



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 = Summer
Using FSR data

Peak rain intens. 184.24 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	11.7	225	1200	43.85	43.93	44.80	0.28	0.07	0.00	0.000	527	OK
2	I	1.02 S-MH-02	77.8	34.9	300	1200	43.58	43.72	44.80	0.45	0.14	0.00	0.000	1579	OK
3	I	1.03 S-MH-03	78.4	46.6	300	1200	43.43	43.60	44.80	0.59	0.17	0.00	0.000	2106	OK
4	I	1.04 S-MH-04	78.0	46.6	300	1500	43.30	43.47	44.60	0.60	0.17	0.00	0.000	2106	OK
5	B	2.01 S-MH-09	184.0	23.6	450	1500	43.08	43.16	44.35	0.13	0.08	0.00	0.000	1065	OK
6	B	2.02 S-MH-10	184.9	78.8	450	1500	42.99	43.19	44.35	0.43	0.20	0.00	0.000	3560	OK
7	B	2.03 S-MH-12	398.2	78.8	450	1500	42.87	42.98	44.35	0.20	0.11	0.00	0.000	3560	OK
8	I	1.05 S-MH-05	227.8	125.4	450	1500	42.79	43.04	44.42	0.55	0.24	0.00	0.000	5666	OK
9	B	3.01 S-MH-13	42.1	11.7	225	1200	43.90	43.97	44.80	0.28	0.07	0.00	0.000	527	OK
10	B	3.02 S-MH-14	95.8	35.0	300	1200	43.70	43.82	44.80	0.37	0.12	0.00	0.000	1582	OK
11	B	3.03 S-MH-15	298.4	46.7	300	1200	43.47	43.54	44.92	0.16	0.07	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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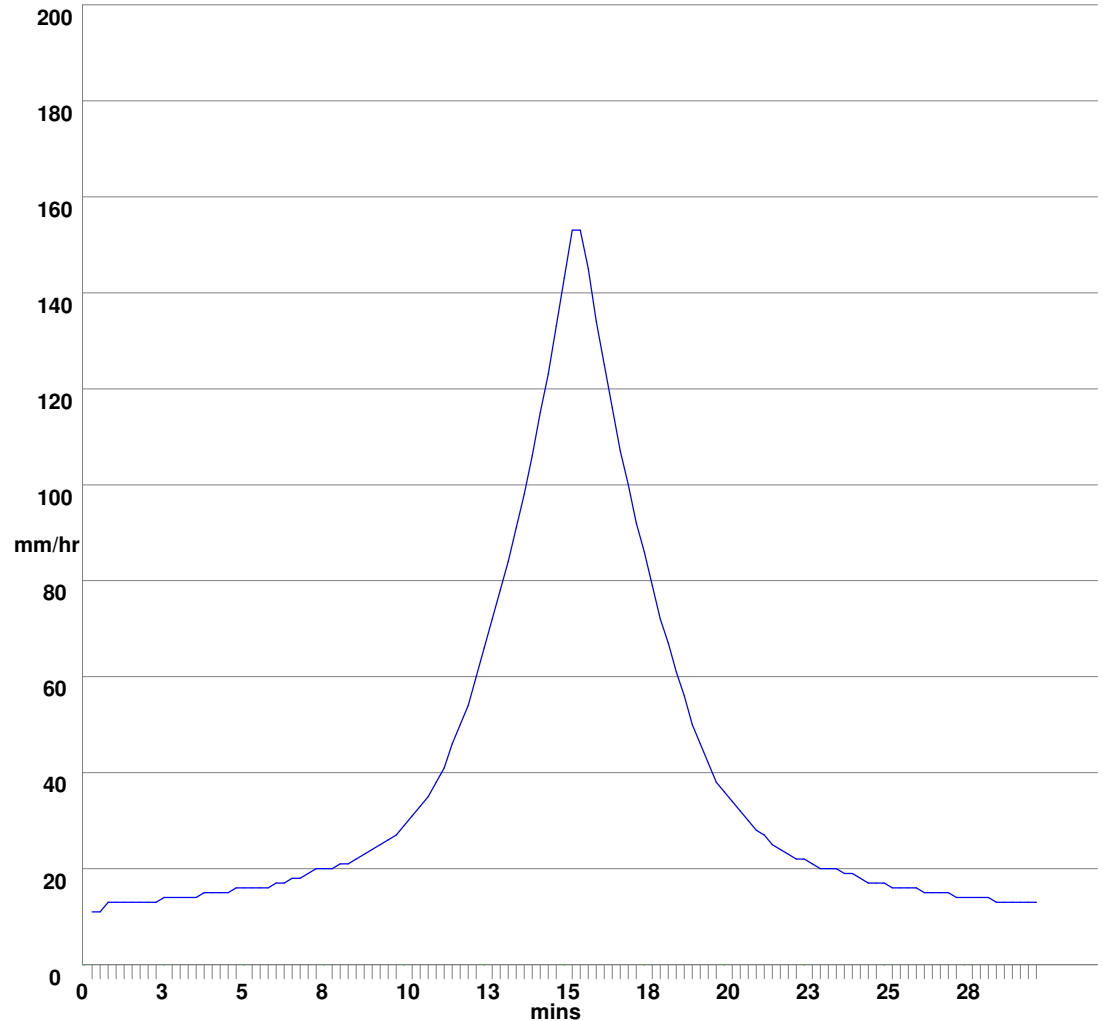
Project

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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
0:15	10.95	10:15	31.27	20:15	33.62
0:30	10.95	10:30	33.23	20:30	31.66
0:45	12.51	10:45	35.18	20:45	29.71
1:00	12.51	11:00	37.92	21:00	27.75
1:15	12.51	11:15	41.44	21:15	26.58
1:30	12.90	11:30	45.74	21:30	25.02
1:45	12.90	11:45	49.65	21:45	23.85
2:00	13.29	12:00	53.95	22:00	23.06
2:15	13.29	12:15	59.81	22:15	22.28
2:30	13.68	12:30	65.67	22:30	21.89
2:45	13.68	12:45	71.54	22:45	20.72
3:00	13.68	13:00	77.79	23:00	19.94
3:15	14.07	13:15	84.44	23:15	19.94
3:30	14.07	13:30	90.69	23:30	19.55
3:45	14.85	13:45	97.73	23:45	19.15
4:00	14.85	14:00	106.33	24:00	18.76
4:15	14.85	14:15	114.54	24:15	17.59
4:30	15.25	14:30	123.14	24:30	17.20
4:45	15.64	14:45	132.91	24:45	16.81
5:00	16.03	15:00	143.07	25:00	16.81
5:15	16.03	15:15	153.24	25:15	16.42
5:30	16.42	15:30	153.24	25:30	16.03
5:45	16.42	15:45	145.03	25:45	16.03
6:00	16.81	16:00	134.47	26:00	15.64
6:15	17.20	16:15	125.09	26:15	15.25
6:30	17.59	16:30	116.10	26:30	15.25
6:45	18.37	16:45	107.50	26:45	14.85
7:00	19.15	17:00	99.68	27:00	14.85
7:15	19.55	17:15	92.25	27:15	14.07
7:30	19.94	17:30	85.61	27:30	14.07
7:45	19.94	17:45	78.96	27:45	13.68
8:00	20.72	18:00	72.32	28:00	13.68
8:15	21.11	18:15	66.84	28:15	13.68
8:30	22.28	18:30	60.59	28:30	13.29
8:45	23.06	18:45	55.51	28:45	13.29
9:00	23.85	19:00	50.43	29:00	12.90
9:15	24.63	19:15	46.13	29:15	12.90
9:30	26.19	19:30	42.22	29:30	12.90
9:45	27.36	19:45	38.31	29:45	12.51
10:00	29.32	20:00	35.57	30:00	12.51

Hydrograph profile derived from data in the Flood Studies Report

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





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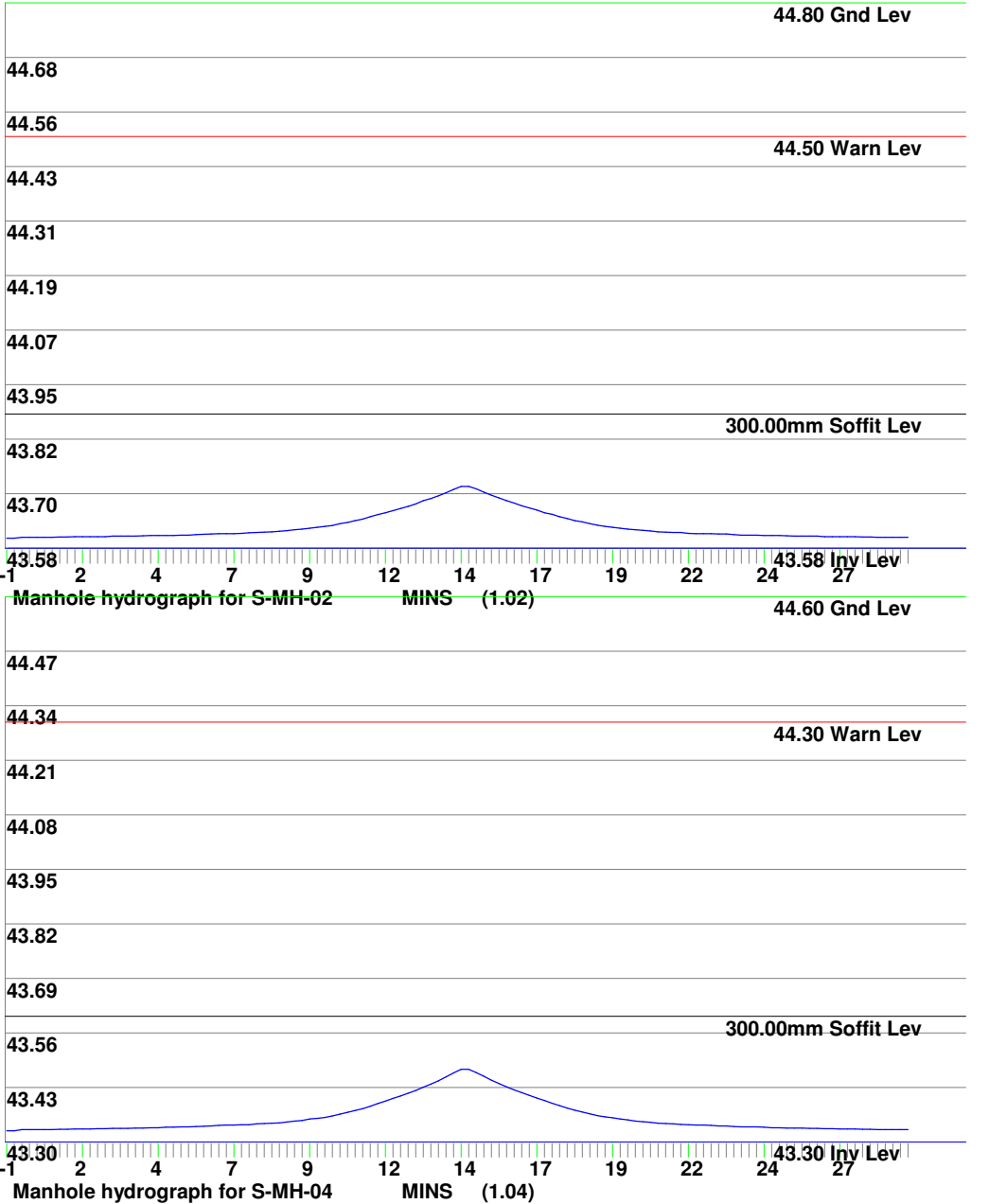
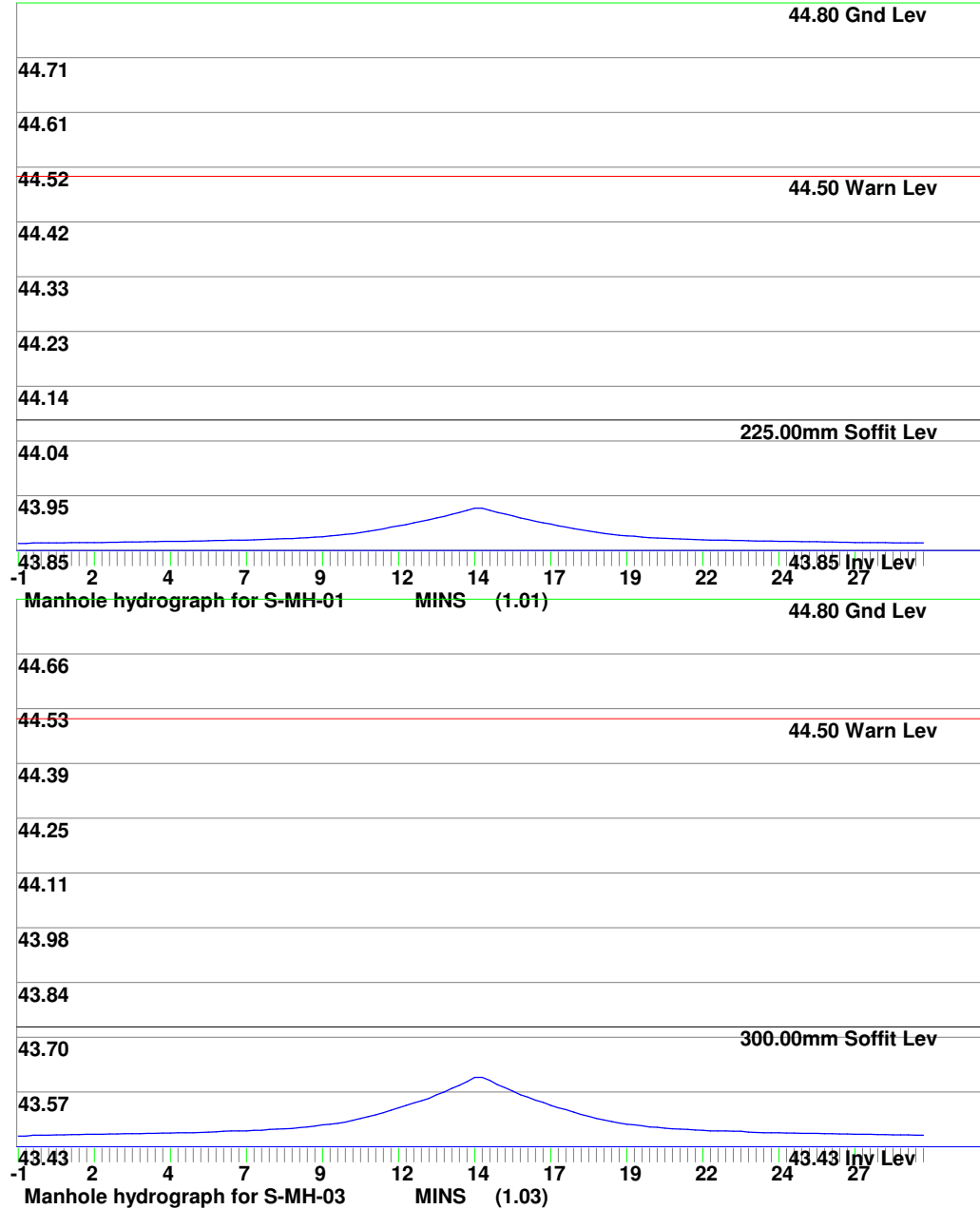
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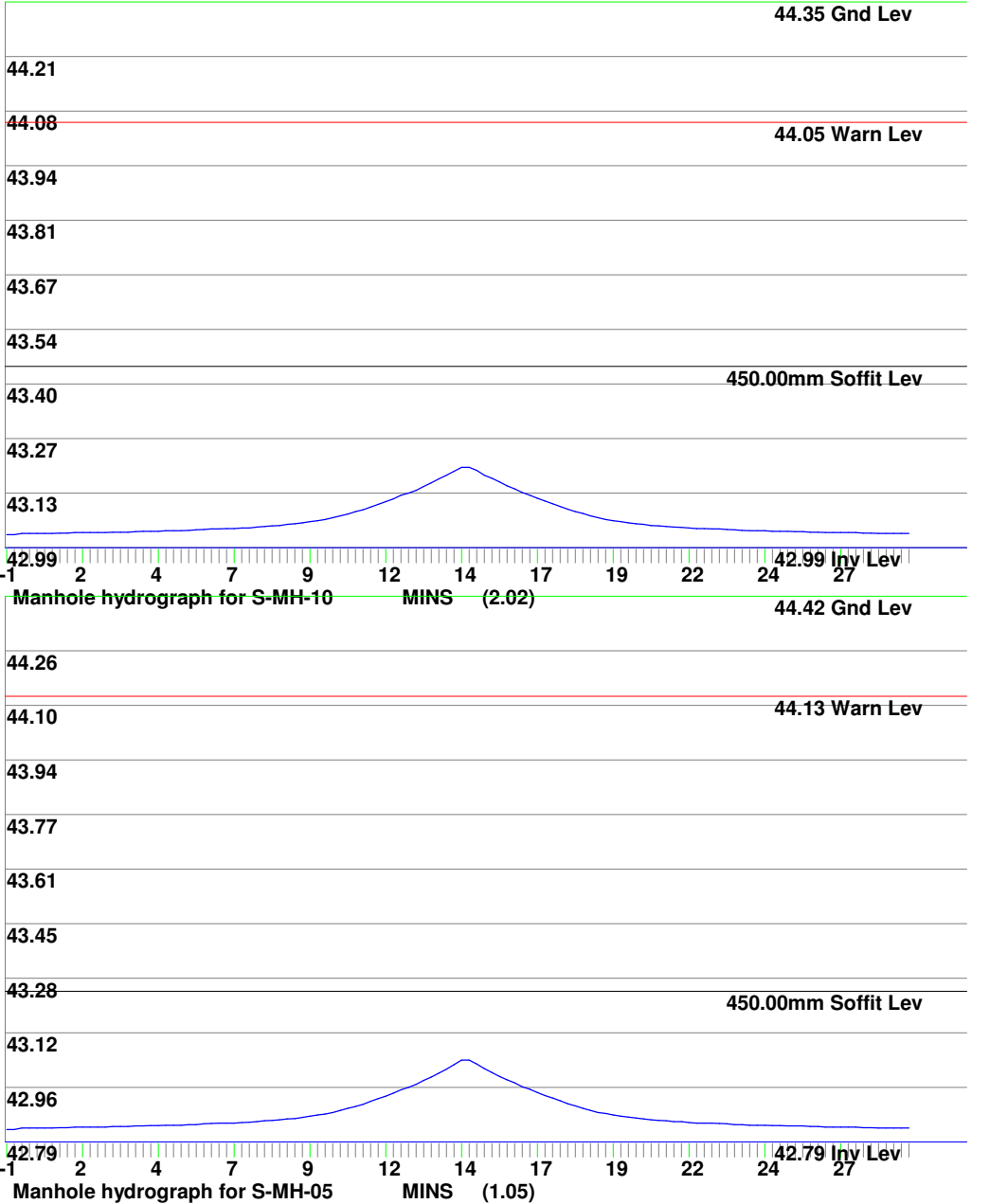
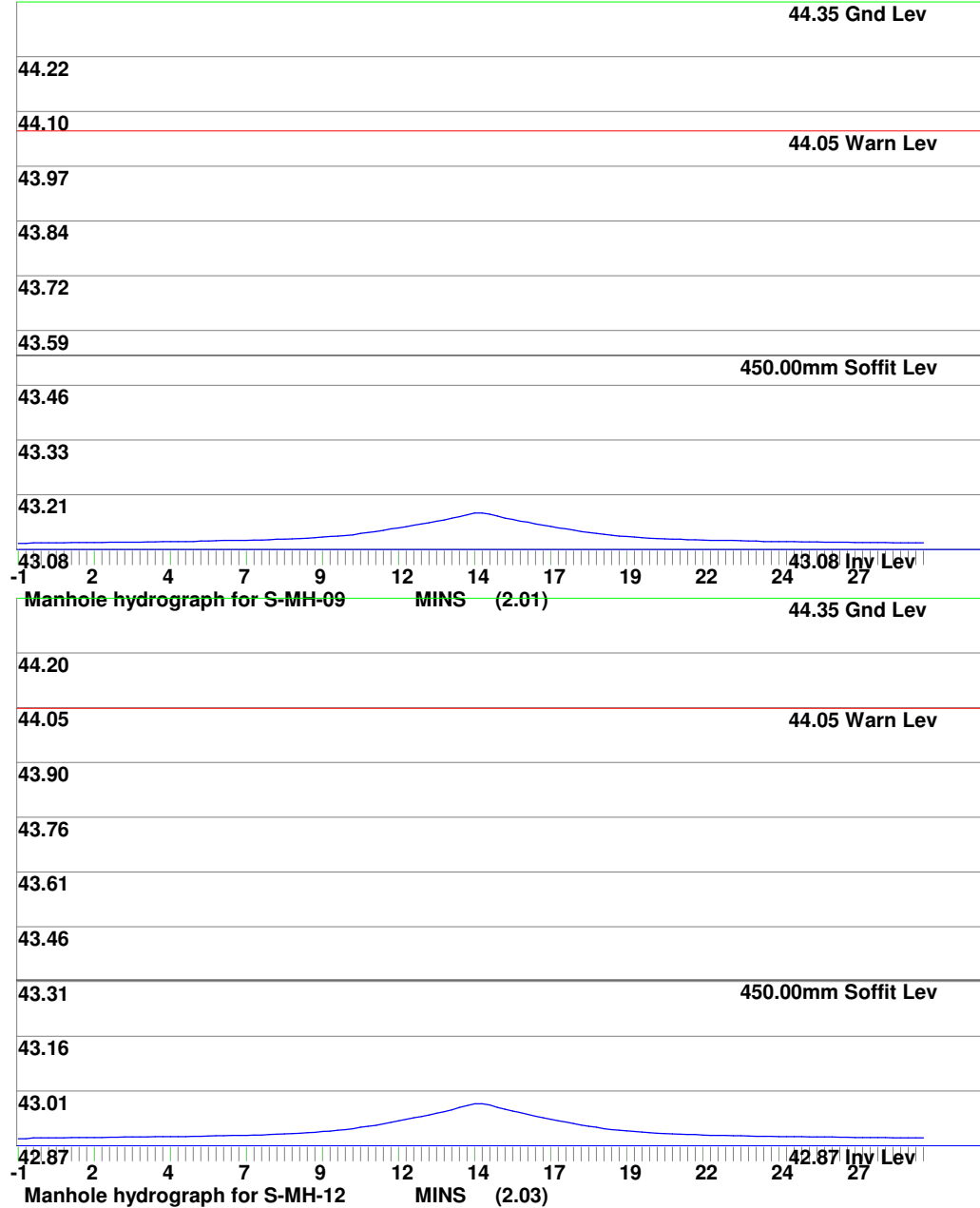
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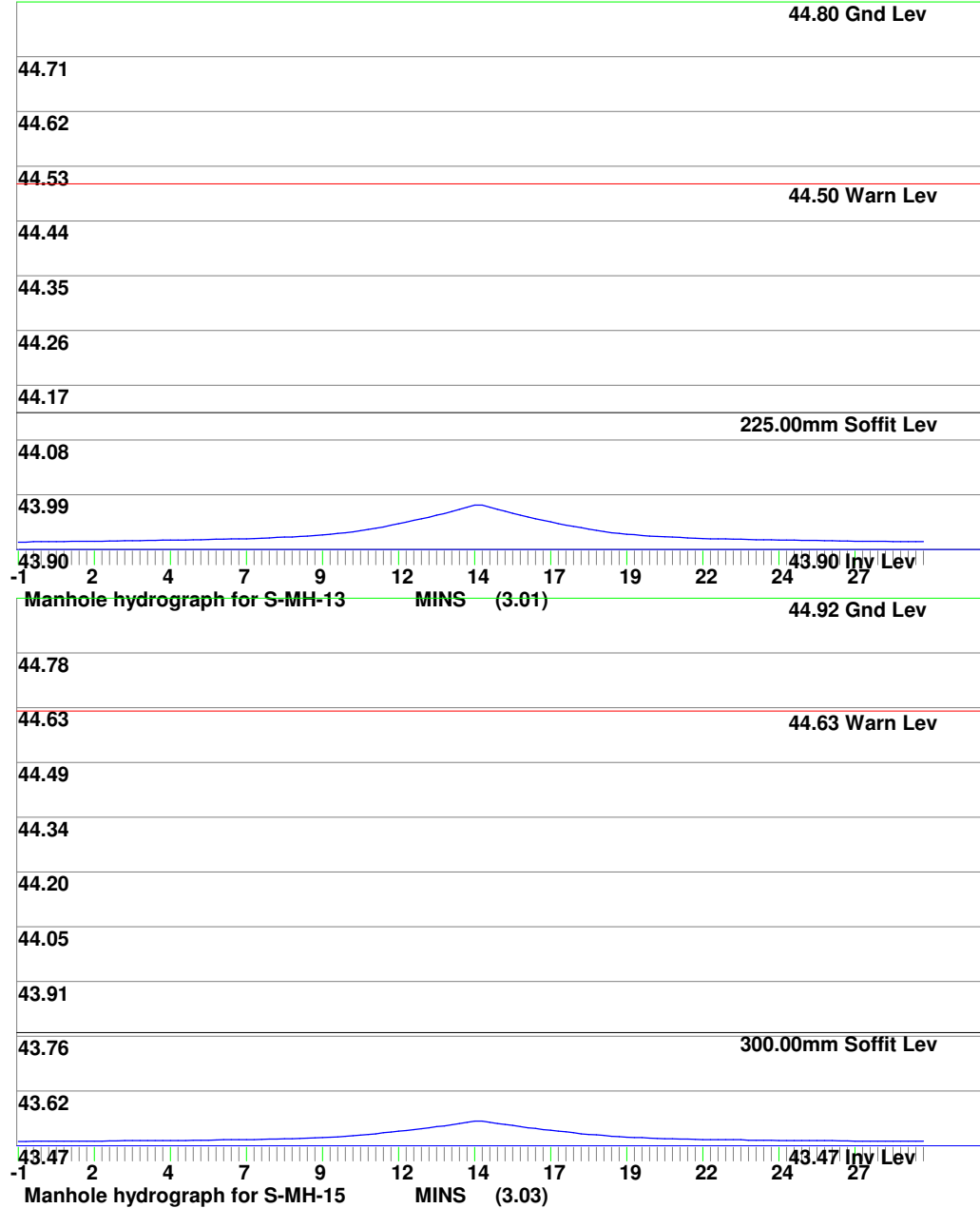
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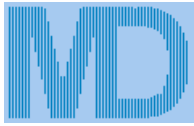
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Manhole hydrograph for S-MH-06

MINS (1.06)



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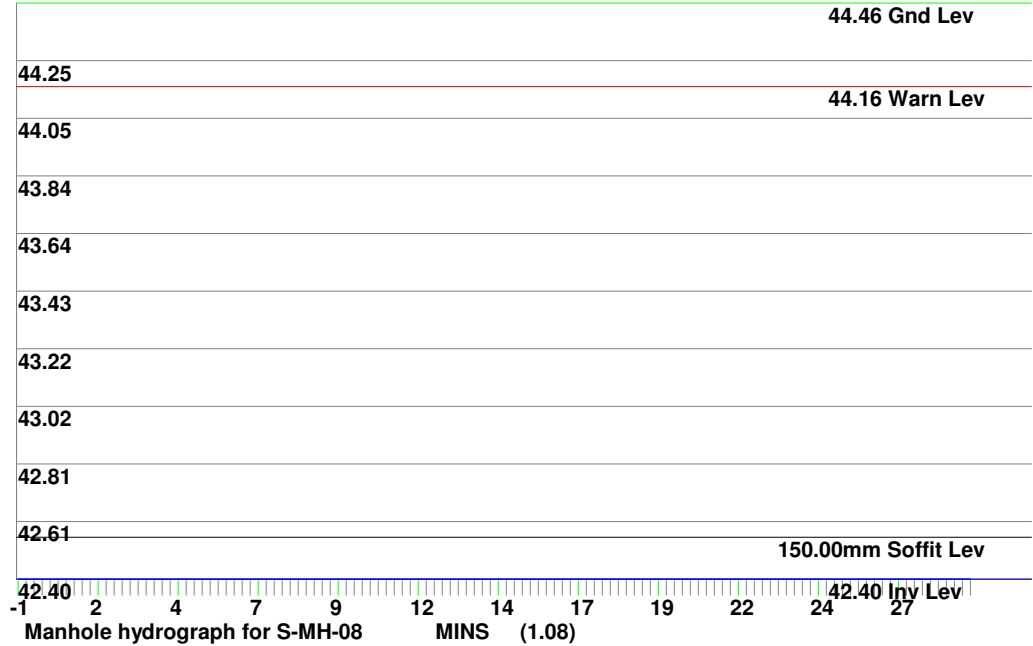
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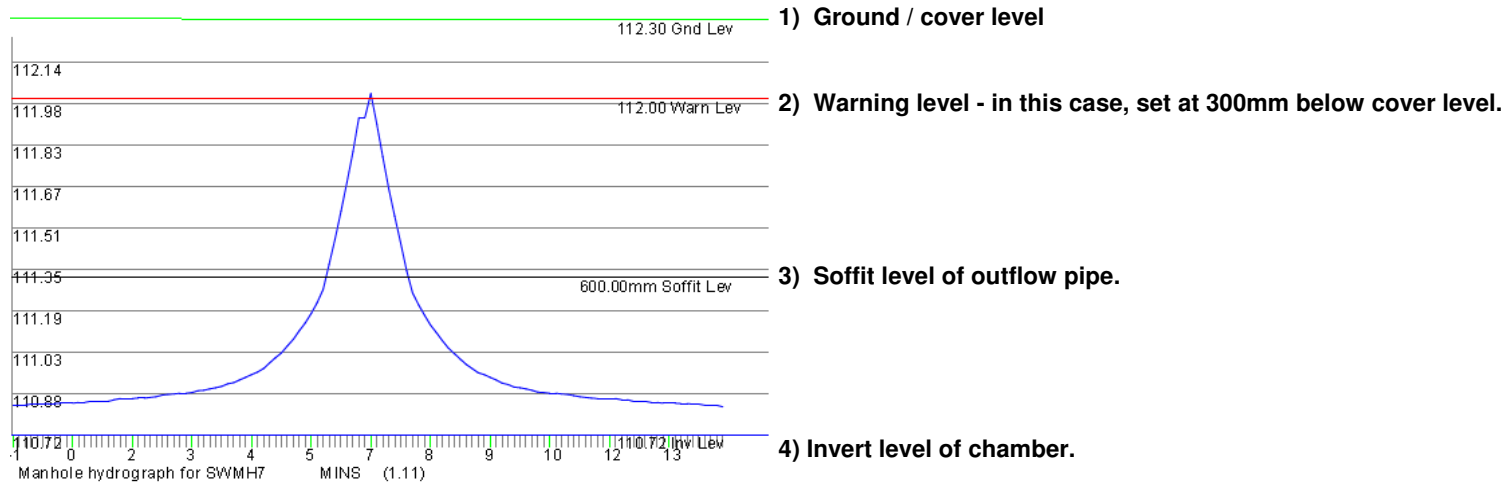
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Notes

- 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.