



No. RW/NH-33044/29/2021-S&R(P&B) Part (Comp No 262799)
Government of India
Ministry of Road Transport & Highways
Transport Bhawan, 1, Parliament Street, New Delhi-110001

Dated: 25th February, 2026

CIRCULAR

To,

1. The Chief Secretaries of all the State Governments/ UTs.
2. The Principal Secretaries/ Secretaries of all States/ UTs Public Works Department/ Road Construction Department/ Highways Department (dealing with National Highways and other centrally sponsored schemes).
3. The Chairman, National Highways Authority of India, G-5 & 6, Sector-10, Dwarka, New Delhi-110075.
4. The Managing Director, NHIDCL, 1 st & 2 nd floor, Tower-A, World Trade Centre, Nauroji Nagar, New Delhi-110029.
5. The Director General (Border Roads), Seema Sadak Bhawan, Ring Road, New Delhi-110010.
6. All Engineers-in-Chief and Chief Engineers of Public Works Department of States/ UTs/ Road Construction Department/ Highways Departments (dealing with National Highways and other centrally sponsored schemes).
7. The Secretary General, Indian Roads Congress
8. The Director, IAHE, Noida, UP
9. All CE-ROs, ROs and ELOs of the Ministry.

Subject: "Revised Document for Request for Proposal (RFP) for appointment of Consultancy Services for preparation of Detailed Project Report (DPR) in respect of National Highways and centrally sponsored road works"-Amendment in RFP reg.

Reference: Ministry's circular no. RW/NH-33044/29/2021-S&R(P&B) Part (Comp No 248404) dated 29.09.2025

Madam/Sir,

Please refer to the Revised RFP for appointment of Consultancy Services for preparation of Detailed Project Report (DPR) in respect of National Highways and centrally sponsored road works, circulated vide Ministry's circular dated 29.09.2025 cited under reference above.

2. Certain amendments to the Standard RFP clauses have been made. These amendments are attached as **Annexure-A** to this circular.

3. All the executing agencies are requested to make the aforesaid modifications in the RFP document for appointment of Consultancy Services for preparation of Detailed Project Report (DPR) in respect of National Highways and centrally sponsored road works, before inviting tenders.

4. This issues with the approval of Competent Authority.

Encl: Annexure-A

Yours' Faithfully,

(Akil Ahmad)
Superintending Engineer
For DG(RD)&SS

Copy:

1. Technical circular file of S&R (P&B) Section Technical circular file of S&R (P&B) Section
2. NIC-for uploading on Ministry's website under "What's new" & "Comprehensive Compendium circulars"

Copy for kind information to:

1. PS to Hon'ble Minister (RT&H)
2. PS to Hon'ble MOS (RT&H)
3. OSD to Hon'ble MOS (Corporate Affairs and RT&H)
4. Sr. PPS to Secretary (RT&H)
5. Sr. PPS to DG (RD) & SS
6. Sr. PPS to AS&FA
7. Sr. PPS to Addl. Secretary (Transport)/Joint Secretary (Toll)
8. Sr. PPS/ PPS to all ADGs/ CEs

Annexure-A

A. The following clause is added to Enclsoure-B of Section VI-A: List of Key Experts and Required Qualifications:

All the Key-Experts should have completed the following tabulated courses to be considered eligible for technical evaluation:

Position	Mandatory Course
Team Leader cum Senior Highway Engineer	<i>"It is mandatory for the key personnel to have attended training course on "Preparation of Feasibility Study and DPR for Highway Projects" conducted by Indian Academy of Highway Engineers (IAHE) or any other institute specifically approved by MoRTH for minimum 6 days duration"</i>
Senior Bridge Design Engineer	
Highway Design Engineer	
Environmental Specialist	
Material Engineer cum Geotechnical Engineer cum Geologist	
Senior Survey Engineer	
Quantity Surveyor/Documentation Expert	
Team Leader cum Senior Bridge Engineer	
Bridge Structural Engineer	
Team Leader cum Senior Tunnel Engineer	
Tunnel Design Expert	
Senior Geotechnical Engineer	
Senior Geophysicist	
Traffic/Road Signage/Marking and Safety Expert	<i>"It is mandatory to have completed at least 15 days' certification course on Road Safety Audit from IAHE or any other institute specifically approved by MoRTH. The CV of the proposed key personnel not having completed minimum 15 days certification course shall not be evaluated"</i>



B. The following evaluation matrix are added to Section VII: Evaluation/Scoring Criteria of the RFP:

"17. Senior Geomatics Expert

S. No.	Description	Max. Points
I	Desirable Qualification	30
i)	Full Time Graduation in Civil Engineering or Equivalent from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks For other AICTE approved colleges give 50% marks i.e. 7.5 marks	15
ii)	Post-Graduation	15
	Full Time/Regular Post-Graduation in Civil Engineering (Geomatics/Geoinformation Technology/Geodesy and Geoinformatics/Geospatial Information Sciences) from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks For other AICTE approved colleges give 50% marks i.e. 7.5 marks]	15
II	Relevant Experience & Adequacy for the Project	65
a)	Total Professional Experience	15
	<12years	0
	12-15 years	11
	>15-18 years	13
	>18 years	15
(b)	Experience in Geomatics Assignments (Handling Aerial/Mobile LiDAR data, Drone (UAV) surveys, and GIS platforms like ArcGIS/QGIS, etc) for Planning, surveying, remote sensing, GIS, project preparation on Highways/Airports/Railways/Irrigation/Hill Roads/Hydel Projects	20
	<12 years	0
	12-15 years	14
	>15-18 years	17
	>18 years	20
c)	Experience in Similar Capacity	30
(i)	Experience as Geomatics Expert (or Equivalent Position) in Geomatics Assignments for landslides/rockfall on Highways/Airports/Railways/Irrigation/Hill Roads/Hydel Projects	20
	<5 years	0
	5-8 years	10

	>8-12 years	14	
	>12-15 years	17	
	>15 years	20	
ii)	Experience in LiDAR (Mobile/Aerial) data processing, Drone (UAV) surveys, or GIS-based Alignment in at least 2 major Infrastructure Project DPRs.		10
	< 2 project	0	
	2-5 Projects	7	
	> 5 Project	10	
III	Employment with Firm		5
	< 1 Year	0	
	1 year	2	
	Add 1 marks for each subsequent year subject to maximum of 3 marks		
	Total		100

Equivalent Positions: -

Entity	Equivalent Position / Designation	Working in
Government/PSU	Executive Engineer/ Sr Manager/ DGM	GIS-based alignment/ LIDAR
Contractor	Manager (Geomatics)	Looking after Execution of LiDAR/GIS surveys,
Consultant	Survey & Geomatics Engineer or GIS Expert	Validation of topographical data, LiDAR point cloud processing, and ensuring sub-meter accuracy in ROW mapping.

18. Senior Hydrology and Hydraulics Expert

S. No.	Description	Max. Points
I	Desirable Qualification	30
i)	Full Time Graduation in Civil Engineering or Equivalent from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks For other AICTE approved colleges give 50% marks i.e. 7.5 marks	15
ii)	Post-Graduation Full Time/Regular Post-Graduation in Civil Engineering (Hydrology/Hydrogeology/Water Resources/Water Technology) from any IIT/NIT/IISC or Top 50 ranked engineering institutes as per NIRF ranking released by Ministry of Education (available as on bid due date) or Engineering Colleges of repute of Foreign Countries give full marks For other AICTE approved colleges give 50% marks i.e. 7.5 marks]	15
II	Relevant Experience & Adequacy for the Project	65

a)	Total Professional Experience		15
	<12years	0	
	12-15 years	11	
	>15-18 years	13	
	>18 years	15	
(b)	Experience in Hydrology and Hydraulics Assignments (Hydraulic modelling by software such as HEC-RAS, MIKE 11/21, or SWMM. Experience in calculating Scour Depth for bridge foundations etc) for landslides/rockfall/river training/bank protection works on Highways/Airport/Railways/Irrigation/Hill Roads/Hydel Projects		20
	<10 years	0	
	10-12 years	14	
	>12-15 years	17	
	>15 years	20	
c)	Experience in Similar Capacity		30
(i)	Experience as Hydrology and Hydraulics Expert (or Equivalent Position) in Hydrology and Hydraulics Assignments for landslides/rockfall/river training/bank protection works on Highways/Airport/Railways/Irrigation/Hill Roads/Hydel Projects		20
	<5 years	0	
	5-8 years	10	
	>8-12 years	14	
	>12-15 years	17	
	>15 years	20	
ii)	Experience in 2D Hydraulic Modelling (HEC-RAS/MIKE/TUFLOW) and design of Urban Drainage/Stormwater Systems in at least 2 Infrastructure DPR Projects.		10
	< 2 project	0	
	2-5 Projects	7	
	> 5 Project	10	
III	Employment with Firm		5
	< 1 Year	0	
	1 year	2	
	Add 1 marks for each subsequent year subject to maximum of 3 marks		
	Total		100

Entity	Equivalent Position / Designation	Experience In
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Government/ PSUs	Executive Engineer (Design) or Director (Hydrology/Water Resources)	Approval of HFL (Highest Flood Level) data, waterway clearances for bridges, and GAD approvals.
Contractor	Design Manager (Hydraulics & Drainage) or Senior Drainage Engineer	Finalizing the sizing of cross-drainage (CD) structures and designing the longitudinal drainage system.
Consultant	Hydrology Expert or Senior Water Resources Engineer	Review of rainfall data, catchment area analysis, and hydraulic modelling (using software like HEC-RAS or MIKE).

C. The following clause wise amendments are made to the RFP:



No.	Reference	Existing Provision				Modified Provision				
(1)	Clause 10.5.1	10) The DPR Consultant will be paid stage-wise as a percentage of the contract value as per the schedule given below. The Performance Bank guarantee shall also be released in Stages defined below:				10) The DPR Consultant will be paid stage-wise as a percentage of the contract value as per the schedule given below. The Performance Bank guarantee shall also be released in Stages defined below:				
		S. No	Item	Payment % of Contract Price	% Release of PBG	S. No	Item	Payment % of Contract Price	% Release of PBG of 5% of contract value	% Release of Remaining PBG (quoted PBG-5% of contract)
		First Stage				First Stage				
		1	Submission of final QAP and Inception Report	2.5 %	-	1	Submission of final QAP and Inception Report	2.5 %	-	
		2	Approval of final Alignment Report, Traffic Study, Topographical Study and Submission of ToR for EAC	10%	-	2	Approval of final Alignment Report, Traffic Study, Topographical Study and Submission of ToR for EAC	10%	-	
		3	Submission of final feasibility Report [#]	7.5%	-	3	Submission of final feasibility Report [#]	7.5%	-	
		Second Stage				Second Stage				
		4	Submission of complete Land Acquisition Proposal (LAC proposals in case of NHAI)	10%	-	4	Submission of complete Land Acquisition Proposal (LAC proposals in case of NHAI)	10%	-	
		5	Submission Of 3a Notification, Draft 3 A and Publication of 3a, 3A notifications	5%	-	5	Submission Of 3a Notification, Draft 3 A and Publication of 3a, 3A notifications	5%	-	
		6	Submission of all utilities shifting proposals to utility owning agencies and submission of utilities relocation plan to Authority	5%	-	6	Submission of all utilities shifting proposals to utility owning agencies and submission of utilities relocation plan to Authority	5%	-	
		7	Submission of Bidding Documents and Technical Schedules	5%	-	7	Submission of Bidding Documents and Technical Schedules	5%	-	
		8	Final approval of utilities shifting estimates and submission of Utilities report, ROB GADs from Railway, Irrigation other concerned departments	5%	5%	8	Final approval of utilities shifting estimates and submission of Utilities report, ROB GADs from Railway, Irrigation other concerned departments	5%	10%	
		9	Submission of all stage I clearance (Forest, Wildlife, EC) proposals on	5%	-					

			Parivesh portal and acceptance by Nodal Officer					9	Submission of all stage I clearance (Forest, Wildlife, EC) proposals on Parivesh portal and acceptance by Nodal Officer	5%	-	
		10	Submission and Approval of Final DPR Report, documents and drawings	5%	-			10	Submission and Approval of Final DPR Report, documents and drawings	5%	-	
		11	Clearance of the project by NPG (if applicable) and Appraisal of Project by SFC (if applicable). In case none of above is applicable then payment shall be released on technical approval of Project by Competent Authority of the implementing agency.	5%	10%			11	Clearance of the project by NPG (if applicable) and Appraisal of Project by SFC (if applicable). In case none of above is applicable then payment shall be released on technical approval of Project by Competent Authority of the implementing agency.	5%	10%	
		Third Stage						Third Stage				
		12	Administrative & Financial Approval of Project by the Competent Authority	5%	-			12	Administrative & Financial Approval of Project by the Competent Authority	5%	-	
		13	Stage II clearance approval (Receiving approval of Forest, Wildlife, EC from Concerned agencies) and submission of final clearances II report	5%	5%			13	Stage II clearance approval (Receiving approval of Forest, Wildlife, EC from Concerned agencies) and submission of final clearances II report	5%	10%	
		14	3D publication for all land parcels identified in item 5 above and submission of Land Acquisition II report	5%	-			14	3D publication for all land parcels identified in item 5 above and submission of Land Acquisition II report	5%	-	
		15	Completion of award declaration (3G) for 90% of land parcels identified and submission of Land Award report	5%	-			15	Completion of award declaration (3G) for 90% of land parcels identified and submission of Land Award report	5%	-	
		16	Receipt of land possession certificates (3H) for 90% of all land parcels identified in LAC report and submission of Land Possession report	5%	5%			16	Receipt of land possession certificates (3H) for 90% of all land parcels identified in LAC report and submission of Land Possession report	5%	10%	
		17	Completion of Condition Precedent on Part of Authority	4.5%	40%			17	Completion of Condition Precedent on Part of Authority	4.5%	50%	
		18	Completion of Mutation of Land	1%	10%			18	Completion of Mutation of Land Record and entry in Highway Land Register with the Highway	1%	10%	

	Record and entry in Highway Land Register with the Highway Administration		
19	Amount to be released at earlier of project's COD or 3 years from start of civil work	4.5%	25%
20	Total:	100%	100%
	Bonus Provision		
21.	In case Appointed Date is declared within the timeline of the contract/concession agreement	1.5%	-
22.	In case the project is completed within SPCD provided in the contract/concession agreement without any EOT	1.5%	-
23.	In case total COS in the project till issuance of Completion Certificate is within 1% of Estimated Civil Project Cost.	2%	-

	Administration			
19	Amount to be released at earlier of project's COD or 3 years from start of civil work	4.5%	--	Balance PBG shall be released per the procedure give below
20	Total:	100%	100%	
	Bonus Provision			
21.	In case Appointed Date is declared within the timeline of the contract/concession agreement	1.5%	-	
22.	In case the project is completed within SPCD provided in the contract/concession agreement without any EOT	1.5%	-	
23.	In case total COS in the project till issuance of Completion Certificate is within 1% of Estimated Civil Project Cost.	2%	-	

Process for release of Remaining PBG (quoted PBG-5% of contract): - the additional PBG (Quoted PBG- 5% of contract Price) (APBG) shall be released at earlier of project's COD or 3 years from start of civil work after deducted the BG amount, if any, as given below: -

a) Discrepancy in land observed within with AD+240 days

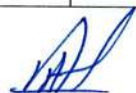
Discrepancy in Land Acquisition % (of Total Land to be actually acquired)	The value APBG withheld and encashed
Upto 2%	5 % of APBG Value
2-5%	10 % of APBG Value
>5%	15 % of APBG Value

For inaccuracies in survey/investigation/design work: -

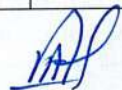
			<table><tr><th>S. No.</th><th>Item</th><th>Penalty (%age of APBG Value)</th></tr><tr><td>1.</td><td>Geotechnical Surveys</td><td></td></tr><tr><td></td><td><i>a)-Incomplete surveys</i></td><td>5%</td></tr><tr><td></td><td><i>b) Data not analysed properly</i></td><td>7.5%</td></tr><tr><td></td><td><i>c) The substrata substantially different from the actual strata found during construction.</i></td><td>10 %</td></tr><tr><td>2.</td><td>Traffic data found to be varying by more than 25% on resurvey at a later date, unless there are justifiable reasons.</td><td>10%</td></tr><tr><td>3.</td><td>Axle load data found to be varying by more than 25% on resurvey at a later date, unless there are justifiable reasons.</td><td>10%</td></tr><tr><td>4.</td><td>Discrepancies in investigations of RE wall, majors structures, bridges, interchanges, Hydraulic calculations for major bridges for which has implication in contract/ project implementation</td><td>10%</td></tr><tr><td>5.</td><td>Instance of raising of HT Towers/ lines missed out, missing out of underground utilities/ pipelines such as Oil, natural gas, industrial pipelines</td><td>10%</td></tr></table> Total cumulative amount of encashment from all discrepancies shall be limited to 100% of the APBG value.	S. No.	Item	Penalty (%age of APBG Value)	1.	Geotechnical Surveys			<i>a)-Incomplete surveys</i>	5%		<i>b) Data not analysed properly</i>	7.5%		<i>c) The substrata substantially different from the actual strata found during construction.</i>	10 %	2.	Traffic data found to be varying by more than 25% on resurvey at a later date, unless there are justifiable reasons.	10%	3.	Axle load data found to be varying by more than 25% on resurvey at a later date, unless there are justifiable reasons.	10%	4.	Discrepancies in investigations of RE wall, majors structures, bridges, interchanges, Hydraulic calculations for major bridges for which has implication in contract/ project implementation	10%	5.	Instance of raising of HT Towers/ lines missed out, missing out of underground utilities/ pipelines such as Oil, natural gas, industrial pipelines	10%
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VAH

(2)	Terms of Reference (ToR), Clause 3.10	Wherever required, consultant will liaise with concerned authorities and arrange all clarifications. Approval of all drawings including GAD and detail engineering drawings will be got done by the consultant from the Railways. However, if Railways require proof checking of the drawings prepared by the consultants, the same will be got done by <Agency> and payment to the proof consultant shall be made by <Agency> directly. Consultant will also obtain final approval from Ministry of Environment and Forest for all applicable clearances. Consultant will also obtain approval for estimates for shifting of utilities of all types from the concerned authorities and <Agency>. Consultant is also required to prepare all Land Acquisition papers (i.e. all necessary schedule and draft 3a, 3A, and 3D, 3G notification as per L.A. act) for acquisition of land either under NH Act or State Act.	Wherever required, consultant will liaise with concerned authorities and arrange all clarifications. Approval of all drawings including GAD and detail engineering drawings will be got done by the consultant from the Railways. However, if Railways require proof checking of the drawings prepared by the consultants, the same will be got done by <Agency> and payment to the proof consultant shall be made by <Agency> directly. Consultant will also obtain final approval from Ministry of Environment and Forest for all applicable clearances. Consultant will also obtain approval for estimates for shifting of utilities of all types from the concerned authorities and <Agency>. Consultant is also required to prepare all Land Acquisition papers (i.e. all necessary schedule and draft 3a, 3A, and 3D, 3G notification as per L.A. act) for acquisition of land either under NH Act or State Act. The consultant will also obtain approval from the National Mission for Clean Ganga as per Ministry of Water Resources, River Development and Ganga Rejuvenation notification No-3187 (E) dated – 07.10.2016.
(3)	Terms of Reference (ToR), Clause 3.12	Consultant shall obtain all types of necessary clearances required for implementation of the project on the ground from the concerned agencies. The client shall provide the necessary supporting letters and any official fees as per the demand note issued by such concerned agencies from whom the clearances are being sought to enable implementation.	Consultant shall obtain all types of necessary clearances, including prior approval from National Mission for Clean Ganga , if required for implementation of the project on the ground from the concerned agencies. The client shall provide the necessary supporting letters and any official fees as per the demand note issued by such concerned agencies from whom the clearances are being sought to enable implementation.
(4)	Terms of Reference (ToR), Clause 4. General, Part 1- Comments of Feasibility Study, Sr. No. 7	7. Forest/Environmental/CRZ clearance Requirement.	7. Applicable statutory clearances like Forest/Environment/CRZ /WL/TTZ/CEC etc and also Prior Approval from National Mission for Clean Ganga (if applicable as per notification No-3187 (E) dated 07.10.2016).
(5)	Terms of Reference (ToR), Clause 4.1	4.1 Primary Tasks General Scope of Services shall cover but be not limited to the following major tasks (additional requirements for Preparation of Detailed Project Report for Hill Roads and Major Bridges are given in Supplement I and II respectively):	4.1 Primary Tasks General Scope of Services shall cover but be not limited to the following major tasks (additional requirements for Preparation of Detailed Project Report for Hill Roads, Major Bridges and Tunnels are given in Supplement I, II and IV respectively):



(6)	Terms of Reference (ToR), Clause 4.11.3.1	4.11.3.1 Road Inventory Surveys 1. Detailed road inventory surveys shall be carried out to collect details of all existing road and pavement features along the existing road sections. The inventory data shall include but not limited to the following: i. Terrain (flat, rolling, mountainous); xvi. Design speed of existing road	4.11.3.1 Road Inventory Surveys 1. Detailed road inventory surveys shall be carried out to collect details of all existing road and pavement features along the existing road sections. The inventory data shall include but not limited to the following: i. Terrain (flat, rolling, mountainous); xvi. Design speed of existing road xvii Details of all Hospitals with a distance of 500 m from the existing as well as proposed alignment. xviii Details of all Educational institution along the existing as well as proposed alignment.
(7)	Terms of Reference (ToR), Clause 4.11.4.4	The Consultants shall carry out geo-technical investigations and sub-surface explorations for the proposed Bridges / Road over bridges/ tunnels/ viaducts/ interchanges etc., along high embankments and any other location as necessary for proper design of the works and conduct all relevant laboratory and field tests on soil and rock samples. The minimum scope of geo-technical investigations for bridge and structures shall be as under:	The Consultants shall carry out geo-technical investigations and sub-surface explorations for the proposed Bridges / Road over bridges/ tunnels/ viaducts/ interchanges/ RE wall locations etc., along high embankments and any other location as necessary for proper design of the works and conduct all relevant laboratory and field tests on soil and rock samples. The minimum scope of geo-technical investigations for bridge and structures shall be as under: . . 7. The Subsurface investigation for RE wall locations shall be carried out as per Section 2 of the IS 18591 : 2024.
(8)	Terms of Reference (ToR), Clause 4.13	Environment and Social Impact Assessment: The consultant shall under take the detailed environmental and social impact assessment in accordance with the standard set by the Government of India for projects proposed to be funded by MORT&H/<Agency>. In respect of projects proposed to be funded by ADB loan assistance. Environmental Assessment Requirements, Environmental Guidelines for selected infrastructure projects, 1993 of Asian Development Bank shall be followed. Similarly, for projects proposed to be funded by World Bank loan assistance, World Bank Guidelines shall be followed.	Environment Impact Assessment (EIA) and Social Impact Assessment (SIA) The consultant shall under take the detailed environmental and social impact assessment in accordance with EIA Notification 14th September 2006 and its amendment from time to time, MoRTH Circulars, IRC Guidelines etc. for projects proposed to be funded by MORT&H/its implementing agencies and also compliance of the Report of the Expert Committee of MoEF&CC vide OM dated 19-07-2023 and Supplementary Report dated 01-04-2025 in compliance of the Order of Hon'ble Supreme Court dated 19.01.2021 in the matter SLP(C) No. 8665-8667 of 2020 titled as "The National Highways Authority of India Vs. Pandarinathan Govindarajulu & others. Relevant Guidelines of ADB /World Bank/JICA are to be followed if the project is funded through their loan for implementation.



(9)	4.13.1	Environmental Impact Assessment: Environment impact assessment or initial environment examination be carried out in accordance with ADB's Environmental Assessment Requirements of ADB 1998 guidelines for selected infrastructure projects 1993 as amended from time to time /World Bank Guidelines / Government of India Guidelines, as applicable.	Environment Impact Assessment (EIA) and Environment Management Plan (EMP) Environment impact assessment be carried out in accordance with EIA Notification 14th September 2006 and its amendment thereafter MoRTH Circulars, IRC Guidelines etc. for projects proposed to be funded by MORT&H/its implementing agencies and also compliance of the Report of the Expert Committee of MoEF&CC vide OM dated 19-07-2023 and Supplementary Report dated 01-04-2025 in compliance of the Order of Hon'ble Supreme Court dated 19.01.2021 in the matter SLP(C) No.8665-8667 of 2020 titled as "The National Highways Authority of India Vs. Pandarinathan Govindarajulu & others.. Relevant Guidelines of ADB /World Bank/JICA are to be followed if the project is funded through their loan for implementation.
		1. The consultant should carry out the preliminary environmental screening to assess the direct and induced impacts due to the project.	1. The consultant should carry out the preliminary environmental screening to assess the direct and induced impacts due to the project on Land, Water, Air Environment, Flora & Fauna, Raw Material, Aesthetics, Socio-economic, Energy Conservation, Conservation of Eco-Fragile Areas, etc. as per the applicable Acts/Rules/ Guidelines of Govt. of India and concerned State Govt.
		2. The consultant shall ensure to document baseline conditions relevant to the project with the objective to establish the benchmarks.	2. The consultant shall ensure to document baseline conditions relevant to the project with the objective to establish the benchmarks as per primary data, Secondary data, Survey and Investigation and Modelling.
		3. The consultant shall assess the potential significant impacts and identify the mitigation measures to address these impacts adequately.	3. The consultant shall assess the potential impacts for all the environmental parameters and prepare the mitigation measures to address these impacts adequately for Land, Water & Air Environment, Flora & Fauna, Raw Material, Aesthetics, Socio-economic, Energy Conservation, Conservation of Eco-Fragile Areas, etc. in the EIA & EMP report.
		4. The consultant shall do the analysis of alternatives incorporating environmental concerns. This should include with and without scenario and modification incorporated in the proposed project due to environment considerations.	4. The consultant shall do the analysis of alternatives incorporating Environmental concerns relating to Topography, Engineering, Administrative, Traffic, Financial, Carbon Foot Print, Socio-economic, aquatic and territorial ecology, CRZ areas, etc. This should include with and without scenario and modification incorporated in the proposed project due to Environmental and Social considerations.
		5. The consultant shall give special attention to the environmental enhancement measures in the project for the following: a. Cultural property enhancement along the highways.	5. The consultant shall give special attention on the environmental and social enhancement measures in the project for the following: a. Cultural property enhancement along the highways. b. Bus bays and bus shelters including a review of their location.

	b. Bus bays and bus shelters including a review of their location. c. Highway side landscape and enhancement of the road junctions, d. Enhancement of highway side water bodies, and e. Redevelopment of the borrow areas located	c. Road Safety aspects d. Highway side landscape and enhancement of the road junctions, e. Enhancement of highway side water bodies, and f. Redevelopment of the borrow areas located g. Conservation of Flora & Fauna and its habitats. h. Site and Species-specific Wildlife Passages and Conservation Plan (if applicable) which is to be approved by the PCCF & CWLW. i. Sound and Noise Barrier on all the structures in PA/Wildlife area/Animals Corridors/Sensitive area like Educational Institutes/Health/Cultural/Religious/Archaeological etc j. Rejuvenation, Protection and Management of River Ganga and its tributaries to maintain the Ecological flow of water and Prevention, Control and abatement of environmental pollution for any activities on its Basin, Active Flood Plain, Water Courses, etc. as per National Mission for Clean Ganga (NMCg) Notification no. SO.3187 (E) dated 7th October 2016. k. Green Belt Development Plan. l. Protections on Slopes, Land Slides area etc. m. Incorporation project specific issues in the design with approval of Authority.
	7. The consultant shall establish a suitable monitoring network with regard to air, water and noise pollution. The consultant will also provide additional inputs in the areas of performance indicators and monitoring mechanisms for environmental components during construction and operational phase of the project.	7. The consultant shall establish a suitable monitoring network with regard to air, water, soil and noise pollution for preparation of EIA/EMP report. Air and Noise modelling should be carried out as per appropriate software. The consultant will also provide additional inputs in the areas of performance indicators and monitoring mechanisms for environmental components on the anticipated impacts during construction and operational phase of the project and its mitigation measures in the EIA & EMP which is to be followed by the contractor/concessionaire.
	8. The consultant shall provide the cost of mitigation measures and ensure that environmental related staffing, training and institutional requirements are budgeted in project cost.	8. The consultant shall provide the detailed Environmental monitoring and management plan along with the budget of all the environmental monitoring parameters. Details of mitigation measures, issues raised during public hearing (if applicable), conservation of flora and fauna, greenbelt development, social awareness and training, provision of health and safety equipment to the project staff, etc. are to be included in the EMP.



		9. The consultant shall prepare the application forms and obtain forestry and environmental clearances from the respective authorities including the SPCBs and the MOEF on behalf of <Agency>. The consultants will make presentation, if required, in defending the project to the MOEF Infrastructure Committee. Further, for Environmental & Wildlife Clearances the firm should have been accredited by National Accreditation Board for Education and Training (NABET) for EIA. In case NABET accreditation is not available, the DPR consultant should have at least 1 retired or Ex Indian Forest Service officer and 2 retired or Ex State Forest Service officers on regular payroll each with over 15 years of service in Forest & Wildlife Department.	9. The consultant shall prepare the documents as per the format/forms to obtain all the applicable statutory clearance's under respective Acts, Rules, Provisions of Government of India, IRC guidelines and local laws from the appropriate statutory authorities and it's the Quasi-Judicious bodies of MoEF&CC, Other Government Departments, State Government etc. The consultants will prepare the project brief/report/document as per the respective formats, maps, site specific conservation plan, SIA, green belt development plan, disaster management plan, occupation, health & safety plan, 2D mathematical model (for construction of bridges in river Ganga & Yamuna and its tributaries), mangroves conservation plan (if CRZ-I A area), Muck disposal plan (for tunneling and cutting), etc. Consultant should present the project details before the respective Quasi Judicious bodies/Government as per applicable Statutory clearances. Consultant should have been accredited by National Accreditation Board for Education and Training (NABET). Consultant may engage/JV/MoU with the NABET accredited consultant, in case the DPR consultant does not have such type of accreditation. There is a provision for engaging 1 full time retired Indian Forest Service (IFS) officer or State Forest Service (SFS) on regular payroll of DFO rank and above with over 15 years of experience in Forest & Wildlife Department as per Forest Clearance Consultants Organization (FCCO) scheme/guidelines of NABET. Consultant should procure Permission/NOC of District Ganga Protection Committee, State Ganga Protection Committee and National Mission of Clean Ganga as per Notification No SO.3187 (E) 7th October 2016 for maintaining ecological flow of water in River Ganga, Yamuna and its tributary to be maintained for any activities on its Basin, Active Flood Plain, Water Courses, etc.
		10. The consultant shall identify and plan for plantation and Transplantation of the suitable trees along the existing highway in accordance with IRC guidelines.	10. The consultant shall identify and plan for plantation and Transplantation of the suitable trees along the existing highway in accordance with IRC guidelines and amendments as well as in consultation with local forest department on the available RoW. Consultant shall prepare green belt plan with item wise specification, quantity, cost, maintenance etc.



		11. The consultant shall assist in providing appropriate input in preparation of relevant environment and social sections of BPIP.	11. The consultant shall provide appropriate input in preparation of relevant environment and social sections of DPR, feasibility reports, EIA & EMP and SIA report etc. as per EIA notification 2006 and its amendments thereafter and also the prevailing Acts/Guidelines of other Government Departments (if applicable).
		12. Provision should be made for Noise Barriers wherever (especially where project highway passes through dense habitation) required as a mitigation measures against noise pollution and nuisance	12. Provision should be made for Noise and light Barriers wherever the project highway passes through dense habitation, sensitive areas like school, colleges, university, health centre, religious structures, archaeological structures, reserved forests, wildlife areas, WL corridors, etc. and also any recommendation of Wild Life Warden/Chief Wild Life Warden/State Board for Wild Life/National Board for Wild Life.
(10)	4.13.4	Reporting Requirements of EIA - The consultant would prepare the stand –alone reports as per the requirement of the ADB/World Bank/<Agency>, as applicable, with contents as per the following : - Executive Summery - Description of the Project - Environmental setting of the project. - Identification and categorization of the potential impacts (during pre-construction, construction and operation periods). - Analysis of alternatives (this would include correlation amongst the finally selected alternative alignment/routing and designs with the avoidance and environmental management solutions). - The public consultation processes. - Policy, legal and administration framework. This would include mechanisms at the states and national level for operational policies. This would also include a description of the organisational and implementation mechanism recommended for this project. - Typical plan or specific designs for all additional environmental items as described in the scope of work. - Incorporating any other as per the suggestions of the ADB/World Bank/<agency>, till the acceptance of the reports by the ADB/World Bank/<agency>, as applicable. - EMP Reports for Contract Package based on uniform methodology and processes. The consultant will also	Reporting Requirements of EIA - The consultant would prepare the EIA & EMP report as per the EIA Notification 2006 of MoEF&CC and its amendments thereafter. The said report should be prepared as per the guidelines of ADB/WB if the project is implemented with the funding of ADB/World Bank/<Agency>. Contents of the EIA & EMP are as under: - Executive Summery - Description of the Project - Description of the Environment - Anticipated Environmental Impacts & Mitigation Measures - Analysis of Alternatives - Environmental Monitoring Program - Additional Studies - Project Benefits - Environmental Cost Benefit Analysis - Environment Management Plan



		ensure that the EMP, has all the elements for it to be a legal document. The EMP reports would include the following: • Brief description of the project, purpose of the EMP, commitments on incorporating environmental considerations in the design, construction and operations phases of the project and institutional arrangements for implementing the EMP. • A detailed EMP for construction and operational phase with recourse to the mitigation measures for all adverse impacts. • Detailed plans for highway-side tree plantation (as part of the compensatory afforestation component). • Environmental enhancement measure would be incorporated. • Enhancement measures would include items described in the scope of work and shall be complete with plans, designs, BOQ and technical specifications. • Environmental monitoring plans during and after construction including scaling and measurement techniques for the performance indicators selected for monitoring. • The EMP should be amendable to be included in the contract documents for the works. • Incorporating any other as per the suggestions of the ADB/World Bank/<agency>, till the acceptance of the reports by the ADB/World Bank/<agency> as per applicable.	• Summary & Conclusion (This will constitute the summary of the EIA Report) • Disclosure of Consultants engaged
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(11)	Terms of Reference (ToR), Clause 10.5, Strip Plan and Clearances, Sr. No. 1	1. The consultant shall submit the following documents- iv. Details for various clearances such as environment and forest clearances; or higher on ground.	1. The consultant shall submit the documents as per Guidelines of EIA Notification and its amendments- iv. Details for all applicable clearances as per Laws of Central, State and Locals such as Environment, CRZ, Forest, Wildlife, TTZ, NMCG Namami Ganga, TTZ, CEC, RMB etc. or higher on ground. ix) Strip Plan showing details of Hospitals within 500 m of proposed alignment. x) Strip Plan showing details of educational institutions along the existing as well as proposed alignment
(12)	Terms of Reference (ToR), Clause 10.8, Clearances report, Sr. No. 1 & 2	1. The consultant shall prepare a report regarding all other clearances required to enable the construction of the project road such as environment, forest, tree cutting and railways clearances. 2. The clearance report shall include km wise requirement of all clearances required presented along with the strip plan including, but not limited to: i. Requirements for environmental clearances along the project corridor viii. Clearances from Irrigation Authorities regarding Irrigation structures, etc.	1. The consultant shall prepare a report regarding all other clearances required to enable the construction of the project road such as environment, forest, tree cutting, railways, and Ganga clearances. 2. The clearance report shall include km wise requirement of all clearances required presented along with the strip plan including, but not limited to: i. Requirements for environmental clearances along the project corridor viii. Clearances from Irrigation Authorities regarding Irrigation structures, etc. ix. Prior Approval from National Mission for Clean Ganga.



(13)	Terms of Reference (ToR), Clause 10.12, LA and Clearances report II, Clearances Report II	The consultant shall obtain all the necessary project related clearances such as environment, forest and wildlife clearance from MOEF, Railways in respect of ROB/ RUBs, Irrigation Deptt, CRZ clearances from concerned authorities, and any other concerned agencies by the end of this stage.	The consultant shall obtain all the necessary project related clearances such as environment, forest and wildlife clearance from MOEF, Railways in respect of ROB/ RUBs, Irrigation Deptt, CRZ clearances from concerned authorities, prior approval from National Mission for Clean Ganga , and any other concerned agencies by the end of this stage.
(14)	Terms of Reference (ToR), Clause 13.3 Construction time and planning	Upon reviewing the improvements planned and in consultation with <Agency> , the design and construction period for this project has been arrived at <xx> months from the date of appointment of the contractor/concessionaire. To enable this construction schedule, a detailed construction plan and timeline has been included in the detailed project report. This also includes a traffic management and lane closure plan for the period of construction.	Upon reviewing the improvements planned and various conditions like Height of embankment, number of Structures, quantity of earth work both in cut and fill, monsoon/ snow season, terrain, tunnels etc as part of this DPR and in consultation with <Agency>, the construction period for this project has been arrived at <xx> months from the date of appointment of the contractor/concessionaire. To enable this construction schedule, a detailed construction plan, timeline, resources required has been included in the detailed project report. This also includes a traffic management and lane closure plan for the period of construction.
(15)	Terms of Reference (ToR), Clause 13.4 Feedback on various Standards/circulars		DPR Consultant is required to identify critical gaps/ discrepancies/ contradictions in MoRTH specification, relevant IRC Codes and circulars issued by Ministry/NHAI/NHIDCL, so as to avoid litigation during implementation and afterwards related to projects execution.



(16)	Enclosure-III, Schedule for submission of Reports and Documents	Stage No.	Activity	No. of Copies	Time Period in days from date of commencement			
			Total Project Duration		5 months	7 months	9 months	12 months
		1	Monthly Reports	3	By 10 th day of every month			
		2	Inception Report (i) Draft Inception Report including QAP document (ii) Inception Report including QAP document	3 3	7 15	10 20	15 25	21 30
		3	F.S. REPORT i) Draft Feasibility Study Report including option study report including draft 3(a) report ii) Comments of client iii) Final Feasibility Study Report incorporating compliance of comments of Client	4 1 4	20 25 32	35 40 54	45 55 75	60 75 90
		4	LA & Clearances I Report	4	40	65	85	105

Stage No.	Activity	Time Period in days from date of commencement			
		5 months	7 months	9 months	12 months
1	Monthly Reports	By 10 th day of every month			
2	Inception Report (i) Draft Inception Report including QAP document (ii) Inception Report including QAP document	7 15	10 20	15 25	21 30
3	F.S. REPORT i) Draft Feasibility Study Report including option study report including draft 3(a) report ii) Comments of client iii) Final Feasibility Study Report incorporating compliance of comments of Client	20 25 32	35 40 54	45 55 75	60 75 90
4	LA & Clearances I Report i) Draft LA & Clearances I	40	65	85	105

	i) Draft LA & Clearances I Report including draft 3(A) report	1	45	70	95	120			Report including draft 3(A) report	45	70	95	120		
	ii) Comments of client	4	60	90	110	135			ii) Comments of client	60	90	110	135		
	iii) Final LA & Clearances I Report incorporating compliance of comments of Client								iii) Final LA & Clearances I Report incorporating compliance of comments of Client						
	5 Detailed Project Report								5 Detailed Project Report						
	i) Draft DPR	4	95	120	135	180			i) Draft DPR	95	120	135	180		
	ii) Comments of client	1	100	130	145	210			ii) Comments of client	100	130	145	210		
	iii) Final DPR incorporating compliance of comments of Client	6	107	150	160	240			iii) Final DPR incorporating compliance of comments of Client	107	150	160	240		
	6 Technical Schedules								6 Technical Schedules						
	i) Draft Technical Schedules	4	95	120	135	180			i) Draft Technical Schedules	95	120	135	180		
	ii) Comments of client	1	100	130	145	210			ii) Comments of client	100	130	145	210		
	iii) Final technical schedule	6	107	150	160	240			iii) Final technical schedule	107	150	160	240		
	7 Land Acquisition II Submission of draft 3D publication report	4	95	120	135	180			7 Land Acquisition II Submission of draft 3D publication report	95	120	135	180		
									8 Land Acquisition III, Award	135	180	195	240		

		8	Land Acquisition III, Award determination (3G)		135	180	195	240			determination (3G)					
		9	Project Clearances & Original LA IV Report Approval of Project clearances from Concerned agencies e.g. from MOEF; Rly for approval of GAD and detail engineering drawing of ROB/RUB, Irrigation Dept., Utility Report and Possession of Land	6	150	210	270	365			9	Project Clearances & LA IV Report Approval of Project clearances from Concerned agencies e.g. from MOEF; Rly for approval of GAD and detail engineering drawing of ROB/RUB; Irrigation Dept., Utility Report and Possession of Land	150	210	270	365
	The checklist for different stages of submission of report has been enclosed as under and the same shall be appended with proper references and page numbering. The checklist/s shall be appended with the report without which no payment shall be made. The checklist for different stages of submission of report has been enclosed as under and the same shall be appended with proper references and page numbering. The checklist/s shall be appended with the report without which no payment shall be made. The checklist for different stages of submission of report has been enclosed as under and the same shall be appended with proper references and page numbering. The checklist/s shall be appended with the report without which no payment shall be made. Note: Only one physical copy of documents shall be submitted at PIU and all documents shall be uploaded to the correspondence section of Datalake Portal.															



SUPPLEMENT-IV

ADDITIONAL POINTS TO BE CONSIDERED FOR TUNNELS IN ADDITION TO POINTS COVERED IN MAIN TOR

Tunnel projects are capital-intensive and are associated with high risk due to uncertainties of the underlying strata. Therefore, proper planning and investigations are critical for the successful implementation of tunnel projects. Improper/deficient alignment of road tunnels can lead to time and cost overruns during the execution stages.

2. To ensure the proper selection of tunnel alignment, a Standard Operating Procedure (SOP) has been prepared to establish a comprehensive and systematic approach, considering all critical factors are taken into account before finalizing the tunnel alignment. The SOP is enclosed as Annexure.

3. The alignment of all long tunnels (length >1.5 km) on National Highways shall be finalized in accordance with the aforementioned SOP. It may be noted that tunnel portals are obligatory reference points in the alignment of a road corridor. Therefore, alignment proposals for all long tunnel projects shall be submitted to the Ministry through DG(RD)&SS for review, prior to the submission of alignment of a corridor or section of NH for approval by the Alignment Approval Committee in accordance with the Ministry's OM No. NH-14012/27/2014-P&M (Vol-IV) dated 20th September 2024 and its subsequent amendments. The alignment proposal must, inter-alia include all details and reports specified in the SOP.

Standard Operating Procedure for National Highway Tunnel Alignment Studies and approval

1. Preamble: The purpose of this SoP is to provide a comprehensive, objective, and replicable methodology for identifying, evaluating, and selecting optimal tunnel alignment options in National Highway (NH) projects in India. Tunnel infrastructure plays a pivotal role in improving road connectivity, especially in mountainous, hilly, and ecologically sensitive regions. Tunnels facilitate direct, all-weather connectivity and help avoid terrain-related constraints such as steep gradients, unstable slopes, and landslide-prone areas. They reduce travel time, fuel consumption, vehicular emissions, and overall operating costs. From a strategic and economic perspective, tunnel development is essential for enhancing border connectivity, supporting tourism, enabling socio-economic integration of remote areas, and ensuring national security.

However, planning tunnel infrastructure is inherently complex and multi-disciplinary. It requires harmonization of topographical, geological, geotechnical, geophysical, hydrological, environmental, social, and financial dimensions. Without rigorous, standardized studies and data-backed alignment evaluations, tunnel projects may face delays, cost escalations, and stakeholder conflicts. This policy document provides an objective and structured Standard Operating Procedure (SOP) for conducting Tunnel Alignment Option Studies on National Highways. It prescribes the methodology for generating technically sound, environmentally sustainable, socially acceptable, and economically viable tunnel alignment options.

2. Alignment Alternatives Objective: Generate technically feasible, environmentally compatible, and economically justifiable alignment options.



- The goal is to evaluate at least 3 alternative alignments with clear differentiators: shortest path, Geologically/geotechnically favourable, least social impact, and cost-optimized route.
- These alignments must avoid critical constraints like ESZs, heritage sites, fault lines, steep slopes ($>45^\circ$), and existing urban settlements.
- All alignments should respect terrain geometry.
- Portal locations should be optimized for access, gradient, drainage, and minimal land acquisition.
- Portal selection considering stable slopes, drainage channels and land cover.
- Horizontal and vertical alignment designed for permissible gradient and minimum curve radius as per design speed [Clause 2.2 and Annexure-B of IRC:SP:91-2019].
- Classify tunnel type: Horseshoe, Circular, or Segmental [Clause 1.5 of IRC:SP:91-2019].
- Define excavation method: NATM, TBM, or Drill & Blast [Chapter 4 of IRC:SP:91-2019].

3. Overall Process flow: The overall methodology for tunnel alignment option study and approval includes:

- Identification of a preliminary corridor for tunnel construction
- Review of past investigation data and gap analysis
- Collection of high-resolution base-line data across multiple disciplines
- Development of technically viable alignment options
- Stakeholder consultations
- Gati Shakti Portal integration
- Evaluation of options, optimisation and deciding the best available alternative
Documentation and submission

4. Procedure for Fixing Tunnel Alignment options

Step 1: Define Project Objectives

Determine and document why a tunnel is needed:

- Reduce travel time
- Bypass steep terrain (e.g., ghat sections)
- Avoid wildlife sanctuaries or urban centers
- Improve road safety and geometric standards
- Ensure year-round connectivity in snowfall zones (e.g., J&K, Ladakh, Himachal Pradesh)

Step 2: Preliminary Corridor Identification

- Study existing maps, topography, and satellite images to define the broad corridor.
- Identify potential tunnel alignments within these corridors.
- Define control points such as entry/exit portals, road intersections, and geological boundaries.
- Use GIS and DEM (Digital Elevation Model) tools to understand elevation profiles and gradients.

Step 3: Reconnaissance Survey

Conduct field visits and aerial drone surveys to:

- Validate topographical data
- Locate ridgelines, valleys, rivers, fault lines
- Identify settlements, existing roads, and utilities
- Produce a Reconnaissance Report with:
 - Tunnel length options
 - Broad geological zoning
 - Access to portals (construction feasibility)
 - Broad environmental sensitivities

Step 4: Data Collection

(i) Review of Existing Investigations and Data

- Collect and review earlier literature on topographical, geological, geophysical, and hydrological investigations (if any) carried out in the project area by central or state agencies.
- Archive all earlier reports, maps, and borehole logs.
- Conduct a desk-based gap analysis to assess their relevance and sufficiency.

(ii) Primary Topographic and Terrain Survey

- Creation of High-resolution Digital Elevation Model (DEM) using high resolution satellite imagery, LiDAR or drone-based photogrammetry.
- Prepare longitudinal sections, contours, and 3D terrain models.
- Prepare terrain classification and slope stability maps (1:5000 or higher resolution).
- Mark proposed tunnel portals, access roads, muck disposal zones, safety areas.



(iii) Traffic Studies

- Traffic Studies: Conduct Classified Traffic Volume Count Survey, peak-hour analysis, and Origin-Destination (OD) surveys.

(iv) Geological, Geotechnical, and Hydrogeological Investigations

Develop a Geotechnical Investigation Interpretative Report (GIR) that synthesizes and interprets the geological, geotechnical, and hydrogeological data collected during field investigations. It must include:

- Corridor-wise geological synthesis including lithological and structural mapping
- Tunnel-specific geological interpretation based on core logging and surface mapping
- Assessment of rock mass quality and classification (RQD, Q-System, RMR, GSI)
- Core logging to determine RQD, Unconfined Compressive Strength (UCS), and groundwater inflow
- Geophysical Investigation (e.g., Seismic and Electrical resistivity surveys) to detect weak zones and aquifers
- Assess tunnel rock classes using Q-System, RMR (Rock Mass Rating), and GSI (Geological Strength Index)
- Lithological logs and cross-sections
- RQD and core recovery values
- Unconfined Compressive Strength (UCS), Point load tests, Permeability tests, slake durability tests
- Geological discontinuity mapping (joints, faults, shear zones)
- Groundwater table depth and flow characteristics, permeability
- Identify high-risk zones for landslides, sinkholes, or fault crossings using remote sensing and historical data.
- Conduct borehole drilling and core logging as per IRC SP:91-2019:
 - For tunnels >1500 m: minimum 2 boreholes at each portal, 1 borehole at 25%, 50%, and 75% of tunnel length

Develop a **Geological Reference Model (GRM)** that consolidates surface and subsurface data.

Tunnelling implications based on expected geological conditions:

- Support system requirements (temporary/permanent)
- Anticipated water ingress or squeezing ground conditions
- Geo-hazard zones including landslide-prone slopes, seismically active faults, and karst features (if any)
- Recommendations for tunnel design and construction strategy including sequencing, heading methods, and instrumentation



- Zoning of tunnel stretches by geological complexity and associated risk levels

(v) Satellite and Remote Sensing Inputs:- To ensure centralized data management, spatial transparency, and inter-agency coordination, all tunnel alignment studies must be integrated with the PM Gati Shakti portal, developed by BISAG-N (Bhaskaracharya National Institute for Space Applications and Geo-informatics). This integration facilitates standardization, concurrent reviews, and intelligent decision-making support). Key remote sensing inputs include:

- **Satellite overlays** for vegetation cover, forest boundaries, slope stability, and land use patterns.
- **Thermal and moisture anomaly analysis** using satellite-based data to assess geotechnical risks

Step 5: Integration with PM Gati Shakti Portal

- **Alignment Overlay:** Use PM Gati Shakti portal to overlay tunnel alignments on infrastructure layers.
- **Identify Conflicts:** Highlight potential conflicts with utilities, transport corridors, and logistics zones.
- **Ensure Synergy:** Optimize alignment to support inter-modal connectivity (rail, road, port, airport).

Step 6: Environmental and Forest Considerations

Use BISAG-N overlays and MoEF&CC databases to map:

- Water bodies, wetlands, CRZ if applicable
- Forest areas, wildlife habitats, and eco-sensitive zones
- Existing EIA database for regional biodiversity and species data

For each alignment option:

- Identify forest diversion needs (in ha) and applicable Forest (Conservation) Rules, 2022
- Map Schedule-I species habitats and corridors (if present)
- Overlay project footprint on Wildlife Institute of India maps
- Identify if tunnel falls in or near Protected Areas or Eco-Sensitive Areas

Conduct preliminary Environmental Screening as per MoEF EIA Notification, 2006:

- Determine applicability of Category A/B EIA
- Pre-scoping to estimate Terms of Reference (ToR)

Step 7: Land Acquisition and Social Impact Analysis



Land acquisition (LA) and social impact considerations are integral to the tunnel alignment selection process. Alignment alternatives must minimize displacement, livelihood disruption, and acquisition of ecologically or culturally sensitive land. This section outlines the protocols to assess LA requirements and social impacts for each proposed alignment.

7.1 For each alignment option, the following assessments must be conducted:

- **Land Type Classification:**
 - Private, government, forest, revenue, defence, or institutional lands
 - Agricultural vs. non-agricultural (barren/waste) classification
- **Ownership and Tenure Mapping:**
 - Geo-referenced cadastral overlays from district authorities
 - Identification of tribal, tenancy, or leasehold lands
- **Built Environment Mapping:**
 - Households, shops, community assets (schools, temples, water sources)
 - GIS-based asset inventory within 100 m corridor on either side of alignment

7.2 Integration into Alignment Selection

- Tabulate alignment-wise land requirement (hectares), cost and number of affected households
- Score alignments for LA impact using a weighted matrix in Multi-Criteria Decision Analysis (MCDA)
- Ensure alignment selection minimizes displacement and is socially acceptable

Step 8: Cost Estimation and Financial Viability

8.1 Cost estimation and financial viability analysis are critical to assess the techno-economic feasibility of each tunnel alignment option. This includes a structured evaluation of capital and recurring costs, realistic risk buffers, and potential returns.

8.2 Life-Cycle Costing (LCC)

In addition to capital costs, prepare life-cycle cost analysis to assess financial sustainability over a 30-50 year design horizon. LCC must include:

- Annual maintenance cost of tunnel civil infrastructure and MEP
- Energy consumption for lighting, ventilation, and safety systems
- Periodic repair and rehabilitation cost assumptions
- Environmental cost internalization (e.g., muck transport, monitoring)



8.3 Economic and Financial Viability Assessment

Each alignment must be evaluated for economic feasibility under standard cost-benefit frameworks:

- **Economic Internal Rate of Return (EIRR) and Benefit-Cost Ratio (BCR)**, including:
 - Vehicle operating cost (VOC) savings
 - Travel time savings
 - Reduced accident risk
 - Reduced GHG emissions and monetized carbon savings
- **Financial Internal Rate of Return (FIRR)**
 - Revenue estimation from tolls (if applicable)
 - O&M cost vs. revenue flow over concession period
- **Sensitivity analysis for key risk parameters:**
 - Traffic growth rate, construction delays, cost overrun, inflation

Step 9: Stakeholder Consultation: - Engaging with affected stakeholders ensures alignment with policy, regulations, and public interests.

- Engage all relevant stakeholders early and throughout the planning process
- **Convene Interdepartmental Meetings:** Involve Forest, PWD, Railways, Irrigation, and Disaster Management Departments.
- **Community Consultation:** Conduct public hearings, especially in tribal and eco-sensitive areas.

Step 10: Alignment Optimization

10.1 Finalize alignment considering:

- Least construction and operational risk
- Minimal environmental/social impact
- Favorable geological conditions

10.2 Apply design constraints:

- Tunnel grade: $\leq 4\%$ (preferably $\leq 2.5\%$)
- Minimum radius: ≥ 250 m for $80\sim$ km/h design speed
- Tunnel cross-section: as per IRC Guidelines

Iterate tunnel alignment design to reduce adverse impacts:

- Avoid ecologically sensitive areas



- Reduce tunnel length while maintaining safe geometry
- Minimize number of cross-passages/ventilation shafts
- Align tunnel with surface roads to minimize connector lengths
- Ensure proper portal orientation to reduce earthwork and construction effort

Step 11: Decision Analysis Framework and Alignment Recommendation: -

The final selection of the preferred tunnel alignment must be based on an objective, transparent, and defensible Decision Analysis framework that aggregates technical, environmental, social, and economic performance across alignment options.

11.1 Structure of the decision analysis framework

Criteria Categories:

- Engineering and Geological Feasibility
- Environmental and Forest Impact
- Social and Land Acquisition Impact
- Financial Cost and Viability
- Connectivity and Strategic Importance

Indicators under each category shall be both qualitative and quantitative, such as:

- Geological risk score (based on GRM)
- Length of tunnel and excavation complexity
- Forest land (ha) and biodiversity hotspots affected
- Net Present Cost (NPC), IRR, and ERR
- Distance saved, regional accessibility, disaster resilience

Suggested evaluation criteria are provided in **Annexure A** for reference.

Step 12: Preparation and Submission of Alignment Option Study Report

- Compile findings from all study components into a consolidated Tunnel Alignment Option Study Report
- The report shall be structured in the following format:
 - Executive Summary
 - Introduction and Project Background
 - Methodology Adopted
 - Existing Data Review and Gap Analysis



- Topographical and Geological Inputs
- Environmental and Social Assessments
- Outcome of Public Consultation
- Risk analysis
- Cost Estimates and Financial Viability
- Decision Analysis Results
- Recommended Alignment Option with Justification
- Annexures: Maps, Reports, MCDA Tables, Satellite Images

5. Validation of Alignment Recommendation

The recommended tunnel alignment option shall be validated by:

- Reconfirming its compliance with technical feasibility, safety, environmental sustainability, and cost-efficiency parameters.
- Ensuring that statutory and regulatory prerequisites (e.g., forest clearance, wildlife clearance feasibility, land availability, seismic and hydrological stability) are reasonably addressed at the planning stage.
- Demonstrating alignment with national policy objectives and MoRTH Guidelines, IRC:SP:91-2019, and relevant codes.
- **Risk Register:** List risks like tunneling in poor geology, water ingress, R&R resistance, and clearance delays. Include mitigation strategies.

6. Final Recommendation

The final recommended alignment option shall be explicitly stated, with justification citing:

- Least environmental/social disruption
- Optimal tunnel length and gradient
- Engineering feasibility and constructability
- Compliance with MoRTH's guidelines and IRC codes.
- Stakeholder and inter-agency consultations (where applicable)

Annexure A

Suggested Alignment Evaluation Criteria

Use a **Multi-Criteria Decision Analysis (MCDA)** approach for decision-making considering the following aspects of each proposed alignment option.

1. Geometric Design



- Grade (preferably <2.5%, max 4%)
- Horizontal curves (minimum radius 250 m for 80~km/h)
- Tunnel length and cross-sectional requirements

2. Geological Conditions

- Stability of rock mass
- Presence of fault zones or weak strata
- Groundwater inflow risks
- Possibility of NATM or TBM methods

3. Construction Feasibility

- Access to portals
- Construction logistics (supporting infrastructure)
- Muck disposal and material transport
- Tunnel method suitability (TBM vs. Drill & Blast)

4. Environmental & Forest Impact

- Protected areas (Wildlife, Reserved Forests)
- Need for forest/wildlife clearances
- Biodiversity impacts and mitigation

5. Cost Estimate

- Construction and operation costs
- Mitigation and environmental costs
- Long-term maintenance

6. Socio-Economic Impact

- Land acquisition needs
- Resettlement or rehabilitation issues
- Impact on local communities and employment

Terms of Reference (ToR) for the DPR Consultant for Prevention and Mitigation of Road Tunnel Collapses

i) At the time of the alignment survey, the geological maps (1:50,000 scale) and National Landslide Susceptibility Mapping (1:50,000 scale) published by the Geological Survey of India (GSI) must be consulted. It will help in identifying the regional geological and structural setup of the area and also help in avoiding placing the tunnel portals close to a major landslide or on its flanks or even in the areas that are likely to be falling in the run-out trajectory of a major landslide. Furthermore, it will enable the project planners to identify the reaches/sections of tunnel alignment that may be faulting below major landslide zones, potentially resulting in

inadequate cover above the tunnel or triggering landslide activity due to blasting during construction.

ii) Comprehensive geological investigations are indispensable for identifying the most suitable route, one that minimizes the potential for encountering adverse ground conditions. A key best practice in this regard is optimizing the tunnel's alignment based on a thorough understanding of prevailing ground conditions and their anticipated behavior during and after construction. By strategically selecting a route that avoids known geological hazards, such as active faults or zones of weak rock, the initial planning can significantly mitigate the likelihood of collapse in later stages of the project.

iii) Ministry vide Circular No. NH-12037/312025ITunnellZone-I dated 02.09.2025 has issued the Standard Operating Procedure (SoP) for NH Tunnel Alignment Studies and Approval. Authority shall ensure its adherence in letter and spirit.

iv) The ToR for DPR/PMC consultants shall mandate the preparation of a Geotechnical Baseline Report (GBR) and a Risk Register. The Risk Register should include the perceived hazards and associated risks for the project and indicate potential mitigation measures with comprehensive explanations for their basis, based on the DPR studies. The baseline report shall serve as a reference for determining expected efforts and aim for the highest practical accuracy. The primary function of this baseline report is to minimize disputes by clearly defining anticipated conditions; significant deviations beyond permissible limits shall be treated as a change in scope (positive or negative). Geotechnical Baselines shall be based on apt and appropriate geological, geophysical and geotechnical investigations.

v) Similarly, the Risk Register at the DPR stage serves as a preliminary framework. It is the responsibility of the execution team to regularly update and refine it. During the DPR finalization process, the Risk Register shall be reviewed by a larger team to incorporate diverse perspectives on risk assessment and mitigation strategies. Ultimately, maintaining the Risk Register as a dynamic, continuously updated document is the Authority's responsibility throughout the project lifecycle.

All the construction tenders shall be issued for bidding with the GBR and Risk Register as part of the information provided to bidders.

2. Design

2.1 Detailed design and its proper implementation are critical for any civil engineering project. However, for tunnel projects, it is even more crucial since the ground itself serves as part of the support system. Predicting ground properties based on a limited number of tests and investigations is an oversimplification, particularly in the Himalayas. Inadequate geological and geotechnical investigations lead to great variation between the ground conditions predicted in the DPR and those actually encountered during the construction stage. This, in turn, results in time and cost overruns in the project.

2.2 A thorough understanding of topography, geology, and hydrogeology is essential for designers. It is beneficial to consider as many different conditions as possible to ensure robust design solutions. It is important to note that during the DPR phase, thorough geological and hydrogeological investigations both surface and subsurface shall be conducted to account for all anticipated variations in ground conditions along the tunnel alignment in the excavation methodology and the design of appropriate support systems. Tunnel design must account for varying ground conditions and anticipated behavior



2.3 The tunnel shape shall be evaluated not only in terms of space requirements but also for structural stability. In weak ground conditions, the provision of an arched invert is essential, and achieving ring closure as early as possible shall be a priority.

2.4 It is essential to clearly define the support class associated with each ground type and expected behavior. This ensures that the execution team can apply the appropriate measures and make necessary modifications based on monitoring results. Furthermore, leaving excavated sections of the tunnel unsupported or inadequately supported beyond the stand-up time poses serious risks to worker safety and can lead to significant project delays in the event of a major collapse.

2.5 Effective management of groundwater is essential for ensuring the long term stability of the tunnel, and the design must include appropriate measures for waterproofing and drainage. The ingress of groundwater into the tunnel can weaken the tunnel linings and the surrounding ground, posing significant safety risks to both construction workers and future users. To mitigate these risks, the design often incorporates a system for proper drainage of groundwater, typically using drainage pipes installed around the tunnel perimeter. For tunnels constructed below the water table or in areas with high groundwater pressure, a systematic drainage system design is crucial to protect the tunnel invert (floor) and to maintain a stable and dry environment inside the tunnel.

2.6 Special ground conditions such as squeezing, swelling, rock bursts, shallow cover zones, sections beneath perennial streams/nalas, hot water ingress, and the presence of toxic or flammable gases (particularly in the case of long tunnels) require specific design and execution measures. Identifying these conditions early in the design phase is crucial.

2.7 In regions known for seismic activity the design of the tunnel must account for the potential stresses and strains caused by earthquakes. This may involve the use of specific design criteria that consider seismic loading" as well as the selection of materials and support systems that can withstand these dynamic traces.

2.8 The primary design principle for tunnel support must be flexible, allowing for real-time adjustments based on actual ground conditions encountered. Designers must be prepared to revise their designs if significant deviations from the initial assumptions arise. However, understanding the limitations of field and monitoring data is equally important. A well-conceived design strikes a responsible and safe balance between anticipated and actual ground conditions.

