



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 = 45 mins
No offline storage

Mean rain intens. 36.00 mm/hr
Storm profile = Summer
Using FSR data

Peak rain intens. 141.12 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	I	1.01 S-MH-01	42.1	8.9	225	1200	43.85	43.91	44.80	0.21	0.06	0.00	0.000	527	OK
2	I	1.02 S-MH-02	77.8	26.6	300	1200	43.58	43.69	44.80	0.34	0.11	0.00	0.000	1579	OK
3	I	1.03 S-MH-03	78.4	35.5	300	1200	43.43	43.57	44.80	0.45	0.14	0.00	0.000	2106	OK
4	I	1.04 S-MH-04	78.0	35.5	300	1500	43.30	43.44	44.60	0.46	0.14	0.00	0.000	2106	OK
5	B	2.01 S-MH-09	184.0	18.0	450	1500	43.08	43.15	44.35	0.10	0.07	0.00	0.000	1065	OK
6	B	2.02 S-MH-10	184.9	60.0	450	1500	42.99	43.16	44.35	0.32	0.16	0.00	0.000	3560	OK
7	B	2.03 S-MH-12	398.2	60.0	450	1500	42.87	42.96	44.35	0.15	0.09	0.00	0.000	3560	OK
8	I	1.05 S-MH-05	227.8	95.5	450	1500	42.79	42.99	44.42	0.42	0.20	0.00	0.000	5666	OK
9	B	3.01 S-MH-13	42.1	8.9	225	1200	43.90	43.96	44.80	0.21	0.06	0.00	0.000	527	OK
10	B	3.02 S-MH-14	95.8	26.7	300	1200	43.70	43.80	44.80	0.28	0.10	0.00	0.000	1582	OK
11	B	3.03 S-MH-15	298.4	35.6	300	1200	43.47	43.53	44.92	0.12	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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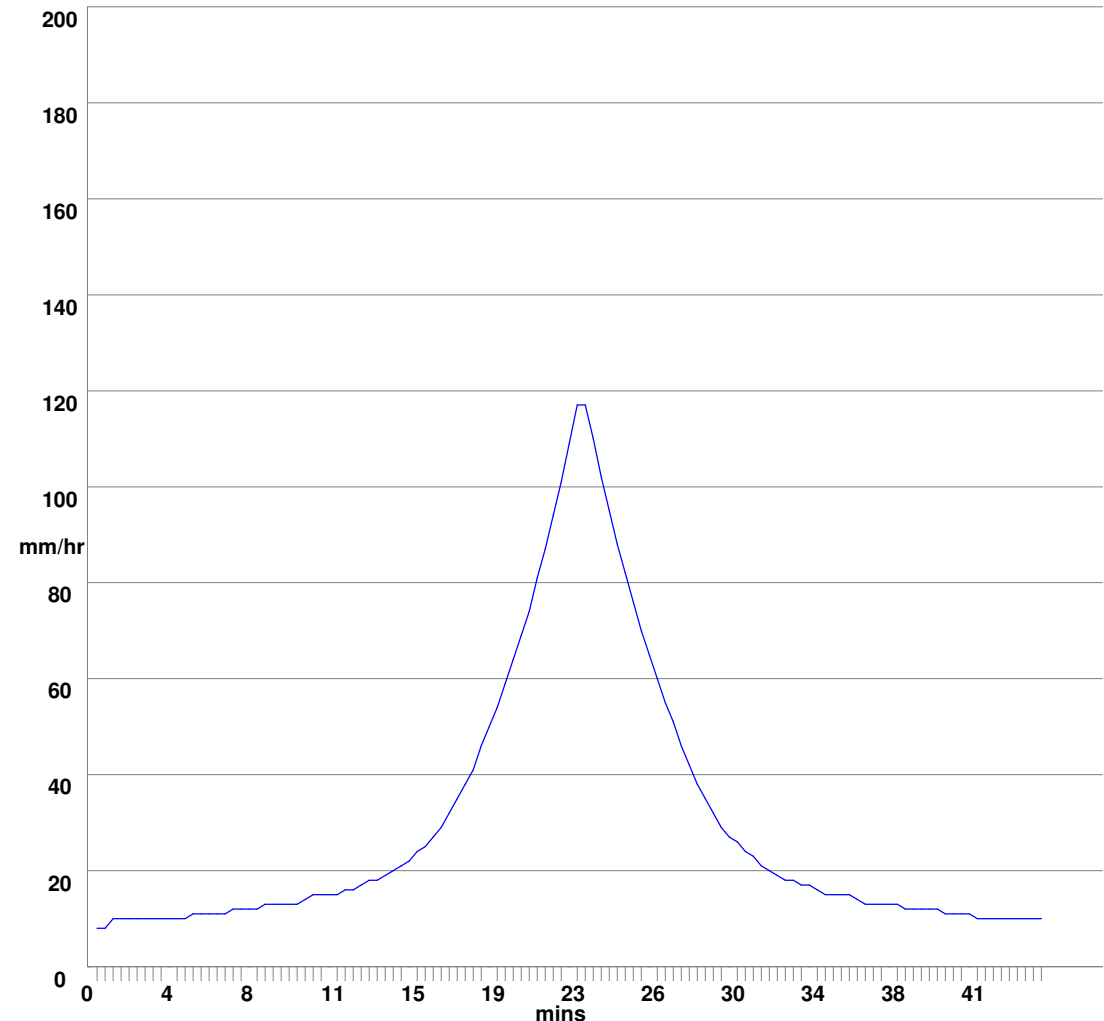
Project

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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
0:22	8.34	15:22	23.82	30:22	25.60
0:45	8.34	15:45	25.31	30:45	24.11
1:08	9.53	16:08	26.79	31:08	22.63
1:30	9.53	16:30	28.88	31:30	21.14
1:52	9.53	16:52	31.56	31:52	20.24
2:15	9.82	17:15	34.83	32:15	19.05
2:38	9.82	17:38	37.81	32:38	18.16
3:00	10.12	18:00	41.08	33:00	17.56
3:22	10.12	18:22	45.55	33:22	16.97
3:45	10.42	18:45	50.02	33:45	16.67
4:08	10.42	19:08	54.48	34:08	15.78
4:30	10.42	19:30	59.24	34:30	15.18
4:52	10.72	19:52	64.31	34:52	15.18
5:15	10.72	20:15	69.07	35:15	14.89
5:38	11.31	20:38	74.43	35:38	14.59
6:00	11.31	21:00	80.98	36:00	14.29
6:22	11.31	21:22	87.23	36:22	13.40
6:45	11.61	21:45	93.78	36:45	13.10
7:08	11.91	22:08	101.22	37:08	12.80
7:30	12.21	22:30	108.96	37:30	12.80
7:52	12.21	22:52	116.70	37:52	12.50
8:15	12.50	23:15	116.70	38:15	12.21
8:38	12.50	23:38	110.45	38:38	12.21
9:00	12.80	24:00	102.41	39:00	11.91
9:22	13.10	24:22	95.27	39:22	11.61
9:45	13.40	24:45	88.42	39:45	11.61
10:08	13.99	25:08	81.87	40:08	11.31
10:30	14.59	25:30	75.92	40:30	11.31
10:52	14.89	25:52	70.26	40:52	10.72
11:15	15.18	26:15	65.20	41:15	10.72
11:38	15.18	26:38	60.14	41:38	10.42
12:00	15.78	27:00	55.08	42:00	10.42
12:22	16.08	27:22	50.91	42:22	10.42
12:45	16.97	27:45	46.15	42:45	10.12
13:08	17.56	28:08	42.28	43:08	10.12
13:30	18.16	28:30	38.40	43:30	9.82
13:52	18.76	28:52	35.13	43:52	9.82
14:15	19.95	29:15	32.15	44:15	9.82
14:38	20.84	29:38	29.18	44:38	9.53
15:00	22.33	30:00	27.09	45:00	9.53

Hydrograph profile derived from data in the Flood Studies Report

Return period= 30 yrs Duration= 45 mins Profile - summer





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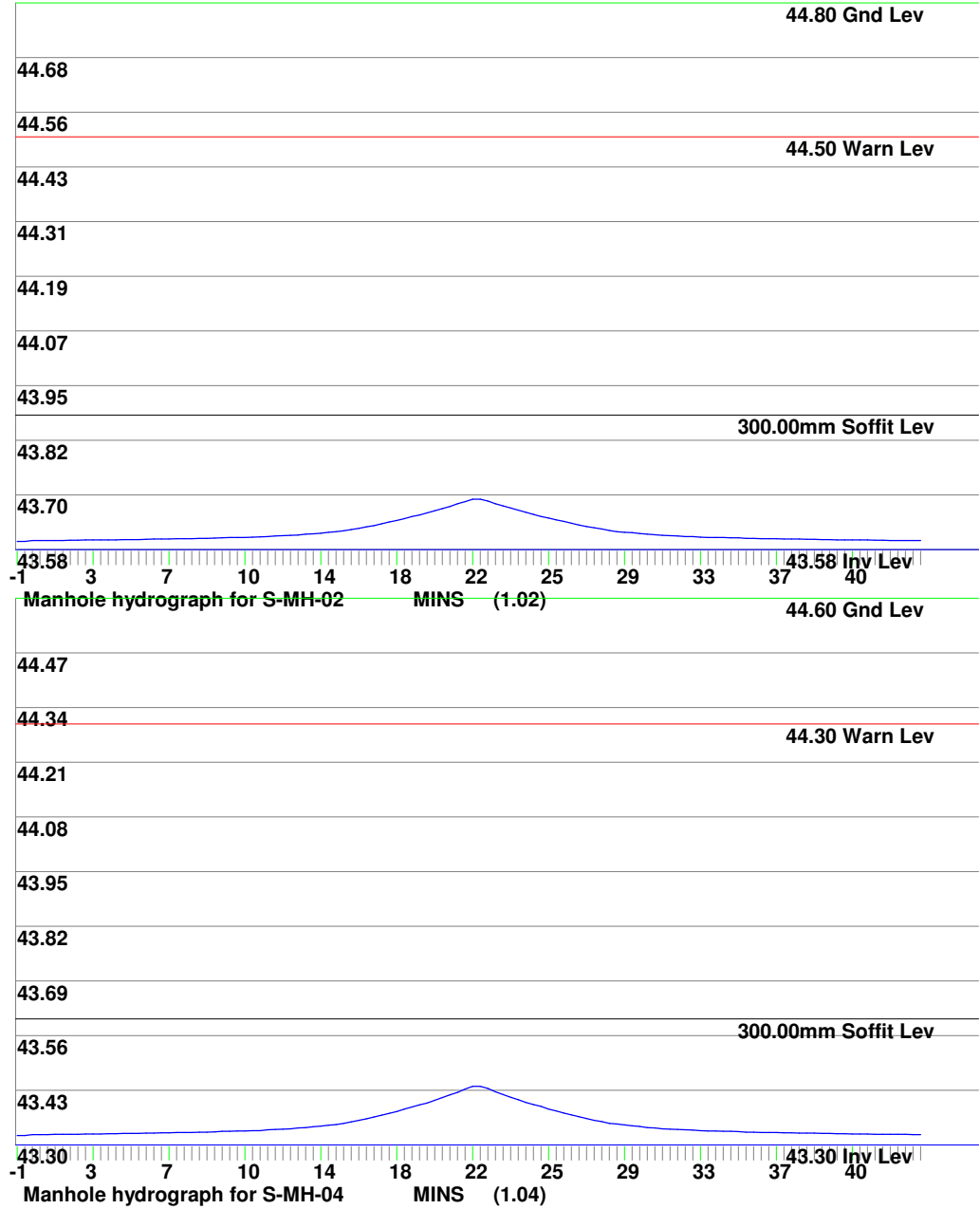
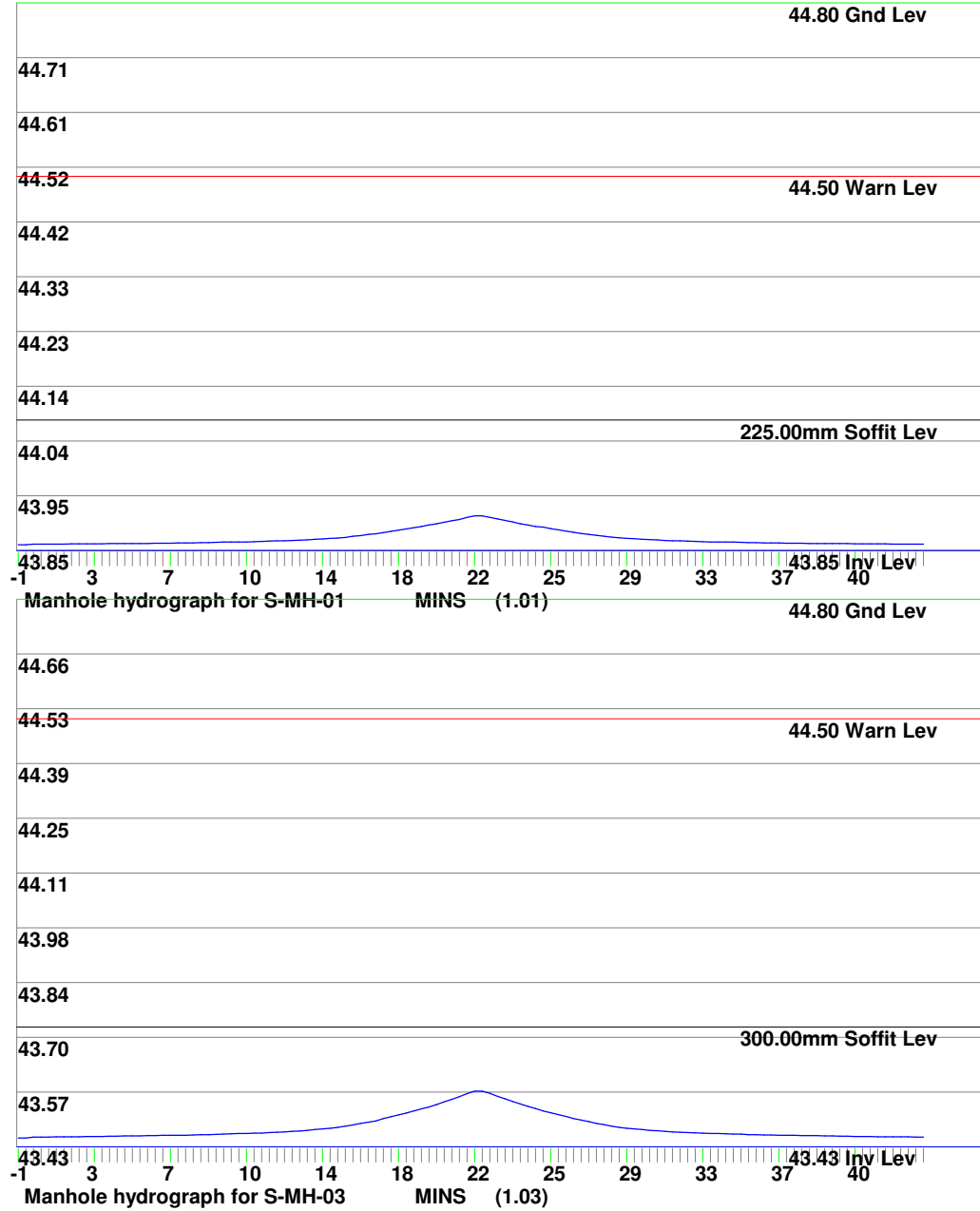
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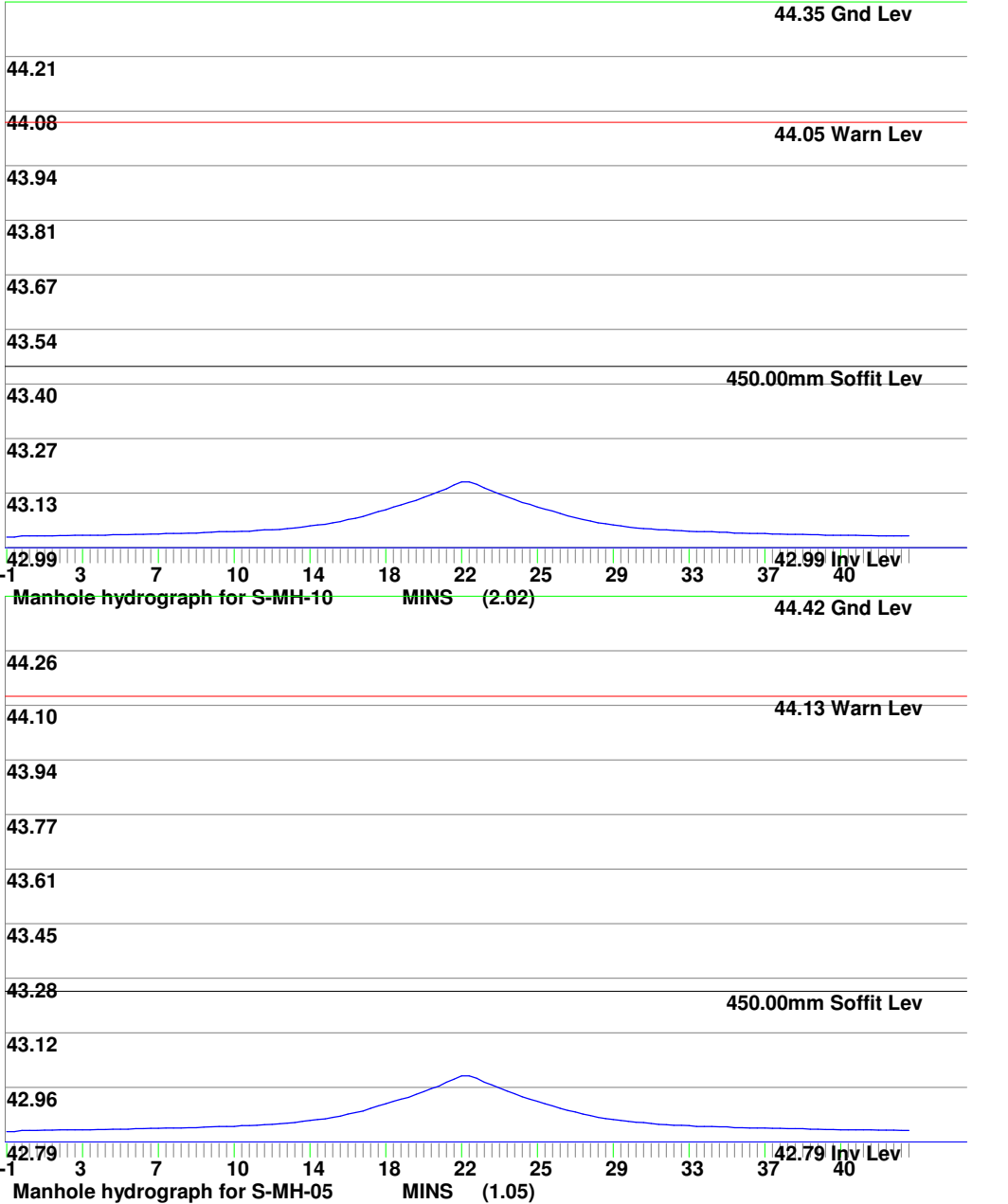
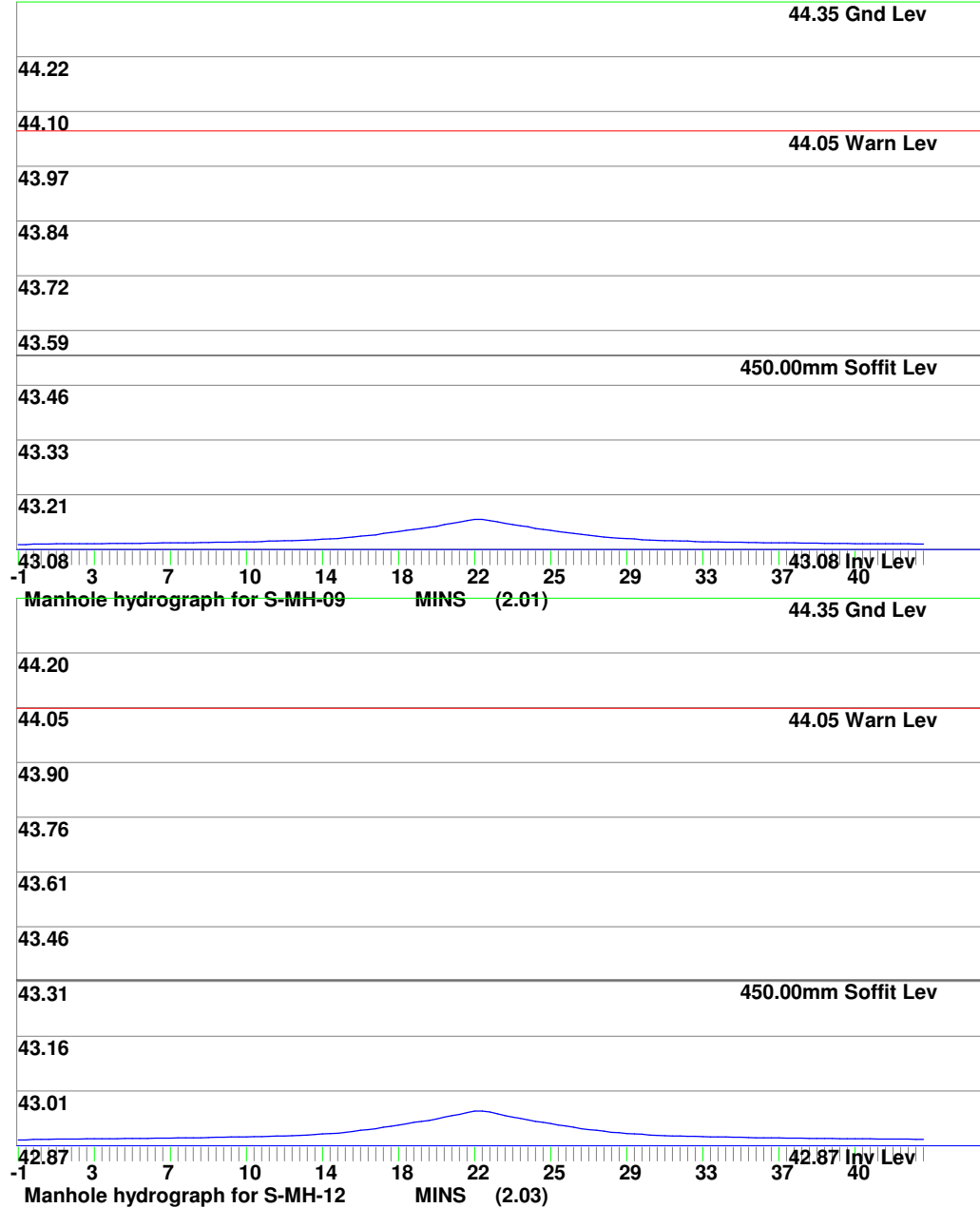
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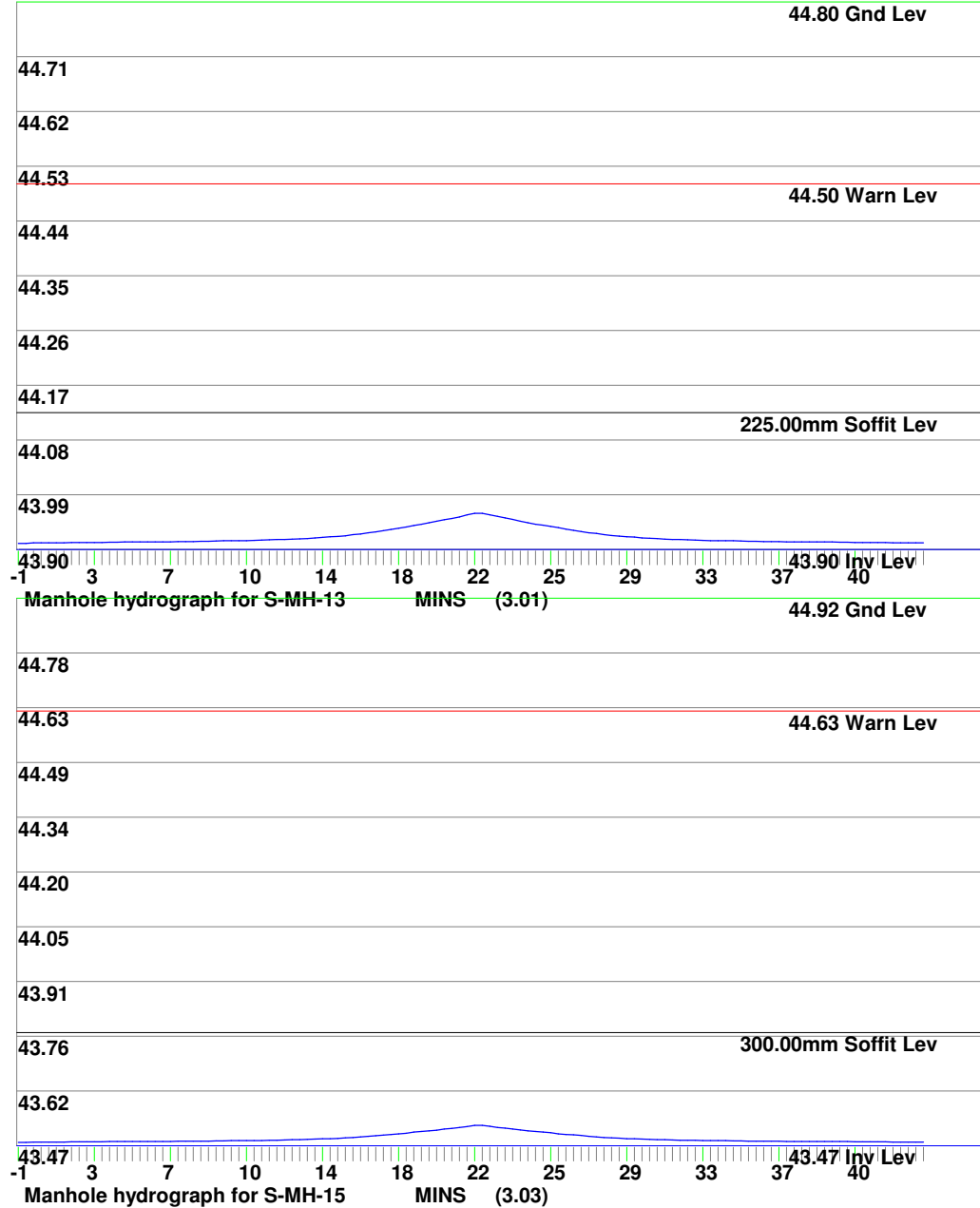
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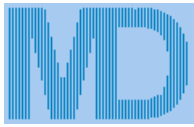
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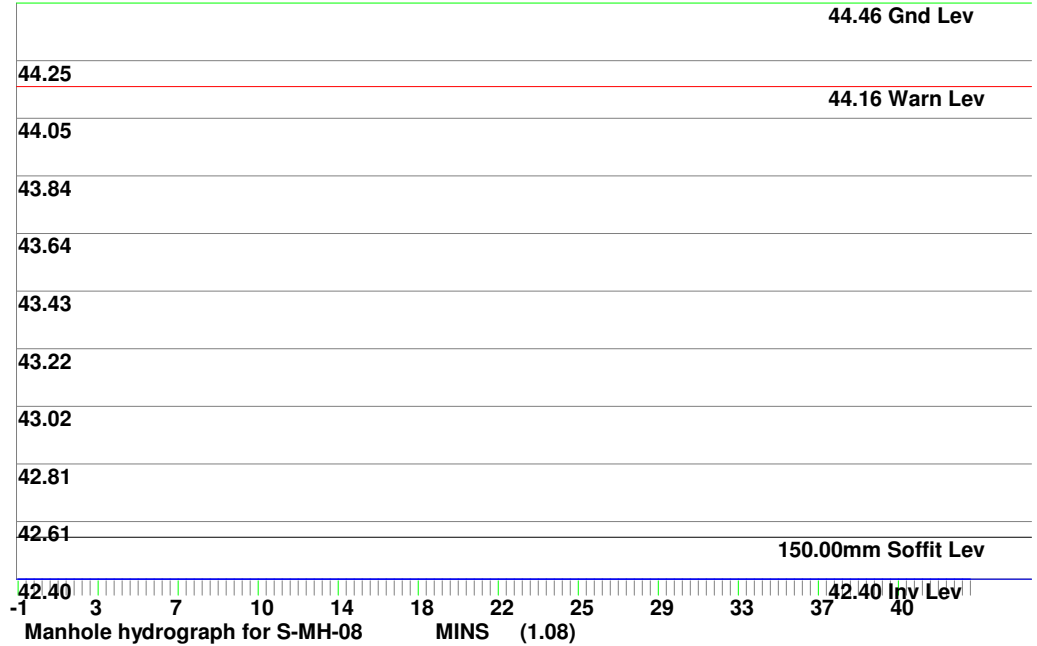
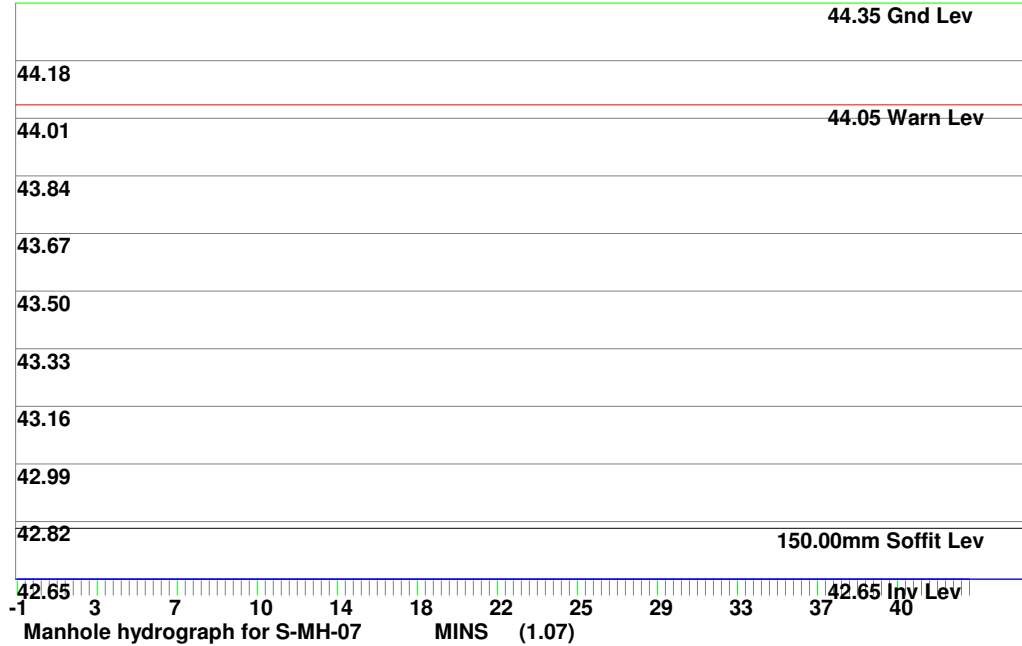
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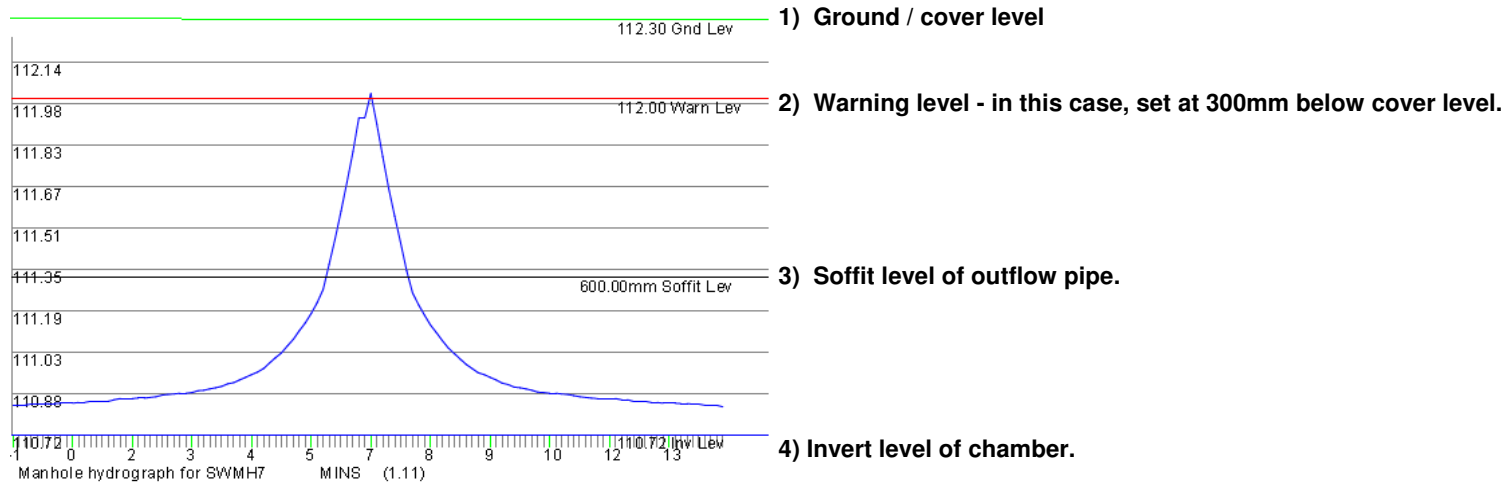
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Notes

- 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.