CHEMPLAST SANMAR LIMITED

Prefeasibility Report for Expansion of PVC Plant at Cuddalore, Tamil Nadu from 300000 TPA to 600000 TPA

JANUARY 2018

Kadam Environmental Consultants
www.kadamenviro.com

Environment for Development
CHEMPLAST SANMAR LIMITED

Prefeasibility Report for Expansion of PVC Plant at Cuddalore, Tamil Nadu from 300000 TPA to 600000 TPA

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1 EXECUTIVE SUMMARY

The company is operating a state of the art plant to produce 300000 TPA PVC Resin at Cuddalore with INEOS Vinlys, U.K. providing the technology. The plant was commissioned in September 2009 meeting all the statutory requirements in full. Now, we would like to submit the following facts for your kind consideration.

1.1 Plant Features and Production Capacity

- The plant has installed four polymerization reactors.
- The technology is a “clean and closed reactor” process with advanced process controls and high integrity safety management system.
- The plant is designed to produce different grades of PVC resin. The factors that define the capacity of the plant is given below,
  - Cycle Time: The time taken per batch: 250-260 minutes per batch was considered
  - Yield per batch: about 40 tons of PVC per batch.
  - Effective plant operating hours: 8000 hours per annum.

With this background, we are planning to install another module of the same configuration to take up the capacity from 300000 TPA to 600000 TPA.

1.2 Environment

At present the process effluents are treated in a state-of-the-art Zero Liquid Discharge plant and completely recycled. No process effluent is discharged for 300000 TPA. The Zero liquid discharge will be expanded to treat and recycle the effluents arise from 600000 TPA plant.

The company has installed state-of-the-art continuous monitoring of VCM (GC based) and is data logged.

The company has on line stack monitoring, online point source emission monitoring systems in place and these are also data logged.

The company employs mobile GC van to do the monitoring of VCM in the nearby villages.

All the online continuous monitoring data are connected online to the TNPCB’s Care Air Center at its headquarters in Chennai.

The company has a captive marine terminal facility to import its raw material Vinyl Chloride Monomer (VCM). Presently, at 300000 TPA, the plant requires about 42-44 shipments per annum and this would go up to 84-86 shipments per annum for the enhanced capacity of 600000 TPA. There would be no change in the pumping rate or pumping conditions. There will be no impact of this on the environment as this is only a direct pumping activity from ships to the double walled refrigerated storage tanks at the plant site.

The company employs about 45-50 trucks a day for clearing the finished products. This would marginally go up to 90-100 trucks. The plant is situated in the state highway connecting Cuddalore to
Chidambaram and roughly about 10000 vehicles pass on a daily basis. The increase in emission from the marginal increase in truck movement from the Plant is insignificant.

1.3 Submission

In the light of the above, we would like to state that the capacity of the plant can be expanded to 600000 TPA by installing an additional plant of 300000 TPA and in doing so the complete system will be studied for its environmental impacts arising out of the expansion and the required augmentation will be made ensuring minimal environmental impact.
2 INTRODUCTION

2.1 Brief Description of the Project

Chemplast Sanmar Limited is the flagship company of Sanmar Group, which is one of the largest industrial firms in the Southern Part of India with Group turnover of Rs. 5,000 Crores per annum. The Sanmar Group manages over 30 businesses that are grouped under various industry segments viz., Chemicals, Engineering, Electronics, Shipping and Metals.

Chemplast Sanmar Limited is operating a PVC Plant Cuddalore and the current capacity of the plant is 300000 TPA. The production of PVC involves the following steps;

- Polymerization of VCM in Reactors to get PVC in slurry form
- Transfer of PVC slurry to Blow down tanks to recover the unreacted VCM.
- Stripping of this slurry to further reduce VCM content in the slurry.
- VCM recovery system to handle the VCM from the blow down stage and from the stripper.
- Slurry de-watering by Centrifugation.
- Wet PVC drying in Fluid bed dryers.
- Conveying of dried PVC to Silos.
- Bagging of the dried PVC.
- Additive section to prepare the reagents and additives that are to be added to the Polymerization reactors
- Vent gas absorption system to absorb all the VCM in the non-condensable from the recovery system.
- In addition to the above following systems and utilities forms part of the overall production process
  - Steam – From Coal fired boiler.
  - Water from Desalination unit.
  - Compressed air.
  - Nitrogen
  - Zero liquid discharge plant to treat the entire effluent and completely recycle the effluents.

2.2 Need for the project and its importance to region

PVC is a versatile polymer, finding varied applications, the most important one being the manufacture of Pipes & Fittings for irrigation purposes. PVC Pipes have very many advantages over conventional pipes, some of them being:

2.2.1 Energy efficient

Less energy is required to manufacture PVC compared to other pipe materials.

2.2.2 Lightweight

PVC’s lighter weight makes it easier and less costly to handle, transport and install. In fact, most PVC pipe sizes can be handled manually, reducing the need for expensive installation equipment.
2.2.3 Excellent flow characteristics

Sludge, slime and other residue buildups are virtually nonexistent because of PVC pipe's extremely smooth inner surface.

2.2.4 Higher flow rates

The smooth interior walls of PVC pipe translate into increased flow rates at flatter grades, resulting in reduced trenching costs and fewer lift stations.

2.2.5 Tough but flexible

PVC will resist earth and live load deflection and will bend under shifting soil conditions.

2.2.6 Non-corrosive

PVC will withstand “hot soil” conditions. In fact, PVC requires virtually no maintenance. But if it does become damaged, it can be easily hand-cut and repaired, resulting in lower repair costs and less interruption in water service to the consumer.

2.2.7 Installation Made Easy

Because of its lightweight and durability, PVC pipe saves time and reduces labor, transportation and maintenance costs.

As could be seen under the Section "Demand-Supply gap", India is deficient in PVC resin production and there is a dire need to add capacity in the country to meet the growing demand. This would also obviate the need to import large volumes of PVC, thereby saving considerable foreign exchange.

Also, currently, the capacity to make PVC resin is highly skewed towards the Western region of the country. In order to optimize on transportation cost and to give a fillip to PVC Pipe producers in the South, it is important that such capacity augmentation takes place in South India.

Therefore, looking at the demand for PVC and the proponent's experience in the sector, the expansion of PVC plant in the SIPCOT site is justified.

2.3 Demand Supply Gap

The following table gives the Demand-Supply balance in India for PVC resin.
## Table 2-1: PVC Industry - Capacity and Domestic Demand.

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<td>Total Production in KT</td>
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<td>Total Domestic Demand in KT</td>
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With demand growing at over 10% CAGR, the gap will further widen in the ensuing years, unless capacity additions happen in the country.

At a macroeconomics level, the per capita PVC consumption in India is low as compared to China and Germany indicating the potential growth opportunity for PVC in India.

### 2.3.1 Domestic / Export Markets

The demand for PVC is also expected to continue in future. In pipes sector, which accounts for 70% of resin consumption, government investments in water services will continue, as a number of smaller towns do not have adequate drinking water facilities. In other major sectors such as films, footwear, cables, etc. no structural changes have taken place, which would significantly change the pattern of PVC consumption.

Therefore, looking at the demand for PVC and the proponent’s experience in the sector, the setting up of PVC plant in the SIPCOT site is justified.

### 2.4 Import vs. Indigenous Production

The additional production from project will substitute the imports.

### 2.5 Export Possibility

There is certainly possibility of exports. But as given above the domestic market itself is more than the domestic production capacity, hence focus is on domestic sales.

### 2.6 Employment Generation (Direct and Indirect) due to the project.

There will direct employment generation in addition to the existing 450-500 persons of about
1. During project phase - 700 to 800 persons on temporary basis.
2. During Operations - 200-225 persons

However, indirect employment is likely to be about 1000 persons.

Significant proceeds will accrue to the State and Central Government by way of taxes,
3 PROJECT DESCRIPTION

3.1 Type of Project including interlinked and interdependent projects, if any

No project is interlinked with this project. This Project falls under As per EIA Notification 2006, the project of petrochemical based processing (processes other than cracking & reformation and not covered under the complexes) is falling under Category 5(e) −A.

3.2 Location (map showing general location, specific location and project boundary & project lay out) with coordinates

The site is located at State Industries Promotion Corporation of Tamil Nadu (SIPCOT) Phase II Industrial Development Area, near Semmankuppam village, Cuddalore District, Tamil Nadu.

The total plot area of the existing unit is about 69.44 Acres in SIPCOT Phase II. Existing and proposed site layout map is attached as Annexure 7 of additional document.

The site co-ordinates are provided in Table 3-1.

Table 3-1: Latitude and Longitude of the Project Site

<table>
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<th>Co-ordinate Identifier as shown in Figure 3-1</th>
<th>Latitude (N)</th>
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<tr>
<td>R</td>
<td>11° 38’ 38.84”</td>
<td>79° 44’ 17.83”</td>
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</table>
3.3  **Details of alternate sites considered and the basis of selecting the proposed site, particularly the environmental considerations gone into should be highlighted**

Since this plant already exists all the environmental considerations have been taken into account in design of the new plant.

3.4  **Size or Magnitude of Operation**

Existing production capacity:  300000 TPA

Proposed production capacity:  600000 TPA

3.5  **Technology and Process Description**

Chemplast has selected technology of M/s INOVIN U. K. Ltd., was formerly known as INEOS Vinlys ltd, for expansion project from  300000 TPA to  600000 TPA. M/s INOVIN is a member of European Council of Vinyl Manufacturers (ECVM). The developments in INEOS’s PVC manufacturing technology are based on the feedback received from their licensees worldwide in addition to their own R&D activities.
3.5.1 Salient Features of Technology

- The technology used is a clean and closed reactor technology, which minimizes reactor opening thereby reducing the potential exposure to the operator and release of residual VCM to the environment. The minimum expected opening frequency is once in 500 batches.
- The VCM recovery system does not use a gasholder thereby reducing the fugitive emission of VCM.
- Ex-situ (outside the reactor) preparation of initiator using commonly available chemicals. This feature eliminates the usual refrigerated storage for bought out initiators.
- Provided with reflux condenser for removing heat of reaction and variable agitator speed for close control of polymer size.
- Water contaminated with VCM is stripped and treated to levels <0.5 PPM before discharge to zero liquid discharge (ZLD) section.
- VCM stripping technology gives low residual VCM with minimal effect on polymer properties. The special design of column is such that there is no buildup of degraded polymer in the column and hence cleaning cycles are not required, so product contamination is minimized. Product residence time can be controlled therefore altering operating conditions optimize VCM removal and product heat treatment. Stripping technology in addition, has low steam consumption.
- The continuous column stripper reduces the residual VCM in finished product to less than 1 PPM. The stripper also reduces the loss of VCM to atmosphere from slurry tank and drier.
- The contact Fluid Bed Drier operates at low temperature and hence has least effect on resin colour and contamination.
- Plant design meets applicable standards of safety and environmental performance.
- The reactor protection systems against major hazard releases are of very high integrity and include a reaction short stop system of extremely high reliability and effectiveness.

3.6 Raw Materials

Details of raw materials are given in the *Annexure 11* of additional document.

3.7 Process Description

Manufacturing process description is given in the *Annexure 10* of additional document.

3.8 Additives and Chemicals

Details of additives & chemicals given in the *Annexure 11* of additional document.

3.9 Raw material required along with estimated quantity, likely source, marketing area of final products, mode of transport of raw material and finished product.

The main raw material VCM (Vinyl Chloride Monomer) is stored in two refrigerated atmospheric storage tank of capacity 7,500 MT each built to API standards.
Additional one number of double walled refrigerated VCM storage tank of capacity 10000 MT will be installed as part of the expansion project from 300000 TPA to 600000 TPA.

The basic raw material required for PVC manufacturing is VCM, which would be received at the MTF. No. of ships will go up from 2-3 ship/month to about 6-7 ships/month. The transfer of VCM from ship to plant will be through trenched and sub terrain pipeline. The design and operation of the pipeline system will ensure that there is no VCM emission into the atmosphere.

Fuels and treatment chemicals will be transported to the site by trucks on Cuddalore-Chidambaram stretch of NH 45A. Number of trips for transportation of finished goods will increase from 45-50 /day to 90-100 /day on an average.

Transportation details of raw materials are given in the Annexure 11 of additional document.

3.10 Resource optimization/ recycling and reuse envisaged in the project, if any should be briefly outlined.

The existing plant has been installed with a Zero Liquid Discharge Facility (ZLD) from the date of commissioning. The effluents are completely recycled.

The effluents arising out from the expansion project from 300000 TPA to 600000 TPA will be completely recycled with help of additional zero liquid discharge plant. There is no risk of contamination of ground water or any other water bodies by industrial activity.

3.11 Availability of water its source, energy/ power requirement and source should be given

The source of water will be from Sea and unit has a Desalination facility. The present desalination capacity will meet the water requirement for expansion project from 300000 TPA 600000 TPA.

Electricity will be used from the existing HT power connection of TNEB. The infrastructure is designed for the maximum demand of 38500 KVA (22500 Old PT+16000 New PT) drawl from TNEB and is sufficient to handle the power requirements.

3.11.1 Water consumption

The details of the water consumption is given in Table 3-2 and water balance diagram is given in Figure 3-2
Figure 3-2: Water Balance Diagram after Proposed Expansion

Inlet → 12184 → Desalination Plant → 8285 → Rejects to Deep Sea

3899 32.0% permeate from Desalination Plant

1560

2000 2640

 Evap. Loss

1560 Evap. + Drift

3860

1785 5645

DM Plant

Plant Washings

100 40

414

40 40

Gardening

Domestic

STP

Treated water used for Green Belt

Recycling UF, RO System and MEE system

5860

5620

5860

ETP (6400 KLD Cap.)

5620

240

SALT for Disposal to TSDF

Note: All values are in KLD

→ Fresh Water
→ Effluent
→ Losses
→ Recycled Water
### Table 3-2: Details of Water Consumption

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Water Consumption Pattern</th>
<th>Water Consumption in KLD</th>
<th>Existing 300000 TPA</th>
<th>Proposed 300000 TPA</th>
<th>Total 600000 TPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>From sea to Desalination plant</td>
<td></td>
<td>6375</td>
<td>5809</td>
<td>12184</td>
</tr>
<tr>
<td>2</td>
<td>From Desalination Plant</td>
<td></td>
<td>2040</td>
<td>1859</td>
<td>3899</td>
</tr>
<tr>
<td>A</td>
<td>Cooling Tower</td>
<td></td>
<td>780</td>
<td>780</td>
<td>1560</td>
</tr>
<tr>
<td>B</td>
<td>DM water</td>
<td></td>
<td>910 +1930 (Recycled)</td>
<td>875 +1930 (Recycled)</td>
<td>1785 +3860 (Recycled)</td>
</tr>
<tr>
<td>a</td>
<td>Process</td>
<td></td>
<td>2255</td>
<td>2255</td>
<td>4510</td>
</tr>
<tr>
<td>b</td>
<td>Boiler</td>
<td></td>
<td>405</td>
<td>370</td>
<td>775</td>
</tr>
<tr>
<td>C</td>
<td>Plant washing</td>
<td></td>
<td>50</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>D</td>
<td>Greenbelt</td>
<td></td>
<td>280</td>
<td>134</td>
<td>414</td>
</tr>
<tr>
<td>E</td>
<td>Domestic</td>
<td></td>
<td>20</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>2040</td>
<td>1859</td>
<td>3899</td>
</tr>
</tbody>
</table>

#### 3.11.2 Fuel

Coal is used as fuel for generation of steam. Presently the steam requirement for 300000 TPA plant is met by 43 MT capacity boiler for an average steam consumption of 28 TPH and peak consumption of 30 TPH.

An additional 43 MT capacity boiler will be installed as part of the expansion project from 300000 to 600000 TPA to meet the steam requirement for an average consumption of 56 TPH and peak consumption of 60 TPH.

Chemplast intends to continue the use of low ash/sulphur content imported coal.

### Table 3-3: Steam and coal consumption details

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Description</th>
<th>Unit</th>
<th>Present quantity for 300000 TPA</th>
<th>Proposed for Additional 300000 TPA</th>
<th>Total for 600000 TPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Boiler capacity</td>
<td>TPH</td>
<td>43</td>
<td>43</td>
<td>86</td>
</tr>
<tr>
<td>2</td>
<td>Average steam</td>
<td>TPH</td>
<td>28</td>
<td>28</td>
<td>56</td>
</tr>
<tr>
<td>3</td>
<td>Peak Steam requirement</td>
<td>TPH</td>
<td>30</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>4</td>
<td>Coal Consumption</td>
<td>TPD</td>
<td>110</td>
<td>110</td>
<td>220</td>
</tr>
</tbody>
</table>

#### 3.12 Quantity of waste to be generated (liquid and solid) and scheme for their management/disposal

#### 3.12.1 Liquid waste

In the Existing 300000 TPA: Out of 2930 KLD for wastewater generation 2810 KLD is the trade effluent and 120 KLD is the steam condensate to ZLD.

In the Proposed 300000 TPA: Out of 2930 KLD for wastewater generation 2810 KLD is the trade effluent and 120 KLD is the steam condensate to ZLD.
For Total 600000 TPA: Out of 5860 KLD for wastewater generation 5620 KLD is the trade effluent and 240 KLD is the steam condensate to ZLD.

### 3.12.2 Solids Waste


The Used/Spent oil generated is being sent only to authorize recyclers.

The solid waste generated under the category 35 and 22 is being disposed off at TNWML (Tamil Nadu Waste Management Limited) common disposal facility at Gummudipondi, an authorized agency.

The increase in Solids waste quantity envisaged due to expansion project from 300000 to 600000 TPA will be disposed off at TNWML, Gummudipondi. Necessary authorization will be applied for the increased quantity with TNPCB.

### 3.12.3 Effluent treatment and disposal

To treat wastewater generated, an Effluent Treatment Plant and Zero liquid discharge plant will be installed to recover 100% of the effluent generated. The effluent streams generated from the various processes in the plant will be routed to the ZLD for treatment and will be completely recycled.

### 3.12.4 Solid and Hazardous Waste Management


**Category 5.1**

Used/Spent Oil: 16.2 MT per annum. The used/spent oil generation will not increase for the expansion project from 300000 TPA to 600000 TPA.

**Category 35.3**

Generation of ETP Sludge will increase from authorized quantity of 80 TPA to 160 TPA.

Generation of Evaporator Solids under expansion project from 300000 TPA to 600000 TPA will be within the present authorized quantity of 1656 TPA.

Generation of Desal Sludge will increase from authorized quantity of 720 TPA to 1250 TPA

**Category: 22.2**

Generation of PVC lumps under expansion project from 300000 TPA to 600000 TPA will be within the present authorized quantity of 10.8 TPA.
The following table explains the generation of Hazardous waste.

**Table 3-4: Details of Hazardous Waste Generation**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Type of Waste</th>
<th>Hazardous Waste Category</th>
<th>Quantity per Year in KTPA</th>
<th>Treatment / Disposal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Present (300000 TPA)</td>
<td>Proposed (300000 TPA)</td>
</tr>
<tr>
<td>1</td>
<td>Used / spent Oil</td>
<td>5.1</td>
<td>16.2</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>ETP sludge</td>
<td>35.3</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>3</td>
<td>Evaporator</td>
<td>35.3</td>
<td>1656</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>Desal Sludge</td>
<td>35.3</td>
<td>720</td>
<td>530</td>
</tr>
<tr>
<td>5</td>
<td>PVC lumps</td>
<td>22.2</td>
<td>10.8</td>
<td>0</td>
</tr>
</tbody>
</table>
4 SITE ANALYSIS

4.1 Connectivity
Most of the industries in Cuddalore Taluk are located in SIPCOT Industrial Complex adjacent to NH-45A (Cuddalore-Chidambaram Stretch). The study area is well connected by roads to Cuddalore and Chidambaram. All the areas in the study area linked either by Pucca or Kutcha roads.

Two nearest Railway stations are available from the proposed site. Cuddalore Port Junction is nearly 7.8 km in NNE direction. Alapakkam Railway Station is nearly 3.48 km in SSW direction.

4.2 Land Form, Land Use and Land ownership
The total plot area of the existing unit is 69.44 Acres.

4.3 Topography (along with map)
The project site generally flat with average level difference of 2.0 m. There are isolated pockets of 1.0 - 2.0 m above or below the average ground well. Shallow depressions are observed on the site and a large area in the middle of the plot towards eastern boundary is elevated.

4.4 Existing land use pattern (agriculture, non-agriculture, forest, water bodies (including area under CRZ)), shortest distances from the periphery of the project to periphery of the forests, national park, wild life sanctuary, etc sensitive areas, water bodies (distance from the HFL of the river), CRZ. In case of notified industrial area, a copy of the Gazette notification should be given.

Land use pattern: Industrial. No change in land use pattern.

Table 4-1: Distance of Project Site from Sensitive Areas

<table>
<thead>
<tr>
<th>Area</th>
<th>Distance in km</th>
<th>Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vadalur Bird Sanctuary</td>
<td>22.0</td>
<td>WSW</td>
</tr>
<tr>
<td>Chidambaram (Notified Archaeological sites)</td>
<td>28.0</td>
<td>SSW</td>
</tr>
<tr>
<td>Puducherry (Any other Archaeological sites)</td>
<td>33.0</td>
<td>NNE</td>
</tr>
</tbody>
</table>

Table 4-2: Distance of Project Site from Water Bodies

<table>
<thead>
<tr>
<th>Sea / Water Body</th>
<th>Distance (in km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sea / Estuary</td>
<td></td>
</tr>
<tr>
<td>Uppanar Canal</td>
<td>Adjacent (20 m) E</td>
</tr>
<tr>
<td>Paravanar River</td>
<td>10.52 (NNE)</td>
</tr>
<tr>
<td>Bay of Bengal</td>
<td>2.54 (E)</td>
</tr>
<tr>
<td>Lake</td>
<td></td>
</tr>
<tr>
<td>Perumal Lake</td>
<td>5.5 (SW)</td>
</tr>
<tr>
<td>Small pond in Cuddalore Town</td>
<td>8.0 (N)</td>
</tr>
</tbody>
</table>
4.5  **Existing Infrastructure**

The required infrastructure for producing 300000 TPA of PVC resin is erected in the site.

Additional infrastructure for producing 300000 TPA of PVC resin is part of capacity enhancement from 300000 TPA to 600000 TPA will erected.

4.6  **Soil classification**

Not required.

4.7  **Climatic data from secondary sources**

The climate in the study area is tropical. It is neither extremely hot nor extremely cold but experiences high humidity. The air gets warmer towards the interior. During summer, the heat is mitigated in the coastal areas by sea breeze. The months between April and June are generally hot with temperatures shooting up to maximum 40°C in winter during the months of December to February the temperature does not fall below 20.5°C.

The study area experiences both SW and NE monsoons. The project site receives annual rainfall of about 1300mm in the NE monsoon, which strikes during November brings heavy rainfall, which accounts up to 60% of the annual rainfall. Gales also affect the area during cyclonic storms. Relative Humidity maximum ranging up to 75% during November to January and 60% in the month of June.

4.8  **Social infrastructure available**

Not applicable.
5 PLANNING BRIEF

5.1 Planning Concept (type of industries, facilities, transportation etc) Town and Country Planning/Development authority Classification

The entire area is a notified industrial area.

5.2 Population Projection

During the Construction and Execution phase of the Project, it is estimated that about 700-800 workers will be involved.

Thereafter during the operation phase at the new 300000 TPA plant around 200-225 positions will be created and employed, this is additional to the existing 450 -500 persons working in operations of 300000 TPA plant

5.3 Land Use planning (Break up along with green belt etc.)

Total area proposed for construction expansion project Existing area: 54121 m²; Proposed area: 54121 m²; Total area: 280852 m², the site is located in M/s Chemplast Sanmar SIPCOT Industrial Complex Phase-II, Semmankuppam. Cuddalore. The Land use breakup at site is given in the following table;

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Title</th>
<th>Area in m²</th>
<th>Area in Percentage (%) For 600000 TPA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing 300000 TPA</td>
<td>Proposed 300000 TPA</td>
<td>Total 600000 TPA</td>
</tr>
<tr>
<td>1</td>
<td>Production</td>
<td>9063</td>
<td>9063</td>
</tr>
<tr>
<td>2.1</td>
<td>Product Storage</td>
<td>9375</td>
<td>9375</td>
</tr>
<tr>
<td>2.2</td>
<td>Raw Material</td>
<td>7400</td>
<td>7400</td>
</tr>
<tr>
<td>2.3</td>
<td>Hazardous Chemical Storage</td>
<td>725</td>
<td>725</td>
</tr>
<tr>
<td>2.4</td>
<td>Fuel Storage</td>
<td>1980</td>
<td>1980</td>
</tr>
<tr>
<td>2.5</td>
<td>Water</td>
<td>4945</td>
<td>4945</td>
</tr>
<tr>
<td>2.6</td>
<td>Hazardous Waste Storage</td>
<td>125</td>
<td>125</td>
</tr>
<tr>
<td>3</td>
<td>Boiler</td>
<td>3319</td>
<td>3319</td>
</tr>
<tr>
<td>4</td>
<td>Electrical Room</td>
<td>5500</td>
<td>5500</td>
</tr>
<tr>
<td>5</td>
<td>DG Room</td>
<td>420</td>
<td>420</td>
</tr>
<tr>
<td>6</td>
<td>Security Room</td>
<td>216</td>
<td>216</td>
</tr>
<tr>
<td>7</td>
<td>Cooling Tower</td>
<td>780</td>
<td>780</td>
</tr>
<tr>
<td>8</td>
<td>Office</td>
<td>324</td>
<td>324</td>
</tr>
<tr>
<td>9</td>
<td>Effluent Treatment Plant</td>
<td>5700</td>
<td>5700</td>
</tr>
<tr>
<td>10</td>
<td>Desalination Plant</td>
<td>3925</td>
<td>3925</td>
</tr>
<tr>
<td>11</td>
<td>Office And Shed</td>
<td>324</td>
<td>324</td>
</tr>
<tr>
<td>12</td>
<td>Green belt area</td>
<td>90054</td>
<td>0</td>
</tr>
</tbody>
</table>
### Table 1: Area Breakdown

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Title</th>
<th>Area in m²</th>
<th>Percentage (%)</th>
<th>Existing 300000 TPA</th>
<th>Proposed 300000 TPA</th>
<th>Total 600000 TPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Un Occupied and Miscellaneous</td>
<td>136677</td>
<td>29.39</td>
<td></td>
<td></td>
<td>82556</td>
</tr>
<tr>
<td></td>
<td>Total Area (Existing+ Proposed)</td>
<td>280852</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### 5.4 Assessment of Infrastructure Demand (Physical and Social)

The proposed project is located in M/s Chemplast Sanmar SIPCOT Industrial Complex Phase-II, Semmankuppam, Cuddalore. Under RS No. 70 part, 71 part, 72, 73, 74 part 75 part, 76 part, 133 part, 134 and bounded

**Physical Demand**

Water: Water for the 300000 TPA plant is from Desalination plant and the rejects of the desalination unit is pumped back to the sea meeting all the regulations. The present Desalination will meet water requirement of the expansion project from 300000 TPA to 600000 TPA. The entire water requirement will be met by Desalination, for which CRZ clearance of adequate capacity is already available.

Electricity: Electricity will be used from the existing HT power connection from TNEB. The infrastructure is designed for the maximum demand of 38500 kVA (22500 Old PT + 16000 New PT) drawl from TNEB and is sufficient to handle the power requirements.

Machinery: New additional reactor, recovery system, dryer. Additive, desalination, ZLD, STP, boiler and diesel generators are envisaged.

Materials and Others: The main raw material required for the production of PVC is Vinyl Chloride Monomer (VCM). VCM is imported from overseas suppliers located at Japan, Qatar, Taiwan and USA by marine vessels in pressurized/refrigerated parcels via a captive Marine Terminal Facility. Other materials DM water, initiator, suspension agents, stabilizers, inhibitors, etc. are sourced locally and imported.

#### 5.5 Amenities / Facilities

Following facilities will be made available at site:

- First Aid Facility
- Hygienic Drinking Water Facility
- Green Area
- Regular Worker Medical Checkup Facility
6 PROPOSED INFRASTRUCTURE

6.1 Industrial Area (processing area)
Existing Facility

6.2 Residential Area (non-processing area)
Not applicable

6.3 Green belt
About 32.06% of the project area is already been developed as greenbelt. This will remain the same as green belt after capacity enhancement.

6.4 Social Infrastructure
Not applicable

6.5 Connectivity (Traffic and transportation road/ rail/ metro/ water ways etc.)
The Project Site at SIPCOT lies at an aerial distance of ~8.5 km SSW of Cuddalore Old Town. Cuddalore is the District Headquarters, and is easily approachable from major towns in Tamil Nadu, including Chennai, the State Capital.

To approach the site from the landward side, from Cuddalore Old Town (there is another town called the Cuddalore New Town, lying at an aerial distance of ~4.0 km N of Cuddalore Old Town), one needs to take the National Highway 45A (traversing along the Chennai-Puducherry-Cuddalore-Chidambaram route), travel along the road for ~12 km, and the site can be identified by its signboard next to the entrance gate at the south-west edge of the site boundary. The site can be easily accessed from Cuddalore by private vehicles as well as State Transport (ST) buses.

The site can also be accessed by sea, through the Uppanar Channel lying immediately adjacent to the east of the site boundary or from the Material Terminal Facility (MTF) ~3.0 km east of the site boundary. The jetty is ~7.7 km south of Cuddalore Port.

The nearest airport is Puducherry (currently inoperative due to ongoing maintenance) lying at a motorable distance of ~37.9 km north of the site and Chennai, airport at ~ 180 km north. All the above distances are presented in Table 6-1.
Table 6-1: Site Connectivity

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Feature</th>
<th>Distance and Direction from Site, (from closest Boundary with respect to Site)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Motorable</td>
</tr>
<tr>
<td>1</td>
<td>Semmankuppam Village (nearest village)</td>
<td>0.89 (NNW)</td>
</tr>
<tr>
<td>2</td>
<td>Cuddalore Old Town (nearest town and district headquarters)</td>
<td>8.23 (NNE)</td>
</tr>
<tr>
<td>3</td>
<td>Chennai (state capital)</td>
<td>195 (NNE)</td>
</tr>
<tr>
<td>4</td>
<td>Cuddalore Port (nearest port)</td>
<td>8.65 (NNE)</td>
</tr>
<tr>
<td>5</td>
<td>Chemplast’s Material Transfer Facility (MTF) (nearest jetty)</td>
<td>10.06 (E)</td>
</tr>
<tr>
<td>6</td>
<td>Alapakkam (nearest broad gauge railway station)</td>
<td>4.19 (SSW)</td>
</tr>
<tr>
<td>7</td>
<td>Puducherry Airport (nearest airport)</td>
<td>37.89 (N)</td>
</tr>
<tr>
<td>8</td>
<td>Chennai Egmore (major railway station to access the site from other parts of the country)</td>
<td>214 (NNE)</td>
</tr>
<tr>
<td>9</td>
<td>Chennai (major airport for international and domestic access)</td>
<td>180 (NNE)</td>
</tr>
</tbody>
</table>

6.6 Drinking water management (source & supply of water)

Existing facilities will be used.

6.7 Sewage system

The existing plant has treatment system for the domestic sewage generated.

The additional domestic sewage envisaged due to expansion project from 300000 TPA to 600000 TPA will be treated with additional sewage treatment plant.

The sewage sludge arising from present 300000 TPA and Expansion project from 300000 TPA to 600000 TPA will be used as manure in green belt of the site.

6.8 Industrial waste management

Existing Hazardous waste storage area is adequate for 300000 TPA. Additional storage will be created for storing additional hazardous waste arising as part of capacity enhancement project of 300000 TPA to 600000 TPA.

6.9 Solid waste management

Refer 3.12.4 for details.
6.10 **Power requirement & supply/source**

Electricity will be used from the existing HT power connection of TNEB. The infrastructure is designed for the maximum demand of 38500 KVA drawl from TNEB and is sufficient to handle the power requirements.

The power requirement in terms of MW will increase. Peak power requirement will go up to 17000 KVA to 18000 KVA from the 8500 to 9000 KVA.

The absolute power consumption in terms of units of power (kwh) will also go up.

- Present average kWh: 1.65 Lakhs/ day
- Revised average after expansion kWh: 3.3 Lakhs / day

**Stand by Emergency Power:**

**Existing**

DG set: 3 Nos. of auto start DG sets of 2000 KVA used only during TNEB failure.

**Proposed**

Additional DG set of 8000 KVA will be installed as part of the expansion project from 300000 TPA to 600000 TPA.

However the same will be revisited and reported in the EIA report.
7  REHABILITATION AND RESETTLEMENTS (R& R) PLAN

7.1  Policy to be adopted (central/ state) in respect of the project affected persons including home oustees, land oustees and landless labourers (a brief outline to be given)

Not applicable since entire project is located on available industrial land.
8 PROJECT SCHEDULE AND COST ESTIMATE

8.1 Likely date of start of construction and likely date of completion (time schedule for the project to be given)

Starting date: March 2019
Completion date: April 2021

8.2 Estimated project cost along with analysis in terms of economic viability of the project:

Rs 500 Crs

8.2.1 Fixed Capital:
Rs 200 Crs

8.2.2 Working Capital:
Rs 190 Crs

8.2.3 Revenues:
Revenue for additional 300000 TPA is Rs 2325 Crs per annum

8.2.4 Breakeven Point:
Rs 3700/MT- As per capacity utilization 80%

8.2.5 Profitability;
Profitability for additional 300000 TPA is Rs 108 Crs per annum
9 ANALYSIS OF PROPOSAL

9.1 Financial and social benefits with special emphasis on the benefit to the local people including tribal population, if any, in the area

The area around the proposed site does not have any Tribal population. There will direct employment generation in addition to the existing 450-500 persons of about

- During project phase - 700 to 800 persons on temporary basis.
- During Operations - 200-225 persons

However, indirect employment is likely to be about 1000 persons.