

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) REPORT



TARKESHWAR INDUSTRIAL AND LOGISTICS PARKS PRIVATE LIMITED

Client:

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LOGISTICS PARKS PRIVATE LIMITED**
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LIST OF ABBREVIATIONS

AAQ	Ambient Air Quality
APCD	Air Pollution Control Devices
CTE	Consent to Establish
CTO	Consent to Operate
CSR	Corporate Social Responsibility
DG	Diesel Generator
ETP	Effluent Treatment Plant
HIRARC	Hazard Identification, Risk Assessment and Risk Control
MEE	Multiple Effect Evaporator
NAAQ	National Ambient Air Quality
OWC	Organic Waste Convertor
RWH	Rainwater Harvesting
SPCB	State Pollution Control Board
STP	Sewage Treatment Plant
APPCB	Andhra Pradesh Pollution Control Board
TTRO	Tertiary Treated Reverse Osmosis
TSS	Total Suspended Solids
TSDF	Treatment, Storage & Disposal Facility

Acknowledgement

Green Envirocare Pvt. Ltd. was appointed to undertake Environmental Impact Assessment study which covers a wide range of technical disciplines and incorporates various environmental components viz. air, water, noise, land, water quality, hydrology, ecology & biological parameters, risk involved, socio economic study along with improvement and alternatives for mitigating the adverse impacts.

The site visit was done on 13th January 2023 by technical team of Green Envirocare for the unit located in Krishna District, Andhra Pradesh.

We would like to mention Mr. Gokul from TVS Industrial & Logistics Parks Private Limited and Mr. Kamalanathan, Deputy technical Manager, Poovarasam Chemist from laboratory were present during site visit and also in data collection.

About Green Envirocare

Green Envirocare Private Limited strives to be at the forefront in the field of Environmental Engineering delivering innovative and feasible solutions thereby setting up benchmark in the industry since 2019. We offer tailored and comprehensive solutions with our technical expertise for Industries & Infrastructural Projects in the area of EIA, Environmental Audit, Environmental monitoring, Ecology & Biodiversity Studies, SPCB Approvals, CRZ Clearances, Ground water NOCs from WRD, Geotechnical and Hydrogeological studies, Socio-economic assessment, water and wastewater engineering, Solid waste management and sustainability studies.

Environmental Impact Assessment (EIA) Team

The study is carried out by Dr. S. Nagarajan, Mrs. M. Vigneshwari, Mrs. D. Lavanya & Ms. A. Sherin.

The team has done extensive site study and prepared the EIA report based on a clear understanding of the project and the area surrounding the site. The report encompasses the detailed list of impacts that are anticipated to arise from the unit and measures adopted to mitigate the impacts and highlights the environmental management plan.

About Tarkeshwar Industrial and Logistics Parks Private Limited

Tarkeshwar Industrial and Logistics Parks Private Limited is wholly owned subsidiary of TVS Industrial & Logistics Parks Private Limited. It is literally redefining the definition of modern industrial parks in the country by building spaces for industrial manufacturing with advanced materials and systems. It has resulted in manufacturing companies with cutting-edge technology setting up their facilities in our parks. The companies also act as a fulcrum for the Make in India initiative.

A global rail equipment manufacturer is already operating out at Coimbatore industrial park. Another company is a pioneer in electric vehicles and has set up its facility in Hosur industrial park. A novel aerospace company involved in building small satellite launch vehicles and rockets has also started operating a facility out at Redhills industrial park, Chennai.

Today, industrial parks are reaching a whole new level by serving Rail, Road to Rocket makers.

Environmental, Health and Safety

Tarkeshwar Industrial and Logistics Parks Private Limited is committed towards assuring the environmental, health and safety (EHS) integrity of its processes, facilities, surrounding communities, and supply chain partners. To accomplish this goal, Tarkeshwar Industrial and Logistics Parks Private Limited will ensure that, internal and external, EHS practices are used that maintain all legal and regulatory compliance, while protecting the well-being of the work force and surrounding environment.

Tarkeshwar Industrial and Logistics Parks Private Limited strives for continuous improvement of EHS across its processes and takes EHS into consideration within business planning and all other aspects. Tarkeshwar Industrial and Logistics Parks Private Limited and its partners must provide systems and methods to improve EHS at all locations and facilities.

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Executive Summary >>

M/s. Tarkeshwar Industrial and Logistics Parks Private Limited proposes to establish a warehouse and light engineering unit at Gollagudem Village, Punadipadu Revenue Village, Kankipadu Mandal, Krishna District, Andhra Pradesh.

The proposed warehouse and light engineering unit is located in S. Nos.107/1A, 107/1B, 107/2, 108/2A2, 108/2B, 108/3, 108/4, 109/5, 109/6 of Gollagudem Village, Punadipadu Revenue Village, Kankipadu Mandal, Krishna District, Andhra Pradesh,

The plot area of the project is 51331.70 Sq.m and the built-up area of the unit is 28319.70 Sq.m.

Water & Wastewater:

The total quantity of fresh water will be procured through borewell. The domestic sewage of 22 kLD generated from the project will be treated using STP (50 kLD). The treated sewage will be used for flushing and gardening purpose within the project thereby no treated or untreated sewage is discharged outside the premises. The rooftop runoff of the project site will be collected and stored in the RWH sump/ pit (556 Cum) and the surface runoff will be recharged into the recharge pits.

Solid Waste Management:

The biodegradable waste of 100 kg/day will be managed through the OWC, which will be installed in the proposed project and the non- biodegradable waste 150 kg/day will be handed over to the authorized recyclers

Air Pollution Control Devices (APCD):

DG set of 125 kVA will be provided with stack for the proper dispersion of the plume.

Green Belt Development:

The proposed project site will be provided with 15% of the plot area as green belt area 530 Nos. of trees will be planted in the proposed site. Native and carbon sequestration trees will be planted which helps in mitigating the air pollution and also, it will attract the avifauna, thereby maintaining a balanced ecosystem.

1. Introduction»»

1.1 General

Development of building sector is a key component of economic development, employment and income for a country. The construction and real estate sector are the second largest employer after agriculture, and a vital sector to gauge economic activity. The economy relies on construction activities for progress and growth. Construction contributes to economic development of a country and to a particular region by satisfying some of the basic objectives of development including output generation, employment creation, and income generation and re-distribution. It also plays a major role in satisfying basic physical and social needs, including the production of shelter, infrastructure, and consumer goods.

An industrial shed is defined as an economical solution for housing and storing heavy machinery like mining plants. Such facilities include a plethora of features like open sides, tilt panels, and concrete flooring to ensure that your machinery is not only safe and shielded from the weather, giving it a long time.

Keeping in view the importance of development of industries for the economic growth, M/s. Tarkeshwar Industrial and Logistics Parks Private Limited has the distinction of implementing Industrial Sheds. But every aspect of construction has some measurable impact from the usage of raw materials, to the waste produced by the project and how it is disposed of is of major concern. However, it is very important to take initiative for Development projects to decrease the environmental impact of construction projects which harm the water, ground, and air.

EIA is an important tool for incorporating environmental concerns at the project level. The objective of EIA is to foresee and address potential environmental problems/concerns at an early stage of project planning and design. Early identification and characterization of critical environmental impacts allow the public and the government to form a view about the environmental acceptability of a proposed developmental project and what conditions should apply to mitigate or reduce those risks and impacts.

1.2 Identification of the Project

M/s. Tarkeshwar Industrial and Logistics Parks Private Limited proposes to construct the Warehouse and Light Engineering at Survey number 107/1A, 107/1B, 107/2, 108/2A2, 108/2B, 108/3, 108/4, 109/5, 109/6 of Gollagudem Village, Punadipadu Revenue Village, Kankipadu Mandal, Krishna District, Andhra Pradesh.

Table 1-1 Identification of the Project

S. No.	Description	Proposed Project
1.	Plot Area of the Project	51,331.70 Sq.m
2.	Built up area of the Project	28,319.70 Sq.m
3.	Brief Description of the project	The proposal involves construction of warehouse and light engineering unit with Built up area of 28,319.70 Sq.m.

1.3 Applicable Environmental Regulations

With respect to prevention and control of environmental pollution, the proposed project is governed by the following Acts and Rules.

Table 1-2 Environmental Regulations

S.No.	Legislation	Areas/Activities covered
1.	Environmental (Protection) Act, 1986 with Rules	Overall Environment protection compliance to environmental (air, water, noise) standards issued under EPR.
2.	Air (Prevention and Control of Pollution) Act, 1981 with rules	Protection of air quality. Obtaining Consent to Establish (CTE) for establishing and Consent to operate (CTO) from SPCB for activities causing air pollution.
3.	Water (Prevention and Control of Pollution) Act 1974	Prevention & control of water pollution and enhancing water quality. Obtaining Consent to Establish (CTE) for establishing and Consent to operate (CTO) for activities causing water pollution
4.	Water Cess Act, 1977	Paying water cess to Pollution Control Board for sourcing of domestic water

5.	Noise Pollution (Regulation and Control Rules 2000 and its subsequent amendment on 2017	Compliance with ambient noise standards in accordance to land use of the area
6.	Hazardous Waste (Management, Handling and Tran boundary Movement Rules, 2016 (as amended)	Obtaining Authorization from SPCB for handling and storing of hazardous waste like waste oil and lubricants Following guidelines for handling and storing of such hazardous waste
7.	Manufacture, Storage and Import of Hazardous Chemicals Rules, 2000 (as amended)	Notifying regulatory authority (in this case, the State Factories Inspectorate) of storage of hazardous substances like HSD Following guidelines on activities such as storage, maintaining updated MSDS, submission of annual Safety Report to authority. Preparation of Onsite Emergency Plan.
8.	E-waste (Management) Rules, 2016 and its subsequent amendment on 2018	To regulate environmentally sound management of waste generated from electrical and electronic equipments etc.,
9.	Motor Vehicles Act with Rules	Lay down restriction for vehicles those are not having pollution under control certificate (PUCC) or proper labeling to enter premises
10.	Petroleum Act with Rules, 2018	Comply with guidance and safety measures for storage and transportation of petroleum within project premises
11.	Municipal Solid Waste Rules, 2016	Management (collection, handling, intermediate storage) of domestic waste from residences
12.	National Building Code of India, 2016	Provision to ensure safety and general welfare
13.	State Town Planning Acts	Development of project in accordance with land use and master plans

14.	State Ground Water Regulation	Strictly monitoring to restriction for drawing of ground water. Arrange for recharge through rainwater harvesting schemes (as applicable)
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1.4 Generic Structure of EIA Report

Chapter 1: Introduction

This chapter contains the general information on the building sector, major sources of Environmental impact in respect of building, construction, townships and area development Projects.

Chapter 2: Project Description

This chapter furnishes detailed description of the proposed project, such as the type of the project, need for the project, project location, land availability, utilities (power and water supply) and infrastructure facilities such as roads and other requirements. The project implementation schedule, estimated cost of development should also be included.

Chapter 3: Description of the Environment

This chapter covers baseline data in the project area and study area.

Chapter 4: Impact Analysis and Mitigation Measures

This chapter describes the anticipated impact on the environment and mitigation measures. The method of assessment of impact including studies carried out, modelling techniques adopted to assess the impact where pertinent should be elaborated in this chapter. It gives the details of the impact on the baseline parameters, both during the construction and operational phases and suggests the mitigation measures to be implemented by the proponent.

Chapter 5: Analysis of Alternatives (Technology and Site)

This chapter includes the options, details of the alternatives of materials that are to be used inbuilding construction and the energy conservation methods to be adopted. The various details regarding the transportation sector, road connectivity, link facilities, parking details etc. are to be discussed in this chapter.

Chapter 6: Environmental Monitoring Program

This chapter covers the planned environmental monitoring program. It also includes the technical aspects of monitoring the effectiveness of mitigation measures.

Chapter 7: Additional Studies

This chapter covers the details of the additional studies required and which are necessary to cater to more specific issues applicable to the particular project.

Chapter 8: Project Benefits

This chapter covers the benefits accruing to the locality, neighborhood, region and nation as a whole. It brings out the details of benefits by way of improvements in the physical infrastructure, social infrastructure, employment potential and other tangible benefits.

Chapter 9: Environmental Management Plan

This chapter comprehensively present the Environmental Management Plan (EMP), which includes the administrative and technical setup, summary matrix of EMP, the cost involved to implement the EMP, both during the construction and operational phase and provisions made towards the same in the cost estimates of project construction and operation. This chapter also describes the proposed post-monitoring scheme as well as inter-organizational arrangements for effective implementation of the mitigation measures.

Chapter 10: Summary and Conclusions

This chapter gives the summary of the full EIA report. It also provides the overall justification for implementation of the project and explains how the adverse effects have been mitigated.

2 Project Description

2.1 Site Location

The proposed warehouse and light engineering unit is located in S. Nos.107/1A, 107/1B, 107/2, 108/2A2, 108/2B, 108/3, 108/4, 109/5, 109/6 of Gollagudem Village, Punadipadu Revenue Village, Kankipadu Mandal, Krishna District, Andhra Pradesh.

Latitude: 16.450976 & **Longitude:** 80.785664

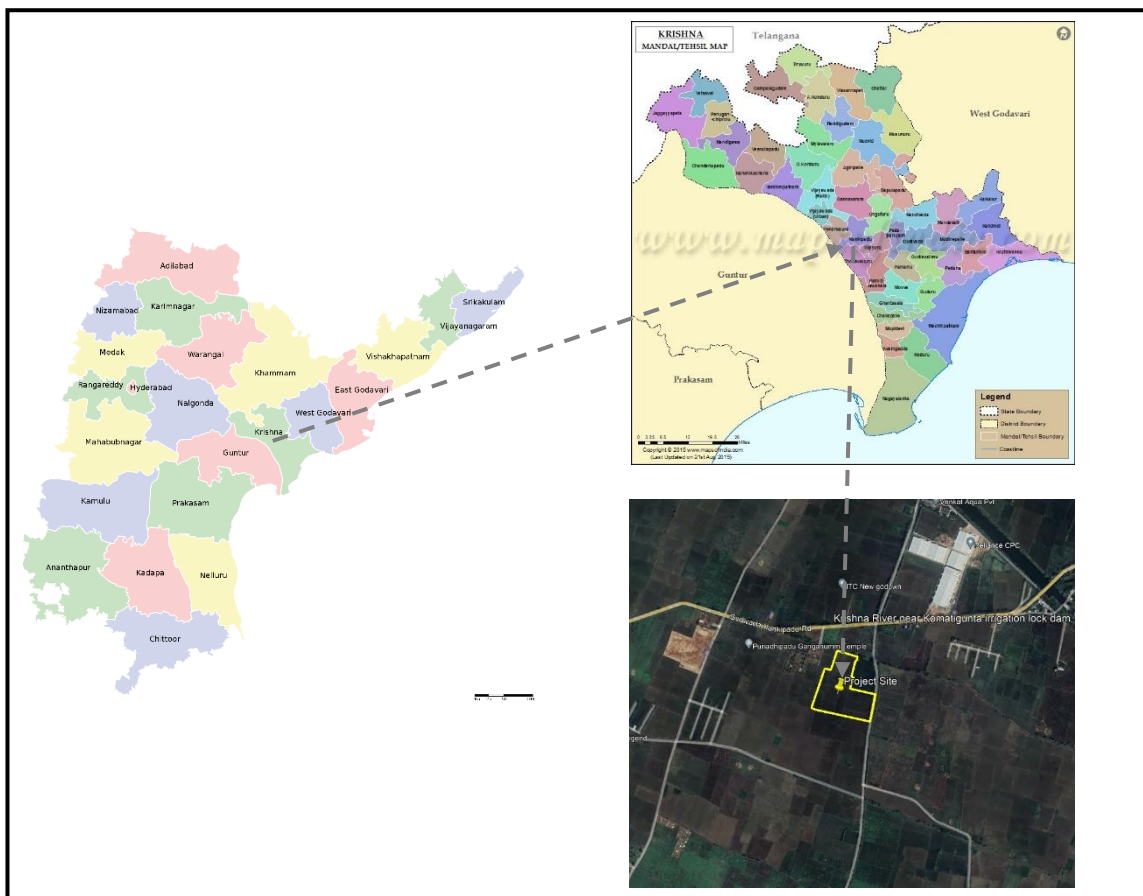


Figure 2-1 Site Location

The geographical coordinates of the unit are shown below



Source: Google Earth

Figure 2-2 Geographical Coordinates of the unit



Figure 2-3 Site Photographs (Taken on 13.01.2023)

2.2 Salient features of the unit

The site plan showing STP, scrap yard, security room, and rain water harvesting sump is shown below.

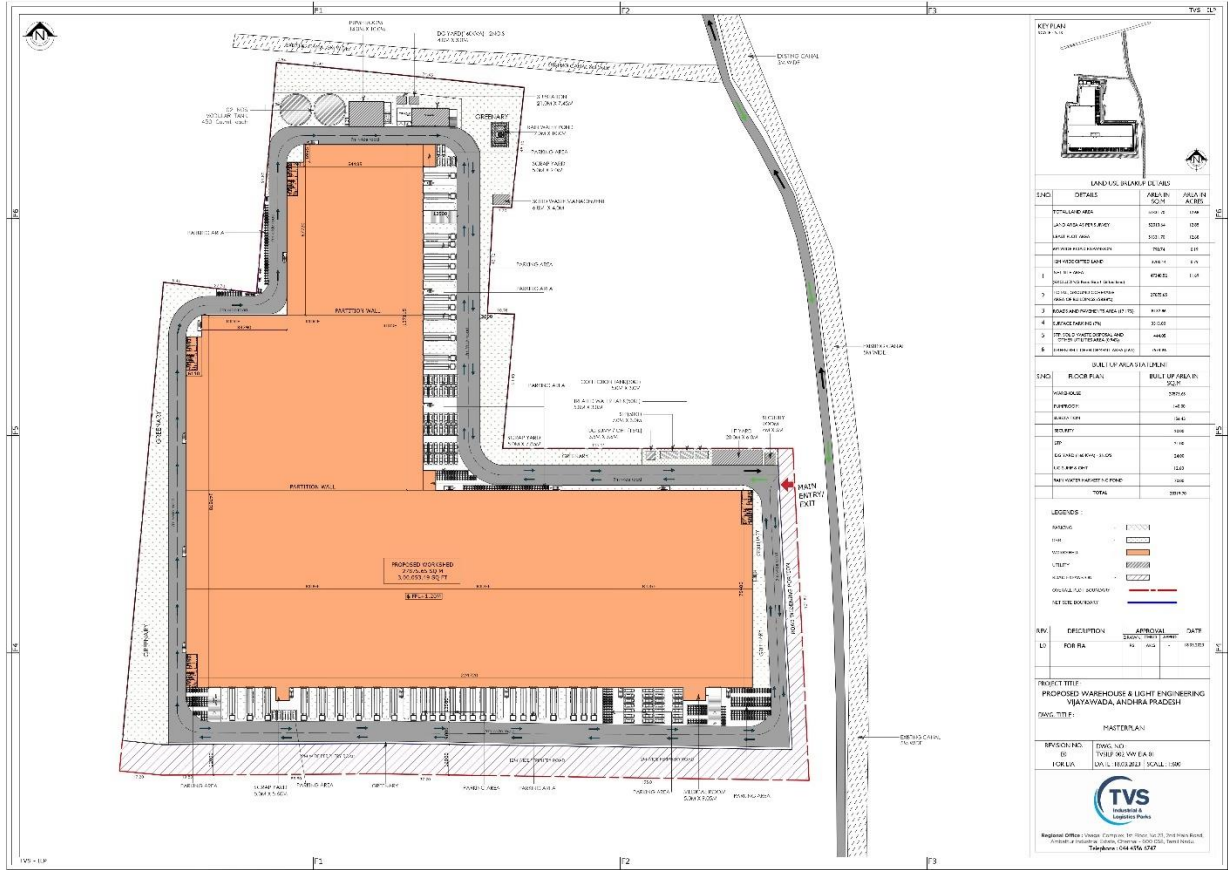


Figure 2-4 Site plan of the project

Google Images showing 5 km and 10km radius around the unit is given below

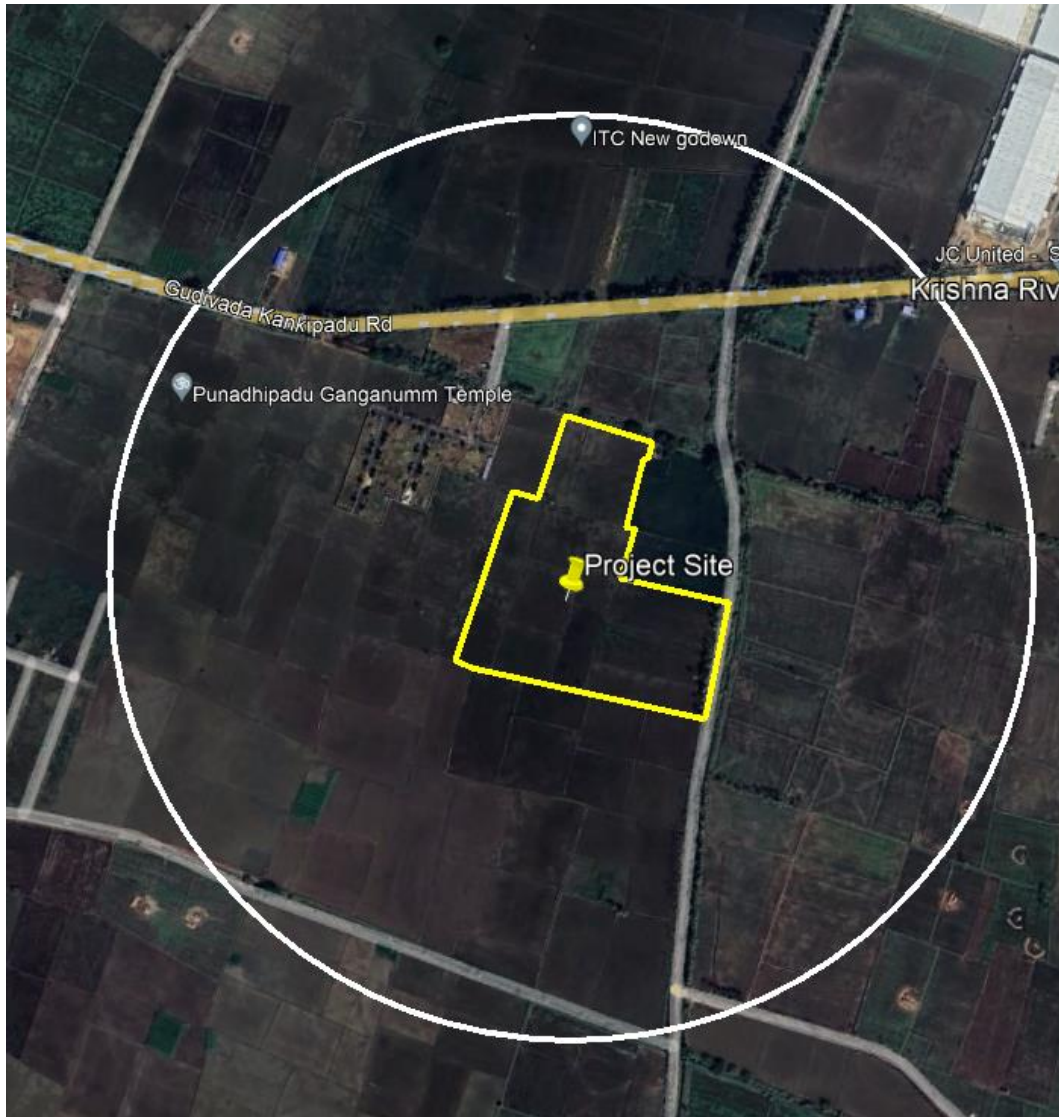


Figure 2-5 5 km Radius around the project site

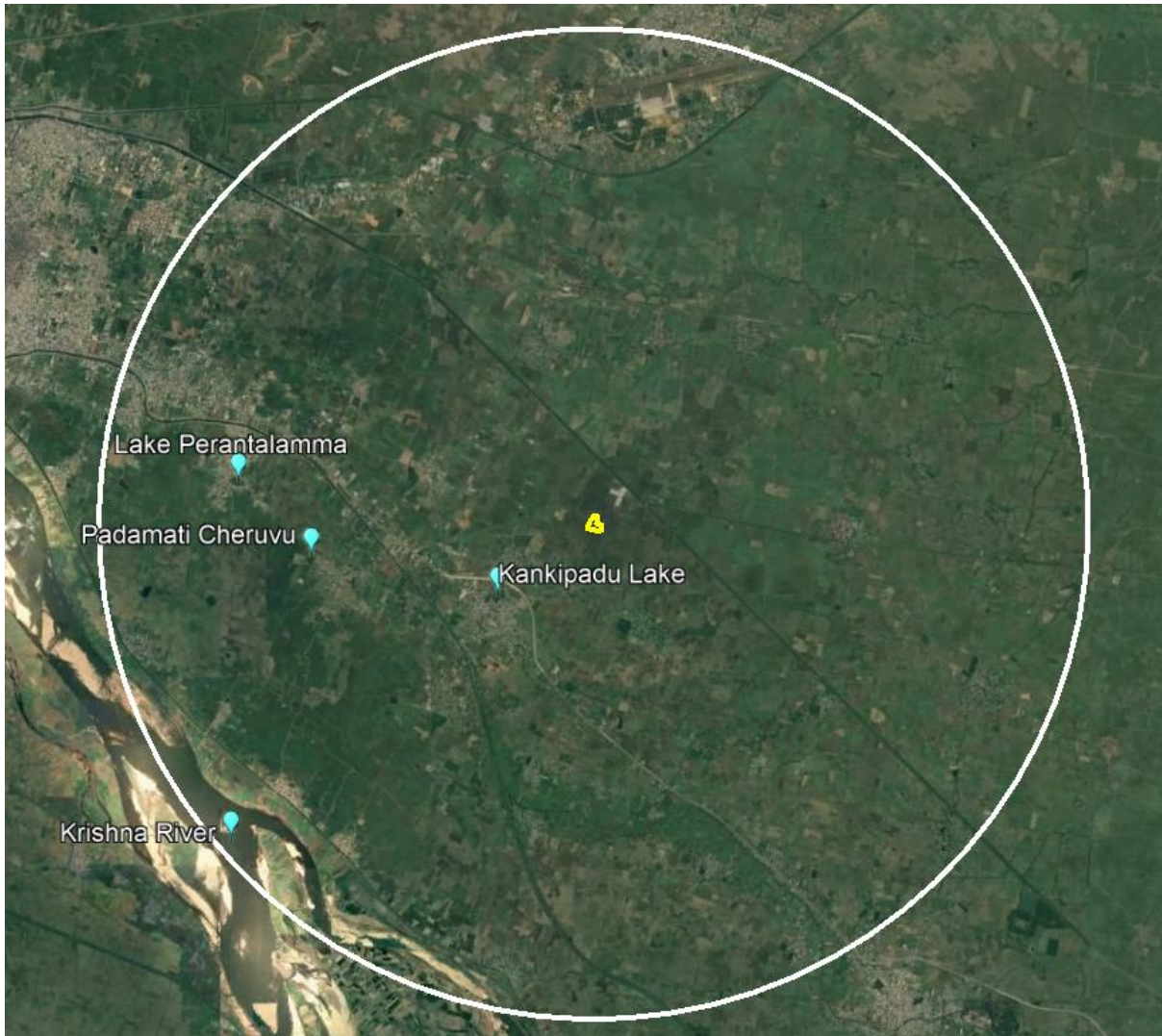
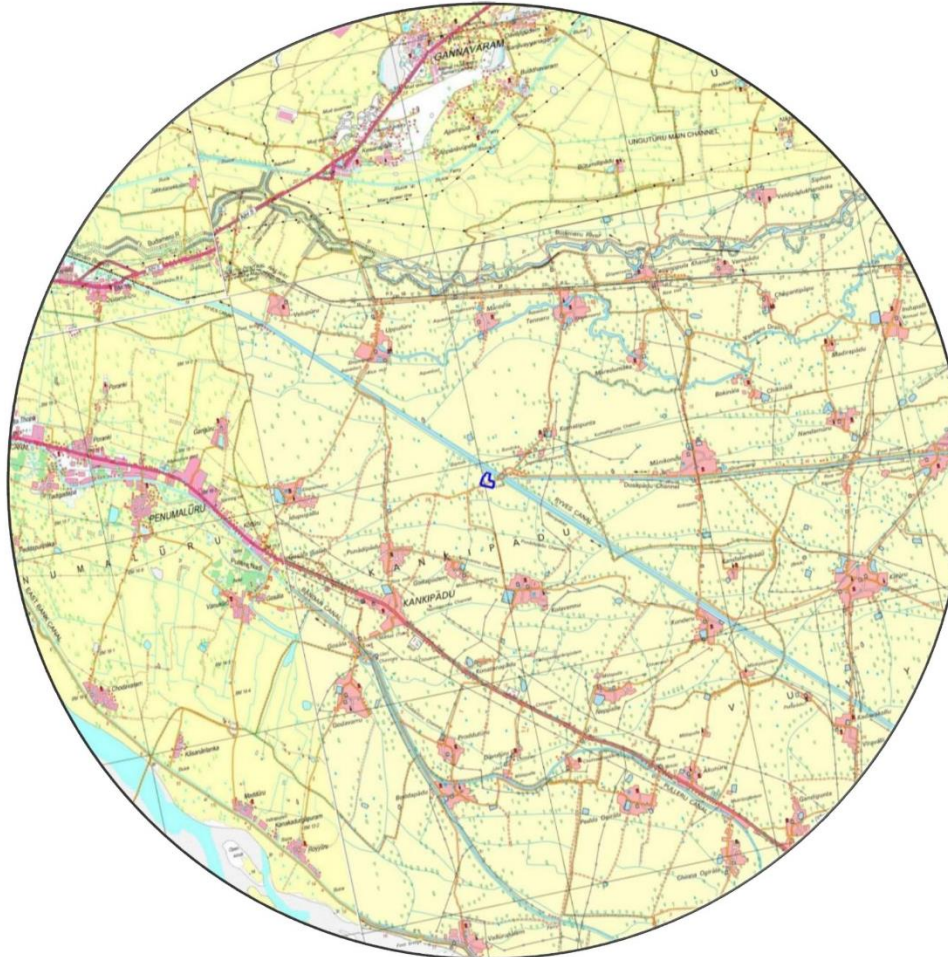


Figure 2-6 10 km Radius around the project site

SITE LOCATION WITH 10 KM RADIUS ON TOPOGRAPHICAL MAP



Project Name
 Proposed Warehouse &
 Light Engineering ,
 Vijayawada, Andhra
 Pradesh.

Source Extraction from :
 E44U10_65D10,D11,D14,D15

Conventional Symbols

Express highway; with toll; with bridge; with distance stone				
Roads, installed according to importance				
Roads, double carriageway according to importance				
Unmetalled road, Cart-track, Pack-track with pass, Foot-path				
Streams: with track in bed; undefined; Canal				
Dams: masonry or rock-filled; earthwork; Weir				
River: dry with water channel; with island & rocks; Tidal river				
Submerged rocks, Shoal, Swamp, Rocks				
Wells: lined; unlined; Tube-well; Spring; Tank; perennial; dry				
Embarkments: road or rail; tank; Broken ground				
Railways, broad gauge: double; single with station; under constr.				
Railways, other gauge: double; single with distance stone; do				
Miscellaneous line or tramway. Kin. Cutting with tunnel				
Contours with sub-features: Rocky slopes, Cliffs				
Sand features: (Wind-blown-hills (permanant), (Cliffless) (shifting))				
Towns or Villages: inhabited; deserted; Fort				
Huts: permanent; temporary; Tower; Antiquities				
Temples: Chhatri, Church, Mosque, Sighi, Tomb, Graves				
Lighthouses, Lightship, Buoy; lighted; unlighted; Anchorage				
Mine: Vise on mells; Grass, Scrub				
Palms; palmyra; other; Plantain, Coffer, Bamboo, Other trees				
Areas: cultivated; wooded; Surveyed tree				
Boundary, international				
- state; demarcated; undemarcated				
- district; subdivision, taluk or taluk; forest				
Boundary pillars: surveyed; unlocated; village junction				
Heights, triangulated: station; point; approximate				
Bench-mark: geodetic; tertiary; canal				
Post office, Telegraph office, Overhead tank				
Rest house or inspection bungalow; Circuit house, Police station				
Campship ground; Forest: reserved; protected				
Spaced names: administrative; locality or tribal				
Hospital, Dispensary, Veterinary; Hospital / Dispensary				
Aerodrome, Helipad, Tourist site				
Power line: with pylons surveyed; with poles unsurveyed				

Figure 2-7 Topographical map

The salient features of the unit are listed below

Table 2-1 Salient features of the unit

Particulars	Details	
Location	S. Nos.107/1A, 107/1B, 107/2, 108/2A2, 108/2B, 108/3, 108/4, 109/5, 109/6 of Gollagudem Village, Punadipadu Revenue Village, Kankipadu Mandal, Krishna District, Andhra Pradesh	
Geographical Coordinates	16.452782°	80.785668°
	16.452526°	80.786546°
	16.452375°	80.786508°
	16.452353°	80.786455°
	16.451698°	80.786283°
	16.451681°	80.786372°
	16.451202°	80.786226°
	16.450956°	80.787320°
	16.449830°	80.787086°
	16.450329°	80.784725°
	16.450402°	80.784551°
	16.452038°	80.785133°
	16.451977°	80.785393°
Total Plot Area	51,331.70 Sq.m	
Built up area	28,319.70 Sq.m	
Elevation above msl	13m	
Nearest Water Bodies within 10km radius	Kankipadu Lake, Padamati Cheruvu, Lake Perantamma and River Krishna	
Reserve Forest within 10km radius	NIL	
Eco Sensitive Area within 10km radius	NIL	
Nearest Highway	SH 243 (Gudivada Kankipadu Road)	
Nearest Town	Komatigunta (0.89km, NE)	
Nearest Railway Station	Uppaluru (4.55 km, N)	
Nearest Airport	Vijayawada International Airport (7.85km, N)	
Nearest Schools/Colleges	<ul style="list-style-type: none"> Zila Parishad High School (1.77km, S) 	

	<ul style="list-style-type: none"> • MPPS (1.26km, S) • ZP High School (2.49 km, S) • HMK School (3.79 km) • Sri Vidyalaya Olympiad School (3.74 km, SW) • Sri Chaitanya School (2.50km, SW)
Nearest Hospitals	<ul style="list-style-type: none"> • Sri Lakshmi Hospitals (2.43 km, S) • Sri Chinmaya Hospital (2.68 km, S) • Dr. Gopalachari Hospital (2.59 km, S)
Source of power	Andhra Pradesh State Power Distribution Corporation Limited – APSPDCL
Power Backup	DG Sets – 125 kVA (1No.)
Fresh Water Requirement	15 KLD
Water Source	Borewell
Occupancy Load	500
Project cost	Rs. 52,46,46,621.
Parking facilities	Surface parking area of 3313.00 sq.m. No. of Cars -144, No. of Bikes – 205 No. of Lorries – 31

2.3 Area Statement

The total plot area of the proposed project is 51,331.70 Sq.m. The land use breakup is listed below.

Table 2-2 Land use Breakup

S. No.	Description	Area (in Sq. m.)	Area (in %)
1.	Ground coverage	27875.65	54.3
2.	Green Belt area	7574.96	15
3.	Road and pavements	8132.86	15.8
4.	Surface parking	3313.00	6
5.	STP, solid waste disposal and other utilities area	444.05	0.9
6.	Road Expansion	790.74	1.54
7.	Gifted land	3200.44	6.23
Total		51331.70	100

2.4 Built-up area Statement

The Built-up area statement is detailed below

Table 2-3 Built up Area Summary

S. No.	Description	Built up Area (in Sq.m.)
1.	Warehouse Building	27875.65
2.	Pump room	140.00
3.	Substation	156.45
4.	Security Room	20.00
5.	STP	21.00
6.	DG Yard (125 KVA)- 1 No.	24.00
7.	UG Sump & OHT	12.60
8.	Rainwater Harvesting Sump/ Pit	70.00
Total		28319.70

2.5 Occupancy details

Table 2-4 Occupancy Load Details

Project Components	Occupancy Load
Warehouse	500 Nos.

2.6 Project Cost

2.7 The project cost estimated for the proposed project is Rs. 52,46,46,621.

2.8 Project requirements during Construction phase

2.8.1 Construction equipments

The equipments used for the construction is listed below

Table 2-5 Equipments used for the Construction

S. No.	List of Equipments & Machineries	Quantity
1.	Excavators	2
2.	Backhoe	2
3.	Bulldozers	2
4.	Wheel Tractor Scraper	2
5.	Loaders	2
6.	Compactors	2

7.	Graders	2
8.	Trenchers	2
9.	Drill rigs	3
10.	Mixers	1

2.8.2 Population details

The total occupancy load during the construction phase is estimated to be 150 persons.

2.8.3 Raw Materials

The raw materials which are required for the construction is summarized below.

Table 2-6 Raw Materials

S. No.	Raw Material	Units	Nos.
1.	Cement	Bag	106652
2.	Sand	Cft	365664
3.	Aggregates	Cft	213304
4.	Steel	Kg	1218880
5.	Bricks	Pcs	5484959

2.8.4 Water requirement Calculation

The water requirement calculation for the domestic purpose of the construction workers is listed below.

Table 2-7 Water Requirement Calculation (During Construction Phase)

Project Components	Water consumption (lpd)	Wastewater generation (lpd)
Construction Employees (150 worker x 45 lpcd)	6750	6075
Dust Suppression	4000	--
Curing	3000	--

Source: The per capita basis is calculated based on National Building Code, 2016, Volume II –

2.8.5 Solid waste Calculation

Two types of waste will be generated during Construction Phase viz. Construction waste and Domestic waste. Construction will comprise of excavated materials, used bags, bricks, concrete, MS rods, tiles, wood etc.

Table 2-8 Types of waste

S. No.	Solid waste	Solid waste Management
1.	Waste materials like MS Rods, bricks, concrete, broken tiles, wood pieces, cement bags etc.	Material would be segregated. Recyclable material will be sold to authorize dealers. Rest will be used within project site for filling & leveling purpose. Remaining will be sent for disposal through government authorized vendors. Cement bags will be used for road making.
2.	Excavated Soil	Top soil will be stored in covered areas and will be later used for landscaping purpose. Remaining soil will be used for back filling & leveling of site. Un-used soil will be disposed off to designated side through authorized vendors on payment basis.

The domestic waste generated from the labour camp will comprise of both biodegradable and non-biodegradable. The quantification, composition and management of the waste is listed below.

Quantification of Solid waste generated:

Table 2-9 Quantification of Solid waste generated (During Construction Phase)

S. No.	Project Components	Occupancy load (Nos.)	Per Capita generation (kg)	Total waste generation (Kg/day)
1	Construction Labours	150	0.5	75
Total Waste Generation in Kg/day				75

Source: As per Central Public Health and Environmental Engineering Organization (CPHEEO), Per capita waste generation for Construction Labors is 0.5 kg / capita / day.

2.9 Project requirements during Operation phase

2.9.1 Occupancy Load Calculation

The total occupancy load during the operation phase is estimated to be 500 persons.

2.9.2 Water requirement

Total water requirement estimated during the operation phase will be 23 KLD and daily fresh water requirement for domestic use will be 15 KLD.

Table 2-10 Water Requirement Calculation (During Operation Phase)

Project component	Total Occupancy (Nos.)	Water Requirement for Non Flushing @ (LPCD)	Water requirement for Flushing @ (LPCD)	Total water Requirement (litres.)
Employees	500	30 LPCD	15 LPCD	22500
		15000 Say 15 KLD	7500 Say 8 KLD	Say 23 KLD

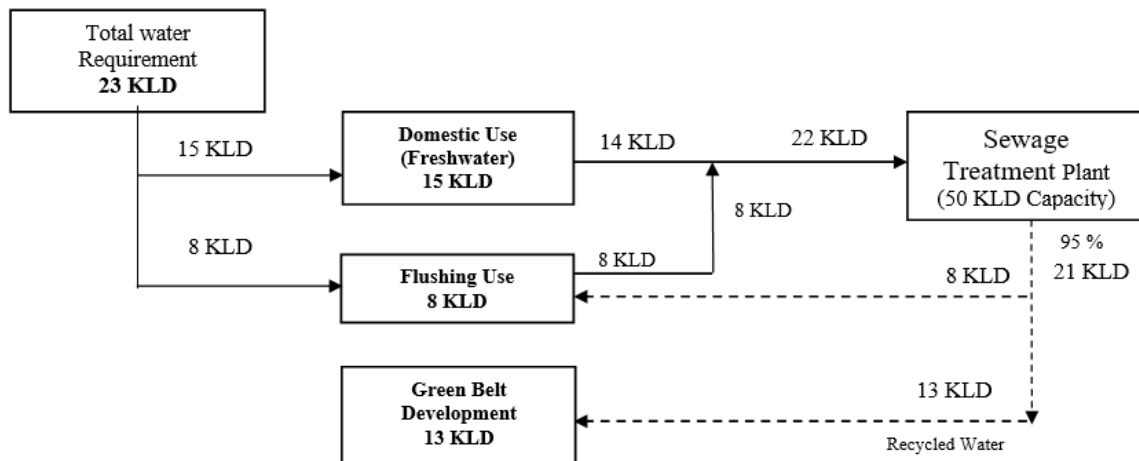


Figure 2-8 Water Balance Chart (Operation Phase)

2.9.3 Municipal solid waste generation

Quantity of solid waste to be generated from the proposed project is given below:

Table 2-11 Solid waste calculation (During Operation Phase)

S. No.	Project Components	Occupancy load (Nos.)	Per Capita generation (kg)	Total solid Waste generation (Kg/day)
1	Ware house	500	0.5	250
2	STP Sludge			2.8
Total Waste Generation in Kg/day				257.8

Solid waste Management:**Table 2-12 Composition & Management of Solid waste generated**

S. No.	Description	Quantity (kg/day)	Per Capita generation Total solid Waste generation Kg/day
1	Biodegradable waste	100	Will be treated in OWC.
2	Non-Biodegradable waste	150	Handed over to authorized recyclers or local bodies for recycling
3	STP sludge	2.8	Will be dried and used as manure for greenbelt development

2.10 Green Belt Development

The landscape of project site has been planned to provide a clean, healthy and beautiful green environment in the area of 7574.96 sq.m. for the people. The planting arrangement will be based on the optimal use of available land. The tree plantation (large size species) will 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. Also, local and fast-growing species will be planted for control of pollution and aesthetic view. Total of 530 Nos. of trees will be planted in the proposed project site.

Table 2-13 Proposed Tree Plantation

S. No.	Tree species	Common name	No. of trees	Environmental Significance
1	<i>Azadirachta indica</i>	Neem	81	Roots of Neem purifies water inside soil, Noise Reduction

2	<i>Ficus religiosa</i>	ArasaMaram	60	Tolerant to dust and smoke
3	<i>Pongamia pinata</i>	Pungam	78	Greater canopy making to trap pollutants to a greater level
4	<i>Bauhinia purpurea</i>	Mantharai	85	Holds medicinal values
5	<i>Syzygiumcumini</i>	Naval	99	Dust Tolerant
6	<i>Mimusopselengi</i>	Magilam	54	Holds medicinal values
7	<i>Thespesia populnea</i>	Poovarasa Maram	73	Captures high amount of dust compared to other plants

2.11 Rainwater Harvesting

The annual recorded rainfall in the district of Krishna is 1070.54 mm.

Table 2-14 Rainwater Calculation

S. No.	Description	Area in Sq.m	Coefficient of Runoff	Annual Rainfall in mm	Rainwater Runoff in Cum
1	Roof area	27875.65	0.9	1070.54	26857.80
2	Road area	8132.86	0.75	1070.54	6529.92
3	Green area	7574.96	0.1	1070.54	810.930
Total Annual Run-off					34198.64
Considering Rainy 50 days per Annum, per day rainwater runoff will be					684
Rain water collection Sump/pit proposed for storing 100% of the roof area with the capacity.					537
Run off to recharge pit					146
Size of RWH Pit (1.3m x 1.3m x 1.4m)					2.366 mm ²
No. of Pits Proposed					62 Nos.

The total runoff for the project area is 34,198.64 cumec. By considering the no. of rainy days as 50 throughout the year. Hence 62 Nos. of RWH pits having the dimension of (1.3m x 1.3m x 1.4m) will be provided.

- Estimated runoff from project site = 684 Cum (per day maximum rain poured = 3 hrs) = 0.06 Cu.m/sec
- Cross section of the storm water trench = 0.6 m x 1 m = 0.6 Sq.m.

(The trench may be 0.5 to 1.0 m wide 1 to 1.5 m deep - Ref. Chapter 5, Re-Charge Structure and Its design, Pg. no. 23, in Rain Water Harvesting and Conservation Manual by CPWD, GOI)

$$Q = A \times V$$

Q = Discharge in Cu.m/sec; A = Area in Sq.m; V = Velocity in m/sec

$$V = \frac{1}{n} \times R^{2/3} \times S^{1/2}$$

n = Manning's Coefficient (For concrete finished surface = 0.013)

R = Hydraulic Radius in m ($R = A/P$, where P = Wetted Perimeter in m)

S = Channel slope in m/m

For the proposed development,

$$n = 0.013$$

$$A = 0.6 \text{ Sq.m. (wide } 0.6 \text{ m x } 1 \text{ m deep)}$$

$$P = 0.6 + (2 \times 1) = 2.6$$

$$R = A/P = 0.230$$

$$S = 1/350 = 0.003$$

On calculating, $V = 1.50 \text{ m/sec}$

$$\text{Hence, } Q = 0.6 \times 1.50 = 0.9 \text{ cum/sec}$$

Thus, the proposed internal storm water trench is adequate to handle the runoff from the project site.

Details of Recharge Trenches: Trench will be maintained all along the boundary, the depth of the trenches will be around 1 m. It is planned to remove the entire impervious layer to facilitate rain water recharge. The width of the proposed trenches is 0.6 m. Pebbles of different size will be provided in an ascending order in the tank and a layer of sand will be provided on top of the filter media. The rain water flowing through the open land and paved area will be used for recharging of ground water through the above said trenches.

3 Description of the Environment

3.1 Environmental Impact assessment Introduction

Baseline data is a tool basis for identification, prediction and evaluation of impacts in the proposed project. Through field study, baseline data are collected considering various factors of the project. This includes,

- Physical- the area, the soil properties, the geological characteristics, the topography, etc.
- Chemical- water, air, noise and soil pollution levels, etc.
- Biological- the biodiversity of the area, types of flora and fauna, species richness, species distribution, types of ecosystems, presence or absence of endangered species and/or sensitive ecosystems etc.
- Socioeconomic- demography, social structure, economic conditions, developmental capabilities, displacement of locals, etc.

The main objectives are:

- To assess the environmental quality, which is prevailing now and to compare the same after the development of the proposed project.
- A study area of 10 km radius from the project site is considered. All the monitoring works are done as per the CPCB Guidelines.

Methodology adopted:

The project site is considered as core zone and 10 km radius around the project site is designated as buffer zone.

Instruments Used

The following instruments were used at the site for baseline data collection.

1. Respirable Dust Sampler with attachment for gaseous Pollutants, Envirotech APM 460, APM411.
2. Fine Particulate Matter (FPM) Sampler, APM 550
3. Sound Level Meter.

3.2 Baseline Data Collection Period:

The baseline data is collected in accordance with the CPCB Guidelines. The Baseline study is carried out as One- time sampling in January 2023.

3.2.1 Frequency of Monitoring

Table 3-1 Frequency of Sampling and Analysis

S. No.	Description	Frequency of Sampling and Analysis
1.	Ambient Air Quality: PM ₁₀ , PM _{2.5} , SO ₂ , NO _x , NH ₃ , O ₃ , CO, Lead, Benzene, Arsenic, Nickel and Benzo(a) Pyrene	One-time sampling
2.	Ambient Noise Level	One-time sampling
3.	Soil Quality: Organic matter, Texture, pH, Electrical conductivity, Permeability Water holding capacity, porosity	One-time sampling
4.	Ground & Surface Water Quality: Colour, odour, pH, temperature, turbidity, magnesium, total alkalinity, chloride, sulphate, calcium, fluoride, sodium, salinity, DO, Heavy metals, Total coliforms, faecal coliforms	Set of grab samples for Ground & Surface Water (One-time sampling)

3.2.2 Secondary Data Collection

Apart from the primary data, Secondary data is also used for the collection; collation; synthesis and interpretation. The secondary data collected are given below.

- Flora & Faunal Study
- Land use study
- Demography and socio-economic analysis
- Meteorological data, from Indian Meteorological Department (IMD)

3.2.3 Study Area Details

Table 3-2 Study area details

S. No.	Description	Details	Source																																										
1.	Project Location	S.Nos.107/1A,107/1B,107/2,108/2A2, 108/2B,108/3,108/4,109/5,109/6 of Gollagudem Village, Punadipadu Revenue Village, Kankipadu Mandal, Krishna District, Andhra Pradesh.	Field Study																																										
2.	Latitude & Longitude	<table border="1"> <thead> <tr> <th>S. No.</th> <th colspan="2">Coordinates</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>16.452782°</td> <td>80.785668°</td> </tr> <tr> <td>2.</td> <td>16.452526°</td> <td>80.786546°</td> </tr> <tr> <td>3.</td> <td>16.452375°</td> <td>80.786508°</td> </tr> <tr> <td>4.</td> <td>16.452353°</td> <td>80.786455°</td> </tr> <tr> <td>5.</td> <td>16.451698°</td> <td>80.786283°</td> </tr> <tr> <td>6.</td> <td>16.451681°</td> <td>80.786372°</td> </tr> <tr> <td>7.</td> <td>16.451202°</td> <td>80.786226°</td> </tr> <tr> <td>8.</td> <td>16.450956°</td> <td>80.787320°</td> </tr> <tr> <td>9.</td> <td>16.449830°</td> <td>80.787086°</td> </tr> <tr> <td>10.</td> <td>16.450329°</td> <td>80.784725°</td> </tr> <tr> <td>11.</td> <td>16.450402°</td> <td>80.784551°</td> </tr> <tr> <td>12.</td> <td>16.452038°</td> <td>80.785133°</td> </tr> <tr> <td>13.</td> <td>16.451977°</td> <td>80.785393°</td> </tr> </tbody> </table>	S. No.	Coordinates		1.	16.452782°	80.785668°	2.	16.452526°	80.786546°	3.	16.452375°	80.786508°	4.	16.452353°	80.786455°	5.	16.451698°	80.786283°	6.	16.451681°	80.786372°	7.	16.451202°	80.786226°	8.	16.450956°	80.787320°	9.	16.449830°	80.787086°	10.	16.450329°	80.784725°	11.	16.450402°	80.784551°	12.	16.452038°	80.785133°	13.	16.451977°	80.785393°	Google Earth
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13.	16.451977°	80.785393°																																											
3.	Topo Sheet No.	E44U10-65D10, D11, D14, D15	Survey of India Toposheet																																										
4.	Total Plot Area	51331.70 Sq.m	--																																										
Demography in the study area (as per Census 2011)																																													
5.	Total Population	7234	Census Survey of India																																										
6.	Total Number of Households	1705																																											
7.	Maximum Temperature (°C)	33.7	IMD																																										
8.	Minimum Temperature (°C)	21.2																																											

9.	Ecological Sensitive Areas - Wetlands, watercourses or other waterbodies, coastal zone, biospheres, mountains, forests	Krishna River – 8.5 km (SW)	Survey of India Toposheet
10.	Densely Populated area	Komatigunta (0.89km, NE)	
11.	Areas occupied by sensitive man-made land uses (hospitals, schools, places of worship, community facilities)	<ul style="list-style-type: none"> • Zila Parishad High School (1.77km, S), • MPPS (1.26km, S), • ZP High School (2.49 km, S), • HMK School (3.79 km), • Sri Vidyalaya Olympiad School (3.74 km, SW), • Sri Chaitanya School (2.50km, SW) • Sri Lakshmi Hospitals (2.43 km, S), Sri Chinmaya Hospital (2.68 km, S), Dr. Gopalachari Hospital (2.59 km, S) 	Google Earth/ Field study

3.2.4 Site Connectivity



Figure 3-1 Site Connectivity

The site is connected to SH 243 Gudivada Kankipadu Road (0.30 km, North), Vijayawada Gudivada Road (1.56 km, West) & Zilla Parishad Road (1.40 km, South). The nearest railway station is Tenneru railway station is located at a distance of 5.21 km from the site in North East direction and the Vijayawada international airport is located at a distance of 9.15 km from the site in North direction. The project site is well connected to roads for easy approach.

3.3 Description of the Land Use/ Land cover classes

The Land Use & Land Cover around 10 km radius from the unit is shown below.

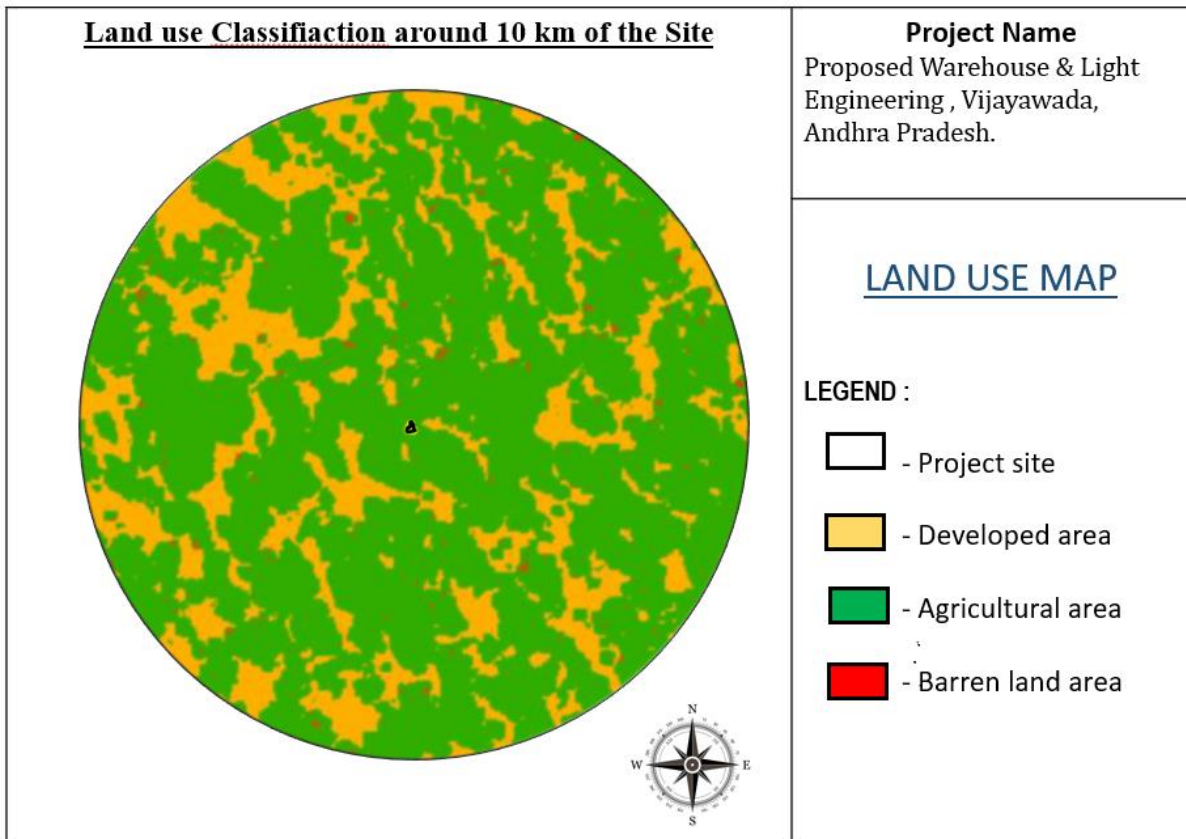


Figure 3-2 Land use classification

3.4 Water Environment

3.4.1 Contour & Drainage

The project site is 13 m AMSL. The drainage pattern within in the 10 km of the project site is sub-dendritic.

The Krishna is the major river which drains the district, it is perennial in nature and flows along the western boundary of the district. South of Avanigadda the river bifurcates into four branches before it debouches into the Bay of Bengal. The other important rivers flowing in the district are Muniyeru, Tammileru and Budameru. The general drainage pattern is dendritic to sub-dendritic. The drainage density is high in consolidated formations, low in semi-consolidated formations, whereas in alluvial areas the density is meager. Kolleru lake is located between Krishna and Godavari delta and spans into two districts - Krishna and West Godavari. It is the largest freshwater lake in Asia. The lake serves as a natural flood-balancing reservoir for these two rivers. The lake is fed directly by water from the seasonal Budameru and Tammileru rivers and is connected to the Krishna and Godavari systems by over 68 inflowing drains and channels. The lake is an important habitat for an estimated 20 million resident and migratory birds. It is known the world over for the famous Kolleru Bird Sanctuary

Source: http://cgwb.gov.in/District_Profile/AP/Krishna.pdf

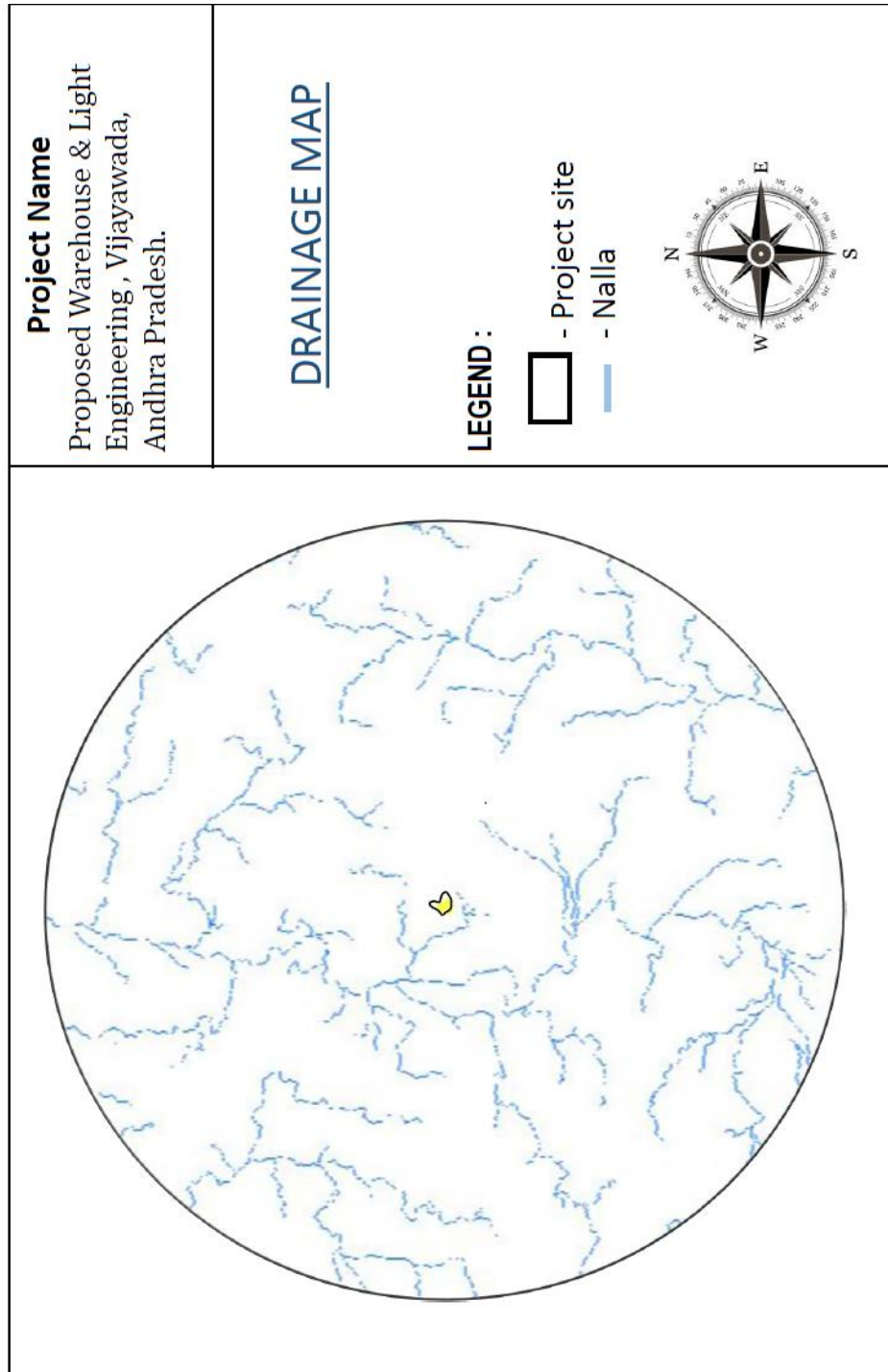


Figure 3-3 5 km Drainage Map

3.4.2 Geomorphology

The geomorphological study is done within 5km from the project site. The major formations are

- Coastal Origin – Older Deltaic Plain:** The area adjacent to the project site within 5 km radius is of Deltaic plain. The delta is relatively a flat area. Krishna river divides itself at Avanigadda and south of Nagayalanka into four branches forming an arcuate delta. The deltaic coast protrudes towards open sea at the mouths of these four branches forming a cusped foreland.

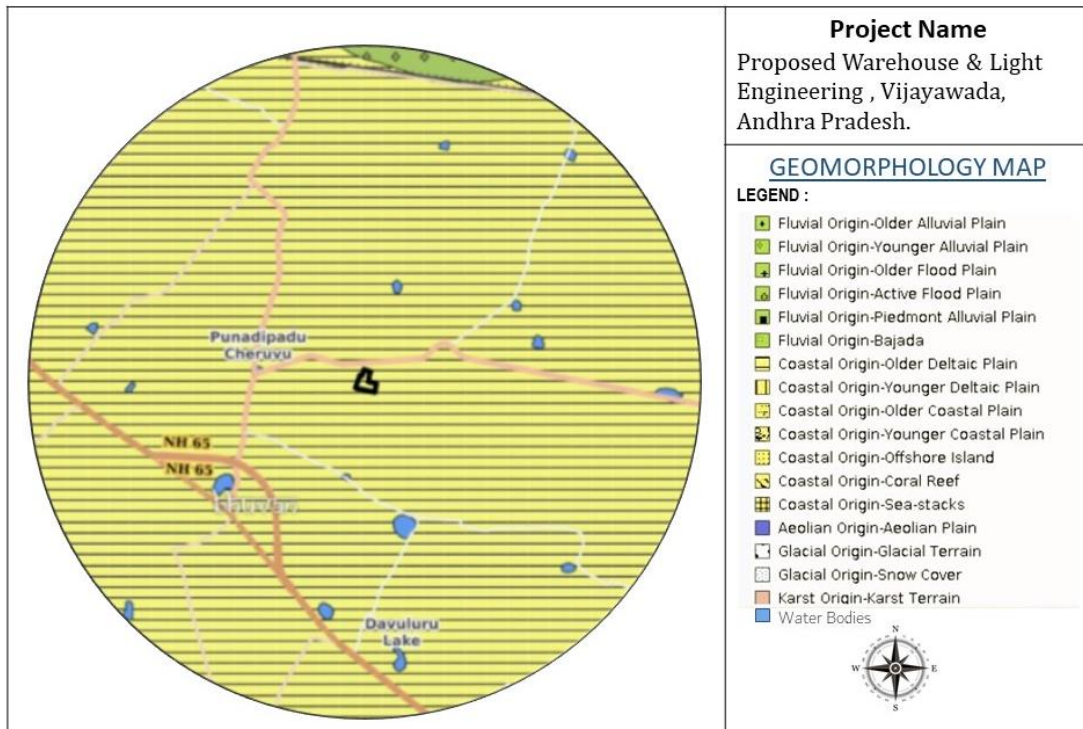


Figure 3-4 Geomorphology within 5 km radius

3.4.3 Geology

The predominant soils in the district are black cotton soils/deltaic soils, red loamy soils and sandy soils. Red clayey soils with sandy loam to clayey loam in texture and occur in the northern part of the district. The deltaic alluvium is grey, brown to black in colour with fine to medium texture and poorly permeable. They are fertile soils.

3.4.4 Hydrogeology

The district is underlain by a variety of geological formations comprising from the oldest Archaeans to Recent Alluvium. Hydrogeologically these formations are classified as consolidated (Hard), semi-consolidated (Soft) and unconsolidated (Soft) formations. The consolidated formations include crystallines (khondalites, charnockites and granitic gneisses) and metasediments (Limestones, shales, phyllites and quartzites) of Archaean and Pre-cambrian periods respectively. The semi consolidated formations are represented by Tertiary formations (Rajahmundry & Gollapalli sandstones) and unconsolidated formations comprise

deltaic alluvial deposits of Quaternary period. Prominent lineaments are trending in NE-SW, NW-SE and NNE-SSW direction.

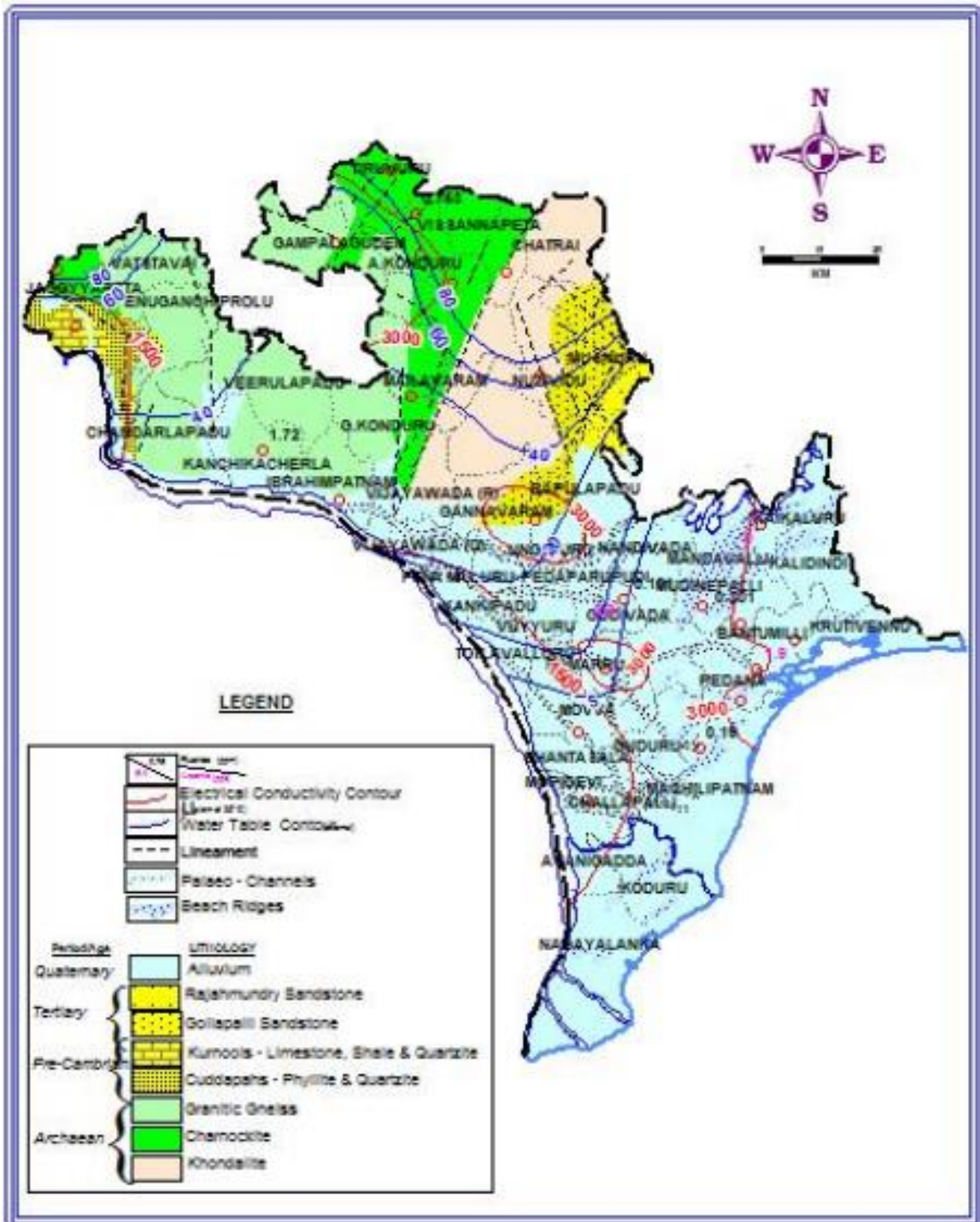


Figure 3-5 Hydrogeology map

3.4.5 Depth of ground water level & Ground water prospects

The ground water near the project site is found to be 7m BGL (Source: CGWB). The ground water prospects within 5km radius of the project site (Source: Bhuvan) are listed below.

1. 30m Deep well -80m Deep well: - 400 to 800 LPM yield found in Ganguru, Edupugallu, Punadipadu, Jagannadhapuram, Kolavennu, Konathanapadu, Prodduturu and penamaluru
2. <30m Deep well – Prospects limited to valley portion is found in Vanukuru and Godavarru

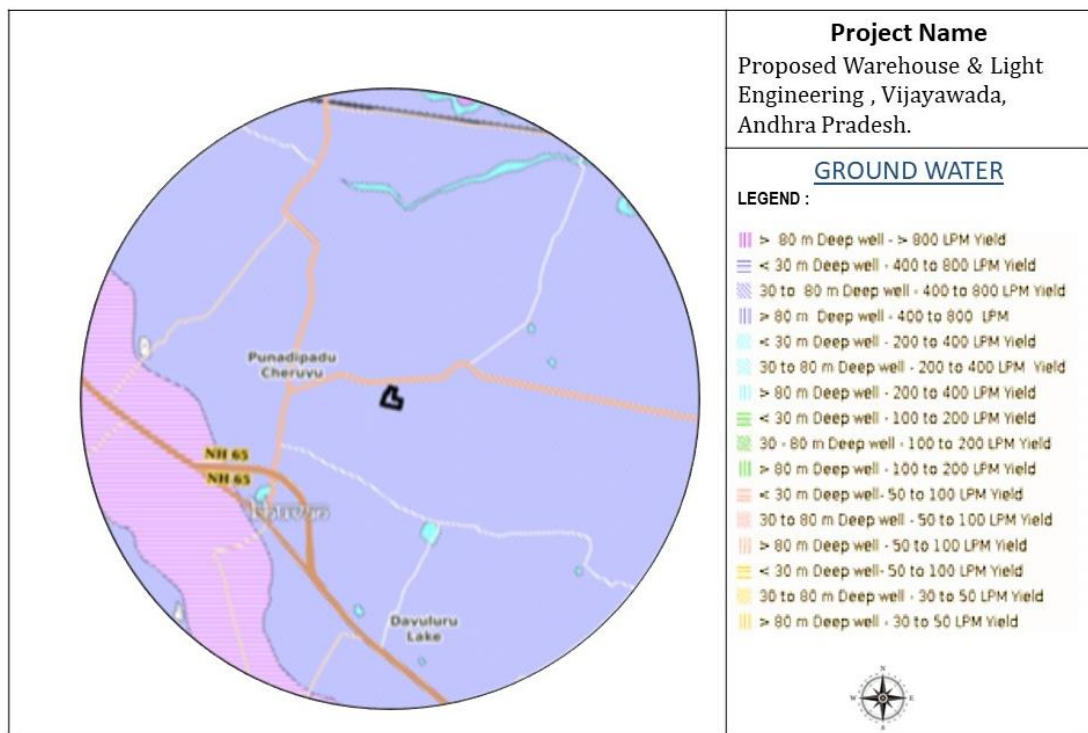


Figure 3-6 Ground water prospects within 5 km radius of the project site

3.4.6 Ground water Quality Monitoring

Ground water quality monitoring is done in the unit (core zone) and 3 locations around the project site (buffer zone). The analysis is done for physical, chemical & biological parameters.

Table 3-3 Ground water Quality Analysis

Environmental Parameters: Ground water Quality Analysis	
Monitoring Period	January 2023
Design Criteria	Based on the Environmental settings in the study area

Monitoring Locations	Project Site Harsha First Aid Center Public Library HCL Technologies
Methodology	Water Samples were collected in 5 litre fresh cans as per IS 3025 Part I and transported to the laboratory in Iceboxes

Sampling Procedure

Quality of ground water was compared with IS: 10500: 1991 (Reaffirmed 1993 With Amendment NO -3 July 2010) for drinking purposes. Water samples were collected as Grab sample from three sampling locations in a 5 litre plastic jerry can and 250 ml sterilized clean glass/pet bottle for complete physico-chemical and bacteriological tests respectively. The samples were analyzed as per standard procedure / method given in IS: 3025 (Revised Part) and standard method for examination of water and wastewater Ed. 21st, published jointly by APHA.

S.No.	Parameters	Test Method
1	Colour	IS 3025-Part 4
2	Odour	IS 3025-Part 5
3	pH @ 25°C	IS 3025-Part 11
4	Electrical Conductivity	IS 3025-Part 14
5	Temperature	IS 3025-Part 9
6	Turbidity	IS 3025-Part 10
7	Total Dissolved Solids (TDS)	IS 3025-Part 16
8	Total Hardness as CaCO ₃	IS 3025-Part 21
9	Sulphate as SO ₄ ²⁻	APHA-23rd Edn-2017
10	Calcium as Ca	IS 3025-Part 40
11	Magnesium as Mg	IS 3025-Part 46
12	Chloride as Cl	IS 3025-Part 32
13	Sodium as Na	IS 3025 part-45
14	Zinc as Zn	IS 3025-Part 49
15	Mercury as Hg	IS 3025-Part 48
16	Lead as Pb	IS 3025-Part 47
17	Arsenic as As	IS 3025-Part 37
18	Total Chromium (as Cr)	IS 3025-Part 52
19	Iron as Fe	IS 3025 (Part 53)

20	Reactive Silica	IS 3025 Part 35
21	Phosphate as PO4	APHA-23rd Edn-2017
22	Salinity	APHA-23rd Edn-2017
23	Total Coliforms	IS 1622:1981
24	E. coli	IS 1622:1981

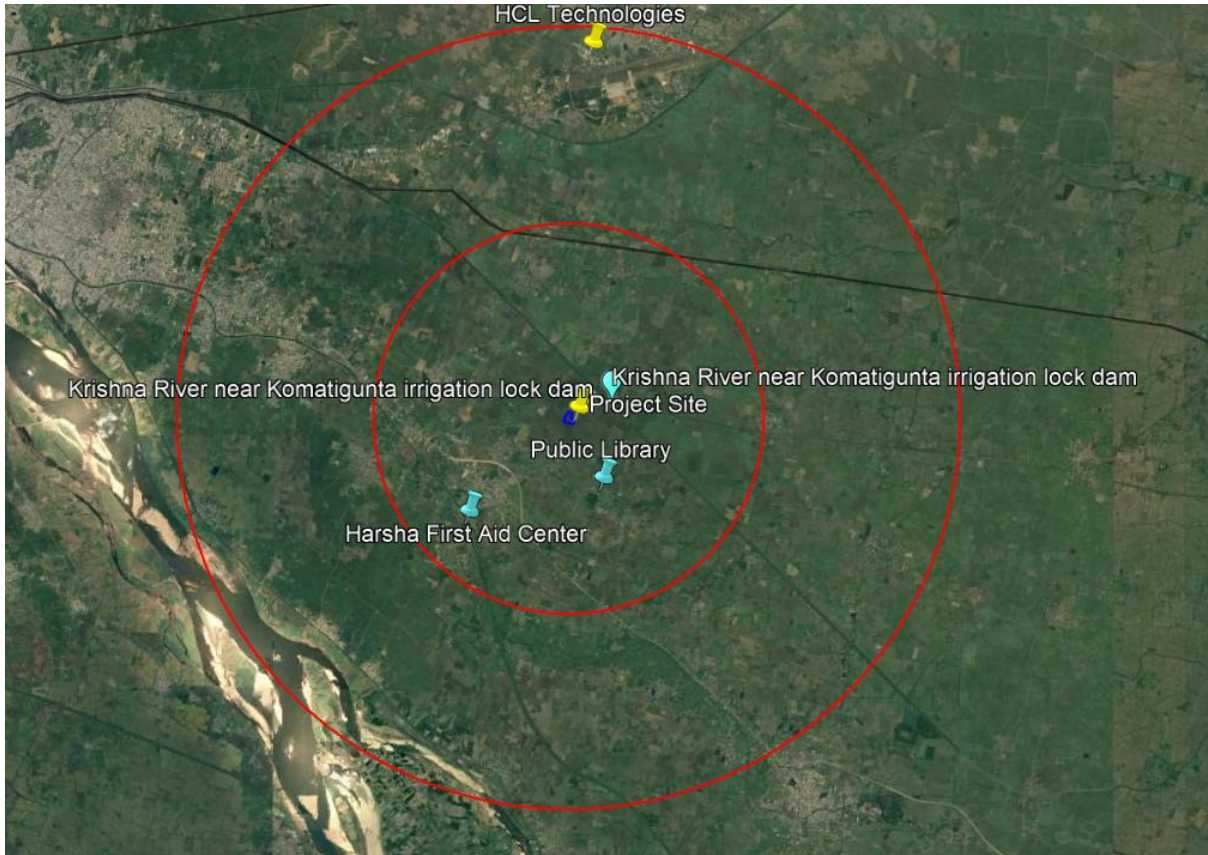


Figure 3-7 Water Quality Monitoring Locations

Table 3-4 Ground water sampling results

Parameters	Unit	Project Site	Harsha First Aid Centre	Public Library	HCL Technologies
		GW 1	GW 2	GW 3	GW 4
		Well	Well	Well	Well
pH (at 25°C)	-	7.31	7.19	7.51	7.90
Electrical Conductivity	µS/cm	1302	1330	1351	1324
Color	Hazen Unit	5	5	5	2.0
Turbidity	NTU	BDL (DL:0.5)	BDL (DL:0.5)	BDL (DL:0.5)	BDL (DL:0.5)
Total Dissolved Solids	mg/L	742	760	770	820
Total Hardness as CaCO ₃	mg/L	340	352	368	221
Calcium as Ca	mg/L	80	88	92.8	72.2
Magnesium as Mg	mg/L	33.6	31.7	32.6	9.75
Chloride as Cl	mg/L	242	260	270	146
Sulphate as SO ₄	mg/L	110	122	135	190
Iron as Fe	mg/L	0.11	0.08	0.06	BDL (DL : 0.01)
Silica as SiO ₂	mg/L	31	34	38.0	81.5
Sodium	mg/L	162	178	194	110
E. coli	Mpn/100 ml	<2	<2	<2	50
Coliform	Mpn/100 ml	<2	<2	<2	140



Figure 3-8 Ground water Analysis

Interpretation of results:

Physical parameters of water:

The basic physical parameters of water include the following details.

Colour:

Value observed in project site (True/Apparent Color) is 5 Hazel unit. Acceptable and permissible limits is 5 Hazel units and 15 Hazel units respectively. The value in the project site is less than the acceptable limits prescribed by IS 10500: 2012 (referred as “Standards” from herein).

pH:

Value observed in the project site: 7.31. Acceptable and permissible limits is 6.5-8.5. The pH value is the measure of acid – base equilibrium. The value of pH in the project site clearly indicates that water is neutral in nature.

Turbidity:

Value observed in the project site is BDL (DL:0.5). Acceptable and permissible limits is 1 NTU & 5 NTU respectively. The value of turbidity generally indicates the presence of phytoplanktons and other sediments. The value in the project site indicates the water is less turbid and no physical treatment is required to treat the turbidity of the water.

Total Dissolved Solids:

Value observed in project site is 742 mg/L. Acceptable and permissible limits is 500 mg/L and 2000 mg/L respectively. The TDS is the presence of the inorganic salts and small amounts of organic matter present in the water. This is mainly due to the result of surface runoff as the cations and anions in the topsoil is carried away by the water. As per the Guidelines of WHO, if the value of TDS is from 600 mg/L to 900 mg/L, it is rated as fair. If the value of the TDS is greater, it causes unpleasant taste and will have scaling issues in the materials. It will also limit the effectiveness of detergents.

The chemical parameters of the drinking water include the following details.

Calcium:

Value observed in project site is 80mg/L. Acceptable and permissible limits is 75mg/L and 200 mg/L respectively. Calcium is the essential macronutrient. The value of the calcium is little high than the prescribed acceptable standards. The higher level of calcium may cause hardening in domestic equipment and will also reduce the detergent efficiency. For Human ,higher levels of calcium will lead to constipation, gas, and bloating and extra calcium may also increase the risk of kidney stones. If the calcium deposit in blood is high, it may lead to hypercalcemia.

Magnesium:

Value observed in project site is 33.6mg/L. Acceptable and permissible limits is 30 mg/L and 100 mg/L respectively. The value of Magnesium in the project site is higher than acceptable limit and less than the permissible limit. The increase in the level of magnesium will cause diarrhea and vomiting for children.

Chloride:

Value observed in project site is 242 mg/L. Acceptable and permissible limits is 250 mg/L and 1000 mg/L respectively. The chloride level in the project site is less than the acceptable limit. Hence it will not have any major impact.

Total Alkalinity as CaCO₃:

Value observed in project site is 340 mg/L. Acceptable and permissible limits is 200 mg/L and 600 mg/L respectively. Total Alkalinity is the measure of the concentration of all alkaline substances dissolved in the water which includes carbonates, bicarbonates and hydroxides. The value of the total alkalinity is slightly greater in the project site, which will impart soda taste to the water.

Hardness:

Value observed in project site is 340 mg/L. Acceptable and permissible limits is 200 mg/L and 600 mg/L respectively. The value of Hardness in the project site is higher than acceptable limit. The increase in the level of hardness may cause corrosion and scaling problems, increased soap consumption and it also contributes to the salty taste of water. All other parameters like sulphate, iron, silica, nitrate, sodium well within the limits prescribed the drinking water standards, IS 10500:2012.

Biological parameters of water:

The biological parameters of water include

E- Coli & Coliform: Value observed in project site: <2 mpn /100ml e-coli

<2 mpn /100ml – Coliforms

The E- coli and coliform shall not be detectable in any 100 ml sample as the drinking water standards IS 10500:2012.

3.4.7 Surface Water Analysis

Surface water samples were taken from Krishna River Near Komatigunta irrigation lock Dam.

The results are summarized below.

Table 3-5 Surface water sample results

Parameters	Unit	Krishna River (Near Komatigunta irrigation lock Dam)
pH (at 25°C)	-	7.73
Electrical Conductivity	µS/cm	1025
Colour	Hazen Unit	10
Total Dissolved Solids	mg/L	564
Total Hardness as CaCO ₃	mg/L	184
Calcium as Ca	mg/L	40
Magnesium as Mg	mg/L	20.2
Chloride as Cl	mg/L	160
Sulphate as SO ₄	mg/L	62
Iron as Fe	mg/L	0.16
Fluoride as F	mg/L	0.57
Nitrate	mg/L	3.05

Sodium as Na	mg/L	48.1
Biochemical Oxygen Demand@270C	mg/L	BDL (DL:2.0)
Dissolved Oxygen	mg/L	6.6



Figure 3-9 Surface water sampling collection

Inference: The surface water quality monitored in the Krishna river is compared with the CPCB Water Quality Criteria against A, B, C, D & E class of water. From the test result, it is observed that the water fits Class A and hence, it can be used as drinking water source without conventional treatment but after disinfection.

3.5 Climate and Meteorology

Vijayawada Gannavaram IMD meteorological station is 10 km North direction from the project site. Climate and meteorology of a place can play an important role in the implementation of any developmental project. Meteorology is also the key to understand local air quality as there is an essential relationship between meteorology and atmospheric dispersion involving wind in the broadest sense of the term.

Table 3-6 Meterological Data of Gannavaram IMD station (For past 5 years)

Average Daily Temperature												
Year	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
2018	76.62	79.15	85.04	90.08	92.42	90.5	85.74	84.37	85.82	84.72	82.04	77.15
2019	75.17	80.47	85.85	90.77	94.74	92.99	86.78	85.68	84.41	83.65	81.86	78.54
2020	78.89	80.85	86.38	92.96	95.55	90.05	85.68	84.29	85.67	83.57	80.42	76.71
2021	78.57	79.57	86.03	89.87	90.67	88.97	84.93	85.59	85.13	85.27	80.72	77.17
2022	77.2	79.76	86.2	90.35	92.71	91.64	84.47	85.71	84.32	82.49	79.79	79.24
Average Relative Humidity [%]												
Year	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
2018	70.50	67.30	70.20	66.50	67.50	67.80	75.50	78.30	77.40	74.20	73.50	75.90
2019	75.30%	74.70%	73.90%	67.90%	65.50%	63.90%	75.00%	78.90%	83.60%	84.20%	76.80%	76.60%
2020	78.10%	75.10%	67.80%	65.30%	61.90%	70.50%	82.90%	82.60%	82.60%	84.90%	77.50%	74.10%
2021	76.00%	70.60%	68.90%	68.70%	68.10%	70.10%	80.80%	79.70%	80.60%	80.50%	82.70%	74.70%
2022	77.40%	71.70%	67.80%	69.70%	65.70%	66.10%	80.50%	79.10%	82.20%	80.80%	75.90%	78.10%
Average Wind Speed [MPH]												
Year	Jan	Feb	Mar	April	May	June	July	Aug	Sep	Oct	Nov	Dec
2018	1.2	1.6	1.6	3.7	3.6	5	6.1	5.7	2.1	1.8	2.3	2.7
2019	1.5	1.8	1.8	3.1	3.6	4.9	4.2	4.6	3	2.6	2.7	3.5
2020	3	3.2	2.4	2.6	2.5	4.7	5.8	6.1	4.8	3.4	5.8	4.4
2021	4.2	3.9	3.7	3.9	4.6	6.3	6.3	5.3	5.1	3.4	6.3	4.3
2022	3.6	3.5	3.7	4.5	6.2	6.3	7.2	5.5	4.3	4.1	3.8	3.9

Assessment of Climate risk

The proposed project is construction of warehouse and light engineering unit there will be slightly change in the air environment due to the proposed DG sets and transportation of vehicles. Hence there is no change in the climate and there is no major climatic risks.

Windrose

The wind rose denotes a class of diagrams designed to display the distribution of wind direction at a given location over a period of time. Wind roses are also useful as they projected a large quantity of data in a simple graphical plot.

The wind speed & wind direction data are taken and wind rose is plotted for January 2023. The predominant wind direction is in East direction.

Meteorological Data represented as Windrose

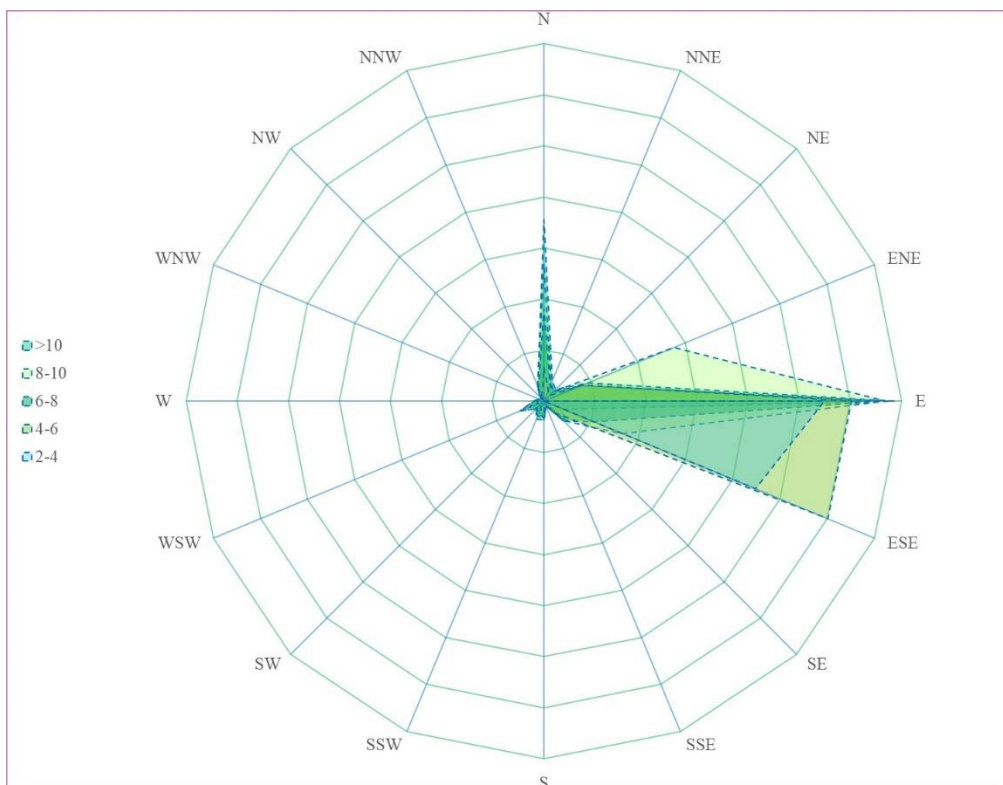


Figure 3-10 Windrose for the period of January 2023

Selection of Sampling Locations:

All the five monitoring locations including project site is selected based on the wind direction and wind speed. The monitoring locations are chosen in upwind, downwind and crosswind directions.

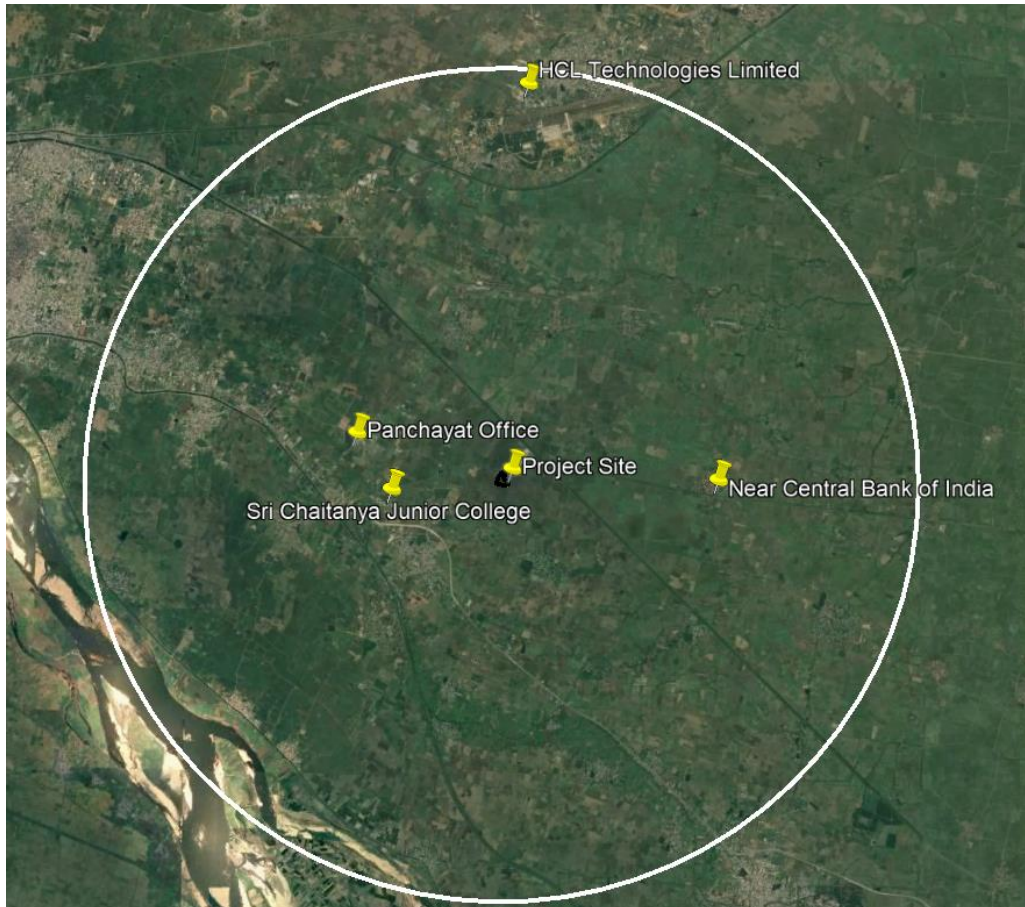


Figure 3-11 AAQ Monitoring Locations

3.6 Air Environment

Environmental Parameters: Ambient Air			
Monitoring Period	January 2023		
Design Criteria	The monitoring stations are selected based on factors like topography/terrain, prevailing meteorological conditions like predominant wind direction etc, plays a vital role in selection of air sampling stations. Based on these criteria, 5 air sampling stations were selected in the area as shown below.		
Monitoring Locations	Location & Code	Distance (km)	Direction
	Project Site -AAQ 1	-	-
	Near central bank of India- AAQ 2	5.14	E
	Sri Chaitanya Junior College – AAQ3	2.79	WSW
	Panchayat office- AAQ 4	3.64	WNW
	HCL Technologies Limited – AAQ 5	9	N
Methodology	Respirable Dust Sampler with attachment for gaseous Pollutants, Envirotech APM 460, APM411. Fine Particulate Matter (FPM) Sampler, APM 550		

3.6.1 Ambient Air Quality: Results & Discussion

The test results of the ambient air quality monitored in the project site (Core zone) and four locations around the project site (Buffer zone) is summarized below.

Table 3-7 Ambient Air Quality

Parameters	Unit	AAQ 1 Project Site	AAQ 2 Near central bank of India	AAQ3 Sri Chaitanya Junior College	AAQ 4 Panchayat office	AAQ 5 HCL Technologies Limited	Specification	
							*NAAQ STANDARDS	
							24 hours	Annual
Particulate Matter in (PM ₁₀)	µg/m ³	52.6	62.7	53.8	58.2	61.2	100	60
Particulate Matter in (PM _{2.5})	µg/m ³	16.9	22.1	18.4	19.7	20.1	60	40
Sulphur Dioxide as SO ₂	µg/m ³	5.95	6.42	5.30	5.85	15.2	80	50
Nitrogen Dioxide as NO ₂	µg/m ³	10.8	13.1	10.6	12.1	29.4	80	40
Ozone as O ₃	µg/m ³	9.20	8.95	9.55	8.75	BDL (DL:1.0)	180(1hr)	100(8hr)
Ammonia as NH ₃	µg/m ³	24.7	25.7	23.1	25.3	BDL (DL:1.0)	400	100
Carbon Monoxide as CO (1hr)	mg/m ³	BDL (DL:1.15)	BDL (DL:1.15)	BDL (DL:1.15)	BDL (DL:1.15)	BDL (DL:1.15)	4.0(1hr)	02(8hr)
Lead as Pb	µg/m ³	BDL (DL:0.5)	BDL (DL:0.5)	BDL (DL:0.5)	BDL (DL:0.5)	BDL (DL:0.5)	1.0	0.5
Benzene as C ₆ H ₆	µg/m ³	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	5.0	5.0
Arsenic as As	ng/m ³	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	6.0	6.0
Nickel as Ni	ng/m ³	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	20.0	20.0
Benzo(a)Pyrene in C ₂₀ H ₁₂	ng/m ³	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	BDL (DL:1.0)	1.0	1.0

Inference: The ambient air quality is monitored in five places around 10 km of the project site is well within the standards prescribed by NAAQ.

Interpretation of ambient air quality:

To assess the impact, AAQ were monitored in project site and four locations within 10 km radius. The values of the AAQ in terms of NO_x, SO_x, PM_{2.5} is maximum in the AAQ 2 than all other locations, which is in the crosswind direction at a distance of 9 km. The value of PM₁₀ is also high in AAQ 2 near central Bank of India.

PM_{2.5} & PM₁₀:

Description	PM _{2.5}	Location	PM ₁₀	Location
Max	22.1	Near central bank of India	62.7	Near central bank of India
Min	16.9	Project Site	52.6	Project Site
Standard PM_{2.5} - 60			Standard PM₁₀ - 100	

The main sources of PM include incomplete combustion, automobile emissions, dust and particles produced due to the chemical reactions in the atmosphere. From the monitoring locations, it is inferred that the maximum value of both PM₁₀ & PM_{2.5} is observed near Central Bank of India. Since, the movement of the general public is more in the area due to the existence of Central Bank, it is also a contributing factor that is attributed to the high value of PM.

The minimum value of both PM₁₀ & PM_{2.5} is observed in Project site. It is inferred that there will be no drastic changes in the ambient air quality due to the proposed construction of warehouse.

The governing factors for the transport of PM are wind direction & wind speed. The baseline monitoring is done for the month of January 2023. The predominant wind direction is blowing from west to east and the maximum wind speed is 4.2 mps. The greater values of Particulate matter will have its impacts on Human Health. Short term exposure may cause coughing, shortness of breath, tightness of the chest, irritation of the eyes. The Long-term exposure may lead to reduced lung function, development of respiratory diseases and premature death of people with lung diseases.

3.7 Noise Environment

Table 3-8 Noise Analysis

Environmental Parameters: Noise Analysis	
Monitoring Period	January 2023
Design Criteria	Based on the Sensitivity of the area
Monitoring Locations	Project Site (N1) Near Bank of Baroda (N2) Near APSRTC Bus stand, Kankipadu (N3) HCL Technologies (N4) Aerodrone Technologies (N5)
Methodology	Noise level measurements were taken at the selected locations using noise level meter both during day and nighttime. Noise level measurements were taken for only one time.

3.7.1 Ambient Noise Quality & Results

Ambient Noise levels are monitored in five locations including the project site (Core zone and buffer zone) and the results are summarized below.

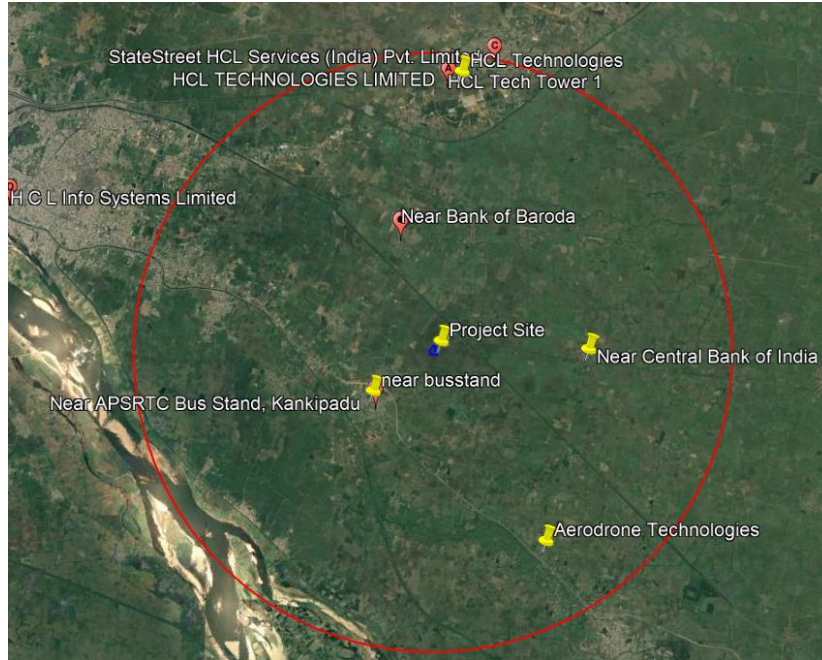


Figure 3-12 Ambient Noise Levels (Leq)

Location	Leq in dB(A)		Limits as per CPCB	
	Day	Night	Day	Night
Project Site	60.8	54.7	75 dB (A)	70 dB (A)

Near Bank of Baroda	62.9	56.8	
Near APSRTC Bus stand, Kankipadu	68.1	63.4	
HCL Technologies	57.1	52.3	
Aerodrome Technologies	55.9	51.2	



Figure 3-13 Monitoring Noise levels

Inference: The maximum value is observed near APSRTC Bus stand, Kandipadu. The contributing factors for the noise include the movement of buses and vehicles in the road. The project area falls under Industrial zone as per and the standard for industrial zone during daytime is 75 dB(A) and night time is 70 dB(A). Within the project site the noise level observed is minimum, so there will be no more impacts due to the proposed warehouse and light engineering unit project.

3.8 Soil Environment

3.8.1 Geomorphology

Geomorphology of the project site around 10 km has been studied. Most of the land around the project site having the Coastal origin – Older deltaic plain and Coastal origin – Younger deltaic plain. Few parts only having Aeolian origin – Aeolian plain. The geomorphology map around 10 km site of the project site is given below.

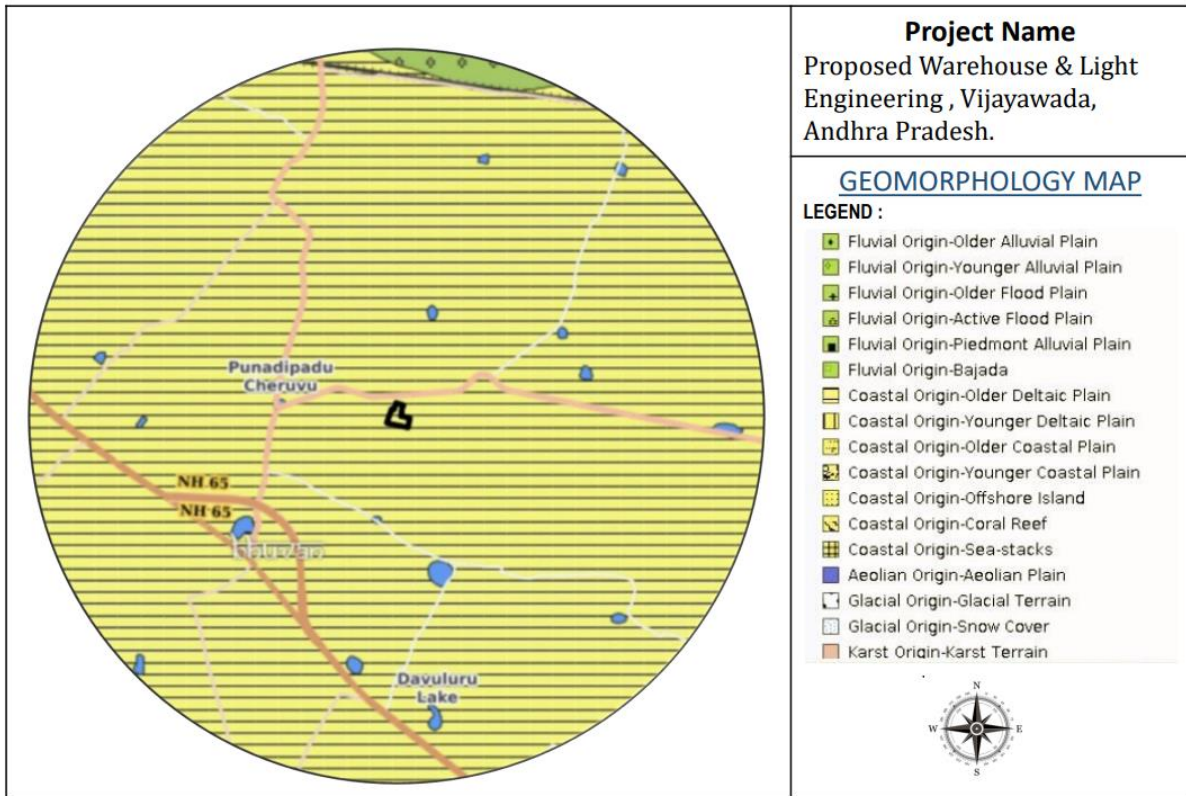


Figure 3-14 Geomorphology of the project site

The sampling locations have been identified with the following objectives:

- To determine the impact of proposed project on soil characteristics and
- To determine the impact on soils more importantly from agricultural productivity point of view.

Table 3-9 Soil Quality Analysis

Environmental Parameters: Soil Quality Analysis	
Monitoring Period	January 2023
Design Criteria	Based on the environmental settings of the study area
Monitoring Locations	Project Site (SQ1) Venkata Dasu Gari Gudi (SQ 2) Krishna River Near Komatigunta irrigation lock Dam (SQ 3) HCL Technologies (SQ 4) Aerodrone Technologies (SQ5)
Methodology	Composite soil samples using sampling augers and field capacity apparatus

To assess the soil quality of the study area, five monitoring stations were selected and the results are summarized below.

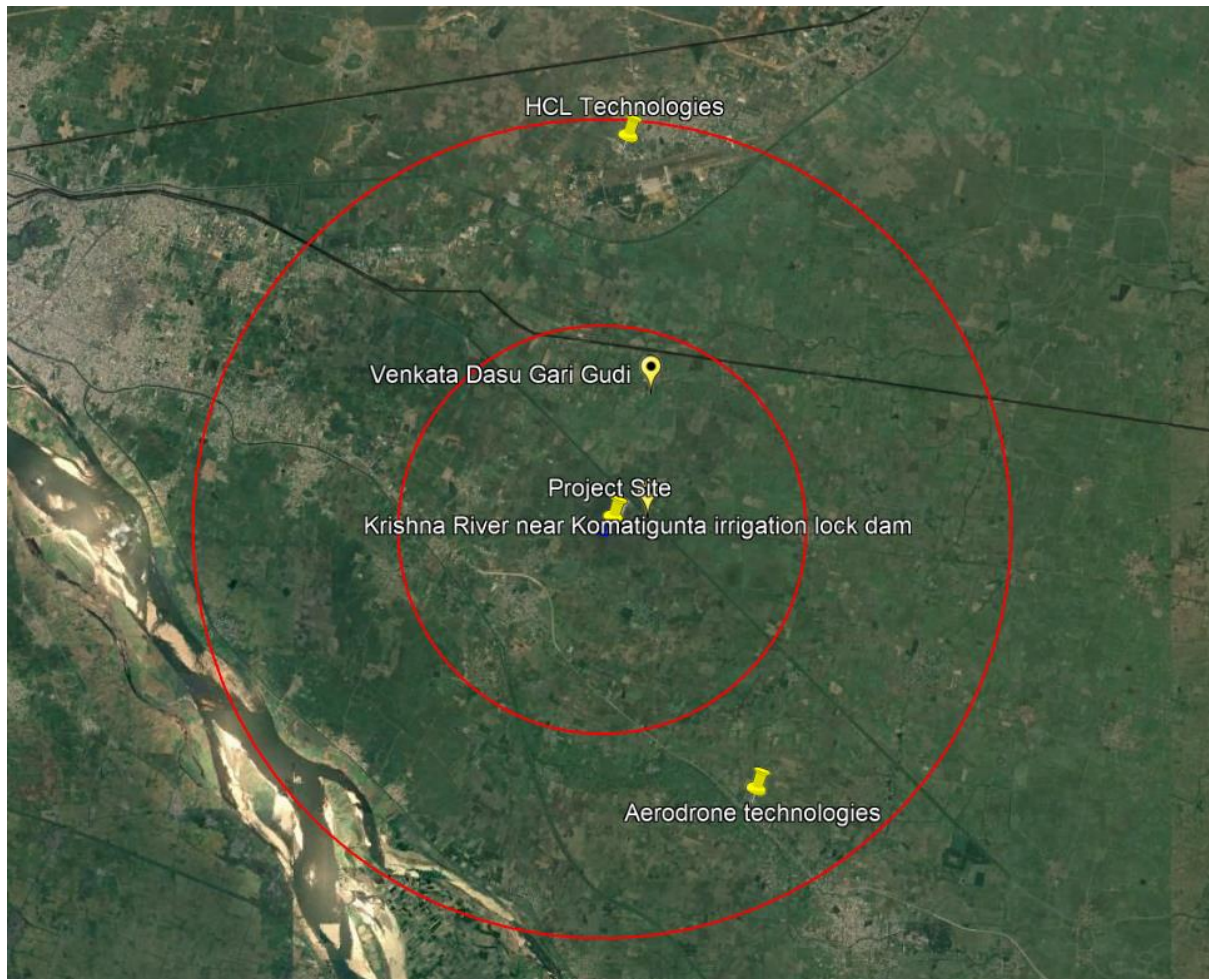


Figure 3-15 Soil quality monitoring locations

Table 3-10 Soil Quality Analysis

Parameters	Unit	Project Site (SQ 1)	Venkata Dasu Gari Gudi (SQ 2)	Krishna River (Near Komatigunta irrigation lock Dam) (SQ 3)	HCL Technologies (SQ 4)	Aerodrone Technologies (SQ5)
pH (at 25°C)	-	8.71	8.73	8.86	7.98	8.34
Electrical Conductivity	µs/cm	262	316	272	175	204
Moisture Content	%	8.20	6.22	7.36	9.5	8.76
Total Kjheldal Nitrogen as N	%	0.027	0.021	0.026	0.018	0.022
Total Phosphorus as P	%	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.1)	BDL (DL:0.05)	BDL (DL:0.1)
Soluble Sodium (as Na)	meq /100g	1.84	1.76	1.79	1.71	1.76
Soluble Potassium as K	meq /100g	1.05	1.01	1.02	1.03	1.05
Soluble Hexavalent chromium Cr6+	%	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)	BDL (DL:0.05)
Copper as Cu	%	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)	BDL (DL:0.02)
Nickel as Ni	%	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
Manganese as Mn	%	BDL (DL:0.04)	BDL (DL:0.04)	BDL (DL:0.04)	BDL (DL:0.04)	BDL (DL:0.04)
Mercury as Hg	%	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)
Arsenic as As	%	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)	BDL (DL:0.01)



Figure 3-16 Soil sample collection

Inference:

Chemical characteristics of soils include pH. The value of the pH is highly alkaline, it ranges from 7.98 to 8.86. The soil in the project site is 8.71 alkaline in nature, which challenges the growth of all types of plants and the soil is having nutrient deficiency. The soil is sodic unfertile in nature.

3.9 Ecology and Biodiversity

The basic purpose is to explore the biological environment under Environment Impact Assessment (EIA) and to assist in the decision-making process and to ensure that the project options under consideration are bio-environmental friendly. EIA identifies ways of improving project environmentally by preventing, minimizing, mitigating or compensating for adverse impacts before construction and development phase. The present study on the floral & faunal assessment of the proposed project is based on field survey of the area supported by secondary data from various governmental and non-governmental sources.

3.9.1 Flora

The Study of ecology conducted in the entire site and list of flora founded core & buffer zone of the project site are as follows.

Table 3-11 List of Flora

S. No.	Scientific Name	Common Name	Family
Plantations			
1.	Causurina	Sarugudu/ Casuarina	Casuarinaceae
2.	Musa paradisiaca	Banana	Musaceae
3.	Carica papaya	Papaya	Caricaceae
4.	Eucalyptus	Nigiri / Blue Gum	Myrtaceae
5.	Tectona grandis	Teak	Verbenaceae
6.	Leuceana	Subabul	Mimosaceae
Natural vegetation			
7.	Acacia nilotica	Nalla Tumma	Mimosaceae
8.	Anacardium	Cashew Nut/Jeedimamidi	Anacardiaceae
9.	Albizia lebeck	Siris	Mimosaceae
10.	Acyranthes	Uttareni	Amaranthaceae
11.	Borassus flabellifer	Toddy Palm	Arecaceae
12.	Cassia tora	Chinnakasinda	Caesalpinaceae
13.	Caryota urens	Fish Tail Palm	Arecaceae
14.	Calotropis	Giledu, Milkweed	Asclepidaceae
15.	Cocos nucifera	Coconut	Arecaceae
16.	Crotalaria jundia	Janumu, Sum hemp	Fabaceae
17.	Datura metel	Dhatura, Umettha	Solanaceae
18.	Ficus	Raavi Chettu	Moraceae
19.	Ficus religiosa	Marri Chettu	Moraceae
20.	Garuga pinnata	Konda Vepa	Burseraceae
21.	Ficus racemosa	Medi Chettu	Moraceae
22.	Flacourtia indica	Kanru	Flacourtiaceae

23.	Gloriosa superba	Adavi Nabhi	Liliaceae
24.	Hibiscus rosa-sinensis	Mandaram, Hibiscus	Malvaceae
25.	Ipomea aquatica	Tutikura, Water morning glory	Convolvulaceae
26.	Ipomea carnea	Pink Moming Glory	Convolvulaceae
27.	Adhatoda vasica	Addasarum/ Malabar nut	Acanthaceae
28.	Jasmimum	Jasmine	Oleaceae
29.	Jatropha	Nepalam	Euphorbiaceae
30.	Lantana camara	Lantana	Verbanaceae
31.	Mangifera indica	Mango	Anacardiaceae
32.	Mallotus	Kusum Chettu	Euphorbiaceae
33.	Malvastrum	False Mallow	Malvaceae
34.	Melia azadirach	Turka Vepa, Persian Lilac	Meliaceae
35.	Mollugo hirta	Thela Poraku, Lotus Sweet Juice	Aizoaceae
36.	Moringa oleifera	Drumstick tree, Mulaga Chettu	Moringaceae
37.	Ocimum sanctum	Tulasi	Labiatae
38.	Oogeinia cojeinensis	Vandanam, Sandan	Papillionaceae
39.	Opuntia dilleni	Nagajamudu	Opuntiaceae
40.	Pithcellobium dulce	Seema Chinta, Vilayati Imli	Mimosaceae

3.9.2 Fauna

There are no endangered and endemic fauna found in the study area. The observed species from the core & buffer zone of the study area is as follows.

Table 3-12 List of Fauna

S. No.	Scientific Name	Common Name	Conservation Status as per Indian Wildlife Protection Act (1972)
Avifauna			
1.	Acridotheres tristis	Common Myna	Sch-IV
2.	Corvus splendens	House crow	Sch-IV
3.	Corvus macrorhynchos	Jungle crow	Sch-IV
4.	Coracious benghalensis	Indian roller	Sch-IV
5.	Dicrurus macrocerus	Black drongo	Sch-IV
6.	Bubulcus ibis	Cattle egret	Sch-IV
7.	Ardeola grayii	Pond heron/ Paddy	Sch-IV
8.	Tyto alba	Barn owl	Sch-IV
9.	Columba Iva	Blue rock pigeon	Sch-IV
10.	Alcedo atthis	Common kingfisher	Sch-IV
11.	Eudynamys scolopacsa	Koel	Sch-IV
12.	Anas acuta	Common teal	Sch-IV
13.	Saxicoloides fulicata	Indian robin	Sch-IV
14.	Apus affinis	House swift	Sch-IV
15.	Ploceus philippinus	Weaver bird	Sch-IV
16.	Egretta garzetta	Little egret	Sch-IV
17.	Vanellus indicus	Red wattled lapwing	Sch-IV
18.	Phalacrocorax niger	Little cormorant	Sch-IV
19.	Streptopelia chinensis	Spotted dove	Sch-IV
20.	Dendrocitta vagabunda	Indian Treepie	Sch-IV

Reptiles			
1.	Calotes versicolor	Common garden lizard	Sch-IV
2.	Ptyas mucosus	Rat snake	Sch-II
3.	Naja naja	India cobra	Sch-II
4.	Vipera russelli	Russel's viper	Sch-II
5.	Bungarus caerlous	Krait	Sch-IV
Amphibians			
1.	Rana hexadactyla	Frog	Sch-IV
2.	Rana tigrina	Bull frog	Sch-IV
3.	Bufo melanosticus	Common toad	Sch-IV
Mammals			
1.	Hystrix indica	Porcupine	Sch-IV
2.	Funambulus palmarum	Squirrel	Sch-IV
3.	Sus scrofa	Wild boar	Sch-III
4.	Bandicoota indica	Greater Bandicoot	Sch-V
5.	Rattus sp	Rat	Sch-V
6.	Herpestis edwardsii	Common Mongoose	Sch-II
7.	Vulpes benghalensis	Indian fox	Sch-II
8.	Macaca mulatta	Rhesus Macaque	Sch-II
9.	Presbytis entellus	Hanuman Langur	Sch-II

Inference: The list of flora and fauna in the core zone and buffer zone are listed above. To maintain the ecosystem, project site will be planted with 530 Nos. of tree saplings (Native species such as Azadirachta indica, Ficus Religiosa, Pongamiapinata etc) which in turn will attract the avifauna, thus maintaining the ecosystem to possible extent.

3.10 Demography & Socio Economic

The demography survey study is done within 10km from the project site. The population, Household, Sex ratio, Literacy rate, SC, ST details for all the villages in the study area is listed below:

Table 3-13 Demographic Study

Villages	Population	HH	Sex Ratio		Literacy rate (in %)		SC	ST
			Male	Female	Male	Female		
Chalivendrapalem	1043	331	506	537	351	326	9	63
Davuluru	1,490	419	769	721	75.25	65.71	715	4
Godavarru	1,465	444	721	744	62.23	48.38	533	0
Kandalampadu	296	86	145	151	83.85	71.21	228	0
Kolavennu	5,076	1,499	2,503	2,573	75.10	67.86	2,160	52
Konathanapadu	1,681	211	1,433	248	95.56	77.93	359	20
Manthena	2,347	690	1,183	1,164	71.08	63.63	700	1
Tenneru	3,646	997	1,777	1,869	82.40	74.86	1,754	35
Velpuru	22,768	6,781	11,102	11,666	80.70	76.00	2,905	104
Gosala	6,325	1,758	3,074	3,251	77.24	67.77	656	120
Boddapadu	720	176	356	364	66.04	45.60	22	0
Kankipadu	3,065	910	1,488	1,577	78.74	73.01	509	179
Punadipadu	7,235	1,705	3,670	3,565	82.61	70.33	2,501	186
Gannavaram	20,728	5,452	10,614	10,114	88.71	82.35	3,750	378
Buddavaram	10,309	2,553	4,953	5,356	80.52	72.15	1,961	179
Kesarapalle	9,076	2,384	4,490	4,586	74.93	64.51	2,224	304
Jakkulanekkalam	806	266	389	417	83.75	63.83	299	0
Manikonda	4,789	880	2,452	2,337	57.71	36.43	554	0
Tenneru	3,646	997	1,777	1,869	82.40	74.86	1,754	35

3.10.1 Socio economic study of the project area

The total population in Punapadu district is 7,235. In this total population there are 3,670 Male and 3,565 Female with households of 1,705. The literacy rate of male is 82.61 % and female is 70.33 %. There are 2,501 nos. of Scheduled Caste and 186 nos. of Scheduled Tribes. Krishna river is in the distance of 8.5 km from the project site. This river will provide drinking water for the surrounding people.

3.10.2 Impacts to the social development

The proposed project is a construction of warehouse and light engineering unit. There will be an increase in employment opportunities to the local people. Therefore, skilled labours may be taken from local community. The economic condition of local people will be improved by introducing shops for the basic needs of workers in the proposed project will be developed.

The mitigation measures for both the social and the environmental impacts is described in Chapter 4

4 Anticipated Environmental Impacts & Mitigation

4.1 Introduction

Environmental Impacts can be group into Primary impacts & Secondary Impacts

Primary Impacts: These impacts are directly attributed by the project.

Secondary Impacts: These are those which are induced by primary impacts and include the associated investments and changed patterns of the social and economic activities by the action.

Table 4-1 Impacts & Mitigation Measures on Land Environment

Aspect	Impact	Mitigation Measures
Construction Phase		
Site Clearance and Excavation	<p>The construction of the proposed project involves Site Clearance. Hence there will be loss of topsoil leading to erosion.</p> <p>In addition to that, during Construction phase, Solid waste like litters, Cement residue, scraps and also settlement of dust may pollute the soil</p>	<p>Topsoil excavated will be stored and will be used in the area of green belt. Other construction waste materials like concrete blocks will be used for site filling & leveling.</p>
Operation Phase		
Solid waste Management	<p>The main impact is associated with the dumping of solid waste in open space as there are chances of these wastes polluting the soil environment and causing odor nuisance, which in turn cause health problem to the construction workers.</p>	<p>The solid waste will be separated in the source.</p> <p>Biodegradable waste will be treated in Organic Waste Converter.</p> <p>Non-biodegradable will be handed over to authorized recyclers.</p> <p>Sludge will be dried and used as manure for green belt.</p> <p>No solid waste will be disposed in the open space.</p>

Improper management of Wastewater	Improper management of the wastewater from the project site may affect the soil	Wastewater will be managed efficiently by providing treatment plants. The treated water will be recycled within the project site for flushing, gardening purposes thus no wastewater will be let into the land either treated or untreated.
Improper management of Storm water flow	Improper management of Storm water may lead to erosion.	The project will have proper storm water management with Rainwater Harvesting structures like recharge pits and also storm water drains.

Table 4-2 Impacts & Mitigation Measures on Air Environment

Aspect	Impact	Mitigation Measures
Construction Phase		
Site clearance	Dust will be emitted during construction phase during site excavation.	Water sprinkling will be done in the project site periodically to suppress dust emission. The site will be completely barricaded by GI sheets all around the boundary to control the spread of dust emission beyond the project site.
Construction of structure & Super structure	<p>During construction in the project, the following activities will be there in the project site.</p> <ul style="list-style-type: none"> ➤ Movement of construction vehicles. ➤ Emission of dust and PM due to material handling 	<p>Mitigation measures will be adopted based on the source – Point Source (Running of DG sets), Line source (movement of construction vehicles), Area source (Emission of dust and particulate matter due to material handling such as dropping them from heights).</p> <p>The impacts will be minimized by</p>

	<p>such as dropping them from heights</p> <ul style="list-style-type: none"> ➤ Usage of paint cans ➤ Running of DG sets ➤ The above activities will emit SO_x, NO_x, CO, CO₂, VOC, PM, Dust etc., which in turn will affect human health by causing respiratory problems 	<ol style="list-style-type: none"> 1. The vehicles will be checked for a Pollution certificate before permitting entry into the project site. 2. The average speed of the trucks will be restricted to 20 km/hr. 3. Reducing the dropping height and ensure that no spilling occurs. 4. Cement storage, loading and unloading activity will be covered using tarpaulin sheet. 5. Temporary power will be obtained from Andhra Pradesh State Power Distribution Corporation Limited - APSPDCL and DG sets will be used only during power failure. 6. Wheel washing bay will be provided in the project site during construction phase.
Operation Phase		
<p>Running of DG sets</p>	<p>The major sources of air pollution during operation phase will be Running of DG sets. 1 No. of 125 kVA DG set will be installed, this may cause the emission of NO_x & PM, which will cause respiratory and cardiovascular diseases.</p>	<p>To regulate the plume emissions from DG set, Stack height from the ground level will be provided as per CPCB norms.</p>

Vehicular movement	There will be vehicular emission as the proposed project will be a warehouse.	The project will be provided with separate entry and exit for the movement of vehicles to avoid traffic congestion and also to combat air pollution. Green belt will be provided all around the boundary of the project site mainly native species and also carbon sequestration trees to maintain the ambient air quality.
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Table 4-3 Impacts & Mitigation Measures on Water Environment

Aspect	Impact	Mitigation Measures
Construction Phase		
Dumping of Construction waste	There may be chances for the dumping of Construction waste and disposal of wastewater generated by construction labors into the Lakes & water bodies, which may pose a serious Environmental threat to the flora and fauna which are using these water bodies.	Construction debris such as concrete blocks, etc will be used in laying internal roads. Domestic waste generated by construction workers will be segregated and the same will be handed over to local body daily. The wastewater generated from labours will be treated by septic tank and soak pit thereby managing the wastewater generated.
Excavation activity	Topsoil runoff from the proposed project site during rain	The soil runoff will happen only before flooring of the surface, when the area is unpaved. Hence the flooring works will be completed before rainy season. Construction

		of silt fence will be done in the project site
Operation Phase		
Improper Management of wastewater	Improper management of the wastewater from the project site may affect the ground water and nearby surface waters.	Wastewater will be managed efficiently. Wastewater generated from the proposed project will be treated using STP of 50 kLD respectively. The treated water will be recycled within the project site for flushing, gardening purposes thus no wastewater will let into the land either treated or untreated.
Improper Management of Storm water	Improper management of Storm water may lead to flooding.	The proposed project will have proper storm water management with Rainwater Harvesting structures like recharge pits.

Table 4-4 Impacts & Mitigation Measures on Biological Environment

Aspect	Impact	Mitigation Measures
Construction Phase		
Site Clearance	Loss of vegetation due to Site Clearance, which may impact the floral distribution and the faunal community	The proposed project site is vacant land with only few shrubs and herbs. Hence, there will be only minimal impact during site clearance. In order to reduce the impact due to the noise generated from the site during construction activity, it is ensured that all the construction equipments are maintained and running properly.

		<p>The speed of the vehicles in the construction site will be reduced.</p> <p>Acoustic silencers for DG sets will be used. Conveyor belts will be used as an alternative to rollers. In order to reduce noise machinery operation, welds will be used instead of rivets wherever possible. To avoid metal to metal contact, plastic bumpers will be used.</p> <p>Movement of heavy vehicles will be restricted to well define path so that the noise was decreased. Construction activities will be restricted to daytime only.</p>
Operation Phase		
Development of Green Belt	The proposed project will be provided with 15% of the plot area as green belt, which will have a positive impact on the Environment as compared against the existing vacant land	The project site will be planted with 530 Nos. of tree saplings (Native species such as Azadirachta indica, Ficus Religiosa, Pongamiapiñata etc) which in turn will attract the avifauna, thus maintaining the ecosystem to possible extent

Table 4-5 Impacts & Mitigation Measures on Socio Economic Environment

Aspect	Impact	Mitigation Measures
Construction Phase		
Employment Opportunities	The project site is a vacant land. Hence there is no negative impact to socio economic environment prior	-

	<p>to the start of the construction.</p> <p>During construction phase, employment opportunities will be provided, which will create positive impact.</p> <ul style="list-style-type: none"> ➤ Site clearance – Unskilled labors ➤ Excavation work – Skilled & semi – skilled labors ➤ Construction of super Structure - Skilled & semi – skilled labors <p>For carrying out each activity in every stage, both skilled and unskilled workers will be employed, they will be hired from the local villages after conducting discussion with the construction workers in and around the villages. This will improve the livelihood of the local workers employed</p>	
Operation Phase		
Developmental activity	The proposed project will lead to the organized urban developmental activity.	Due to the proposed project, there will be development in Drinking water supply, Electricity, transport facilities etc.

5 Analysis of Alternatives

5.1 Introduction

To maintain Environmental sustainability, it is important to analyse the various options that are available for different components of the project. The analysis of alternatives is discussed for various activities

- Energy Conservation measures
- Road Connectivity

5.2 Energy Conservation Measures

To achieve conservation of energy, appropriate design of a building is of paramount importance. Accordingly, it is proposed to incorporate the guidelines of Energy conservation Building Code, 2018 for the structures of the Project.

The concept of passive solar design emphasizes architectural design with an approach of minimizing building energy consumption by integrating conventional energy-efficient devices, such as mechanical and electrical pumps, fans, lighting fixtures, and other equipment, with passive design elements, such as building sitting, an efficient envelope, appropriate amounts of fenestration, increased day lighting design, and thermal mass. The basic idea of passive solar design is to allow daylight, heat, and airflow into a building only when beneficial.

5.3 Road Connectivity

The project site is adjacent to SH 243 Gudivada Kankipadu Road. The site is connected to SH 243 Gudivada Kankipadu Road (0.30 km, North), Vijayawada Gudivada Road (1.56 km, West) & Zilla Parishad Road (1.40 km, South). The project site is well connected to roads for easy approach.



Figure 5-1 Road Connectivity

6 Environmental Management Plan

6.1 Introduction

Environmental Monitoring Program is an important aspect which also includes monitoring the effectiveness of mitigation measures (including measurement methodologies, frequency, location, reporting schedules & procurement schedules).

The detailed Environmental Monitoring Plan is listed below:

Table 6-1 Environmental Monitoring Plan

Location	Environment	Parameters	Frequency	Data analysis	Reporting Schedules	Procurement Schedule
Near Entry Gate & Near STP	Air Environment	SO ₂ , NO _x , PM ₁₀ , PM _{2.5} , CO, Lead, Ozone, Ammonia, Benzene, Benzo(a)pyrene, Arsenic, Nickel.	Once in every month	Compared with prescribed NAAQ Standards: 2009	Reporting to APPCB.	During Construction & Operation Phase
DG Area (Stack Monitoring)		Particulate Matter, SO ₂ , NO _x , CO, Flow Rate.	Once in every month	Compared with CPCB Norms	Reporting to APPCB.	During Operation Phase
Near the project site	Noise Environment	Ambient Day Level Noise & Night Level Noise	Once in every month	Compared with CPCB Limits for Noise	Reporting to APPCB.	During Construction & Operation Phase
West side of the project site	Soil Environment	pH, Electrical Conductivity, Water Content, Chloride, Calcium as Ca, Sodium, Available Potassium, Organic Matter, Magnesium as Mg,	Once in every month	--	Reporting to APPCB.	During Construction Phase

		Total Sulphates, Carbonates and Bicarbonates, Permeability, Holding Capacity, Porosity				
STP Inlet and Outlet Water	Wastewater (Black water)	pH, conductivity, TDS, COD, Grease, Coliform, E. Coli	Once in every month	Compared with acceptable limits for CPCB Standards	Reporting to APPCB.	During Operation Phase
Compost from OWC	Solid waste Management	Organic Content, Nitrogen, Phosphorous, Potassium	Once in every month	--	Reporting to APPCB.	During Operation Phase

7 Additional Studies

7.1 Introduction

The following additional studies were the studies for the proposed project.

- Risk Assessment
- Safety aspects considered during Construction & Operation Phase
- Disaster Management Plan
- Traffic Assessment

7.1.1 Risk Assessment

This chapter broadly looks at various aspects related to risk assessment and disaster management through Emergency Response Plan/

Risk Analysis is a process involving identification of possible hazard scenarios and undertaking a treatment for estimation of risks from selected hazards through a systematic process which involves both qualitative and quantitative analysis.

Hazard identification is considered the first step in risk assessment. The others being consequence analysis and frequency estimation. There are different ways through which hazard analysis can be undertaken, both qualitatively and quantitatively.

This chapter provides the identification of various probable hazards (unsafe conditions) that may occur at the proposed project (residential) site.

Risk assessment is undertaken through a risk matrix which deals with the identification and quantification of risks, the equipment / facilities and personnel exposed to accidents resulting from the hazards present at the proposed project area.

Disaster Management Plan involves the different management steps which considers both natural and human induced hazards. It involves different phases such as pre-disaster, during disaster and post disaster. It includes an action plan for ensuring that the community is provided with adequate knowledge and resources in the event of any unwanted incident.

The overall objective of a disaster management plan is make use of the combined resources at the site and outside services to achieve the following :

- To localize the emergency and if possible, eliminate it.

- To minimize the effects of the accidents on people and property.
- Effect the rescue and medical treatment of casualties.
- Safeguard and evacuate people to safe areas.
- Informing and collaborating with statutory authorities
- Provide authoritative information to news media.
- Ultimately bring the incident under control.
- Preserve relevant records and equipment for the subsequent enquiry in to the cause and circumstances of the emergency and
- Investigating and taking steps to prevent reoccurrence.

Emergency prevention through good design, operation, maintenance and inspection are essential to reduce the probability of occurrence and consequential effect of such eventualities. However, it is not possible to totally eliminate such eventualities and or human errors, omissions and unsafe acts cannot be ruled out. An essential part of major hazard control has therefore, to be concerned with mitigating the effects of such emergency and restoration to normalcy at the earliest.

7.1.1.1 Safety measures during Construction phase

The safety measures during construction phase includes,

- Providing clean drinking water to all the workers
- To maintain proper sanitization, decentralized latrines and urinals will be provided to the construction labours.
- Conducting safety audits during Construction Phase
- Employing Safety officer
- Construction workers will be provided with PPE such as helmets, aprons, gloves, boots, ear plugs etc.
- Guarding all parts of the dangerous machineries
- Indicating “Precautions for working” on machines
- Conducting mock drills periodically
- Site will be maintained properly so that no water is stagnant in the project site.
- Frequent health check-ups will be conducted to all the construction workers.
- Ensuring sound construction of walking surfaces at heights with safety rails or belts
- Maintenance of hoists, lifts, chains, ropes and other lifting tackles in good condition

7.1.1.2 Safety measures during Operation Phase

The safety measures during operation phase includes,

- Providing fire evacuation plan with proper fire exit. The proposed warehouse building will be provided with Fire Hydrants, Yards, Sprinklers, Fire Sump
- Fire Alarm system will be provided in all the floors.
- Emergency Exit plan will provided at various locations and the safe assembly points will be marked clearly
- Safety barricades will be provided in the Sewage Treatment Plant. DG oil will be stored in leak proof containers at designated locations to prevent spillage.
- Organic Waste Converter

7.1.2 Introduction

7.1.2.1 Risk Assessment and Disaster Management Plant

The proposed warehouse and light engineering unit is of total area 51331.70 Sq.m and Built up area of 28319.70 Sq.m. The proposed building will be designed as per the National Building Code 2016 or amended from time to time for consideration of all structural and design safeguards. This should consider the stability of the buildings, fire protection systems and other necessary safety aspects during occupation.

7.1.2.2 Hazard Identification

At the proposed project site, hazard occurrence may result in on site implications like:

- Fire and / or explosion
- Leakage of flammable material and catching fire.
- Natural calamities like earthquakes, cyclone etc.

Other incidents, which can also result in a disaster are,

- Agitation/forced entry by external group of people and
- Sabotage

Risk Assessment is divided into two phases for construction and occupation phase. It follows the principle of ALARP (As low as reasonably possible).

The construction phase would involve the different hazards as enumerated in the Table below.

Table 7-1 Different Hazards involved in Construction Phase

S. No.	Type of Hazard	Description	Possible Causes
1.	Ergonomic	Stress, Strain	Work schedule pressure, construction work complexity, personal issues, external psychological stress, high noises, near injury and strong illumination.
2.	Mechanical	Trips, Falls, Slips, cuts, scratch	Loss of concentration, improper scaffolding, wet surfaces, slippery surfaces, improper body harness, mis-handling of cutting tools, carelessness, Non-use of correct PPEs, use of glass and metals.
3.	Heat	Burns, dehydration, eye injuries	Improper Welding process, carelessness during work on hot surfaces, Non-use of correct PPEs, not keeping hydrated.
4.	Electric and confined spaces	Shock, burns, asphyxiation/ choking	In correct work procedures during wiring and installation of electric components, absence of grounding during electric works, improper ventilation, non-use of PPEs suitable for electric works.
5.	Chemical	Asphyxiation, burns, injuries, irritation	Improper use of hazardous chemicals such as paints, varnish, machine oils and pigments, inhalation of VOCs.
6.	Biological	Illness, fever, body ache, others like contagious diseases	Water and air borne diseases could affect the workforce from an individual or a group.

Apart from the above, it is important to note that construction phase hazards are interwoven and one can lead to the other. Hence, a healthy workplace environment can ensure that the hazards are under check. This would greatly improve profitability and productivity. Some of the safeguards which are suggested for a construction project for reducing on-site hazards are provided in Table.

Table 7-2 Hazard Minimization Steps

S. No	Type of Hazard	Hazard Minimization Steps
1.	Ergonomic	A proper work plan involving adequate stress relievers such as community happiness programs for workers and managers
2.	Mechanical	Ensuring proper maintenance of equipments which are used on daily basis for any residual oils, grease could save lives. During rainy seasons, additional communication on safety and working at heights should be imparted. All necessary PPEs should be supplied.
3.	Heat	There should be an SOP or an orientation to the contractor to take adequate precautions when conducting any hot work such as welding, metal cutting, etc. All necessary PPEs should be supplied.
4.	Electric and confined spaces	Proper supervision during electrical works, especially during installation of cables should be undertaken. De-energization should be ensured before any major installation. Proper PPEs suitable for electrical works must be supplied to the workforce.
5.	Chemical	Large volumes of chemicals should be avoided on-site. In addition, the workforce must be sensitized regarding the various hazards as well as remedial measures through the Material Safety Data Sheets. Eye showers and proper PPEs such as rubber gloves should be provided
6.	Biological	It is important to carry out medical checks of all personnel before the commencement of work for any abnormality.

		First aid boxes should be provided at micro level with 24X7 connectivity to a nearby hospital should be initiated. It is also important to ensure that proper health and hygiene facilities, especially in the labour camps are maintained even if they are not on-site. This will ensure that no disease is spread on-site through any contamination. Water quality should be checked for any pathogens.
7.	Logistics	Heavy weights, materials off take, vehicle related injuries, accidents,
8.	Natural	Earthquakes, heavy winds, cyclonic rains, extreme temperatures, heat waves

Risk is a combination of frequency of incidents and probability of those incidents. A typical risk matrix is provided in Table. The numbers represent different risk levels.

These are derived by the product of frequency (which has been categorised as possible, likely and frequent) with Probability (which has been classified as Low, medium and high)

Table 7-3 Risk Matrix for the Proposed project

Frequency	Possible (1)	Likely (2)	Frequent (3)
Probability	Risk		
Low (1)	1	2	3
Medium (2)	2	4	6
High (3)	3	6	9

Reference

Risk Bands	Low	Medium	High	Very High
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An assessment of the hazards and their frequency is provided in the table below.

Table 7-4 Risk classification of various hazards in construction phase

Hazards Associated with Construction Activities	Frequency	Consequences (Probability)	Estimated Risk Value
Ergonomic	3	1	3
Fire	2	2	4
Injury due to defective or wrong tools	3	2	6
Electricity	2	2	4
Excavations	2	2	4
Noise	3	2	6
Logistics	1	3	3
Natural	1	3	3
Chemical	1	3	3
Biological	1	3	3

7.1.2.3 Risk & Control measures

It is attempted to plan and construct the buildings following all safety norms. However, it is not always possible to eliminate such eventualities and random failures of equipment or human errors. An essential part of major hazard control has therefore, to be concerned with mitigating the effects of such emergency and restoration of normalcy at the earliest. A detailed table showing activities during construction and operation phase along with mitigation measures are given in below table.

Table 7-5 Activities during construction and operation along with mitigation measures

Hazards Associated with Activities (During Construction & Operation)	Control/Mitigation Measures
Manual Handling <ul style="list-style-type: none"> ➤ Strains and sprains due to incorrect lifting too heavy loads ➤ Twisting - bending - repetitive movement - body vibration. 	<ul style="list-style-type: none"> • Exercise/warm up • get help when needed • control loads • rest breaks/no exhaustion • no rapid movement /twisting/ bending / repetitive movement

	<ul style="list-style-type: none"> • Good housekeeping.
<p>Falls - Slips - Trips</p> <ul style="list-style-type: none"> ➤ Falls on same level ➤ falls to surfaces below ➤ poor housekeeping ➤ slippery surfaces ➤ uneven surfaces ➤ poor access to work areas climbing on and off plant ➤ unloading materials into excavations wind ➤ falling objects. 	<ul style="list-style-type: none"> • Good Housekeeping • tidy workplace • guardrails, handholds, harnesses, hole cover, hoarding, no slippery floors/trip hazards • clear/ safe access to work areas • egress from work areas • dust/water controlled • PPE.
<p>Fire</p> <ul style="list-style-type: none"> ➤ Flammable liquids/Gases like LPG, Diesel Storage area and combustible building materials ➤ poor housekeeping ➤ grinding sparks ➤ open flames, absence of Fire hydrant network. 	<ul style="list-style-type: none"> • Combustible/flammable materials properly stored/used • good housekeeping • fire extinguishers made available & Fire hydrant Network with reserve Fire water (As per NFPA Code) • Emergency Plan in case of Fire or collapse of structure.
<p>Absence of Personal Protective Equipment</p> <ul style="list-style-type: none"> ➤ Lack of adequate footwear ➤ head protection ➤ hearing/eye protection ➤ respiratory protection ➤ gloves ➤ goggles. 	<ul style="list-style-type: none"> • Head/face • footwear • hearing/eye • skin • respiratory protection provided • training • maintenance
<p>Defective or wrong Hand Tools</p> <ul style="list-style-type: none"> ➤ Wrong tool ➤ defective tool ➤ struck by flying debris 	<ul style="list-style-type: none"> • Right tool for the job • proper use of tools

<ul style="list-style-type: none"> ➤ caught in or on ➤ missing guards 	<ul style="list-style-type: none"> • good condition/ maintenance guards • isolation/ proper demarcation of workspace. • eye/face protection • flying debris controlled
<p>Electricity</p> <ul style="list-style-type: none"> ➤ Electrocutation ➤ overhead/underground services ➤ any leads damaged or poorly insulated ➤ temporary repairs ➤ no testing and tagging. ➤ circuits overloaded ➤ nonuse of protective devices. 	<ul style="list-style-type: none"> • Leads good condition and earthed. • no temporary repairs • no exposed wires • good insulation • no overloading • use of protective devices • testing and tagging • no overhead/ underground services
<p>Excavations</p> <ul style="list-style-type: none"> ➤ Trench collapse ➤ material falling in undetected underground services. ➤ falls ➤ Hazardous atmosphere struck by traffic and mobile plant. 	<ul style="list-style-type: none"> • Soil stability known • no water accumulation • existing services known • material 600mm from edge • clear of suspended loads • hardhats/PPE • ladders • public protection • atmospheric testing • traffic controls • Emergency Plan.
<p>Gas Cutting and Welding</p> <ul style="list-style-type: none"> ➤ Fire ➤ welding flash, burns, fumes, electrocution in wet conditions 	<ul style="list-style-type: none"> • Welding flash and burns controlled with PPE and shields • fumes controlled with ventilation and PPE (in good condition and properly

<ul style="list-style-type: none"> ➤ flashback in oxygen set, leaking cylinders, acetylene cylinders lying down ➤ Poorly maintained leads. 	<p>positioned), Gas cylinders be kept upright & secured position (properly tied)</p> <ul style="list-style-type: none"> • Combustible materials to be kept at secured place to avoid fire & Fire Extinguishers to be kept in fire prone area with training to people for its use.
<p>Noise</p> <ul style="list-style-type: none"> ➤ Unknown noise levels ➤ known noise levels over 85 decibels 	<ul style="list-style-type: none"> • Levels below 85 decibels • Proper protection.

The above safeguards would lead to a risk reduction from the estimated value of risk estimation in Table, which should be within the acceptable limits and in accordance with the ALARP during the construction phase.

7.1.2.4 Risk in Operation Phase

The risk during the operation phase would be different from that of construction phase as several safeguards would be in place before workers are allowed. These would include proper rail guards for staircases, landing as per the NBC, firefighting systems at both external and internal levels, IEC regarding disaster management, important phone numbers during emergency, medical facilities and presence of maintenance team.

7.2 Emergency Response Plan (ERP)

The overall objective of an Emergency Response Plan (ERP) is to make use of the combined resources at the site and outside services to achieve the following:

- To localize the emergency and if possible, eliminate it.
- To minimize the effects of the accident on people and property.
- Effect the rescue and medical treatment of casualties.
- Safeguard other people
- Evacuate people to safe areas
- Informing and collaborating with statutory authorities
- Initially contain and ultimately bring the incident under control

- Preserve relevant records and equipment for the subsequent enquiry into the cause and circumstances of the emergency.
- Investigating and taking steps to prevent reoccurrence.

The ERP is therefore related to identification of sources from which hazards can arise and the maximum credible loss scenario that can take place in the concerned area. The plan considers the maximum credible loss scenario - actions that can successfully mitigate the effects of losses/ emergency need to be well planned so that they would require less effort and resources to control and terminate emergencies, should the same occur.

Main hazards identified for the project include hazards pertaining to fires in buildings and fire in diesel storage areas, earthquake and an ERP pertaining to these is described in the following section.

7.2.1 Response in case of earthquake

If indoors:

1. Take cover under a piece of heavy furniture or against an inside wall and hold on.
2. Stay inside: The most dangerous thing to do during the shaking of an earthquake is to try to leave the building because objects can fall on you.

If outdoors:

Move into the open, away from buildings, streetlights, and utility wires. Once in the open, stay there until the shaking stops.

If in a moving vehicle:

Stop quickly and stay in the vehicle. Move to a clear area away from buildings, trees, overpasses, or utility wires. Once the shaking has stopped, proceed with caution. Avoid bridges or ramps that might have been damaged by the quake.

After the earthquake

1. After the earthquake be prepared for aftershocks.
2. Although smaller than the main shock, aftershocks cause additional damage and may bring weakened structures down. Aftershocks can occur in the first hours, days, weeks, or even months after the quake.

7.2.2 Response in case of cyclones and floods

1. Developer would construct an embankment/flood wall around the proposed site.
2. Proper maintenance of storm water channel and sewer lines.

3. Developer would build the proposed building with all the measures to withstand high wind velocity.
4. Developer would identify nearby medical store.
5. Awareness would be spread about the hazards of stored water. Communicable diseases like malaria, dengue, etc. could spread if water is stored for longer time.
6. Building would be investigated for leakages and any leakage would be repair by developer at low cost.

7.2.3 Response in case of fire

1. Required response during in the event of a fire should be detected in fire alarm.
2. On sighting a fire, it should be immediately informed to the environment manager giving the exact location and type of fire in detail.
3. Initiate the Emergency Response Team for fires.
4. If the fire is small, engage in extinguishing the fire using the nearest fire extinguisher.
5. Guide the Emergency Response Team staff to the emergency assembly point.
6. The Emergency Response Team should immediately inform the nearest dispensary and security force. If required a fire tender should be summoned.
7. The response team should immediately move to the point of fire and take all necessary steps to stop the fire. If the fire is not controllable and spreads then the manager in charge should inform the district authorities and call for external help.
8. The Emergency Response Team will provide immediate relief to the injured at the scene of incident. Any injured persons should be evacuated on priority to the dispensary or one of the nearest hospitals based on their condition.

7.3 Resource Conservation

The project will lead to utilization of various natural resources. As an environmentally responsible corporate, the developers endeavor to conserve these resources by judicious management and recycling and strive to build up these resources where possible.

Water Resources:

To minimize the use of available freshwater, various low flow fixtures may be provided such as Low flow flushing systems, sensor-based fixtures, waterless urinals, tap aerators. The wastewater generated from the sites will be treated in an on-site Sewage Treatment Plant. This will enable the treated wastewater to be used for flushing and landscaping thereby reducing the requirement of freshwater for these purposes.

Rainwater harvesting: The increased hard surface at project site increases the runoff as compared to the otherwise barren land. It is proposed to harvest this rainwater runoff and use it after filtration while reducing the burden of storm water management of the city and eventually natural water bodies. Apart from the open spaces, it is proposed to harvest the roof top rainwater. The storm water will be treated through an oil and grease trap and allowed to flow through layers of sand and gravel for filtration prior to reaching the water table, to avoid any possibility of groundwater contamination.

Construction materials:

The project will require various kinds of natural construction materials such as sand, gravel etc. It is proposed for prior estimation of required quantities of these materials and procurement only as per requirement. This will also result in cost-efficiency. Excavated soil from the project site will be used within the site to the extent feasible. Excess soil will be made available to the construction sites, as per need.

Topsoil:

The topsoil from the site will be conserved. The topsoil from the areas where excavation will be carried out and to be stored and to be used for future landscaping. There should not be any exposed soil without vegetative cover so as to prevent topsoil erosion due to wind or by runoff.

Energy:

To conserve the energy resources, good practices will be followed during the construction phase such as turning off lights and equipments when not in use, ensuring fuel efficiency of motors and vehicles through proper maintenance and minimal work at night. The principles of energy conservation will also be embedded in the buildings through use of energy efficient fixtures, maximum availability of natural light and use of solar energy for street lighting.

7.4 Resettlement and Rehabilitation

The project will not result in displacement of any local population and hence, does not require a resettlement and rehabilitation study.

7.5 Traffic Analysis

Traffic assessment of SH 243 Gudivada Kankipadu Road was carried out to estimate the peak traffic load. The existing traffic load during the morning and evening peak hours were studied and the vehicle counts were categorized under different heads. The peak traffic load in terms

of PCUs was arrived and the incremental traffic due to the project was worked out. This projected traffic load (incremental) was compared with the standard carrying capacity of the existing road. It was observed that the ratio between Volume and Capacity (V/C ratio) was well within the limits.

Maximum of the peak traffic observed at SH 243 Gudivada Kankipadu Road was found to be 3503 PCU/hr. The capacity of road for 6 lane Two way road due to medium cross traffic is taken as 4200 PCU/hr as per IRC Standards. Hence the V/C Ratio for the SH 243 Gudivada Kankipadu Road is found to be $3503/4200 = 0.83$. Hence the level of service for the SH 243 Gudivada Kankipadu Road is “D” & the performance is “Approaching unstable flow”. Hence the impact of the traffic due to the proposed project is insignificant. The detail of the traffic assessment is presented below

Table 7-6 Traffic Assessment

Road	Existing Volume (PCU/hr.)	Existing Volume/ Capacity ratio	Additional Volume (PCU/hr.)	Modified Volume (PCU/hr.)	Modified Volume/ Capacity ratio	Modified LOS
SH 243 Gudivada - Kankipadu Road	3503	0.83	500	4003	0.86	D (Approaching unstable flow)

8 Project Benefits

8.1 Introduction

This chapter covers the benefits accruing to the locality, neighbourhood and region. It also briefs about the improvements in the physical infrastructure, social infrastructure and employment potential.

8.2 Physical infrastructure

The proposed project will be in the middle of so many villages which will leads to increase of shops for basic needs. Transportation will be increased for the local people.

8.3 Employment potential

During Construction Phase, the local people will be engaged for the project. Direct Employment will be given to most of the local people. There will be an increase in employment opportunities for the village people during operation phase as the workers. The workers will be grouped into skilled and unskilled labours based on their experience. This will improve the livelihood of the local workers employed.

9 Environmental Management Plan

9.1 Introduction

This chapter will provide information about Environmental Management Plan (EMP), which includes the administrative and technical setup, summary matrix of EMP, the cost involved to implement the EMP, both during the construction and operational phase. This chapter will also describe the proposed post-monitoring scheme for effective implementation of the mitigation measures.

9.2 Administrative and Technical set up

Tarkeshwar Industrial and Logistics Parks Private Limited has taken extensive measures to delineate the environmental monitoring plan for compliance of various environmental regulations. The Environment Management Plan (EMP) will consist of all mitigation measures for each component of the environment due to the activities increased during the construction, operation and the entire life cycle to minimize adverse environmental impacts resulting from the activities of the project.

The environmental management team comprises of Environmental Manager, Project Engineer, and Monitoring team. The Environmental Management team reports to the Project manager. The Team ensured the suitability, adequacy and effectiveness of the Environment Management Programme.

Table 9-1 Environmental Management Plan

S. No.	Impacts On Environment	Activity /Aspect	Anticipated Impacts	Mitigation Measures	Budgetary Allocation
1.	Air	Point source emission from operation of DG sets Dust emission	Particulate Matter & Gaseous emission Dust will be emitted in the site during various construction activities.	Temporary power will be sourced from APSPDCL and DG sets will be used only during power failure. Water will be sprinkled in the site as dust suppression measure.	Rs. 3,08,000 Rs. 80,000
2.	Water	Construction Activities	Impact on competing users due to large consumption of water for curing, dust suppression, construction, domestic use etc.,	The following measures will be used in the project site:- Curing water will be sprayed on concrete structures: free flow of water not be allowed for curing	Rs. 10,000

			movement of construction vehicles	The machineries will be maintained in the good condition.	
4.	Land	Improper management of domestic waste from Labor colony and also construction waste	Improper disposal of construction waste may lead to soil pollution	The construction debris and the excavated earth will be used for laying the internal roads. The domestic waste generated from the labor colony will be handed over to local body.	-
5.	Social Responsibility	Construction workers	Unhygienic site sanitation facilities may cause health damage to construction workers.	The objective is to ensure health and safety of the workers with effective provisions for the basic facilities of sanitation, drinking water, safety of equipments or machinery etc. The following will be done in the site.	

				<p>By complying with the safety procedures, norms and guidelines (as applicable) as outlined in the National Building Code of India, Bureau of Indian Standards.</p> <p>Providing clean drinking water to all workers.</p> <p>Provide adequate number of decentralized latrines and urinals.</p> <p>Providing septic tank with soak pit for management of wastewater generated.</p> <p>Providing First Aid room, conducting frequent health checkups to labor and conducting free medical camps.</p>	<p>Rs. 1,00,000</p> <p>Rs. 3,00,000</p> <p>Rs. 5,00,000</p> <p>Rs. 2,00,000</p>
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				<p>Providing safety helmet, Gloves, Jacket & Boots</p> <p>Durable and reusable formwork systems to replace timber formwork and ensure that formwork where used is properly maintained.</p>	Rs. 1,50,000
				<p>Ensuring that walking surfaces or boards at height are of sound constructions and are provided with safety rails or belts.</p>	Rs.10,000
				<p>Providing measures to prevent fires. Firefighting extinguishers and buckets of sand will be provided in the construction site.</p>	Rs. 50,000
				<p>Provide sufficient and suitable light for working during nighttime.</p>	Rs. 50,000

6.	Building materials resource conservation	Building Material consumption	Use of farfetched construction materials than the locally available construction materials may lead to over exploitation of natural resources & increase in carbon footprint.	Use of locally available construction materials.	-
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Table 9-2 Operation Phase

S. No.	Impacts On Environment	Activity /Aspect	Anticipated Impacts	Mitigation Measures	Budgetary Allocation
1.	Air	Point source emission from operation of DG sets (500 kVA)	Particulate matter & gaseous emission	Stack height as per CPCB standards Development of a dense belt in the project site Promotion of use of cleaner fuel	Rs.3,00,00 Rs.2,700

				All DG set will comply emissions norms notified by MoEF&CC / CPCB	
2.	Water	Water consumption	Impact on competent users due to consumption of public supply/ ground water (resource loss)	<p>Installation of 50 kLD (MBBR) STP for treatment of wastewater and reusing the same for flushing, Gardening to minimize the fresh water demand</p> <p>Monitoring water use: Use of water meter conforming to ISO Standards will be installed at the inlet point of water uptake and at the discharge point to monitor the daily water consumption.</p> <p>Use of water saving devices/fixtures: low water consumption fixtures like low flow flushing systems,</p>	<p>Rs. 40,00,000</p> <p>Rs. 16,000</p> <p>Rs. 26,400</p>

				<p>sensor-based fixtures, waterless urinals, tap aerators etc to reduce the water usage.</p> <p>Installation of dual plumbing for using recycled water.</p> <p>Use of rainwater to fulfill the non-flushing water demands.</p>	
3.	Noise	Noise from operation of DG sets & Vehicular Movement	Noise Pollution	<p>Providing DG sets with acoustic enclosures</p> <p>Providing adequate driveway in the project site for easy maneuvering of vehicles to avoid traffic congestion.</p>	Rs.10,000
4.	Soil	Municipal solid waste	Improper disposal of municipal solid waste	Segregation of waste at source into biodegradable and non-biodegradable	Rs. 20,000

			may lead to impact on land.	waste by providing colored bins. Disposal of biodegradable municipal solid waste by OWC. E-waste will be handed over to Authorized recyclers	Rs.7,33,000
5.	Energy Conservation	Consumption of energy	Non adoption of renewable source of energy like solar energy may lead to increase in consumption of energy by competing users.	Solar Details to be Proposed: 15 Nos. of solar lights having power of 80 Watts.	Rs. 1,00,000
6.	Disaster Management Plan	Flood	Improper management of storm water may lead to flooding	The drainage system typically includes a sump pit and a discharge point above the DFE (Design Flood Elevation).	-

Table 9-3 Budgetary Allocation During Construction Phase:

S. No.	Description	Budgetary Allocation (in Rs.)
1.	Drinking water & Sanitation (Temporary Toilet) Facilities	1,00,000
	Drinking water facilities –	1,00,000
	Provision of Decentralized Latrines and urinals.	5,00,000
	Provision of septic tank and soak pit	2,00,000
	Health Check up and Health camps and other sanitation measures	1,50,000
	Provision of proper PPE such as Gloves, Safety helmets and Jackets, Boots and other safety precautions (such as fire extinguisher)	50,000
2.	Solid/ Construction Management (Domestic waste from labor colony, office waste such as paper from site office, used gunny bags, construction debris etc from construction site)	3,00,000
3.	Environmental Monitoring	
	Air Quality Monitoring – 5 Locations	18,750
	DG Stack monitoring	1,750
	Water Quality Monitoring (Bore well water)	15,000
	Soil sample Analysis – 5 Location	15,000
	Noise Monitoring – 5 Locations	5,000
4.	Pollution Control Measures – Dust Suppressions and also emissions from DG sets, use of clear fuel	2,00,000
Total Cost		16,40,500

Table 9-4 Budgetary Allocation During Operation Phase:

S. No.	Description		Budgetary Allocation (in Rs.)	
			Capital Cost	Maintenance Cost/Annum
1.	Wastewater Management			
	i.	Provision of 50 kLD STP	38,00,000	13,60,000
2.	Solid waste Management			
	i.	OWC	7,33,000	-
	ii.	Dumper Bins	20,000	-
	iii.	Maintenance	-	3,00,000
3.	Green Belt Development			
	i.	Saplings	1,42,570	-
	ii.	Guards		-
	iii.	Establishing cost	1,42,570	-
	iv.	Gardener (1 No. for every 2500 Sq.m)	-	
	v.	Maintenance	-	1,00,000
4.	Environmental Monitoring			
	i.	Air Quality Monitoring – 5 Locations		50,000
	ii.	DG Stack monitoring		50,000
	iii.	Water Quality Monitoring (Bore well water)		30,000
	iv.	STP water (Inlet & Outlet)		25,000
	v.	Soil sample Analysis – 5 Locations		30,000
	vi.	Noise Monitoring – 5 Locations		10,000
5.	Rainwater Harvesting			
	i.	Rainwater Harvesting Sump/ Pit	11,000	-
	ii.	Rainwater percolation pits –	60,00,000	-
	iii.	Maintenance Staffs	-	1,20,000
Total Cost				1,39,68,140.

10 Summary and Conclusions

10.1 Introduction

This chapter gives the overall summary of the proposed warehouse and light engineering unit is located in S. Nos.107/1A, 107/1B, 107/2, 108/2A2, 108/2B, 108/3, 108/4, 109/5, 109/6 of Gollagudem Village, Punadipadu Revenue Village, Kankipadu Mandal, Krishna District and also briefs the overall justification for implementation of the project and explains how the adverse effects have been mitigated.

10.2 Project overview

Table 10-1 Project Overview

Particulars	Details	
Location	S. Nos.107/1A, 107/1B, 107/2, 108/2A2, 108/2B, 108/3, 108/4, 109/5, 109/6 of Gollagudem Village, Punadipadu Revenue Village, Kankipadu Mandal, Krishna District, Andhra Pradesh	
Geographical Coordinates	16.452782°	80.785668°
	16.452526°	80.786546°
	16.452375°	80.786508°
	16.452353°	80.786455°
	16.451698°	80.786283°
	16.451681°	80.786372°
	16.451202°	80.786226°
	16.450956°	80.787320°
	16.449830°	80.787086°
	16.450329°	80.784725°
	16.450402°	80.784551°
	16.452038°	80.785133°
16.451977°	80.785393°	
Total Plot Area	51,331.70 Sq.m	
Built up area	28,319.70 Sq.m	
Elevation above msl	13m	

Nearest Water Bodies within 10km radius	Kankipadu Lake, Padamati Cheruvu, Lake Perantamma and River Krishna
Reserve Forest within 10km radius	NIL
Eco Sensitive Area within 10km radius	NIL
Nearest Highway	SH 243 (Gudivada Kankipadu Road)
Nearest Town	Komatigunta (0.89km, NE)
Nearest Railway Station	Uppaluru (4.55 km, N)
Nearest Airport	Vijayawada International Airport (7.85km, N)
Nearest Schools/Colleges	<ul style="list-style-type: none"> • Zila Parishad High School (1.77km, S) • MPPS (1.26km, S) • ZP High School (2.49 km, S) • HMK School (3.79 km) • Sri Vidyalaya Olympiad School (3.74 km, SW) • Sri Chaitanya School (2.50km, SW)
Nearest Hospitals	<ul style="list-style-type: none"> • Sri Lakshmi Hospitals (2.43 km, S) • Sri Chinmaya Hospital (2.68 km, S) • Dr. Gopalachari Hospital (2.59 km, S)
Source of power	Andhra Pradesh State Power Distribution Corporation Limited – APSPDCL
Power Backup	DG Sets – 125 kVA (1 No.)
Fresh Water Requirement	15 KLD
Water Source	Borewell
Occupancy Load	500
Project cost	Rs. 52,46,46,621.
Parking facilities	Surface parking area of 3313.00 sq.m. No. of Cars -144, No. of Bikes – 205 No. of Lorries – 31

10.3 Environmental Description

10.3.1 Land Environment

The project site is a vacant land. There is no change in land use pattern due to the proposed project. During construction phase, there may loss of topsoil. To mitigate this, the topsoil will be stored separately in the bales and the same will be used for green belt development.

- Solid waste management – disposed to local body during construction phase and through OWC recyclers during operation phase
- Wastewater management – through septic tank & soakpit during construction phase and STP (50 KLD) during Operation phase.

10.3.2 Water Environment

To avoid the ground water depletion during Construction & Operation Phase, the water requirement during construction phase will be met by private water tankers. During Operation Phase, combination of efficient water management to reduce water consumption, reuse of treated wastewater to reduce freshwater demand and rainwater harvesting to replenish groundwater and storm water management is proposed to have a positive bearing on the water environment of the region. A Sewage Treatment Plant (STP) of 50 KLD will be set up to treat wastewater.

10.3.3 Air Environment

During construction phase, the major air pollutant of prime concern is PM_{2.5}, PM₁₀ as impacts of other emissions such as SO₂, NO₂, and CO will not be significant. The levels of PM_{2.5}, PM₁₀, NO₂, SO₂ and CO at all the five locations were within the standards prescribed by NAAQ. Thus, dust emissions from construction activities shall require comprehensive mitigation measures and best construction practices.

Water sprinklers will be used to suppress dust during construction. During operation phase, adequate stack height will be provided for the proposed D.G. Sets to provide for sufficient dispersion of pollutants. Adequate driveway and separate entry/exit points will be provided within the project site to avoid traffic congestion. Green belt will be carbon sequestration tree species/Native Tree species will be planted along the periphery of the project site to combat air pollution.

10.3.4 Noise Environment

The major noise during construction is due to operation of machines, movement of construction vehicles and during operation phase, the major source is running of DG sets. To mitigate this impact, construction workers will be provided with ear plugs and earmuffs and acoustic enclosures will be provided for DG sets. Green belt of native species will be planted along the boundary of the project site to reduce the impact of noise during operation phase. Since the proposed project is a warehouse there won't be noise generation other than the DG sets.

10.3.5 Biological Environment

The project site is a vacant land and there is no vegetation except for few shrubs and grasses. Due to the construction activity of the proposed project, there may disturbance to local flora and fauna which is temporary.

Site will be completely barricaded to mitigate the noise. During operation phase, 7574.96 Sq.m of the total plot area will be provided for green belt plantation, which in turn will attract avifauna.

10.3.6 Socio Economic Environment

The project does not involve any Land acquisition and project site is initially a vacant land. Hence there is no significant impact in the Socio-Economic Environment. The project will provide employment opportunities, either directly or indirectly during construction phase and the operation phase will improve the employment generation.

10.4 Conclusion

The study has provided valuable insights of environmental impacts due to the proposed warehouse and light engineering unit is located in S. Nos.107/1A, 107/1B, 107/2, 108/2A2, 108/2B, 108/3, 108/4, 109/5, 109/6 of Gollagudem Village, Punadipadu Revenue Village, Kankipadu Mandal, Krishna District, Andhra Pradesh. The source of pollutants and implementation of mitigation measures were described in the report.

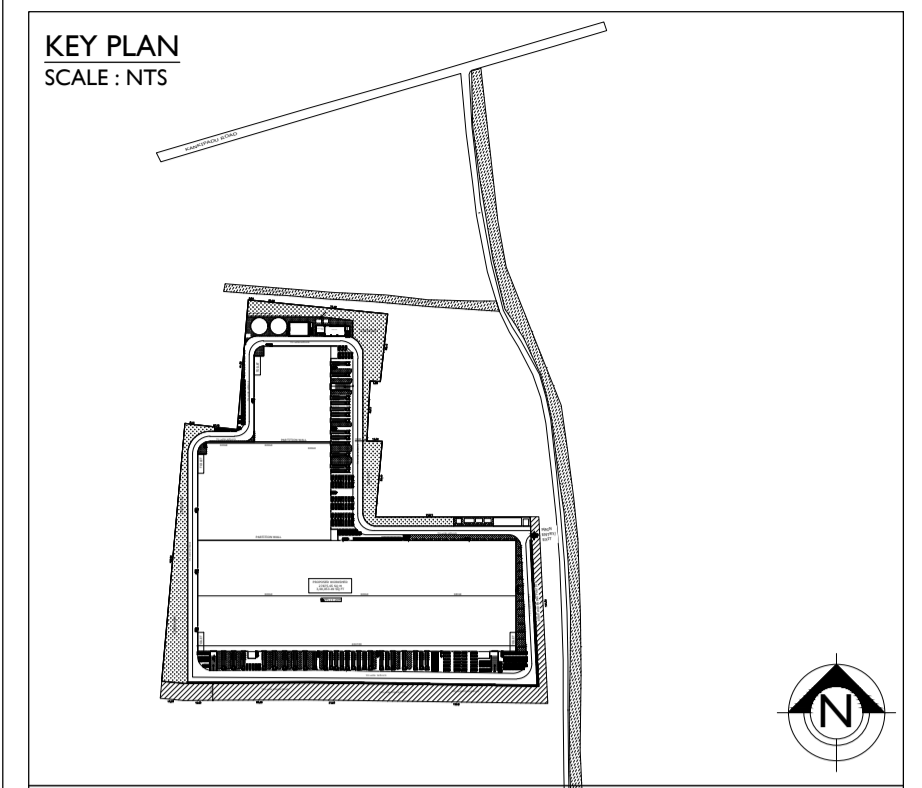
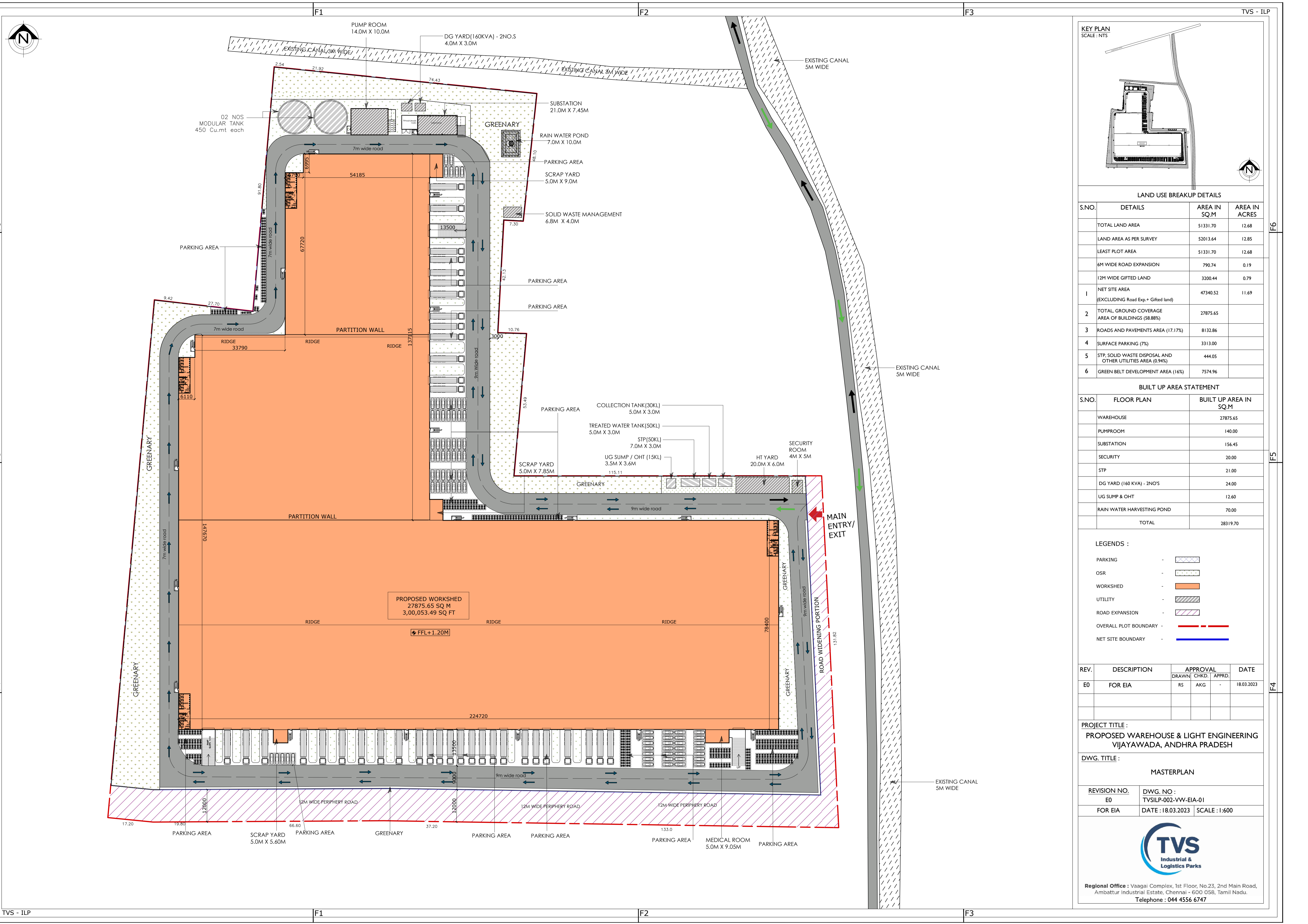
It is observed that there is no impact on Environment which includes Air, Water, Soil, Ecological & Biodiversity (Flora, Fauna) and Human Health.

ANNEXURES



ANNEXURE -1

MASTER LAYOUT



LAND USE BREAKUP DETAILS

S.NO.	DETAILS	AREA IN SQ.M	AREA IN ACRES
	TOTAL LAND AREA	51331.70	12.68
	LAND AREA AS PER SURVEY	52013.64	12.85
	LEAST PLOT AREA	51331.70	12.68
	6M WIDE ROAD EXPANSION	790.74	0.19
	12M WIDE GIFTED LAND	3200.44	0.79
1	NET SITE AREA (EXCLUDING Road Exp. - Gifted land)	47340.52	11.69
2	TOTAL GROUND COVERAGE AREA OF BUILDINGS (58.88%)	27875.65	
3	ROADS AND PAVEMENTS AREA (17.17%)	8132.86	
4	SURFACE PARKING (7%)	3313.00	
5	STP, SOLID WASTE DISPOSAL AND OTHER UTILITIES AREA (0.94%)	444.05	
6	GREEN BELT DEVELOPMENT AREA (16%)	7574.96	

BUILT UP AREA STATEMENT

S.NO.	FLOOR PLAN	BUILT UP AREA IN SQ.M
	WAREHOUSE	27875.65
	PUMPROOM	140.00
	SUBSTATION	156.45
	SECURITY	20.00
	STP	21.00
	DG YARD (160 KVA) - 2NOS	24.00
	UG SUMP & OHT	12.60
	RAIN WATER HARVESTING POND	70.00
	TOTAL	28319.70

- LEGENDS :**
- PARKING - [Pattern]
 - OSR - [Pattern]
 - WORKSHED - [Pattern]
 - UTILITY - [Pattern]
 - ROAD EXPANSION - [Pattern]
 - OVERALL PLOT BOUNDARY - [Red Dashed Line]
 - NET SITE BOUNDARY - [Blue Solid Line]

REV.	DESCRIPTION	APPROVAL		DATE
		DRAWN	CHKD. / APPRD.	
E0	FOR EIA	RS	AKG	18.03.2023

PROJECT TITLE :
PROPOSED WAREHOUSE & LIGHT ENGINEERING VIJAYAWADA, ANDHRA PRADESH

DWG. TITLE :
MASTERPLAN

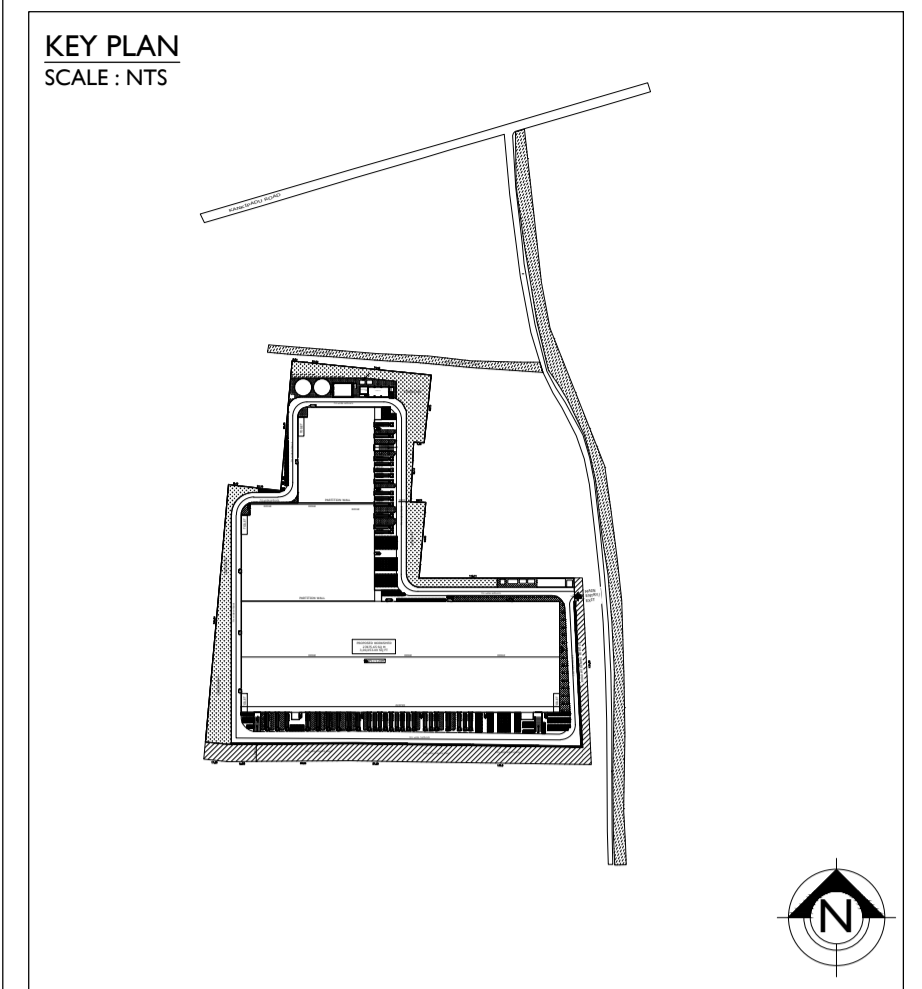
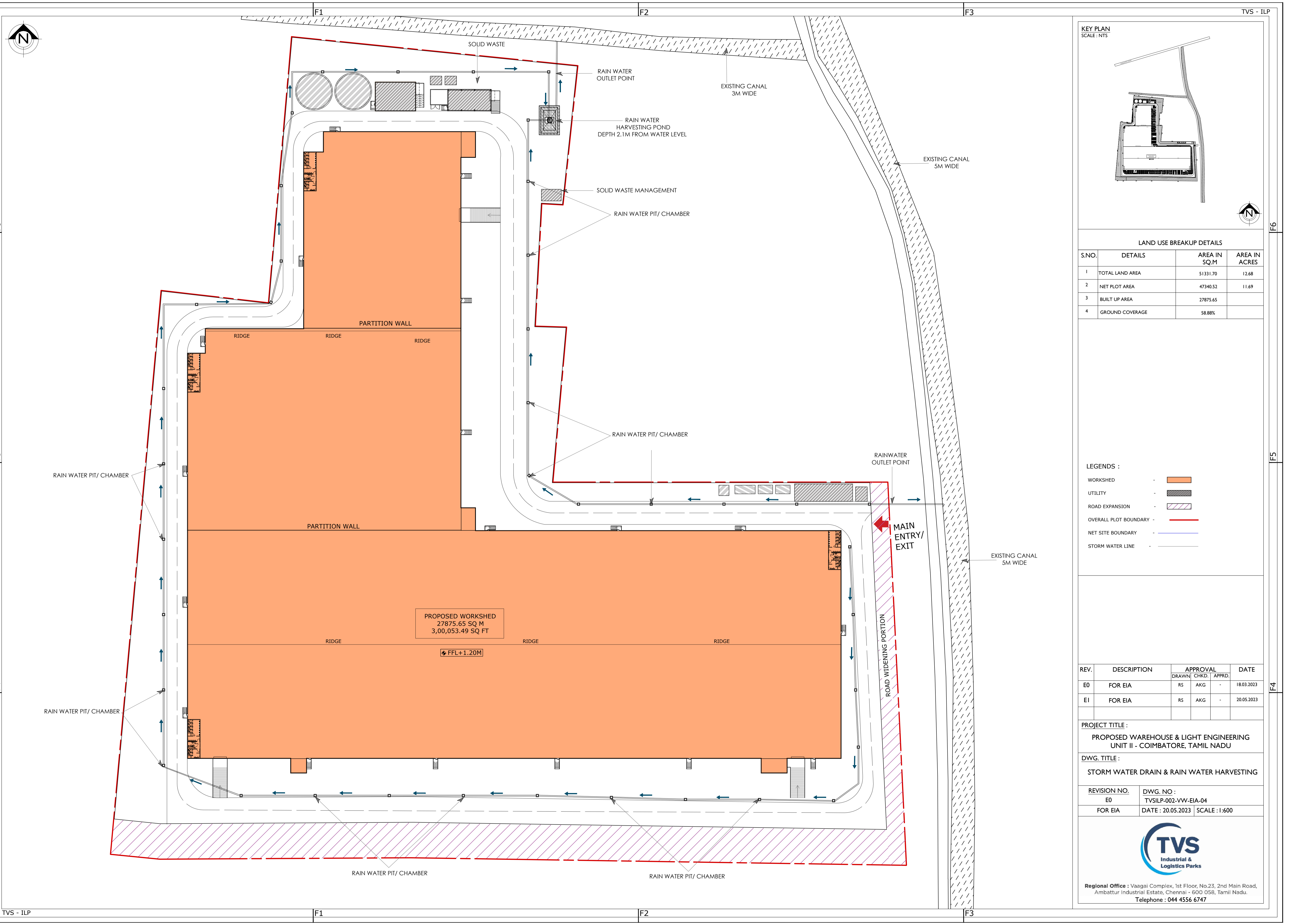
REVISION NO.	DWG. NO. :
E0	TVSILP-002-VW-EIA-01
FOR EIA	DATE : 18.03.2023 SCALE : 1:600

Regional Office : Vaagai Complex, 1st Floor, No.23, 2nd Main Road, Ambattur Industrial Estate, Chennai - 600 058, Tamil Nadu.
Telephone : 044 4556 6747



ANNEXURE-2

**STORM WATER
LAYOUT**



LAND USE BREAKUP DETAILS

S.NO.	DETAILS	AREA IN SQ.M	AREA IN ACRES
1	TOTAL LAND AREA	51331.70	12.68
2	NET PLOT AREA	47340.52	11.69
3	BUILT UP AREA	27875.65	
4	GROUND COVERAGE	58.88%	

- LEGENDS :
- WORKSHED - [Orange Box]
 - UTILITY - [Hatched Box]
 - ROAD EXPANSION - [Diagonal Hatched Box]
 - OVERALL PLOT BOUNDARY - [Red Dashed Line]
 - NET SITE BOUNDARY - [Blue Dashed Line]
 - STORM WATER LINE - [Dashed Line with Arrow]

REV.	DESCRIPTION	APPROVAL			DATE
		DRAWN	CHKD.	APPRD.	
E0	FOR EIA	RS	AKG	-	18.03.2023
E1	FOR EIA	RS	AKG	-	20.05.2023

PROJECT TITLE :
PROPOSED WAREHOUSE & LIGHT ENGINEERING UNIT II - COIMBATORE, TAMIL NADU

DWG. TITLE :
STORM WATER DRAIN & RAIN WATER HARVESTING

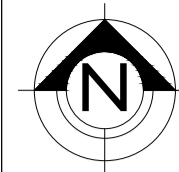
REVISION NO. E0 FOR EIA	DWG. NO : TVSILP-002-VW-EIA-04 DATE : 20.05.2023 SCALE : 1:600
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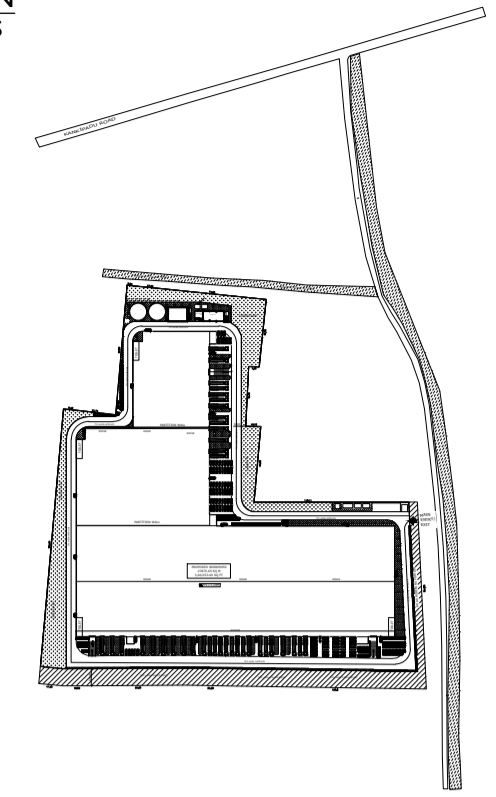
Regional Office : Vaagai Complex, 1st Floor, No.23, 2nd Main Road,
 Ambattur Industrial Estate, Chennai - 600 058, Tamil Nadu.
 Telephone : 044 4556 6747

ANNEXURE-3

GREEN BELT LAYOUT



KEY PLAN
SCALE: NTS



LAND USE BREAKUP DETAILS

S.NO.	DETAILS	AREA IN SQ.M	AREA IN ACRES
1	TOTAL LAND AREA	51331.70	12.68
2	NET PLOT AREA	47340.52	11.69
3	BUILT UP AREA	27875.65	
4	GROUND COVERAGE	58.88%	

GREENARY AREA STATEMENT

S.NO.	DESCRIPTION	AREA IN SQ.M
1	GA - 1	2734.53
2	GA - 2	2000.00
3	GA - 3	717.62
4	GA - 4	433.58
5	GA - 5	257.44
6	GA - 6	349.67
7	GA - 7	64.30
8	GA - 8	370.12
9	GA - 9	470.95
10	GA - 10	176.75
TOTAL GREENARY AREA		7574.96

GREEN BELT DEVELOPMENT AREA - 7574.96 SQ.M / 16%
NO OF TREES PROPOSED - 530NOS IN GREEN BELT AREA

LEGENDS :

- WORKSHED - [Orange Box]
- UTILITY - [Hatched Box]
- ROAD EXPANSION - [Dotted Box]
- OVERALL PLOT BOUNDARY - [Red Dashed Line]
- NET SITE BOUNDARY - [Blue Dashed Line]

REV.	DESCRIPTION	APPROVAL			DATE
		DRAWN	CHKD.	APPRD.	
E0	PROPOSED FOR EIA	RS	AKG	-	18.03.2023

PROJECT TITLE :
PROPOSED WAREHOUSE & LIGHT ENGINEERING
VIJAYAWADA, ANDHRA PRADESH

DWG. TITLE :
GREEN BELT LAYOUT

REVISION NO. E0	DWG. NO : TVSILP-002-VW-EIA-02
FOR EIA	DATE : 18.03.2023 SCALE : 1:600



Regional Office : Vaagai Complex, 1st Floor, No.23, 2nd Main Road,
Ambattur Industrial Estate, Chennai - 600 058, Tamil Nadu.
Telephone : 044 4556 6747



ANNEXURE-4
STP -SPECIFICATION

50KLD SEWAGE TREATMENT PLANT - DAIKI

TECHNICAL SPECIFICATION FOR 50KLD SEWAGE TREATMENT PLANT

Client

*M/s. TVS Industrial & Logistics Parks Pvt
Ltd*

Contractor

M/s. Daiki India (P) Ltd

Description

P.O. No.

	Rev.	Date
Prepared by	Approved by	Checked by

Technical Specification for 50KLD Sewage Treatment Plant

1.0 Project & Business Objectives

M/S. Daiki India (P) Ltd seeks to provide the best technology for the Design, Supply, Installation & commissioning of equipments for the 50KLD- Daiki Sewage Treatment Plant.

2.0 Scope of Work

- Basic design & Concept development
- Detailed Engineering & Technical Specification
- Fabrication & Procurement of all equipments.
- Supply and erection of all equipments.
- Testing, pre commissioning and commissioning of the plant.

3.0 Flow rate logistics

Sewage Treatment Plant (STP) - 50KLD DAIKI

Plant Capacity : 50 KLD
 Operating Hours : 20 hrs
 Plant Flow Rate : 2.5 cum/hr

4.0 Quality logistics

S.No	Parameter	Units	DAIKI STP Inlet	BA OUTLET	MOEF Outlet
1	pH	-	6.0 – 8.0	6.0 - 8.0	6.5 – 9.0
2	BOD	Mg/l	300	< 20	<20
3	COD	Mg/l	500	< 50	-
4	TSS	Mg/l	240	< 30	< 50
5	Oil & Grease	Mg/l	40	< 10	-
6	T-N	Mg/l	50	< 45	-
7	F.Colifom	(MPN / 100 ml)	600	<100	<1000

5.0 Battery Limit

1. Inlet Water to the STP Collection tank & STP treated water outlet is under client's scope.
2. Collection Tank & Treated Water Tank under client scope.
3. Raw Sewage Pump & Treated water pump is under Client's scope.
4. Incomer Electrical power – 415 Volts, 3 Phase and 50 Hz
5. Power incomer to our panel is under client's scope
6. Water & Electricity during the erection & commissioning is under Client's scope
7. Tanks, Pedestals, Enclosure for STP Plant & all necessary civil works are under Client's scope.
8. Lockable storage should be provided by the client & safety of equipments within the site is under client's scope.
9. Landscaping & gardening is under Client's scope.
10. Plant Lighting & Ventilation system is under client's scope

6.0 Codes & Standards

All design; fabrication, inspection, and testing of the plant will be done with respect to the latest Indian Standards. In case of non-availability of standards, good engineering practice will be adopted.

Standards to be followed:

Plain & reinforced cement concrete	– IS 456: 2000
Concrete structure for the storage of liquids	– IS 3370: 1981-88
Pressure vessels	– ASME SEC VIII
Pumps	– IS 5120
Others	– Available IS standards.

In case of non-availability of standards, good engineering practice will be adopted.

**TECHNICAL SPECIFICATIONS
FOR
ELECTROMECHANICAL WORKS
(DAIKI SCOPE)**

SEWAGE TREATMENT PLANT-50KLD DAIKI

Specification of 50KLD - DAIKI Packaged STP

Client : M/s. Margathambal Industrial logistics LLP, Hosur.

Contractor : M/S. Daiki India (P) Ltd, Chennai

Sl.No	Description	Specification
Pump data		
1	Quantity	1 No.
2	Inflow Capacity	50 cum/day
3	Average Flow	2084 lph
4	Peak Flow	5210 lph
4	Dimension	W: 2.20m, L:10.67m, H:2.3m
5	Volume	34.43m ³
6	Weight	2530 Kgs
7	Electric Consumption	17.86 kwh/day
8	Make	HECS-Daiki

SEWAGE TREATMENT PLANT-50KLD DAIKI

Specification of 50KLD - DAIKI Packaged STP

Client : M/s. Margathambal Industrial logistics LLP, Hosur.

Contractor : M/S. Daiki India (P) Ltd, Chennai

Sl.No	Description	Specification
Blower data		
1	Quantity	3 No.
2	Type	Electromagnetic
3	Capacity	240 ltrs/min - 2 nos 200 ltrs/min - 1 no
4	Bore diameter	20 mm
5	Motor rating	310 W - 2 nos 240 W - 1 no
6	Voltage	220 V

SEWAGE TREATMENT PLANT -50KLD DAIKI

Specification of Raw Sewage Pump – Client Scope

Client : M/s. Margathambal Industrial logistics LLP, Hosur.

Contractor : M/S. Daiki India (P) Ltd, Chennai

Sl.No	Description	Specification
Pump data		
1	Quantity	1 No
2	Type	Centrifugal Monobloc
3	Capacity	2.5 cum/hr
4	Head	12 - 15 m
5	MOC	CI
6	Model	SP'O'
7	Power Rating	1 HP
8	Voltage / Frequency	415 v +/- 10% , 50 Hz +/- 10%
9	Class of insulation	F
10	Suction & Delivery Size	40 mm x 40 mm
11	Protection	IP 55
12	Make	Kirloskar / Eq.

SEWAGE TREATMENT PLANT -50KLD DAIKI

Specification of Instruments

Client : M/s. Margathambal Industrial logistics LLP, Hosur.

Contractor : M/S. Daiki India (P) Ltd, Chennai

Sl.No	Description	Specification
Pressure Gauge		
1	Quantity	2 Nos.
2	Type	4" Dial type
3	MOC	CI
4	Range	0 - 7 Kg/cm ²
5	Make	Waaree / H guru / eq.
Flow Meter		
6	Quantity	1 No
7	Type	Electromagnetic type
8	Capacity	0 - 2.5 cum/hr
9	MOC of Electrode	SS
10	Lining	Rubber Lining
11	Make	Aster / eq.

SEWAGE TREATMENT PLANT -50KLD DAIKI

Specification of Starter Switch

Client : M/s. Margathambal Industrial logistics LLP, Hosur.

Contractor : M/S. Daiki India (P) Ltd, Chennai

Sl.No	Description	Specification
Switch data		
1	Quantity	1 No
2	Type	Wall Mounted
3	Starter type	DOL Starter for Raw Sewage Pump (Client's scope)
4	Size	As per Mfg Std
5	Components	MCB / OLR / Contactor
6	Make of Components	Siemens / Schneider / L&T / eq.
7	Make of Cables	Finolex / Polycab / Orbit
8	Socket Spec	15A 3 Pin Socket with switch (For Flow meter & blowers)

SEWAGE TREATMENT PLANT -50KLD DAIKI

Specification of Interconnecting Pipes & Valves

Client : M/s. Margathambal Industrial logistics LLP, Hosur.

Contractor : M/S. Daiki India (P) Ltd, Chennai

Sl.No	Description	Specification
Water line		
1	Quantity	1 Lot
2	MOC	UPVC SCH 40
3	Class	6 kg/cm ²
4	Size	As per the requirement
5	Accessories	Elbows, Tees, Reducers, MTAs, etc...
6	Make	Finolex / Supreme/ Astral / Eq.
Non - Return Valves		
7	Quantity	1 lot
8	Type	Flap type
9	Size	Suitable for pumps & Blowers
10	MOC	CI
11	Make	Intervalve / L&T / Cair / eq.
Butterfly valves		
12	Quantity	1 lot
13	Type	Wafer Type
14	Size	Suitable for Pumps, Blowers & Filters
15	MOC	CI
16	Make	Intervalve / L&T / Cair / eq.
Ball Valves		
17	Quantity	1 lot
18	Type	Full Way Open Type
19	Size	Suitable for Pumps & Filters
20	MOC	UPVC
21	Make	Finolex / Supreme / Ashirvad / eq.

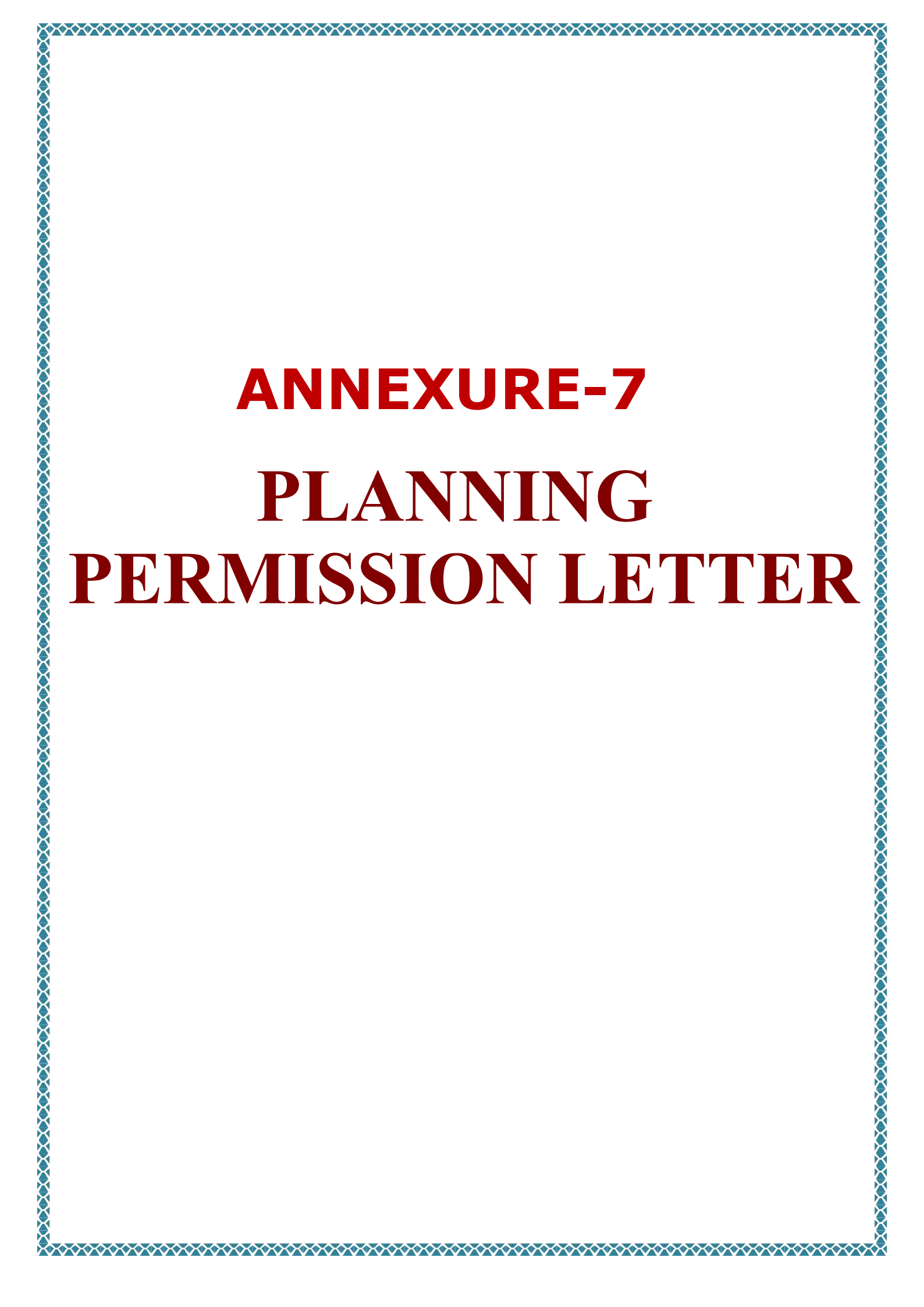


ANNEXURE-5

**LAND USE
CLASSIFICATION**

ANNEXURE-6

LAND DOCUMENTS



ANNEXURE-7

PLANNING

PERMISSION LETTER



ANNEXURE-8
NOC LETTERS