जनेपन्यास
JNPT

IMPACT OF CHANGES IN NATURAL GROWTH ZONE AND EMERGENCY PLANNING ZONE OF TARAPUR ATOMIC POWER STATION FOR PROPOSED DEVELOPMENT OF VADHAVAN PORT

FEE | Fine Envirotech Engineers

CONTENTS

LIST OF TABLES

LIST OF FIGURES

1.0 ABOUT VADHVAN PORT

1.1 Background

Sagarmala project is an initiative of the Government of India to augment port-led development and development of coastlines to contribute in India's growth. The objective of this project is to promote port-led direct and indirect development and to provide infrastructure to transport goods to and from ports and meet the demand of growing traffic, easing out spillover traffic at JNPT and attract traffic from competing port within & outside India in most efficient and cost-effectively manner. The Sagarmala project envisages transforming existing ports into modern world-class ports, and developing new ports based on the requirement. It also aspires to efficiently integrate ports with industrial clusters, the hinterland and the evacuation systems through road, rail, inland and coastal waterways.

In order to meet these objectives, Indian Port Association (IPA) appointed the consortium of McKinsey and AECOM as Project Development Consultant to prepare the National Perspective Plan for the Sagarmala Project. AECOM, in their techno-economic feasibility report, have established the need for a new port at Vadhavan on the west coast of Maharashtra state. This project development of a port at Vadhavan has been thus conceived under Sagarmala program, with an objective to augment the handling capacity of Major Ports on the west coast.

Vadhavan Port is planned to be developed by JNPT (Jawaharlal Nehru Port Trust) and MMB (Maharashtra Maritime Board) as Joint Venture Project with equity share of 74% & 26% respectively.

Progen Technical Consultants LLC in consortium with Pentacle Consultants (India) Private Limited (PCIPL), was awarded a contract for preparation of Detailed Project Report (DPR) for development of a port at Vadhavan by JNPT in December 2017.

1.2 Need of the project

Jawaharlal Nehru Port Trust (JNPT) is one of the Major Ports of India and is located on the west coast near Mumbai. The JN Port handles mainly containers but also liquid bulk and cement. Presently, JNPT has four dedicated container terminals (latest one is BMCT) and is handling around 45% of country's container traffic.

Under Phase II of the 4th Container Terminal 1000 m additional quay length is planned to be commissioned as part of BMCT terminal by 2022-23. Additional Liquid Cargo Terminal is being developed close to Liquid Cargo berth near BPCL berth to meet growing liquid cargo traffic demand. In addition to port capacity improvement, downstream facilities are also under augmentation for efficient evacuation like Common Rail Yard and Road network with expansion and dedicated road. Common Rail yard is Dedicated Freight Corridor (DFC) rail siding connecting to Mumbai JNPT to Delhi (Dadri) with intermittent cargo transhipment or loading/unloading facilities.

Considering the growing demand at JNPT and development in competing ports within & outside India, there is an urgent need to reduce the traffic on existing infrastructure of the JNPT port land and to develop a deep-water major port along west coast in the vicinity of JNPT to arrest the spillover growing container traffic apart from development of a deep draft port for new generation container vessels which are being developed on account of logistics cost optimisation. Further, the port is also proposed to meet the requirement of other cargo which are likely to increase in the context of India's economic growth as reflected in sustained GDP profile.

1.3 Project Location

The proposed port is located at Vadhavan point near Dahanu, abutting northern boundary of Palghar district of Maharashtra at co-ordinates Latitude 19°55.8'N and Longitude 72°39.6'E. Location of Vadhavan Port is shown below:

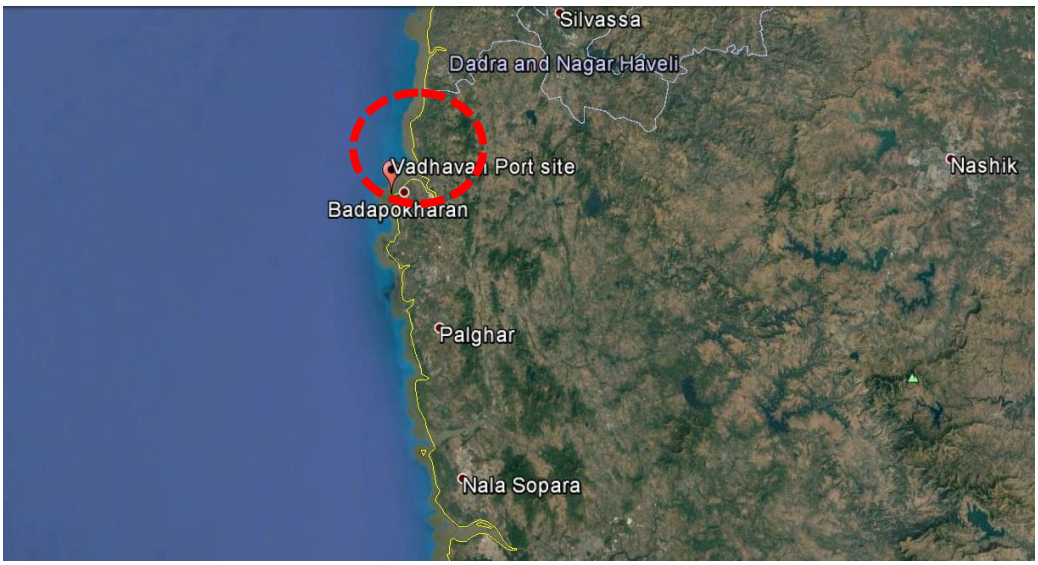

Figure 1 - Vadhavan Port location

1.4 Port limits

The limits of the port development are defined as shown in below figure below. The breakwaters are to be planned within the port limits.

Point A 19º57’58”N, 72º42’15”E

Point B 19º54’26”N, 72º42’30”E

Point C 20º0’0”N, 72º30’0”E

Point D 19º54’5”N, 72º30’0”E

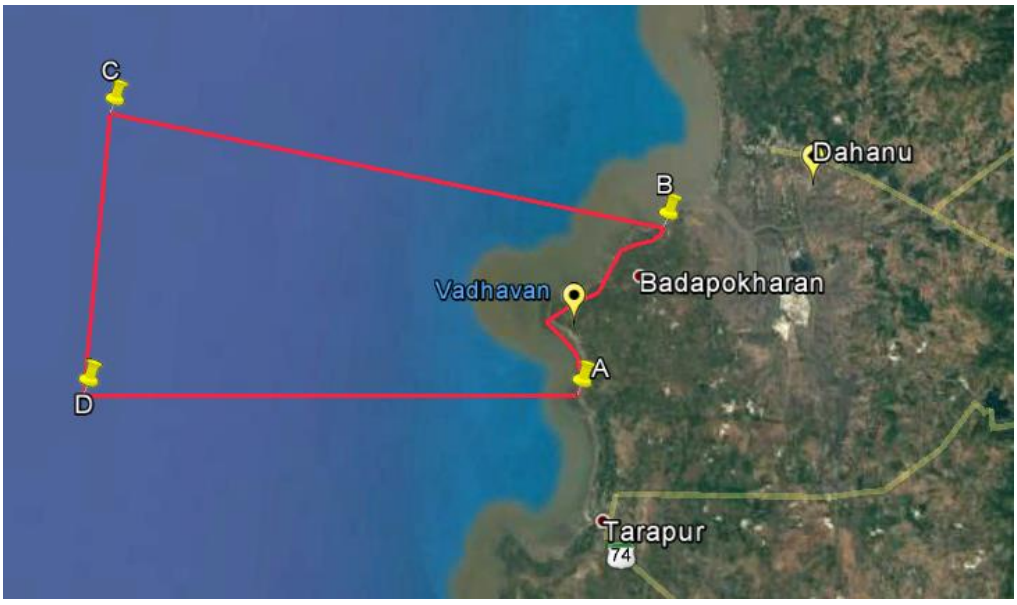

Figure 2 – Vadhavan Port Limit

1.5 Types of Cargos projected to be handles at Vadhavan Port

Commodity	units	FY2021	FY 2025	FY 2030	FY 2035	FY 2040	FY 2045	FY 2050
Containers	MTEU	0.2	1.4	3.2	7.1	12.3	19.2	28.3
	MTPA	2.4	16.8	38.4	85.2	147.6	230.4	339.6
Crude	MTPA	-	6	12	15	21	21	21
LPG	MTPA	-	1.5	3.1	3.7	4.5	5.3	6.1
LNG	MTPA	-	1	3.1	5	5	5	5
Edible oil	MTPA	0.08	0.59	1.16	1.38	1.61	1.88	2.2
Chemical	MTPA	1.82	2.05	2.38	2.76	3.19	3.7	4.29
Thermal coal	MTPA	4.03	5.15	6.17	7.4	8.87	10.63	12.8
Fertiliser	MTPA	1.16	1.25	1.37	1.51	1.66	1.83	2.02
Ro-Ro	Vehicles (in 000)	16.7	32.1	51	143.7	214.4	296.3	371.2
General cargo	MTPA	0.89	2.19	3.66	4.59	5.73	6.17	6.67
Coastal	MTPA	0.66	1.64	2.73	3.43	4.28	4.61	4.98
Total	MTPA	11.04	38.17	74.07	129.97	203.44	290.52	404.7

2.0 ABOUT TARAPUR ATOMIC POWER STATION (TAPS)

Tarapur Atomic Power Station was constructed initially with two boiling water reactor (BWR) units under the 1963 123 Agreement between India, the United States, and the International Atomic Energy Agency (IAEA). It was built for Department of Atomic Energy by GE and Bechtel. Units 1 and 2 were brought online for commercial operation on 28 October 1969 with an initial power of 210 MW of electricity. Later on this was reduced to 160 MW due to technical difficulties. These were the first of their kind in Asia.

More recently, additional two pressurised heavy water reactor (PHWR) units of 540 MW each were constructed by L&T and Gammon India, seven months ahead of schedule and well within the original cost estimates. Unit 3 was brought online for commercial operation on 18 August 2006, and unit 4 on 12 September 2005.

The facility is operated by the NPCIL (Nuclear Power Corporation of India). The personnel operating the power plant live in a residential complex called TAPS colony, 19.816°N 72.743°E, which is a fifteen-minute drive from Boisar, the nearest railway station. The residential complex was also constructed by Bechtel to house both Indian and American employees. Due to this, the residential complex had a very Indian small-town look, with neat sidewalks, spacious houses, a club with tennis courts, swimming pool, a commissary etc. While the original American residents have long gone, the colony continues to thrive.

2.1 Emergency Planning Zone of TAPS

The operating procedure is intended to be a guide for handling radiation emergencies in the public domain (beyond site boundary) due to incident/ accident at any of the installations of TAPS. The emergency response plan, the emergency organization, details of logistics needed to protect the public at large up to Emergency Planning Zone (EPZ) needed are outlined in this procedure. The aspects relevant to maintaining the emergency plan and organization in constant operational readiness are also dealt with.

2.2 Extent of Emergency Planning

- In case of off-site Emergency all the protective counter measures will be restricted initially in areas within 16 KMs.
- The site layout map indicating boundary of different installations at TAPS has been drawn up.
- The population distribution in the area surrounding the site is given in the list of important towns/villages up to a distance of about 16 km and 5 Km with their population.
- The area of 1.6 km radius from TAPS and TAPS 3&4 has been completely acquired by DAE and is known as exclusion zone.
- The common produce outside this area are grass, rice and vegetables, while marine production is fish.

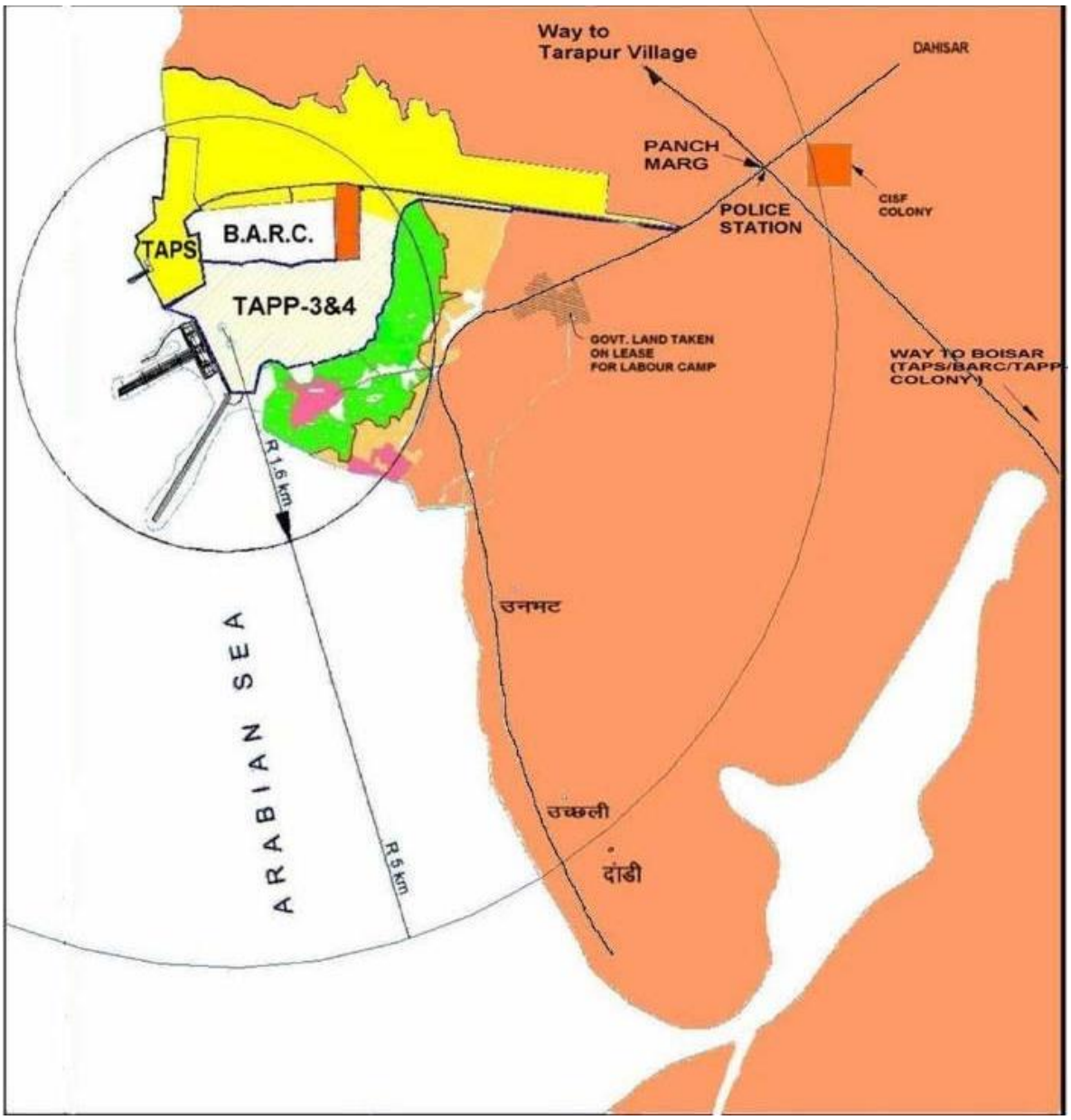

Figure 3 - Layout map indicating boundary of different installations of Tarapur DAE center and site boundary

2.3 Location of Vadhavan Port with respect to TAPS

The proposed Vadhavan port is located within the Emergency Planning Zone of TAPS at a distance of 12 kms from TAPS. The figure showing the proposed port location and port boundary is given below:

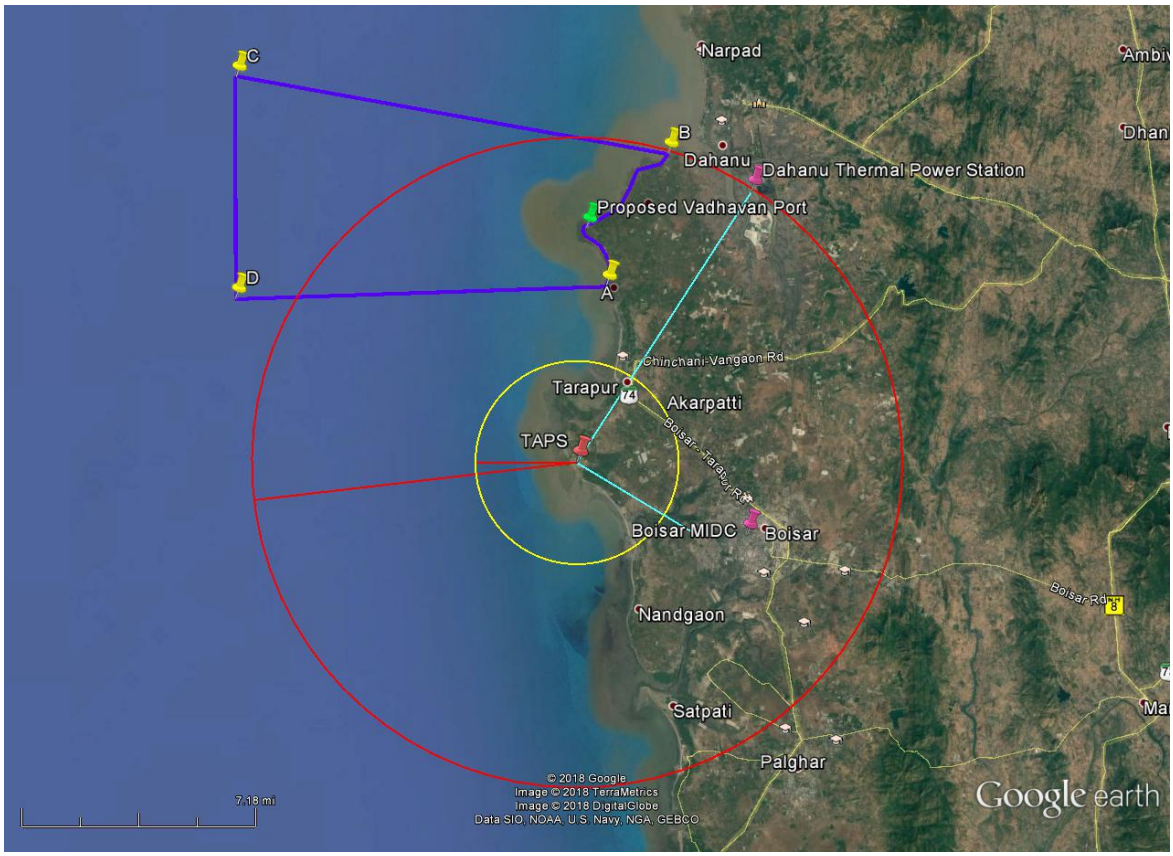

Figure 4 - Location of Vadhavan Port with respect to TAPS

3.0 POPULATION WITHIN EMERGENCY PLANNING ZONE

Emergency Planning Zone is divided into eight sectors for purposes of emergency planning and in the event of an emergency in TAPS people living within 5 kms are proposed to be evacuated to safer areas to protect them form radiation fallout. Similarly, People living in the villages within 16 kms of TAPS are also proposed to be evacuated basis the nature and extent of the radiation risk.

Table 1 - Sector Wise Population Details within 16 Km Emergency Planning Zone (EPZ)

SECTOR A		
Sr. No	**Name of the Village**	**Population**
1	Varor	2721
2	**Vadhavan**	**1850**
3	Badapokharan	1643
4	Pokharan Pada	749
5	Tadiyale Pada	1043
6	Gungawada	2721
7	Dhakti Dahanu	5242
8	Sarakari Amba	105
TOTAL		**15969**
SECTOR B		
Sr. No	**Name of the Village**	**Population**
1	Kamboda	819
2	Tarapur	7643
3	Chinchani Shivaji Nagar, Mangel wada	14644
4	Tanashi	1022
5	Osar	1044
6	Vasgaon	6510
7	Chandigaon	1450
8	Dhumket Pada	2107
9	Vadade	488
10	Nava Bavde pada	200
11	Abhram pada	520
12	Matgaon	1214
TOTAL		**37641**
SECTOR C		
Sr. No	**Name of the Village**	**Population**
1	Kaloli	1940

2	Dedale	1328
3	Bawade	1707
4	Vangaon	6501
5	Asangaon	3089
6	Ghivali	2716
7	Ambedkarali	210
8	Kotim	212
9	Khetkhadi	200
10	Kapshi	1260
11	Kudan	2518
12	Dehane	3024
13	Savrai pada	413
TOTAL		**24496**
SECTOR D		
Sr. No	**Name of the Village**	**Population**
1	Bivade	250
2	Chinchapada	240
3	Bhendvadpada	1158
4	Patilpada	245
5	Dahisar	1786
6	Panchmarg	530
7	Vave	850
8	Nevale	513
9	Shigaon (Rampada)	1773
10	Vire	637
11	Chandranagar	1706
12	Khambale	1099
13	Gundavli	255
14	Mogarbav	250
15	Delvadi	1642

16	CISF Colony	200
17	Dabar Pada	50
18	Govane	1570
19	Dabhale	1169
20	Hanuman Nagar	1085
21	Ranishigaon	480
TOTAL		**15468**
SECTOR E		
Sr. No	**Name of the Village**	**Population**
1	Vengani	755
2	Pasthal	2000
3	MSEB Colony	530
4	Boisar	16005
5	Banganga	510
6	Salgaon	175
7	Khutad	1653
8	Kukade	1188
9	Patharali	441
10	Parnali	1143
11	TAPS,BARC, TAPP-3&4	15642
12	CIDCO Colony	1000
13	Bhimnagar	2500
14	Vanjarwada	2400
15	Dhananinagar	200
16	Varangade	824
17	Mahagaon	1773
18	Talekhal	53
19	Deejay Nagar	2450
20	Chitralaya	2500
21	Swaroop Nagar	2000

22	Kurgaon	3306
23	Jindal colony	100
24	SSL Colony	250
25	Gothan Pada	100
26	Zenith Colony & KP Nagar	1000
27	MIDC Colony	100
28	Gosaliya park	300
29	Khodaram Baug	220
30	Chandrika Nagar	105
31	Vishal Co Opt.Hsg. Society	100
32	Dandi Pada	260
33	Temporary Labour Camp	4000
TOTAL		**48905**

SECTOR F		
Sr. No	**Name of the Village**	**Population**
1	Salwad	8608
2	Man	8608
3	Unbhat	1250
4	Pamtembhi	2080
5	Mahadev Nagar	1500
6	Kolvada	4214
7	MIDC & MIDC Residential area	1100
8	Saravali	5995
9	Khairapada	22896
10	Panchali	1293
11	Umroli	4040
12	Kolgaon	1781
13	Padghe	2325
14	Birwadi	1324
15	Kambalgaon	52

16	Betegaon	1981
17	Phalepada	100
18	Mahendra Park	400
19	Trivedi Nagar	100
20	Sai Dham	260
TOTAL		**66447**
SECTOR G		
Sr. No	**Name of the Village**	**Population**
1	Uchcheli	1709
2	Dandi	6705
3	Tembhi	942
4	Navapur	4488
5	Alewadi	1006
6	Dapoli	820
7	Kharekuran	2442
8	Morekuran	766
9	Akkarpatti	1027
10	Popharan	1824
11	Kumbhavali	2275
TOTAL		**24004**
SECTOR H		
Sr. No	**Name of the Village**	**Population**
1	Nandgaon Tarfe Tarapur	2705
2	Murbe	7973
3	Satpati	19157
TOTAL		**29835**
TOTAL SECTOR A+B+C+D+E+F+G+H		**262765**

Table 2 - Village Wise Population Details within 5 Km from TAPS

Sr. No	Sector	Name of the Village	Population
1	A	Nil	NIL
2	B	Tarapur	7643
3	B	Kamboda	819
4	C	Ghivali	2716
5	C	Ambedkar Ali	210
6	C	Savarai Pada	413
7	D	Dabar Pada	50
8	E	Temporary labour camp	4000
TOTAL			**15851**

3.1 Population to Palghar District

Palghar is the 36th district of Maharashtra state. It is spread between the west coast of Maharashtra state and the Sahyadri Mountains rows that are east of the Northern District of Palghar. Palghar District total population is around 29, 90,116. The district has a total of 8 talukas, Mokhada, Talasari, Vasai, Vikramgad, Palghar, Dahanu and Wada. Palghar District has 4,69,699 hectares of the total geographical area in a total 1008 villages and 3818 sub-villages as well as 477 gram panchayats. In District the literacy rate is 66.65% and male literacy percentage is 72.23% and female literacy rate is 59.28%.

Table 3 - Population as per Census 2011

Sr. No.	Tahsil	Total Population		
		Male	Female	Total
1	Vasai	709771	633631	1343402
2	Palghar	288514	261652	550166
3	Wada	91990	86380	178370
4	Dahanu	199574	202521	402095
5	Talasari	76417	78401	154818
6	Jawhar	69333	70854	140187
7	Vikramgad	68489	69136	137625
8	Mokhada	41691	41762	83453
Total		**1545779**	**1444337**	**2990116**

Source: https://palghar.gov.in/

3.2 Population Growth 2001-2011

In 2011, Thane had population of 11,060,148 of which male and female were 5,865,078 and 5,195,070 respectively. In 2001 census, Thane had a population of 8,131,849 of which males were 4,377,747 and remaining 3,754,102 were females. Thane District population constituted 9.84 percent of total Maharashtra population. In 2001 census, this figure for Thane District was at 8.39 percent of Maharashtra population. There was change of 36.01 percent in the population compared to population as per 2001. In the previous census of India 2001, Thane District recorded increase of 54.92 percent to its population compared to 1991.

Table 4 - Population Growth 2001-2011

Sl. No.	Tahsil	2001	2011	Decadal Variation	
				no.	%
1	Talasari	121217	154818	33601	27.7
2	Dahanu	340537	402095	61558	18.1
3	Vikramgad	105546	137625	32079	30.4
4	Jawhar	111039	140187	29148	26.3
5	Mokhada	67319	83453	16134	24.0
6	Vada	142753	178370	35617	25.0
7	Palghar	454635	550166	95531	21.0
8	Vasai	795863	1343402	547539	68.8
9	Thane	2486941	3787036	1300095	52.3
10	Bhiwandi	945582	1141386	195804	20.7
11	Shahapur	273304	314103	40799	14.9
12	Kalyan	1276614	1565417	288803	22.6
13	Ulhasnagar	473731	506098	32367	6.8
14	Ambarnath	366501	565340	198839	54.3
15	Murbad	170267	190652	20385	12.0
	Total	**8131849**	**11060148**	**2928299**	**36.0**

As can be seen, the population of the Thane district has increased by 36% in last 10 years. In 2001 census total population here were about 8131849.

- Total Population of Palghar District = 2990116
- Total Population of 16 km around the TAPS = **262765**
- **Population of the villages, within 16 km Emergency Planning Zone of TAPS is 8% of total population of Palghar district.**

4.0 INFRASTRUCTURE WITHIN THE EMERGENCY PLANNING ZONE OF TAPS

4.1 Schools in Dahanu & Palghar Taluka

- Primary school Dhakti Dahanu
- St. Mary Primary School
- ZP School Salwad
- ZP School Tarapur MIDC
- Dnyan sagar school MIDC Staff Colony
- ZP School Dandipada
- ZP School Urdu Tarapur
- ZP School Murbe
- ZP School Dandipada
- Janata High School, Navapur
- ZP School Salgaon
- ZP School Vadhvan
- Primary School, Thighrepada
- ZP School Tanashi
- ZP School Sonarpada
- ZP School Chinchani No. 5
- ZP School Badapokharan
- Deep Educational Campus
- Dr. S.D. Vidyalay

4.2 Rail & Roads

Rail

The Western Railway Line stations Umroli, Boisar & Vangaon are passing from the 16 Emergency Zone of TAPS. The Umroli, Boisar & Vangaon railway stations are located approx. 13 km, 11km and 13 km respectively from TAPS.

Roads

NH 8 is located at a distance of 24 kms from TAPS. The Chinchani-Vangaon Road, Boisar-Tarapur Road, Boisar-Palghar Road are interconnected and located within the 16 km

Emergency Planning Zone (EPZ) of Taps. These roads are directly connected to NH8. The other village roads within the EPZ are Shigaon Road, Navapur Road, Nandgaon Raod, Navapur-Nandgaon Raod, Kumbhavali-Murbe Road.

4.3 Health Institutions

- Thunga Hospital, Boisar
- TIMA Hospital, Boisar
- Rural Hospital, Boisar
- Sanjivani Hospital
- Saileela Hospital
- Anand Hospital,
- ENT Hospital
- Chinmay Hospital
- Boisar Nursing Home
- Primary Health Center, Chanchanni
- Government Hospital, Tarapur
- Primary Health Center, Murbe
- Government Hospital, Murbe
- Vikas Hospital

4.4 Fire Stations

- MIDC Fire Station
- Palghar Fire Brigade

4.5 Police Stations

- Boisar MIDC Police Station
- Palghar Police Station
- Satpati Police Station

4.6 Existing Industries in the Emergency Planning Zone

The major industries located within Emergency Planning Zone of 16 km are Tarapur MIDC, Boisar and Dahanu Thermal Power Station with generation capacity of 500 MW. There are more than 1323 industries in Boisar and MIDC areas at a distance of 10 kms from TAPS.

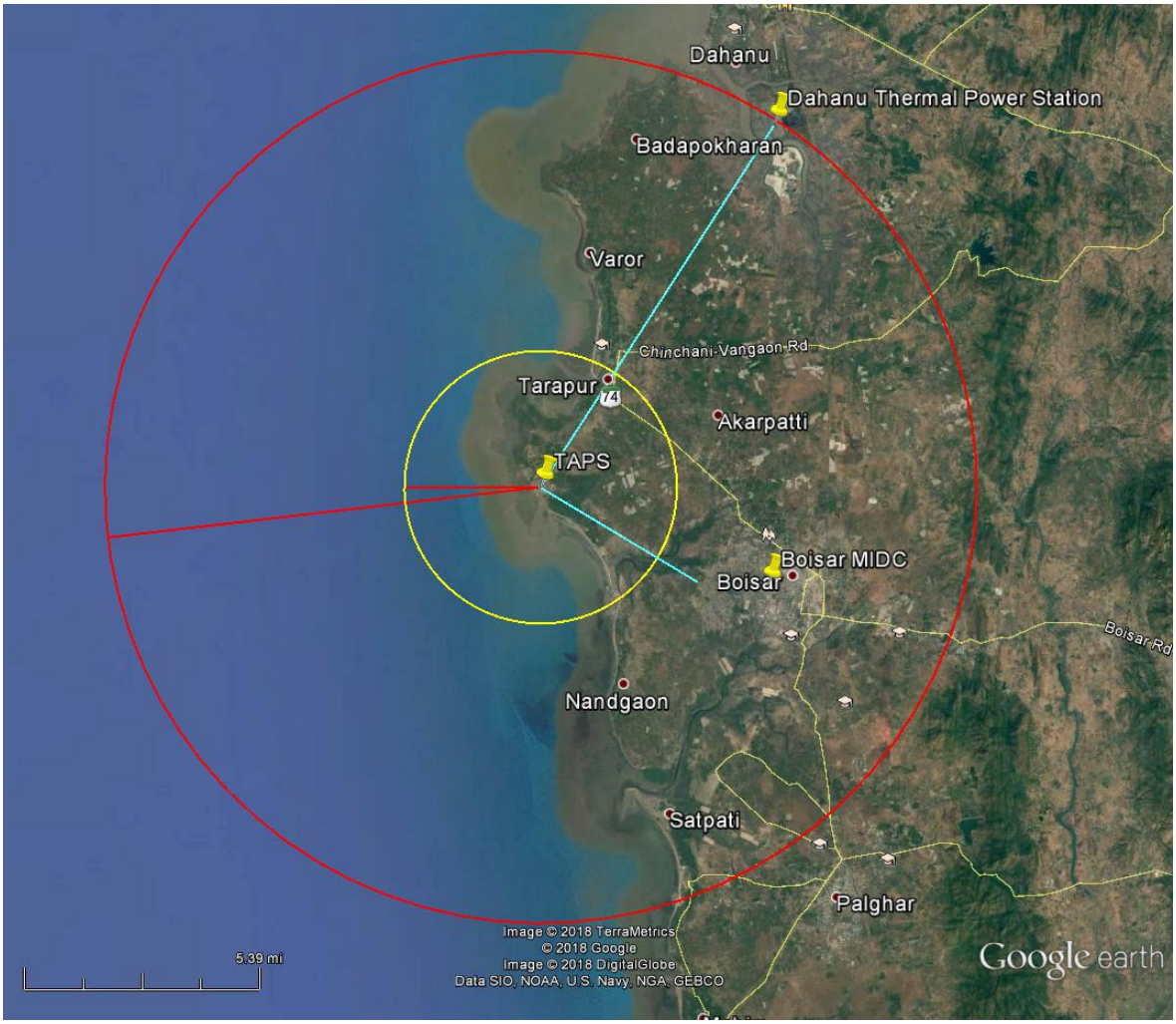

Figure 5 - Existing Industries in the Emergency Planning Zone

5.0 OTHER NEW INFRASTRUCTURE PROJECTS IN PALGHAR

The major infrastructure projects which are in different stages of development are as follows:

5.1 Vadodara-Mumbai Expressway

- Project Location The proposed Vadodara - Mumbai expressway starts (km 0.0) at Km 499 of Ahmedabad - Mumbai National Highway (NH 8) and ends (km 378.722 at Km 80 of Ahmedabad - Vadodara Expressway (NE 1). The lengths falling within Maharashtra, Dadra & Nagar Haveli and Gujarat are 112.851 km, 5.423 km and 260.407 km respectively. The Project has been divided into three phases for implementation viz Phase I The project includes construction of new 6/8 lane expressway from km 104+700 (km 390+864 of NH-8) to km 378+722 (Km 80 of NE-1). The total length of Phase-I of the project road is 274.022kms and proposed Right of Way is 100/120 m. The Phase I of VME is passing through Vadodara (54.4km), Bharuch (62.5 km), Surat (57.3km), Navsari (37.6km) and Valsad (48.6km) in the state of Gujarat (260.40km), Union Territory of Dadra & Nagar Haveli (5.5kms) and district of Palghar in the state of Maharashtra (8.1kms).

- Phase II From km 26+320 to km 104+700 (78.38 km) in District Palghar District of Maharashtra

- Phase III From km 0.00 to km 26+320 (26.320 km) in District Thane of Maharashtra

Figure 6 -Alignment of Vadodara-Mumbai Expressway

5.2 Mumbai- Ahmadabad High Speed Rail Corridor

The Mumbai–Ahmedabad high-speed rail corridor is an under-construction high-speed rail line connecting the cities of Ahmedabad, Gujarat, and India's economic hub Mumbai, Maharashtra. It will be India's first high-speed rail line. The line will have 12 stations. Proposed stations are Mumbai, Thane, Virar, Boisar, Vapi, Bilimora, Surat, Bharuch, Vadodara, Anand and Ahmedabad, Sabarmati.

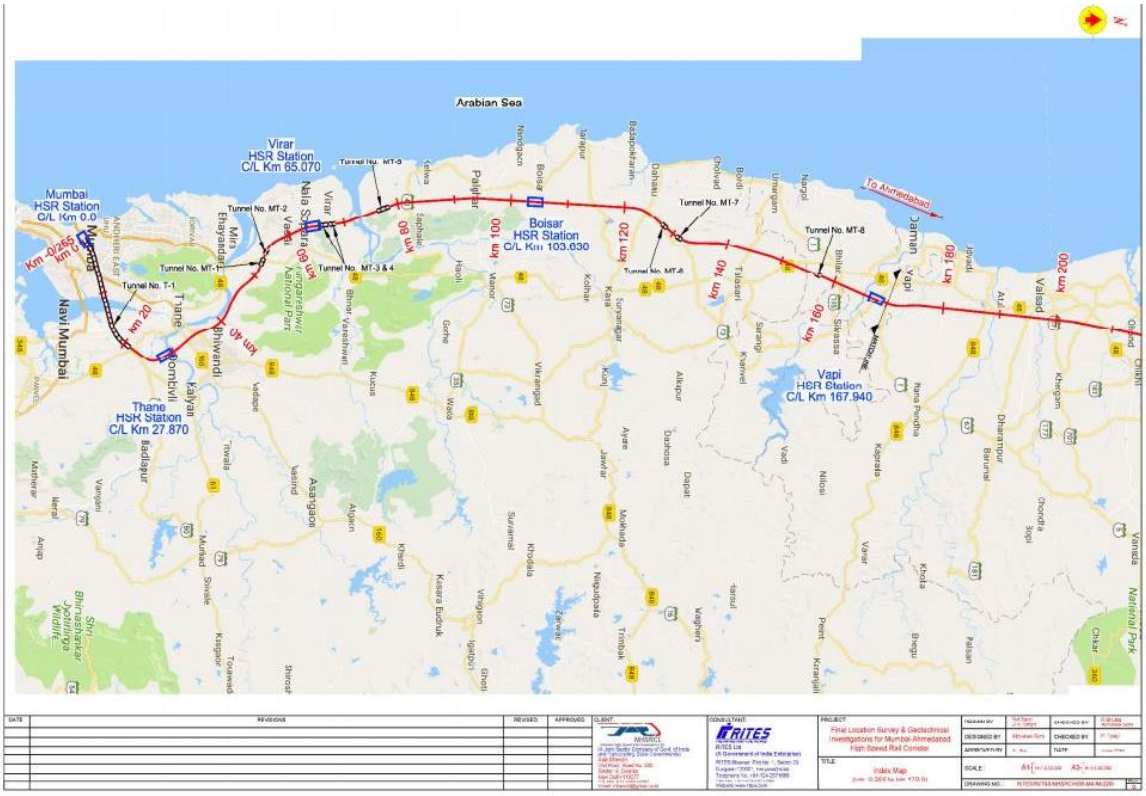

Figure 7 - Mumbai- Ahmadabad High Speed Rail Corridor

5.3 DFCC

The Western Dedicated Freight Corridor covers a distance of 1504 km of double line electric (2 X 25 KV) track from JNPT to Dadri via Vadodara-Ahmedabad-Palanpur-Phulera-Rewari. Alignment has been generally kept parallel to existing rail lines except provision of detour at Diva, Surat, Ankleshwar, Bharuch, Vadodara, Anand, Ahmedabad, Palanpur, Phulera and Rewari. However, it is entirely on a new alignment from Rewari to Dadri. The Western DFC is proposed to join Eastern Corridor at Dadri. Junction Stations between the existing railway system and the Western DFC have been provided at Vasai Road, Kosad/Gothangam, Makarpura (Vadodara), Amli Road (Sabarmati), Palanpur, Marwar Jn., Phulera, Rewari and Pirthala Road.

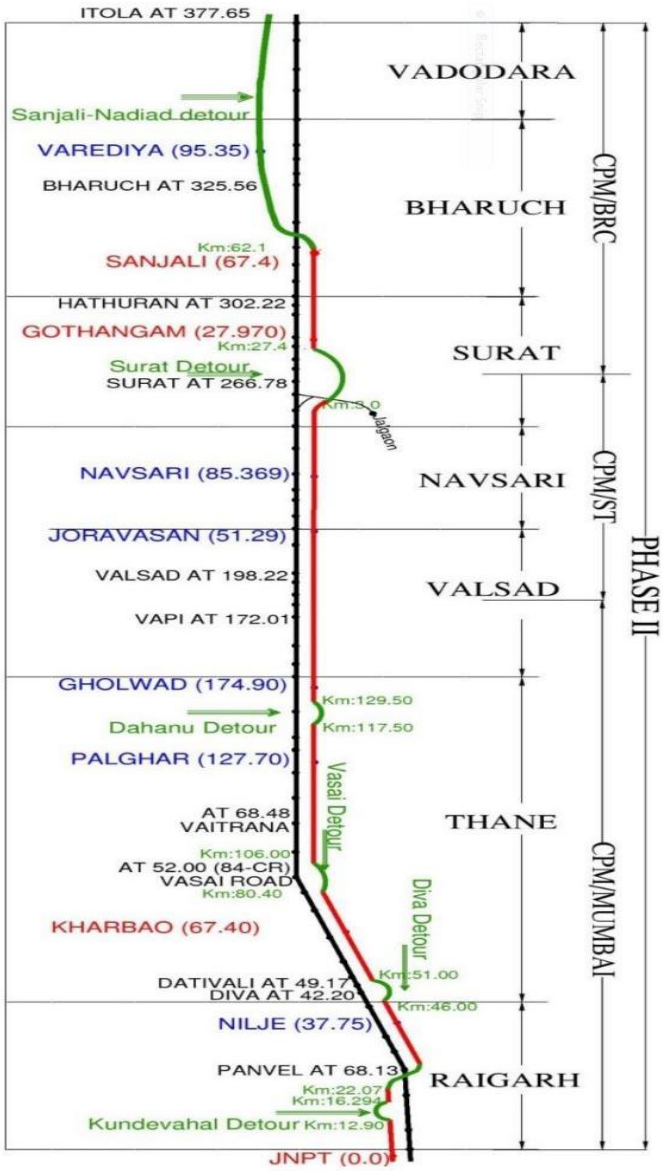

Figure 8 - Dedicated Freight Corridor

6.0 CONCLUSION

All these infrastructure projects have been planned independently of proposed Vadhavan Port and are in different stages of implementation and they are bound to have beneficial impact on economic development of Palghar district which is inhabited by large tribal population and as such it has declared as a Adivasi (tribal) district. However, these projects are not likely to change the demographic pattern or natural growth of the district in general and villages around TAPS because they are communication and logistics improvement projects for transportation of cargo and movement of people. It may be noted that all above projects i.e. Vadodara-Mumbai Expressway, Mumbai–Ahmadabad high-

speed rail corridor and Dedicated Freight Corridor Phase II (Western) are passing though the 16 km EPZ of TAPS along the Boisar Station.

Proposed Vadhavan Port is also located within 16 kms EPZ of TAPS at a distance of 12 kms. This being an infrastructure project is likely to impact demography of Palghar district if at all very marginally. The present growth of population between year 2001 and 2011 was at the rate of 21% and this is not likely to spurt or increase substantially because of Vadhavan port or other infrastructure projects. Port is a service industry engaged in import and export trade of the country by exchanging cargo between land and sea interface and does not itself manufacture or produce any item for any industry. It will create some direct and indirect employment roughly about 1000 persons directly in the proposed port given high level of mechanization and automation and about 5000 persons employed indirectly. However, not all of them will reside in the EPZ of TAPS because of meagre civic amenities. They may like to reside in Dahanu and Palghar towns which are outside the EPZ of TAPS.

As per 2011 census total population in the Emergency Planning Zone of TAPS was 262765 and considering 21% population growth between the last two census in Palghar District now the population in EPZ of TAPS may be 312427 (18.2% increase). This may increase by 3-5% due to the above infrastructure projects over 10 -15 years due to proposed Vadhavan port and other infrastructure projects as discussed above.

In view of the foregoing analysis and based on available data, it can be concluded that proposed Vadhavan port project may have a very marginal impact if at all on the emergency planning zone of TAPS but it will create employment opportunities for the local population living in the EPZ.