SHAPING A SUSTAINABLE INDIA
Presented by

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Shaping A Sustainable India

Case Study Of

CROSSINGS REPUBLIK

360 ACRES
NEW COMMUNITY INTEGRATED TOWNSHIP
FOR
150,000 POPULATION
A SHINING EXAMPLE OF SUSTAINABLE INDIA
Concept
Is the practice of creating structures and using processes that are environmentally responsible and resource-efficient throughout a building’s life-cycle: from siting to design, construction, operation, maintenance, renovation.

The design to reduce the overall impact of the built environment on human health and the natural environment by:

- Efficiently using energy, water, and other resources
- Protecting occupant’s health and improving employee productivity
- Reducing waste, pollution and environmental degradation.
Climatology: Wind

Wind Rose Diagram gives the monthly wind direction for the site to understand the annual wind pattern. The Average Annual Wind Direction is North West to South East. The winds in this zone on an average are light but gain force in summers and monsoons.

The site is located South East to the Master Plan Green. The wind direction being North West to South East will bring purified cool breeze into the site.
Human comfort is a function of four primary variables; air temperature, air movement, humidity, and the mean radiant temperature of interior surfaces. Natural ventilation is an energy efficient way to increase human comfort because air movement increases heat transfer from the surface when cooler outside air replaces warm and humid indoor air. Natural ventilation, unlike fan-forced ventilation, uses the natural forces of wind and buoyancy to deliver fresh air into buildings.

To maximize Natural Ventilation in buildings:

- **Climatology**: Sun
- **Variations in Wind Movement through the Building**
- **The size of the fenestrations affect the indoor temperature**
- **Cross Ventilation**
- **No Natural Ventilation**
- **No Outlet**
Ghaziabad falls in the Composite Climatic Zone of India having all types of climatic characteristics from hot & dry, warm, humid as well as cold conditions.

A climatic data glance over the past two decades for monthly average weather conditions with exceptional occurrences is given below:

**TEMPERATURE**
- Hottest Months- May, June
- Coldest Months- December, January

**RAINFALL**
Normal Annual Rainfall: 553mm

[Graphs showing temperatures, average rainfall, and wind speed]
The Sun is at Higher Altitude in Summers and Lower Altitude in Winters.

Solar Chart

This solar chart is used to establish the angle of incidence of solar radiation in relation to the building elevation.

Hourly Solar Radiation Data: Gurgaon

Sustainable Building Design Practices: By Energy and Resources Institute
Architectural Treatments like light shelves, sun shades, louvres can prevent/maximize the sun in the apartment.

The location, size and control of fenestrations can control the sunlight and temperature in the apartment.

The sun light for winters and summers can also be taken care the type of vegetation.

The use of appropriate material and insulation can help in maintaining the room temperature.

To maximize Sunlight in buildings:

Building Orientation helps in maximizing the daylight.

To maximize the usage of daylight in maximum number of apartments on the site, Low rise development should be on the Southern side and High rise development should be on the Northern side.
Initial Site Image
PLANNING CONSIDERATIONS

• Maximum utilization of Natural Resources
• Gated community with three tier security system
• Tower in front to be planned in such a way so that it can enhance the beauty of the site and can act as a landmark.
• Natural light and Ventilation to maximum number of apartments
• Maximize Green Area with large central park, fountains and water bodies
• Towers to face maximum open spaces and landscaped courts
• Outdoor Play Areas (Hard and Soft)
• Basement for Parking and Services
• Energy Efficiency
• Vaastu Compliance
• Kid’s Bus Shelter
• Party Lawns/ Celebration Court
• Convenient and Daily needs Shop

ARCHITECTURAL CONSIDERATIONS

• Intelligent building concept
• Towers to have covered drop offs with landscaped surroundings
• Double height Entrance Lobby
• Provision of Utility balconies
• Deep Balconies
• IIT vetted Earthquake Resistant RCC Framed Structure (Zone V Compliant)
• High Speed Elevators
• Separate swimming pools for males and females
• 100% backup for common areas
• Dedicated Driver facilities and Maid’s Room
• Office space for complaints and monitoring for an Efficient Maintenance System
LandScape Use Programme

Land use distribution:
- Hospitals
- Schools
- Shopping Mall
- Residential

Landscape Area approx. 90%
Opportunities & Constraints
OPPORTUNITIES:
• Proximity to Delhi
• Site Access
• Regional Population Growth
• Existing Waterways
• New Northern Development
• Viewshed
• Flat Topography
• Greenbelts and Greenways
• Wetlands

CONSTRAINTS:
• Polluted Waterways
• Image of Ghaziabad
• Industrial Development
• Existing STP
• Adjacent Villages
Conversion from land to home, Conserving the nature thro’ green architecture, through sustainable development

**Original Shape**

**Present Status**
Original Shape

Present Status
Original Shape

Present Status
Uses Resource Optimization for self sufficiency

Construction Phase :

- Earth Excavation and Balancing
  - **Excavation**
    - Excavation of earth
    - in Residential & Commercial sectors
  - **Volume**
    - 5,00,000 cum till date

- Optimum Utilization
  - Road work - 50% For developing Road embankment inside the Township
  - Horticulture -30% For developing Green area inside sectors, Roadside & Central verges
  - Back filling – 20% For leveling of land
Fly Ash (Used in)

- Ready mixed concrete
  4MT/lacs cum of fly ash used in concrete

- Fly Ash bricks
  2.5 lacs cum fly ash brick used in residential and commercial sectors.

- Fly Ash blocks of Different Sizes
  2500 cum fly ash blocks such as kerb stones has been used in footpath and allied works.

  Fly ash content (approx. 2MT) has been used in Grass Pavers and Footpath Tiles
Construction Waste Material:

Mulba and other Debris material have been used as a soling coat in Road work.

Existing Nalah:

Nalah along the Periphery of township - Approx.- 10,000 plants have been planted

Original Shape of Nalah

Thick Plantation Along the Nalah
STP:

Developed own

One STP of 1.2 MLd capacity based on FAB Technology for 2000 dwelling units.

Construction of STP for future extension is in progress.
1. Low on space. Since the Hydraulic Retention Time required for FAB based Plant is less, it saves on space required for bi-degradation process.

2. Since the HRT is lower and the volume of Aeration (FAB) Tank is lower, it is also a saving on the civil costs involved.

3. The FAB based plant can be operated successfully on as low as 40% of sewage inlet quantity.

4. Since the FAB based Plant has moving media in it, the maintenance of the plant is easy since access to submerged diffusers is possible without shutting down the plant.
Discharge:

- After treatment of sewage water sludge gets convert in to manures in form of 1” cube used for Horticulture.
- Treated Water used inform irrigation and flushing.

Under Ground water tanks:

- Constructed - 300 KLd U/G water tanks for residential as well as commercial purposes.
- Abstraction of Water per day Through bore wells – 300 kLD.

Utilization:
- 10% used for drinking
- 90% used for horticulture and flushing
- **Rainwater harvesting System:**
  Developed Recharge pits with desilting chambers – 50 nos.
  30% storm water of catchment area pass through these Recharge pits.

- **IGL:**
  - Installed CNG & PNG Substation for both commercial as well as residential end users in order to save natural resources of Petroleum & oil.
  - Networking of CNG as well as PNG gas pipe line laid up to 8 km.
**Energy saving:**

- The buildings have been designed & constructed in such a way as to use natural resources of light to its max. saving of power in daytime.

- Establishment of electrical system with modern technique and equipments for both residential and commercial end users.


- Installation of CSS – To reduce the energy loses and enhance the electrical load distribution system.

- Installation of GIS – For high tension distribution system based on latest technology.
Park/ Green Development:

- Golf Course developed with integrated lake - 37 acres
- Thick Green belt developed – 10,000 Trees and plantation
- Eco-Park developed – 5,000 Trees and plants
- Open space – Around 70% inside Township

Thus Conserving the Bio-diversity of the Area.
Artificial Lake
Public Amenities:

1. All facilities at a walking distance.

5 to 10 minutes walking distance from main center of site
2. Pedestrian Walkways

• Dedicated sidewalks along all primary circulation roads have been designed

• Provision of pedestrian walkways, sidewalks, pedestrian plazas and promenade
3. Cycle Track:

- Use of Cycles inside the Township for Residents
- No vehicular movement inside township
- Saving of fuel
- Company is providing 300 nos. of cycles to promote healthy habits in order to provide natural & pollution free environment.
4. Internal Battery operated Vehicles:
   Use of Battery operated Vehicles inside the township.

5. Garbage Disposal:
   - Collection of garbage by well equipped dustbins based on latest technology.
   - Separation of organic and inorganic garbage by the mechanized system developed inside the Township.
Cultural Amenities:

- Club Houses – To promote Social & Cultural Interaction
- Sports Stadium – To Promote Out Door Activities
- Lake Arcade - Place to relax for Residents & Specially Senior to Enjoy the Nature
- Golf Course – To Promote modern life style.
Village Integration:

- 8 Km. Road developed
- Developing Road network for better connectivity with the surrounding Villages.
<table>
<thead>
<tr>
<th>Approx. Area</th>
<th>Approx. Proposed</th>
<th>Approx. Landscape Ground Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>176 Acres</td>
<td>23 Acres</td>
</tr>
<tr>
<td>Shopping Malls</td>
<td>12 Acres</td>
<td>3 Acres</td>
</tr>
<tr>
<td>Schools</td>
<td>29 Acres</td>
<td>4 Acres</td>
</tr>
<tr>
<td>Hospitals</td>
<td>9 Acres</td>
<td>2 Acres</td>
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<tr>
<td>Greens</td>
<td>64 Acres</td>
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<tr>
<td>Roads</td>
<td>45 Acres</td>
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<tr>
<td>Public Facilities</td>
<td>8 Acres</td>
<td>1 Acres</td>
</tr>
<tr>
<td>w.s. Commercial</td>
<td>17 Acres</td>
<td>3 Acres</td>
</tr>
</tbody>
</table>

Total Area: 360 Acres

Total Landscape = 90% of Township Area
Land Use Programme

Total Area - 360 Acre

- Ground Coverage of Residential 6% 153 Acre
- Shopping Malls 3% 9 Acre
- Schools 2% 25 Acre
- Hospitals 1% 7 Acre

Approx. Landscape 90% of Township Area
THANKS