ANKIT GEMS

Architectural Design for a Diamond Factory

Client:	Mr. Pravin Shah
Site Location:	Icchapore, Hazira, Surat
Plot Size:	14,000 sq yards
Construction Area:	1,55,000 sq ft / 14,400 sq m
Cost of Project:	Confidential
Year of Completion:	2017
Services:	Architectural Planning, Interior Design, Landscape Design, MEP Integration, Art Integration
Firms Involved:	EssTeam, Oblique, Essact

essteam

THE SITE:

The Plot is located in the Domestic Tariff Zone of the Gem & Jewellery Park, a sector specific industrial park, measuring about 100 Ha. Interestingly, EssTeam has been the Master Planner for this park, and the project is located in the noble company of some other interesting projects designed by EssTeam.

- Factory building for M/s K.P. Sanghvi & sons
- Office cum factory building for M/s Lemon Technomist & M/s Lexus Softmac
- Office building for M/s. RSM Astute Consulting (Guj.) Pvt. Ltd. Ssa, Ltpl & Lf

FEATURES OF SITE:

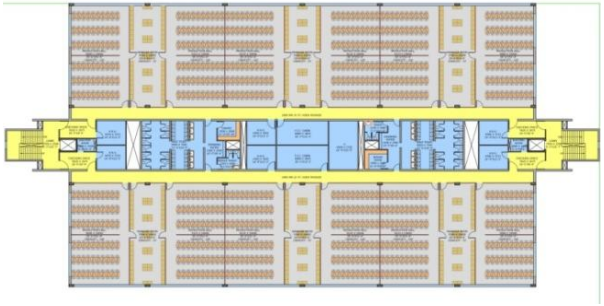
- Access from 16 m wide road on South side of the plot through 373 ft frontage.
- Easily accessible through ONGC bridge.

01. SPACE OPTIMIZATION

02. SPATIAL FLEXIBILITY

03. WELL RESOLVED SERVICES

OPTION 1:



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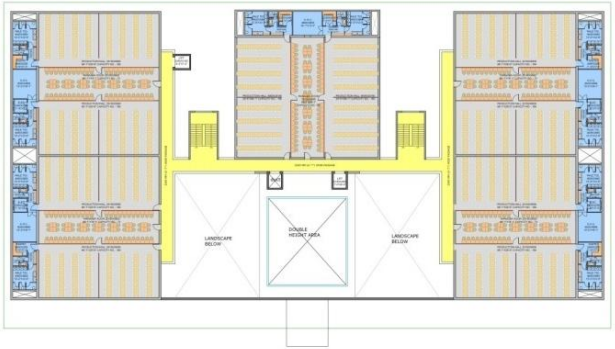

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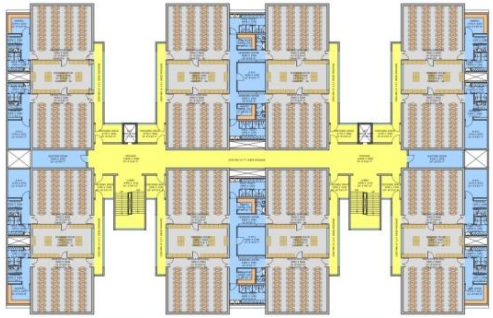


PRODUCTION HALL CIRCULATION AREA SERVICES

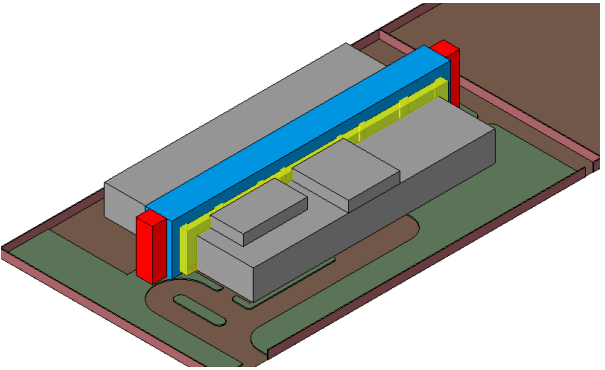
PRODUCTION AREA IN SQ.M	2256.71	72.34%
SERVICE AREA IN SQ.M	447.14	14.33%
CIRCULATION AREA IN SQ.M	415.55	13.32%
TOTAL AREA IN SQ.M	3119.40	100.00%

PRODUCTION AREA IN SQ M	2398.85	76.86%
SEVICE AREA IN SQ M	419.90	13.45%
CIRCULATION AREA IN SQ M	302.15	9.68%
TOTAL AREA IN SQ M	3120.90	100.00%

PRODUCTION AREA IN SQ.M0	1995.12	65.44%
SERVICE AREA IN SQ.M	561.72	18.42%
CIRCULATION AREA IN SQ.M	491.96	16.14%
TOTAL AREA IN SQ.M	3048.80	100.00%

Keeping in mind the values that are critical for designing a Diamond Factory- Space Optimization, Spatial Flexibility and Well Resolved Services, the following options were provided showing the various criteria and calculations done for space efficiency, that was later responsible for the decision- making process, taking care of the Production area, Service area and Circulation area.

OPTION 1:



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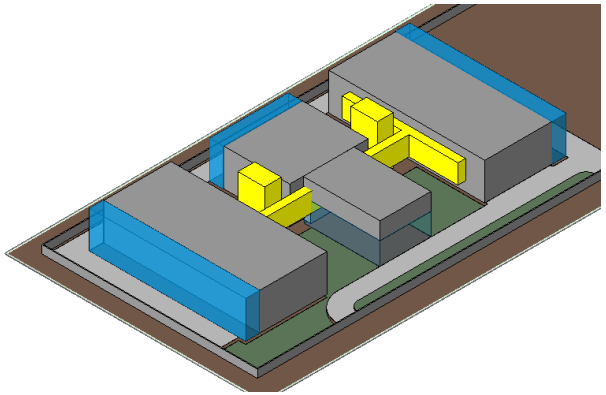

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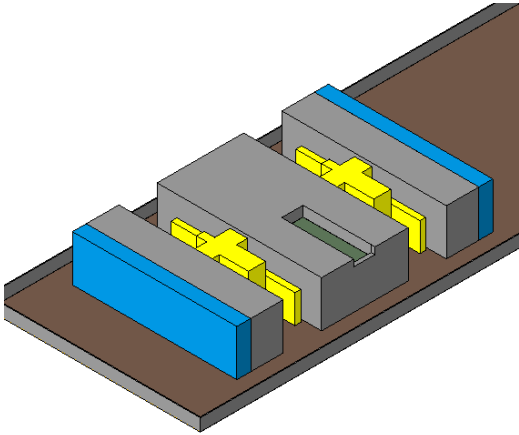
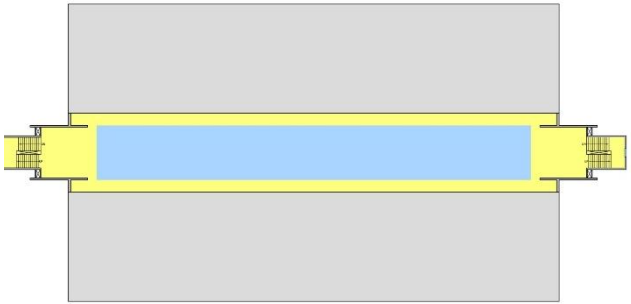
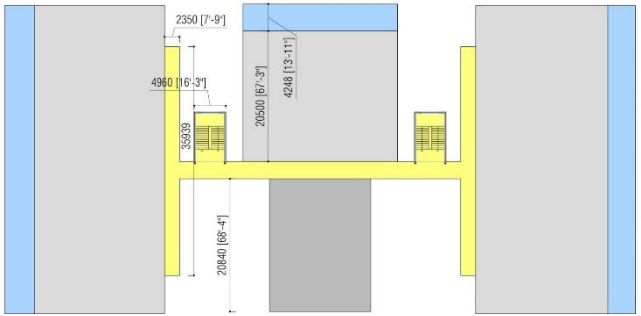
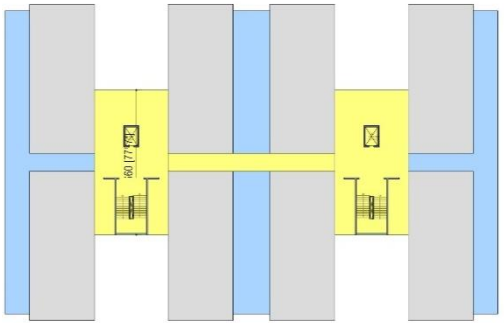


PRODUCTION HALL CIRCULATION AREA SERVICES







PLAN DERIVATION

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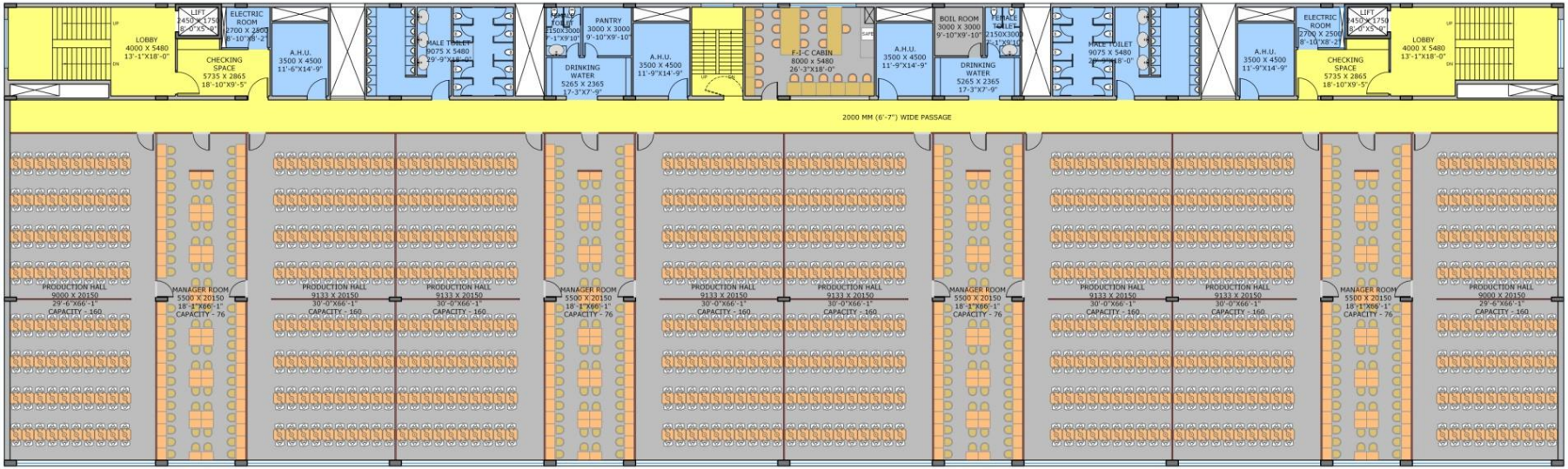

PRODUCTION AREA IN SQ M	1904.46	75.39%
SEVICE AREA IN SQ M	291.19	11.53%
CIRCULATION AREA IN SQ M	330.33	13.08%
TOTAL AREA IN SQ M	**2525.98**	**100.00%**

The option selected, provided more production area with required service area and adequate circulation space with a total area of 2,525 sq m, thereby making it an efficient planning and design for the client according to their requirements, also taking care of the Space Optimization, Spatial Flexibility and Well Resolved Services needed for the factory.

PLAN DERIVATION

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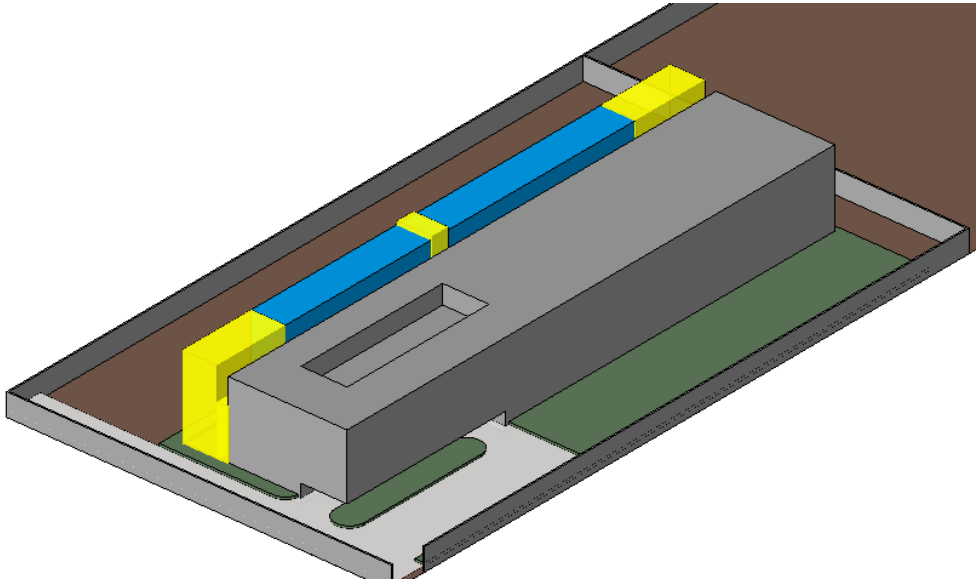
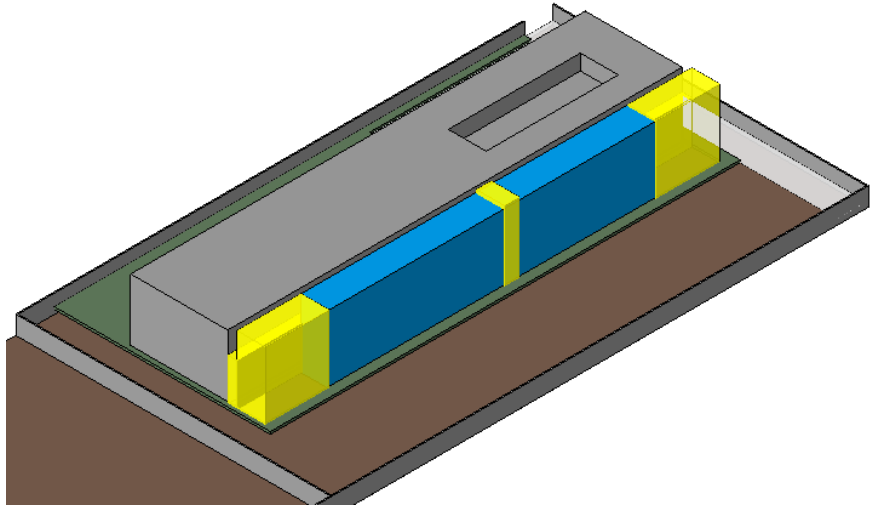
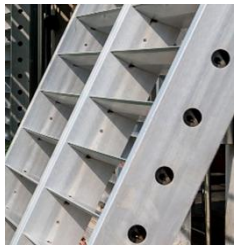
Located in an Industrial Park not far from the city, the architecture of the project is a brutal expression as made of form finished concrete box than encompassed large space on each floor which can be divided as per needs by partition making them workspace. This offers high level of flexibility which counts as a huge asset knowing the dynamics in technology the industry faces today and that it will face tomorrow. The interiors are warm felt spaces using Italian marble and white ash wood for furniture with some hints of copper sparkled in each executive space. The facade is made using perforated Corten Steel which having dual purpose of security grill and the aesthetics of the building. A vast Landscape at the south of the building invites visitors pleasing their eyes naturally.

Around 56,000 units of energy and consequently money is saved in energy consumption of the factory premises with the use of thermal tank in the chiller system of HVAC and on-site solar PV installation of 550 KW. Installation of BMS to monitor process and non-process loads. More than 50% of materials are procured within a radius of 500 km from site and 100% of plywood and veneer is sourced from FSC certified forests.





FORM FINISHED CONCRETE



ALUMINIUM

CORTEN STEEL

GLASS

BUILT TO LAST

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BUILT TO LAST

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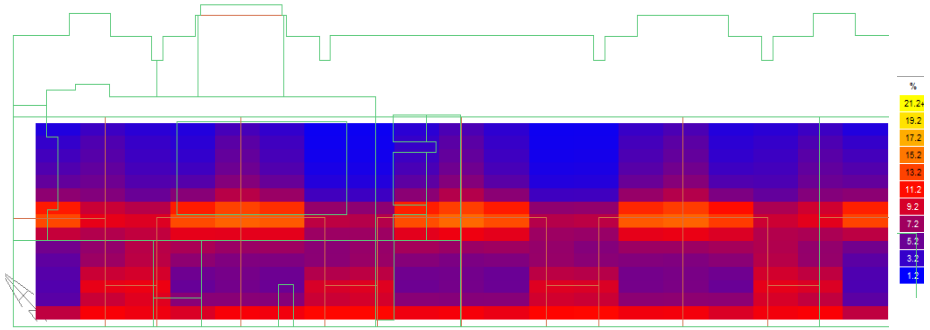
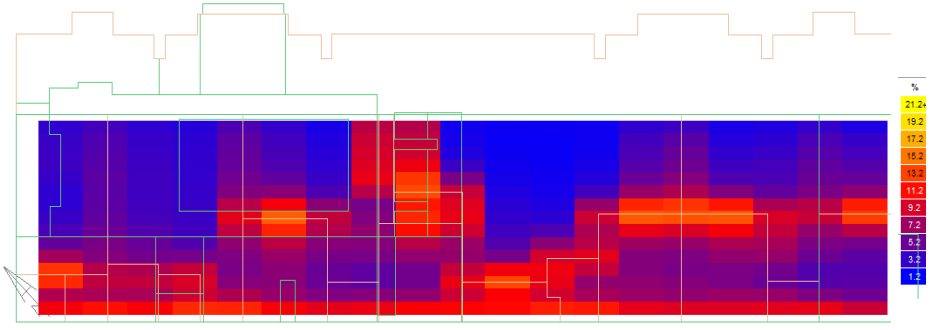
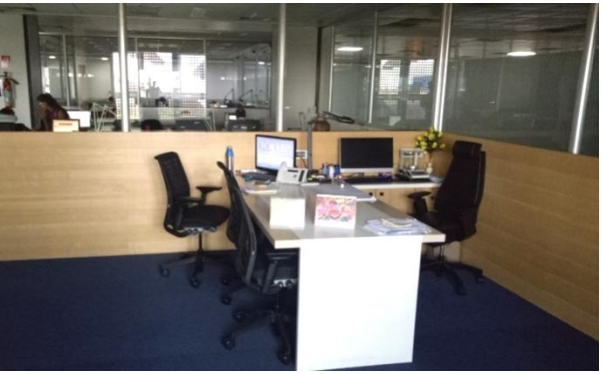


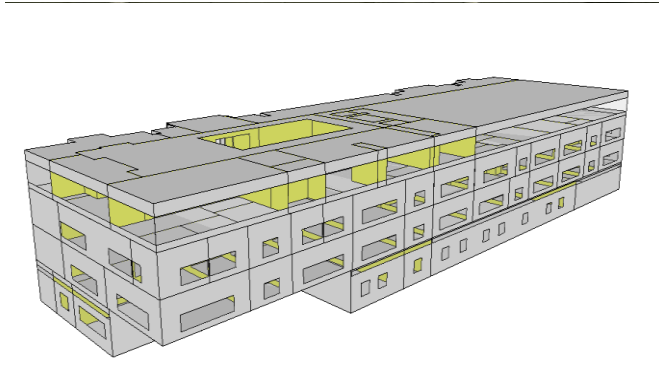
FIRST FLOOR- ALL OCCUPIED SPACES

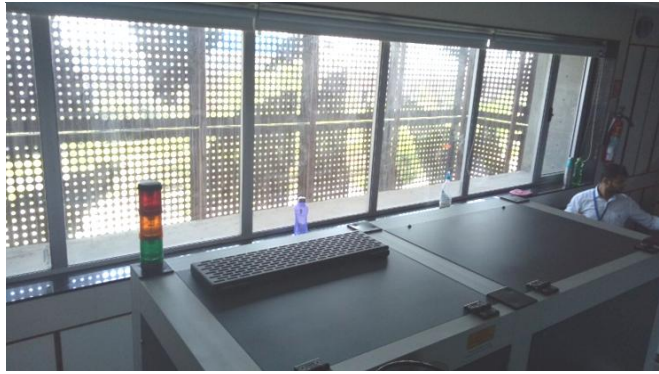


SECOND FLOOR- ALL OCCUPIED SPACES

Day Lighting Simulation has been done for the building. Result shows that the more than 80% of the regularly occupied area is getting minimum daylight factor as required which is necessary for good health and eyesight and helps conserve energy as well.







DAYLIT SPACES ON 1ST AND 2ND FLOOR

DAYLIGHTING

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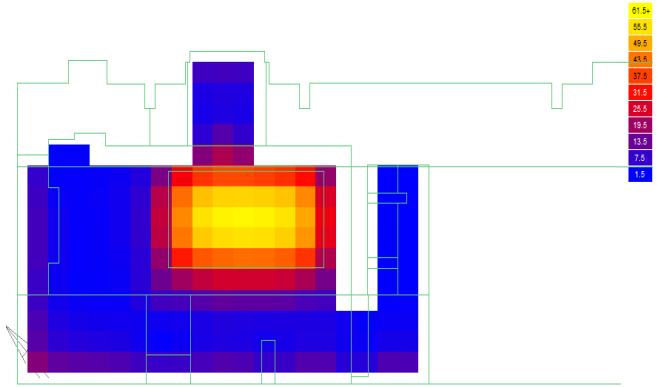


THIRD FLOOR– ALL OCCUPIED SPACES

DAYLIT CANTEEN

DAYLIT EXECUTIVE LOUNGE

DAYLIGHTING

essteam

OPTION 1

The Façade Design is inspired from the waves generated in water which gives depth to the façade. The Façade is designed to allow adequate light in the internal spaces, give clear view and become a protective screen to angular sun rays entering the building directly thereby decreasing the overall heat gain.

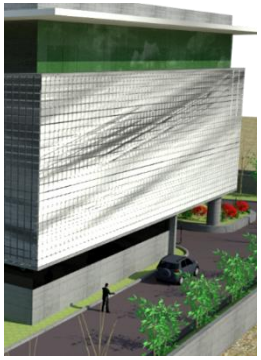
OPTION 2

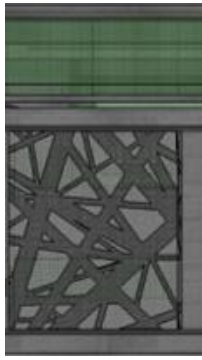
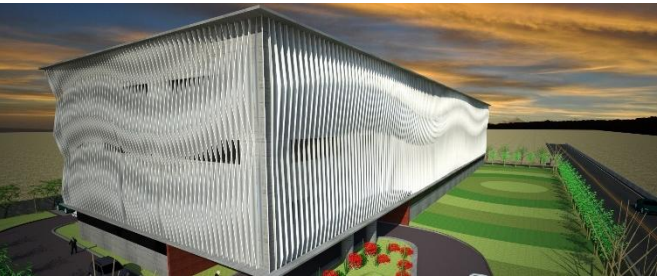
This design is a kinetic façade which shows motion when experiences air movement. It is a representation of dynamic façade.

OPTION 3

Pre weathered zinc sheet façade with The Lines that start on the ground in the landscape, interesting each other through out the site area and climb up on the vertical face of the façade of the building, forming a dialogue between the landscape and the façade that compliment each other.



The orientation of the building demanded a façade design that needed to reduce the glare but still allow adequate light in the usable spaces and therefore, three options were designed and the final option was selected based on the best performance with glare reduction and the ability to control the amount of light entering the spaces.

FAÇADE DESIGN- PROCESS

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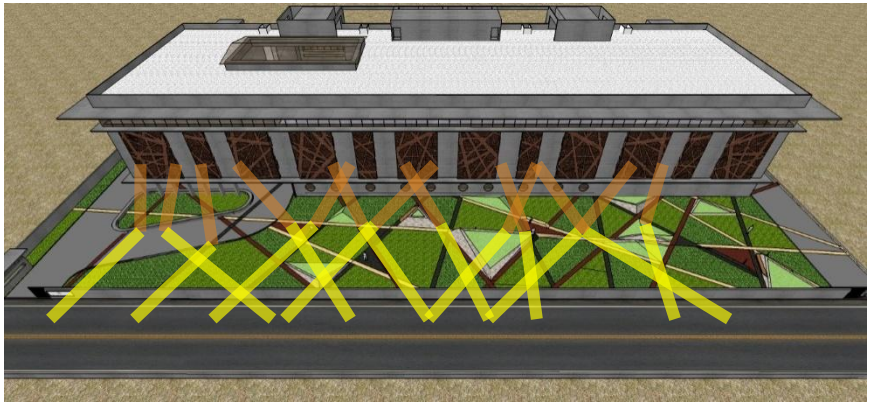
The Lines start on the ground in the landscape, interesting each other through out the site area and climb up on the vertical face of the façade of the building, forming a dialogue between the landscape and the façade that compliment each other.

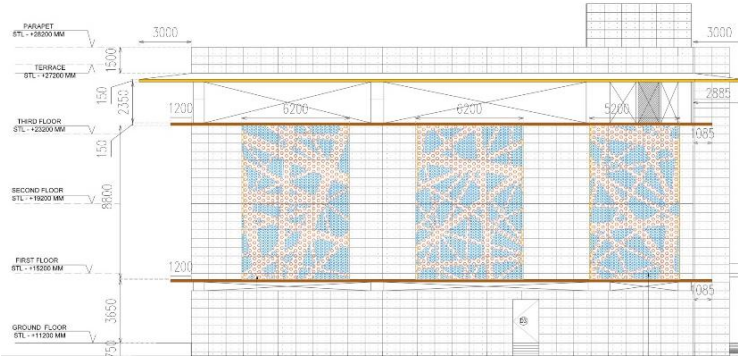
Façade to extend on both sides as well to the rcc wall on the back having the extension of the criss cross pattern from the front face

The façade to have perforation in form of holes of two different sizes and spacing to achieve 80% perforation for visibility & 20% solid metal for opacity.

RCC slab projection at bottom of façade for support



EAST SIDE ELEVATION



FAÇADE DESIGN

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AMALGAMATION OF FACADE AND LANDSCAPE DESIGN

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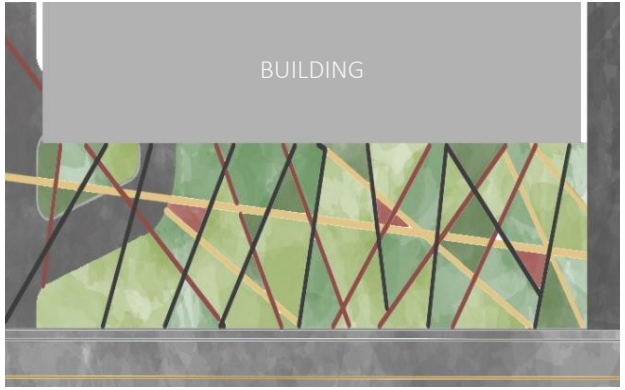
These Lines in the floor are made of three different colored granites. These would bring variations in colors seen from point to point in the landscape area rather then a monotonous feel.



The green space are of plantations with various colors and texture that gives a mixed visual delight as the viewer moves through the entire area.

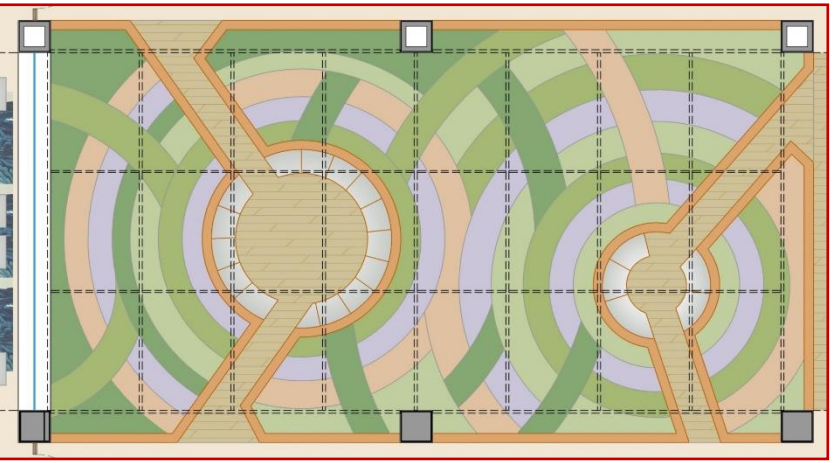
RED GRANITE

BEIGE GRANITE

SILVER PEARL GRANITE

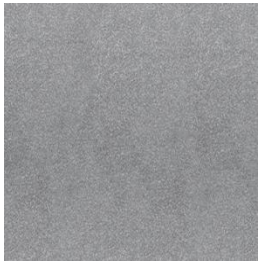
GREEN PLANTATION

The plants are planted in the center as place for refreshment increasing the working efficiency of the workers by providing proper indoor environment.



LANDSCPAE AREA WITH MEETING SPACES

Indoor plants as a way to purify the air and observed that some volatile organic compounds (VOCs) are filtered out from the air by several indoor plants. It is one of the best plants to purify air polluted with synthetic chemicals from furniture and cleaning solutions. It energizes the interiors by filtering air and increasing oxygen inflow. These plants are low maintenance and drought tolerant.



GREY GRANITE

WHITE ASH WOOD

SILVER TRAVERTINE

GLASS

DWARF PEACE LILY

HELICONIA FIRE FLASH

AGLONEMA SILVER QUEEN

MONEY PLANT

HELICONIA

CAPE JASMINE

DAY JASMINE

KODIA BROWN & YELLOW

CROTON

SINGLE MOGRA

LANDSCAPE- DROUGHT TOLERANT SPECIES

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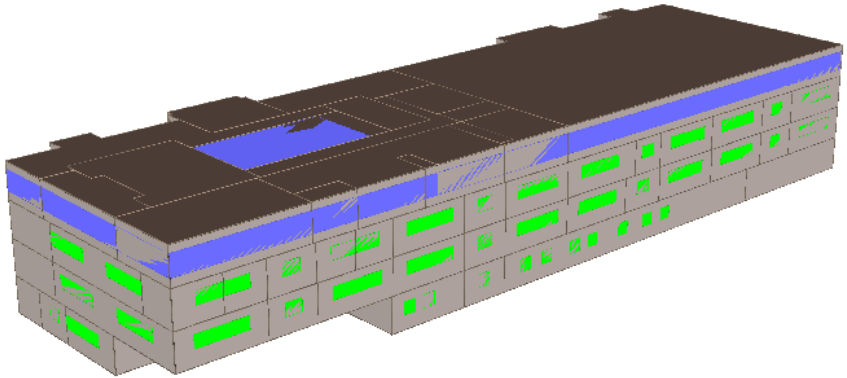
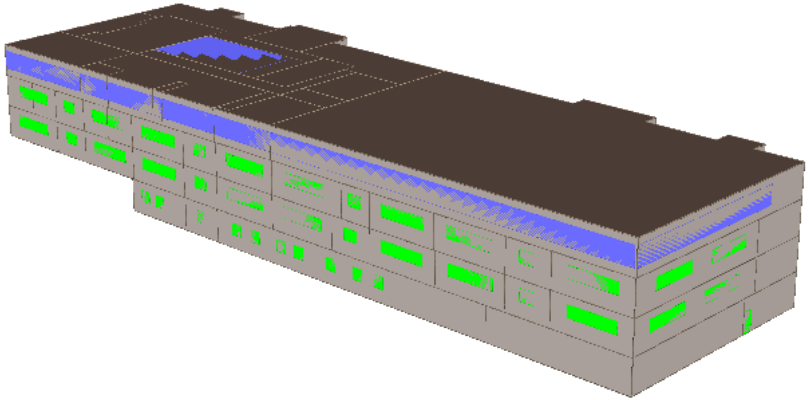
From the simulation results and calculating the Wall to Window Ratio (WWR), the building is 27.59% efficient than baseline case under non-process energy consumption.





Design Model	Proposed Case	Baseline Case
Wall-U- Value (Btu/h ft^2.deg F)	0.544	0.124
Roof-U- Value (Btu/h ft^2.deg F)	0.377	0.063
Glass-U- Value (Btu/h ft^2.deg F)	0.986	1.22
Glass-SC	0.78	0.2873
Skylight-U- Value (Btu/h ft^2.deg F)	0.68	1.98
Skylight-SC	0.31	0.19

ITEM	BASELINE BUILDING	PROPOSED BUILDING
MAIN SYSTEM DESCRIPTION	System 6	Centralised Chilled Water System & VRF System
WATER- SIDE	N/A	Water Cooled Screw Chiller No. of Chiller-3 Each Capacity-275 TR
AIR- SIDE	Packaged VAV with PFP Boxes	AHU & Cassette Units for Chilled Water System Cassette Units for VRF System
EFFICIENCY	EER-9.5, 9.2	COP of Chiiler-6.39 COP of VRF-3.74
FAN POWER	Fan Power calculated as ASHRAE 90.1-2004	For AHU Systems Total Static Pressure 50 mmwg
HEATING SYSTEM OVERSIZING	Oversized by 25%	N/A
COOLING SYSTEM OVERSIZING	Oversized by 25%	N/A

89% of the parking area is covered with permanent roof solar panels & structure. Total 520kW Solar has been installed on site. Installed renewable energy system is generating 49% of annual energy consumption of the factory building (including the process load).

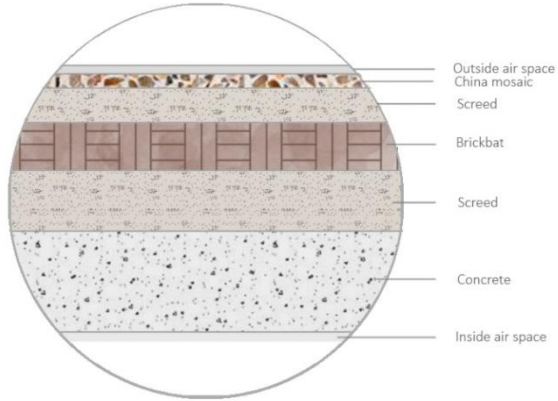
TERRACE FLOOR PLAN

Total Roof area is 3157.16 sq m in which 100% exposed roof (927 sq m) is covered with china mosaic tiles and Parking area is covered with solar panels.

Capacity of installed Solar PV System (kW)	1,250
Threshold Generation/kWh	1,441
Total Generation (kWh)	18,01,250
Total Non Process Energy Consumption (kWh)	16,44,900
Annual solar generation over total non- process consumption	100%

Why China Mosaic?

Providing appropriate roof material can reduce heat radiation upto 80%, thereby China mosaic is used for high thermal reflectivity.



ENERGY CONSERVATION

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1. Proposed Building Energy Performance is 34% more efficient than Baseline Case

2. Onsite Installed Solar PV System is generating 54% more energy than proposed non-process energy consumption.

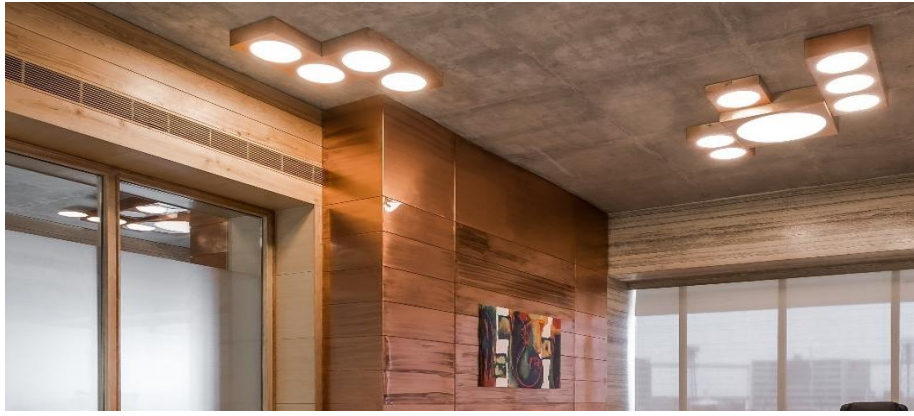
3. Total local materials use in the project is 100%.

4. IGBC AP

5. 100% Rapidly Renewable, FSC Certified & Green Guard Certified wood has been used in the project.







The Interior Lighting Power Density of the entire building is 0.28 w/ sq ft almost 3 times lesser than the actual lighting power density that the building would consume.

INTERIOR LIGHTING POWER DENSITY

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The use of materials without asbestos content was encouraged to minimize the risk of major health effects throughout the factory campus. Roofing has been done by concrete only. Moreover, Structure roofing to cover duct, mechanical equipment, parking area, skylight etc. has been done by solar panel & double glazed unit glasses. Hence, the factory is free from asbestos containing products.

NO USE OF ABSETOS IN THE BUILDING

essteam

LOCAL MATERIALS-

Materials used in the project are local materials obtained by places nearby in order to save transportation fuel.

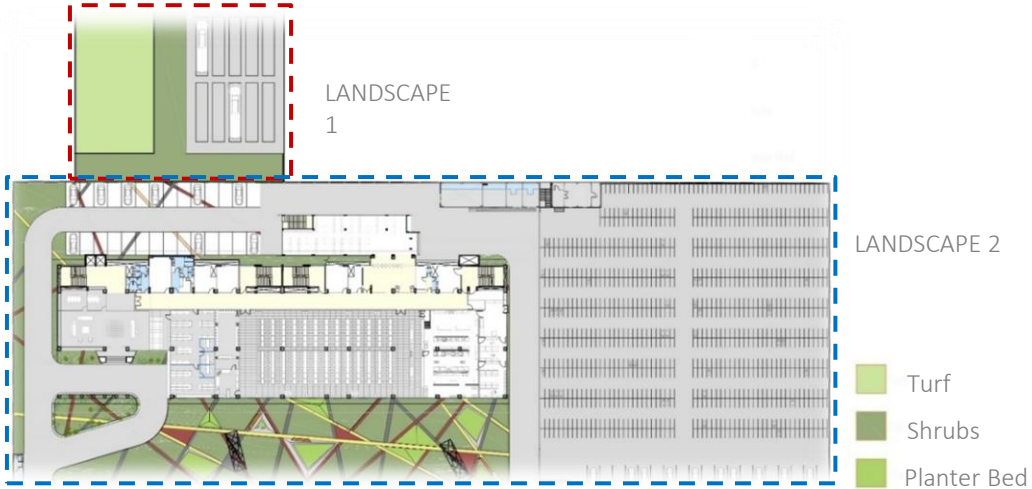
WASTE REDUCTION DURING CONSTRUCTION-

STEEL STORAGE

TILES, CEMENT STORAGE

REUSE OF STEEL BARS IN MAKING PCC OF PARKING

SHUTTERING STORAGE



SITE LAYOUT

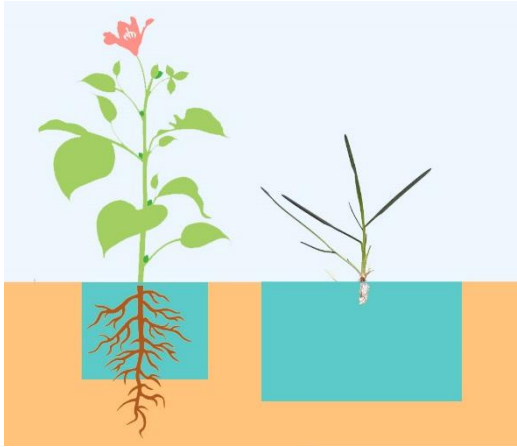
Sr No	Description	Area (sq m)
1	Landscape 1 - Planter Bed	164
2	Landscape 1 - Shrubs	1616
3	Landscape 2 - Turf	530
4	Landscape 2 - Shrubs	489
Total Landscape Area		2799
% of Landscape over Site area		21%
% of Turf Area		19%
% of Drought tolerant species		75%

Turf area is limited upto 530sqm (19% of the total landscape area) to reduce consumption of large quantities of water areas are divided so that the amount of water required by a typology is supplied and water is not wasted.

SPRINKLER SYSTEM

DRIP IRRIGATION SYSTEM

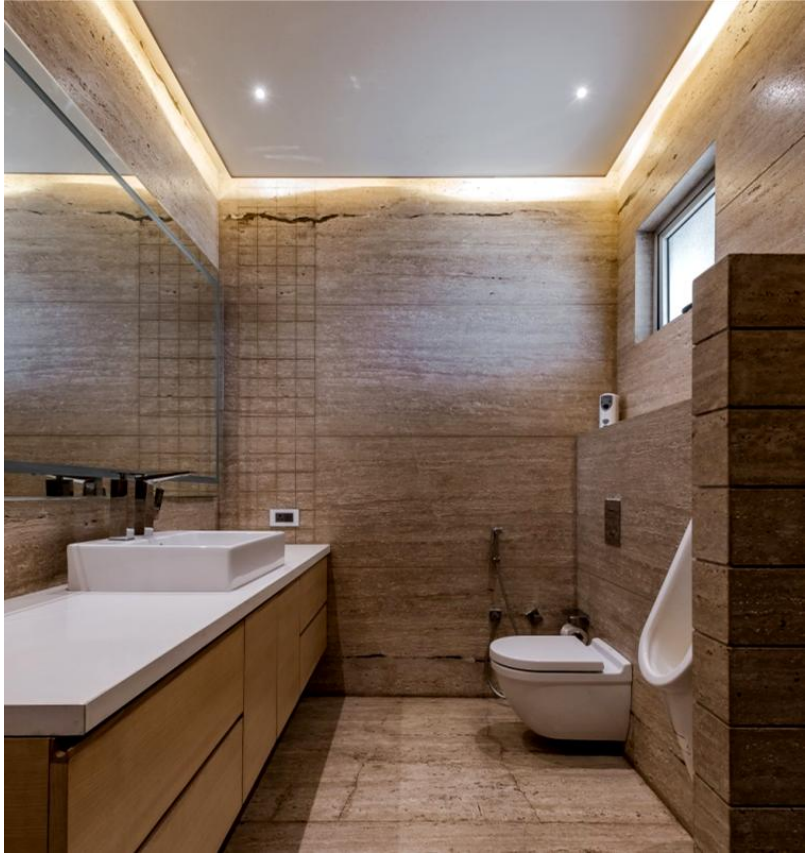
CENTRAL SHUTOFF VALVE



Turf consumes a lot more water as compared to the shrubs used so only 19% of landscape consists of turf

WATER CONSERVATION

essteam



Installation of efficient water fixtures is done to minimize dependence on municipal and bore water, thereby conserving water resources and saving 32% over baseline consumption. Calculation has been carried out with maximum occupancy.

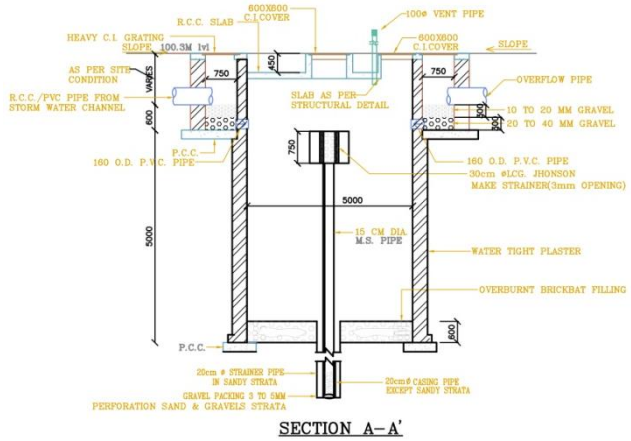
URINAL FLUSH

SHOWER HEAD

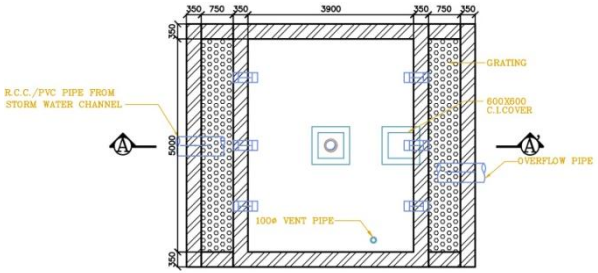
PLUMBING FAUCET

WATER CONSERVATION THROUGH FIXTURES

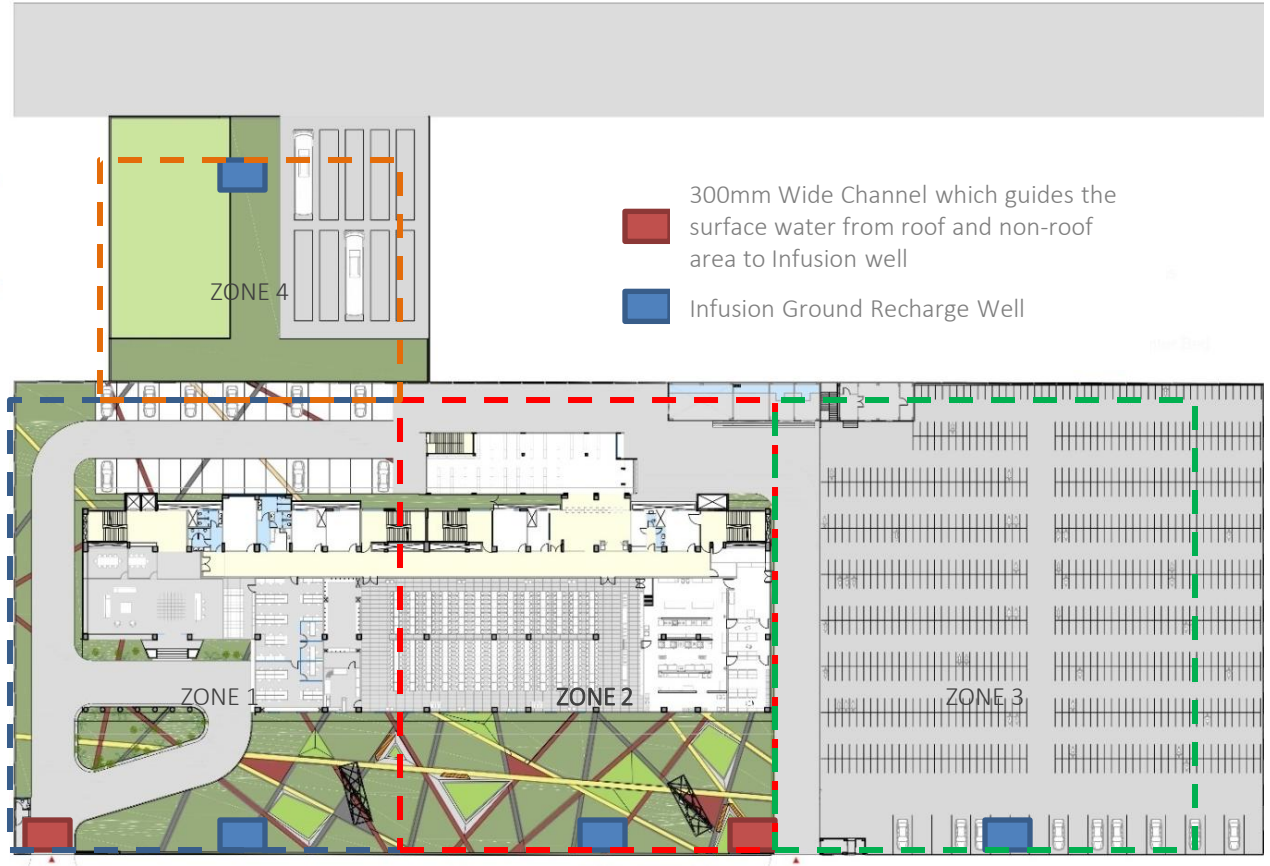
essteam



SECTION A–A'



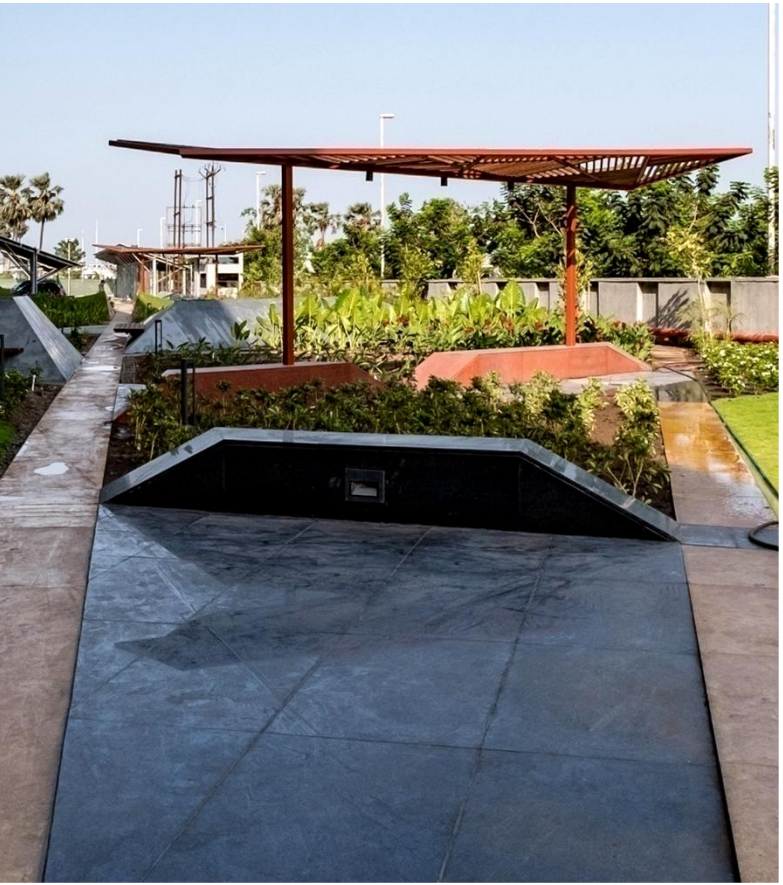
Plan – Infusion Ground Recharge Well



Location of Infusion Ground Recharge well on site layout

essteam

Outdoor seating spaces in exterior landscape is provided area along with the interior canteen space for more than 5% of regular employees per shift to rejuvenate themselves.



REDUCTION OF WORKMEN FATIGUE

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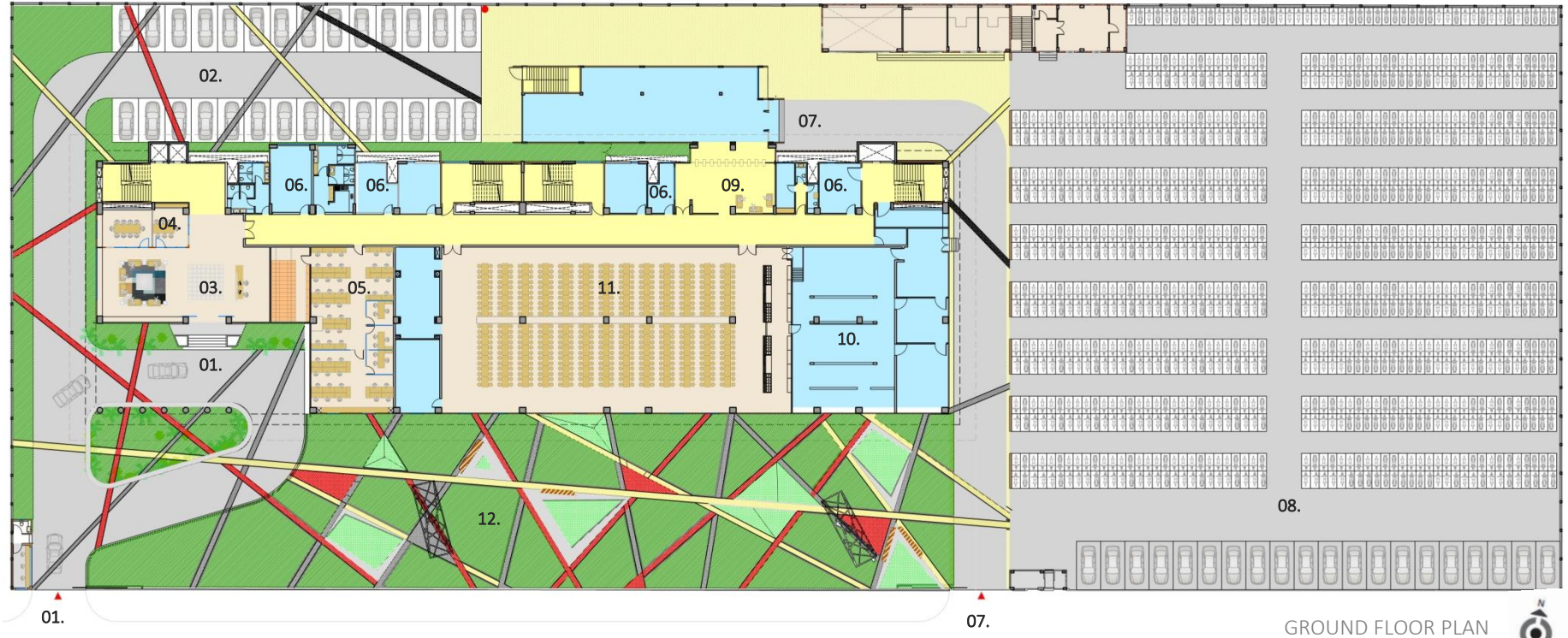
AEROBIC & CARDIOVASCULAR GYMNASIUM

Gym facility has been provided on third floor in the project building which is capable to cater at least 2% of occupants in the factory campus.



GROUND FLOOR PLAN

01. Executive Entry
02. Executive Parking
03. Reception & Waiting
04. Meeting Rooms
05. Accounts
06. Utilities
07. Workers' Entry
08. Workers' Parking
09. Checking space
10. Kitchen
11. Dinning Hall
12. Landscape Garden

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LIFT LOBBY AREA

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RECEPTION AREA

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RECEPTION AREA

LIFT LOBBY AREA

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FIRST FLOOR PLAN

01. Polishing Mills
02. Bruter Department
03. Support Staff
04. Manager's Cabin
05. Male Toilet
06. Female Toilet
07. Pantry
08. AHU Room
09. Electrical Room
10. Staircase

PLAN

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SECOND FLOOR PLAN

01. Polishing Mills
02. Bruter Department
03. Assorting Department
04. Support Staff
05. Director's Cabin
06. Galaxy Department
07. Male Toilet
08. Female Toilet
09. Pantry
10. AHU Room
11. Electrical Room
12. Staircase

PLAN

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DIRECTOR’S CABIN

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ACCOUNTS DEPARTMENT

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ACCOUNTS DEPARTMENT

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THIRD FLOOR PLAN

01. Reception & waiting
02. Landscape with Glass roof
03. Informal Lounge
04. Meeting room
05. Director's Cabin
06. Conference room
07. Gym area
08. Head Cabins
09. Spare Hall
10. Male Toilet
11. AHU Room
12. Staircase

PLAN

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RECEPTION AND WAITING AREA

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RECEPTION AND WAITING AREA

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EXECUTIVE FLOOR

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EXECUTIVE LOUNGE

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DIRECTOR’S CABIN

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DIRECTOR’S CABIN

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DIRECTOR’S LOUNGE

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CONFERENCE AREA

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CONFERENCE AREA

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MEETING ROOM

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DIAMOND FACTORY-ANKIT GEMS IGBC GREEN FACTORY PLANTINUM RATIING	INDIVIDUAL RESIDENTIAL UNIT POINTS AVAILABLE	INDIVIDUAL RESIDENTIAL UNIT POINTS ACHIEVED
SITE SELECTION AND PLANNING	16	12
WATER EFFICIENCY	21	21
ENERGY EFFICIENCY	23	21
MATERIALS AND RESOURCES	16	12
INDOOR ENVIRONMENTAL QUALITY AND OCCUPATIONAL HEALTH	19	15
INNOVATION AND DESIGN PROCESS	05	05
TOTAL POINTS	100	**86**

FINAL RATING ACHIEVED - **PLATINUM**

ACHIEVEMENTS

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IGBC

Confederation of Indian Industry
125 Years - Since 1895

Johnson Controls

IGBC Performance Challenge 2020

This is certify that

Diamond Factory and Office of Ankit Gems Private Limited

Surat

is recognised for their continuous performance since their achievement of green building rating

Excellence Award

Category : Factory

Gurmit Singh Arora	V Suresh	K S Venkatagiri
Vice Chairman, IGBC	Chairman, IGBC	Executive Director, CII-Godrej GBC


LEADERSHIP IN ENERGY & ENVIRONMENTAL DESIGN
LEED
PLATINUM
ANKIT GEMS PVT LTD
DIAMOND FACTORY & OFFICE
Surat, India
HAS FULFILLED THE REQUIREMENTS OF THE LEED GREEN BUILDING RATING SYSTEM CERTIFICATION ESTABLISHED BY THE U.S. GREEN BUILDING COUNCIL AND VERIFIED BY GREEN BUSINESS CERTIFICATION INC.
v4.1
OPERATIONS AND MAINTENANCE: EXISTING BUILDINGS
PLATINUM
December 2021
MAHESH RAMANUJAM, PRESIDENT & CEO, U.S. GREEN BUILDING COUNCIL,
PRESIDENT & CEO, GREEN BUSINESS CERTIFICATION INC.

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