



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited "A" Grade by NAAC | 12B Status by UGC | Approved by AICTE

www.sathyabama.ac.in

SCHOOL OF BUILDING AND ENVIRONMENT

DEPARTMENT OF ARCHITECTURE
M. Arch (Sustainable Architecture)

PROFESSIONAL TRAINING (S89APT)
JUL 2022 - AUG 2022

Name of the Student : M.ABIRAMI

Semester : III

Reg No. : 41890003

Batch : 2021-2023



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M. Arch (Sustainable Architecture)

VIVA-VOCE EXAMINATION

This is to certify that the Professional Training Report (S89APT) is the work of **M.ABIRAMI** who had undergone training in **EARTHONOMIC ENGINEERS PVT.LTD.** and has been monitored by the continuous assessment from Jul 2022 to Aug 2022.

Dr.Devyani Gangopadhyay
HOD AND DEAN

Submitted for Viva-voce Examination held on 20 / 12 / 2022

Internal Examiner

External Examiner



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DECLARATION

I **ABIRAMI.M** hereby declare that this Professional Training Report one month done by me under the guidance of **Ar. ARAVIND BALAJI. M.P** is submitted in partial fulfillment of the requirements for the completion of practical training session.



DATE : 20 / 12 / 2022

PLACE : CHENNAI

SIGNATURE OF CANDIDATE

ACKNOWLEDGEMENT

I am pleased to acknowledge my sincere thanks to Board of Management of **SATHYABAMA INSTITUTE OF SCIENCE & TECHNOLOGY** for their kind encouragement in doing this project and for completing it successfully. I am grateful to them.

I convey my thanks to **Dr. Devyani Gangopadhyay Dean, School of building and Environment** for providing me with necessary support and details at the right time during the progressive reviews.

I would like to express my sincere and deep sense of gratitude to **Ar.Aravind Balaji** for his valuable guidance, suggestions and constant encouragement paved way for the successful completion of my Training.

I would also like to express my sincere thanks to **Ar.Catherine Selvaraj** (Internal Co - ordinator) for her valuable guidance, during the entire Professional Training period.

I wish to express my thanks to all Teaching and Non-teaching staff members of the Department of Architecture who were helpful in many ways for the completion of the project.

I also thank **Mr. Girish Vishwanathan & Earthonomic Engineers team** for providing an opportunity to learn and understand new ideas and concepts of sustainability by a short period of time.

ABIRAMI.M

19th August 2022

CONFIRMATION LETTER

To

The Head of the Department,

Sathyabama Institute of Science and Technology

Rajiv Gandhi Salai, Jeppiaar Nagar,

Chennai - 600119,

Tamil Nadu

Subject: Trainee Confirmation for 11th July 2022 to 19th August 2022

Respected Madam,

I **GIRISH. R. VISVANATHAN** accept Abirami. M bearing reg.no 41890003 pursuing 3rd semester M Arch Department of Architecture in Sathyabama Institute of Science and Technology as an intern and confirm her internship program with us for the period between (11th July 2022 to 19th August 2022).

Regards and Thanks,



GIRISH. R. VISVANATHAN

(Director - Technical)

Earthonomic Engineers Private Limited

Adyar, Chennai - 600020

JOINING LETTER

11th July 2022

Dear Abirami,

We are very pleased to offer you an internship program with **EARTHONOMIC ENGINEERS PVT LTD** from 11th July 2022 to 19th August 2022.

Your responsibilities will be directed to you by your reporting manager.

Kindly note that any information and data collected from you during the course of your internship should be kept confidential at all times.



Yours sincerely,

Girish.R.Visvanathan
Director-TECHNICAL



MONTHLY REPORT



SATHYABAMA

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SCHOOL OF BUILDING & ENVIRONMENT, DEPARTMENT OF ARCHITECTURE

M. Arch (Sustainable Architecture) Batch 2021-2023

Continuous Assessment Report for Professional training

(Continuous progress report of the trainee architect/Project Manager for the period of 15 working days in the office to be submitted to HOD)

1. Name of the office / organization :	EARTHONOMIC ENGINEERS PVT. LTD.
2. Address & Contact Number :	B4, Parameswari Nagar, Adyar (6379181440)
3. Name of the student :	M. ABIRAM I
4. Duration :	From 11 th July 2022 To 30 th July 2022
5. Total No. of days :	15 days
6. Evaluation of Performance criteria shall be on	

* Note: Kindly grade the student as per his/her overall performance in the office during the assessment month.

Description of works	Excellent	Good	Fair	Poor	NA
Understanding of office culture	✓				
Skillsets related to project management	✓				
Design Management	✓				
Understanding the Triple Constraints	✓				
Observation during Site Visits			X		
Understanding of construction details		✓			
Understanding of Construction sequences		✓			
Site Supervision / Discussion with clients	✓				
Adherence to Time schedule	✓				
Quantitative aptitude		✓			
Documentation skills		✓			
Coordination with other consultants	✓				

Overall Grading*	"A"
------------------	-----

(A - 8.0, B - 7.0, C - 6.0, D - 5.5, E - 5.0, F - <5)

7. Any other Remarks : Hardworking and good commitment towards work given.

8. Signature of the Head of the Office / Organization (With Seal)

[Signature]



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M. Arch (Sustainable Architecture) Batch 2021-2023

Continuous Assessment Report for Professional training

(Continuous progress report of the trainee architect/Project Manager for the period of 15 working days in the office to be submitted to HOD)

1. Name of the office / organization :	EARTHONOMIC ENGINEERS PVT. LTD.
2. Address & Contact Number :	B4, Parameswari Nagar, Adyar (6379181440)
3. Name of the student :	M. ABIRAM I
4. Duration :	From 1 st AUGUST 2022 To 17 th August 2022
5. Total No. of days :	15 days
6. Evaluation of Performance criteria shall be on	

* Note: Kindly grade the student as per his/her overall performance in the office during the assessment month.

Description of works	Excellent	Good	Fair	Poor	NA
Understanding of office culture	✓				
Skillsets related to project management	✓				
Design Management	✓				
Understanding the Triple Constraints	✓				
Observation during Site Visits			X		
Understanding of construction details		✓			
Understanding of Construction sequences		✓			
Site Supervision / Discussion with clients	✓				
Adherence to Time schedule	✓				
Quantitative aptitude	✓				
Documentation skills	✓				
Coordination with other consultants	✓				

Overall Grading*	"A"
------------------	-----

(A - 8.0, B - 7.0, C - 6.0, D - 5.5, E - 5.0, F - <5)

7. Any other Remarks : Understood office work schedule and worked with Sincerity and good understanding

8. Signature of the Head of the Office / Organization (With Seal)

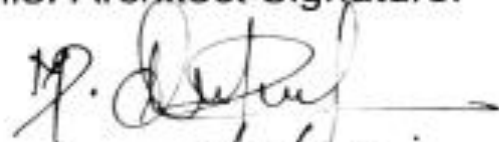
[Signature]



WORK DIARY

DAY	PROJECT NAME	WORK DONE	DAY	PROJECT NAME	WORK DONE
01	General Introduction (IGBC)	IGBC - Daylighting Guidelines Study	14	Green Factory Building	Documentation
02	Green Homes - New	Manual lighting Calculation	15	"	Documentation
03	Green Homes - New	Learning Design Builder	16	Green Data Centre Building	IESVE - Model Making
04	Green Homes - New	Design Builder Model	17	"	IESVE - Model Making
05	Green Homes - New	Design Builder Model Simulation	18	Green Factory Building	Conceptual Planning + Documentation
06	Green Factory Building	Manual calculation (RW, WF)	19	Green Data Centre	IESVE - Model Making
07	Green Factory Building	Manual calculation + Guidelines	20	Green Data Centre	Explore Model Simulation
08	Green Homes	Daylighting - Report Preparation	21	Green Campus - Existing	Project Introduction
09	Green Factory Building	Understanding IGBC Guidelines	22	"	Manual Calculation
10	Green Factory Building	Understanding IGBC Guidelines	23	Assignment	Lighting Calculation
11	Green Factory Building	Project Introduction - Calculation	24	Green Factory Building	LPD Calculation
12	"	Documentation	25	Green Campus - Existing	Documentation
13	"	Documentation + Calculation	26	Green New Building (Office)	Preliminary Review Report

Chief Architect Signature:


19/08/2022

Office seal:

Earthnomic Engineers Pvt. Ltd.
Old No. 47, New No. 41,
F2 Ashok Castle, 12th Avenue,
Ashok Nagar, Chennai - 600 083.

WORK DIARY

[illegible]

Chief Architect Signature:

19/05/2022

Office seal:

Earthonomic Engineers Pvt. Ltd.
Old No. 47, New No. 41,
F2 Ashok Castle, 12th Avenue,
Ashok Nagar, Chennai - 600 026

Curthomonic Engineers Private Limited
Registered office: 12 Ashok Castle,
47, 12th Avenue Ashok Nagar, Chennai – 600083
Email: info@curthomonic.com
GSTIN: 33AAAC2933A1ZA



19th August 2022

Consolidated Certificate (Experience)

To,

The Head of the Department

Sathyabama institute of science and technology,

Rajiv Gandhi Salai,

Jeppiaar Nagar,

Chennai -600019.

Subject: Successful completion of 1 month long professional training.

Respected Madam,

This is to certify that 'Abirami. M ' bearing reg. No 41890003 of 3rd semester M. Arch (SA) Department of Architecture in Sathyabama institute of science and technology has successfully completed 1-month long professional training by working in our office "Earthnomic Engineers". She was associated as a trainee for the period between (11th July 2022 to 19th August 2022).

She excelled in her work as an intern in " **Earthonomic engineers, Adyar, Chennai.**" during his period work.

Regards and Thanks,



GIRISH. R. VISVANATHAN

(Director - Technical)

Earthonomic Engineers Private Limited

Adyar, Chennai – 600020

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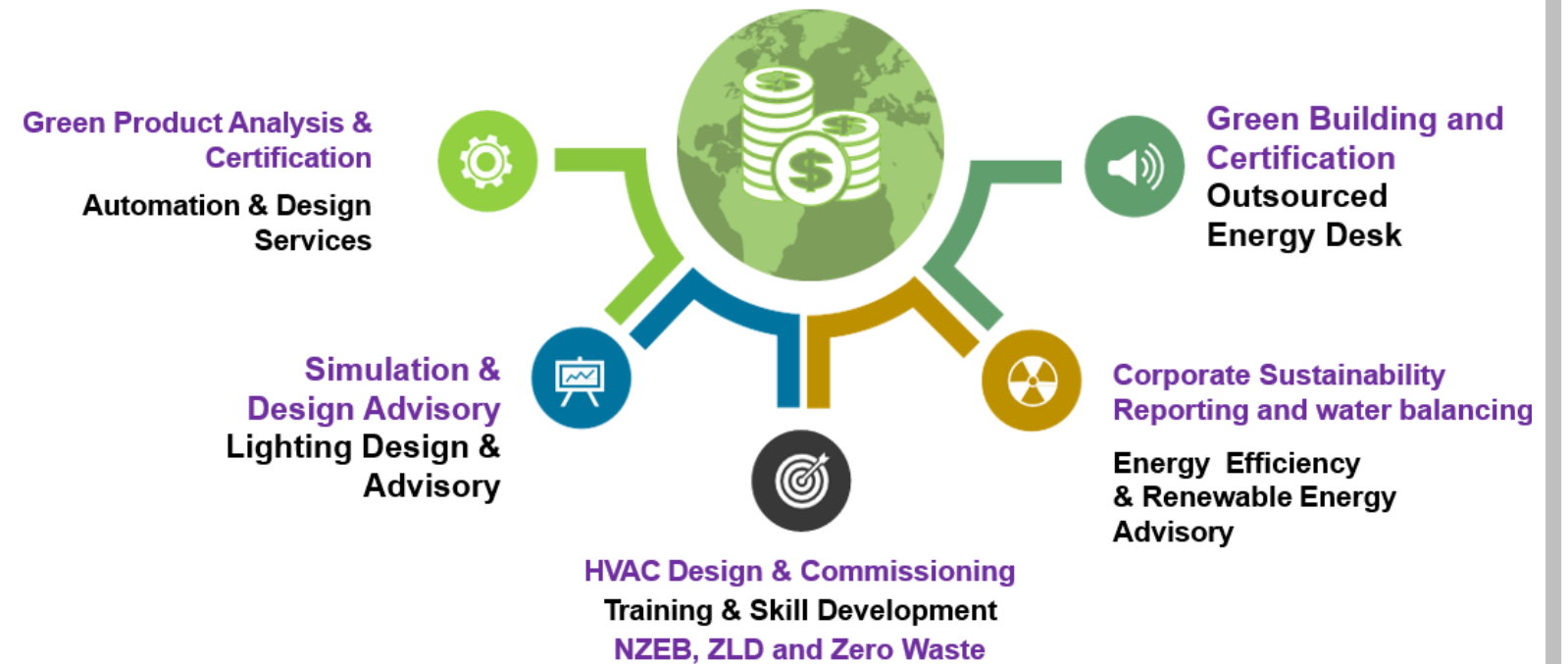
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	<u>GREEN FACTORY - I</u>	
	▪ Site visit photos.....	05
	▪ Feasibility report.....	09
	<u>GREEN FACTORY – II</u>	
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FIRM INTRODUCTION

- **OFFICE NAME - EARTHONOMIC ENGINEERS.**
- **LOCATION - ADYAR, CHENNAI.**
- **WORK TYPOLOGY**
 - **IGBC CERTIFICATION,**
 - **SUSTAINABLE INTERIORS,**
 - **RESEARCH ON INTERIOR PLANTATION**

- At Earthonomic, we work towards developing sustainable environments for homes and organizations. Our primary aim is to provide the best options for sustainable living by creating high-performance environments for everyone.
- We aim to transform people's perception of "environment is cost".

- We are pioneers in providing a new lean and green paradigm that is ROI centric.
- We assist architects and consultants to improve building designs, energy efficiency, selection of building materials, and optimize building economics, for residencies, institutions, offices, and factories.



CLIENT



SOFTWARE TRAINING



WHY?

Green concepts and techniques in the industry can help address issues like

- Energy efficiency,
- Conservation of natural resources,
- Handling of consumer waste,
- Water efficiency and
- Reduction in fossil fuel use
- occupant health and wellbeing.

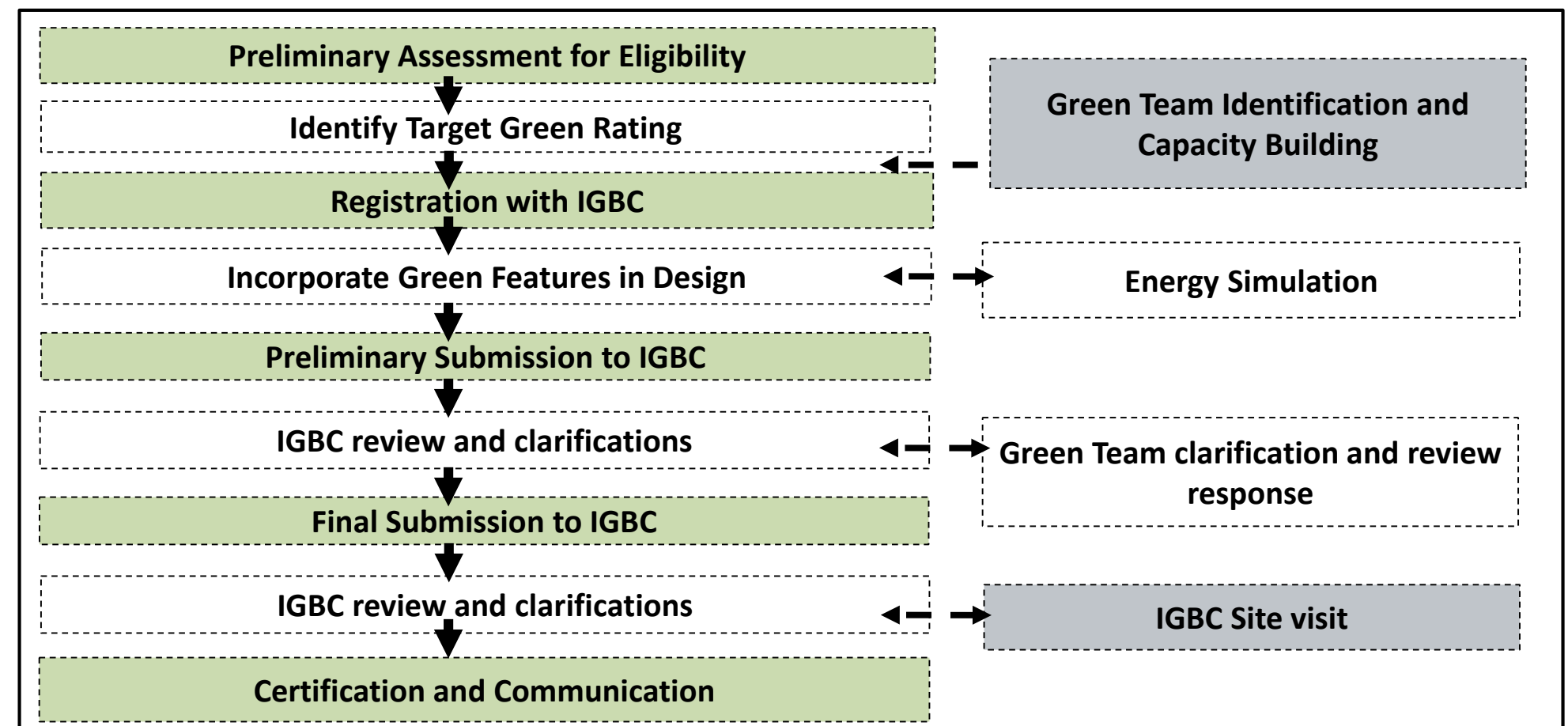
CATEGORIES OF CREDITS

CREDITS	POINTS AVAILABLE
Site Selection & Planning	16
Water Conservation	21
Energy Conservation	23
Material Conservation	16
Indoor Environment Quality	19
Innovation	5
TOTAL	100

CERTIFICATION LEVELS

Certification Level	Points Required	Recognition
Certified	51-60	Best Practices
Silver	61-70	Outstanding Performance
Gold	71-80	National Excellence
Platinum	81-100	Global Leadership

CERTIFICATION PROCESS:



MANDATORY CRITERIA

1. Local Building Regulations
2. Soil Erosion Control
3. Rain Water Harvesting Roof & Non Roof
4. Water Efficient Plumbing Fixtures
5. Ozone depleting Substances
6. Minimum Energy Performance
7. Segregation of waste ,Post Occupancy
8. Tobacco Smoke Control
9. Minimum fresh Air Requirement
10. Avoid use of asbestos



SITE SELECTION & PLANNING:

CREDITS	SITE SELECTION & PLANNING	POINTS
MR 1	Compliance with local regulations	-
MR 2	Soil erosion & prevention control	-
SS CR1	Contaminated site remediation	1
SS CR2	Access to public transport / shuttle services	3
SS CR3	Basic Amenities	2
SS CR4	Natural Topography and Landscape 20%, 30%	2
SS CR5	Heat Island Effect on roof and parking area	4
SS CR6	Non-fossil fueling facility for vehicles	1
SS CR7	Design for differently abled	2
SS CR8	Night sky pollution reduction	1
TOTAL		16

MANDATORY REQUIREMENT:

- **Compliance with local regulations** - The project should comply with the local building regulation.
- **Soil erosion control** – The topsoil should be preserved for future use in the landscape.

CREDITS

- **Contaminated site remediation** – rehabilitation of the contaminated site.
- **Natural topography & landscape** - Retaining the natural topography of the site or landscape by avoiding site disturbance for at least 20%.
- **Heat Island Effect on roof and parking area** – Roof high SRI value white paint and shaded parking area with trees.
- **Non-fossil fueling facility for vehicles** – 5% of parking capacity should have a non-fossil fuel facility.
- **Night sky pollution reduction** – light pollution in the exterior facade to enhance the nocturnal environment.



WATER CONSERVATION:

CREDITS	WATER CONSERVATION	POINTS
MR 1	Rainwater harvesting 50% roof and non-roof run-off	-
MR 2	Low flow water fixture	-
WC CR1	Limit turf area 20%, 30%, 40%	3
WCCR2	Drought tolerant species 30%, 40%	2
WC CR3	Management of irrigation system	2
WC CR4	Rainwater harvesting 75%, 95%	6
WC CR5	Non-process waste water treatment 75%, 95%	4
WC CR6	Water use reduction 20%, 30%	4
TOTAL		21

MANDATORY REQUIREMENT:

- **Rainwater harvesting (roof & non-roof runoff)** - 95% of surface area runoff is to be captured for storage or recharge of aquifers
- **Low flow water fixture** – Installing low flow water fixture.

CREDIT:

- **Landscape design** – Limit turf area and increase native /drought species.
- **Management of irrigation system** – Provide highly efficient irrigation system according to the water quantity required for the species.
- **Non-process wastewater treatment** – Install an onsite or offsite sewage treatment plant (STP) to treat & reuse non-process wastewater.



ENERGY CONSERVATION:

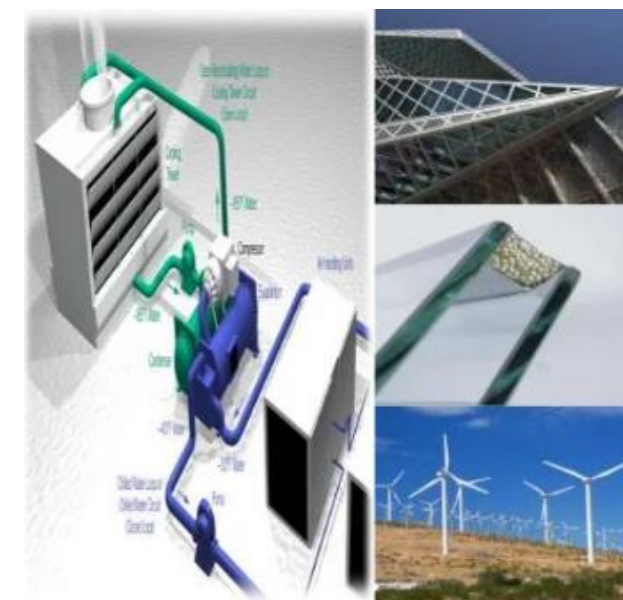
CREDITS	ENERGY CONSERVATION	POINTS
MR 1	Ozone depleting substances	-
MR 2	Minimum energy efficiency	-
EC CR1	Eco-friendly refrigerants	1
EC CR2	Enhanced energy efficiency	6
EC CR3	On-site renewable energy	2
EC CR4	Green power	6
EC CR5	Energy metering	6
EC CR6	Eco-friendly DG Sets	2
TOTAL		23

MANDATORY REQUIREMENT:

- **Ozone depleting substances** - Install systems with CFC and halon free.
- **Minimum energy efficiency** – Energy simulation

CREDITS

- **Eco-friendly refrigerants** – Using HCFC-free substance
- **Enhanced energy efficiency** – Energy efficiency management pattern for non-process load in the facility.
- **On-site renewable energy** – Install a renewable energy system to cater to 15% of non-process energy consumption.
- **Green power** – Off-site renewable energy.
- **Energy metering** – At least 3 sub-metering in applications with BMS.
- **Eco-friendly dg sets** – Low emitting fuels reduce the emission level for a better environment.



MATERIAL CONSERVATION:

CREDITS	MATERIAL CONSERVATION	POINTS
MR 1	Segregation of waste, post occupancy	-
MC CR1	Handling of waste material, during construction	2
MCCR2	Material with recycled content	2
MC CR3	Local material	4
MC CR4	Material reuse	4
MC CR5	Certified wood /rapidly renewable building material	4
TOTAL		16

MANDATORY REQUIREMENT:

- **Segregation of waste, post occupancy** - facilitate segregation of waste at source

CREDIT:

- **Handling of waste material, during construction** – Record the total quantity of waste generated on-site and the quantity recycled..
- **Material with recycled content** – record material with recycled content in the master material.
- **Local material** – Record materials with local purchase in the master material.
- **Material reuse** – Ensure at least 5% of the total cost of the building material is salvaged, refurbished and reused.
- **Certified wood /rapidly renewable building material** – door with FCS certification and rapidly renewable material.



INDOOR ENVIRONMENTAL QUALITY & OCCUPATIONAL HEALTH:

CREDITS	INDOOR ENVIRONMENTAL QUALITY & OCCUPATIONAL HEALTH	POINTS
MR 1	Tobacco smoke control	-
MR 2	Minimum fresh air requirements	-
MR 3	Avoid use of asbestos in the building	-
IEQ CR1	Improved fresh air ventilation	4
IEQ CR2	Building flush out	2
IEQ CR3	Day lighting 50%, 75%, 95%	6
IEQ CR4	Low VOC materials	2
IEQ CR5	Reduction of workmen fatigue (breakout space)	2
IEQ CR6	Eco-friendly house keeping chemicals	1
IEQ CR7	Aerobic & cardiovascular gymnasium	2
TOTAL		19

MANDATORY REQUIREMENT:

- **Tobacco smoke control** - No smoking zone to reduce health impacts.
- **Minimum fresh air requirement** – providing adequate outdoor air ventilation to avoid pollutants in indoor air quality
- **Avoid use of asbestos.**

CREDITS

- **Improve fresh air ventilation**– 30% above mandatory.
- **Building flush out**– carry out flush post construction.
- **Daylighting** – Ensure daylighting in interiors.
- **Low VOC material** – use of low VOC content material
- **Reduction of workmen fatigue (breakout space)**–.
- **Eco-friendly housekeeping chemicals**– Green seal standard(GS-37) or equivalent material.
- **Aerobic & cardiovascular gym** – provide a gym for 2% of building occupant

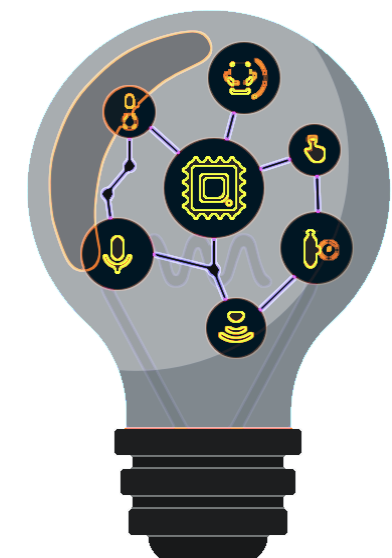


INNOVATION IN DESIGN:

CREDITS	INNOVATION IN DESIGN	POINTS
WC CR1	Innovation in design	1
WCCR2	Innovation in design	1
WC CR3	Innovation in design	1
WC CR4	Innovation in design	1
WC CR5	Innovation in design	1
TOTAL		5

Innovation in design includes the exemplary performance of the credits such as

- Rain water harvesting
- Water conservation
- Energy optimization
- IGBC AP certification



SITE OBSERVATION & PHOTOGRAPHS



OBSERVATION IN SITE:

- No.of.occupant
- Basic amenities (atm, first aid. Etc..)
- Welfare center
- Shuttle service
- Parking area – Heat island
- Check for universal design
- Rainwater harvesting
- Water fixture
- Irrigation system
- Landscape percentage
- Turf area & drought species
- Daylighting
- Lighting fixtures
- No smoking zone,
- Eco-friendly chemical
- Wastewater reuse
- On-site /offsite renewable.
- Waste management

FEASIBILITY REPORT

SITE SELECTION & PLANNING

Credits	Points Available	Points as per current stand	NA/Requires Assessment
Local Building Regulations	Required	Achievable	-
Soil Erosion Control	Required	Achievable	-
Contaminated Site Remediation	1	-	1
Access to Public Transport / Shuttle Services	3	1	2
Basic Amenities	2	2	-
Natural Topography or Vegetation	2	-	2
Heat island effect roof & Parking	4	-	4
Non Fossil Fueling Facility for Vehicles	1	-	1
Design for Differently abled	2	-	2
Night Sky Pollution reduction	1	-	1

- The possibilities of points to be achieved according to the current status and also possibilities of points that can be achieved are guided according to the site condition.

ASSESSMENT OF POINT

Points As per current stand	3
Points Requiring Further Assessment	8
Points Not Attempted	5
Total points	16

SITE SELECTION & PLANNING

Credit	Compliance Requirement	Current Status
Local Building Regulations	Project shall comply with statutory regulatory codes.	Approvals to be obtained
Soil Erosion Control	Stockpile the Top soil and reuse for landscape	Earthnomic will share the guidelines for the soil erosion control.
Contaminated Site Remediation	Rehabilitate contaminated sites where development is complicated by environmental contamination.	Our Site is a greenfield development and hence not eligible for this point
Access to Public Transport / Shuttle Services	Provide Housing & shuttle service facility to at least 40% of the employees	The Project team has proposed a staff quarters for 22% of the staff people. It doesn't meet the requirement. – 2 points As per discussion from the project team there is no any provision for shuttle service. – 1 points
Basic Amenities	Minimum 3 basic amenities such as Schools, Grocery stores, Public transport, ATM, Hospital..Etc.. shall be within 2km distance from factory entrance. And Minimum 3 Insitu amenities (within factory site) such as canteen, first aid facility, lockers & showers, creche, Guest house Etc...	Three basic amenities within 2kms distance are available. As per current design provision of canteen, first aid and locker facility is possible and hence eligible for 2 points
Natural Topography & Vegetation	Avoid site disturbance by retaining the natural topography of the site and / or landscape at least 20% of the site area.	As per the landscape layout provided by Earthnomic, the total landscape area is around 20% of total site area and hence the point has been awarded
Heat Island effect roof & Parking	Roof areas to be coated with High SRI (white) Paints and parking areas to be shaded with trees and/or for covered parking SRI Paint to be coated in the roof	As per drawings, parking areas shall be shaded by trees hence it is eligible for 2 points In Factory roof area the color of the roof sheets is white and also the entire factory roof area is also covered with solar panel. – 2 points
Non Fossil Fuelling facility for Vehicles	Provide Non-fossil fueling facility within the site to cater at least 5% of the parking capacity.	Install At least 2 charging points facility for E-Vehicle (Please refer implementation guideline for further details)
Design for Differently abled	Ensure the factory space is user friendly for differently abled people	Provide the following a) 1 Differently abled toilet b) Preferred Car parking space for differently abled c) Ramps at building entrances (Please refer implementation guideline for further details)
Night Sky Pollution reduction	Reduce light pollution from exterior and façade lighting to enhance Nocturnal environment	Documents required for further assessment.

WATER CONSERVATION

Credits	Points Available	Points as per current stand	NA/Requires Assessment
Rainwater Harvesting, Roof & Non-roof	Required	Achievable	-
Water Efficient Plumbing Fixtures	Required	Achievable	-
Landscape Design (Turf+Drought)	5	5	-
Management of Irrigation Systems	2		2
Rainwater Harvesting, Roof & Non-roof	6	6	
Water Efficient Plumbing Fixtures	4	4	-
Wastewater Treatment	4	4	-

ASSESSMENT OF POINT

Points As per current stand	19
Points Requiring Further Assessment	2
Points Not Attempted	0
Total points	21

- The possibilities of points to be achieved according to the current status and also possibilities of points that can be achieved are guided according to the site condition.

Credit	Compliance Requirement	Current Status
Rainwater Harvesting, Roof & Non-roof	95% of the surface area run-off is to be captured for storage and/or recharge of aquifers.	Well connected RWH system with injection bore well to be implemented to capture run off volume of 60 Cu.m (Confirmation required from the project team)
Water Efficient Plumbing Fixtures	Install low flow water fixtures	As per Online Site audit the project team has installed low flow fixtures (Confirmation required from the project team)
Landscape Design	Limit turf area and increase native/drought species area	Almost the project team planned native tree and there are less amount of turf area are planted hence the project is eligible for – 5 points
Management of Irrigation Systems	Provide highly efficient irrigation systems	Provide any 2 feature from following for 1 additional point a) Drip irrigation for 50% of landscape areas b) Pressure regulating devices c) Moisture Sensor d) Timer based control Currently not in place hence the project is not eligible for – 2 points
Wastewater Treatment	Install a sewage Treatment plant (STP) to treat & Reuse non-process waste water	ETP plant capacity 40KLD is proposed .

ENERGY CONSERVATION

Credits	Points Available	Points as per current stand	NA/Requires Assessment
Ozone Depleting Substances	Required	Achievable	-
Minimum Energy Efficiency	Required	Achievable	-
Eco-friendly Refrigerants	1	1	-
Enhanced Energy Efficiency	6	5	1
Onsite Renewable Energy	6	5	1
Green Power	6	-	6
Energy Metering	2	1	1
Eco friendly DG sets	2	2	-

ASSESSMENT OF POINT

Points As per current stand	14
Points Requiring Further Assessment	3
Points Not Attempted	6
Total points	23

- The possibilities of points to be achieved according to the current status and also possibilities of points that can be achieved are guided according to the site condition.

Credit	Compliance Requirement	Current Status
Ozone Depleting Substances	Install systems which are CFC and Halon free	Air conditioning & fire fighting systems to be CFC/HCFC Free
Minimum Energy Efficiency	Energy Simulation	Earthnomic shall perform detailed energy simulation analysis to prove compliance
On Site Renewable Energy	Install Renewable energy system to cater 15% of non process energy consumption for 6 points	Planning to install roof top solar the tentative solar panel capacity is about 50 KWp
Green Power	Encourage investments in off-site renewable energy technologies to be supported to the grid.	As per discussions with the team currently there is no scope for Green Power purchase
Energy Metering	Demonstrate sub-metering for at least three of the use applications with BMS	Sub Metering to be provided for any 4 of the following for 2 points - Energy meter for air-conditioning - Energy meter for internal lighting - Energy meter for external lighting - Energy meter for municipal water pumping - Energy meter for grey water pumping - Energy meter for water pumping for landscaping
Eco friendly DG Sets	To reduce emission levels and their impacts on environment through the use of low emitting fuels or better equipment.	DG system Specification sheet required for further assessment

INDOOR ENVIRONMENT QUALITY

Credits	Points Available	Points as per current stand	NA/Requires Assessment
Minimum Fresh Air Ventilation	Required	Achievable	
Tobacco Smoke Control	Required	Achievable	
Avoid use of asbestos in the building	Required	Achievable	
Improved Fresh air ventilation	4	-	4
Day lighting	6	2	4
Building Flush out	2	2	
Low-emitting Materials	2	2	
Reduction of Workmen Fatigue (Breakout Space)	2	2	
Eco-friendly chemical	1	1	
Gymnasium	2		2

ASSESSMENT OF POINT

Points As per current stand	9
Points Requiring Further Assessment	10
Points Not Attempted	0
Total points	19

- The possibilities of points to be achieved according to the current status and also possibilities of points that can be achieved are guided according to the site condition.

Credits	Compliance Requirement	Current Status
Minimum Fresh Air Ventilation	Provide adequate outdoor air ventilation, so as to avoid pollutants affecting indoor air quality	Some of the areas in the factory floor do not meet the required fresh air percentage (Admin Area, Staff Room, Workers room etc). Detailed Analysis & suggestions shall be made post discussions with the project team. Either Improvements to be made by increasing window areas or through forced ventilation techniques (Exhaust, Ventilation fans etc). Fresh air should also be ensured in AC areas
Tobacco Smoke Control	Minimize exposure of non-smokers to the adverse health impacts arising due to passive smoking	The entire factory site will be a Tobacco free zone. Sign boards shall be placed post construction
Avoid use of asbestos in the building	Avoid use of asbestos in the building construction	Asbestos shall not be used anywhere in the project site
Improved Fresh air ventilation	Provide fresh air ventilation 30% above mandatory	Detail analysis required.
Day lighting	Ensure connectivity between the interior and the exterior environment, by providing adequate daylighting.	As per current design, In Main Factory area has skylight, Light Tube and windows and in some spaces like admin area, Staff room etc the project is failed to achieved daylight. Detail analysis required.

INDOOR ENVIRONMENT QUALITY

Credits	Compliance Requirement	Current Status
Building Flush out	Carry out flush out post construction	Declaration and Photos required for the credit.
Low-emitting Materials	Use paints & adhesives with low or no VOC content so as to reduce adverse health impacts for building occupants.	Specification sheet required for adhesives, sealants and paints for further assessment
Occupant Well-being Facilities	Provide facilities for the workmen to minimize work related fatigue.	The project team has proposed outdoor play area (ball badminton court and some gathering spaces for the workers)
Eco-friendly chemical	Use products that meet green seal standard (GS-37) or equivalent or use products which comply with the specified emission limits	Specification sheet required for Eco – Friendly chemical for further assessment.
Gymnasium	Provide gymnasium facility for 2% of building occupant	To be discussed with the project team. Identify an area inside the site and provide Gymnasium to cater to at least 2% of the building occupants

Credits	Points Available	Current Stand	Points Requiring Detailed Analysis	Not Attempted
Site Selection & Planning	16	7	4	5
Water Conservation	21	19	2	0
Energy Conservation	23	14	3	6
Material Conservation	16	8	4	4
Indoor Environment Quality	19	9	10	0
Innovation	5	3	2	0
Total	100	60	25	15

Total Credit Points current status: 60 (SILVER RATING)

**Points Required to Achieve Gold
= 12+**

**Points Required to Achieve
Platinum = 22+**

Credit	Document Required
Local Regulation	- Approval Plan - Fit for Occupancy Documents - Photographs for Factory Building - NOC Certification from government
Soil Erosion	Photographs of during construction and Stockpiling of topsoil
Basic Amenities	Photograph for Off Site amenities within 2km radius and Onsite Amenities
Natural Topography and Landscape	Photograph for Landscape area
Non Fossil Fuelling Facility	- Tax invoice of purchased charging facilities - Photographs of charging facility
Design for differently abled	Photographs for differently abled toilet and ramp
Night Sky pollution Reduction	- External Lighting Layout - Tax Invoice of purchased lighting fixtures - Model and brand name of lighting fixtures
Rainwater harvesting	Detailed layout for rainwater tank and percolation pit
Local Regulation	- Approval Plan - Fit for Occupancy Documents - Photographs for Factory Building - NOC Certification from government
Soil Erosion	Photographs of during construction and Stockpiling of topsoil
Basic Amenities	Photograph for Off Site amenities within 2km radius and Onsite Amenities
Natural Topography and Landscape	Photograph for Landscape area
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Design for differently abled	Photographs for differently abled toilet and ramp
Night Sky pollution Reduction	- External Lighting Layout - Tax Invoice of purchased lighting fixtures - Model and brand name of lighting fixtures
Rainwater harvesting	Detailed layout for rainwater tank and percolation pit

Credit	Document Required
Low Flow Fixtures	- Tax Invoice for purchased Fixtures layout - Photograph, Model and brand name of water fixtures
Irrigation System	- Tax Invoice for purchased Irrigation system - Photographs of Irrigation system
Waste Water Treatment	Specification & Photographs of ETP
Enhanced Energy & onsite Renewable energy	- Floor Plan, Section, Elevation - Internal and External lighting layout - Ac layout - Model and brand name of AC
Energy Meter	- Tax Invoice for purchased Meter - Photographs of Meter
Certified Wood	- Tax Invoice for purchased Wood - Photographs of Woods
Handling of construction waste	- Photographs of waste generated during construction - Third Party Agreement copy for scrapyard
Local Material & Material Recycle	Earthnomic shall share the format please fill it.
Fresh Air ventilation	- Tax Invoice for purchased Fresh Air unit - Fresh Air Layout - Photographs of Fresh Air layout
Daylight	- Tax Invoice for purchased glass - Model and Brand Name of Glass - Skylight layout - Light Tube layout - Photograph of Daylight
Building Flush Out	Photograph of Entire Factory that cover both indoor and outdoor. While during photograph make sure that all windows and door should be open.
Low Emitting Material	- Tax Invoice for purchased Low Emitting Material - Photographs of Low Emitting Material
Occupant Well Being	Photographs of Staff Break out space and Indoor& outdoor games
Eco Friendly Chemical	- Tax Invoice for purchased Chemical - Photographs of Chemical
Gymnasium	Photographs of Dedicative Gym room with equipment

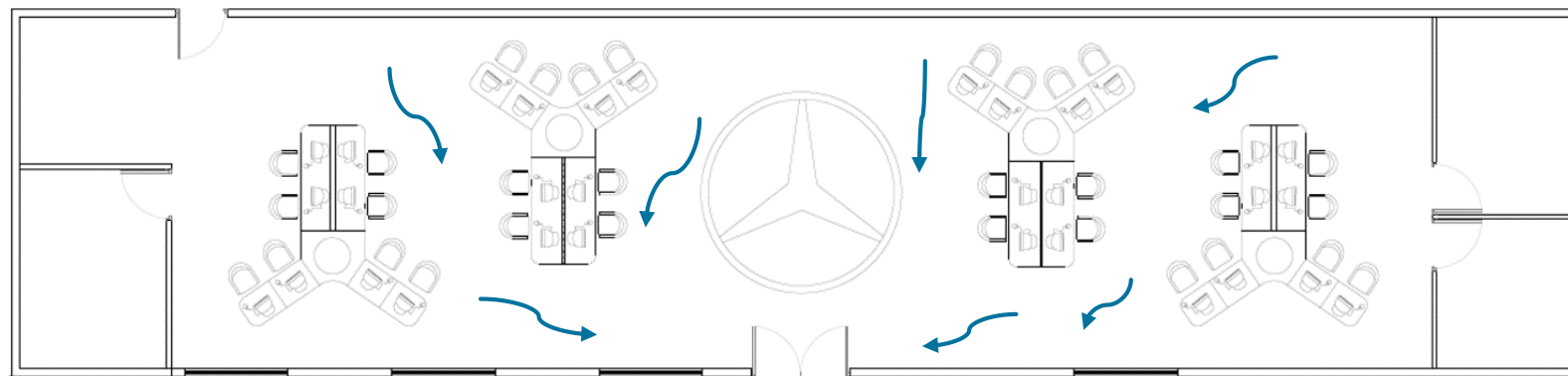
EFFORT LEVEL IN INVESTMENT IN IMPLEMENTATION:

Credits Kept On Hold	Points Available	Comments	Effort Level In-terms Of Investment	Effort Level In-terms Of Implementation
Non Fossil Fuel Facility	1	Provide Non-fossil fueling facility within the site to cater at least 5% of the parking capacity.	Medium	Low
Design for differential abled person	2	Provide 1 differential abled toilet and ramp at the entrance level for more details refer implementation guideline	High	High
Night sky pollution	1	Document required for the further assessment (Specification sheet for Outdoor Lighting fixtures)	Medium	High
Irrigation system	2	Irrigation system for plants need to be implemented on site. (from Options suggested)	High	High
Enhanced Energy & Onsite Solar energy & Certified Woods	6	Document required for the further assessment	High	High
Energy Meter	1	Energy Meter system to be implemented on site. (from Options suggested)	Low	High
Fresh air Ventilation	4	Increase fresh air in all regularly occupied areas 30% above requirement	High	High
Day lighting	2	Provide Daylight facility for Admin area, Staff quarters etc	Medium	High
Gymnasium	2	Provide a dedicated room for GYM with minimum equipment and indoor games	Low	High

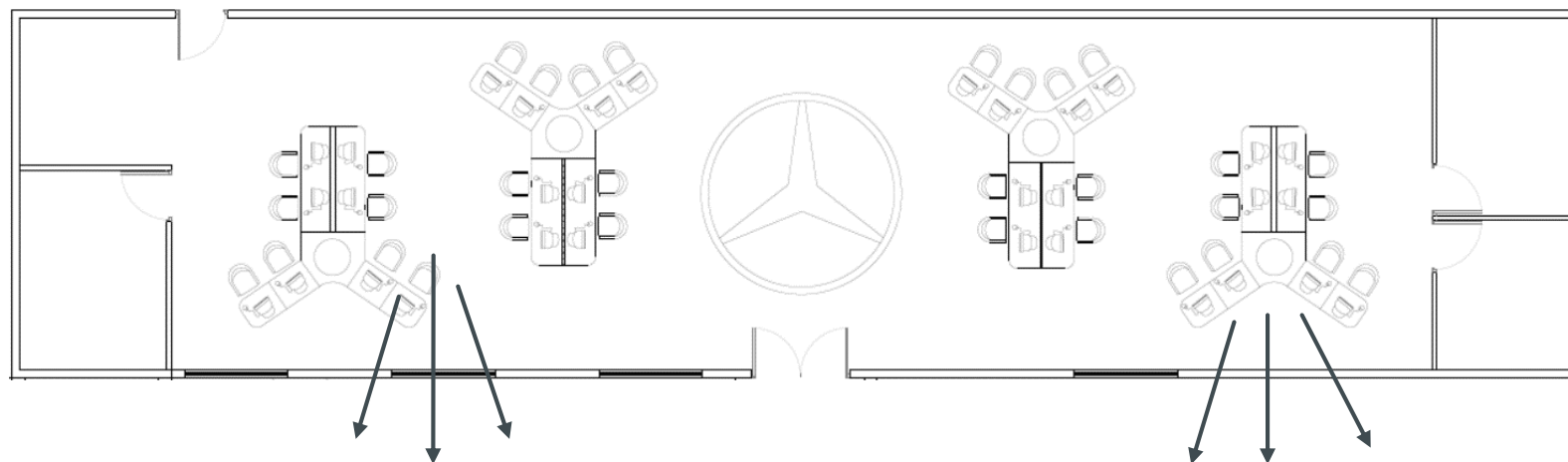
GREEN FACTORY – OFFICE SPACE DESIGN STRATEGIES

CHALLENGES:

- Insufficient indoor air quality
- Thermal heat trapped in the workstation
- Noise pollution due to adjacent factory
- Irregular spatial arrangement
- Insufficient daylighting for better productivity
- No breakout space for the workers



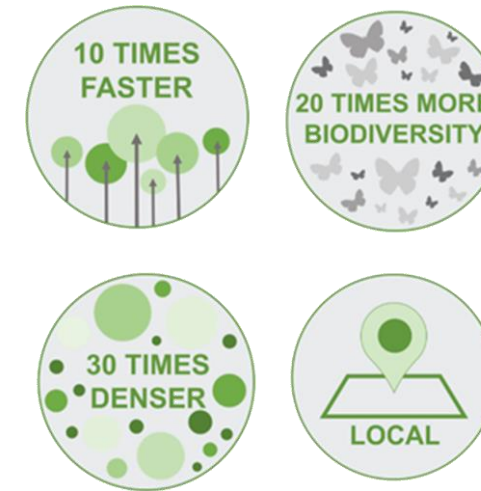
Spatial and circulation of the workstation



Connectivity between nature and staffs through direct view

- The ideology of the design is based on improving the indoor environment quality and user-friendly design
- Helps in improving the occupant comfort- visual comfort, and thermal comfort..

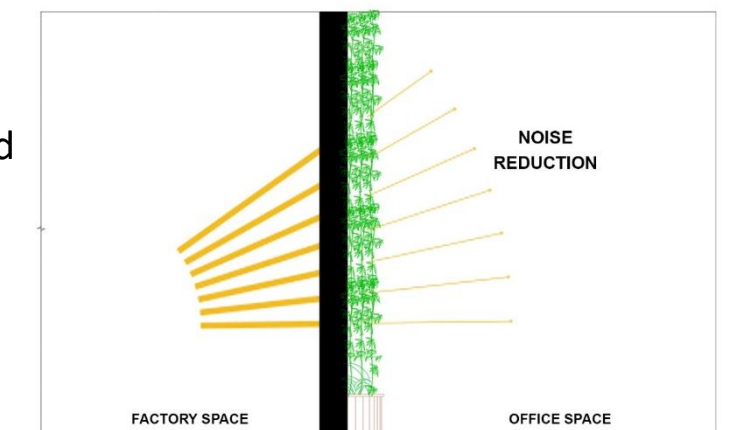
ADVANTAGES OF MIYAWAKI FOREST



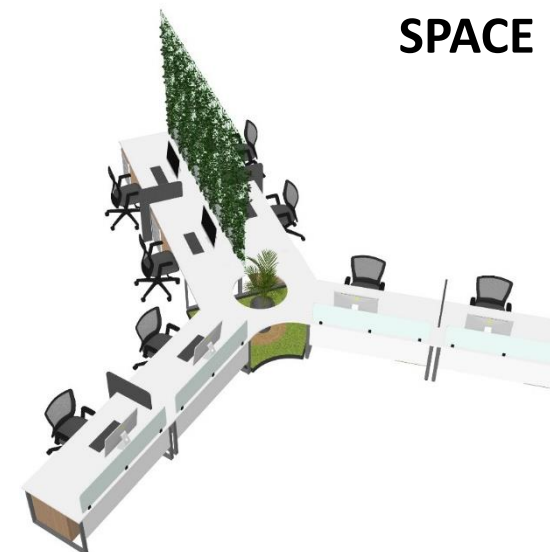
- Forests improve air quality
- Vegetation decreases noise level and regulate temperature.
- Soil is better protected. Erosion and risk of flooding are effectively reduced.
- Forests provide great habitat for biodiversity.
- Forests store significant amount of CO² that no longer stay in the atmosphere.

NOISE REDUCTION

- Refraction of sound waves occurs when sound passes through vegetative barriers and bends around plant structures.
- The green partition in the space gives quality air and also helps in reducing the noise pollution.



SPACE DESIGN



- The existing office space is with typical cabin and congested pathways that have no user-friendly approach.
- The table design is based on the access of the user inside the space and connectivity to the exterior environment.

GREEN FACTORY – AREA STATEMENT

Typology	Sq.m	Acres
Site Area	1500	0.37
Area Spilt Up		
Typology	Area Sq.m	Percentage
Regular occupied Building		
Main Building	540	36%
Pedestrian Area	399	26.6%
Parking Area	33	2.2%
Staff room & Dining	52	3.5%
Security Cabin	8	0.5%
Utility Area	143	9.5%
Toilet	15	1.0%
Landscape Area	310	20.7%
Parking		
Four Wheelers	5	Nos
Two Wheelers	4	Nos

RUNOFF CO-EFFICIENT FOR TYPICAL SURFACE

S.No	Surface Type	Runoff Coefficient
1	Cemented / tiled Roof	0.95
2	Roof Garden	0.30
3	Pavement, Asphalt	0.95
4	Pavement , Pervious	0.60
5	Vegetation, average (1-3 % slope)	0.20
6	Pavement, concrete	0.95

SITE RAINFALL CALCULATION
Run-off Calculation

S.No.	Zone	Area (sq.m.)	Run-off Coefficient	Impervious Area (sq. m.)
1	Cemented Roof (Main Building, Security Area, Staffroom & Dining, Toilet)	615.00	0.95	584.3
2	Vegetation	310.00	0.20	62.0
3	Hardscape (Parking Area)	33.00	0.95	31.4
4	Pedestrian Area	399.00	0.95	379.1
5	Utility Area (Transformer)	143.00	0.95	135.9
Net Impervious Area				1192.5
Rainfall Intensity (m/day) considering 6% (Mandatory) of average peak rainfall				0.023
Total Run-off Volume (Cu.m.) for 6% average peak rain fall				28.01
Proposed Rain Water Tank pond 160 sq.m x 1.75 depth				280

CRIS RAINFALL DATA – 5 YEARS

YEAR	JAN		FEB		MAR		APR		MAY		JUN		JUL		AUG		SEPT		OCT		NOV		DEC	
	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP	R/F	%DEP
2017	0.6	-96	0.0	-100	1.2	-92	0.0	-100	16.4	49	140.3	-11	236.2	-24	345.4	23	168.8	-4	41.7	-27	0.0	-100	0.0	-100
2018	0.0	-100	18.5	69	1.3	-92	14.4	49	36.4	231	242.0	53	397.2	29	224.7	-20	111.3	-37	0.0	-100	0.0	-100	12.6	4
2019	15.9	25	0.0	-100	5.4	-63	1.6	-78	0.0	-100	79.8	-52	384.8	26	316.2	12	388.4	131	39.5	-26	2.5	-84	9.5	-24
2020	34.6	173	9.4	-22	40.7	180	15.8	120	13.7	19	187.1	13	264.7	-13	407.8	45	124.5	-26	39.5	-26	5.4	-66	0.6	-95
2021	2.0	-84	8.7	-28	21.5	48	2.3	-68	38.8	237	223.4	34	319.0	5	173.8	-38	333.4	98	24.2	-55	3.5	-78	14.6	17

Year	Peak Month Rainfall	Peak Rainfall (mm)
2016	July	418
2017	August	345
2018	July	397
2019	September	388
2020	August	408
Last 5 years average daily rainfall (mm)		391.42

GREEN FACTORY – AREA STATEMENT

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Security Cabin	8	0.5%
Utility Area	143	9.5%
Toilet	15	1.0%
Landscape Area	310	20.7%
Parking		
Four Wheelers	5	Nos
Two Wheelers	4	Nos

FACTORY POPULATION:

S.NO	OCCUPANT DETAIL	PEOPLE
1	People Stay in quarters	10
2	People from outside	35
3	Male population	15
4	Female Population	30
Total No.of People		15+30=45

AIM

- To minimize non-process water usage by installing efficient water fixtures.

BASELINE FLOW RATE FOR WATER FIXTURES

S.No	Fixtures	Units	Baseline Flow Rates
1	Water Closets	LPF	6 / 3
2	Urinals	LPF	3.0
3	Showers	LPM	9.5*
4	Faucets	LPM	8.3*

WATER FIXTURE CALCULATION:

S.no	Fixture type	Duration(Minutes)	Daily use per FTE	No . Of Occupants	Baseline		Proposed case	
					Flow rate	Total daily Water	Flow rate	Total daily Water
1	Water closets (Full flush)	1	2	45	6	540	4	360
2	Water closets (Half flush)	1	2	23	3	138	2	92
3	Faucets	0.25	4	45	6	270	2.5	112.5
4	Health faucets LPM	0.25	1	45	6	67.5	3.8	42.75
5	Urinal	1	2	15	3	90	1.25	37.5
				Baseline consumption		1105.5	Proposed Consumption	644.75
				Percentage savings			41.68%	

GREEN FACTORY - REVIEW RESPONSE STATUS

IGBC Credits The environmental categories are subdivided into credits, which are based on desired performance goals within each category. An assessment of whether the credit is achieved, pending or rejected is made and a narrative describes the basis for the assessment.

Audit The credits/mandatory requirement are marked 'Audit'. These would be physically audited during the visits of the IGBC Assessors.

Anticipated The applicant has provided the mandatory documentation which supports achievement of the credit requirements and associated points. For Pilot Version, the documentation of these credits is complete, and the points which are considered as achieved are designated as 'CAA' (Credit Achievement Anticipated). These credits will be finally awarded during the Final Review.

Pending The applicant has not totally satisfied the mandatory documentation, or the documentation is incomplete and point assessment cannot yet be made. Currently the project has the potential to score the adjacent points in this category with additional documentation.

Denied The applicant has applied for a point in a particular credit, but has misinterpreted the credit intent or cannot substantiate meeting the requirements. The project has not demonstrated achievement of these credits.

Preliminary Rating: Not Certified

Scores: Certified: 51-60; Silver Rating: 61-70; Gold Rating: 71-80; Platinum Rating: 81-100

NARRATIVE FOR REVIEW RESPONSE

SITE SELECTION & PLANNING

CR.4 NATURAL TOPOGRAPHY AND LANDSCAPE,20%,30%

Review:

Please submit a declaration from the client confirming the proposed landscape area to be cultivated and reserved as a landscaped area for the life of the project and include a specific timeline for the complete implementation of all the landscape features.

Response:

Declaration highlighting "The client confirming the proposed landscape area to be cultivated and reserved as a landscaped area for the life of the project and include a specific timeline for the complete implementation of all the landscape features" has been enclosed

Enclosures:

Declaration from the client. (ATTACHMENT AS FOLDER)

SITE SELECTION & PLANNING



Pending

Natural Topography and Landscape, 20%, 30%

Credit 4

Preliminary Review:

The submitted template demonstrates that the project have designed 21.03% of the site area as landscaped area. Of the total site area which is 58,844 m² the landscape area proposed on site is 12,375 m².

The project team have submitted landscape plan in support which indicates the landscape area as proposed, photographs of few area where landscape work seems to be in progress as well calculations that bifurcate the landscape area from turf, drought resistant plant species and native plant species. Additional details area required for credit compliance.

Requirements: Avoid site disturbance by retaining the natural topography of the site and / or landscape atleast 20% of the site area or meet the local regulation, whichever is higher. Points are awarded as follows:

Points for retaining natural topography or landscaping

Percentage of site area with natural topography and / or landscaped area	Points
≥ 20 %	1
≥ 30 %	2

Notes:

- ❖ Parking areas, walkways etc., are considered as site disturbances
- ❖ Landscaped areas over built structures such as roofs, basement etc cannot be considered for the purpose of calculation of landscaped area
- ❖ Potted plants will not be considered as landscape

Technical Advice:

Please submit declaration from client confirming the proposed landscape area to be cultivated and reserved as landscaped area for the life of the project and include a specific timeline for the complete implementation of all the landscape features

NARRATIVE FOR REVIEW RESPONSE

SITE SELECTION & PLANNING

CR.7 DESIGN FOR DIFFERENTLY ABLED

Review:

Please submit / clarify the following:

- Clarification of the discrepancy in design observed for the differently abled toilet. The image indicates a vertical obstruction in front of the WC thereby hindering the easy access of differently abled occupants whereas the schematic layout does not indicate any such obstruction. Support the justification with additional photographs from inside the toilet.
- Photographs of the dedicated parking are only by the 2 wheeler parking bay. Provide location and image of dedicated parking provided for differently abled using car.
- Photographs of permanent signage's and measures taken at the parking bay to indicate its location.

Response:

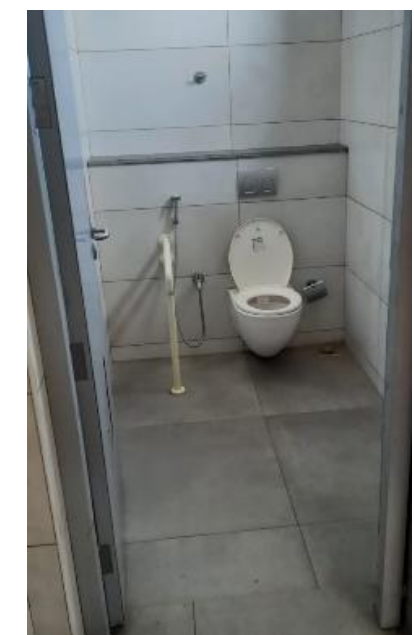
- As per the reviewer's comments the project team has relocated the universal design restroom and the restroom has been designed as per standards. The updated universal design restroom image has been attached below.
- The project team has proposed dedicated differently abled car parking at the building entrance and in the common parking area

Enclosures:

- Site plan highlighting the location of differential abled parking.
- Photographs of Universal design parking (ATTACHED AS FOLDER).



DIFFERENTLY ABLED - CAR



RESTROOM -
UNIVERSAL DESIGN

NARRATIVE FOR REVIEW RESPONSE

WATER CONSERVATION

CR.3 MANAGEMENT OF IRRIGATION SYSTEM

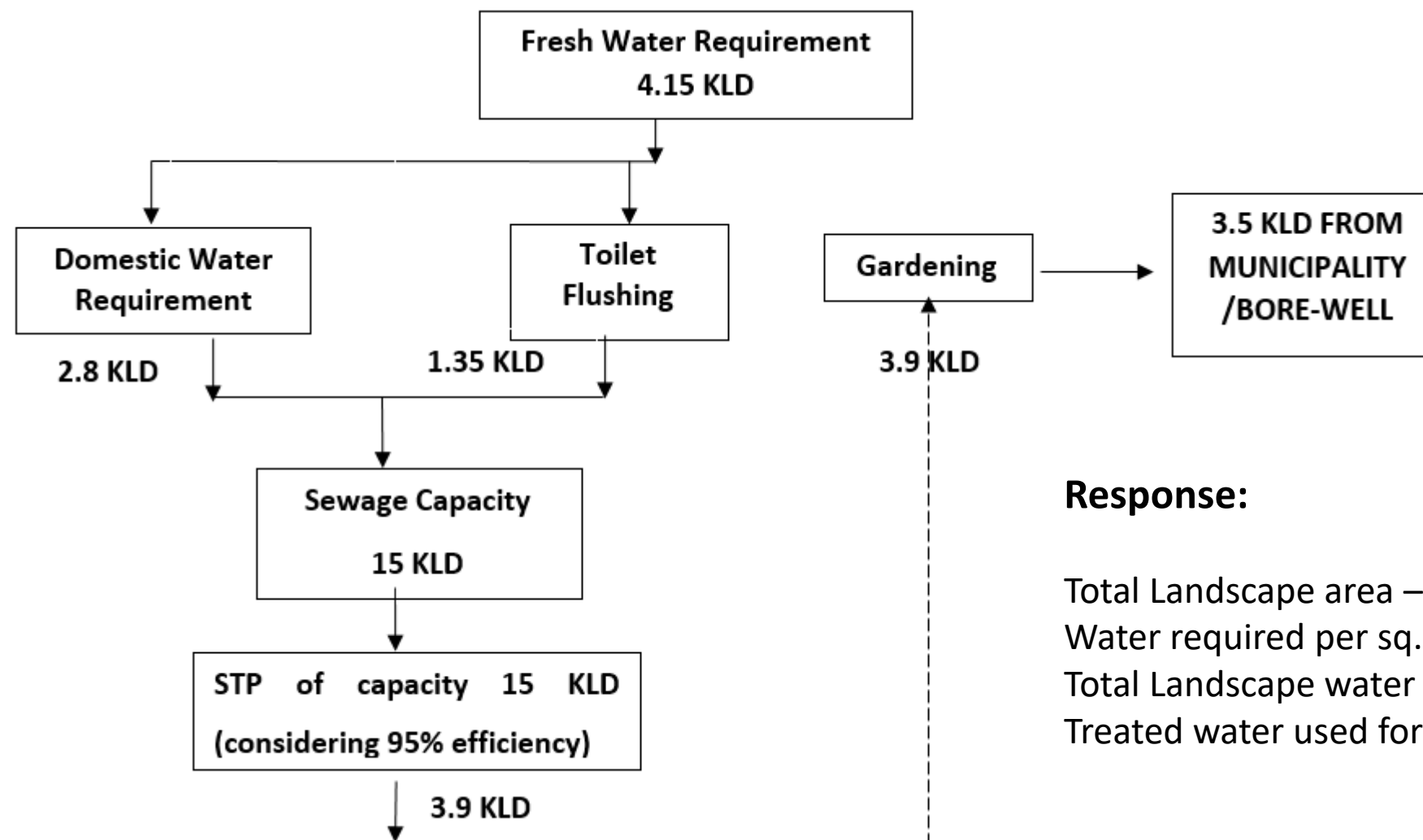
☐	☒	☐	Management of Irrigation System	Credit 3
Pending			Preliminary Review:	

Review:

Please submit / clarify the following:

- Irrigation calculations highlighting the approximate water usage considered for the landscape installed at the project. (Note that approximate 10 liters per square meter may be considered for calculation purposes)
- An updated water balance chart based on the calculation for irrigation.

DAILY WATER BALANCE SHEET



Response:

Total Landscape area – 12375 sq. m
 Water required per sq. m – 6 Liters
 Total Landscape water required – 7.4 KLD for irrigation
 Treated water used for irrigation – 3.9KLD for irrigation

NARRATIVE FOR REVIEW RESPONSE

ENERGY CONSERVATION

CR.3 MANAGEMENT OF IRRIGATION SYSTEM

Review:

Please provide the following details/ clarifications:

- Purchase invoice of all the installed meters.
- Bifurcation of the type of water being metered as aligned to the IGBC green factory rating system requirements. A common meter to monitor water consumption from all sources does not qualify.
- Photographs of the installed meter supported with the process or non-process load it monitors for easy identification.
- Legible SLD drawings along with the location of all declared meters are clearly highlighted.

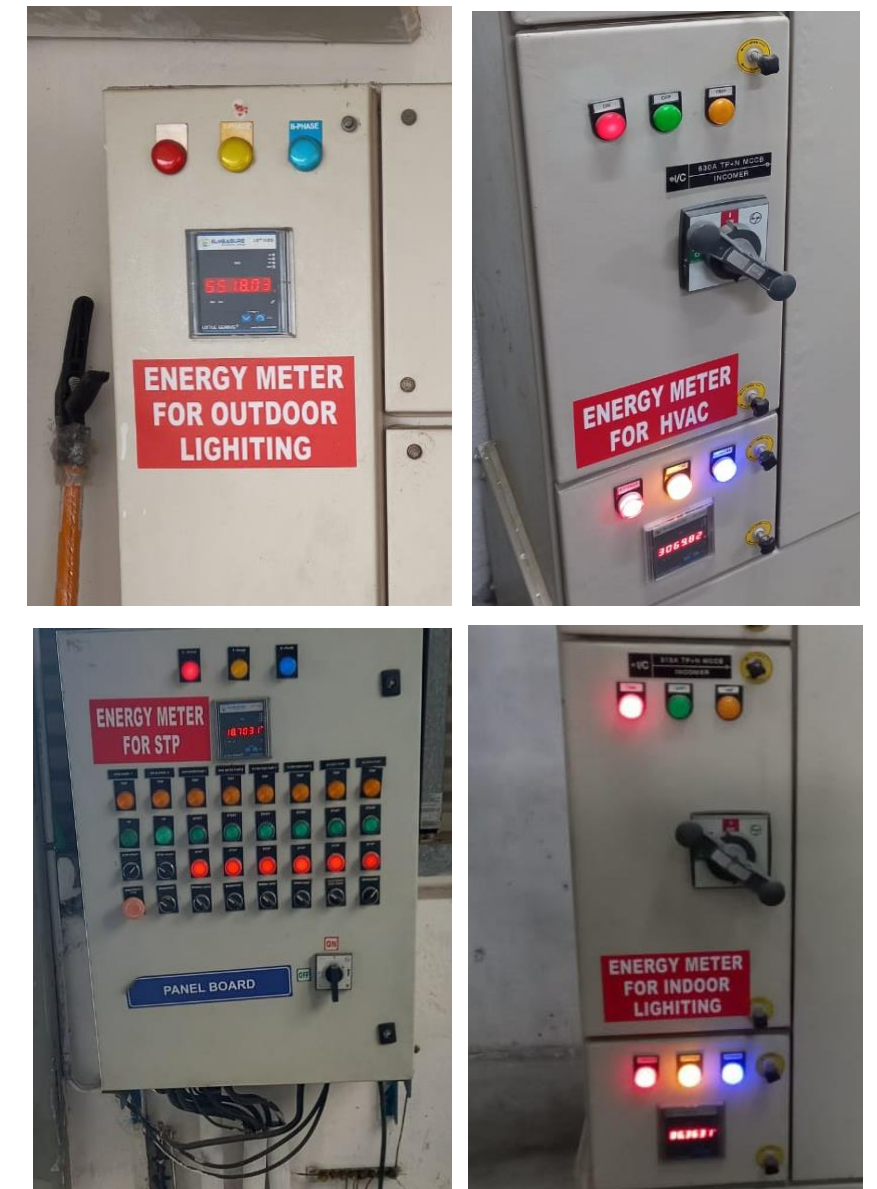
Response:

- Purchase invoice of all the installed meters has been enclosed.
- As per the reviewer's comments the project team has accepted and executed the required meters as per the IGBC requirements. List of energy meters installed in the project.
 - ❖ Energy Meter for STP – photograph attached
 - ❖ Energy Meter for Outdoor Lighting – photograph attached
 - ❖ Energy Meter for Indoor Lighting – photograph attached
 - ❖ Energy Meter for HVAC – photograph attached.
- Photographs have been enclosed.
- Electrical SLD along with the location of all declared meters has been enclosed.

Enclosures:

- Photographs of Energy Meter installed.
- Electrical SLD
- Purchase invoice for Energy meter.
(ATTACHED AS FOLDER).

☐	☒	☐	Metering	Credit 3
Pending			Preliminary Review:	



PHOTOGRAPH - METERS

NARRATIVE FOR REVIEW RESPONSE

ENERGY CONSERVATION

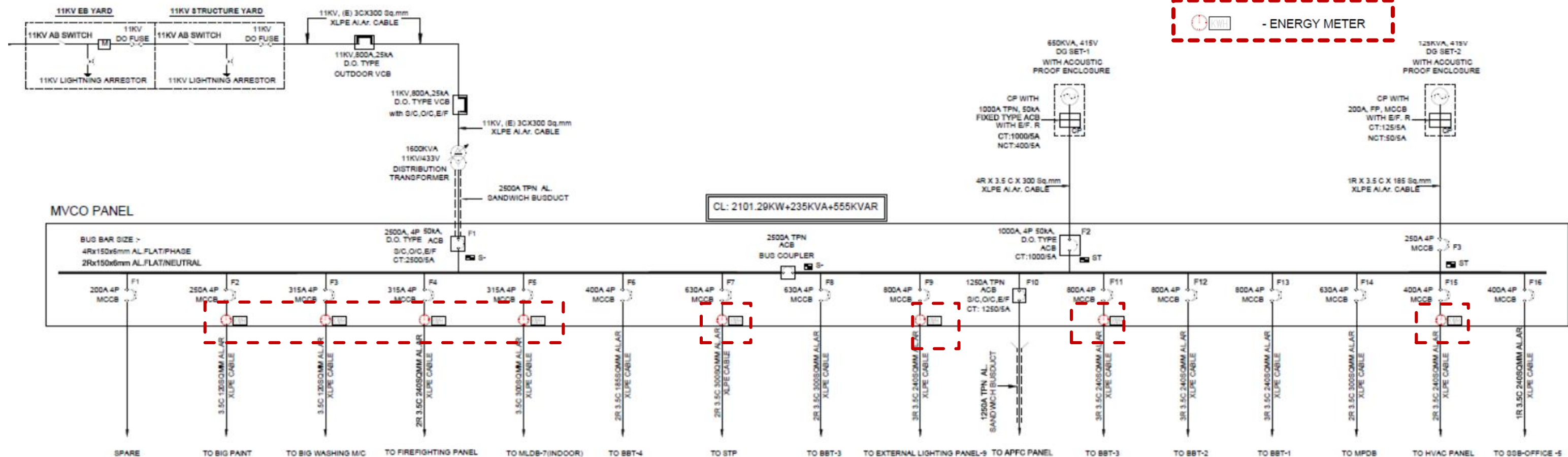
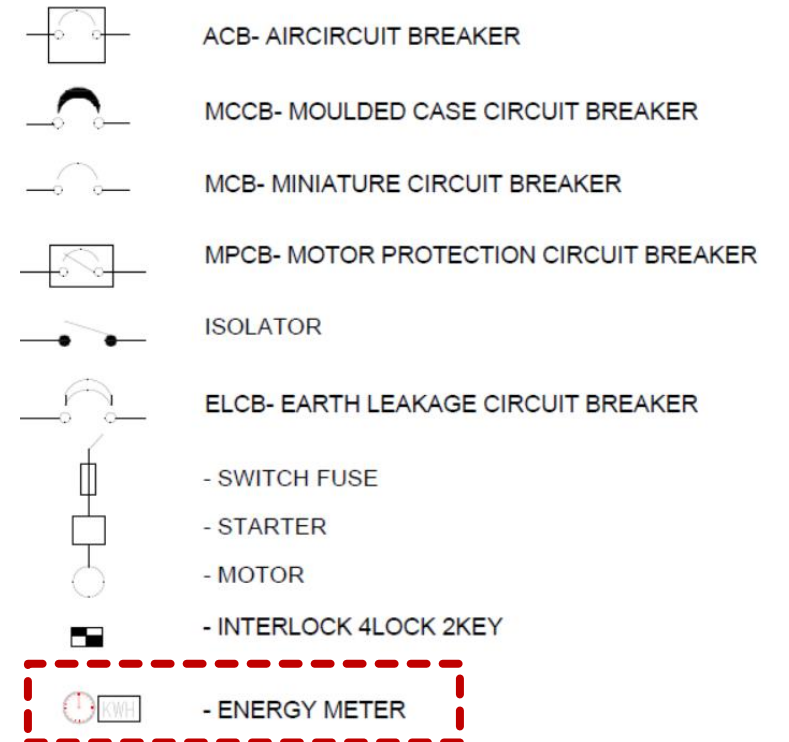
CR.3 MANAGEMENT OF IRRIGATION SYSTEM

Review:

Please provide the following details/ clarifications:

- Purchase invoice of all the installed meters.
- Bifurcation of the type of water being metered as aligned to the IGBC green factory rating system requirements. A common meter to monitor water consumption from all sources does not qualify.
- Photographs of the installed meter supported with the process or non-process load it monitors for easy identification.
- Legible SLD drawings along with the location of all declared meters are clearly highlighted.

LEGENDS



NARRATIVE FOR REVIEW RESPONSE

MATERIAL CONSERVATION

CR.1 WASTE REDUCTION DURING CONSTRUCTION

Review:

Please provide the following details/ clarifications and submit revised documents:

- The project should submit a clear excel record of the gate records, highlighting the quantities taken from site every month.
- Please submit revised declarations/ submittals that reflect how and where each material was reused/ recycled.

Response:

- The documents for construction waste which was recorded for every three months has been enclosed (Pdf format sheet) and the waste has been properly reused in Apex solar coco Ltd.

The declaration from the respective vendor has been enclosed.

Enclosures:

- The construction waste recorded documents – Pdf format.
- The declaration from the vendor. (ATTACHED AS FOLDER).

QUANTITY OF MATERIAL REUSED/RECYCLED FROM SITE

SUMMARY - CONSTRUCTION WASTE MANAGEMENT

S.No	Type of Waste Material	Quantity generated (Kgs)	Method of Disposal
1	Broken bricks	20000	Use for Backfilling
2	Waste steel bars	4000	Transfer to another site
3	Cement bags	3600	Transfer to another site
5	Concrete debris	60000	Use for Backfilling
7	Tiles and other paper-based packing material	1000	Transfer to another site
8	Waste Aluminium profiles	1000	Transfer to another site
9	Wood waste	6000	Transfer to another site
10	Plastic packing waste	500	Transfer to another site
11	Un-segregated mixed waste	1000	Disposed in landfill
Total waste generated		97100	
Quantity of waste recovered		96100	
% of waste recovered		99%	

MONTHLY REPORT

JULY - SEPTEMBER			
S.No	Type of Waste Material	Quantity generated (Kgs)	Method of Disposal
1	Broken bricks	2400	Use for Backfilling
2	Waste steel bars	400	Transfer to another site
3	Cement bags	500	Transfer to another site
5	Concrete debris	6500	Use for Backfilling
7	Tiles and other paper-based packing material	125	Transfer to another site
8	Waste Aluminium profiles	100	Transfer to another site
9	Wood waste	700	Transfer to another site
10	Plastic packing waste	65	Transfer to another site
11	Un-segregated mixed waste	150	Disposed in landfill
Total waste generated		10940	
Quantity of waste recovered		10790	
% of waste recovered		99%	

OCTOBER - DECEMBER			
S.No	Type of Waste Material	Quantity generated (Kgs)	Method of Disposal
1	Broken bricks	2700	Use for Backfilling
2	Waste steel bars	600	Transfer to another site
3	Cement bags	500	Transfer to another site
5	Concrete debris	8000	Use for Backfilling
7	Tiles and other paper-based packing material	150	Transfer to another site
8	Waste Aluminium profiles	150	Transfer to another site
9	Wood waste	800	Transfer to another site
10	Plastic packing waste	60	Transfer to another site
11	Un-segregated mixed waste	100	Disposed in landfill
Total waste generated		13060	
Quantity of waste recovered		12960	
% of waste recovered		99%	

JANUARY - MARCH			
S.No	Type of Waste Material	Quantity generated (Kgs)	Method of Disposal
1	Broken bricks	2250	Use for Backfilling
2	Waste steel bars	400	Transfer to another site
3	Cement bags	500	Transfer to another site
5	Concrete debris	7500	Use for Backfilling
7	Tiles and other paper-based packing material	100	Transfer to another site
8	Waste Aluminium profiles	125	Transfer to another site
9	Wood waste	750	Transfer to another site
10	Plastic packing waste	55	Transfer to another site
11	Un-segregated mixed waste	125	Disposed in landfill
Total waste generated		11805	
Quantity of waste recovered		11680	
% of waste recovered		99%	

NARRATIVE FOR REVIEW RESPONSE

MATERIAL CONSERVATION

CR.1 WASTE REDUCTION DURING CONSTRUCTION

Review:

- Please provide manufacturer/ material vendor declaration letters or documents justifying the quantity of recycled content in the materials (in case 'project specific' certificates cannot be acquired, then generic certificates will also do – as the supplier has already confirmed the name of the vendors).

Response:

- The declaration from the different material vendors confirming the percentage of recycle content of the respective material. List of recycled material used in the project is given below

Material	Recycle Content
Reinforcement Steel	25%
Cement Products	14%
Concrete	44%
Fly ash Bricks	43%
AAC Blocks	10%
Solid Blocks	10%
Glass	18%

Overall the project has used **23% (by cost)** of the materials from recycled content.

Enclosures:

- The declaration from the respective vendor (ATTACHED AS FOLDER).

MATERIAL RECYCLE CONTENT

Product details	Reinforcement Steel
Quantity/Volume	387 MT
Total value of supply	Rs. 1,54,60,473.00
Name of manufacturer	Slyvanaki Steel
Recycled content	25%
Source place of manufacture	Coimbatore
Distance of source from factory	30 KM

CEMENT

Product details	Cement
Quantity/Volume	3600 bags
Total value of supply	Rs. 9,36,000.00
Name of manufacturer	Ultratech Cement
Recycled content	14%
Source place of manufacture	Coimbatore
Distance of source from factory	30 KM

GLASS

Performance/ Combinations	ET 425 6mm -12mm Air gap- 5mm DGU	6mm ET 425 SGU
Light transmission %	21	23
External reflection %	21	21
Internal Reflection %	15	9
Solar Factor	0.18	0.24
U value (W/sq.m. K)	2	3.8

- 1) Glass is manufactured by Float-Glass technology and the recycled content is 18%. (Approx.: 12% Industrial and 6% from consumers).

AAC BLOCK

Product details	AAC Blocks (8")
Quantity/Volume	900 Cum
Total value of supply	Rs. 18,40,440.00
Name of manufacturer	Coral Conrete
Recycled content	10%
Source place of manufacture	Coimbatore
Distance of source from factory	15 KM

NARRATIVE FOR REVIEW RESPONSE

INDOOR ENVIRONMENTAL QUALITY

CR.6 ECO-FRIENDLY HOUSEKEEPING CHEMICALS

Review:

Please submit/ clarify the following:

- Declaration from the client committing to use of eco-friendly and GS-37 compliant chemicals for the life of the project.
- Purchase invoice of the chemicals purchased for the project aligned with chemicals declared in the narrative along with GS-37 compliance documentation.
- The name of the chemicals declared in the narrative could not identified in the MSDS's submitted. Resubmit MSDS's with the name of the chemical highlighted as declared in the narrative.
- Details of the housekeeping chemical intended to be used in the canteen, kitchen and dish washing area along with requisite certificates that highlight GS-37 compliance has been met.

Response:

- Declaration from the client committing to use eco-friendly and GS-37 compliant chemicals for the life of the project has been enclosed.
- Purchase invoice of Eco friendly chemicals has been enclosed.
- List of ECO friendly chemicals used in the project
 - ❖ For Floor cleaner – Schevaran
 - ❖ For Multi-Purpose cleaning – Schevaran S2 All klean
 - ❖ For Room Fresher - Schevaran S5 Room Freshener.
- For the cleaning propose, project team has purchased “Schevaran” brand chemicals and it is Eco- Friendly
- A snapshot of “Schevaran” products from the Directory on Green Products, Materials & Technology has been enclosed.
- The project team is using Schevaran mixed-purpose cleaning for both Kitchen and canteen.

Enclosures:

- Declaration from the client
- Purchase invoice of Eco-friendly chemical
- Directory on Green Product.

Schevaran Laboratories
Validity: Dec 2022

SCHEVARAN

About Manufacturer

Schevaran is the pioneer in the Indian cleaning and sanitation product industry. It offers a wide range of cleaning products for the janitorial, medical, catering, pharmaceutical and other industry segments manufactured at their factory in Mysore, India.

Schevaran Eco Research Center is set up in the year 2013 for doing Research in Sanitation and Cleaning and first of its kind in India.

Schevaran's environmental consciousness reflects in it's product range which is completely Eco-friendly. Schevaran strives to deliver the highest standards both in terms of quality and bio biodegradability. With it state of the art in-house R&D facility, Schevaran is uniquely position to design cleaning chemical solutions for your specific needs.



Green Product Features

- Minimal generation of environmental pollutants during use
- Restriction of prohibited hazardous substances use as raw material
- Instituted a mechanism for product take back to promote circular economy
- Use of green packaging materials

GreenPro Certified Products

- All Klean
- Scale Off
- Super Lime Plus
- Sparklean Green with Lime
- Germ Free
- Herbal Floor Cleaner
- Window Shine
- Labello
- Superklean

Contact Details
 Name: Mr. Benjamin Alexander
 Email: benjamin@schevaran.com
 Ph: 9819146467
 Website: www.schevaran.com

GREEN HOMES - GUIDELINES

Sustainable Design		Possible Points:	20
SD Mandatory Requirement 1	Local Building Regulations	Required	
SD Mandatory Requirement 2	Soil Erosion Control	Required	
SD Credit 1	Natural Topography & Vegetation	4	
SD Credit 2	Heat Island Effect, Roof & Non-roof	4	
SD Credit 3	Passive Architecture	2	
SD Credit 4	Universal Design	2	
SD Credit 5	Green Parking Facility	4	
SD Credit 6	Access to Amenities	2	
SD Credit 7	Basic Facilities for Construction Workforce	1	
SD Credit 8	Green Education & Awareness	1	
Water Conservation		Possible Points:	23
WC Mandatory Requirement 1	Water Efficient Plumbing Fixtures	Required	
WC Mandatory Requirement 2	Rainwater Harvesting	Required	
WC Credit 1	Water Efficient Plumbing Fixtures	6	
WC Credit 2	Landscape Design	3	
WC Credit 3	Management of Irrigation System	2	
WC Credit 4	Recycle & Reuse of Waste water	4	
WC Credit 5	Water Quality	1	
WC Credit 6	Enhanced Rainwater Harvesting	4	
WC Credit 7	Water Metering	3	
Energy Efficiency		Possible Points:	20
EE Mandatory Requirement 1	HCFC Free Equipment	Required	
EE Mandatory Requirement 2	Minimum Energy Performance	Required	
EE Credit 1	Enhanced Energy Performance	10	
EE Credit 2	Alternate Water Heating system	3	
EE Credit 3	On-site Renewable Energy - Common area Lighting	4	
EE Credit 4	Energy efficiency in common area equipment	1	
EE Credit 5	Integrated Energy Monitoring System	2	

Materials and Resources		Possible Points:	18
MR Mandatory Requirement 1	Separation of House-hold Waste	Required	
MR Credit 1	Green Procurement Policy	1	
MR Credit 2	Optimisation on Structural Design	1	
MR Credit 3	Certified Green Products	5	
MR Credit 4	Local Materials	2	
MR Credit 5	Eco friendly wood based materials	2	
MR Credit 6	Alternative Construction Material	2	
MR Credit 7	Handling of Construction & Demolition Waste	2	
MR Credit 8	Organic Waste treatment Post Occupancy	3	
Resident Health & Wellbeing		Possible Points:	14
RHW Mandatory Requirement 1	Minimum Daylighting, 50%	Required	
RHW Mandatory Requirement 2	Ventilation Design	Required	
RHW Mandatory Requirement 3	No Smoking Policy	Required	
RHW Credit 1	Enhanced Daylighting	2	
RHW Credit 2	Enhanced Ventilation Design	2	
RHW Credit 3	Cross Ventilation	4	
RHW Credit 4	Connectivity to Exteriors	2	
RHW Credit 5	Low VOC Materials, Paints & Adhesives	2	
RHW Credit 6	Facility for Physical Wellbeing	2	
Innovation & Design		Possible Points:	5
ID Credit 1.1-1.2	Innovation	2	
ID Credit 2.1-2.2	Exemplary Performance	2	
ID Credit 3	IGBC Accredited Professional	1	
Total Available Points			100

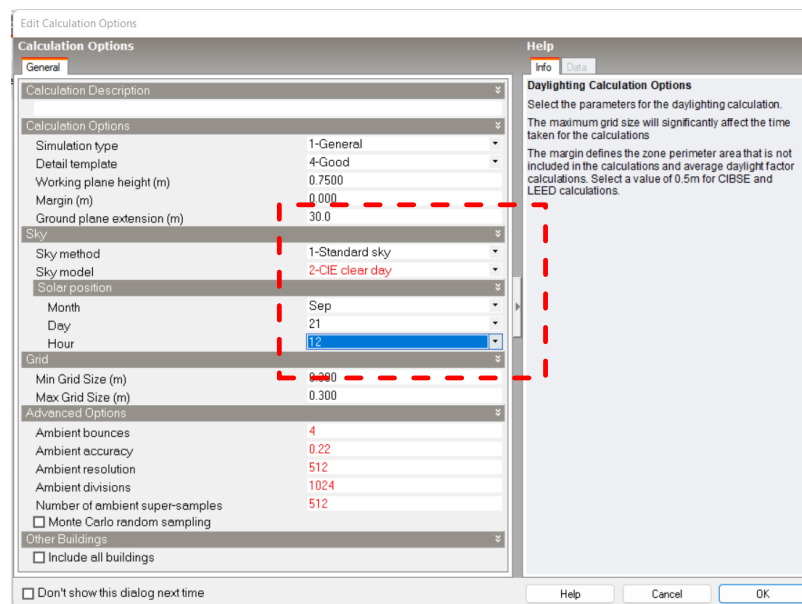
CERTIFICATION LEVEL

Certification Level	Points Required	Recognition
Certified	50 - 59	Best Practices
Silver	60 - 69	Outstanding Performance
Gold	70 - 79	National Excellence
Platinum	80- 100	Global Leadership

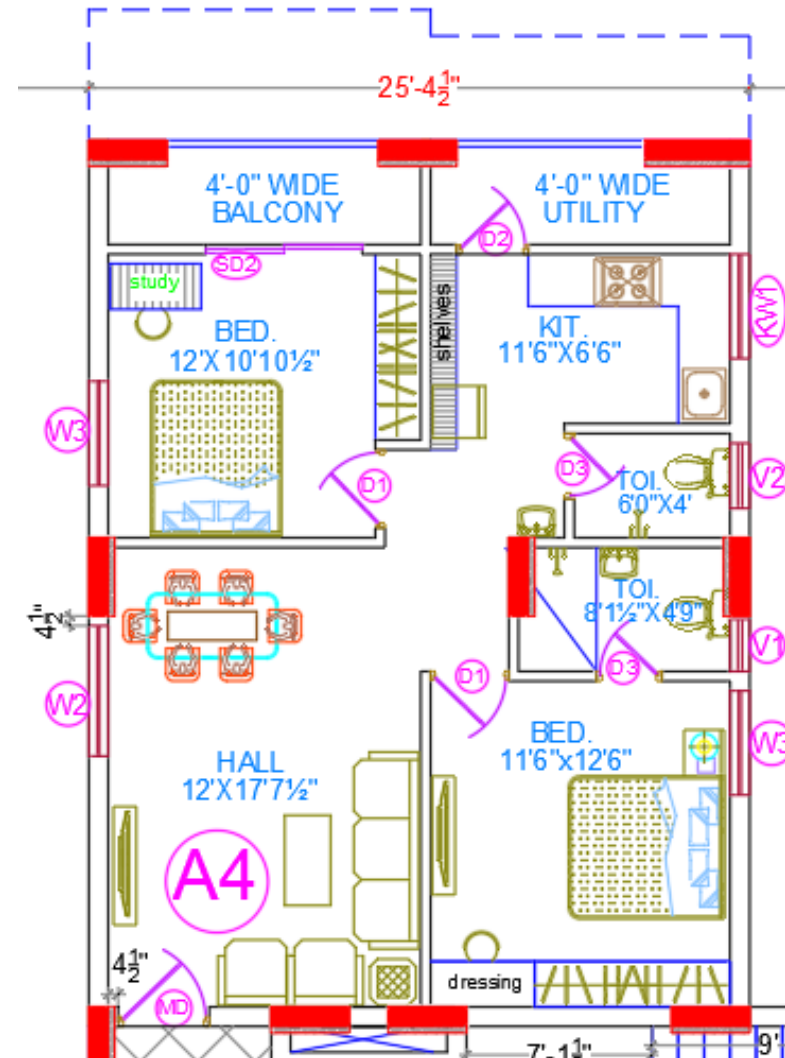
APARTMENT – LAYOUT PLAN



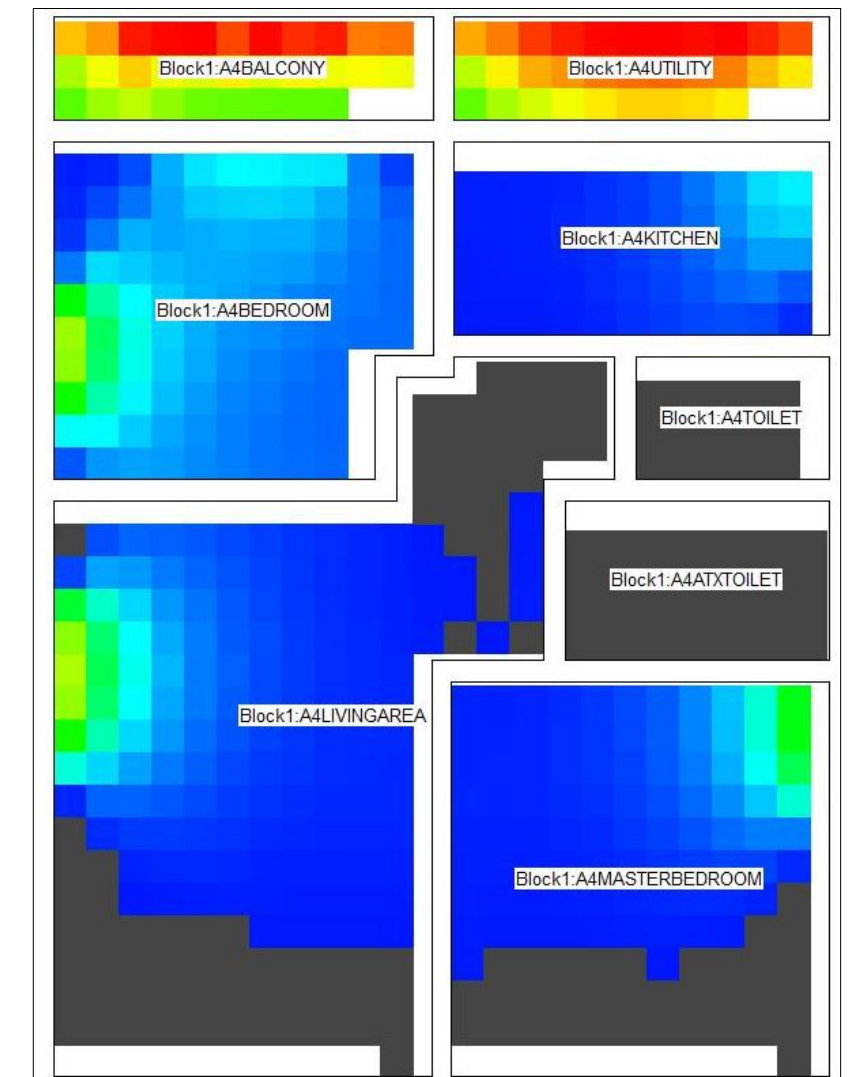
- There are total 22 units out of which 10 units have been taken for the daylighting analysis
- These 10 units are considered as worst case as they receive less daylighting due to orientation and higher angle of obstruction (70%).



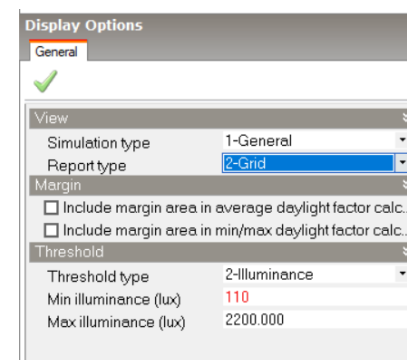
UNIT - A4 DAYLIGHTING SIMULATION



TYPICAL FLOOR PLAN



DAYLIGHT SIMULATION



Regular occupied area

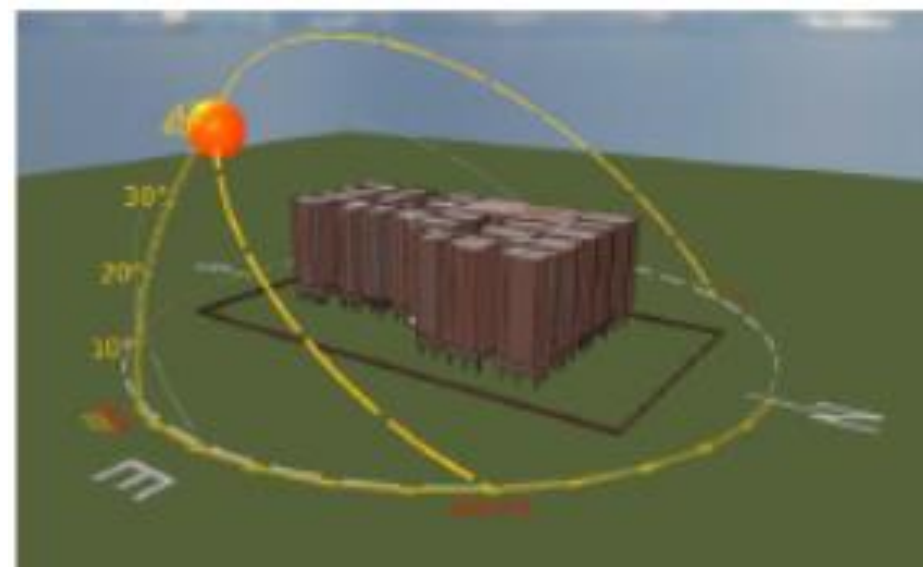
- 1.Living
- 2.Kitchen
- 3.Master Bedroom
- 4.Bedroom

Non regular occupied area

- 1.Attached Toilet
- 2.Common Toilet
- 3.Utility
- 4.Balcony

78% OF THE REGULARLY OCCUPIED AREAS MEETS DAYLIGHT LEVELS OF 110 LUX

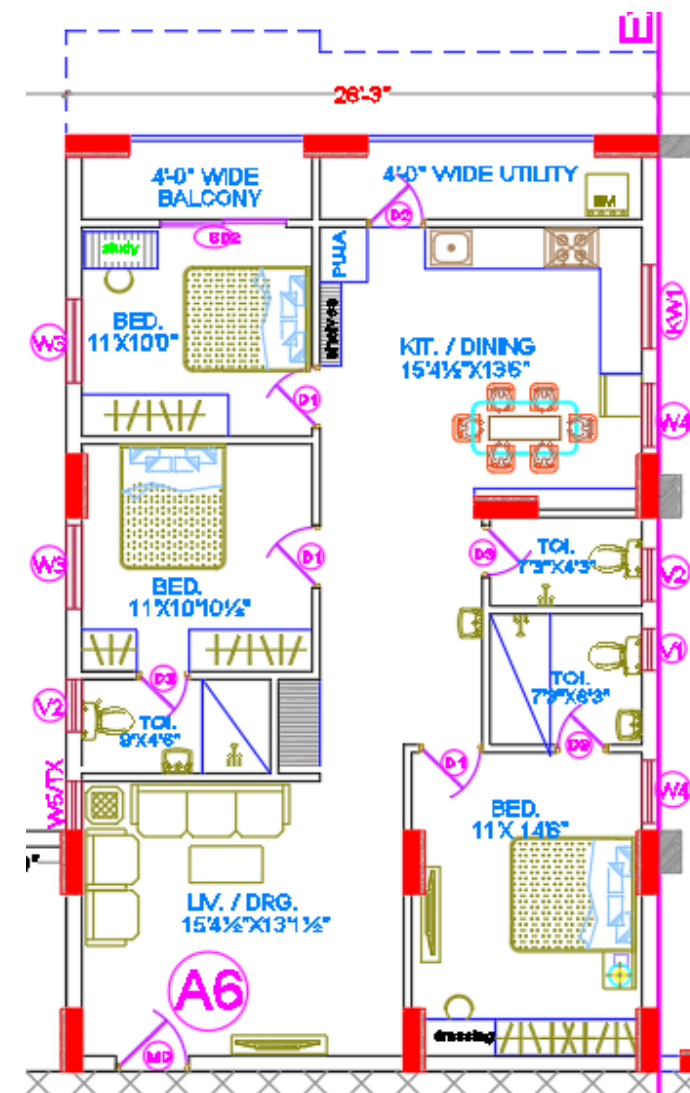
APARTMENT – LAYOUT PLAN



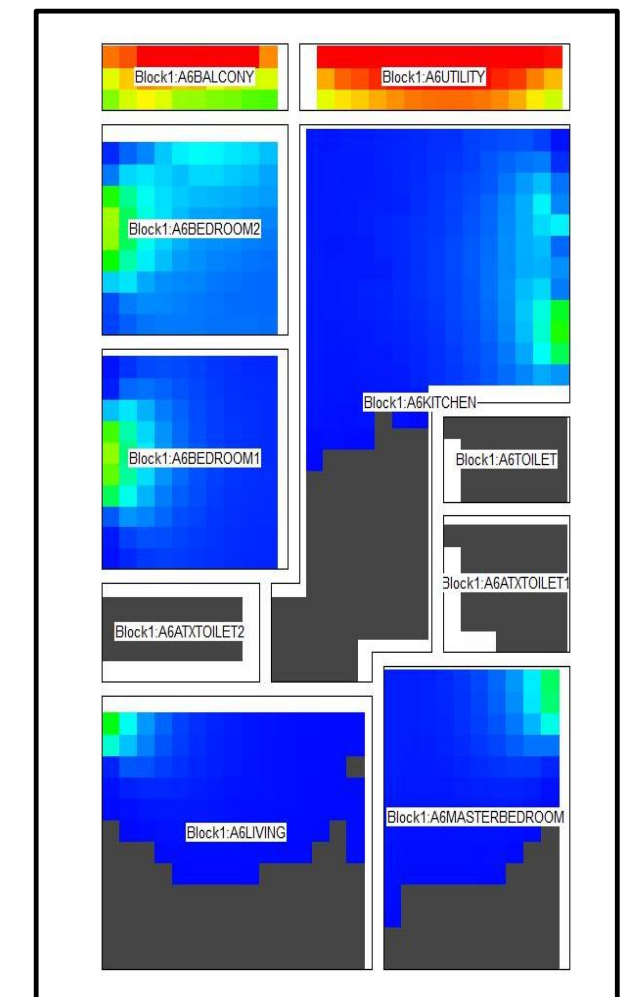
DAYLIGHTING SIMULATION - RESULTS

Zone	Floor Area (m2)	Floor Area above Threshold (m2)	Floor Area above Threshold (%)
A6 BEDROOM 2	9.415	9.415	100
A6 KITCHEN	27.369	19.493	71.223
A6 BEDROOM 1	9.906	9.906	100
A6 LIVING	17.743	14.054	56.667
A6 MASTER BEDROOM	13.534	9.28	68.571
	77.967	62.148	80%

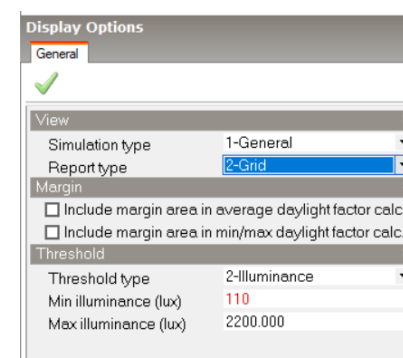
UNIT – A6 DAYLIGHTING SIMULATION



TYPICAL FLOOR PLAN



DAYLIGHT SIMULATION



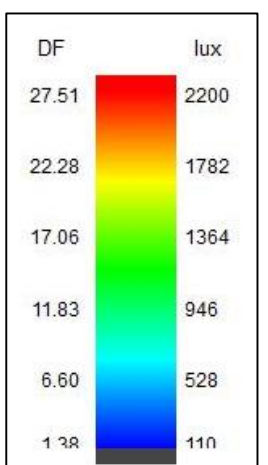
Regular occupied area

- 1.Living
- 2.Kitchen
- 3.Master Bedroom
- 4.Bedroom 1
- 5.Bedroom 2

Non regular occupied area

- 1.Attached Toilet 1
- 2.Attached Toilet 1
- 3.Common Toilet
- 4.Utility
- 5.Balcony

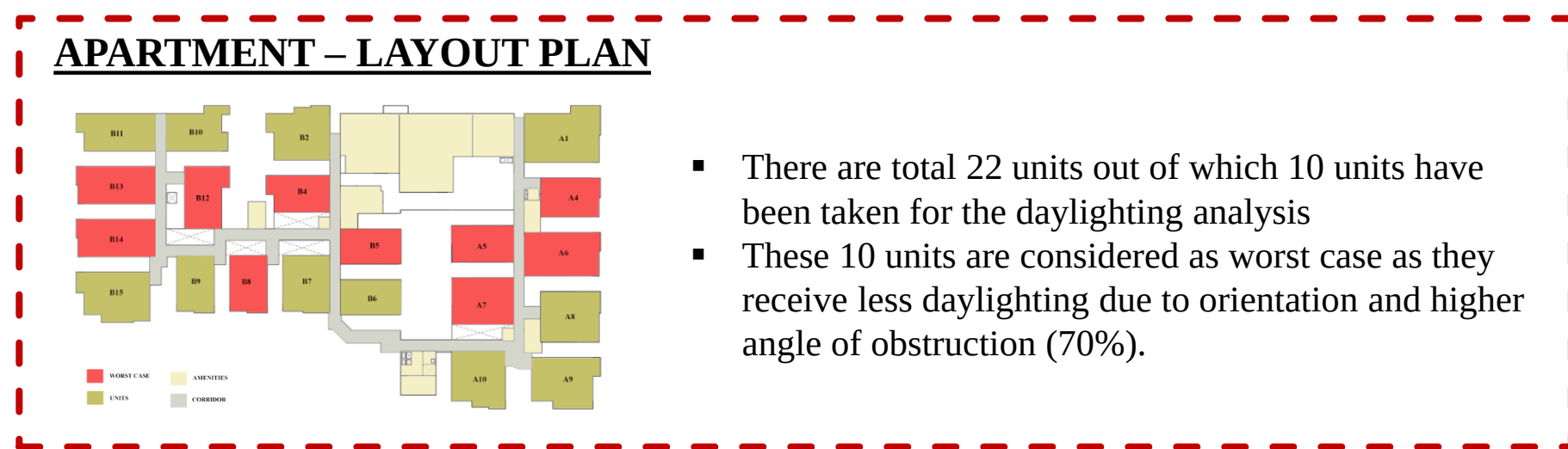
80% OF THE REGULARLY OCCUPIED AREAS MEETS DAYLIGHT LEVELS OF 110 LUX



OUTDOOR VIEW CALCULATION

UNIT - A1 (3BHK)									
Regularly Occupied Spaces	Floor Length(m)	Floor Width(m)	Total Floor Area (Carpet) (Sq.m)	Window Opening	Direct Sight Line	Obstruction (8M)	Access either to Sky or flora and fauna	Eligible	Meet The Requirement
Living room	3.80	5.55	21.09	W2	NO	YES	YES	YES	21.09
Dining & kitchen	5.59	5.13	28.68	W2 & KW2	NO	NO	NO	NO	0.00
Bedroom 1	4.37	3.80	16.61	W4	NO	NO	NO	NO	0.00
Bedroom 2	4.07	4.00	16.28	W2	NO	YES	YES	YES	16.28
Bedroom 3	3.38	4.00	13.52	W3 & SD2	NO	YES	YES	YES	13.52

Total Regular Occupied Area	96.17
Total Area Meet the Requirement	50.89
Percentage Achieved	53%



UNIT - B3 (2BHK)									
Regularly Occupied Spaces	Floor Length(m)	Floor Width(m)	Total Floor Area (Carpet) (Sq.m)	Window Opening	Direct Sight Line	Obstruction (8M)	Access either to Sky or flora and fauna	Eligible	Meet The Requirement
Living room & Dining	4.87	3.65	17.78	W1	NO	NO	NO	NO	0.00
kitchen	2.13	4.00	8.52	KW1	NO	NO	NO	NO	0.00
Bedroom 1	3.35	4.00	13.40	W3	NO	NO	NO	NO	0.00
Bedroom 2	3.23	3.65	11.79	W3 & SD2	NO	YES	YES	YES	11.79

Total Regular Occupied Area	51.49
Total Area Meet the Requirement	11.79
Percentage Achieved	23%

GREEN CAMPUS - GUIDELINES

SITE PLANNING AND MANAGEMENT

Credit	Available Points
Green Building within the campus	Required
Soil Erosion Control	Required
Green Building within the campus	10
Green Cover or Vegetation	6
Heat Island Reduction, Non-Roof	4
Outdoor Light Pollution Reduction	2
Green Building within the campus (Max 10 Points under 5 Category)	
Passive Architecture	2
Heat Island Effect, Roof	2
Water Efficient Plumbing Fixtures	3
Waste Water Reuse	2
Eco-Friendly Refrigerants	1
Energy Efficient Lighting Fixtures	3
High Performance Air-conditioning Equipment	3
On-site Renewable Energy	3
Daylighting	2
Outdoor Views	1

SUSTAINABLE TRANSPORTATION

Credit	Available Points
Pedestrian Network	3
Bicycle Lanes Network	4
Access to Sustainable Transportation	4

ENERGY CONSERVATION

Energy Efficiency in Infrastructural Equipment	10
On-site Renewable Energy	5
Off-site Renewable Energy	4
Energy Metering	2

WATER CONSERVATION

Credit	Available Points
Rainwater Harvesting	Required
Rainwater Harvesting	6
Landscape Design	4
Management of Irrigation System	2
Wastewater Treatment and Reuse	4
Water Metering	2

MATERIAL CONSERVATION

Separation of Waste, Post-Occupancy	Required
Organic Waste Management, Post-occupancy	3
Handling of waste during construction	1
Local materials	2

GREEN EDUCATION

Green Education	2
Green Campus Guidelines	1

HEALTH & WELL-BEING

Tobacco Smoke Control	Required
Basic Amenities	1
Health & Well-being Facilities	4
Universal Design	1

INNOVATION

Innovation and Design Process	4
IGBC Accredited Professional	2

CERTIFICATION LEVEL

Certification Level	Points Required	Recognition
Certified	36 – 44	Best Practices
Silver	45 – 53	Outstanding Performance
Gold	54 – 66	National Excellence
Platinum	67 - 90	Global Leadership

GREEN EDUCATION



SITE PHOTOS



ORGANIC WASTE COMPOSTER

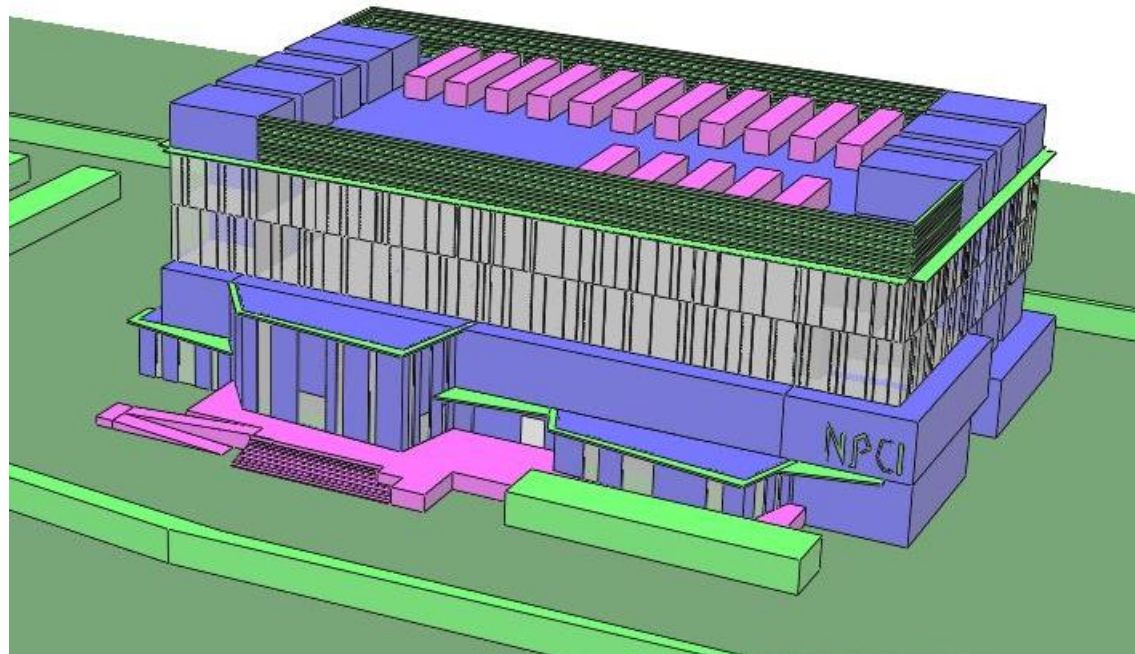


STP WATER – 500KLD

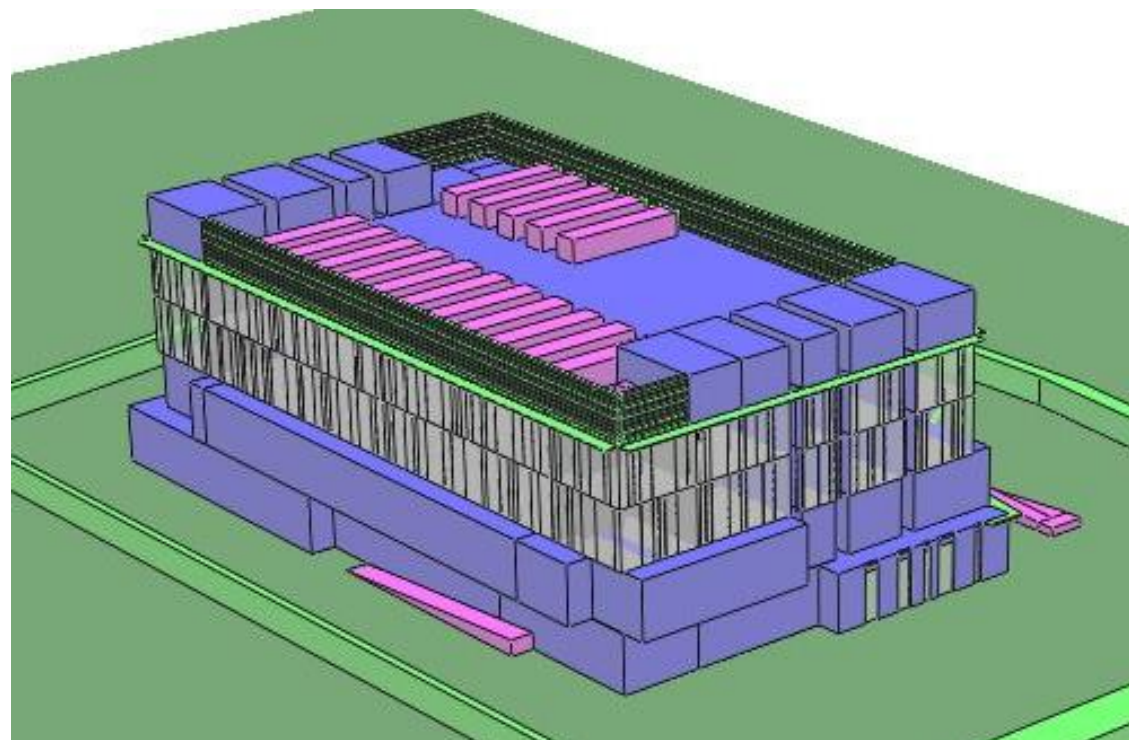
IESVE MODEL MAKING

PROJECT - GREEN DATA CENTRE

LOCATION - HYDRABAD



VIEW OF DATA CENTRE



ASSIGNMENT - CALCULATION

LPD CALCUALTION – CS BLOCK & IT BLOCK

Fixtures	Watt	No of Fixture	Wattage
Tube Light -2 Nos	72	285	20520
Tube Light	36	45	1620
LED Tube	18	174	3132
CFL Fitting 2 Nos	22	84	1848
2 Feet LED Fitting 2Nos	44	12	528
Overall wattage			27648
Builtup Area (sq.ft)			52696.2384
Basecase LPD (W/sq.ft) as per ASHARE 90.1.2010			0.99
Proposed LPD (W/sq.ft)			0.52
overall savings - Base case vs proposed case			47%

Fixtures	Watt	No of Fixture	Wattage
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Proposed LPD (W/sq.ft)			0.52
overall savings - Base case vs proposed case			47%

LUMENS = AREA X LUX REQUIRED

EFFICACY = LUMEN /WATT

TOTAL WATTAGE = LUMEN / EFFICACY

FIXTURE WATTAGE = SPECIFICATION

NO OF FIXTURES = TOTAL WATTAGE / FIXTURE WATTAGE

ANNUAL RUNNING HOURS = NO OF WORKING HOURS X NO OF DAYS
WRKING IN A YEAR

ANNUAL ENERGY = ANNUAL HOURS X (TOTAL WATTAGE /1000)

TOTAL BILL = ANNUAL ENERGY X COST /UNIT

TOTAL INVESTMENT COST FOR FIXTURE = NO OF FIXTURE X COST OF
FIXTURE

LPD = TOTAL WATTAGE / AREA