Consultancy Services for Project Management Phase I including Feasibility Study & Preparation of Detailed Project Report (DPR) for Up-gradation to TwoLaningwith Paved Shoulder of Wakan-Pali-Khopoli Road (SH-93) from Km 0/000 to Km 41/000 in the State of Maharashtra

PRE FEASIBILITY REPORT (PFR)

Submitted By

MAHARASHTRA STATE ROAD DEVELOPMENT CORPORATION LIMITED
(Govt. of Maharashtra Undertaking)

July 2016

1. Executive Summary

Road projects are generally undertaken to improve the economic and social welfare of those using the road or served by it. Increased road capacity and improved pavements can reduce travel times and lower the costs of vehicle use. Benefits include increased access to markets, jobs, education and health services, and reduced transport costs for both freight and passengers, reduce fuel consumption and exhaust emissions from the vehicle plying on the road.Improvement of the road project will have significant positive impact, but they may simultaneously also bring significant negative impacts on nearby communities if proper precaution is not taken during design and implementation stage of the project. People may also be indirectly affected by the project, through the increase in noise levels and pollution. Roads bring people and people bring development. Roads are agents of change, which can bring both benefits and damage to the existing balance between the people and their environment.

The Maharashtra State Road Development Corporation Ltd (MSRDC) has been entrusted with the assignment of Project Management Consultancy Phase I including Feasibility Study & preparation of Detailed Project Report (DPR) for Up-gradation to four laning configuration ofWakan-Pali-Khopoli Road (SH-93) from Km 0/000 to Km 41/000 in the State of Maharashtra.

- **Project**

The project road from Wakan to Khopoli section (Km 0/000 to Km 41/000) of State Highway (SH-93)is the road which is proposed to be widened from existing two lanes to two lanning with paved shoulder.The road starts from T- Junction with Mumbai – Goa highway road near Wakan village andpasses through three major villages namely Pali, Paraliand Pedali. The roadcontinues and connects to the Mumbai-Pune Expressway near KhopoliToll Plaza junction.

The project envisages two bypasses at Padali&Parli villages, intersection development at Wakan junction &Khopoli junction, rehabilitation of 2 major, 8 minor & cross drainage structures, suitable location for Toll Plaza and provision of Roadside amenities.

The cost of Project is approx.. Rs 500 crores. Construction period is of 30 months after receipt of approval to DPR, clearances from MoEF&CC and MoRTH

- **Objective**

The main objective of the project is to establish the technical, economic and financial viability of the project as a two-lane with paved shoulder facility taking into account the requirements with regard to rehabilitation, upgrading and improvement based on highway design, pavement design, provision of 4-lane divided carriageway, wherever necessary, type of intersections, rehabilitation and widening of existing and/or construction of new bridges and structures, road safety features, quantities of various items of works and cost estimates vis-à-vis the investment and financial return through toll and other revenues.Hence, ensuring:

- Enhanced safety and level of service for the road users;
- Superior operation and maintenance enabling enhanced operational efficiency of theProject;
- Minimal adverse impact on the local population and road users due to road construction;
- Minimal adverse impact on environment
- Minimal additional acquisition of land

2. Introduction of the project / Background information

i. Identification of project and project proponent.

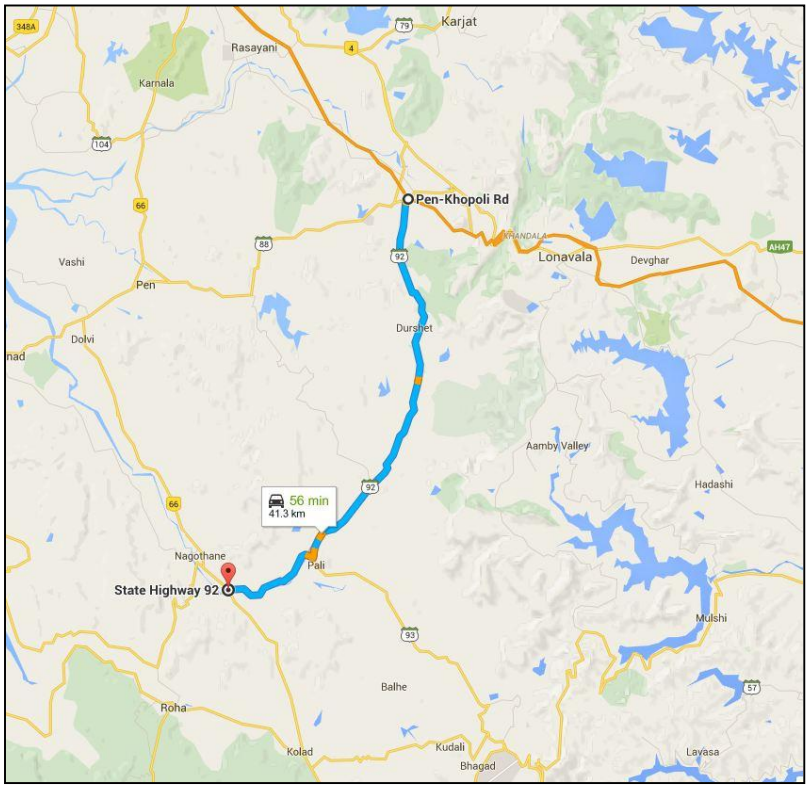
Project: Consultancy Services for Project Management Phase I includingFeasibility Study & Preparation of Detailed Project Report (DPR) for Up-gradation to Four Laning Configuration of Wakan-Pali-Khopoli Road (SH-93) from Km 0/000 to Km 41/000 in the State of Maharashtra.

Project Proponent: Maharashtra State Road Development Corporation Limited (MSRDC)

ii. Brief Description of Project

The project road from Wakan to Khopoli section (Km 0/000 to Km 41/000) of State Highway (SH-93)is the road which is proposed to be widened from existing two lanes to two lanning with paved shoulder.The road starts from T- Junction with Mumbai –Goa highway road near Wakan village andpasses through Pali village which is one of the prime religious locations in the area. Paraliand Pedali are other two major villages which fall on the alignment of this road. The roadcontinues and connects to the Mumbai-Pune Expressway near KhopoliToll Plaza junction.The Project Road is shown below:

Figure-1: Project Road



iii. Need for the project and its importance to the country and or region.

The widening is necessary to develop the State Highway and Major district corridors wheretraffic intensity has increased significantly and there is requirement of better

connectivity tovarious towns and villages having considerable agricultural and Industrial produce.
The main objective of the project is to establish the technical, economic and financialviability of the project as a two-lane with paved shoulder facility taking into account therequirements with regard to rehabilitation, upgrading and improvement based on highwaydesign, pavement design, provision of 4-lane divided carriageway, wherever necessary, typeof intersections/flyovers/ROB's, rehabilitation and widening of existing and/or constructionof new bridges and structures, road safety features, quantities of various items of works andcost estimates vis-à-vis the investment and financial return through toll and other revenues.It should ensure:

- Enhanced safety and level of service for the road users;
- Superior operation and maintenance enabling enhanced operational efficiency of theProject;
- Minimal adverse impact on the local population and road users due to roadconstruction;
- Minimal adverse impact on environment
- Minimal additional acquisition of land

iv. Demand and supply Gap

Not Applicable

v. Imports vs. Indigenous production

Not Applicable

vi. Export Possibility.

Not Applicable

vii. Domestic / export Markets.

Not Applicable

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

Direct employment generation: During the construction phase of the project which is likely to be completed within 30 months, manpower will be needed to take the part in various project activities. About 1000persons per day, which will include skilled, semi-skilled and unskilled labours, will be engaged.In the post construction phase, the project will provide social benefits to no. of people in terms of direct employment by way of better commercial and industrial development of the area.

Indirect employment: Ancillary units will also be set up due to project which will provide employment. Local vendors / tradersetc. will be benefitted through employment generated during construction and operation phase.

3. PROJECT DESCRIPTION

i. Type of project including interlinked and interdependent projects, if any.

Not applicable

ii. Location (map showing general location, specific location, and project boundary & project site layout) with coordinates.

Attached as **Annexure-1**

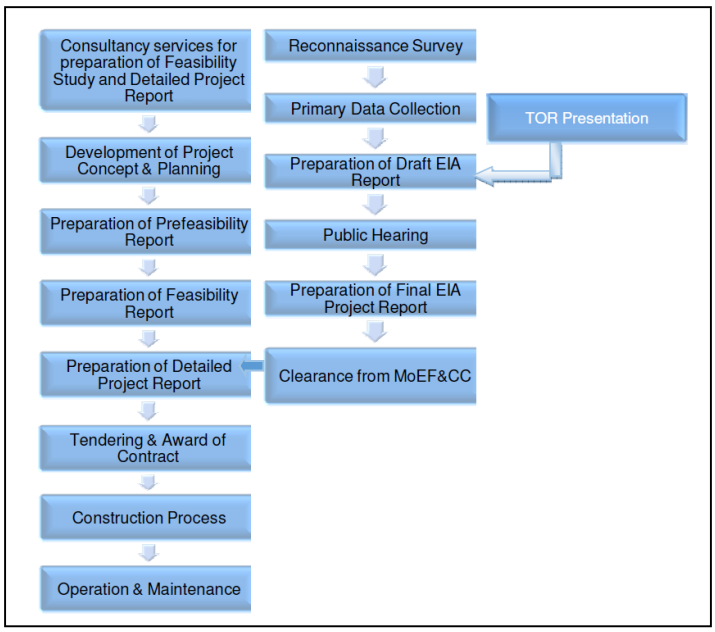
iii. Details of alternate sites considered and the basis of selecting the proposed site, particularly the environmental considerations gone into should be highlighted.

The existing road is proposed to widen from 2 lane to 2 lane with paved shoulder of NH standard. Bypasses are identified at three major villages along the road. Their alignment selection will be detailed in detail in EIA report.

iv. Size or magnitude of operation

The project corridor is of 41 km length, starting from Wakan junction on Mumbai-Goa highway to Khopoli junction on Pen-Khopoli Road. Widening of this road from 2 lane to 2 lane with paved shoulder will serve as connector between NH-66 (Old NH-17) to NH-4. The project envisages development of three Bypasses at major villages along road, intersections improvement, rehabilitation of major & minor bridges with cross drainage works.

v. Project description with process details (a schematic diagram/ flowchart showing the project layout, components of the project etc.should be given)-



vi. Raw material required along with estimated quantity, likely source, marketing area of final product/s, Mode of transport of raw Material and Finished Product.

Raw materials requirement:

Sand	-	2 Lakh Cum	- 110km from site
Murrum	-	20 Lakh cum	- Within 5 km
Stone	-	4 Lakh cum	- Unneri village, 4 km from Imagica
Steel	-	10,000 Tonnes	- Kalamboli Steel market, 40km
Cement	-	40,000 Tonnes	- Mumbai, 60km

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

Soil removed during cutting & filling will be kept aside for reuse in median development. Bituminous material removed will be reused to maximum extent by reusing the same for filling low laying areas if any or in embankment. Else it will be used in filling other identified low lying areas or nearby quarry sites after prior permission.

Possibility of use of fly ash and slag from industries located along the project road and within 100 km radius will be checked for its usage in construction as per MoEF&CC guidelines.

viii Availability of water its source, Energy/ power requirement and source should be given.

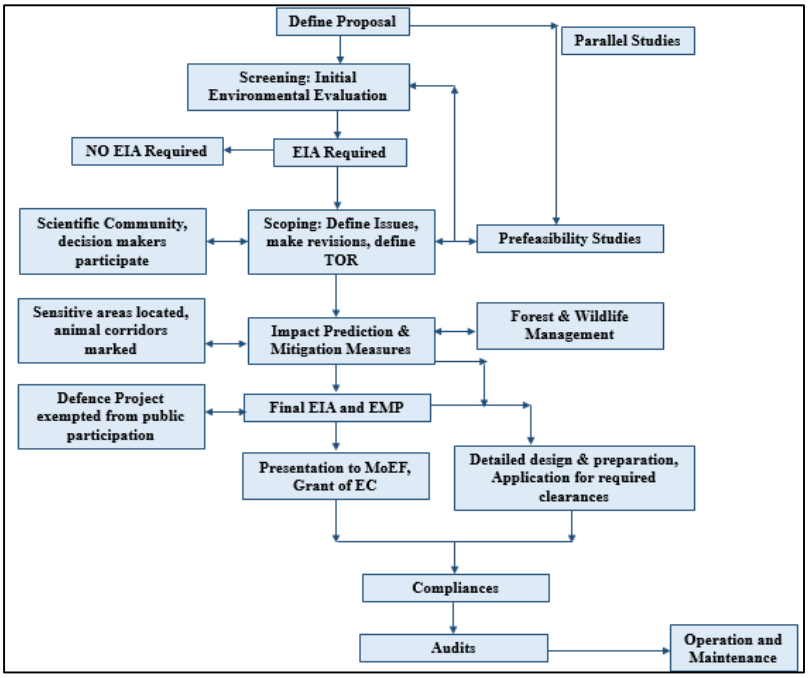
Waterwill be required during construction phase at about 9.6 Lakh KL total for site activities and labour camps. The water shall be obtained from nearby surface/ ground water with consent.

D.G. sets will be used to meet the power requirement of onsite activities, wherever grid power supply is not available. Power requirement at labour camps will be arranged by prospective contractor.

ix. Quantity of wastes to be generated (liquid and solid) and scheme for their Management/disposal.

Debris generated during construction will be utilised to maximum extent for filling low lying area if any or in embankment development etc. Also arrangements will be made by prospective contractors for disposal of solid waste.Movable toilets will be provided as sanitation facility wherever necessary while solid waste will be segregated and disposed as per MSW rules & regulations.

x. Schematic representations of the feasibility drawing which give information of EIA purpose.



4. SITE ANALYSIS

i. Connectivity

The Project Road starts from Wakan junction on Mumbai-Goa highway and ends at Khopoli junction on Pen-Khopoli road. The road passes through three talukas namely Roha, Sudhagad-Pali and Khopoli of Raigad district of Maharahstra. This road connects NH-66 (Old NH-17) to NH-4 via Mumbai-Pune expressway.

ii. Land Form, Land use and Land ownership

The adjoining land-use pattern of the project road varies from rural/agricultural to openbarren land and forest land. There are several small and big villages along theroad. Throughout the projectcorridor, majority of the land use on the edges is open/barren or agricultural withseveral trees and other plantations. There are few industries and factories which arepresent at intermediate locations on the road.

iii. Topography

The project road passes through plain and rolling terrain. Amba River flows along the road for few stretches and also crosses at few locations.

iv. Existing land use pattern (agriculture, non-agriculture, forest, water bodies(including area under CRZ)), shortest distances from the periphery of theproject to periphery of the forests, national park, wildlife sanctuary,

ecosensitive areas, water bodies (distance from the HFL of the river), CRZ. Incase of notified industrial area, a copy of the Gazette notification should be given.

The landuse of project road corridor is mainly agriculture followed by barren and built up land with few forest patches. There are 27 villages along the road of which Pali, Parli and Pedali are major habitats.

Table-1:List of Villages along Project Corridor

Sr. No.	Name of Village	Taluka	Distance from Wakan Junction, km
1	WakanPhata	Roha	0.000
2	RabGaon	Sudhaghad-Pali	5.200
3	Balapa	Sudhaghad-Pali	6.700
4	Ekalahara	Sudhaghad-Pali	7.200
5	UdharPhata	Sudhaghad-Pali	7.900
6	Pali	Sudhaghad-Pali	8.700
7	Dhapule	Sudhaghad-Pali	10.000
8	Rasal	Sudhaghad-Pali	11.500
9	Wahve	Sudhaghad-Pali	13.300
10	JambulPhata	Sudhaghad-Pali	13.600
11	Chave	Sudhaghad-Pali	14.600
12	Tiuri	Sudhaghad-Pali	17.700
13	Pedali	Sudhaghad-Pali	18.600
14	Kasnal	Sudhaghad-Pali	20.600
15	Hedvali	Sudhaghad-Pali	22.000
16	Warad	Sudhaghad-Pali	23.000
17	Parli	Sudhaghad-Pali	25.200
18	Nanose	Sudhaghad-Pali	27.000
19	DudhaneWadi	Sudhaghad-Pali	28.000
20	Durshet	Khalapur	29.200
21	Shimadi	Khalapur	30.900
22	Kargaon	Khalapur	33.400
23	Umbergaon	Khalapur	34.600
24	Mirkutwadi	Khalapur	37.500
25	Thanenhave	Khalapur	38.000
26	Devnahve	Khalapur	39.200
27	Dahivali	Khalapur	39.900

Source: PWD office, Pali Village

AmbaRiver is the major river in the district.It flows parallel to project road from Wakan to Pali and crosses at several locations. There are 2 major and 9 minor bridges along the road on river.

v. Existing Infrastructure

The project road is existing 2 lanes, which is proposed to widen to 2 lanning with paved shoulder. This will connect to Mumbai-Goa, NH-66 (Old NH-17) to Mumbai-Chennai, NH-4 via Mumbai-Pune expressway.

vi. SoilClassification

The soils of the Raigaddistrict are formed from the Deccan trap which is the predominating rock formation of this district with small out-crops of laterite at a few places. Various types of these soils are marked out as per topographical situation and location. They are generally grouped as forest,varkas,rice,kharor salt, coastal alluvial and laterite soils.

vii. Climatic data from secondary sources

The climate of this district is typical of that on the west coast of India, with plentiful and regular seasonable rainfall, oppressive weather in the hot months and high humidities throughout the year. The summer season from March to May is followed by the south-west monsoon season from June to September. October and November form the post-monsoon or the retreating monsoon season. The period from December to February is the cold season.

The average annual rainfall for the district as a whole is 3,028.9 mm. May is the hottest month with a mean daily maximum temperature at 31.7°C (89.1°F) and the mean daily minimum temperature at 26.4°C (79.5°F). In the period from December to February the weather is cooler than in the post-monsoon months. The air is humid throughout the year. Relative humidity is on an average over 80 per cent. during the south-west monsoon season. In the rest of the year the relative humidity is between 65 per cent and 75 per cent. Winds are very strong and blow from west or south-west during monsoon season. During the period from October to December winds are generally moderate but sometimes strong in October and blow from directions between north-east and south-east. In the three months from January to March the winds continue to be moderate and are predominantly from directions between north and east. In April while there is a slight strengthening of wind, the direction is variable. In May there is a further strengthening of winds and the directions are between south-west and north-west.

viii. Social Infrastructure available

As per census 2001, total population of district is 22.07 lacs (Male-11.17 lacs and Female-10.90 lacs). Rural population is about 76% while urban population is 24%. Basic social infrastructure facilities are available like health care centre, primary school, market place, police station, transportation, roads etc.

5. PLANNING BRIEF

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

Widening the Carriageway:

The facility improvement is proposed generally by introduction of a new carriageway besidethe existing one, separated by median. Widening on one side will be proposed to save the trees, existing pavement andexisting bridges. Widening on both sides of the carriageway will also be proposed at certainlocations with settlements but that will be as an exception to eccentric widening.

Cross Section Improvement Facility

Cross-section for the improved facility should be adequate to cater for the traffic expected very the design period and offer safe & convenient traffic operation at speeds consistentwith the terrain conditions. For a given terrain condition, cross sectional elements will be similar everywhere in order tofacilitate consistency in design and operation. This will however also make the road pleasingin appearance. Besides, there will be cases where the cross section dimensions will changesuddenly which will be mitigated by means of advance signing and tapers etc.

Intersection Planning on End junctions

There will be an intersection improvement plan at both the end junctions viz. Wakanjunction and Khopoli junction. At Wakan junction,there will be an improvement plan which willavoid conflicts and will have separate turning movement in all directions. Similarly at theKhopoli junction, Pen-Khopoli road and the project road form a T-junction. Also Mumbai –Pune expressway is passing near to the Khopoli junction. The connectivity to the expresswaywould be improved and planned from the Khopoli junction.

Toll Plaza and Tolling System

The project road will have open type toll system which is best suited. The traffic surveys and roadnetwork study in the area would bring out the most suitable locations for toll plaza.The traffic study would also facilitate to determine the number of toll lanes for the TollPlaza. Further, it is recommended to avoid location of toll plaza within a radius of 5.0kmfrom the boundary of villages, towns, etc.

Wayside Amenities, Truck Lay Byes and Bus Bays

The provision of proper and adequate wayside amenities including truck parking emerges tobe an important requirement. Any new provision will keep into account the existing facilitiesand habits of road users. A complete inventory of all the existing roadside facilities will bemade. This will constitute the database for proposing new amenities.

ii. Population Projection

During construction phase about 1000 personnel will be required in the form of skilled, semi-skilled and unskilled. Prospective Contractor will set up labour camp along the road stretch as per the requirement. Ancillary development will also likely to cause increase in population in nearby areas.

iii. Land use planning (breakup along with green belt etc).

The Project road is proposed to widen from 2 lanes to 2 lanes with paved shoulder within existing ROW wherever possible. Three bypasses are proposed at major villages to avoid traffic congestion. Landscaping / arboriculture along roadside will be developed as per IRC-SP-21:2009.

Details will be provided in EIA.

iv. Assessment of Infrastructure Demand (Physical & Social).&
v. Amenities/Facilities.

The existing 2 lane road is proposed to widen to facilitate easy connectivity between NH-66 (Old NH-17) and NH-4 by improvising road geometry, pavement, bridges, cross drainages, intersections etc. Area of project road is already developed area. There are industries along the road. Theme park is also located on this road, which attracts sizable population during weekend and holidays. Hence, basic infra-structural facilities are already developed which will be enhanced due to proposed project.

6. PROPOSED INFRASTRUCTURE

i. Industrial Area (Processing Area)

There are no. of industries located along the road. Also there are major industrial Areas located at both ends of project road. Those areas will be supported by way of good connectivity.

ii. Residential Area (Non Processing Area)

The project road already has 27 villages along the route, which will be flourished due to improved infrastructure network.

iii. Green Belt

Landscaping shall be developed on either side of the road, as well as on the median as per IRC-SP-21:2009.

iv. Social Infrastructure

The project envisages development of roadside amenities, truck lay-byes; bus bays, petrol pumps etc. along the alignment.

v. Connectivity (Traffic and Transportation Road/ Rail/ Metro/ Water waysetc)

The project road connectsMumbai-Goa, NH–66 (NH-17) at Wakan junction to NH-4 at Khopoli junction via Mumai-Pune Expressway. It is also well connected to villages alongside.

vi. Drinking Water Management (Source & Supply of water)

Water will be required about 9.6 Lakh KL during construction, which will be available from existing surface and groundwater bodies with prior permission. Water requirement for labour camps will be fulfilled by prospective contractor from nearby areas.

vii. Sewerage System

Mobile toilets shall be provided during construction phase.

viii. Industrial Waste Management

Waste management during construction and operational phase shall be done as per stipulated guidelines of MoEF&CC.

ix. Solid Waste Management

Waste management during construction and operational phase shall be done as per stipulated guidelines of MoEF&CC.

x. Power Requirement & Supply / source

Power requirement during construction phase will be met by D.G sets in case of non-availability of electric supply. During operational phase, electrical supply will be used wherever available.

7. REHABILITATION AND RESETTLEMENT (R & R) PLAN

i. Policy to be adopted (Central/State) in respect of the project affected persons including home oustees, land oustees and landless laborers (a brief outline to be given).

Land required for widening and bypasses is mostly either agricultural or barren land. Few patches of forest (about 20 ha) are also anticipated.30 Ha agriculture land will be acquired for bypasses and 8 Ha of barren land for curve and other alignment improvement. The total land required for project road will be acquired by MSRDC after the finalisation of alignment before the start of construction work. R&R plan will be developed.

8. PROJECT SCHEDULE & COST ESTIMATES

i. Likely date of start of construction and likely date of completion

The construction work will start after approval of DPR and Environmental Clearance from MoEF&CC. The completion period is estimated of about 30 months.

ii. Estimated project cost along with analysis in terms of economic viability of the project.

The estimated cost is approximately Rs. 500 Crores.

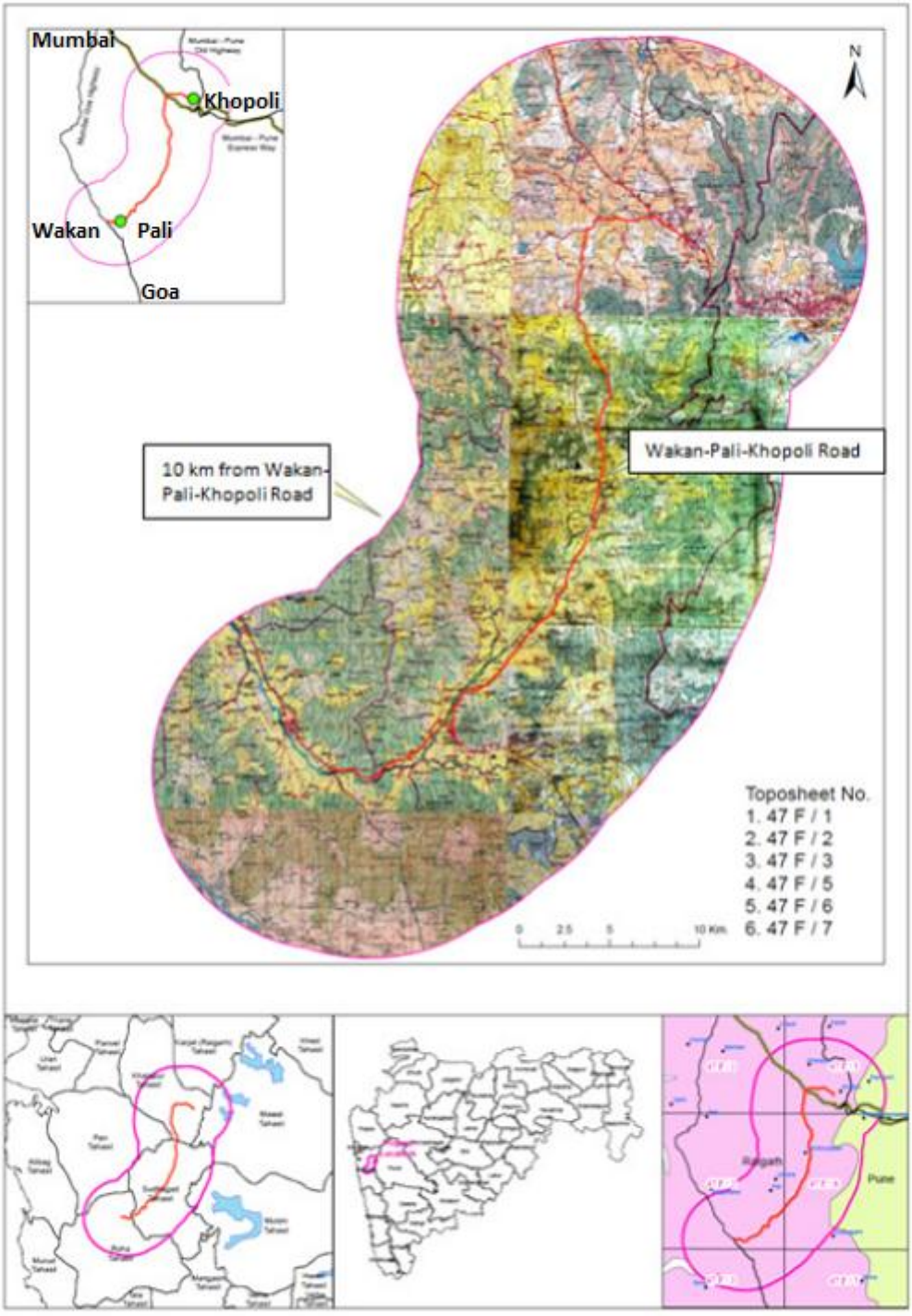
9. ANALYSIS OF PROPOSAL (FINAL RECOMMENDATIONS)

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

Widening of Existing Road, SH-93 from 2 lanes to 2 laneswith paved shoulder configuration will provide good and safe connectivity between Mumbai-Goa, NH-66 (old NH-17) to Mumbai-Chennai, NH-4 via Mumbai-Pune expressway.

Road projects are generally undertaken to improve the economic and social welfare of those using the road or served by it. Increased road capacity and improved pavements can reduce travel times and lower the costs of vehicle use. Benefits include increased access to markets, jobs, education and health services, and reduced transport costs for both freight and passengers, reduce fuel consumption and exhaust emissions from the vehicle plying on the road.Improvement of the road project will have significant positive impact, but they may simultaneously also bring significant negative impacts on nearby communities if proper precaution is not taken during design and implementation stage of the project.

ANNEXURE-1: Alignment



Name of Work :- Up-gradation to Two Lane with Paved shoulder configuration of Wakan-Pali-Khopoli Road (SH-93) from Km 0/000 to 41/000 Proposed National Highway

Brief Summary of Project

Sr. No.	Description	Parameters			
		Existing	Proposed / Design		
1	Length of Project road	41 km	40.6 km		
2	Starting Chainage	km 0/000	km 0/000		
3	Ending Chainage	km 41/000	km 40/600		
4	Speed (kmph)	Existing Speed	Design Speed		
		50-60 kmph	80/65 kmph		
5	Lane Configuration	Two lane with Earthen Shoulders	Two lane with Paved shoulder		
6	Pavement Type	Flexible pavement	Rigid pavement		
7	Number of Bypasses Proposed	2 nos.			
8	Number of Realignment Proposed	31 nos.			
9	Total Length of Bypasses (km)	3.84			
10	Length of Existing Alignment Proposed to be strengthened / Widened (km)	36.76			
11	RoW of Existing Alignment (m)	Varies	30.0		
12	Bridges	Existing	New Construction	Widening & Repair	
a	Major	2	2	-	
b	Minor	8	3	6	
13	Culverts	Existing		New	Widening & Repair

Sr. No.	Description	Parameters		
		Existing	Proposed / Design	
			Construction	
a	Slab Culvert	47	4	42
b	Pipe Culverts	84	91	--
14	Number of Flyovers	--		
15	Number of Vehicular Underpass	--	1	
16	Number of Vehicular Overpass	--	--	
17	Number of Pedestrian /Cattle Underpass	--	--	
18	Number of at-grade Railway Crossing	--	--	
19	Number of Road over Bridge Railway crossings	--	--	
20	Number of Road under Bridge Railway crossings	--	--	
21	Number of viaducts	--	--	
22	Number of curves proposed to be improved			
23	Length of Earthen Drain Proposed (km)	31.32		
24	Length of lined Drain Proposed (km) (one side)	9.28		
25	Length of Retaining Wall Proposed (km)	3.28		
26	Length of Road required Slope Cutting (km)	--		
27	Length of Service Road Proposed (km)	3.35		

Sr. No.	Description	Parameters	
		Existing	Proposed / Design
28	Number of Bus bays proposed	06	
29	Number of Truck Lay bays proposed	02	
30	Number of Toll Plazas proposed	Nil	
31	Length of new alignment proposed in agricultural land (km)		
32	RoW of new alignment proposed in agricultural land (m)	30	
33	Length of new alignment proposed in Forest area (km)	6.7	
34	RoW of new alignment proposed in Forest area (m)	30/45	
35	Area of Forest land to be diverted (ha)	20	
36	Number of trees (Small & Medium Size) proposed to be Felled	6158	