Appendix - F

BRIEF OF THE PROJECT
(NH-74)

BREIEF OF THE PROJECT

0.01 Background

Ministry of Road Transport and Highways (MoRT&H), Government of India (GOI) has decided to take up the development of various National Highways stretches/corridors in the country where the intensity of traffic has increased significantly and there is requirement of augmentation of capacity for safe and efficient movement of traffic.

National Highways Authority of India (NHAI) has been entrusted by the MoRT&H, GOI with the task of the development of selected stretches of **National Highways into 2-lane with paved shoulders configuration with provision of capacity augmentation**. The project is being prepared for implementation under the NHDP, Phase-IVB programme on BOT Mode / EPC Mode.

Accordingly, NHAI has assigned the work of *"Consultancy Services for Preparation of Detailed Project Report (DPR) for Rehabilitation and Upgradation of National Highway Stretches under NHDP-IVB, Group-B (Package No. UP/DPR/NHDP-IV/08); (i) Chutmalpur-Saharanpur-Yamunanagar-Haryana/UP Border section of NH-73 (Length 50 km); (ii) Dehradun- Chutmalpur-Roorkee section of NH-72A (Length 70 km); (iii) Sitarganj-Tanakpur section of NH-125 (Length 52 km) & (iv) Haridwar-Kashipur section of NH-74 (Length 167 km)* under a single contract Package No. UP/DPR/NHDP-IV/08" to M/s SAI Consulting Engineers Private Limited, Ahmedabad. The agreement for the Consultancy services was signed on 16th March 2010. The commencement of services has taken place on the 7th day after signing contract agreement i.e. on 23rd March 2010.

This submission is the Draft Detailed Project Report for Haridwar-Najibabad-Dhampur-Afjalgarh-Kashipur section of NH-74.

The total length of the existing alignment of the section of project road is 175.000 km as per existing kilometer stone.

As per Design Chainage, the total length of proposed/approved alignment of project road is 170.432 km.

Based on the evaluation of study carried out, as detailed in subsequent sections, the project road is proposed to be developed as 4-lane divided road configuration for the entire length of the project road.

The details of project road are described in the following paragraph.

0.02 Project Objective

The main objective of the present project covering Haridwar-Najibabad-Dhampur-Afjalgarh-Kashipur section of NH-74 includes the following:

- To establish the technical, economical and financial viability of the project and prepare detailed project reports for rehabilitation and upgrading of the existing 2-lane road to 4-lane divided road with paved shoulders configuration.
- Requirements with regard to rehabilitation, upgrading and improvement based on highway design, pavement design, provision of service roads wherever necessary, type of intersections, rehabilitation and widening of existing and/or construction of new bridges, underpasses, flyovers, ROBs and other structures, road safety features, quantities of various items of works & cost estimates, economic analysis and financial analysis for computation of financial returns through toll and other revenues.

0.03 Deficiencies and Issues

The following major deficiencies have been identified and addressed in terms of traffic operation and safety, road conditions and maintenance. A few other issues which contribute to operational deficiencies and safety concern and which prevent the optimum utilization of the highway capacity to a desirable level of service, e.g. driving discipline and compliance, traffic surveillance, corridor security and management, level of regular road maintenance, truck overloading, maintenance and its road worthiness etc. are beyond the scope of this study.

a) Operation

- *Road capacity augmentation*
- *Congestion and delays through built-up areas*
- *No access control*
- *Vehicle competing with slow moving vehicle for the pavement space*
- *Deficient road surface conditions (roughness)*
- *Pedestrian crossing on the road*
- *No pavement edge markings*
- *Uncontrolled roadside developments and encroachments*
- *Bridges requiring rehabilitation*

b) Safety

- *Shoulder drop-off at places*
- *Exposed roadside hazards.*
- *No pavement markings*
- *Inadequate traffic signs*
- *Conflict with pedestrians, cattle, slow vehicles*

c) Road

- *Shoulder functionally and structurally inadequate*
- *Cross drainage - poor condition and inadequate*
- *Curve radii less than what is required for the Design speed of 100 km / hr in roads for plain terrain*

- *Deficient curves and reverse curves in roads in plain terrain without transition length for safe reversal of elevation.*

0.04 Description of the Project Road

As shown in the **Index Map** (refer Figure 1.1), the existing alignment of the project road starts at km 0.000 of NH-74 at the junction of NH-58 & NH-74 at km 204.300 of NH-58 at Haridwar, runs through the towns/places like Kangadi, Najibabad, Kotwali, Nagina, Dhampur, Afjalgarh, Jaspur and Kashipur and ends at existing km 175.000 of NH-74 after Jagannathpur village. The total length of the project road is 170.432 km as per design chainage.

Project road is situated partially in Haridwar & Udham Singh Nagar districts of Uttarakhand and partially in Bijnor district of UP. The stretch of road from km 0.000 to km 30.000 and km 132.000 to km 175.000 of NH-74 lies in Haridwar & Udham Singh Nagar districts of Uttarakhand respectively. The remaining stretch of NH-74 from km 30.000 to km 132.000 lies in Bijnor district of UP. Haridwar is located at 29°58' N and 78°09' E, Najibabad is located at 29°40'N and 78°20'E and the Kashipur is located at 29°15' N and 79°00' E.

The entire stretch of project road lies predominantly on plain terrain, except some stretches on hilly & rolling terrain (refer Chapter-3 for details).

The formation soil type along all the stretches of the project road is alluvial soil (predominantly Silty Sand, some locations it may be Silty Clayey Sand) in plain terrain and matrix of sand-silt-clay-intermixed with boulders in hilly terrain.

Land use pattern abutting the project highway is predominantly agriculture except some sections of the road passing through the reserve forest, built-up area and commercial area. For details refer Chapter-3.

The existing highway is a 2-lane single carriageway road with generally 7 m wide carriageway with 1.0 m earthen shoulder on both sides and without paved shoulder, except at few locations where paved shoulder exists. At Kashipur, non-standard 4-lane divided road exists from km 156.800 to km 158.800.

Conditions of existing bridges are good, except some repair & maintenance work for few old bridges.

The condition of existing pavement surface mostly varies from fair to good. Pavement surface from km 100.500 to km 111.200 is full of cracks, rutting and potholes and thus in very poor condition. Poor to very poor pavement conditions was also observed at some isolated stretches.

At many locations the height of existing road with respect to adjoining ground level was observed to be around 0.5 m only.

At some locations in urban area road side drain was unavailable. Where ever drain exists in urban area, the condition is very poor due to lack of regular maintenance work.

Mostly the traffic is of through type. The major traffic generation point along this stretch of project road are junction of NH-74 with NH-119 at km 50.100 of NH-74 at Najibabad, Junction of NH-74 and SH-12 at km 93.850 of NH-74 and Junction of NH-74 with NH-121 at km 158.350 of NH-74 at Kashipur. MDR, SH & NH coming from Bijnor & Moradabad districts of UP join/cross this stretch of NH-74 at different locations. Volume of traffic observed on this section of NH is moderate to high at different stretches.

There are seventeen (17) major bridges and twenty eight (28) minor bridges present on Haridwar - Kashipur section of NH-74.

A total of two seventy two (272) numbers of existing CD structures are present on NH-74 section of project road. Summarized details are given as below:

- **Total Culverts** **272** **nos**.
- Pipe Culvert 94 nos.
- Slab Culverts 130 nos.
- Arch Culverts 44 nos.
- Arch/Pipe Culverts 01 no.
- Slab/Pipe Culverts 01 no.
- Box 02 nos.

There are four railway level crossing and no ROB present at existing chainage on Haridwar - Kashipur (UP / Uttrakhand Border) section of NH-74.

0.05 Proposed Alignment of Project Road

Based on Alignment Options Study for realignment/bypasses, the alignment of project road as recommended by the Consultants and approved by the NHAI in principle is described below.

The project road alignment starts from km 0.000 of NH-74 (existing km 204.300 of NH-58 at Haridwar on right side of NH-58), follows the existing alignment of NH-74 up to km 39.230 of NH-74. From km 39.230 the alignment takes left turn & follows the route of recommended alignment of realignment at Mandawali village up to km 41.098 of NH-74.

From km 41.098 of NH-74 the alignment follows the route of existing alignment of NH-74 up to km 42.696 of NH-74. From km 42.696 of NH-74 the alignment takes right turn & follows the route of recommended alignment of Najibabad Bypass up to km 54.151 of NH-74. From km 54.151 of NH-74 the alignment follows the existing alignment of NH-74 up to km 66.380 of NH-74.

From km 66.380 of NH-74 the alignment takes right turn & follows the route of recommended alignment of realignment at Daultabad village up to km 68.396 of NH-74. From km 68.396 of NH-74 the alignment follows the existing alignment of NH-74 up to km 68.628 of NH-74.

From km 68.628 of NH-74 the alignment takes left turn & follows the route of recommended alignment of realignment at Kotwali town up to km 71.052 of NH-74. From km 71.052 of NH-74 the alignment follows the existing alignment of NH-74 up to km 73.311 of NH-74.

From km 73.311 of NH-74 the alignment takes right turn & follows the route of recommended alignment of Nagina Bypass up to km 79.933 of NH-74. From km 79.933 of NH-74 the alignment follows the existing alignment of NH-74 up to km 92.223 of NH-74.

From km 92.223 of NH-74 the alignment takes left turn & follows the route of recommended alignment of Dhampur Bypass up to km 97.058 of NH-74. From km 97.058 of NH-74 the alignment follows the existing alignment of NH-74 up to km 117.245 of NH-74.

From km 117.245 of NH-74 the alignment takes right turn & follows the route of recommended alignment of realignment at Afjalgarh town up to km 120.492 of NH-74. From km 120.492 of NH-74 the alignment follows the existing alignment of NH-74 up to km 122.635 of NH-74.

From km 122.635 of NH-74 the alignment again takes right turn & follows the route of recommended alignment of Udhhowala Bypass up to km 126.406 of NH-74. From km 126.406 of NH-74 the alignment follows the existing alignment of NH-74 up to km 135.409 of NH-74.

From km 135.409 of NH-74 the alignment takes left turn & follows the route of recommended alignment of Jaspur Bypass up to km 146.258 of NH-74. From km 146.258 of NH-74 the alignment follows the existing alignment of NH-74 up to km 149.459 of NH-74.

From km 149.459 of NH-74 the alignment takes right turn & follows the route of recommended alignment of Kashipur Bypass up to km 175.000 of NH-74, where the project road ends. The Details of Proposed Alignment has been given in Chapter-3.

Total length of final alignment of the project road = 170.432 km

The final alignment comprises

- 101.823 km of existing NH-74
- 68.609 km of New Alignment

0.06 Traffic

For Traffic Study purpose, the project road has been divided in six (6) traffic homogenous sections as follows:

Section-1: Haridwar to Mandawali (km 0.000 to km 40.000)

Section-2: Mandawali to Najibabad (km 40.000 to km 50.750)

Section-3: Najibabad to Dhampur (km 50.750 to km 94.000)

Section-4: Dhampur to Afjalgarh (km 94.000 to km 120.500)

Section-5: Afjalgarh to Kashipur (km 120.500 to km 158.350)

Section-6: Kashipur to End of Project Road (km 158.350 to km 175.000)

The Average Daily Traffic (ADT) and Average Annual Daily Traffic (AADT) in 2010 on the six traffic homogeneous sections of the existing alignment of the project road as determined from the traffic surveys are as detailed below in **Table - 0.01.**

Table – 0.01: Traffic on the Project road

Section	Traffic in AADT	
	Total Vehicles	PCU
Section-1, (near Kangadi Village at Km 6.000 of NH-74)	10930	15330
Section-2, (near Puranpur Village at km 48.000 of NH-74)	12209	17645
Section-3, (Near Hotel Walia Residency, Najibabad at km 52.000 of NH-74)	13830	20435
Section-4, (Outskirt of Dhampur at km 96.000 of NH-74)	12923	20132
Section-5, (near Missarwala Village at km 153.200 of NH-74)	11746	15713
Section-6, (near Multiwall Pulp & Board Mills at km 167.400 of NH-74)	12046	16737

Considering the AADT & PCUs values of all the 6 traffic homogenous sections, it is clear that the LOS-B of existing 2 lane carriageways without paved shoulders has been already been exceed.
Considering the growth rates under the normal scenario, the LOS-C for 2 lane carriageways with paved shoulders for Section-1, Section-2, Section-3, Section-4, Section-5 & Section-6 shall exceed in the year 2016, 2016, 2013, 2014, 2016 & 2015 respectively.

LOS-C for 4 lane divided road with paved shoulders for Section-1, Section-2, Section-3, Section-4, Section-5 & Section-6 shall exceed in the year 2034, 2034, 2031, 2032, 2034 & 2033 respectively.

Considering that the execution of project road will commence in the begining of 2014 and all the construction activities will be completed by the middle of 2016 for opening of road to traffic, it is necessary that the entire length of the project road should be constructed as 4-lane divided road with paved shoulders in the beginning itself.

Hence it is recommended to construct 4 lane divided road with paved shoulders and service roads (as applicable) for Haridwar – Kashipur section of NH-74.

0.07 Surveys and Investigations

Following surveys and investigations have been undertaken for the feasibility study so far:

- Inventory and condition survey for roads
- Inventory and Condition Survey for Bridges and Structures
- Traffic survey
- Axle Load Survey
- Pavement Investigations
- Alignment Options Study for Bypasses and Realignment
- Hydrological Studies
- Soil and Materials Investigations
- Topographical Survey
- Social screening survey
- Environmental screening survey

The data obtained from these field works have been used judiciously in the preliminary design and preparation of feasibility study report.

0.08 Improvement Proposals

The improvement proposals incorporated in the design of the project road are based on the guidelines of IRC:SP:84 – 2009.

The existing alignment of the road is generally retained where the road geometry is within acceptable norms as per design standards .

The typical widened cross-section would consist of the following salient features:

i) 7.0 m carriageway for 2 lane road
ii) 1.5 m wide paved shoulders
iii) 2.0 m wide earthen shoulders
iv) 7.0m carriageway for service roads in urban area along existing road.
v) 2.0 m median (raised) in urban area and 4.5 m median (raised) in rural area for 4 lane divided road
vi) 0.25m kerb shyness/edge strip at the edge of median for rural & urban area for 4 lane road.

The main improvement proposals are broadly stated below:

- For realignment/bypass (i.e. new alignment) stretches minimum 60 m RoW has been considered in plain & rolling terrain.
- At junction locations RoW has been considered as per junction improvement requirement.
- Both side widening has been proposed at built-up area locations.

- One side widening has been proposed in rural area or the semi urban locations, so that felling of trees as well as shifting of existing utilities lines shall be minimum.
- Four - lane divided road with paved shoulders and service roads (as applicable) shall be constructed for entire length of project road.
- Widening of all cross drainage structures in good condition has been proposed as per the standard cross sections to match with the 4 lanes carriageway configuration.
- Overtopping of road by rain/flood water has happened in the past at some location on the project road, hence raising of road is contemplated in those stretches of NH-74.
- Considering bottlenecks, geometric deficiencies, existing RoW and site constraints along the existing road, realignments/bypasses have been proposed at Shyampur (Km 9.375 to Km 10.587 of NH-74), Mandawali (km 39.230 to km 41.098 of NH-74), Najibabad (km 42.696 to km 54.151 of NH-74), Daultabad (Km 66.380 to Km 68.396 of NH-74), Kotwali (km 68.628 to km 71.052 of NH-74), Nagina (km 73.311 to km 79.933 of NH-74), Dhampur (km 92.233 to km 97.058 of NH-74), Afjalgarh (km 117.245 to km 120.492 of NH-74), Udhhowala (km 122.635 to km 126.406 of NH-74), Jaspur (km 135.409 to km 146.258 of NH-74) and Kashipur (km 149.459 to km 175.000 of NH-74).
- Geometric improvements of existing road section have been done at many locations to improve the alignment/radius of curvature of curves as per IRC norms as far as possible considering the site constraints.
- Provisions of service roads have been envisaged in built-up areas. Service/ Slip roads have been also proposed on bypasses and Realignment stretches for safety & control of access at location of Vehicular Underpass and any other locations depending on site conditions as required.
- At some built-up area locations service road has not been provided to avoid the acquisition of large number of road side structures. Only four - laning of existing road has been proposed.
- Three (03) numbers ROBs have been provided on the proposed alignment of the project road. One ROB is coming on Nazibabad Bypass, second on Nagina Bypass and third ROBs on Kashipur Bypass. On Kashipur Bypass **ROBs has been constructed as ROB cum Flyover** due to proximity of MDR at one location.
- One (1) four - lane Flyover has been provided over NH-119 on Najibabad Bypass.
- Eleven (11) Vehicular Underpass & Fifteen (15) Pedestrian/Cattle Underpass has been proposed on bypasses for safety and partial access control.
- In addition, traffic calming measures like Pedestrian Crosswalk, ZEBRA Crossing and Rumble Strip along with pedestrian crossing signs will be provided on existing road at the important intersection locations, locations of school, hospital, religious places and also at the settlement locations for safe passage of pedestrians.
- Two (2) pedestrian foot over bridge have been proposed at Bhaguwala (Existing km 33.405) and Sherkot (Existing Km 102.545).
- The other major facilities considered for improved functions of the corridor are:

  - **Three Toll Plazas** comprising 3+3 - lanes for normal vehicles and 2x1-lane to cater for over sized/ toll free vehicles complete with administrative offices have been proposed at **Existing Km 31.770 near Bhaguwala village, km 81.525 near**

Puraini village & km 147.343 near Jagatpurpatti village on NH-74 respectively. Provision has also been kept for adding additional lanes in future on either side as per guidelines of IRC: SP: 84-2009.

- **Truck lay-bye** at 6 (Six) locations on both sides at km 4.882, 34.100, 35.170, 54.698, 55.004 & 148.730 of NH-74 have been proposed to accommodate 15 to 20 trucks.

- At 70 places **Bus bays** with passenger shelter have been proposed. At each place bus bay will be placed for each traffic direction. As bus traffic is not significant, bus bays with provision of single bus parking is proposed.

0.09 Bypass/Realignment Proposals

Based on site visit, discussion with concerned agencies, study of Development Plan (as available), existing RoW (as per details provided by PWD NH Divisions Roorkee, Ghaziabad & Haldwani and existing ROW as per revenue village maps), available present land width between buildings/structures, RoW required for four - laning with/without service road, geometrics of existing road and associated problems of land acquisition, demolition of structures and utility shifting, it was considered necessary to provide realignment/ bypasses at **Shyampur**, **Mandawali, Najibabad, Daultabad, Kotwali, Nagina, Dhampur, Afjalgarh, Udhhowala, Jaspur and Kashipur.**

Based on Alignment Options Study of Realignments/Bypass Alternatives, the Consultant has recommended realignments/bypasses at Shyampur (Km 9.375 to Km 10.587 of NH-74), Mandawali (km 39.230 to km 41.098 of NH-74), Najibabad (km 42.696 to km 54.151 of NH-74), Daultabad (Km 66.380 to Km 68.396 of NH-74), Kotwali (km 68.628 to km 71.052 of NH-74), Nagina (km 73.311 to km 79.933 of NH-74), Dhampur (km 92.233 to km 97.058 of NH-74), Afjalgarh (km 117.245 to km 120.492 of NH-74), Udhhowala (km 122.635 to km 126.406 of NH-74), Jaspur (km 135.409 to km 146.258 of NH-74) and Kashipur (km 149.459 to km 175.000 of NH-74).

All the Bypasses/ Realignment shall be constructed as 4 lane divided road. The summary of preferred alternative of bypasses is detailed in **Table–0.02** below:

Table – 0.02: Summary of Recommended Bypass/Realignment

Bypass	Start Point		End Point		Length of Bypass (km)	Length on NH-74 (km)	Cost of Civil Works (Rs. millions)
	Place	Existing Chainage on NH-74	Place	Existing Chainage on NH-74			
Realignment at Shyampur	Shyampur	km 9+375 of NH-74	Shyampur	km 10+587 of NH-74	1.242	1.212	151.089

Bypass	Start Point		End Point		Length of Bypass (km)	Length on NH-74 (km)	Cost of Civil Works (Rs. millions)
	Place	Existing Chainage on NH-74	Place	Existing Chainage on NH-74			
Realignment at Mandawali	Meerampur	km 39+230 of NH-74	Mandawali	km 41+098 of NH-74	2.027	1.868	119.361
Najibabad Bypass	Rahatpur	km 42+696 of NH-74	Fajalpur	km 54+151 of NH-74	10.119	11.455	1552.877
Realignment at Daultabad	Daultabad	km 66+380 of NH-74	Ghosipur	km 68+396 of NH-74	2.369	2.016	140.668
Realignment at Kotwali	Ghosipur	km 68+628 of NH-74	Roshanpur	km 71+052 of NH-74	1.710	2.424	104.115
Nagina Bypass	Nagina	km 73+311 of NH-74	Aligarh	km 79+933 of NH-74	5.770	6.622	732.430
Dhampur Bypass	Rashulpur Amla	km 92+233 of NH-74	Dhampur	km 97+058 of NH-74	4.426	4.835	364.016
Realignment at Afjalgarh	Chauwala	km 117+245 of NH-74	Afzalgarh	km 120+492 of NH-74	2.383	3.247	136.809
Udhhowala Bypass	Zigariwala	km 122+635 of NH-74	Badhigarh	km 126+406 of NH-74	4.010	3.771	402.723
Jaspur Bypass	Kishanpura	km 135+409 of NH-74	Govindpur	km 146+258 of NH-74	11.283	10.849	817.178
Kashipur Bypass	Kunda	km 149+459 of NH-74	Jagannathpur	km 175+000 of NH-74	23.270	25.541	3003.493

0.10 Pavement Design

Flexible pavement has been proposed for the project road for a design period of 15 years and rigid pavement for a design period of 30 years. Bituminous course has been provided for a design period of 10 years and Granular Course has been provided for 15 years. The Granular Course provided is valid for a traffic loading up to 150 MSA & CBR value of 7% (refer IRC:37-2001) and design period of 30 years for rigid pavement. Concrete pavement has been proposed at Toll Plaza locations for a central length of 100 m.

Preliminary pavement design based on investigations carried out and following the guidelines of IRC and other standards (for the case where IRC guidelines/standards are not available for the desired solution/design) has yielded the following tentative proposals:

a) New Flexible Pavement for Main carriageway

Pavement Composition for new carriageway, widening of existing carriageway, Paved Shoulder and Bus Bay have been proposed as given in the **Table-0.03** below.

Table – 0.03: Pavement Composition of New Flexible Pavement and Paved Shoulder

Traffic Homogenous Section	Pavement Composition (As Per IRC: 37-2001)				
	BC (mm)	DBM (mm)	WMM (mm)	GSB (mm)	Total Thickness (mm)
Haridwar to Mandawali	40	115	250	230	635
Mandawali to Najibabad	40	115	250	230	635
Najibabad to Dhampur	40	125	250	230	645
Dhampur to Afjalgarh	40	125	250	230	645
Afjalgarh to Kashipur (End of Project Road)	40	120	250	230	640

b) New Flexible Pavement for Service Road

Service road will be provided on either side of the main carriageway in urban & semi-urban areas and also in some rural area depending on site conditions. These will be of 2-lane lane width of 7.0 m or 5.5 m (as applicable) and will be used by local traffic. As per Para 5.5.5 of IRC: SP: 84-2009, the new flexible pavement of service road has been designed for design traffic of 5 MESA.

Adopted value of pavement compositions of service/slip road for the enire stretch of the project road is as follows:

SDBC = 25 mm
DBM = 50 mm
WMM = 250 mm
GSB = 180 mm

c) Strengthening Overlay on Existing Pavement

Strengthening with overlay on existing pavement has been designed using the guidelines of IRC: 81. The kilometre wise overlay thickness has been grouped in to various homogenous section based on thickness of DBM. In overlay the thickness of BC has been provided as 40 mm and the thickness of DBM varies from 50 – 125 mm. For details refer Chapter-7 of Volume-II: Design Report (Part-1: Road).

d) Design of Pavement for Reconstruction Stretch

For the reconstruction stretch, the composition of the pavement shall be the same as recommended for widening of existing carriageway at the corresponding locations.

e) Rigid Pavement

Rigid pavement is proposed at Toll Plaza location for central 100 m length. For design, IRC: 58-2011, Guidelines for the Design of Plain Jointed Rigid Pavements for Highways, have been followed.

New rigid pavement compositions considered are as follows:

240 mm : PQC of Grade M-40

150 mm : DLC of Grade M-10

150 mm : Subbase

500 mm : Subgrade

f) Earthen Shoulder

Earthen shoulders shall be constructed of selected soil.

Subgrade and minimum 200 mm of Sub base will be continued for the full width of formation for effective drainage consideration and the rest will be made up with selected earth.

0.11 Bridges & Structures

This report has considered the reconstruction and improvements necessary to rehabilitate and extend the life of existing bridges and CD structures.

Bridges

There are seventeen (17) major bridge and twenty eight (28) minor bridges on the existing alignment of project road.

On the proposed alignment of the project road there are Seventeen (17) major bridges and Thirty four (34) minor bridges and following improvement proposal is given:

(i) Structures falling under existing NH-74 section are as follows,

- Re-construction of 2 lane existing bridges into 4 lanes : 01 no.
- Additional 2 lane New-construction parallel to existing bridges : 22 nos.
- 4 lane New-construction : 01 no.
- Widening of Existing Bridge : 02 nos.

(ii) Structures falling under new alignment/bypass are listed below.

- Additional 4 lane New-construction on Bypass Section : 25 nos.

Culverts

There are 272 nos. of CD structures on the existing alignment of project road.

Due to realignment / bypasses, the total no. of CD structures on the proposed alignment of the project road has increased to 341. Following improvement proposal as mentioned in

Table-0.04 is proposed for widening, reconstruction and rehabilitation of the existing CD structures on the recommended alignment.

Table- 0.04: Improvement Proposal for Existing CD Structures

Proposed Action	Recons as Slab	Recons+ Add. 2lane as slab	Recons as Pipe	Recons + Add. 2lane as Pipe	Cleaning / Repairing / Widening of Exist + New add. 2 lane	4Lane new Balanced	New on Bypass	Total Nos. of 4-lane Culverts
Existing Type	(Nos.)	(Nos.)	(Nos.)	(Nos.)	(Nos.)	(Nos.)	(Nos.)	
Slab	31	15	-	-	6	1	45	**98**
Pipe	0	-	43	6	2	84	63	**198**
Arch	20	-	-	-	-	-	-	**20**
Box	1	-	-	-	-	-	23	**24**
Arch/Pipe	-	-	1	-	-	-	-	**1**
Total	**52**	**15**	**44**	**6**	**8**	**85**	**131**	**341**

Out of the above culvert list total no. of both 2-lane and 4-lane culverts are 341 (216 new culverts +125 existing)

ROB

There are four (04) Level crossings and no ROB on the existing alignment of project road.

On the proposed alignment, three (03) ROBs are proposed.

Flyover

There is no flyover on the existing alignment of project road.

On the proposed alignment, one (01) flyover (Najibabad bypass) is proposed.

Underpass

There is one (01) Underpass on the existing alignment of project road.

On the proposed alignment, additional 2-lane underpass is proposed at Sherkot due to widening of the existing 2-lane road to 4-lane configuration.

Vehicular Under Pass (VUP) & Cattle/Pedestrian under Pass (CUP/PUP)

There is no VUP or PUP on the existing alignment of project road.

On the proposed alignment, Eleven (11) VUPs and fifteen (15) CUPs/PUPs are proposed.

Foot Over Bridge (FOB)

There is no foot over bridge on the existing alignment of project road.

On the proposed alignment, two (02) Foot over Bridges are proposed at Bhaguwala and Sherkot.

0.12 Socio-economic Profile

Large populace of the project area is dependent on agriculture and a small section deals in trade and commercial entrepreneurship. Instant 4 – laning of the road with paved shoulder will bring about positive social changes by way of reduced travel time, increased access to markets and basic social services, generating employment from road construction / maintenance work and from enhanced business opportunities, increasing educational opportunities and health care services leading to overall development of the region at large and the project area in particular.

Socio-economic profile of state of Uttarakhand & Uttar Pradesh and the relative status of the project influence area within the state has been reviewed. Traces has been given on population density, the work force, distribution of work force, the changes in sectoral distribution of workers, growth of enterprises, status of non-agricultural workers, distribution of important units, condition of cultivators, condition of household workers, condition of non-workers, condition of manufacturing industry and the related social problems, such as poverty eradication, Gender issue, etc., of the different region of Uttarakhand & Uttar Pradesh and other economic variables of the states and the PIA districts (Haridwar, Bijnor, Rampur & Udham Singh Nagar).

The profile discusses the past performance and the present scenario and also a broad assessment of the perspective growth of the economy and social development of state and PIA Districts (Haridwar, Bijnor, Rampur & Udham Singh Nagar), as basis for estimating the future growth in transport demand. The influence area of the project road, for the purpose of present study, is defined at the state level. Appropriate major economic characteristics are reviewed for the district as well. The output of socio-economic study is the economic growth prospects of the PIA with respect to certain selected economic variables and serves as the basis for arriving at a realistic traffic growth rate for different vehicle categories. Secondary data available from the different departments of the State Government have been collected and analyzed for preparation of socio-economic profile.

0.13 Environmental & Social Studies

Environmental Studies

The project road passes through mainly plain terrain with only a small stretch in hilly/rolling terrain and the proposed alignment does not pass through any ecologically sensitive area and no endangered or rare plant species are reported in the vicinity of the project RoW.

Based on the EIA study and surveys conducted for the Project, it can be safely concluded that associated potential adverse environmental impacts can be mitigated to an acceptable level by adequate implementation of the measures as stated in the EIA Report. Adequate provisions will be made in the Project to cover the environmental mitigation and monitoring requirements, and their associated costs as suggested in environmental budget. The proposed project will improve road efficiency and environmental sustainability.

Social Studies

As a part of the project development process, concerted effort has been made to minimize the adverse social impact by integrating the social concerns in design and planning of the up-gradation proposals. There will be direct impact on Project Affected Households. Project Affected Persons (PAPs) generated due to acquisition of land and property particularly in the semi-urban & urban settlements. The major settlements at Mandawali, Najibabad, Daultabad, Kotwali, Nagina, Dhampur, Afjalgarh, Udhhowala, Jaspur and Kashipur, where there will be severe R&R and Land Acquisition problems are proposed to be bypassed to reduce the social impact.

The resettlement and rehabilitation action plan has been formulated based on the Government of India policy guidelines to compensate & rehabilitate the Project Affected Persons (PAPs).

Several new infrastructures will come up along the existing road, as is the trend for all 4-lane projects. With such development on this project road, there will be more employment and revenue generation.

0.14 Cost Estimate

The process of cost estimation involved the following steps:

- Rate analysis and reviewing unit rates of various construction items.
- Estimation of quantities of cut and fill and other road components based on preliminary design
- Estimation of quantities of bridges, structures and CD structures items.
- Estimation of cost due to utility relocation, environmental mitigation costs, and land acquisition, resettlement and rehabilitation costs.
- Assessed Routine and Periodic Maintenance cost.

The preliminary cost estimates for strengthening and widening of the existing road to 4-lane carriageway with paved shoulders configuration to meet the desired objectives of the project have been worked out.

A provision for Inflation @ 5% of civil work cost from base year 2012 up to the start of construction, Contingencies / QC @ 1% of civil work cost, IC & Pre-operative expenses @ 1% of EPC, Cost Escalation @ 5% per annum of EPC (Civil construction cost + contingencies), Interest During Construction @ 11.75% on Debt, Financing Charges @ 1 % of Debt, have been considered in the preliminary estimate to arrive at the total project cost.

Cost of Civil Works, EPC Cost (i.e. cost of civil works+ Inflation +Contingencies/QC) and Total Project Cost (i.e. EPC cost + IC and pre-Operated expenses + Escalation of EPC cost + Interest during construction on debt + Financing Charges) for the proposed alignment have been presented below.

Length of Recommended Alignment (km)	Cost of Civil Works (Rs. Millions)		EPC Cost (Rs. Millions)		Total Project Cost (Rs. Millions)	
	Total Cost	Per km Cost	Total Cost	Per km Cost	Total Cost	Per km Cost
170.432	15320.362	89.891	17509.606	100.096	19536.732	114.630

The construction cost of the project is marginally on the higher side as a result of

a) Reconstruction/new construction of Bridges, ROBs, Underpasses & Flyovers

b) Scarification & Strengthening, Raising & Reconstruction of existing road

c) Realignment/Bypasses of around 68.609 km.

0.15 Construction Time Period

It is estimated that construction will take a period of **30 months** to complete. The implementation of this project is planned for commencement in the begining of 2014 and completion by mid of 2016.

0.16 Economic Analysis

The economic analysis has been carried out within the broad frame with the cost benefit technique. It involved comparison of costs and benefits under both the “with” and “without” project conditions and determination of Economic Internal Rate of Return (EIRR) of the project using discounted cash flow method. The EIRR was then compared with the acceptable rate of return of 12 percent.

The annual cost and benefit streams are used to derive the net cash flow for the project. The EIRR and NPV of the net benefit stream @ 12% discount rate were determined using the discounted cash-flow technique for the project road sections. The results of economic analysis are given in **Table-0.05** below:

Table – 0.05 : Results of Economic Analysis

Project Road Section	EIRR (%)	NPV @ 12% (Rs. million)
Haridwar - Mandawali	19.20	3123.123
Mandawali - Najibabad	22.50	2450.493
Najibabad - Dhampur	25.77	4242.8132
Dhampur - Afzalgarh	27.86	3885.846
Afzalgarh - Kashipur	18.92	4780.905

Project Road Section	EIRR (%)	NPV @ 12% (Rs. million)
Project Road	**21.67**	**3696.637**

The entire project road is found to be economically viable as the EIRRs are above the minimum 12% even in the worst scenario. Since the project road is economically viable in sections as well as in totality, implementation could be done in separate packages or a single package for the whole project.

0.17 Financial Analysis

For execution of the project road on BOT basis, the financial viability of the project road has been examined as per Growth rate provided in the "New Model Concession Agreement (MCA) for Public Private Partnership in National Highways, published by planning commission in September 2006".

The project is found viable with 35.7% VGF for concession period of 25 years.

The results of financial analysis are given in **Table - 0.06** below:

Table – 0.06: Financial Viability under BOT

Indicator	Concession Period
	25 Years
Grant as % of TPC	35.7
Pre-Tax Proj. IRR (%)	14.12
Post-Tax Proj. IRR (%)	12.97
Equity IRR (%)	15.02
Net Present Value (NPV) Rupees in millions	5167.77

0.18 Conclusions and Recommendations

The following conclusions have emerged:

a) Based on traffic volume count survey and traffic capacity analysis following improvement measures are required in terms of capacity augmentation of road.

- Four - lane divided road with paved shoulders and service roads (as applicable) is required for the entire length of project road.

- Realignments/bypasses are required at Shyampur, Mandawali, Najibabad, Daultabad, Kotwali, Nagina, Dhampur, Afjalgarh, Udhhowala, Jaspur and Kashipur.

b) Project road is economically viable in sections as well as in totality; implementation could be done in separate packages or a single package for the whole project.

c) The project is commercially viable with 35.7% VGF for concession period of 25 years.

The Consultant makes the following recommendations based on their conclusions indicated above:

1. Existing 2-lane road with/without paved shoulder is proposed for immediate widening to 4-lane divided carriageways with paved shoulders configuration for Haridwar – Kashipur section of NH-74.

2. Realignments/bypasses are proposed at Shyampur, Mandawali, Najibabad, Daultabad, Kotwali, Nagina, Dhampur, Afjalgarh, Udhhowala, Jaspur and Kashipur.

3. The project is economically viable as a whole, and also for all the sections. Hence it is recommended for implementation.

4. **The project may be taken up on BOT (Toll) basis, as well as per the findings of financial analysis.**

ABSTRACT OF TREES TO BE FELLED

Appendix – I

Administrative/Financial Approval of the project

Appendix – K

SITE INSPECTION REPORT NOT BELOW THE RANK OF DCF

(For the forest land to be diverted under FCA)

A proposal has been received by this office from **National Highways Authority of India (NHAI)**, **Dehradun** for diversion under FCA-1980) of **88.982 Ha. Forest land (RF land 0.00Ha. and PF land 88.982Ha.)** of forest land for non-forestry purpose. The Project envisages the use of forest land for **Widening and Strengthing of Haridwar -Nagina & Kashipur section of NH-74 (KM 30.00 to 132.000).** The site inspection of the land involved in the proposal has done by me on dated.

On inspection of the site, it is found that the land required by the user agency is forest land measuring: **88.982 Ha. Forest land (RF land 0.000 Ha. and PF land 88.982 Ha.)**
Weather any rare/ endangered / unique species of flora and fauna found in the area. If, so the details there of.- **No**

Weather any protected archaeological / heritage site / defense establishment or any other important monuments is located in the area, if, so the details there of with NOC from competent authority, if required.- **No**

a) The user agency has not violated the provisions of forest (Conversation), Act 1980 and no work has been started without proper sanction.
b) It has been found that the user agency has violated the forest (Conversation), Act, 1980 provisions. A detail report as per para 1.9 of chapter 1, para C of Handbook of forest (Conversation) Act, 1980 is attached.
c) Specific recommendation for acceptance or otherwise of the proposal.

Project is recommended for acceptance.

(Signature)
Place:-..... Name.....
Date..... Designation.....

Office Seal

N.B. x state the purpose for which the forest land is proposed to be diverted.
Xx put of (a) and (b) tick the option which is applicable and cross the option which is not applicable.

As per letter number 2-2-2000 FC dated 16-10-2000 from Ministry of Environment & Forest, Government of India for proposal involving less than 40 hectares of forest land, the site inspection report from DCF is required and for proposal involving more than 40 hectares of forest land site inspection report from the conservation of forest is required.

APPENDIX –K

Proposal for the diversion of 88.982 Ha. Forest land (RF land 0.000 Ha. and PF land 88.982 Ha.) in Bijnor District (KM 30.00 to KM 132.000 of NH-74) for Widening and Strengthening of Haridwar – Nagina &Kashipur section of National Highway -74 (KM 0.00 to KM 175.000) in the state of Uttar Pradesh and Uttarakhand

JOINT INSPECTION REPORT

It is certified that on joint inspection of forest land proposed to be acquired astride National Highway -74 for Widening and Strengthening of Haridwar – Nagina &Kashipur section of National Highway -74 (KM 30.00 to KM 132 .000) in the state of Uttar Pradesh was carried out jointly by the representatives of National Highway Authority of India (Ministry of Road Transport & Highways) and DFO-Bijnor . During the joint inspection it was revealed that there is no other land available for the said purpose other than proposed and the requirement of forest land is barest minimum.

Signature

Divisional Forest Officer
Bijnor Division,
Bijnor Dist

Signature

Project Director
National Highways authority of India
PIU- Dehradun.

Appendix - L

Proposal for the diversion of 88.982 Ha. Forest land (RF land 0.000 Ha. and PF land 88.982 Ha.) in Bijnor District (KM 30.00 to KM 132.000 of NH-74) for Widening and Strengthening of Haridwar – Nagina &Kashipur section of National Highway -74 (KM 0.00 to KM 175.000) in the state of Uttar Pradesh and Uttarakhand

मानक शर्तें

Appendix - M

Proposal for the diversion of 88.982 Ha. Forest land (RF land 0.000 Ha. and PF land 88.982 Ha.) in Bijnor District (KM 30.00 to KM 132.000 of NH-74) for Widening and Strengthening of Haridwar – Nagina &Kashipur section of National Highway -74 (KM 0.00 to KM 175.000) in the state of Uttar Pradesh and Uttarakhand

भूमि स्वामित्व सम्बन्धी प्रमाण पत्र

प्रमाणित किया जाता है कि प्रभावित संरक्षित वन भूमि रा0रा0 74 के किमी0 **30.00** से किमी **132.00** राजमार्ग की पटरी है अतः इस भूमि का स्वमित्व सड़क परिवहन एवं राजमार्ग मंत्रालय, भारत सरकार, नई दिल्ली का है।

दिनांक .....
स्थान – देहरादून

महाप्रबंधक सह परियोजना निदेशक
भरतीय राष्ट्रीय राजमार्ग प्राधिकरण
देहरादून

Appendix – N

Proposal for the diversion of 88.982 Ha. Forest land (RF land 0.000 Ha. and PF land 88.982 Ha.) in Bijnor District (KM 30.00 to KM 132.000 of NH-74) for Widening and Strengthening of Haridwar – Nagina &Kashipur section of National Highway -74 (KM 0.00 to KM 175.000) in the state of Uttar Pradesh and Uttarakhand

CERTIFICATE REGARDING NON AVAILABILITY OF ALTERNATIVE LAND

It is certified that no alternative land is available for the proposed diversion of land by the National Highway Authority of India (Ministry of Road Transport & Highways) for the Widening and Strengthening of Haridwar – Nagina & Kashipur section of National Highway -74 (KM 30.00 to KM 132.000) and the requirement is barest minimum.

Authorized Signatory

Signature

Divisional Forest officer,
Bijnor

Project Director
NHAI-PIU, Dehradun

District Magistrate
Bijnor

Appendix - O

Proposal for the diversion of 88.982 Ha. Forest land (RF land 0.000 Ha. and PF land 88.982 Ha.) in Bijnor District (KM 30.00 to KM 132.000 of NH-74) for Widening and Strengthening of Haridwar – Nagina &Kashipur section of National Highway -74 (KM 0.00 to KM 175.000) in the state of Uttar Pradesh and Uttarakhand

CERTIFICATE REGARDING ENVIRONMENTAL CLEARANCE

It is certified that Environmental Clearance is under process for the proposed diversion of land by the National Highway Authority of India (Ministry of Road Transport & Highways) for the Widening and Strengthening of Haridwar – Nagina &Kashipur section of National Highway -74 (KM 30.00 to KM 132.000) and the requirement is barest minimum.

Note: TOR by MoEF has been approved (Copy enclosed)

Authorized Signatory

Signature

Divisional Forest officer,
Bijnor

Project Director
NHAI-PIU, Dehradun

Appendix - P

Proposal for the diversion of 88.982 Ha. Forest land (RF land 0.000 Ha. and PF land 88.982 Ha.) in Bijnor District (KM 30.00 to KM 132.000 of NH-74) for Widening and Strengthening of Haridwar – Nagina &Kashipur section of National Highway -74 (KM 0.00 to KM 175.000) in the state of Uttar Pradesh and Uttarakhand

वचनबद्धता प्रमाण पत्र

प्रमाणित किया जाता है कि प्रतिपूरक वनीकरण करने तथा उसके अनुरक्षण के लिए वन विभाग द्वारा तैयार की गई योजना के अनुसार प्रतिपूरक वृक्षारोपण की धनराशि वन विभाग को देने की वचनबद्धता दी जाती है।

सधन्यवाद

दिनांक .....
स्थान – देहरादून

परियोजना निदेशक
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
देहरादून

Appendix - Q

Proposal for the diversion of 88.982 Ha. Forest land (RF land 0.000 Ha. and PF land 88.982 Ha.) in Bijnor District (KM 30.00 to KM 132.000 of NH-74) for Widening and Strengthening of Haridwar – Nagina &Kashipur section of National Highway -74 (KM 0.00 to KM 175.000) in the state of Uttar Pradesh and Uttarakhand

एन.पी.वी. की धनराशि निर्धारण का प्रमाण पत्र

प्रमाणित किया जाता है कि राष्ट्रीय राजमार्ग संख्या 74 के चौड़ीकरण के निर्माण के लिये आधिगृहीत की जा रही आरक्षित वन भूमि के वर्तमान शुद्व मूल्य **(एन.पी.वी.)**, का भुगतान प्राधिकरण द्वारा माननीय सर्वोच्च न्यायालय के निर्देशानुसार किया जायेगा। तथा यदि माननीय सर्वोच्च न्यायालय द्वारा इसमें कोई वृद्धि की जाती है तो उसका भुगतान भी प्राधिकरण द्वारा किया जायेगा।

दिनांक .....
स्थान – देहरादून

परियोजना निदेशक
भारतीय राष्ट्रीय राजमार्ग प्राधिकरण
देहरादून

Appendix - R

Proposal for the diversion of 88.982 Ha. Forest land (RF land 0.000 Ha. and PF land 88.982 Ha.) in Bijnor District (KM 30.00 to KM 132.000 of NH-74) for Widening and Strengthening of Haridwar – Nagina &Kashipur section of National Highway -74 (KM 0.00 to KM 175.000) in the state of Uttar Pradesh and Uttarakhand

UNDERTAKING TO MINIMIZE THE FELLING OF TREES

In the proposal numbers of trees have been proposed for felling. We hereby undertake that during construction we shall further try to minimize the felling of trees.

Project Director
National Highways Authority of India
PIU Dehradun

Date:

Place: Dehradun

Appendix - S

Proposal for the diversion of 88.982 Ha. Forest land (RF land 0.000 Ha. and PF land 88.982 Ha.) in Bijnor District (KM 30.00 to KM 132.000 of NH-74) for Widening and Strengthening of Haridwar – Nagina &Kashipur section of National Highway -74 (KM 0.00 to KM 175.000) in the state of Uttar Pradesh and Uttarakhand

टास्क फोर्स सर्टिफिकेट

प्रमाणित किया जाता है कि जनपद बिजनौर के किमी0 **30.00** से लेकर किमी0 **132.00** तक (राष्ट्रीय राजमार्ग सं0 **74**) मोटर मार्ग के चौड़ीकरण के निर्माण हेतू योजना के टास्क फोर्स के सभी नियमों का पालन याचक विभाग को मान्य है।

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Appendix – T

Proposal for the diversion of 88.982 Ha. Forest land (RF land 0.000 Ha. and PF land 88.982 Ha.) in Bijnor District (KM 30.00 to KM 132.000 of NH-74) for Widening and Strengthening of Haridwar – Nagina &Kashipur section of National Highway -74 (KM 0.00 to KM 175.000) in the state of Uttar Pradesh and Uttarakhand

वचनबद्धता प्रमाण पत्र

प्रमाणित किया जाता है कि परियोजना निर्माण के समय जो मलबा आदि (Solid Waste) एकत्र होगा उसका परियोजना निर्माण में समुचित उपयोग/निस्तारण कर लिया जायेगा।

सधन्यवाद

दिनांक .....
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परियोजना निदेशक
भरतीय राष्ट्रीय राजमार्ग प्राधिकरण
देहरादून

Appendix - U

Proposal for the diversion of 88.982 Ha. Forest land (RF land 0.000 Ha. and PF land 88.982 Ha.) in Bijnor District (KM 30.00 to KM 132.000 of NH-74) for Widening and Strengthening of Haridwar – Nagina &Kashipur section of National Highway -74 (KM 0.00 to KM 175.000) in the state of Uttar Pradesh and Uttarakhand

वचनबद्धता प्रमाण पत्र

प्रमाणित किया जाता है कि निकटवर्ती वनों पर जैविक दबाव को कम करने के उद्देश्य से परियोजना निर्माण में कार्यरत मजदूरों/स्टाफ को रसोई गैस/कैरोसीन तेल की आपूर्ति की जायेगी।

सधन्यवाद

दिनांक .....
स्थान – देहरादून

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भरतीय राष्ट्रीय राजमार्ग प्राधिकरण
देहरादून

Appendix – V

Proposal for the diversion of 88.982 Ha. Forest land (RF land 0.000 Ha. and PF land 88.982 Ha.) in Bijnor District (KM 30.00 to KM 132.000 of NH-74) for Widening and Strengthening of Haridwar – Nagina &Kashipur section of National Highway -74 (KM 0.00 to KM 175.000) in the state of Uttar Pradesh and Uttarakhand

CERTIFICATE OF NON-STATRT OF WORK AT SITE

This is to certify that no has work has been started at the project site and the provisions of the Forest (Conservation) Act 1980 are not violated.

Date: Signature

Place: Dehradun

Project Director
National Highways authority of India
PIU - Dehradun.

Appendix – W

Proposal for the diversion of 88.982 Ha. Forest land (RF land 0.000 Ha. and PF land 88.982 Ha.) in Bijnor District (KM 30.00 to KM 132.000 of NH-74) for Widening and Strengthening of Haridwar – Nagina &Kashipur section of National Highway -74 (KM 0.00 to KM 175.000) in the state of Uttar Pradesh and Uttarakhand

CERTIFICATE OF NON-EXISTANCE OF PROTECTED AREAS WITHIN 10 KM RADIUS FROM THE BOUNDARY OF AREA PROPOSED FOR DIVERTION

This is to certify that the project Widening and Strengthening of Haridwar – Nagina & Kashipur section of National Highway -74 (KM 30.00 to KM 132.000) in Bijnor District in the state of Uttarpradesh does not affect any Protected areas within 10 K.M. .radius from the proposed project boundary.

Date:
Place: Dehradun

Divisional Forest Officer,
Bijnor

Project Director
NHAI-PIU, Dehradun

District Magistrate
Bijnor Dist

Appendix - X

EXECUTIVE SUMMARY OF EIA

CHAPTER - 11

SUMMARY & CONCLUSIONS

11.1 PROJECT BACKGROUND

Road network is vital to the economic development, trade and social integration. It facilitates smooth conveyance of both people and goods. Due to India's steady growth rate (over 8%) during past few years, transport demand in India has been growing rapidly. In recent years this demand has shifted mainly to the advantage of road transport since it provides easy accessibility, flexibility of operations, door-to-door service and reliability.

NHAI has been entrusted to implement the development, maintenance and management of National Highways of the country under **NHDP** in phases for rehabilitation and upgrading of National Highways to 2-lane with paved shoulder standards at least by MoRTH, GOI. Accordingly, NHAI has taken up the project **"Widening & improvement of existing 2 lane to 4 laning of Haridwar to Kashipur section of NH74 in the States of Uttar Pradesh and Uttarakhand".** NHAI has appointed M/s. SAI Consulting Engineers as project consultants to assist NHAI in all aspects of project preparation for implementation in accordance with the objectives as detailed in its Terms of Reference. Consequence upon the application by NHAI for prior EC to the project, MoEF has issued ToR vide letter dated---March 6,2012--- to conduct EIA study as envisaged in September 14, 2006 EIA notification.

THE PROJECT ROAD & AREA

This section of project road is situated partially in Haridwar & Udham Singh Nagar districts of Uttarakhand and partially in Bijnor district of UP. The stretch of road from km 0.000 to km 30.000 and km 132.000 to km 175.000 of NH-74 lies in Haridwar & Udham Singh Nagar districts of Uttarakhand respectively. The remaining stretch of NH-74 from km 30.000 to km 132.000 lies in Bijnor district of UP. Haridwar is located at 29°58' N and 78°09' E, Najibabad is located at 29°40'N and 78°20'E and the Kashipur is located at 29°15' N and 79°00' E.

PROPOSED IMPROVEMENTS

The existing project highway is presently a 2-Lane undivided carriage. The project proposes to:

- Developing the carriageway into 4 lane divided carriageway by overlays / rehabilitation / reconstruction.
- In addition to strengthening the existing carriageway, the project would improve the

  geometric deficiencies through curve improvements and the improvement of the various intersections.
- The proposed improvement includes repair / rehabilitation of existing cross-drainage (CD) structures.
- Structures on the highway and provision of new CD structures.
- The project highway passes through many settlements.

- To minimise the adverse impacts on the various settlements and to minimize land acquisition, short realignments at two locations are proposed. The proposed ROW shall be limited to 25/40/60/80m. It is also proposed to have concentric widening to the extent possible to remove discrimination and local conflicts.
- Service roads are also proposed to be provided at a number of locations. These locations were proposed based on the proximity to cultural properties, educational and health units, and size of Settlements.
- Proper drainage, grade-separation, road furniture, utilities and amenities wherever required shall also be provided.

11.2 ENVIRONMENTAL IMPACT ASSESSMENT (EIA) STUDY IN THE PROJECT

The Environmental Impact Assessment study of the project road has been carried out as per terms of reference given by MoEF,GOI.

The study methodology for EIA employs a simplistic approach in which the important environmental receptors were identified. Based on the identification baseline data was generated and then analyzed to predict the impacts and quantify them. Avoidance, Mitigation and Enhancement measures were then developed and these have been incorporated in the Environmental Management Plan (EMP), designs and / or Bills of Quantities as appropriate. Implementation arrangements including responsibilities of all facets have been streamlined and documented for guidance and implementation.

11.3 POLICY, LEGAL AND ADMINISTRATIVE FRAMEWORK

11.3.1 Institutional Setting

The project has been initiated by the GOVT of Uttar Pradesh and GOVT of Uttarakhand and is being carried out by the NHAI. The primary responsibility of the project rests with the NHAI in providing encumbrance free ROW to the contractor, who shall implement the project.

11.3.2 Clearances

As part of the project preparations, NHAI shall seek forest diversion for 73.735 ha and tree felling permission from the respective Divisional Forest Officer, who is the designated officer under the WALTA act by GOVT of Uttar Pradesh and GOVT of Uttarakhand. The application for Forest diversion has also been processed and submitted to the Nodal Officer in the Forest Department.

As additional right of way requirement for improvement of the project road is less than 10-15m, this project come under the purview of the MoEF Notification (Sept 2006). The assessment of the additional right of way has been made considering the average additional land width requirement over the length of the corridor.

The contractor shall seek the following clearances, NOCs & licenses from the authorities prior to his work initiation:

- NOC And Consents Under Air , Water, EP Acts & Noise rules of SPCB for establishing and operating plants from SPCB
- NOC under Hazardous Waste (Management and Handling) Rules, 1989 from SPCB

- PUC certificate for use of vehicles for construction from Department of Transport
- Quarry lease deeds and license and Explosive license from Dept. of Geology and Mines & Chief controller of explosives
- NOC for water extraction for construction and allied works from Ground Water Authority Apart from the above clearances, the contractor also has to comply with the following:
- Clearance of Engineer for location and layout of Worker's Camp, Equipment yard and Storage yard.
- Clearance of Engineer for Traffic Management Plan for each section of the route after it has been handed over for construction.
- An Emergency Action Plan should be prepared by the contractor and approved by the Engineer for accidents responding to involving fuel & lubricants before the construction starts.
- Submit a Quarry Management Plan to the Engineer along with the Quarry lease deeds

11.4 BASELINE ENVIRONMENTAL PROFILE

11.4.1 Physical Environment

Meteorology

The study of Meteorological and micro meteorological parameters is significant in a road project as these parameters regulate transport and diffusion of pollutants released into the atmosphere.

Climate

Seasons

The project area experiences typical Mountain climate. The moderating effects of the nearby mountains and the fairly high amount of relative humidity in the atmosphere have restricted the variability.

Haridwar

Due to its location away from any major water body and its close proximity to the Himalayas, Haridwar has an extreme and erratic continental climate. Summers start in late March and go on up till early July, with average temperatures around 29^{o}C. The monsoon season starts in July and goes on up till October, with torrential rainfall, due to the blocking of the monsoon clouds by the Himalayas. The post monsoon season starts in October and goes on up till late November, with average temperatures sliding from 24^{o}C to 13^{o}C. Winters start in December, with lows close to freezing and frequent cold waves due to the cold katabatic winds blowing from the Himalayas. The total annual rainfall is about 2400 mm.

Kashipur

This region experiences a tropical to sub tropical climate. The mean monthly temperature in summer is 43^{0}c, while that in winter is 22^{0}c and the total annual precipitation is about 210 cms.

Temperature

Seasonal variations in temperature follow closely the course of the Sun. The month of January is invariably the coldest and May the warmest month. With the onset of monsoon in early June, there is a reversal of temperature curve and the temperature during the period of monsoon remains very uniform at about 25ºC. During post- monsoon season, the temperature slightly increases above 25ºC, but gradually falls by the start of January. On an average, the temperature during summer months varies from 25ºC to 44ºC, while in winter it ranges from 6ºC to 24ºC.

Relative Humidity

The Relative Humidity ranges between 70% and 90% in the monsoon period. Between November and January i.e. during winter months, the relative humidity varies from 64% to 83%. The relative humidity generally is higher than 49% throughout the year.

Rainfall

Monsoon generally sets in around the second week of June and continues till late September. July and September are the wettest month all over the region. There is hardly a day without rain during these three months. Towards the later part of the season, as the frequency of rain decreases, the project area experiences oppressive hot weather associated with high relative humidity. It receives the maximum rainfall during southwest monsoon season. After this North-east monsoon starts. The average rainfall received ranges from 1500 mm to 2100 mm in a year. About 76 to 85 % of the rainfall is through monsoons.

Seismicity

India has most tectonically active as well as most stable landmasses. India is divided into 5 zones according to the probability of the earthquake occurrence. Zone 1 is the least active and zone 5 is the most active zone. The project area falls in zone IV of seismic zone, in accordance with seismic zoning map. as per the India Meteorological Department (IMD), would be adequate and considered for design purpose for Civil Engineering structures and while finishing civil designs.

Air Quality

The air quality in the project area is generally pristine. The PM10, PM2.5 levels were found well within the prescribed standards of CPCB. The gaseous concentration such as SO2, NOX & CO was also within CPCB prescribed limits.

Noise Quality

It has been observed that noise levels exceed prescribed limits of CPCB in major locations, as normally observed in other State highways. The noise levels are below the stipulatory standards near rural and forest sections.

Water Hydrology and Drainage

To facilitate the cross-drainage at water crossings, cross-drainage structures are proposed. The water quality of the surface water bodies like Ganga River and amgangaen canal, when tested, indicates no biological contamination, making water from these sources suitable for drinking & bathing.

11.4.2 Biological Environment

Forest Resources

The proposed ROW is passing through the patches of Protected Forest different patches all along the 3 districts and Reserve forest (km 3025.000 to km 318.400 on left,Right and on both sides) in Shayampur RF, In Chidyanpur RF(km 19.200 to km 30.300 on on left,Right and on both sides) & Rampur RF(km 30.000 to km 130.900 on on left,Right and on both sides and 142.400 to 143.000) There is no endangered flora and fauna found in these Protected Forests and RF**.** Even at 10 m buffer on either side of the ROW the forest trees are found to be very less and there is no endangered species of animals are found.

Trees within ROW

Tree survey is being carried out along the proposed alignment. Most of the trees were planted along the roads in the past. From the environmental point of view there exists numbers of big trees on either side of the Existing Road. There are as many as 68791 trees in revenue & private land that are likely to be impacted.

Fauna

Domesticated animals mainly constitute the faunal population within the project area. Wild animals are not reported in the project vicinity. No endangered species of flora and fauna are found in the project area.

11.4.3 Social Environment

Settlement

There exist settlements varying in size and populations along the project corridor.

Cultural Properties

The project highway traverses through a number of settlements and there are some religious and cultural properties which though not of archaeological significance are nevertheless, significant to the community.

Census Profile

Uttar pradesh

According to the 2001 census of India, The total population of the State according to the 2001 Census, is 16, 61, 97,921 crores of this, 79.21 percent of the people live in rural areas and 20.78 percent live in urban areas. The State has a high density of population, about 689 persons per square kilometre. The sex ratio for the State is 898 females per 1,000 males. In rural Uttar Pradesh, however, there are more women than urban, and the ratio is 904 women per 1,000 men, while in urban Uttar Pradesh the ratio is 876 women.

Uttarakhand

The total population of the State according to the 2001 Census, is 84.89 lacs of this, 80 percent of the people live in rural areas and 20 percent live in urban areas. The State has a low density of

population, about 151 persons per square kilometre. The sex ratio for the State is 962 females per 1,000 males. In rural Uttarakhand, however, there are more women than men, and the ratio is 1,007 women per 1,000 men, while in urban Uttarakhand the ratio is 845 women

Public Consultation

Public consultations were conducted during the project preparations. The main purpose of these consultations was to know the community's reaction to the perceived impact of proposed project on the people at individual and settlement level. The issues of the most concern were related to rehabilitation and resettlements and have been dealt in social assessment report. It was also felt during the public consultation process that most of the people are aware about the project but they did not appreciate environmental problems associated with road projects. However, some people were concerned about environmental issues, mainly air and noise pollution. The other concerns raised at during public consultation were demand for submergence of project road and safety problems. The issues raised by the public have been duly incorporated in project design.

11.5 POTENTIAL ENVIRONMENTAL IMPACTS

The environmental components are mainly impacted during the construction and operational stages of the project and have to be mitigated for and incorporated in the engineering design. Environmental mitigation measures represent the project's endeavour to reduce its environmental footprint to the minimum possible. These are conscious efforts from the project to reduce undesirable environmental impacts of the proposed activities and offset these to the degree practicable. Enhancement measures are project's efforts to gain acceptability in its area of influence. They reflect the pro-active approach of the project towards environmental management.

11.5.1Impacts on Climate

Impact on the climate conditions from the proposed road project widening will not be significant as no major deforestation and / or removal of vegetation is involved for the project

11.5.2 Impact on Air Quality

There will be rise in SPM levels during the construction activities, which shall again be within prescribed limit after the construction activities are over.

11.5.3 Impact on Noise Levels

The impact of noise levels from the proposed project on the neighbouring communities is addressed. It has been concluded that both day and nighttimes equivalent noise levels are within the permissible limits right from start of project life. Noise sensitive receptors have been identified along the project road.

11.5.4 Impact on Water Resources and Quality

The construction and operation of the proposed project roads will not have any major impacts on the surface water and the ground water quality in the area. Contamination to water bodies may result due to spilling of construction materials, oil, grease, fuel and paint in the equipment yards and asphalt plants. This will be more prominent in case of locations where the project road crosses

rivers, canals distributaries, etc. Mitigation measures have been planned to avoid contamination of these water bodies.

11.5.5. Impact on Ecological Resources

There is no major loss of vegetation hence adverse impact in terms of availability of nesting sites for the bird doesn't arise. Furthermore, there is no sensitive ecological area along the existing project roads, so the impact will be insignificant during construction period. But on the long run the project shall have a positive impact due to the compensatory forestation and avenue plantation.

11.5.6 Impact on Land

During the construction of the proposed project, the topography will change due to excavation of borrow areas, stone quarrying, cuts and fills for project road and construction of project related structures etc. Provision of construction yard for material handling will also alter the existing topography. The change in topography will also be due to the probable induced developments of the project. Benefits in the form of land levelling and tree plantations in the vicinity of the project road shall enhance the local aesthetics.

11.5.7 Impact on Human Use Values

The PAPs shall be compensated as per the RAP. Accidents are bound to increase coupled with ribbon development. There shall also be some impacts on cultural or religious properties along the corridor.

11.6 ANALYSIS OF ALTERNATIVES

Detailed analyses of the alternatives have been conducted taking into account both with and without project scenario and the available alignment options. The analysis also dealt with the justification of selections of the proposed alignment and the modifications on it due to environmental considerations, realignment and bypasses and the minimization of negative impacts. Based on all these alternative studies the present alignment was proposed.

11.7 MITIGATION AVOIDANCE AND ENHANCEMENT MEASURES

Both generic and site specific mitigation and enhancement measures have been planned for identified adverse environmental impacts. The construction workers camp will be located at least 500m away from habitations. The construction yard, hot mix plants, crushers etc. will be located at 500m away from habitations and in downwind directions. Adequate cross drainage structures have been planned to maintain proper cross drainage. In order to compensate negative impacts on flora due to cutting of trees the project plans compensatory plantation in the ratio of 1:2 i.e. for every tree to be cut, two trees will be planted. The project shall also witness the plantation of trees for providing aesthetic beauty and shade. As the space for compensatory afforestation might not be adequate along the project road, this plantation shall be taken up by the forest department, after payment of the cost for raising and maintaining the saplings for three years. The project will take an opportunity to provide environmental enhancement measures to improve aesthetics in the project area. The planned environmental enhancement measures include plantation in available clear space in ROW, enhancement of water bodies, enhancement of cattle market etc. In order to avoid

contamination of water bodies during construction sedimentation chambers, oils and grease separators, oil interceptors at storage areas and at construction yard have been planned.

11.8 INSTITUTIONAL REQUIREMENTS AND ENVIRONMENTAL MONITORING PLAN

The responsibility of implementing the mitigation measures and all activities under environmental management plan (EMP) lies with the contractor (selected through International Competitive Bidding) through the contractor. All construction activities being taken up by the contractor and shall be scrutinized by NHAI.

The implementation of RAP shall be as per the details given in the RAP report. In the pre-construction phase of the project the consultant as appointed by NHAI shall review the EMP and RAP to identify environmental and social issues and arrive at a suitable strategy for implementation.

For effective implementation and management of the EMP, The Contractor shall establish a Safety, Health and Environment (SHE) Cell headed by an Environment Officer to deal with the environmental issues of the project. This officer shall interact with the contractor, NHAI and other departments to ensure that the mitigation and enhancement measures mentioned in the EMP are adhered. The Environmental officer of the contractor shall be the interface between the Environmental Specialist of IC and the Environmental Officer of the contractor. His prime responsibility shall be to appraise the Environmental Specialist about the ground conditions. He shall also procure the requisite clearances and the NOCs for the project and shall also strictly supervise that the contractor adheres to the EMP. The officer shall also participate in training programmes and assist NHAI in preparing documentation for good practices in environmental protection.

The reporting system will operate linearly – contractor who is at the lowest rung of the implementation system reporting to the Contractor, who in turn shall report to NHAI. All reporting by the contractor shall be on a quarterly basis, while the reporting time of the contractor shall be decided upon by the contractor. The NHAI Site Office will be responsible for setting the targets for the various activities anticipated during construction phase and obtaining agreement from the Contractor after mobilization but before beginning of works on site. The contractor will report from then on regarding the status on each of these. The NHAI Site Office will monitor the activities through its own staff or the consultant's Environmental Specialist after it has obtained the Contractor's report with the Consultant's remarks on it during the construction phase. During the operation phase, the supervision as well as reporting responsibilities will lie with the NHAI site office.

11.9 ENVIRONMENTAL MANAGEMENT PLAN

Project specific environmental management plan have been prepared for ensuring the implementation of the proposed measures during construction phase of the project, implementation and supervision responsibilities, sufficient allocation of funds, timeframes for anticipated activities etc. has been dealt with in this document, which will eventually form a part of the Contract documents between the NHAI and the Contractor.

11.10 CONCLUSIONS

Based on the EIA study and surveys conducted for the Project, it can be safely concluded that associated potential adverse environmental impacts can be mitigated to an acceptable level by adequate implementation of the measures as stated in the EIA Report. Adequate provisions shall be made in the Project to cover the environmental mitigation and monitoring requirements, and their associated costs as suggested in environmental budget. The proposed project shall improve Road efficiency and bring economic growth, social inclusion and environmental sustainability.

Appendix – Y

Cost of Compensatory Afforestation and certificate regarding suitability of area for plantation by DFO

परियोजना का नामः– राष्ट्रीय राज मार्ग परियोजना (चतुर्थ चरण) के अन्तर्गत राष्ट्रीय राजमार्ग सं0 74 हरिद्वार नगीना–काशीपुर भाग के 4–लेन में चौड़ीकरण एवं सुदृढ़ीकरण का कार्य।

राष्ट्रीय पार्क/वन्य जीव अभ्यारण्य प्रमाण–पत्र

प्रमाणित किया जाता है कि वन प्रभाग, हरिद्वार के अन्तर्गत भारतीय राष्ट्रीय राज मार्ग प्राधिकरण द्वारा वन क्षेत्र में राष्ट्रीय राज मार्ग परियोजना (चतुर्थ चरण) के अन्तर्गत **राष्ट्रीय राजमार्ग सं0 74 हरिद्वार नगीना–काशीपुर भाग (कि0मी0 30.000 से कि0मी0 132.000 तक) के 4–लेन में चौड़ीकरण एवं सुदृढ़ीकरण कार्य** हेतु प्रस्तावित स्थल में किसी भी राष्ट्रीय पार्क/वन्य जीव अभ्यारण्य का हिस्सा नहीं है।

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क्षतिपूरक वृक्षारोपण स्थल उपयुक्तता प्रमाण–पत्र

प्रमाणित किया जाता है कि वन क्षेत्र में भारतीय राष्ट्रीय राज मार्ग प्राधिकरण द्वारा वन क्षेत्र में **राष्ट्रीय राजमार्ग सं0 74 हरिद्वार नगीना–काशीपुर भाग (कि0मी0 30.000 से कि0मी0 132.000 तक) के 4–लेन में चौड़ीकरण एवं सुदृढ़ीकरण कार्य** हेतु प्रस्तावित क्षतिपूरक वृक्षारोपण हेतु चयनित वनीकरण क्षेत्र अतिरिक्त भूमि वन प्रभाग, रामनगर के अन्तर्गत हैं, उपयुक्त है।

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वैकल्पिक समरेखणों को निरस्त किये जाने का प्रमाण–पत्र।

प्रमाणित किया जाता है कि भारतीय राष्ट्रीय राज मार्ग प्राधिकरण द्वारा वन क्षेत्र में **राष्ट्रीय राजमार्ग सं0 74 हरिद्वार नगीना–काशीपुर भाग (कि0मी0 30.000 से कि0मी0 132.000 तक) के 4–लेन में चौड़ीकरण एवं सुदृढ़ीकरण कार्य** हेतु 3 समरेखणों पर विचार किया गया। संरेखण संख्या 2 एवं 3 को अधिक निर्माण लागत अधिक भू अर्जन की आवश्यकता एंव पुर्नवास एंव पुर्नस्थापन पर अधिक व्यय के कारण निरस्त कर दिया गया है। गया। समरेखण सख्या 1 समुचित ज्यामिति तथा न्यूनतम निर्माण लागत न्यूनतम भू अर्जन की आवश्यकता एंव न्यूनतम पुर्नवास एंव पुर्नस्थापन व्यय व सम्प्रति राष्ट्रीय राज मार्ग के रुप में प्रयुक्त होने के कारण उचित पाया गया जो कि प्रस्तावित है।

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वन्य जीव/वनस्पतियों को क्षति न पहुॅचायें जाने का प्रमाण–पत्र

प्रमाणित किया जाता है कि भारतीय राष्ट्रीय राज मार्ग प्राधिकरण द्वारा वन क्षेत्र में भारतीय राष्ट्रीय राज मार्ग प्राधिकरण द्वारा में **राष्ट्रीय राजमार्ग सं0 74 हरिद्वार नगीना–काशीपुर भाग (कि0मी0 30.000 से कि0मी0 132.000 तक) के 4–लेन में चौड़ीकरण एवं सुदृढ़ीकरण कार्य** के दौरान भारतीय राष्ट्रीय राजमार्ग प्राधिकरण द्वारा वन्य जीव/स्थानीय वनस्पतियों को कोई नुकसान नहीं पहुॅचाया जायेगा।

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लाभान्वित होने वाले ग्रामों/परिवारों/जनसंख्या के सम्बन्ध में प्रमाण पत्र

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भा0रा0रा0प्रा0,
पी0आई0यू0–देहरादून

परियोजना का नामः– राष्ट्रीय राज मार्ग परियोजना (चतुर्थ चरण) के अन्तर्गत राष्ट्रीय राजमार्ग सं0 74 हरिद्वार नगीना–काशीपुर भाग के 4–लेन में चौड़ीकरण एवं सुदृढ़ीकरण का कार्य।

प्रस्तावित परियोजना के लिये ली गई वन भूमि के सीमांकन करने हेतु आर0सी0सी0 पिलरों का निर्माण

प्रमाणित किया जाता है कि भारतीय राष्ट्रीय राज मार्ग प्राधिकरण द्वारा वन क्षेत्र में भारतीय राष्ट्रीय राज मार्ग प्राधिकरण द्वारा **राष्ट्रीय राजमार्ग सं0 74 हरिद्वार नगीना–काशीपुर भाग (कि0मी0 30.000 से कि0मी0 132.000 तक) के 4–लेन में चौड़ीकरण एवं सुदृढ़ीकरण कार्य** हेतु वर्तमान मार्ग प्रयुक्त होने के कारण वन भूमि के सीमांकन/सर्वेक्षण हेतु आर0सी0सी0 पिलरों के निर्माण की आवश्यकता नहीं है।

परियोजना निदेशक,
भा0रा0रा0प्रा0,
पी0आई0यू0–देहरादून