10.0 ENVIRONMENT MANAGEMENT PLAN :-

The Environment Management Plan would consist of all mitigation measures for each item wise activity to be undertaken during the construction, operation and the entire life cycle to minimize adverse environmental impacts as a result of the activities of the project. It would also delineate the environmental monitoring plan for compliance of various environmental regulations. It will state the steps to be taken in case of emergency such as accidents at the site including fire.

10.1 Proposed Environmental Mitigation Measures

These measures together constitute part of Environmental Management Plan (EMP). The environmental mitigation measures for construction and operation phases have been given in the following **Table**.

Proposed Environmental Mitigation Measures

Area	Mitigation Measures
	Construction Stage:
Water quality	• Toilet and drinking water facilities for construction workers will be provided by the contractor at the construction site to avoid unhygienic condition at site. • Sewage from toilets at construction site will be collected and disposed to STP through authorized tankers.
Air quality	• Barricades of sufficient height all along the project boundary will be erected to prevent dispersion of dust and noise • Regular sprinkling of water on roads and vulnerable areas of the construction site will be carried out for dust suppression. • Properly tuned construction machinery & vehicles in good working condition with low noise & emission will be used and engines will be turned off when not in use. DG sets to comply with emission norms & stack height regulations. • Construction materials will be properly stored at the storage yard with proper shades and covers located at the off-site. • Trucks carrying construction materials and debris will be suitably covered by tarpaulin and plastic sheets. • Use of mask by construction workers.
Noise level	• Enclosed/ canopy type DG sets will be used. • Protective gears such as ear mufflers etc. will be provided to construction personnel exposed to high noise levels.
Solid wastes	• Construction wastes will be recycled and excess construction debris will be disposed at designated places in tune with the local norms. • Municipal solid wastes from construction site will be disposed at designated dumping site through authorized vendors.

Landscape	• Appropriate landscape including plantation of evergreen and ornamental flowering trees, palms, shrubs and ground covers at open spaces within the complex will be done, which would serve the dual purpose of controlling fugitive dust and improving the aesthetics of the area.
Health & Safety	• Personal protective equipment (PPE) and other safety measures will be provided to the construction workers as per occupational safety norms to prevent accidents/ hazards. • First aid and health checkup facility will be provided at the construction site.
Operation Stage:	
Water quality	• Sewage will be treated up to the tertiary level in the on-site STP. • Entire treated sewage will be reused for cooling, toilet flushing and horticulture. • Regular monitoring of STP and STP effluent quality will be carried out as per norms.
Air quality	• Back up DG sets will comply the applicable emission norms. • Adequate stack height for DG sets will be provided as per norms. • Back up DG sets will be used only during power failure. • Regular monitoring of emissions from DG sets and ambient air quality will be carried out as per norms.
Noise level	DG sets will be installed in the basement to minimize the vibration and impact on ambient noise. DG room will be treated acoustically as per norms to control the noise from DG sets. Pumps, Compressors, DG sets etc. will be properly maintained for fuel efficiency and noise control. Personal protective equipment will be provided to the maintenance staff working in high noise areas.
Solid wastes	• Solid wastes will be segregated into biodegradable & non-biodegradable components. • Biodegradable wastes will be composted in an on-site composting unit and the manure will be used for landscaping. • Non-biodegradable/ recyclable wastes will be disposed at designated dumping site through authorized vendors.
Hazardous waste	• Used/spent oil from DG sets will be temporarily stored in an isolated area with proper marking & restriction and finally sold to registered recyclers as per HW rules.
Rainwater harvesting	• Adequate rainwater harvesting pits will be provided for collection of rainwater and recharge into the groundwater.
Fire protection	• Adequate fire protection facilities will be installed including fire detectors, fire alarm and firefighting system as per National Building Code of India. • Firefighting training & mock drills will be conducted at regular intervals as

	per norms and safety manual
Landscape	• Proper maintenance of landscape round the year including replacement of the decayed plants.
Health & Safety	• Adequate safety measures will be provided to the maintenance staff complying to the occupational safety manuals to prevent accidents / hazards. • First aid and health checkup facility will be provided at the building.
Others	• The building will be provided with disabled-friendly design, timber-free construction, energy efficient lighting & ventilation, and control of indoor environment. • Undertaking all necessary pollution control measures to maintain the emissions and discharges within the prescribed/stipulated limits.

10.2 **GREEN BELT DEVELOPMENT AND LANDSCAPING** :-

An area of 1192.08 Sqm. area (21 % of total land area) on ground will be developed and maintained for green belt within the project premises.

After construction of the Residential Group Housing Project, trees will be grown to the maximum extent all around the premises boundary.

As per the requirement of EIA Notification 2006 amendment vide Gazette Notification No. S.O. 3999(E) dt: 09.12.2016, one tree / 80 Sq. M. should be planted in case of building & construction projects, approx. 70 nos. of trees will be planted within and all around the proposed project premises.

While carrying out plantation within premises or outside the following considerations will be given for choice of types of trees :

- Species of trees and plants suitable for the local agro-climatic and soil conditions will be selected.
- Natural hedgerows will be preferred over fencing wherever possible.
- Trees with large canopies will be chosen which will serve as natural air filters, noise attenuators and umbrellas.
- Automatic irrigation systems will be installed. Irrigation will preferably be carried out at night so that less water is lost in evaporation and most of the water naturally percolates to groundwater through the soil.
- Location of trees and shrubs will be chosen such that they provide a natural shield to the buildings from natural ailments like excessive sunlight and rain.
- Organic manure made from garden waste (dry leaves etc.) & STP sludge will be used so that dependence on chemical fertilizer can be reduced.

Following species will be planted within the premises of proposed Residential Group Housing and Commercial Building Project:

• Crotons
• Coleus
• Colocasia
• English Laurel
• Song of India
• Roses
• Jasmine
• Chrysanthemum
• Gerbera
• Marigold
• Geranium
• Dahlia
• Daffodils
• Tulips
• Bird's Nest Fern
• Bougainvillea
• Arabian Jasmine
• Orchid Tree
• Bottle Brush
• Jungle Flame or West Indian Jasmine

10.8 ENVIRONMENT CONSERVATION CONSIDERATIONS ;

Following initiatives may be considered (if feasible within economic constraints) for energy conservation & preserving the environment ;

- Switching to low-flow toilets or installing toilet tank fill diverters.
- Installation of low-flow showerheads and sink aerators.

- Switching to compact fluorescent light bulbs in lobbies and common areas and use of sensors and/or timers for areas that are infrequently used.
- Awareness program for residential owner of the proposed Residential Group Housing and Commercial Building Projectto close drapes and turn off lights and turn off heating / air conditioning when rooms are unoccupied.
- Installation of window film to lower heating and cooling loads
- Provision of recycler baskets for newspaper, white paper glass, aluminum, cardboard and plastic.
- Provision of recycling bins to make recycling as easy as possible.
- Use of least toxic cleaners, sanitizers, paints, pesticides etc. throughout and ensuring all chemicals are stored safely in a well-ventilated area.

- Monitoring and tracking rates of energy and water use. Making repairs or replace equipment when rate changes indicate problems.
- Creating an incentive program to encourage management staff to participate in and improve upon environmentally friendly practices.

10.9 ENVIRONMENTAL MONITORING PROGRAM ;

Monitoring / Sampling stations will be fixed as per recommendation of Environmental Clearance to assess the ambient levels in relevant areas of environment after the commissioning of the project. An environmental monitoring programme is important as it provides useful information on the following aspect:

i) It helps to verify the predictions on environmental impacts presented in this study.
ii) It helps to indicate warnings of the development of any alarming environmental situations, and thus, provides opportunities for adopting appropriate control measures.

The monitoring programme in different areas of environment are outlined below;

POST PROJECT ENVIRONMENTAL MONITORING PROGRAM

Area of Monitoring	Frequency of sampling	Parameters to be Analyzed
Ambient Air Quality	Quarterly	PM_{10}, $PM_{2.5}$, SO_2, NO_2 & O_3
DG Set Stack Emission	Quarterly	PM, SO_2 & NO_2
Ground Water Quality	Monthly	As per IS 10500:2012
Effluent sample before & after STP	Monthly	In accordance with EPA, 1986 and requirement of Central Pollution Control Board (CPCB)
Noise	Quarterly i.e. once in three months	Ambient Equivalent continuous Sound Pressure Levels (Leq) at Day and Night Time

10.10 ENVIRONMENTAL BUDGET FOR STATUTORY COMPLIANCES;

Sr. No.	EHS Component	One Time Installation Cost	Recurring Cost / Annum
1.	Installation of STP & Water Treatment Plant	Rs. 20 Lakhs	Rs 10 Lakhs
2.	Installation of SPV and Solar Lighting System	Rs. 25 lakhs	Rs. 5 Lakhs
3.	Installation of Fire Fighting & Management System	Rs. 25 Lakhs	Rs. 2 Lakhs
4.	Environmental Monitoring as per	---	Rs. 10 Lakhs

	requirement of EC		
5.	Green Belt Development & Maintenance	Rs. 15 Lakhs	Rs. 5 Lakhs
6.	Rain Water Recharging (4 Nos.)	Rs. 5 Lakhs	Rs. 0.25 Lakhs
7.	Municipal Solid waste (Bio composting pits – 2 Nos. 300 kg/day)	Rs. 3 Lakhs	Rs. 0.25 Lakhs
TOTAL AMOUNT		**Rs. 93 Lakhs**	**Rs. 32.5 Lakhs ~ 33 Lakhs**

After the completion of Construction work of proposed residential project of M/s Shivam Constructions, Residential Group Housing and Commercial Building Project will be handed over to respective buyers. Owner Society will carry out environmental monitoring & management work as per conditions imposed in Environmental Clearance issued by State Expert Appraisal Committee, Bihar. A fixed amount as per above budget will be allocated for Environmental Monitoring & Management work of proposed Residential Group Housing Project. All these work will be accomplish under the supervision of Secretary or his authorized representative of the Owner Society of the proposed building project.

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