



MasterDrain
SW

Muir Associates (UK) Limited

www.muir-associates.co.uk

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 = 45 mins
No offline storage

Mean rain intens. 66.00 mm/hr
Storm profile = Summer
Using FSR data

Peak rain intens. 258.72 mm/hr
Sample period = 22.5 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	16.3	225	1200	43.85	43.95	44.80	0.39	0.09	0.00	0.000	527	OK
2	I	1.02 S-MH-02	77.8	48.9	300	1200	43.58	43.76	44.80	0.63	0.18	0.00	0.000	1579	OK
3	I	1.03 S-MH-03	78.4	65.2	300	1200	43.43	43.66	44.80	0.83	0.23	0.00	0.000	2106	OK
4	I	1.04 S-MH-04	78.0	65.2	300	1500	43.30	43.53	44.60	0.84	0.23	0.00	0.000	2106	OK
5	B	2.01 S-MH-09	184.0	33.0	450	1500	43.08	43.19	44.35	0.18	0.11	0.00	0.000	1065	OK
6	B	2.02 S-MH-10	184.9	110.2	450	1500	42.99	43.26	44.35	0.60	0.26	0.00	0.000	3560	OK
7	B	2.03 S-MH-12	398.2	110.2	450	1500	42.87	43.01	44.35	0.28	0.14	0.00	0.000	3560	OK
8	I	1.05 S-MH-05	227.8	175.4	450	1500	42.79	43.12	44.42	0.77	0.33	0.00	0.000	5666	OK
9	B	3.01 S-MH-13	42.1	16.3	225	1200	43.90	43.99	44.80	0.39	0.09	0.00	0.000	527	OK
10	B	3.02 S-MH-14	95.8	49.0	300	1200	43.70	43.85	44.80	0.51	0.15	0.00	0.000	1582	OK
11	B	3.03 S-MH-15	298.4	65.3	300	1200	43.47	43.56	44.92	0.22	0.08	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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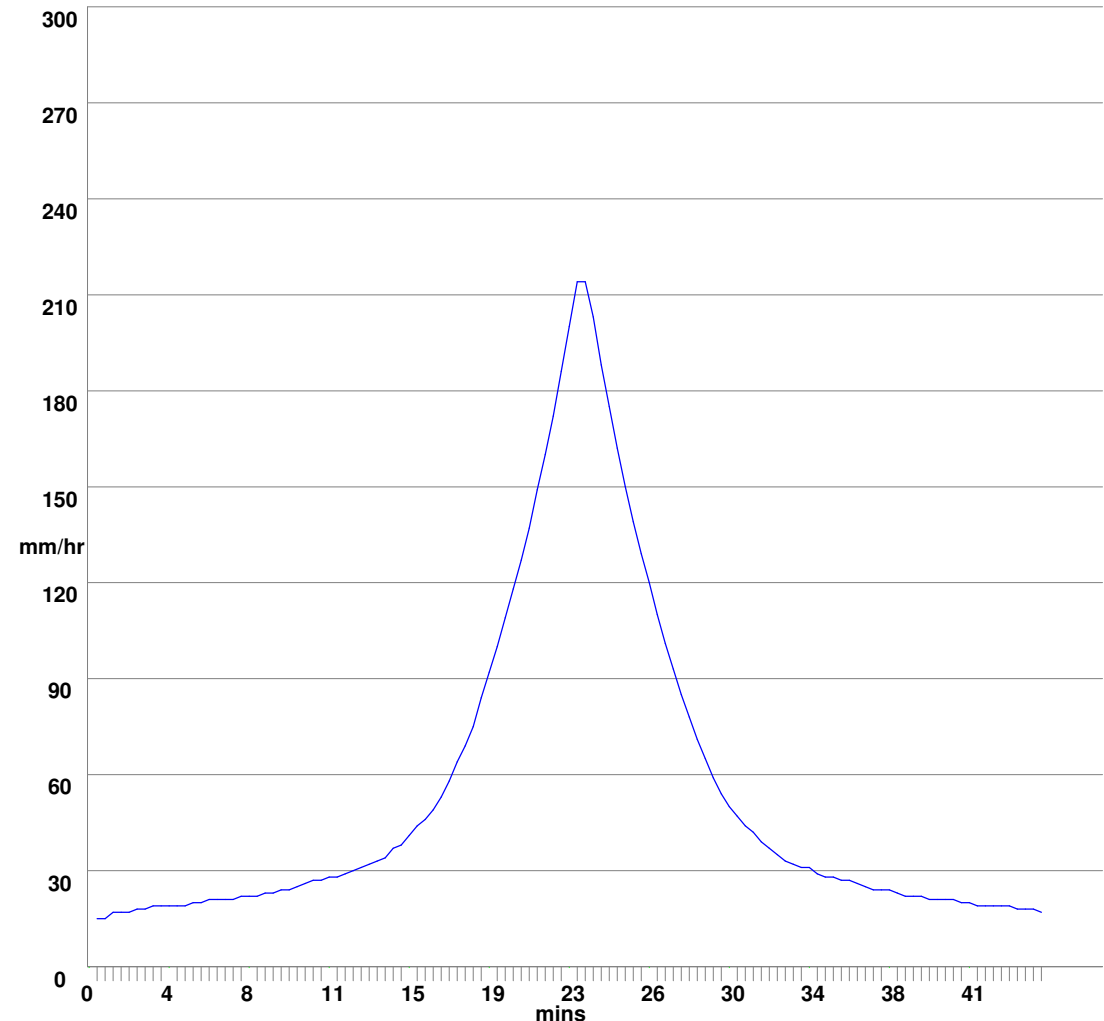
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Time mins	Rain mm/hr	Time mins	Rain mm/hr	Time mins	Rain mm/hr
0:22	15.31	15:22	43.73	30:22	47.01
0:45	15.31	15:45	46.47	30:45	44.28
1:08	17.49	16:08	49.20	31:08	41.55
1:30	17.49	16:30	53.03	31:30	38.81
1:52	17.49	16:52	57.95	31:52	37.17
2:15	18.04	17:15	63.96	32:15	34.99
2:38	18.04	17:38	69.42	32:38	33.35
3:00	18.59	18:00	75.44	33:00	32.25
3:22	18.59	18:22	83.64	33:22	31.16
3:45	19.13	18:45	91.84	33:45	30.61
4:08	19.13	19:08	100.04	34:08	28.97
4:30	19.13	19:30	108.78	34:30	27.88
4:52	19.68	19:52	118.08	34:52	27.88
5:15	19.68	20:15	126.82	35:15	27.33
5:38	20.77	20:38	136.66	35:38	26.79
6:00	20.77	21:00	148.69	36:00	26.24
6:22	20.77	21:22	160.17	36:22	24.60
6:45	21.32	21:45	172.20	36:45	24.05
7:08	21.87	22:08	185.86	37:08	23.51
7:30	22.41	22:30	200.07	37:30	23.51
7:52	22.41	22:52	214.29	37:52	22.96
8:15	22.96	23:15	214.29	38:15	22.41
8:38	22.96	23:38	202.81	38:38	22.41
9:00	23.51	24:00	188.05	39:00	21.87
9:22	24.05	24:22	174.93	39:22	21.32
9:45	24.60	24:45	162.36	39:45	21.32
10:08	25.69	25:08	150.33	40:08	20.77
10:30	26.79	25:30	139.40	40:30	20.77
10:52	27.33	25:52	129.01	40:52	19.68
11:15	27.88	26:15	119.72	41:15	19.68
11:38	27.88	26:38	110.42	41:38	19.13
12:00	28.97	27:00	101.13	42:00	19.13
12:22	29.52	27:22	93.48	42:22	19.13
12:45	31.16	27:45	84.73	42:45	18.59
13:08	32.25	28:08	77.62	43:08	18.59
13:30	33.35	28:30	70.52	43:30	18.04
13:52	34.44	28:52	64.50	43:52	18.04
14:15	36.63	29:15	59.04	44:15	18.04
14:38	38.27	29:38	53.57	44:38	17.49
15:00	41.00	30:00	49.75	45:00	17.49

Hydrograph profile derived from data in the Flood Studies Report

Return period= 100 yrs Duration= 45 mins Profile - summer

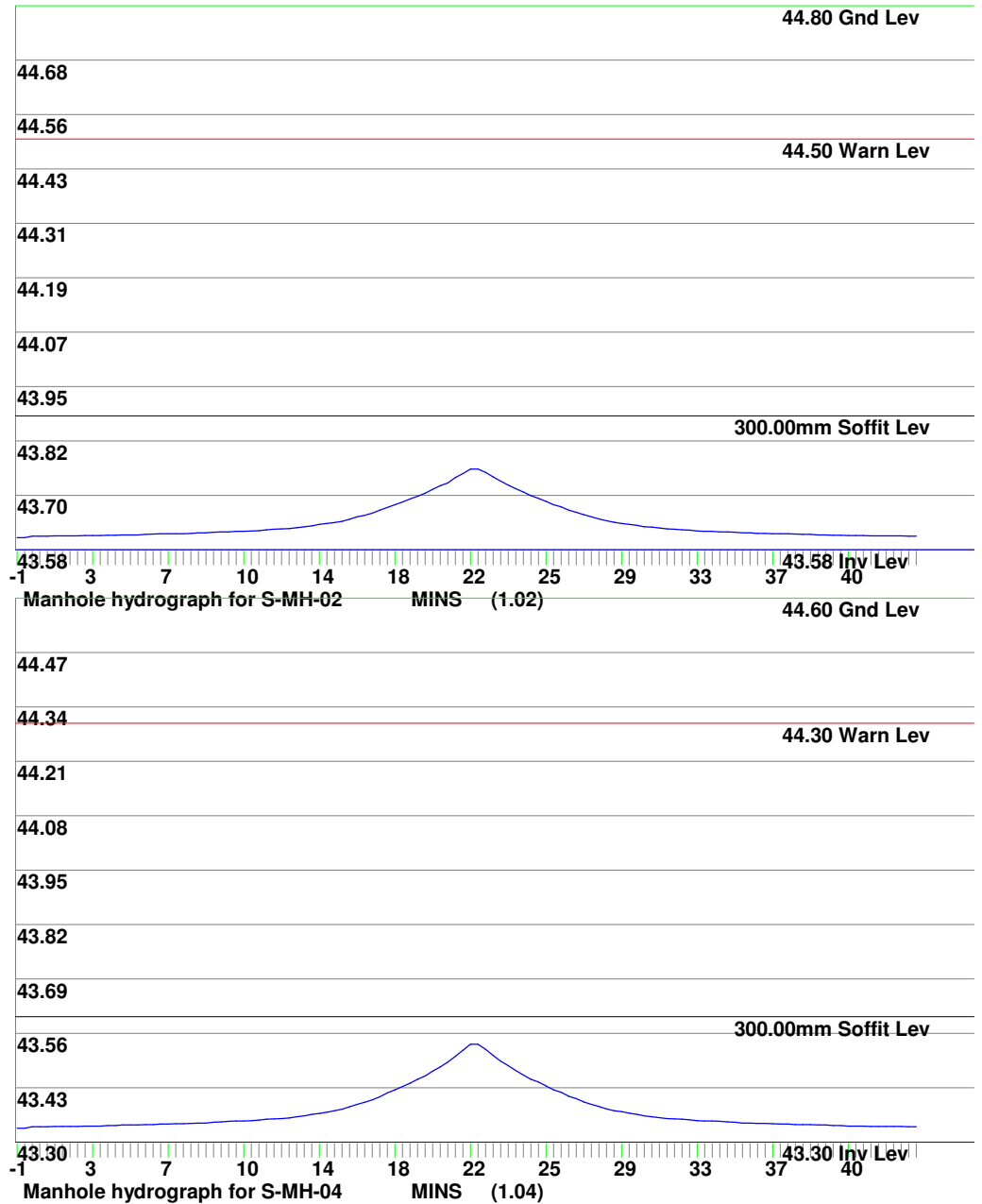




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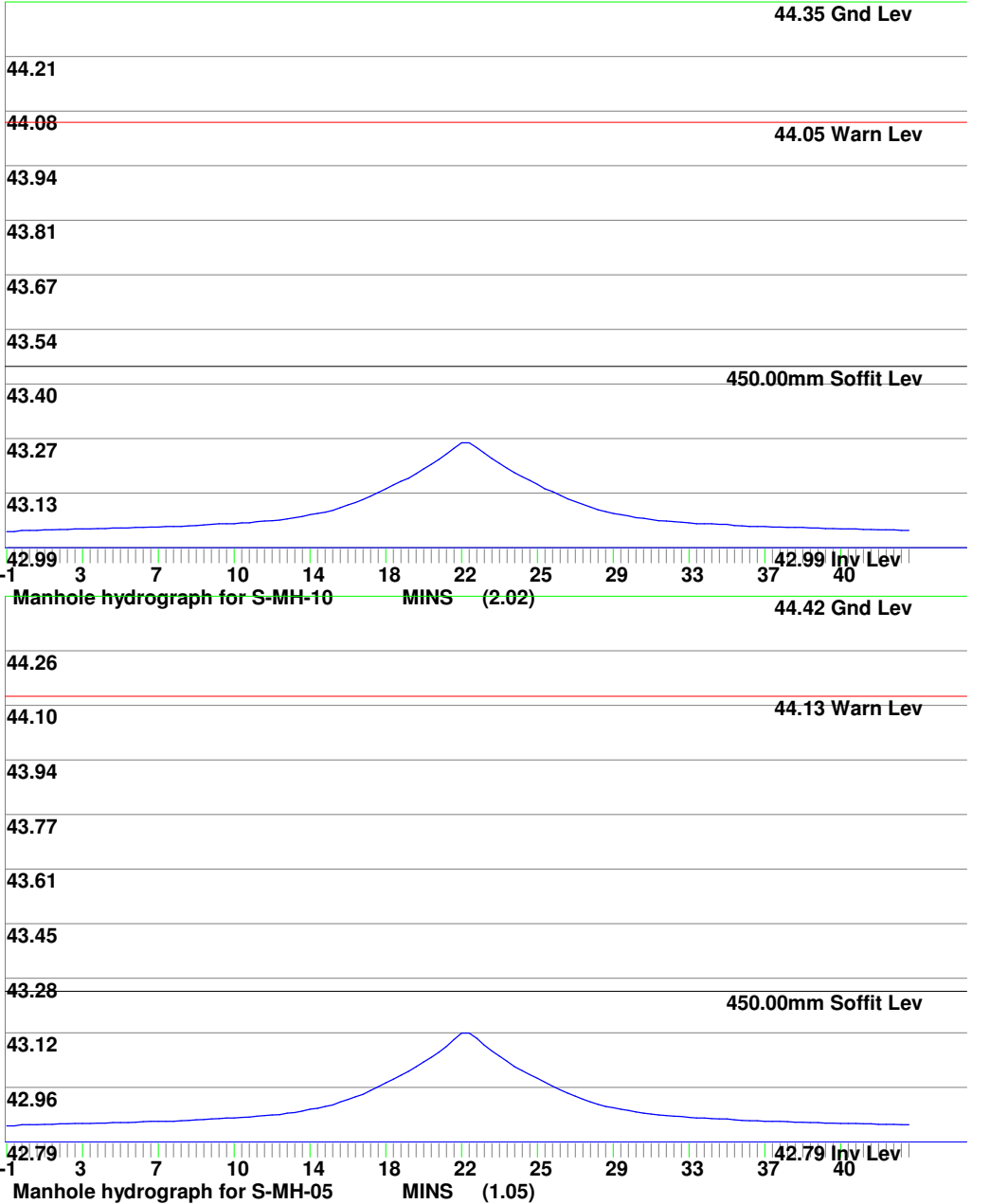
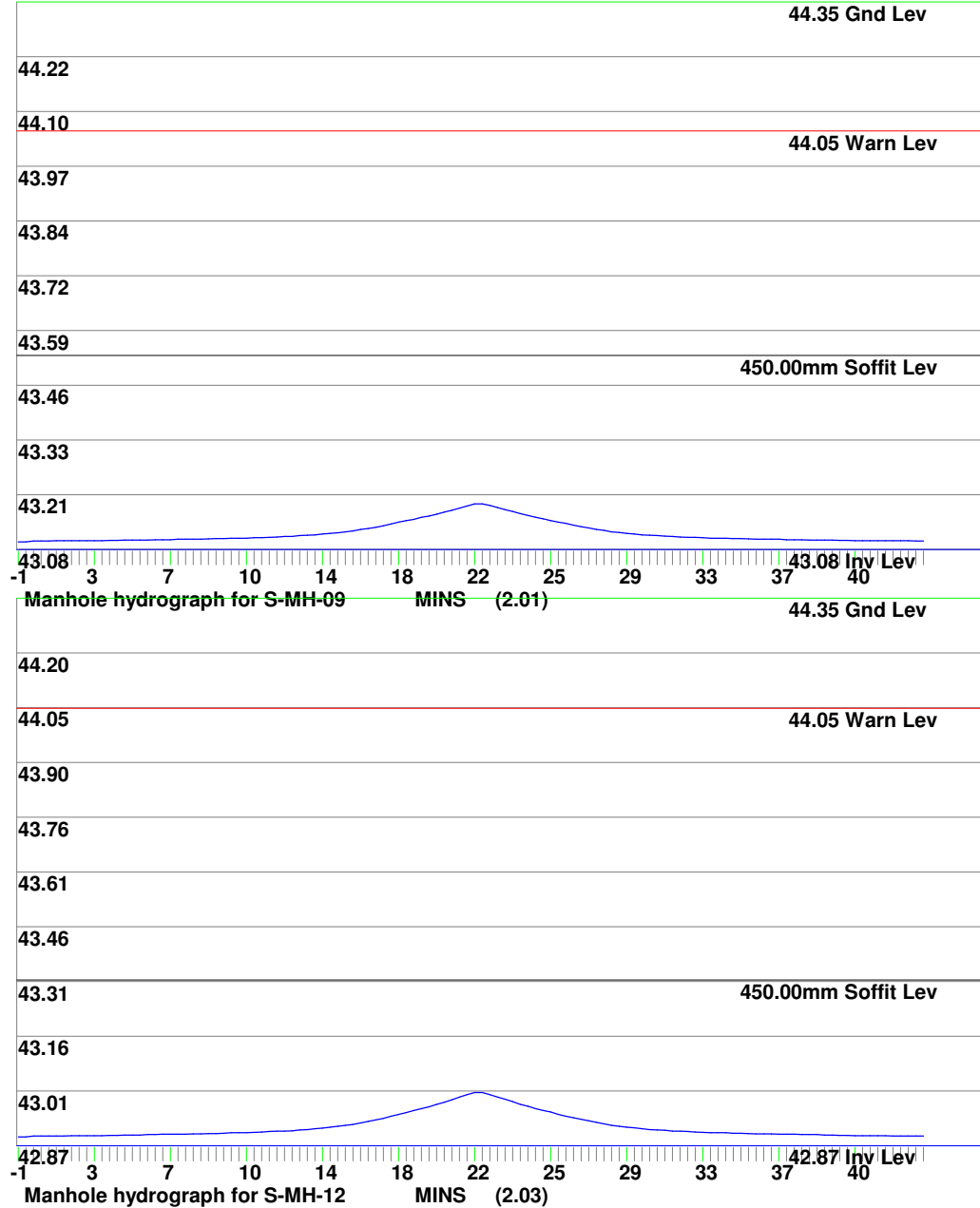
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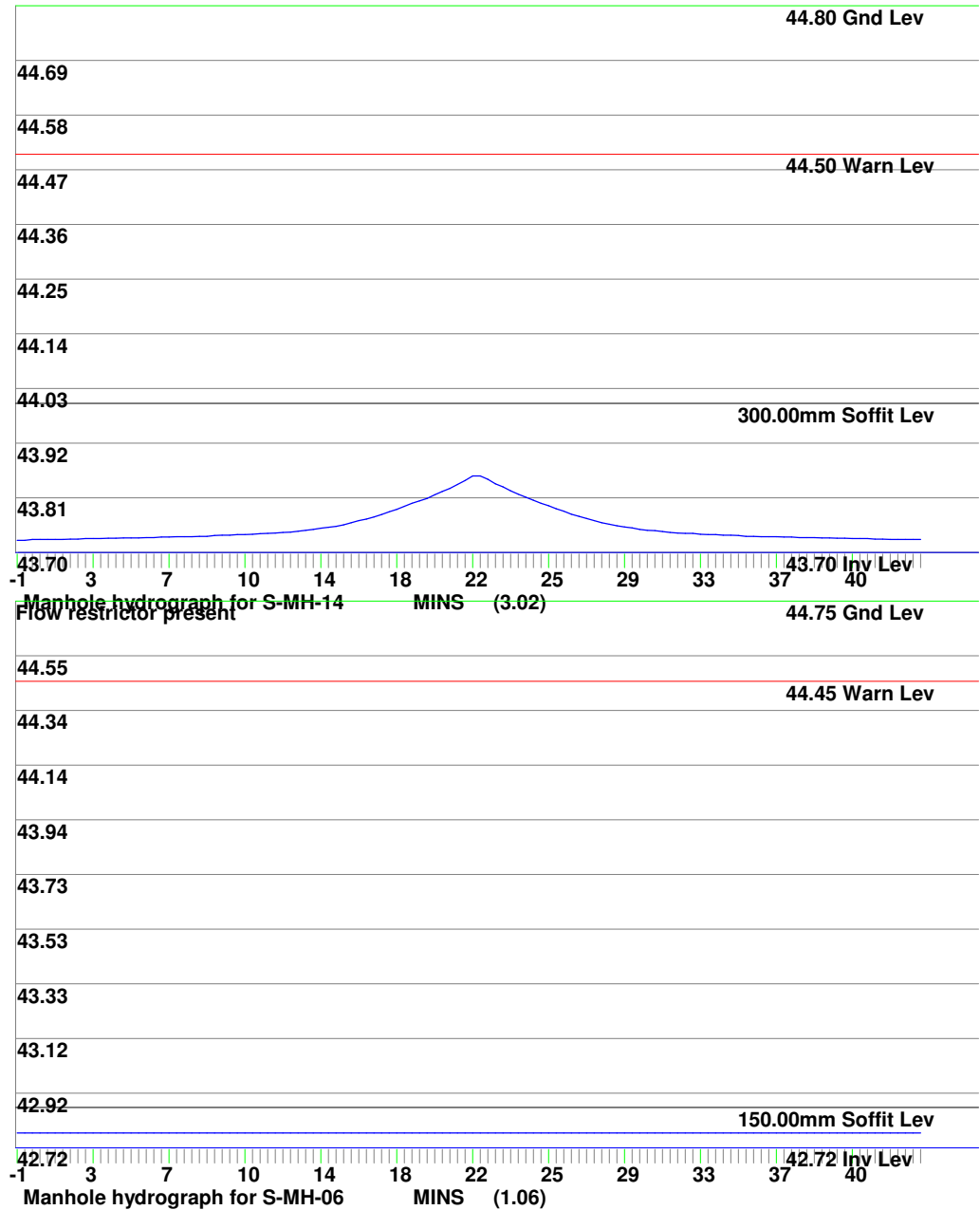


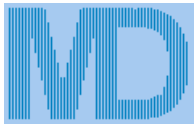
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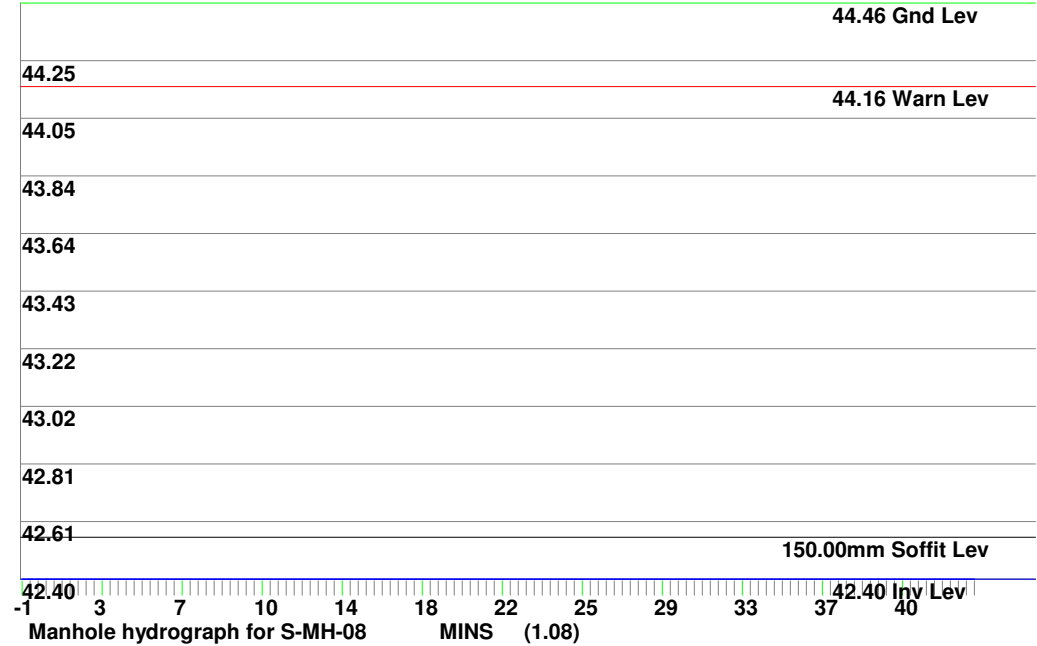
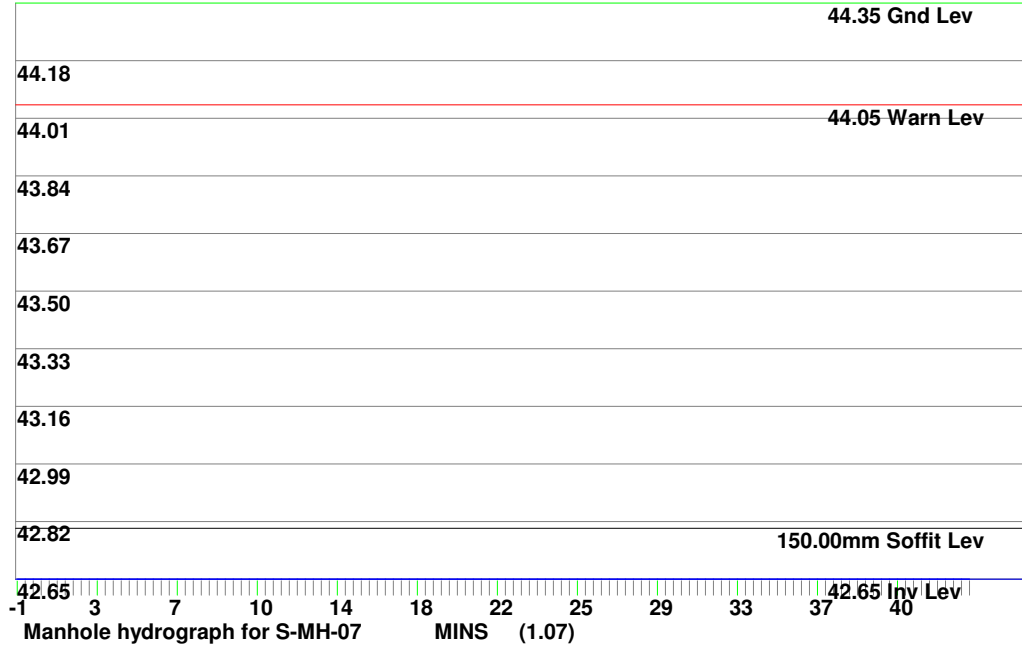
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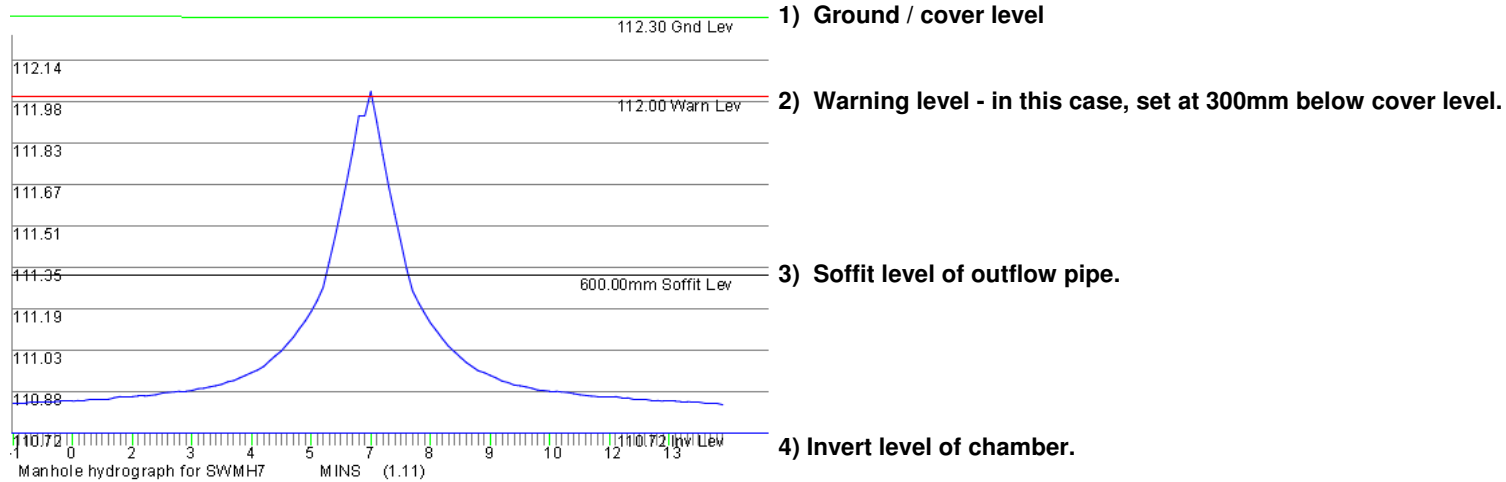
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- Notes**
- a) Lower section of the graph shows the water depth filling the channel. Channel is assumed to be a full pipe diameter in depth.
 - b) Upper section of the graph shows the water depth filling the chamber. Chamber has a greater width/diameter than the channel, so increases in depth are proportionally less.
 - c) The top of the graph clips the warning level and would be marked thus on the printout.
 - d) 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.
 - e) The diagram above is a general one and is not part of the current calculation.