



MasterDrain
SW

Muir Associates (UK) Limited

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Trinity Chambers,
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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 CCF = 40%**

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

PEAK hydrograph values printed
Storm duration = 240 mins
No offline storage

Mean rain intens. 19.00 mm/hr
Storm profile = Summer
Using FSR data

Peak rain intens. 74.48 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 fract.	Depth	EXCESS FLOW l/s	FLOODED VOL m³	DRAINED AREA (m²) x FACTOR	STATUS
1	I	1.01 S-MH-01	42.1	4.8	225	1200	43.85	43.89	44.80	0.11	0.04	0.00	0.000	527	OK
2	I	1.02 S-MH-02	77.8	14.3	300	1200	43.58	43.65	44.80	0.18	0.07	0.00	0.000	1579	OK
3	I	1.03 S-MH-03	78.4	19.1	300	1200	43.43	43.52	44.80	0.24	0.09	0.00	0.000	2106	OK
4	I	1.04 S-MH-04	78.0	19.1	300	1500	43.30	43.39	44.60	0.24	0.09	0.00	0.000	2106	OK
5	B	2.01 S-MH-09	184.0	9.7	450	1500	43.08	43.13	44.35	0.05	0.05	0.00	0.000	1065	OK
6	B	2.02 S-MH-10	184.9	32.3	450	1500	42.99	43.10	44.35	0.17	0.10	0.00	0.000	3560	OK
7	B	2.03 S-MH-12	398.2	32.3	450	1500	42.87	42.93	44.35	0.08	0.06	0.00	0.000	3560	OK
8	I	1.05 S-MH-05	227.8	51.4	450	1500	42.79	42.92	44.42	0.23	0.12	0.00	0.000	5666	OK
9	B	3.01 S-MH-13	42.1	4.8	225	1200	43.90	43.94	44.80	0.11	0.04	0.00	0.000	527	OK
10	B	3.02 S-MH-14	95.8	14.3	300	1200	43.70	43.76	44.80	0.15	0.06	0.00	0.000	1582	OK
11	B	3.03 S-MH-15	298.4	19.1	300	1200	43.47	43.51	44.92	0.06	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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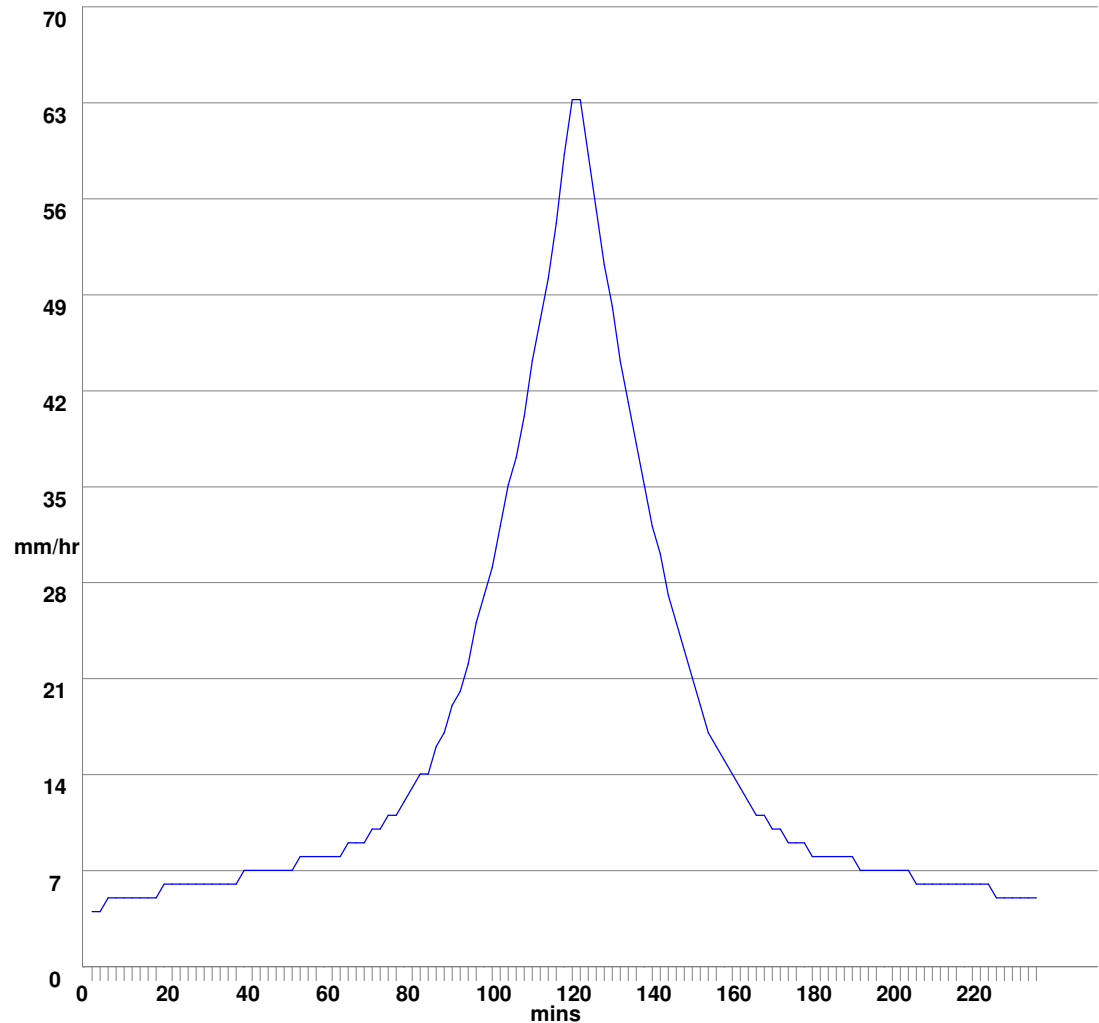
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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
2:00	4.49	82:00	12.82	162:00	13.78
4:00	4.49	84:00	13.62	164:00	12.98
6:00	5.13	86:00	14.42	166:00	12.18
8:00	5.13	88:00	15.54	168:00	11.37
10:00	5.13	90:00	16.98	170:00	10.89
12:00	5.29	92:00	18.74	172:00	10.25
14:00	5.29	94:00	20.35	174:00	9.77
16:00	5.45	96:00	22.11	176:00	9.45
18:00	5.45	98:00	24.51	178:00	9.13
20:00	5.61	100:00	26.91	180:00	8.97
22:00	5.61	102:00	29.32	182:00	8.49
24:00	5.61	104:00	31.88	184:00	8.17
26:00	5.77	106:00	34.60	186:00	8.17
28:00	5.77	108:00	37.17	188:00	8.01
30:00	6.09	110:00	40.05	190:00	7.85
32:00	6.09	112:00	43.57	192:00	7.69
34:00	6.09	114:00	46.94	194:00	7.21
36:00	6.25	116:00	50.46	196:00	7.05
38:00	6.41	118:00	54.47	198:00	6.89
40:00	6.57	120:00	58.63	200:00	6.89
42:00	6.57	122:00	62.80	202:00	6.73
44:00	6.73	124:00	62.80	204:00	6.57
46:00	6.73	126:00	59.43	206:00	6.57
48:00	6.89	128:00	55.11	208:00	6.41
50:00	7.05	130:00	51.26	210:00	6.25
52:00	7.21	132:00	47.58	212:00	6.25
54:00	7.53	134:00	44.05	214:00	6.09
56:00	7.85	136:00	40.85	216:00	6.09
58:00	8.01	138:00	37.81	218:00	5.77
60:00	8.17	140:00	35.08	220:00	5.77
62:00	8.17	142:00	32.36	222:00	5.61
64:00	8.49	144:00	29.64	224:00	5.61
66:00	8.65	146:00	27.39	226:00	5.61
68:00	9.13	148:00	24.83	228:00	5.45
70:00	9.45	150:00	22.75	230:00	5.45
72:00	9.77	152:00	20.67	232:00	5.29
74:00	10.09	154:00	18.90	234:00	5.29
76:00	10.73	156:00	17.30	236:00	5.29
78:00	11.21	158:00	15.70	238:00	5.13
80:00	12.01	160:00	14.58	240:00	5.13

Hydrograph profile derived from data in the Flood Studies Report

Return period= 100 yrs Duration= 240 mins Profile - summer

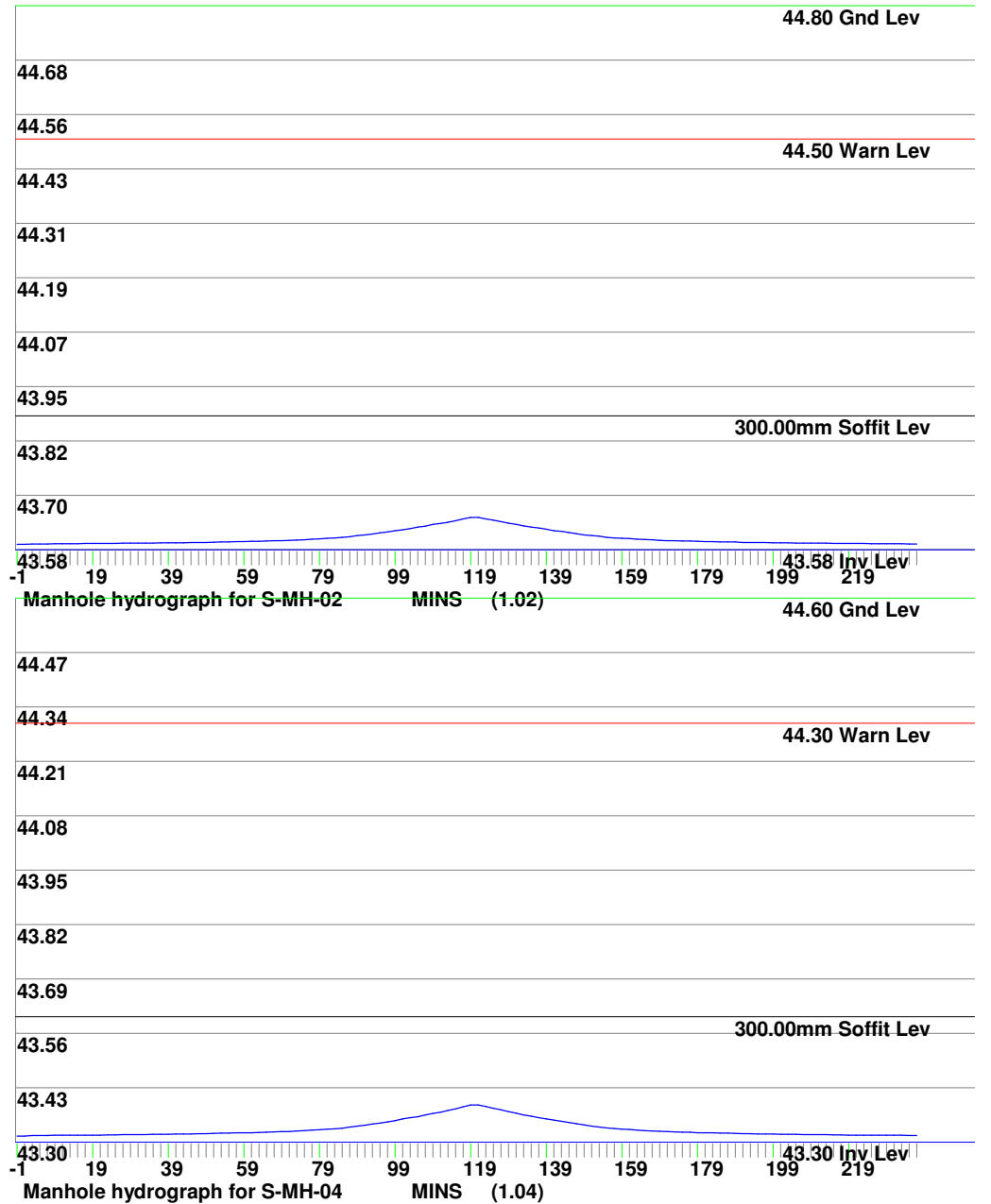




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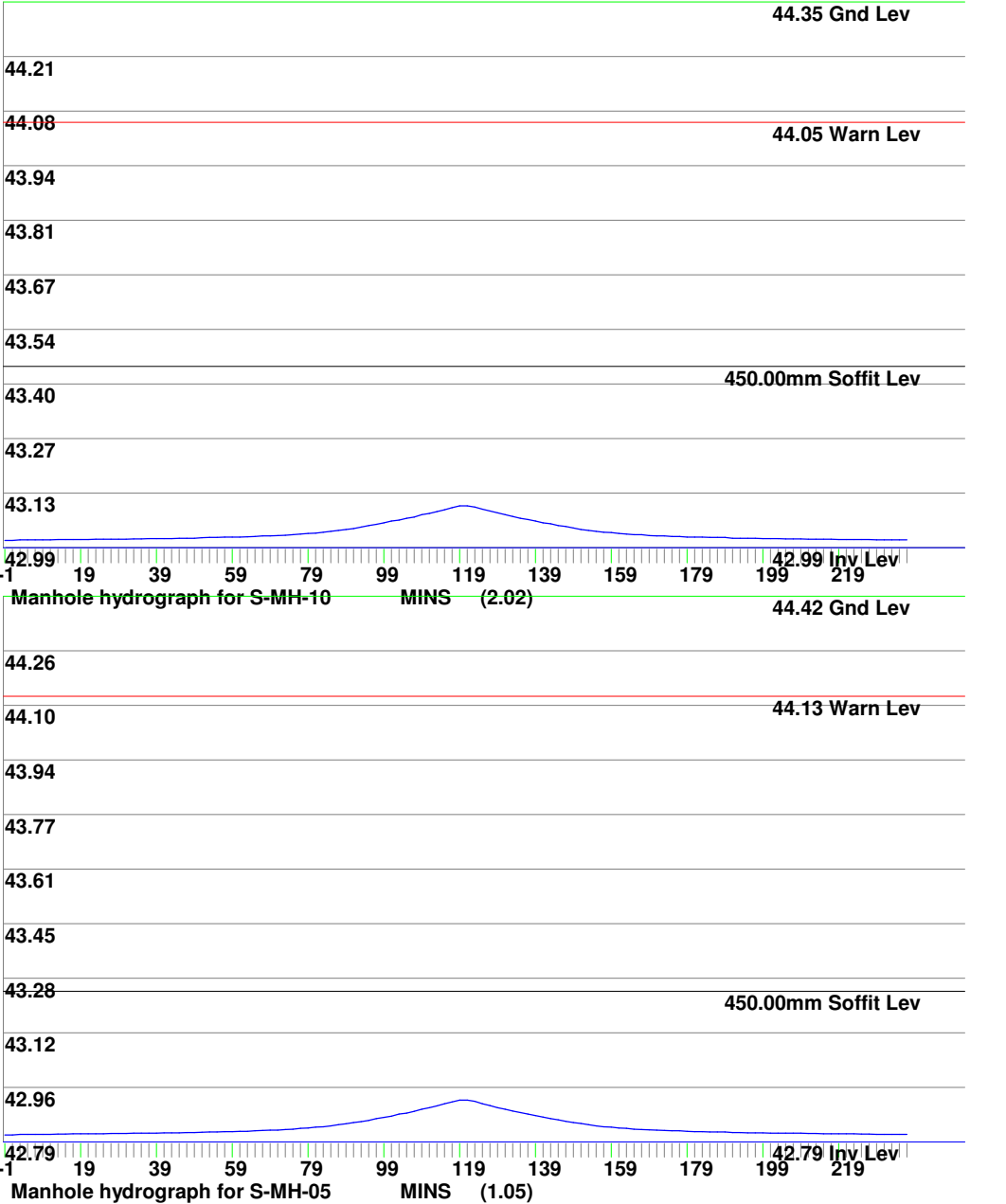
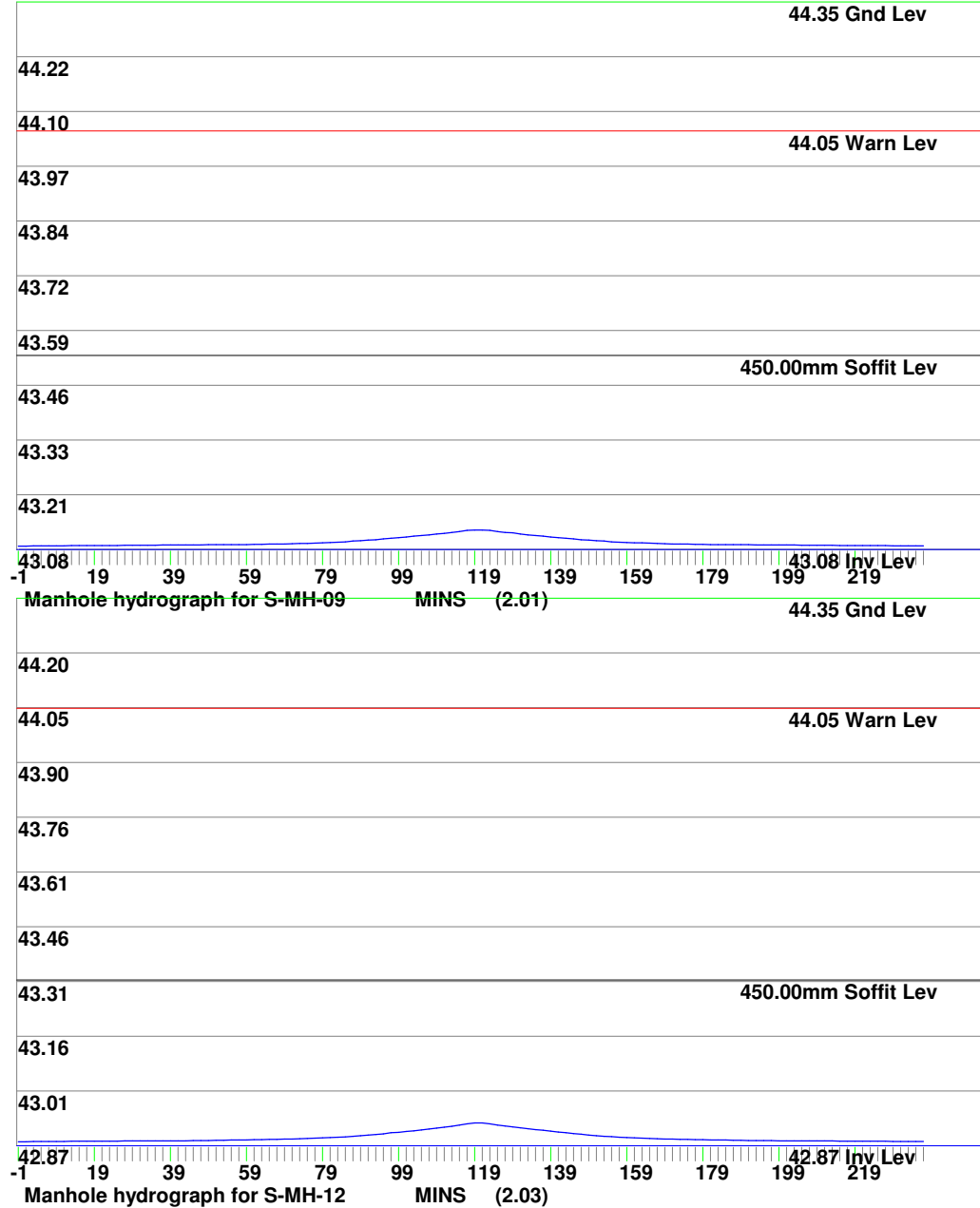
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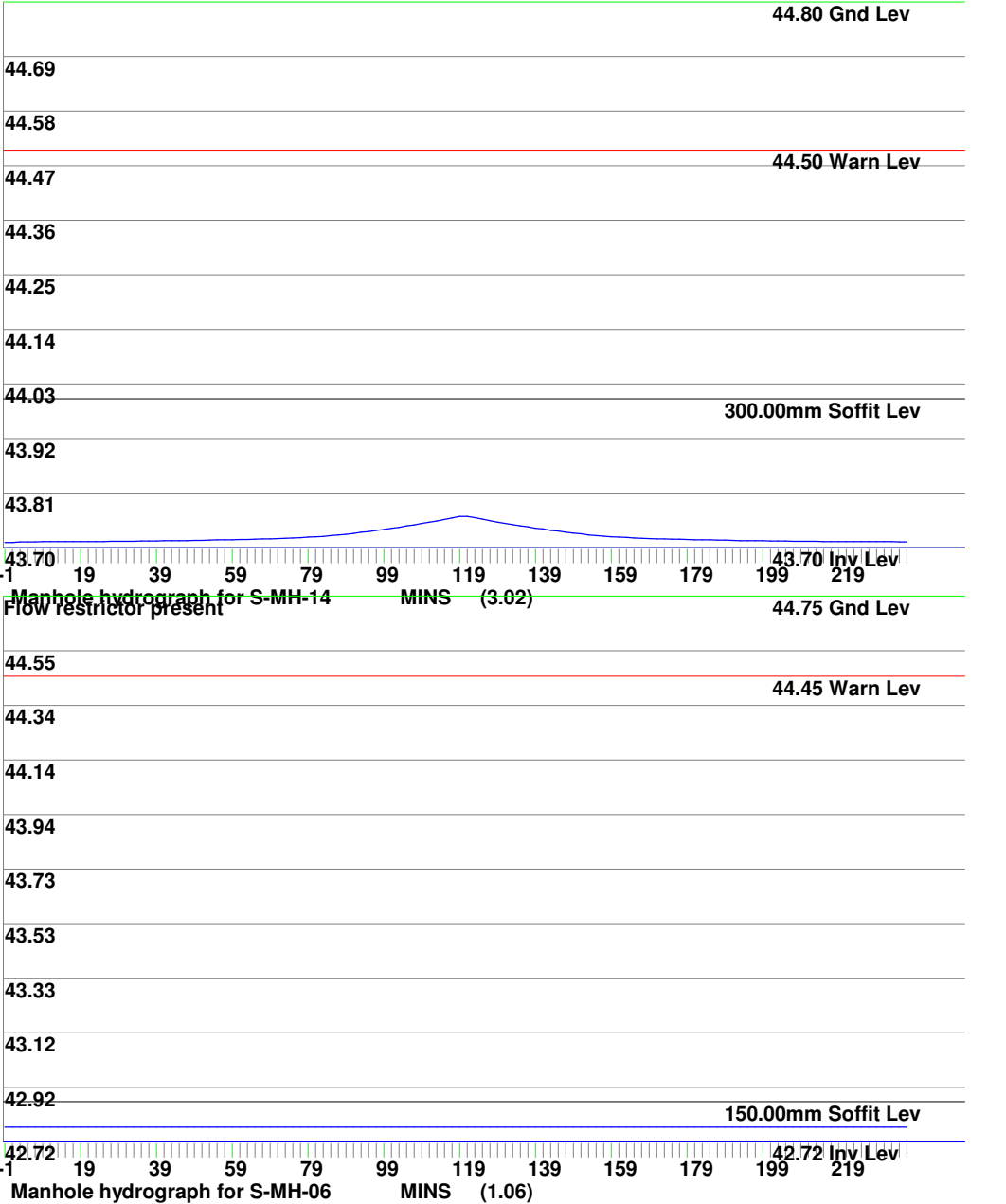
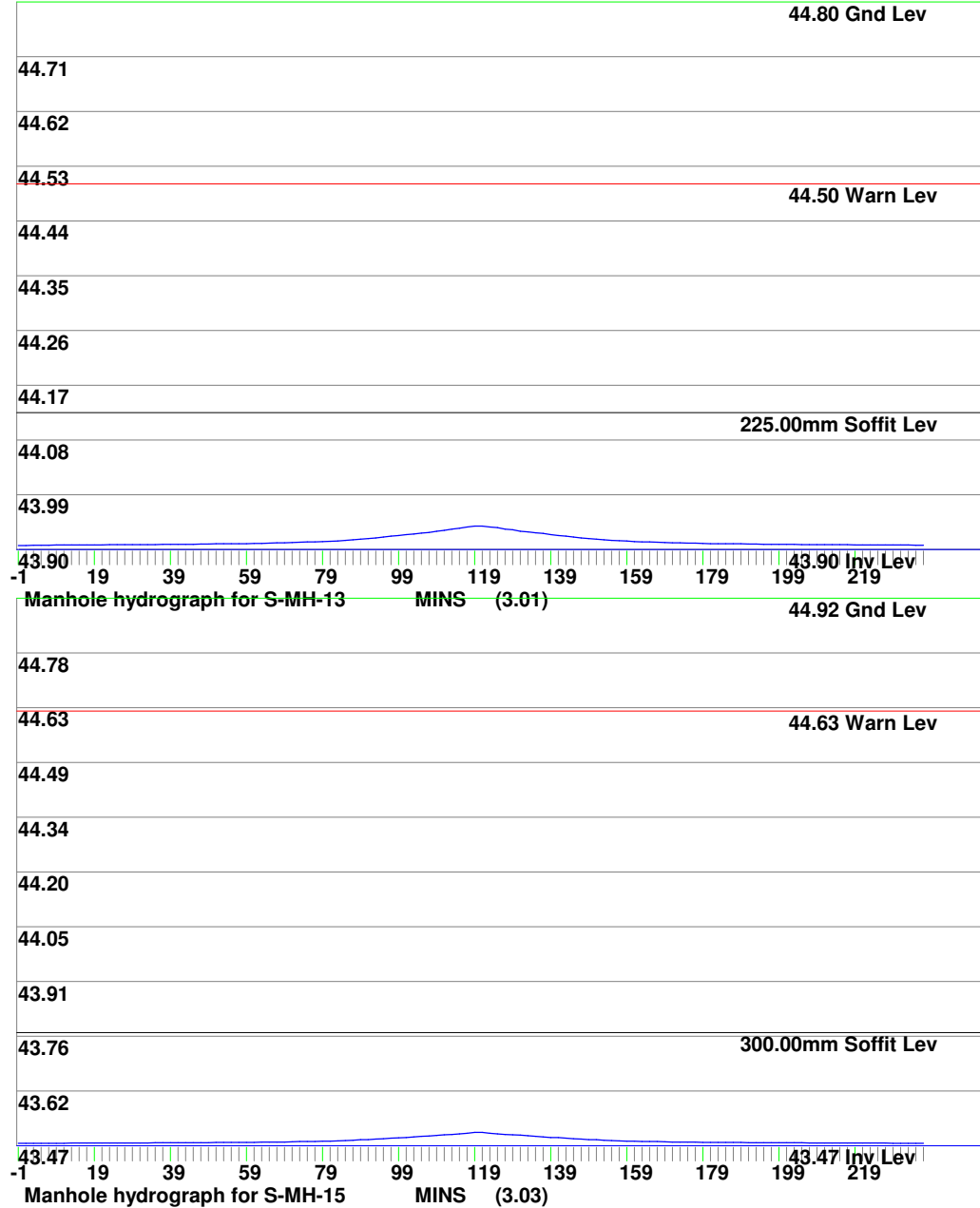
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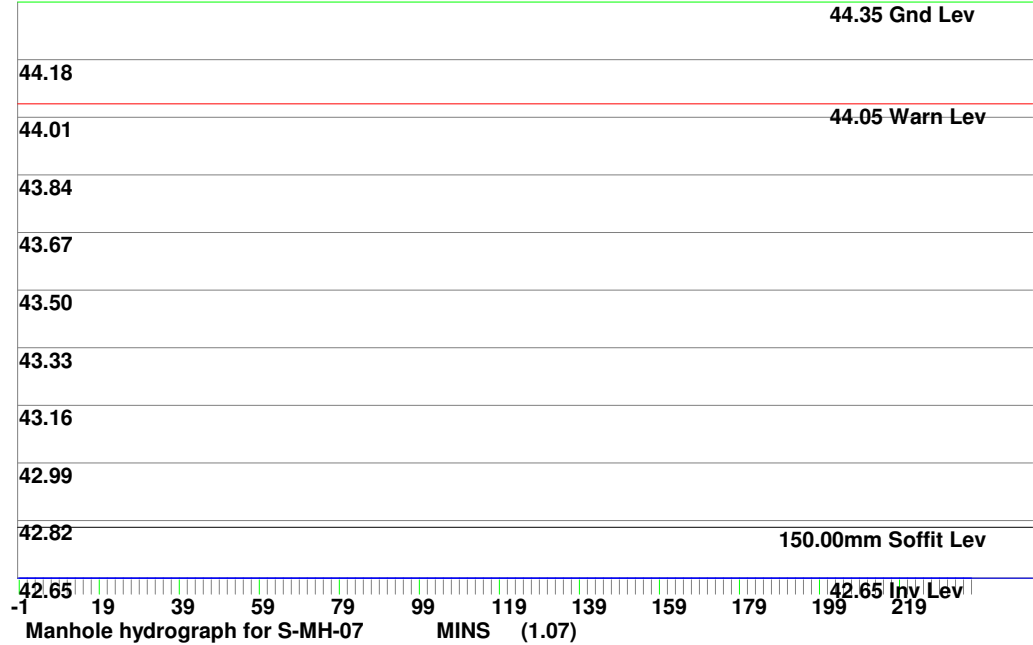
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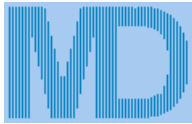
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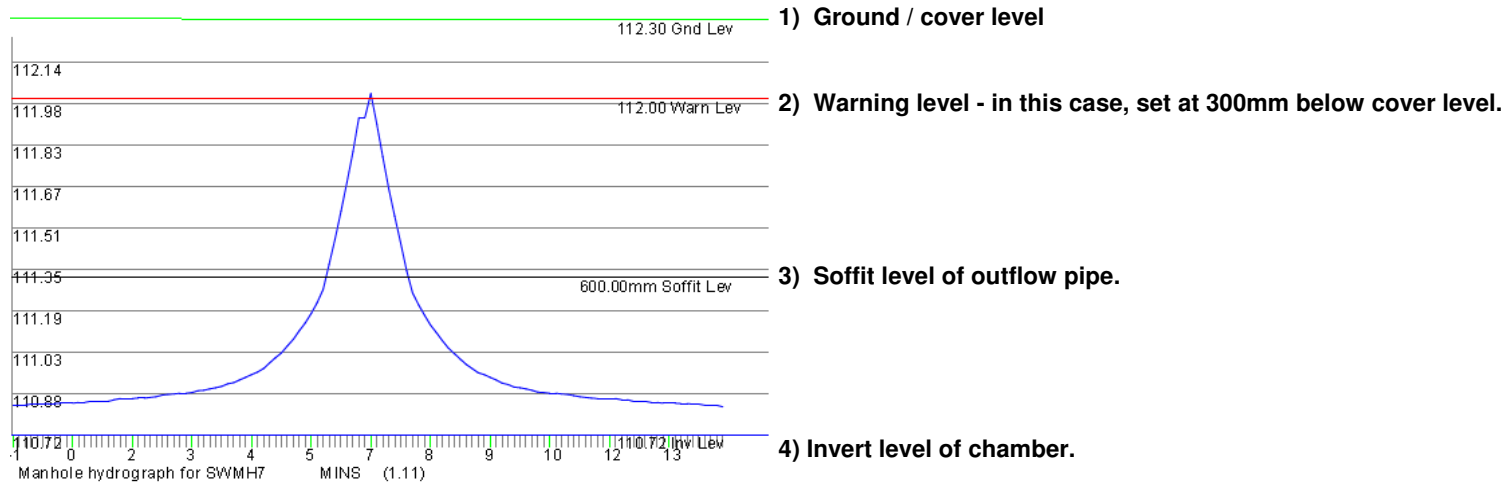
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Notes

- 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.