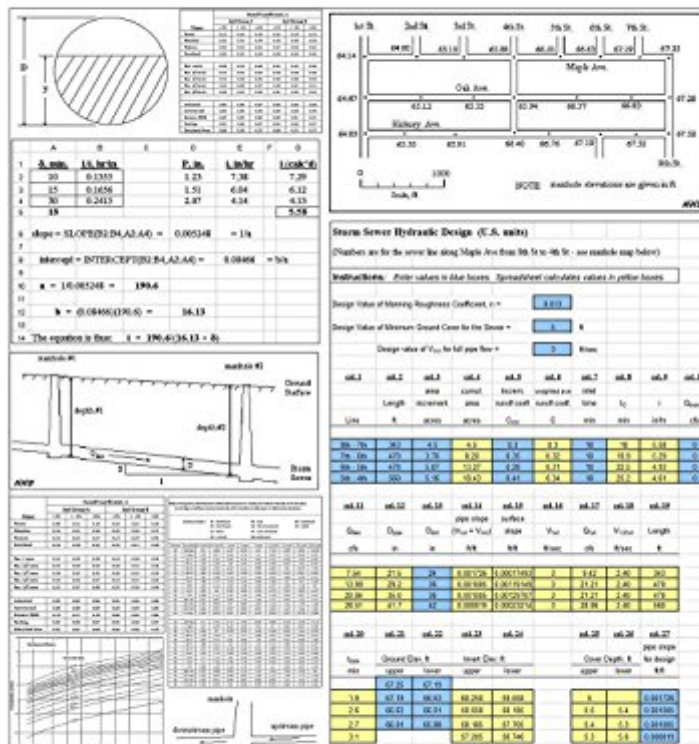


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Hydraulic Design Of Storm Sewers With A Spreadsheet

Hydraulic Design of Storm Sewers with a Spreadsheet



The spreadsheet includes the following components:

- Manhole Schedule Table:**

Station	Manhole No.	Depth	Flow Area	Flow Velocity	Flow Capacity
0+00	1	4.00	1.57	1.20	1.88
0+25	2	4.00	1.57	1.20	1.88
0+50	3	4.00	1.57	1.20	1.88
0+75	4	4.00	1.57	1.20	1.88
1+00	5	4.00	1.57	1.20	1.88
1+25	6	4.00	1.57	1.20	1.88
1+50	7	4.00	1.57	1.20	1.88
1+75	8	4.00	1.57	1.20	1.88
2+00	9	4.00	1.57	1.20	1.88
2+25	10	4.00	1.57	1.20	1.88
2+50	11	4.00	1.57	1.20	1.88
2+75	12	4.00	1.57	1.20	1.88
3+00	13	4.00	1.57	1.20	1.88
3+25	14	4.00	1.57	1.20	1.88
3+50	15	4.00	1.57	1.20	1.88
3+75	16	4.00	1.57	1.20	1.88
4+00	17	4.00	1.57	1.20	1.88
4+25	18	4.00	1.57	1.20	1.88
4+50	19	4.00	1.57	1.20	1.88
4+75	20	4.00	1.57	1.20	1.88
5+00	21	4.00	1.57	1.20	1.88
5+25	22	4.00	1.57	1.20	1.88
5+50	23	4.00	1.57	1.20	1.88
5+75	24	4.00	1.57	1.20	1.88
6+00	25	4.00	1.57	1.20	1.88
6+25	26	4.00	1.57	1.20	1.88
6+50	27	4.00	1.57	1.20	1.88
6+75	28	4.00	1.57	1.20	1.88
7+00	29	4.00	1.57	1.20	1.88
7+25	30	4.00	1.57	1.20	1.88
7+50	31	4.00	1.57	1.20	1.88
7+75	32	4.00	1.57	1.20	1.88
8+00	33	4.00	1.57	1.20	1.88
8+25	34	4.00	1.57	1.20	1.88
8+50	35	4.00	1.57	1.20	1.88
8+75	36	4.00	1.57	1.20	1.88
9+00	37	4.00	1.57	1.20	1.88
9+25	38	4.00	1.57	1.20	1.88
9+50	39	4.00	1.57	1.20	1.88
9+75	40	4.00	1.57	1.20	1.88
10+00	41	4.00	1.57	1.20	1.88
10+25	42	4.00	1.57	1.20	1.88
10+50	43	4.00	1.57	1.20	1.88
10+75	44	4.00	1.57	1.20	1.88
11+00	45	4.00	1.57	1.20	1.88
11+25	46	4.00	1.57	1.20	1.88
11+50	47	4.00	1.57	1.20	1.88
11+75	48	4.00	1.57	1.20	1.88
12+00	49	4.00	1.57	1.20	1.88
12+25	50	4.00	1.57	1.20	1.88
12+50	51	4.00	1.57	1.20	1.88
12+75	52	4.00	1.57	1.20	1.88
13+00	53	4.00	1.57	1.20	1.88
13+25	54	4.00	1.57	1.20	1.88
13+50	55	4.00	1.57	1.20	1.88
13+75	56	4.00	1.57	1.20	1.88
14+00	57	4.00	1.57	1.20	1.88
14+25	58	4.00	1.57	1.20	1.88
14+50	59	4.00	1.57	1.20	1.88
14+75	60	4.00	1.57	1.20	1.88
15+00	61	4.00	1.57	1.20	1.88
15+25	62	4.00	1.57	1.20	1.88
15+50	63	4.00	1.57	1.20	1.88
15+75	64	4.00	1.57	1.20	1.88
16+00	65	4.00	1.57	1.20	1.88
16+25	66	4.00	1.57	1.20	1.88
16+50	67	4.00	1.57	1.20	1.88
16+75	68	4.00	1.57	1.20	1.88
17+00	69	4.00	1.57	1.20	1.88
17+25	70	4.00	1.57	1.20	1.88
17+50	71	4.00	1.57	1.20	1.88
17+75	72	4.00	1.57	1.20	1.88
18+00	73	4.00	1.57	1.20	1.88
18+25	74	4.00	1.57	1.20	1.88
18+50	75	4.00	1.57	1.20	1.88
18+75	76	4.00	1.57	1.20	1.88
19+00	77	4.00	1.57	1.20	1.88
19+25	78	4.00	1.57	1.20	1.88
19+50	79	4.00	1.57	1.20	1.88
19+75	80	4.00	1.57	1.20	1.88
20+00	81	4.00	1.57	1.20	1.88
20+25	82	4.00	1.57	1.20	1.88
20+50	83	4.00	1.57	1.20	1.88
20+75	84	4.00	1.57	1.20	1.88
21+00	85	4.00	1.57	1.20	1.88
21+25	86	4.00	1.57	1.20	1.88
21+50	87	4.00	1.57	1.20	1.88
21+75	88	4.00	1.57	1.20	1.88
22+00	89	4.00	1.57	1.20	1.88
22+25	90	4.00	1.57	1.20	1.88
22+50	91	4.00	1.57	1.20	1.88
22+75	92	4.00	1.57	1.20	1.88
23+00	93	4.00	1.57	1.20	1.88
23+25	94	4.00	1.57	1.20	1.88
23+50	95	4.00	1.57	1.20	1.88
23+75	96	4.00	1.57	1.20	1.88
24+00	97	4.00	1.57	1.20	1.88
24+25	98	4.00	1.57	1.20	1.88
24+50	99	4.00	1.57	1.20	1.88
24+75	100	4.00	1.57	1.20	1.88
- Design Calculations:**
 - Slope = SLOPE(D14:A2:A4) = 0.005148 = 1%
 - Intercept = INTERCEPT(D2:A4:A2:A4) = 0.08498 = 5%
 - $x = 10.081248 = 199.4$
 - $y = @0.08498(D16:G) = 16.13$
 - The equation is then: $y = 199.4(36.13 + 4)$
- Storm Sewer Hydraulic Design (U.S. units):**
 - Design Value of Manning Roughness Coefficient, $n = 0.15$
 - Design Value of Maximum Ground Cover for the Sewer = 0.001
 - Design value of V_{max} for full pipe flow = 3 ft/sec
- Manhole Schedule Table:**

Station	Manhole No.	Depth	Flow Area	Flow Velocity	Flow Capacity
0+00	1	4.00	1.57	1.20	1.88
0+25	2	4.00	1.57	1.20	1.88
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0+75	4	4.00	1.57	1.20	1.88
1+00	5	4.00	1.57	1.20	1.88
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1+50	7	4.00	1.57	1.20	1.88
1+75	8	4.00	1.57	1.20	1.88
2+00	9	4.00	1.57	1.20	1.88
2+25	10	4.00	1.57	1.20	1.88
2+50	11	4.00	1.57	1.20	1.88
2+75	12	4.00	1.57	1.20	1.88
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9+50	39	4.00	1.57	1.20	1.88
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24+50	99	4.00	1.57	1.20	1.88
24+75	100	4.00	1.57	1.20	1.88
- Design Summary Table:**

Station	Manhole No.	Depth	Flow Area	Flow Velocity	Flow Capacity
0+00	1	4.00			

Synopsis

Storm sewers are widely used to carry away stormwater runoff from storms, primarily in urban areas. The hydraulic design begins after the location of the manholes for the system have been determined. Between each pair of manholes the storm sewer will have a constant slope and diameter. The hydraulic design process results in determination of an appropriate diameter and slope for each length of storm sewer and determines the depth of the bottom of the pipe at each manhole. The overall procedure and each step are presented and discussed in this e-book. Example calculations for a single length of storm sewer between two manholes is performed and an example of calculations between successive manholes will be shown using an Excel spreadsheet.

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