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PRAJ MATRIX

Award Category - Industrial

Ar. Hemant S. Mahajan **Ar. Prashant P. Shah**

Both passed from B.K.P.S college of Architecture, Pune in 1986. Group Phi is practicing in this profession of architectural, interior and campus planning for about 22 years

Email : groupphi@vsnl.com / groupphi@gmail.com

Website : hemantmahajan@groupphi.com
prashantshah@groupphi.com

The company :-

The innovation centre is designed along the principles of sustainability with the goal of providing eco-friendly solution for the future perfect world.

The company applies multidisciplinary experiences & expertise and utilizes world class laboratory and pilot scale facility to accelerate the development of Bio-based technologies.

The Department of scientific & Industrial Research, Government of India has certified the company as a recognized in house R & D Laboratory unit.

The R & D campus has received the status of private sector Biotech Park from the Government of Maharashtra

Located in the Picturesque Pirangut Valley near Pune (India).

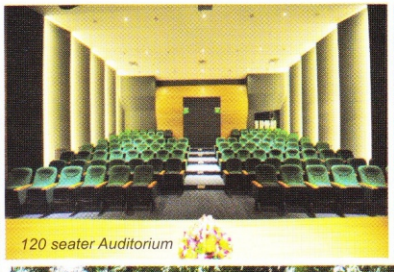
The company is built on a 5 acres campus with a built up area about 85,000 sqft.

Vision :-

To be a global leader in break through sustainable, commercializable technologies for renewable energy and bio-based chemicals & materials, environment and health solutions while enhancing societal and stakeholder value.

Entrance to the R&D Center

Office area with modular workstations



120 seater Auditorium

Auditorium

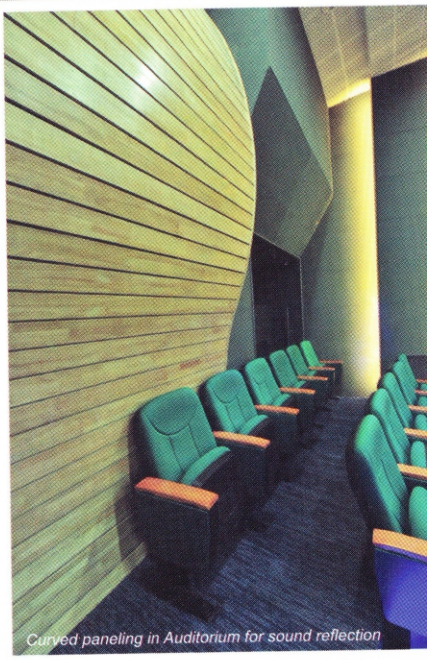
Secondary Entrance to the facility

80m X 6m wall panel used for Company display seen from the viewing gallery & Central plaza

Block wise summary of R & D center facility.

Total Area of Plot: @ 5.22 acres

Block 1	:	Laboratory & lab scale	: 20,000 sqft (G + 1).
		Fermentation Facility along with entrance plaza	
Block 2	:	Office Admin Block,	: 10,000 sqft.
		Training Room,Library,	: 10,000 sqft.
		Laboratories (Clean Room)	
Block 3	:	Bench scale plants for technology	: 20,000 sqft.
		Biodiesel (Ground storey– 30' ht)	
Block 4	:	Common Utilities	: 5,000 sqft.
		(Ground storey– 30' ht)	
Block 5	:	Bio products Manufacturing Facility	: 5,000 sqft.
Waste Treatment & Disposal			
Service Floor above block			**: 20,000 sqft.**
Service area below ground			**: 5,000 sqft.**
(due to topographical difference)			



Curved paneling in Auditorium for sound reflection

Topography of the land :

Site has a total level difference of @ 4 to 5 m from entrance road level to the end of the plot. So from the road we see the structure G + 1 only and on the southern end of the plot parking is provided for the staff.

Design solutions :-

Flexibility in construction /phasing .

Conservation of existing trees and topography of land.

At the lower level staff canteen, Executive canteen, Gymnasium along with the amphitheater in between the block 1 & block 3 & 4 is proposed.

From Functioning point of view all utilities plant room, drivers seating area provided at lower level.

Through the entrance plaza there is a access control. So only restricted entry is allowed the laboratories.

For the guests / scientist all will have a meeting in entrance plaza as well as through connecting bridge they can see the pilot plant activity of block 3 & 4 without entering into the plant. (through viewing gallery only)

Each floor is provided with a height of about 4.2 m & 3.6 m below false ceiling line Use of natural light for the service floor. All the AHU & services to clean-room are provided from top. Electrical light fittings are maintained from outside.

To avoid the cross contamination of air the use of hepa filers was the necessity.

All the clean-room were provided with metal partitions, flame proof fittings & fixture, coving were provided to bottom & ceilings.

Flooring provided for the same was 3 mm epoxy self leveling floor.

Use of walkable flooring / metal ceiling from maintenance point of view.

The floor should have proper slope in order to drain the liquid / solid waste into the gutters to ETP location.

Total staff numbers inside the campus will be to the tune of @ 150 nos. including technical, non-technical, security, pilot plant area.

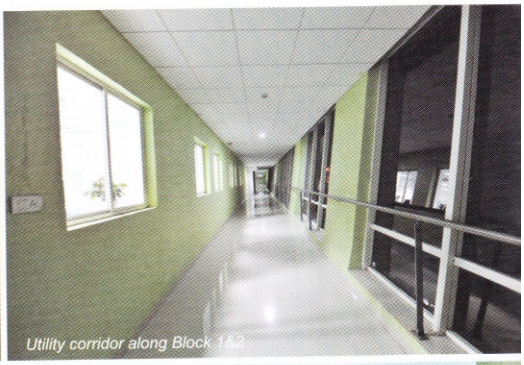
Requirement of two cold store with installation of puf panels to slabs, floor, door & refrigeration units.

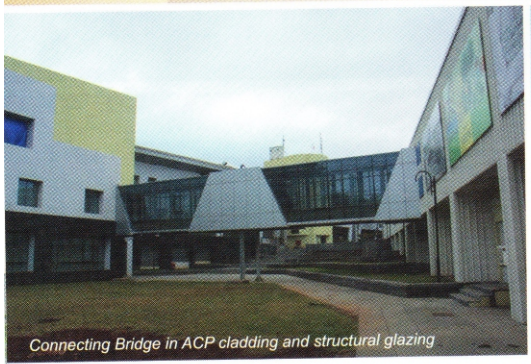
Separate ventilation system required for the exhaust of fume hoods, Auto claves , laminar flow machines.

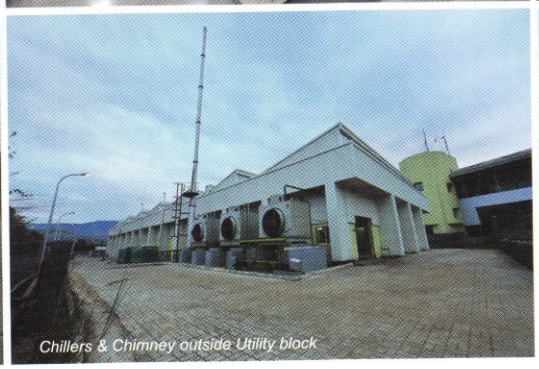
The bio-diesel produced in the pilot project will run the generator sets.


Staff dining block


Typical Lab


Utility corridor along Block 1&2


Connecting Bridge in ACP cladding and structural glazing


Chillers & Chimney outside Utility block


Utility block & Pilot plant with north light roof trusses

WTP :- Water treatment plant.

(Domestic – 25 m3 / day , Lab – 8m3 / day , Pilot plants - 40m3 / day, Utility section – 215 m3 / day, (for HVAC , softener , cooling tower and for pilot plant requirements). Fire demand - 265 m3 / day. So total requirement of @ 480m3 / day is designed for WTP which is located on the side of block 1 & 2 there also we have provided natural light for WTP and separate access for maintenance for lower level.

EFFLUENT TREATMENT PLANT (Zero discharge)

AND SEWAGE TREATMENT PLANT :-

The boitech unit of the company is having the full fledged effluent treatment plant to treat the effluents generated from operating of the unit.The facility is also capable of doing research in the area of waste water treatment in the area in which it operates.

The installed facility is capable of treating both Industrial and Domestic effluents and having capacity of treating 30 M3 of effluent /Day. (Industrial Effluent – 10 M3/Day and Domestic- 20 M3/Day

The ETP facility is designed to treat following effluent input-

COD - 10,000 PPM

BOD - 5,000 PPM

TS - 10,000 PPM

Silent Features of the Effluent Treatment Plant are-

ETP is having treatment facilities as mentioned below-

1. Primary Treatment- Consists of equalization tank, chemical treatment.

2. Secondary Treatment- Consists of bio digestors, Primary and Secondary lamella clarifier

3. Tertiary Treatment- Pressure Sand Filter and Activated Carbon Filter

Treated effluent will be having following characteristics-

COD- Less than 250 PPM

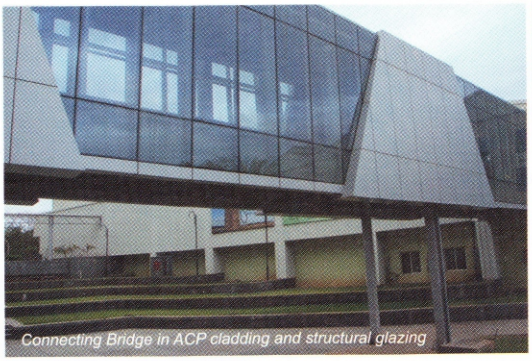
BOD- Less than 100 PPM

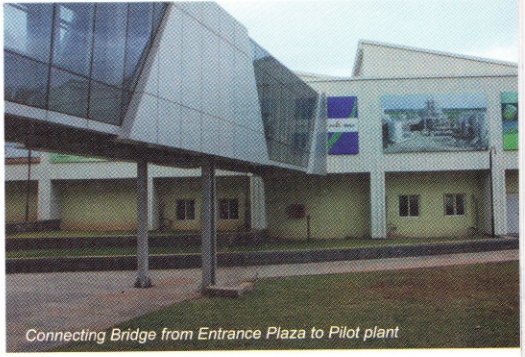
TS- Less than 2100 PPM

Quality of the treated water is as per the MPCB consent conditions and disposal of the treated water is for Gardening purpose as per the Consent Conditions. The company Praj Industries Ltd is member of the Hazardous Waste Storage, treatment and disposal facility approved by MPCB


Block 1&2


West facade of Block 1&2


Connecting Bridge in ACP cladding and structural glazing


Connecting Bridge from Entrance Plaza to Pilot plant

Safety :-

In all labs gas detectors, smoke detector were also installed. Fire & smoke alarms system.

All the facilities related to health, safety & environment are complied in the campus. All health safety & environment process meet global standards.

Temperature & humidity controller required in each labs.

Total water requirement was @ 120 m3 / day

Segregation of vision & staff movement is achieved through design & access control

One main entry from plaza area. Side entry for material & equipment movement.

Directors cabin with guest seating / meeting facility. Training room, library, guest restroom, facility, Auditorium / seminar hall, server room. These are the ancillary facilities provided on the first floor.

Electrical :-

Total electrical load required was @ 1245 kw. (1556 KVA). It has been designed to go for 2 DG sets of rating 625 KVA & 380 KVA.

The transformer rating will be 2500 KVA. For MSEB norms 60% diversity is to be considered hence total required rating is 1500 KVA.

In each lab safety showers, eye wash, safety cabinets were provided at proper location

From safety point of view separate sealing arrangement adjacent to labs are provided for all scientist.

Conclusion :-

So we have tried to maximize the conservation and utilized the resources. (Land, water, natural habitat and energy conservation.

Water is reused for the landscape purpose.

Building design is optimized by means of natural day lighting accordingly conventional energy demands is reduced.

Use of low energy material in interiors.

Effluent treatment plant and sewage treatment plant are


The level drop of 4m is transformed into a central amphitheater

designed in such a way that it creates zero waste and this company is leader in such a technology.

Water is recycled and used for landscape purpose.

All the paints used inside are water based and solvent based paints.

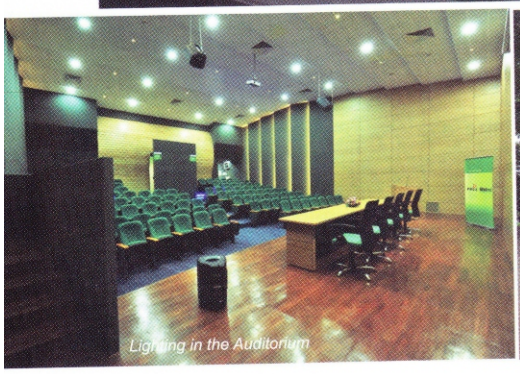
Building audit and validation is done every year.

Company has non smoking policy inside the campus.

Company is providing green building practice and concept and also taking different workshops from educational point of view.


Amphitheater


Dry stone cladding and Aluminium Louvers


Lighting in the Auditorium


Block 1&2 seen from the entrance


Pilot plant with connecting bridge

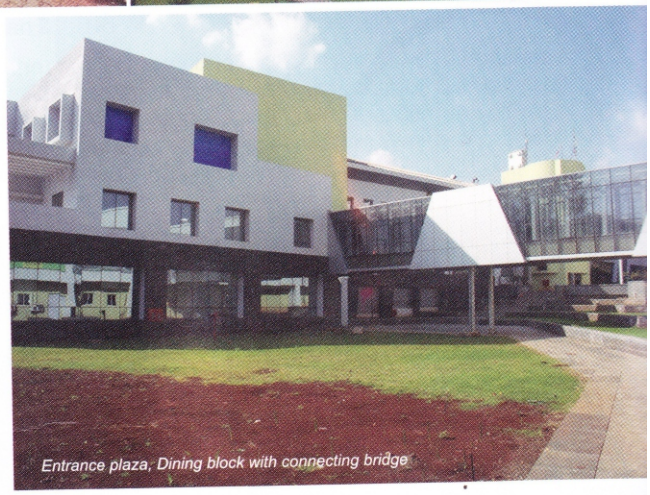
Silent Features of HVAC System Installed in the company

Total Area under Comfort Air conditioning	: 24800 Sqft
Total Area under Class 10 K / 100 K Air conditioning	: 11200 Sqft
System Installed Water cooled screw chillers	: 200 TR Screw chillers (2 x 100 TR (1 W + 1 SB)
Refrigerant Used	: R 134 A

Primary Pumps & Secondary Pumps with VFD are installed to optimize the running cost.

Total No. of cassettes installed	: 103 nos. (93000 CFM)
Total No. of AHU's installed	: 9 nos. (73000 CFM)

With above indoor configuration we can have individual control as per individual requirement.Heat reclaimed i.e water available @ 50°C at 5 lit/sec = 18000 lit/hr available.


Entrance plaza, Dining block with connecting bridge

Short Note on Auditorium of the company:-

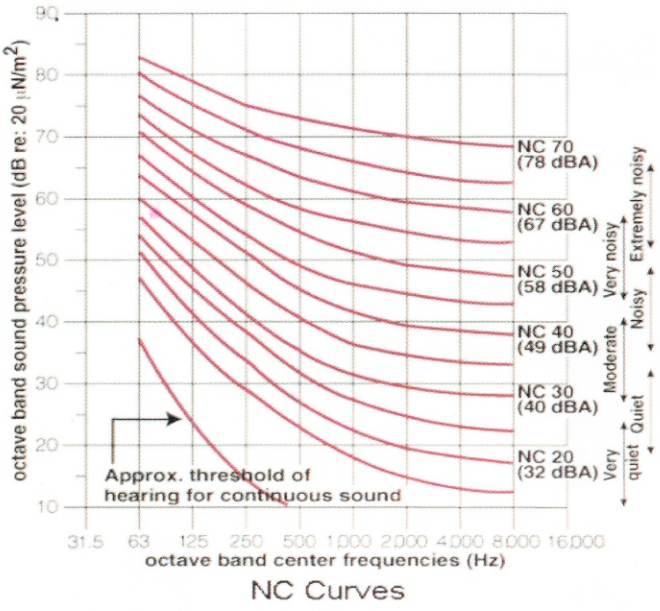
Acoustics:

Acoustics for the corporate auditorium is one of the critical acoustical design because, achieving perfect Speech clarity itself is a challenge .

Basic considerations for acoustical performance of any auditorium are

- Noise
- Reverberation Time
- Acoustical reflections
- Acoustical diffusion

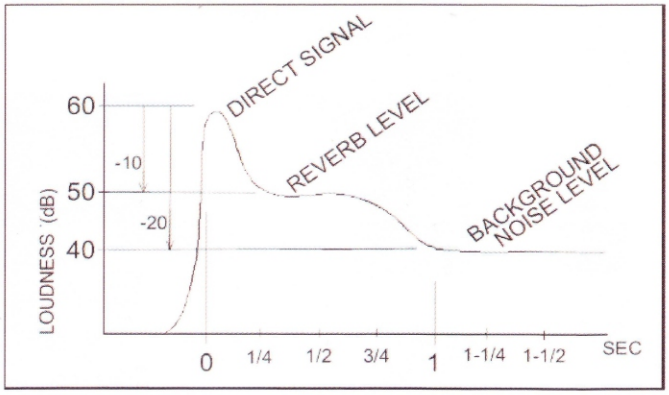
Noise: As for any auditorium there is always a limit for maximum gain we can give to sound reinforcement system before it gives feedback, internal noise level is very critical factor in auditorium. Ideally inside noise for such auditorium should follow NC 38 curve (38 dB in simple words) Secondly more the noise, we loose our ability to hear clearly, as noise always mask the original signal. To achieve perfect speech clarity we should have signal level 25dB above the noise level. In other words for a given signal level we must keep the noise to a level 25dB less than signal.



NC Curves

Our first objective was certainly to control internal Noise level below 38dB

Reverberation Time: This is another important factor in auditorium acoustics. Reverberation is a stored energy of sound waves, which gradually decay. It is the time taken by the sound energy to decay by 60 dB from its original value.



Speech clarity is inverse function of reverberation time, but it does not mean that 0 Sec of reverberation time will give the best effect in the auditorium (by applying as much as sound absorption we can). Some reverberation is always needed for liveliness of the sound, weather it is speech or music. This optimum reverberation time can be derived from, auditorium volume, available surface area, number of seating & the purpose of the auditorium. We have to consider & calculate the absorption of each & every material used inside the auditorium (flooring, wall paneling, carper, drapery & even the chairs).

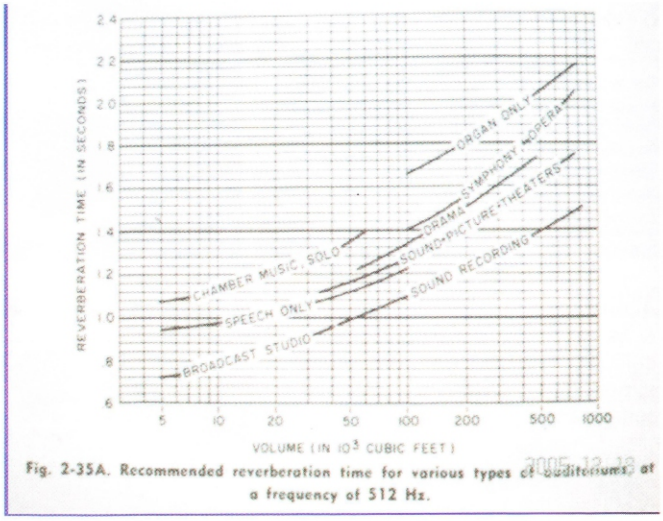


Fig. 2-35A. Recommended reverberation time for various types of auditoriums at a frequency of 512 Hz.

Our objective was to achieve, through perfect absorption, optimum reverberation time 0.8 Sec for this Auditorium

Acoustical Reflections: The third most important acoustical factor in auditorium designing is sound reflections. All these reflections are directly affect the definition of the sound. Most of the sound we hear in any enclosed hall is reflected sound & not the direct sound. These reflections can be sub divided in 3 parts

1. Early reflections: These are good reflections & normally adds to improve the definition of the sound & increase the clarity.
2. Late reflections: These are bad reflections & ruin the clarity.
3. Reverberation: Reverberation is really function of very late & diffused reflections.

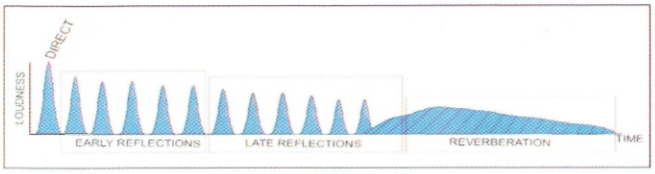
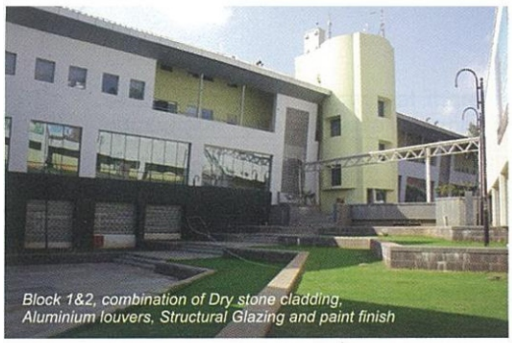


FIG-3
Late reflections and echoes intefere with understanding.


Pilot plant & Amphitheater

These reflections can be controlled by giving proper shapes to the reflecting surfaces like ceiling & wall paneling. (Ref the ceiling segments)

Our Objective was to, through perfect reflecting panels & ceiling shape, receive maximum of good reflections so as to increase the speech clarity & acoustic gain.



Block 1&2, combination of Dry stone cladding, Aluminium louvers, Structural Glazing and paint finish

Connecting bridge in ACP cladding and structural glazing

Acoustical diffusion: Diffused sound field is always needed & is a basic assumption in all acoustical calculations, for natural, lively experience of the performance.

This can be achieved by providing proper acoustical diffusers or using some interior decoration items as diffusers.

One can always find the combination of absorbing panels & diffusers in any good auditorium.

Audio System:

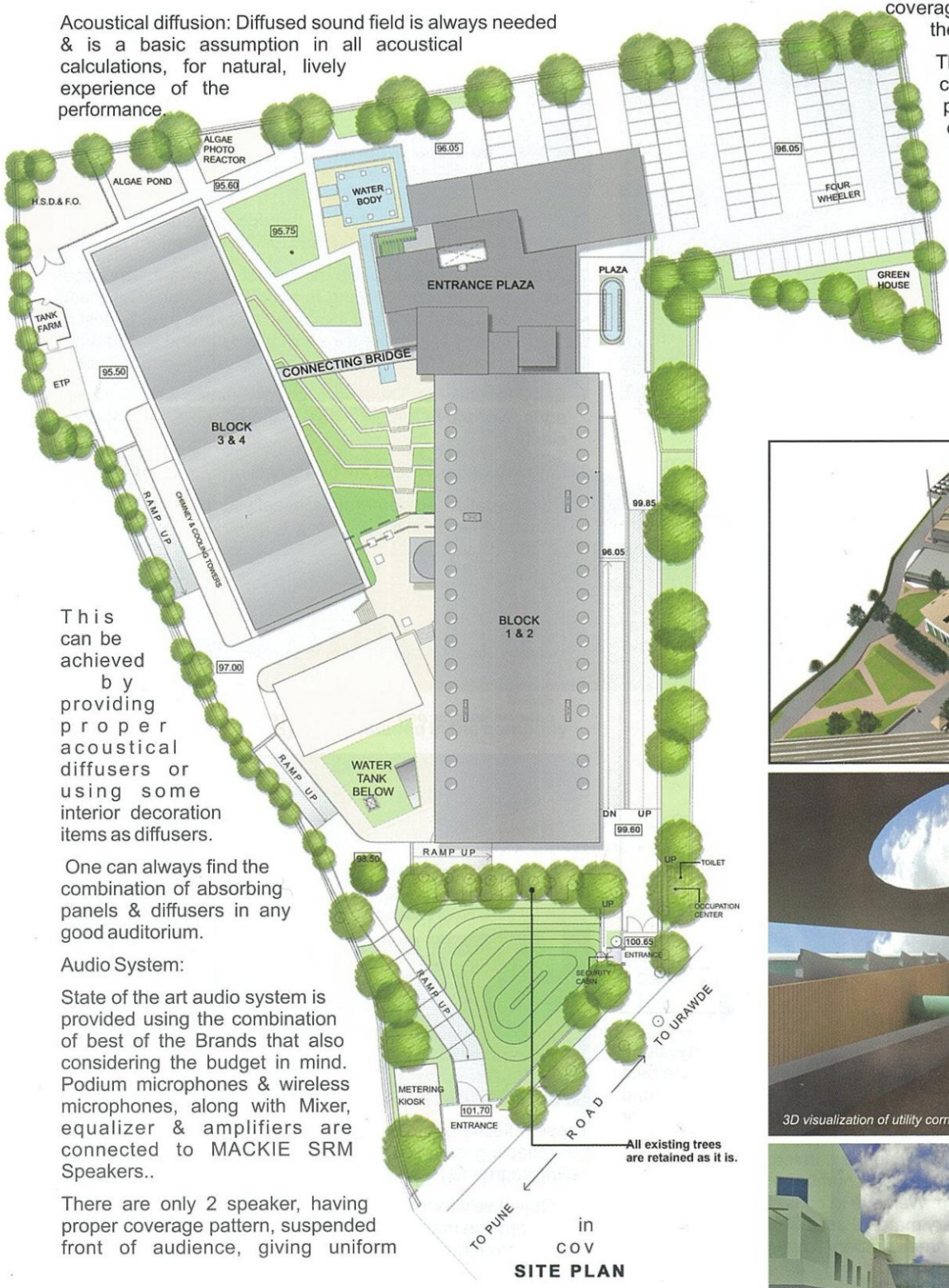
State of the art audio system is provided using the combination of best of the Brands that also considering the budget in mind. Podium microphones & wireless microphones, along with Mixer, equalizer & amplifiers are connected to MACKIE SRM Speakers..

There are only 2 speaker, having proper coverage pattern, suspended front of audience, giving uniform coverage to each & every seat in the auditorium.

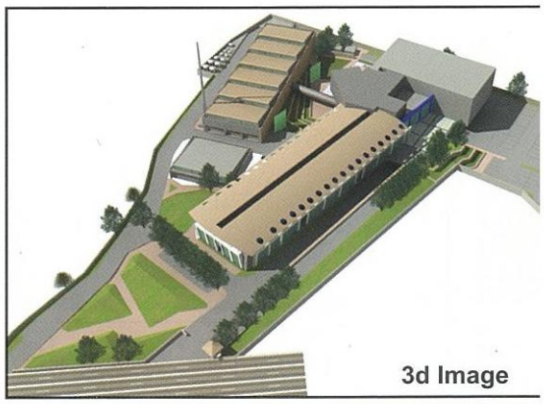
The same audio system can be used for all the programs including occasional screening of Movies.

Projection:

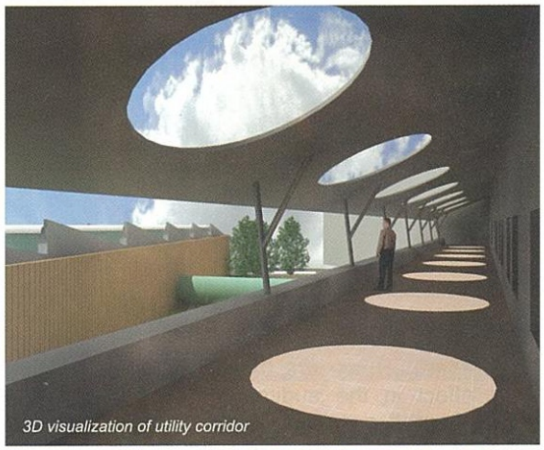
LCD projector Is be used to project the image on motorized screen. This will be used for all type of presentations & video clips as well as occasional screening of Movies.



SITE PLAN



3d Image



3D visualization of utility corridor