

PROJECT : Proposed I.T. Park at Plot No. 6 K, Park -05, G. Noida West Gautam Buth Nagar U.P.

DESIGN OF DRAIN LINE -Phase-1

Rainfall intensity (I)	=	25 mm/hour
Coefficient of Runoff (C)	=	0.50
Area of Drainage district	=	2.84 Hectare
Total Site Discharge	= 10°C ¹ A	= 355 Cu M / Hour
	or	98.61 Lit/sec

Drain Pipe Design

Final Drain Pipe Dia Selected	=	400 mm
Slope (1 in ...)	=	600

Drain Design as per Manning Formula

$$V = \frac{3.968 \times 10^{-3} \times D^{2.49} \times S^{0.54}}{n}$$

V	=	0.80 m/sec
D	=	400 mm
S	=	600
n	=	0.011
V	=	Velocity (m/sec)

Actual Pipe Capacity (Q) at 100% flow

$$Q = \frac{1}{4} \times \pi \times D^2 \times V$$

Q	=	100.42 m ³ /sec
Q	=	100.42 Lit/sec

Where -

D	=	400 mm
V	=	Velocity (m/sec)
Q	=	Pipe Capacity (at full flow) m ³ /sec

Total Site Discharge = 98.61 Lit/sec
Actual Pipe Capacity at 100% flow = 100.42 Lit/sec
Total Site discharge is less the pipe capacity, hence 400 mm Pipe Dia is OK

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DESIGN OF DRAIN LINE, Phase-2

Rainfall intensity (I)	=	25 mm/hour
Coefficient of Runoff (C)	=	0.50
Area of Drainage district	=	2.82 Hectare
Total Site Discharge	= 10°C ¹ A	= 353 Cu M / Hour
	or	97.92 Lit/sec

Drain Pipe Design

Final Drain Pipe Dia Selected	=	400 mm
Slope (1 in ...)	=	600

Drain Design as per Manning Formula

$$V = \frac{3.968 \times 10^{-3} \times D^{2.49} \times S^{0.54}}{n}$$

V	=	0.80 m/sec
D	=	400 mm
S	=	600
n	=	0.011
V	=	Velocity (m/sec)

Actual Pipe Capacity (Q) at 100% flow

$$Q = \frac{1}{4} \times \pi \times D^2 \times V$$

Q	=	97.92 m ³ /sec
Q	=	97.92 Lit/sec

Where -

D	=	400 mm
V	=	Velocity (m/sec)
Q	=	Pipe Capacity (at full flow) m ³ /sec

Total Site Discharge = 97.92 Lit/sec
Actual Pipe Capacity at 100% flow = 100.42 Lit/sec
Total Site discharge is less the pipe capacity, hence 400 mm Pipe Dia is OK

PROJECT : Proposed I.T. Park at Plot No. 6 K, Park -05, G. Noida West Gautam Buth Nagar U.P.

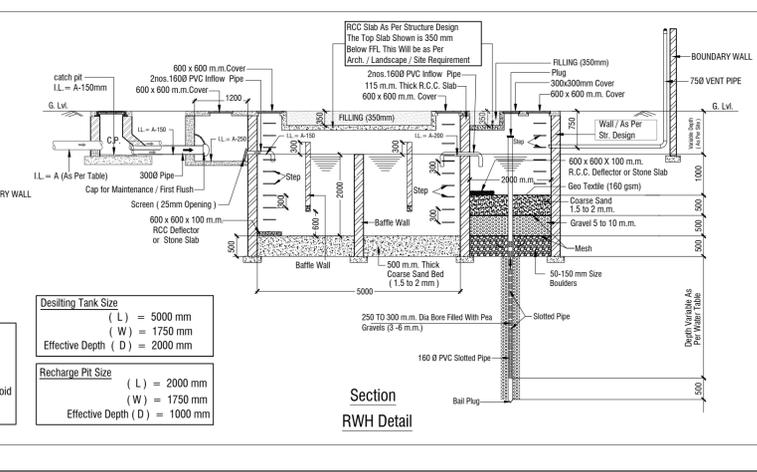
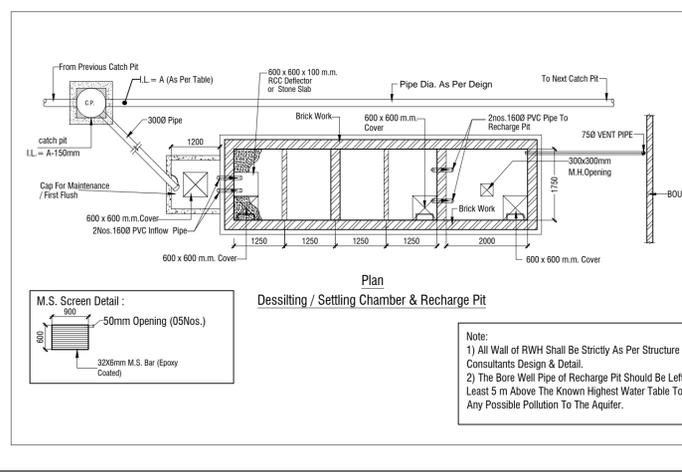
RAIN WATER HARVESTING CALCULATION

The capacity of tank and recharge pit is designed to retain runoff for at least 15 minutes of rain fall of the peak intensity.

Peak Rainfall in one hour	=	about 90mm / hr
Peak Rainfall in 15 minutes, R	=	90 / 4 mm
Say	=	22.5 mm = 0.0225m
Average run off coefficient, C	=	0.025 m.
Total Roof area, A	=	11434 sq.m.
Hence total combined capacity of deslting tank and recharge pit required,	=	AxRxV
Providing Deslting tank of size	=	5 x 1.75 x 2 m. effective depth
Capacity of deslting tank of given size (Cu.m.), a	=	17.5
Providing Recharge pit of size	=	2 x 1.75 x 1 m. effective depth
Capacity of recharge pit of given size (Cu.m.), b	=	3.5
Hence total combined capacity of one set of deslting tank and recharge pit, (Cu.M)	=	a+b
	=	21
Therefore no. of deslting tank and recharge pit required	=	(AxRxV) / (a+b)
	=	12.26 nos.
Say,	=	13

Hence, 13 sets of rechrge pit and deslting tank are required of following size :

Deslting tank	=	5 x 1.75 x 2 m. effective depth
Recharge pit	=	2 x 1.75 x 1 m. effective depth



Deslting Tank Size

(L) = 5000 mm
(W) = 1750 mm
Effective Depth (D) = 2000 mm

Recharge Pit Size

(L) = 2000 mm
(W) = 1750 mm
Effective Depth (D) = 1000 mm

Note:
1) All Wall of RWH Shall be Strictly As Per Structure Consultants Design & Detail.
2) The Bore Well Pipe of Recharge Pit Should be Left At Least 5 m Above The Known Highest Water Table To Avoid Any Possible Pollution To The Aquifer.



Rev. no.	Date	Revision
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LEGEND :

S.No.	SYMBOL	DESCRIPTION
1.	C.P. □	CATCH PIT
2.	---□---	UNDER GROUND DRAIN
3.	■	RAIN WATER HARVESTING
4.	---	BASEMENT LINE

Project
PROPOSED I.T. PARK AT PLOT NO-06,K.P.-5,GREATER NOIDA WEST, GAUTAM BUDDH NAGAR,UP

Owner
ELEGENT IT SOLUTIONS PVT LTD

Title
SITE PLAN

Subtitle
EXTERNAL DRAINAGE SYSTEM

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Org. no. I.T. PARK / EX / S-02 **Drawn by** Kulwant

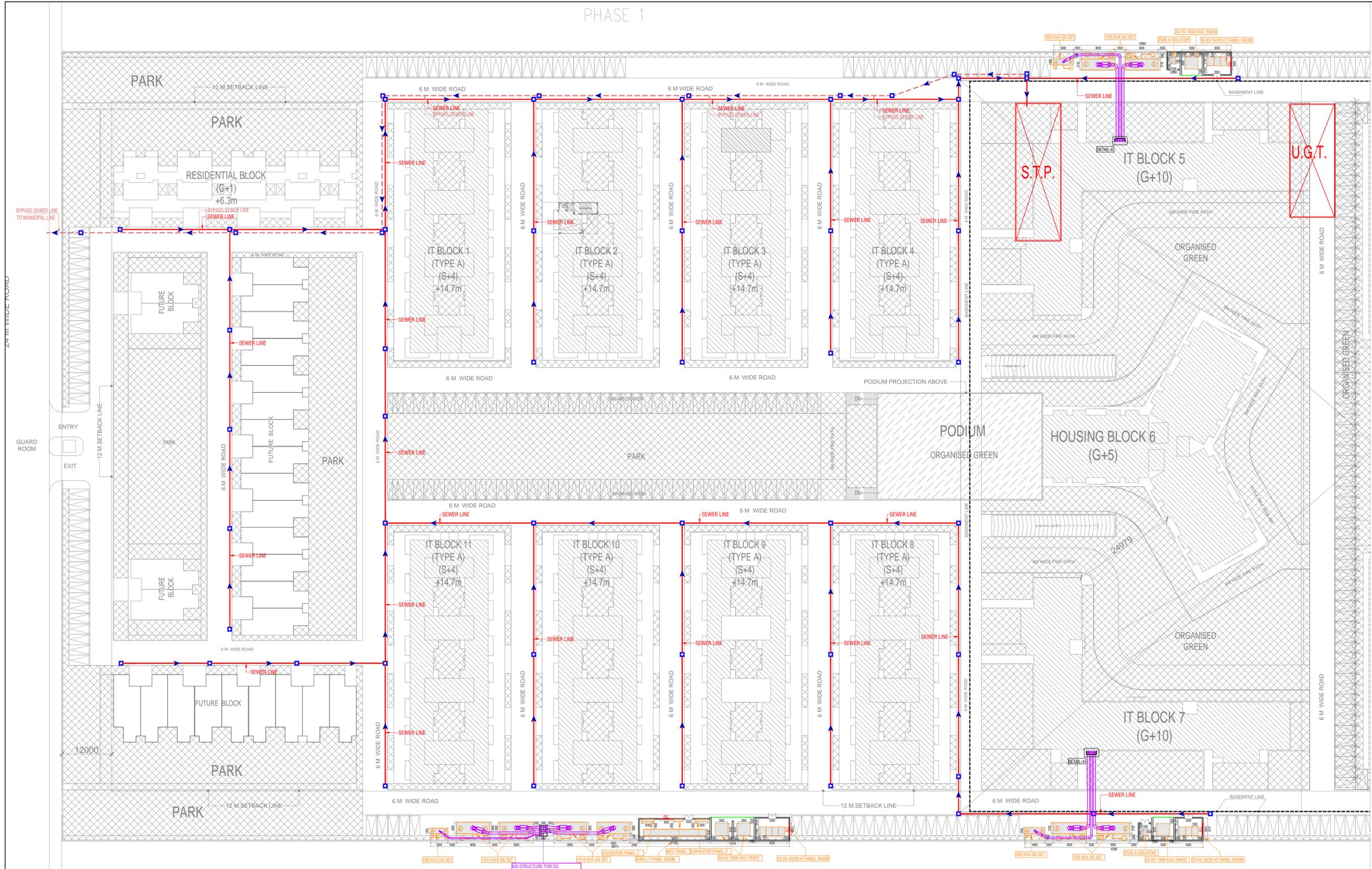
Scale 1:530 @ A1 **Designed by** R.K.

Date May 2017 **Checked by** Anand Havella

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PHASE 1



PROJECT : Proposed I.T. Park at Plot No. 6 K. Park -05, G. Noida West
Gautam Budh Nagar, U.P.
DESIGN OF SEWER LINE

Population		
Permanent Population (Shopping)	=	288 Persons
Transient Population (Shopping)	=	400 Persons
Office Population	=	4,740 Persons
Floating Population (Office)	=	474 Persons
Restaurant / Cafeteria	=	1,071 Persons
Residential Units	@ 4.5 Person	= 738 Persons
Floating Population (Resi. Units)	=	74 Persons
Maintenance Staff	=	250 Persons
Total Water Demand		
Permanent Population (Shopping), Office Population, Club / Banquet & Staff (Commercial & Apartments)	@ 45 lpcd	= 2,37,510 Liters
Transient Population (Shopping), Floating Population (Office) & Floating Population (Apartments)	@ 15 lpcd	= 15,417 Liters
Restaurant	@ 70 lpcd	= 75,000 Liters
Apartment	@ 135 lpcd	= 99,630 Liters
Total Water Demand		= 4,27,567 Liters
By taking Interception factor	@ 90%	= 3,84,810 Lit/day or 4.45 Lit/sec
Hence Total Sewage Load		
By taking Peak Factor	@ 3	
Peak Sewage Generated (3 times of Avg. Flow)		= 13.36 Lit/sec
Sewer Pipe Design		
Final Sewage Pipe Dia Selected		= 250 mm
Slope (1 in ...)		= 300
Sewer Design as per Manning Formula		
$V = \frac{3.986 \times 10^3 \times D^{5/2} \times S^{1/2}}{n}$		
$V = 0.83 \text{ m/sec}$		
D = Dia (mm) = 250 mm		
S = Slope = 300		
n = Manning Coefficient = 0.011		
V = Velocity (m/sec)		
Actual Pipe Capacity (C)		
at 100% flow	$C = \frac{100 \times V}{4}$	= 0.040550 m ³ /sec
	$C = 40.55$	Lit/sec
Where -		
D = Dia (mm) = 250 mm		
V = Velocity (m/sec) = 0.83		
C = Pipe Capacity (at full flow) m ³ /sec		
Peak Sewage Generated (site peak discharge)	=	13.36 Lit/sec
Actual Pipe Capacity at 100% flow	=	40.55 Lit/sec
Site peak discharge is less than 50% of pipe capacity, hence 250 mm Pipe Dia is OK		

Rev. no.	Date	Revision
..

Project
PROPOSED I.T. PARK AT PLOT NO-06,K.P.-5,GREATER NOIDA WEST, GAUTAM BU DH NAGAR,UP

Owner
ELEGENT IT SOLUTIONS PVT LTD

Title
SITE PLAN

Subtitle
EXTERNAL SEWERAGE SYSTEM

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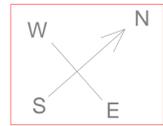
Org. no. I.T. PARK / EX / S-01 **Drawn by** Kulwant

Scale 1:500 @ A1 **Designed by** R.K.

Date May 2017 **Checked by** Anand Havella

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LEGEND :

S. No.	SYMBOL	DESCRIPTION
1.	M.H. □	MANHOLE
2.	—■—	SEWER LINE
3.	- - - - -	BYPASS SEWER LINE
4.	— — — — —	BASEMENT LINE