HSVP

हरियाणा शहरी विकास प्राधिकरण
HARYANA SHEHARI
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Address: C-3, HSVP , HQ Sector-6
Panchkula

From

The Chief Engineer-I,
HSVP, Panchkula.

To

The Director ,
Town and Country Planning,
Haryana, Chandigarh.

Memo No: - CE-I/SE(HQ)/EE(M)/SDE(W-1)/2024/ 100655
Dated:- 22/04/2024

SUB: **Approval of service plan estimate of Residential Plotted Colony on land measuring 121.0125 acres (License no. 94 of 2013 dated 31.10.2013 & no. 11 of 2015 dated 01.10.2015 and no. 254 of 2023 dated 17.11.2023) falling in the revenue estate of Village Harsaru, Sector-88A & 88B, Gurugram being developed by M/s Vatika Limited.**

Ref:- Please refer to your good drawing no. 9826 dated 20.11.2023, vide which the revised layout plans pertaining to subject cited colony was approved by your office.

The service plan estimate for providing Public Health/B & R services to be provided by the Colonizer M/s Vatika Limited in subject cited colony has been received from Superintending Engineer, HSVP, Circle-I, Gurugram vide his office memo no. 68889 dated 15.03.2024. The same has been checked and corrected wherever necessary and is sent herewith for execution as well as for Bank Guarantee purpose, subject to the following comments:-

SFI
EE(M)

1. **EXTERNAL DEVELOPMENT CHARGES:-**
The colonizer will have to pay the proportionate cost of external development charges for setting up of Residential Plotted Colony for the services like water supply, sewerage, storm water drainage, roads, bridges, community building, street lighting and horticulture and Mtc. thereof etc. on gross average basis as and when determined by HSVP/Govt. for District-Gurugram. These charges will be modifiable as and when approved by the authority /State Govt. and will be binding upon the colonizer.

2. **MAINTENANCE OF SERVICES:-**
The mtc. Charges for various services like water supply, sewerage, storm water drainage, roads, street lighting and Hort., etc. has been included by the firm in the Sub Work No.VII and the total cost of works out to ₹. **2997.19 Lakh.** It may be made clear to the colonizer that they are liable to maintain the estate developed by them for 10 years or as per HSVP norms till such time, the colony is taken over by the local authority/State Govt.

3. **DENSITY/AREA/POPULATION:-**
The overall density of the Residential Plotted colony works out to **120 PPA** considering 13.5 person per plot. The category wise area as shown on the plans and proposed density of population thereof has been treated to be correct for the purposes of services only. This may be checked and confirmed by your office that overall density of sector should be maintained according to the final development plan.

4. The title and name of the licencee may be examined by your office.

5. All technical notes and comments incorporated in this estimate in two sheets will also apply. A copy of these are also appended as **Annexure-'A'**.

6. The colonizer will have to ensure that sewer/storm water laid by them will be connected with the proposed/existing master services by gravity. If it is not possible to connect the services by gravity, it will be the responsibility of the colonizer to make the pumping arrangement and Mtc. thereof for all the time to come.

P.T.O.

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7. It is made clear to the colonizer that release of water for external source will take about five years for the new licensed area subject to the following:

i) Availability of litigation free land in the alignment of services.

ii) Permission from forest and environment department are accorded, where ever required.

iii) HSVP shall supply the drinking water only to the license granted in the master plan area.

iv) HSVP shall provide water supply along master road at the initial stage and various colonizer will have to take connection from this water supply main up to their site at their own expenses, till the land of master road encircling the licensed area is acquired and the area in between licensed area. & master road is further acquired by HSVP or licensee.

v) Till the water supply and other services are made available by HSVP, the licenses will have to make their own arrangement Tube wells can be bored with permission from Haryana Water Resources Authority and other concerned authority, for the purposes.

8. It may be clarified to the colonizer that recycled water is proposed to be utilized for flushing purposes. The firm has made provision of separate flushing line, storage tank, metering system, pumping system and plumbing. It may be clarified to developer that no tap or outlet of any kind will be provided from the flushing lines/plumbing lines for recycled water except for connection to the cistern of flushing tanks and for Horticulture purposes & any scouring arrangement. Even ablution taps should be avoided.

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(i) Two separate distribution systems, independent of each other, will be adopted, one for potable water supply and second for recycled water. Home /Office /business establishment will have access to two water pipe lines.

(ii) Potable water and recycled water supply lines will be laid on opposite berms of road. Recycled water lines will be above sewer lines. Wherever unavoidable and if all pipes are required to be laid on same side of road, these will be located from the ground surface in order of descending quality. Potable water shall be above recycled water which should be above sewer. Minimum clear vertical separation between a potable water line and a recycled water line shall be one feet, if not possible then readily identifiable sleeve should be used.

To avoid any accidental use of recycled water for potable purposes :-

(a) All Recycle water pipes, fittings, Appurtenances, valves, taps, meters, hydrants will be of Red Color or painted red.

(b) Sign and symbols signifying and clearly indicating "Recycle Water" "Not fit for Drinking" must invariably be stamped/fixed on outlets, Hydrants Valves both surface and subsurface, Covers and at all conspicuous places of recycle distribution system.

(c) Detectable marker tapes of red color bearing words "Recycle Water" should be fixed at suitable interval on pipes.

(d) Octagonal covers, red in color or painted Red and words "Recycle Water-Not for Drinking" embossed on them should be used for recycled water.

9. It shall be mandatory for the firm to provide dual/two button or lever flushing system in toilets.

10. It may be made clear to the colonizer that he will not make the connection with the master services without prior approval of the competent authority, in writing.

11. The revised layout plan for setting up of Residential Plotted Colony having an area 121.0125 acres supplied vide your office drawing no. 9826 dated 20.11.2023, have been considered to be correct for the purposes of estimation/services only.

12. For disposal of sewage of the colony, the colonizer has proposed Sewage Treatment Plant (2350 KLD) (1500+850 KLD) (at two locations) capacity in their colony. It may be made clear to the colonizer that he will be sole responsible for disposal of sewage of their colony as per requirement of HSPCB/Environment

Contd

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Deptt. till such time the HSVP services are made available as per proposal of the Town. All the link connection with the HSVP services shall be made by the colonizer at his own cost.

13. That colonizer/owner shall ensure the installation of Solar Power Plant as per provision of Haryana Solar Power Policy,2016 issued by Haryana Govt. Renewable Energy Department vide notification No. 19/4/2016-5 power 14.3.2016, if applicable.
14. The estimate does not include the provision of electrification of the colony. However, it may be made clear to the colonizer that the supervision charges O & M charges shall be paid by them directly to the HVPNL.
15. It may be made clear to the colonizer that there will be no pollution due to disposal of sewerage of their colony. The disposal of effluent should be in accordance to the standard norms, fixed by the Haryana State Pollution Control Board/Environment Deptt.
16. The colonizer will be responsible for the construction of various structures such as RCC, UGT and OHSR; water/sewage treatment plant etc. according to the standard specification, good quality workmanship and water tightness of all the structures will be responsibility of the colonizer.
17. The portion of the sector/development plan roads/green belt as provided in the development plan which is part of the licensed area shall be transferred free of cost to the Govt. /HSVP.
18. In case of 24 Mtrs. Wide road if it is decided by the Govt. that master services be extended on 24 Mtrs. Wide internal circulation road, additional amount at rates as decided by the authority will recoverable over and above the EDC.

SFI

19. The correctness of the levels of the colony will be sole responsibility of the colonizer for integrating the internal sewer/storm water drainage of the colony by gravity with the master services to be provided by HSVP as per the proposal.

XEN(m)

20. In case some additional structures are required to be constructed, as decided by HSVP at a later stage, the same will be binding upon the colonizer .Flow control valves will be installed, preferably of automatic type on water supply connection with HSVP water supply line.
21. The tertiary water shall be used for green belt and parks as per proposal made for use of recycled water plan.
22. That the colonizer/owner shall use only compact fluorescent lamps/LED fitting for internal lighting as well as campus lighting.
23. Levels of the external services i.e. water supply sewerage & SWD will be provided by HSVP and proporitionate cost of discharge/quantity of these services will be deposited by the colonizer to HSVP.
24. **COMMON SERVICES:-**

The estimate does not include the common services like water supply, storage tank on the top of the building block. The plumbing works will be the part of building works.

NOTE(1) :-

In order to implement the directions given by National Green Tribunal in O.A. No. 21 of 2014 and No. 95 of 2014 (in the matter of Vardhman Kaushik V/s. Union of India and Ors), instructions have been issued vide this office letter No. 2121-37 dated 23.2.2015, 2609-19 dated 5.3.2015, 4412-21 dated 22.4.2015, 4971-89 dated 30.4.2017, 5442-5457 dated 11.05.2015, 15622-43 dated 10.12.2015, 1-16 dated 1.1.2016 and No. 114152-154/114160-114196 dated 21.1.2016. The same may be incorporated in the estimate and the developer must ensure implementation of these instructions at site.

NOTE-2:-

Hon'ble Supreme Court vide its judgment dated 20.10.2023 in Writ Petition (Civil) no. 324 of 2020 titled as Dr. Balram Singh Vs Union of India & ors. Has passed the directions on implementation of "The prohibition of Employment as Mannual Scavengers and their

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Rehabilitation Act, 2013 (M.S. Act, 2013). The Developer must comply to the directions of Hon'ble Supreme Court failing which the Developer shall be liable to face action as per Govt. instructions/prevailing law.

The estimated cost of various services to be provided by the colonizer for the development of internal services has been checked and corrected for the purposed of bank guarantee and execution of works as under:-

S.No.	Description	Amount (in Rs. Lakh)
1	Water Supply	2489.94
2	Sewerage	1019.93
3	Storm Water Drainage	892.70
4	Roads	626.98
5	Street Lighting	464.29
6	Horticulture	89.95
7	Mtc. of services for ten yrs including resurfacing of roads after 1st five years and 2nd five yrs. of Mtc (as per HSVP norms)	2997.19
	Total	8580.98

Dev. Cost per acre =₹. 8580.98 Lakh/121.0125 acres= ₹. 70.90 Lakh per gross acre.

Two copies of the estimate along with **Plans** and proposal as received are sent herewith duly corrected and signed for taking further necessary action.

It is requested to get three copies of the service plan estimate from the colonizer for distribution amongst the field station.

DA/-Estimate in duplicate
along with Plans
& Annexure-A.

Executive Engineer (M),
For Chief Engineer-I, HSVP,
Panchkula.

Endst. No: - Dated:-

A copy of the above is forwarded to the Superintending Engineer, HSVP, Circle-I, Gurugram w.r.t. his office memo no. 68889 dated 15.03.2024 for information.

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For Chief Engineer-I, HSVP,
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CE-I No. 100655
Dated: 22/04/2024

Annexure-A

SUB:- Approval of service plan estimate of Residential Plotted Colony on land measuring 121.0125 acres (License no. 94 of 2013 dated 31.10.2013 & no. 11 of 2015 dated 01.10.2015 and no. 254 of 2023 dated 17.11.2023) falling in the revenue estate of Village Harsaru, Sector-88A & 88B, Gurugram being developed by M/s Vatika Limited.

Technical note and comments:-

1. All detailed working drawings would have to be prepared by the colonizer for Integrating the internal services proposals with the master proposals of town.
2. The correctness of the levels will be the sole, responsibility of the colonizer for the integration of internal proposals, with the master proposals, of town and will be got confirmed before execution.
3. The material to be used shall the same specifications as are being adopted by HSVP and further shall also confirm to such directions, as issued by Chief Engineer, HSVP from time to time.
4. The work shall be carried out according to Haryana PWD specification or such specifications as are being followed by HSVP. Further it shall also confirm to such other directions, as are issued by Chief Engineer, HSVP from time to time.
5. The colonizer will be fully responsible to meet the demand of water supply and allied services till such time these are made available by State Government/ HSVP. All link connections with the State Government/ HSVP system and services will be done by the colonizer. If necessary extra tube-wells shall also be installed to meet extra demand of water beyond the provision according to EDC deposited.
6. Structural design & drawings of all the structures, such as pump chamber, boosting chamber, RCC OHSR, underground tanks, quarters, manholes chamber, sections of RCC pipes sewer and SW pipes, sewer, ventilating shafts for sewerage and Masonry Ventilation Chamber *for* Chamber for storm water drainage, temporary disposal/ arrangement etc. will be as per relevant I.S codes and PWD specifications, colonizer himself will be responsible for structural stability of all structures.
7. Potability of water will be checked and confirmed and the tube-wells will be put into operation after getting chemical analysis of water tested.
8. Only C.I/D.I pipes will be used in water supply and flushing system, UPVC/HDPE pipe for irrigation purposes.

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9. A minimum 100 I/d C.I/D.I, 200mm I/d SW and 400mm id RCC NP-3 pipes will be used for water supply, sewerage and storm water drainage respectively.
10. Standard X-section for S.W. pipes sewer, RCC pipes sewer etc. will be followed as are being adopted in Haryana Public Health Engineering Deptt. or HSVP. If needed, the same may be sought by the colonizer from concerned Executive Engineer of HSVP.
11. The X-section, width of roads, will be followed as approved by the Chief Town Planner, Haryana, Chandigarh. The kerbs and channels will also be provided as per approved X-section and specifications. If needed, the same may be sought by the colonizer from concerned Executive Engineer of HSVP.
12. The specifications for various roads will be followed as per IRC/MORTH specifications.
13. The wiring system of street lighting and specifications of street lighting fixture will be as per relevant standards.
14. This shall confirm to such other conditions as are incorporated in the approved estimate and the letter of approval.

Executive Engineer (M),
for Chief Engineer-I, HSVP,
Panchkula.

Service Estimate

For Development of Eco-Friendly
Infrastructure Services

by

Vatika Ltd

121.0125 Acres
in Sector 88A-88B Gurgaon

Overview

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7. Maintenance of Services for 10 years including resurfacing of roads

REPORT

Report for approval of Service Estimate for Development of Eco-Friendly Infrastructure Services by Vatika Ltd in 121.0125 Acres in Sector 88A-88B Gurgaon

1 INTRODUCTION

Gurgaon has been an important urban centre in the neighborhood of Delhi. The town is known for automobile companies, modern commercial malls, cyber parks & software development centre. The town is located only at 10 Km distance from the Indira Gandhi Airport, Delhi.

1.2. Location

Located on the south western border of Delhi, the district lies between 27 degree 39' and 28 degree 32' 25" latitude, and 76 degree 39' 30"and 77 degree 20' 45" longitude.

1.3. Development Proposal by Vatika

Vatika Ltd has been authorized to develop a residential colony in Gurgaon Urban Complex, Sector-88A-88B, Gurgaon (121.0125 Acres)

2 ROADS

2.1. Soil Investigation Results (CBR Value)

- CBR Value : 6%

2.2. Design of road crust

Based on data of C.B.R. values 6% in the area the roads specifications proposed are approximately as under:-

12 m & 15 m Collector Streets

a. Sub grade: Existing soil to be pulverized & mechanically compacted
b. 150 mm GSB as per MORTH Specification
c. 150 mm W M M. as per MORTH Specification
d. 50 mm BM as per MORTH Specification No.5
e. 20 mm MSS as per MORTH Specification No.510

18 m & 24 m wide road

a. Sub grade: Existing soil to be pulverized & mechanically compacted
b. 200 mm GSB as per MORTH Specification No.401
c. 150 mm WMM as per MORTH Specification No.406
d. 75 mm DBM as per MORTH Specification
e. 25 mm SDBC as per MORTH Specification No.512

Detail of Road Lengths

Table-1

Description	Wide Road			
	12 M	15 M	18 M	24 M
Road Length 121.0125 Acre	6710			1190

3 WATER SUPPLY

3.1. Daily Water Demand of 121.0125 Acre Area

S.No.	Plot Type	Population	Water requirement per person in lpd (As/HUDA norms)	Total Water Demand in lpd
1	General & NPNL	11907	172.5	2053057.5
2	EWS	1989	135	17901.0
	Total	13896		2071858.5
				2072 KLD

3.2. Domestic Water Demand (Litres / Day) 65 % of Total Demand = 1347 KLD

3.3. Flushing Water Demand (Litres / Day) 35 % of Total Demand = 725 KLD

3.4. Horticultural water requirement (green area)=9.04 ACRES x 25 KLD = 226 KLD

- Total Water Demand = 2072KLD + 226KLD = 2298 KLD
- Fresh Water Demand = 1347KLD
- Recycled Treated waste water Demand= 725KLD + 226KLD = 951 KLD

3.5. Fire Demand

- Fire Demand in Liters. $= (P)^{1/2}\ 100\ X1000$
- (P is Population in thousands) $= (13.896)^{1/2} X100 = 372.77$ KL Say 375KL

3.6. Boosting Stations

- The area falls in Sector 88A & 88B
- It is proposed to construct 2 no. Boosting station each in Sector 88A& 88B.

3.7. Hydro pneumatic water supply

- Proposal of providing Hydro pneumatic device to control uniform pressure head is proposed with individual over head tanks.

3.8. Under Ground Tank

- Water Tank of 400 KL capacity is proposed to meet Water Demand of Sector – 88A. including 150 KL capacity is required to meet Fire Demand of Sector 88A.

- Water Tank of 200 KL capacity in four places are proposed to meet Water Demand of Zone 2 , Sector – 88B . Total Domestic Water Tank capacity = 800KL.
- 200 KL capacity is proposed to meet Fire Demand of Sector – 88B
- Also Recycled UGTs provided with sanitary separation as dual plumbing system in this township for Sector – 88 B & 88 A

3.9. Water Supply Net Work

Description	Quantities 121.0125 Acre
(For Distribution Net Work)	
100 mm	6020 mt.
(For Rising Main)	
100 mm	1100 mt.
150 mm	90 mt.
200 mm	30 mt.

4 Sewer Waste Water

4.1. Estimation of Sewer Waste Demand

- Estimated Generation of Waste Water 1660 KLD

S.No.	Location	STP Treated Water UGT at STP – KL
1	Sector - 88B	~~1200 KL~~ 1500 KLD ~~in phase, first phase of 500 KLD, second proposed 500 KLD + Balance 200KLD~~
2	Sector - 88A	~~500 KL in two phase, first phase of 300 KLD and second proposed 200 KLD~~ 850 KLD

- Excess Quantity of Sewer Waste to be treated **up to** tertiary Level: 1000KLitres (Two units 1000 KLD + 300 KLD). Rest shall go in to the Master Sewer System.
- Sewer Waste Water flow is towards Railway Track as per planning of Master Sewerage Scheme.
- STP is proposed to be constructed at Sector -88B and Sector -88A located in area in possession of Vatika Ltd.

4.2. Design of Sewer Pipe Line System

Sewer Pipe Length

Description	Quantities 121.0125 Acre
200 mm dia Sewer Pipe, Average Depth up to 2 M	4390
250 mm dia Sewer Pipe, Average Depth 2 M to 4 M	2200
300 mm dia Sewer Pipe, Average Depth 2 M to 4M	300

4.2.1. Pipe Line Length for Recycling System

Description	Quantities 121.0125 Acre
Providing Stringing, cutting and jointing HDPE Pipe of 6 kg cm^2 pressure including cost of excavation complete in all respect	
90 mm o/d	4320
75 mm o/d	1130
63 mm o/d	2100

5 Storm Water Drainage & Recharge Wells

5.1. Adopted Design Criteria

- External Storm water Drainage along Master Roads is provided to cater for rain fall up to Intensity@ 3.12 mm /Hr.
- Internal Storm water Drainage is provided to cater for rain fall up to Rain Fall Intensity @ 6.25 mm /Hr.

5.2. Storm Pipe/Drain of Internal Storm Water System

As per Original Proposal	
250 mm dia, Storm Pipe	5524
300 mm width, Covered RCC Drain	250
400 width, Covered RCC Drain	90

300 mm ϕ to 800 mm ϕ RCC NP3 PIPE

Recharge Wells

- Total No. of Recharge wells approved for 121.0125 Acre area : 15 Nos.

6 HORTICULTURE / ARBORICULTURE

- Green area acts in the similar manner as lungs perform in human body. Hence its development is important for eco friendly development.

- Fine grassing is proposed in all the parks.
- Shrubs and creepers will be provided at suitable places.
- Road side plantation will be carried out as per norms i.e. at 10 m c/c on foot paths.

7 STREET LIGHTING

- 40 Watt LED street lights have been proposed on 24 m road on both sides at 44 m distance in a staggered manner i.e. 20 m centre to centre.
- 20 Watt LED street lights have been proposed on 18 m road on one side at 25m distance.
- At road junctions also 20 Watt LED street lights have been proposed at 15 m distance.
- Height of tubular pole for 24 m, 18 m wide roads and road junctions will be 6.75 m above ground level and 1.25 m below ground level.
- It is proposed to provide LED Lights 15 mt. & 12 mt wide roads on one side @25 m c/c with height of pole above road level is 5.75 m. & with 1.5 m projection..
- The distance of pole from metalled edge is 1.40 m.
- Street Lights have been proposed at a spacing of 40mts. on both sides of the 24 mts. wide roads i.e., these shall be located alternately for proper lighting on both sides. The actual spacing would thus be 20mts.

8 SPECIFICATIONS:

- The work will be carried out in accordance with the MORTH, HARYANA PWD & HUDA specification/ Guide lines.
- Specification s in detail has been submitted at time of calling tenders

9 RATES

- The Costing for providing services in this project has been prepared on the basis of recent market rates and H.S.R.

10 COSTING

8580.90 lacs

- The total cost of the project for 121.0125 Acres: ~~37.02~~ Cr.
- The cost of development in this project comes out to be ~~33.493~~ Lacs per acre

70.90

FINAL ABSTRACT OF COST

DESIGN CALCULATION

I. DESIGN CALCULATIONS

1. Total Site Area = 121.0125 Acres

Total Area of Site	121.0125	Acres
Area under 60 M & 75 M Sector Road	3.62	Acres
50% of the Area Sector Roads	1.81	Acres
Area under Undetermined Use	3.64	Acres
Total Net Planned Area	**115.5625**	**Acres**

Basis of Occupancy of Residential as per average family size (Adopted in Haryana)/ Non Residential Buildings as per NBC					
		Norms of population as per average family size (Adopted in Haryana)			
Sr. No.	Occupancy	No. of Dwelling Units/Plot	No. of Persons /Family	Total No. of Persons /Plots	
		Nos.	Nos.	Nos.	
	Residential				
1	Residential Plots	3	4.5	13.5	
2	EWS Plots	2	4.5	9	
	Non Residential Buildings /Plots				
3	Commercial	1 person per 10 sqm area for working population & 10% floating population			
4	Institutional	1 person per 10 sqm area for working population & 5% floating population			
5	Nursery School	200 students per location & 1 staff per 20 students & 10% floating population			
6	Primary School	500 students per location & 1 staff per 20 students & 10% floating population			
7	Community Centre	1000 persons per location & 5% working staff			
8	Nursing Home	25 beds per location & 40% working staff, 50 visitors per location			
9	Taxi Stand	1 person per 200 sqm area			

2. **Population Calculations**

Achieved Population Calculation (SEC. 88 A + 88 B)						
Sr. No.	Plot Category	No. of Plots	Dwelling Unit per Plot	Population per Dwelling Unit	Population	
1	Plots (Gen+NPNL)	882	3	4.5	11907	Persons
2	EWS Plots	221	2	4.5	1989	Persons
	Total	1370			13896	Persons

Green Area				
Sr. No.	Description	Percentage	Provided	
1	Organized Green	6.23 %	7.20	Acres
2	Incidental Green	1.59 %	1.84	Acres
3	Green Required@2.5Sqmts/Person	7.42 %	8.58	Acres
	Total Green	7.82 %	9.04	Acres

SECTOR WISE POPULATION BREAK UP

For Sector 88 B			
	Count of Plots		Population
General & NPNL Plots	570	@ 13.5	7695
EWS	77	@ 9.0	693
Grand Total			**8388**

(8) Pl. see opp.

For Sector 88 A			
	Count of Plots		Population
General & NPNL Plots	312	@ 13.5	4212
EWS	144	@ 9.0	1296
Grand Total			**5508**

Add. Req. 1 No. Nursery School - 5000 Ltr
1 No. Nursing Home - 50000 Ltr
55000 Ltr or 55 KL

Green area 2.04 acre appx @ 25000 Ltr/Acre = 51000 Ltr
Area under roads 8.81 acre @ 5000 Ltr Acre = 44050 Ltr
95050 Ltr
or 95 KL

Community Sites	Required	Provided
Primary School	1	1
Nursery School	2	4
Dispensary	1	1
High School	1	1
Religious Site	1	1
Club	1	1
Crench	1	1
STP/Taxi stand	1	1
Booth	12	12
Clinic 250 sq.m each	4	4
ATM 12 Sq.m each	4	4
Beauty Parlour 12 Sq.m each	4	4

4. Water Calculations :

TOTAL WATER DEMAND (Sector- 88A + 88B)

S.No.	Plot Type	Population	Water requirement per person in lpd (As/HUDA norms)	Total Water Demand in lpd
1	General & NPNL	11907	172.5	2053957.5
2	EWS	1989	~~135~~ 172.50	~~268515.0~~ 343102.50
	Total	13896		~~2322472.5~~ 2397060
	Add. Req. for institutional use		Say ~~2323~~ KLD	2397 + 380 KL = 2777 KL

Domestic Water Demand (Litres / Day) 65 % of Total Demand = ~~1510~~ 1805 KLD

Flushing Water Demand (Litres / Day) 35 % of Total Demand = ~~813~~ 972 KLD

Horticultural water requirement (organized green area)

Total area=9.04 ACRES x 25 KLD = 226 KLD (175KL+51KL) + (115%+45) 160KL = 386 KL

& sweeping of roads

Flushing & Horticulture water demand = ~~1039~~ 1805 KLD 1358 KL

Fresh Total water demand = ~~1610~~ KLD

Fire demand

As per NBC of India, static underground fire storage = 100 KL

Fire Fighting Demand	372.77	KL
Proposed Fire Fighting of Sector 88 B	250	KL
Proposed Fire Fighting of Sector 88 A	150	KL

SECTOR WISE WATER DEMAND

S.No.	Plot Type	Population of Sector -88B	Population of Sector -88A	Total Population
1	General & NPNL	7695	4212	11907
2	EWS	693	1296	1989
	Total	**8388**	**5508**	**13896**

SECTOR – 88 B, WATER DEMAND

S.No.	Plot Type	Population	Water requirement per person in lpd (As/HUDA norms)	Total Water Demand in lpd
1	General & NPNL	7695	172.5	1327387.5
2	EWS	693	~~135~~ 172.50	~~93555~~ 119542.50 lpd
	Total	8388		~~1420942.5~~ 1446930 lpd
				~~1421~~ KLD 1447 KLD

Add for Institutional etc 325 KLD

1772 KLD

Domestic Water Demand (Litres / Day) 65 % of Total Demand = ~~924~~ 1152 KLD

Flushing Water Demand (Litres / Day) 35 % of Total Demand = ~~497~~ 620 KLD

SECTOR – 88 A, WATER DEMAND

S.No.	Plot Type	Population	Water requirement per person in lpd (As/HUDA norms)	Total Water Demand in lpd
1	General & NPNL	4212	172.5	~~726915~~ 726570
2	EWS	1296	~~135~~ 172.50	~~174960~~ 223560
	Total	5508		~~901875~~ 950130 lpd
				~~902~~ KLD 950 KLD

Add for Institutional etc 55 KLD

1005 KLD

Domestic Water Demand (Litres / Day) 65 % of Total Demand = ~~586~~ 653 KLD

Flushing Water Demand (Litres / Day) 35 % of Total Demand = ~~316~~ 352 KLD

Sector 88 B

Under ground storage tank (Drinking water)

Taking cap. of U.G.T. @ 60% = 1152 x 0.60 = 691.20 KL

Fire fighting $100\sqrt{8.388} \times 1/3$ = 96.54 KL = 100.00 KL

Say 100 KL

791.20 KL

Say 800 KL

Flushing water tank

Daily req. for Flushing water incl. losses.

620 KL + 291 KL = 911 KL

Storage req. @ 60% = 911 x 0.60 = 546.60 KL

Say 550 KLD

Sector - 88 A (Drinking water)

UGT. (Drinking water) = 653 KLD

Cap. req. @ 60% = 653 x 0.60 = 391.80 KL

Add for fire fighting

$100 \times \sqrt{5.56} \times 1/3$ = 78.59 KL say 100 KL 100.00 KL

491.80 KL

Say 500 KL

Flushing water tank

Daily req. for flushing water incl. losses

= 352 KL + 95 KL = 447 KLD

taking cap @ 60% = 268.20 KLD

Say 300 KLD

SECTOR WISE : DOMESTIC & FLUSHING WATER DEMAND

S.No.	Location	Total Water Demand in KLD	Domestic Water Demand in KLD (65%)	Flushing Water Demand in KLD (35%)
1	Sector - 88 B	1772 ~~1421~~	1152 ~~924~~	620 ~~497~~
2	Sector - 88 A	1005 ~~902~~	653 ~~586~~	352 ~~316~~
	Total	~~2323~~ KLD 2777	~~1510~~ KLD 1805	972 ~~813~~ KLD

Total Capacity of Potable UGT ~~provided~~ Req. = 800 KL incl. 100 KL for fire Reserve

S.No.	Location	Provided Domestic UGT – KL
1	Sector - 88 B	Two Main UGT 88B, 300 KL + 300 KL +330 KL = 930 KL (proposed)
2	Sector - 88 A	~~600~~ KL 700 KL incl. 100 KL fire reserve

Sewerage Calculation

S.No.	Location	Total Water Demand in KLd	Sewerage to STP- (80 %) - in KLD	Treated effluent available from STP- (80 %) - in KLD
1	Sector - 88 B	1772 ~~1421~~	~~1136.8~~ 1417.60	~~909.5~~ 1135
2	Sector - 88 A	1005 ~~902~~	~~721.6~~ 804	~~577.3~~ 643
	Total	~~2323~~ KLD 2777		

Sec 88 B = 1417.60 + 5% marginal factor = 1488.48 KLD say 1500 KLD

Sec 88 A = 804 KL + 5% marginal factor = 844.20 KLD say 850 KLD

PROPOSED STP CAPACITY

S.No.	Location	STP Treated Water UGT at STP – KL
1	Sector - 88B	~~1200~~ KL 1500 KLD in two phase, first phase of 500 KLD and second proposed 700 KLD
2	Sector - 88A	1000 KL in two phase, first phase of 500 KLD and second proposed 500 KLD 850 KLD

Arrangement for treatment of 100% sewer water up to tertiary level. In emergency Excess quantity of sewer is to be disposed off in master sewer.

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	Final Abstract of Cost of Vatika Township, in Sector 88 B & 88 A being developed by Vatika Group		
Sr. No.	**Description**	~~**Total Cost (Rs.)**~~	**Total Cost (Lacs Rs.)**
1	Sub Work No. 1 (Roads)	~~233853988~~	~~2338.540~~ 1622.43
2	Sub Work No. 2 (Water Supply)	~~34491930~~	~~344.919~~ 664.58
3	Sub Work No. 3 (Sewerage ~~Waste & Recycling Water~~)	~~52096100~~	~~520.961~~ 581.68
4	Sub Work No. 4 (Storm Water)	~~27888900~~	~~278.889~~ 408.53
5	Sub Work No. 5 (Horticulture & Plantation)	~~4504541~~	~~45.045~~ 58.61
6	Sub Work No. 6 (Lightings & Fittings)	~~30253125~~	~~302.531~~ 302.53
7	Sub Work No. 7 (MTC of Services incl. & Resurfacing of Roads) for 10 years	~~173012175~~	~~1730.122~~ 1952.95
	Sub Total	~~556100758~~	~~5561.007~~ 5591.31
	Add 3 % Contigency charges	~~16683023~~	~~166.830~~ 167.74
	~~Sub Total~~	~~572283781~~	~~5727.837~~ 5759.05
	Add 49 % Charges on account Maintenance, Supervision charges, departmental charges, Admin charges, unforseen.	~~280664053~~	~~2806.640~~ 2831.93 lacs
			8580.98 lacs
	Total Cost	~~853447834~~	~~8534.477~~
	Cost / Acre including Maintenance for net area planned –121.0125 Acres	~~8655688~~	~~70.526~~ 70.90 lacs

VATIKA LIMITED

Auth. Signatory

Executive Engineer
HSVP Division No. V,
Gurugram

Checked subject to Comments
In forwarding letter No. 10655
Dt. 22/04/2024.....and notes
Attached with the estimate

Executive Engineer (M)
for Chief Engineer-I
HSVP, Panchkula

Superintending Engineer,
HSVP, Circle-I, Gurugram.

Tel. : 2570982
Toll Free No. : 1800-180-3030
Website : www.hsvp.in
Email : cencrhuda@ gmail.com

हरियाणा शहरी विकास प्राधिकरण
HARYANA SHEHARI
VIKAS PRADHIKARAN

Address: C-3, HSVP , HQ Sector-6
Panchkula

CE-I No. 100655
Dated: 23/04/2024
Annexure-A

SUB:- Approval of service plan estimate of Residential Plotted Colony on land measuring 121.0125 acres (License no. 94 of 2013 dated 31.10.2013 & no. 11 of 2015 dated 01.10.2015 and no. 254 of 2023 dated 17.11.2023) falling in the revenue estate of Village Harsaru, Sector-88A & 88B, Gurugram being developed by M/s Vatika Limited.

Technical note and comments:-

1. All detailed working drawings would have to be prepared by the colonizer for Integrating the internal services proposals with the master proposals of town.
2. The correctness of the levels will be the sole, responsibility of the colonizer for the integration of internal proposals, with the master proposals, of town and will be got confirmed before execution.
3. The material to be used shall the same specifications as are being adopted by HSVP and further shall also confirm to such directions, as issued by Chief Engineer, HSVP from time to time.
4. The work shall be carried out according to Haryana PWD specification or such specifications as are being followed by HSVP. Further it shall also confirm to such other directions, as are issued by Chief Engineer, HSVP from time to time.
5. The colonizer will be fully responsible to meet the demand of water supply and allied services till such time these are made available by State Government/ HSVP. All link connections with the State Government/ HSVP system and services will be done by the colonizer. If necessary extra tube-wells shall also be installed to meet extra demand of water beyond the provision according to EDC deposited.
6. Structural design & drawings of all the structures, such as pump chamber, boosting chamber, RCC OHSR, underground tanks, quarters, manholes chamber, sections of RCC pipes sewer and SW pipes, sewer, ventilating shafts for sewerage and Masonry Ventilation Chamber *for* Chamber for storm water drainage, temporary disposal/ arrangement etc. will be as per relevant I.S codes and PWD specifications, colonizer himself will be responsible for structural stability of all structures.
7. Potability of water will be checked and confirmed and the tube-wells will be put into operation after getting chemical analysis of water tested.
8. Only C.I/D.I pipes will be used in water supply and flushing system, UPVC/HDPE pipe for irrigation purposes.

Tel. : 2570982
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Email : cencrhuda@ gmail.com

हरियाणा शहरी विकास प्राधिकरण

HARYANA SHEHARI VIKAS PRADHIKARAN

Address: C-3, HSVP , HQ Sector-6 Panchkula

9. A minimum 100 i/d C.I/D.I, 200mm i/d SW and 400mm id RCC NP-3 pipes will be used for water supply, sewerage and storm water drainage respectively.
10. Standard X-section for S.W. pipes sewer, RCC pipes sewer etc. will be followed as are being adopted in Haryana Public Health Engineering Deptt. or HSVP. If needed, the same may be sought by the colonizer from concerned Executive Engineer of HSVP.
11. The X-section, width of roads, will be followed as approved by the Chief Town Planner, Haryana, Chandigarh. The kerbs and channels will also be provided as per approved X-section and specifications. If needed, the same may be sought by the colonizer from concerned Executive Engineer of HSVP.
12. The specifications for various roads will be followed as per IRC/MORTH specifications.
13. The wiring system of street lighting and specifications of street lighting fixture will be as per relevant standards.
14. This shall confirm to such other conditions as are incorporated in the approved estimate and the letter of approval.

Executive Engineer (M),
for Chief Engineer-I, HSVP,
Panchkula.

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	Abstract of Sub Work No. 2 (Water Supply)		
	No. of Sub Head	Name of Sub Head	Amount in Rs.
1	Sub Head No. 1	~~Source Generation~~ Head Works	101.75 ~~6000000~~
2	Sub Head No. 2	Water Works & Boosting Station	230.85 ~~13650000~~
3	Sub Head No. 3	Distribution System & Rising Main	158.40 ~~14841930~~
	~~Total Cost in Rs.~~ sub Head - 4	Dom Recycle water	173.56 ~~34491930~~
			664.56 Lacs

C.o.t final abstract of cost

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Cost Estimation of Sub Work No. 1 (Roads)					
	SUB HEAD NO. 1	121.0125 Acres			
S No	Description	Qty.	Unit	Rate	Amount
		Roads			
1	**Providing for leveling & earth filling :** includes providing good earth transportation from source to site, laying in layer, rolling & watering & compaction to the desired specification complete as per MORT & H specifications for road & bridge works Clause - 305 for all leads and lifts as per site conditions	121.013	Acres	175000	21177188
2	Contraction of Road By :- i) Providing **GSB 300** mm thick as per MORT & H specifications conforming to Clause 401 grading -II 400.1				
3	ii) Providing Laying, spreading and compacting graded stone aggregates as per Table 400-11 to **Wet Mix Macadam** specifications - 406 MORT&H, IV Revision, including premixing the mixed materials with water to OMC in Mechanical mixer (Plug Mill) carriage of mixed material by tipper to site, laying in uniform layers using paver in subbase / base course, on a well prepared sub base and compacting with power and vibratory roller to achieve & desired density, including cost of material complete **150 mm thick** 200 mm GSB 250 mm Stone Agregate 50 mm DBM	~~129456~~ 66320	sq mtr	1500	~~19418400~~ 994.80 lacs
4	Providing, laying & compaction of **B.M. (Bituminous Macadum) 50 mm thick** with grading 2 as per table No. 500.10 and minimum 4.5% bitumen of 60/70 grade as per MORT&H specifications for road & bridge works 2001 (Revision IV) clause. 507.1 to 507.8 for all leads & lifts etc. complete in all respects to the satisfaction of the Engineer in charge				
5	20 mm thick ~~mix seal surfacing~~. BC				
6	Providing & Fixing **kerbs & channels** of C.C. M-20 grade as per standard size including back filling etc. complete in all respects.	~~10788~~ 22655	mtr	600	~~6472800~~ 135.93 lacs
7	Provision for Guide Maps & **Plot Indicators, Road Marking Strips & Post Delinators .**	L S		~~500000~~	~~500000~~ 20.00 lacs
8	Provision for Carriage of materials. & other unforseen	L S		~~100000~~	~~100000~~
~~9~~ 9/10.15 9.11SR	Provision for 80 mm thick Pavement of parking in shopping **center/commercial center for pavement/parking** taking 50 % of the area 2.48 acres x 4047 = 5018 Sqm + 19775 Sqm for Pavement on Road Side	~~11420~~ 24793	sq mtr	1000	~~11420000~~ 247.93 lacs
	Total				~~23385988~~

10 - Prov. for Traffic Control arrangement (L.S) 2.00 lacs

Rs 1628.43 lacs

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	Cost Estimation of Water Supply Scheme				
	Cost Estimation of Sub Work No. 2	Water Supply			
	SUB HEAD NO. 1	Source Generation — Head Works			
Sr. No.	Description	Qty.	Unit	Rate in ₹	Amount in ₹
1	Boring of tubewells having minimum of 450 mm dia with depth of 70 mtr including providing & fixing 200 mm inside dia V - wire Screen of stainless steel of approved make, blind pipe of MS confirming is IS: 3589 of 4.8 mm thick threaded and socketed as per approved design including cost of all fitting and clamps placed on the girder and coated with antic crosive paint of approved quality, including supply and installation of 12.5 BHP pumping set, GI coloumn pipes, panal board and all other electrical appretenances to run the tubewell, making provision for the earthing, cost of panal baord etc complete in all respect upto delievery pipe lines including the cost of Sluice valves, scour valves and non return valves etc.	3	Nos.	1500000	4500000
2	Providing & installation of Generator Set of Standard make 35 KVA capacity to run the tubewell fixed with the comapy and plateform including cost of change over switch etc complete in all repect.	~~3~~	~~Nos.~~	400000	5.25 lacs ~~1200000~~
3	Provision for releasing electric connection charges to the DHBVN for the above tube wells @ cost of transformer service	1	L.S	~~300000~~	7.50 lacs ~~300000~~
4	Provision for carriage of materials and other unforeseen items	1	L.S	~~150000~~	250000
	Total				~~6000000~~

5 Prov. for cheap pressure type chlorination Plant Complete (L.S) 2.00 lacs

6. Const. of Pump chamber as per standard design. 3 Nos @ ₹ 3.00 lacs ₹ 9.00 lacs

7 Providing and installing electricity driven electro or submersible pumping sets capable of delivering about 22.50 lit Water p.sec. against at total head of 60mt Complete with motor and other accessories 3 No. @ ₹ 2.00 lacs ₹ 6.00 lacs

8 Prov for making foundation and erection of Pumping machinery (L.S) ₹ 2.00 lacs

9) Prov for staff Qrs for cost. 3 No. 350 SFT (L.S) ₹ 22.50 lacs

₹ 101.75 lacs

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	Cost Estimation of Sub Work No. 2				Water Supply			
	SUB WORK NO. 2				Water Supply-Head works			
	SUB HEAD NO.2				(Water Works, Boosting Station)			
Sr. No.	Description				Qty.	Unit	Rate in `	Amount in Rs.
1	Construction of **Boosting chamber** of suitable sizewith cost of **Pumping Machinery** (3 No Horizontal centrifugal pumps, 9LPS at 56 M Head, ,Three No Horizontal centrifugal pumps, 5 LPS at 56 M Head and ~~Generating set of 50KVA capacity on each~~ locationete. complete in all respect. As detailed below				(3+3) 6 Nos	No	4.00 lacs 2000000 each	24.00 lacs 6000000
	At zone 1, Sector 88B - 2no. & zone 2, Sector 88A - 1no				3 No		3.00 lacs	9.00 lacs
2	Construction of **RCC Under Ground Clear Water Storage Tank**, capacity in two compartments including inlet, outlet & overflow							
	~~Zone-1~~	Main UGT 88-B	UGT1	200	UGT2 400 (3 Nos)	600	KL	~~5500~~	~~3300000~~
	~~Zone-2~~	Main UGT 88-A	UGT3	200	(1 No)	200	KL	5500	~~1100000~~
2a	Construction of **RCC Under Ground Clear Water Recycled Storage Tank**, capacity in two compartments including inlet, outlet & overflow					~~300~~	KL	5500	~~1650000~~ 46.75 lacs
3	Construction of Boosting Station suitable for the pumping machinery and D.G. set.					3	Nos.	400000	~~900000~~ 12.00 lacs
4	Provision for **carriage** of materials and other unforeseen items.					1	L.S.	~~100000~~	500000
5	Construction of **Boundary wall** and gate around the water works					1	L.S.	~~200000~~	~~200000~~ 10.00 lacs
6	**Development** of campus of water works including construction of approach roads, footpath, hedges and development of lawns and plantation etc. complete at water works site					LS	No	~~100000~~	~~100000~~ 10.00 lacs
7	~~Provision for Pump operator office space~~					~~LS~~		~~300000~~	~~300000~~
	Total								~~13650000~~ 230.85 lacs
	C .O to Abstract of Cost of sub work no 2								

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	SUB HEAD NO.3	Distribution System & Rising Main			
Sr.No.	Description	Qty.	Unit	Rate in Rs.	Amount in Rs.
1	Providing, stringing, cutting and jointing water supply pipe including cost of excavation complete in all respect				
	(For Distribution)	✓		✓	
	100 mm id	9298	Mtr	1460	13575080 ✓
	For Rising Main				7.515 lacs
	150 mm Sec. 88 D	370 ~~90~~	Mtr	2040 ✓	~~183600~~
	~~200~~ mm Sec. 88 A	100 ~~30~~	Mtr	~~2475~~ 1960 ✓	~~74250~~ 1.46 lacs
2	Providing and fixing cast iron double falnged sluice valve/ Butter Fly Valve PN 1.6 marked with IS: 14846 including cost of all joint of material, carriage, loading, unloading, stacking, handling etc complete in all respect ot the satisfaction to the Engineer - in charge.				
	100 mm id	38	Nos.	12000	~~384000~~ 4.56
	150 mm id	~~8~~	Nos.	~~12~~000	~~120000~~ 0.30
	~~200 mm id~~	~~2~~	Nos.	~~32000~~	~~64000~~
3	Providing and fixing Fire Hydrants complete with masonry chambers	18	Nos.	15000	2.70 ~~40000~~
4	Construction of Brick masonry Sluice Valve Chambers & Fire hydrent including surface boxes complete as per Public Health Standard	21	Nos.	5500.00	115500
5	Provision for indicating Arrow plates for Sluice valve & Fire hydrent	21	Nos.	2000	0.42 ~~10500~~
6	Providing and fixing C.I. double Air valves marked with relevent IS code including carriage, loading, unloading, stacking, handling, re-handling etc., drilling, tapping, screwing in valves connections complete in all respects to the satisfaction of Engineer-in-charge 100mm i/d.	5	Nos.	~~10~~000	0.50 ~~75000~~
7	Provision for Carrige of material	1	LS	~~100000~~	~~1~~00000
8	Provision for Cutting of Roads and making good to its orignal condition	1	LS	~~100000~~	~~1~~00000
					~~158.40~~ lacs
	Total				14841930

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	Abstract of Sub Work No. 3 (Waste Water Collection System & Recycling of Treated Water)					
1	No. of Sub Head	Name of Sub Head				Amount in `
2	Sub Head No. 1	Sewerage Waste Water collection system & STP				42757660
3	Sub Head No. 2	Recycling of Treated Water				9338440
		Total Cost				52096100

C .O to Final Abstract of Cost

	Cost Estimation of Waste Water / Sewerage SUB WORK NO. 3				
Sr. No.	Description	Qty.	Unit	Rate in `	Amount in `
1	**Providing of sewer pipes in standard length of each pipe and their lowering, cutting, jointing and testing , including cost of excavation, bed concrete , Man holes jointing materials as well as carriage, loading, unloading stacking, handling, rehandling etc, complete in all respects to the satisfaction of Engineer in Charge.** S.W. PIPE				
1.01	**200 mm id Sewer Pipe**				
	i) Average Depth up to 2 M	6511	M	1700	11068700
1.04	**250 mm id Sewer Pipe** S.W PIPE				
1.05	ii) Average Depth 2 M to 4 M	2521	M	2000	5042000
1.06	**300 mm id Sewer Pipe** S.W. PIPE				
1.07	i) Average Depth 2 M to 4 M	367	M	2880	1056960
2	Prov. for providing and fixing vent shaft ~~Construction of Brick masonry Sewer Manhole including SFRC cover complete as per Public Health Standard~~ at suitable places as per P.H. requirement	~~230~~	~~Each~~ (LS)	~~48000~~	~~4140000~~ 10.00 lac
3	Provision for Carrige of material etc other unforeseen items	1	LS	~~100000~~	~~100000~~ 10.00 lac
4	Provision for Cutting of Roads and making good to its orignal condition	1	LS	~~100000~~	500000
5	Fee & connection charges for HUDA Main Master Sewer line.	2 Nos	LS	~~300000~~	400000
6	Provision for ~~HUDA sewer connection including Pipes, fitting , Manhole etc for commissioning of sewer over flow Bypass connection, arranging other allied work i.e HUDA sewer connection including Cutting of Roads and making good to its orignal condition.~~ providing adequate junction and temporary tapping etc	1	LS	~~150000~~	5.00 ~~150000~~
	~~Sub Total~~				~~21957660~~

STP Works

Sr. No.	Description	Qty.	Unit	Rate in `	Amount in `
1	Providing of sewer treatment plant complete in all respects to the satisfaction of Engineer in Charge. For Sector 88B : 1500 KLD in ~~two phase, first phase of 200 KLD and second proposed 800~~ KLD And For Sector 88A : ~~300~~ 850 KLD				376.00 lac
	STP Works (1500 KLD + ~~300~~ 850 KLD) = ~~1300~~ 2350 KLD	~~1300~~ 2350	KLD	16000	~~20800000~~
	Sub Total			~~208~~ Lakhs	

	Cost Sewerage pipe line works & STP Works		Rs.	~~42757660~~

~~428~~ Lakhs 581.68 lacs

C .O to Abstract of Cost of sub work no 3

	Recycling of Treated Water	Distribution System			
	SUB HEAD NO 6 (Recycling of Treated Water)	Qty.	Unit	Rate in ₹	Amount in ₹
Sr.No.	Description				
1	Providing, stringing, cutting and jointing HDPE **Pipe of 6 kg / cm²** pressure **including cost of Excavation** complete in all respect	1856		2040	37.86
1.01	90 mm/od	9416	Mtr	840	7909440
1.02	50 mm/od	180	Mtr	680	122400
2	Providing and fixing **Sluice valves /BF Valve in C.I. body with integrally moulded liner of nitrile or EPDM, as per is :13095 in PN 1.0.**				
2.01	90 mm i/d	60	Nos.	3600	216000
2.02	50 mm i/d	60	Nos.	1200	72000
3 28.13(A)	Providing and fixing **Air Valves , Butter Fly valves** marked with relevent IS code including carriage, loading, unloading, stacking, handling, re-handling etc., drilling, tapping, screwing in valves connections complete in all respects to the satisfaction of Engineer-in-charge 100mm i/d.	6	Nos.	3100	18600
4	Provision for indicating **Arrow Plates** for sluice valve and Air Valves	60	Nos.	1000	60000
5	Construction of Brick masonry Chamber for and Air valves including surface boxes complete Public Health Standard	6	Nos.	5000	30000
6	Provision for providing & fixing **lawn hydrants/ Sprinklers** with sprinkler system at a distance of 30 m centre to centre on the periphery (green land) complete in all respects	60	Nos.	1000	60000
8	Construction of Boosting Station suitable for the pumping machinery and D.G. set.	1	Nos.	150000	150000
9	Providing and installing of pumping set with electric driven slip ring motor complete in all respects.	5	Each	100000	500000
10	Provision for **Carrige** of material	1	LS	100000	200000
11	Provision for **Cutting of Roads** and making good to its orignal condition	1	LS	100000	200000
	Total				9338440

C ,O to Abstract of Cost of sub work no 3

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	Cost Estimation of Sub Work No. 4 (Storm Water Drainage)				
	Sub Head No. 1	(Storm Water Drainage)			
Sr. No.	Description	Qty.	Unit	Rate in `	Amount in `
1	Construction of **RCC Drain**, 1:3 cement plaster inside with 1 mm thick cement rendering, RCC slab in RMC M20 or SFRC slab including cost of excavation & complete in all respect				
2 (R)	Providing & Fixing RCC 400mm dia Pipe NP 3, avg.depth 0.4-2 M (Pl. see below)	7746	mtr.	2500	19365000 (₹ 204.53 las)
2.01	Construction of RCC Covered Drain 300 mm x 300 mm in M20 Cement concrete	250	M	3400	850000
3 (2)	Construction of Brick masonry **Storm drainage catch basin Chambers** including SFRC drain cover complete as per Public Health Standard	60	Each (L.S)	9000	540000 (25.00 las)
4 (3)	Provision for connection of proposed drains with existing HUDA Drains	2 Nos	Each	20000 (2.00 las)	30000 (4.00 las)
5 (4)	Provision for Shoring & Timbering , Lighting & Watching	1	L.S	153900	153900 (10.00 las)
5	Provision for Community **Recharge Wells** with civil work, piping , boring, filter media, desilting chamber complete in all respect. (at suitable places)	15	Nos (L.S)	450000	6750000 (100.00 las)
6	Provision for Carriage of Material & other unforeseen items	1	L.S	400000	400000 (10.00 las)
7	Provision for cutting of road & making good to its original conditions	1	L.S	100000	100000 (5.00 las)
8	Total Cost / Provn. for temporary disposal arrangement till HUDA services are available (L.S)				27888900 (50.00 las)
					₹ 408.53 las

C.O to Final Abstract of Cost

(R) RCC NP-3 PIPE

400 mm ∅	= 5928 mtr	@ ₹ 2500/mtr	₹ 148.20 las
500 mm ∅	= 804 mtr	@ ₹ 2700/mtr	₹ 21.71 las
600 mm ∅	= 884 mtr	@ ₹ 3000/mtr	₹ 26.52 las
800 mm ∅	= 162 mtr	@ ₹ 5000/mtr	₹ 8.10 las
			₹ 204.53 las

	Sub Work No. 5	Horticulture and Road Side Plantation			
	Sub Head No. 1	**Qty.**	**Unit**	**Rate in ₹**	**Amount in ₹**
Sr. No.	**Description**				
1	DEVELOPMENT OF GREEN AREA (9.04 Acres) a) Trenching the ordinary soil up to depth of 60 cm i.e. removal and stacking of serviceable material & disposing by spreading and leveling within a lead of 50 M and making up the trench area for proper levels by filling with earth or earth mixed with manure before and after flooding trench with water excluding cost of imported earth and manure. **Area of Road**	9.04	Acres	150000	1356000
1.1	b) Supply and stacking sludge at site including royalty and carriage Green Area				
1.2	C) Rough dressing of turfed area Grassing with "DOOB GRASS" i.e. watering & maintenance of lawns for 30 days till the grass forms a thick lawn, free from weeds and fit moving in rows 7.5 cm part in either direction including provision for hedges and barbed wire around park				
1.3	d) Maintenance of lawns or turfing of slopes for a period of 1 year				
2	Road Side Plantation and plantation along the roads and above after distance of each 12 m Detail of Cost				
i	Trees\ Shurbs = ~~60~~ Rs 150.0				
ii	Excavation = ~~60~~ Rs 60.0				
iii	Manure = ~~90~~ Rs 100.0				
iv	Tree Guard = ~~2100~~ Rs 2000.0	✓		✓	
v	**Total Cost of 1 Tree = 2310** ✓	**1950**	**No**	**2310**	4504500 ✓ 5860500 ~~4504541~~
	Total cost				OR ₹ 58.61 lacs

C .O to Final Abstract of Cost

vatika

	Cost Estimation of Sub Work No. 6 (Street Lighting & Fittings)				
	Sub Work No. 6	**Lighting & Fittings**			
Sr. No.	**Description**	**Qty.**	**Unit**	**Rate in ₹**	**Amount in ₹**
1	Provision for Street Lighting at surrounding area as per standard specification of HVPNL, complete in all respect .	121.015	per Acres	250000	30253125
	Total cost				30253125

Rs 3025315/-

C .O to Final Abstract of Cost

vatika

	Sub Work No. 7	Services & Resurfacing of Roads			
Sr. No.	Description	Qty.	Unit	Rate in `	Amount in `
1	Provision of MTC charges for W/S, SWD & Sewerage, Roads, Street Lighting, Horticulture etc				
a	Complete in all aspect including operational and establishment charges as per HUDA norms for 10 years completion.	Acres	121.013	~~750000~~ 8.00	~~90759375~~ 968.10 lacs
2	Provision of repairing of concrete roads				
a	Resurfacing of road after 5 years of MTC 1st phase with provision of 50mm thick BM incl. levelling course and 30mm thk. BC or as per	~~60928~~ 66320	Sqm	~~600~~ 660/-	~~36556800~~ 437.71 lacs
b	Resurfacing of road after 10 years of MTC consult design whichever is safer	~~60928~~ 66320	Sqm	~~750~~ 825/-	~~45696000~~ 547.14 lacs
	with 50mm BM, & 30mm BC or as per				1952.95 lacs
	consult design which ever is safer Total (Rs.)				~~173012175~~
	Total (Lac Rs.)				~~1730.12~~

C.o.t. find abstract of cost

Vatika TWN008 Sec-88A & 88B Material Statement of Road					
Sr. No.	Street/Road Name	12 Mtr. ROAD		24 Mtr. ROAD	
		LENGTH	AREA (Sqm.)	LENGTH	AREA (Sqm.)
Sector 88A					
1	AVENUE 2			146	3504
2	E-11 LANE	264	3168		
3	E-12 LANE	55	660		
4	E-14 LANE	260	3120		
5	E-15 LANE	218	2616		
6	E-16 LANE	218	2616		
7	E-17 LANE	197	2364		
8	E-18 LANE	236	2832		
9	E-19 LANE	124	1488		
10	E-20 LANE	167	2004		
11	E-21 LANE	62	744		
12	E-22 LANE	57	684		
13	E-31 LANE	175	2100		
14	E-33 LANE	175	2100		
15	E-34 LANE	175	2100		
16	E-35 LANE	169	2028		
17	E-36 LANE	51	612		
18	E-37 LANE	75	900		
19					
	TOTAL	2678	32136.00	146.00	3504.00
Sector 88B					
1	5TH BOULEVARD LANE	160	1920		
2	AVENUE 5			356	8544
3	AVENUE 6			67	1608
4	AVENUE 7			339	8136
5	AVENUE 8			320	7680
6	AVENUE 9			47	1128
7	AVENUE 10	281	3372		
8	H-3 LANE	460	5520		
9	H-11 LANE	296	3552		
10	H-12 LANE	114	1368		
11	H-14 LANE	114	1368		
12	H-15 LANE	114	1368		
13	H-16 LANE	114	1368		
14	H-21 LANE	269	3228		
15	H-22 LANE	61	732		
16	H-23 LANE	125	1500		
17	H-24 LANE	121	1452		
18	H-30 LANE	255	3060		
19	H-31 LANE	193	2316		
20	H-32 LANE	127	1524		
21	H-33 LANE	127	1524		
22	H-34 LANE	206	2472		
23	H-35 LANE	151	1812		
24	H-41 LANE	180	2160		
25	H-42 LANE	160	1920		
26	J-11 LANE	190	2280		
27	J-12 LANE	91	1092		
28	J-14 LANE	91	1092		
29	J-15 LANE	169	2028		
30	J-16 LANE	52	624		
31	F-12 LANE	292	3504		
32	F-14 LANE	180	2160		
33	F-15 LANE	68	816		
34	G-11 LANE	251	3012		
35	G-12 LANE	84	1008		
36	G-14 LANE	262	3144		
37	G-16 LANE	101	1212		
38	G-17 LANE	101	1212		
	TOTAL	5560	66720	1129.00	27096.00
GRAND TOTAL (88A & 88B)		8238.00	98856.00	1275.00	30600.00
GRAND TOTAL (12m. + 24m.wide)		LENGTH		AREA (Sqm.)	
		9513.00		129456.00	

Vatika Ltd -121.0125 Acres Sec-88A & 88B Material Statement of Road					
Sr. No.	Street/Road Name	12 Mtr. ROAD		24 Mtr. ROAD	
		Length (m.)	Area of GSB/WMM/BM as average 6 mt. Pavement for 9 m. width Road (sqmt.)	Length (m.)	Area of GSB/WMM/BM as average 6 mt. Pavement for 12 m. width Road (sqmt.)
	Sector 88A	2678.00	✓ 32136.00	146.00	3504.00
	Sector 88B	5560.00	✓ 66720.00	1129.00	27096.00
	TOTAL	8238.00	✓ 98856.00	1275.00	30600.00
			Pl. see below		
GRAND TOTAL (12m. + 24m.wide)		LENGTH		AREA (Sqm.)	
		9513.00		129456.00	

For - 121.0125 Acres - Road K&C Length (mt.)

	Road Length	Kerbs & channels	
Length of 12 m. width Road	8238.00 x2	~~8238~~ 16476	Kerbs & Channels in ~~single~~ two side
Length of 24 m. width Road	1275.00 x4	~~2550~~ 5100	Kerbs & Channels in ~~both~~ four side
Total		~~10788~~ 21576 Rmt	

Add 5% for Curves 1079

22655 mt

	Road Length	80mm Parking Pavements (sqmt.)	
Sector 88A	~~2824.00~~ 2678 x2x1.20	~~3390~~	6427.20 Sqm
Sector 88A	~~6689.00~~ 5560x2x1.20	~~8030~~	13344.0 Sqm
Total	9513.00	~~11420~~	19771.20 Sqm

Say 19775 Sqm

Metalled width

12m wide Road = 8238 m x 5.5m = 45309 Sqm

24 m wide Road = 1275 m x 14.0m (2x7) = 17850 Sqm

63159 Sqm

Add 5% for Curves 3158 Sqm

66317 Sqm

Say 66320 Sqm

VATIKA TWNOOB SEC-88A & 88B			
Measurement Sheet for Water Supply			
	Line reference	Length of Pipe (m)	Dia of pipe in mm
	For Distribution Line		
	PUMP-01 TO WS-101	72	100
	WS-101 TO WS-102	63	100
	WS-101 TO WS-103	60	100
	WS-103 TO WS-104	97	100
	WS-103 TO WS-105	60	100
	WS-105 TO WS-106	98	100
	WS-105 TO WS-107	242	100
	WS-107 TO WS-108	67	100
	WS-108 TO WS-109	58	100
	WS-109 TO WS-110	70	100
	WS-110 TO WS-111	65	100
	WS-111 TO WS-112	130	100
	WS-112 TO WS-113	65	100
	WS-113 TO WS-114	58	100
	WS-114 TO WS-115	21	100
	WS-114 TO WS-109	127	100
	WS-113 TO WS-110	127	100
	WS-107 TO WS-117	107	100
	WS-116 TO WS-117	68	100
	WS-117 TO WS-118	89	100
	WS-118 TO WS-119	85	100
	WS-118 TO WS-120	67	100
	WS-120 TO WS-121	113	100
	WS-121 TO WS-122	28	100
	WS-123 TO WS-124	164	100
	WS-124 TO WS-125	60	100
	PUMP-02 TO WS-201	39	100
	WS-201 TO WS-202	110	100
	WS-201 TO WS-203	62	100
	WS-203 TO WS-204	77	100
	WS-205 TO WS-206	117	100
	WS-206 TO WS-207	86	100
	WS-205 TO WS-208	146	100
	WS-208 TO WS-209	46	100
	PUMP-02 TO WS-210	60	100
	WS-210 TO WS-211	25	100
	WS-211 TO WS-212	72	100
	WS-212 TO WS-213	128	100
	WS-213 TO WS-214	72	100
	WS-214 TO WS-215	70	100
	WS-215 TO WS-216	66	100
	WS-214 TO WS-211	128	100
	WS-215 TO WS-217	128	100

3713

3713 mL

	Line reference	Length of Pipe (m)	Dia of pipe in mm
	WS-216 TO WS-218	128	100
	WS-210 TO WS-217	46	100
	WS-217 TO WS-218	65	100
	WS-218 TO WS-219	75	100
	WS-219 TO WS-220	122	100
	WS-220 TO WS-221	60	100
	PUMP-03 TO WS-301	28	100
	WS-301 TO WS-302	83	100
	WS-302 TO WS-303	124	100
	WS-303 TO WS-304	85	100
	WS-304 TO WS-305	66	100
	WS-305 TO WS-306	28	100
	WS-305 TO WS-307	78	100
	WS-304 TO WS-308	170	100
	WS-304 TO WS-309	59	100
	WS-309 TO WS-310	97	100
	WS-309 TO WS-311	59	100
	WS-311 TO WS-312	97	100
	WS-311 TO WS-313	28	100
	WS-303 TO WS-314	52	100
	WS-314 TO WS-315	126	100
	WS-315 TO WS-316	174	100
	WS-315 TO WS-317	141	100
	WS-317 TO WS-319	59	100
	WS-317 TO WS-318	35	100
	WS-314 TO WS-320	153	100
	WS-320 TO WS-321	116	100
	PUMP-04 TO WS-402	33	100
	WS-402 TO WS-401	150	100
	PUMP-04 TO WS-403	33	100
	WS-403 TO WS-404	20	100
	WS-404 TO WS-405	165	100
	WS-405 TO WS-406	120	100
	WS-404 TO WS-407	68	100
	WS-407 TO WS-408	212	100
	WS-408 TO WS-409	165	100
	WS-408 TO WS-410	79	100
	WS-410 TO WS-411	62	100
	WS-411 TO WS-412	40	100
	WS-411 TO WS-413	47	100
	WS-413 TO WS-414	320	100
	WS-407 TO WS-415	56	100
	WS-415 TO WS-416	182	100
	WS-415 TO WS-417	46	100
	WS-403 TO WS-418	52	100
	WS-418 TO WS-419	54	100
	WS-418 TO WS-420	237	100
	WS-418 TO WS-421	58	100
	WS-421 TO WS-422	176	100
	WS-421 TO WS-423	56	100
	WS-423 TO WS-424	176	100
	WS-423 TO WS-425	44	100
	WS-425 TO WS-426	176	100

8892

	Line reference	Length of Pipe (m)	Dia of pipe In mm
	WS-425 TO WS-427	32	100
	WS-427 TO WS-428	67	100
	WS-427 TO WS-433	176	100
	WS-429 TO WS-431	52	100
	WS-430 TO WS-431	79	100
		9298 ✓	
	Summary		
	100 mm dia distribution pipe	9298 ✓	MTR
		mh	

VATIKA TWIN008 SEC-88A & 88B			
Measurement Sheet for SEWER			
	Line reference	Length of Pipe (m)	Dia of pipe in mm
	For Distribution Line		
	SW-101 TO SW-102	127	200
	SW-102 TO SW-108	146	250
	SW-103 TO SW-107	166	200
	SW-104 TO SW-105	82	200
	SW-106 TO SW-107	175	200
	SW-107 TO SW-108	128	250
	SW-108 TO SW-119	60	250
	SW-109 TO SW-111	17	200
	SW-110 TO SW-111	95	200
	SW-111 TO SW-113	57	200
	SW-112 TO SW-113	95	200
	SW-113 TO SW-118	61	200
	SW-114 TO SW-116	175	200
	SW-115 TO SW-117	84	200
	SW-116 TO SW-117	30	200
	SW-117 TO SW-118	63	200
	SW-118 TO SW-119	84	250
	SW-119 TO SW-122	162	250
	SW-120 TO SW-121	63	200
	SW-121 TO SW-122	52	200
	SW-122 TO SW-124	71	250
	SW-123 TO SW-124	23	200
	SW-124 TO SW-126	72	250
	SW-125 TO SW-126	95	200
	SW-126 TO SW-127	64	250
	SW-126A TO SW-127	96	200
	SW-127 TO SW-149	47	250
	SW-128 TO SW-129	44	200
	SW-129 TO SW-133	114	200
	SW-130 TO SW-131	44	200
	SW-131 TO SW-132	162	200
	SW-132 TO SW-133	31	200
	SW-133 TO SW-135	60	200
	SW-134 TO SW-135	86	200
	SW-135 TO SW-137	74	200
	SW-136 TO SW-137	88	200
	SW-137 TO SW-139	90	250
	SW-138 TO SW-139	50	200
	SW-139 TO SW-144	161	250
	SW-140 TO SW-141	52	200
	SW-141 TO SW-142	18	200
	SW-142 TO SW-143	13	200
	SW-143 TO SW-144	144	200

	Line reference	Length of Pipe (m)	Dia of pipe In mm
	SW-144 TO SW-146	35	250
	SW-145 TO SW-146	82	200
	SW-146 TO SW-148	83	250
	SW-147 TO SW-148	125	200
	SW-148 TO SW-149	75	250
	SW-150 TO SW-151	38	200
	SW-149 TO SW-151	24	300
	SW-151 TO SW-153	107	300
	SW-152 TO SW-153	151	200
	SW-153 TO SW-156	69	300
	SW-154 TO SW-155	20	200
	SW-155 TO SW-156	107	200
	SW-156 TO SW-157	117	300
	SW-157 TO STP-01	50	300
	SW-158 TO SW-159	51	200
	SW-159 TO SW-163	65	250
	SW-160 TO SW-162	25	200
	SW-162 TO SW-163	130	200
	SW-161 TO SW-162	100	200
	SW-163 TO SW-165	56	250
	SW-164 TO SW-165	113	200
	SW-165 TO SW-167	68	250
	SW-166 TO SW-167	134	200
	SW-167 TO SW-169	67	250
	SW-168 TO SW-169	176	250
	SW-169 TO SW-171	60	250
	SW-170 TO SW-171	109	200
	SW-171 TO SW-175	55	250
	SW-172 TO SW-174	85	200
	SW-173 TO SW-174	54	200
	SW-174 TO SW-175	59	200
	SW-175 TO SW-176	115	250
	SW-176 TO STP-01	15	250
	SW-201 TO SW-202	168	200
	SW-202 TO SW-212	220	200
	SW-203 TO SW-209	50	200
	SW-205 TO SW-206	240	200
	SW-206 TO SW-207	41	200
	SW-204 TO SW-207	40	250
	SW-207 TO SW-208	62	200
	SW-208 TO SW-209	23	200
	SW-209 TO SW-211	220	200
	SW-210 TO SW-211	38	200
	SW-211 TO SW-212	61	250
	SW-212 TO SW-216	67	250
	SW-213 TO SW-215	100	200
	SW-214 TO SW-215	23	200
	SW-215 TO SW-216	171	200
	SW-216 TO SW-220	20	250
	SW-217 TO SW-219	153	200
	SW-218 TO SW-219	16	200
	SW-219 TO SW-220	45	200
	SW-220 TO SW-224	47	250

	Line reference	Length of Pipe (m)	Dia of pipe In mm
	SW-223 TO SW-224	230	200
	SW-224 TO STP-2	60	250
	SW-225 TO SW-227	76	200
	SW-226 TO SW-229	50	200
	SW-228A TO SW-224A	172	200
	SW-225A TO SW-226	172	200
	SW-227A TO SW-228	172	200
	SW-229A TO SW-230	172	200
	SW-230A TO SW-231	211	250
	SW-231 TO STP-02	60	250
		9399	
	Summary		
300 mm dia distribution pipe		387	mt.
250 mm dia distribution pipe		2521	mt.
200 mm dia distribution pipe		6511	mt.
TOTAL		9399	mt.

VATIKA TWN008 SEC-88A & 88B			
Measurement Sheet for Recycle Water Supply			
	Line reference	Length of Pipe (m)	Dia of pipe In mm
	For Distribution Line		
	STP-01 TO -FW-101	15	150 ~~90~~
	FW-101 TO FW-102	97	150 ~~90~~
	FW-102 TO FW-103	60	90
	FW-103 TO FW-104	63	90
	FW-103 TO **PUMP-01**	72	90
	FW-102 TO FW-105	60	90
	FW-105 TO FW-106	98	150 ~~90~~
	FW-105 TO FW-107	242	150 ~~90~~
	FW-107 TO FW-108	67	150 ~~90~~
	FW-108 TO FW-109	58	90
	FW-109 TO FW-110	58	90
	FW-110 TO FW-111	65	90
	FW-111 TO FW-112	130	90
	FW-112 TO FW-113	65	90
	FW-113 TO FW-114	58	90
	FW-114 TO FW-115	21	90
	FW-110 TO FW-113	127	90
	FW-109 TO FW-114	127	90
	FW-108 TO FW-116	107	150 ~~90~~
	FW-116 TO FW-117	89	90
	FW-117 TO FW-118	88	90
	FW-117 TO FW-119	67	90
	FW-119 TO FW-120	113	90
	FW-120 TO FW-121	28	90
	FW-119 TO FW-122	31	90
	FW-122 TO FW-123	164	90
	FW-123 TO FW-124	60	90
	FW-116 TO FW-125	68	150 ~~90~~
	FW-125 TO FW-126	46	90
	FW-125 TO FW-127	146	150 ~~90~~
	FW-127 TO FW-128	117	90
	FW-128 TO FW-129	86	90
	FW-127 TO FW-130	45	150 ~~90~~
	FW-130 TO FW-131	77	90
	FW-130 TO FW-132	82	150 ~~90~~
	FW-132 TO FW-133	110	90
	FW-132 TO **PUMP-02**	39	90
	PUMP-02 TO FW-138	60	90
	FW-138 TO FW-139	25	90
	FW-139 TO FW-140	72	90
	FW-140 TO FW-141	128	90
	FW-141 TO FW-142	72	90
	FW-142 TO FW-143	70	90

	Line reference	Length of Pipe (m)	Dia of pipe In mm
	FW-143 TO FW-144	66	90
	FW-144 TO FW-145	128	90
	FW-138 TO FW-145A	46	150 ~~90~~
	FW-143 TO FW-145A	128	90
	FW-139 TO FW-142	128	90
	FW-145A TO FW-145	65	150 ~~90~~
	FW-145 TO FW-146	75	150 ~~90~~
	FW-146 TO FW-148	122	90
	FW-148 TO FW-149	60	90
	FW-147 TO FW-150	20	90
	FW-150 TO FW-151	83	150 ~~90~~
	FW-151 TO **PUMP-03**	28	150 ~~90~~
	FW-150 TO FW-152	140	150 ~~90~~
	FW-152 TO FW-153	85	90
	FW-153 TO FW-154	66	90
	FW-154 TO FW-155	28	90
	FW-154 TO FW-156	78	90
	FW-153 TO FW-157	170	90
	FW-153 TO FW-158	59	90
	FW-158 TO FW-159	97	90
	FW-158 TO FW-160	59	90
	FW-160 TO FW-161	97	90
	FW-160 TO FW-162	28	90
	FW-152 TO FW-163	52	90
	FW-163 TO FW-164	126	90
	FW-164 TO FW-165	174	90
	FW-164 TO FW-166	141	90
	FW-166 TO FW-167	59	90
	FW-166 TO FW-168	35	90
	FW-163 TO FW-169	153	90
	FW-169 TO FW-170	116	90
	STP-02 TO FW-201	54	90
	FW-201 TO FW-202	56	90
	FW-202 TO FW-203	176	90
	FW-202 TO FW-204	56	90
	FW-204 TO FW-205	176	90
	FW-204 TO FW-206	44	90
	FW-206 TO FW-207	176	90
	FW-206 TO FW-208	32	90
	FW-208 TO FW-210	176	90
	FW-209 TO FW-212	52	90
	FW-211 TO FW-212A	79	90
	FW-208 TO FW-213	67	90
	FW-201 TO FW-214	52	90
	FW-214 TOPUMP-04	33	90
	PUMP-4 TO FW-215	33	150 ~~90~~
	FW-215 TO FW-215A	150	90

	Line reference	Length of Pipe (m)	Dia of pipe In mm
	FW-214 TO FW-216	20	90
	FW-216 TO FW-217	165	90
	FW-217 TO FW-218	120	90
	FW-216 TO FW-219	68	150 ~~90~~
	FW-219 TO FW-220	56	90
	FW-220 TO FW-221	46	90
	FW-220 TO FW-222	182	90
	FW-219 TO FW-223	212	150 ~~90~~
	FW-223 TO FW-224	165	90
	FW-223 TO FW-225	79	90
	FW-225 TO FW-226	62	90
	FW-226 TO FW-227	40	90
	FW-226 TO FW-228	47	90
	FW-228 TO FW-229	320	90
	FW-201 TO FW-420	237	90
		9416	
	Summary		
	150 mm & 90 mm dia distribution pipe	1856 ~~9416~~ 7560	MTR

VATIKA TWN008 SEC-88A & 88B			
Measurement Sheet for STORM			
	Line reference	Length of Pipe (m)	Dia of pipe In mm
	Sector -88 B		
	For Storm Line		
1	**RWH-01** To R-106	100	400
2	R-106 TO R-105	59	400
3	R-105 TO R-103	59	400
4	R-103 TO R-101	50	400
5	R-101 TO R-606	54	400
6	R-606 - RWH-06 TO 706	55	500
7	R-706 TO R-704	70	500
8	R-704 TO R-701	135	500
9	R-701 TO R-901	40	500
10	R-901 TO R-903	130	600
11	R-903 TO R-910	58	600
12	R-910 TO R-912	140	600
13	R-912 TO RWH-09	110	800
14	**RWH-09 - Over flow**	20	800
15	R-102 TO R-103	52	400
16	R-104 TO R-105	102	400
17	R-201 TO R-202	182	400
18	R-202 TO **RWH-02**	25	400
19	R-203 TO R-204	35	400
20	R-204 TO R-206	70	400
21	R-205 TO R-206	58	400
22	R-206 TO R-208	56	400
23	R-207 TO R-208	58	400
24	R-208 TO R-210	60	400
25	R-209 TO R-210	58	400
26	R-210 TO **RWH-02**	65	400
27	R-301 TO R-302	51	400
28	R-302 TO R-304	56	400
29	R-303 TO R-304	51	400
30	R-304 TO R-306	62	400
31	R-305 TO R-306	51	400
32	R-304 TO **RWH-03**	20	400
33	R-401 TO R-402	55	400
34	R-402 TO R-404	107	400

35	R-403 TO R-404	29	400
36	R-404 TO R-406	61	400
37	R-405 TO R-406	78	400
38	R-406 TO R-408	73	400
39	R-407 TO R-408	38	400
40	R-408 TO R-410	98	400
41	R-409 TO R-410	53	400
42	R-410 TO **RWH-04**	30	500
43	R-501 TO R-503	88	500
44	R-502 TO R-503	90	500
45	R-503 TO **RWH-05**	20	500
46	R-601 TO R-603	72	500
47	R-602 TO R-603	40	500
48	R-603 TO R-606	80	500
49	R-605 TO R-606	100	500
50	R-702 TO R-703	57	400
51	R-703 TO R-704	111	400
52	R-705 TO R-706	103	400
53	R-706 TO R-708	77	400
54	R-707 TO R-708	98	400
55	R-708 TO **RWH-07**	15	400
56	R-801 TO R-808	92	400
57	R-802 TO R-808	171	400
58	R-803 TO R-807	95	400
59	R-805 TO R-806	25	400
60	R-804 TO R-806	95	400
61	R-806 TO R-807	64	400
62	R-807 TO R-808	60	400
63	R-808 TO **RWH-08**	25	400
64	R-902 TO R-903	58	600
65	R-906 TO R-907	31	600
66	R-905 TO R-907	45	600
67	R-907 TO R-909	139	600
68	R-908 TO R-909	171	600
69	R-909 TO R-910	112	600
	Sector -88 A		
70	R-1001 TO R-1002	315	400
71	R-1002 TO R-1004	46	400
72	R-1003 TO R-1004	31	400
73	R-1004 TO **RWH-010**	33	400

74	R-1005 TO R-1007	158	400
75	R-1006 TO R-1007	86	400
76	R-1007 TO R-1009	64	400
77	R-1008 TO R-1009	86	400
78	R-1009 TO **RWH-010**	60	400
79	R-1101 TO R-1103	28	400
80	R-1102 TO R-1103	110	400
81	R-1103 TO R-1105	63	400
82	R-1104 TO R-1105	112	400
83	R-1105 TO **RWH-011**	48	400
84	R-1201 TO R-1202	59	400
85	R-1201 TO R-1202	59	400
86	R-1202 TO **RWH-012**	170	400
87	R-1203 TO **RWH-012**	35	400
88	R-1301 TO **RWH-013**	280	400
89	R-1401 TO R-1405	168	400
90	R-1402 TO R-1404	168	400
91	R-1403 TO R-1404	28	400
92	R-1404 TO R-1405	56	400
93	R-1405 TO **RWH-014**	35	400
94	R-1501 TO **RWH-015**	188	400
95	R-1502 TO R-1504	130	400
96	R-1503 TO R-1504	50	400
97	R-1504 TO R-1506	41	400
98	R-1505 TO R-1506	71	400
99	R-1506 TO **RWH-015**	20	400
	Summary		
	Sector 88B		
	400 mm dia pipe	3130 ~	MTR
	500 mm dia pipe	804 ~	MTR
	600 mm dia pipe	884 ~	MTR
	800 mm dia pipe	~~130~~ 162	MTR
	Sector 88A		
	400 mm dia pipe	2798	MTR
	TOTAL PIPE	~~7746~~ 7778	

400 mm ϕ = 3130 + 2798 m = 5928 mt

74	R-1005 TO R-1007	158	400
75	R-1006 TO R-1007	86	400
76	R-1007 TO R-1009	64	400
77	R-1008 TO R-1009	86	400
78	R-1009 TO **RWH-010**	60	400
79	R-1101 TO R-1103	28	400
80	R-1102 TO R-1103	110	400
81	R-1103 TO R-1105	63	400
82	R-1104 TO R-1105	112	400
83	R-1105 TO **RWH-011**	48	400
84	R-1201 TO R-1202	59	400
85	R-1201 TO R-1202	59	400
86	R-1202 TO **RWH-012**	170	400
87	R-1203 TO **RWH-012**	35	400
88	R-1301 TO **RWH-013**	280	400
89	R-1401 TO R-1405	168	400
90	R-1402 TO R-1404	168	400
91	R-1403 TO R-1404	28	400
92	R-1404 TO R-1405	56	400
93	R-1405 TO **RWH-014**	35	400
94	R-1501 TO **RWH-015**	188	400
95	R-1502 TO R-1504	130	400
96	R-1503 TO R-1504	50	400
97	R-1504 TO R-1506	41	400
98	R-1505 TO R-1506	71	400
99	R-1506 TO **RWH-015**	20	400
	Summary		
	Sector 88B		
	400 mm dia pipe	3130 ✓	MTR
	500 mm dia pipe	804 ✓	MTR
	600 mm dia pipe	884 ✓	MTR
	800 mm dia pipe	~~130~~ 168	MTR
	Sector 88A		
	400 mm dia pipe	2798	MTR
	TOTAL PIPE	~~7746~~ 7778	

400 mm ø = 3130 + 2798 m = 5928 mt

74	R-1005 TO R-1007	158	400
75	R-1006 TO R-1007	86	400
76	R-1007 TO R-1009	64	400
77	R-1008 TO R-1009	86	400
78	R-1009 TO **RWH-010**	60	400
79	R-1101 TO R-1103	28	400
80	R-1102 TO R-1103	110	400
81	R-1103 TO R-1105	63	400
82	R-1104 TO R-1105	112	400
83	R-1105 TO **RWH-011**	48	400
84	R-1201 TO R-1202	59	400
85	R-1201 TO R-1202	59	400
86	R-1202 TO **RWH-012**	170	400
87	R-1203 TO **RWH-012**	35	400
88	R-1301 TO **RWH-013**	280	400
89	R-1401 TO R-1405	168	400
90	R-1402 TO R-1404	168	400
91	R-1403 TO R-1404	28	400
92	R-1404 TO R-1405	56	400
93	R-1405 TO **RWH-014**	35	400
94	R-1501 TO **RWH-015**	188	400
95	R-1502 TO R-1504	130	400
96	R-1503 TO R-1504	50	400
97	R-1504 TO R-1506	41	400
98	R-1505 TO R-1506	71	400
99	R-1506 TO **RWH-015**	20	400
	Summary		
	Sector 88B		
	400 mm dia pipe	3130 ~	MTR
	500 mm dia pipe	804 ~	MTR
	600 mm dia pipe	884 ~	MTR
	800 mm dia pipe	~~130~~ 168	MTR
	Sector 88A		
	400 mm dia pipe	2798	MTR
	TOTAL PIPE	~~7746~~ 7778	

400 mm ø = 3130 + 2798 m = 5928 mk

Design Statement of Waste Water collection - sewer line System

Sr. No.	Line No.	Length of Sewer Line	Popn. served by segment	Cumulative Population.	Waste water Generation Factor (as per NCR Plan)	Average Flow	Peaking Factor	Peak Sewage Flow , PF-3	Infiltration @ 10% of Avg. Flow	Design Flow (q) in	Sewer Diameter (D)	Ground level in M	Invert level in M	Depth of IL from GL	Slope - 1 in "L"	Discharge for Full Flow	Velocity for Full Flow	Actual Velocity	Avg. Depth
	From - To	(M)	(Persons)	(Persons)	(lpcd)	MLD		MLD	MLD	LPS	(MM)	U/S MH	D/S MH	U/S (M)		LPS	M / sec	M / sec	(M)
PROPOSED SEWER NETWORK																			
1	SW-101 TO SW-102	127	135	135	20858.75	0.021	3.00	0.0629	0	0.70	200	220.000	219.100	0.900	200	22.96	0.73	0.326	1.2
2	SW-102 TO SW-106	146	162	297	46109.25	0.046	3.00	0.1383	0	1.60	250	220.000	218.415	1.585	250	37.26	0.76	0.377	1.9
3	SW-103 TO SW-107	166	108	108	16767	0.017	3.00	0.0503	0	0.60	200	220.000	219.100	0.900	200	22.96	0.73	0.310	1.3
4	SW-104 TO SW-105	62	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	0.900	200	22.96	0.73	0.365	1.1
5	SW-105 TO SW-107	175	432	432	67068	0.067	3.00	0.2012	0.01	2.40	200	220.000	219.100	0.900	200	22.96	0.73	0.473	1.3
6	SW-107 TO SW-108	128	243	675	104793.75	0.105	3.00	0.3144	0.01	3.80	250	220.000	218.220	1.780	250	37.26	0.76	0.489	2.0
7	SW-108 TO SW-119	60	189	432	67068	0.067	3.00	0.2012	0.01	2.40	250	220.000	217.658	2.343	250	37.26	0.76	0.425	2.5
8	SW-109 TO SW-111	17	81	81	12575.25	0.013	3.00	0.0377	0	0.40	200	220.000	219.100	0.900	200	22.96	0.73	0.274	0.9
9	SW-110 TO SW-111	95	216	216	33534	0.034	3.00	0.1006	0	1.20	200	220.000	219.100	0.900	200	22.96	0.73	0.384	1.1
10	SW-111 TO SW-113	57	243	459	71259.75	0.071	3.00	0.2138	0.01	2.60	200	220.000	218.575	1.425	200	22.96	0.73	0.493	1.6
11	SW-112 TO SW-113	95	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	0.900	200	22.96	0.73	0.365	1.1
12	SW-113 TO SW-116	61	216	405	62876.25	0.063	3.00	0.1886	0.01	2.30	200	220.000	218.575	1.425	200	22.96	0.73	0.466	1.6
13	SW-114 TO SW-118	175	243	243	37726.75	0.038	3.00	0.1132	0	1.30	200	220.000	219.100	0.900	200	22.96	0.73	0.394	1.3
14	SW-115 TO SW-117	84	270	270	41917.5	0.042	3.00	0.1258	0	1.50	200	220.000	219.100	0.900	200	22.96	0.73	0.410	1.1
15	SW-116 TO SW-117	30	216	216	33534	0.034	3.00	0.1006	0	1.20	200	220.000	219.100	0.900	200	22.96	0.73	0.384	1.0
16	SW-117 TO SW-118	93	243	459	71259.75	0.071	3.00	0.2138	0.01	2.60	200	220.000	218.900	1.100	200	22.96	0.73	0.463	1.3
17	SW-118 TO SW-119	84	189	432	67068	0.067	3.00	0.2012	0.01	2.40	250	220.000	218.535	1.465	250	37.26	0.76	0.425	1.6
18	SW-119 TO SW-122	162	243	432	67068	0.067	3.00	0.2012	0.01	2.40	250	220.000	218.149	1.851	250	37.26	0.76	0.425	2.2
19	SW-120 TO SW-121	63	216	216	33534	0.034	3.00	0.1006	0	1.20	200	220.000	219.100	0.900	200	22.96	0.73	0.384	1.1
20	SW-121 TO SW-122	62	189	405	62876.25	0.063	3.00	0.1886	0.01	2.30	200	220.000	218.735	1.265	200	22.96	0.73	0.466	1.4
21	SW-122 TO SW-124	71	297	486	75451.5	0.075	3.00	0.2264	0.01	2.70	250	220.000	218.425	1.575	250	37.26	0.76	0.441	1.7
22	SW-123 TO SW-124	23	243	243	37725.75	0.038	3.00	0.1132	0	1.30	200	220.000	219.100	0.900	200	22.96	0.73	0.394	1.0
23	SW-124 TO SW-126	72	216	459	71259.75	0.071	3.00	0.2138	0.01	2.60	250	220.000	218.935	1.065	250	37.26	0.76	0.437	1.2
24	SW-125 TO SW-126	95	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	0.900	200	22.96	0.73	0.366	1.1
25	SW-126 TO SW-127	84	216	405	62876.25	0.063	3.00	0.1886	0.01	2.30	250	220.000	218.575	1.425	250	37.26	0.76	0.422	1.6
26	SW-126A TO SW-127	96	270	270	41917.5	0.042	3.00	0.1258	0	1.50	200	220.000	219.100	0.900	200	22.96	0.73	0.410	1.1
27	SW-127 TO SW-149	47	189	459	71259.75	0.071	3.00	0.2138	0.01	2.60	250	220.000	218.570	1.430	250	37.26	0.76	0.437	1.5
28	SW-128 TO SW-129	44	297	297	46109.25	0.046	3.00	0.1383	0	1.60	200	220.000	219.100	0.900	200	22.96	0.73	0.420	1.0
29	SW-129 TO SW-133	114	216	513	79643.25	0.080	3.00	0.2389	0.01	2.90	200	220.000	218.830	1.170	200	22.96	0.73	0.499	1.5
30	SW-130 TO SW-131	44	243	243	37726.75	0.038	3.00	0.1132	0	1.30	200	220.000	219.100	0.900	200	22.96	0.73	0.394	1.0
31	SW-131 TO SW-132	162	189	432	67068	0.067	3.00	0.2012	0.01	2.40	200	220.000	218.830	1.170	200	22.96	0.73	0.473	1.6
32	SW-132 TO SW-133	31	297	486	75451.5	0.075	3.00	0.2264	0.01	2.70	200	220.000	217.970	2.030	200	22.96	0.73	0.490	2.1
33	SW-133 TO SW-135	60	243	540	83935	0.084	3.00	0.2515	0.01	3.00	200	220.000	217.765	2.235	200	22.96	0.73	0.504	2.4
34	SW-134 TO SW-135	86	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	0.900	200	22.96	0.73	0.365	1.1
35	SW-135 TO SW-137	74	216	405	62876.25	0.063	3.00	0.1886	0.01	2.30	200	220.000	218.620	1.380	200	22.96	0.73	0.466	1.6
36	SW-136 TO SW-137	38	162	162	25150.5	0.025	3.00	0.0755	0	0.90	200	220.000	219.100	0.900	200	22.96	0.73	0.352	1.1

Sr. No.	Line No.	Length of Sewer Line	Popn. served by segment	Cumulative Population.	Waste water Generation Factor (as per NCR Plan)	Average Flow	Peaking Factor	Peak Sewage Flow , PF-3	Infiltration @ 10% of Avg. Flow	Design Flow (q) in	Sewer Diameter (D)	Ground level in M	Invert level in M	Depth of IL from GL	Slope - 1 in "L"	Discharge for Full Flow	Velocity for Full Flow	Actual Velocity	Avg. Depth
	From - To	(M)	(Persons)	(Persons)	(lpcd)	MLD		MLD	MLD	LPS	(MM)	U/S MH	U/S MH	U/S (M)		LPS	M / sec	M / sec	(M)
37	SW-137 TO SW-139	90	189	351	54492.75	0.054	3.00	0.1635	0.01	2.00	250	220.000	218.610	1.390	250	37.26	0.76	0.404	1.6
38	SW-138 TO SW-139	50	216	216	33534	0.034	3.00	0.1006	0	1.20	200	220.000	219.100	0.900	200	22.96	0.73	0.384	1.0
39	SW-139 TO SW-144	161	243	459	71259.75	0.071	3.00	0.2138	0.01	2.60	250	220.000	218.800	1.200	250	37.26	0.76	0.437	1.5
40	SW-140 TO SW-141	52	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	0.900	200	22.96	0.73	0.365	1.0
41	SW-141 TO SW-142	18	270	459	71259.75	0.071	3.00	0.2138	0.01	2.60	200	220.000	218.790	1.210	200	22.96	0.73	0.483	1.3
42	SW-142 TO SW-143	13	189	459	71259.75	0.071	3.00	0.2138	0.01	2.60	200	220.000	218.650	1.350	200	22.96	0.73	0.483	1.4
43	SW-143 TO SW-144	144	297	486	75451.5	0.075	3.00	0.2264	0.01	2.70	200	220.000	218.535	1.465	200	22.96	0.73	0.490	1.8
44	SW-144 TO SW-146	36	189	486	75451.5	0.075	3.00	0.2264	0.01	2.70	250	220.000	217.765	2.235	250	37.26	0.76	0.441	2.3
45	SW-145 TO SW-146	82	162	162	25150.5	0.025	3.00	0.0755	0	0.90	200	220.000	219.100	0.900	200	22.96	0.73	0.352	1.1
46	SW-146 TO SW-148	93	189	351	54492.75	0.054	3.00	0.1635	0.01	2.00	250	220.000	218.640	1.360	250	37.26	0.76	0.404	1.5
47	SW-147 TO SW-148	120	297	297	46109.25	0.046	3.00	0.1383	0	1.60	200	220.000	219.100	0.900	200	22.96	0.73	0.420	1.2
48	SW-148 TO SW-149	75	189	486	75451.5	0.075	3.00	0.2264	0.01	2.70	250	220.000	218.425	1.575	250	37.26	0.76	0.441	1.7
49	SW-150 TO SW-151	38	243	243	37725.75	0.038	3.00	0.1132	0	1.30	200	220.000	219.100	0.900	200	22.96	0.73	0.394	1.0
50	SW-149 TO SW-151	24	189	189	29342.25	0.029	3.00	0.0880	0	1.00	300	220.000	219.100	0.900	300	55.35	0.78	0.287	0.9
51	SW-151 TO SW-153	107	216	405	62876.25	0.063	3.00	0.1885	0.01	2.30	300	220.000	218.970	1.030	300	55.35	0.78	0.365	1.2
52	SW-152 TO SW-153	151	162	162	25150.5	0.025	3.00	0.0755	0	0.90	200	220.000	219.100	0.900	200	22.96	0.73	0.352	1.1
53	SW-153 TO SW-156	69	189	351	54492.75	0.054	3.00	0.1635	0.01	2.00	300	220.000	218.295	1.705	300	55.35	0.78	0.367	1.8
54	SW-154 TO SW-155	20	243	432	67068	0.067	3.00	0.2012	0.01	2.40	200	220.000	218.015	1.985	200	22.96	0.73	0.473	2.0
55	SW-155 TO SW-156	107	216	459	71259.75	0.071	3.00	0.2138	0.01	2.60	200	220.000	217.865	2.135	200	22.96	0.73	0.483	2.4
56	SW-156 TO SW-157	117	216	432	67068	0.067	3.00	0.2012	0.01	2.40	300	220.000	217.280	2.720	300	55.35	0.78	0.387	2.9
57	SW-157 TO STP-01	50	189	405	62876.25	0.063	3.00	0.1886	0.01	2.30	300	220.000	216.840	3.160	300	55.35	0.78	0.365	3.2
58	SW-158 TO SW-159	31	270	270	41817.5	0.042	3.00	0.1255	0	1.50	200	220.000	219.100	0.900	200	22.96	0.73	0.410	1.0
59	SW-159 TO SW-163	65	189	459	71259.75	0.071	3.00	0.2138	0.01	2.60	250	220.000	218.795	1.205	250	37.26	0.76	0.437	1.3
60	SW-160 TO SW-162	25	297	297	46109.25	0.046	3.00	0.1383	0	1.60	200	220.000	219.100	0.900	200	22.96	0.73	0.420	1.0
61	SW-162 TO SW-163	130	189	486	75451.5	0.075	3.00	0.2264	0.01	2.70	200	220.000	218.925	1.075	200	22.96	0.73	0.490	1.4
62	SW-161 TO SW-162	100	162	162	25150.5	0.025	3.00	0.0755	0	0.90	200	220.000	219.100	0.900	200	22.96	0.73	0.352	1.2
63	SW-163 TO SW-165	56	189	189	29342.25	0.029	3.00	0.0880	0	1.00	250	220.000	218.225	1.775	250	37.26	0.76	0.328	1.9
64	SW-164 TO SW-165	113	297	297	46109.25	0.046	3.00	0.1383	0	1.60	200	220.000	219.100	0.900	200	22.96	0.73	0.420	1.2
65	SW-165 TO SW-167	68	189	486	75451.5	0.075	3.00	0.2264	0.01	2.70	250	220.000	218.485	1.515	250	37.26	0.76	0.441	1.7
66	SW-166 TO SW-167	134	243	243	37725.75	0.038	3.00	0.1132	0	1.30	200	220.000	219.100	0.900	200	22.96	0.73	0.394	1.2
67	SW-167 TO SW-169	67	189	432	67068	0.067	3.00	0.2012	0.01	2.40	250	220.000	218.380	1.620	250	37.26	0.76	0.425	1.8
68	SW-168 TO SW-169	176	216	216	33534	0.034	3.00	0.1006	0	1.20	250	220.000	219.100	0.900	250	37.26	0.76	0.345	1.3
69	SW-169 TO SW-171	80	162	378	59684.5	0.059	3.00	0.1791	0.01	2.20	250	220.000	218.062	1.938	250	37.26	0.76	0.416	2.1
70	SW-170 TO SW-171	109	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	0.900	200	22.96	0.73	0.365	1.2
71	SW-171 TO SW-176	55	243	432	67068	0.067	3.00	0.2012	0.01	2.40	250	220.000	217.772	2.228	250	37.26	0.76	0.425	2.3
72	SW-172 TO SW-174	85	216	216	33534	0.034	3.00	0.1006	0	1.20	200	220.000	218.505	1.495	200	22.96	0.73	0.384	1.7
73	SW-173 TO SW-174	54	216	216	33534	0.034	3.00	0.1006	0	1.20	200	220.000	219.100	0.900	200	22.96	0.73	0.384	1.0
74	SW-174 TO SW-175	59	189	405	62876.25	0.063	3.00	0.1886	0.01	2.30	200	220.000	218.030	1.970	200	22.96	0.73	0.466	2.1
75	SW-175 TO SW-176	115	243	432	67068	0.067	3.00	0.2012	0.01	2.40	250	220.000	217.685	2.315	250	37.26	0.76	0.425	2.5

Sr. No.	Line No.	Length of Sewer Line	Popn. served by segment	Cumulative Population.	Waste water Generation Factor (as per NCR Plan)	Average Flow	Peaking Factor	Peak Sewage Flow , PF-3	Infiltration @ 10% of Avg. Flow	Design Flow (q) in	Sewer Diameter (D)	Ground level in M	Invert level in M	Depth of IL from GL	Slope - 1 in "L"	Discharge for Full Flow	Velocity for Full Flow	Actual Velocity	Avg. Depth
	From - To	(M)	(Persons)	(Persons)	(pcd)	MLD		MLD	MLD	LPS	(MM)	U/S MH	U/S MH	U/S (M)		LPS	M / sec	M / sec	(M)
76	SW-176 TO STP-01	15	162	405	62876.25	0.063	3.00	0.1886	0.01	2.30	250	220.000	217.175	2.825	250	37.26	0.76	0.422	2.9
77	SW-201 TO SW-202	166	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	0.900	200	22.96	0.73	0.365	1.3
78	SW-202 TO SW-212	120	216	405	62876.25	0.063	3.00	0.1886	0.01	2.30	200	220.000	218.220	1.780	200	22.96	0.73	0.466	2.1
79	SW-203 TO SW-209	56	162	162	25150.5	0.025	3.00	0.0755	0	0.90	200	220.000	219.100	0.900	200	22.96	0.73	0.352	1.0
80	SW-205 TO SW-206	240	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	0.900	200	22.96	0.73	0.365	1.5
81	SW-206 TO SW-207	41	243	432	67068	0.067	3.00	0.2012	0.01	2.40	200	220.000	217.850	2.150	200	22.96	0.73	0.473	2.3
82	SW-204 TO SW-207	40	216	216	33534	0.034	3.00	0.1006	0	1.20	250	220.000	219.100	0.900	250	37.26	0.76	0.345	1.0
83	SW-207 TO SW-208	67	216	432	67068	0.067	3.00	0.2012	0.01	2.40	200	220.000	218.890	1.110	200	22.96	0.73	0.473	1.3
84	SW-208 TO SW-209	73	189	405	62876.25	0.063	3.00	0.1886	0.01	2.30	200	220.000	218.530	1.470	200	22.96	0.73	0.466	1.5
85	SW-209 TO SW-211	320	243	432	67068	0.067	3.00	0.2012	0.01	2.40	200	220.000	218.365	1.635	200	22.96	0.73	0.473	2.2
86	SW-210 TO SW-211	38	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	0.900	200	22.96	0.73	0.365	1.0
87	SW-211 TO SW-212	41	216	405	62876.25	0.063	3.00	0.1886	0.01	2.30	250	220.000	217.215	2.785	250	37.26	0.76	0.422	2.9
88	SW-212 TO SW-216	67	162	162	25150.5	0.025	3.00	0.0755	0	0.90	250	220.000	219.100	0.900	250	37.26	0.76	0.316	1.0
89	SW-213 TO SW-215	100	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	0.900	200	22.96	0.73	0.365	1.2
90	SW-214 TO SW-215	23	243	243	37725.75	0.038	3.00	0.1132	0	1.30	200	220.000	219.100	0.900	200	22.96	0.72	0.394	1.0
91	SW-215 TO SW-216	171	216	459	71259.75	0.071	3.00	0.2138	0.01	2.60	200	220.000	218.935	1.065	200	22.96	0.73	0.483	1.5
92	SW-216 TO SW-220	20	216	432	67068	0.067	3.00	0.2012	0.01	2.40	250	220.000	218.030	1.970	250	37.26	0.76	0.425	2.0
93	SW-217 TO SW-219	153	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	0.900	200	22.96	0.73	0.365	1.3
94	SW-218 TO SW-219	16	243	243	37725.75	0.038	3.00	0.1132	0	1.30	200	220.000	219.100	0.900	200	22.96	0.73	0.394	0.9
95	SW-219 TO SW-220	45	189	432	67068	0.067	3.00	0.2012	0.01	2.40	200	220.000	218.970	1.030	200	22.96	0.73	0.473	1.1
96	SW-220 TO SW-224	47	216	216	33534	0.034	3.00	0.1006	0	1.20	250	220.000	217.900	2.100	250	37.26	0.76	0.345	2.2
97	SW-222 TO SW-224	230	162	162	25150.5	0.025	3.00	0.0755	0	0.90	200	220.000	218.400	1.600	200	22.96	0.73	0.352	2.2
98	SW-224 TO STP-2	60	189	351	54492.75	0.054	3.00	0.1635	0.01	2.00	250	220.000	217.200	2.800	250	37.26	0.76	0.404	2.9
99	SW-225 TO SW-227	76	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	0.900	200	22.96	0.73	0.365	1.1
100	SW-226 TO SW-229	50	243	243	37725.75	0.038	3.00	0.1132	0	1.30	200	220.000	219.100	0.900	200	22.96	0.73	0.394	1.0
101	SW-225A TO SW-224A	172	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	0.900	200	22.96	0.73	0.365	1.3
102	SW-225A TO SW-226	172	216	216	33534	0.034	3.00	0.1006	0	1.20	200	220.000	219.100	0.900	200	22.96	0.73	0.384	1.3
103	SW-227A TO SW-228	172	162	162	25150.5	0.025	3.00	0.0755	0	0.90	200	220.000	219.100	0.900	200	22.96	0.73	0.352	1.3
104	SW-229A TO SW-230	172	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	0.900	200	22.96	0.73	0.365	1.3
105	SW-230A TO SW-231	211	243	243	37725.75	0.038	3.00	0.1132	0	1.30	250	220.000	218.190	1.810	250	37.26	0.76	0.366	2.2
106	SW-231 TO STP-02	60	189	432	67068	0.067	3.00	0.2012	0.01	2.40	250	220.000	217.296	2.704	250	37.26	0.76	0.425	2.8

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Design Statement of Waste Water collection - sewer line System

Sr. No.	Line No.	Length of Sewer Line	Popn. served by segment	Cumulative Population.	Waste water Generation Factor (as per NCR Plan)	Average Flow	Peaking Factor	Peak Sewage Flow , PF-3	Infiltration @ 10% of Avg. Flow	Design Flow (q) in	Sewer Diameter (D)	Ground level in M	Invert level in M		Depth of IL from GL		Slope - 1 in "L"	Avg. Depth
	From - To	(M)	(Persons)	(Persons)	(lpcd)	MLD		MLD	MLD	LPS	(MM)	U/S M.H	U/S.MH	D/S.M.H	U/S (M)	D/S (M)		(M)
PROPOSED SEWER NETWORK																		
1	SW-101 TO SW-102	127	135	135	20958.75	0.021	3.00	0.0629	0	0.70	200	220.000	219.100	218.465	0.900	1.535	200	1.2
2	SW-102 TO SW-106	146	162	297	46109.25	0.046	3.00	0.1383	0	1.60	250	220.000	218.415	217.831	1.585	2.169	250	1.9
3	SW-103 TO SW-107	166	108	108	16767	0.017	3.00	0.0503	0	0.60	200	220.000	219.100	218.270	0.900	1.730	200	1.3
4	SW-104 TO SW-105	62	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	218.790	0.900	1.210	200	1.1
5	SW-106 TO SW-107	175	432	432	67068	0.067	3.00	0.2012	0.01	2.40	200	220.000	219.100	218.225	0.900	1.775	200	1.3
6	SW-107 TO SW-108	128	243	675	104793.75	0.105	3.00	0.3144	0.01	3.80	250	220.000	218.220	217.708	1.780	2.292	250	2.0
7	SW-108 TO SW-119	60	189	432	67068	0.067	3.00	0.2012	0.01	2.40	250	220.000	217.658	217.418	2.342	2.582	250	2.5
8	SW-109 TO SW-111	17	81	81	12575.25	0.013	3.00	0.0377	0	0.40	200	220.000	219.100	219.015	0.900	0.985	200	0.9
9	SW-110 TO SW-111	95	216	216	33534	0.034	3.00	0.1006	0	1.20	200	220.000	219.100	218.625	0.900	1.375	200	1.1
10	SW-111 TO SW-113	57	243	459	71259.75	0.071	3.00	0.2138	0.01	2.60	200	220.000	218.575	218.290	1.425	1.710	200	1.6
11	SW-112 TO SW-113	95	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	218.625	0.900	1.375	200	1.1
12	SW-113 TO SW-118	81	216	405	62876.25	0.063	3.00	0.1886	0.01	2.30	200	220.000	218.575	218.270	1.425	1.730	200	1.6
13	SW-114 TO SW-118	175	243	243	37725.75	0.038	3.00	0.1132	0	1.30	200	220.000	219.100	218.225	0.900	1.775	200	1.3
14	SW-115 TO SW-117	84	270	270	41917.5	0.042	3.00	0.1258	0	1.50	200	220.000	219.100	218.650	0.900	1.320	200	1.1
15	SW-116 TO SW-117	30	216	216	33534	0.034	3.00	0.1006	0	1.20	200	220.000	219.100	218.950	0.900	1.050	200	1.0
16	SW-117 TO SW-118	63	243	459	71259.75	0.071	3.00	0.2138	0.01	2.60	200	220.000	218.900	218.585	1.100	1.415	200	1.3
17	SW-118 TO SW-119	84	189	432	67068	0.067	3.00	0.2012	0.01	2.40	250	220.000	218.535	218.199	1.465	1.801	250	1.6
18	SW-119 TO SW-122	162	243	432	67068	0.067	3.00	0.2012	0.01	2.40	250	220.000	217.418	216.770	2.582	3.230	250	2.9
19	SW-120 TO SW-121	63	216	216	33534	0.034	3.00	0.1006	0	1.20	200	220.000	218.100	217.785	1.900	2.215	200	2.1
20	SW-121 TO SW-122	52	189	405	62876.25	0.063	3.00	0.1886	0.01	2.30	200	220.000	217.735	217.475	2.265	2.525	200	2.4
21	SW-122 TO SW-124	71	297	486	75451.5	0.075	3.00	0.2264	0.01	2.70	250	220.000	216.770	216.486	3.230	3.514	250	3.4
22	SW-123 TO SW-124	23	243	243	37725.75	0.038	3.00	0.1132	0	1.30	200	220.000	218.100	217.985	1.900	2.015	200	2.0
23	SW-124 TO SW-126	72	216	459	71259.75	0.071	3.00	0.2138	0.01	2.60	250	220.000	216.486	216.198	3.514	3.802	250	3.7
24	SW-125 TO SW-126	95	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	218.500	218.025	1.500	1.975	200	1.7
25	SW-126 TO SW-127	84	216	405	62876.25	0.063	3.00	0.1886	0.01	2.30	250	220.000	216.198	215.942	3.802	4.058	250	3.9
26	SW-126A TO SW-127	95	270	270	41917.5	0.042	3.00	0.1258	0	1.50	200	220.000	219.100	218.620	0.900	1.380	200	1.1
27	SW-127 TO SW-149	47	189	459	71259.75	0.071	3.00	0.2138	0.01	2.60	250	220.000	215.942	215.754	4.058	4.246	250	4.2
28	SW-128 TO SW-129	44	297	297	46109.25	0.046	3.00	0.1383	0	1.60	200	220.000	219.100	218.880	0.900	1.120	200	1.0
29	SW-129 TO SW-133	114	216	513	79643.25	0.080	3.00	0.2389	0.01	2.90	200	220.000	218.830	218.260	1.170	1.740	200	1.5
30	SW-130 TO SW-131	44	243	243	37725.75	0.038	3.00	0.1132	0	1.30	200	220.000	219.100	218.880	0.900	1.120	200	1.0
31	SW-131 TO SW-132	162	189	432	67068	0.067	3.00	0.2012	0.01	2.40	200	220.000	218.830	218.020	1.170	1.980	200	1.6
32	SW-132 TO SW-133	31	297	486	75451.5	0.075	3.00	0.2264	0.01	2.70	200	220.000	217.970	217.815	2.030	2.185	200	2.1
33	SW-133 TO SW-136	60	243	540	83835	0.084	3.00	0.2515	0.01	3.00	200	220.000	217.765	217.465	2.235	2.535	200	2.4
34	SW-134 TO SW-135	86	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	218.670	0.900	1.330	200	1.1

Sr. No.	Line No.	Length of Sewer Line	Popn. served by segment	Cumulative Population.	Waste water Generation Factor (as per NCR Plan)	Average Flow	Peaking Factor	Peak Sewage Flow , PF-3	Infiltration @ 10% of Avg. Flow	Design Flow (q) in	Sewer Diameter (D)	Ground level in M	Invert level in M		Depth of IL from GL		Slope - 1 in "L"	Avg. Depth
	From - To	(M)	(Persons)	(Persons)	(lpcd)	MLD		MLD	MLD	LPS	(MM)	U/S. MH	U/S.MH	D/S.M.H	U/S (M)	D/S (M)		(M)
35	SW-135 TO SW-137	74	216	405	62876.25	0.063	3.00	0.1886	0.01	2.30	200	220.000	218.620	218.250	1.380	1.750	200	1.6
36	SW-136 TO SW-137	66	162	162	25150.5	0.025	3.00	0.0755	0	0.90	200	220.000	219.100	218.660	0.900	1.340	200	1.1
37	SW-137 TO SW-139	90	189	351	54492.75	0.054	3.00	0.1635	0.01	2.00	250	220.000	218.610	218.250	1.390	1.750	250	1.6
38	SW-138 TO SW-139	50	216	216	33534	0.034	3.00	0.1006	0	1.20	200	220.000	219.100	218.850	0.900	1.150	200	1.0
39	SW-139 TO SW-144	181	243	459	71259.75	0.071	3.00	0.2138	0.01	2.60	250	220.000	218.800	218.156	1.200	1.844	250	1.5
40	SW-140 TO SW-141	52	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	218.840	0.900	1.160	200	1.0
41	SW-141 TO SW-142	18	270	459	71259.75	0.071	3.00	0.2138	0.01	2.60	200	220.000	218.790	218.700	1.210	1.300	200	1.3
42	SW-142 TO SW-143	13	189	459	71259.75	0.071	3.00	0.2138	0.01	2.60	200	220.000	218.650	218.585	1.350	1.415	200	1.4
43	SW-143 TO SW-144	144	297	486	75451.5	0.075	3.00	0.2264	0.01	2.70	200	220.000	218.535	217.815	1.465	2.185	200	1.8
44	SW-144 TO SW-146	35	189	486	75451.5	0.075	3.00	0.2264	0.01	2.70	250	220.000	217.765	217.625	2.235	2.375	250	2.3
45	SW-145 TO SW-146	82	162	162	25150.5	0.025	3.00	0.0755	0	0.90	200	220.000	219.100	218.690	0.900	1.310	200	1.1
46	SW-146 TO SW-148	63	189	351	54492.75	0.054	3.00	0.1635	0.01	2.00	250	220.000	218.640	218.306	1.360	1.692	250	1.5
47	SW-147 TO SW-148	125	297	297	46109.25	0.046	3.00	0.1383	0	1.60	200	220.000	219.100	218.475	0.900	1.525	200	1.2
48	SW-148 TO SW-149	75	189	486	75451.5	0.075	3.00	0.2264	0.01	2.70	250	220.000	218.425	218.125	1.575	1.875	250	1.7
49	SW-150 TO SW-151	38	243	243	37725.75	0.038	3.00	0.1132	0	1.30	200	220.000	219.100	218.910	0.900	1.090	200	1.0
50	SW-149 TO SW-151	24	189	189	29342.25	0.029	3.00	0.0880	0	1.00	300	220.000	215.754	215.674	4.246	4.326	300	4.3
51	SW-151 TO SW-153	107	216	405	62876.25	0.063	3.00	0.1886	0.01	2.30	300	220.000	215.674	215.317	4.326	4.683	300	4.5
52	SW-152 TO SW-153	151	162	162	25150.5	0.025	3.00	0.0755	0	0.90	200	220.000	219.100	218.345	0.900	1.655	200	1.3
53	SW-153 TO SW-156	69	189	351	54492.75	0.054	3.00	0.1635	0.01	2.00	300	220.000	215.317	215.087	4.683	4.913	300	4.8
54	SW-154 TO SW-155	20	243	432	67068	0.067	3.00	0.2012	0.01	2.40	200	220.000	215.037	214.937	4.963	5.063	200	5.0
55	SW-155 TO SW-156	107	216	459	71259.75	0.071	3.00	0.2138	0.01	2.60	200	220.000	214.887	214.352	5.113	5.648	200	5.4
56	SW-156 TO SW-157	117	216	432	67068	0.067	3.00	0.2012	0.01	2.40	300	220.000	215.087	214.697	4.913	5.303	300	5.1
57	SW-157 TO STP-01	50	189	405	62876.25	0.063	3.00	0.1886	0.01	2.30	300	220.000	214.647	214.481	5.353	5.519	300	5.4
58	SW-158 TO SW-159	51	270	270	41917.5	0.042	3.00	0.1258	0	1.50	200	220.000	219.100	218.845	0.900	1.155	200	1.0
59	SW-159 TO SW-163	65	189	459	71259.75	0.071	3.00	0.2138	0.01	2.60	250	220.000	218.795	218.535	1.205	1.465	250	1.3
60	SW-160 TO SW-162	25	297	297	46109.25	0.046	3.00	0.1383	0	1.60	200	220.000	219.100	218.975	0.900	1.025	200	1.0
61	SW-162 TO SW-163	130	189	486	75451.5	0.075	3.00	0.2264	0.01	2.70	200	220.000	218.925	218.275	1.075	1.725	200	1.4
62	SW-161 TO SW-162	100	162	162	25150.5	0.025	3.00	0.0755	0	0.90	200	220.000	219.100	218.600	0.900	1.400	200	1.2
63	SW-163 TO SW-165	56	189	189	29342.25	0.029	3.00	0.0880	0	1.00	250	220.000	218.225	218.001	1.775	1.999	250	1.9
64	SW-164 TO SW-165	113	297	297	46109.25	0.046	3.00	0.1383	0	1.60	200	220.000	219.100	218.535	0.900	1.465	200	1.2
65	SW-165 TO SW-167	66	189	486	75451.5	0.075	3.00	0.2264	0.01	2.70	250	220.000	218.485	218.213	1.515	1.787	250	1.7
66	SW-166 TO SW-167	134	243	243	37725.75	0.038	3.00	0.1132	0	1.30	200	220.000	219.100	218.430	0.900	1.570	200	1.2
67	SW-167 TO SW-169	67	189	432	67068	0.067	3.00	0.2012	0.01	2.40	250	220.000	218.380	218.112	1.620	1.888	250	1.8
68	SW-168 TO SW-169	176	216	216	33534	0.034	3.00	0.1006	0	1.20	250	220.000	219.100	218.396	0.900	1.604	250	1.3
69	SW-169 TO SW-171	80	162	378	58684.5	0.059	3.00	0.1761	0.01	2.20	250	220.000	218.062	217.822	1.938	2.178	250	2.1
70	SW-170 TO SW-171	109	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	218.555	0.900	1.445	200	1.2
71	SW-171 TO SW-175	55	243	432	67068	0.067	3.00	0.2012	0.01	2.40	250	220.000	217.772	217.552	2.228	2.448	250	2.3

Sr. No.	Line No.	Length of Sewer Line	Popn. served by segment	Cumulative Population.	Waste water Generation Factor (as per NCR Plan)	Average Flow	Peaking Factor	Peak Sewage Flow , PF-3	Infiltration @ 10% of Avg. Flow	Design Flow (q) in	Sewer Diameter (D)	Ground level in M	Invert level in M		Depth of IL from GL		Slope - 1 in "L"	Avg. Depth
	From - To	(M)	(Persons)	(Persons)	(lpcd)	MLD		MLD	MLD	LPS	(MM)	U/S. MH	U/S.MH	DIS.M.H	U/S (M)	DIS (M)		(M)
72	SW-172 TO SW-174	85	216	216	33534	0.034	3.00	0.1006	0	1.20	200	220.000	218.505	218.080	1.495	1.920	200	1.7
73	SW-173 TO SW-174	54	216	216	33534	0.034	3.00	0.1006	0	1.20	200	220.000	219.100	218.830	0.900	1.170	200	1.0
74	SW-174 TO SW-175	59	189	405	62876.25	0.063	3.00	0.1886	0.01	2.30	200	220.000	218.030	217.735	1.970	2.265	200	2.1
75	SW-175 TO SW-176	115	243	432	67068	0.067	3.00	0.2012	0.01	2.40	250	220.000	217.685	217.225	2.315	2.775	250	2.5
76	SW-176 TO STP-01	15	162	405	62876.25	0.063	3.00	0.1886	0.01	2.30	250	220.000	217.175	217.115	2.825	2.885	250	2.9
77	SW-201 TO SW-202	165	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	218.270	0.900	1.730	200	1.3
78	SW-202 TO SW-212	220	216	405	62876.25	0.063	3.00	0.1886	0.01	2.30	200	220.000	218.220	217.620	1.780	2.380	200	2.1
79	SW-203 TO SW-206	50	162	162	25150.5	0.025	3.00	0.0755	0	0.90	200	220.000	219.100	218.850	0.900	1.150	200	1.0
80	SW-205 TO SW-206	240	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	217.900	0.900	2.100	200	1.5
81	SW-206 TO SW-207	41	243	432	67068	0.067	3.00	0.2012	0.01	2.40	200	220.000	217.850	217.645	2.150	2.355	200	2.3
82	SW-204 TO SW-207	40	216	216	33534	0.034	3.00	0.1006	0	1.20	250	220.000	219.100	217.645	0.900	2.355	250	1.6
83	SW-207 TO SW-208	62	216	432	67068	0.067	3.00	0.2012	0.01	2.40	200	220.000	217.595	217.285	2.405	2.715	200	2.6
84	SW-208 TO SW-209	23	189	405	62876.25	0.063	3.00	0.1886	0.01	2.30	200	220.000	217.235	217.120	2.765	2.880	200	2.8
85	SW-209 TO SW-211	220	243	432	67068	0.067	3.00	0.2012	0.01	2.40	200	220.000	217.070	216.970	2.930	4.030	200	3.5
86	SW-210 TO SW-211	38	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	216.970	0.900	4.030	200	2.5
87	SW-211 TO SW-212	61	216	405	62876.25	0.063	3.00	0.1886	0.01	2.30	250	220.000	215.920	215.676	4.080	4.324	250	4.2
88	SW-212 TO SW-216	67	162	162	25150.5	0.025	3.00	0.0755	0	0.90	250	220.000	215.676	215.408	4.324	4.592	250	4.5
89	SW-213 TO SW-215	100	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	218.600	0.900	1.400	200	1.2
90	SW-214 TO SW-215	23	243	243	37725.75	0.038	3.00	0.1132	0	1.30	200	220.000	219.100	218.985	0.900	1.015	200	1.0
91	SW-215 TO SW-216	171	216	459	71259.75	0.071	3.00	0.2139	0.01	2.60	200	220.000	218.935	218.080	1.065	1.920	200	1.6
92	SW-216 TO SW-220	20	216	432	67068	0.067	3.00	0.2012	0.01	2.40	250	220.000	215.408	215.328	4.592	4.672	250	4.6
93	SW-217 TO SW-219	153	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	218.335	0.900	1.665	200	1.3
94	SW-218 TO SW-219	16	243	243	37725.75	0.038	3.00	0.1132	0	1.30	200	220.000	219.100	219.020	0.900	0.980	200	0.9
95	SW-219 TO SW-220	45	189	432	67068	0.067	3.00	0.2012	0.01	2.40	200	220.000	218.970	218.745	1.030	1.255	200	1.1
96	SW-220 TO SW-224	47	216	216	33534	0.034	3.00	0.1006	0	1.20	250	220.000	215.278	215.090	4.722	4.910	250	4.8
97	SW-223 TO SW-224	230	162	162	25150.5	0.025	3.00	0.0755	0	0.90	200	220.000	218.400	217.250	1.600	2.750	200	2.2
98	SW-224 TO STP-2	60	189	351	54492.75	0.054	3.00	0.1635	0.01	2.00	250	220.000	215.090	214.850	4.910	5.150	250	5.0
99	SW-225 TO SW-227	76	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	218.720	0.900	1.280	200	1.1
100	SW-226 TO SW-228	50	243	243	37725.75	0.038	3.00	0.1132	0	1.30	200	220.000	219.100	218.850	0.900	1.150	200	1.0
101	SW-228A TO SW-224A	172	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	219.100	218.240	0.900	1.760	200	1.3
102	SW-225A TO SW-226	172	216	216	33534	0.034	3.00	0.1006	0	1.20	200	220.000	218.900	218.040	1.100	1.960	200	1.5
103	SW-227A TO SW-228	172	162	162	25150.5	0.025	3.00	0.0755	0	0.90	200	220.000	218.700	217.840	1.300	2.160	200	1.7
104	SW-229A TO SW-230	172	189	189	29342.25	0.029	3.00	0.0880	0	1.00	200	220.000	218.500	217.640	1.500	2.360	200	1.9
105	SW-230A TO SW-231	211	243	243	37725.75	0.038	3.00	0.1132	0	1.30	250	220.000	217.590	216.746	2.410	3.254	250	2.8
106	SW-231 TO STP-02	60	189	432	67068	0.067	3.00	0.2012	0.01	2.40	250	220.000	216.696	216.456	3.304	3.544	250	3.4
		9399																

SEWER

Design Statement of Water Supp

C=120

Distribution main

Sr. No.	Junction	Length	sec_pop	Tot_pop	Total Water Demand	Peak demand	Pipe Dia	Hl/km	Total Head loss	HGL	GL	Terminal Head	Remark
		Mtrs.			LPM	LPM	mm	Mtrs.	Mtrs.	265.000	220.000	45.00	Pump
1	PUMP-01 TO WS-101	72	54	4108.5	480666	1381998	100	51.911	3.738	261.262	220.000	41.26	
2	WS-101 TO WS-102	63	81	4054.5	454611	1363833	100	50.656	3.191	258.071	220.000	38.07	
3	WS-101 TO WS-103	60	162	3973.5	445529	1336587	100	48.800	2.928	255.143	220.000	35.14	
4	WS-103 TO WS-104	97	108	3811.5	427364	1282092	100	45.183	4.383	250.760	220.000	30.76	
5	WS-103 TO WS-105	60	135	3703.5	415255	1245765	100	42.843	2.571	255.500	220.000	35.50	
6	WS-105 TO WS-106	96	94.5	3568.5	400118	1200354	100	39.999	3.920	251.580	220.000	31.58	
7	WS-105 TO WS-107	242	162	3474	389522	1168566	100	38.061	9.211	248.860	220.000	28.86	
8	WS-107 TO WS-108	67	135	3312	371358	1114074	100	34.843	2.334	246.526	220.000	26.53	
9	WS-108 TO WS-109	58	162	3177	356221	1068663	100	32.261	1.871	244.655	220.000	24.66	
10	WS-109 TO WS-110	70	81	3015	338057	1014171	100	29.284	2.050	246.810	220.000	26.81	
11	WS-110 TO WS-111	65	189	2934	328975	986925	100	27.845	1.810	245.000	220.000	25.00	
12	WS-111 TO WS-112	130	81	2745	307783	923349	100	24.618	3.200	241.800	220.000	21.80	
13	WS-112 TO WS-113	65	189	2664	298701	896103	100	23.291	1.514	245.298	220.000	25.30	
14	WS-113 TO WS-114	58	81	2475	277509	832527	100	20.326	1.179	244.117	220.000	24.12	
15	WS-114 TO WS-115	21	162	2394	268427	805281	100	19.113	0.401	243.716	220.000	23.72	
16	WS-114 TO WS-109	127	216	2232	250263	750789	100	16.789	2.132	243.164	220.000	23.16	
17	WS-113 TO WS-110	127	54	2016	226044	678132	100	13.908	1.766	241.398	220.000	21.40	
18	WS-107 TO WS-117	107	162	1962	219989	659967	100	13.226	1.415	242.702	220.000	22.70	
19	WS-116 TO WS-117	68	135	1800	201825	605475	100	11.277	0.767	241.935	220.000	21.94	
20	WS-117 TO WS-118	89	162	1665	186688	560064	100	9.763	0.869	243.248	220.000	23.25	
21	WS-118 TO WS-119	85	135	1503	168524	505572	100	8.078	0.687	242.561	220.000	22.56	
22	WS-118 TO WS-120	67	162	1368	153387	460161	100	6.787	0.455	242.106	220.000	22.11	
23	WS-120 TO WS-121	113	216	1206	135223	405669	100	5.376	0.607	264.393	220.000	44.39	
24	WS-121 TO WS-122	28	162	990	111004	333012	100	3.731	0.104	264.289	220.000	44.29	
25	WS-123 TO WS-124	164	135	828	92840	278520	100	2.681	0.440	263.953	220.000	43.95	
26	WS-124 TO WS-125	60	693	693	77703	233109	100	1.929	0.116	263.837	220.000	43.84	
										265.000	220.000	45.00	
27	PUMP-02 TO WS-201	39	81	1512	169533	508599	100	8.168	0.319	264.681	220.000	44.68	
28	WS-201 TO WS-202	110	54	432	48438	145314	100	0.805	0.089	264.592	220.000	44.59	
29	WS-201 TO WS-203	82	81	378	42383	127149	100	0.628	0.051	264.541	220.000	44.54	
30	WS-203 TO WS-204	77	27	297	33301	99903	100	0.402	0.031	264.650	220.000	44.65	
31	WS-205 TO WS-206	117	54	270	30274	90822	100	0.337	0.039	264.611	220.000	44.61	
32	WS-206 TO WS-207	86	81	216	24219	72657	100	0.223	0.019	264.573	220.000	44.57	
33	WS-205 TO WS-208	146	54	135	15137	45411	100	0.094	0.014	264.559	220.000	44.56	
34	WS-208 TO WS-209	46	81	81	9082	27246	100	0.036	0.002	264.590	220.000	44.59	
35	PUMP-02 TO WS-210	60	81	1080	121095	363285	100	4.383	0.263	264.327	220.000	44.33	
36	WS-210 TO WS-211	25	81	999	112013	336039	100	3.794	0.095	264.232	220.000	44.23	
37	WS-211 TO WS-212	72	54	918	102931	308793	100	3.245	0.234	243.482	220.000	23.48	

Design Statement of Water Supply

C=120

Distribution main

Sr. No.	Junction	Length	sec_pop	Tot_pop	Total Water Demand	Peak demand	Pipe Dia	Hl/km	Total Head loss	HGL	GL	Terminal Head	Remark
38	WS-212 TO WS-213	128	108	864	96876	290628	100	2.901	0.371	243.111	220.000	23.11	
39	WS-213 TO WS-214	72	54	756	84767	254301	100	2.266	0.163	264.427	220.000	44.43	
40	WS-214 TO WS-215	70	81	702	78712	236136	100	1.975	0.138	264.289	220.000	44.29	
41	WS-215 TO WS-216	66	27	621	69630	208890	100	1.575	0.104	264.185	220.000	44.19	
42	WS-214 TO WS-211	128	81	594	66602	199806	100	1.450	0.186	264.241	220.000	44.24	
43	WS-215 TO WS-217	128	54	513	57520	172560	100	1.106	0.142	264.099	220.000	44.10	
44	WS-216 TO WS-218	128	81	459	51465	154395	100	0.900	0.115	263.984	220.000	43.98	
45	WS-210 TO WS-217	46	54	378	42383	127149	100	0.828	0.029	264.212	220.000	44.21	
46	WS-217 TO WS-218	65	27	324	36329	108987	100	0.473	0.031	264.181	220.000	44.18	
47	WS-218 TO WS-219	75	81	297	33301	99903	100	0.402	0.030	263.954	220.000	43.95	
48	WS-219 TO WS-220	122	54	216	24219	72657	100	0.223	0.027	263.927	220.000	43.93	
49	WS-220 TO WS-221	60	81	162	18164	54492	100	0.131	0.008	264.204	220.000	44.20	
										265.000	220.000	45.00	
50	PUMP-03 TO WS-301	28	81	2646	296683	890049	100	23.001	0.644	264.356	220.000	44.36	
51	WS-301 TO WS-302	83	54	1323	148341	445023	100	6.380	0.530	263.826	220.000	43.83	
52	WS-302 TO WS-303	124	108	1269	142287	426861	100	5.907	0.732	263.094	220.000	43.09	
53	WS-303 TO WS-304	85	54	1161	130177	390531	100	5.011	0.426	263.930	220.000	43.93	
54	WS-304 TO WS-305	66	81	1107	124122	372366	100	4.588	0.303	263.627	220.000	43.63	
55	WS-305 TO WS-306	26	27	1026	115040	345120	100	3.986	0.112	263.515	220.000	43.52	
56	WS-305 TO WS-307	78	81	999	112013	336039	100	3.794	0.296	263.219	220.000	43.22	
57	WS-304 TO WS-308	170	81	918	102931	308793	100	3.245	0.552	263.075	220.000	43.08	
58	WS-304 TO WS-309	59	54	837	93849	281547	100	2.735	0.161	262.914	220.000	42.91	
59	WS-309 TO WS-310	97	108	783	87794	263382	100	2.418	0.235	262.679	220.000	42.68	
60	WS-309 TO WS-311	59	54	675	75684	227052	100	1.837	0.108	262.571	220.000	42.57	
61	WS-311 TO WS-312	97	81	621	69630	208890	100	1.575	0.153	262.418	220.000	42.42	
62	WS-311 TO WS-313	28	27	540	60548	181644	100	1.216	0.034	262.645	220.000	42.65	
63	WS-303 TO WS-314	52	81	513	57520	172560	100	1.106	0.058	262.587	220.000	42.59	
64	WS-314 TO WS-315	126	54	432	48438	145314	100	0.805	0.101	262.486	220.000	42.49	
65	WS-315 TO WS-316	174	81	378	42383	127149	100	0.628	0.109	262.309	220.000	42.31	
66	WS-315 TO WS-317	141	54	297	33301	99903	100	0.402	0.057	262.252	220.000	42.25	
67	WS-317 TO WS-319	59	27	243	27246	81738	100	0.278	0.016	262.402	220.000	42.40	
68	WS-317 TO WS-318	35	81	216	24219	72657	100	0.223	0.008	262.394	220.000	42.39	
69	WS-314 TO WS-320	153	54	135	15137	45411	100	0.094	0.014	262.380	220.000	42.38	
70	WS-320 TO WS-321	116	81	81	9082	27246	100	0.036	0.004	263.923	220.000	43.92	
										265.000	220.000	45.00	
71	PUMP-04 TO WS-402	33	108	5508	617585	1852755	100	89.287	2.946	262.054	220.000	42.05	
72	WS-402 TO WS-401	150	1296	1296	145314	435942	100	6.141	0.921	261.133	220.000	41.13	
73	PUMP-04 TO WS-403	33	243	4212	472271	1416813	100	54.357	1.794	263.206	220.000	43.21	
74	WS-403 TO WS-404	20	135	3969	445024	1335072	100	48.698	0.974	262.232	220.000	42.23	

Design Statement of Water Supp

C=120

Distribution main

Sr. No.	Junction	Length	sec_pop	Tot_pop	Total Water Demand	Peak demand	Pipe Dia	Hl/km	Total Head loss	HGL	GL	Terminal Head	Remark
75	WS-404 TO WS-405	165	162	3834	429887	1289661	100	45.678	7.537	254.695	220.000	34.70	
76	WS-405 TO WS-406	120	54	3672	411723	1235169	100	42.171	5.061	258.145	220.000	38.15	
77	WS-404 TO WS-407	68	162	3618	405668	1217004	100	41.031	2.790	255.355	220.000	35.36	
78	WS-407 TO WS-408	212	135	3456	387504	1162512	100	37.697	7.992	247.363	220.000	27.36	
79	WS-408 TO WS-409	165	162	3321	372367	1117101	100	35.018	5.778	248.917	220.000	28.92	
80	WS-408 TO WS-410	79	135	3159	354203	1062609	100	31.924	2.522	246.395	220.000	26.40	
81	WS-410 TO WS-411	62	54	3024	339066	1017198	100	29.446	1.826	252.869	220.000	32.87	
82	WS-411 TO WS-412	40	162	2970	333011	999033	100	28.480	1.139	251.730	220.000	31.73	
83	WS-411 TO WS-413	47	108	2808	314847	944541	100	25.673	1.207	250.523	220.000	30.52	
84	WS-413 TO WS-414	320	189	2700	302738	908214	100	23.877	7.641	255.004	220.000	35.00	
85	WS-407 TO WS-415	56	162	2511	281546	844638	100	20.877	1.169	253.835	220.000	33.84	
86	WS-415 TO WS-416	182	135	2349	263382	790146	100	18.454	3.359	250.476	220.000	30.48	
87	WS-415 TO WS-417	46	189	2214	248245	744735	100	16.540	0.761	249.762	220.000	29.76	
88	WS-403 TO WS-418	52	135	2025	227053	681159	100	14.023	0.729	249.033	220.000	29.03	
89	WS-418 TO WS-419	54	81	1890	211916	635748	100	12.342	0.666	249.857	220.000	29.86	
90	WS-418 TO WS-420	237	162	1809	202834	608502	100	11.382	2.698	247.159	220.000	27.16	
91	WS-416 TO WS-421	56	135	1647	184670	554010	100	9.568	0.536	246.623	220.000	26.62	
92	WS-421 TO WS-422	176	243	1512	169533	508599	100	8.168	1.438	245.185	220.000	25.19	
93	WS-421 TO WS-423	56	135	1269	142287	426861	100	5.907	0.331	246.828	220.000	26.83	
94	WS-423 TO WS-424	176	162	1134	127150	381450	100	4.797	0.844	245.984	220.000	25.98	
95	WS-423 TO WS-425	44	81	972	108996	326958	100	3.607	0.159	245.825	220.000	25.83	
96	WS-425 TO WS-426	176	162	891	99903	299709	100	3.071	0.540	245.285	220.000	25.29	
97	WS-425 TO WS-427	32	162	729	81739	245217	100	2.118	0.068	245.916	220.000	25.92	
98	WS-427 TO WS-428	67	135	567	63575	190725	100	1.331	0.089	245.827	220.000	25.83	
99	WS-427 TO WS-433	176	243	432	48438	145314	100	0.805	0.142	245.685	220.000	25.69	
100	WS-429 TO WS-431	52	108	189	21192	63576	100	0.174	0.009	245.676	220.000	25.68	
101	WS-430 TO WS-431	79	81	81	9082	27246	100	0.036	0.003	245.673	220.000	25.67	
		9298											

esign Statement of Recycled Water S. pply

C=120

Distribution main

Sr. No.	Junction	Length	sec_pop	Tot_pop	Total Water Demand	Peak demand	Pipe Dia	Hl/km	Total Head loss	HGL	GL	Terminal Head	Remark
		Mtrs.			LPM	LPM	mm	Mtrs.	Mtrs.	265.000	220.000	45.00	Pump
1	STP-01 TO -FW-101	15	0	4095	282555	847665	90	35.106	0.527	264.473	220.000	44.47	
2	FW-101 TO FW-102	97	135	3960	273240	819720	90	32.995	3.201	261.272	220.000	41.27	
3	FW-102 TO FW-103	60	54	3906	269514	808542	90	32.167	1.930	259.342	220.000	39.34	
4	FW-103 TO FW-104	63	81	3825	263925	791775	90	30.944	1.949	262.624	220.000	42.52	
5	FW-103 TO PUMP-01	72	189	3636	250884	752652	90	28.175	2.029	260.495	220.000	40.50	
6	FW-102 TO FW-105	60	108	3528	243432	730296	90	26.646	1.599	258.896	220.000	38.90	
7	FW-105 TO FW-106	98	189	3339	230391	691173	90	24.066	2.359	256.538	220.000	36.54	
8	FW-105 TO FW-107	242	27	3312	228528	685584	90	23.707	5.737	254.758	220.000	34.76	
9	FW-107 TO FW-108	67	189	3123	215487	646461	90	21.265	1.425	253.333	220.000	33.33	
10	FW-108 TO FW-109	58	135	2988	206172	618516	90	19.596	1.137	259.358	220.000	39.36	
11	FW-109 TO FW-110	58	189	2799	193131	579393	90	17.365	1.007	258.351	220.000	38.35	
12	FW-110 TO FW-111	65	54	2745	189405	568215	90	16.750	0.972	253.786	220.000	33.79	
13	FW-111 TO FW-112	130	54	2691	185679	557037	90	16.145	2.099	252.659	220.000	32.66	
14	FW-112 TO FW-113	65	189	2502	172638	517914	90	14.110	0.917	251.742	220.000	31.74	
15	FW-113 TO FW-114	58	81	2421	167049	501147	90	13.277	0.770	261.754	220.000	41.75	
16	FW-114 TO FW-115	21	54	2367	163323	489969	90	12.734	0.267	252.659	220.000	32.66	
17	FW-110 TO FW-113	127	189	2178	150282	450846	90	10.917	1.386	251.273	220.000	31.27	
18	FW-109 TO FW-114	127	27	2151	148419	445257	90	10.668	1.355	259.917	220.000	39.92	
19	FW-108 TO FW-116	107	189	1962	135378	406134	90	8.999	0.963	256.954	220.000	36.95	
20	FW-116 TO FW-117	89	27	1935	133515	400545	90	8.771	0.781	259.136	220.000	39.14	
21	FW-117 TO FW-118	88	27	1908	131652	394956	90	8.546	0.752	258.384	220.000	38.38	
22	FW-117 TO FW-119	67	81	1827	126063	378189	90	7.887	0.528	257.856	220.000	37.86	
23	FW-119 TO FW-120	113	243	1584	109296	327888	90	6.057	0.684	259.233	220.000	39.23	
24	FW-120 TO FW-121	28	189	1395	96255	288765	90	4.788	0.134	259.099	220.000	39.10	
25	FW-119 TO FW-122	31	108	1287	88803	266409	90	4.125	0.128	259.008	220.000	39.01	
26	FW-122 TO FW-123	164	189	1098	75762	227286	90	3.075	0.504	258.504	220.000	38.50	
27	FW-123 TO FW-124	60	162	936	64584	193752	90	2.289	0.137	258.247	220.000	38.25	
28	FW-116 TO FW-125	68	27	909	62721	188163	90	2.168	0.147	258.237	220.000	38.24	
29	FW-125 TO FW-126	46	135	774	53406	160218	90	1.610	0.074	252.585	220.000	32.59	
30	FW-125 TO FW-127	146	108	666	45954	137862	90	1.219	0.178	252.481	220.000	32.48	
31	FW-127 TO FW-128	117	81	585	40365	121095	90	0.959	0.112	252.369	220.000	32.37	
32	FW-128 TO FW-129	86	27	558	38502	115506	90	0.879	0.060	258.177	220.000	38.18	
33	FW-127 TO FW-130	45	135	423	29187	87561	90	0.527	0.045	258.192	220.000	38.19	
34	FW-130 TO FW-131	77	189	234	16146	48438	90	0.176	0.014	258.178	220.000	38.18	
35	FW-130 TO FW-132	82	27	207	14283	42849	90	0.140	0.016	252.353	220.000	32.35	

esign Statement of Recycled Water S pply

C=120

Distribution main

Sr. No.	Junction	Length	sec_pop	Tot_pop	Total Water Demand	Peak demand	Pipe Dia	Hl/km	Total Head loss	HGL	GL	Terminal Head	Remark
36	FW-132 TO FW-133	110	135	135	9315	27945	90	0.064	0.005	252.364	220.000	32.36	
37	FW-132 TO PUMP-02	39	135	135	9315	27945	90	0.064	0.007	258.170	220.000	38.17	
38	PUMP-02 TO FW-138	60	0	1512	104328	312984	90	5.557	0.333	265.000	220.000	45.00	Pump
39	FW-138 TO FW-139	25	27	1512	104328	312984	90	5.557	0.139	264.861	220.000	44.86	
40	FW-139 TO FW-140	72	54	1485	102465	307395	90	5.375	0.387	264.474	220.000	44.47	
41	FW-140 TO FW-141	128	135	1431	98739	296217	90	5.019	0.642	264.358	220.000	44.36	
42	FW-141 TO FW-142	72	54	1296	89424	268272	90	4.179	0.301	264.057	220.000	44.06	
43	FW-142 TO FW-143	70	108	1242	85698	257094	90	3.862	0.270	263.787	220.000	43.79	
44	FW-143 TO FW-144	66	189	1134	78246	234738	90	3.264	0.215	263.572	220.000	43.57	
45	FW-144 TO FW-145	128	27	945	65205	195615	90	2.329	0.298	263.759	220.000	43.76	
46	FW-138 TO FW-145A	46	189	918	63342	190026	90	2.208	0.102	263.657	220.000	43.66	
47	FW-143 TO FW-145A	128	135	729	50301	150903	90	1.441	0.184	263.873	220.000	43.87	
48	FW-139 TO FW-142	128	189	594	40986	122958	90	0.987	0.126	263.747	220.000	43.75	
49	FW-145A TO FW-145	65	54	405	27945	83835	90	0.486	0.062	263.697	220.000	43.70	
50	FW-145 TO FW-146	75	54	351	24219	72657	90	0.373	0.028	263.731	220.000	43.73	
51	FW-146 TO FW-148	122	81	297	20493	61479	90	0.274	0.033	263.698	220.000	43.70	
52	FW-148 TO FW-149	60	81	216	14904	44712	90	0.152	0.009	264.349	220.000	44.35	
53	FW-147 TO FW-150	20	54	135	9315	27945	90	0.064	0.001	263.731	220.000	43.73	
54	FW-150 TO FW-151	83	54	81	5589	16767	90	0.025	0.002	263.729	220.000	43.73	
55	PUMP-03 TO FW-150	28	0	2646	182574	547722	90	15.649	0.438	265.000	220.000	45.00	Pump
56	FW-150 TO FW-152	140	189	2646	182574	547722	90	15.649	2.191	262.809	220.000	42.81	
57	FW-152 TO FW-153	85	189	2457	169533	508599	90	13.645	1.160	261.649	220.000	41.65	
58	FW-153 TO FW-154	66	135	2268	156492	469476	90	11.767	0.777	264.223	220.000	44.22	
59	FW-154 TO FW-155	28	54	2133	147177	441531	90	10.504	0.294	263.929	220.000	43.93	
60	FW-154 TO FW-156	78	108	2079	143451	430353	90	10.017	0.781	263.148	220.000	43.15	
61	FW-153 TO FW-157	170	189	1971	135999	407997	90	9.076	1.543	261.606	220.000	41.61	
62	FW-153 TO FW-158	59	27	1782	122958	368874	90	7.532	0.444	263.485	220.000	43.49	
63	FW-158 TO FW-159	97	189	1755	121095	363285	90	7.322	0.710	262.775	220.000	42.78	
64	FW-158 TO FW-160	59	135	1566	108054	324162	90	5.930	0.350	263.579	220.000	43.58	
65	FW-160 TO FW-161	97	189	1431	98739	296217	90	5.019	0.487	263.092	220.000	43.09	
66	FW-160 TO FW-162	28	54	1242	85698	257094	90	3.862	0.228	263.257	220.000	43.26	
67	FW-162 TO FW-163	52	54	1188	81972	245916	90	3.557	0.185	263.300	220.000	43.30	
68	FW-163 TO FW-164	126	189	1134	78246	234738	90	3.264	0.411	262.889	220.000	42.89	
69	FW-164 TO FW-165	174	81	945	65205	195615	90	2.329	0.405	263.818	220.000	43.82	
70	FW-164 TO FW-166	141	54	864	59616	178848	90	1.974	0.278	263.300	220.000	43.30	
71	FW-166 TO FW-167	59	189	810	55890	167670	90	1.751	0.103	263.197	220.000	43.20	

esign Statement of Recycled Water S pply

C=120

Distribution main

Sr. No.	Junction	Length	sec_pop	Tot_pop	Total Water Demand	Peak demand	Pipe Dia	Hl/km	Total Head loss	HGL	GL	Terminal Head	Remark
72	FW-166 TO FW-188	35	27	621	42849	128547	90	1.071	0.037	262.772	220.000	42.77	
73	FW-163 TO FW-169	153	54	594	40986	122958	90	0.987	0.151	262.621	220.000	42.62	
74	FW-169 TO FW-170	116	27	540	37260	111780	90	0.827	0.096	262.676	220.000	42.68	
75	STP-02 TO FW-201	54	27	513	35397	106191	90	0.752	0.041	262.635	220.000	42.64	
76	FW-201 TO FW-202	56	0	486	33534	100602	90	0.681	0.038	262.597	220.000	42.60	
77	FW-202 TO FW-203	176	54	486	33534	100602	90	0.681	0.120	262.477	220.000	42.48	
78	FW-202 TO FW-204	56	54	432	29808	89424	90	0.547	0.031	262.446	220.000	42.45	
79	FW-204 TO FW-205	176	135	378	26082	78246	90	0.428	0.075	262.522	220.000	42.52	
80	FW-204 TO FW-206	44	54	243	16767	50301	90	0.189	0.008	262.514	220.000	42.51	
81	FW-206 TO FW-207	176	108	189	13041	39123	90	0.119	0.021	262.493	220.000	42.49	
82	FW-206 TO FW-208	32	189	81	5589	16767	90	0.025	0.001	262.492	220.000	42.49	
83	FW-208 TO FW-210	176	27	27	1863	5589	90	0.003	0.001	262.513	220.000	42.51	
84	FW-209 TO FW-212	52	81	81	5589	16767	90	0.025	0.001	262.512	220.000	42.51	
85	FW-211 TO FW-212A	79	135	135	9315	27945	90	0.064	0.005	262.509	220.000	42.51	
86	FW-208 TO FW-213	67	81	81	5589	16767	90	0.025	0.002	262.507	220.000	42.51	
87	FW-201 TO FW-214	52	54	54	3726	11178	90	0.012	0.001	262.512	220.000	42.51	
88	FW-214 TOPUMP-04	33	54	54	3726	11178	90	0.012	0.000	262.513	220.000	42.51	
89	PUMP-4 TO FW-215	33	189	2808	193752	581256	90	17.468	0.576	261.937	220.000	41.94	
90	FW-215 TO FW-215A	150	216	2619	180711	542133	90	15.355	2.303	265.000	220.000	45.00	Pump
91	FW-214 TO FW-216	20	189	2403	165807	497421	90	13.095	0.262	262.513	220.000	42.51	
92	FW-216 TO FW-217	165	189	2214	152766	458298	90	11.253	1.857	260.656	220.000	40.66	
93	FW-217 TO FW-218	120	243	2025	139725	419175	90	9.541	1.145	261.332	220.000	41.33	
94	FW-218 TO FW-219	68	189	1782	122958	368874	90	7.532	0.512	260.820	220.000	40.82	
95	FW-219 TO FW-220	56	297	1593	109917	329751	90	6.121	0.343	260.989	220.000	40.99	
96	FW-220 TO FW-221	46	324	1296	89424	268272	90	4.179	0.192	260.797	220.000	40.80	
97	FW-220 TO FW-222	182	162	972	108986	326958	90	6.025	1.097	260.235	220.000	40.24	
98	FW-219 TO FW-223	212	216	810	55890	167670	90	1.751	0.371	259.864	220.000	39.86	
99	FW-223 TO FW-224	165	189	1188	81972	245916	90	3.557	0.587	259.277	220.000	39.28	
100	FW-223 TO FW-225	79	189	999	68931	206793	90	2.582	0.204	259.073	220.000	39.07	
101	FW-225 TO FW-226	62	135	810	55890	167670	90	1.751	0.109	259.755	220.000	39.76	
102	FW-226 TO FW-227	40	216	675	46575	139725	90	1.250	0.050	259.705	220.000	39.71	
103	FW-226 TO FW-228	47	108	459	31671	95013	90	0.612	0.029	259.676	220.000	39.68	
104	FW-228 TO FW-229	320	189	351	24219	72657	90	0.373	0.119	259.557	220.000	39.56	
105	FW-201 TO FW-420	237	162	162	11178	33534	90	0.089	0.021	259.684	220.000	39.68	
	TOTAL	9416											

Design Statement of Storm Water collection - RWH System

Sr. No.	Line No.	Length of Storm water Line	Rain Rall	Area	Peak Storm Flow	Infiltration & recharge @ 30% of Avg. Flow	Storm Water Design Flow (q) 70%	Storm Diameter (D)	Ground level in M	Invert level in M	Depth of IL from GL	Slope - 1 in "L"	Discharge for Full Flow	Velocity for Full Flow	Actual Velocity	Avg. Depth
	From - To	(M)	mm/hr	sqm	cum/hr	MLD	LPS	(MM)	U/S. MH	U/S.MH	U/S (M)		LPS	M / sec	M / sec	(M)
PROPOSED STORM NETWORK																
1	RWH-01 To R-106	100	6.25	16187	101.169	0.73	19.70	400	220.000	219.100	0.900	400.00	103.33	0.82	0.631	1.0
2	R-106 TO R-105	59	6.25	36422	227.638	1.64	44.20	400	220.000	218.850	1.150	400.00	103.33	0.82	0.766	1.2
3	R-105 TO R-103	59	6.25	48562	303.513	2.18	59.00	400	220.000	218.705	1.295	400.00	103.33	0.82	0.847	1.4
4	R-103 TO R-101	50	6.25	56856	354.100	2.55	68.90	400	220.000	218.555	1.445	400.00	103.33	0.82	0.878	1.5
5	R-101 TO R-606	54	6.25	56856	354.100	2.55	68.90	400	220.000	218.430	1.570	400.00	103.33	0.82	0.878	1.6
6	R-606 - RWH-06 TO 706	55	6.25	56856	354.100	2.55	68.90	400	220.000	218.295	1.705	400.00	103.33	0.82	0.878	1.8
7	R-706 TO R-704	70	6.25	64750	404.688	2.91	78.70	400	220.000	218.158	1.843	400.00	103.33	0.82	0.903	1.9
8	R-704 TO R-701	135	6.25	72843	455.269	3.28	88.60	500	220.000	217.983	2.018	600.00	153.09	0.78	0.808	2.1
9	R-701 TO R-901	40	6.25	80937	505.856	3.64	98.40	500	220.000	217.758	2.243	600.00	153.09	0.78	0.828	2.3
10	R-901 TO R-903	130	6.25	89031	556.444	4.01	108.20	600	220.000	217.691	2.309	800.00	215.72	0.76	0.761	2.4
11	R-903 TO R-910	58	6.25	97125	607.031	4.37	118.00	600	220.000	217.528	2.472	800.00	215.72	0.76	0.777	2.5
12	R-910 TO R-912	140	6.25	105218	657.613	4.73	127.80	600	220.000	217.456	2.544	800.00	215.72	0.76	0.792	2.6
13	R-912 TO RWH-09	110	6.25	121406	758.788	5.46	147.50	800	220.000	217.281	2.719	1100.00	396.57	0.79	0.732	2.8
14	RWH-09 - Over flow	20	6.25	169968	1062.300	7.65	206.60	800	220.000	217.181	2.819	1100.00	396.57	0.79	0.796	2.8
15	R-102 TO R-103	52	6.25	40469	252.931	1.82	49.20	400	220.000	219.100	0.900	400.00	103.33	0.82	0.809	1.0
16	R-104 TO R-105	102	6.25	40469	252.931	1.82	49.20	400	220.000	217.231	2.769	400.00	103.33	0.82	0.809	2.9
17	R-201 TO R-202	102	6.25	40469	252.931	1.82	49.20	400	220.000	217.131	2.869	400.00	103.33	0.82	0.809	3.1
18	R-202 TO RWH-02	25	6.25	44515	278.219	2	54.10	400	220.000	219.100	0.900	400.00	103.33	0.82	0.829	0.9
19	R-203 TO R-204	35	6.25	44515	278.219	2	54.10	400	220.000	218.988	1.013	400.00	103.33	0.82	0.829	1.1
20	R-204 TO R-205	70	6.25	44515	278.219	2	54.10	400	220.000	218.850	1.150	400.00	103.33	0.82	0.829	1.2
21	R-205 TO R-206	58	6.25	44515	278.219	2	54.10	400	220.000	219.100	0.900	400.00	103.33	0.82	0.829	1.0
22	R-206 TO R-208	56	6.25	44515	278.219	2	54.10	400	220.000	218.905	1.095	400.00	103.33	0.82	0.829	1.2
23	R-207 TO R-208	58	6.25	44515	278.219	2	54.10	400	220.000	218.715	1.285	400.00	103.33	0.82	0.829	1.4
24	R-208 TO R-210	60	6.25	36422	227.638	1.64	44.20	400	220.000	218.520	1.480	400.00	103.33	0.82	0.788	1.6
25	R-209 TO R-210	58	6.25	36422	227.638	1.64	44.20	400	220.000	219.100	0.900	400.00	103.33	0.82	0.788	1.0
26	R-210 TO RWH-02	65	6.25	36422	227.638	1.64	44.20	400	220.000	218.905	1.095	400.00	103.33	0.82	0.788	1.2
27	R-301 TO R-302	51	6.25	36422	227.638	1.64	44.20	400	220.000	218.693	1.308	400.00	103.33	0.82	0.788	1.4
28	R-302 TO R-304	56	6.25	36422	227.638	1.64	44.20	400	220.000	218.515	1.485	400.00	103.33	0.82	0.788	1.6
29	R-303 TO R-304	51	6.25	36422	227.638	1.64	44.20	400	220.000	219.100	0.900	400.00	103.33	0.82	0.788	1.0
30	R-304 TO R-306	62	6.25	36422	227.638	1.64	44.20	400	220.000	218.693	1.308	400.00	103.33	0.82	0.788	1.4
31	R-305 TO R-306	51	6.25	36422	227.638	1.64	44.20	400	220.000	218.515	1.485	400.00	103.33	0.82	0.788	1.5
32	R-304 TO RWH-03	20	6.25	36422	227.638	1.64	44.20	400	220.000	218.325	1.675	400.00	103.33	0.82	0.788	1.7
33	R-401 TO R-402	55	6.25	36422	227.638	1.64	44.20	500	220.000	218.923	1.078	600.00	153.09	0.78	0.675	1.1

Sr. No.	Line No.	Length of Storm water Line	Rain Fall	Area	Peak Storm Flow	Infiltration & recharge @ 30% of Avg. Flow	Storm Water Design Flow (q) 70%	Storm Diameter (D)	Ground level in M	Invert level in M	Depth of IL from GL	Slope - 1 in "L"	Discharge for Full Flow	Velocity for Full Flow	Actual Velocity	Avg. Depth
	From - To	(M)	mm/hr	sqm	cum/hr	MLD	LPS	(MM)	U/S. MH	U/S.MH	U/S (M)		LPS	M / sec	M / sec	(M)
54	R-402 TO R-404	107	6.25	44515	278.219	2	54.10	500	220.000	219.100	0.900	600.00	153.09	0.78	0.713	1.0
55	R-403 TO R-404	29	6.25	44515	278.219	2	54.10	500	220.000	218.872	1.128	600.00	153.09	0.78	0.713	1.2
36	R-404 TO R-406	61	6.25	44515	278.219	2	54.10	500	220.000	218.773	1.227	600.00	153.09	0.78	0.713	1.3
37	R-405 TO R-406	78	6.25	40469	252.931	1.82	49.20	500	220.000	219.100	0.900	600.00	153.09	0.78	0.694	1.0
38	R-406 TO R-408	73	6.25	40468	252.931	1.82	49.20	500	220.000	218.920	1.080	600.00	153.09	0.78	0.694	1.1
39	R-407 TO R-408	38	6.25	40469	252.931	1.82	49.20	500	220.000	218.748	1.252	600.00	153.09	0.78	0.694	1.3
40	R-408 TO R-410	58	6.25	40469	252.931	1.82	49.20	500	220.000	218.635	1.365	600.00	153.09	0.78	0.694	1.4
41	R-409 TO R-410	53	6.25	40469	252.931	1.82	49.20	500	220.000	218.422	1.578	600.00	153.09	0.78	0.694	1.6
42	R-410 TO RWH-04	30	6.25	40469	252.931	1.82	49.20	500	220.000	218.283	1.717	600.00	153.09	0.78	0.694	1.7
43	R-501 TO R-503	88	6.25	40469	252.931	1.82	49.20	500	220.000	218.000	2.000	600.00	153.09	0.78	0.694	2.1
44	R-502 TO R-503	90	6.25	40469	252.931	1.82	49.20	400	220.000	217.803	2.197	400.00	103.33	0.82	0.809	2.3
45	R-503 TO RWH-05	20	6.25	40469	252.931	1.82	49.20	400	220.000	217.528	2.472	400.00	103.33	0.82	0.809	2.5
46	R-601 TO R-603	72	6.25	40469	252.931	1.82	49.20	400	220.000	218.100	1.900	400.00	103.33	0.82	0.809	2.0
47	R-602 TO R-603	40	6.25	40469	252.931	1.82	49.20	400	220.000	217.870	2.130	400.00	103.33	0.82	0.809	2.2
48	R-603 TO R-605	80	6.25	40469	252.931	1.82	49.20	400	220.000	217.720	2.280	400.00	103.33	0.82	0.809	2.4
49	R-605 TO R-606	100	6.25	40469	252.931	1.82	49.20	400	220.000	217.470	2.530	400.00	103.33	0.82	0.809	2.7
51	R-702 TO R-703	57	6.25	42492	265.575	1.91	51.60	400	220.000	219.100	0.900	400.00	103.33	0.82	0.819	1.0
52	R-703 TO R-704	111	6.25	42492	265.575	1.91	51.60	400	220.000	218.908	1.093	400.00	103.33	0.82	0.819	1.2
53	R-705 TO R-706	103	6.25	42492	265.575	1.91	51.60	400	220.000	218.580	1.420	400.00	103.33	0.82	0.819	1.5
54	R-706 TO R-708	77	6.25	42492	265.575	1.91	51.60	400	220.000	219.100	0.900	400.00	103.33	0.82	0.819	1.0
55	R-707 TO R-706	95	6.25	42492	265.575	1.91	51.60	400	220.000	218.858	1.143	400.00	103.33	0.82	0.819	1.3
56	R-708 TO RWH-07	15	6.25	42492	265.575	1.91	51.60	400	220.000	219.100	0.900	400.00	103.33	0.82	0.819	1.0
57	R-801 TO R-808	92	6.25	42492	265.575	1.91	51.60	400	220.000	219.100	0.900	400.00	103.33	0.82	0.819	1.0
58	R-802 TO R-808	171	6.25	42492	265.575	1.91	51.60	600	220.000	218.820	1.180	600.00	215.72	0.76	0.623	1.3
59	R-803 TO R-807	95	6.25	42138	263.363	1.9	51.20	600	220.000	217.900	2.100	800.00	215.72	0.76	0.622	2.2
60	R-805 TO R-806	25	6.25	42138	263.363	1.9	51.20	600	220.000	217.731	2.269	800.00	215.72	0.76	0.622	2.5
61	R-804 TO R-805	95	6.25	42138	263.363	1.9	51.20	600	220.000	217.650	2.350	800.00	215.72	0.76	0.622	2.4
62	R-805 TO R-807	64	6.25	42138	263.363	1.9	51.20	600	220.000	219.100	0.900	800.00	215.72	0.76	0.622	0.9
63	R-807 TO R-808	60	6.25	42138	263.363	1.9	51.20	600	220.000	218.970	1.030	800.00	215.72	0.76	0.622	1.1
64	R-808 TO RWH-08	25	6.25	42138	263.363	1.9	51.20	600	220.000	218.845	1.155	800.00	215.72	0.76	0.622	1.2
65	R-902 TO R-903	58	6.25	42138	263.363	1.9	51.20	600	220.000	218.764	1.236	800.00	215.72	0.76	0.622	1.3
66	R-906 TO R-907	31	6.25	42138	263.363	1.9	51.20	600	220.000	218.641	1.359	800.00	215.72	0.76	0.622	1.4
67	R-905 TO R-907	46	6.25	42138	263.363	1.9	51.20	600	220.000	218.553	1.448	800.00	215.72	0.76	0.622	1.5
68	R-907 TO R-909	139	6.25	42138	263.363	1.9	51.20	800	220.000	218.446	1.554	800.00	466.02	0.93	0.610	1.6
69	R-908 TO R-909	171	6.25	42138	263.363	1.9	51.20	800	220.000	218.223	1.778	800.00	466.02	0.93	0.610	1.9
70	R-909 TO R-910	112	6.25	42138	263.363	1.9	51.20	800	220.000	217.959	2.041	800.00	466.02	0.93	0.610	2.1

Sr. No.	Line No.	Length of Storm water Line	Rain Rati	Area	Peak Storm Flow	Infiltration & recharge @ 30% of Avg. Flow	Storm Water Design Flow (q) 70%	Storm Diameter (D)	Ground level in M	Invert level in M	Depth of IL from GL	Slope - 1 in "L"	Discharge for Full Flow	Velocity for Full Flow	Actual Velocity	Avg. Depth
	From - To	(M)	mm/hr	sqm	cumhr	MLD	LPS	(MM)	U/S. MH	U/S.MH	U/S (M)		LPS	M / sec	M / sec	(M)
70	R-1001 TO R-1002	315	6.25	20639	128.994	0.93	25.10	400	220.000	219.100	0.900	400.00	103.33	0.82	0.672	1.3
71	R-1002 TO R-1004	46	6.25	20639	128.994	0.93	25.10	400	220.000	218.263	1.738	400.00	103.33	0.82	0.672	1.8
72	R-1003 TO R-1004	31	6.25	20639	128.994	0.93	25.10	400	220.000	218.098	1.903	400.00	103.33	0.82	0.672	1.9
73	R-1004 TO RWH-010	33	6.25	20639	128.994	0.93	25.10	400	220.000	219.100	0.900	400.00	103.33	0.82	0.672	0.9
74	R-1005 TO R-1007	158	6.25	20234	126.463	0.91	24.60	400	220.000	218.400	1.600	400.00	103.33	0.82	0.672	1.6
75	R-1006 TO R-1007	86	6.25	20234	126.463	0.91	24.60	400	220.000	219.100	0.900	400.00	103.33	0.82	0.672	1.0
76	R-1007 TO R-1008	64	6.25	20234	126.463	0.91	24.60	400	220.000	218.835	1.165	400.00	103.33	0.82	0.672	1.2
77	R-1008 TO R-1009	86	6.25	20234	126.463	0.91	24.60	400	220.000	218.625	1.375	400.00	103.33	0.82	0.672	1.5
78	R-1009 TO RWH-010	60	6.25	20234	126.463	0.91	24.60	400	220.000	218.360	1.640	400.00	103.33	0.82	0.672	1.7
79	R-1101 TO R-1103	28	6.25	20234	126.463	0.91	24.60	400	220.000	219.100	0.900	400.00	103.33	0.82	0.672	0.9
80	R-1102 TO R-1103	110	6.25	20234	126.463	0.91	24.60	400	220.000	218.980	1.020	400.00	103.33	0.82	0.672	1.2
81	R-1103 TO R-1105	63	6.25	20234	126.463	0.91	24.60	400	220.000	218.655	1.345	400.00	103.33	0.82	0.672	1.4
82	R-1104 TO R-1105	112	6.25	20234	126.463	0.91	24.60	400	220.000	219.100	0.900	400.00	103.33	0.82	0.672	1.0
83	R-1105 TO RWH-011	48	6.25	20234	126.463	0.91	24.60	400	220.000	218.770	1.230	400.00	103.33	0.82	0.672	1.3
84	R-1201 TO R-1202	59	6.25	20234	126.463	0.91	24.60	400	220.000	219.100	0.900	400.00	103.33	0.82	0.672	1.0
85	R-1201 TO R-1202	59	6.25	20234	126.463	0.91	24.60	400	220.000	219.100	0.900	400.00	103.33	0.82	0.672	1.0
86	R-1202 TO RWH-012	170	6.25	20234	126.463	0.91	24.60	400	220.000	219.100	0.900	400.00	103.33	0.82	0.672	1.1
87	R-1203 TO RWH-012	35	6.25	20234	126.463	0.91	24.60	400	220.000	218.625	1.375	400.00	103.33	0.82	0.672	1.4
88	R-1301 TO RWH-013	280	6.25	20234	126.463	0.91	24.60	400	220.000	218.488	1.513	400.00	103.33	0.82	0.672	1.9
89	R-1401 TO R-1405	168	6.25	20234	126.463	0.91	24.60	400	220.000	219.100	0.900	400.00	103.33	0.82	0.672	1.1
90	R-1402 TO R-1404	168	6.25	20234	126.463	0.91	24.60	400	220.000	218.630	1.370	400.00	103.33	0.82	0.672	1.5
91	R-1403 TO R-1404	28	6.25	20234	126.463	0.91	24.60	400	220.000	218.160	1.840	400.00	103.33	0.82	0.672	1.9
92	R-1404 TO R-1405	56	6.25	20234	126.463	0.91	24.60	400	220.000	219.100	0.900	400.00	103.33	0.82	0.742	1.0
93	R-1405 TO RWH-014	35	6.25	20234	126.463	0.91	24.60	400	220.000	218.940	1.060	400.00	103.33	0.82	0.742	1.1
94	R-1501 TO RWH-015	188	6.25	20234	126.463	0.91	24.60	400	220.000	218.773	1.228	400.00	103.33	0.82	0.742	1.5
95	R-1502 TO R-1504	130	6.25	20234	126.463	0.91	24.60	400	220.000	219.100	0.900	400.00	103.33	0.82	0.742	1.1
96	R-1503 TO R-1504	50	6.25	20234	126.463	0.91	24.60	400	220.000	218.725	1.275	400.00	103.33	0.82	0.742	1.3
97	R-1504 TO R-1506	41	6.25	20234	126.463	0.91	24.60	400	220.000	218.550	1.450	400.00	103.33	0.82	0.742	1.5
98	R-1505 TO R-1506	71	6.25	20234	126.463	0.91	24.60	400	220.000	218.398	1.603	400.00	103.33	0.82	0.742	1.7
99	R-1506 TO RWH-015	20	6.25	20234	126.463	0.91	24.60	400	220.000	218.170	1.830	400.00	103.33	0.82	0.742	1.9
	Total	7746														