225	1050	29.40	29.48	30.27	0.29	0.08	0.00	0.000	618	OK
2	I	1.02 SMO05-U2	89.9	26.7	300	1200	29.07	29.17	30.27	0.30	0.10	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	14.1	225	1050	29.42	29.49	30.27	0.27	0.07	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	14.1	225	1200	29.14	29.21	30.27	0.27	0.07	0.00	0.000	703	OK
5	I	1.03 SMO06-U2	169.8	40.8	300	1200	28.92	29.01	30.27	0.24	0.09	0.00	0.000	2031	OK
6	I	1.04 SMO09-U2	485.3	40.8	600	1200	28.44	28.52	30.33	0.08	0.08	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	22.5	300	1200	28.99	29.08	30.50	0.25	0.09	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	22.5	300	1200	28.99	29.07	30.50	0.25	0.09	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	90.0	375	1200	28.75	28.91	30.50	0.40	0.16	0.00	0.000	4476	OK
10	I	1.05 SMO10-U2	480.5	130.9	600	1500	28.33	28.52	30.33	0.27	0.19	0.00	0.000	6508	OK
11	I	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	I	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design
Title
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 30 mins
No offline storageMean rain intens. 43.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 107.50 mm/hr
Sample period = 15.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY L/s	RATE FLOW L/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW L/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	T	1.01 SMO04-U2	42.4	7.9	225	1050	29.40	29.45	30.27	0.19	0.05	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	17.0	300	1200	29.07	29.14	30.27	0.19	0.07	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	9.0	225	1050	29.42	29.47	30.27	0.17	0.05	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	9.0	225	1200	29.14	29.19	30.27	0.17	0.05	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	26.0	300	1200	28.92	28.98	30.27	0.15	0.06	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	26.0	600	1200	28.44	28.50	30.33	0.05	0.06	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	14.4	300	1200	28.99	29.05	30.50	0.16	0.07	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	14.4	300	1200	28.99	29.05	30.50	0.16	0.07	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	57.4	375	1200	28.75	28.87	30.50	0.26	0.11	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	83.5	600	1500	28.33	28.47	30.33	0.17	0.14	0.00	0.000	6508	OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	T	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design
Title
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 45 mins
No offline storageMean rain intens. 33.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 129.36 mm/hr
Sample period = 22.5 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY L/s	RATE FLOW L/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW L/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	T	1.01 SMO04-U2	42.4	9.7	225	1050	29.40	29.46	30.27	0.23	0.06	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	20.8	300	1200	29.07	29.15	30.27	0.23	0.09	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	11.0	225	1050	29.42	29.48	30.27	0.21	0.06	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	11.0	225	1200	29.14	29.19	30.27	0.21	0.06	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	31.8	300	1200	28.92	28.99	30.27	0.19	0.07	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	31.8	600	1200	28.44	28.51	30.33	0.07	0.07	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	17.5	300	1200	28.99	29.06	30.50	0.19	0.08	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	17.5	300	1200	28.99	29.06	30.50	0.19	0.08	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	70.2	375	1200	28.75	28.89	30.50	0.31	0.13	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	102.0	600	1500	28.33	28.49	30.33	0.21	0.16	0.00	0.000	6508	OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	T	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design
Title
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 45 mins
No offline storageMean rain intens. 33.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 82.50 mm/hr
Sample period = 22.5 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY L/s	RATE FLOW L/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW L/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	T	1.01 SMO04-U2	42.4	6.2	225	1050	29.40	29.45	30.27	0.15	0.05	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	13.3	300	1200	29.07	29.13	30.27	0.15	0.06	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	7.0	225	1050	29.42	29.46	30.27	0.14	0.04	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	7.0	225	1200	29.14	29.18	30.27	0.14	0.04	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	20.3	300	1200	28.92	28.97	30.27	0.12	0.05	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	20.3	600	1200	28.44	28.49	30.33	0.04	0.05	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	11.2	300	1200	28.99	29.04	30.50	0.12	0.05	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	11.2	300	1200	28.99	29.04	30.50	0.12	0.05	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	44.8	375	1200	28.75	28.85	30.50	0.20	0.10	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	45.1	600	1500	28.33	28.45	30.33	0.14	0.12	0.00	0.000	6508	OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	T	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 60 mins
No offline storageMean rain intens. 28.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 109.76 mm/hr
Sample period = 30.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) : FACTOR	STATUS
1	T	1.01 SMO04-U2	42.4	8.1	225	1050	29.40	29.46	30.27	0.19	0.06	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	17.3	300	1200	29.07	29.14	30.27	0.19	0.08	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	9.2	225	1050	29.42	29.47	30.27	0.18	0.05	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	9.2	225	1200	29.14	29.19	30.27	0.18	0.05	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	26.5	300	1200	28.92	28.99	30.27	0.16	0.07	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	26.5	600	1200	28.44	28.50	30.33	0.05	0.06	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	14.6	300	1200	28.99	29.05	30.50	0.16	0.07	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	14.6	300	1200	28.99	29.05	30.50	0.16	0.07	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	58.4	375	1200	28.75	28.87	30.50	0.26	0.12	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	84.9	600	1500	28.33	28.47	30.33	0.18	0.14	0.00	0.000	6508	OK
11	I	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	I	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 60 mins
No offline storageMean rain intens. 28.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 70.00 mm/hr
Sample period = 30.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) : FACTOR	STATUS
1	T	1.01 SMO04-U2	42.4	5.1	225	1050	29.40	29.44	30.27	0.12	0.04	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	11.1	300	1200	29.07	29.12	30.27	0.12	0.05	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	5.9	225	1050	29.42	29.46	30.27	0.11	0.04	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	5.9	225	1200	29.14	29.17	30.27	0.11	0.04	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	16.9	300	1200	28.92	28.97	30.27	0.10	0.05	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	16.9	600	1200	28.44	28.49	30.33	0.03	0.05	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	9.3	300	1200	28.99	29.03	30.50	0.10	0.05	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	9.3	300	1200	28.99	29.03	30.50	0.10	0.05	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	37.3	375	1200	28.75	28.84	30.50	0.17	0.08	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	54.2	600	1500	28.33	28.43	30.33	0.11	0.10	0.00	0.000	6508	OK
11	I	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	I	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 120 mins
No offline storageMean rain intens. 17.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 66.66 mm/hr
Sample period = 60.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) : FACTOR	STATUS
1	T	1.01 SMO04-U2	42.4	5.1	225	1050	29.40	29.44	30.27	0.12	0.04	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	10.9	300	1200	29.07	29.12	30.27	0.12	0.05	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	5.8	225	1050	29.42	29.46	30.27	0.11	0.04	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	5.8	225	1200	29.14	29.17	30.27	0.11	0.04	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	16.7	300	1200	28.92	28.97	30.27	0.10	0.05	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	16.7	600	1200	28.44	28.49	30.33	0.03	0.05	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	9.2	300	1200	28.99	29.03	30.50	0.10	0.05	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	9.2	300	1200	28.99	29.03	30.50	0.10	0.05	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	36.8	375	1200	28.75	28.84	30.50	0.16	0.08	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	53.5	600	1500	28.33	28.47	30.33	0.11	0.10	0.00	0.000	6508	OK
11	I	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	I	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 120 mins
No offline storageMean rain intens. 17.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 42.50 mm/hr
Sample period = 60.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMO04-U2	42.4	3.2	225	1050	29.40	29.43	30.27	0.08	0.03	0.00	0.000	618	OK
2	I	1.02 SMO05-U2	89.9	7.0	300	1200	29.07	29.11	30.27	0.08	0.04	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	3.7	225	1050	29.42	29.45	30.27	0.07	0.03	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	3.7	225	1200	29.14	29.16	30.27	0.07	0.03	0.00	0.000	703	OK
5	I	1.03 SMO06-U2	169.8	10.7	300	1200	28.92	28.95	30.27	0.06	0.03	0.00	0.000	2031	OK
6	I	1.04 SMO09-U2	485.3	10.7	600	1200	28.44	28.47	30.33	0.02	0.03	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	5.9	300	1200	28.99	29.02	30.50	0.06	0.04	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	5.9	300	1200	28.99	29.02	30.50	0.06	0.04	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	23.5	375	1200	28.75	28.82	30.50	0.11	0.06	0.00	0.000	4476	OK
10	I	1.05 SMO10-U2	480.5	34.2	600	1500	28.33	28.41	30.33	0.07	0.08	0.00	0.000	6508	OK
11	I	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	I	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 180 mins
No offline storageMean rain intens. 13.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 50.96 mm/hr
Sample period = 90.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMO04-U2	42.4	3.8	225	1050	29.40	29.43	30.27	0.09	0.03	0.00	0.000	618	OK
2	I	1.02 SMO05-U2	89.9	8.3	300	1200	29.07	29.11	30.27	0.09	0.04	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	4.4	225	1050	29.42	29.45	30.27	0.08	0.03	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	4.4	225	1200	29.14	29.17	30.27	0.08	0.03	0.00	0.000	703	OK
5	I	1.03 SMO06-U2	169.8	12.6	300	1200	28.92	28.96	30.27	0.07	0.04	0.00	0.000	2031	OK
6	I	1.04 SMO09-U2	485.3	12.6	600	1200	28.44	28.48	30.33	0.03	0.04	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	7.0	300	1200	28.99	29.02	30.50	0.08	0.04	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	7.0	300	1200	28.99	29.02	30.50	0.08	0.04	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	27.8	375	1200	28.75	28.82	30.50	0.12	0.07	0.00	0.000	4476	OK
10	I	1.05 SMO10-U2	480.5	40.4	600	1500	28.33	28.41	30.33	0.08	0.08	0.00	0.000	6508	OK
11	I	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	I	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 180 mins
No offline storageMean rain intens. 13.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 32.50 mm/hr
Sample period = 90.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMO04-U2	42.4	2.4	225	1050	29.40	29.42	30.27	0.06	0.02	0.00	0.000	618	OK
2	I	1.02 SMO05-U2	89.9	5.3	300	1200	29.07	29.10	30.27	0.06	0.03	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	2.8	225	1050	29.42	29.44	30.27	0.05	0.02	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	2.8	225	1200	29.14	29.16	30.27	0.05	0.02	0.00	0.000	703	OK
5	I	1.03 SMO06-U2	169.8	8.0	300	1200	28.92	28.95	30.27	0.05	0.03	0.00	0.000	2031	OK
6	I	1.04 SMO09-U2	485.3	8.0	600	1200	28.44	28.47	30.33	0.02	0.03	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	4.4	300	1200	28.99	29.01	30.50	0.05	0.03	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	4.4	300	1200	28.99	29.01	30.50	0.05	0.03	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	17.7	375	1200	28.75	28.81	30.50	0.08	0.05	0.00	0.000	4476	OK
10	I	1.05 SMO10-U2	480.5	25.8	600	1500	28.33	28.39	30.33	0.05	0.06	0.00	0.000	6508	OK
11	I	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	I	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design
Title
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 240 mins
No offline storageMean rain intens. 11.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 43.12 mm/hr
Sample period = 120.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	T	1.01 SMO04-U2	42.4	3.1	225	1050	29.40	29.43	30.27	0.07	0.03	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	6.7	300	1200	29.07	29.10	30.27	0.07	0.04	0.00	0.000	1328	OK
3	M	2.01 SMO08-U2	51.9	3.6	225	1050	29.42	29.45	30.27	0.07	0.03	0.00	0.000	703	OK
4	M	2.02 SMO07-U2	51.9	3.6	225	1200	29.14	29.16	30.27	0.07	0.03	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	10.3	300	1200	28.92	28.95	30.27	0.06	0.03	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	10.3	400	1200	28.44	28.47	30.33	0.02	0.03	0.00	0.000	2031	OK
7	M	3.01 SMO01-U2	90.5	5.7	300	1200	28.99	29.02	30.50	0.06	0.03	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	5.7	300	1200	28.99	29.02	30.50	0.06	0.03	0.00	0.000	1119	OK
9	M	3.02 SMO02-U2	223.7	22.7	375	1200	28.75	28.81	30.50	0.10	0.06	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	33.0	400	1500	28.33	28.40	30.33	0.07	0.07	0.00	0.000	6508	OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	T	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design
Title
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 240 mins
No offline storageMean rain intens. 11.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 27.50 mm/hr
Sample period = 120.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	T	1.01 SMO04-U2	42.4	2.0	225	1050	29.40	29.42	30.27	0.05	0.02	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	4.3	300	1200	29.07	29.09	30.27	0.05	0.03	0.00	0.000	1328	OK
3	M	2.01 SMO08-U2	51.9	2.3	225	1050	29.42	29.44	30.27	0.04	0.02	0.00	0.000	703	OK
4	M	2.02 SMO07-U2	51.9	2.3	225	1200	29.14	29.16	30.27	0.04	0.02	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	6.6	300	1200	28.92	28.94	30.27	0.04	0.02	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	6.6	400	1200	28.44	28.46	30.33	0.01	0.02	0.00	0.000	2031	OK
7	M	3.01 SMO01-U2	90.5	3.6	300	1200	28.99	29.01	30.50	0.04	0.03	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	3.6	300	1200	28.99	29.01	30.50	0.04	0.02	0.00	0.000	1119	OK
9	M	3.02 SMO02-U2	223.7	14.3	375	1200	28.75	28.80	30.50	0.06	0.04	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	21.0	400	1500	28.33	28.38	30.33	0.04	0.05	0.00	0.000	6508	OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	T	1.07 SMO01	14.3	1.9	150	1200	27.72	27.75	30.50	0.13	0.03	0.00	0.000	6508	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design
Title
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 340 mins
No offline storageMean rain intens. 8.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 31.36 mm/hr
Sample period = 180.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	T	1.01 SMO04-U2	42.4	2.3	225	1050	29.40	29.42	30.27	0.05	0.02	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	5.0	300	1200	29.07	29.10	30.27	0.06	0.03	0.00	0.000	1328	OK
3	M	2.01 SMO08-U2	51.9	3.7	225	1050	29.42	29.44	30.27	0.05	0.02	0.00	0.000	703	OK
4	M	2.02 SMO07-U2	51.9	2.7	225	1200	29.14	29.16	30.27	0.05	0.02	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	7.7	300	1200	28.92	28.95	30.27	0.05	0.03	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	7.7	400	1200	28.44	28.47	30.33	0.02	0.03	0.00	0.000	2031	OK
7	M	3.01 SMO01-U2	90.5	4.2	300	1200	28.99	29.01	30.50	0.05	0.03	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	4.2	300	1200	28.99	29.01	30.50	0.05	0.03	0.00	0.000	1119	OK
9	M	3.02 SMO02-U2	223.7	16.9	375	1200	28.75	28.80	30.50	0.08	0.05	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	24.6	400	1500	28.33	28.39	30.33	0.05	0.06	0.00	0.000	6508	OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	T	1.07 SMO01	14.3	1.8	150	1200	27.72	27.75	30.50	0.12	0.03	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 340 mins
No offline storageMean rain intens. 8.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 20.00 mm/hr
Sample period = 180.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMO04-U2	42.4	1.5	225	1050	29.40	29.42	30.27	0.04	0.02	0.00	0.000	618	OK
2	I	1.02 SMO05-U2	89.9	3.2	300	1200	29.07	29.09	30.27	0.04	0.02	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	1.7	225	1050	29.42	29.44	30.27	0.03	0.02	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	1.7	225	1200	29.14	29.15	30.27	0.03	0.02	0.00	0.000	703	OK
5	I	1.03 SMO06-U2	169.8	4.9	300	1200	28.92	28.94	30.27	0.03	0.02	0.00	0.000	2031	OK
6	I	1.04 SMO09-U2	485.3	4.9	600	1200	28.44	28.46	30.33	0.01	0.02	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	2.7	300	1200	28.99	29.01	30.50	0.03	0.02	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	2.7	300	1200	28.99	29.01	30.50	0.03	0.02	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	10.2	375	1200	28.75	28.79	30.50	0.05	0.04	0.00	0.000	4476	OK
10	I	1.05 SMO10-U2	480.5	15.7	600	1500	28.33	28.37	30.33	0.03	0.04	0.00	0.000	6508	OK
11	I	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	I	1.07 SMO01	14.3	1.9	150	1200	27.72	27.75	30.50	0.14	0.03	0.00	0.000	6508	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 720 mins
No offline storageMean rain intens. 5.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 19.60 mm/hr
Sample period = 360.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMO04-U2	42.4	1.4	225	1050	29.40	29.42	30.27	0.03	0.02	0.00	0.000	618	OK
2	I	1.02 SMO05-U2	89.9	3.0	300	1200	29.07	29.09	30.27	0.03	0.02	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	1.6	225	1050	29.42	29.44	30.27	0.03	0.02	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	1.6	225	1200	29.14	29.15	30.27	0.03	0.02	0.00	0.000	703	OK
5	I	1.03 SMO06-U2	169.8	4.6	300	1200	28.92	28.94	30.27	0.03	0.02	0.00	0.000	2031	OK
6	I	1.04 SMO09-U2	485.3	4.6	600	1200	28.44	28.46	30.33	0.01	0.02	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	2.6	300	1200	28.99	29.01	30.50	0.03	0.02	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	2.6	300	1200	28.99	29.01	30.50	0.03	0.02	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	10.2	375	1200	28.75	28.79	30.50	0.05	0.03	0.00	0.000	4476	OK
10	I	1.05 SMO10-U2	480.5	14.9	600	1500	28.33	28.37	30.33	0.03	0.04	0.00	0.000	6508	OK
11	I	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	I	1.07 SMO01	14.3	1.9	150	1200	27.72	27.75	30.50	0.14	0.03	0.00	0.000	6508	OK

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SWDesign Coordination Limited
200 Rotherhead Road, Meck, Writal,
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E: designcoordinationltd@gmail.comJob No.
1431-23Sheet no.
1Date
30/03/23By
MDJ

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 30 + 0% Climate Change AllowanceUsing in-line restrictors
Return period = 30 yrs
Climate change factor = 0PEAK hydrograph values printed
Storm duration = 720 mins
No offline storageMean rain intens. 5.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 12.50 mm/hr
Sample period = 360.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMO04-U2	42.4	0.9	225	1050	29.40	29.41	30.27	0.02	0.01	0.00	0.000	618	OK
2	I	1.02 SMO05-U2	89.9	1.9	300	1200	29.07	29.08	30.27	0.02	0.02	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	1.0	225	1050	29.42	29.43	30.27	0.02	0.01	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	1.0	225	1200	29.14	29.15	30.27	0.02	0.01	0.00	0.000	703	OK
5	I	1.03 SMO06-U2	169.8	3.0	300	1200	28.92	28.93	30.27	0.02	0.01	0.00	0.000	2031	OK
6	I	1.04 SMO09-U2	485.3	3.0	600	1200	28.44	28.45	30.33	0.01	0.01	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	1.6	300	1200	28.99	29.00	30.50	0.02	0.02	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	1.6	300	1200	28.99	29.00	30.50	0.02	0.01	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	4.3	375	1200	28.75	28.78	30.50	0.03	0.03	0.00	0.000	4476	OK
10	I	1.05 SMO10-U2	480.5	9.5	600	1500	28.33	28.36	30.33	0.02	0.03	0.00	0.000	6508	OK
11	I	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	I	1.07 SMO01	14.3	2.0	150	1200	27.72	27.75	30.50	0.14	0.03	0.00	0.000	6508	OK



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1

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design

Title
Surface Water Drainage Design - 1 in 30 + 0% Climate Change Allowance

Using in-line restrictors
Return period = 30 yrs
Climate change factor = 0

PEAK hydrograph values printed
Storm duration = 1440 mins
No offline storage

Mean rain intens. 3.00 mm/hr
Storm profile = Summer
Using FSR data

Peak rain intens. 11.76 mm/hr
Sample period = 720.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/lwW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) : x FACTOR	STATUS
1	T	1.01 SMH04-U2	42.4	0.8	225	1050	29.40	29.41	30.27	0.02	0.01	0.00	0.000	618	OK
2	T	1.02 SMH05-U2	89.9	1.8	300	1200	29.07	29.08	30.27	0.02	0.02	0.00	0.000	1328	OK
3	M	2.01 SMH08-U2	51.9	1.0	225	1050	29.42	29.43	30.27	0.02	0.01	0.00	0.000	703	OK
4	M	2.02 SMH07-U2	51.9	1.0	225	1200	29.14	29.15	30.27	0.02	0.01	0.00	0.000	703	OK
5	T	1.03 SMH06-U2	169.8	2.8	300	1200	28.92	28.93	30.27	0.02	0.01	0.00	0.000	2031	OK
6	T	1.04 SMH09-U2	485.3	2.8	400	1200	28.44	28.45	30.33	0.01	0.01	0.00	0.000	2031	OK
7	M	3.01 SMH01-U2	90.5	1.5	300	1200	28.99	29.00	30.50	0.02	0.01	0.00	0.000	1119	OK
8	SI	4.01 SMH03-U2	91.4	1.5	300	1200	28.99	29.00	30.50	0.02	0.01	0.00	0.000	1119	OK
9	M	3.02 SMH02-U2	223.7	4.2	375	1200	28.75	28.78	30.50	0.03	0.03	0.00	0.000	4476	OK
10	T	1.05 SMH10-U2	480.5	9.0	400	1500	28.33	28.36	30.33	0.02	0.03	0.00	0.000	6508	OK
11	T	1.06 SMH11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	T	1.07 SMH01	14.3	2.0	150	1200	27.72	27.75	30.50	0.14	0.03	0.00	0.000	6508	OK



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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design

Title
Surface Water Drainage Design - 1 in 30 + 0% Climate Change Allowance

Using in-line restrictors
Return period = 30 yrs
Climate change factor = 0

PEAK hydrograph values printed
Storm duration = 1440 mins
No offline storage

Mean rain intens. 3.00 mm/hr
Storm profile = Winter
Using FSR data

Peak rain intens. 7.50 mm/hr
Sample period = 720.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/lwW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) : x FACTOR	STATUS
1	T	1.01 SMH04-U2	42.4	0.5	225	1050	29.40	29.41	30.27	0.01	0.01	0.00	0.000	618	OK
2	T	1.02 SMH05-U2	89.9	1.2	300	1200	29.07	29.08	30.27	0.01	0.01	0.00	0.000	1328	OK
3	M	2.01 SMH08-U2	51.9	0.6	225	1050	29.42	29.43	30.27	0.01	0.01	0.00	0.000	703	OK
4	M	2.02 SMH07-U2	51.9	0.6	225	1200	29.14	29.14	30.27	0.01	0.01	0.00	0.000	703	OK
5	T	1.03 SMH06-U2	169.8	1.8	300	1200	28.92	28.93	30.27	0.01	0.01	0.00	0.000	2031	OK
6	T	1.04 SMH09-U2	485.3	1.8	400	1200	28.44	28.45	30.33	0.00	0.01	0.00	0.000	2031	OK
7	M	3.01 SMH01-U2	90.5	1.0	300	1200	28.99	29.00	30.50	0.01	0.01	0.00	0.000	1119	OK
8	SI	4.01 SMH03-U2	91.4	1.0	300	1200	28.99	29.00	30.50	0.01	0.01	0.00	0.000	1119	OK
9	M	3.02 SMH02-U2	223.7	3.9	375	1200	28.75	28.77	30.50	0.02	0.02	0.00	0.000	4476	OK
10	T	1.05 SMH10-U2	480.5	5.7	400	1500	28.33	28.35	30.33	0.01	0.02	0.00	0.000	6508	OK
11	T	1.06 SMH11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	T	1.07 SMH01	14.3	2.0	150	1200	27.72	27.75	30.50	0.14	0.03	0.00	0.000	6508	OK



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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage Design

Title
Surface Water Drainage Design - 1 in 30 + 0% Climate Change Allowance

Notes

Printout headings:

- | | | |
|---|--|--|
| 1) Entry no - position in file | 2) Section no - pipe identifier | 3) Manhole ref - Manhole identifier |
| 4) Pipe cap - full bore capacity of that pipe | 5) Rate of flow - calculated flow rate (l/s) § = flow restrictor | 6) Pipe diam - outlet pipe diameter (mm) |
| 7) Chamber diam - chamber diam. at base of MH | 8) Invert level - invert level of manhole | 9) Water level - calculated peak water level |
| 10) Grnd level - ground / cover level | 11) Surch. fract - calc flow/pipe capacity | 12) Surch. depth - surcharge level above sufft |
| 13) Overflow - surcharged flow rate (l/s) | 14) Flooded vol - volume of water above cover | 15) Upstrm Vol - upstream pipe vol to previous manhole(s) |
| 16) Status - OK - outlet not surcharged | 17) Status - Surcharged - outlet surcharged | 18) Status - Warning - water level within 299mm of cover level |
| 19) Status - Flooded - cover over-topped | 20) § against diameter indicates throttle pipe used. | |

Title box

Hydrograph data

- | | | |
|---|--------------------------------------|--|
| 1) Ret. period - that used to calculate profile | 2) Duration - length of storm (mins) | 3) Profile - either Winter (75%) or Summer (50%) |
|---|--------------------------------------|--|

Flow restrictors

Manhole reference - SMH11-U2

Restrictor flowrate - 2 l/s

Flood volumes

Check that the upstream storage of the manhole is adequate to take the flood volume - see Upstrm Vol above.

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 15 mins
No offline storageMean rain intens. 114.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 446.88 mm/hr
Sample period = 7.5 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) IN FACTOR	STATUS
1	I	1.01 SMO04-02	42.4	33.2	225	1050	29.40	29.56	30.27	0.78	0.16	0.00	0.000	618	OK
2	I	1.02 SMO05-02	89.9	71.3	300	1200	29.07	29.29	30.27	0.79	0.22	0.00	0.000	1328	OK
3	B	2.01 SMO08-02	51.9	37.8	225	1050	29.42	29.57	30.27	0.73	0.15	0.00	0.000	703	OK
4	B	2.02 SMO07-02	51.9	37.8	225	1200	29.14	29.29	30.27	0.73	0.15	0.00	0.000	703	OK
5	I	1.03 SMO06-02	169.8	109.1	300	1200	28.92	29.11	30.27	0.64	0.19	0.00	0.000	2031	OK
6	I	1.04 SMO09-02	485.3	109.1	600	1200	28.44	28.61	30.33	0.22	0.17	0.00	0.000	2031	OK
7	B	3.01 SMO01-02	90.5	60.1	300	1200	28.99	29.18	30.50	0.66	0.19	0.00	0.000	1119	OK
8	SI	4.01 SMO03-02	91.4	60.1	300	1200	28.99	29.17	30.50	0.66	0.19	0.00	0.000	1119	OK
9	B	3.02 SMO02-02	223.7	240.4	375	1200	28.75	29.24	30.50	1.07	0.49	16.70	0.000	4476	Surch.
10	I	1.05 SMO10-02	480.5	349.5	600	1500	28.33	28.74	30.33	0.73	0.41	0.00	0.000	6508	OK
11	I	1.06 SMO11-02a	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	I	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 15 mins
No offline storageMean rain intens. 114.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 285.00 mm/hr
Sample period = 7.5 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) IN FACTOR	STATUS
1	I	1.01 SMO04-02	42.4	21.2	225	1050	29.40	29.51	30.27	0.50	0.11	0.00	0.000	618	OK
2	I	1.02 SMO05-02	89.9	45.5	300	1200	29.07	29.22	30.27	0.51	0.15	0.00	0.000	1328	OK
3	B	2.01 SMO08-02	51.9	24.1	225	1050	29.42	29.53	30.27	0.46	0.11	0.00	0.000	703	OK
4	B	2.02 SMO07-02	51.9	24.1	225	1200	29.14	29.24	30.27	0.46	0.11	0.00	0.000	703	OK
5	I	1.03 SMO06-02	169.8	69.6	300	1200	28.92	29.05	30.27	0.41	0.13	0.00	0.000	2031	OK
6	I	1.04 SMO09-02	485.3	69.6	600	1200	28.44	28.56	30.33	0.14	0.12	0.00	0.000	2031	OK
7	B	3.01 SMO01-02	90.5	38.3	300	1200	28.99	29.12	30.50	0.42	0.13	0.00	0.000	1119	OK
8	SI	4.01 SMO03-02	91.4	38.3	300	1200	28.99	29.12	30.50	0.42	0.13	0.00	0.000	1119	OK
9	B	3.02 SMO02-02	223.7	153.3	375	1200	28.75	29.00	30.50	0.69	0.24	0.00	0.000	4476	OK
10	I	1.05 SMO10-02	480.5	222.9	600	1500	28.33	28.41	30.33	0.46	0.28	0.00	0.000	6508	OK
11	I	1.06 SMO11-02a	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	I	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 30 mins
No offline storageMean rain intens. 78.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 305.76 mm/hr
Sample period = 15.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) IN FACTOR	STATUS
1	I	1.01 SMO04-02	42.4	22.7	225	1050	29.40	29.52	30.27	0.53	0.12	0.00	0.000	618	OK
2	I	1.02 SMO05-02	89.9	48.7	300	1200	29.07	29.23	30.27	0.54	0.16	0.00	0.000	1328	OK
3	B	2.01 SMO08-02	51.9	25.8	225	1050	29.42	29.53	30.27	0.50	0.11	0.00	0.000	703	OK
4	B	2.02 SMO07-02	51.9	25.8	225	1200	29.14	29.25	30.27	0.50	0.11	0.00	0.000	703	OK
5	I	1.03 SMO06-02	169.8	74.5	300	1200	28.92	29.06	30.27	0.44	0.14	0.00	0.000	2031	OK
6	I	1.04 SMO09-02	485.3	74.5	600	1200	28.44	28.57	30.33	0.15	0.13	0.00	0.000	2031	OK
7	B	3.01 SMO01-02	90.5	41.1	300	1200	28.99	29.12	30.50	0.45	0.14	0.00	0.000	1119	OK
8	SI	4.01 SMO03-02	91.4	41.1	300	1200	28.99	29.12	30.50	0.45	0.14	0.00	0.000	1119	OK
9	B	3.02 SMO02-02	223.7	164.2	375	1200	28.75	29.01	30.50	0.73	0.26	0.00	0.000	4476	OK
10	I	1.05 SMO10-02	480.5	238.7	600	1500	28.33	28.43	30.33	0.50	0.30	0.00	0.000	6508	OK
11	I	1.06 SMO11-02a	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	I	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 30 mins
No offline storageMean rain intens. 78.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 195.00 mm/hr
Sample period = 15.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY L/s	RATE FLOW L/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract	Depth	EXCESS FLOW L/s	FLOODED VOL m³	DRAINED AREA (m²) x FACTOR	STATUS
1	T	1.01 SMO04-U2	42.4	14.4	225	1050	29.40	29.48	30.27	0.34	0.08	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	31.1	300	1200	29.07	29.18	30.27	0.35	0.11	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	16.4	225	1050	29.42	29.50	30.27	0.32	0.08	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	16.4	225	1200	29.14	29.22	30.27	0.32	0.08	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	47.5	300	1200	28.92	29.02	30.27	0.28	0.10	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	47.5	600	1200	28.44	28.53	30.33	0.10	0.09	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	26.2	300	1200	28.99	29.08	30.50	0.29	0.10	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	26.2	300	1200	28.99	29.08	30.50	0.29	0.10	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	104.7	375	1200	28.75	28.93	30.50	0.47	0.18	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	152.2	600	1500	28.33	28.54	30.33	0.32	0.21	0.00	0.000	6508	OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	T	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 45 mins
No offline storageMean rain intens. 61.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 239.12 mm/hr
Sample period = 22.5 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY L/s	RATE FLOW L/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract	Depth	EXCESS FLOW L/s	FLOODED VOL m³	DRAINED AREA (m²) x FACTOR	STATUS
1	T	1.01 SMO04-U2	42.4	17.7	225	1050	29.40	29.50	30.27	0.42	0.10	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	38.2	300	1200	29.07	29.20	30.27	0.42	0.13	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	20.2	225	1050	29.42	29.51	30.27	0.39	0.09	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	20.2	225	1200	29.14	29.23	30.27	0.39	0.09	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	58.4	300	1200	28.92	29.03	30.27	0.34	0.11	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	58.4	600	1200	28.44	28.55	30.33	0.12	0.11	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	32.2	300	1200	28.99	29.10	30.50	0.36	0.12	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	32.2	300	1200	28.99	29.10	30.50	0.35	0.11	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	128.6	375	1200	28.75	28.97	30.50	0.57	0.21	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	187.0	600	1500	28.33	28.58	30.33	0.39	0.25	0.00	0.000	6508	OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	T	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 45 mins
No offline storageMean rain intens. 61.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 152.50 mm/hr
Sample period = 22.5 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY L/s	RATE FLOW L/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract	Depth	EXCESS FLOW L/s	FLOODED VOL m³	DRAINED AREA (m²) x FACTOR	STATUS
1	T	1.01 SMO04-U2	42.4	11.3	225	1050	29.40	29.47	30.27	0.27	0.07	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	24.3	300	1200	29.07	29.16	30.27	0.27	0.10	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	12.9	225	1050	29.42	29.49	30.27	0.25	0.07	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	12.9	225	1200	29.14	29.20	30.27	0.25	0.07	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	37.2	300	1200	28.92	29.00	30.27	0.22	0.08	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	37.2	600	1200	28.44	28.52	30.33	0.08	0.08	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	20.5	300	1200	28.99	29.07	30.50	0.23	0.08	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	20.5	300	1200	28.99	29.07	30.50	0.22	0.08	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	82.0	375	1200	28.75	28.90	30.50	0.37	0.15	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	119.2	600	1500	28.33	28.51	30.33	0.25	0.18	0.00	0.000	6508	OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	T	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 60 mins
No offline storageMean rain intens. 51.00 mm/hr
Storm profile = Summer
Using F8R dataPeak rain intens. 199.92 mm/hr
Sample period = 30.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/lxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) : K FACTOR	STATUS
1	T	1.01 SMO04-U2	42.4	14.8	225	1050	29.40	29.43	30.27	0.35	0.09	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	31.8	300	1200	29.07	29.18	30.27	0.35	0.12	0.00	0.000	1328	OK
3	M	2.01 SMO08-U2	51.9	16.9	225	1050	29.42	29.50	30.27	0.32	0.08	0.00	0.000	703	OK
4	M	2.02 SMO07-U2	51.9	16.9	225	1200	29.14	29.22	30.27	0.32	0.08	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	48.7	300	1200	28.92	29.02	30.27	0.29	0.10	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	48.7	400	1200	28.44	28.54	30.33	0.10	0.10	0.00	0.000	2031	OK
7	M	3.01 SMO01-U2	90.5	26.8	300	1200	28.99	29.09	30.50	0.30	0.10	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	26.8	300	1200	28.99	29.09	30.50	0.29	0.10	0.00	0.000	1119	OK
9	M	3.02 SMO02-U2	223.7	107.3	375	1200	28.75	28.94	30.50	0.48	0.18	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	154.0	400	1500	28.33	28.55	30.33	0.32	0.22	0.00	0.000	6508	OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	T	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 60 mins
No offline storageMean rain intens. 51.00 mm/hr
Storm profile = Winter
Using F8R dataPeak rain intens. 127.50 mm/hr
Sample period = 30.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/lxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) : K FACTOR	STATUS
1	T	1.01 SMO04-U2	42.4	9.4	225	1050	29.40	29.46	30.27	0.22	0.06	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	20.3	300	1200	29.07	29.15	30.27	0.23	0.08	0.00	0.000	1328	OK
3	M	2.01 SMO08-U2	51.9	10.7	225	1050	29.42	29.48	30.27	0.21	0.06	0.00	0.000	703	OK
4	M	2.02 SMO07-U2	51.9	10.7	225	1200	29.14	29.19	30.27	0.21	0.06	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	31.1	300	1200	28.92	28.99	30.27	0.18	0.07	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	31.1	400	1200	28.44	28.51	30.33	0.06	0.07	0.00	0.000	2031	OK
7	M	3.01 SMO01-U2	90.5	17.1	300	1200	28.99	29.06	30.50	0.19	0.07	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	17.1	300	1200	28.99	29.06	30.50	0.19	0.07	0.00	0.000	1119	OK
9	M	3.02 SMO02-U2	223.7	68.4	375	1200	28.75	28.88	30.50	0.31	0.13	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	99.5	400	1500	28.33	28.49	30.33	0.21	0.16	0.00	0.000	6508	OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	T	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 120 mins
No offline storageMean rain intens. 32.00 mm/hr
Storm profile = Summer
Using F8R dataPeak rain intens. 125.44 mm/hr
Sample period = 60.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/lxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) : K FACTOR	STATUS
1	T	1.01 SMO04-U2	42.4	9.4	225	1050	29.40	29.46	30.27	0.22	0.06	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	20.1	300	1200	29.07	29.15	30.27	0.22	0.08	0.00	0.000	1328	OK
3	M	2.01 SMO08-U2	51.9	10.7	225	1050	29.42	29.48	30.27	0.21	0.06	0.00	0.000	703	OK
4	M	2.02 SMO07-U2	51.9	10.7	225	1200	29.14	29.19	30.27	0.21	0.06	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	30.8	300	1200	28.92	28.99	30.27	0.18	0.07	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	30.8	400	1200	28.44	28.51	30.33	0.06	0.07	0.00	0.000	2031	OK
7	M	3.01 SMO01-U2	90.5	17.0	300	1200	28.99	29.06	30.50	0.19	0.07	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	17.0	300	1200	28.99	29.06	30.50	0.19	0.07	0.00	0.000	1119	OK
9	M	3.02 SMO02-U2	223.7	67.8	375	1200	28.75	28.88	30.50	0.30	0.13	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	98.6	400	1500	28.33	28.49	30.33	0.21	0.16	0.00	0.000	6508	OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	T	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 120 mins
No offline storageMean rain intens. 32.00 mm/hr
Storm profile = Winter
Using FBR dataPeak rain intens. 80.00 mm/hr
Sample period = 60.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
										Fract. Depth			IN FACTOR	
1	T	1.01 SMO04-U2	42.4	6.0	225	1050	29.40	29.44	30.27	0.14	0.04	0.00	0.000	618 OK
2	T	1.02 SMO05-U2	89.9	12.8	300	1200	29.07	29.13	30.27	0.14	0.06	0.00	0.000	1328 OK
3	B	2.01 SMO08-U2	51.9	6.8	225	1050	29.42	29.46	30.27	0.13	0.04	0.00	0.000	703 OK
4	B	2.02 SMO07-U2	51.9	6.8	225	1200	29.14	29.18	30.27	0.13	0.04	0.00	0.000	703 OK
5	T	1.03 SMO06-U2	169.8	19.6	300	1200	28.92	28.97	30.27	0.12	0.05	0.00	0.000	2031 OK
6	T	1.04 SMO09-U2	485.3	19.6	400	1200	28.44	28.49	30.33	0.04	0.05	0.00	0.000	2031 OK
7	B	3.01 SMO01-U2	90.5	10.8	300	1200	28.99	29.04	30.50	0.12	0.05	0.00	0.000	1119 OK
8	SI	4.01 SMO03-U2	91.4	10.8	300	1200	28.99	29.04	30.50	0.12	0.05	0.00	0.000	1119 OK
9	B	3.02 SMO02-U2	223.7	43.3	375	1200	28.75	28.83	30.50	0.19	0.09	0.00	0.000	4476 OK
10	T	1.05 SMO10-U2	480.5	62.9	400	1500	28.33	28.44	30.33	0.13	0.11	0.00	0.000	6508 OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508 OK
12	T	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0 OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 180 mins
No offline storageMean rain intens. 24.00 mm/hr
Storm profile = Summer
Using FBR dataPeak rain intens. 94.08 mm/hr
Sample period = 90.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
										Fract. Depth			IN FACTOR	
1	T	1.01 SMO04-U2	42.4	7.0	225	1050	29.40	29.45	30.27	0.17	0.05	0.00	0.000	618 OK
2	T	1.02 SMO05-U2	89.9	15.2	300	1200	29.07	29.13	30.27	0.17	0.07	0.00	0.000	1328 OK
3	B	2.01 SMO08-U2	51.9	8.0	225	1050	29.42	29.47	30.27	0.15	0.05	0.00	0.000	703 OK
4	B	2.02 SMO07-U2	51.9	8.0	225	1200	29.14	29.18	30.27	0.15	0.05	0.00	0.000	703 OK
5	T	1.03 SMO06-U2	169.8	23.2	300	1200	28.92	28.98	30.27	0.14	0.06	0.00	0.000	2031 OK
6	T	1.04 SMO09-U2	485.3	23.2	400	1200	28.44	28.50	30.33	0.05	0.06	0.00	0.000	2031 OK
7	B	3.01 SMO01-U2	90.5	12.8	300	1200	28.99	29.04	30.50	0.14	0.06	0.00	0.000	1119 OK
8	SI	4.01 SMO03-U2	91.4	12.8	300	1200	28.99	29.04	30.50	0.14	0.06	0.00	0.000	1119 OK
9	B	3.02 SMO02-U2	223.7	51.1	375	1200	28.75	28.86	30.50	0.23	0.11	0.00	0.000	4476 OK
10	T	1.05 SMO10-U2	480.5	74.3	400	1500	28.33	28.46	30.33	0.15	0.13	0.00	0.000	6508 OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508 OK
12	T	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0 OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 180 mins
No offline storageMean rain intens. 24.00 mm/hr
Storm profile = Winter
Using FBR dataPeak rain intens. 60.00 mm/hr
Sample period = 90.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
										Fract. Depth			IN FACTOR	
1	T	1.01 SMO04-U2	42.4	4.5	225	1050	29.40	29.44	30.27	0.11	0.04	0.00	0.000	618 OK
2	T	1.02 SMO05-U2	89.9	9.7	300	1200	29.07	29.11	30.27	0.11	0.05	0.00	0.000	1328 OK
3	B	2.01 SMO08-U2	51.9	5.1	225	1050	29.42	29.46	30.27	0.10	0.04	0.00	0.000	703 OK
4	B	2.02 SMO07-U2	51.9	5.1	225	1200	29.14	29.17	30.27	0.10	0.04	0.00	0.000	703 OK
5	T	1.03 SMO06-U2	169.8	14.8	300	1200	28.92	28.96	30.27	0.09	0.04	0.00	0.000	2031 OK
6	T	1.04 SMO09-U2	485.3	14.8	400	1200	28.44	28.48	30.33	0.03	0.04	0.00	0.000	2031 OK
7	B	3.01 SMO01-U2	90.5	8.1	300	1200	28.99	29.03	30.50	0.09	0.04	0.00	0.000	1119 OK
8	SI	4.01 SMO03-U2	91.4	8.1	300	1200	28.99	29.03	30.50	0.09	0.04	0.00	0.000	1119 OK
9	B	3.02 SMO02-U2	223.7	32.6	375	1200	28.75	28.83	30.50	0.15	0.08	0.00	0.000	4476 OK
10	T	1.05 SMO10-U2	480.5	47.4	400	1500	28.33	28.42	30.33	0.10	0.09	0.00	0.000	6508 OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508 OK
12	T	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0 OK

MasterDrain
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205 Broomhead Road, Black, Wimal,
Macclesfield, Ch47 0NF
T : 07513 777051
E: designcoordination@ghel.comJob No.
1431-23Sheet no.
1Date
30/03/23By
MDJ

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 240 mins
No offline storageMean rain intens. 20.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 78.40 mm/hr
Sample period = 120.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/lxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	T	1.01 SMO04-U2	42.4	5.7	225	1050	29.40	29.44	30.27	0.13	0.04	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	12.3	300	1200	29.07	29.12	30.27	0.14	0.06	0.00	0.000	1328	OK
3	M	2.01 SMO08-U2	51.9	6.5	225	1050	29.42	29.46	30.27	0.13	0.04	0.00	0.000	703	OK
4	M	2.02 SMO07-U2	51.9	6.5	225	1200	29.14	29.18	30.27	0.13	0.04	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	18.8	300	1200	28.92	28.97	30.27	0.11	0.05	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	18.8	400	1200	28.44	28.49	30.33	0.04	0.05	0.00	0.000	2031	OK
7	M	3.01 SMO01-U2	90.5	10.4	300	1200	28.99	29.04	30.50	0.11	0.05	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	10.4	300	1200	28.99	29.04	30.50	0.11	0.05	0.00	0.000	1119	OK
9	M	3.02 SMO02-U2	223.7	41.5	375	1200	28.75	28.83	30.50	0.19	0.09	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	40.3	400	1500	28.33	28.44	30.33	0.13	0.11	0.00	0.000	6508	OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	T	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 240 mins
No offline storageMean rain intens. 20.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 50.00 mm/hr
Sample period = 120.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/lxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	T	1.01 SMO04-U2	42.4	3.6	225	1050	29.40	29.43	30.27	0.09	0.03	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	7.8	300	1200	29.07	29.11	30.27	0.09	0.04	0.00	0.000	1328	OK
3	M	2.01 SMO08-U2	51.9	4.2	225	1050	29.42	29.45	30.27	0.08	0.03	0.00	0.000	703	OK
4	M	2.02 SMO07-U2	51.9	4.2	225	1200	29.14	29.17	30.27	0.08	0.03	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	12.0	300	1200	28.92	28.96	30.27	0.07	0.04	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	12.0	400	1200	28.44	28.48	30.33	0.02	0.04	0.00	0.000	2031	OK
7	M	3.01 SMO01-U2	90.5	6.6	300	1200	28.99	29.02	30.50	0.07	0.04	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	6.6	300	1200	28.99	29.02	30.50	0.07	0.04	0.00	0.000	1119	OK
9	M	3.02 SMO02-U2	223.7	26.4	375	1200	28.75	28.82	30.50	0.12	0.07	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	38.4	400	1500	28.33	28.41	30.33	0.08	0.08	0.00	0.000	6508	OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	T	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 360 mins
No offline storageMean rain intens. 15.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 58.80 mm/hr
Sample period = 180.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/lxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	T	1.01 SMO04-U2	42.4	4.2	225	1050	29.40	29.44	30.27	0.10	0.04	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	9.1	300	1200	29.07	29.11	30.27	0.10	0.05	0.00	0.000	1328	OK
3	M	2.01 SMO08-U2	51.9	4.8	225	1050	29.42	29.45	30.27	0.09	0.03	0.00	0.000	703	OK
4	M	2.02 SMO07-U2	51.9	4.8	225	1200	29.14	29.17	30.27	0.09	0.03	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	13.9	300	1200	28.92	28.96	30.27	0.08	0.04	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	13.9	400	1200	28.44	28.48	30.33	0.03	0.04	0.00	0.000	2031	OK
7	M	3.01 SMO01-U2	90.5	7.7	300	1200	28.99	29.03	30.50	0.08	0.04	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	7.7	300	1200	28.99	29.03	30.50	0.08	0.04	0.00	0.000	1119	OK
9	M	3.02 SMO02-U2	223.7	30.7	375	1200	28.75	28.83	30.50	0.14	0.07	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	44.6	400	1500	28.33	28.42	30.33	0.09	0.09	0.00	0.000	6508	OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	T	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 360 mins
No offline storageMean rain intens. 15.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 37.50 mm/hr
Sample period = 180.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	T	1.01 SMO04-U2	42.4	2.7	225	1050	29.40	29.43	30.27	0.06	0.03	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	5.8	300	1200	29.07	29.10	30.27	0.06	0.04	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	3.1	225	1050	29.42	29.45	30.27	0.06	0.03	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	3.1	225	1200	29.14	29.16	30.27	0.06	0.03	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	8.9	300	1200	28.92	28.95	30.27	0.05	0.03	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	8.9	400	1200	28.44	28.47	30.33	0.02	0.03	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	4.9	300	1200	28.99	29.02	30.50	0.05	0.03	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	4.9	300	1200	28.99	29.02	30.50	0.05	0.03	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	19.6	375	1200	28.75	28.81	30.50	0.09	0.05	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	28.5	400	1500	28.33	28.40	30.33	0.06	0.07	0.00	0.000	6508	OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	T	1.07 SMO01	14.3	0.0	150	1200	27.72	27.72	30.50	0.00	0.00	0.00	0.000	0	OK

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Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 720 mins
No offline storageMean rain intens. 9.00 mm/hr
Storm profile = Summer
Using FSR dataPeak rain intens. 35.28 mm/hr
Sample period = 360.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	T	1.01 SMO04-U2	42.4	2.5	225	1050	29.40	29.43	30.27	0.06	0.03	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	5.4	300	1200	29.07	29.10	30.27	0.06	0.03	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	2.9	225	1050	29.42	29.44	30.27	0.06	0.02	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	2.9	225	1200	29.14	29.16	30.27	0.06	0.02	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	8.3	300	1200	28.92	28.95	30.27	0.05	0.03	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	8.3	400	1200	28.44	28.47	30.33	0.02	0.03	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	4.6	300	1200	28.99	29.01	30.50	0.05	0.03	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	4.6	300	1200	28.99	29.01	30.50	0.05	0.03	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	18.3	375	1200	28.75	28.81	30.50	0.08	0.05	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	26.7	400	1500	28.33	28.39	30.33	0.06	0.06	0.00	0.000	6508	OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	T	1.07 SMO01	14.3	1.9	150	1200	27.72	27.75	30.50	0.13	0.03	0.00	0.000	0	OK

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Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 720 mins
No offline storageMean rain intens. 9.00 mm/hr
Storm profile = Winter
Using FSR dataPeak rain intens. 22.50 mm/hr
Sample period = 360.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE Fract	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	T	1.01 SMO04-U2	42.4	1.6	225	1050	29.40	29.42	30.27	0.04	0.02	0.00	0.000	618	OK
2	T	1.02 SMO05-U2	89.9	3.5	300	1200	29.07	29.09	30.27	0.04	0.02	0.00	0.000	1328	OK
3	B	2.01 SMO08-U2	51.9	1.8	225	1050	29.42	29.44	30.27	0.04	0.02	0.00	0.000	703	OK
4	B	2.02 SMO07-U2	51.9	1.8	225	1200	29.14	29.15	30.27	0.04	0.02	0.00	0.000	703	OK
5	T	1.03 SMO06-U2	169.8	5.3	300	1200	28.92	28.94	30.27	0.03	0.02	0.00	0.000	2031	OK
6	T	1.04 SMO09-U2	485.3	5.3	400	1200	28.44	28.46	30.33	0.01	0.02	0.00	0.000	2031	OK
7	B	3.01 SMO01-U2	90.5	2.9	300	1200	28.99	29.01	30.50	0.03	0.02	0.00	0.000	1119	OK
8	SI	4.01 SMO03-U2	91.4	2.9	300	1200	28.99	29.01	30.50	0.03	0.02	0.00	0.000	1119	OK
9	B	3.02 SMO02-U2	223.7	11.7	375	1200	28.75	28.79	30.50	0.05	0.04	0.00	0.000	4476	OK
10	T	1.05 SMO10-U2	480.5	17.0	400	1500	28.33	28.38	30.33	0.04	0.05	0.00	0.000	6508	OK
11	T	1.06 SMO11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	T	1.07 SMO01	14.3	2.0	150	1200	27.72	27.75	30.50	0.14	0.03	0.00	0.000	6508	OK

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Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 1440 mins
No offline storageMean rain intens. 5.00 mm/hr
Storm profile = Summer
Using F88 dataPeak rain intens. 19.60 mm/hr
Sample period = 720.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE fract	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMH04-U2	42.4	1.5	225	1050	29.40	29.42	30.27	0.04	0.02	0.00	0.000	618	OK
2	I	1.02 SMH05-U2	89.9	3.2	300	1200	29.07	29.09	30.27	0.04	0.02	0.00	0.000	1328	OK
3	B	2.01 SMH08-U2	51.9	1.7	225	1050	29.42	29.44	30.27	0.03	0.02	0.00	0.000	703	OK
4	B	2.02 SMH07-U2	51.9	1.7	225	1200	29.14	29.15	30.27	0.03	0.02	0.00	0.000	703	OK
5	I	1.03 SMH06-U2	169.8	4.9	300	1200	28.92	28.94	30.27	0.03	0.02	0.00	0.000	2031	OK
6	I	1.04 SMH09-U2	485.3	4.9	600	1200	28.44	28.46	30.33	0.01	0.02	0.00	0.000	2031	OK
7	B	3.01 SMH01-U2	90.5	2.7	300	1200	28.99	29.01	30.50	0.03	0.02	0.00	0.000	1119	OK
8	RI	4.01 SMH03-U2	91.4	2.7	300	1200	28.99	29.01	30.50	0.03	0.02	0.00	0.000	1119	OK
9	B	3.02 SMH02-U2	223.7	10.9	375	1200	28.75	28.79	30.50	0.05	0.04	0.00	0.000	4476	OK
10	I	1.05 SMH10-U2	480.5	15.8	600	1500	28.33	28.37	30.33	0.03	0.04	0.00	0.000	6508	OK
11	I	1.06 SMH11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	I	1.07 SMH01	14.3	2.0	150	1200	27.72	27.75	30.50	0.14	0.03	0.00	0.000	6508	OK

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Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change AllowanceUsing in-line restrictors
Return period = 100 yrs
Climate change factor = 40PEAK hydrograph values printed
Storm duration = 1440 mins
No offline storageMean rain intens. 5.00 mm/hr
Storm profile = Winter
Using F88 dataPeak rain intens. 12.50 mm/hr
Sample period = 720.0 secs.

Entry No.	SECT. No.	MANHOLE REF	PIPE CAPACITY l/s	RATE FLOW l/s	PIPE SIZE mm	CHAMBER DIAM/LxW mm	INVERT LEVEL m	WATER LEVEL m	GRND LEVEL m	SURCHARGE fract	Depth	EXCESS FLOW l/s	FLOODED VOL m ³	DRAINED AREA (m ²)	STATUS
1	I	1.01 SMH04-U2	42.4	1.0	225	1050	29.40	29.41	30.27	0.02	0.01	0.00	0.000	618	OK
2	I	1.02 SMH05-U2	89.9	2.1	300	1200	29.07	29.08	30.27	0.02	0.02	0.00	0.000	1328	OK
3	B	2.01 SMH08-U2	51.9	1.1	225	1050	29.42	29.43	30.27	0.02	0.01	0.00	0.000	703	OK
4	B	2.02 SMH07-U2	51.9	1.1	225	1200	29.14	29.15	30.27	0.02	0.01	0.00	0.000	703	OK
5	I	1.03 SMH06-U2	169.8	3.1	300	1200	28.92	28.94	30.27	0.02	0.02	0.00	0.000	2031	OK
6	I	1.04 SMH09-U2	485.3	3.1	600	1200	28.44	28.46	30.33	0.01	0.02	0.00	0.000	2031	OK
7	B	3.01 SMH01-U2	90.5	1.7	300	1200	28.99	29.00	30.50	0.02	0.02	0.00	0.000	1119	OK
8	RI	4.01 SMH03-U2	91.4	1.7	300	1200	28.99	29.00	30.50	0.02	0.02	0.00	0.000	1119	OK
9	B	3.02 SMH02-U2	223.7	6.9	375	1200	28.75	28.78	30.50	0.03	0.03	0.00	0.000	4476	OK
10	I	1.05 SMH10-U2	480.5	10.1	600	1500	28.33	28.36	30.33	0.02	0.03	0.00	0.000	6508	OK
11	I	1.06 SMH11-U2	14.4	2.0	150	1500	28.18	28.21	30.50	0.14	0.03	0.00	0.000	6508	OK
12	I	1.07 SMH01	14.3	2.0	150	1200	27.72	27.75	30.50	0.14	0.03	0.00	0.000	6508	OK

MasterDrain
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1431-23Sheet no.
2Date
30/03/23By
MDJ

Checked

Reviewed

Project
Unit 2 Bryn Lane Wrexham Ind Estate - Surface Water Drainage DesignTitle
Surface Water Drainage Design - 1 in 100 + 40% Climate Change Allowance

Notes

Printout headings

- | | | |
|---|--|--|
| 1) Entry no - position in file | 2) Section no - pipe identifier | 3) Manhole ref - Manhole identifier |
| 4) Pipe cap - full bore capacity of that pipe | 5) Rate of flow - calculated flow rate (l/s) $\pm$ = flow restrictor | 6) Pipe diam - outlet pipe diameter (mm) |
| 7) Chamber diam - chamber diam. at base of MH | 8) Invert level - invert level of manhole | 9) Water level - calculated peak water level |
| 10) Grnd level - ground / cover level | 11) Surch. fract - calc. flow/pipe capacity | 12) Surch. depth - surcharge level above soffit |
| 13) Overflow - surcharged flow rate (l/s) | 14) Flooded vol - volume of water above cover | 15) Upstrm Vol - upstream pipe vol to previous manhole(s) |
| 16) Status - OK - outlet not surcharged | 17) Status - Surcharged - outlet surcharged | 18) Status - Warning - water level within 209mm of cover level |
| 19) Status - Flooded - cover over-topped | 20) $\pm$ against diameter indicates throttle pipe used. | |

Title box

Hydrograph data

- | | | |
|---|--------------------------------------|--|
| 1) Ret. period - that used to calculate profile | 2) Duration - length of storm (mins) | 3) Profile - either Winter (75%) or Summer (50%) |
|---|--------------------------------------|--|

Flow restrictors

Manhole reference - SMH11-U2

Restrictor flowrate - 2 l/s

Flood volumes

Check that the upstream storage of the manhole is adequate to take the flood volume - see Upstrm Vol above.