Environmental Managment plan for APOLLO Tyres at Oragadam and Mathur village, kancheepuram District.TN

M/s. APOLLO TYRES LTD chennai.

Prepared by

ECS

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CHAPTER –1
INTRODUCTION

General

M/s. Apollo Tyres Ltd, is a large-scale industry and categorized as red industry, doing radial tyre manufacturing at Oragadam, Mattur, Chengalpattu Tehsil, Kancheepuram district, has entrusted the assignment to M/s. Hubert Enviro Care Systems Pvt. Ltd., for preparation of Environmental Management Plan (EMP). This Environmental Management Plan after obtaining the No objection Certificate from the Tamil Nadu Government, it will be submitted to Ministry of Environment & Forests along with their questionnaire for approval.

The tyre manufacturing comes under large scale industry status. As typical of government of India Notification, this project has to get State Government clearance before installation.

This EMP recognizes all the facts and information's about the Tyre manufacturing process and suggests adequate pollution control measures incorporating for total control ensures the best practices for an ideal processing without any significant impact on the Environment.

CHAPTER – II

PROJECT BACKGROUND

General

During the last decades there has been a growing realization that development cannot be sustained unless the Environment is preserved. So, with this view, the proposed unit must be evaluated in detail.

In light of the massive usage of automobiles in India and other parts of the globe, there has been a severe spurt of requirements for redial tyres. With this in view, the unit is proposed to meet the market demand.

Accordingly an EMP study will be ideal one to get information about any adverse impacts on the Environmental Management and to identify the possible impact due to the industrial activity and accordingly formulate the control measures necessary to maintain the Environment within suitable levels.

To review the current environmental status a study is conducted for various Environmental factors like Air, Water, Noise, Flora & Fauna, Socio-Economic factors within the 2 km radius around the proposed unit. Moreover a mitigation measure to ensure the preservation of the Environmental quality in all aspects and to prepare a post-monitoring is done in this regard.

Project Details

In view of demand for radial tyres in market, M/s. Apollo Tyres Ltd., doing radial tyre manufacturing at Oragadam, Mattur, Chengalpattu Tehsil, Kancheepuram District. These products are in demand and benefit to the local community with Direct and Indirect employment and economic activity.

Site Justification

The unit M/s. Apollo Tyres Ltd., is located at Oragadam, Mattur, Chengalpattu Tehsil, Kancheepuram district, with a total area of 128.5 acres. The prime justification for this processing unit is its location, as it is located far from the residential area and the impacts are comparatively less.

Environmental and Ecological Factors

1. As in this process, air pollution control measures are used and air emissions are minimum; no negative impact exists on Air environment.
2. The existing site does not require any removal of forest or any form of greenery.
3. The site does not create any dislocation and displacement of human settlements from their habitat.
4. As in this process there is no noise generating equipments, no negative impact on noise environment is envisaged.

Transportation

The proximity to the highway is very close and easy. The nearest highway is Chennai – Bangalore Highway at a distance of about 22 Km from project site. The project site is located at Oragadam, Mattur. The nearest Town is Chengalpattu and nearest Railway Station is Chengalpattu railway station. The nearest Airport is Meenampakkam airport. The plant is well connected by roads to various surrounding districts and National Highway.

Topography

The project site comes in the Kancheepuram district. This district is elevated from 10 .5 m above the mean sea level. The study area is mainly plain with undulating topographical features in some parts.

Local Infrastructure

- Availability of adequate skilled manpower.
- Availability of transportation facilities

Project Cost

The Project cost in Phase-I will be approximately 500 Crores. Their break-up rates are as follows.

Description	Cost (Rs. Cr)
Land & Building Cost	115
Machinery & other Utilities	382.5
Pollution control facility	2.5
Total Cost	**500**

Area Details

The Total area for the project will be around 128.5 acres. Among them, 30.5 acres will be build-up area and 25 acres will be utilized for green belt.

Description	Area (Acres)
Building up Area	30.5
Green Belt	25
Open space	73
Total Area	**128.5**

CHAPTER – III

Project Details

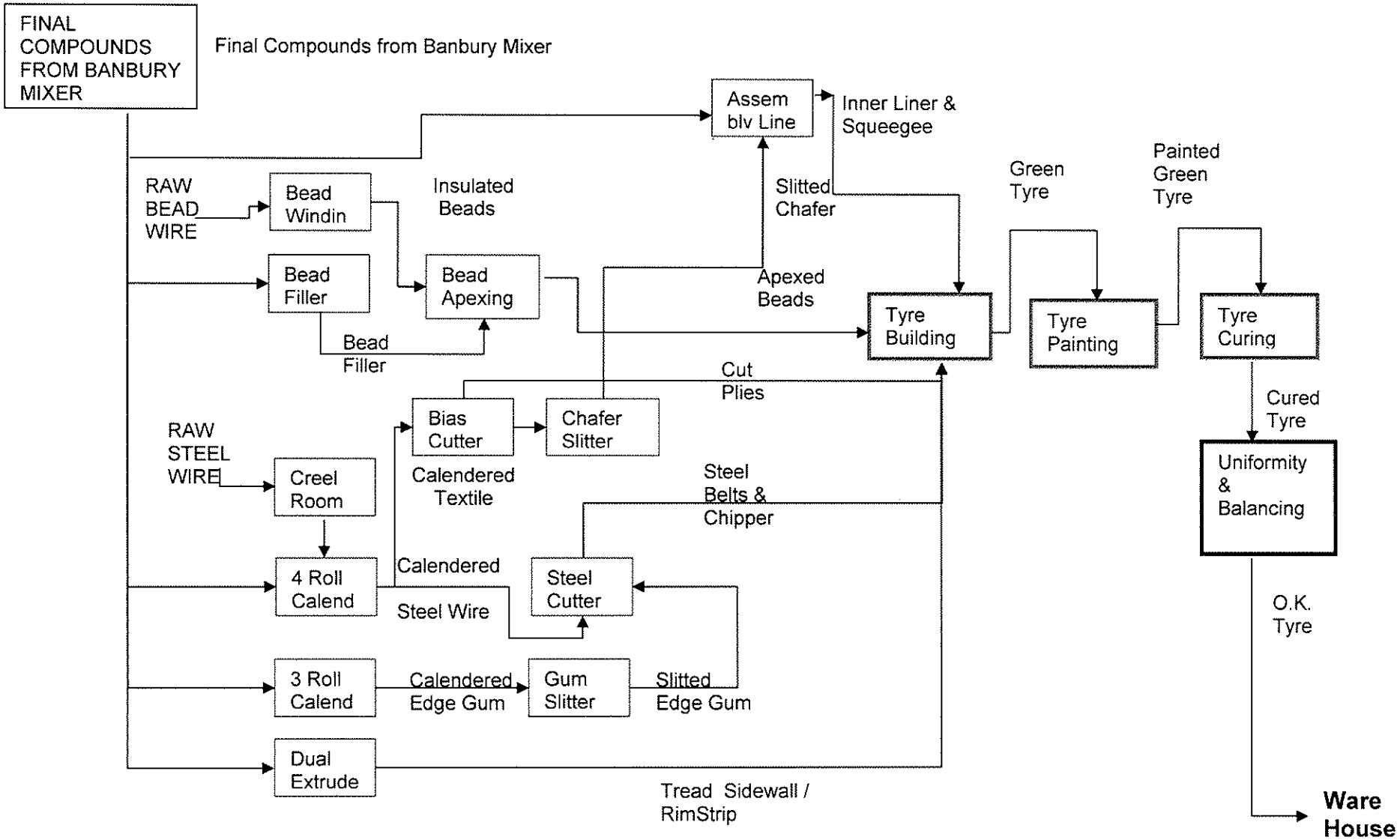
We are proposed to manufacture radial tyres for automobile industries from rubber, steel wire and etc. The manpower requirement will be 1200 persons they will work in three shifts. the production capacity is 9,00,000 nos /month and the raw material requirement is 5030 tons.

Total raw material Quantity (Tonnes / Month)	5030T/M
Total raw material Quantity (Tonnes / Day)	168 T/D
Total production(tyres) per month	900000 nos/month
Total production (tyres) per day	30,000 nos/day

TECHNOLOGICAL PROFILE **Annexure II - Raw Material Details**							
List of raw materials to be used at all stages of manufacture	**Physical Nature**		**Chemical Nature**		**Quantity (tonnes/month) full production capacity**	**Source of materials**	**Means of transportation (Source to storage site) with justification**
	Solid	**Liquid**	**Organic**	**Inorganic**			
NATURAL RUBBER	Solid		Organic		810	A.K.rubbers, Paika, Poovarany, Arakulam Rubbers, Moolamattam	By Road
SYNTHETIC RUBBER	Solid		Organic		1410	Lanxess Deutschland Gmbh (formerly Bayer AG), Germany	By Sea
POLYESTER FABRIC	Solid		Organic		139	Invista S.A.R.L (formerly KOSA) (AA 793 HMLS yarn) ,Perfoormance Fiber	By Sea
Nylon Fabric	Solid		Organic		50	SRF India/SRF Dubai	By Road/Sea
CARBON BLACK	Solid		Organic	Inorganic	1378	Cabot India Ltd.	By Road
STEEL TYRE CORD	Solid			Metal	269	Bakaert India Ltd.	By Road

BEAD WIRE	Solid			Metal	145	Rajratan Global Wire Ltd. (formerly Rajratan Gustav Wolf Ltd.)	By Road
COMPACTED SILICA	Solid			Inorganic	14	Insilco	By Road
SULPHUR	Solid			Inorganic	11	Standard Chemical Co. Pvt. Ltd.	By Road
DPG ACCLERATOR	Solid		Organic		1.0	Flexsys	By Sea
DCBS ACCLERATOR	Solid		Organic		4.0	Lanxess India Pvt. Ltd. (formerly Bayer)	By Road
STEARIC ACID	Solid		Organic		32.0	Godrej Soaps Ltd.	By Road
MBTS ACCLERATOR	Solid		Organic		2.0	Lanxess India Pvt. Ltd. (formerly Bayer)	By Road
Resorcinol 66.7% / St. acid 33.3% Melt	Solid		Organic		4.0	Techno Products	By Road
TDQ ANTIOXIDANT	Solid		Organic		8.0	Lanxess India Pvt. Ltd. (formerly Bayer)	By Road
PIL CURE CBS	Solid		Organic		12.0	NOCIL	By Road
PEPTIZER	Solid		Organic		1.0	Acmechem Pvt. Ltd.	By Road
ZINC OXIDE	Solid			Inorganic	64.0	J.G.Chemicals	By Road
ACCLERATOR	Solid			Inorganic	23.0	NOCIL	By Road
OIL MODIFIED PHENOLIC RESIN	Solid		Organic		8.0	Xpro India (Division of Cimmco Ltd.)	By Road
WAX BLEND	Solid			Inorganic	25.0	Repsol Derivados	By Road

INSOLUBLE SULPHUR	Solid			Inorganic	42	Oriental Carbon and Chemicals Ltd.	By Road
ANTIOXIDANT	Solid		Organic		34	NOCIL	By Road
TBBS ACCLERATOR	Solid		Organic		3.0	Merchem Ltd.	By Road
RETARDER	Solid		Organic		2.0	NOCIL	By Road
PF RESIN	Solid		Organic		39.0	Bakalite Hylam Ltd.	By Road
ALIPHATIC RESIN	Solid		Organic		4.0	Exxon	By Sea
RF RESIN	Solid		Organic		3.0	Singh Plasticizers & Resins	By Road
HR CLAY	SOLID			Inorganic	44.0		
MANOBOND	Solid		Organic		1.0	OMG ,Mancherster, England	By Sea
80 MESH CRUMB RUBBER	Solid		Organic		90.0	Badri Narain Rubbers	By Road
AROMATIC OILS(ASTM-101)		Liquid	Organic		357	HPCL	By Road
Total Quantity (Tonnes / Month)					**5030**		
Total Quantity (Tonnes / Day)					**168**		


FINAL COMPOUNDS FROM BANBURY MIXER
Final Compounds from Banbury Mixer
Assem bly Line
Inner Liner & Squeegee
RAW BEAD WIRE
Bead Windin
Insulated Beads
Slitted Chafer
Green Tyre
Painted Green Tyre
Bead Filler
Bead Apexing
Apexed Beads
Tyre Building
Tyre Painting
Tyre Curing
Bead Filler
Cut Plies
Bias Cutter
Chafer Slitter
Cured Tyre
RAW STEEL WIRE
Creel Room
Calendered Textile
Steel Belts & Chipper
Uniformity & Balancing
4 Roll Calend
Calendered
Steel Cutter
Steel Wire
O.K. Tyre
3 Roll Calend
Calendered Edge Gum
Gum Slitter
Slitted Edge Gum
Dual Extrude
Tread Sidewall / RimStrip
Ware House

Brief Detail Of Manufacturing Process

ATL has proposed to manufacture Radial Tyres at its proposed project site in state of Tamilnadu. These are for use in India and exports abroad. Tyre production processes in its most basic form are described as below.

1.0 Compounding and mixing elastomers, carbon blacks, pigments, and other chemicals such as vulcanizing agents, accelerators, plasticizers, and initiators;

2.0 Extruding the rubber mixture between pairs of large rollers to prepare it for the feed mill, Then further it feed to the diff. extrusion process, where it take the shape of the tread and sidewall and liner materials;

3.0 Processing fabrics and coating them with rubber to make fabric calendar and calendar steel cord to make steel Cord Fabric in a calendaring operation;

4.0 Processing bead wires and coating them with rubber in an extruding process;

5.0 Cutting and cooling the various extruded and calendared outputs;

6.0 Assembling all of the components (bead wires, coated fabrics, treads, etc.) on a tire-building machine;

7.0 Lubricating the green tire (green tire spraying)

8.0 Vulcanizing and molding the tire with heat and pressure;

9.0 Finishing the product.

The description of the Manufacturing Process is as follows:

Tyre is a Toroidal shaped flexible pressure container capable of giving high mechanical performance and is made of polymeric materials like rubber and high strength cord fabric. Tyre contains approximately 13% Fabric, 83% Rubber Compounds and 4% Steel Wire. Generally, Nylon or Rayon is used for the fabric reinforcement and both natural and synthetic rubber for rubber compounds.

There are basically two types of Tyres viz. Bias Tyres and Radial Tyres, depending on the Engineering in the design of fabric reinforcement. Radial Tyres are the latest in the Tyre technology and offers distinctly improved performance over Bias Tyres such as high mileage, higher fuel efficiency, improved acceleration and breaking efficiency, etc.

The manufacturing process of Tyres can be briefly summarized as follows:

Preparation of Rubber Compounds

Raw rubber needs to be toughened to make it usable. Incorporating carbon black and various chemicals into rubber in a heavy-duty machine called Banbury Mixer does this. Banbury Mixer consists of an enclosed chamber with two rotating rotors inside which sheer rubber and the material against the inside of the chamber. The rotors are rotated by high power DC motor. The rubber and the materials are loaded into the chamber with the help of an automatic feeding system. The chamber temperature is controlled using tempered water. The mixed rubber compound is sheeted out from a two-roll mill and is used in the subsequent process.

Fabric Treatment

The strength required for the Tyre is provided by fabric reinforcement. Generally, Nylon, Rayon and Polyester are used for the same. In steel radial Tyres, steel cords are used as reinforcement. The textile fabric reinforcement used is to be chemically treated for bonding the same with rubber, which is very essential for the life of Tyre. The fabric is then hot stretched and thermally stabilized so that the Tyre maintains its dimensional parameters. These two treatments are done in Dip Unit. The fabric is first let through an adhesive emulsion and is dried, stretched at high temperature and subsequently stabilized.

Fabric Calendering

The treated fabric / steel cords are then embedded in rubber compound in a process called Calendaring. The processed fabric / steel-cords are sandwiched between two thin films of rubber compound in a multi Roll Calendar. The coated fabric is subsequently cooled and wound in liners for further processing.

Preparation of Tread and Side Wall

Tread is the patterned rubber mass on the circumference of the Tyre, which makes contact with the road surface. It is the wearing portion of the Tyre and hence is the heaviest component in the Tyre assembly. A process called Extrusion manufactures this component. The rubber compound after warming on two roll mills is forced through a dye with the help

of heavy-duty screw extruder to get a pre-designed shape. This tread is then cooled and cut to the required size for the Tyre. Sidewall is a thin sheet of rubber on both sides of the Tyre and protects the textile reinforcement from external damages, degrading agents etc. This component is made in a similar way as of tread.

Bead Making:

The fabric reinforcement in the Tyre is tied around two steel rings on either side of the Tyre. These steel rings called the Beads, forms the rigid portion of the Tyre, which seats on the rims of the vehicle. The steel rings are made of steel wires coated with rubber compounds and wound on forms of required diameter. The rubber coating is done with the help of extruder.

Fabric Preparation:

The continuous length calendared fabric is cut to design the angle and width for the respective Tyres called plies on a bias cutter and is then spliced into a continuous sheet. Additional layer of rubber film called Squeegee is applied on this sheet.

Assembling of Green Tyres:

Various components mentioned above viz. Coated Fabric Plies, Tread, Side Wall, Beads etc. are assembled to a green Tyre on an assembly machine. This machine essentially has a cylindrical shaped collapsible drum mounted on a rotating shaft. The coated fabric in the required numbers of layers is serviced on to this drum with the help of a servicer. Beads are applied on to the coated plies from the sides of the drum and the same is locked in position by turning the fabric around it. After requisite number of fabric layers is assembled on the drum the tread is applied and consolidated followed by sidewall. The Green Tyre so formed is removed by collapsing the drum.

Moulding Tyre:

The assembled Green Tyre, after suitable treatment, is moulded in heavy-duty Tyre Curing presses. The presses essentially consist of a fixed bottom frame, which holds the bottom half of the mould, and a movable top frame holding the top half of the mould. At the centre of the bottom mould, an inflatable barrel shaped rubber bladder, with suitable arrangement for

lifting and lowering the same is provided. The moulding process essentially consists of pre-shaping the cylindrical shaped green Tyre into a toroidal shape by placing over the bladder and administering steam into the bladder. The two half of the mould are then closed over the Green Tyre and locked in with high closing force. The Green Tyre is then moulded against moulds by administering high-pressure steam and hot water into the bladder. Tyre is heated both from inside as well as from outside to harden (cure) the rubber compounds. Tyre is removed by opening the mould and releasing the bladder and is subsequently cooled under pressure conditions on post cure in flaters. The Tyre so made with suitable finishing is ready for use.

Production Details

The Total Production rate of Apollo Tyres will be around 170 TPD.

That is about Passengers radial tyres 30,000 nos /day

CHAPTER I V
ENVIRONMENTAL MANAGEMENT PLAN

4.1 General

The most essential aspect of Environmental Management is to identify the possible impacts due to the industrial activity accordingly formulate the control measures necessary to maintain the environment within suitable levels.

4.2 Air Environment

Air emissions

The air emissions from the plant consist of dust, vulcanization and emissions from the steam Boiler. Dust emissions will be efficiently mitigated and controlled through ventilation and filtration systems. Solvent fume (Volatile Organic Compound) emissions will be negligible due to minimized use of solvents. Fugitive emissions from tyre vulcanization will be limited, but foul-smelling. However, because there are no permanent residential areas within close range to the plant, this will not cause significant nuisance to local population. The emissions from the steam boiler will be insignificant due to use of natural coal/gas as fuel. The plant is not expected to have a significant impact on the ambient air quality in the surrounding areas.

The main sources will be from the process area, boiler.The emission will be controlled by providing the gas scrubbers. Scrubbers will be provided for controlling the air emissions form boiler sets and dust collector will be provided for process emissions control.

The source of air Pollutants are as follows

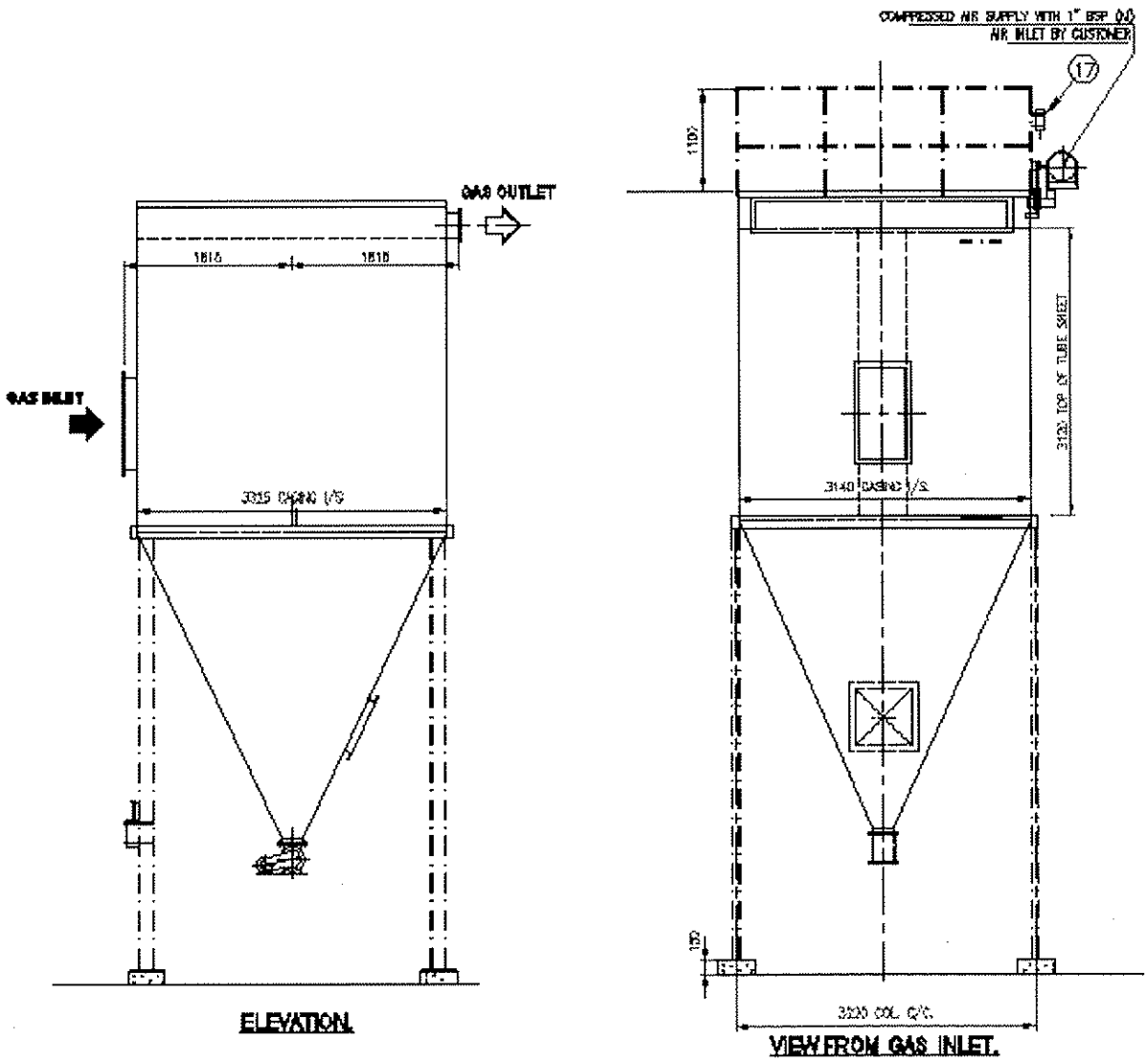
I. Banbury Mixer:

Number of Mixer	: 2
Approx.Ventillation flow for each	: 20000m3/hr
Outlet RPM	: 300 Kg/hr

II. Dust Collector:

The outlet gas from the process will be connected to bag filter arrangement to remove particulates present in the gas. The details are as follows.

Number of Dust Collector	: 2
Flow rate	: 24000m3/hr
Outlet RPM	: 36 Kg/hr



Layout of Dust Collector

III. Diesel Generator

Capacity 1 MVA-2 nos the flue gas from the DG sets will be connected to the stack as per TNPCB/MoEF guidelines and will be 30 -35 mts from the ground level.

IV Boiler:

Parameters	**Coal fired Boiler**
Capacity	24 TPH
Fuel Consumption	coal 2916 kg/hr
SPM	at Chimney outlet <150 mg/m^3
So_2	At chimney outlet <14ppm
NOx	At chimney outlet <25ppm

Design basis:

Coal Boiler Flue gas temp	: 140-150 degC.
Flue gas flow rate	: 24000 m3/hr
Air flow rate	: 24000 m3/hr

Codes and standards

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

Equipment details

Ducting

MOC	: MS - Epoxy.
Diameter	: 600 mm
Location	: Blower

ID Fan

Quantity	: 1
Motor make	: Kirloskar/ eq.
Flow	: 24000 m^3/hr
Motor rating	: 10 HP
Make	: HECS

Scrubber

MOC	: MS - Epoxy.
Diameter	: 3000 mm
HoS	: 2800 mm
Thickness	: 8 mm
Location	: ID fan out let
Make	: HECS

Chimney

MOC	: MS - Epoxy.
Diameter	: 600 mm
HOS	: 15 m
Sampling port	: 100 mm dia (4 nos)
Location	: scrubber out let

Water circulation pump

Quantity	: 1
Type	: Centrifugal monobloc
Head	: 10 m
Flow	: 40 m^3/hr
MOC	: SS
Make	: Sharp / Kirloskar / Eq

Circulation tank

Quantity	: 1
Capacity	: 1200 cum
MOC	: RCC

Chemical dosing systems

Dosing tank

Quantity	: 1
MOC	: HDPE
Volume	: 100 ltr
Make	: Sintex / Eq

Dosing Pump

Quantity	: 2 No
Rate	: 0 – 12 lph
Pressure	: 2 Ksc
Make	: Etatron / Eq

Electrical system

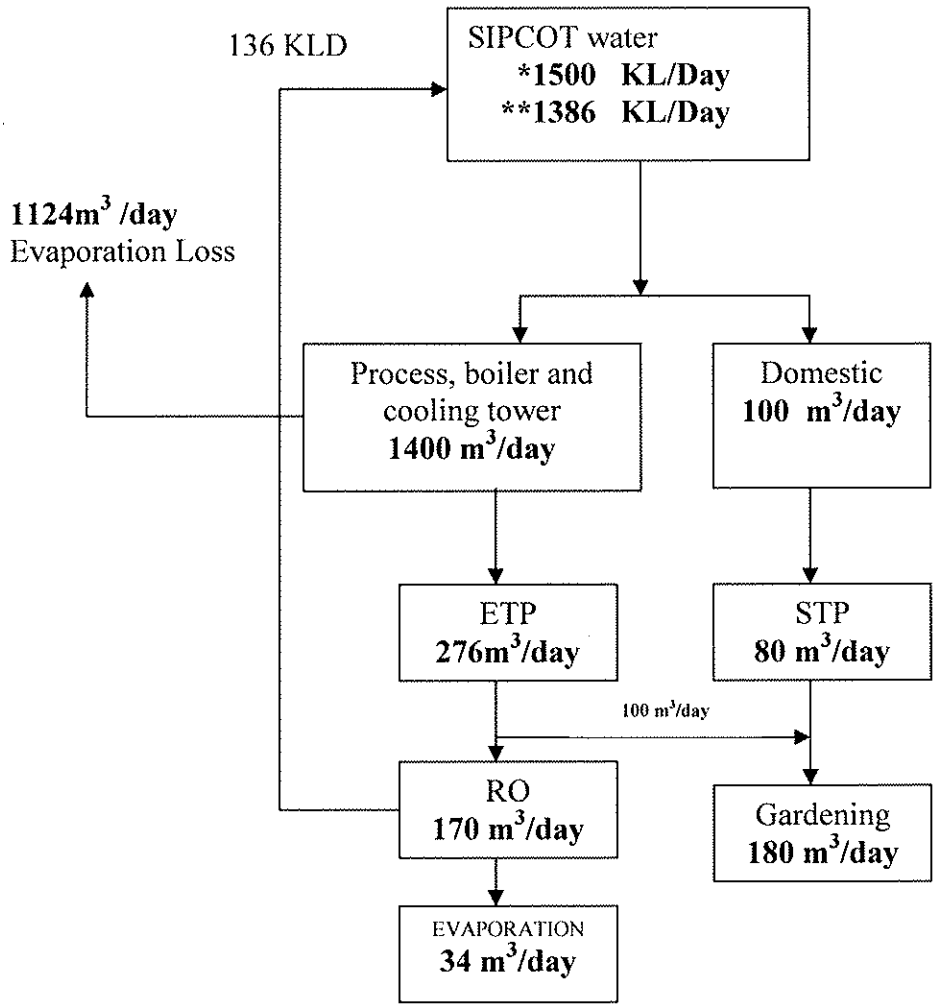
Quantity	: 1
Type	: Wall mounted
Starter	: DOL / Star – delta
Components	: Havells/ C&S/Eq
Make	: HECS

4.3 Water environment

Consumption Details

The total demand for water will be 1500 m^3 / day. The source of water is from SIPCOT water. The wastewater generated from the domestic use and process is treated and reused.

Water balance



Note:

- 51300 m^2 area available for Greenbelt Development for disposal of 180 m^3/day

- *1ST day of commissioning water requirement
- ** 2nd onwards water consumption

Effluent treatment plant

Due to closed cooling water system, the amount of wastewater is minimized. The overflow water from the cooling system flows through a pre-treatment system consisting of filtration and oil separation before it is discharged effluent treatment plant.

4.3.1 Effluent Treatment Plant I

Plant capacity : 276 KLD

Flow logic : 10 / 12 / 14 m^3/hr

Operation hours : 24 hrs

The cooling process generating some wastewater from different activity like rinsing washing and cleaning of this process. The following process involved in this treatment plant.

Neutralization tank and **Collection tank** cum where the effluent will be collected in various process activity then the wastewater will pumped to **flash mixer** here are adding coagulant polyelectrolyte to make precipitate (flocs) and it will flows to **settling tank** then the overflow collected in **chlorination tank** for disinfections.

Equalization tank – 1 no

Size : 4 x 3 x 3 m

Moc : RCC with FRP lining
With air agitation

Acid Storage Tank – 1 no

Size : 1.5m dia 2.0 height

MOC : MS with FRP/Rubber lining

Storage capacity : 1000 liters

Flash mixer

Size : 1 x 1 x 1m

MOC : RCC with epoxy paint

Settling tank

Size : 4 m dia x 3 m height

MOC : RCC with epoxy paint

Capacity : 37 m^3

Chlorine contact / treated water tank

Size : 2 x 3.5 x 3.5 m

MOC : RCC with epoxy paint

Capacity : 24.5 m^3

4.31A Reverse Osmosis Plant – 170 KLD

Flow : 15 m^3/hr

Recovery : 80%

Head : 150 m

Make : Manfang / Equ/groundfos

RO Unit – 170 KLD

Flow : 15 m^3/hr

No. of membranes : 18

Size : 8" x 40"

Make : BW 3040 (DOW)

Evaporator- 35 KLD

Make : HECS

Flow : 34 m^3/ day

Rate : 2 m^3 / hr

Type : Direct fired with diesel burner

Sludge Drying Beds

Qty	: 2 nos
Size	: 2 x 4 x 1 m
MOC	: brick work

Design Report for Effluent Treatment Plant – 276 KLD
Operation - 24 hrs
Flow logic - 12 m3/hr

Size of the ETP Units:

s.no	Description	Quantity	Size
1	Equalization tank	**1**	4 x 3 x 3 m
2	Acid storage tank	**1**	1.5 m dia 2.0 m height
3	Flash Mixer	**1**	1.0 x 1.0 x 1.0 m
4	Flocculants / coagulant	**3**	0.5 dia x 0.5 height
5	Settling tank	**1**	4 m dia x 3 m height
6	Chlorine contact tank	**1**	3.5 x 3.5 x 2 m
7	Filter Press	**1**	18" x 18" – 15nos plates type
8	PSF	**1**	1.0 m dia x 2.0 m HOS
9	ACF	**1**	1.0 m dia x 2.0 m HOS
10	RO plant	**1**	170 m3/day
11	Evaporator	**1**	35 KLD

10.0 Equalization Tank

Size – 4 x 3 x 3 m
Volume – 144 m3
- 144/276*24
= 12 hrs

We obtained 12 Hrs HRT; hence it is adequate for equalizing the effluent.

2. Acid storage Tank – 1 No.

Size – 1.5 m dia x 2.0 m HOS
- 3.5 m^3
- The storage volume is adequate for Ph correction hence adequate.

3. Flash Mixer – 1 No.

Size =1.0 x 1.0 x 1.0m
Volume =1.0 m3
Flow rate =12 m3/hr
=12000/60min*5min
=1000 lit

For mixing of the coagulant and flocculants with the effluent 5 minutes HRT is enough, hence the above size is adequate.

4. Flocculants / Coagulant Tank – 3 Nos.

Size-1 m dia x1m
HOS

Volume = 750 lit each

Flocculants dosing tanks provided for dosing of alum lime, polyelectrolyte.

Hence the volume of the tank is adequate one day consumption.

5. Settling Tank – 1 No.

Size = 4 m dia x 3 m height
Volume = 37.68 m^3
= 38/276 x 24
= 3 Hrs

Settling tank HRT is 2 – 3 hrs, hence the tank size is adequate.

6. Chlorine Contact Tank – 1 No.

Size = 3.5 x 3.5 x 2.0 m
Volume = 24.5 m^3
= 24.5/276 x 24
= 2 Hrs

Hence the size of the chlorine contact tank is adequate for disinfect the treated effluent.

7. Sludge holding tank
Size = 3.5 x 3.5 x 1 m
Volume = 12.5 m3

Sludge generation 6 kg/hr and 144 kg/day will be stored in the holding tank hence adequate.

6. Filter Press – 1 No.

Size = 18" x 18" – 15 Nos.
5 mm space available between the plates
Hence it is adequate to filter the sludge 8 times per day

7. Pressure sand filter – 1 no.

Size = 1.0 m dia x 2.0 m HoS
Area = 0.8 sqmt
Volume =1.6m3

Filtration flow rate is $5m^3$ / Hr. Hence it is adequate.

8. Activated Carbon Filter – 1 No

Size = 1.0 m dia x2.0 m Hos
Size = 0.8 sqmt
Volume = 1.6 m3

Filtration flow rate is $5m^3$/hr. Hence it is adequate.

9. Reverse Osmosis Plant

The treated effluent water sent to RO systems and the reject water will be **sent to** evaporator

Flow	: 15 m^3/hr
Operation	: 12 hrs
Recovery	: 80%
Feed flow	: 170 KLD
Product	: 136 KLD
Reject	: 34 KLD
Head	: 150 m
Make	: Manfang / Equ/Grounfos

RO Unit

Flow	: 15 m^3/hr
No. of membranes	: 18
No of housing	: 3 (code line)
Size	: 8" x 40"
Model	: BW 3040 (Spiral wound)
Make	: DOW

10. Evaporator

Make	: HECS
Flow	: 34 m^3/ day
Evaporation Rate	: 2 m^3 / hr
Operation	: 16 hrs
Type	: Direct fired with diesel burner
Evaporator size	: 4 m x 3m
Fuel consumption	: 10 – 25 lit / hr
Fuel	: diesel
Burner	: Benton / jet
No of Burner	: 2
Burner range	: 0-5000 kcal/hr : 5000 – 10000 kcal /hr

ID Fan

Qty	: 1no
Flow rate	: 1500 cfm
MOC	: MS
Make	: HECS
Motor rating	: 1 HP
Make	: kirlosker

4.3.2 Sewage treatment plant

Domestic wastewater sent to sewage treatment plant and treatment system consisting of screening, aeration clarifier, filtration and disinfection.

Scheme

The sewage from the toilets shall be collected and made available by gravity sewer mains at the Sewage Treatment Plant. The treatment plant is proposed to be installed at below ground level at the location shown in the site layout drawing

Sewage quality:

Taking into consideration the type of occupation in a industry, the organic loading is mainly from the bathrooms, toilets, canteen blocks. For application such as this is the BOD of the wastewater varies from 300 to 425 mg/lit. Hence an average BOD load of 450 mg/l considered for design of the system. The characteristics of the sewage would be like that of domestic effluent and the expected waste water characteristics are given below:

Inlet Conditions:

Raw Sewage Quantity	: 80 m^3/day.
Expected average BOD_5 of Raw Sewage	: 300 - 425 mg/Lit.
Expected average COD of Raw Sewage	: 350 – 525 mg/lit.
Expected Suspended solids of Raw Sewage	: 150 - 300 mg/Lit.
Expected oil and grease of Raw sewage	: 50 mg/Lit
Expected Ph of Raw Sewage	: 6 to 8

Outlet Conditions:

Treated Sewage BOD_5	: Less than 20 mg/Lit.
Treated Sewage COD	: Less than 250 mg/Lit.
Treated Sewage Ph	: Around 5.5 to 9.
Treated Sewage Suspended Solids	: Less than 10 mg/Lit.
Oil & Grease level in treated Sewage	: Less than 10 mg/Lit.

Process Selection:

The treatment process envisaged is "Modified Activated sludge process" with attached and suspended growth biological system. This type of bioreactor is popularly known as Fluidised bed aerobic bioreactor. This type of biological reactor has long sludge retention time since the packaging media provides much larger surface area for biological growth and the bio-flock get attached to the packing media. The sludge produced in the conversion of dissolved organic matter in this process is comparatively lesser than suspended growth system due to long sludge residence time and will not produce bad odour

Sewage collection:

The water from toilets, bathrooms, and canteen will be collected and made available by gravity sewer main to the STP. This will be stored in a RCC tank. This is mainly to take up the flow fluctuation and to provide the required volume for continuous operation of the plant when there is no in flow.

Grit Chamber/Oil & Grease separator:

The effluent from the kitchen will have to be passed through oil/grease catcher and then mixed with the sewer. The raw sewage shall be screened for removal of floating matter and coarse solids/garbage wastes. Necessary grit chamber with grate bars shall be detailed and shall be fixed in the inlet to the collection tank.

Equalisation

In order to keep the effluent fresh and to get uniformity, air mixing is proposed. This air mixing will be through coarse bubble diffusers and the required airline will be taken from the air blower main header.

Biological treatment

The sewage received in the collection tank will be pumped to the biological reactor at a constant rate. The bioreactor is a fluidised bed aerobic reactor with a free-floating plastic media. The packing media is of very large area to volume ratio. The internal protected area of the packing is 400 m^2 per m^3. For oxygen transfer, the bubble air diffusers are provided. The get air supply from the aeration grid connected to the common air blower.

The main header is connected to two nos. (1W + 1Sby) rotary twin lobe type air blower, which delivers the required quantum of air to the system. The rising bubbles from the diffusers scrub the water more efficiently causing molecular diffusion of oxygen and thus enhance the dissolved oxygen level in the effluent. With organic matter as food and oxygen for respiration, the aerobic bacterial volume increases day by day and starts consuming the organic matter present in the water. The bacterial volume increases wit assimilation of the organic matter and this grows exponentially till such time, the organic matter available in the wastewater proves as the limiting factor for the growth. This provides very high food to microbe ratio. In technical terms it is popularly known as MLSS in a suspended growth system.

This bacterial flock gets attached to the packing; there is no need to recirculate the settled biological sludge as warranted in a suspended growth system. With this high bacterial volume, the time required to consume the organic matter in the effluent is considerably reduced and the residual BOD is also considerably reduced. This process converts the organic matter present in the wastewater into bacterial floc. Since the process is selected so and the flock grows in protected surface they detach on aging. This high sludge age provides long sludge retention time and the sludge produced are digested fully and no further sludge treatment may be necessary. The FBBR media will be added for increasing the area for better growth for micro organisms. The MLSS concentration will get increased the solid water will be separation more clarity.

Settling

The overflow from the bioreactor is guided to a hopper bottom-settling tank to settle the biological sludge. The water enters through the central well and moves down. On moving down all the suspended solids settles down in the hopper and the overflow is collected through a launder provided around the [periphery of the settling tank.

Sludge storage

Since there is a continuous microbial production and the decay rate of the bacteria is comparatively lesser, the microbial volume increases and competes for the food. When the organics in the effluent becomes a limiting factor, the decay of the bacteria starts and

becomes bacterial sludge. This need to be removed from the system along with the other suspended solids.

Sludge Decanting

The process of decanting excess sludge is termed as sludge decanting. The sludge consistency in the sludge holding tank is only 1 % and the excess water to be removed in order to get it as a cake. Hence the 1% sludge is drawn through a screw pump and fed to a filter press of 35 litres cake volume where only the solids are retained and the excess water is drained. The excess sludge from the filter press is wiped and stored in a container and will be mixed with the ordinary soil and used a s manure for horticulture application.

Disinfection

Chlorine dosing @ 5-8 mg/l, sodium hypo-chlorite solution will be dosed in the clarified water tank in order to disinfect the water and enough residence time is provided to achieve maximum disinfection. After disinfection the water will be filtered through a dual media filter.

Filtration

The disinfected water in the clarified water tank will be pumped by means of two nos. (1W+1Sby) centrifugal, Monoblock pump through a dual media filter to reduce the particulate matter and passed through an activated carbon filter to reduce the organic matters, H_2S, ammonia etc.

4.3.2 Equipment Details

Bar Screen

Size	: 0.5 x 0.5 x 0.5 m
Qty	: 1 no
C to C	: 15 mm space between bars

Sewage Collection Tank

Quantity	: 1 no

Capacity : 18 KLD

Effective depth of the tank: 2.5 m below invert level

Size : 3 x 3 x 3.5 m

Free board : 0.5 m

Make : RCC.

Fluidized Bed Aerobic Biological Reactor

Quantity : 1no

Effective depth of the tank: 4m

Size : 4 x 4 x 4.5 m

Free board : 0.5 m

Moc : RCC

Settling tank

Quantity : 1 no

Size : 3 dia 2.5 H

Tank type : Hopper bottom

Moc : RCC

Sludge Holding tank

Quantity : 1 no

Moc : RCC

SIZE : 2 X2 X 2 M

Free board : 0.4 m

Treated water collection tank

Quantity : 1 no.

Moc : RCC

Size : 3 x 3 x 3 m

Air blower

Quantity : 1+1 no.

Number of working : 1 no.

Number of stand by : 1 no.

Air flow : 100 CFM

Pressure : 0.4 kg/sq.cm

Membrane Diffuser

MOC : EPDM

Membrane tube module size : 90 mm dia x 1000 mm long

Nos. provided in aeration tank: 16 nos. fine bubble

Dosing pumps

Type : Electronic control

Flow & Pressure : 0-6 lph @ 3 kg/sq.cm

Pack media for FBBR

Quantity : 1 m^3

Type : Internally finned & externally serrated

MOC : polypropylene

Organic loading rate: 10 kg/ m^3

Filter press

Quantity : 1 no.

Type : Recessed type

Size : 18' x 18'

MOC : poly propylene

Operating pressure: 3 kg/sq.cm

Dual media filter

Quantity : 1 no.

Type : Vertical

Design pressure : 3.5 kg/sq.cm

Size : 1000 mm dia x 2000 mm HOS

MOC : MS

Flow rate : 5 cum/hr

Filter media : Graded sand & pebbles

Activated carbon filter

Quantity : 1 no.

Type : Vertical

Design pressure : 3.5 kg/sq.cm

Size : 1000 mm dia x 2000 mm HOS

MOC : MS to IS 2062

Flow rate : 5 cum/hr

Filter media : Granular activated carbon

Design analysis report for STP- 100 KLD

Design Report for sewage Treatment Plant – 100 KLD
Operation - 24 hrs
Flow logic - 4 m3/hr

Adequacy report on sewage treatment

The toilet waste from various blocks is connected to septic tanks and the septic tank overflow is connected to collection tank the wash water (sludge) from toilet, bath etc. is connected to collection tank / Aeration Tank.

S.no	Description	Quantity	Size
1	Bar screen	1	0.5 x 0.5 x 0.5 m
2	Collection tank	1	3 x 3 x 3.5 m
3	FBBR Tank	1	4 X 4 X 4.5 m
4	Settling tank	1	3 m dia 2.5 m height
5	Sludge holding Tank	1	2 x 2 x 2 m
6	Treated water tank	1	3 x 3 x 3 m
7	Air Compressor	1+1	100 cfm
8	Filter Press	1	18" x 18" - 15nos plates type
9	PSF	1	1.0 m dia x 2.0 m HOS
10	ACF	1	1.0 m dia x 2.0 m HOS

1.0 Bar Screen

Size : 0.5 x 0.5 x 0.5 m
Qty : 1 no
C to C : 15 mm space between bars
Considering the velocity of sewage is 0.5 m/s hence its adequate

2.0 Collection tank

Size : 3 x 3 x 3.5 m
Volume : 31.5 m3
= 31.5/100*24
= 7.5 hrs
Hence the collection tank volume is adequate as per engineering practice 4 hrs is enough we provide 7.5 hrs provided.

3.0 **FBBR tank (aeration tank)**

Size : 4 x 4 x 4.5 m
Volume : 72 m3
= 72/10*24
= 17 hrs
We provide HRT 17 hrs along with FBBR media hence its adequate

Air requirement design

Assume Q_2 requirment	= 2kg of O_2 / 1kg of BOD
	= 1kg of O_2 BOD = 2kg of O_2
Assume BOD for sewage	= 250mg/lit
	= 0.25kg/m^3
BOD load	= 72 x 0.25
	= 18 kg of BOD/day
O_2 requirement	=18 x 2
	= 32 O_2/day
Oxygen transfer	= 16%
SOTR	= 32 / 0.16 x 0.21 = 952
Density	= PM/RT
R	= 1.16
Volume m/r	= 952 / 1.16
	= 820.7 / day
	= 34 m^3/Hr

1 HP blower will be provided it will deliver 30m3/hr
We provide 3 HP rated with blower Hence it is adequate

3. Settling tank

Size	= 3 m dia x 2.0 m height
Volume of settling tank	= 14.0 m^3
	= 14/100 x 24 = 3hrs

However we providing clarisettler internal to increase the surface area for better sludge settling, hence the retention time is adequate

4. Sludge holding tank

Size	= 2.0 x 2.0 x 2.0 m
Capacity	=8 m3

The sludge generation per day = 200- 500 litters/day
Hence the volume of SHT is adequate.

5. Treated water tank (Chlorine contact tank)

Size	= 3.0 x 3.0 x 3.0 m
Capacity	=27 m3
	=27/100 x 24
	= 6 hrs

Minimum 2 hrs required for chlorination contact time. However we providing NAOCL dosing systems to increase the disinfection rate hence the retention time are adequate.

6. Filter Press – 1 No.

Size = 18" x 18" – 15 Nos.
5 mm space available between the plates
Hence it is adequate to filter the sludge 8 times per day

7. Pressure sand filter-1 no

Size	= 1.0 m dia x 2.0 m HoS
Area	= 0.8 sqmt
Volume	=1.6m3

Filtration flow rate is max 5m^3 / Hr. Hence it is adequate.

8. Activated Carbon Filter – 1 No

Size	= 1.0 m dia x 2.0 m Hos
Size	= 0.8 sqmt
Volume	= 1.6 m3

Filtration flow rate is max $5m^3$/hr. Hence it is adequate.

4.3.3 Rain water harvesting

Rain and storm water will be collected through a separate drainage system in a sedimentation lagoon and it will be treated for recycle purpose. Pre-treated wastewater is designed to meet the applicable regulations with regard to all parameters.

4.3.4 Waste management

The plant will generate significant amount of waste. Solid waste management will be organised in accordance with the principles of waste minimization and recycling. The majority of the waste is non-vulcanized rubber waste, which can be to large extent recycled within the plant. Scrap rubber tyres will be delivered to specialized companies to be re-used as construction material. Household waste and production waste that is not suitable for recycling will be disposed of in accordance with regulatory requirements. Hazardous waste management will be outsourced to licensed companies. Used oils will be collected into the waste storage facility located in the garage complex. Waste storage or handling will not have a significant effect on the environment outside the plant's territory.

Solid Waste Management

S.No	Description	Quantity	Method of collection	Method of disposal
1	From process Compound Steel wire Polyester fabric Bend wire Tyre	 5 MT/month 7 MT/month 7 MT/month 2.5 MT /month 25 MT /month	Stock yard	CPCB/SPCB authorized vendors
2	From ETP	100 kg/day	Drum	Sludge will be stored in container

3	From STP	100 kg/day	Drum	Used as Manure

Treatment & Disposal

- The solid waste from the process is recycled and reused in the process.
- The solid wastes from ETP will be stored separately and disposed in hazardous waste storage facility as approved by TNPCB.
- The solid wastes from the STP plant will be used as Manure for Green Belt development.

4.3.5 Chemical storage and handling

Chemicals will be stored in steel, plastic containers surrounded by a concrete secondary containment preventing any leakage of chemicals from contaminating soil or groundwater.

4.3.6Noise

Noise abatement has been taken into consideration in the project design and the plant layout. Significant noise sources, such as compressor plant, steam boiler, manufacturing equipment and cooling system condensers will be installed in noise suppressing enclosures ensuring that noise levels at the perimeter of the plant will meet regulatory limits.

Traffic

Transportation to and from the plant will be carried out by both rail (40%) and road (60%). The increase of road and rail traffic has been assessed to be negligible and not to cause significant disturbance to the surroundings.

4.3.7 Occupational health and safety

The plant will adhere to Apollo Tyres corporate occupational health and safety standards and industrial worker health and safety regulations. All necessary measures will be implemented to achieve healthy working conditions. All those working on the Company's premises are required to observe its protection instructions. The Company will Provide training and guidance and supervise the instructions are followed. Employees' health is also taken care of by means of education and guidance and regular independent

workplace surveys.

4.3.8 Fire safety

Due to the presence of dust in the manufacturing process the fire safety precautions have been carefully taken into consideration in the project design. Fire detectors will be installed at all process equipment where fire hazard is present. Sprinkler systems will be installed in all production buildings. Staff will be trained in fire prevention and fire-fighting.

4.3.9 Socio-economic impacts

The plant will have a positive socio-economic impact by creating direct jobs for 1200 (by 2009) and indirect employment for approximately 100 persons.

Community issues

In accordance with its corporate policies, Apollo tyres ltd is committed to operate as a good corporate citizen and maintain open dialogue and close relationship with the surrounding community and local population. It will keep the community informed via its website and other forms of communication.

4.3.10Monitoring

Apollo tyres ltd will monitor and report the environmental impact of the project and its operation in accordance with SPCB/CPC/MoEF environmental law and with Apollo tyres corporate environmental reporting standards, based on ISO 14001 and safety management systems.

The Bank will evaluate the project's compliance with the applicable environmental and social requirements during the lifetime of the project by reviewing annual environmental reports (AERs) covering:

(i) Ongoing environmental, health and safety performance

(ii) The status of implementation of environmental mitigation and improvement measures.

The Bank's representatives will also conduct periodic site supervision visits when deemed appropriate.

CHAPTER V
SUMMARY

1. The project does not have any Negative Impact on the Environment. More over due to effective Environmental Management Plans, the quality of the Environment can be still improved.

2. There would be improvement in the existing Environment due to this project.

3. There would be generation of direct and indirect employment.

4. There would be increased economic activity enhancing wider secondary economic benefits to the business segments.

5. Therefore considering the above, this project may kindly be approved.