



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 = 360 mins
No offline storage

Mean rain intens. 8.00 mm/hr
Storm profile = Summer
Using FSR data

Peak rain intens. 31.36 mm/hr
Sample period = 180.0 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	1.9	225	1200	43.85	43.88	44.80	0.05	0.02	0.00	0.000	527	OK
2	I	1.02 S-MH-02	77.8	5.7	300	1200	43.58	43.62	44.80	0.07	0.04	0.00	0.000	1579	OK
3	I	1.03 S-MH-03	78.4	7.6	300	1200	43.43	43.48	44.80	0.10	0.05	0.00	0.000	2106	OK
4	I	1.04 S-MH-04	78.0	7.6	300	1500	43.30	43.35	44.60	0.10	0.05	0.00	0.000	2106	OK
5	B	2.01 S-MH-09	184.0	3.9	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	12.9	450	1500	42.99	43.05	44.35	0.07	0.06	0.00	0.000	3560	OK
7	B	2.03 S-MH-12	398.2	12.9	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	20.5	450	1500	42.79	42.86	44.42	0.09	0.07	0.00	0.000	5666	OK
9	B	3.01 S-MH-13	42.1	1.9	225	1200	43.90	43.92	44.80	0.05	0.02	0.00	0.000	527	OK
10	B	3.02 S-MH-14	95.8	5.7	300	1200	43.70	43.73	44.80	0.06	0.03	0.00	0.000	1582	OK
11	B	3.03 S-MH-15	298.4	7.6	300	1200	43.47	43.49	44.92	0.03	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

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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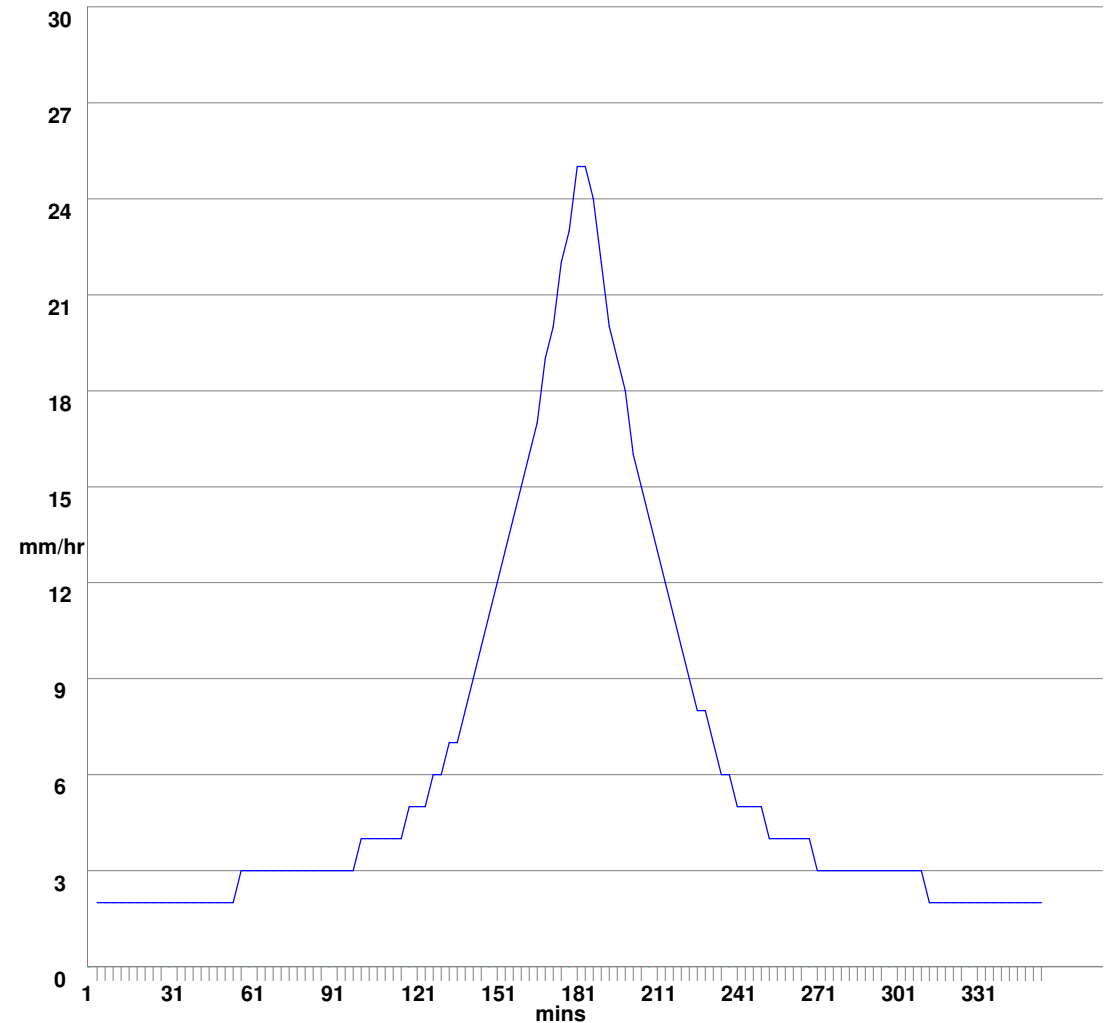
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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
3:00	1.79	123:00	5.11	243:00	5.49
6:00	1.79	126:00	5.43	246:00	5.17
9:00	2.04	129:00	5.75	249:00	4.85
12:00	2.04	132:00	6.20	252:00	4.54
15:00	2.04	135:00	6.77	255:00	4.34
18:00	2.11	138:00	7.47	258:00	4.09
21:00	2.11	141:00	8.11	261:00	3.90
24:00	2.17	144:00	8.82	264:00	3.77
27:00	2.17	147:00	9.77	267:00	3.64
30:00	2.24	150:00	10.73	270:00	3.58
33:00	2.24	153:00	11.69	273:00	3.39
36:00	2.24	156:00	12.71	276:00	3.26
39:00	2.30	159:00	13.80	279:00	3.26
42:00	2.30	162:00	14.82	282:00	3.19
45:00	2.43	165:00	15.97	285:00	3.13
48:00	2.43	168:00	17.38	288:00	3.07
51:00	2.43	171:00	18.72	291:00	2.87
54:00	2.49	174:00	20.12	294:00	2.81
57:00	2.56	177:00	21.72	297:00	2.75
60:00	2.62	180:00	23.38	300:00	2.75
63:00	2.62	183:00	25.04	303:00	2.68
66:00	2.68	186:00	25.04	306:00	2.62
69:00	2.68	189:00	23.70	309:00	2.62
72:00	2.75	192:00	21.98	312:00	2.56
75:00	2.81	195:00	20.44	315:00	2.49
78:00	2.87	198:00	18.97	318:00	2.49
81:00	3.00	201:00	17.57	321:00	2.43
84:00	3.13	204:00	16.29	324:00	2.43
87:00	3.19	207:00	15.08	327:00	2.30
90:00	3.26	210:00	13.99	330:00	2.30
93:00	3.26	213:00	12.90	333:00	2.24
96:00	3.39	216:00	11.82	336:00	2.24
99:00	3.45	219:00	10.92	339:00	2.24
102:00	3.64	222:00	9.90	342:00	2.17
105:00	3.77	225:00	9.07	345:00	2.17
108:00	3.90	228:00	8.24	348:00	2.11
111:00	4.02	231:00	7.54	351:00	2.11
114:00	4.28	234:00	6.90	354:00	2.11
117:00	4.47	237:00	6.26	357:00	2.04
120:00	4.79	240:00	5.81	360:00	2.04

Hydrograph profile derived from data in the Flood Studies Report

Return period= 30 yrs Duration= 360 mins Profile - summer





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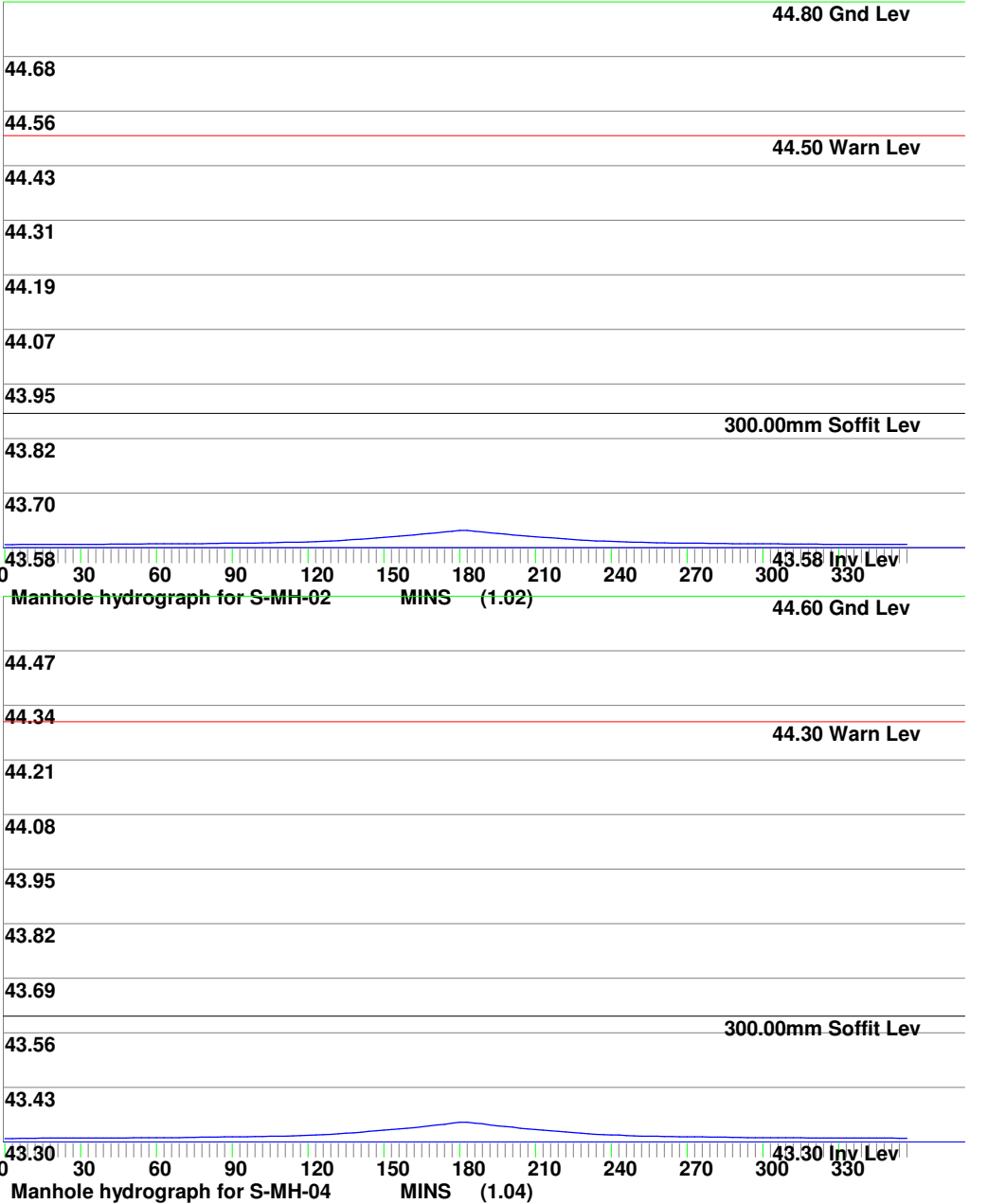
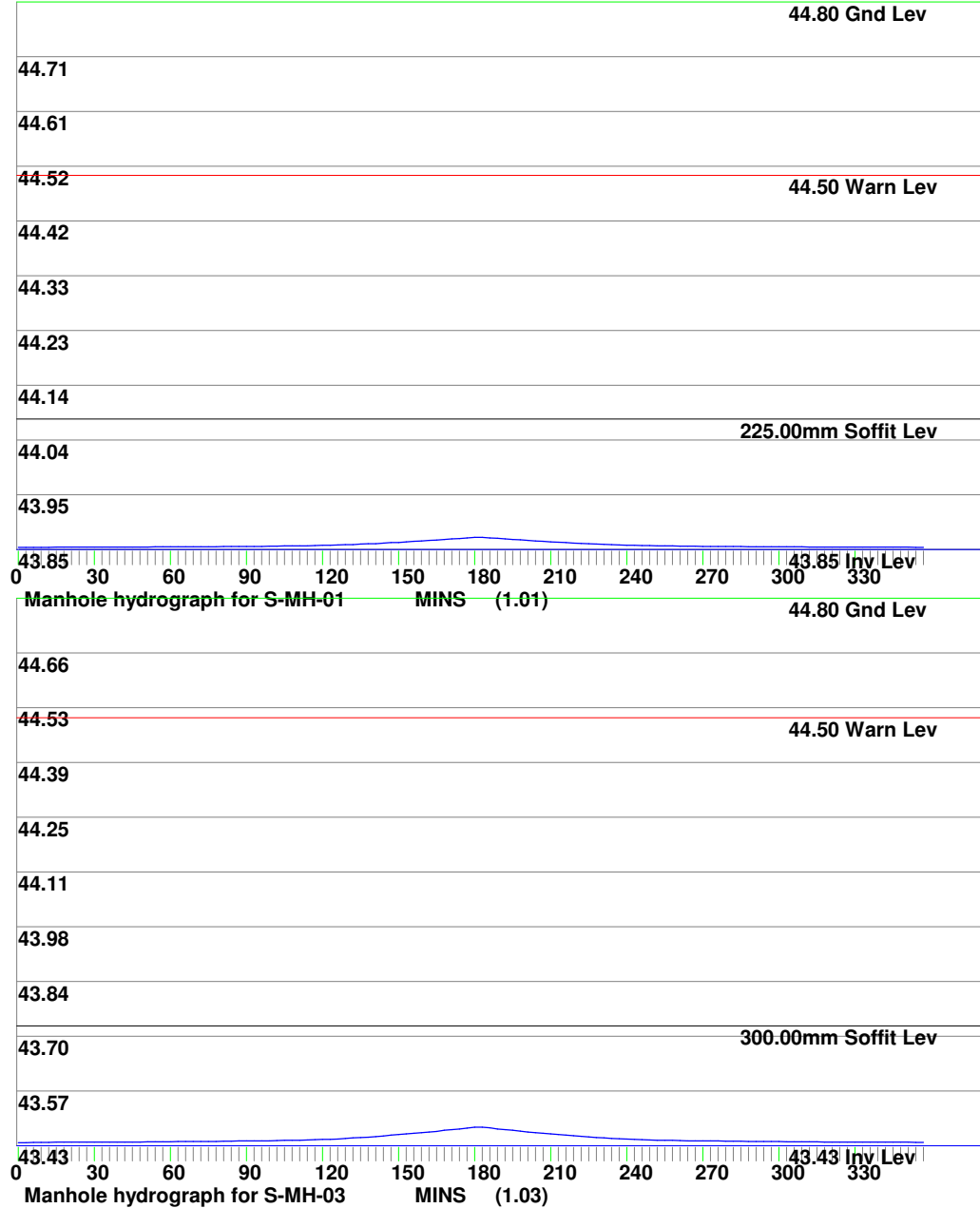
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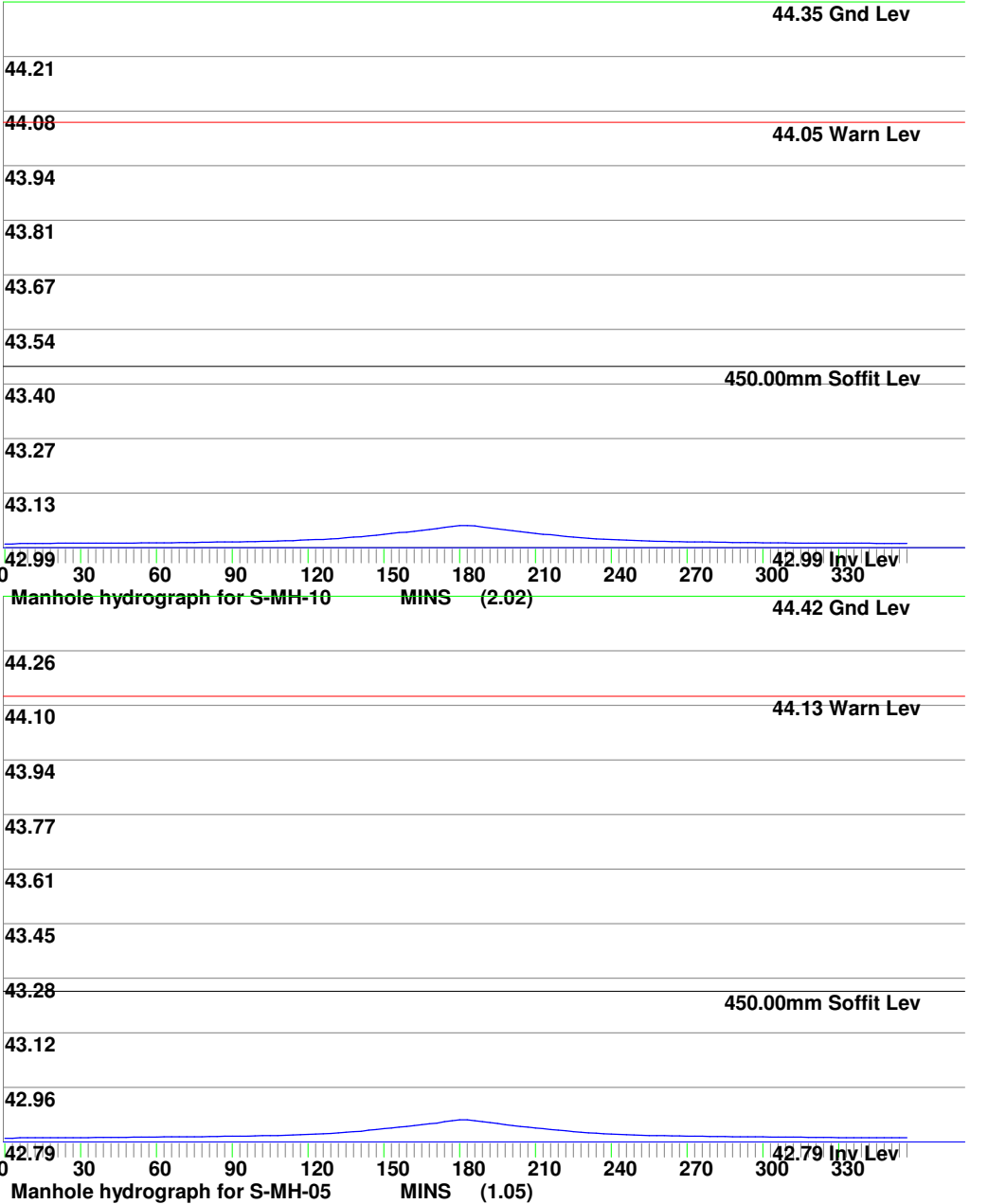
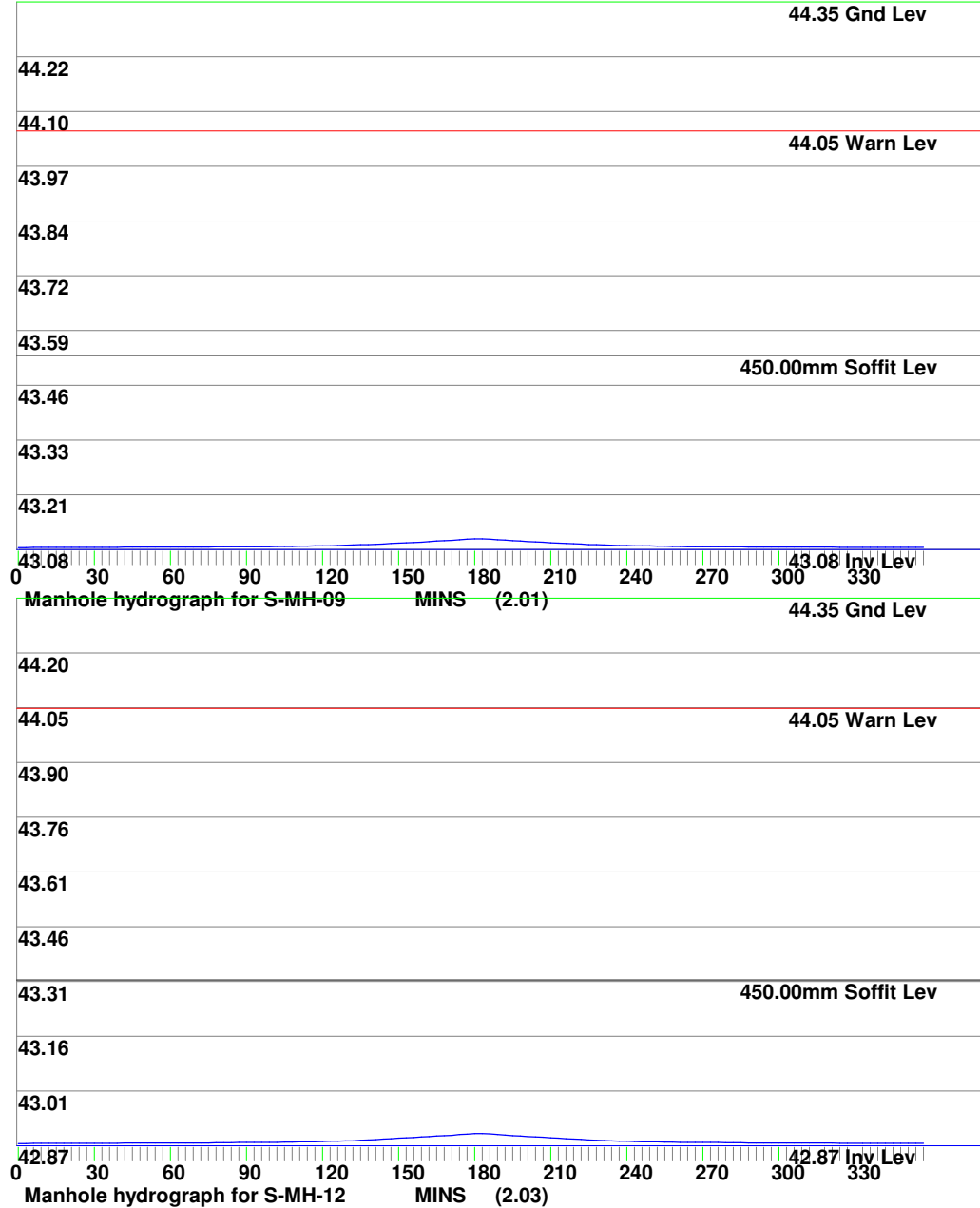
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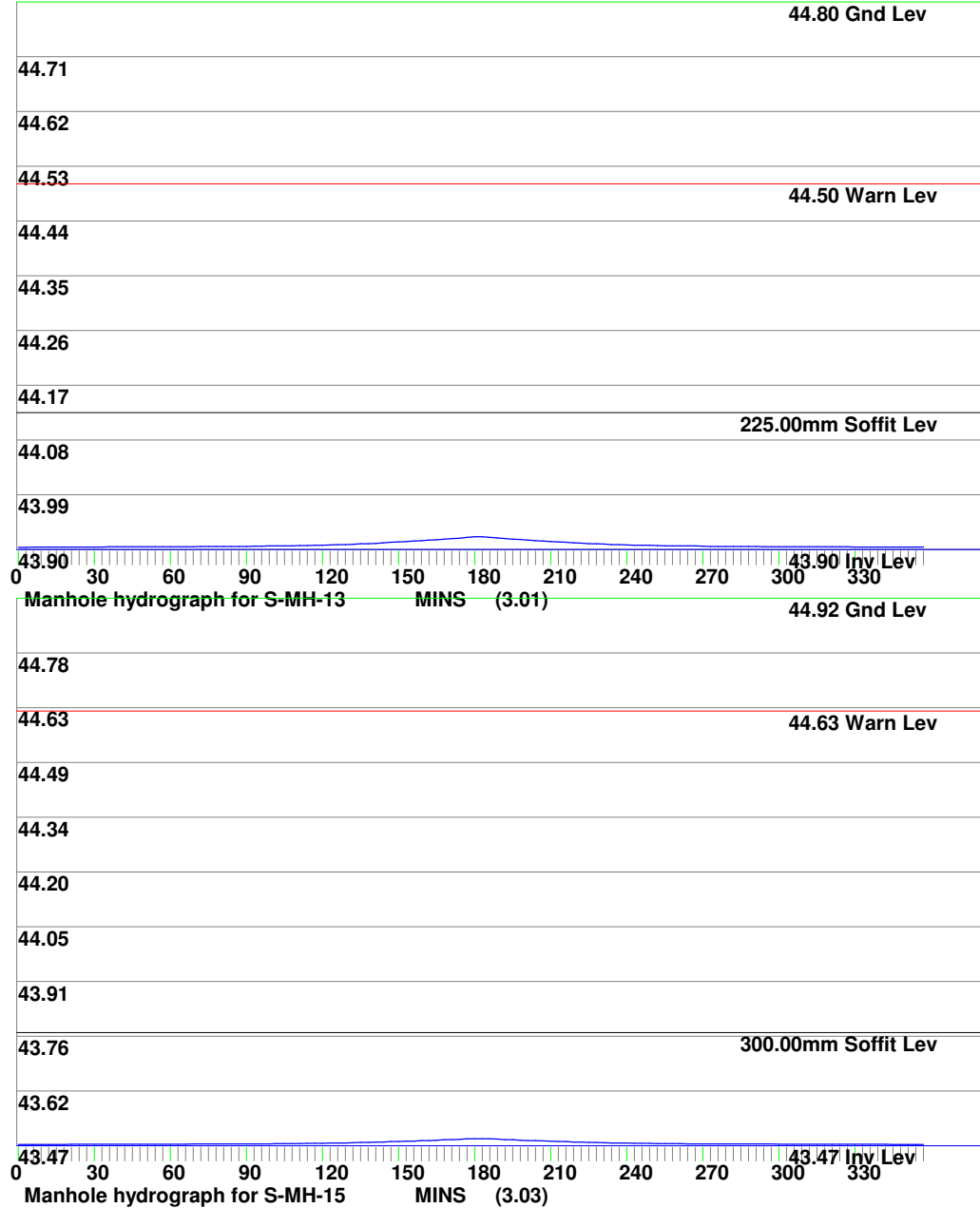
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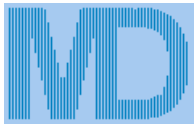
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Manhole hydrograph for S-MH-06 MINS (1.06)



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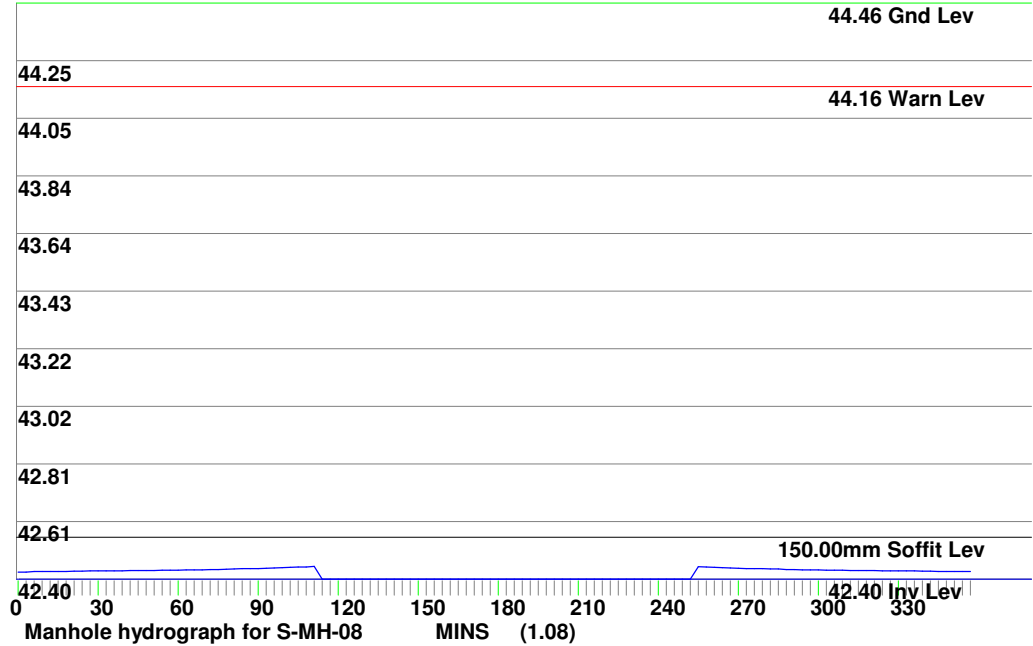
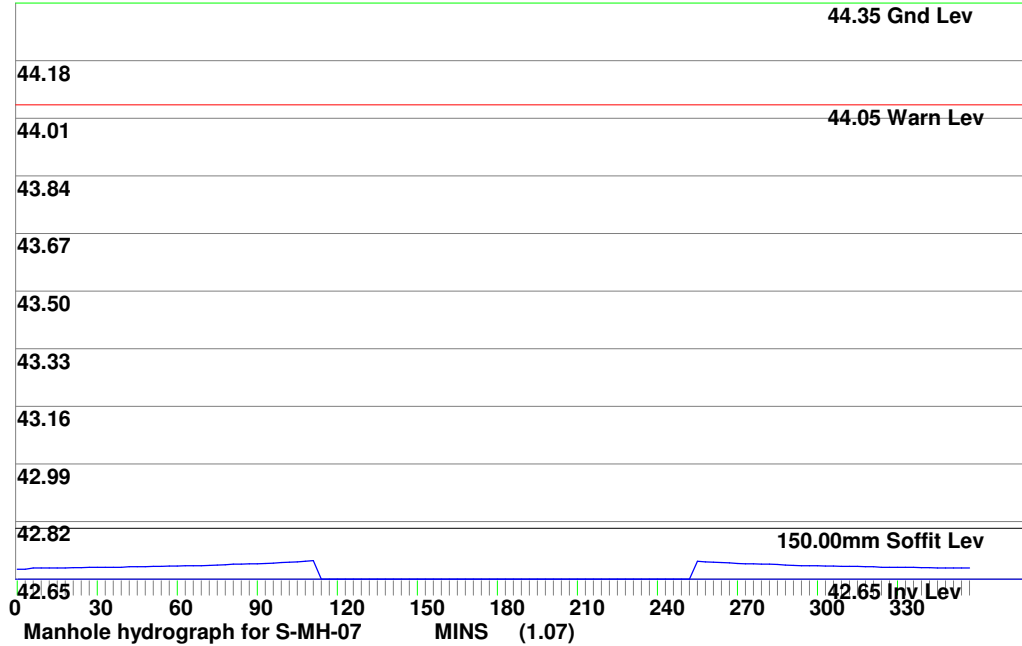
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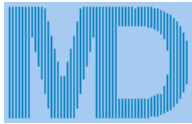
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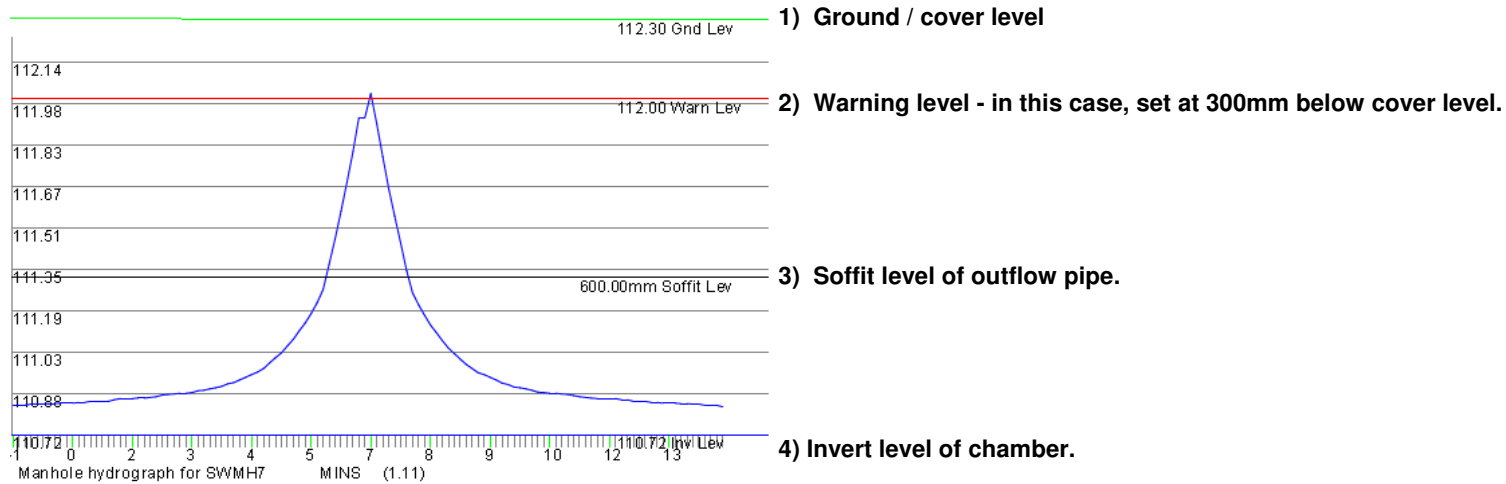
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Notes

- 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.