

**EXECUTIVE SUMMARY**  
**FOR**  
**JIVDANI PASSENGER FUNICULAR SYSTEM (ROPEWAY)**

**AT**



**Public Registration No. A/397, Shree Jivdani Marg,  
Village-Virar, Tal- Vasai, District-Palghar, Maharashtra-401305**

**Elevation (UTP)- 222 m above MSL**

**Technology- Funicular Ropeway System Technology**

**Item-7 (g); Category-A**

Cost of Project:- Rs. 32 crores

**(Reference TOR vide letter no F. No. 10-46/2019-IA-III dated 3rd December 2019.)**

**Submitted By:**

**SHREE JIVDANI DEVI SANSTHAN, VIRAR**

Public Registration No. A/397, Shree Jivdani Marg, Virar (East), District-Palghar, Maharashtra-401305

**Prepared By:**

**M/S PERFECT ENVIRO SOLUTIONS PVT. LTD.**

(NABET REGISTERED VIDE LIST OF ACCREDITED CONSULTANTS ORGANIZATIONS/ REV 83/ 20<sup>th</sup> Jan 2020/ S.NO-120)

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## EXECUTIVE SUMMARY

### INTRODUCTION

The proposed project titled “Jivdani Passenger Funicular System (Ropeway)” shall be developed at Village-Virar, Tal- Vasai, District-Palghar, Maharashtra- 401305 by Shree Jivdani Devi Sansthan Virar, which is a Special Purpose Vehicle (SPV) incorporated under the Companies Act for implementation and operation of Jivdani Passenger Funicular System (Ropeway) at Shree Jivdani Devi temple, at S. No. 398, Virar -E, Virar, Maharashtra in order to promote tourism & modal shift to transit and reduction in traffic congestion in the region.

The project falls under activity 7 (g) of the schedule of EIA notification, 2006 under category A, due to applicability of general condition as the project lies at 4.4 km E from Notified WLS (Tungareshwar WLS) under Wildlife Protection Act 1972 and 2.5 km from the Notified ESZ of Tungareshwar WLS dated 11th September 2019. S.O. 3250(E). The proposed Funicular system shall have two terminal stations (lower and upper) at the hilltop of village Virar, Maharashtra. The lower terminal will be located at 19°27'48.39"N and 72°49'30.92"E elevation 52 m and the upper terminal will be located at 19°27'58.75"N and 72°49'38.44"E elevation 222 m. Also, there will be a provision of two lifts of capacity 50 passengers each from upper terminal to Temple. The estimated project cost is of Rs. 32 crores.

Jivdani Mandir is a temple located on a hill in Virar, Maharashtra. The temple is on the hill, almost 230 m from the sea-level. The Goddess rests in a temple situated on a hill that forms a part of the Satpura Range in Virar. The hill offers a very picturesque view of Virar and its vicinity. Large numbers of devotees take Darshan at Shree Jivdani Devi Temple, Virar East, every day and particularly on holidays and festival days. Presently, their journey to the Temple is arduous as they have to climb over 900 steep steps up the Jivdani hill to reach the temple. The average pilgrims are approximately 10000 per day and during festivals and weekends sometimes increases to 40000 to 50000 per day. The Managing Trust for the Temple, Shree Jivdani Devi Sansthan studied various alternatives to provide transport facilities to the devotees to climb the hill, and construction of passenger Funicular system is considered as the best alternative. About 80 No. of persons (technical and non technical) shall be employed for the installation of the Funicular system. The Funicular system will have a carrying capacity of 1200 PPH per direction and one way travelling time is approximately 3 minutes. Operation of 12 hrs of the Funicular system is envisaged. Length of the Funicular system will be 400m. About 25 no. of staff shall be employed during the operation phase.

### TERMS OF REFERENCE

The case was enlisted in the 45th Meeting of Expert Appraisal Committee (Infra 2) Scheduled on 18.10.2019. ToR was granted to the project vide TOR letter F. No. 10-46/2019-IA-III dated 3rd December 2019. This EIA is prepared on the basis of Terms of Reference granted.

## PROJECT DESCRIPTION

**TABLE : PROJECT DETAILS**

| SI No. | Particular                       | Unit           | Details                                                                                                                                                                                                                                                                                                                                                            |
|--------|----------------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1      | Plot Area                        | m <sup>2</sup> | 19500                                                                                                                                                                                                                                                                                                                                                              |
| 2      | Number of Terminals              | No.            | 2                                                                                                                                                                                                                                                                                                                                                                  |
| 3      | Carrying capacity                | PPH            | 1200 per Direction                                                                                                                                                                                                                                                                                                                                                 |
|        | Maximum speed, max. acceleration | m/sec          | 0 to 4 m/ sec, 0.5 m/sec                                                                                                                                                                                                                                                                                                                                           |
| 4      | Hours of Operation               | Hr             | 12                                                                                                                                                                                                                                                                                                                                                                 |
| 5      | Length of Funicular system       | m              | 400                                                                                                                                                                                                                                                                                                                                                                |
|        | Vertical Rise                    | m              | 170                                                                                                                                                                                                                                                                                                                                                                |
| 6      | Number of Cabins                 | No.            | 4                                                                                                                                                                                                                                                                                                                                                                  |
| 7      | Travel Time                      | min            | 3                                                                                                                                                                                                                                                                                                                                                                  |
| 8      | Vertical rise                    | m              | 170 m                                                                                                                                                                                                                                                                                                                                                              |
| 9      | Track gauge                      | mm             | 1500 mm                                                                                                                                                                                                                                                                                                                                                            |
| 10     | Rail attachment spacing          | m              | 0.8 m                                                                                                                                                                                                                                                                                                                                                              |
| 11     | Rail size                        | Kg/M (IU)      | 52                                                                                                                                                                                                                                                                                                                                                                 |
| 12     | Cars and Traction                | -              | <p>- 80 passenger + 1 driver capacity, 4 doors on each side, passenger door operations will be automatic. Wheel diameter- 500 mm. Spring loaded emergency rail brakes, hydraulically released.</p> <p>- 40 mm haul rope connected by rope drum. Traction on top with 2 groove bull wheel, main motor 355 KW, emergency motor 15 KW, active brake and emergency</p> |

Total 4376 m<sup>2</sup> will be used for the Funicular system out of 19500 sq.m. land which is converted from forest land to non-forest land by the forest department in favour of Shree Jivdani Devi Mandir Trust, Virar. The project lies in the reserve forest area. The Boundaries of the forest area - North, East, West, & South are defined by reserved forest survey no. 398 of village Virar. The total land of 1.95 Ha has been transferred by the Forest Department to Shree Jivdani Devi Mandir Trust, Virar vide letter no. कक्ष - १ /२०/जमीन /६३५७ dated 1.02.2005.

Area requirement for Funicular system:

1. Top Station: 748.11 sq. m.
2. Bottom Station: 518.32 sq. m.

3. Funicular corridor: 3440 sq. m.

The area bifurcation of 1.95 Ha for various purposes is as follows:

| S. No. | Area Description                                                          | Area (sq. m)                    |
|--------|---------------------------------------------------------------------------|---------------------------------|
| 1.     | Shree Jivdani Devi Mandir, Sabha Mandap and Funicular system (UTP)        | 2500.00                         |
| 2.     | Funicular Rail Track                                                      | 3600.00                         |
| 3.     | Repair of Road leading to Shri Jivdani Temple                             | 1100.00                         |
| 4.     | Repair of existing parking road                                           | 9620.00                         |
| 5.     | Funicular base station                                                    | 600.00                          |
| 6.     | Shree Baronda Mandir                                                      | 300.00                          |
| 7.     | Shree Mahakali Mandir                                                     | 300.00                          |
| 8.     | Shree Dutt Mandir                                                         | 300.00                          |
| 9.     | Shree Ganesh Mandir, Sabha Mandap, Offices and related construction works | 500.00                          |
| 10.    | Toilets                                                                   | 180.00                          |
| 11.    | Bhandara Shed                                                             | 500.00                          |
|        | <b>Total</b>                                                              | <b>19500.00 Sq. m (1.95 Ha)</b> |

#### Proposed Infrastructure/Activities at each Terminal Station

| Station    | Elevation | Area         | Activities/Proposed Infrastructure                |
|------------|-----------|--------------|---------------------------------------------------|
| <b>UTP</b> | 222 m     | 748.11 sq.m. | Lift, Sheds, Bio Toilets, Stairs                  |
| <b>LTP</b> | 52 m      | 518.32 sq.m. | Waiting Hall, lift, Entrance hall, Toilets, sheds |

## ENVIRONMENTAL SETTING

### Study Period

Monitoring was carried out in the Summer Season from March 2019 - May 2019. The results have been summarized below:

### Ambient Air

The ambient air quality at Six sampling stations were assessed (2 onsite locations( LTP and

UTP), Khatkanpada, Virar East, Sai Nath Nagar and Phulpada. The mean value of  $\text{SO}_2$ ,  $\text{NO}_2$ ,  $\text{PM}_{10}$  &  $\text{PM}_{2.5}$  are within the limits of National ambient air quality standards.

## Noise

The ambient noise level during daytime at the proposed project site varies from 58.5 dB (A) to 61.3 dB (A) which are within the standard limit of industrial area ~ 65 dB (A). During the night the noise level at the project site ranges from 50.4 dB (A) to 53.1 dB (A) which is within the night-time noise standard limit of 55 dB(A) for commercial areas. The noise level is 57.5 dB (A) at the site N6 which is slightly higher than the standard limit of residential area that is ~55 dB(A) due to regular vehicular movement at connecting roads & market area. During the night, the noise level at all the residential sites were recorded between 46.9 dB (A) – 47.3 dB (A) which is exceeding the standard limit of residential area that is ~45 dB(A). The noise level of NH-8 is 67.6 dB(A) at day time and 58.2 – 60.3 dB(A) at Approach road and NH-8 is exceeding the standard limits of commercial area at day and night that is ~ 65.0 dB(A) and ~ 55.0 dB(A) due to increased vehicular movement.

## Water Environment

The Ground water quality of Core LTP, UTP and shows that all parameters are within the drinking water standards (IS:10500) and can be used for drinking purpose and other household activities. The Ground water quality of Buffer zone at location Phulpada, Virar East, Ghaspada village, Sai Nath Nagar, and Khatkaripada shows that all parameters are within the drinking water standards (IS:10500) and can be used for drinking purpose and other household activities whereas at groundwater quality at Sai Dutt Nagar, some parameters are exceeding the drinking water standards (IS:10500) which suggests that groundwater is not fit for drinking purpose. The surface water quality of Virar Dam, Ghanicha Talab, Ghaspada Pond, Panchpiyari Pond, Vaitarna river (Khadi), Kopori Lake and Virar Pond shows that all the parameters does not fall under any defined class of surface water quality criteria and falls below category 'E'. The Surface water quality of the naala near Virar Nala shows that Odour and Nitrate Nitrogen is higher than EPA discharge standards. All other parameters are within the range of EPA Discharge standards.

## Soil

The soil quality at location Onsite (UTP), Onsite (LTP), Khatkanpada, Virar East, Ghaspada, Sai Nath Nagar, Saidutt Nagar, Phulpada, and Forest near Phulpada was assessed. At core zone, the soil is clayey at places with low nutrient status and pH value ranges between 7.5-7.13. Amount of primary nutrient like Organic matter is 0.5% and the Available Nitrogen ranges between 30.8-40 mg/kg is low and Available Potassium ranges between 15.2-18 mg/kg is low while the available Phosphorus ranges between 7.9-12.6 mg/kg that is medium in range. In Buffer zone, the colour of the soil is reddish brown to blackish brown, pH ranges from 6.5 to 7.4. Amount of primary nutrients like Organic matter 0.5 % to 2.2 %, the Available Nitrogen 33.6 mg/kg to 60.2 mg/kg that is low in range, the Available Phosphorus

6.2 mg/kg – 27.1 mg/kg is medium to high in range, Available Potassium 10.4 mg/kg to 32.1 mg/kg that is low in range. Primary nutrient profile shows that soil is average fertile due to the availability of low amounts of nitrogen, available potassium.

### Biological Environment

The proposed project is a Funicular project located at Village-Virar, Tal- Vasai, District-Palghar, Maharashtra. No tree at the project site will be cut. The proposed project is located at a rocky site where no floral biodiversity has been observed at lower and upper terminal stations. Although few species of shrubs and grasses around the elevation like *Calotropis gigantea*, *Lantana camara*, *Cynodon dactylon* and *Parthenium hysterophorus* and few fauna species of reptiles, birds and few mammals have been observed in the core zone except LTP & UTP. Primary survey and secondary survey was carried out for 5 Km of Buffer Zone. Tungareshwar Wildlife Sanctuary (4.4 Km from ESZ boundary) falls within the 5 Km of Buffer Zone. Secondary Survey was carried out for the same. There are fifteen Schedule I Species found in the buffer zone.

### Socio-economic Environment

There are 42 villages in the study area (39 rural and 3 urban). The demographic profile shows that the total population of the study area is 221691 which constitute 50046 households. The average sex ratio of the study area is 937 (Rural 942 and Urban 877) while the sex ratio of the age group 0 to 6 years is 999 (Rural 1006 and Urban 908). According to the census data 2011, the overall literacy rate of the study area is 77.92% (Rural 77.50 % and Urban 83.43%) with male literacy rate is 85.11 % (Rural 84.86% and Urban 88.24%) and female literacy rate is 70.25 % (Rural 69.64% and Urban 78.13%). The average percentage of total workers in the study areas is 44.79% (Rural 45.13% and urban 40.36%), main workers in study area is 75.14 % (Rural 74.43% and Urban 84.33%). The work participation rate is minimum in Khardi (CT) (31.35%) and maximum in village Hedavade (71.45%).

## ANTICIPATED IMPACT AND MITIGATION AND ENVIRONMENT MANAGEMENT PLAN

### Ambient Air

The construction activities for the proposed terminal stations will be in limited areas and thus the particulate emissions will be minimal and short term in nature. Construction material shall be stored inside the project boundary and shall be covered with the tarpaulin/ cloth cover. Provision for sprinkling water will be made to reduce dust emissions during the construction phase. Wet jet system shall be used for the stone cutting to avoid the emission from the dry stone cutting. DG set of capacity 1 X 500 KVA (Main) & 1 X 25 KVA (Auxiliary) shall be proposed for backup power supply. These D.G. Sets will be provided with proper stack height as per the CPCB norms.



## Water Environment

Water supply during construction phase and operation phase will be met through Municipal Supply by VVCMC. During the construction Phase, around 80 people will be working for installation work. The water will mainly be required for dust suppression & human consumption. It is estimated that around 3 KLD of water shall be required out of which 2.5 KLD of waste water will be treated in septic tank via soak pits. During the operation phase, the total water requirement has been estimated during Normal days is 43 KLD and Festival days is 164 KLD. Water shall be used mainly for flushing, drinking, hand washing & horticulture purposes. Total quantity of waste water generation has been estimated to be 35 KLD during Normal days and 137 KLD during Festival days/ holidays. The wastewater generated will be treated in the Sewage Treatment Plant of 165 KLD capacity. For drinking water, water cooler/water Dispenser shall be provided at each Terminal.

## Land / Soil

The project lies in the reserve forest area. The Boundaries of the forest area - North, East, West, & South are defined by reserved forest survey no. 398 of village Virar. The total land of 1.95 Ha has been transferred by Forest Department to Shree Jivdani Devi Mandir Trust, Virar vide letter no. कक्ष - १ / २०/जमीन /६३५७ dated 1.02.2005. Total 4376 m<sup>2</sup> is to be used for the Funicular system out of 19500 sq. m land which is converted from forest land to non-forest land by the forest department in favour of Shree Jivdani Devi Mandir Trust, Virar. The diversion of forest land has been carried out as per the guidelines of the Forest (Conservation) Act, 1980. A micro plan was approved by the Thane Forest Division for the rehabilitation of degraded forest areas under joint forest management around Shree Jivdani Temple at Virar. Around 2 Lakh trees are already grown for the same purpose and are taken care of by the Shree Jivdani Devi Mandir Trust, Virar. The excavation shall only be done to provide foundation and column foundation. The excavated soil & rocks shall be reused to the extent possible. Top soil shall be used in Landscaping. The remaining excavated soil and stones shall be utilized in re-filling of foundation, road works, etc.

## Noise Levels

DG set of 1 x 500KVA for main power and 1 x 25 KVA for auxiliary backup are proposed. These D.G. Sets will be acoustically enclosed. DG sets will be used as a stand-by only at the time of power failure. Regular maintenance will be carried out for the Funicular system. Regular maintenance of Funicular system equipment will be done. Equipment generating noise will be provided with a noise shield.

## Solid Waste

Solid waste during construction phase will mainly be municipal waste generated due to construction activities, excavation waste and labor waste. Waste generated due to construction for the project will be re-used for backfilling and landscaping. Approx. 4 kg/day

of Municipal solid waste shall be generated from temporary laborers which shall be disposed off at municipal solid waste site. During the operation phase, 350 kg/day of Biodegradable waste generated during normal days and 1400 kg/day during festival days will be treated in Organic Waste Converter to get converted to manure. It will be used for horticulture purposes. No disposal of the waste on land and to the nearby rivers will be done. Used oil generated from the DG sets will be sent to registered recyclers for hazardous waste authorized by CPCB.

### Flora and fauna

The total land allotted to Shree Jivdani Devi Sansthan, Virar is about 1.5 Ha. out of which 4376 m<sup>2</sup> area will be used for the Funicular system. The alignment falls within a Forest land for development of terminal stations & line columns for the proposed project. The diversion of forest land has been carried out vide letter no. कक्ष - १ /२०/जमीन /६३५७ dated 1.02.2005 for various activities. No tree shall be cut for the proposed project. A micro plan was approved by the Thane Forest Division for the rehabilitation of degraded forest areas under joint forest management around Shree Jivdani Temple at Virar. Around 2 Lakh trees are already grown for the same purpose and are taken care of by the Shree Jivdani Devi Mandir Trust, Virar. Proper noise control measures shall be adopted during construction phase to ensure minimum or no disturbance to the fauna of the area. There is no wild Fauna present on site.

### Socio-economic environment

The proposed project is Jivdani Passenger Funicular System (Ropeway) and is located in a vacant area hence there is no displacement of local people and no impacts on land use. The livelihood of villagers may improve as they get employment opportunities during the construction and operation phase of this project. The proposed project will benefit the Socio-economic scenario of the area. With increased tourist traffic, more economic activity will follow thus leading to direct & indirect income for locals. The Funicular system will boost the local economy when a larger number of tourists will visit the place. Influx of more tourist population will lead to more requirement of lodging facilities, food outlets, car & other shops, maintenance area and other related shops.

## RISK ASSESSMENT

Passenger Funicular System (Ropeway) are liable to suffer from environmentally induced threats, risks and hazards as well as human -caused occurrences. Natural disasters include earthquakes, landslides, rock falls, storms, lightning etc. and human caused occurrences include fire, technical failures may occur.

### General safety measures

- In order to enhance system reliability, besides the electric main drive unit (AC motor), the auxiliary electric drive units shall be provided for operation of the system at a reduced capacity and in emergency cases.



- The auxiliary electric drive will bring the passengers back to the station in case of a power failure.
- Key functions of the Funicular System, such as rope speed, Passenger load and opening and closing of breaks are monitored and controlled by electronic safety circuits in order to ensure smooth operation and maximum safety.
- The Funicular Car will be parked in the upper and lower station respectively when not in operation. The Funicular System is designed for reversible travel. In case of emergency the journey can be aborted and passengers can be brought back safely to the starting point.
- Entire Rail Track is mounted on to steel girders which are anchored on concrete columns.
- The Funicular cars shall be provided with Automatic doors, which cannot be opened by the passengers. In case of emergency or failure of electric supply the driver operating the car can open the doors manually; allowing passengers to step out on emergency staircase led alongside the entire length of the track and reach the nearest station for safe exit.
- In the event of main supply power failure, full capacity D.G. Sets provided to supply power to run drive motors.
- Emergency push buttons should be provided at all stations to stop the Funicular system, if required.

## PROJECT BENEFITS

After installation of the Funicular system the following benefits to the local people/ pilgrims of the area is envisaged:

- Save time & energy,
- Convenient to children, old, ladies, infirm.
- Tedious climb reduces efficiency for a week
- Physical fatigue distracts from basic aim
- Increased income for the tourism sector.
- Development of transportation and civic amenities.
- Direct & indirect employment.
- Benefit from CER activities.

## Corporate Environmental Responsibility

As per CER office memorandum of MOEF dated 1.5.2018, the project cost is Rs. 32 Crores, hence the total cost under Corporate Environment Responsibility is 2% of total project cost i.e. Rs. 64 Lakhs, which will be used on various developmental activities in the area under the OM.

## COST OF EMP

The cost of the project is estimated to be about Rs. 32 crores. Rs. 135 Lacs of capital cost &

Rs. 12.8 Lacs/yr of recurring cost shall be spent on Environment Management Plan.

## CONCLUSIONS

Thus, it can be concluded on a positive note that after the implementation of the mitigation measures and Environmental Management Plan, the normal operation of the project will have negligible impact on the environment.