APPENDIX II
(See paragraph 6)

FORM-1A
(Only for construction projects listed under item 8 of the Schedule)

CHECK LIST OF ENVIRONMENTAL IMPACTS

(Project proponents are required to provide full information and wherever necessary attach explanatory notes with the Form and submit along with proposed environmental management plan & monitoring programme)

1. LAND ENVIRONMENT

1.1 Will the existing land-use get significantly altered from the project that is not consistent with the surroundings? (Proposed land use must conform to the approved Master Plan / Development Plan of the area. Change of land-use if any and the statutory approval from the competent authority are submitted). Attach Maps of (i) site location, (ii) surrounding features of the proposed site (within 500 meters) and (iii) the site (indicating levels & contours) to appropriate scales. If not available attach only conceptual plans.

Location of the Project Site:

The proposed project is a Commercial/Residential Complex located at Kanuru Village, Kanuru Panchayat Area, Penamaluru Mandal, Krishna Dist. A.P. It is connected with well laid road network. The proposed project site is earmarked for Commercial/Residential Building Construction as per the local development plans and the proposed project is planned and designed as per the regulations and procedures laid down by the Local Authority. The location of the project site is shown in **Annex. 1**

Surrounding Features:

The project site is a piece of plain vacant land earmarked for Commercial/Residential Development as per the local development plan. The terrain of the project site is leveled. The site is devoid of any outcrops and is not covered by any notified forests or protected areas.

1.2 List out all the major project requirements in terms of the land area, built up area, water consumption, power requirement, connectivity, community facilities, parking needs etc.

Salient Features of the Project

Items	**Details**
Location	Proposed Commercial/Resiential Complex Construction at R.S. No. 288/3 in Kanuru Village, Kanuru Panchayat Area, Penamaluru Mandal, Krishna Dist., A.P.
Plot area	1.53 acres (6193.94 m^2)
Built up area	24524.86 m^2
Maximum height	34.95 m
Number of floors & basements	Commercial: Ground+ upper 9 floors Residential: Stilt + upper 10 floors Cellars: 2Nos. (Commercial/Residential)
Parking facilities	Approx. 201 ECS and 307 two wheelers during operation stage
Power requirement & source	The total power requirement will be, Commercial 200 KVA & Residential 160 KVA. Electricity supply from APCPDCL
Power backup	(Commercial 180 KVA & Residential 160 KVA DG set with acoustic enclosure and Synchronizing panel should be provided for load sharing and auto start facility.)
Water requirement & source	Fresh water: 30kLD (from Public Supply) Reuse of treated effluent from STP:34 kLD (30 flushing+4 gardening)

Items	Details
	Total water requirement:64 KLD
Sewage treatment & disposal	Sewage treatment facility: STP of 60KLD capacity
Project cost	Rs.24.4 crores
Connectivity	The site is directly accessible through Existing 10 m wide Road (Proposed 36m) connecting to Auto nagar on the left and Kanuru on the right

The layout plan of the project is shown in **Annex 2**.

1.3 What are the likely impacts of the proposed activity on the existing facilities adjacent to the proposed site? (Such as open spaces, community facilities, details of the existing land use, disturbance to the local ecology).

No adverse impacts of the proposed activity on the existing facilities adjacent to the proposed site are envisaged.

1.4 Will there be any significant land disturbance resulting in erosion, subsidence & instability? (Details of soil type, slope analysis, vulnerability to subsidence, seismicity etc may be given).

No significant land disturbance is expected. This is a conventional construction

1.5 Will the proposal involve alteration of natural drainage systems? (Give details on a contour map showing the natural drainage near the proposed project site)

There will be no alteration to natural drainage system. The study area have natural slope towards Eastern & southern side. No storm water will be disposed off during operation as rainwater harvesting system will be provided

1.6 What are the quantities of earthwork involved in the construction activity-cutting, filling, reclamation etc. (Give details of the quantities of earthwork involved, transport of fill materials from outside the site etc.)

Quantity of earth excavation will be about 15818 m^3. Waste construction materials will be recycled and excess construction debris will be disposed at designated places in tune with the local norms.

1.7 Give details regarding water supply, waste handling etc. during the construction period.

Water requirement for the construction period will be met through tankers and no ground water at the site will be extracted and used for the construction.

The construction workers will be hired from nearby areas and no labour camps are to be built at site. On site drinking water facilities and sanitation facilities will be provided for construction workers.

1.8 Will the low-lying areas & wetlands get altered? (Provide details of how low lying and wetlands are getting modified from the proposed activity)

As such there is no modification on the wet lands due to the project. The project development is within the boundary limits of the project.

1.9 Whether construction debris & waste during construction cause health hazard? (Give quantities of various types of wastes generated during construction including the construction labour and the means of disposal)

The excess earth would only be the construction waste and will not cause any health hazards.

2. WATER ENVIRONMENT

2.1 Give the total quantity of water requirement for the proposed project with the breakup of requirements for various uses. How will the water requirement met? State the sources & quantities and furnish a water balance statement.

Total water requirement for the project is 64KLD (30 KLD fresh & 34 KLD treated). Out of this 30 KLD only is the makeup water from public supply. The details of water requirement and its breakup, source given in the **Table** below and the water balance details are given in **Annexure 3.**

Water Requirement, Source and Water Balance

S. No.	Description	Quantity(kLD)
1	Domestic (Non Flushing)/Make up water	30
2	Flushing (treated water)	30
3	Gardening & green Belt development (treated water)	4
	Total requirement	**64kLD**

Water Treatment

Treated water will be supplied from public supply. However, filtration & disinfection will be done, if required, to achieve the safe and desired quality.

2.2 What is the capacity (dependable flow or yield) of the proposed source of water?

The source of water will be met through Municipal water and tanker water supply.

2.3 What is the quality of water required, in case, the supply is not from a municipal source? (Provide physical, chemical, biological characteristics with class of water quality)

Not applicable. The water will be taken from Public supply for domestic (non-flushing) & treated STP water for flushing, horticulture.

Water Quality

Ground water data results were was taken from the secondary data source. The result of ground water is presented in the Table below.

Statistical Analysis of Groundwater Quality in the Area

S.No	Parameter tested	Units	Result	Desirable limits as per IS:10500
1	Color	Hazen	< 5	< 5
2	Turbidity	NTU	< 5	< 5
3	pH		7.01	6.5 - 8.5
4	EC	Micro Siemens /cm	820	--
5	Total Dissolved Solids	mg/L	460	500
6	Total Hardness as $CaCO_3$	mg/L	220	300
7	P - Alkalinity as $CaCO_3$	mg/L	Nil	--
8	M - Alkalinity as $CaCO_3$	mg/L	180	200

9	Non CO_3 hardness as $CaCO_3$	mg/L	11	--
10	Calcium as Ca	mg/L	40	200
11	Magnesium as Mg	mg/L	13	120
12	Sodium as Na	mg/L	42	--
13	Potassium as K	mg/L	1.1	--
14	Chloride as Cl	mg/L	72	250
15	Sulphates asSO_4	mg/L	25	200
16	Nitrates as NO_3	mg/L	2	45
17	Fluoride as F	mg/L	0.40	1.00

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2.4 How much of the water requirement can be met from the recycling of treated wastewater? (Give the details of quantities, sources and usage)

About 55 KLD of treated water shall be available for recycling. The wastewater shall be treated at Sewage treatment plant planned for the project and shall be used for flushing & horticulture. Flushing water shall be supplied through a separate plumbing line.

2.5 Will there be diversion of water from other users? (Please assess the impacts of the project on other existing uses and quantities of consumption).

No, there is no diversion of water from the other users.

2.6 What is the incremental pollution load from wastewater generated from the proposed activity? (Give details of the quantities and composition of wastewater generated from the proposed activity).

During the operation, 58 kLD of wastewater will be generated that will be treated in the sewage treatment plant of capacity 60 kLD after treated at individual units, if required. The excess waste water if any left after using for landscape & flushing shall be let out in Municipal sewer lines with prior permission. Table below shows the expected characteristics of wastewater and treated wastewater.

Characteristics of Wastewater and Treated Water

Parameter	Expected Wastewater Characteristics	Treated Wastewater Characteristics
pH	7 to 8.0	6.5 to 7.5
BOD_3 at 27°C (mg/L)	350 to 400	< 5
Suspended solids (mg/L)	250 - 450	<5

2.7 Give details of the water requirements met from water harvesting? Furnish details of the facilities created.

The rainwater collected from the rooftop and other paved areas within the project area will be conveyed into the rainwater harvesting system consisting of Desilting-cum-Filter Chamber, Oil & Grease Separators and Boreholes for recharge into the groundwater. The details of rainwater harvesting system are given in **Annex 4**.

2.8 What would be the impact of the land use changes occurring due to the proposed project on the runoff characteristics (quantitative as well as qualitative) of the area in the post construction phase on a long-term basis? Would it aggravate the problems of flooding or water logging in any way?

The project will have provision for rainwater harvesting system. No storm water will be disposed in nearby drains in operation phase of the project. There will be no excess run off generated from construction phase of the project that will cause problems of flooding and water logging in the nearby area.

2.9 What are the impacts of the proposal on the ground water? (Will there be tapping of ground water; give the details of ground water table, recharging capacity, and approvals obtained from competent authority, if any)

The ground water table in the area is more than 10 m. Rainwater harvesting provision has been made for recharge of groundwater aquifer& will have beneficial impact on the groundwater resources.

2.10 What precautions/measures are taken to prevent the run-off from construction activities polluting land & aquifers? (Give details of quantities and the measures taken to avoid the adverse impacts).

The runoff from construction activities will be recycled after treatment. No runoff will be disposed outside the project boundary.

Strom water drains will be provided along with the internal roads over the site to meet the expected increase in the runoff during the rainy season due to the impervious nature of the roof, roads and other paved areas. In addition, all roof water will be collected and discharged into specially designed rainwater harvesting facilities.

Considering all roof tops rain water will be collected and diverted to rainwater harvesting facilities, and the rest of the rainwater as contributing to runoff on the site and assuming a coefficient of runoff of 0.675 and maximum rainfall intensity of 80 mm/hr. The storm drain will be discharged to drain which is back of the site.

2.11 How is the storm water from within the site managed? (State the provisions made to avoid flooding of the area, details of the drainage facilities provided along with a site layout indication contour levels)

The storm water from the site will be collected by rainwater harvesting system and will be used for recharging the ground water.

2.12 Will the deployment of construction labourers particularly in the peak period lead to unsanitary conditions around the project site (Justify with proper explanation)

The construction labourers will not be stationed in the project site. Proper on site sanitation facilities will be provided at the construction site.

2.13 What on-site facilities are provided for the collection, treatment & safe disposal of sewage? (Give details of the quantities of wastewater generation, treatment capacities with technology & facilities for recycling and disposal).

The details of quantity of sewage and sewage collection, treatment, reuse and disposal are given below and design parameters, process description and schematic flow diagram of the STP is given in **Annex 5**.

Sewage Quantity, Treatment, Reuse & Disposal

Quantity of sewage	58 KLD
Collection of sewage	Sewage generated during the operation phase will be collected through underground sewerage system for treatment in STP.
Treatment of sewage	Sewage will be treated with MBBR treatment process in a Sewage Treatment Plant (STP).

Reuse/recycle and Disposal of treated sewage	During normal operations, the treated sewage will be reused and recycled for Flushing, Irrigation /landscaping. The excess treated water, if any shall be let out in public sewer line with prior permission from the competent authority.

2.14 Give details of dual plumbing system if treated waste used is used for flushing of toilets or any other use.

The treated wastewater will be used for Flushing, Irrigation /landscaping. Dual plumbing system will be adopted one for domestic water supply and other flushing water supply.

3. VEGETATION

3.1 Is there any threat of the project to the biodiversity? (Give a description of the local ecosystem with its unique features, if any)

There is no threat to local biodiversity. Further, there are no forests, National parks and Sanctuaries located in the study area.

3.2 Will the construction involve extensive clearing or modification of vegetation? (Provide a detailed account of the trees & vegetation affected by the project)

The project site is a piece of vacant land having very sparse vegetative cover. Further, the plant species around the site are local tree species and no rare or endangered tree species are found in the site hence unlikely to be affected. Any loss of vegetation in the project site will be compensated through plantation and landscaping.

3.3 What are the measures proposed to be taken to minimize the likely impacts on important site features (Give details of proposal for tree plantation, landscaping, creation of water bodies etc along with a layout plan to an appropriate scale)

Any loss in vegetation will be compensated by plantation of trees adopting the following measures. The landscape of project site has been planned to provide a clean, healthy and beautiful green environment for the people. Within the proposed project site, landscape/ green areas will be developed to achieve a blend between modern building and various species of plants to create a clean, healthy and aesthetic environment that provides a visual treat and relaxation to the occupants of these buildings. Within these green areas walking tracks, fountains, etc. will be developed all through the building.

A combination of evergreen and ornamental flowering trees, palms, shrubs and ground covers will be planted along the roadsides and in open spaces within the project complex. The planting arrangement should be based on optimal use of available land and quantum of irrigation water and treated wastewater. It is recommended that tree plantation (large size species) should be undertaken at the time of preparation of the site so that they would grow to considerable size by the time of commissioning of the proposed project. The landscape plan is shown in the project site layout plan given as **Annex 2.**

4. FAUNA

4.1 Is there likely to be any displacement of fauna-both terrestrial and aquatic or creation of barriers for their movement? Provide the details.

The proposed site is an open land and devoid of forestation or aquatic body, so in existing conditions, this place is not the habitat for local fauna, hence there will not be any type of displacement or effect on the local fauna due to proposed project activities.

4.2 Any direct or indirect impacts on the avifauna of the area? Provide details.

Within the proposed project site, green areas will be developed to achieve a blend between modern and various species of plants to create a clean, healthy and aesthetic environment. Common native variety of

trees and ornamental flowering species will be planted in the green space. Landscaping can have direct positive impact on the local avifauna as this will provide shelter to local birds.

4.3 Prescribe measures such as corridors, fish ladders etc to mitigate adverse impacts on fauna

These measures are not applicable for the proposed project.

5. AIR ENVIRONMENT

5.1 Will the project increase atmospheric concentration of gases & result in heat islands? (Give details of background air quality levels with predicted values based on dispersion models taking into account the increased traffic generation as a result of the proposed constructions)

Background Air Quality

Ambient air quality monitoring in respect of PM_{10}, SO_2, NO_x and CO has been taken from the Secondary data of APPCB monitoring Report of Hyderabad city. The results of ambient air quality monitoring are summarized in the Table below.

Summary of Ambient Air Quality of Hyderabad city

S. No.	Parameter	Annual Avg. Concentrations/ (Commercial)	Standard for Res. & Rural Area
1	Particulate Matter (PM_{10}) ($\mu g/m^3$)	49	100
2	Sulphur Dioxide (SO_2) ($\mu g/m^3$)	4.5	80
3	Oxides of Nitrogen (NO_x) ($\mu g/m^3$)	21.1	80
4	Carbon Monoxide (CO) (mg/m^3)	0.9	2

Source: *APPCB, Hyderabad, India*

From the above summarized monitoring results it is clear that 24-hourly average levels of PM_{10} were observed under the limit of $100\mu g/m^3$ and SO_2, NO_X were observed within the limit of $80\mu g/m^3$ and CO concentration was also observed within the national standard of $2mg/m^3$ for industrial, residential, rural & other areas as stipulated in the National Ambient Air Quality Standards

5.2 What are the impacts on generation of dust, smoke, odorous fumes or other hazardous gases? Give details in relation to all the meteorological parameters.

No such impacts are envisaged such as smoke, odour or hazards gases and will not be generated from this project.

5.3 Will the proposal create shortage of parking space for vehicles? Furnish details of the present level of transport infrastructure and measures proposed for improvement including the traffic management at the entry & exit to the project site.

Proposed Parking Facilities:

The building is proposed to have adequate parking. The parking facility will be provided at the Basement levels of the proposed Building.

Provided Parking area: 6902.4 m^2

Traffic Management Plan at the Entry & Exit to the Project Site:

The site is directly accessible through Existing 10 m proposed (36 m) wide Road connecting to Auto nagar on the left and Kanuru on the right. The increase in traffic due to the project is marginal compared

to the existing high volume of traffic in the area, and therefore the impact will be marginal. Internal roads will be provided within the building. The traffic management plan for the project is given in **Annex 7**.

5.4 Provide details of the movement patterns with internal roads, bicycle tracks, pedestrian pathways, footpaths etc., with areas under each category.

The proposed project development will have access through the proposed driveways width of 7m internally with entry and exit gates width of 7m, 4m, 3m.

5.5 Will there be significant increase in traffic noise & vibrations? Give details of the sources and the measures proposed for mitigation of the above.

There will be marginal increase in traffic on the adjacent road that will have marginal increase in noise and vibrations.

5.6 What will be the impact of DG sets & other equipment on noise levels, vibration & ambient air quality around the project site? Provide details.

Impacts on Air Quality due to DG Sets:

Impacts on ambient air during operation phase would be due to emissions from the stacks attached to standby DG sets which will operate only during power failure.

Further, referring to the background ambient air quality, the mean baseline level when added to the corresponding maximum predicted incremental GLC, the resultant levels of PM_{10}, SO_2 and NO_x will remain well within their permissible standard laid for industrial, residential, rural & other areas.

It may, therefore, be concluded that the setting up and operation of the proposed project will not cause any intolerable impact on the ambient air quality.

Mitigation Measures for Impacts of DG Sets on Ambient 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.
- During operation stage, monitoring of emissions from DG sets and ambient air quality will be carried out as per norms.
- Type approved and conformity of production certified DG sets shall only installed and operated

6. AESTHETICS

6.1 Will the proposed constructions in any way result in the obstruction of a view, scenic amenity or landscapes? Are these considerations taken into account by the proponents?

The architecture of the project matches with the surroundings. The approval of the architectural plan of the will be taken from local authority.

6.2Will there be any adverse impacts from new constructions on the existing structures? What are the considerations taken into account?

This will be new construction and will not have any adverse impact on the existing structures in the vicinity of the project site.

6.3 Whether there are any local considerations of urban form & urban design influencing the design criteria? They may be explicitly spelt out.

The proposed site falls under the area of development plan of Local authority. The Commercial complex will be constructed within the designated site as per the building by-laws. The approval of the design of the building will be taken from local authority.

6.4 Are there any anthropological or archaeological sites or art facts nearby? State if any other significant features in the vicinity of the proposed site have been considered.

There is no archeological site nearby the project site.

7. SOCIO-ECONOMIC ASPECTS

7.1 Will the proposal result in any changes to the demographic structure of local population? Provide the details.

The operation of the project will provide value addition to the existing infrastructure, as due to development of the project, the commercial facilities such as public transport, water supply, telecommunications, power lines, road maintenance etc. will be upgraded. The operation of project and other allied facilities will provide direct and indirect employment opportunities for a large section of society. The employment will have positive impact thereby increasing the quality of life.

7.2 Give details of the existing social infrastructure around the proposed project.

The project site being located within the limits of Vijayawada Municipal Corporation, all sorts of social infrastructure like transportation facilities, water supply & sanitation facilities, communication facilities, educational institutions, hospitals, markets, banks, cultural amenities etc. already exist around the project area.

7.3 Will the project cause adverse effects on local communities, disturbance to sacred sites or other cultural values? What are the safeguards proposed?

The project will be constructed as per the defined building by-laws of local authority. The project activities will be confined within the premises and no adverse impacts are envisaged.

8. BUILDING MATERIALS

8.1 May involve the use of building materials with high-embodied energy. Are the construction materials produced with energy efficient processes? (Give details of energy conservation measures in the selection of building materials and their energy efficiency)

Conventional construction material will be used. The major materials required for construction of the proposed project will be steel, cement, bricks, metal, flooring tiles/stones, sanitary and hardware items, electrical fittings, water, etc.

8.2 Transport and handling of materials during construction may result in pollution, noise & public nuisance. What measures are taken to minimize the impacts?

Mitigation Measures for Air Pollution during Construction Stage

Air quality around the project site will be adversely impacted during construction stage. Various construction activities especially related to handling of loose material are likely to generate fugitive dust that will affect the air quality of the surrounding area of the project site. To minimize such impacts following measures has been proposed:

- Ready Mix concrete will be used.

- All construction material will be covered by tarpaulin during transportation and will be kept at covered storage yard.
- Water sprinkling will be done for dust suppression.

To minimize the occupational health hazard, proper personal protective gears i.e. mask will be provided to the workers who are engaged in dust generation activity

Mitigation Measures for Noise Pollution during Construction Stage

During construction stage, expected noise levels will be in the range of (80-85dBA), which will decrease with increase in distance. Administrative as well as engineering control of noise will be implemented. Isolation of noise generation sources and temporal differentiation of noise generating activities will ensure minimum noise at receiver's end.

All the construction activities will be carried out during the daytime. To prevent any occupational health hazard, ear-muff / ear plug will be given to the workers working around or operating plant and machinery emitting high noise levels. Use of such plant or machinery will be strictly prohibited during night. Careful planning of machinery operation and scheduling of operations will be done to minimise such impact.

8.3 Are recycled materials used in roads and structures? State the extent of savings achieved?

The possibility of using recycled material such as fly ash has been proposed in construction of this project. If the recyclable material is readily available and if it is economically feasible it will be used for the construction of roads and structures. Waste from construction like excavated earth, iron rods etc shall be handed over to the authorized vendor for recycling.

8.4 Give details of the methods of collection, segregation & disposal of the garbage generated during the operation phases of the project.

The details of solid wastes collection recycle and disposal is given in the Table below.

Solid Wastes Collection, Recycle & Disposal

Nature and quantity	Organic waste: Waste vegetables and foods Inorganic waste: Papers, cartons, thermocol, plastics, polythene bags, glass etc.
Collection and disposal	The solid wastes generated will be segregated into organic and inorganic components and collected in separate bins. The organic biodegradable wastes (waste vegetables, foods etc.) will be transferred into a designated solid waste collection point for disposal by municipal authority.
Recycling	The inorganic wastes comprising recyclable materials, such as paper, plastic, glass etc., will be sold to prospective buyers.

9. ENERGY CONSERVATION

9.1 Give details of the power requirements, source of supply, backup source etc. What is the energy consumption assumed per square foot of built-up area? How have you tried to minimize energy consumption?

The details of power requirement, source, and power backup are given in the Table below.

Power Requirement, Source and Backup Arrangement

Power requirement	Commercial 200 KVA & Residential 160 KVA
Sources of power	from APCPDCL

Backup power supply arrangement	(Commercial 180 KVA & Residential 160 KVA DG set with acoustic enclosure and Synchronizing panel should be provided for load sharing and auto start facility).
Location of gensets	1st Basement

9.2 What type and capacity of, power back up do you plan to provide?

Details are given in point 9.1 above.

9.3 What are the characteristics of the glass you plan to use? Provide specifications of its characteristics related to both short wave and long wave radiation?

The project is a commercial project for which glass will be used only for windows. Therefore normal glass of 5mm thick will be used for windows and pin head 4mm thick glass for ventilators.

9.4 What passive solar architectural features are being used in the building? Illustrate the applications made in the proposed project.

No solar architecture systems will be used.

9.5 Does the layout of streets & buildings maximize the potential for solar energy devices? Have you considered the use of street lighting, emergency lighting and solar hot water systems for use in the building complex? Substantiate with details.

Solar street lighting and fencing is proposed.

9.6 Is shading effectively used to reduce cooling/heating loads? What principles have been used to maximize the shading of Walls on the East and the West and the Roof? How much energy saving has been effected?

Shading options wherever available will be used for energy saving.

9.7 Do the structures use energy-efficient space conditioning, lighting and mechanical systems? Provide technical details. Provide details of the transformers and motor efficiencies, lighting intensity and air-conditioning load assumptions? Are you using CFC and HCFC free chillers? Provide specifications.

Energy Efficient Features:

- Automatic capacitor control panel will be supplied separately for power factor correction to reduce maximum demand. APFC panel to maintain the power factor at 0.95.
- Harmonic Filters to reduce the Total harmonic Distortion in the System.
- Maximum utilization of natural light
- CFL & T-5 lighting fixtures in the common areas and Truelite fluorescent lamps in basements
- .Energy efficient HVAC systems to maintain indoor air quality
- Appropriate thermal insulation in walls and roofs to reduce heat gain and loss
- Glazing Glass: to keep the U value as per ECBC
- External glazing will be below 40% of the total vertical surface as per ECBC.

9.8 What are the likely effects of the building activity in altering the micro-climates? Provide a self assessment on the likely impacts of the proposed construction on creation of heat island & inversion effects?

The building will be constructed with environmental friendly designs that will control formulation of heat island effect. There will be also sufficient green cover at site to reduce formation of heat island. Passive design concepts have been used to minimize energy consumption and maximize the energy efficiency.

9.9 What are the thermal characteristics of the building envelope? (a) roof; (b) external walls; and (c) fenestration? Give details of the material used and the U-values or the R-values of the individual components.

The U-values of the roof, external wall and fenestration of the retail portion of the building will meet the requirements as specified in the Energy Conservation Building Code (ECBC).

S. No.	Component	Material Used	Permissible U-Value as per ECBC (W/m^2-°C)
1.	Roof	Concrete	0.409
2.	External Wall	Brick	0.44
3.	Fenestration	Glazing Facade	3.3

9.10 What precautions & safety measures are proposed against fire hazards? Furnish details of emergency plans.

Suitable fire fighting measures as required shall be provided in this project

9.11 If you are using glass as wall materials provide details and specifications including emissivity and thermal characteristics.

Glass will not be used as a wall material and will only be used in fenestration.

9.12 What is the rate of air infiltration into the building? Provide details of how you are mitigating the effects of infiltration.

Adequate provisions are provided to mitigate the effects of air infiltration.

9.13 To what extent the non-conventional energy technologies are utilized in the overall energy consumption? Provide details of the renewable energy technologies used.

There will be no usage of Non conventional technologies for the proposed project.

10. **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.

The Environment management plan is attached as **Annex 8**.