



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 = 240 mins
No offline storage

Mean rain intens. 10.00 mm/hr
Storm profile = Winter
Using FSR data

Peak rain intens. 25.00 mm/hr
Sample period = 120.0 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		EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) :x FACTOR	STATUS	
1	I	1.01	S-MH-01	42.1	1.7	225	1200	43.85	43.87	44.80	0.04	0.02	0.00	0.000	527	OK
2	I	1.02	S-MH-02	77.8	5.0	300	1200	43.58	43.62	44.80	0.06	0.04	0.00	0.000	1579	OK
3	I	1.03	S-MH-03	78.4	6.7	300	1200	43.43	43.47	44.80	0.08	0.04	0.00	0.000	2106	OK
4	I	1.04	S-MH-04	78.0	6.7	300	1500	43.30	43.34	44.60	0.09	0.04	0.00	0.000	2106	OK
5	B	2.01	S-MH-09	184.0	3.4	450	1500	43.08	43.10	44.35	0.02	0.02	0.00	0.000	1065	OK
6	B	2.02	S-MH-10	184.9	11.2	450	1500	42.99	43.05	44.35	0.06	0.05	0.00	0.000	3560	OK
7	B	2.03	S-MH-12	398.2	11.2	450	1500	42.87	42.90	44.35	0.03	0.03	0.00	0.000	3560	OK
8	I	1.05	S-MH-05	227.8	17.9	450	1500	42.79	42.86	44.42	0.08	0.06	0.00	0.000	5666	OK
9	B	3.01	S-MH-13	42.1	1.7	225	1200	43.90	43.92	44.80	0.04	0.02	0.00	0.000	527	OK
10	B	3.02	S-MH-14	95.8	5.0	300	1200	43.70	43.73	44.80	0.05	0.03	0.00	0.000	1582	OK
11	B	3.03	S-MH-15	298.4	6.7	300	1200	43.47	43.49	44.92	0.02	0.02	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	4.8	150	1200	42.65	42.71	44.35	0.33	0.05	0.00	0.000	7775	OK
14	I	1.08	S-MH-08	18.6	4.8	150	1200	42.40	42.45	44.46	0.26	0.05	0.00	0.000	7775	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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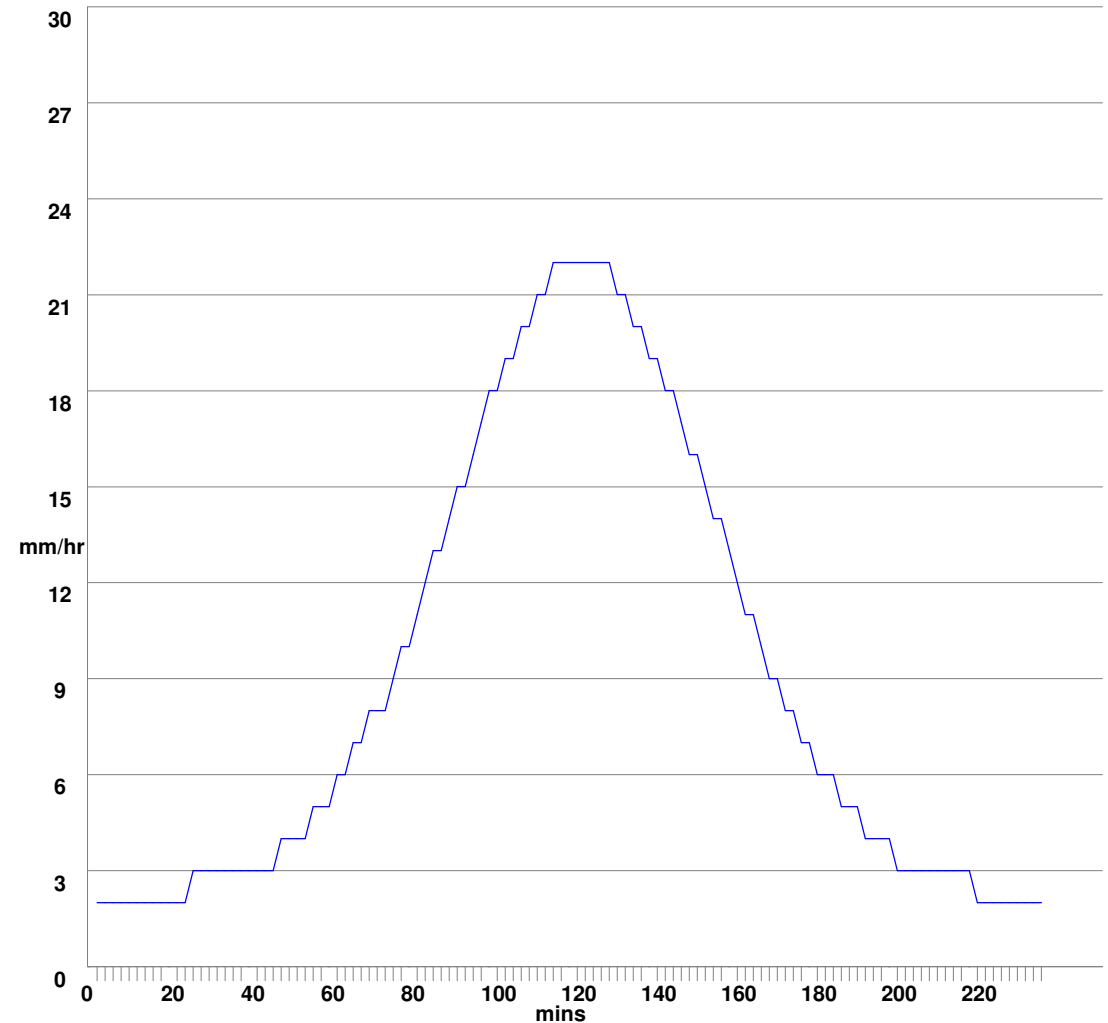
Project

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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
2:00	2.36	82:00	11.19	162:00	11.98
4:00	2.36	84:00	11.89	164:00	11.37
6:00	1.75	86:00	12.51	166:00	10.67
8:00	1.75	88:00	13.29	168:00	9.80
10:00	1.75	90:00	14.08	170:00	9.18
12:00	1.75	92:00	14.78	172:00	8.66
14:00	1.92	94:00	15.39	174:00	8.13
16:00	1.92	96:00	16.18	176:00	7.61
18:00	2.01	98:00	17.05	178:00	7.17
20:00	2.19	100:00	17.67	180:00	6.65
22:00	2.27	102:00	18.37	182:00	6.12
24:00	2.36	104:00	18.80	184:00	5.77
26:00	2.54	106:00	19.33	186:00	5.51
28:00	2.62	108:00	19.85	188:00	5.25
30:00	2.71	110:00	20.29	190:00	4.81
32:00	2.80	112:00	20.82	192:00	4.55
34:00	2.89	114:00	21.16	194:00	4.29
36:00	2.97	116:00	21.51	196:00	3.94
38:00	3.06	118:00	21.69	198:00	3.67
40:00	3.24	120:00	21.78	200:00	3.59
42:00	3.32	122:00	21.86	202:00	3.50
44:00	3.50	124:00	21.86	204:00	3.41
46:00	3.50	126:00	21.78	206:00	3.24
48:00	3.67	128:00	21.69	208:00	3.15
50:00	3.94	130:00	21.51	210:00	3.06
52:00	4.20	132:00	21.25	212:00	2.89
54:00	4.46	134:00	20.90	214:00	2.80
56:00	4.81	136:00	20.47	216:00	2.80
58:00	5.07	138:00	19.94	218:00	2.62
60:00	5.42	140:00	19.42	220:00	2.54
62:00	5.68	142:00	18.98	222:00	2.36
64:00	6.12	144:00	18.45	224:00	2.27
66:00	6.56	146:00	17.84	226:00	2.19
68:00	7.00	148:00	17.14	228:00	2.10
70:00	7.52	150:00	16.35	230:00	1.92
72:00	8.05	152:00	15.57	232:00	1.92
74:00	8.48	154:00	14.87	234:00	1.84
76:00	9.10	156:00	14.17	236:00	1.75
78:00	9.71	158:00	13.56	238:00	1.75
80:00	10.49	160:00	12.68	240:00	1.75

Hydrograph profile derived from data in the Flood Studies Report

Return period= 30 yrs Duration= 240 mins Profile - winter





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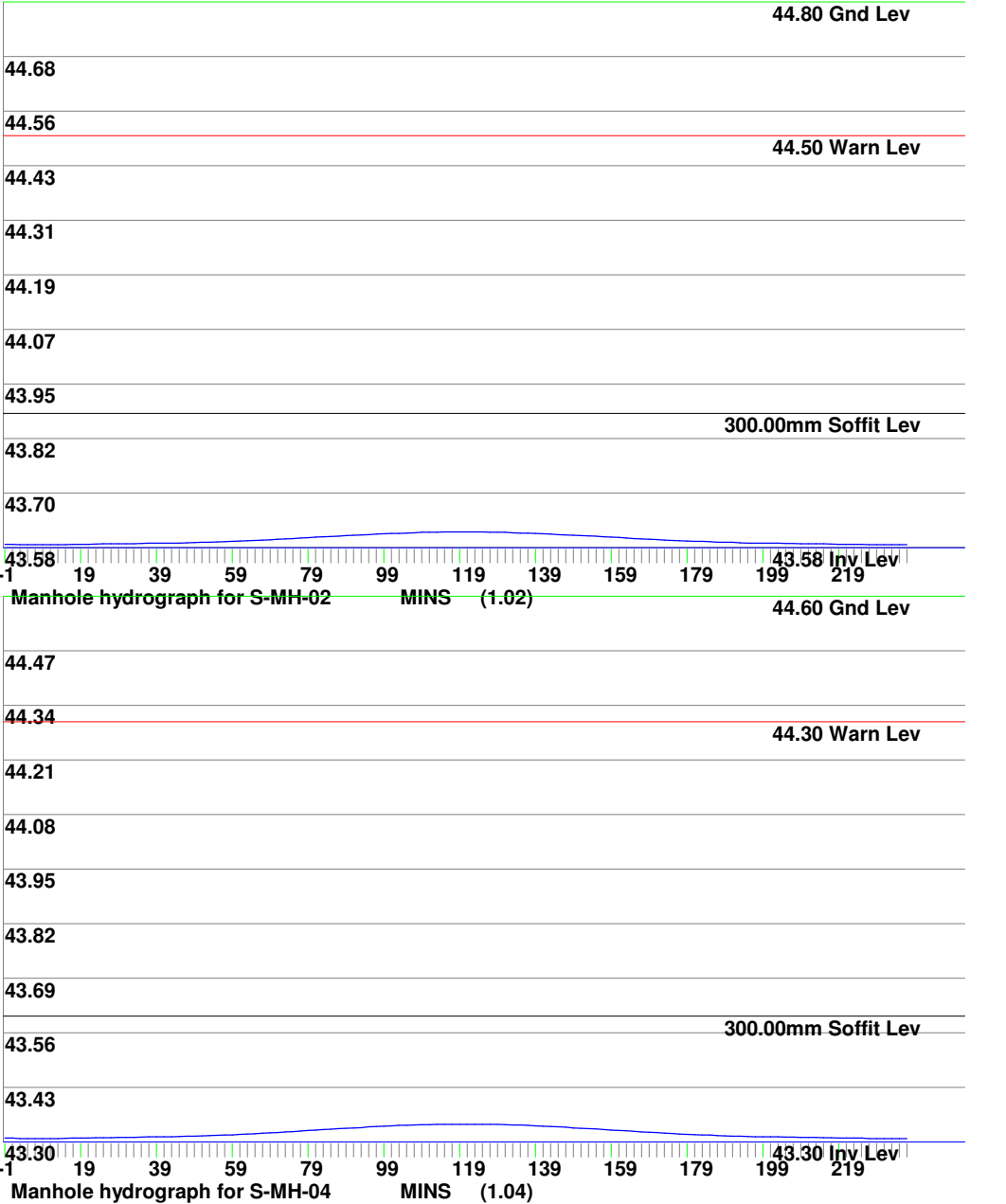
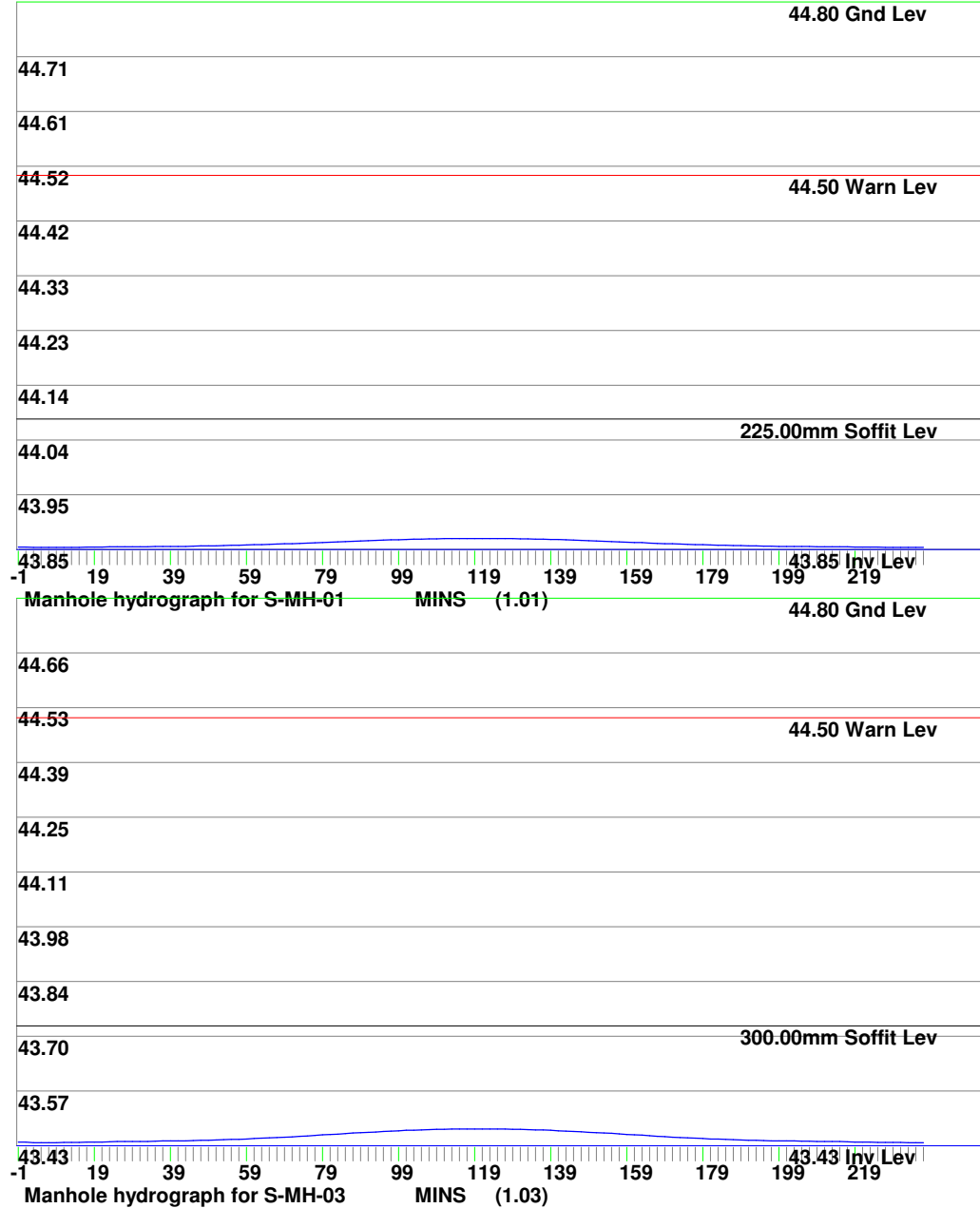
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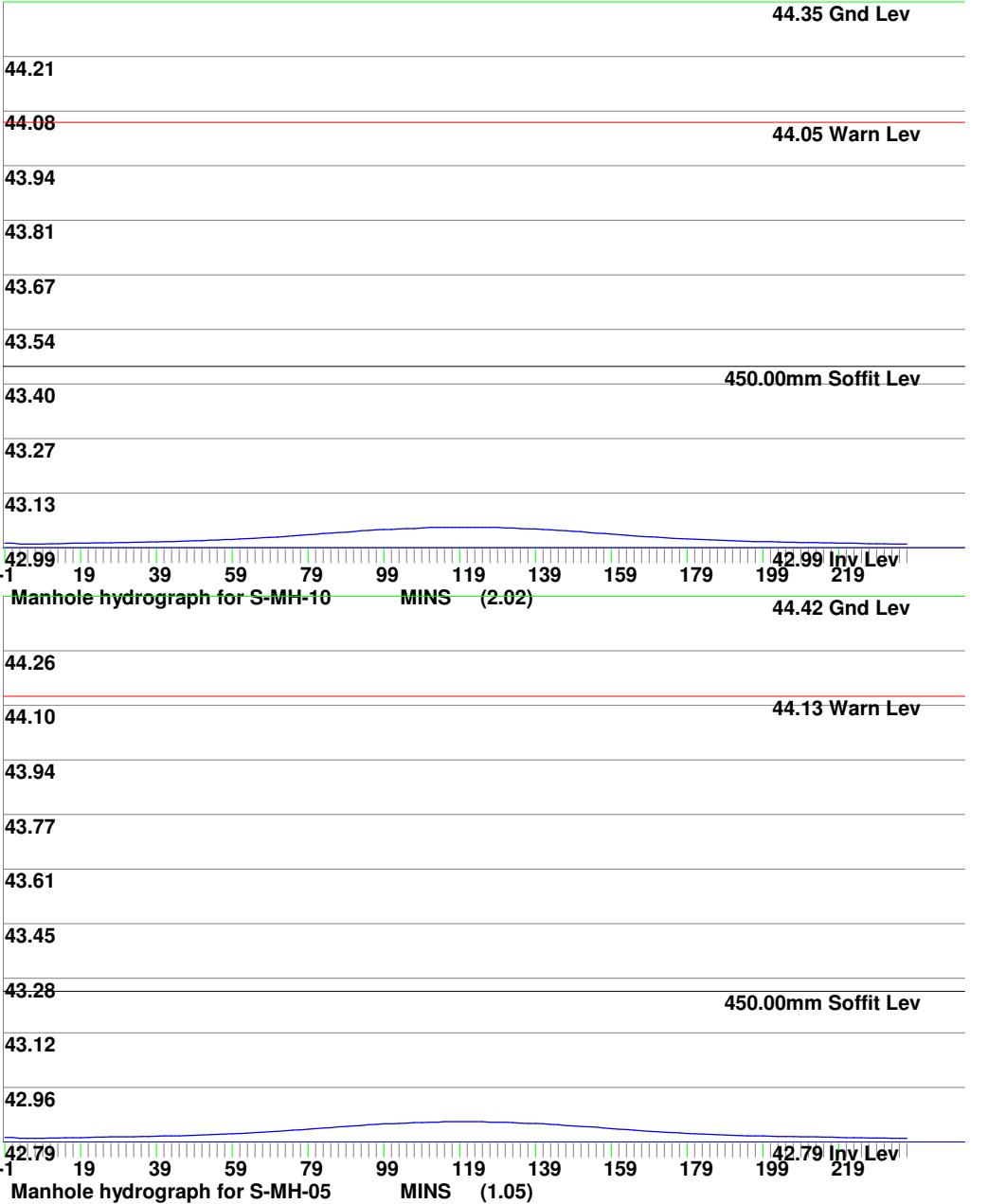
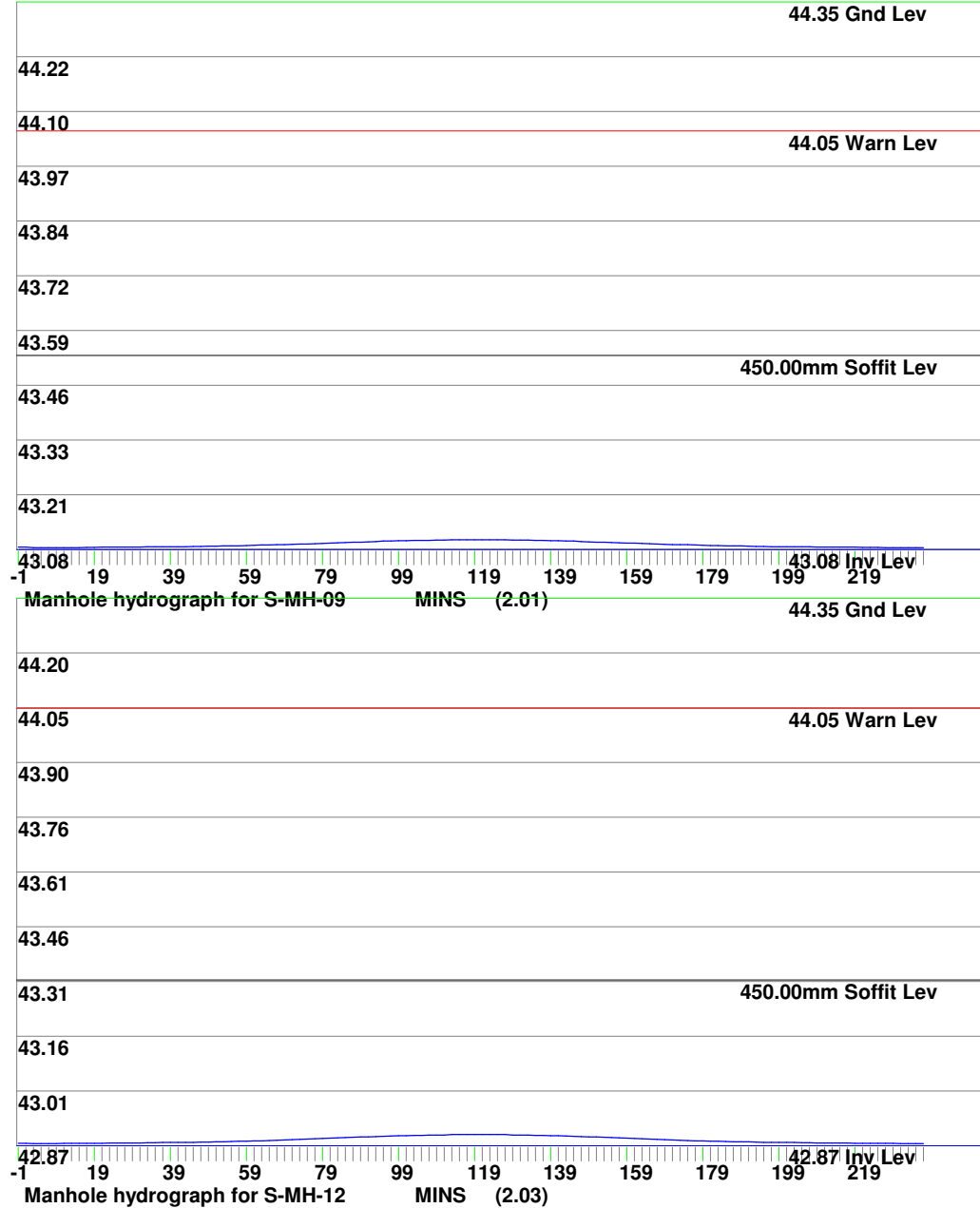
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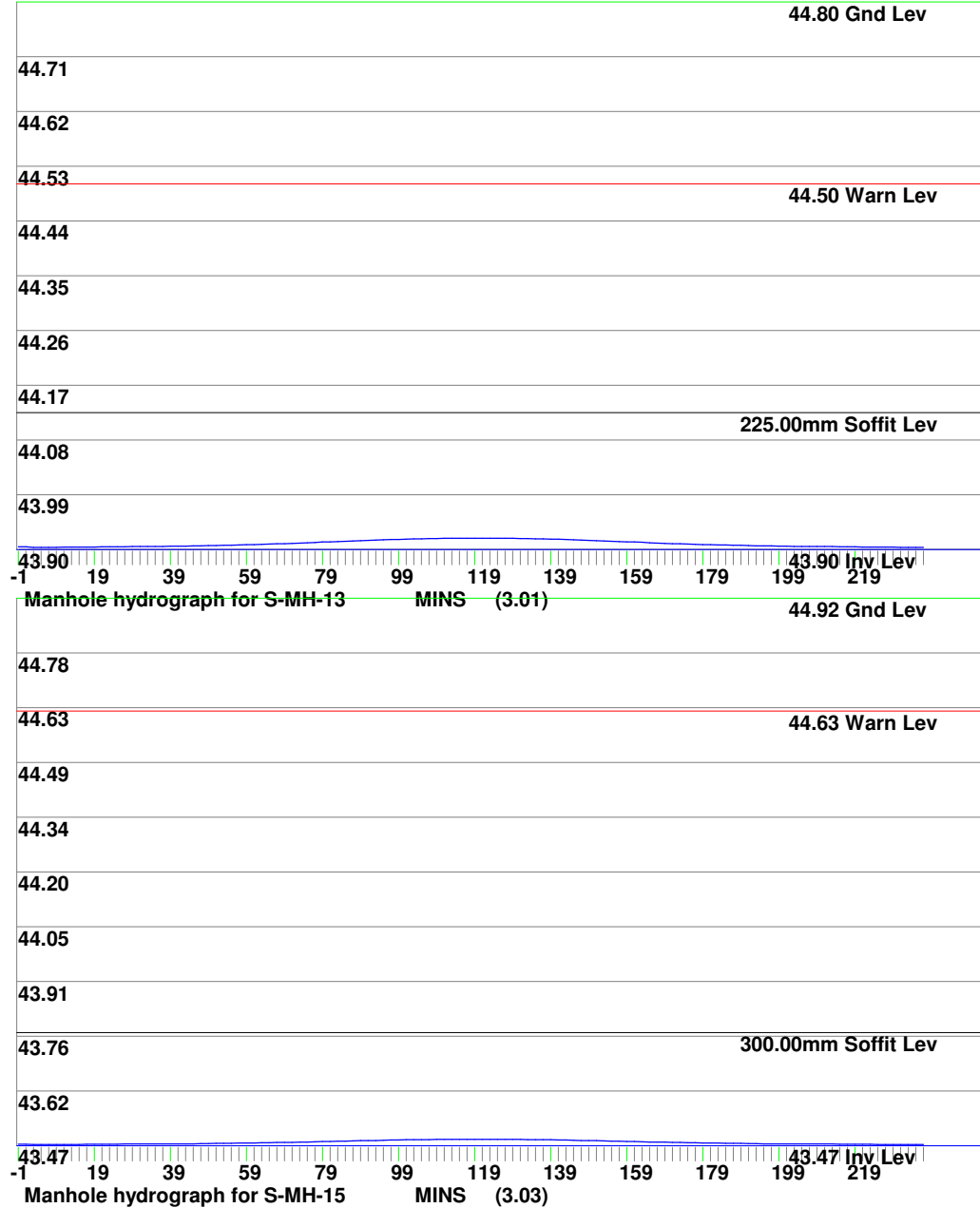
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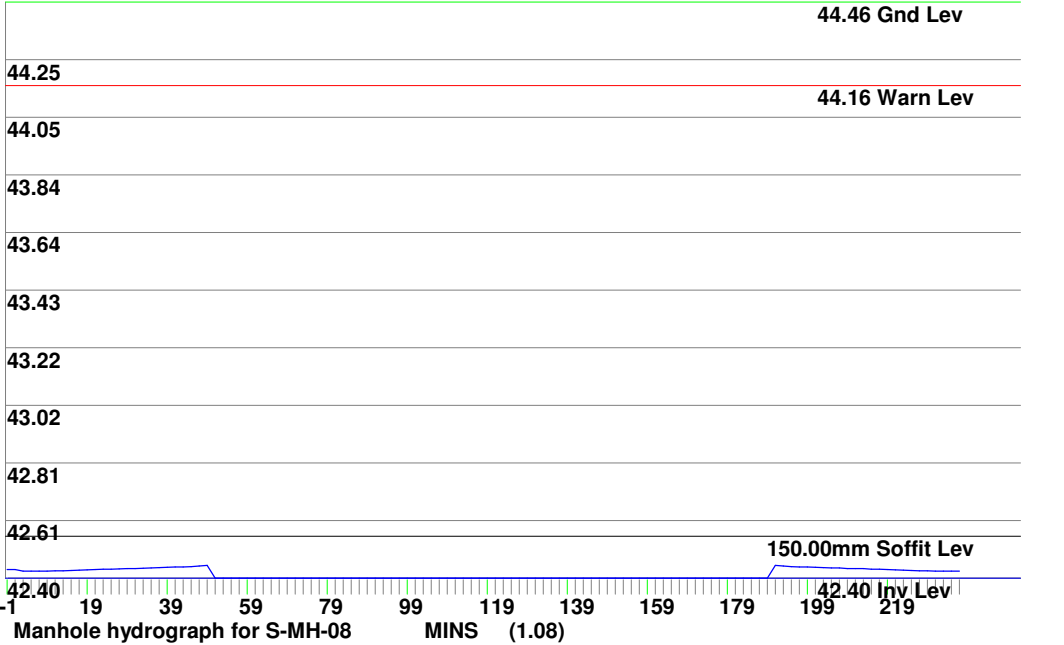
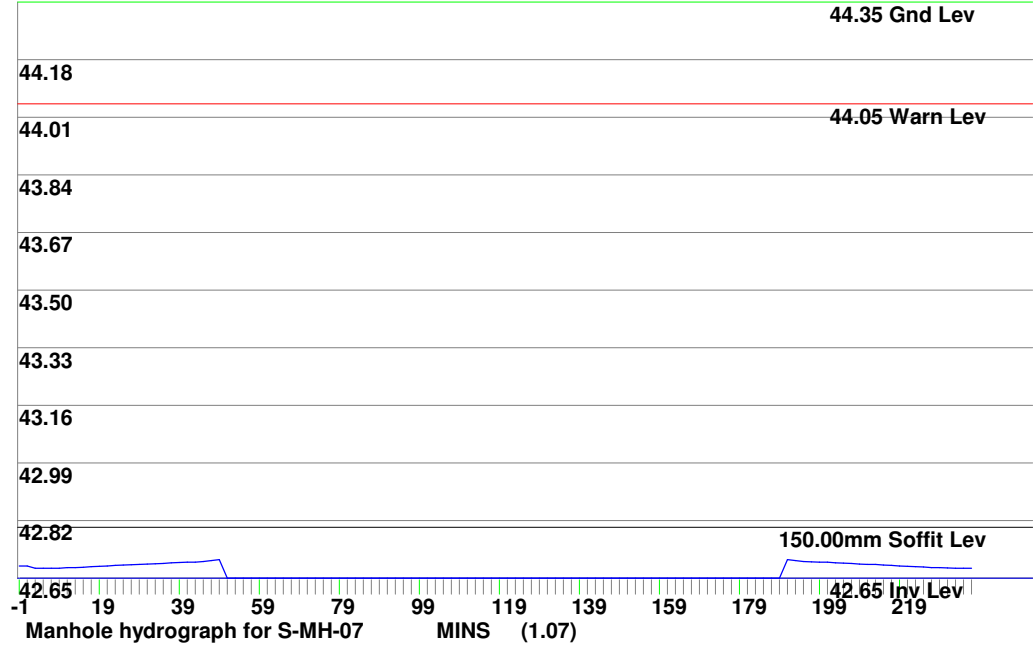
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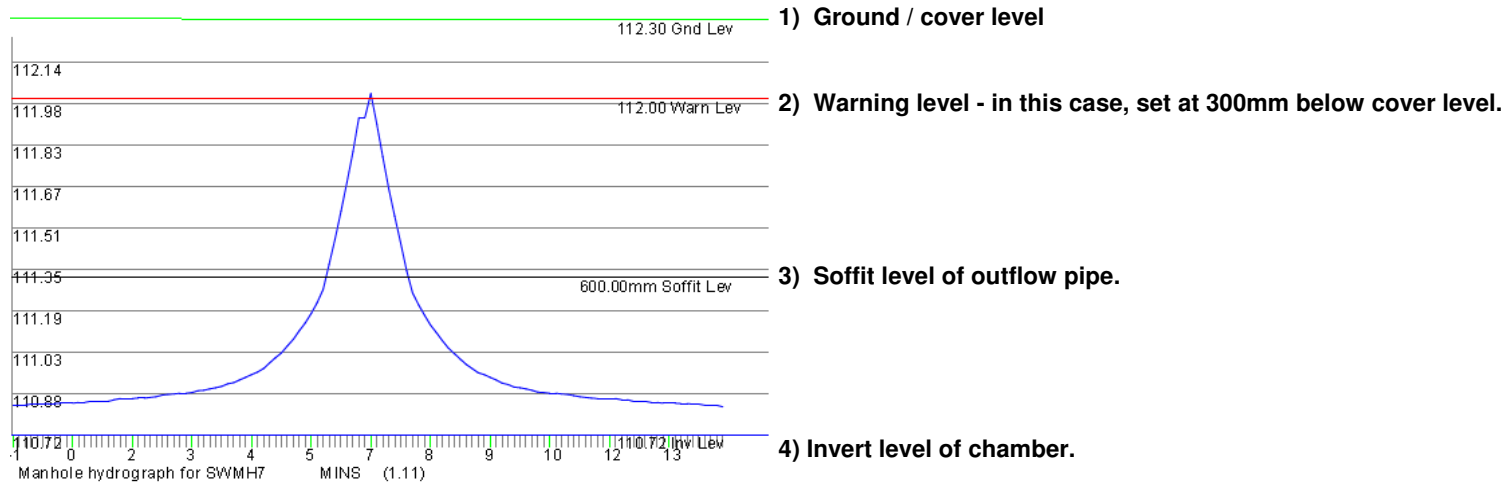
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Notes

- 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.