



MasterDrain
SW

Muir Associates (UK) Limited

www.muir-associates.co.uk

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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 = 30 mins
No offline storage

Mean rain intens. 47.00 mm/hr
Storm profile = Winter
Using FSR data

Peak rain intens. 117.50 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 m³	DRAINED AREA (m²) x FACTOR	STATUS
1	I	1.01 S-MH-01	42.1	7.4	225	1200	43.85	43.91	44.80	0.18	0.05	0.00	0.000	527	OK
2	I	1.02 S-MH-02	77.8	22.3	300	1200	43.58	43.68	44.80	0.29	0.10	0.00	0.000	1579	OK
3	I	1.03 S-MH-03	78.4	29.7	300	1200	43.43	43.55	44.80	0.38	0.12	0.00	0.000	2106	OK
4	I	1.04 S-MH-04	78.0	29.7	300	1500	43.30	43.42	44.60	0.38	0.12	0.00	0.000	2106	OK
5	B	2.01 S-MH-09	184.0	15.0	450	1500	43.08	43.14	44.35	0.08	0.06	0.00	0.000	1065	OK
6	B	2.02 S-MH-10	184.9	50.2	450	1500	42.99	43.14	44.35	0.27	0.14	0.00	0.000	3560	OK
7	B	2.03 S-MH-12	398.2	50.2	450	1500	42.87	42.95	44.35	0.13	0.08	0.00	0.000	3560	OK
8	I	1.05 S-MH-05	227.8	80.0	450	1500	42.79	42.97	44.42	0.35	0.17	0.00	0.000	5666	OK
9	B	3.01 S-MH-13	42.1	7.4	225	1200	43.90	43.95	44.80	0.18	0.05	0.00	0.000	527	OK
10	B	3.02 S-MH-14	95.8	22.3	300	1200	43.70	43.79	44.80	0.23	0.09	0.00	0.000	1582	OK
11	B	3.03 S-MH-15	298.4	29.8	300	1200	43.47	43.52	44.92	0.10	0.05	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	0.0	150	1200	42.65	42.66	44.35	0.00	0.00	0.00	0.000	0	OK
14	I	1.08 S-MH-08	18.6	0.0	150	1200	42.40	42.40	44.46	0.00	0.00	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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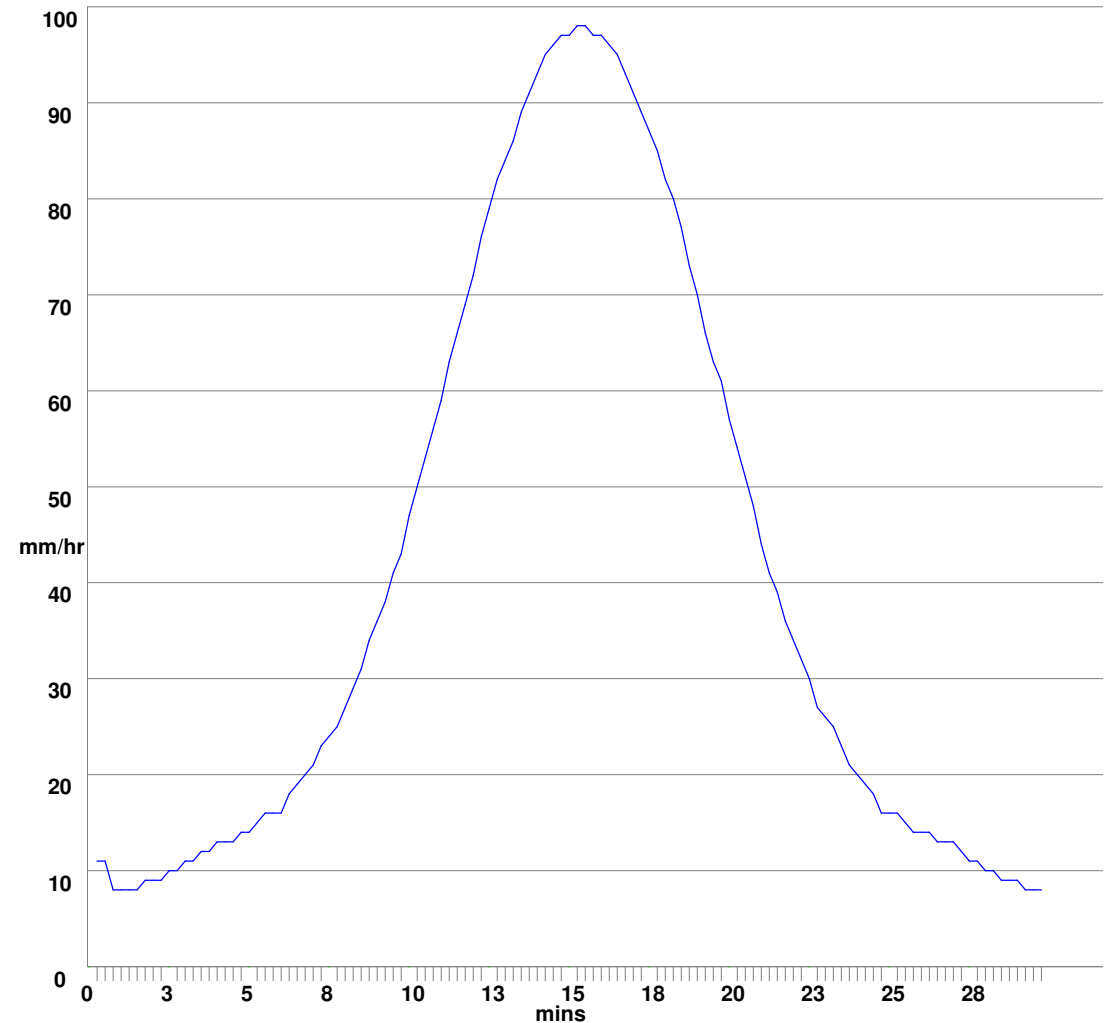
Project

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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
0:15	10.55	10:15	50.04	20:15	53.55
0:30	10.55	10:30	53.16	20:30	50.82
0:45	7.82	10:45	55.90	20:45	47.69
1:00	7.82	11:00	59.42	21:00	43.78
1:15	7.82	11:15	62.94	21:15	41.05
1:30	7.82	11:30	66.06	21:30	38.70
1:45	8.60	11:45	68.80	21:45	36.35
2:00	8.60	12:00	72.32	22:00	34.01
2:15	8.99	12:15	76.23	22:15	32.05
2:30	9.77	12:30	78.96	22:30	29.71
2:45	10.16	12:45	82.09	22:45	27.36
3:00	10.55	13:00	84.04	23:00	25.80
3:15	11.34	13:15	86.39	23:15	24.63
3:30	11.73	13:30	88.74	23:30	23.45
3:45	12.12	13:45	90.69	23:45	21.50
4:00	12.51	14:00	93.04	24:00	20.33
4:15	12.90	14:15	94.60	24:15	19.15
4:30	13.29	14:30	96.16	24:30	17.59
4:45	13.68	14:45	96.94	24:45	16.42
5:00	14.46	15:00	97.34	25:00	16.03
5:15	14.85	15:15	97.73	25:15	15.64
5:30	15.64	15:30	97.73	25:30	15.25
5:45	15.64	15:45	97.34	25:45	14.46
6:00	16.42	16:00	96.94	26:00	14.07
6:15	17.59	16:15	96.16	26:15	13.68
6:30	18.76	16:30	94.99	26:30	12.90
6:45	19.94	16:45	93.43	26:45	12.51
7:00	21.50	17:00	91.47	27:00	12.51
7:15	22.67	17:15	89.13	27:15	11.73
7:30	24.24	17:30	86.78	27:30	11.34
7:45	25.41	17:45	84.83	27:45	10.55
8:00	27.36	18:00	82.48	28:00	10.16
8:15	29.32	18:15	79.74	28:15	9.77
8:30	31.27	18:30	76.62	28:30	9.38
8:45	33.62	18:45	73.10	28:45	8.60
9:00	35.96	19:00	69.58	29:00	8.60
9:15	37.92	19:15	66.45	29:15	8.21
9:30	40.65	19:30	63.33	29:30	7.82
9:45	43.39	19:45	60.59	29:45	7.82
10:00	46.91	20:00	56.68	30:00	7.82

Hydrograph profile derived from data in the Flood Studies Report

Return period= 30 yrs Duration= 30 mins Profile - winter





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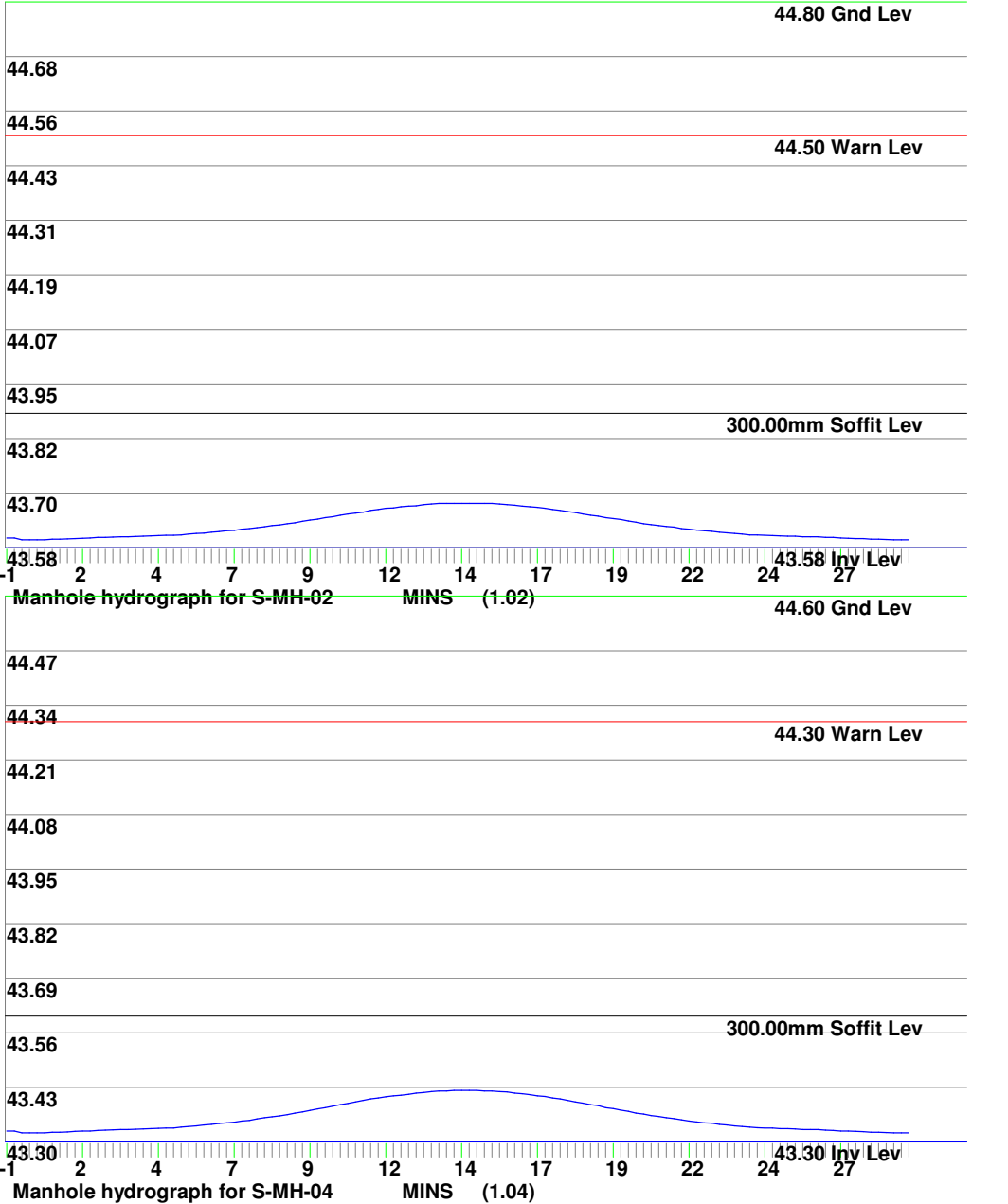
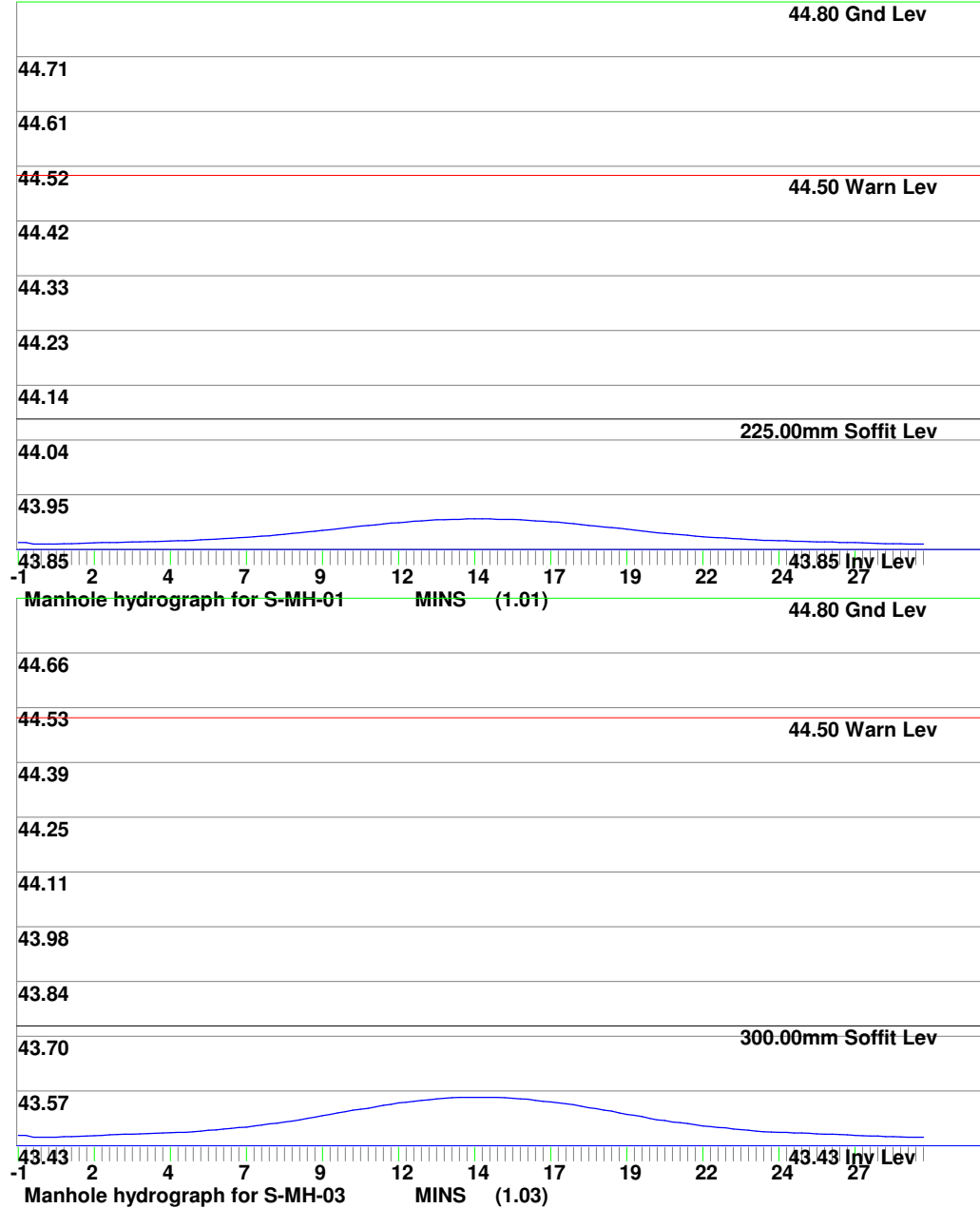
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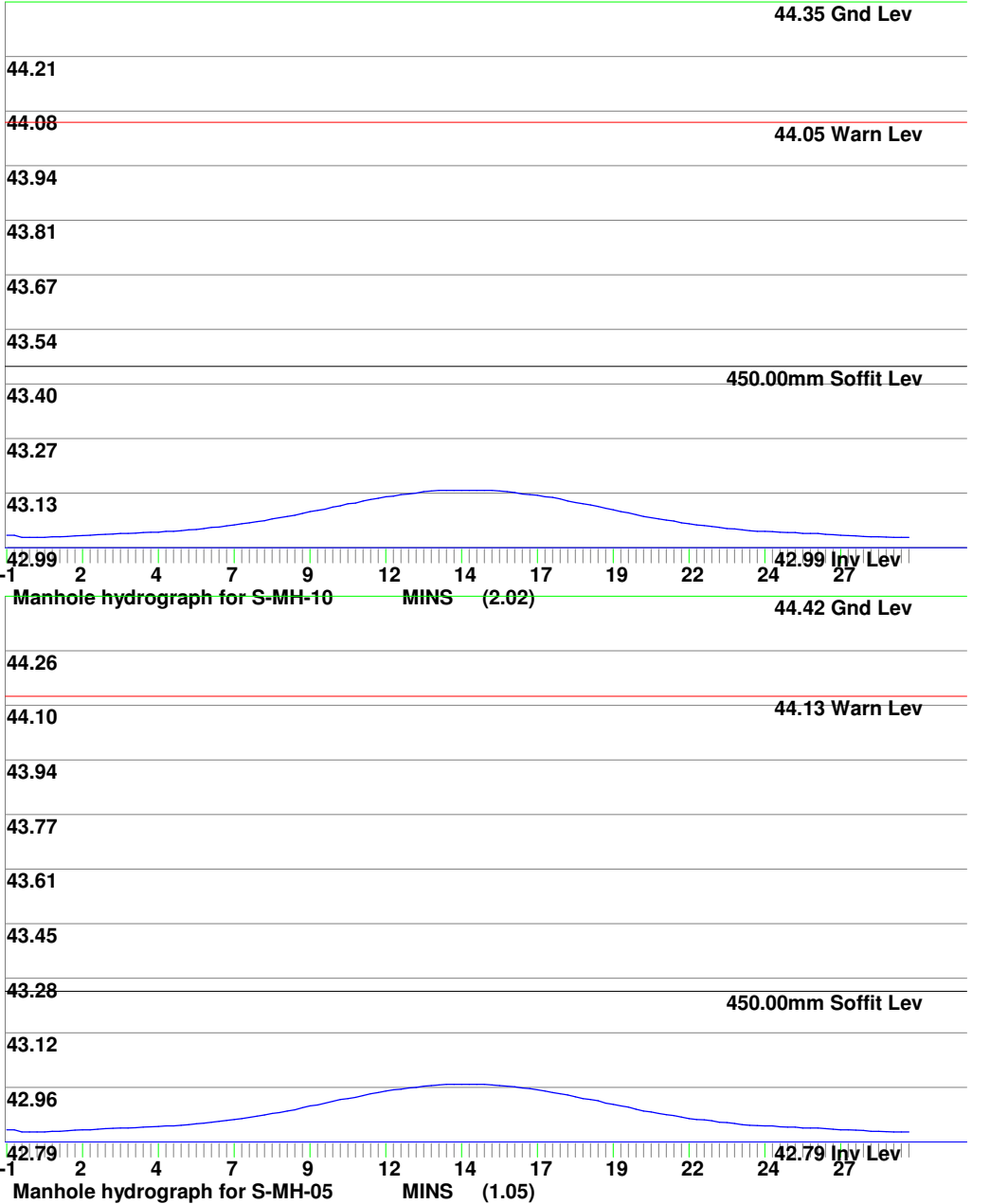
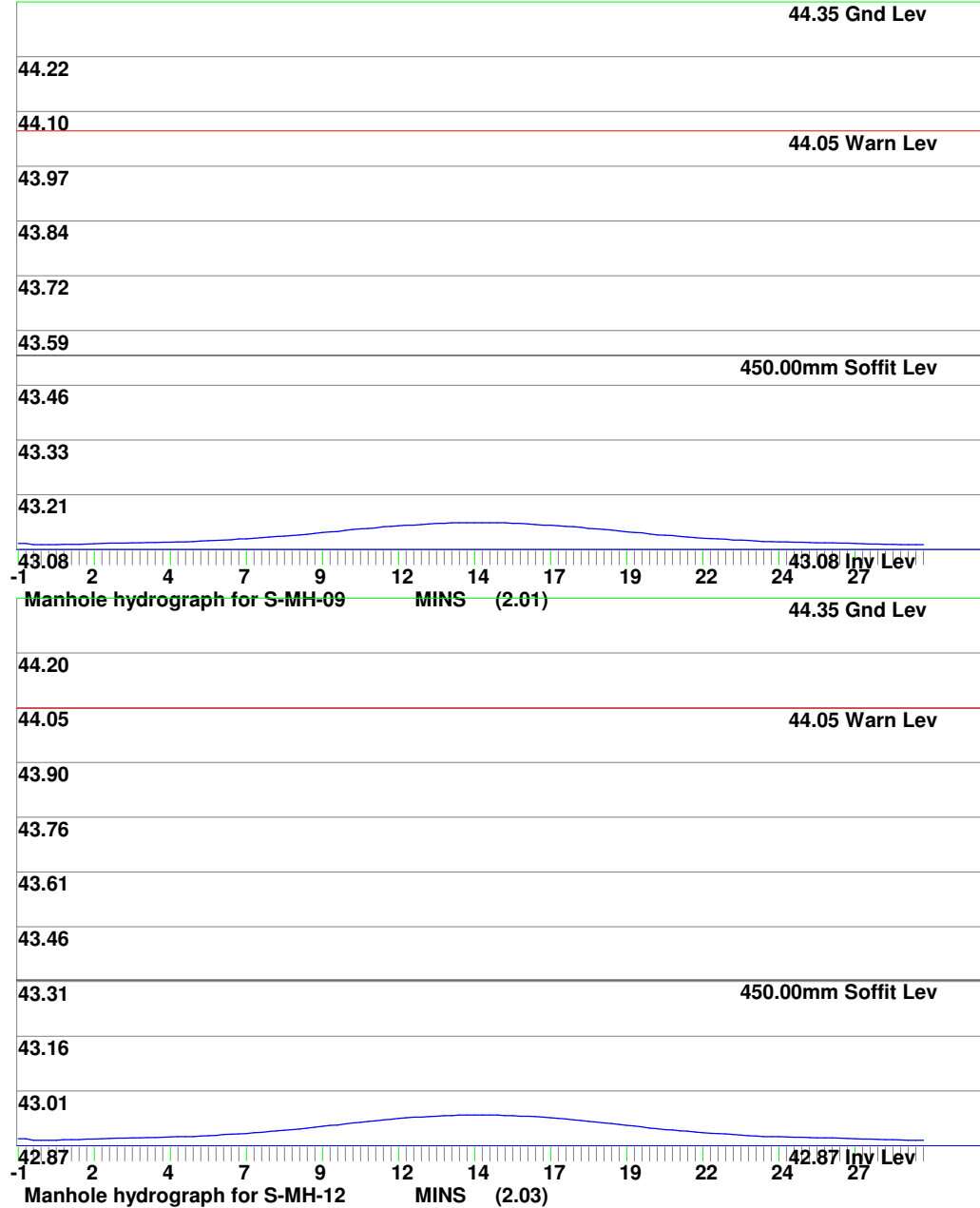
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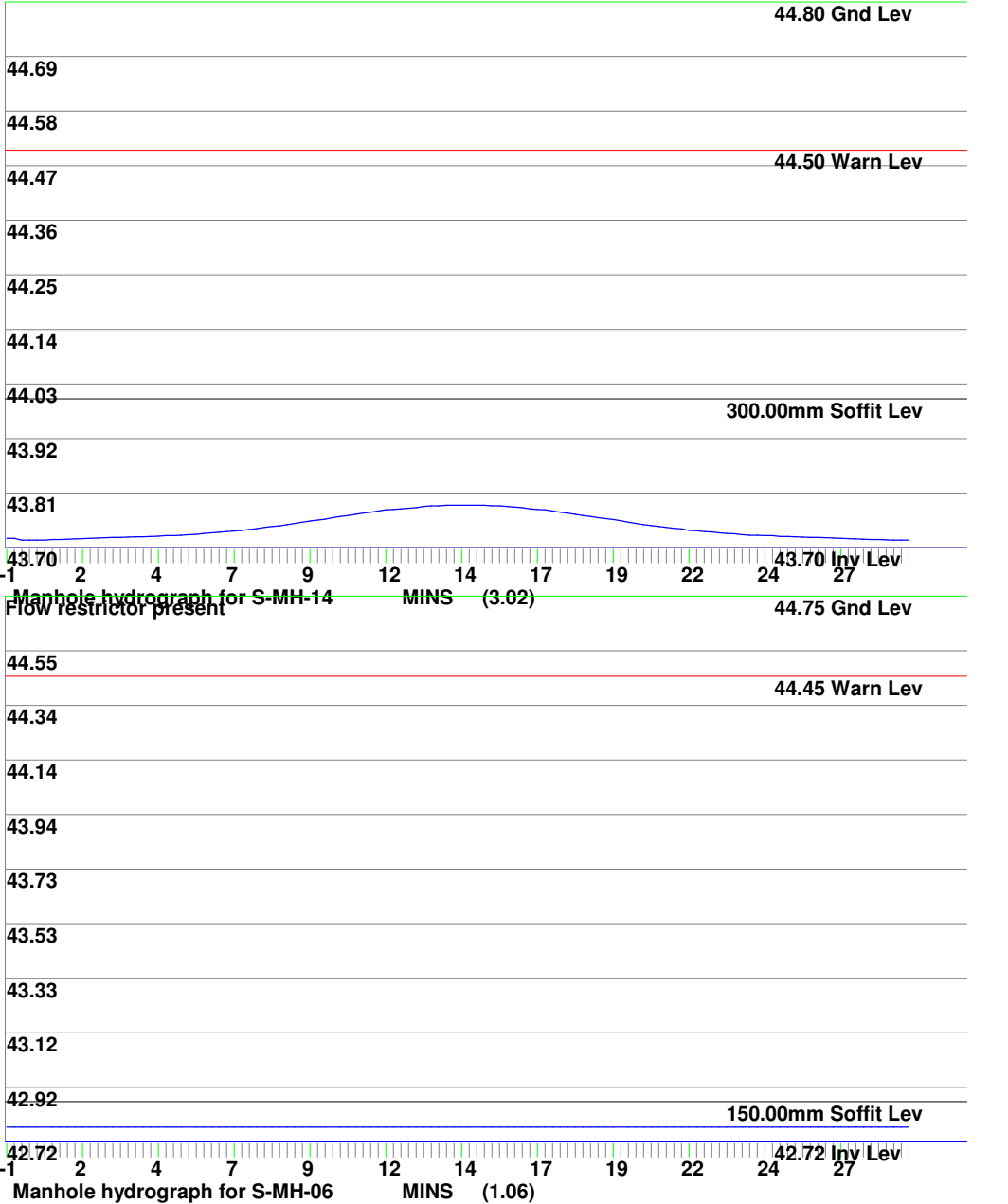
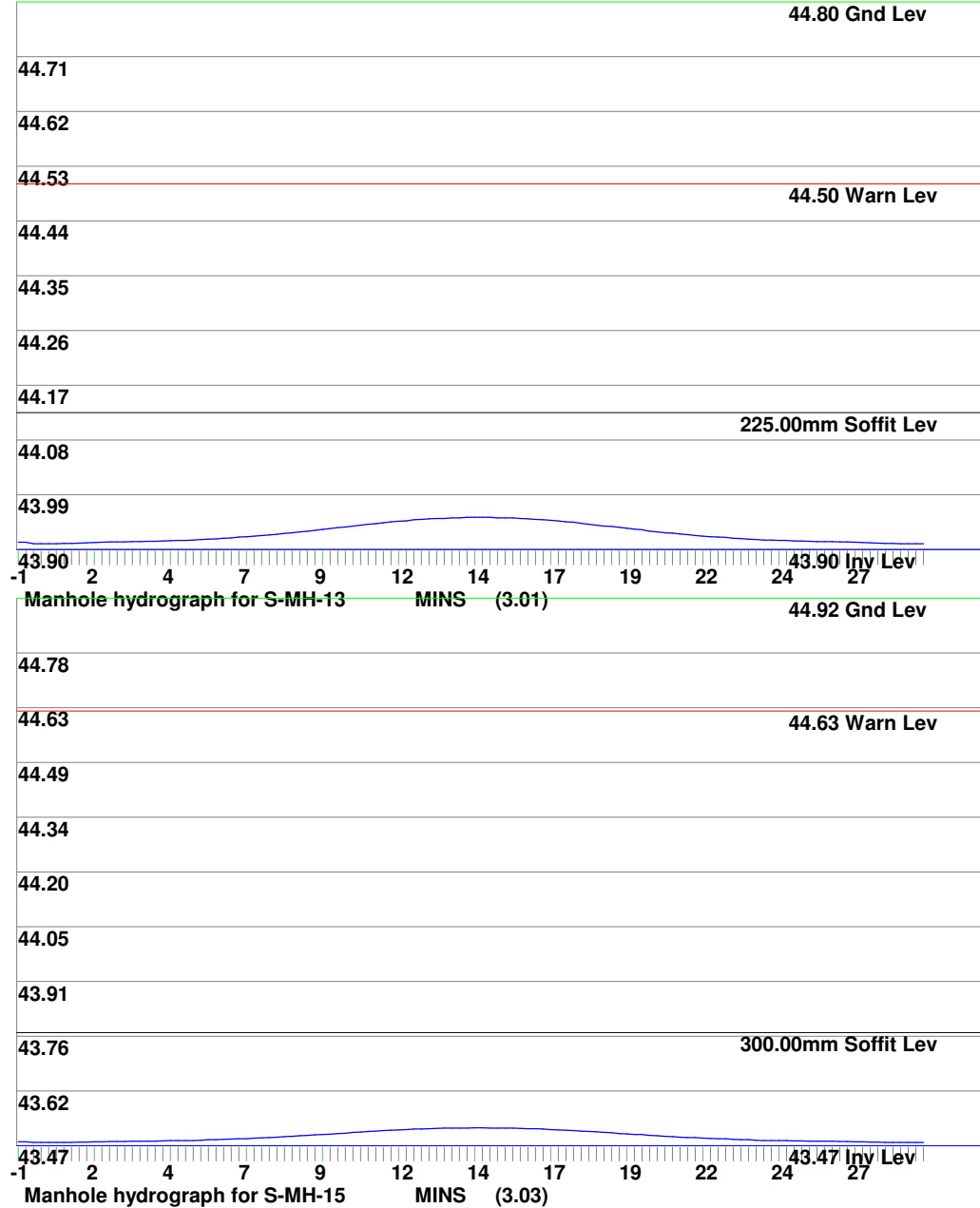
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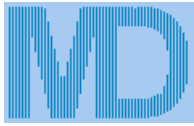
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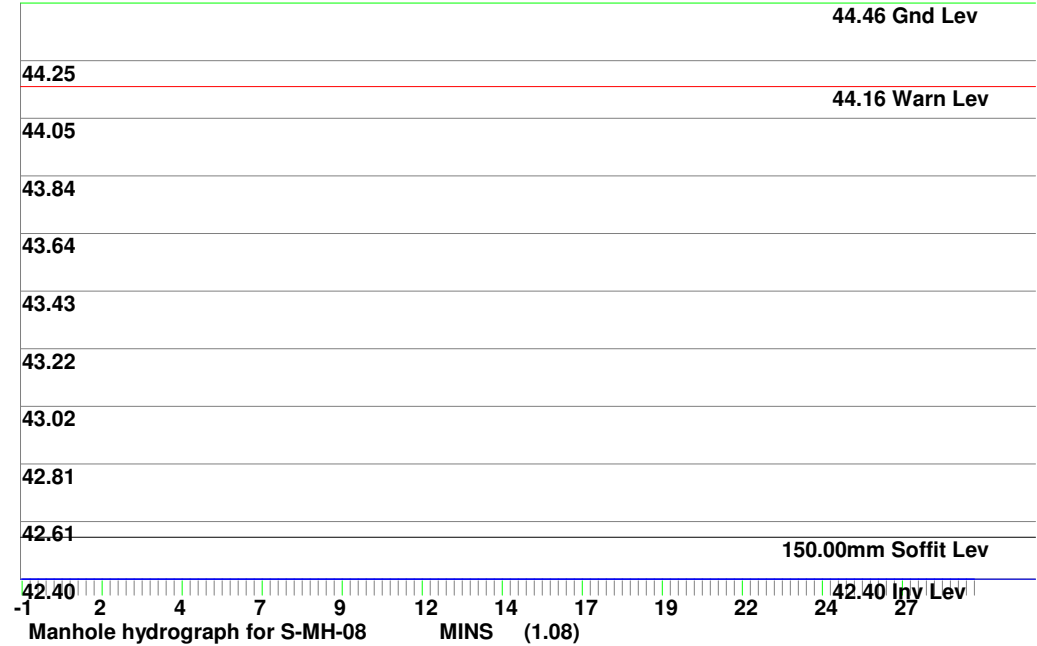
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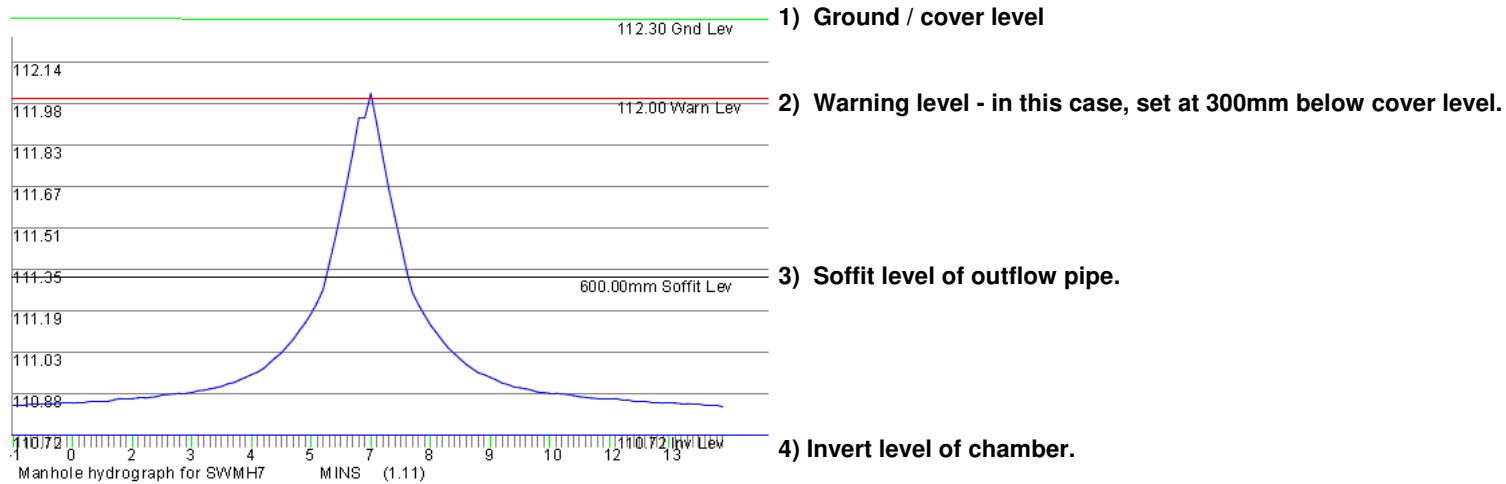
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Notes

- 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.