AMAN
ARCHITECT & INTERIOR DESIGNER
9412738524, 9638201616
sarvjeet4042@gmail.com

Ref. No.

I- PHE SYSTEM

Date : 19.10.2023

A. WATER SUPPLY SYSTEM

i) **WATER REQUIREMENT**

During construction phase water will be supplied by private water tankers, whereas during operation phase water supply will be provided through the Municipal water supply/ tube-wells. Total water requirement is approx. 178 KLD, out of which domestic water requirement is approx. 110 KLD. Fresh water requirement is approx. 73 KLD which is 66% of the domestic water demand. Daily water requirement calculation is given below in Table 1.

Table 1: Calculations for Daily Water Demand

A. Total Water requirement-Domestic

Description	No. of Houses	Person/Plot	Water Consumption /day	No. of Persons	Assumption (Fresh Water)	Total water requirement (KLD)	Fresh Water (KLD)	Flushing Water (KLD)
PLOTS	61	6	135	366	66%	49.41	32.61	16.80
SAY						**49.41**	**32.61**	**16.80**

B. Horticulture and Landscape Development

	Area (Sq.mt.)	**Water requirement/ Sq.mt (Ltr.)**	**Water requirement (KLD)**	**Say (KLD)**
Green Area (SQ MT)	1311.07	6	7.86	8.00
Road washing (SQ MT)	2590.87	5	12.95	13.00
Path Way Washing (SQ MT)	168.00	5	0.84	1.00
Total (Say)				**22.00 KLD**

Table 2: Waste Water Calculations

Domestic Water Requirement	**49.41 KLD**
• Fresh(66% of domestic)	32.61 KLD
• Flushing (34% of domestic)	16.80 KLD
Waste Water Generated (75% of total Domestic water + 100% of Flushing Requirement)	49.41 KLD
Additional 20% additional capacity for future provision	49.41
Proposed, SAY	**50 KLD**

ii) **WATER BALANCE DIAGRAM (Figure 1):**

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9412738524, 9638201616
sarvjeet4042@gmail.com

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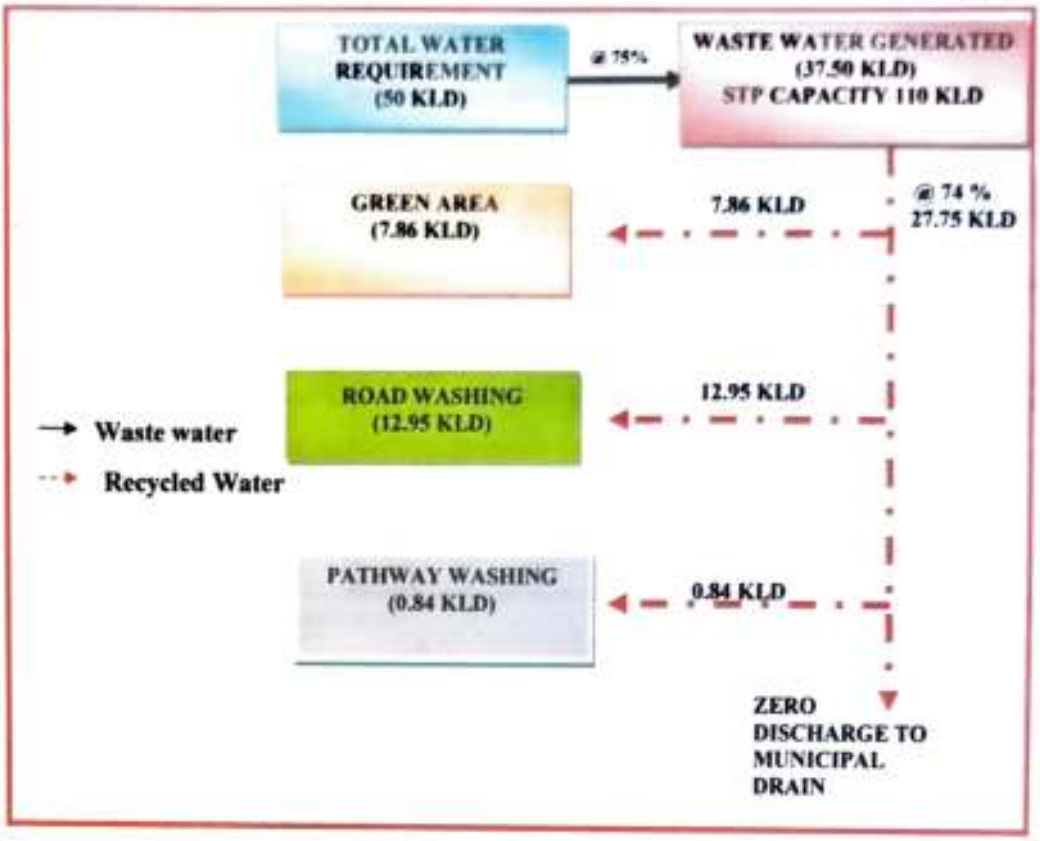

Figure 1: Water Balance Diagram

iii) Bore Wells

Treated (Potable) water will be supplied by Municipal Authority, but there is no municipal water supply available near by the site, so to meet the present water requirements of the colony, tube-wells are proposed to the requirement. One number bore well is proposed for every block. Anticipated yield of one tube-well 5000 litres per day. Depth of tube-well of diameter 100mm would be in the range 100-125 m.

We have proposed 1000 lts. Water storage in overhead water tank placed on terrace at every block and water to be transferred from the individual bore wells to Over Head In house individual tank, from where, water shall be supplied to the toilet, pantry and other uses area.

Diesel Generator Size Capacity for water supply

	Description	Load(HP)	Load(KW)	Quantity	Total(KW)
1)	External Lighting				5.75 KW

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2)	For STP Pumps	3.00 KW
	Total DG Capacity (Power Factor@0.8, Loading@0.85)	**8.75 KVA**

Hence, We are proposed 25 KVA DG Set for water Supply in case of power failure.

B. SEWAGE SYSTEM

i. SEWAGE NETWORK

An external sewage network shall collect the sewage from all units, and flow by gravity to the proposed sewage treatment plant. The sewage network, having manhole & piping shall be proposed.

The alignment and slope of the sewer line will follow the road network, drains or natural ground surface and will be connected to the trunk sewers. The discharge point will be a treatment plant.

ii. Wastewater Generation & Treatment

It is expected that **49.41 KLD** of wastewater shall be generated from project site during operation phase. Wastewater will be treated in the STP provided within the complex generating **22 KLD** of recoverable water from STP.

iii. SEWAGE TREATMENT TECHNOLOGY

a) FAB TECHNOLOGY

Following are the benefits of providing the Sewage Treatment Plant in the present circumstances:

- Reduced net daily water requirements, source for Horticultural, Road Washing & Pathway Washing purposes by utilization of the treated waste water.
- Reduced dependency on the public utilities for water supply and sewerage systems.
- Sludge generated from the Sewage Treatment Plant shall be rich in organic content and an excellent fertilizer for horticultural purposes.

b) Wastewater Details

(a)	Daily load	:	49.41 KLD
(b)	Duration of flow to STP	:	24 hours
(c)	Temperature	:	Maximum 32°C
(d)	pH	:	7 to 9.5
(e)	Colour	:	Mild
(f)	T.S.S. (mg/l)	:	100-400 mg/l
(g)	BOD (mg/l)	:	200-300 mg/l
(h)	COD (mg/l)	:	500-700 mg/l

c) Final discharge characteristics

(a)	pH	:	6.5 to 7.5
(b)	Oil & Grease	:	<10 mg/l
(c)	B.O.D.	:	<10 mg/l
(d)	C.O.D.	:	<50 mg/l
(e)	Total Suspended Solids	:	<10 mg/l

C. RAIN WATER HARVESTING DETAILS

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S. No.	Type of Surface	Catchment's Area		Run off Coeff [C]	Intensity of Rainfall (mm/hr)	Discharge (Run Off) [Q=10CIA] m^3/hr	Total (m^3/hr) [Q]
		sq. m	Ha.				
1	Building/Roof Top (Ground covered)						
(a)	Area	11211.55	1.12	0.9	25	10X0.90X0.25X11211/1000	25.22
2	Paved Surface+ Road Surface						
(a)	Area	2590.87	0.25	0.7	25	10X0.70X0.25X2590/1000	4.53
3	Landscape/Greens Area						
(a)	Area	1311.07	0.377	0.2	25	10X0.20X0.25X1311/1000	0.65
Grand Total (1+2+3)							30.40

VOLUME OF STORM WATER DRAINAGE

Volume = 30.40
Say = 31.00 Cu.mt/hr

VOLUME OF 1 RAIN WATER HARVESTING PIT

Dia of Pit (D) = 3.0 m
Hight of Pit (H) = 3.65 m
Volume of Pit = $\pi d^2 h/4$
= 3.14 x 2.5 x 2.5 x 3.0 / 4=14.72 Cu.mt.

Total No. of Rainwater harvesting pit

= 31 / 14.72 = 2.10 Nos.
= Say 2 Numbers

As per calculation total 2.10 Nos. of RWH pits required, however we are proposed 2 numbers RWH pits to accumulate entire excess water within project area.

8- ELECTRICAL SYSTEM

1. **REFERENCE STANDARDS**

The following standards and codes shall be followed during detailed design of the electrical system:

- National Building Code of India – 2016
- Energy Conservation Building Codes 2007-Revised Version May 2008
- Relevant codes of Bureau of Indian Standards
- NEC, National Electric Code of India
- Indian Electricity rule

2. **DESIGN CALCULATIONS**

Based on presently available architectural plans the estimated Electrical Power requirements and selection of equipment's for the housing is enclosed as Annexure-A.

3. **SOURCES OF POWER SUPPLY**

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✉ sarvjeet4042@gmail.com

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The electrical system has been design based on 11KV tapping available near to site.

4. HT POWER DISTRIBUTION SCHEME

The HT Power shall be transmitted from the 11 kV line to Unitized (Compact) Sub Station at the Ground level through 11,000 volt grade XLPE Insulated aluminum conductor cable from Over Head line. The substation shall comprise of 1 no 630 amps 11kV VCB as incomer / outgoing feeders as per Schematic Diagram. 630 kVA, 11/0.433 kV outdoor duty type Oil cooled transformers with OFF Load Tap Changer on HV located outdoor at ground level

Transformers shall be designed with latest technology which shall have more efficiency with low losses. These losses shall be as per IS1180.

5. POWER FACTOR IMPROVEMENT

Automatic power factor compensating multiple capacitor units shall be provided for maintenance of average power factor of 0.90 to unity to have effective savings in energy cost. The system shall automatically switch ON/OFF the capacitor units to achieve the preset power factor. Capacitors shall be provided in all main power distribution panels.

6. LT DISTRIBUTION SCHEME

LT Power from the Transformers shall be brought to the Main LT Panel (located in Unitized Substation)

Power from the Main LT panel shall feed to Meter Boards in each block by XLPE insulated aluminum cables. Meter panel shall be provided at Ground Floor Near electrical shaft at their respective block. The meter panel fed from the Main LT Panel by cable and it shall consist of energy meters and MCB to isolate the supply in case of emergency. The Energy Meters shall be provided by Electricity Board.

7. ELECTRICAL SYSTEM FOR APARTMENT

Following provisions shall be made while designing electrical system for Apartments:

- All apartments shall be provided with individual switches for lighting controls & fans. Fan shall be equipped with electronic step fan regulators.
- Power outlets for TV shall be provided in Bed Room.

8. EARTHING SYSTEM

The earthling system shall be based on the Indian TNS system and shall conform to IS 3043: 1987. In addition the design shall conform to IE Rules. The earthling conductors proposed to be used are

- Copper Earthling for Neutral earthling
- Galvanized Iron (GI) for body earthling.

Separate and distinct earth stations with insulated electrode shall be provided for the following system:

- Neutral of Unitized Substation
- Body of Unitized Substation

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- Meter Boards.

Earthing for light and power points shall be carried out with insulated copper earth wire running throughout the length of the circuit and shall be terminated at equipment, fixtures etc with effective bonding to main earthing grid.

All the pits and main earthing bars are to be connected to each other to make a common earthing electrode grid. If the resistivity of the soil is very high then, earthing calculations shall be done to ensure that the conductivity is maintained at less than 1 Ω.

9. TRANSFORMER SIZING CALCULATION

The total Demand of the project is 556.54KW for which 1 no. 630KVA Transformer has been proposed, the detailed load calculation is enclosed herewith.

LOAD CALCULATION FOR TRANSFORMER

S. No.	DESCRIPTION	NO OF UNIT	TOTAL CONNECTED LOAD / PLOT	DIVERSITY FACTOR (%)	TOTAL DEMAND LOAD(KW)
A.	PLOT				
i)	Plot Load (Lighting + Power) (As per Annexure-A)	25	5.56 KW	65%	90.67 KW
ii)	Plot Load (Lighting + Power) (As per Annexure-B)	36	5.13 KW	65%	120.04 KW
	TOTAL LOAD MAIN BUILDING				**210.71 KW**
B.	**COMMON SERVICES**				
i)	External Development	1	10.00	80%	8.00 KW
ii)	Plumbing System	1	20.00	80%	16.00 KW
iii)	STP	1	15.00	80%	12.00 KW
					36.00 KW

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	TRANSFORMER SELECTION				
	Total Maximum Load on Transformer				246.71 KW
	Total Demand Load Considering Diversity @ 80 %				197.36 KW
	Considering Power Factor @0.9				219.06 KW
	Considering 80% as efficiency of Transformer				273.82 KVA
	Hence we propose to install 1 Nos. 630 KVA 11KV/433V OIL Transformer with ON Load Tap Changer.				

ANNEXURE-A
LOAD CALCULATION FOR PLOT-A-TYPE-8 x 12M

S.NO.	LOCATION	POWER SOCKET			LIGHT FIXTURE			
		6 AMP SOCKET OUTLET	16 AMP SOCKET OUTLET	25A SWITCH & SOCKET	12W LED DOWN LIGHT	MIRROR LIGHT	20W LED BATTEN LIGHT	1200MM CEILING FAN
1	GROUND FLOOR	10	3	1	30	1	5	5
	TOTAL	10	3	1	30	1	5	5
	LOAD IN WATT	100W	1000W	2000W	12W	9W	20W	60W
	DIVERSITY	30%	20%	50%	80%	80%	80%	80%
	TOTAL IN WATT	300W	600W	1000W	288W	7W	80W	240W
	TOTAL LIGHT LOAD IN KW	0.62KW						
	TOTAL POWER LOAD	1.90KW						
	TOTAL LOAD IN KW	2.52KW						
2	FIRST FLOOR	10	2	1	30	2	4	3
	TOTAL	10	2	1	30	2	4	3

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	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	DIVERSITY	30%	20%	100%	80%	80%	80%	80%
	TOTAL IN WATT	300W	400W	2000W	288W	14W	64W	144W
	TOTAL LIGHT LOAD IN KW	0.37KW						
	TOTAL POWER LOAD	2.70KW						
	TOTAL LOAD IN KW	3.07KW						

ANNEXURE-B
LOAD CALCULATION FOR PLOT-B-TYPE-8x14M

S.NO.	LOCATION	POWER SOCKET			LIGHT FIXTURE			
		6 AMP SOCKET OUTLET	16 AMP SOCKET OUTLET	25A SWITCH & SOCKET	12W LED DOWN LIGHT	MIRROR LIGHT	20W LED BATTEN LIGHT	1200MM CEILING FAN
1	GROUND FLOOR	15	4	1	23	2	4	4
	TOTAL	15	4	1	23	2	4	4
	LOAD IN WATT	100W	1000W	2000W	12W	9W	20W	60W
	DIVERSITY	30%	20%	50%	80%	80%	80%	80%
	TOTAL IN WATT	450W	800W	1000W	221W	14W	64W	192W
	TOTAL LIGHT LOAD IN KW	0.48KW						
	TOTAL POWER LOAD	2.25KW						
	TOTAL LOAD IN KW	2.74KW						
1	FIRST FLOOR	8	3	1	28	2	7	6
	TOTAL	8	3	1	28	2	7	6
	LOAD IN WATT	100W	1000W	2000W	12W	9W	20W	60W
	DIVERSITY	30%	25%	50%	80%	80%	80%	80%

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	TOTAL IN WATT	240W	750W	1000W	269W	14W	112W	288W
	TOTAL LIGHT LOAD IN KW	0.40KW						
	TOTAL POWER LOAD	1.99KW						
	TOTAL LOAD IN KW	2.39KW						

CAPACITOR BANK SIZING CALCULATION		
Transformer Capacity	=	280 KVA
	=	224 KW
Intial Existing PF	=	0.8
Desired PF	=	0.9
Multiplying Factor for PF Correction per KW of Load to bring PF from 0.8 to 0.9	=	0.266
Hence total size of capacitor Bank	=	59.58
	SAY	60 KVAR
HENCE WE PREPOSE TO INSTALL 5 Nos. 10 & 3 Nos. 20 & 5 Nos. 5 KVAR CAPACITOR BANKS.		

III - BUDGETORY ESTIMATE FOR PHE & ELECTRICAL SERVICES

S.No	DESCRIPTION	UNIT	QTY.	U. RATE	AMOUNT
I.	PHE SYSTEM				
1)	STP (50KLD)	SET	1.00	61,41,504.00	61,41,504.00
2)	RECHARGE WELL	NOS	2.00	7,82,000.00	15,64,000.00
3)	SEWER	ACRE	6.22	7,18,000.00	44,65,960.00
4)	DRAINAGE	ACRE	6.22	8,22,000.00	51,12,840.00
5)	WATER SUPPLY	ACRE	6.22	8,18,000.00	50,87,960.00

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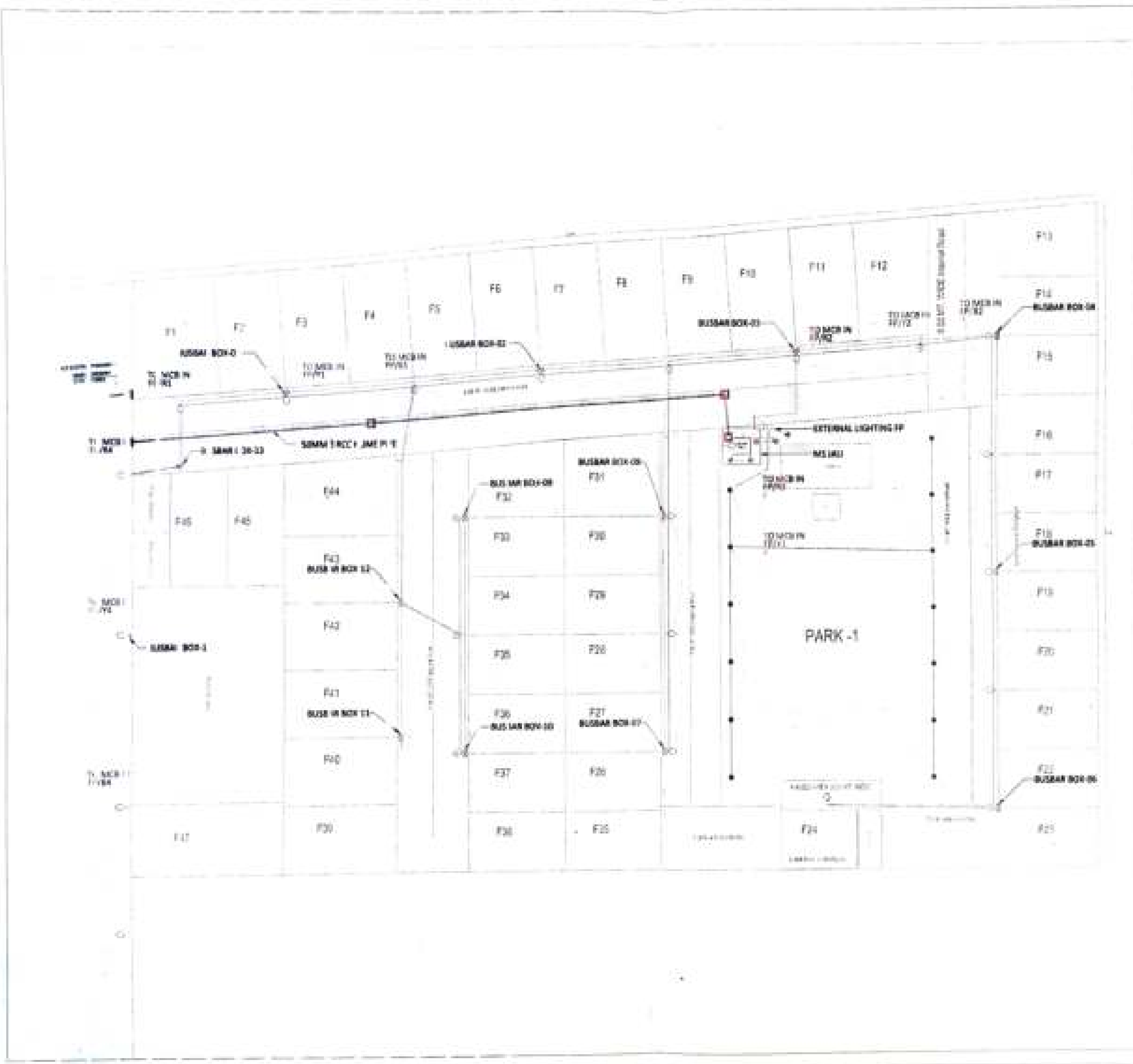
	TOTAL (I)			**RS.**	**2,23,72,264.00**
II.	**CONSTRUCTION**				
1)	SUB GRADE 1200MM	SQM	2590.87	2799.00	72,51,845.00
2)	SUB BASE 600MM	SQM	2590.87	800.00	20,72,696.00
3)	BASE COURSE 450MM	SQM	2590.87	675.00	17,48,837.00
4)	CONCRETE SLAB 200MM	SQM	2590.87	1400.00	36,27,218.00
5)	STEEL	KGS	21,500	70.00	15,05,000.00
	TOTAL (II)			**RS.**	**1,62,05,596.00**
II.	**ELECTRICAL SYSTEM**				
1)	OH LINE FROM TAPPING POINT TO SUBSTATION	RM	280.00	7421.00	20,77,880.00
2)	UNIT SUB-STATION COMPRISING OF 11KV H.T. PANEL, 11KV/433 VOLT 630 KVA OIL FILLED TRANSFORMER WITH OFF LOAD TAP CHANGER & LT PANEL	SET	1.00	30,73,600.00	30,73,600.00
3)	LT CABLING & TERMINATION	LS			20,36,800.00
4)	EARTHING	LS			4,07,360.00
5)	METER BOARD	NOS	5.00	2,41,004.00	12,05,020.00
6)	25 KVA DG SET IN ACOUSTIC ENCLOSURE	SET	1.00	23,32,812.00	23,32,812.00
7)	EXTERNAL LIGHTING	LS			16,22,080.00
	TOTAL (III)			**RS.**	**1,27,55,552.00**
	GRAND TOTAL (I+II)			**RS.**	**5,13,33,412.00**

Amanpreet Kaur

Ar. Amanpreet Kaur
B. Arch
CA/2011/58252

Office : H.No.-9, Residency Garden, Stadium Road, Bareilly.



Lighting

NO OF PRINTS	ISSUED TO	DATE

REV.	DATE	DETAILS

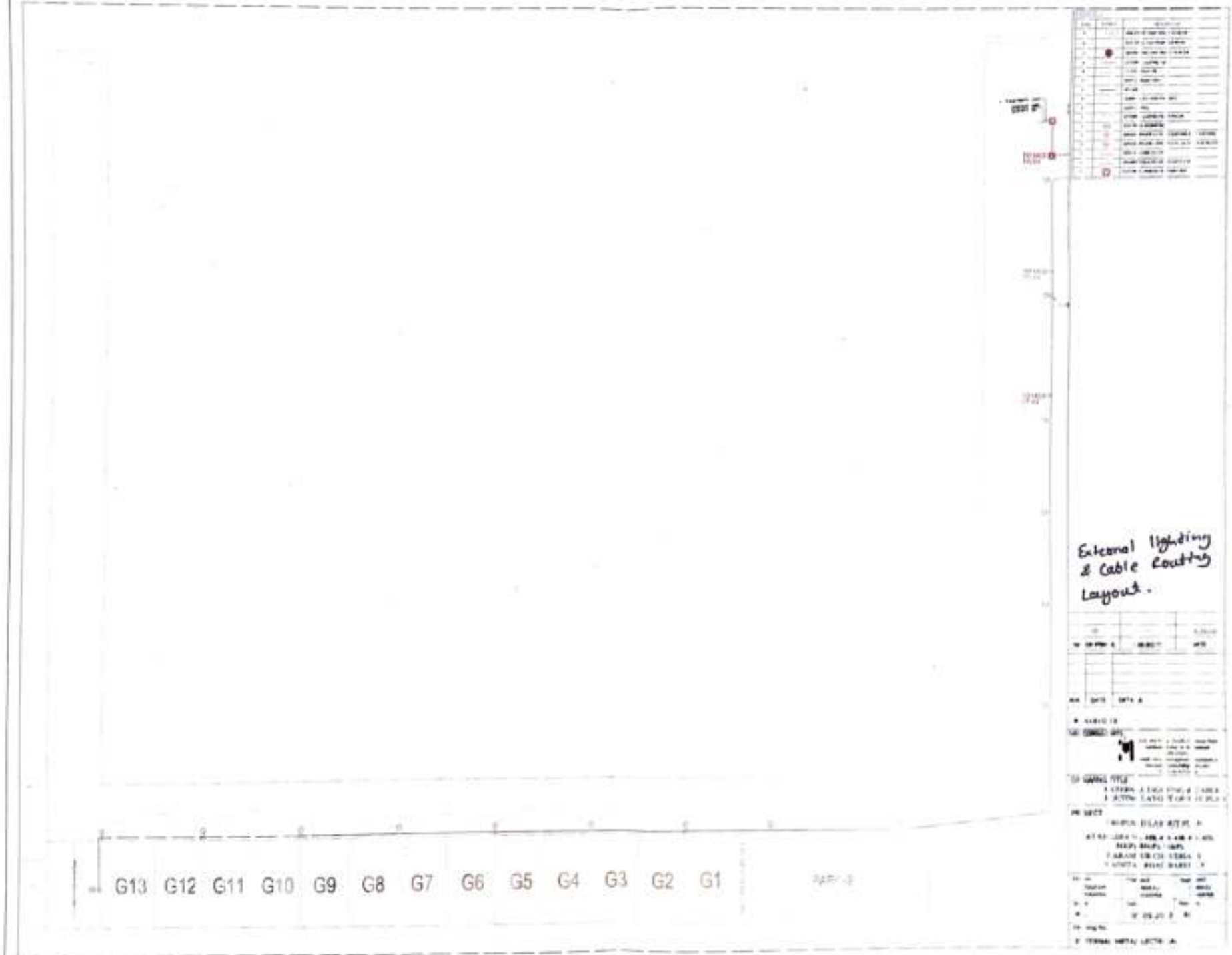
REVISIONS

DRAWING TITLE
EXTERNAL LIGHTING & CABLE ROUTING LAYOUT OF SITE PLAN

PROJECT
PROPOSED LAYOUT PLAN

Drawn	Checked	Approved
Scale	Date	Rev. No.
N/S	05.09.2013	R1

Drawing No.


G13 G12 G11 G10 G9 G8 G7 G6 G5 G4 G3 G2 G1
External lighting & Cable routing layout.

OPOSED LAYOUT DEVELOPMENT OF RESIDENTIAL COLONY -AERO CITY (PHASE-II) OWNED BY :-SHRI MANMOHAN SINGH CHHABRA S/o LATE SHR
H,SMT SATNAM KAUR D/o LATE S. HARBHAJAN SINGH AND W/o LATE S. PRITPAL SINGH , SMT.MANPREET KAUR D/o, LATE S. CHARANJIT SINGH
AN SINGH CHHABRA (DEVELOPER: M/S KUNAL PROPERTIES)
. 428, 429, 430, 431, 432, 512 (P) , 531 (P) , 532 (P) ,
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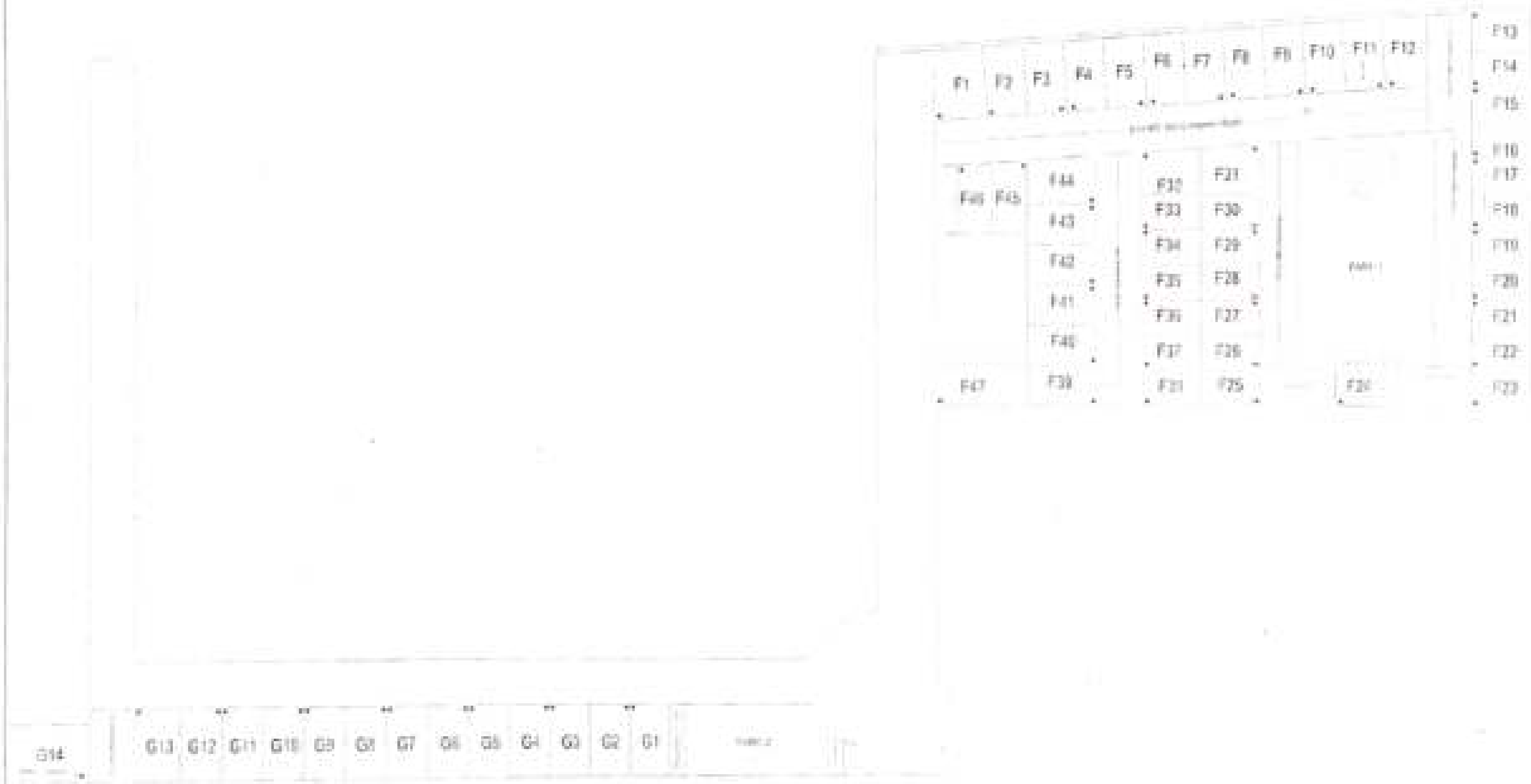

WATER SUPPLY PLAN

BORE WELL

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AN SINGH CHHABRA (DEVELOPER: M/S KUNAL PROPERTIES)
), 428, 429, 430, 431, 432, 512 (P) , 531 (P) , 532 (P) .
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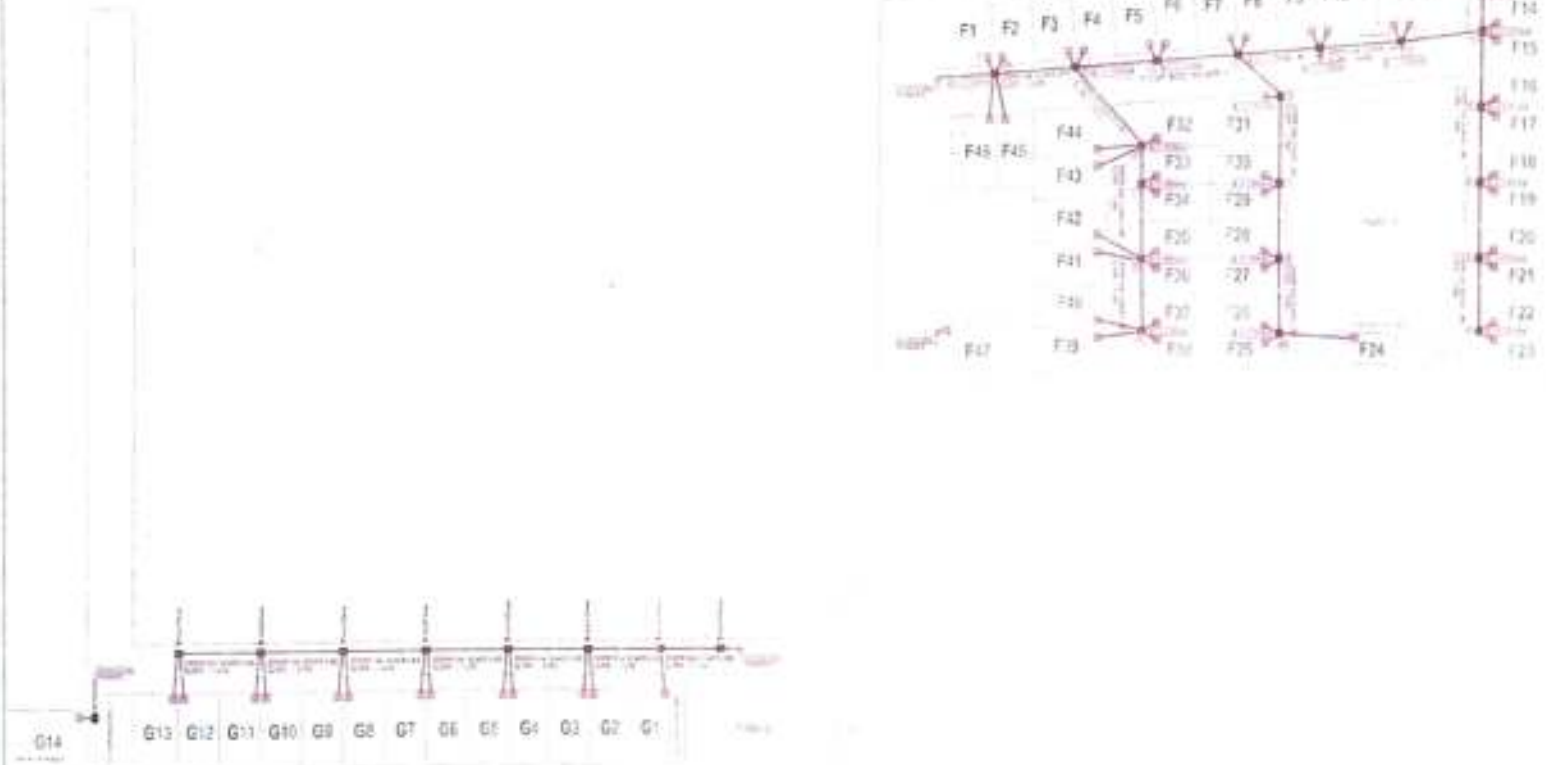

SEWERAGE PLAN

Sewerage Plan

ROPOSED LAYOUT DEVELOPMENT OF RESIDENTIAL COLONY -AERO CITY (PHASE-II) OWNED BY :-SHRI MANMOHAN SINGH CHHABRA S/o LATE SHR
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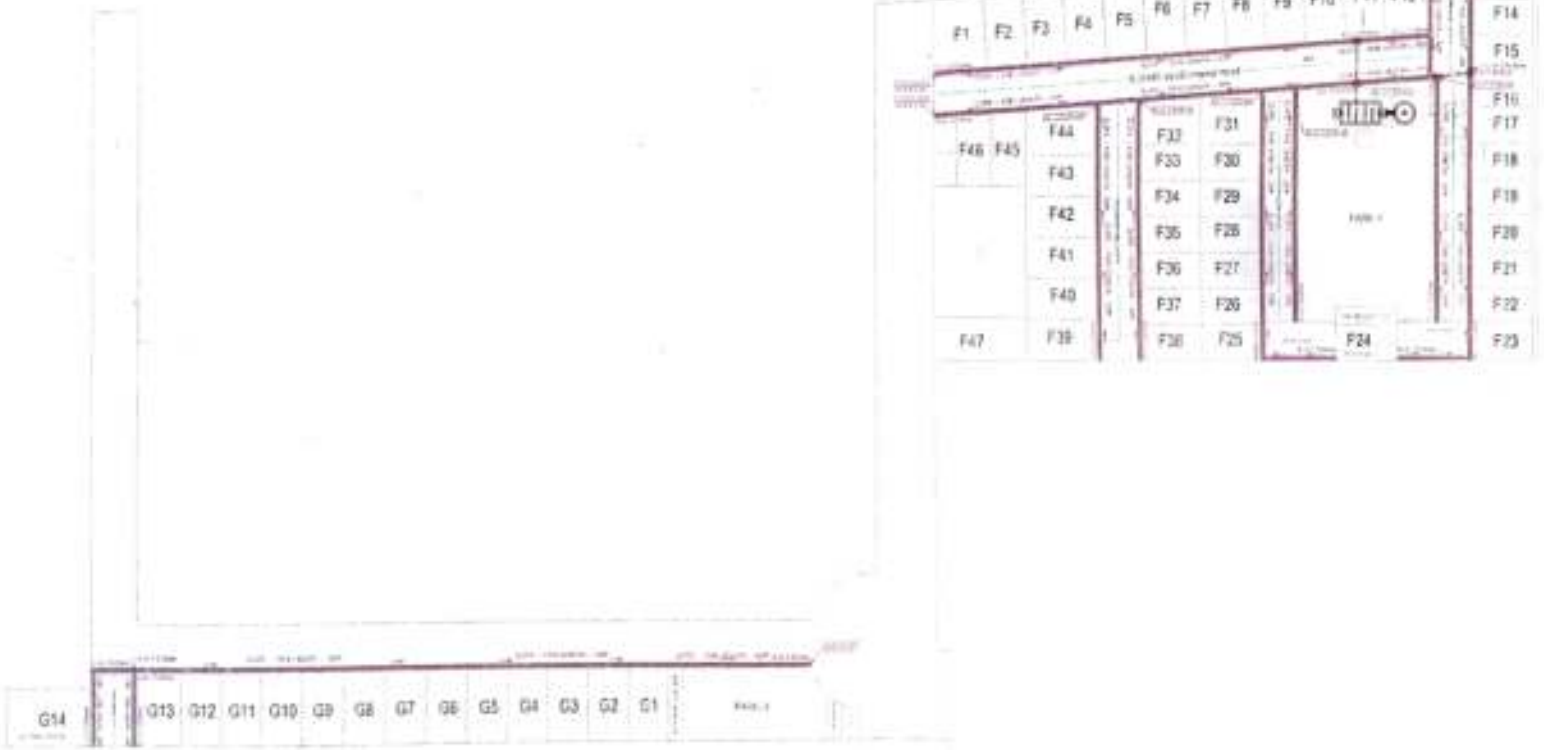

DRAINAGE PLAN

Drainage Plan

NO. OF PRINTS | ISSUED TO | DATE

NO. | DATE | DETAILS

REVISIONS

DRAWING TITLE

EXTERNAL DRAINAGE SYSTEM

PROJECT

PROPOSED LAYOUT PLAN

AT KHASRA No. 428, 429, 430, 431, 432, 512 (P), 531 (P), 532 (P), KARANPUR CHAUDHARY NAINITAL ROAD BAREILLY

Drawn	Checked	Approved
SAGAR	PANKAJ	PANKAJ
Scale	Date	Rev. No.
NTS	13.09.2023	R0

Drawing No.

EXTERNAL INFRA/DRAIN 1