



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 = 720 mins
No offline storage

Mean rain intens. 4.00 mm/hr
Storm profile = Summer
Using FSR data

Peak rain intens. 15.68 mm/hr
Sample period = 360.0 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	
										fract.	Depth					
1	I	1.01	S-MH-01	42.1	1.1	225	1200	43.85	43.87	44.80	0.03	0.01	0.00	0.000	527	OK
2	I	1.02	S-MH-02	77.8	3.3	300	1200	43.58	43.61	44.80	0.04	0.03	0.00	0.000	1579	OK
3	I	1.03	S-MH-03	78.4	4.4	300	1200	43.43	43.46	44.80	0.06	0.03	0.00	0.000	2106	OK
4	I	1.04	S-MH-04	78.0	4.4	300	1500	43.30	43.33	44.60	0.06	0.03	0.00	0.000	2106	OK
5	B	2.01	S-MH-09	184.0	2.2	450	1500	43.08	43.10	44.35	0.01	0.02	0.00	0.000	1065	OK
6	B	2.02	S-MH-10	184.9	7.5	450	1500	42.99	43.03	44.35	0.04	0.04	0.00	0.000	3560	OK
7	B	2.03	S-MH-12	398.2	7.5	450	1500	42.87	42.89	44.35	0.02	0.02	0.00	0.000	3560	OK
8	I	1.05	S-MH-05	227.8	12.0	450	1500	42.79	42.84	44.42	0.05	0.05	0.00	0.000	5666	OK
9	B	3.01	S-MH-13	42.1	1.1	225	1200	43.90	43.91	44.80	0.03	0.01	0.00	0.000	527	OK
10	B	3.02	S-MH-14	95.8	3.3	300	1200	43.70	43.72	44.80	0.03	0.02	0.00	0.000	1582	OK
11	B	3.03	S-MH-15	298.4	4.5	300	1200	43.47	43.49	44.92	0.01	0.01	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	4.5	150	1200	42.65	42.71	44.35	0.31	0.05	0.00	0.000	7775	OK
14	I	1.08	S-MH-08	18.6	4.5	150	1200	42.40	42.44	44.46	0.24	0.04	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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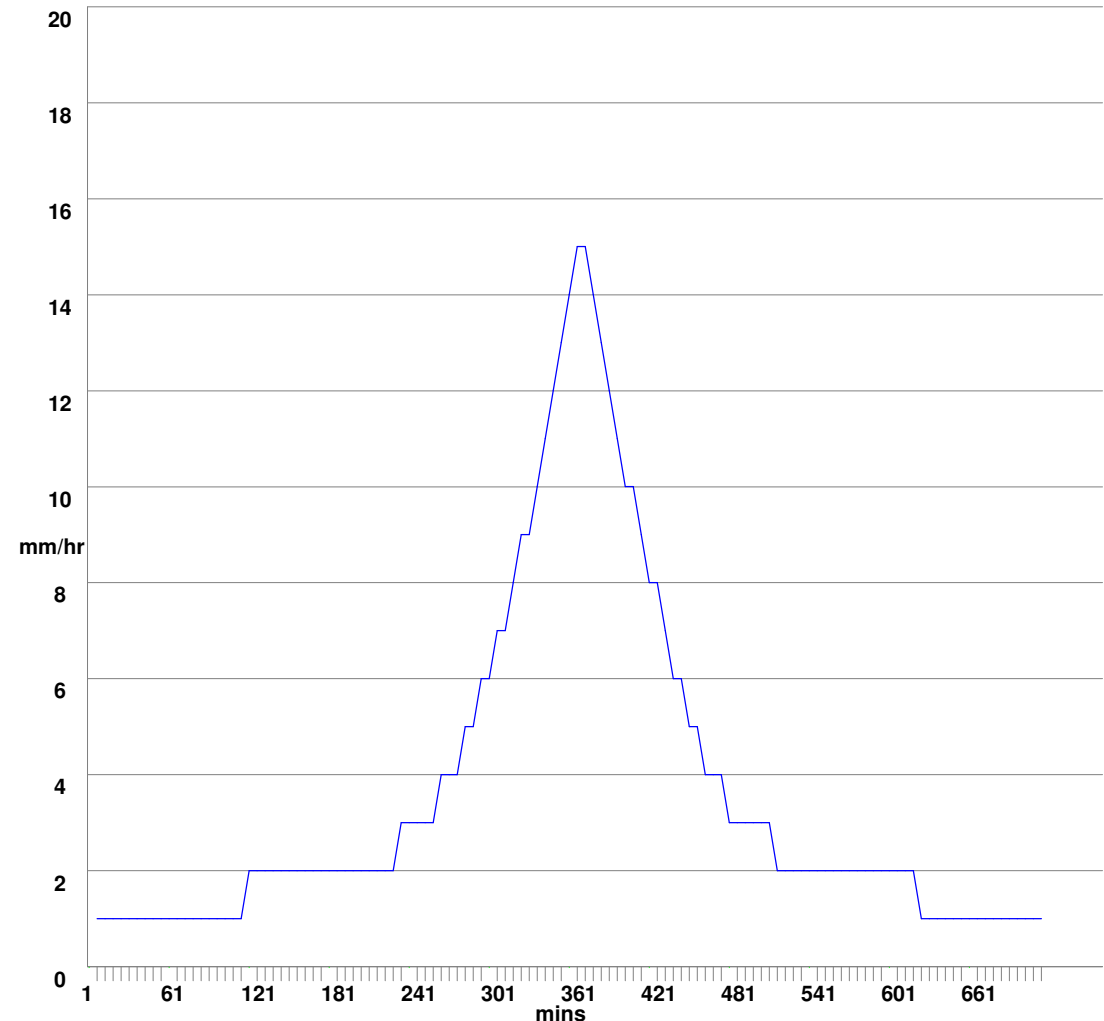
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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
6:00	1.04	246:00	2.98	486:00	3.21
12:00	1.04	252:00	3.17	492:00	3.02
18:00	1.19	258:00	3.36	498:00	2.83
24:00	1.19	264:00	3.62	504:00	2.65
30:00	1.19	270:00	3.95	510:00	2.54
36:00	1.23	276:00	4.36	516:00	2.39
42:00	1.23	282:00	4.74	522:00	2.27
48:00	1.27	288:00	5.15	528:00	2.20
54:00	1.27	294:00	5.71	534:00	2.13
60:00	1.31	300:00	6.27	540:00	2.09
66:00	1.31	306:00	6.82	546:00	1.98
72:00	1.31	312:00	7.42	552:00	1.90
78:00	1.34	318:00	8.06	558:00	1.90
84:00	1.34	324:00	8.65	564:00	1.86
90:00	1.42	330:00	9.32	570:00	1.83
96:00	1.42	336:00	10.14	576:00	1.79
102:00	1.42	342:00	10.93	582:00	1.68
108:00	1.45	348:00	11.75	588:00	1.64
114:00	1.49	354:00	12.68	594:00	1.60
120:00	1.53	360:00	13.65	600:00	1.60
126:00	1.53	366:00	14.62	606:00	1.57
132:00	1.57	372:00	14.62	612:00	1.53
138:00	1.57	378:00	13.84	618:00	1.53
144:00	1.60	384:00	12.83	624:00	1.49
150:00	1.64	390:00	11.93	630:00	1.45
156:00	1.68	396:00	11.08	636:00	1.45
162:00	1.75	402:00	10.26	642:00	1.42
168:00	1.83	408:00	9.51	648:00	1.42
174:00	1.86	414:00	8.80	654:00	1.34
180:00	1.90	420:00	8.17	660:00	1.34
186:00	1.90	426:00	7.53	666:00	1.31
192:00	1.98	432:00	6.90	672:00	1.31
198:00	2.01	438:00	6.38	678:00	1.31
204:00	2.13	444:00	5.78	684:00	1.27
210:00	2.20	450:00	5.30	690:00	1.27
216:00	2.27	456:00	4.81	696:00	1.23
222:00	2.35	462:00	4.40	702:00	1.23
228:00	2.50	468:00	4.03	708:00	1.23
234:00	2.61	474:00	3.65	714:00	1.19
240:00	2.80	480:00	3.39	720:00	1.19

Hydrograph profile derived from data in the Flood Studies Report

Return period= 30 yrs Duration= 720 mins Profile - summer





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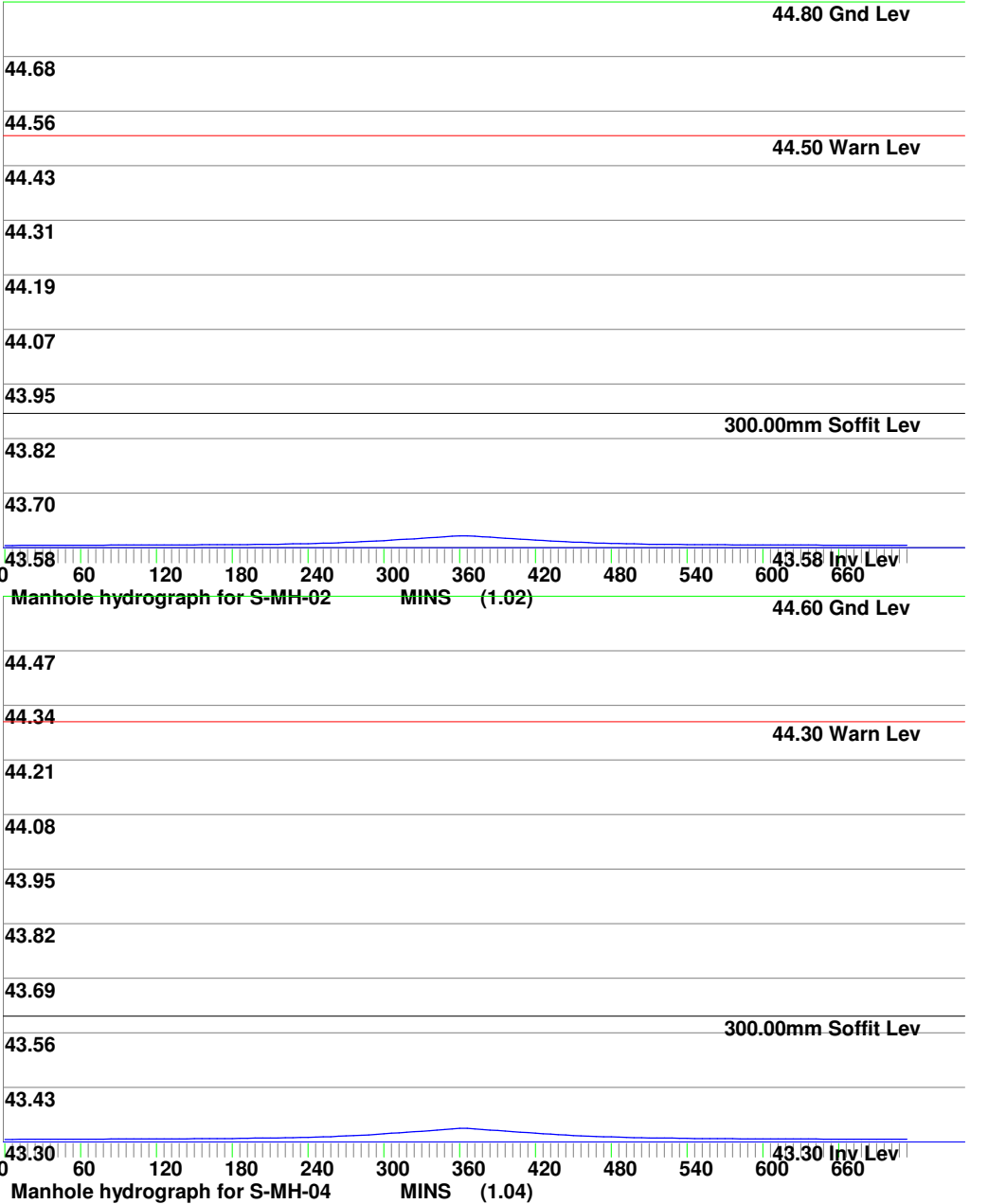
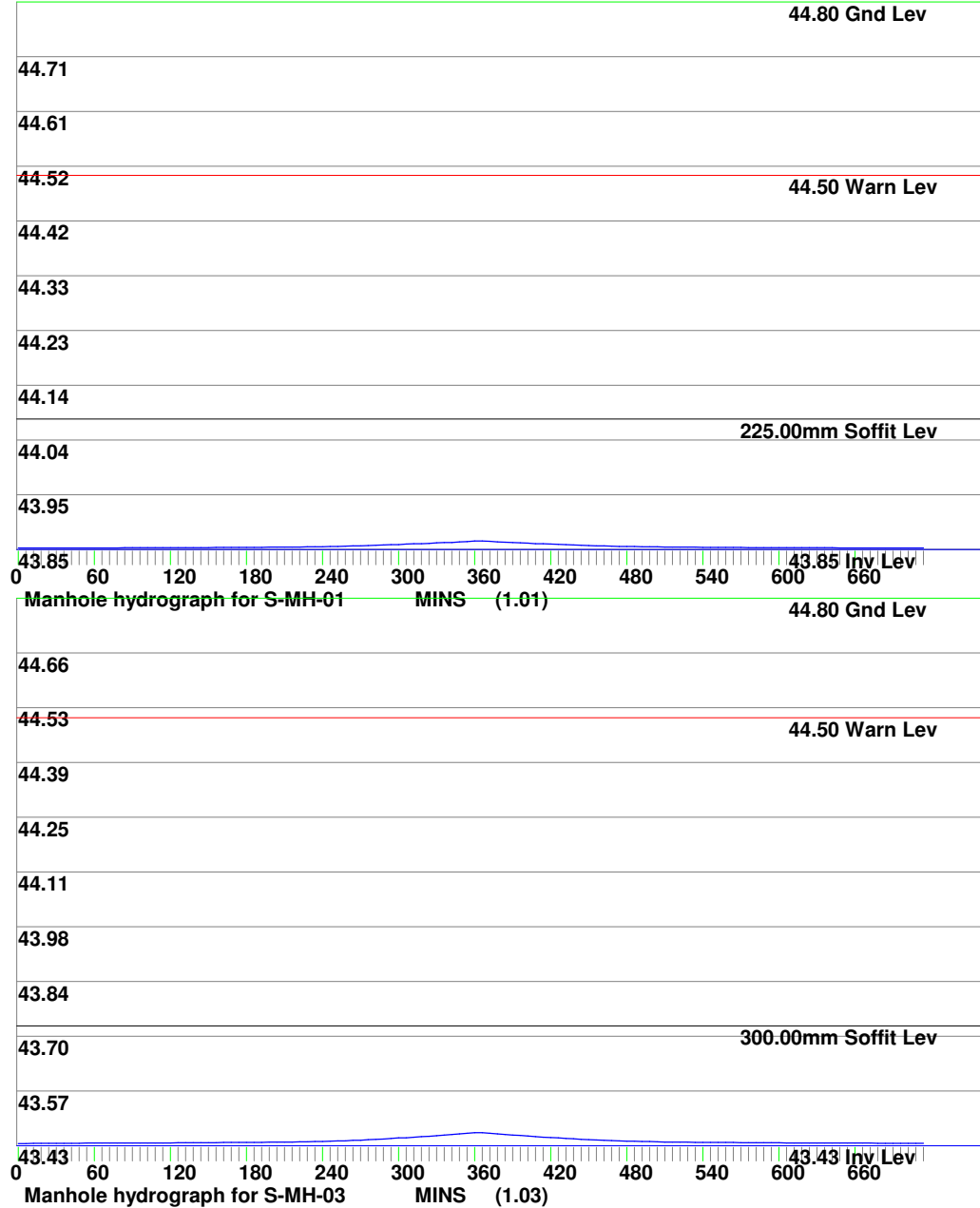
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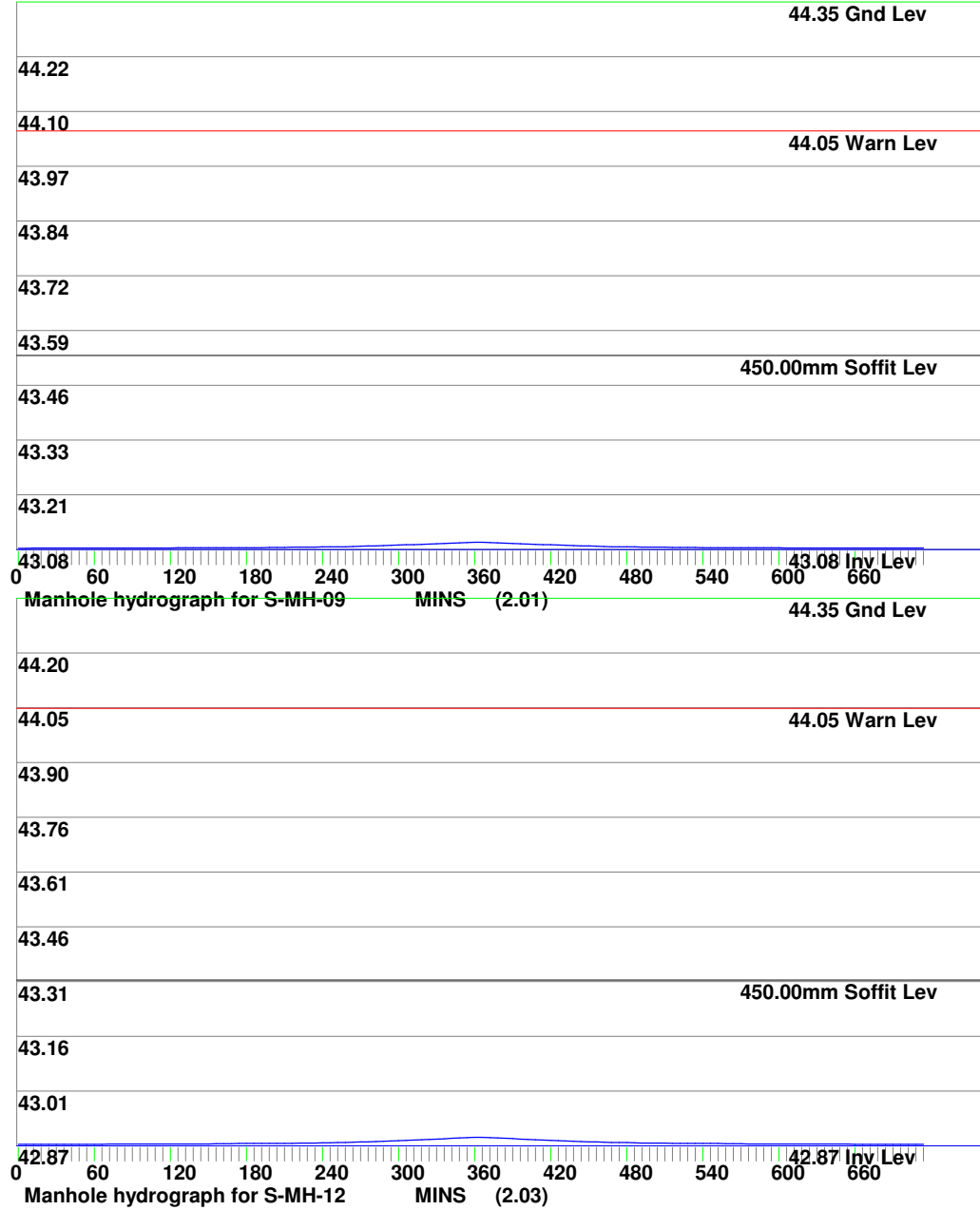
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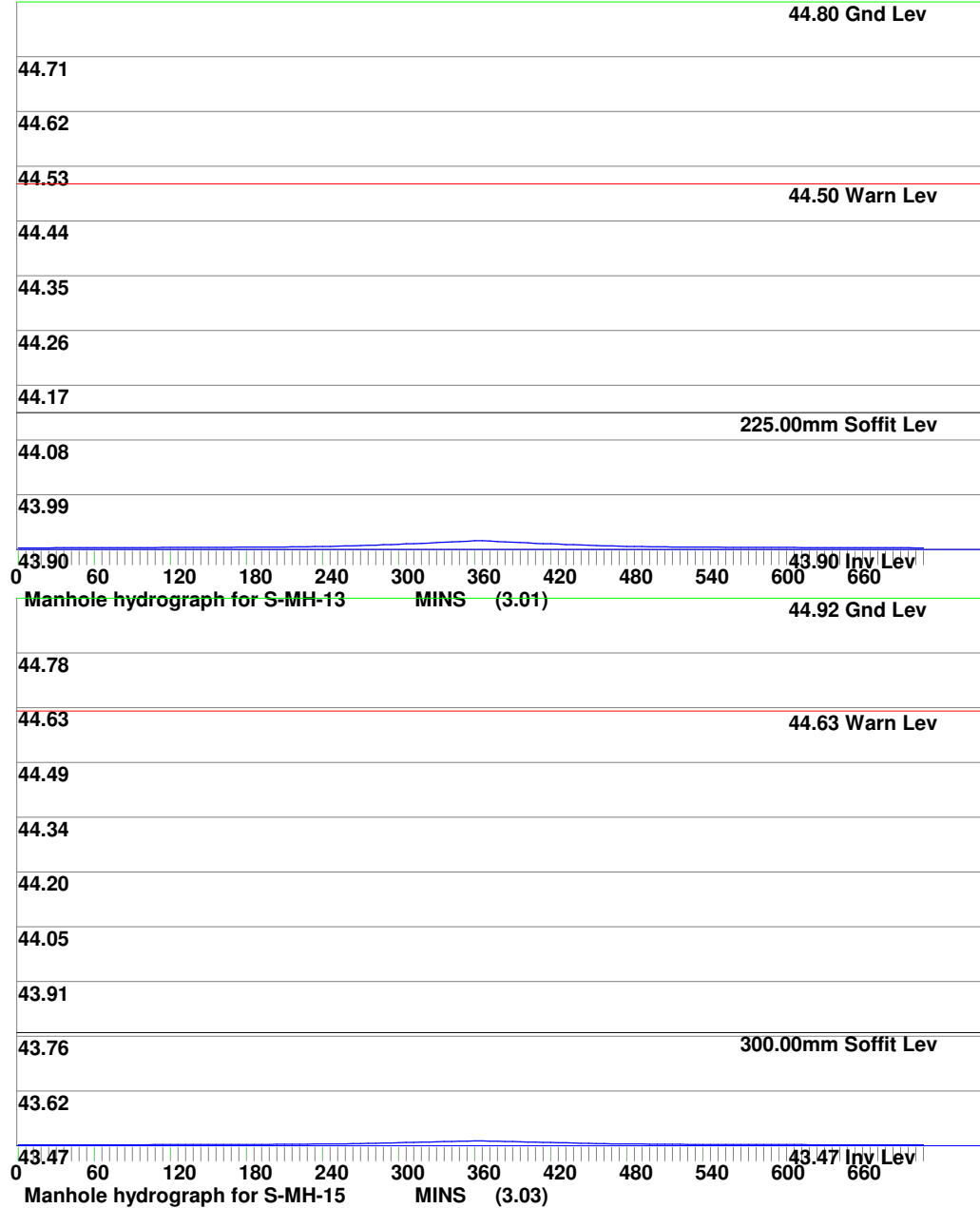
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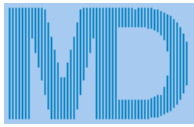
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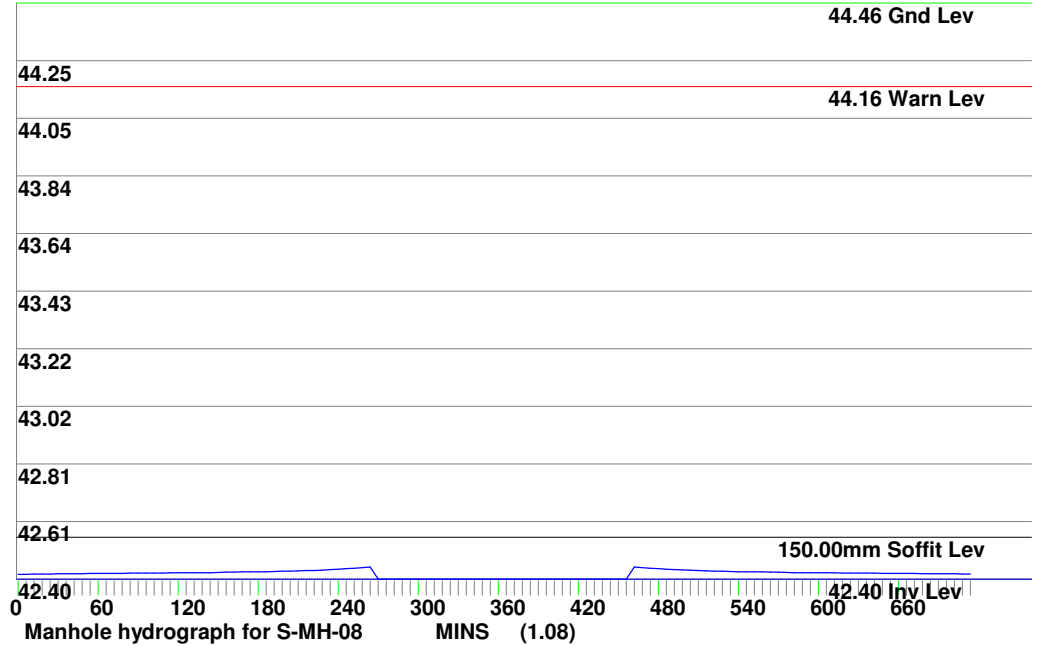
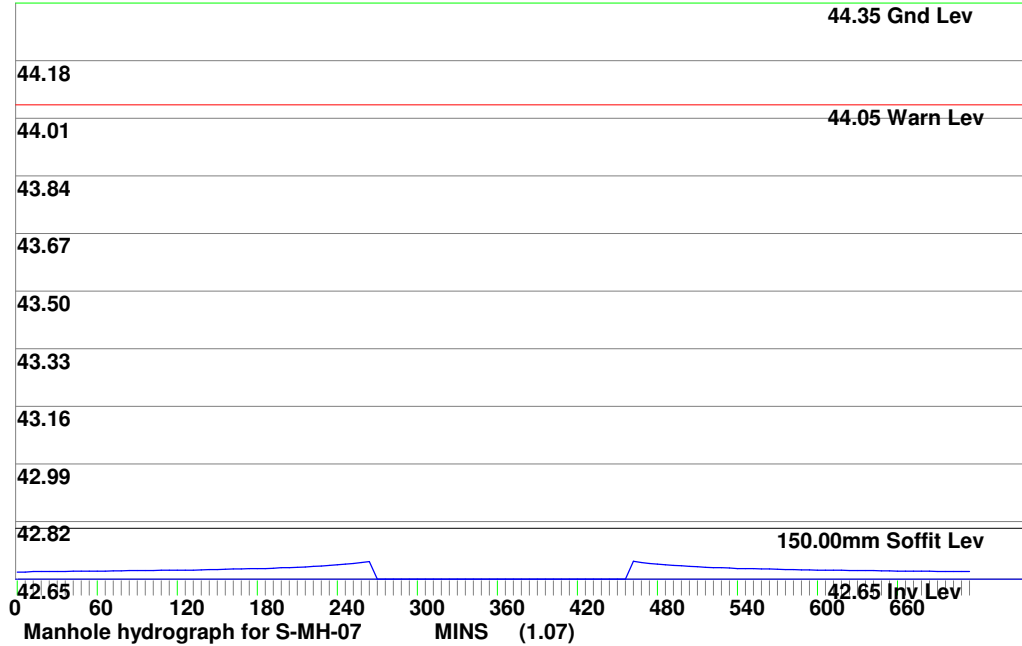
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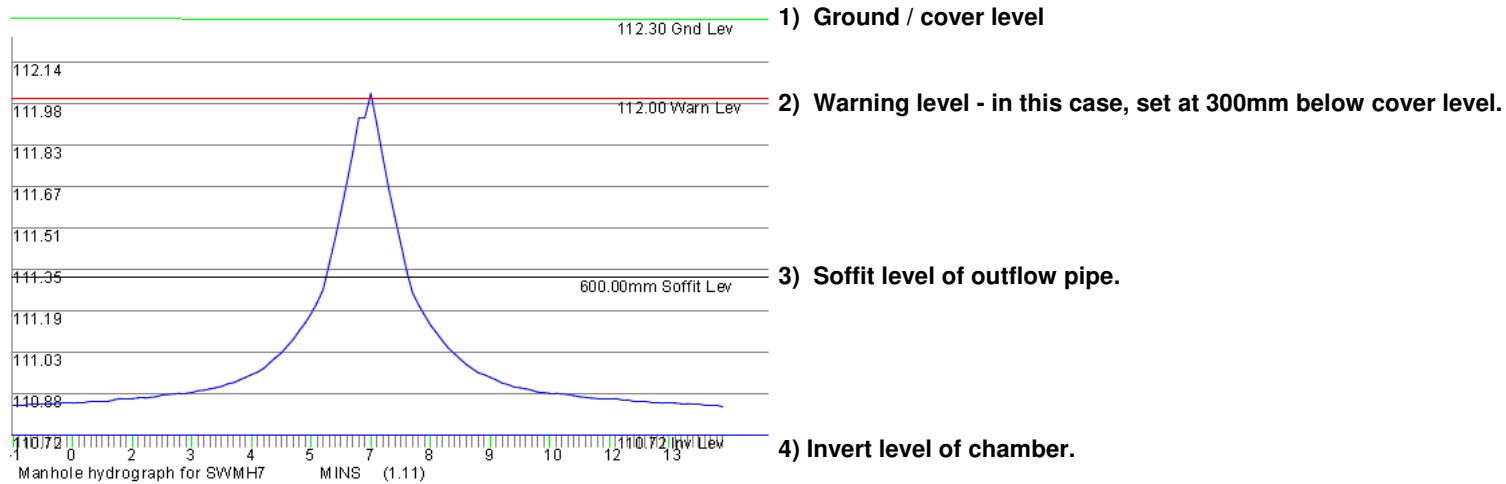
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Notes

- 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.