Rujeib New Suburb

Outline

- The purpose of the project.
- Methodology.
- Area description.
- Water And Sewage Networks Design.
- The Results.
- Construction Details.
- Bill Of Quantities.
- Conclusion.
- Recommendation.

Purpose

- Lack of Water and sewage networks in Rujeib suburb.
- Thus the aim of the project is to design water and sewage networks for Rujeib suburb.

Data Collected

The information which needed was taken from the municipality, as:

- Topography of the region.
- Maps for the region.
- Water consumption data.
- Design criteria.

Area Description

Rujeib Suburb located:

- Located in the north of Nablus.
- Lies between the villages of Beit Furik and Beit Dajan.
- Has an area of 2.7 km2.

Rujeib suburb in Nablus Governorate

Water Network Design

The water network is provided with water from two wells.

The general layout of water distribution system for Rujeib is assigned by using the WaterGEMS.

Data Analysis

Design

- The Design was developed twice.
- The demand for each node depended on the area served by that node.
- Type and material used in the network connections, and avoid exceeding the limits.
- Pipe diameters not less than 2 inches.

Design

Velocity:

- Min Velocity (>0.5 m/s), to avoid sedimentation of materials in the pipes.
- Max Velocity (< 3 m/s), To avoid increasing dynamic head and friction.

Pressure:

Pressure less than 2 bars is not sufficient for water to reach home tanks, thus the value minimum is bars limited to deterioration in the pipes.

Design

- The project area contain two pressure zones.
- Two networks were designed for the region:

First network (E02).

Second network (E01).

Pattern

Pattern

Supply And Demand

- Supply provided for region: 365 m3/h.
- The water supply pumps water one time every three days.
- Volume of reservoir = 1000 m3.
- Process full of reservoir is 4 hrs.

Supply And Demand

- Total water demand = 1658 m3/day
- Percentage fill = 7 hrs
- Inflitration rate = 20%
- Peak Factor = 3
- Water water generation = 1658*0.7/24*3 = 4975 m3/day

Results from WaterGEMS

Waste Water characteristics

Sewage Network Design

Disposing waste water in a healthy and safe way became more important.

The general layout of sewer collection system for the suburb is assigned by using the SewerGEMS.

Results

	Design Criteria	Results
Velocity →	0.6-3 m/s	0.6-2.57 m/s
Slope →	1%-12%	0.5%-10%
Cover →	0.6-5 m	0.9-14 m

Design

1. No loops in the network.
2. Manholes and pipes located on streets and near the buildings to save them.
3. The distance between manholes is preferred to be from 25-50 m.

The Cover Problem

Construction Details

For Water Network

For Sewage Network

Construction Details

Bill Of Quantities

Total expected cost of water network = 915,000 EURO

Total expected cost of sewage network = 550,000 EURO

Conclusion

- Designed the water network and estimated the total cost for it.
- Designed the sewage network and estimated the total cost for it.
- The project, compared the old conceptual plan for this area, and we have the more feasible to take it.

Recommendation

We recommend Nablus municipality:

- To modify size of the reservoir.
- Provide the region by more water by increasing the pumps period.

Asma'a Al-Dament
Hala Abo-Soud
Nala Al-Aghbar
Rasha Al-Sayyad

Prezi

Rujeib New Suburb

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- Recommendation.

Purpose

- Lack of water and sewage networks in Rujeib suburb.
- Lack of water and sewage networks in the suburb affects the environment and health.

Data Collected

The information which needed was taken from the municipality, as:

- Topography of the region.
- Maps for the region.
- Water consumption data.
- Design criteria.

Area Description

Rujeib, Jordan suburb.

- Located right west of Irbid.
- Lies between the villages of Bani Obeid and Rashda.
- Has an area of 1.7 km2.

Water Network Design

Data taken from municipality: Max. consumption per capita = 150 l/c/d, Population = 7000 capita, Average consumption per capita = 100 l/c/d, Peak factor = 1.5, Water loss = 25%, Water demand = 1050 m3/day

Pattern

Design

- The main water lines are designed in loops.
- The demand for each node depended on the area served by that node.
- Pipes and nodes placed on the streets and intersections and avoid crossing the lands.
- Pipe diameters can't less than 2 inches.

Design

Velocity:

- Min Velocity is 0.3 m/s ; to avoid sedimentation or materials inside pipes.
- Max Velocity is 3 m/s ; To avoid increasing dynamic head and friction.

Pressure:

Pressure less than 2 bars is not sufficient for water to reach home tanks, also the value more than 10 bars leads to deformation in the pipes.

Design

- The project area contain two pressure zones.
- Two networks were designed for the region:

First network (E02).
Second network (E01).

Pattern

1. For the Under Zone, which pass 1.0bar (Pressure more than 10 bar)

Pattern

1. For the Upper Zone (which pass 2.0bar) (Pressure more than 10 bar)

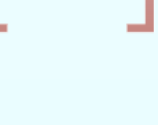
Supply And Demand

- Supply provided for region. (Q) included.
- The municipality pumps water can cover every three days.
- Volume of reservoir = 3000m3.
- Percent fill of reservoir = 40%.

Water And Sewage

- Water and sewage networks in Rujeib suburb affects the environment and health.

Construction Details



Construction Details

For Water Network

For Sewage Network

Bill Of Quantities

Total expected cost of water network=935,000 EURO

Total expected cost of sewage network=350,000 EURO

Conclusion

- Designed the water network and estimated the total cost for it.
- Designed the sewage network and estimated the total cost for it.
- The project proposed the optimal solution for this area, and was feasible municipality to take it.

Recommendation

We recommend Nahlim municipality:

- To actively use of the reservoir.
- Provide the region by more water by increasing the pumps period.

Asma'a Al-Demoni
Hala Abo-Soud
Hala Al-Aghbar
Rasha Al-Sayyad

The sewer Problem

The main problem that we faced in this project was that we have found in the project area the existence of a big pipe of the sewer network, and it should be water but we were not able to know the reason yet.

Results

	Design Criteria	Results
Velocity →	(0.6-3) m/s	(0.3-2.7) m/s
Slope →	(1%-12%)	(0.5%-10%)
Cover →	(0.6-5) m	(0.9-14) m

Design

1. No loops in the network.

2. Manholes and pipes located on streets and near the buildings to serve them.

3. The distance between manholes is preferred to be from (50-60) m.

Waste Water Generation

- Total water demand = 1050 m3/day
- Percentage (%) = 75%
- Infiltration rate = 20%
- Peak Factor = 3

- Waste water generation = 1050*0.75*1.2*3
= 2835 m3/day

Sewage Network Design

Disposing waste water in a healthy and safe way became more important.

The general layout of sewer collection system for the suburb is assigned by using the SewerGEMS.

Results (with Water Q)

Prezi

Outline

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Prezi

Purpose

- Design of Water and Sewage Networks for Rujeib new suburb.
- The project will assist the municipality in preparing infrastructural plans for this area.

Prezi

Collect the data

Analysis of Data

Design Water Network

Design Sewage Network

Check The Design

Redesign

Costs Estimate

Constructi on Details

Body

Body

Body

Body

Body

PREZI

Data Colleected

The information which needed was taken from the municipality, as:

- Topography of the region.
- Maps for the region.
- Water consumption data.
- Design criteria.

Prezi

Area Description

Rujeib New suburb:

- locate 6 km east of Nablus.
- Lies between the villages of Beit Furik and Rujeib.
- Rises 570 m above sea level.
- Has an area of 1.7 Km2.

Prezi

Aerial photo for Rujieb New Suburb

Prezi

Population Estimate

The estimation of population is based on dividing the area into Regions :

Region (A): Villas Zone.

Region (B): Residential apartment's area.

Prezi

(B): Residential apartment's area.

Prezi

Water Network Design

The main purpose is to provide continuous and clean water for people.

The general layout of water distribution system for the suburb is assigned by using the WaterGEMS.

Prezi

Data Analysis

	Region A	Region B	Agriculture Area	Garden	School (Girls)	School (Boys)	Mosque	
Area (dunum)	252	1165	57	8.5	18.6	15.7	12	
Population	880	13500	-	-	500	500	_	
Consumption (L/cap. day)	120	120	-	-	10	10	-	
Consumption m^3/day	151	1620	3.6	32	5	5	1	∑=1818
Consumption m^3/year	55115	591300	1314	11680	1825	1825	365	∑= 663424

Prezi

Design

- The system was looped system.
- The demand for each node depend on the area served by that node.
- Pipes and nodes placed on the streets and intersections and avoid entering the lands.
- Pipe diameters not less than 2 inches.

Prezi

Design

Velocity :

- Min Velocity is 0.5 m/s : to avoid sedimentation of materials inside pipes
- Max Velocity is 3 m/s : To avoid increasing dynamic head and friction.

Pressure:

Pressure less than 2 bars is not sufficient for water to reach home tanks, also the value more than 18 bars leads to destruction in the pipes.

Prezi

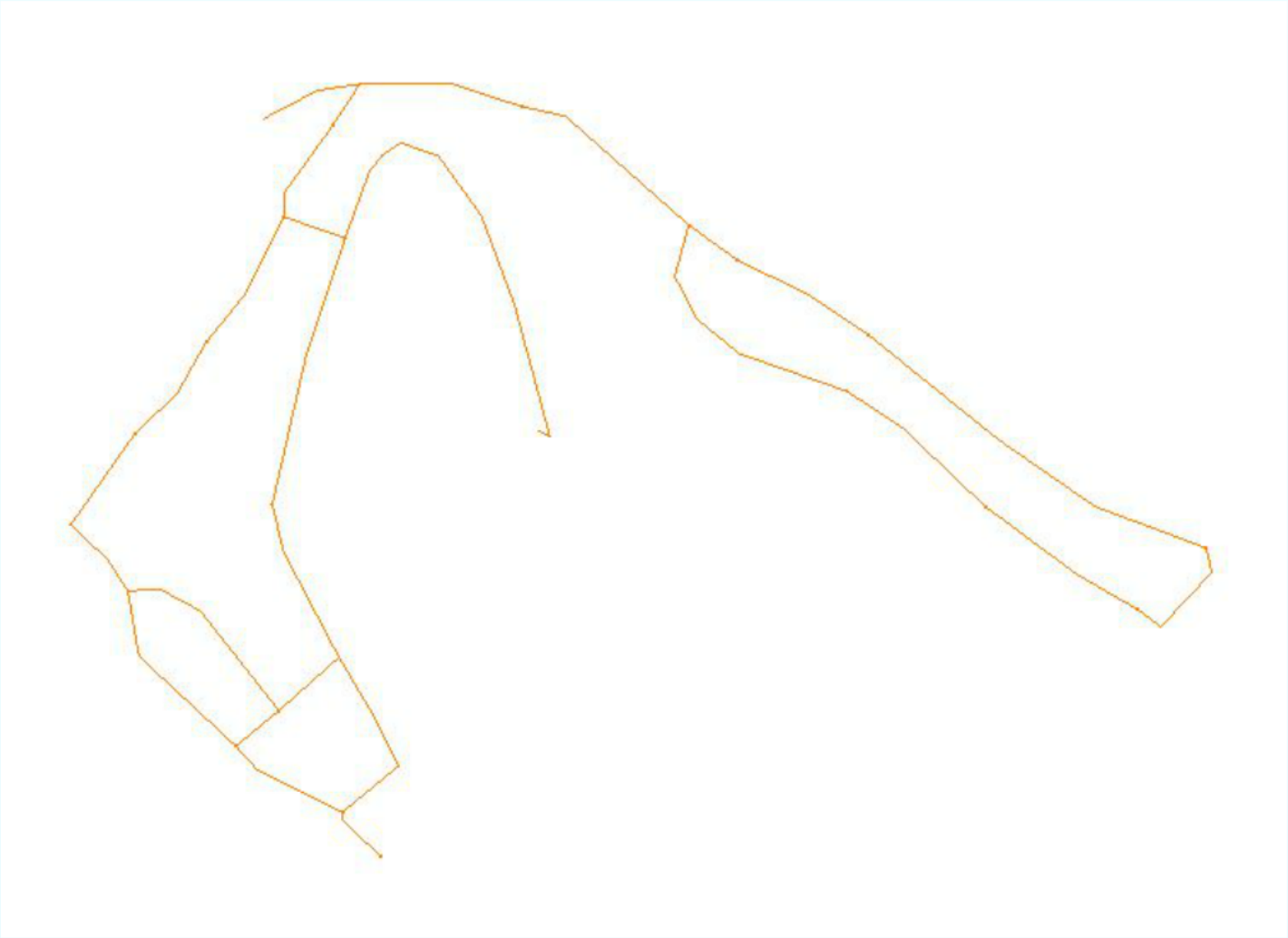
Design

- The project area contain two pressure zones.
- Two networks were designed for the region:

First network (E02).

Second network (E01).

Prezi



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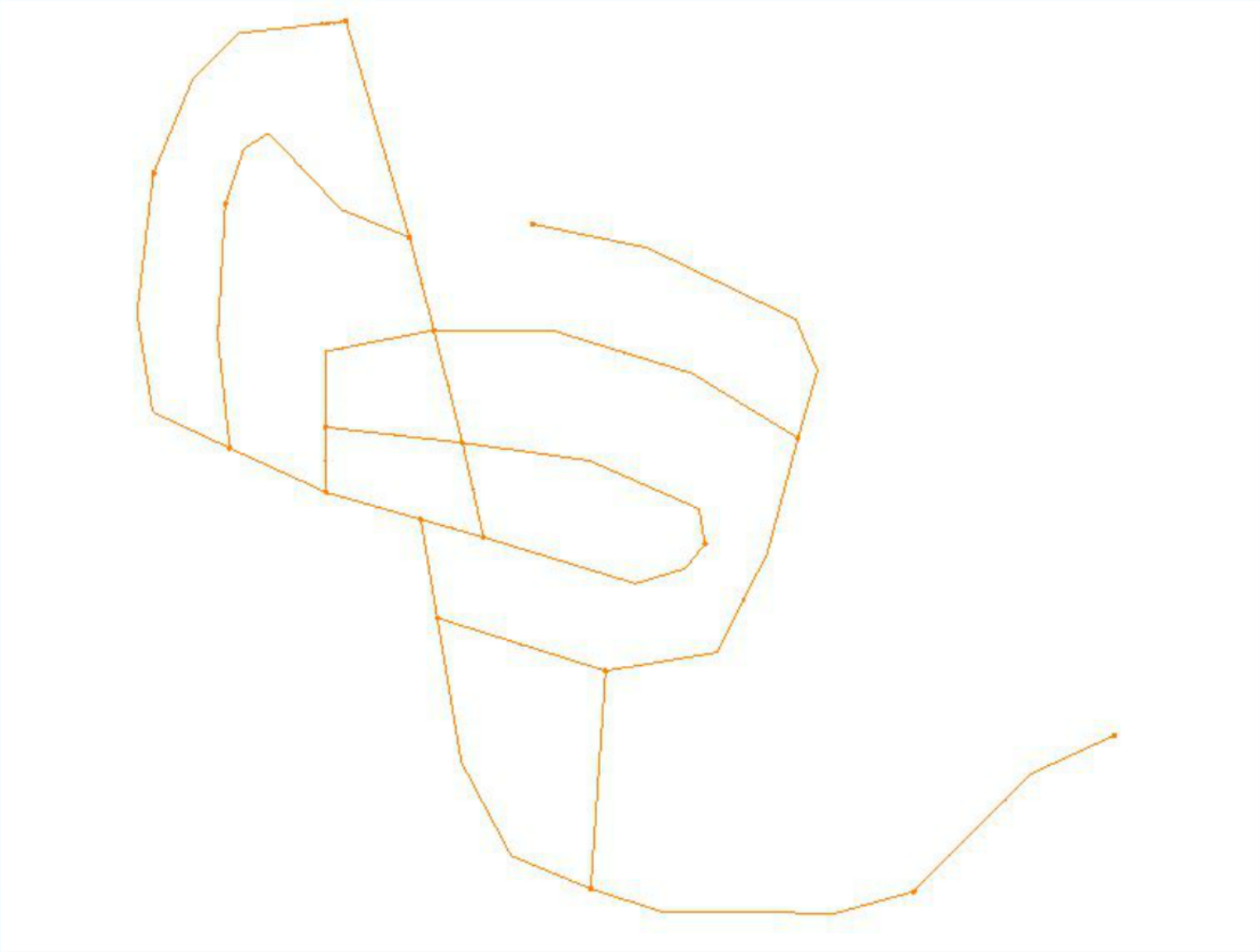

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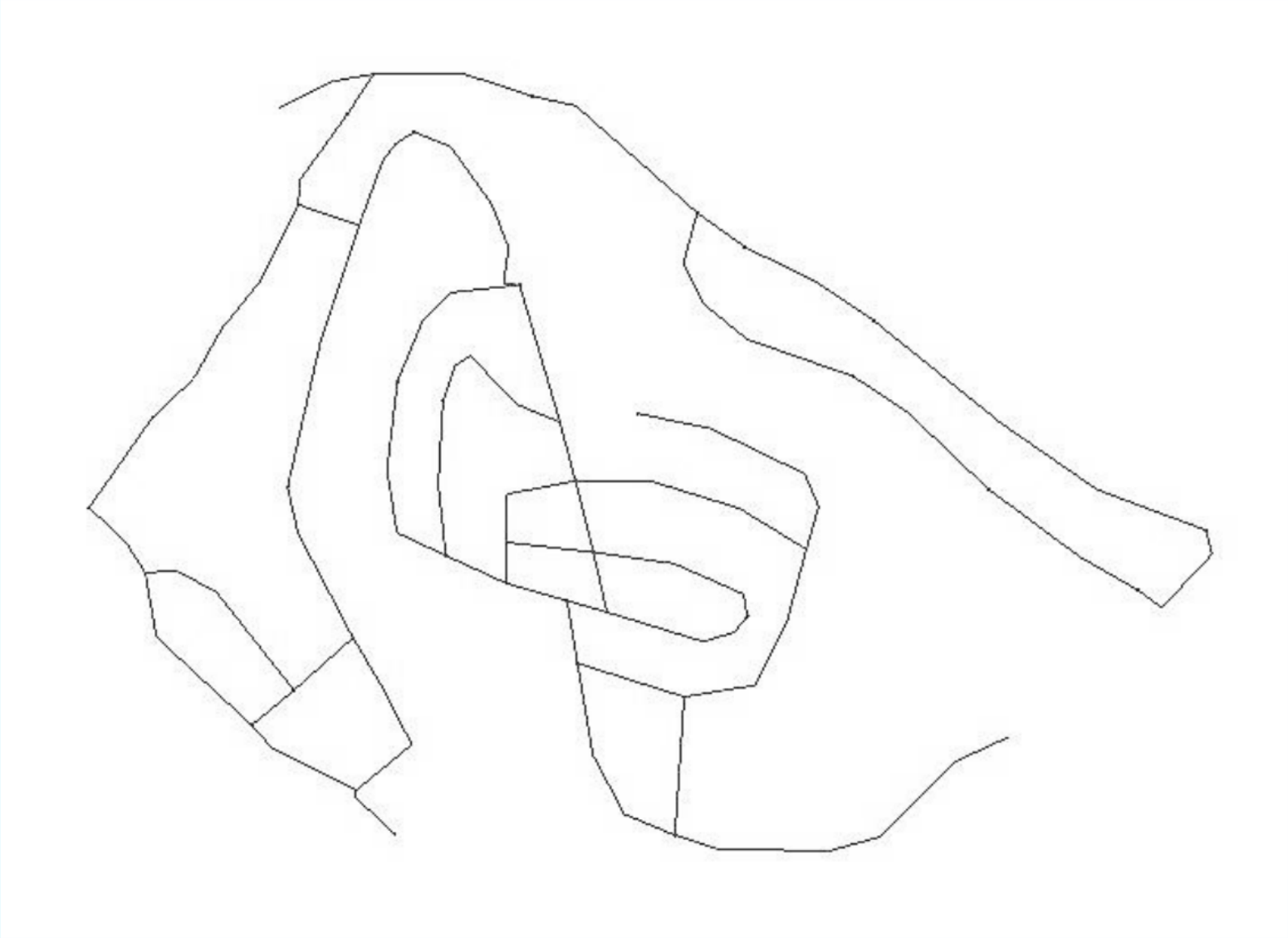
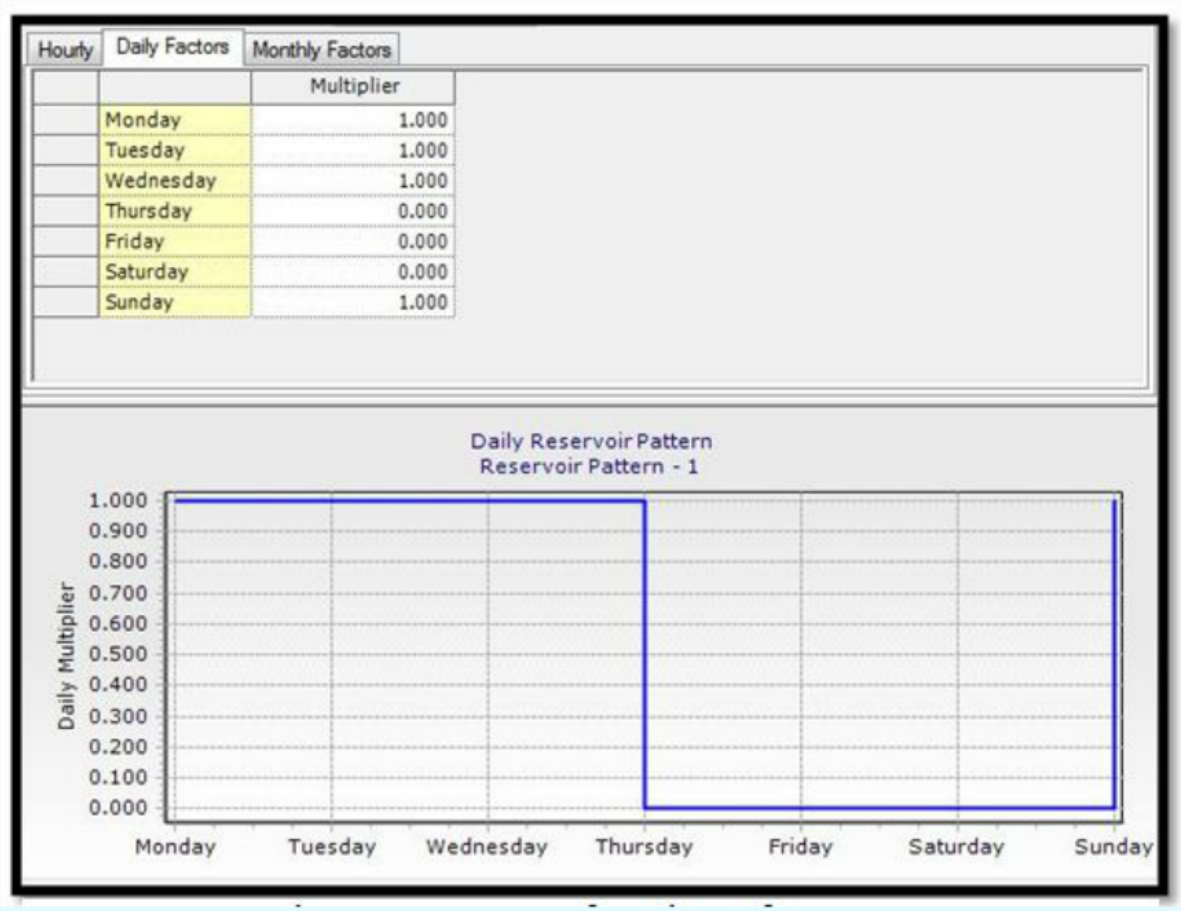


Prezi

Pattern

1-For Ein Dafna pump which pump 105m3/h one time every three days.

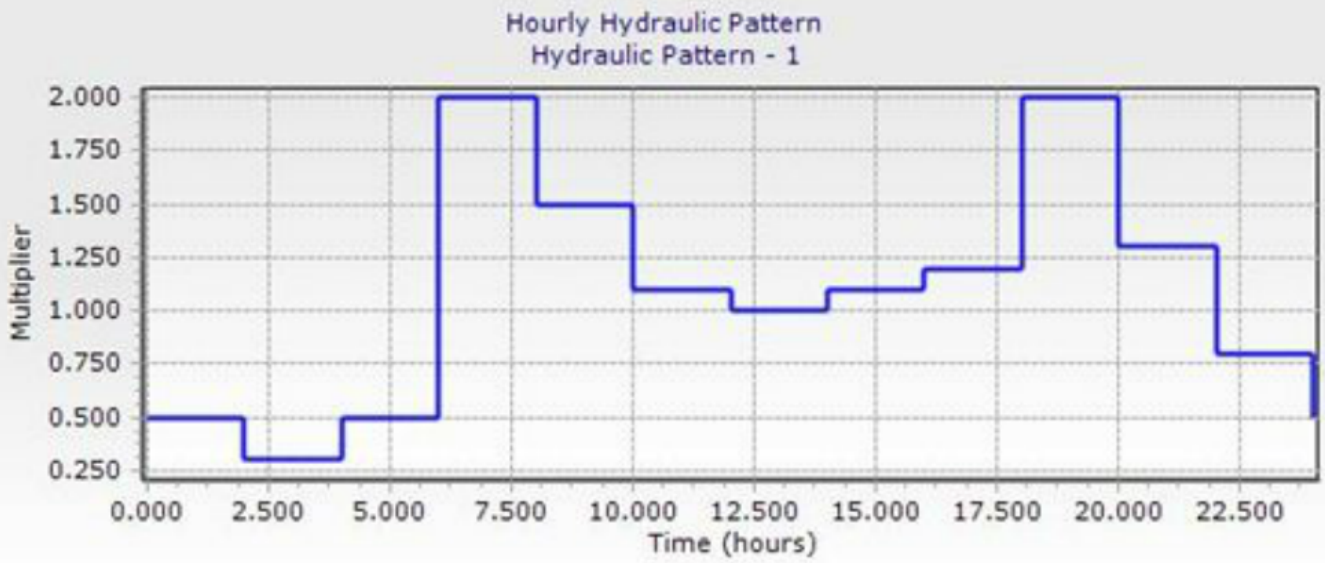


Prezi

Pattern

2-For the 2-Networks provided from Palestinian water authority.

	Time from Start (hours)	Multiplier
1	2.000	0.300
2	4.000	0.500
3	6.000	2.000
4	8.000	1.500
5	10.000	1.100
6	12.000	1.000



Supply And Demand

- Supply provided for region: 105 (m3/h).
- The municipality pumps water one time every three days.
- Volume of reservoir is 2000m3.
- Percent full of reservoir is 80%.

Prezi

Supply And Demand

Supply = 105 (m3/h) * 24(h/d)

= 2520 m3/3d

= 840 m3/d

Total Demand = 1818 m3/d

Storage in Reservoir = 80%*2000m3

=1616 m3/d

This amount will not meet the needs for the next two days of water thus the supply is less than the demand.

Prezi

Results from WaterGEMS

Values	Minimum Flow at 3 AM	Maximum Flow at 6AM &6PM
Max.Velocity	1.6m/s	1.88 m/s
Min. Velocity	.02 m/s	.08 m/s
Max. Pressure	14 bar	10 bar
Min. Pressure	4 bar	2 bar

Prezi

Sewage Network Design

Disposing waste water in a healthy and safe way became more important.

The general layout of sewer collection system for the suburb is assigned by using the SewerGEMS.

Prezi

Waste Water Generation

- Total water demand = 1818 m3/day
- Percentage full = 75%
- Infiltration rate = 20%
- Peak Factor = 3

- Waste water generation = 1818*0.75*1.2*3
  = 4910 m3/day

Prezi

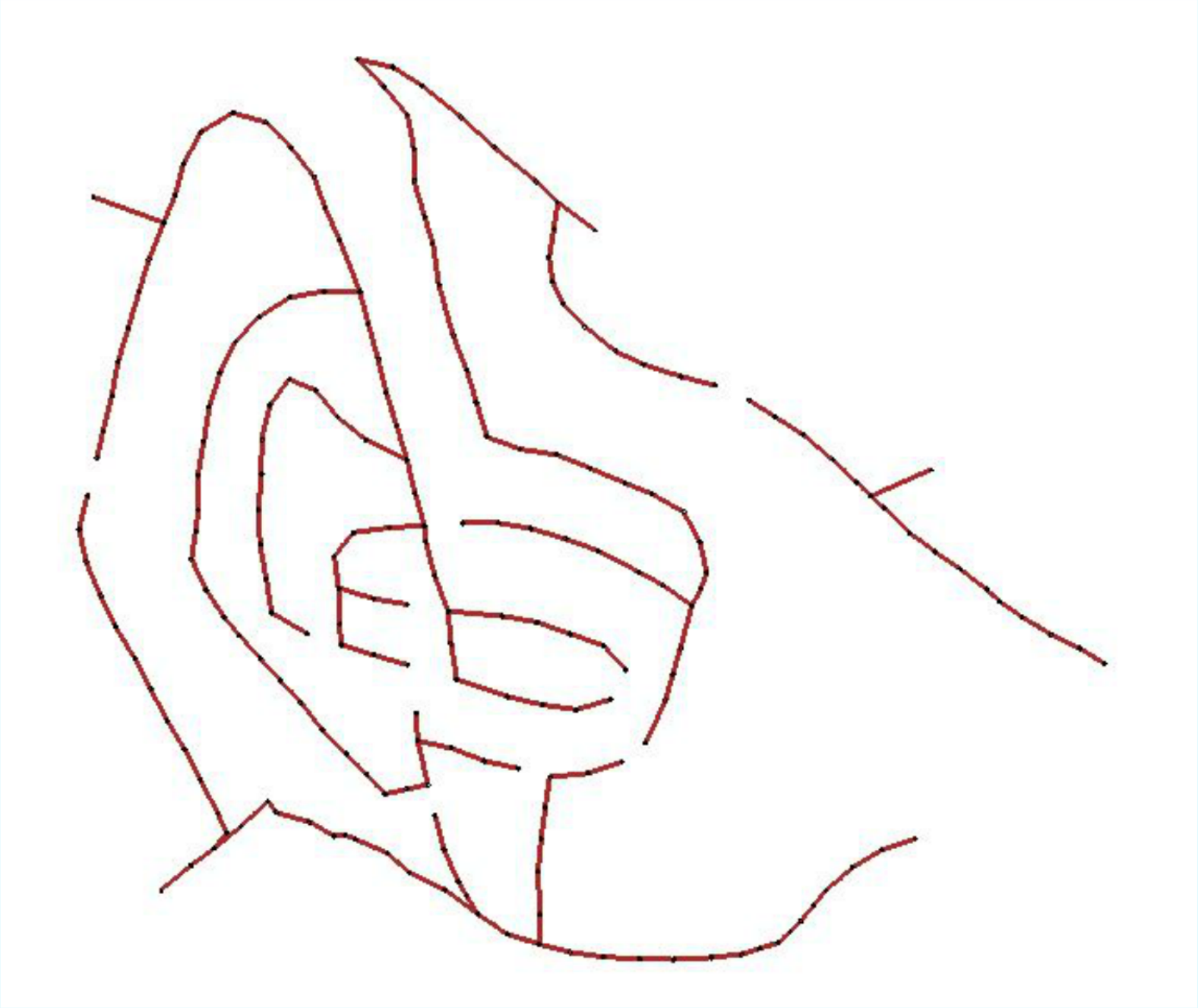
Design

1. No loops in the network.

2. Manholes and pipes located on streets and near the buildings to serve them.

3. The distance between manholes is preferred to be from (25-50) m.

Prezi



Prezi

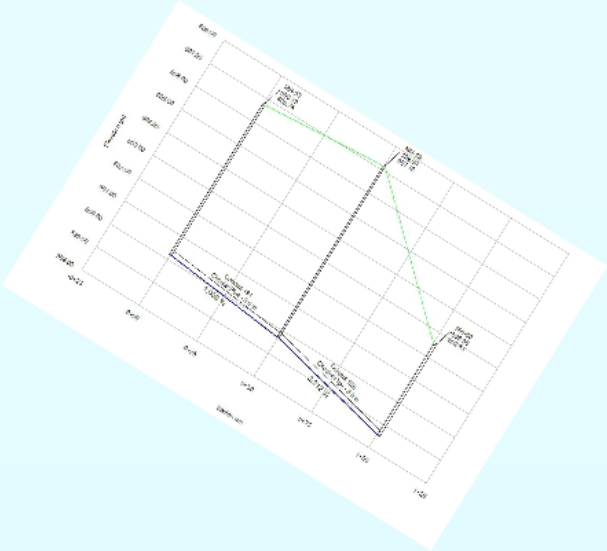
Results

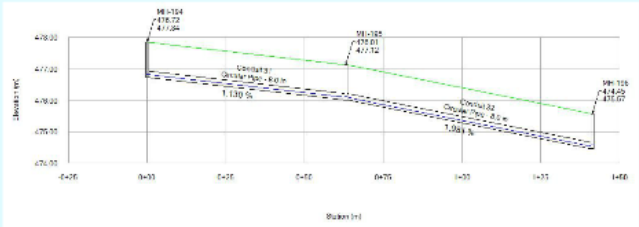
	Design Criteria	Results
Velocity →	(0.6-3) m/s	(0.4-2.7) m/s
Slope →	(1%- 12%)	(0.5%- 10%)
Cover →	(0.8-5) m	(0.9-18) m

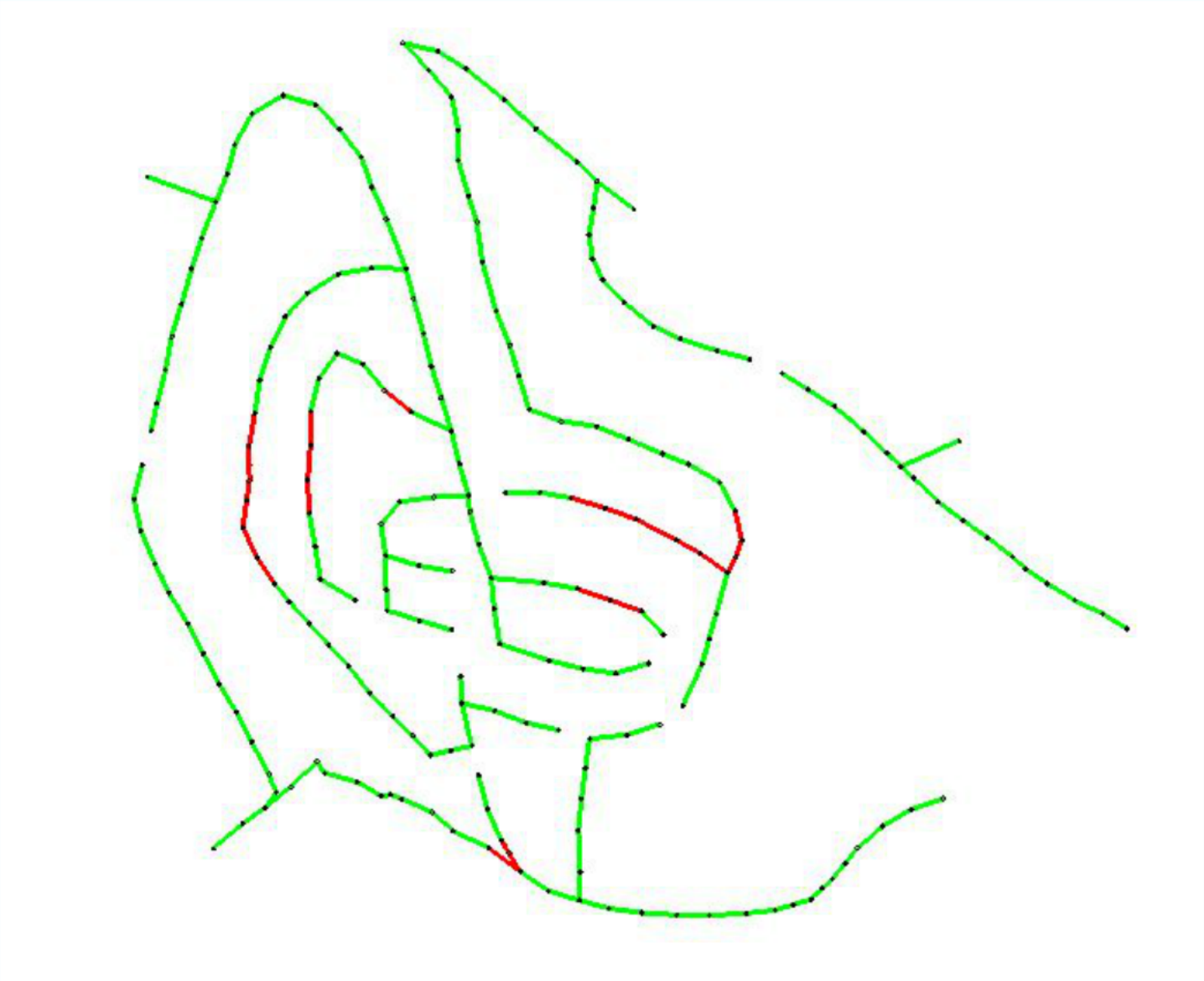
Prezi

The Cover Problem

The reason for this problem is elevations that have been used in the design are the elevations of natural ground not streets altitudes as it should, because they were not available from the municipality.







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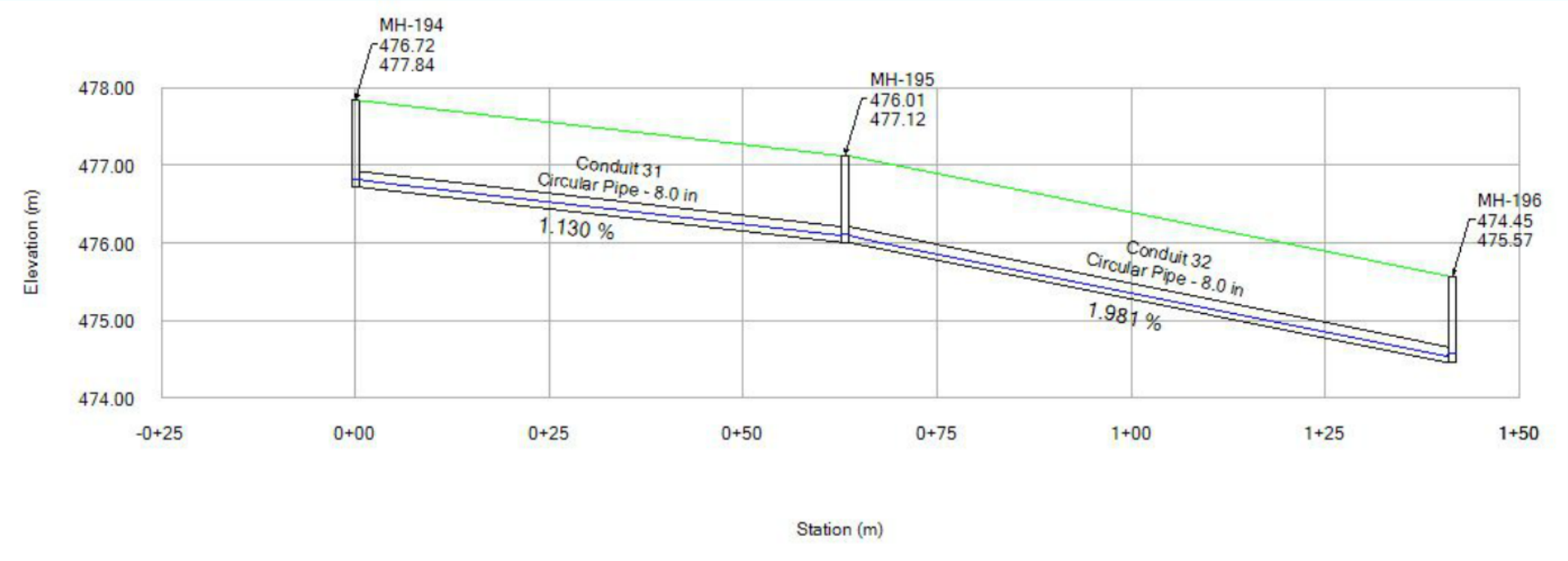
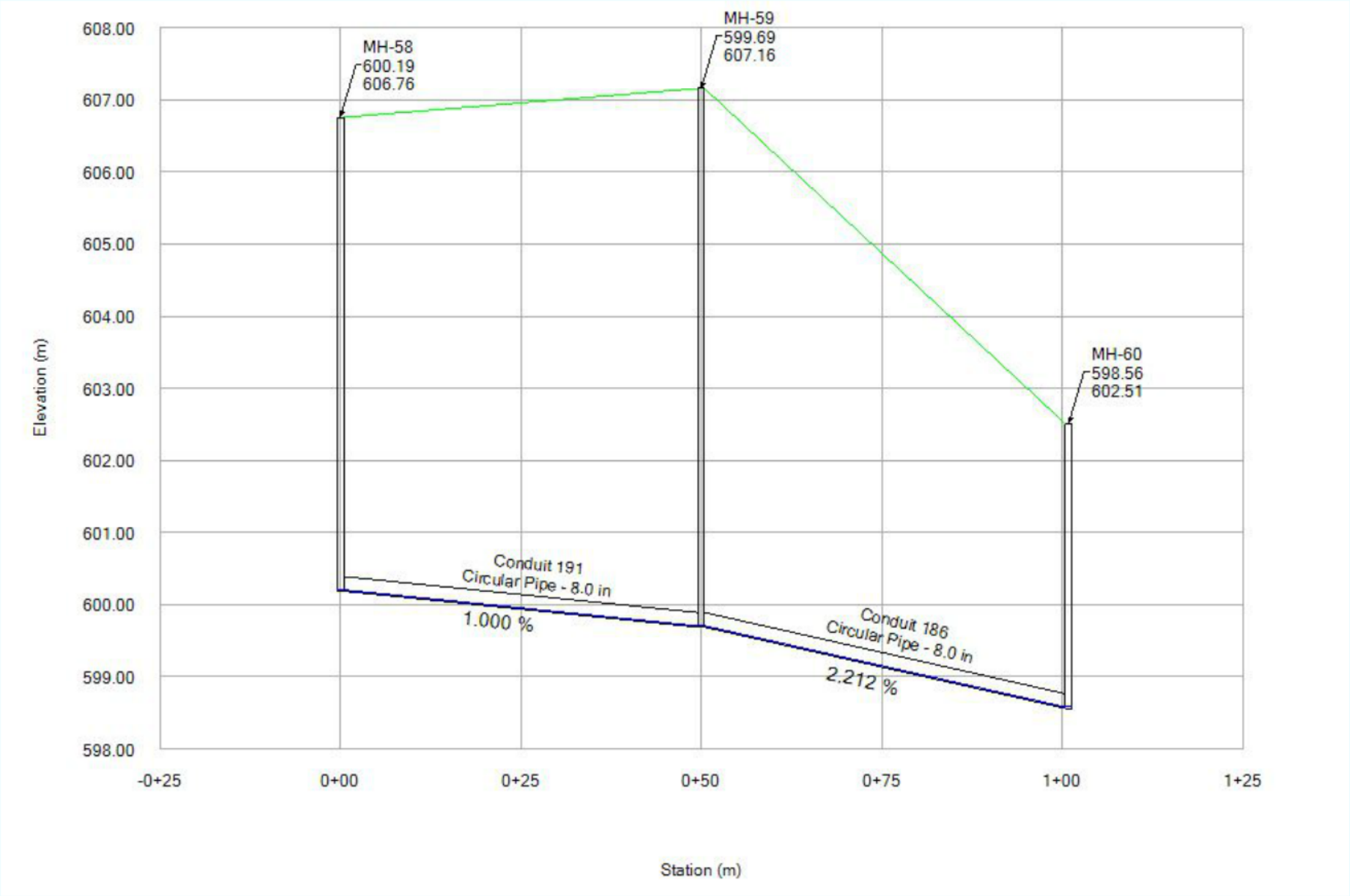

MH-194
476.72
477.84
MH-195
476.01
477.12
MH-196
474.45
475.57
Conduit 31
Circular Pipe - 8.0 in
1.130 %
Conduit 32
Circular Pipe - 8.0 in
1.981 %
478.00
477.00
476.00
475.00
474.00
Elevation (m)
-0+25
0+00
0+25
0+50
0+75
1+00
1+25
1+50
Station (m)

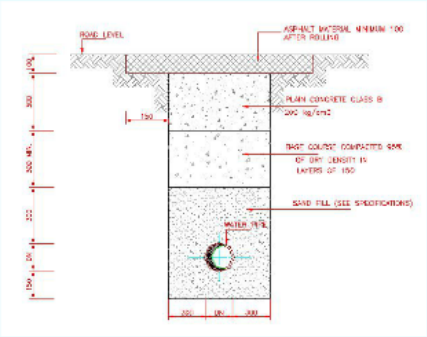
Prezi


MH-58
600.19
606.76
MH-59
599.69
607.16
MH-60
598.56
602.51
Conduit 191
Circular Pipe - 8.0 in
1.000 %
Conduit 186
Circular Pipe - 8.0 in
2.212 %
608.00
607.00
606.00
605.00
604.00
603.00
602.00
601.00
600.00
599.00
598.00
Elevation (m)
-0+25
0+00
0+25
0+50
0+75
1+00
1+25
Station (m)

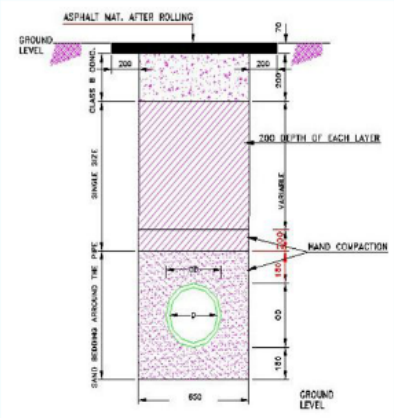
Prezi

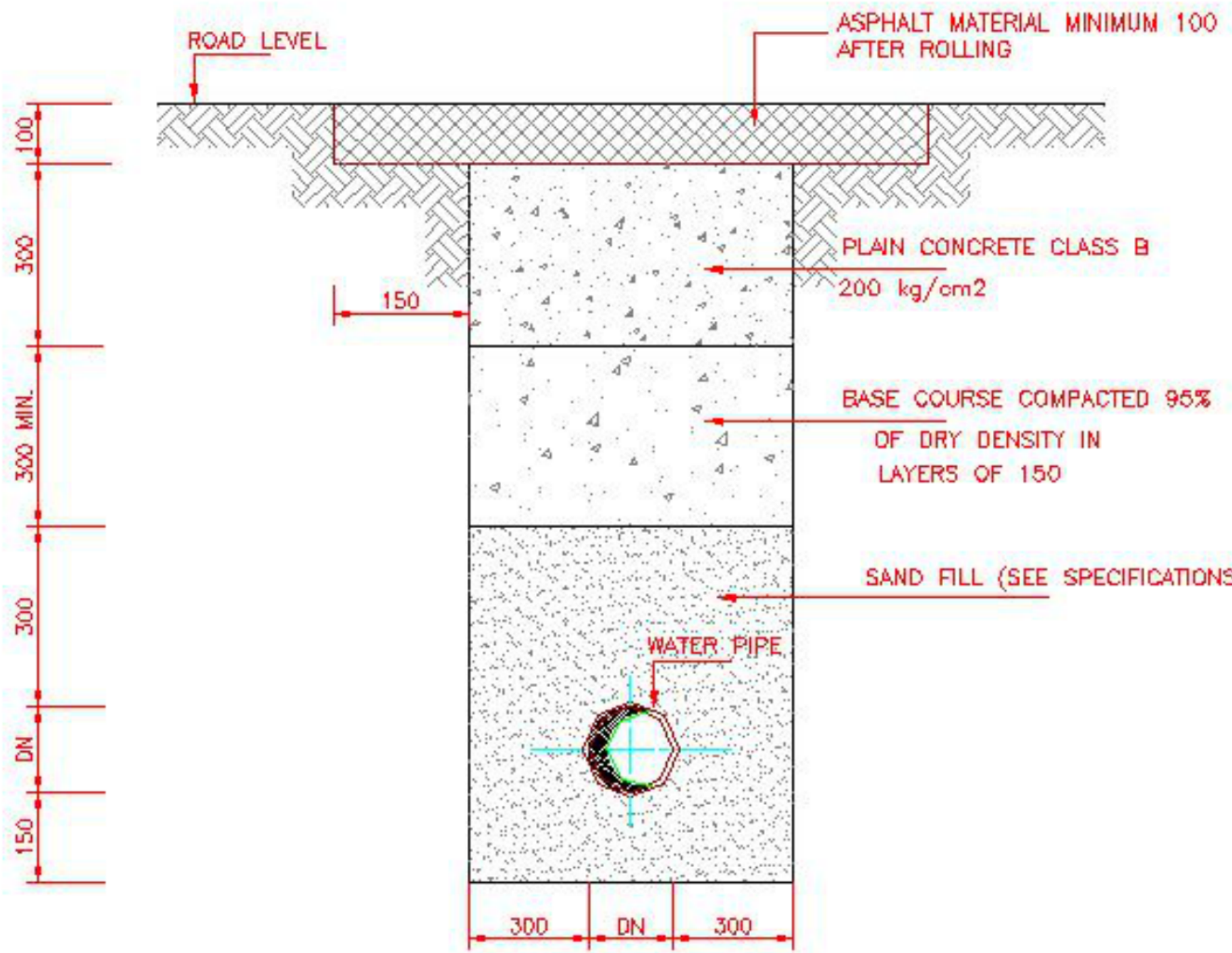
Construction Details

For Water Netwok

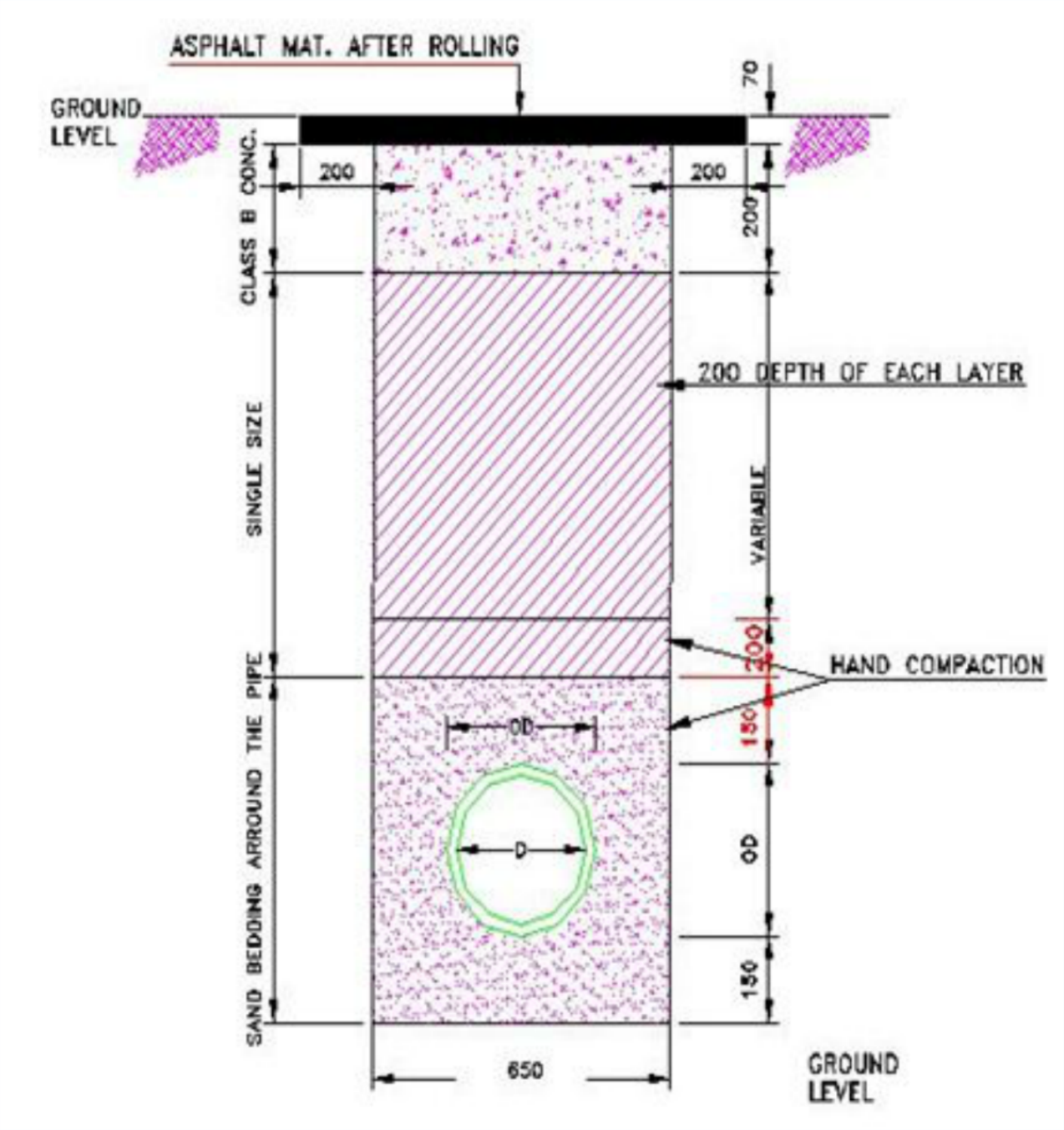


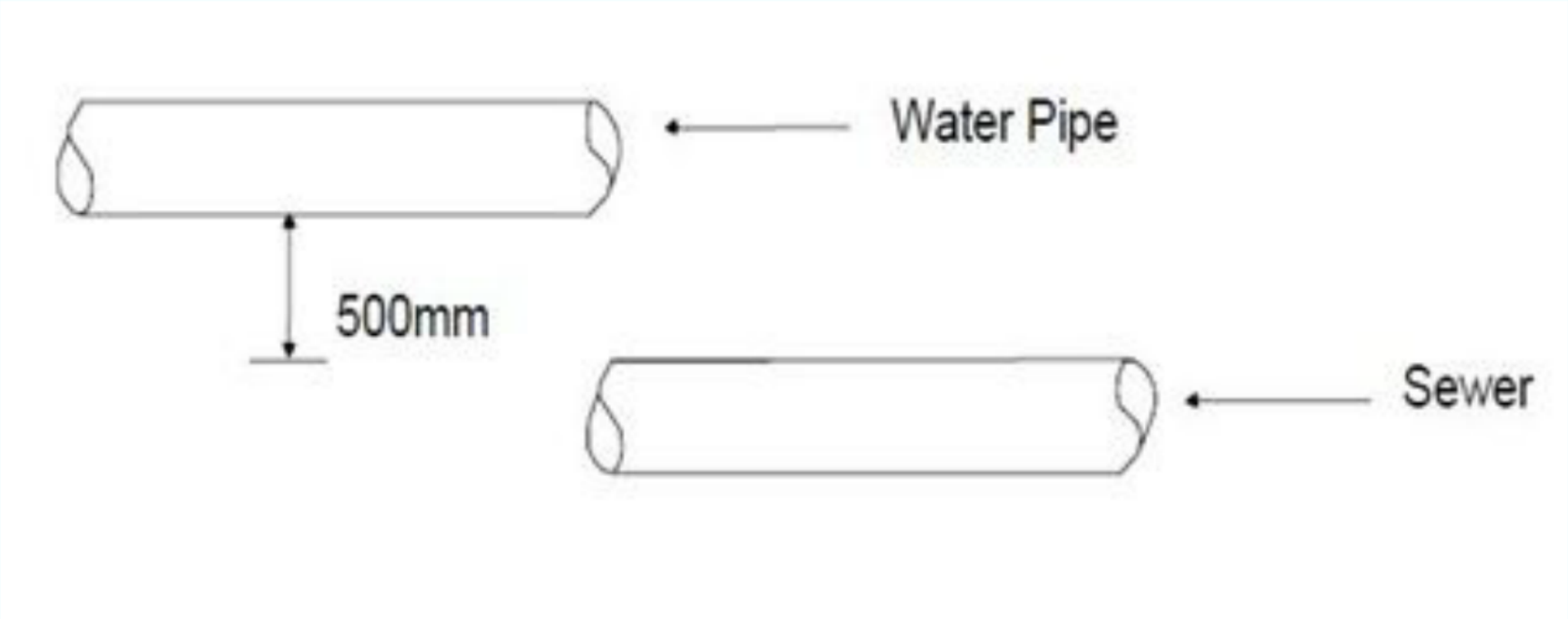
For Sewage Network

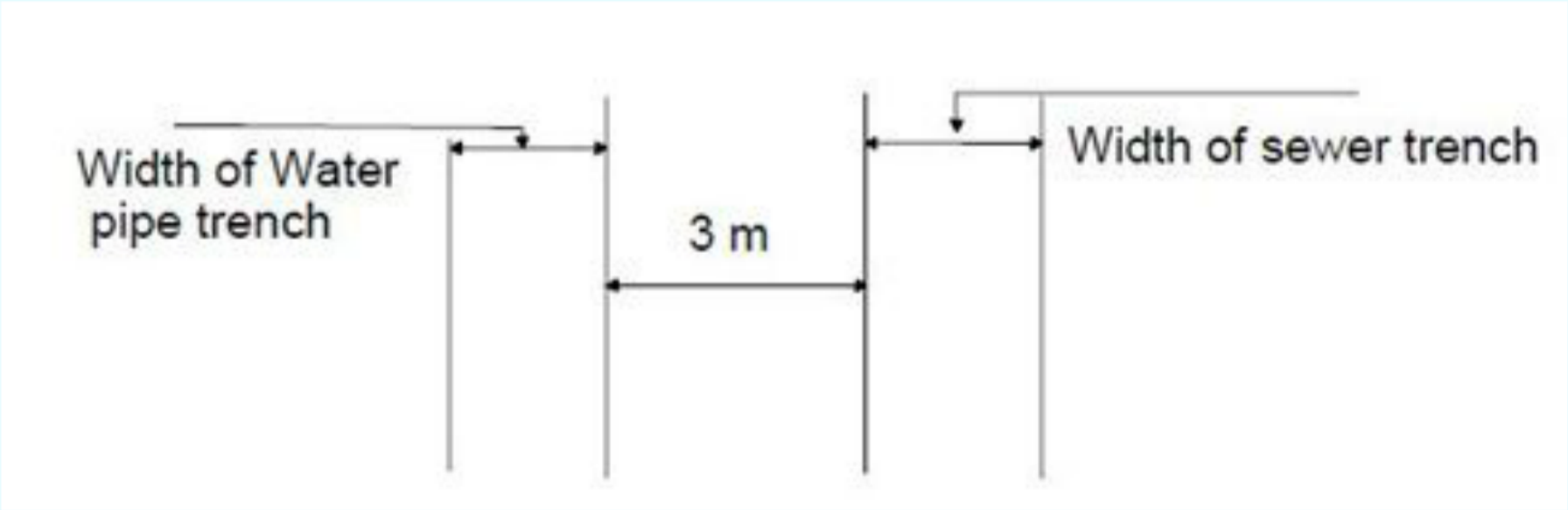



ROAD LEVEL
ASPHALT MATERIAL MINIMUM 100
AFTER ROLLING
100
300
300 MIN.
300
DN
150
150
PLAIN CONCRETE CLASS B
200 kg/cm2
BASE COURSE COMPACTED 95%
OF DRY DENSITY IN
LAYERS OF 150
SAND FILL (SEE SPECIFICATIONS
WATER PIPE
300
DN
300

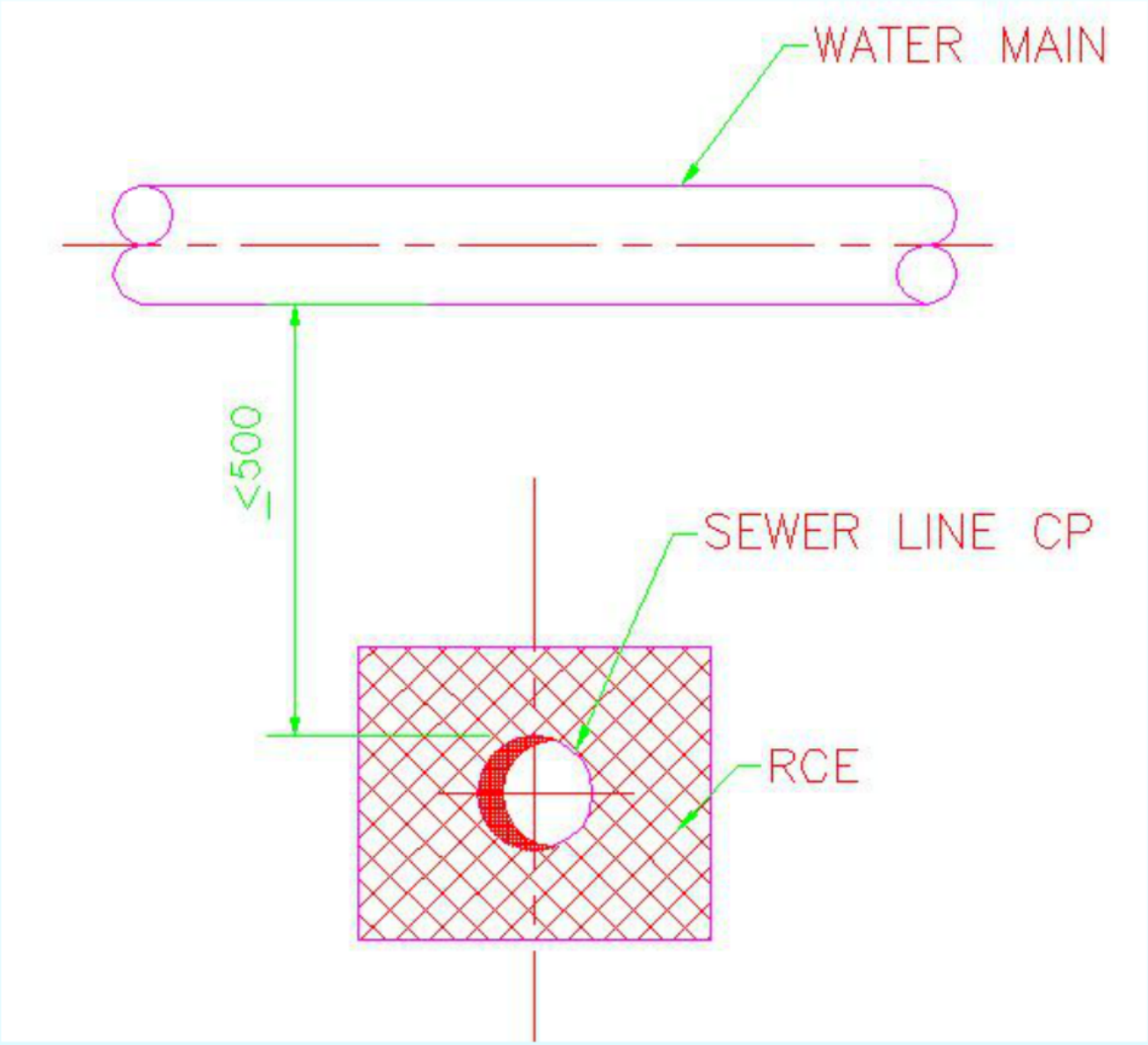
Prezi


ASPHALT MAT. AFTER ROLLING
GROUND LEVEL
70
200
200
200
CLASS B CONC.
200 DEPTH OF EACH LAYER
SINGLE SIZE
VARIABLE
200
HAND COMPACTION
150
OD
D
OD
150
SAND BEDDING ARROUND THE PIPE
650
GROUND LEVEL


Water Pipe
500mm
Sewer


Width of Water pipe trench
3 m
Width of sewer trench

Prezi



Prezi

Construction Details

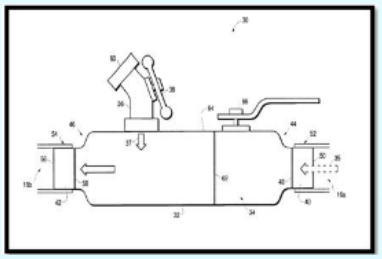
Air Valve

Float Valve

Gate Valve

Non-Return Valve

Wash out Valve



Prezi

Air Valve

Prezi

Float Valve

Prezi

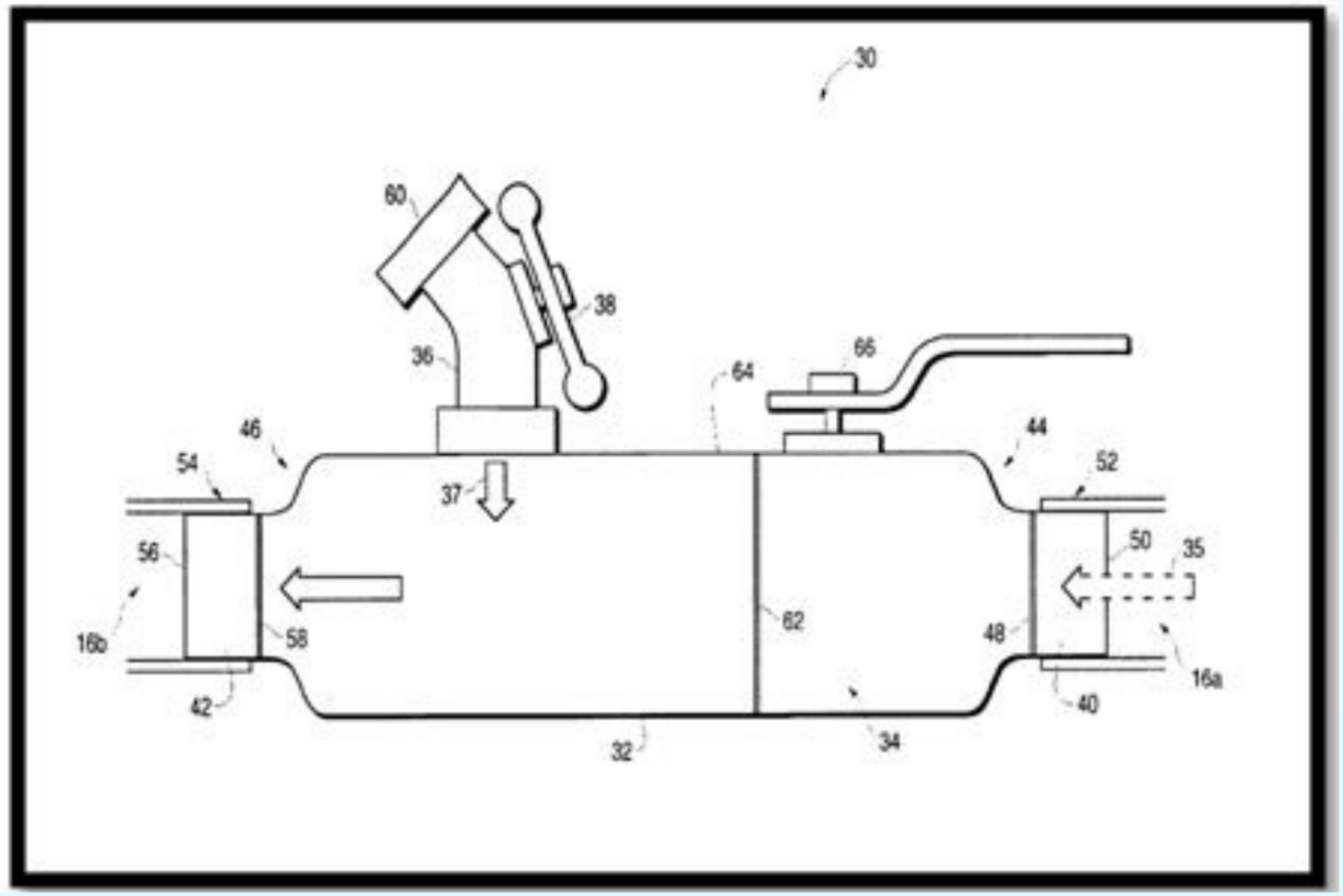
Gate Valve

Prezi

Non-Return Valve

Prezi

Wash out Valve



Prezi

Bill Of Quantities

Item	Description of Works	Unit	Quantity	Unit Price EURO	Total
Section 1 - Excavation, Backfilling, Reinstatement					
1.1	Trench Excavation				
	In any type of soil or rock for laying of pipelines. The unit price shall include cleaning site from all surplus excavated materials or results from excavation works. The excavated soil shall be disposed off immediately out of site. The last 20cm in the bottom of the trench shall be excavated and leveled manually. Trenches for pipes, as follows:				
1.1.1	for steel pipes 2" width 55cm, depth not less than 120 cm	ML	8,136.00	8.90	72410.4
1.1.2	for steel pipes 3" width 60cm, depth not less than 125 cm	ML	2,293.00	8.90	20407.7
1.1.3	for steel pipes 4" width 60cm, depth not less than 125 cm	ML	1,280.00	8.90	11392
1.1.4	for steel pipes 6" width 65cm, depth not less than 130 cm	ML	1,080.00	8.90	9612

Total expected cost of water network=935,000 EURO

Total expected cost of sewege network=350,000 EURO

Prezi

Item	Description of Works	Unit	Quantity	Unit Price EURO	Total
Section 1 - Excavation, Backfilling, Reinstatement					
1.1	**Trench Excavation**				
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1.1.2	for steel pipes 3" width 60cm, depth not less than 125 cm	ML	2,293.00	8.90	20407.7
1.1.3	for steel pipes 4" width 60cm, depth not less than 125 cm	ML	1,280.00	8.90	11392
1.1.4	for steel pipes 6" width 65cm, depth not less than 130 cm	ML	1,080.00	8.90	9612

Prezi

Conclusion

- Designed the water network and estimated the total cost for it.
- Designed the sewage network and expected the total cost for it.
- The project prepared the infrastructural plans for this area, and we hope the municipality to take it.

Prezi

Recommendation

We recommend Nablus municipality:

- To restudy site of the reservoir.
- Provide the region by more water by increasing the pumps period.

Prezi

Asma'a Al-Damoni
Hala Abo-Soud
Mais Al-Aghbar
Rasha Al-Sayyed

Prezi