



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 = 60 mins
No offline storage

Mean rain intens. 29.00 mm/hr
Storm profile = Winter
Using FSR data

Peak rain intens. 72.50 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 S-MH-01	42.1	4.6	225	1200	43.85	43.89	44.80	0.11	0.04	0.00	0.000	527	OK
2	I	1.02 S-MH-02	77.8	13.9	300	1200	43.58	43.65	44.80	0.18	0.07	0.00	0.000	1579	OK
3	I	1.03 S-MH-03	78.4	18.5	300	1200	43.43	43.52	44.80	0.24	0.09	0.00	0.000	2106	OK
4	I	1.04 S-MH-04	78.0	18.5	300	1500	43.30	43.39	44.60	0.24	0.09	0.00	0.000	2106	OK
5	B	2.01 S-MH-09	184.0	9.4	450	1500	43.08	43.13	44.35	0.05	0.05	0.00	0.000	1065	OK
6	B	2.02 S-MH-10	184.9	31.3	450	1500	42.99	43.10	44.35	0.17	0.10	0.00	0.000	3560	OK
7	B	2.03 S-MH-12	398.2	31.3	450	1500	42.87	42.93	44.35	0.08	0.06	0.00	0.000	3560	OK
8	I	1.05 S-MH-05	227.8	49.8	450	1500	42.79	42.92	44.42	0.22	0.12	0.00	0.000	5666	OK
9	B	3.01 S-MH-13	42.1	4.6	225	1200	43.90	43.94	44.80	0.11	0.04	0.00	0.000	527	OK
10	B	3.02 S-MH-14	95.8	13.9	300	1200	43.70	43.76	44.80	0.15	0.06	0.00	0.000	1582	OK
11	B	3.03 S-MH-15	298.4	18.6	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	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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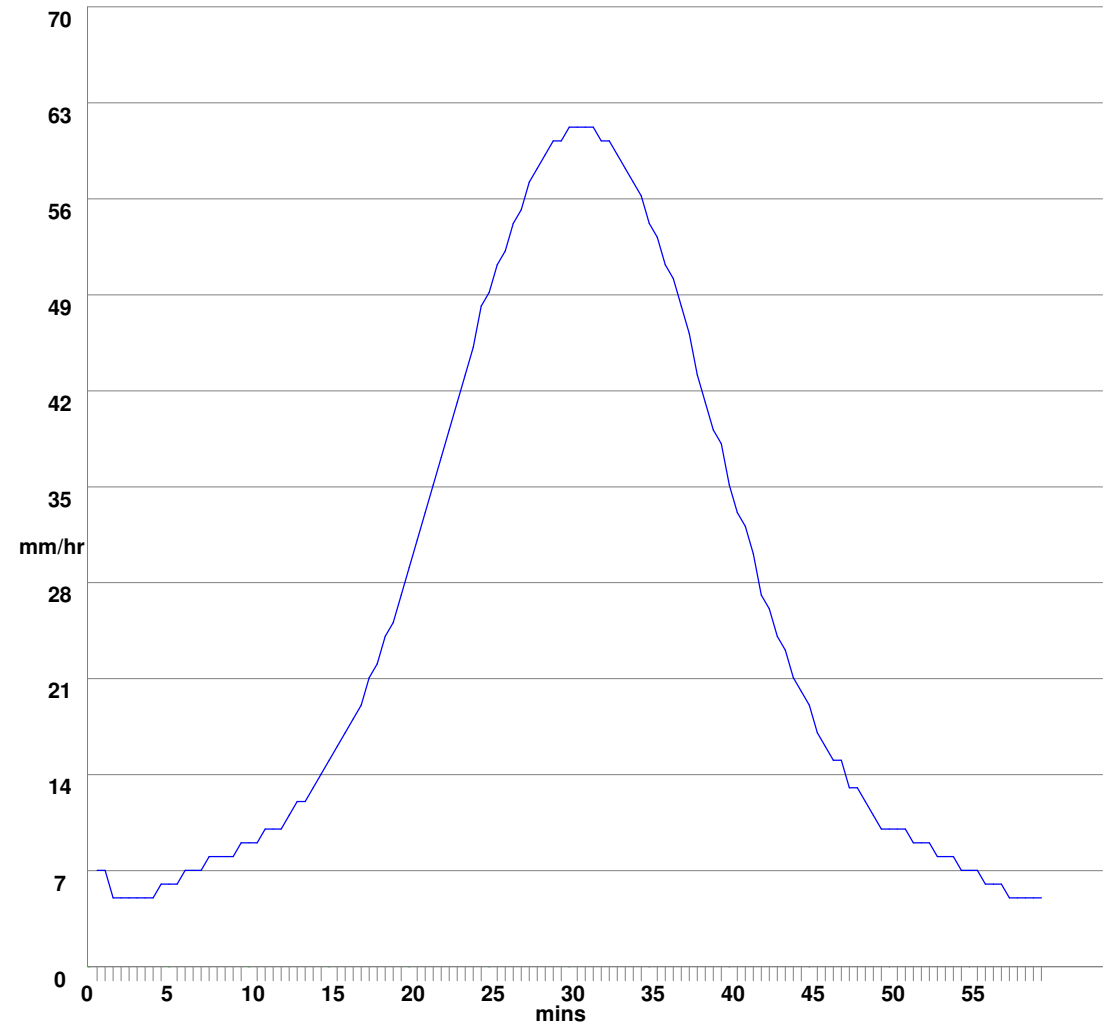
Project

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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
0:30	6.58	20:30	31.19	40:30	33.38
1:00	6.58	21:00	33.14	41:00	31.67
1:30	4.87	21:30	34.84	41:30	29.72
2:00	4.87	22:00	37.03	42:00	27.29
2:30	4.87	22:30	39.23	42:30	25.58
3:00	4.87	23:00	41.18	43:00	24.12
3:30	5.36	23:30	42.88	43:30	22.66
4:00	5.36	24:00	45.07	44:00	21.20
4:30	5.60	24:30	47.51	44:30	19.98
5:00	6.09	25:00	49.22	45:00	18.52
5:30	6.33	25:30	51.17	45:30	17.06
6:00	6.58	26:00	52.38	46:00	16.08
6:30	7.07	26:30	53.85	46:30	15.35
7:00	7.31	27:00	55.31	47:00	14.62
7:30	7.55	27:30	56.53	47:30	13.40
8:00	7.80	28:00	57.99	48:00	12.67
8:30	8.04	28:30	58.96	48:30	11.94
9:00	8.28	29:00	59.94	49:00	10.96
9:30	8.53	29:30	60.42	49:30	10.23
10:00	9.01	30:00	60.67	50:00	9.99
10:30	9.26	30:30	60.91	50:30	9.75
11:00	9.75	31:00	60.91	51:00	9.50
11:30	9.75	31:30	60.67	51:30	9.01
12:00	10.23	32:00	60.42	52:00	8.77
12:30	10.96	32:30	59.94	52:30	8.53
13:00	11.70	33:00	59.21	53:00	8.04
13:30	12.43	33:30	58.23	53:30	7.80
14:00	13.40	34:00	57.01	54:00	7.80
14:30	14.13	34:30	55.55	54:30	7.31
15:00	15.11	35:00	54.09	55:00	7.07
15:30	15.84	35:30	52.87	55:30	6.58
16:00	17.06	36:00	51.41	56:00	6.33
16:30	18.27	36:30	49.70	56:30	6.09
17:00	19.49	37:00	47.75	57:00	5.85
17:30	20.95	37:30	45.56	57:30	5.36
18:00	22.42	38:00	43.37	58:00	5.36
18:30	23.63	38:30	41.42	58:30	5.12
19:00	25.34	39:00	39.47	59:00	4.87
19:30	27.04	39:30	37.77	59:30	4.87
20:00	29.24	40:00	35.33	60:00	4.87

Hydrograph profile derived from data in the Flood Studies Report

Return period= 30 yrs Duration= 60 mins Profile - winter





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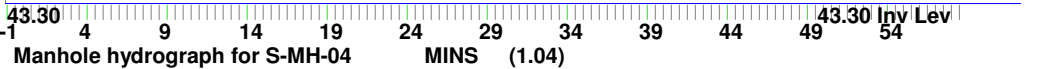
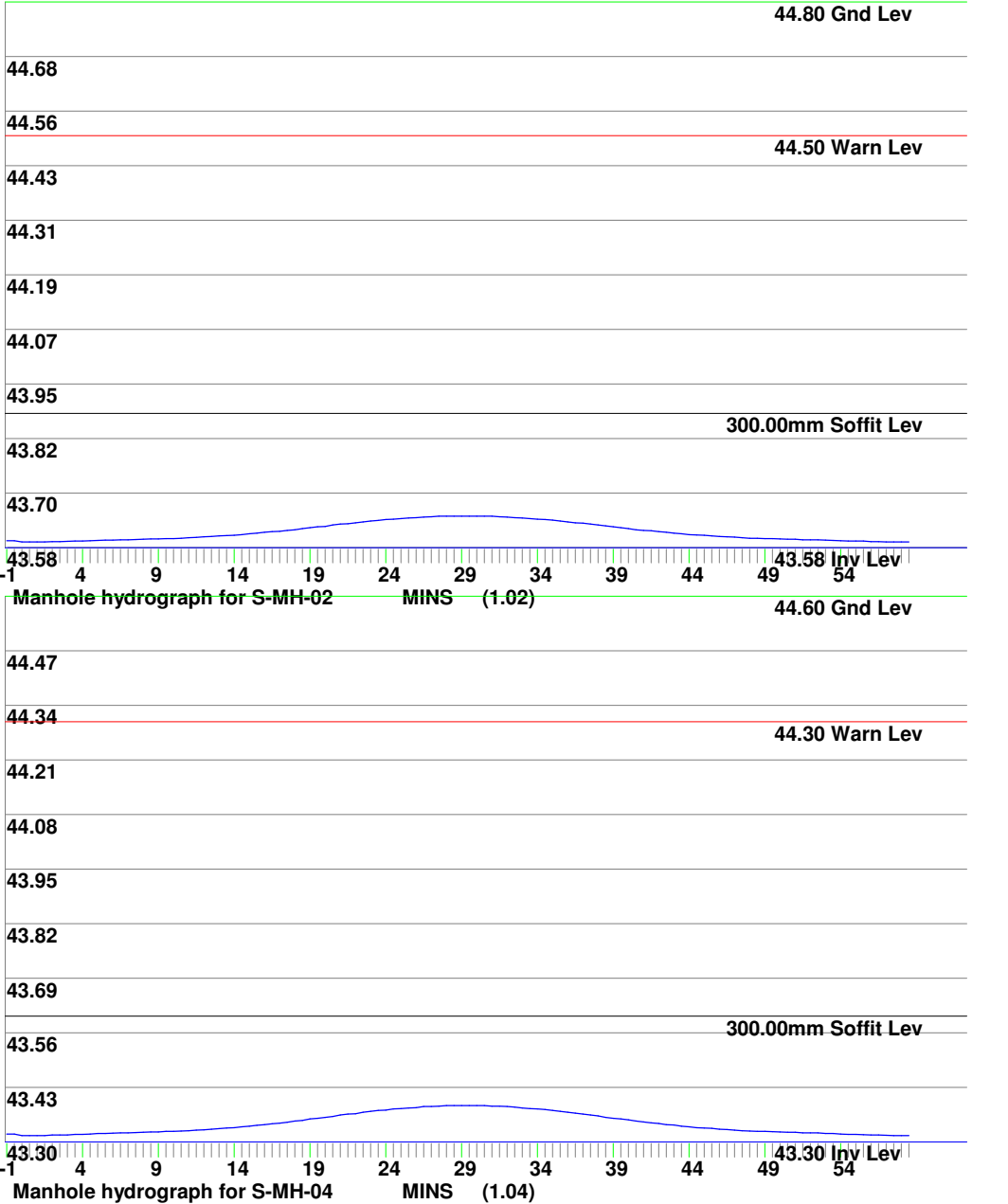
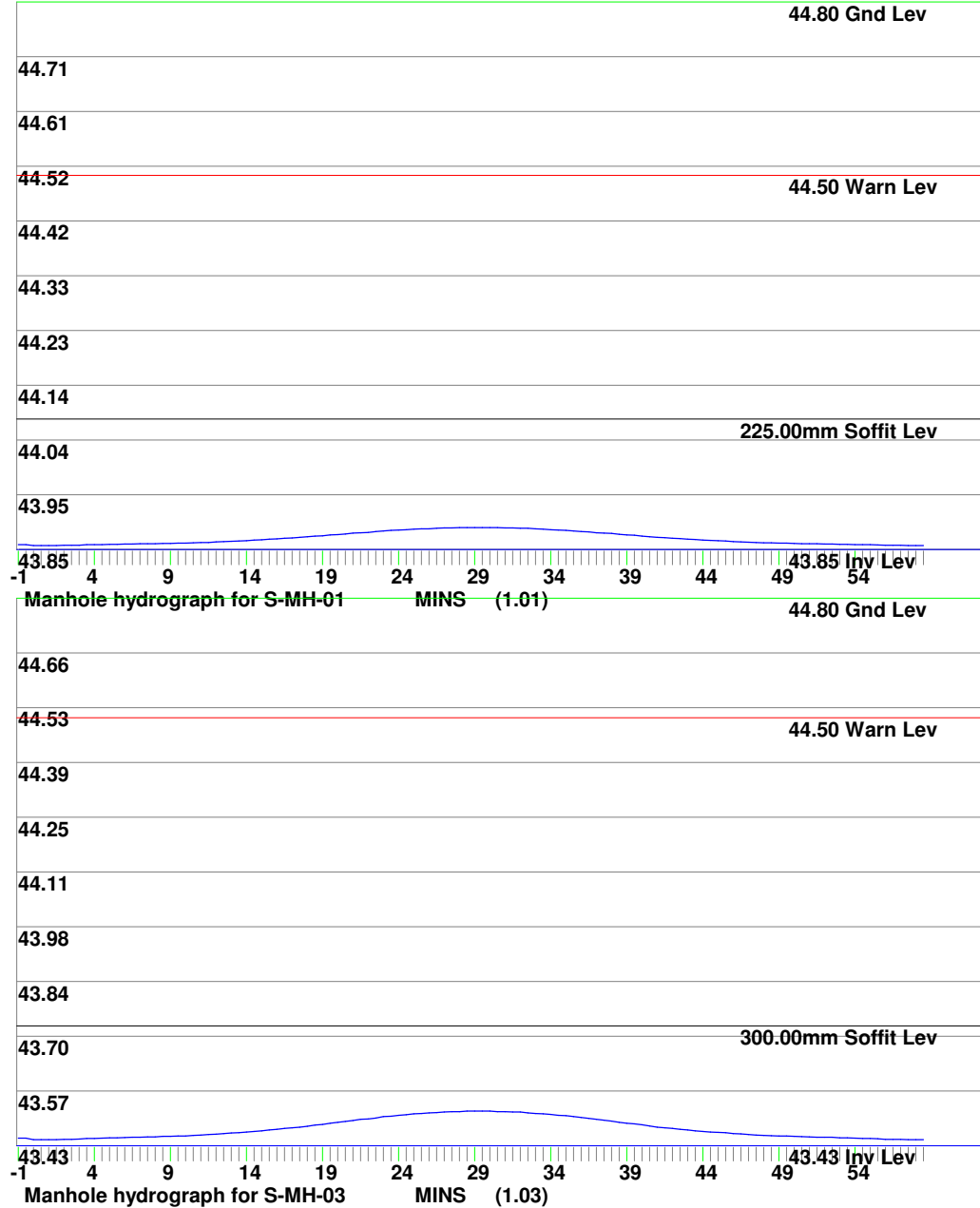
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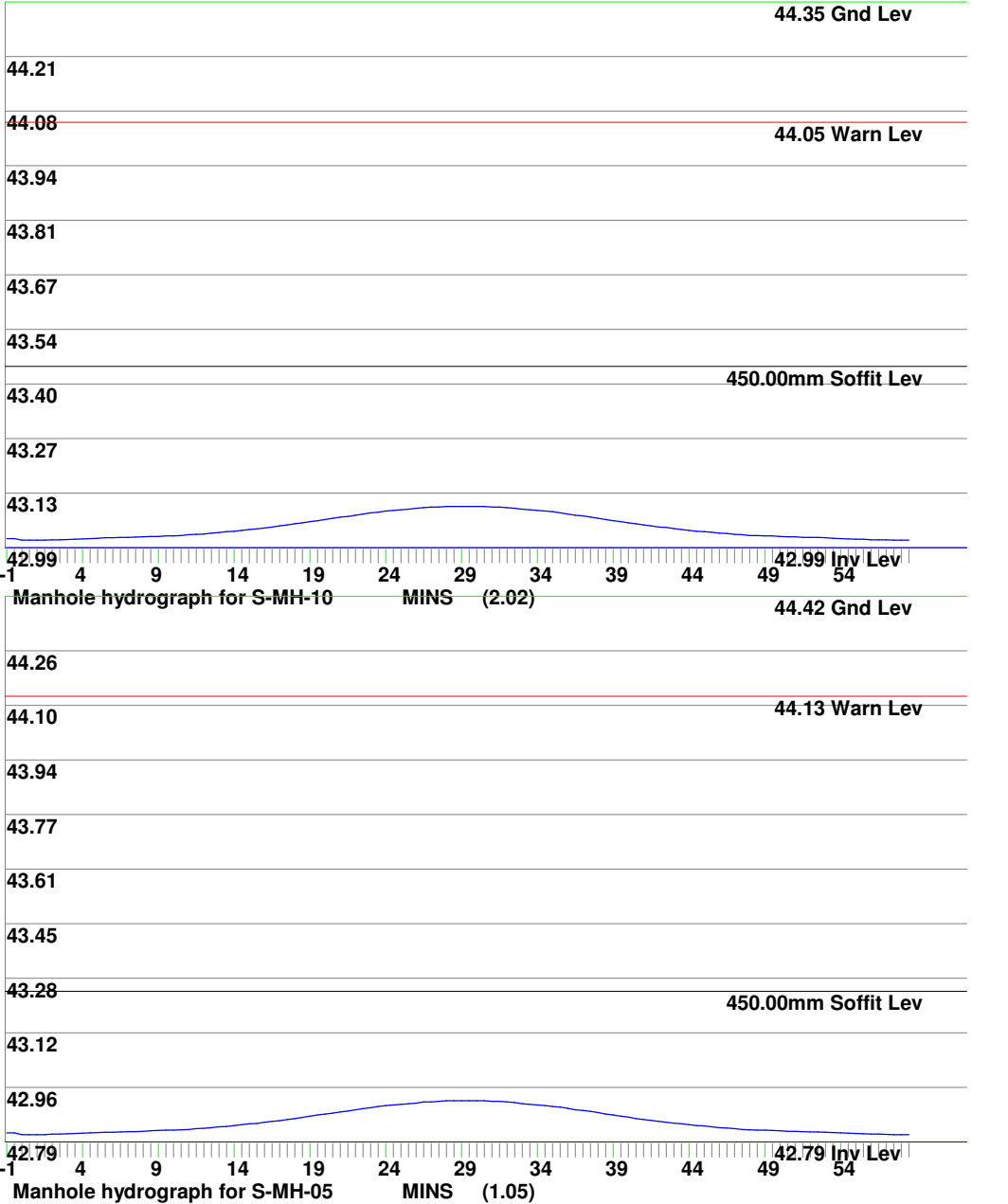
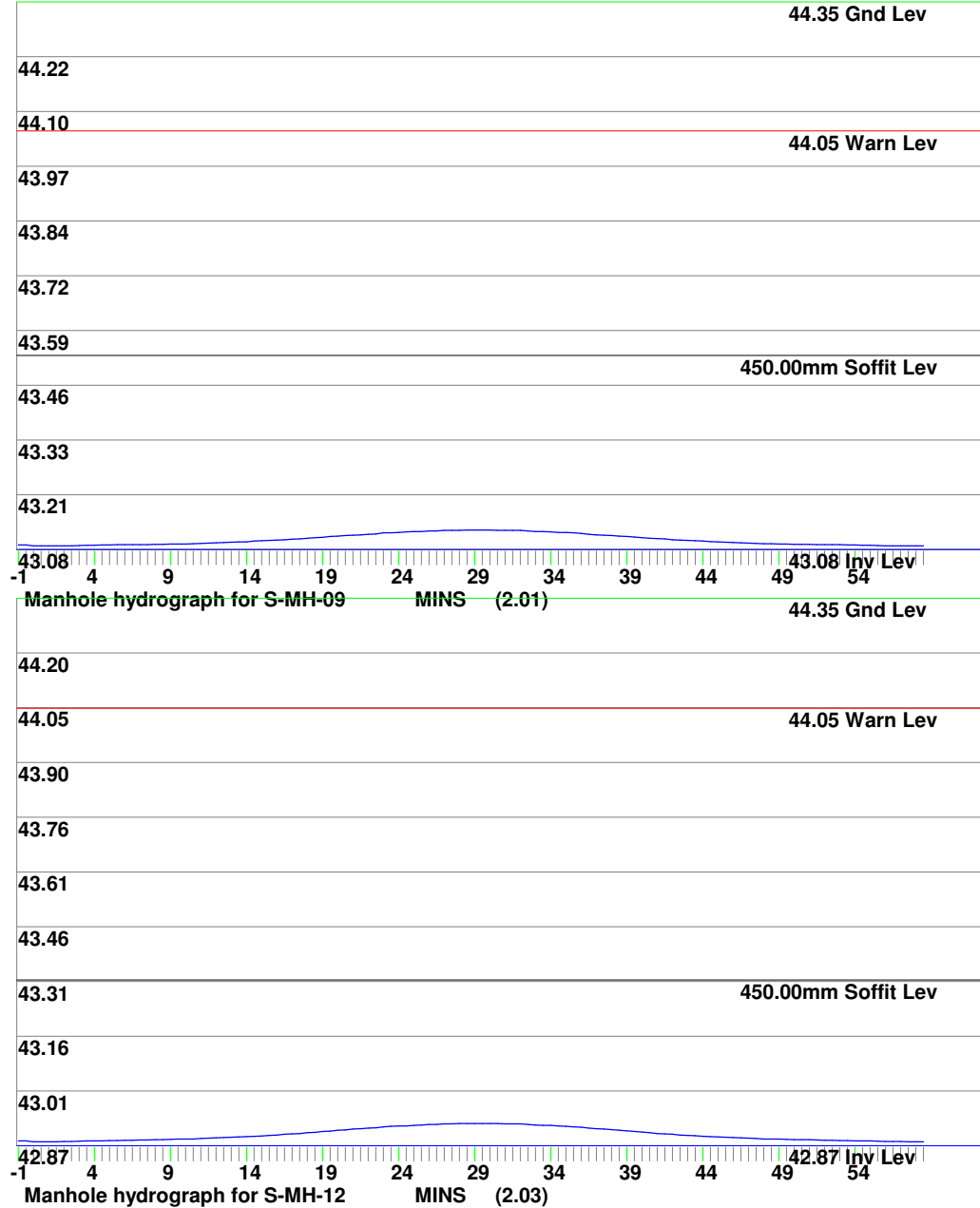
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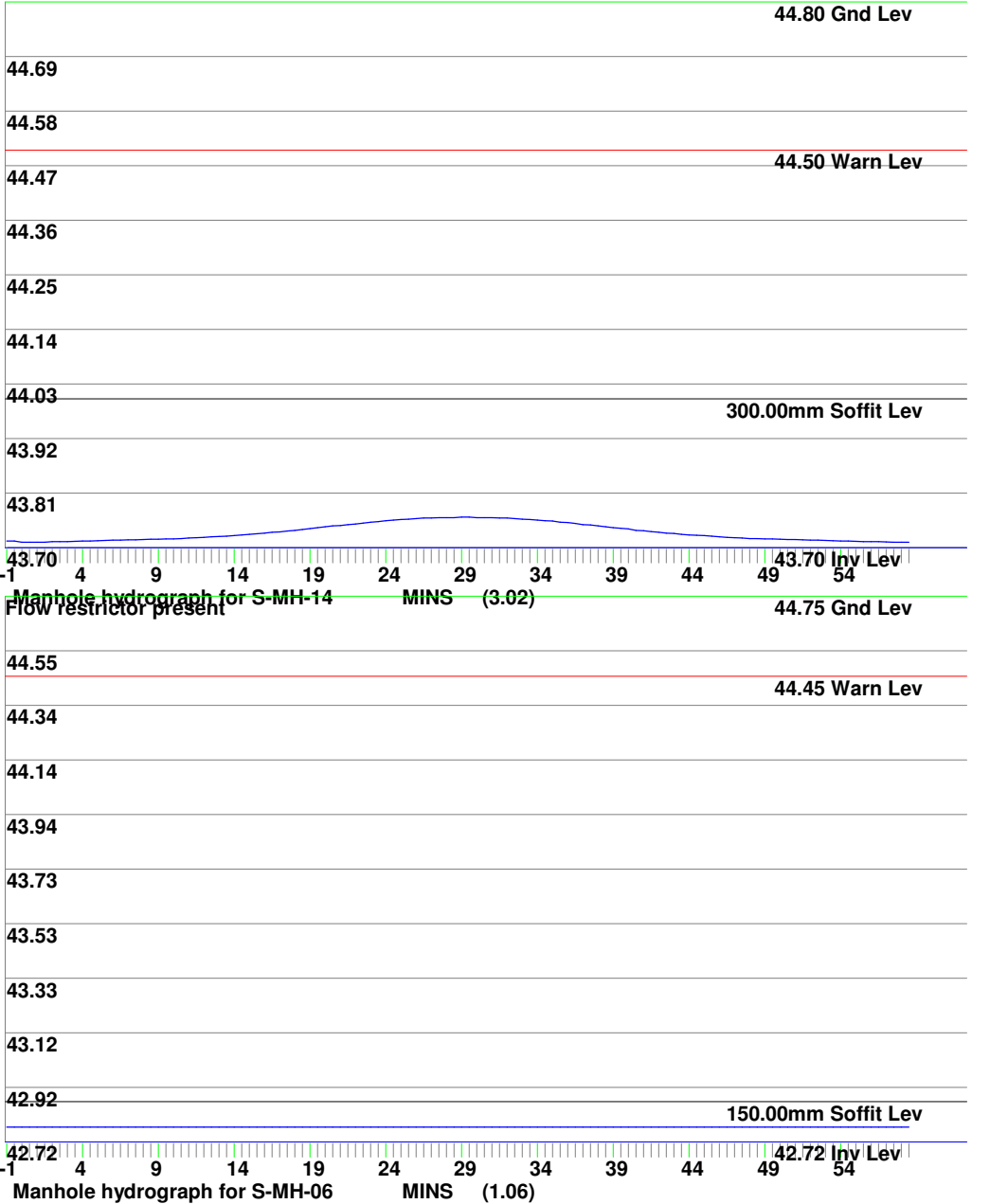
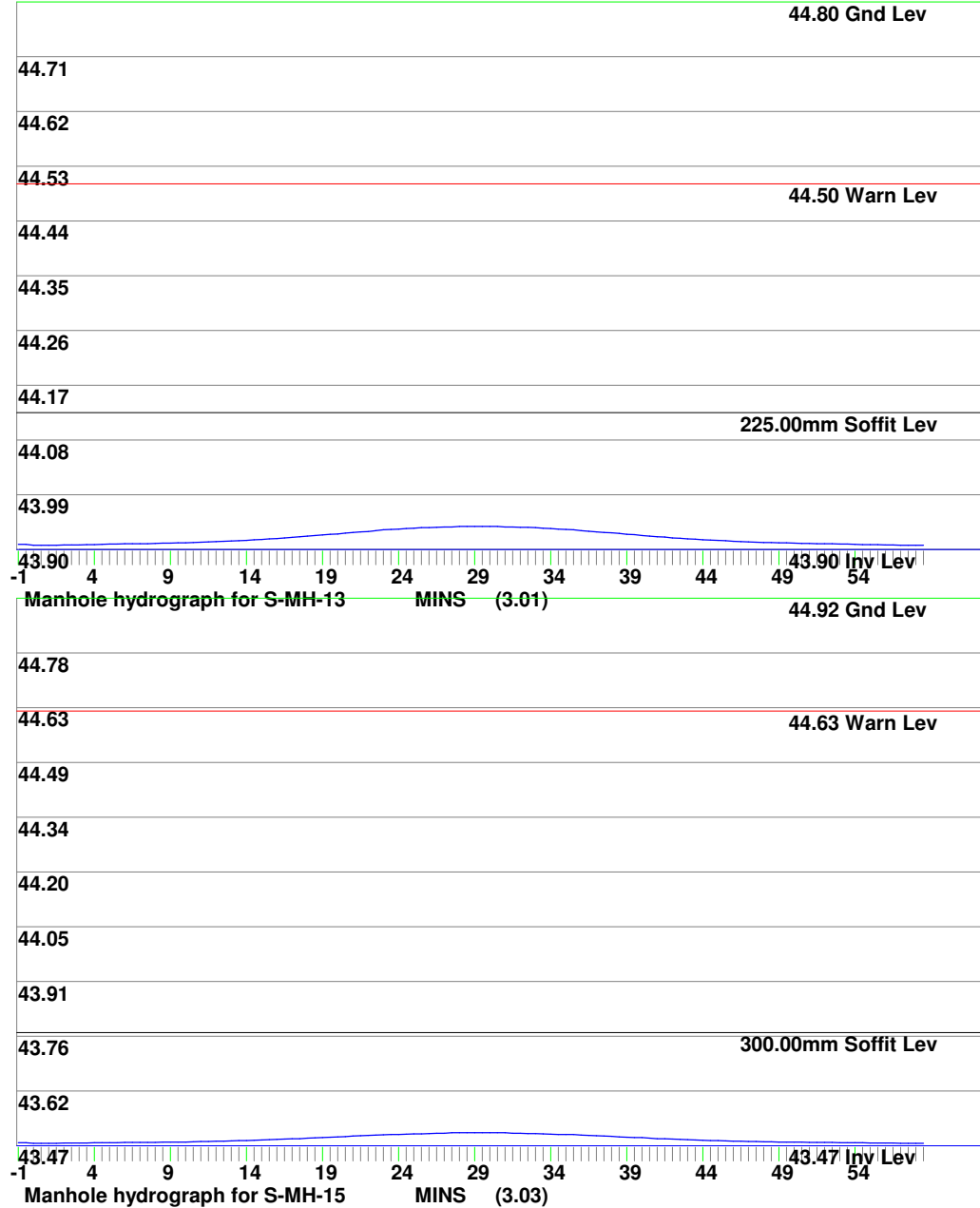
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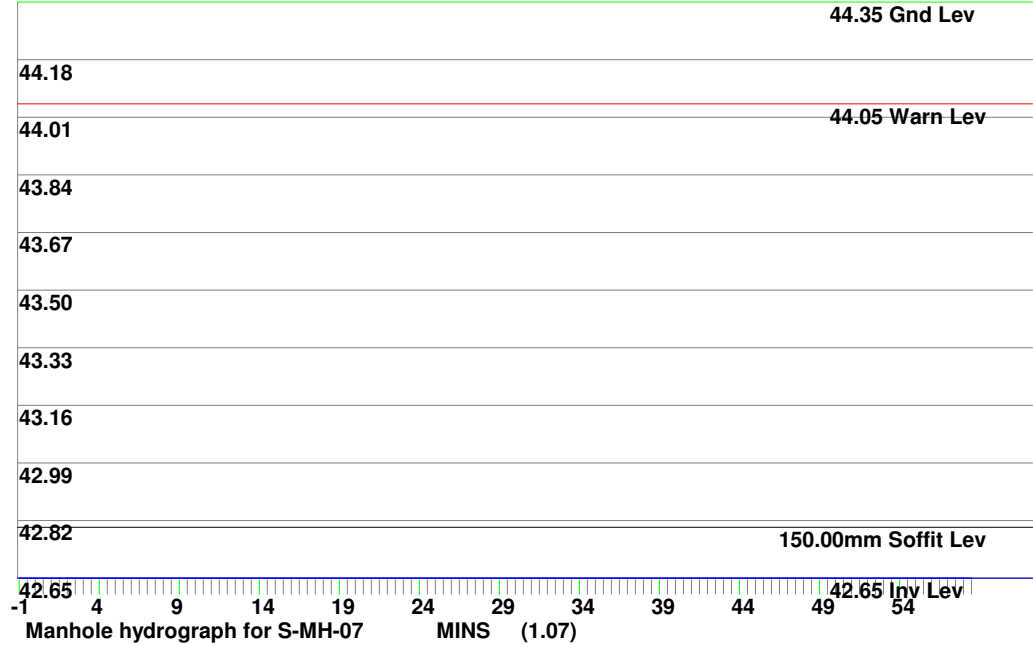
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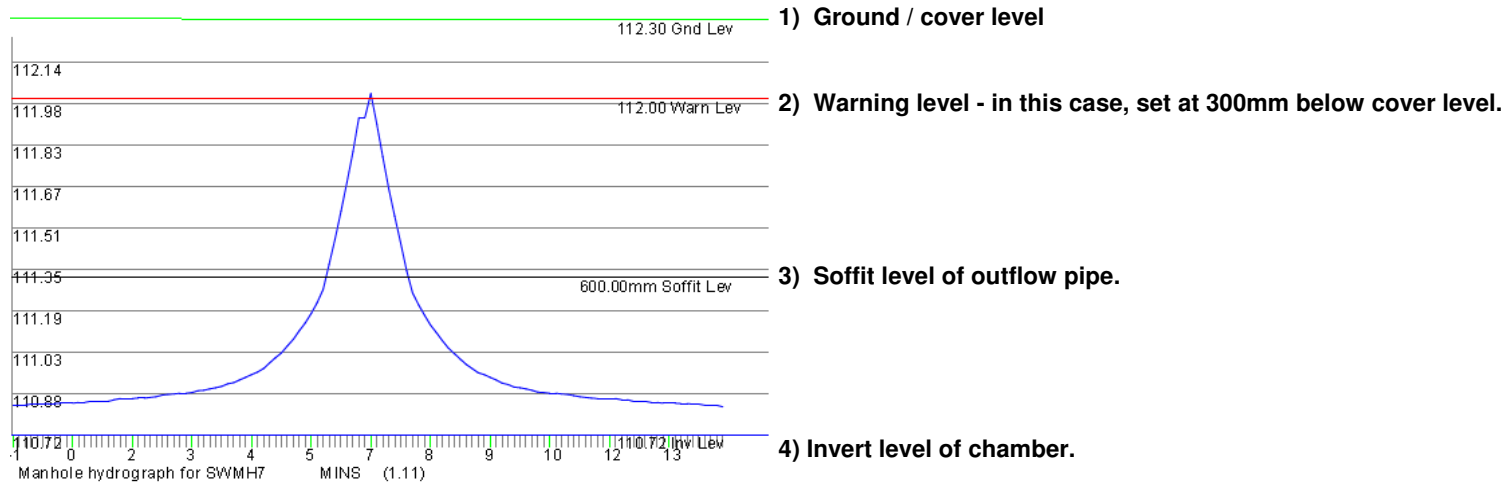
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Notes

- 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.