



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 CCF = 40%**

Using in-line restrictors
Return period = 100 yrs
Climate change factor = 40

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

Mean rain intens. 33.00 mm/hr
Storm profile = Winter
Using FSR data

Peak rain intens. 82.50 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	5.2	225	1200	43.85	43.90	44.80	0.12	0.04	0.00	0.000	527	OK
2	I	1.02 S-MH-02	77.8	15.5	300	1200	43.58	43.66	44.80	0.20	0.08	0.00	0.000	1579	OK
3	I	1.03 S-MH-03	78.4	20.7	300	1200	43.43	43.52	44.80	0.26	0.09	0.00	0.000	2106	OK
4	I	1.04 S-MH-04	78.0	20.7	300	1500	43.30	43.39	44.60	0.26	0.09	0.00	0.000	2106	OK
5	B	2.01 S-MH-09	184.0	10.4	450	1500	43.08	43.13	44.35	0.06	0.05	0.00	0.000	1065	OK
6	B	2.02 S-MH-10	184.9	34.9	450	1500	42.99	43.11	44.35	0.19	0.11	0.00	0.000	3560	OK
7	B	2.03 S-MH-12	398.2	34.9	450	1500	42.87	42.93	44.35	0.09	0.06	0.00	0.000	3560	OK
8	I	1.05 S-MH-05	227.8	55.6	450	1500	42.79	42.93	44.42	0.24	0.13	0.00	0.000	5666	OK
9	B	3.01 S-MH-13	42.1	5.2	225	1200	43.90	43.94	44.80	0.12	0.04	0.00	0.000	527	OK
10	B	3.02 S-MH-14	95.8	15.5	300	1200	43.70	43.77	44.80	0.16	0.07	0.00	0.000	1582	OK
11	B	3.03 S-MH-15	298.4	20.7	300	1200	43.47	43.51	44.92	0.07	0.04	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

Flood volumes

Check that the upstream storage of the manhole is adequate to take the flood volume - see Upstrm Vol above.



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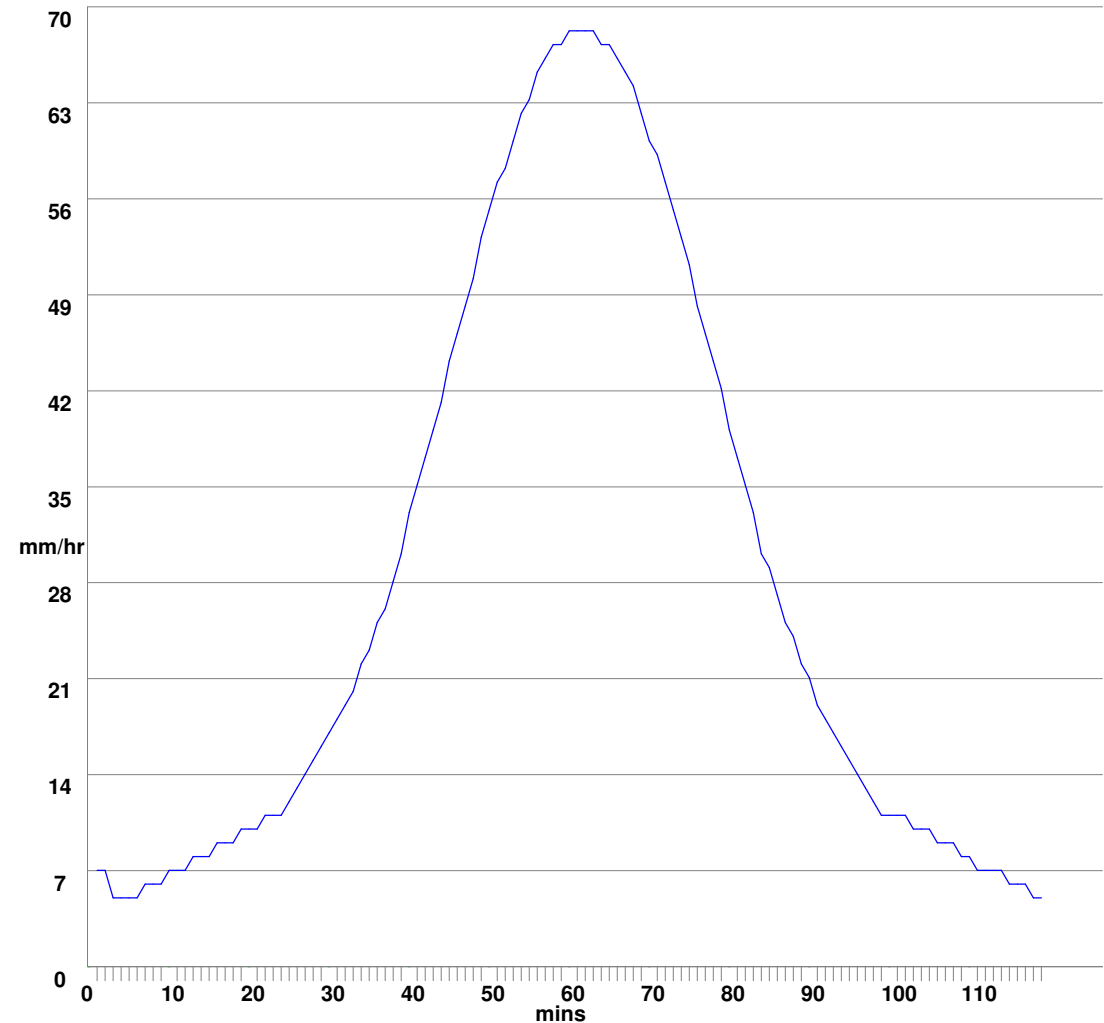
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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
1:00	7.33	41:00	34.77	81:00	37.21
2:00	7.33	42:00	36.94	82:00	35.31
3:00	5.43	43:00	38.84	83:00	33.14
4:00	5.43	44:00	41.29	84:00	30.42
5:00	5.43	45:00	43.73	85:00	28.52
6:00	5.43	46:00	45.90	86:00	26.89
7:00	5.98	47:00	47.81	87:00	25.26
8:00	5.98	48:00	50.25	88:00	23.63
9:00	6.25	49:00	52.97	89:00	22.27
10:00	6.79	50:00	54.87	90:00	20.64
11:00	7.06	51:00	57.04	91:00	19.01
12:00	7.33	52:00	58.40	92:00	17.93
13:00	7.88	53:00	60.03	93:00	17.11
14:00	8.15	54:00	61.66	94:00	16.30
15:00	8.42	55:00	63.02	95:00	14.94
16:00	8.69	56:00	64.65	96:00	14.12
17:00	8.96	57:00	65.73	97:00	13.31
18:00	9.24	58:00	66.82	98:00	12.22
19:00	9.51	59:00	67.36	99:00	11.41
20:00	10.05	60:00	67.63	100:00	11.14
21:00	10.32	61:00	67.91	101:00	10.87
22:00	10.87	62:00	67.91	102:00	10.59
23:00	10.87	63:00	67.63	103:00	10.05
24:00	11.41	64:00	67.36	104:00	9.78
25:00	12.22	65:00	66.82	105:00	9.51
26:00	13.04	66:00	66.01	106:00	8.96
27:00	13.85	67:00	64.92	107:00	8.69
28:00	14.94	68:00	63.56	108:00	8.69
29:00	15.75	69:00	61.93	109:00	8.15
30:00	16.84	70:00	60.30	110:00	7.88
31:00	17.66	71:00	58.94	111:00	7.33
32:00	19.01	72:00	57.31	112:00	7.06
33:00	20.37	73:00	55.41	113:00	6.79
34:00	21.73	74:00	53.24	114:00	6.52
35:00	23.36	75:00	50.79	115:00	5.98
36:00	24.99	76:00	48.35	116:00	5.98
37:00	26.35	77:00	46.18	117:00	5.70
38:00	28.25	78:00	44.00	118:00	5.43
39:00	30.15	79:00	42.10	119:00	5.43
40:00	32.60	80:00	39.39	120:00	5.43

Hydrograph profile derived from data in the Flood Studies Report

Return period= 100 yrs Duration= 120 mins Profile - winter





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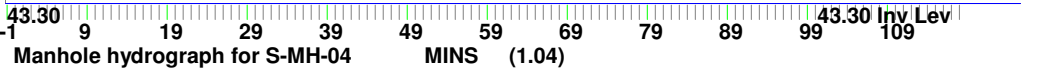
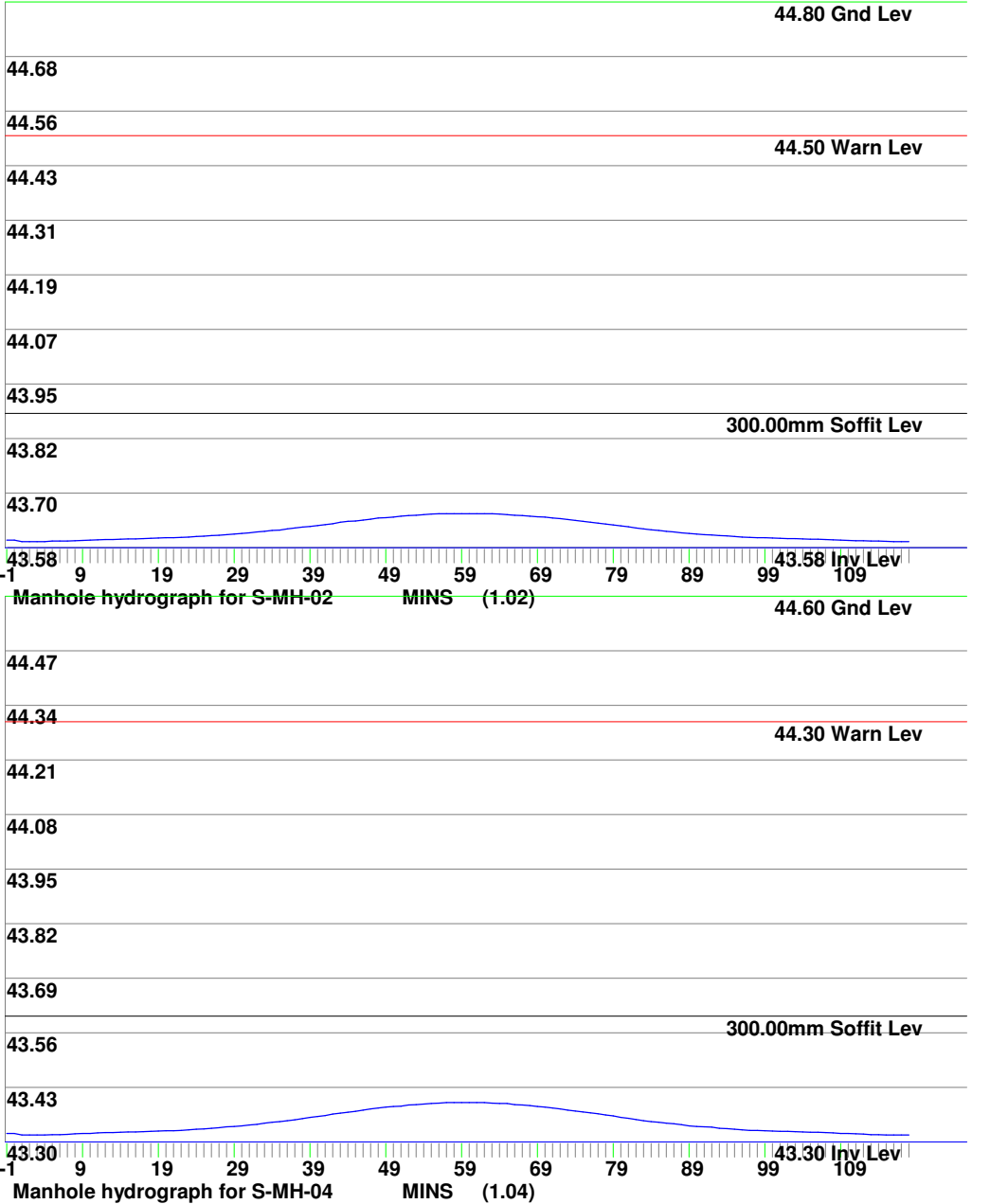
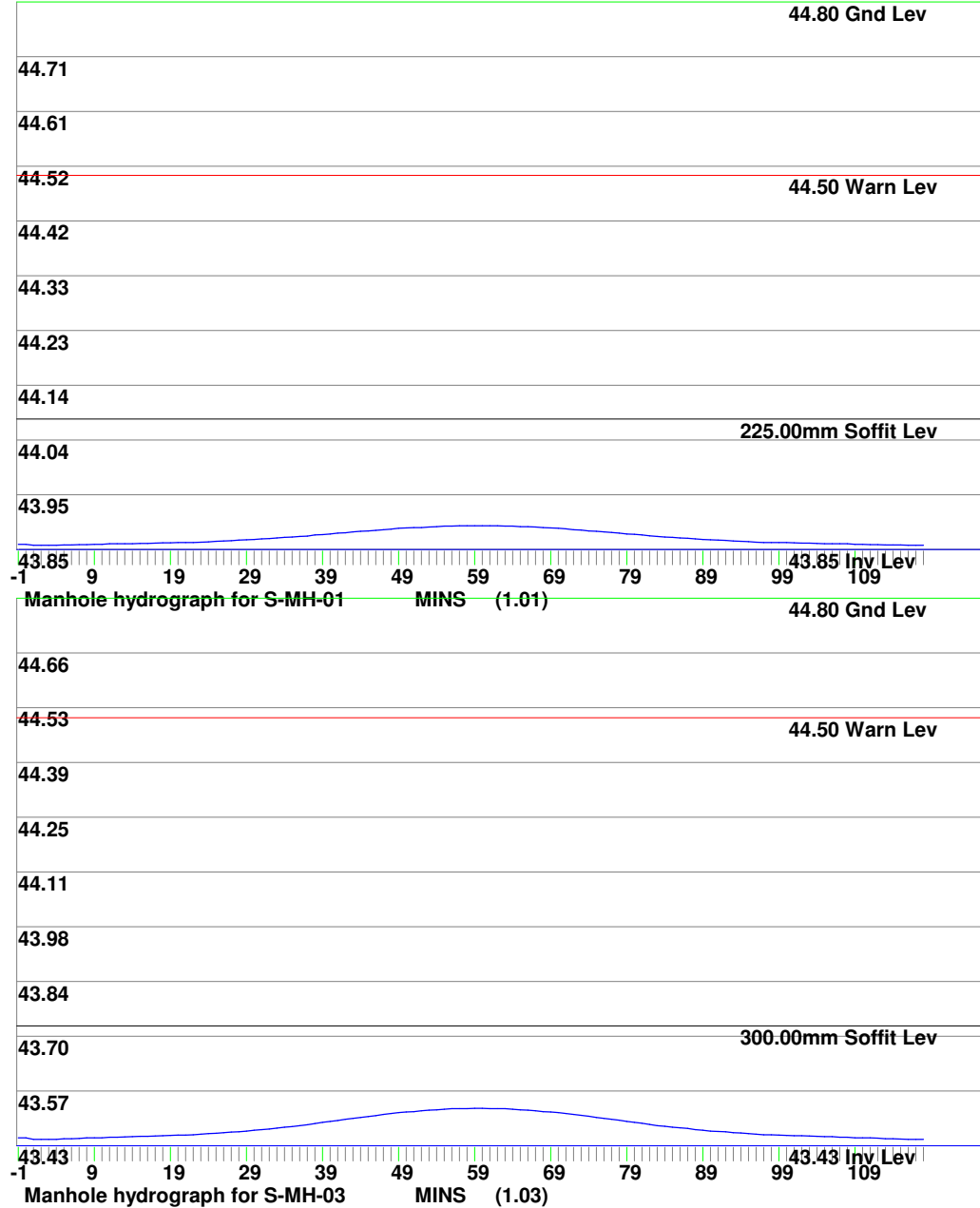
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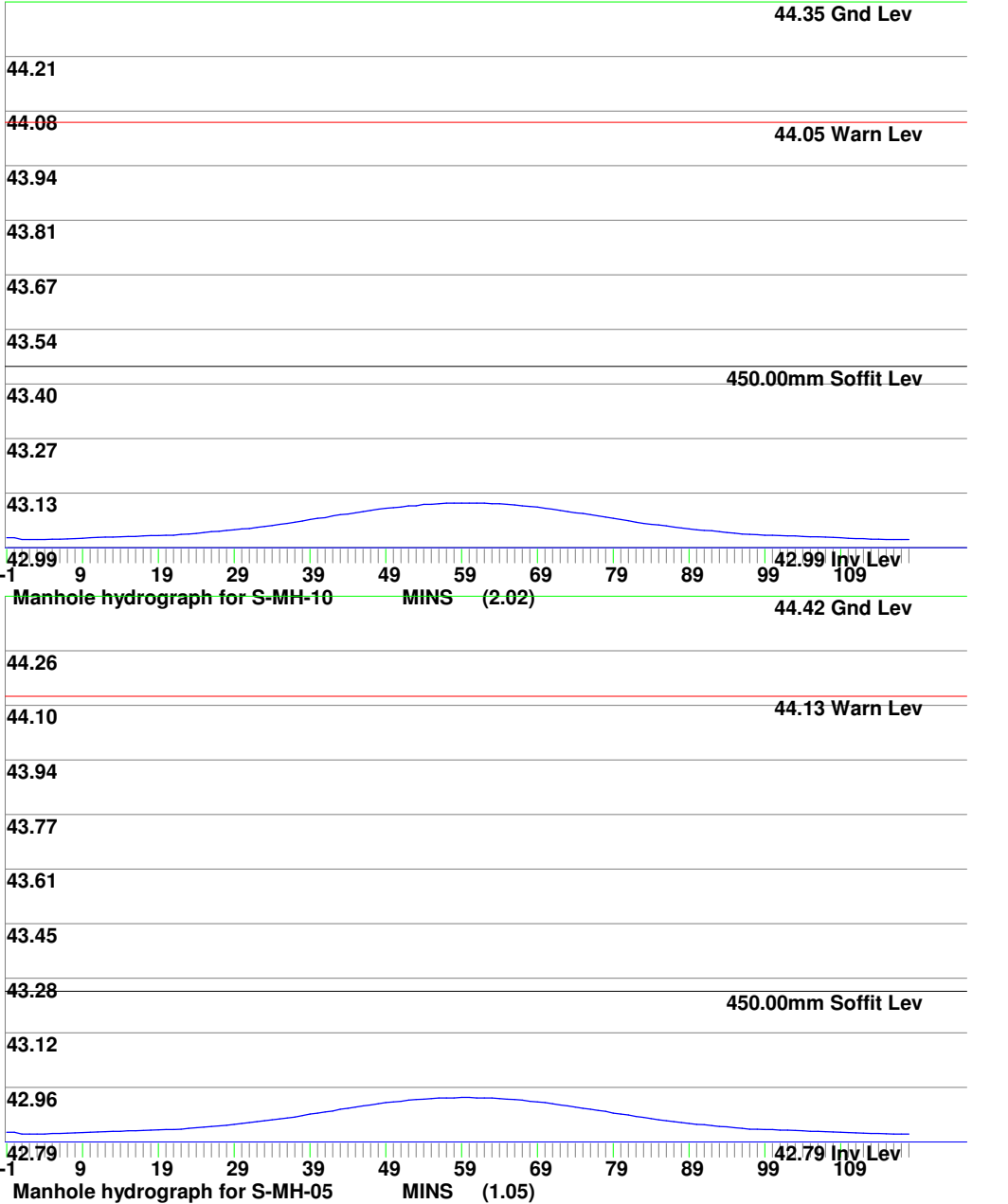
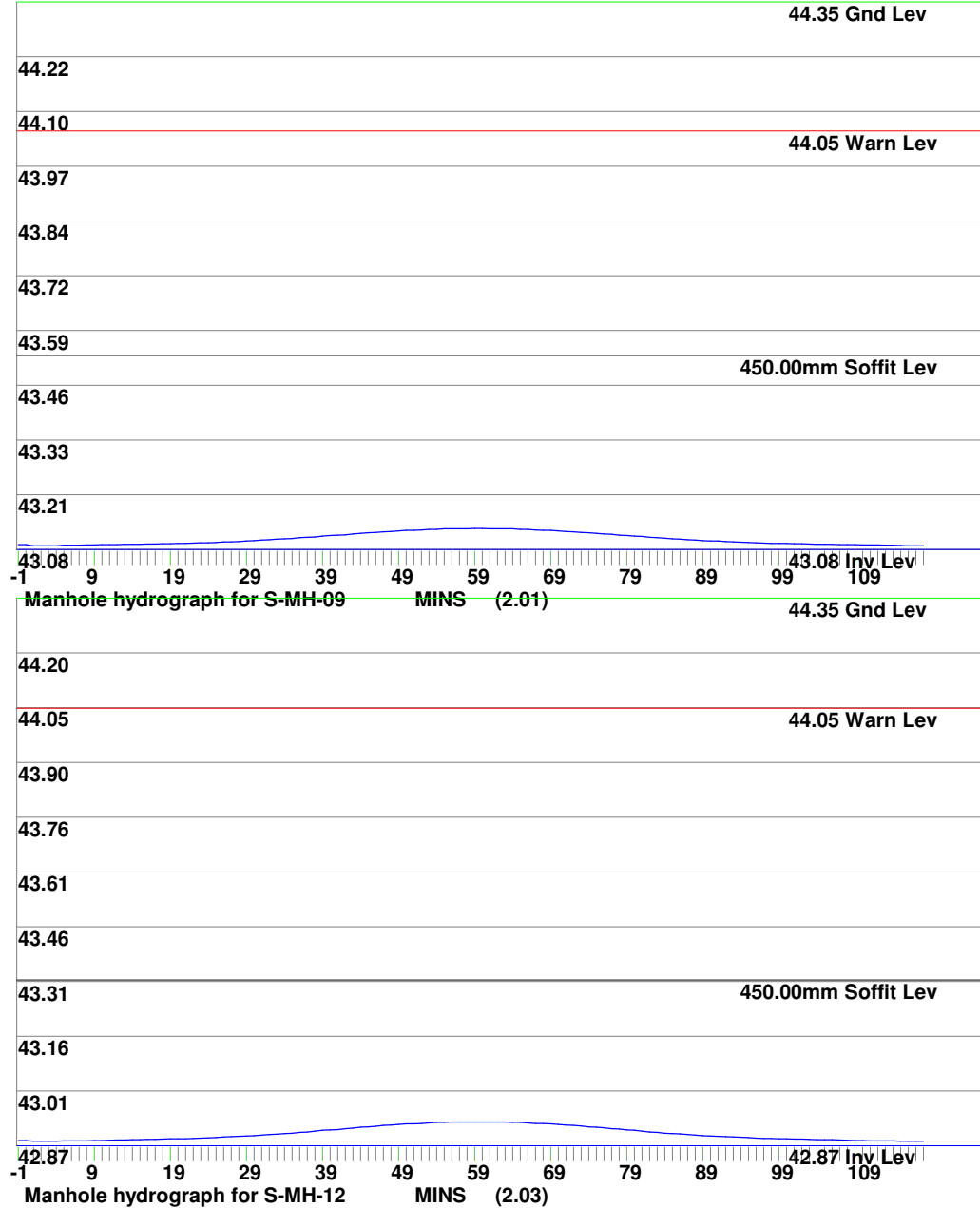
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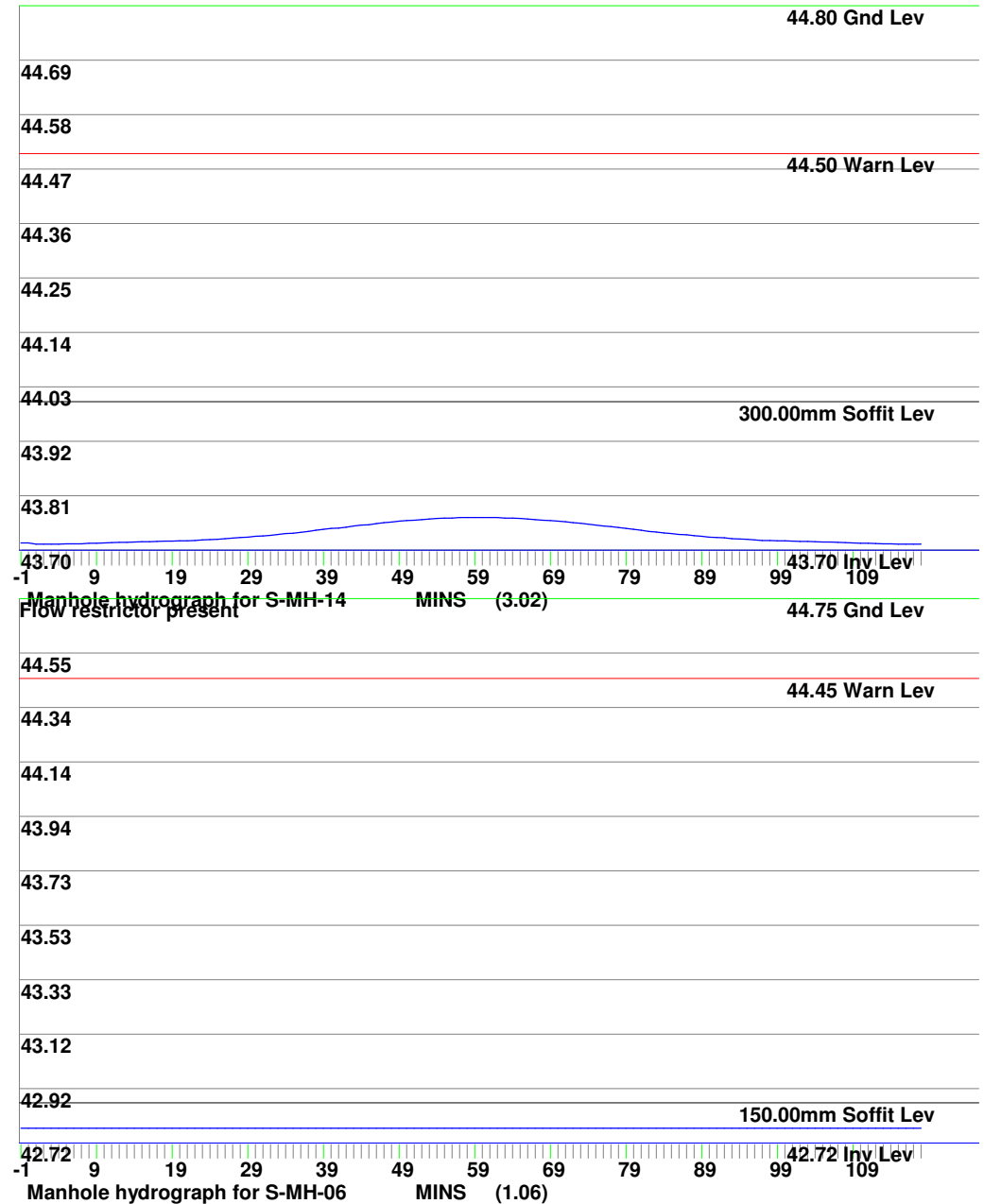
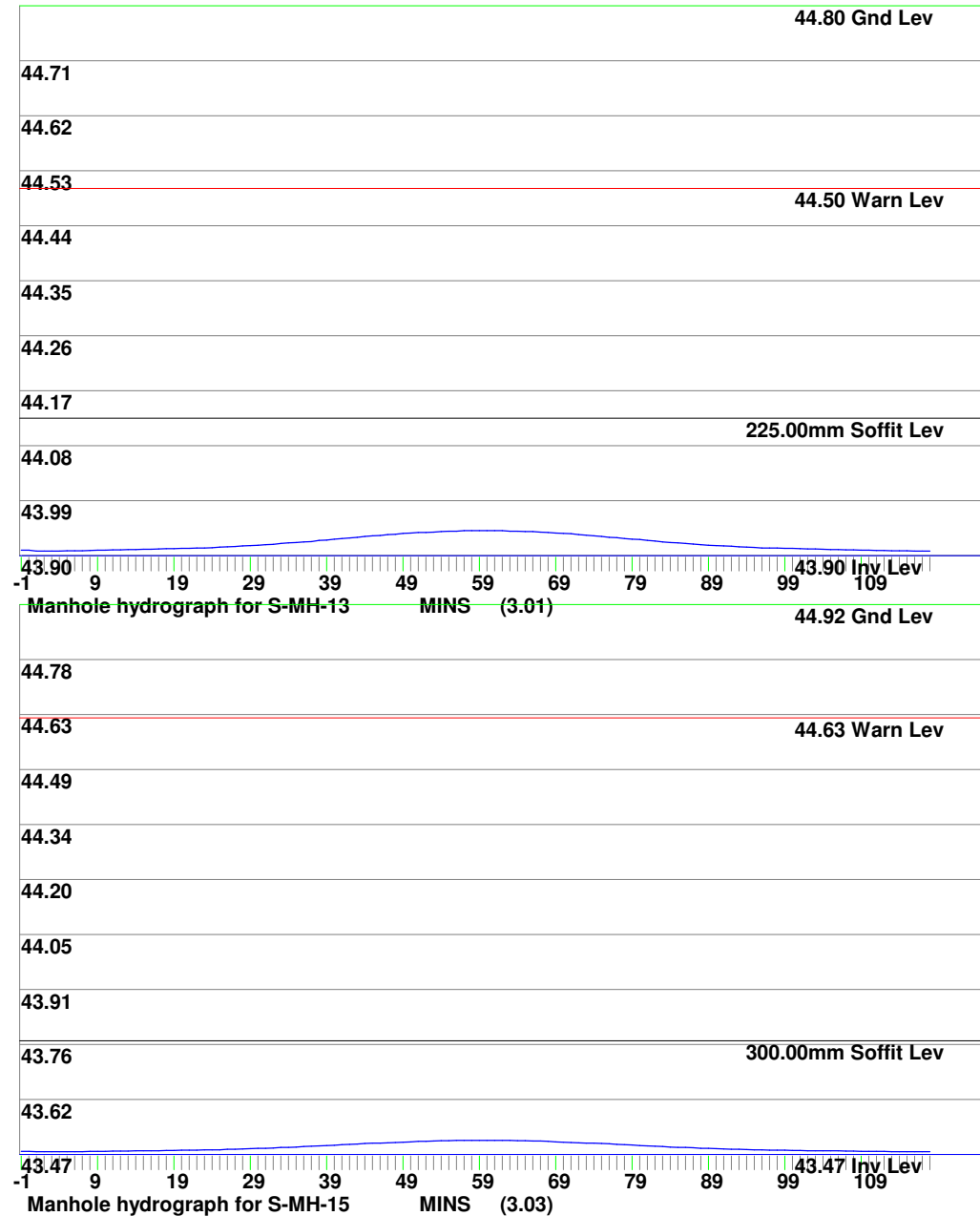


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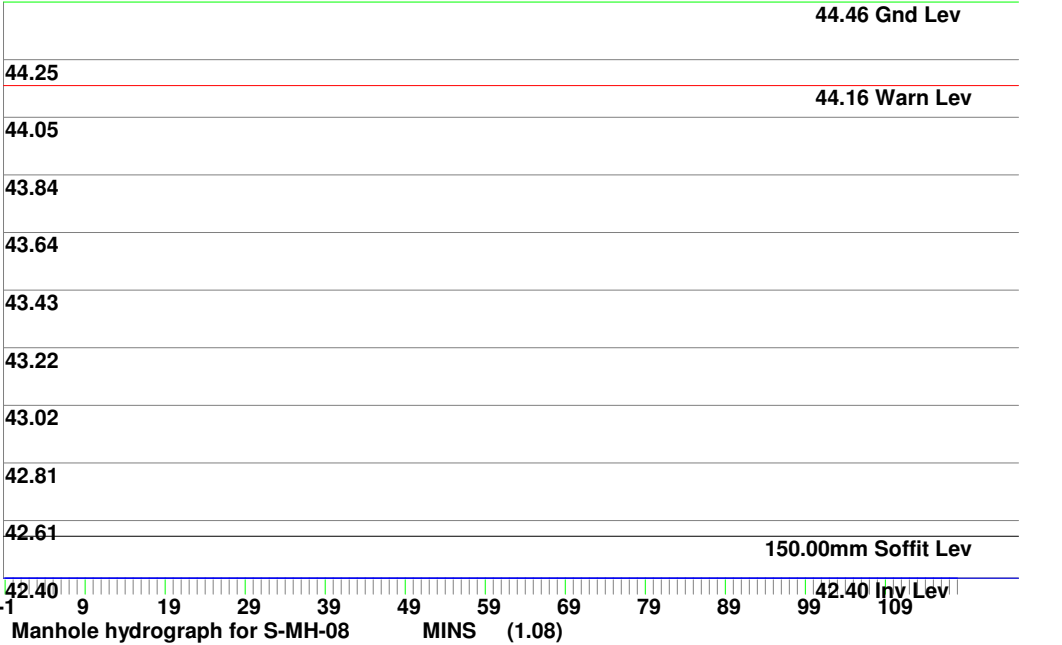
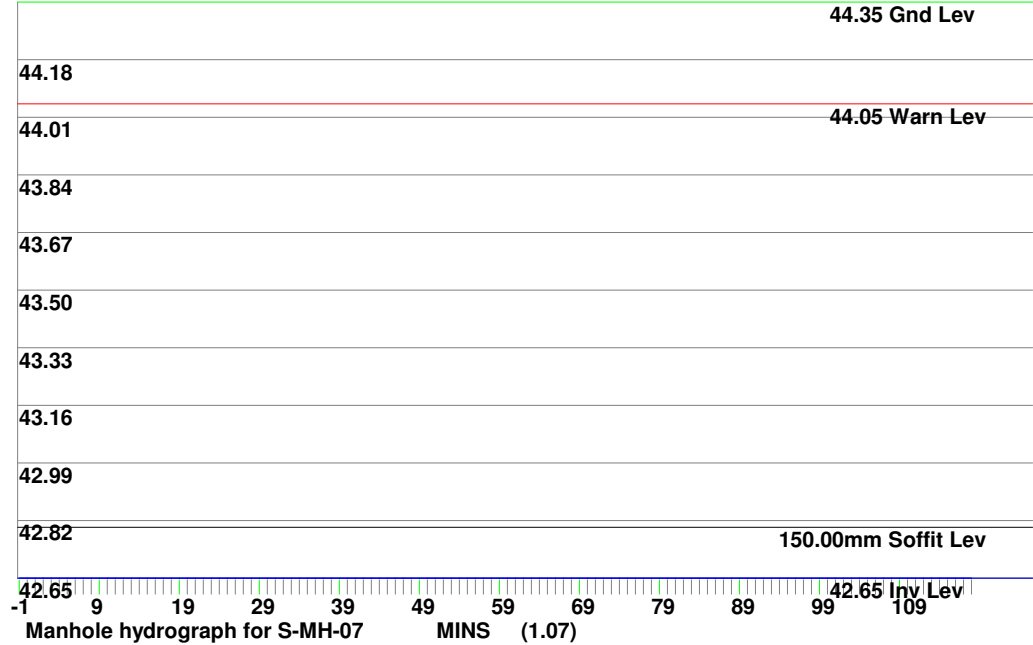
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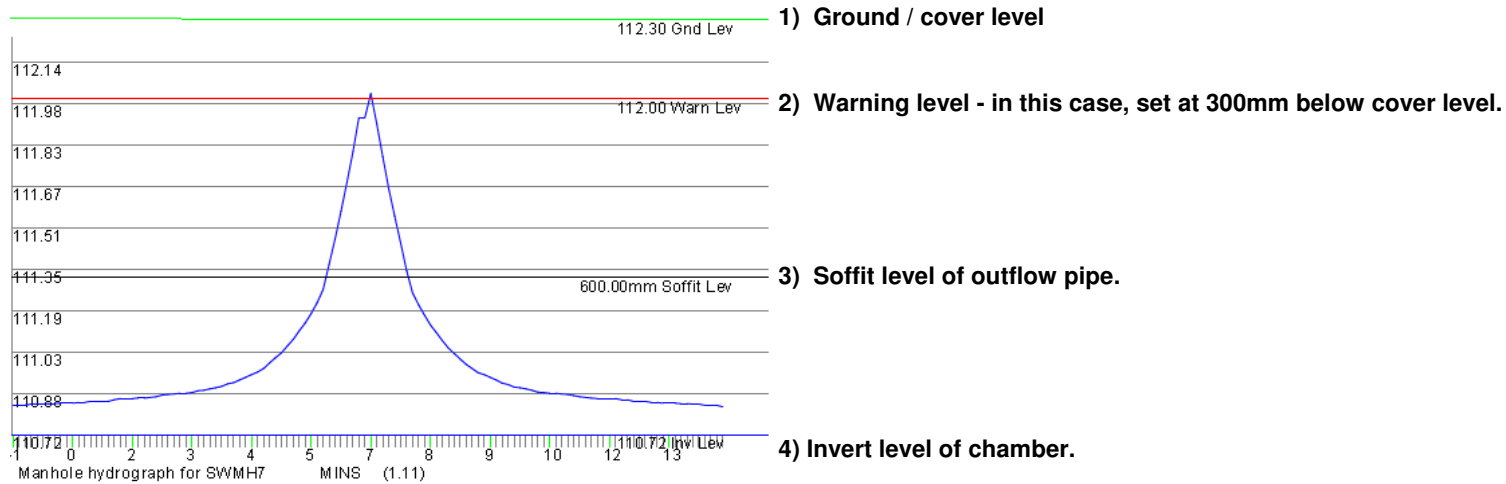
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Notes

- 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.