I. EXECUTIVE SUMMARY

Industrial growth is unprecedented in the last one decade in India, especially in the state of Karnataka, it is rapid and continuing. Eventually, the waste generation from industries has grown to become a serious environmental threat. Most of the wastes from industrial activities are toxic and hazardous in nature. In India, required scientific systems and facilities to handle and manage such industrial hazardous waste have not yet established sufficiently and it was stressed in many Environmental Forums that Hazardous Waste Management Facilities are the need of this hour to sustain the growth of the Industries.

Karnataka, especially Urban-Connects from Bangalore has become a hub for industrial growth and the proposed project location, Tumkur which is by 75 Km from Bangalore is experiencing a phenomenal growth in the recent past.

The proposed Hazardous waste management facility is envisaged as Resource Recovery Plant (RRP) and will be located in one of the largest Industrial Area developed by Karnataka Industrial Area Development Board (KIADB) near Vasanthanarasapura, Tumkur. The location of this notified Industrial area has more than 4000 acres of land under industrial development with more than 100 industries in operation and another 100 more industries of varied types like Pharmaceuticals, Paint, Automobile, Adhesives, Chemical, Metal, Wood, Paper, etc, are in pipe line under various stages of establishment.

The proponent Century Eco Solutions India Private Limited (CESPL), is already having a Barrel Reconditioning and Recycle unit in the same premises. The present proposal of CESPL is an Integrated Hazardous Waste Management Facility (IHWMF) is proposed with Engineered Plants and Machineries like Disintegrator, Mixer, Neutralization Reactors and Rotary Kiln Incinerator for Resource reclamation as materials for recycling, fuel- mix proportioning towards a feed for co-processing in Cement/Power/Steel Mills and ultimate disposal of final residues in Rotary Kiln Incinerator. The Plant Components ahead of Rotary Kiln Incinerator are thus will
enable the proposed IHWMF to reclaim **Alternate Fuel and Raw Materials** (AFR) as per the Guidelines of CPCB.

The proposed CESPL Facility is planned for a processing capacity of **25MT per day of Hazardous waste** from industries like Paint, Paper, Automobile Pharmaceuticals, wood, etc. The facility will primarily address the requirement of industries in the KIADB Industrial Estate and small and medium category industries in the project location of Tumkur District in Karnataka.

The proposed facility of CESPL will be first of its kind to have fuel-mix proportioning plant, prior to Incineration so that it ensures complete reclamation of materials, fuel-mix preparation for co-processing and Incinerator for residue management. This proposal is a permitted activity under **EIA Notification, 2006** as **A Category** that requires **ENVIRONMENTAL CLEARANCE** under the defined project classification of TSDF (Treatment, **Storage and Disposal Facility for hazardous Waste**).

An Inventorization study on Industrial waste was made by CESPL in the project location, during December, 2015 and it was assessed with the support of data from Karnataka State Pollution Control Board (KSPCB) that the present level of Hazardous Waste generation in Tumkur District is 50-60Tonnes per day and most of them is currently under captive storage in huge quantity in the respective industries. The types of wastes largely incinerable which includes Paint Sludge, Oily Filter Cake, Spent Carbon, Organic waste, Tarry waste, Biomass, ETP Sludge, etc., and also non-incinerable resin, Distillation Residues, ETP sludge, and alumina sludge. There is a significant quantity of waste that falls under the category of synthetic rubber, plastics, etc., which are characteristically high calorific value, which are recommended for use in co-processing cement industries by CPCB.

The surveyed types of waste as generated in the project location can be strategically segregated, neutralized, mixed- proportionately to use it **Alternate Fuel and Raw Materials** (AFR), as defined by CPCB. The industries that were surveyed are keeping their waste in temporary storage with Authorization from KSPCB to do as, in

There also another unique situation that in several industries the generation level of waste is not enough to facilitate transfer for co processing in Cement Industries. Hence, there is a requirement of intermediary to collect and transfer, after proportioning and enrichment of calorific value by proportionate mixing. This will enable the entire waste transfer and management strategy as technically feasible to reclamation and reuse/recycle. The proposed IHWMF of CESPL at Tumkur in the KIADB approved Industrial area will address this issue and ensure resource optimization, energy from waste and ultimate disposal to ensure environmentally sustainable development of industries in Tumkur District, Karnataka.

Century Drums & Barrels Industries, which is a proprietorship concern, is operating a waste barrel reconditioning and Recycle unit 161-B &C, Vasanthanarsapura KIADB Industrial Area. The available land measures Two Acres and it is under log lease agreement from KIADB.

Century Eco solutions India Private Limited (CESPL) are a newly floated sister concern of Century Drums & Barrels Industries. CESPL is now proposing this in the One acre of vacant land in their industrial plot No. 161-B&C, KIADB Industrial Area, Vasanthanarsapura, Tumkur, KARNATAKA.

The product from Waste Proportioning for Fuel Mix or reclamation of material which can be sent for recycling will be around 15T per day and around 10T per day will be required to be incinerated in the Rotary Kiln Incinerator. Hence, the proposed IHWMF will provide AFR, as mandated by CPCB and will reduce the requirements for Incineration which leads to have the principle of Reduce, Reuse/Recycle ahead of ultimate disposal in Incinerator. The AFR will draw calorific value from the organic part of the waste and material from the mineral part of the waste and thus all reusable/recyclable part of hazardous waste reaching the proposed facility will be
meant for co processing. This will make the proposed CESPL facility as environmentally compatible and financially feasible.

The proposed Integrated Hazardous Waste Management Facility (IHWMF) with Material Recovery systems and Fuel-Mix Proportionate reactors for reclamation of AFR and Rotary Kiln Incinerator to dispose the rejects and non-recoverable trash will cater the requirements of industries to manage their hazardous waste in compliance to Hazardous Waste Management Rules of MoEF&CC. The facility will address the CPCB defined-hierarchy requirements in hazardous Waste management with plant components for Reuse and Recycle ahead of ultimate disposal in Incinerator.

II. INTRODUCTION

The Integrated Hazardous waste Management Facility will have Resource Recovery Plant to recover materials like plastics, metals, glass, etc., and Fuel-Mix plant to proportionately mix select-waste streams to have a qualified feed for Co-processing in industries like Cement, Steel and Power Plants as per the Guidelines of Central pollution Control Board (CPCB).

The reclamation of AFR ahead of Rotary Kiln Incinerator is the unique feature of the proposed IHWMF. CESPL will get state of the art and the best available technologies to install the facility as Waste to Resource Recovery facility.

The IHWMF will be installed with required systems for waste segregation, neutralization, proportionate mixing & incineration for the final residue of waste and rejects from AFR.

The Plant will be installed with PLC based auto operating supports and continuous monitoring and data maintenance systems. The treated effluent will be fully recycled and reused for Emission quenching, wet cleaning, ash wetting, green belt development, etc.,

The final ash from Incinerator will be disposed through approved TSDF
2.1 PROJECT

The proposed project is essentially a Hazardous Waste Management Facility which will have Plant components to reclaim AFR from the hazardous waste streams. The rest which is highly heterogeneous and segregation is challenge, will be disposed through Rotary Kiln Incinerator.

The AFR reclamation facility is envisaged for a processing capacity of **15 MT per day** with Segregation yard, Disintegrator, Neutralizing Reactor, Dry and wet mechanical Mixers for proportionate mixing and value addition for Calorific value and or mineral value.

The reject materials from AFR facility and other waste which have materials in a non recoverable state will be done to ash in Rotary Kiln Incinerator. The Incinerator facility is designed to process **10MT of incinerable waste per day**. The Incinerator will have plant components and systems as per the recommendations of CPCB for Hazardous Waste Incineration Facility.

The Incinerator will be integrated with Cyclone for dry particles separation and Venturi Scrubber for wet cleaning of emission for acid and metal oxides. It also incorporated with an Effluent Treatment Plant for neutralization of the spent liquor from the scrubber.

As a whole, the proposed IHWMF can handle and process 25 MT per day of hazardous waste. The project is proposed to be located in the notified **Industrial Area** by Karnataka Industrial Development Board (KIADB) and in **One acre of land** that falls under revenue division of **R.S.No.161-B&C, I Phase Vasanthanarasapura, Bellavi HO., Tumkur Taluk, Karnataka**.

The Budgetary Estimate of the project is INR **10 Crores**.
2.2 INTEGRATED HAZARDOUS WASTE MANAGEMENT FACILITY - THE PROPOSED PROJECT

The proposed IHWMF will have two major plant components viz., AFR Reclamation facility (15 TPD) and Rotary Kiln Incinerator (10 TPD).

The AFR reclamation facility is envisaged for a processing capacity of 15 MT per day with Segregation yard, Disintegrator, Neutralizing Reactor, Dry and wet mechanical Mixers for proportionate mixing and value addition for Calorific value and or mineral value.

The reject materials from AFR facility and other waste which have materials in a non recoverable state will be done to ash in Rotary Kiln Incinerator. The Incinerator facility is designed to process 10MT of incinerable waste per day. The Incinerator will have plant components and systems as per the recommendations of CPCB for Hazardous Waste Incineration Facility.

2.3 NEED FOR THE PROJECT

The KIADB Industrial area at Vasanthanarasapura is the biggest Industrial area with more than 4000 acres under development. There are another 5 such notified Industrial area under the aegis of KIADB in Tumkur District.

The increased industrial activities around the project location and type of industrial waste streams as they have been surveyed for project survey indicated and concluded for a Waste Management Facility.

The list of major industries with respect to envisaged waste feed streams is presented in ANNEXURE-I.

The classified waste streams from the member industries are listed in ANNEXURE-II.

KSPCB already inventoried the waste streams and stated in many forums on the need for such a proposed IHWMF in the project location.
A Key Plan showing the location of the proposed IHWMF with respect to notified Industrial area for 100Km radius is presented in Annexure-III.

The proposed project will bring a new business model as RRF as it is envisaged to produce AFR at 15TPD which can be co processed in the adjoin industries. A Key Map showing major Cement, Steel and Power Plants in the project location where CESPL is intended send AFR for co processing the qualified feed, which will otherwise remain or managed as waste.

2.4 DEMAND - SUPPLY

As could be observed in Annexure-I,II and III, there is a huge demand for Hazardous Waste Management facility and there is scope to supply qualified- value added fuel mix as AFR that can be supplied to industries for co processing.

CESPL will be able to convert the waste into valuable materials, reclaim a fuel-mix and ultimately enable the client-industries to comply with HW (M,H&TB)Rules,2008.

The proposed CESPL facility for managing Hazardous Waste for recovery of resources from the waste streams will be a trend setter, especially, to demonstrate how an integrated facility will be able to generate resources from the waste, thus IHWMF will be environmentally compatible and financially feasible project.

The project will improve the life cycle resources in the HW streams thus will enhance material optimization and will go in compliance to the CPCB’s mandate for Reuse/Recycle and do the least in Incineration to ensure safe disposal of Hazardous waste from industries.

IMPORTS VS INDIGENOUS PRODUCTION

The indigenous production of AFR, that too from HW streams is a non conventional resource management practice.
The mineral and calorific rich AFR will definitely offset the requirement of fuel which otherwise, in normal circumstance is being imported. However, the size of the proposed facility is tiny and that it will unlikely to have any impact on Imports.

Nevertheless, similar efforts to reclaim the material resources from HW at national scenario as AFR will certainly have a positive impact on imports significantly in the secondary oil requirements and coal products.

2.5 EXPORT POSSIBILITY

The proposed Integrated Hazardous Waste Management facility is essentially a service Industry for waste Management. Hence, despite recovery of AFR from the waste processing, the scope for export does not arise.

2.6 DOMESTIC / EXPORT MARKETS

Despite the facility is primarily a waste management, the recovered AFR can be sold domestically for industrial applications like in co processing in Cement, Steel and Thermal Plants

However, there is no export marketing involved in the activities of the proposed facility.

2.7 EMPLOYMENT GENERATION

CESPL will have employment generation for about 20 for waste handling and 10 for plant operation and maintenance.

III. PROJECT DESCRIPTION

The proposed project is an Integrated Hazardous Waste Management Facility (IHWMF) with two major facility components viz., Alternate Fuel and Raw Material (AFR) Reclamation Plant and Rotary Kiln Incinerator, with HW processing capacity of 25 TPD. This project is a classified activity by EIA Notification, 2006 as TSDF and as A Category Activity.
A Conceptual facility lay out of the proposed IHWMF is presented in Fig.1.

The Integrated Hazardous waste Management Facility will have Resource Recovery Plant to recover materials like plastics, metals, glass, etc., and Fuel-Mix plant to proportionately mix select-waste streams to have a qualified feed for Co-processing in industries like Cement, Steel and Power Plants as per the Guidelines of Central pollution Control Board (CPCB). This plant component is envisaged as Alternate Fuel and Raw Material (AFR) reclamation plant, as recommended by the Guidelines for Co Processing of HW in industrial applications.

**AFR Plant**

The reclamation of AFR ahead of Rotary Kiln Incinerator is the unique feature of the proposed IHWMF. CESPL will get state of the art and the best available technologies to install the AFR Plant as Waste to Resource Recovery facility. This plant will have a well established in-house laboratory to analyze waste streams for their Physical, Chemical and Biological Characteristics.

A rigorous analysis of waste streams for the protocols of Proximate and Ultimate Analysis are the pre requisite to design application-specific AFR for the required mineral and minimum supporting heat value to compliment the intended co processing.

The AFR Plant will be installed with required systems for waste segregation, neutralization, proportionate mixing and value addition sections to enhance the mineral value and calorific value to qualify as feed for co processing along with other raw materials in the manufacturing of Cement, Steel, etc.,

**A Schematic of AFR Plant** is presented in Fig.2

**Waste segregation**

This is a manually operated for quality check protocols for calorific value, organics and minerals. The Organic rich materials will be transferred to incinerator. The Calorific
FIG. 1  CONCEPTUAL PLANT LAY-OUT

Location:
161-B&C, KIADB Industrial Area, Vasanthanarasapura,
Tumkur
KARNATAKA.
Waste Reception (Specific Industrial) → Segregation

- Metals (Reuse)
- Plastics (Reuse)
- Glass (Reuse)
- In organics
- Organics

Neutralization/Precipitation on Proportionate Mixing

- Heat Content (AFM) (>3000 Kcal/Kg)
- To Mix with feed to RK Incinerator (>3000 Kcal/Kg)
- Mixed with Organics

AFR

- Proportionate
- Mineral Oxides (Reuse)
- Residue

FIG.2 Schematics of AFR Plant

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value rich for a minimum of 2500 Kcal/Kg will be segregated to formulate AFR. The mineral rich waste streams will be put into rigorous waste analysis to segregate and proportionately mixed to application-specific AFR.

**Disintegrator**

There will be two types of Disintegrator installed in the AFR plant. One will be used to crush the materials into unrecognizable shapes with a Counter-Current screw as Jaw Crusher.

Another will be a type of Ball Mill which will mill the required materials into required sieve size as powder to add into fuel mix so that proportionate mixing and value addition of the waste mixing as AFR will be achieved.

**Neutralization**

Semi-solid and Liquid waste streams of HW needs to be neutralized either by proportionate mix of different waste streams or by addition of alkali or acid. This is important to control the chemical reactions between various components of the different waste streams.

**Mixers**

There will be another mixer to have wet mixing of certain liquid waste with select solids so that the mix gets required calorific value to enrich the value of AFR for co-processing.

The Plant will be installed with PLC based auto operating supports and continuous monitoring and data maintenance systems. The treated effluent will be fully recycled and reused for Emission quenching, wet cleaning, ash wetting, green belt development, etc.,

The final ash from Incinerator will be disposed through approved Secured Land Fill Facility.
Rotary Kiln Incinerator

The Rotary Kiln will be designed, installed, operated and maintained as per the CPCB Guidance Document on Hazardous Waste Incinerator.

CESPL is proposing the RK Incinerator for waste processing capacity of 500 Kg/hr (10 TPD). The Incinerator will have Waste Proportionate Mixer for preparing a qualified Feed Stream for optimized operating conditions of the Incinerator and towards achieving Incineration efficiency at 99.99%.

The final rejects of AFR plant will also fed into the RK Incinerator.

A Schematic of the proposed Rotary Kiln Incinerator Plant with APC measures is presented in Fig.3

The elemental combustion at 900-950°C will ensure relatively pure emission as the Secondary Chamber at 1100-1200°C will render the emission with only CO₂ in it. However, the residual concentrations of ash and NOx will be removed in a two stage Emission Cleaning systems viz., Cyclone and Wet Scrubber.

The Scrubber liquor will be replaced at 10-20% by fresh alkali solution and the spent liquor will be treated in the ETP.

The ash will be solidified with Cement/Lime before it will be added as constituent of AFR.

The RK Incinerator will have 35m height stack with systems to ensure negative draft in the Kiln so that it performs to control all type of emissions as mandated by MoEF&CC.

3.1 PROJECT SIZE AND TYPE

The proposed project is an Integrated Hazardous Waste Management Facility (IHWMF) with two major facility components viz., Alternate Fuel and Raw Material (AFR) Reclamation Plant and Rotary Kiln Incinerator, with HW processing capacity of 25 TPD.
Fig. 3 SCHEMATICS OF INCINERATOR
ROTARY KILN HAZARDOUS WASTE INCINERATOR

LEGEND
1. Mechanical Waste Feeder
2. Rotary Kiln
3. Secondary Chamber
4. Quenching Tower
5. Cyclone
6. Wet Scrubber
7. ID Fan
8. Stack, 35 m
9. Quenching Water Line
10. Alkali Line

Century Eco Solutions India Private Limited
KIADB Industrial Area, Tumkur, Karnataka
The AFR is envisaged to handle and process 15 TPD of HW and RK Incinerator will process 10TPD of waste.

The AFR plant is a Resource Recovery Plant and RK Incinerator is the ultimate disposal of incinerable residues of the collected HW in to the proposed IHWMF of CESPL.

3.2 LOCATION OF THE PROJECT

The project location is in a Notified Industrial Area of KIDAB of Government of Karnataka in Tumkur District.

The location is in the R.S.No.161-B&C,I Phase Vasanthanarasapura, Bellavi HO., Tumkur Taluk, Karnataka.

The location Map of the proposed project is presented in Fig.4

The project Site is largely a plain terrain in its topographical characteristics. However, the surrounding area is characteristically with much of undulations.

The location is barren land without any water courses, river or lake. The lack of dependable water courses, naturally, keeps the area away from intensive agricultural activities, despite a small patch of reserved forest nearby, as shown in the Fig.5

3.3 ALTERNATIVE SITES

CESPL is managed to exclusively allocate the required land from the already purchased land from KIADB for this project.

Since, the location is within the boundary limits of a developed Notified Industrial area and hence, CESPL have not examined any other alternate site.

3.4 EXTENT OF THE LAND

The proposed site is One Acre of land within the boundary limits of R.S.No.161-B&C,I Phase Vasanthanarasapura, Bellavi HO., Tumkur Taluk, Karnataka.
FIG. 4. PROJECT IMPACT MAP – TOPO PLAN (10 km RADIUS)
FIG. 5. PROJECT IMPACT MAP GOOGLE IMAGE (10 km RADIUS)
This area fall within the boundary limits if the Notified Industrial area of KIADB.

3.5 PROJECT COMPONENTS

The proposed project is an Integrated Hazardous Waste Management Facility (IHWMF) with two major facility components viz., Alternate Fuel and Raw Material (AFR) Reclamation Plant and Rotary Kiln Incinerator, with HW processing capacity of 25 TPD.

The AFR is envisaged to handle and process 15 TPD of HW and RK Incinerator will process 10TPD of waste.

The AFR plant is a Resource Recovery Plant and RK Incinerator is the ultimate disposal of incinerable residues of the collected HW in to the proposed IHWMF of CESPL.

3.6 MATERIAL BALANCE

Being a waste Management Facility, Material Balance of HW Vs Product (AFR) is not scoped. However, for every 10 Tonne of HW, about 7-9 Tonne will be the AFR and for every 10 T of feed into Incinerator 0.01 T will be the final residue of ash.

Project specific material balance is elusive in the absence of the information on the characteristics of HW that are indended for management in the proposed IHWMF.

3.7 RESOURCE OPTIMIZATION

AFR is the heart of the proposed IHWMF which will only be supported to ensure complete and comprehensive disposal of HW from the Client-Industries.

AFR facility (Waste to Resources), where all mineral resources like Plastics, Glass, Paper, Boards, Ferrous & Non Ferrous metals, etc., The resources which cannot be reused will be processed to become AFR with specified Physical, Chemical and Biological Characteristics. The Organic fraction of the waste stream will be segregated
based on the calorific value to impart required heating value so that the final product of AFR will be preferred technically and as well economically for co processing.

The energy value of the residual organic waste will be mixed proportionately to become a qualified feed in the Rotary Kiln Incinerator which eventually will ensure ultimate disposal with minimum impacts.

The impact mitigation will be dealt with suitable feeding mechanisms, APC measures and Monitoring systems.

(A) WATER

It is assessed that 3 KLD will be the requirement for scrubbing. 1 KLD will be the requirement for green belt development of the project area and around 2 KLD will be the requirement domestic uses of the workers.

Hence, the total requirement of water requirement for the facility is assessed for 6 KLD and however, except 2 KLD required for domestic purposes, the remaining 4 KLD can be water reclaimed from treating the effluent in recycle/reuse loop.

The water balance diagram is presented in Fig.6

(B) POWER

Power is assessed for an initial requirement of 100 HP and it will be ensured from the available Grid of the KIADB common facility.

3.8 WASTE TREATMENT & DISPOSAL

The proposed CESPL facility itself is a Waste Management facility for managing 25 Tonnes of Hazardous Waste.

The design and operation of the facility is envisaged with ZLDP and that the proposed IHWMF will not dispose any liquid or solid waste stream.

The Conceptual Layout of ETP is presented in Fig.7
FIG. 6 WATER BALANCE

6 KLD

Scrubber/ Floor Cleaning  →  Drinking & Domestic  →  Green Belt

(-)  →  (-) Spillage

3 (KLD)

ETP

1.1 KLD (recycle)

2.1 (KLD)

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FIG. 7 COMMON EFFLUENT TREATMENT PLANT
Conceptual Lay-out

Capacity: 5 KLD

LEGEND
1. Equalization Sump
2. a, 2b Chemical Preparation Tanks
3. Flocculation – Chemoxidation Reactor
4. Mechanical Clarifier
5. Mechanical Sludge Dewater System
6. Clarified Effluent Sump
7a, 7b Pressure Filters (Sand & Activated Carbon)
8. Filtered Effluent Sump

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The emission from the Incinerator will be subjected to a Two Tier Emission Cleaning Systems viz., Dry (Cyclone) and Wet (Scrubber) for the pollutant free emission from the stack of the Incinerator.

### 3.9 PROJECT FEASIBILITY

The proposed facility will be a common and service industry to ensure HW disposal from the industries in and around 150Km of Tumkur.

The AFR will enable to reclaim all recoverable resources from the collected HW which will get significant revenue, apart from increasing the life cycle of materials and reuse possibilities of such materials in other avenues.

The recovery of saleable AFR will make this IHWMF as environmentally better way of managing HW. This will bring feasibility to operate and maintain in adherence to HW (M&H and TB) Rules, 2008.

It must be noted that there is no such facility, as such, in Tumkur. Hence, the proposed Hazardous Waste Management facility by CESPL is need based and will enable the proposed IHWMF to meet the statutory requirement of **Hazardous Waste Rules of MoEF&CC**.

### IV. SITE ANALYSIS

#### 4.1 CONNECTIVITY

The Proposed site is well connected by roads and Railways. The site is located in Tumkur. The site is about 75 Km from Bangalore.

- Nearest Railway Station: 18 Kms, Tumkur

The connectivity of the sites with all required facilities is the major advantage for the present site for the proposed Hazardous Waste Management Facility located within the notified Industrial Area of KIADB.
4.2 LAND SURVEY

The proposed land of One Acre is plain terrain with no notified water courses in the 1 Km radius, as presented in the Index Map of Project Impact Area.

The land is predominantly barren. Few stretches of land in the project impact area of 10Km radius is under agriculture is also fast becoming lesser and the absence of irrigation systems is making any sustained agriculture as not feasible.

The proposed land is in a notified Industrial Area of KIADB.

4.3 TOPOGRAPHY

The Topography of the project site will be evaluated using Map info with the Maps of Survey of India. GIS based tools will be used, further to evaluate with Satellite Imagery, drawn from National Remote Sensing Agency (NRSA), Hyderabad.

4.4 LAND USE PATTERN

The project site has been already notified by Government of Karnataka to KIADB to establish Industrial Area and the Vasanthanarasapura is under rapid industrial development.

There is a small stretch of notified forest in the project location and as well in the impact area of 5 km radius from the project location.

No notified river or water body is available in the first 1 km radius from the project area.

4.5 EXISTING INFRASTRUCTURES

The proposed location is already declared as Industrial Area by Government of Karnataka.

The project is well connected to roads and telex-communication systems.

Water supply is arranged by KIADB.
4.6 SOIL CLASSIFICATION

The soil is investigated, on a preliminary site assessment study, as red gravelly, loose rock. Detailed investigations will be carried out during EIA studies.

4.7 CLIMATE – METEOROLOGY

The project location is arid in its general characteristics.

The predominant wind direction is SE and SW. The average Wind speed is 6m/sec.

The Relative Humidity is learnt to vary for 70-90%.

The average annual rainfall reported in the project site is 2932 mm.

4.8 SOCIAL INFRASTRUCTURES

The Social Frame work in the Villages of project impact area will be taken for a detailed study in the EIA survey.

V. PLANNING BRIEF

The proposed CESPL facility is a well thought out and planned to support HW Management in the project location.

5.1 CONCEPTUAL PLANNING

The proposed Integrated HW management facility is being envisaged with two major facility components viz., AFR Plant and Rotary Kiln Incinerator and it will perform primarily as Resource Recovery Plant.

The proposed project is primarily a Waste to Resource plant with AFR Plant for reclaiming mineral and organic part of HW as a qualified feed in co processing operations in Steel, Cement and Thermal Power plants.
The AFR is envisaged to handle and process 15 TPD of HW and RK Incinerator will process 10TPD of waste.

The AFR plant is a Resource Recovery Plant and RK Incinerator is the ultimate disposal of the proposed project is an Integrated Hazardous Waste Management Facility (IHWMF) with two major facility components viz., Alternate Fuel and Raw Material (AFR) Reclamation Plant and Rotary Kiln Incinerator, with HW processing capacity of 25 TPD. This project is a classified activity by EIA Notification, 2006 as TSDF and as A Category Activity.

The Integrated Hazardous waste Management Facility will have Resource Recovery Plant to recover materials like plastics, metals, glass, etc., and Fuel-Mix plant to proportionately mix select-waste streams to have a qualified feed for Co-processing in industries like Cement, Steel and Power Plants as per the Guidelines of Central pollution Control Board (CPCB). This plant component is envisaged as Alternate Fuel and Raw Material (AFR) reclamation plant, as recommended by the Guidelines for Co Processing of HW in industrial applications.

5.2 POPULATION PROJECTION

The proposed CESPL facility is small to deal only to deal 25 MT of HW and will have only 20 peoples.

Occupational Health & Safety will be monitored with a common monitoring Health Surveillance System and it will be established with the involvement and support of all member industries.

Special incentive coverage for health and life like ESI, insurance, etc., will be mandated for all member industries so that the workers population in the proposed EI will be safe and risk-free in their work environment.
5.3 LAND USE PLANNING

The project area of One acre is in a notified Industrial Area by Government of Karnataka.

The project area is essentially industrial and it is a declared Industrial area by KIADB.

5.4 INFRASTRUCTURE DEMAND

The demand of infrastructure is assumed for the responsibility KIADB, in the following requirements.

- Roads/Service roads
- Electrical Grid
- Telecommunication
- Water source, storage & supply
- Drainage & Sewage treatment plant
- Green Belt Development
- Rain Water Harvesting Structures

The infrastructures of CESPL will be state of the art AFR plant and Rotary Kiln Incinerator.

5.5 AMENITIES / FACILITIES

KIADB will provide the following common facilities for the sustainable operation of the IHWMF;

- Water storage & supply
- Roads
- EB grid
- Sewage treatment plant
- Rain Water Harvesting Structures
• Green Belt in the Peripheral areas and o the road side and Central meridian
• Fire Station
• Common Medical Dispensary

The following Organizational Set Ups will also be established by CESPL and continuously be run and monitored:

✓ Environmental Cell
✓ Emergency Management Cell
✓ Common Health Surveillance System

CESPL will also continue to commit to continue its coordination with Karnataks State Pollution Control Board, District Health Department and District Administration for issues pertaining to overall Environmental Management and Sustainable Development of the Project location.

All required common amenities will be established by KIADB.

VI INFRASTRUCTURES

6.1 INDUSTRIAL AREA

The entire one acre of land has been already notified by Government of Karnataka to State Urban Development Agency to establish Integrated HW Waste Management facility.

6.2 RESIDENTIAL AREA

There is no area for any exclusive residential area. However, CESPL will provide administration building with security provisions.
6.3 **GREEN BELT DEVELOPMENT**

CESPL will provide greenery with suitable trees and plantation along the sides of the inner plant roads and in all open spaces.

CESPL will ensure atleast 33% of the area will be covered under green belt development.

6.4 **SOCIAL INFRASTRUCTURE**

The social infrastructure in the project impact area will be evaluated in EIA studies and in reporting.

6.5 **CONNECTIVITY**

The proposed HW waste Management facility will be connected by main roads with state and National Highways.

The Railway Station 18 Km at Tumkur; nearest Air Port; Bangalore 75Km. The nearest NH 4 is at 560m.

6.6 **WATER MANAGEMENT**

The water requirement for the project is very meager at 6 KLD and it will be supplied by KIADB. CESPL is committed to install water reclamation facility to Effluent Treatment Plant (5 KLD) and thus around 3.5 KLD (70 % of 5 KLD) will be reclaimed after treatment and will be reused in the facility operations like cleaning of emission, floors, vessels, etc.,.

Drinking Water of 2KLD will be purified to adhere BIS 10500 by a package RO plant.

An exclusive Recycle loop for reuse of treated effluent will be in place. CESPL will draw a maximum of 5 KLD only , as 1 KLD requirement for green belt will be met with recycled water.
6.7 SEWERAGE SYSTEM

CESPL will lay storm water drainage as open concrete channels, all along the internal roads for ensuring proper collection of storm water and the same be used for charging the rain water harvesting structures.

CESPL will have exclusive sewers to collect sewage from worker’s conveniences and rest room s and the same will be treated in Septic Tank and disposed through a Cesspool.

6.8 INDUSTRIAL WASTE MANAGEMENT

The proposed IHWMF is itself a waste Management facility as RRP. The “Zero Waste Objectives” will be the objective to establish Effluent Treatment plant. The liquid waste will be managed for no disposal condition and the solid waste be managed as resource recovery.

Effluent Treatment Plant

The Effluent Treatment Plant is envisaged as a Physico Chemical Treatment Plant with a two-stage, Pressure Filter System, in series.

The combined effluent is assessed to have COD at 1200-900 mg/l and BOD of 450- 350 mg/l only. The pH is 6.0 – 8.5. The effluent may have the oil and grease at 40-30 mg/l.

The effluent will be processed in a mechanical system of Oil and Grease trap, with three compartment tank. The oil, on floatation, can be removed manually.

The oil removed effluent is envisaged for dosage with an alkali solution and polyelectrolyte for neutralization and particle agglomeration. The chemically treated effluent will then be processed through a mechanical system of Plate Settlers for the removal of solids.

The sludge (Settled solids) will be transferred to Sludge Drying Beds.
The clarified effluent will then be passed through a Twin filter plant having Pressure Sand Filter and Activated Carbon Filter. The residual solids, color and Refractories will be removed in these pressure filter systems.

Thus, the proposed effluent treatment plant will perform as Zero Liquid Discharge Plant. There will not be any disposal and the entire treated effluent, as reclaimed as water from the MF cartridge package, will be recycled for process use.

The water is thus reclaimed from the effluent and envisaged for reuse in the chemical preparation (Make-up) for wet scrubber (1 KLD) and used for floor, vessel and vehicle cleanings. The requirement of green belt development will be met by recycle water.

6.9 SOLID WASTE

The proposed IHWMF of CESPL is itself a Solid waste Management facility as RRP.

6.10. POWER

The net power which is envisaged as requirement for operating the proposed IHWMF is estimate for 100 HP. This power will be made available from State EB through its exclusive grid and distribution lines.

KIADB will ensure the power lines to establish this common facility.

7 REHABILITATION AND RESETTLEMENT (R & R) PLAN

The proposed location does not require any evacuation. The location is an approved industrial plot in a Notified Industrial Area of KIADB

Hence, there is no requirement for any exclusive RR plan. No land is under agricultural activities.

During EIA studies, a detailed Socio Economic survey in the project impact area will be carried out.
8 PROJECT SCHEDULE & COST ESTIMATES

The time schedule of project execution, of land development and getting the CESPL facility to be commissioned, is proposed for Eight months.

The budgetary estimate of the project is assessed for Rs.10 Crores.

9 ANALYSIS OF PROPOSAL

A conceptual SWAT analysis was made on the proposed project. A detailed SWAT analysis will be made as part of EIA and SIA studies.

A detailed Environmental Cost Benefit Analysis will be carried out during EIA studies and documentation.

10 CORPORATE RESPONSIBILITY PLAN

CESPL will develop an exclusive Corporate Responsibility Plan to ensure proper environmental management with monitoring programs for the listed pollutant concentrations in air, water, soil and noise, in the ambient environment of the assessed project impact area of 10Km radius of the location. Special Programs and Implementation systems will be stressed for Occupational Health and Safety.

Common Initiatives like Off-Site and On-site Emergency Management Plans will be in place with the support of KIADB and Community groups of the surrounding areas for 10Km radius.

CSP will have special programs and financial provisions to support the community development and social festivals around the project location.

The environmental monitoring will be jointly carried out by CESPL as per MoEF&CC/CPCB Guidelines and State PCB guidelines.

A detailed, Comprehensive Plan of Social and Environmental Responsibility will be framed on completing the EIA studies and documentation.
LIST OF MAJOR INDUSTRIES

1. TMEIC
2. AS REFINERIES
3. INDIA FOOD PARK
4. KAILASH ROOFING OF STRUCTURES
5. LAKSHMI WASTE OIL REFINERIES
6. TATA MARCOPOLO, PHARWAD
7. TATA MOTORS LTD, PHARWAD
8. L&T LIMITED
9. LM GLASS FIBER, DABASPET
10. ESSILOR GLASS LENS MANUFACTURING LTD.,
11. RESONANLE LABORATORIES (P) LTD.,
12. SE BLADES, MANGALORE
## WASTE STREAMS FROM THE MEMBER INDUSTRIES

<table>
<thead>
<tr>
<th>Name of HW as in CAR</th>
<th>Test Result</th>
<th>Water Solubles</th>
<th>Availability tonnage/annum</th>
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<td>LoI % (w/w)</td>
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## PRE-FEASIBILITY REPORT
**INTEGRATED HAZARDOUS WASTE MANAGEMENT FACILITY**
Century Eco Solutions India Private Limited
KIADB Industrial Area, Tumkur, Karnataka

<table>
<thead>
<tr>
<th>Material</th>
<th>Wet Content</th>
<th>Solid Content</th>
<th>Volatile Content</th>
<th>Moisture Content</th>
<th>Water Content</th>
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<td>C3 (%)</td>
<td>Quantity (Kg)</td>
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<td>FRP Sheets</td>
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<td>0.15</td>
<td>62.50</td>
<td>4125</td>
<td>&lt; 1.0</td>
</tr>
<tr>
<td>Used Oil (residue)</td>
<td>NA</td>
<td>0.25</td>
<td>96.37</td>
<td>9340</td>
<td>&lt; 0.10</td>
</tr>
<tr>
<td>ETP Sludge</td>
<td>8.01</td>
<td>7.57</td>
<td>59.33</td>
<td>4084</td>
<td>2.03</td>
</tr>
<tr>
<td>Grinding Dust</td>
<td>7.12</td>
<td>2.67</td>
<td>13.76</td>
<td>2487</td>
<td>0.20</td>
</tr>
<tr>
<td>Paint Residue</td>
<td>7.23</td>
<td>3.79</td>
<td>77.22</td>
<td>3370</td>
<td>1.29</td>
</tr>
<tr>
<td>Spent Ion Exchange Resin</td>
<td>8.54</td>
<td>&lt; 1.0</td>
<td>95.00</td>
<td>3309</td>
<td></td>
</tr>
<tr>
<td>Sodium chloride salt and Sodium Sulphate salt</td>
<td>8.07</td>
<td>11.58</td>
<td>63.60</td>
<td>4439</td>
<td>31.76</td>
</tr>
<tr>
<td>Hyfloc Carbon</td>
<td>2.99</td>
<td>4.34</td>
<td>44.34</td>
<td>6678</td>
<td>8.05</td>
</tr>
<tr>
<td>Expired drugs</td>
<td>8.62</td>
<td>2.47</td>
<td>99.23</td>
<td>9608</td>
<td>&lt; 1.0</td>
</tr>
<tr>
<td>Sludge Recovered from effluent of Ploy Vinyl Alcohol</td>
<td>8.24</td>
<td>64.07</td>
<td>88.80</td>
<td>4870</td>
<td>18.89</td>
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<tr>
<td>Process waste from polishing process</td>
<td>6.40</td>
<td>54.92</td>
<td>36.00</td>
<td>6314</td>
<td>1.14</td>
</tr>
<tr>
<td>Solvent residue</td>
<td>4.42</td>
<td>69.95</td>
<td>99.37</td>
<td>5908</td>
<td>&lt; 1.0</td>
</tr>
<tr>
<td>Spent carbon from propyphenazone</td>
<td>7.98</td>
<td>41.05</td>
<td>76.89</td>
<td>6165</td>
<td>9.43</td>
</tr>
<tr>
<td>Propyphenazone solid waste</td>
<td>7.06</td>
<td>39.53</td>
<td>72.31</td>
<td>8023</td>
<td>5.70</td>
</tr>
<tr>
<td>Spent carbon</td>
<td>1.86</td>
<td>6.34</td>
<td>87.68</td>
<td>4025</td>
<td>7.98</td>
</tr>
<tr>
<td>Carbon Powder</td>
<td>7.40</td>
<td>1.47</td>
<td>84.34</td>
<td>7305</td>
<td>1.14</td>
</tr>
</tbody>
</table>
ENVIRONMENTAL IMPACT ASSESSMENT

TSDF - KEY MAP

To Sira

To Tumkur

ANNEXURE - III

Integrated Hazardous waste Management Facility
Century Eco Solutions India Private Limited
KIADB Industrial Area, Tumkur, Karnataka

Centre for Environment, Health &Safety
Annamalai University

77° 02' 11.13" E 13° 28' 47.15" N
77° 02' 13.76" E 13° 28' 47.59" N
77° 02' 11.73 E 13° 28' 45.20" N
77° 02' 13.86" E 13° 28' 45.60" N