



MasterDrain
SW

Muir Associates (UK) Limited

www.muir-associates.co.uk

Trinity Chambers,
18 Ivy Street,
Birkenhead CH41 5EF
Tel: 0151 650 1200 Mob: 07813 7770514
email: design@muir-associates.co.uk

Job No. 1132-22		
Sheet no. 1		
Date 21/11/22		
By MJ	Checked	Reviewed

Project

Title **Surcharge calcs (Sized at 30 yrs storm) for SURFACE WATER DESIGN.SW**

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

PEAK hydrograph values printed
Storm duration = 120 mins
No offline storage

Mean rain intens. 18.00 mm/hr
Storm profile = Summer
Using FSR data

Peak rain intens. 70.56 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 S-MH-01	42.1	4.4	225	1200	43.85	43.89	44.80	0.10	0.04	0.00	0.000	527	OK
2	I	1.02 S-MH-02	77.8	13.2	300	1200	43.58	43.65	44.80	0.17	0.07	0.00	0.000	1579	OK
3	I	1.03 S-MH-03	78.4	17.6	300	1200	43.43	43.51	44.80	0.22	0.08	0.00	0.000	2106	OK
4	I	1.04 S-MH-04	78.0	17.6	300	1500	43.30	43.38	44.60	0.23	0.08	0.00	0.000	2106	OK
5	B	2.01 S-MH-09	184.0	8.9	450	1500	43.08	43.12	44.35	0.05	0.04	0.00	0.000	1065	OK
6	B	2.02 S-MH-10	184.9	29.7	450	1500	42.99	43.09	44.35	0.16	0.10	0.00	0.000	3560	OK
7	B	2.03 S-MH-12	398.2	29.7	450	1500	42.87	42.92	44.35	0.07	0.06	0.00	0.000	3560	OK
8	I	1.05 S-MH-05	227.8	47.3	450	1500	42.79	42.91	44.42	0.21	0.12	0.00	0.000	5666	OK
9	B	3.01 S-MH-13	42.1	4.4	225	1200	43.90	43.94	44.80	0.10	0.04	0.00	0.000	527	OK
10	B	3.02 S-MH-14	95.8	13.2	300	1200	43.70	43.76	44.80	0.14	0.06	0.00	0.000	1582	OK
11	B	3.03 S-MH-15	298.4	17.6	300	1200	43.47	43.51	44.92	0.06	0.03	0.00	0.000	2109	OK
12	I	1.06 S-MH-06‡	14.6	4.8	150	1500	42.72	42.77	44.75	0.33	0.05	0.00	0.000	7775	OK
13	I	1.07 S-MH-07	14.6	4.6	150	1200	42.65	42.71	44.35	0.32	0.05	0.00	0.000	0	OK
14	I	1.08 S-MH-08	18.6	4.6	150	1200	42.40	42.45	44.46	0.25	0.05	0.00	0.000	0	OK



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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 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 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 - S-MH-06

Restrictor flowrate - 4.83 l/s



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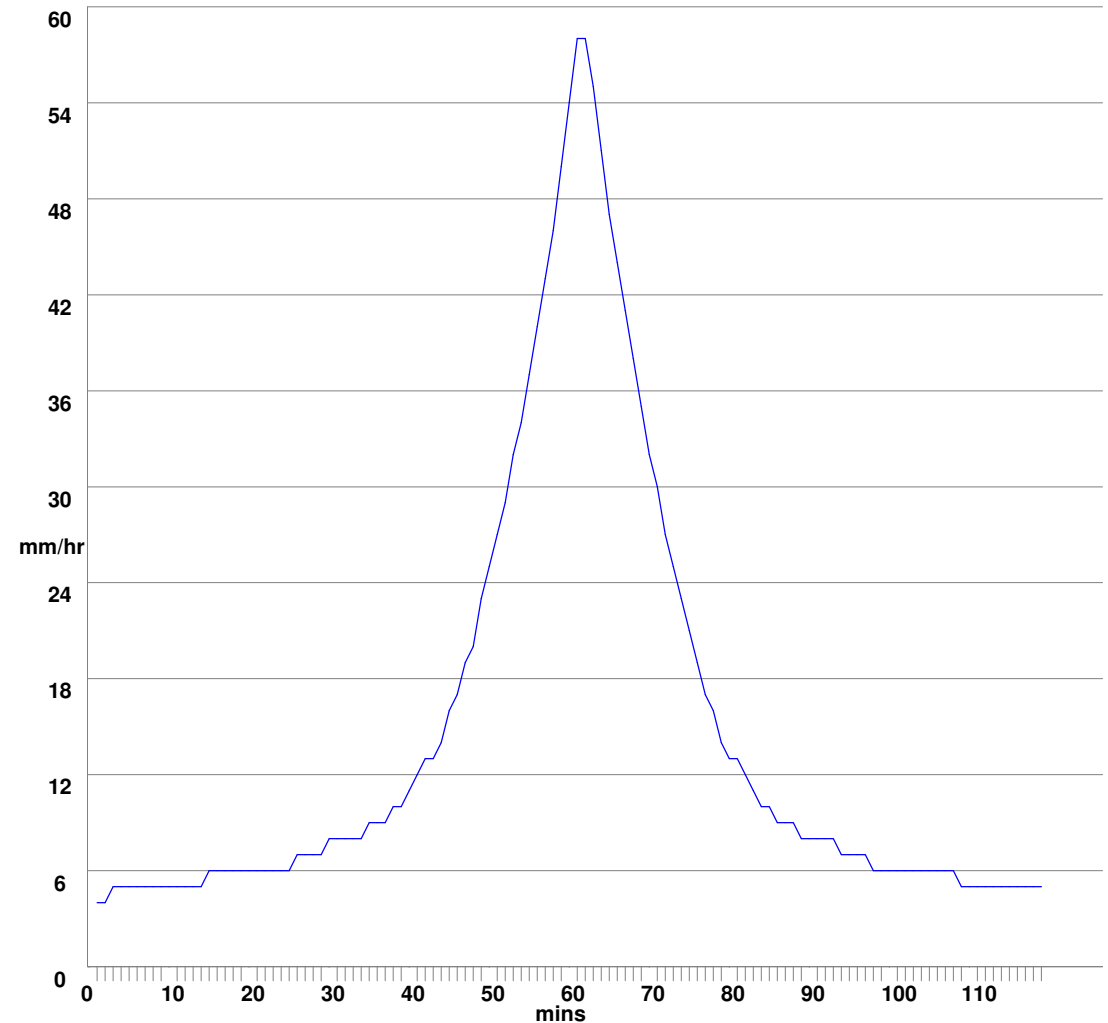
Project

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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
1:00	4.13	41:00	11.80	81:00	12.69
2:00	4.13	42:00	12.54	82:00	11.95
3:00	4.72	43:00	13.28	83:00	11.21
4:00	4.72	44:00	14.31	84:00	10.48
5:00	4.72	45:00	15.64	85:00	10.03
6:00	4.87	46:00	17.26	86:00	9.44
7:00	4.87	47:00	18.74	87:00	9.00
8:00	5.02	48:00	20.36	88:00	8.70
9:00	5.02	49:00	22.57	89:00	8.41
10:00	5.16	50:00	24.79	90:00	8.26
11:00	5.16	51:00	27.00	91:00	7.82
12:00	5.16	52:00	29.36	92:00	7.52
13:00	5.31	53:00	31.87	93:00	7.52
14:00	5.31	54:00	34.23	94:00	7.38
15:00	5.61	55:00	36.88	95:00	7.23
16:00	5.61	56:00	40.13	96:00	7.08
17:00	5.61	57:00	43.23	97:00	6.64
18:00	5.75	58:00	46.47	98:00	6.49
19:00	5.90	59:00	50.16	99:00	6.34
20:00	6.05	60:00	54.00	100:00	6.34
21:00	6.05	61:00	57.83	101:00	6.20
22:00	6.20	62:00	57.83	102:00	6.05
23:00	6.20	63:00	54.74	103:00	6.05
24:00	6.34	64:00	50.75	104:00	5.90
25:00	6.49	65:00	47.21	105:00	5.75
26:00	6.64	66:00	43.82	106:00	5.75
27:00	6.93	67:00	40.57	107:00	5.61
28:00	7.23	68:00	37.62	108:00	5.61
29:00	7.38	69:00	34.82	109:00	5.31
30:00	7.52	70:00	32.31	110:00	5.31
31:00	7.52	71:00	29.80	111:00	5.16
32:00	7.82	72:00	27.29	112:00	5.16
33:00	7.97	73:00	25.23	113:00	5.16
34:00	8.41	74:00	22.87	114:00	5.02
35:00	8.70	75:00	20.95	115:00	5.02
36:00	9.00	76:00	19.03	116:00	4.87
37:00	9.29	77:00	17.41	117:00	4.87
38:00	9.88	78:00	15.93	118:00	4.87
39:00	10.33	79:00	14.46	119:00	4.72
40:00	11.07	80:00	13.43	120:00	4.72

Hydrograph profile derived from data in the Flood Studies Report

Return period= 30 yrs Duration= 120 mins Profile - summer





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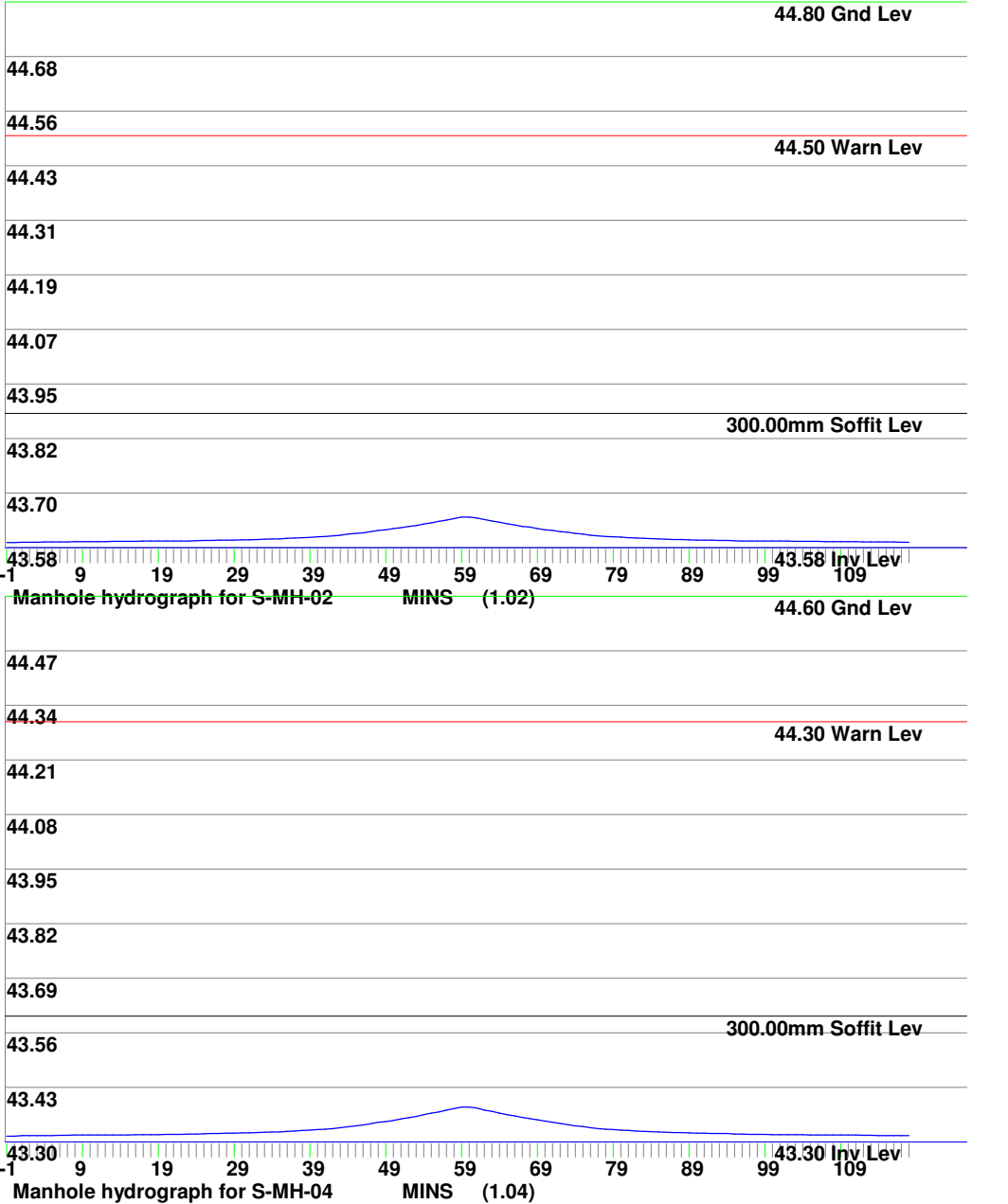
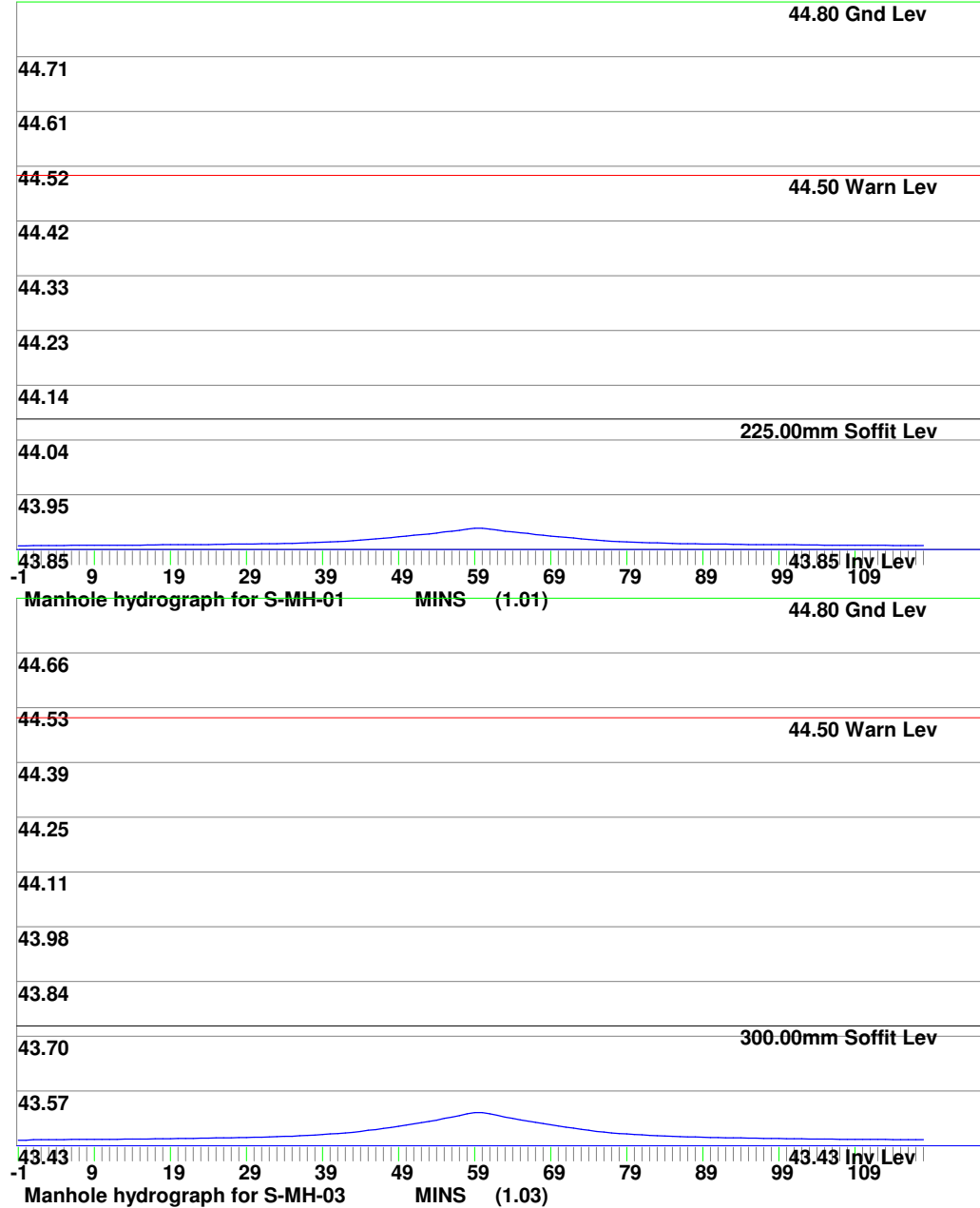
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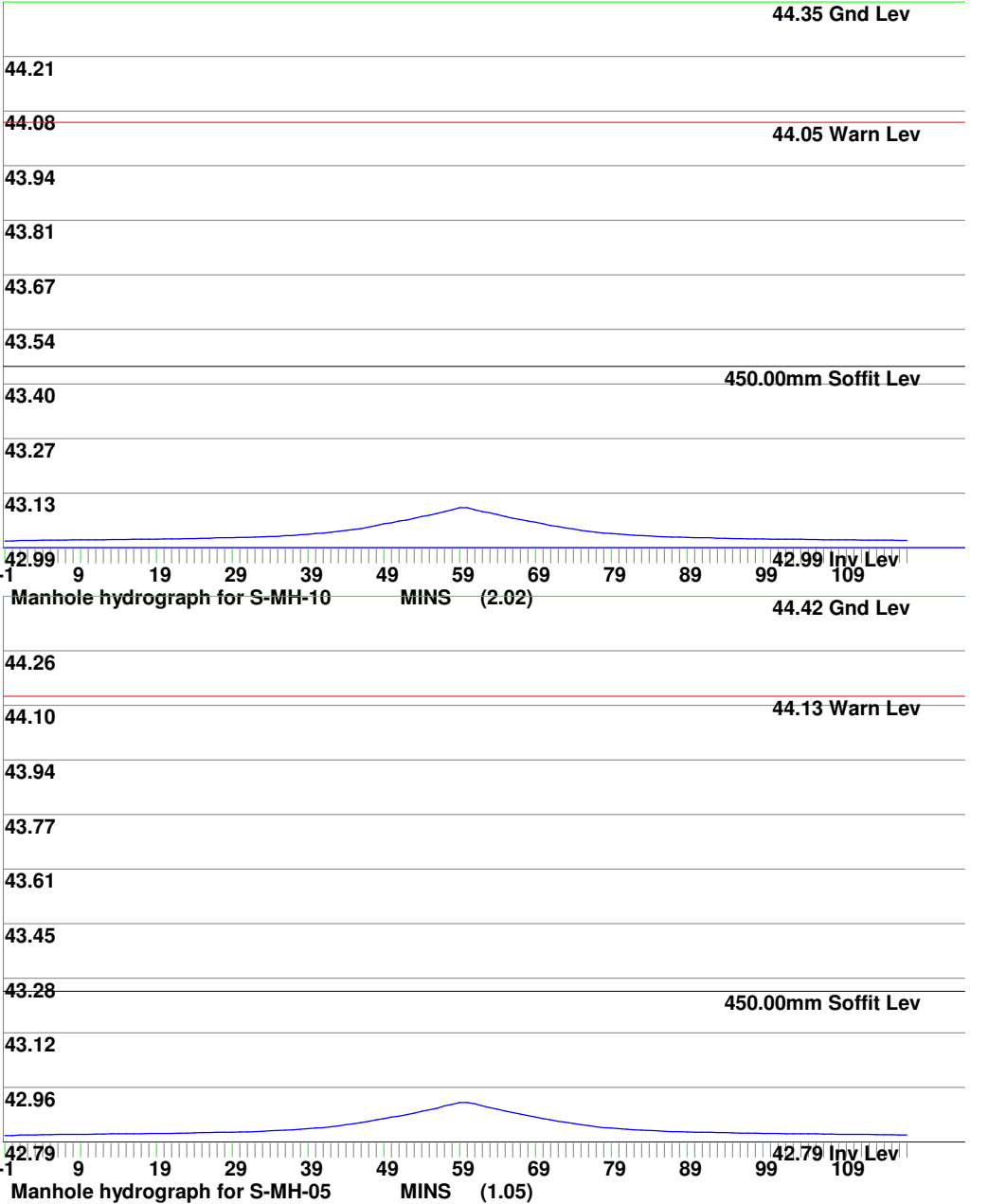
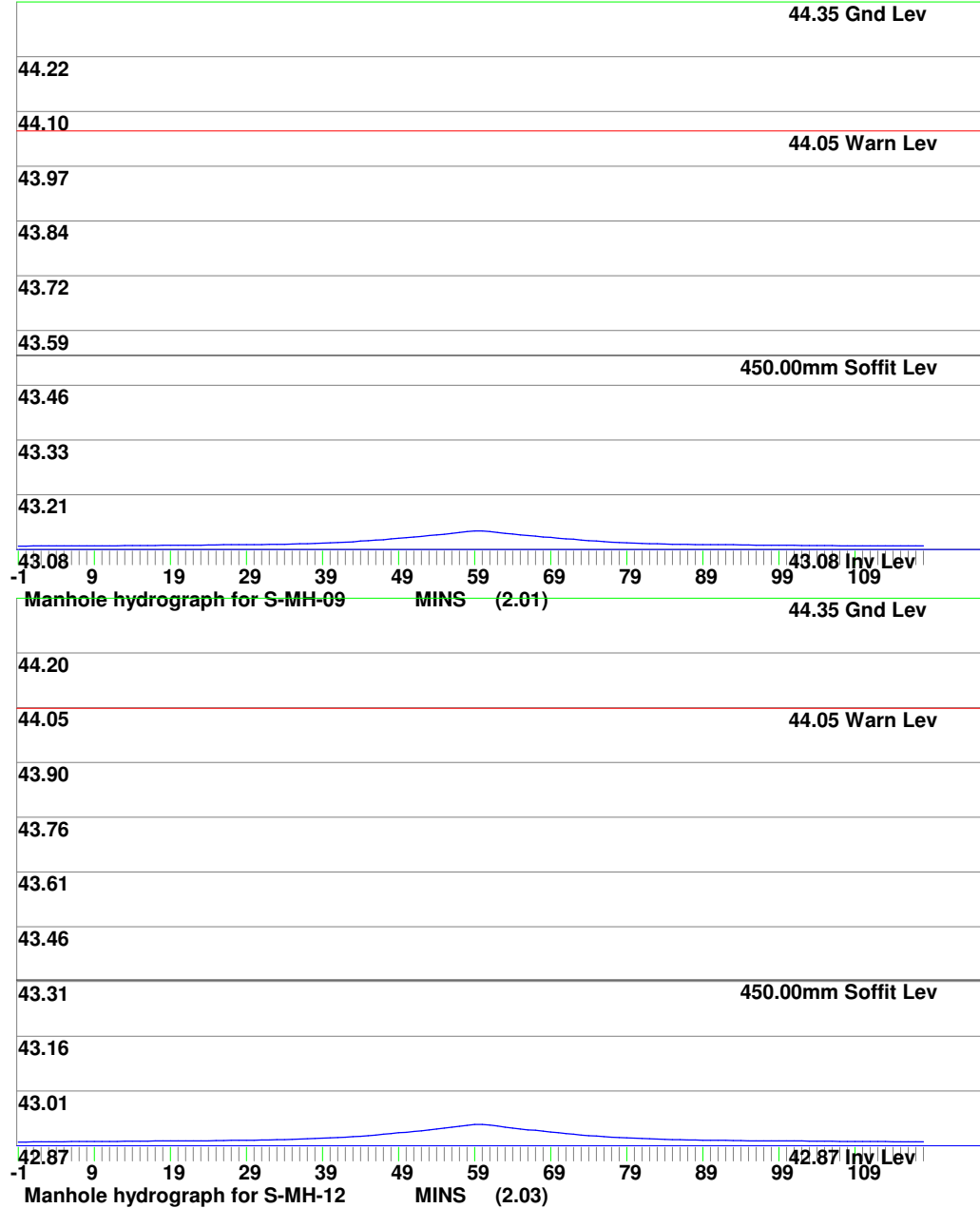
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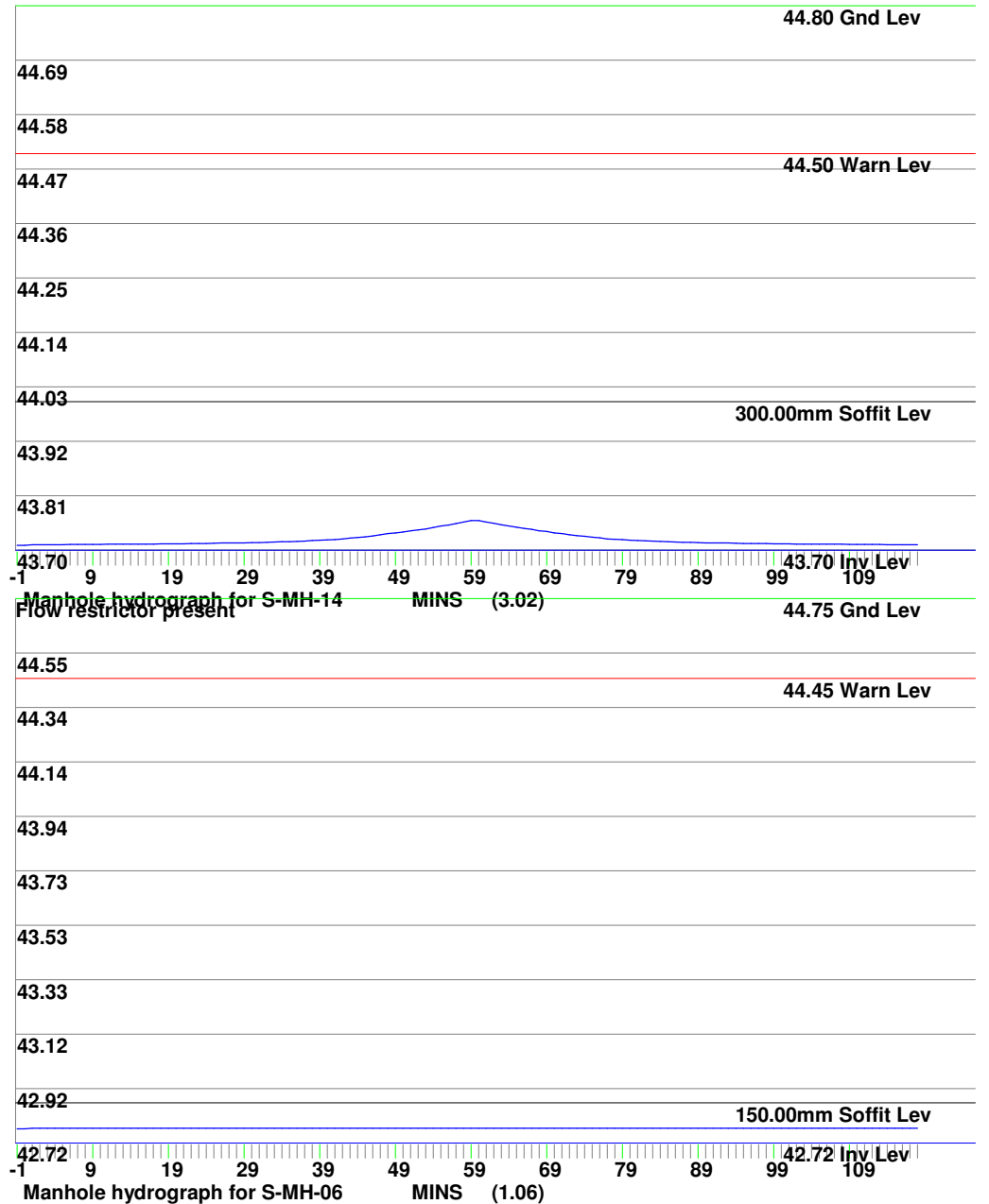




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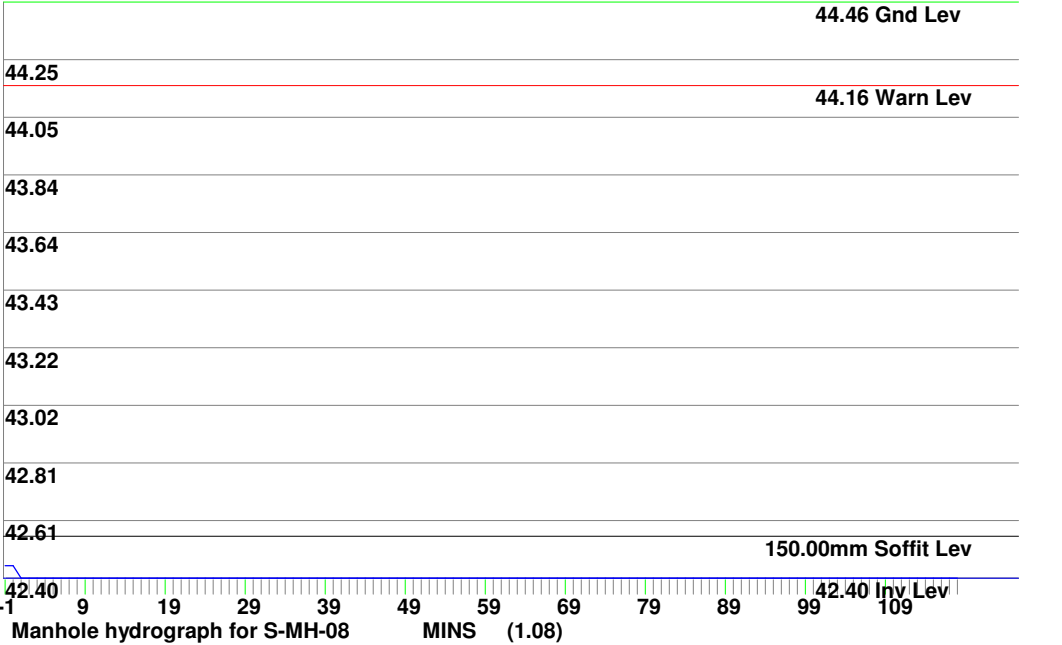
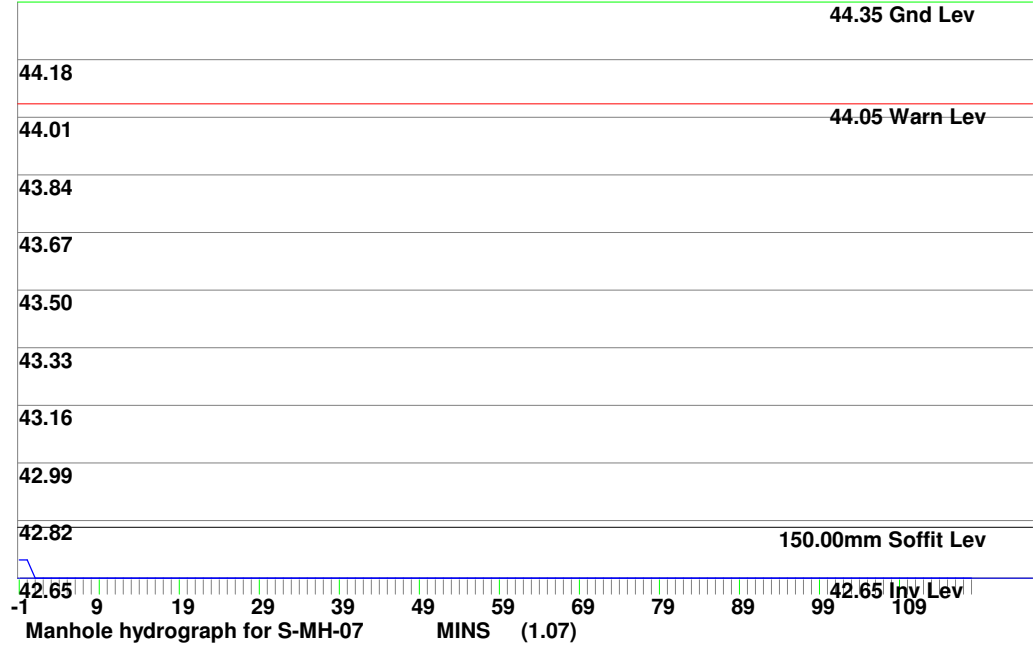
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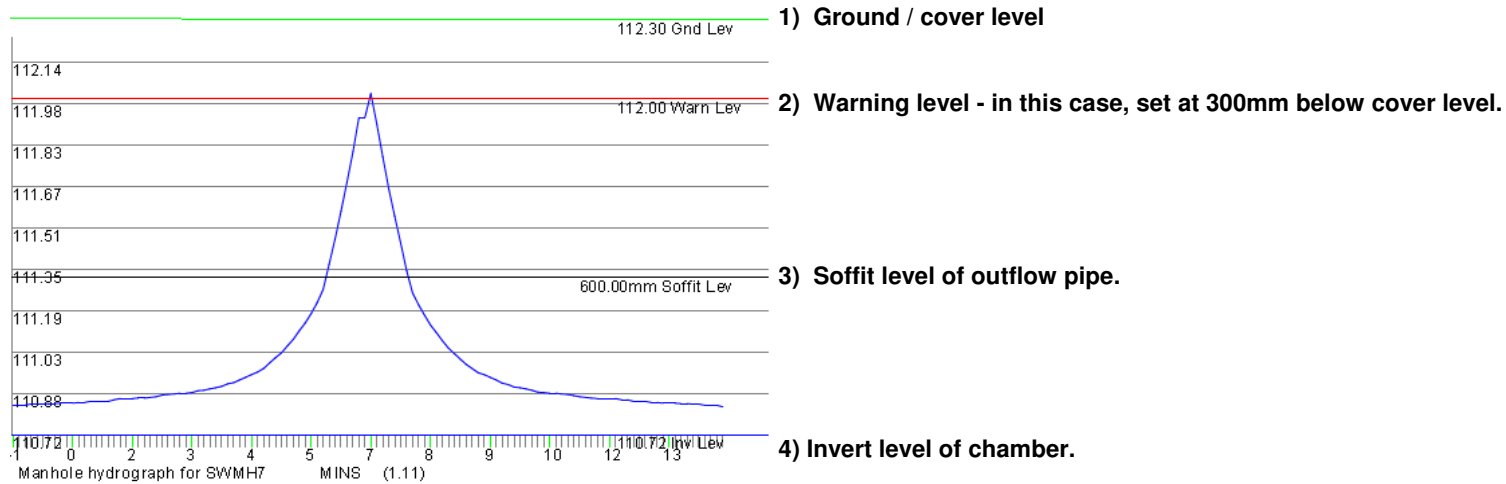
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Notes

- Lower section of the graph shows the water depth filling the channel. Channel is assumed to be a full pipe diameter in depth.
- Upper section of the graph shows the water depth filling the chamber. Chamber has a greater width/diameter than the channel, so increases in depth are proportionally less.
- The top of the graph clips the warning level and would be marked thus on the printout.
- In many cases the invert of the offline storage is required to enter at the channel soffit level, meaning that the pipe will still surcharge but flooding risk reduced.
- The diagram above is a general one and is not part of the current calculation.