

Ujjain Underground Sewerage Scheme-Sewer Network Design 1/3

SL	Starting Node	Ending Node	Chainage	Intial Population 2020	Initial Ultimate Population (Pi)	Contributory Population (Pc)	Total Ultimate population (Pu) 2050	Dry Weather Flow in LPS	Infiltration in LPS	Total Ultimate Flow in LPS	Peak Factor for Q20 (Initial Flow)	Peak Factor for Q50 (Ultimate Flow)	Qp20 (Initial Flow)	Qp50 (Ultimate Flow)	Type of Pipe	Pipe Dia (in m)
1	MH-41	MH-40	50	254	1315	0	1315	1.64	0.0116	1.656	3	3	0.951	4.968	DWC NP3	0.6
2	MH-40	MH-39	93.8	222	1152	1315	2468	3.08	0.0116	3.096	3	3	0.833	9.289	DWC NP3	0.6
3	MH-39	MH-38	142.99	250	1294	2468	3762	4.70	0.0116	4.714	3	3	0.936	14.142	DWC NP3	0.6
4	MH-38	MH-37	217.84	380	1969	3762	5731	7.16	0.0116	7.176	3	3	1.424	21.527	DWC NP3	0.6
5	MH-37	MH-36	335.19	595	3087	5731	8819	11.02	0.0116	11.035	3	3	2.233	33.105	DWC NP3	0.6
6	MH-36	MH-35	370.61	180	932	8819	9751	12.19	0.0116	12.200	3	3	0.674	36.599	DWC NP3	0.6
7	MH-35	MH-34	414.3	222	1149	9751	10900	13.63	0.0116	13.637	3	3	0.831	40.910	DWC NP3	0.6
8	MH-34	MH-33	454.63	205	1061	10900	11961	14.95	0.0116	14.963	3	3	0.767	44.889	DWC NP3	0.6
9	MH-33	MH-32	567.45	572	2968	11961	14929	18.66	0.0116	18.673	3	3	2.147	56.020	DWC NP3	0.6
10	MH-32	MH-31	623.78	286	1482	14929	16411	20.51	0.0116	20.526	3	3	1.072	61.577	DWC NP3	0.6
11	MH-31	MH-30	731.51	547	2834	16411	19246	24.06	0.0116	24.069	3	3	2.050	72.206	DWC NP3	0.6
12	MH-30	MH-29	823.57	467	2422	19246	21668	27.08	0.0116	27.096	3	2.5	1.752	67.740	DWC NP3	0.6
13	MH-29	MH-28	886.42	319	1654	21668	23321	29.15	0.0116	29.163	3	2.5	1.196	72.908	DWC NP3	0.6
14	MH-28	MH-27	960.83	378	1958	23321	25279	31.60	0.0116	31.610	3	2.5	1.416	79.026	DWC NP3	0.6
15	MH-27	MH-26	1065.82	533	2762	25279	28041	35.05	0.0116	35.063	3	2.5	1.998	87.658	DWC NP3	0.6
16	MH-26	MH-25	1186.45	612	3174	28041	31215	39.02	0.0116	39.030	3	2.5	2.295	97.575	DWC NP3	0.6
17	MH-25	MH-24	1260.82	377	1957	31215	33172	41.46	0.0116	41.476	3	2.5	1.415	103.690	DWC NP3	0.6
18	MH-24	MH-23	1378.2	596	3088	33172	36260	45.32	0.0116	45.336	3	2.5	2.233	113.341	DWC NP3	0.6
19	MH-23	MH-22	1552.85	886	4595	36260	40855	51.07	0.0116	51.080	3	2.5	3.323	127.700	DWC NP3	0.6
20	MH-22	MH-21	1657.94	533	2765	40855	43620	54.52	0.0116	54.536	3	2.5	1.999	136.340	DWC NP3	0.6
21	MH-21	MH-20	1810.85	776	4023	43620	47643	59.55	0.0116	59.565	3	2.5	2.909	148.912	DWC NP3	0.6
22	MH-20	MH-19	2087.69	1405	7284	47643	54926	68.66	0.0116	68.669	3	2.25	5.267	154.505	DWC NP3	0.6
23	MH-19	MH-18	2212.86	635	3293	54926	58219	72.77	0.0116	72.786	3	2.25	2.381	163.767	DWC NP3	0.6
24	MH-18	MH-17	2317.07	529	2742	58219	60961	76.20	0.0116	76.213	3	2.25	1.983	171.479	DWC NP3	0.6
25	MH-17	MH-16	2406.19	452	2345	60961	63306	79.13	0.0116	79.144	3	2.25	1.696	178.073	DWC NP3	0.6
26	MH-16	MH-15	2499.91	475	2466	63306	65771	82.21	0.0116	82.226	3	2.25	1.783	185.008	DWC NP3	0.6
27	MH-15	MH-14	2583.86	426	2209	65771	67980	84.97	0.0116	84.987	3	2.25	1.597	191.220	DWC NP3	0.6
28	MH-14	MH-13	2634.98	259	1345	67980	69325	86.66	0.0116	86.668	3	2.25	0.973	195.002	DWC NP3	0.6
29	MH-13	MH-12	2715	406	2105	69325	71430	89.29	0.0116	89.299	3	2.25	1.522	200.924	DWC NP3	0.6
30	MH-12	MH-11	2772.64	292	1516	71430	72947	91.18	0.0116	91.195	3	2.25	1.097	205.189	DWC NP3	0.6
31	MH-11	MH-10	2839.49	339	1759	72947	74705	93.38	0.0116	93.393	3	2.25	1.272	210.135	DWC NP3	0.6
32	MH-10	MH-9	2903.38	324	1681	74705	76386	95.48	0.0116	95.495	3	2.25	1.216	214.863	DWC NP3	0.6
33	MH-9	MH-8	3039.08	688	3570	76386	79957	99.95	0.0116	99.957	3	2.25	2.582	224.904	DWC NP3	0.6
34	MH-8	MH-7	3081.69	216	1121	79957	81078	101.35	0.0116	101.359	3	2.25	0.811	228.057	DWC NP3	0.6
35	MH-7	MH-6	3142.52	309	1600	81078	82678	103.35	0.0116	103.359	3	2.25	1.157	232.558	DWC NP3	0.6
36	MH-6	MH-5	3193.92	261	1352	82678	84030	105.04	0.0116	105.050	3	2.25	0.978	236.361	DWC NP3	0.6
37	MH-5	MH-4	3255.97	315	1633	84030	85663	107.08	0.0116	107.090	3	2.25	1.181	240.953	DWC NP3	0.6
38	MH-4	MH-3	3327.3	362	1877	85663	87540	109.42	0.0116	109.436	3	2.25	1.357	246.231	DWC NP3	0.6
39	MH-3	MH-2	3352.59	128	665	87540	88205	110.26	0.0116	110.268	3	2.25	0.481	248.102	DWC NP3	0.6
40	MH-2	MH-1	3408.24	282	1464	88205	89669	112.09	0.0116	112.098	3	2.25	1.059	252.220	DWC NP3	0.6

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SL	Starting Node	Ending Node	Qfull by Manning's Formula in LPS	Q20/Qfull	Q50/Qfull	Vfull(Vf) by Manning's formula	V20/Vf	V50/Vf	V20 Actual	V50 Actual	Depth ratio corresponding to calculated discharge ratio (d / D) for designed year 50	Remarks
1	MH-41	MH-40	428.14	0.002	0.012	1.357	0.257	0.401	0.35	0.54	0.05	d/D ratio and V50 been very small may be ignored since downstream velocity arriving is quite sartisfactory
2	MH-40	MH-39	302.74	0.003	0.031	0.960	0.257	0.517	0.25	0.50	0.05	
3	MH-39	MH-38	428.14	0.002	0.033	1.357	0.257	0.401	0.35	0.54	0.05	
4	MH-38	MH-37	524.36	0.003	0.041	1.662	0.257	0.517	0.43	0.86	0.05	
5	MH-37	MH-36	428.14	0.005	0.077	1.357	0.257	0.401	0.35	0.54	0.05	
6	MH-36	MH-35	428.14	0.002	0.085	1.357	0.257	0.615	0.35	0.83	0.05	
7	MH-35	MH-34	262.18	0.003	0.156	0.831	0.257	0.776	0.21	0.65	0.05	
8	MH-34	MH-33	262.18	0.003	0.171	0.831	0.257	0.776	0.21	0.65	0.05	
9	MH-33	MH-32	262.18	0.008	0.214	0.831	0.401	0.822	0.33	0.68	0.10	
10	MH-32	MH-31	262.18	0.004	0.235	0.831	0.257	0.822	0.21	0.68	0.05	
11	MH-31	MH-30	262.18	0.008	0.275	0.831	0.401	0.902	0.33	0.75	0.10	
12	MH-30	MH-29	262.18	0.007	0.258	0.831	0.401	0.843	0.33	0.70	0.10	
13	MH-29	MH-28	428.14	0.003	0.170	1.357	0.257	0.776	0.35	1.05	0.05	
14	MH-28	MH-27	428.14	0.003	0.185	1.357	0.257	0.776	0.35	1.05	0.05	
15	MH-27	MH-26	262.18	0.008	0.334	0.831	0.401	0.902	0.33	0.75	0.10	
16	MH-26	MH-25	262.18	0.009	0.372	0.831	0.401	0.954	0.33	0.79	0.10	
17	MH-25	MH-24	262.18	0.005	0.395	0.831	0.401	0.954	0.33	0.79	0.10	
18	MH-24	MH-23	262.18	0.009	0.432	0.831	0.401	1	0.33	0.83	0.10	
19	MH-23	MH-22	262.18	0.013	0.487	0.831	0.401	1	0.33	0.83	0.10	
20	MH-22	MH-21	428.14	0.005	0.318	1.357	0.257	0.902	0.35	1.22	0.05	
21	MH-21	MH-20	428.14	0.007	0.348	1.357	0.401	0.954	0.54	1.29	0.10	
22	MH-20	MH-19	428.14	0.012	0.361	1.357	0.401	0.954	0.54	1.29	0.10	
23	MH-19	MH-18	428.14	0.006	0.383	1.357	0.401	0.954	0.54	1.29	0.10	
24	MH-18	MH-17	741.56	0.003	0.231	2.351	0.257	0.822	0.60	1.93	0.05	
25	MH-17	MH-16	741.56	0.002	0.240	2.351	0.257	0.843	0.60	1.98	0.05	
26	MH-16	MH-15	741.56	0.002	0.249	2.351	0.257	0.843	0.60	1.98	0.05	
27	MH-15	MH-14	741.56	0.002	0.258	2.351	0.257	0.843	0.60	1.98	0.05	
28	MH-14	MH-13	741.56	0.001	0.263	2.351	0.257	0.843	0.60	1.98	0.05	
29	MH-13	MH-12	741.56	0.002	0.271	2.351	0.257	0.902	0.60	2.12	0.05	
30	MH-12	MH-11	741.56	0.001	0.277	2.351	0.257	0.902	0.60	2.12	0.05	
31	MH-11	MH-10	741.56	0.002	0.283	2.351	0.257	0.902	0.60	2.12	0.05	
32	MH-10	MH-9	741.56	0.002	0.290	2.351	0.257	0.902	0.60	2.12	0.05	
33	MH-9	MH-8	741.56	0.003	0.303	2.351	0.257	0.902	0.60	2.12	0.05	
34	MH-8	MH-7	741.56	0.001	0.308	2.351	0.257	0.776	0.60	1.82	0.05	
35	MH-7	MH-6	741.56	0.002	0.314	2.351	0.257	0.902	0.60	2.12	0.05	
36	MH-6	MH-5	741.56	0.001	0.319	2.351	0.257	0.902	0.60	2.12	0.05	
37	MH-5	MH-4	741.56	0.002	0.325	2.351	0.257	0.902	0.60	2.12	0.05	
38	MH-4	MH-3	262.18	0.005	0.939	0.831	0.257	1.14	0.21	0.95	0.05	
39	MH-3	MH-2	262.18	0.002	0.946	0.831	0.257	1.14	0.21	0.95	0.05	
40	MH-2	MH-1	262.18	0.004	0.962	0.831	0.257	1.14	0.21	0.95	0.05	

Ujjain Underground Sewerage Scheme-Sewer Network Design 3/3

SL	Node	G.L	Slope Available	Provided slope	Invert level	Pipe Dia (in m)	Thickness	Crown level	Excavation level	Depth of Excavation	Difference between invert level and Excavation level	Difference between GL and Crown level	Depth of Manhole
1	MH-41	497.703	0.0050	0.0033	496.413	0.6	0.045	497.058	496.168	1.535	0.245	0.645	1.290
2	MH-40	497.452	0.0032	0.0017	496.340	0.6	0.045	496.985	496.095	1.357	0.245	0.467	1.112
3	MH-39	497.314	0.0008	0.0033	496.176	0.6	0.045	496.821	495.931	1.383	0.245	0.493	1.138
4	MH-38	497.353	0.0027	0.0050	495.802	0.6	0.045	496.447	495.557	1.796	0.245	0.906	1.551
5	MH-37	497.152	0.0006	0.0033	495.411	0.6	0.045	496.056	495.166	1.986	0.245	1.096	1.741
6	MH-36	497.22	0.0001	0.0033	495.293	0.6	0.045	495.938	495.048	2.172	0.245	1.282	1.927
7	MH-35	497.217	0.0032	0.0013	495.238	0.6	0.045	495.883	494.993	2.224	0.245	1.334	1.979
8	MH-34	497.356	0.0001	0.0013	495.188	0.6	0.045	495.833	494.943	2.413	0.245	1.523	2.168
9	MH-33	497.351	0.0006	0.0013	495.047	0.6	0.045	495.692	494.802	2.550	0.245	1.660	2.305
10	MH-32	497.417	0.0058	0.0013	494.976	0.6	0.045	495.621	494.731	2.686	0.245	1.796	2.441
11	MH-31	497.092	0.0033	0.0013	494.841	0.6	0.045	495.486	494.596	2.496	0.245	1.606	2.251
12	MH-30	496.741	0.0056	0.0013	494.726	0.6	0.045	495.371	494.481	2.260	0.245	1.370	2.015
13	MH-29	496.222	0.0112	0.0033	494.517	0.6	0.045	495.162	494.272	1.950	0.245	1.060	1.705
14	MH-28	495.515	0.0001	0.0033	494.269	0.6	0.045	494.914	494.024	1.491	0.245	0.601	1.246
15	MH-27	495.511	0.0151	0.0013	494.138	0.6	0.045	494.783	493.893	1.618	0.245	0.728	1.373
16	MH-26	497.092	0.0132	0.0013	493.987	0.6	0.045	494.632	493.742	3.350	0.245	2.460	3.105
17	MH-25	498.69	0.0059	0.0013	493.894	0.6	0.045	494.539	493.649	5.041	0.245	4.151	4.796
18	MH-24	499.13	0.0213	0.0013	493.747	0.6	0.045	494.392	493.502	5.628	0.245	4.738	5.383
19	MH-23	496.627	0.0110	0.0013	493.529	0.6	0.045	494.174	493.284	3.343	0.245	2.453	3.098
20	MH-22	494.711	0.0098	0.0033	493.178	0.6	0.045	493.823	492.933	1.778	0.245	0.888	1.533
21	MH-21	493.676	0.0033	0.0033	492.669	0.6	0.045	493.314	492.324	1.352	0.345	0.362	1.007
22	MH-20	493.165	0.0022	0.0033	491.746	0.6	0.045	492.391	491.401	1.764	0.345	0.774	1.419
23	MH-19	492.556	0.0002	0.0033	491.329	0.6	0.045	491.974	490.984	1.572	0.345	0.582	1.227
24	MH-18	492.528	0.0002	0.0100	490.287	0.6	0.045	490.932	489.942	2.586	0.345	1.596	2.241
25	MH-17	492.553	0.0006	0.0100	489.395	0.6	0.045	490.040	489.050	3.503	0.345	2.513	3.158
26	MH-16	492.503	0.0012	0.0100	488.458	0.6	0.045	489.103	488.113	4.390	0.345	3.400	4.045
27	MH-15	492.387	0.0056	0.0100	487.619	0.6	0.045	488.264	487.274	5.113	0.345	4.123	4.768
28	MH-14	491.913	0.0086	0.0100	487.108	0.6	0.045	487.753	486.763	5.150	0.345	4.160	4.805
29	MH-13	491.474	0.0335	0.0100	486.307	0.6	0.045	486.952	485.962	5.512	0.345	4.522	5.167
30	MH-12	488.79	0.0052	0.0100	485.731	0.6	0.045	486.376	485.386	3.404	0.345	2.414	3.059
31	MH-11	489.091	0.0348	0.0100	485.062	0.6	0.045	485.707	484.717	4.374	0.345	3.384	4.029
32	MH-10	491.415	0.0178	0.0100	484.424	0.6	0.045	485.069	484.079	7.336	0.345	6.346	6.991
33	MH-9	490.279	0.0145	0.0100	483.067	0.6	0.045	483.712	482.722	7.557	0.345	6.567	7.212
34	MH-8	488.305	0.0695	0.0100	482.640	0.6	0.045	483.285	482.295	6.010	0.345	5.020	5.665
35	MH-7	485.343	0.0164	0.0100	482.032	0.6	0.045	482.677	481.687	3.656	0.345	2.666	3.311
36	MH-6	484.346	0.0429	0.0100	481.518	0.6	0.045	482.163	481.173	3.173	0.345	2.183	2.828
37	MH-5	482.141	0.0239	0.0100	480.898	0.6	0.045	481.543	480.553	1.588	0.345	0.598	1.243
38	MH-4	483.623	0.0033	0.0013	480.808	0.6	0.045	481.453	480.463	3.160	0.345	2.170	2.815
39	MH-3	483.857	0.0382	0.0013	480.777	0.6	0.045	481.422	480.432	3.425	0.345	2.435	3.080
40	MH-2	482.891	#REF!	0.0013	480.707	0.6	0.045	481.352	480.362	2.529	0.345	1.539	2.184