CE 412 A: Water Supply & Wastewater Disposal Systems

Tutorial – 2019-20 I

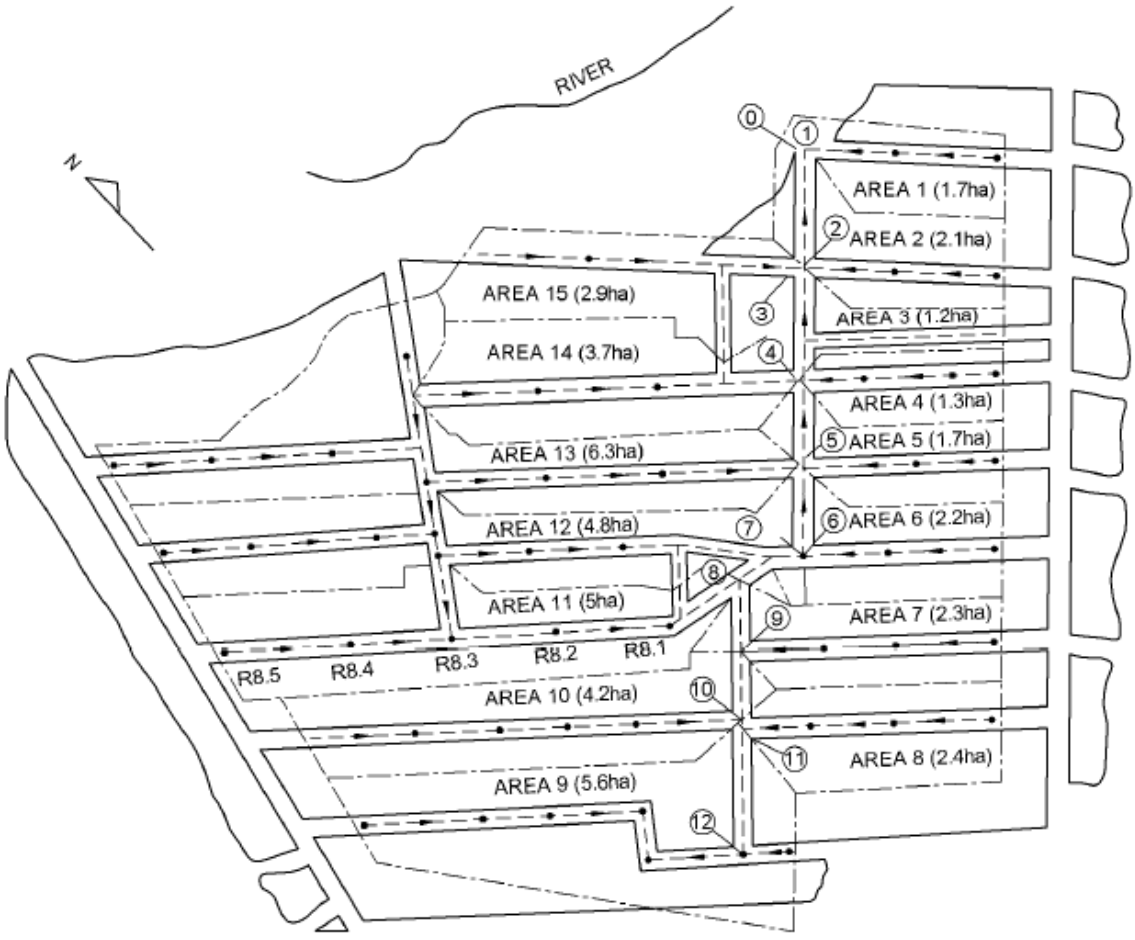
TUTORIAL 5

Problem 1: **Design a system of sanitary sewers for the given area shown in the Figure with the following details:**

1	Population Density	300 Persons/hect.
2	Water Supply	250 lpd/head (ultimate)
3	Maximum rate of infiltration	20,000 lpd/hect.
4	Minimum depth of cover to be provided over the crown of the sewer	1.2m
5	Minimum velocity in sewer at peak flow	0.6 m/sec
6	Maximum velocity in sewer	2.0 m/sec
7	Minimum size of the sewer	150 mm
8	Waste water reaching sewers	90% of Water Supply
9	Peak flow	3.5 x Ave. flow

- Take slopes as per following recommendation:

Dia (mm)	150	200-350	400 and above
Slope	0.008	0.005	0.033



- **A minimum level difference of 30 mm has to be provided between the incoming and outgoing sewers.**

d/D	v/V	q/Q
1.0	1.000	1.000
0.9	1.124	1.066
0.8	1.140	0.968
0.7	1.120	0.838
0.6	1.072	0.671
0.5	1.000	0.500
0.4	0.902	0.337
0.3	0.776	0.196
0.2	0.615	0.088
0.1	0.401	0.021

Manhole		Ground level at starting manhole	Length	Area Served (ha)	
From	To		m	Increment	Total
R.8.5	R.8.4	38.275	120	0.80	0.80
R.8.4	R.8.3	37.960	116	1.20	2.00
R.8.3	R.8.2	36.873	114	1.40	3.40
R.8.2	R.8.1	36.895	116	0.90	4.30
R.8.1	8	36.420	75	0.70	5.0
8	7	36.117	41	14.5	19.5
7	6	35.830	26	4.8	24.3
6	5	35.105	88	2.2	26.5
5	4	34.412	86	7.8	34.3
4	3	34.181	36	5.0	39.3
3	2	34.105	77	1.2	40.5
2	1	34.905	117	5.0	45.5
1	0	33.250	41	1.7	47.2