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Enclosure to letter No RW/NH/12011/1/99/W/RJ dated 15<sup>th</sup> Jan 2001.

**GOVERNMENT OF INDIA**  
**MINISTRY OF ROAD TRANSPORT & HIGHWAYS**

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New Delhi 110 001.

No RW/NH/12011/1/99/W/RJ.

15<sup>th</sup> Jan 2001.

To,

1. Chief Secretaries / Secretaries (PWD / Roads) of all State Governments / UTs dealing with NHs and Centrally sponsored schemes.
2. Chief Engineers of States / UTs (dealing with NHs and Centrally sponsored schemes).
3. The Director General (Border Roads), Seema Sadak Bhawan, Ring Road, New Delhi 110 010.
4. The Chairman, National Highways Authority of India, 1 Eastern Avenue, Maharani Bagh, New Delhi 110 065.

**Sub: Standard Terms of Reference for engagement of consultants for carrying out feasibility studies and inventorisation of new NHs for their improvement to National Highway standards.**

Sir,

A number of new National Highways have been declared recently. The newly declared National Highways are deficient in many respects like, single lane pavements, inadequate formation width and crust, sub-standard horizontal alignment and poor vertical geometrics, existence of causeways, weak and narrow culverts, bridges etc. and are required to be improved to bring it to National Highway standards. A feasibility study would be required to prepare road inventory and proposal for removal of deficiencies in these newly declared National Highways, their cost and phasing.

2. The standard document on Terms for Reference for engagement of consultants is enclosed for National Highway works. This may be brought to the notice of all concerned.

Yours faithfully,

(I K PANDEY)

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Enclosure to letter No RW/NH/12011/1/99/W/RJ dated 15<sup>th</sup> Jan 2001.

Encl: as above.

for Director General(RD)&AS.

No RW/NH/12011/1/99/W/RJ.

15<sup>th</sup> Jan 2001.

Copy to:

1. PPS to Secretary (RT&H) / TS to DG(RD) & AS.
2. The Secretary, IRC, Jamnagar House, New Delhi 110 011.
3. The Director, NITHE, 74 Jorbagh, New Delhi.
4. All technical officers.

(I K PANDEY),  
Superintending Engineer,  
for Director General(RD)&AS.

**TERMS OF REFERENCE FOR ENGAGEMENT OF CONSULTANTS FOR  
INVENTORIZING OF NEW NATIONAL HIGHWAYS AND  
FEASIBILITY STUDIES FOR THEIR UP-GRADATION**

**1. Background:**

It is proposed to engage consultants from the list of consultants empanelled by the Ministry of Road Transport & Highways who will work / associate for providing consulting services for preparation of detailed inventories and undertaking feasibility studies of up-gradation of newly declared National Highways to National Highway standards.

**2. Project Information:**

Sections of National Highway Nos-----in the State/States of - - - - -  
- - - - - as per details indicated in- - - - - are deficient in many respects like existence of submersible causeways, single lane pavements, inadequate formation width and crust, sub-standard curves and grades etc and are required to be improved to National Highway standards. The map of National Highways is enclosed at annexure-\_\_\_\_\_.

**3. Objective:**

The main objective of the study is to prepare a road inventory and proposal for removal of deficiencies in National Highways and to systematically prioritize the required works to be taken up for execution in a phased manner depending upon the availability of resources.

**4. Scope of the Consultancy Services:**

The scope of the consultancy service is to :

- (i) Conduct preliminary surveys in accordance with para 6 of IRC special publication 19.
- (ii) Collect inventory data and to conduct condition survey of roads, bridges, culverts etc as per IRC SP: 19 and compile the information in the enclosed proforma and in an acceptable computerised data base format.
- (iii) Prepare strip plan showing the existing road land width, utility services (both above and below ground level), trees, electric poles, telephone poles, water pipeline, sewer line, bridges, culverts, junctions, adjoining land use, encroachment etc. Digitise these for computer storage.
- (iv) Prepare video filming on compact disk of the present construction of highways particularly with regard to the existence of authorized/unauthorized structures on either side of the highway.
- (v) Identify homogeneous section based on traffic and road geometry.
- (vi) Conduct 7 day traffic (volume count) survey at one location in each homogeneous section. However, traffic survey shall be conducted at an interval of not more than 50 kms within a homogeneous section.
- (vii) Conduct additional traffic survey for each turning movement at major intersection, as per IRC SP: 19.

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- (viii) Gather information on accidents showing type of accident, frequencies and to identify accident prone locations/sections along with main reasons for such situations.
- (ix) Digging test pits at least 1m below the underside of the lowest pavement layer or up to rock level, whichever is less wherever pavement condition changes or at 2 km. intervals whichever is less. Conduct soil tests e.g. gradation test (IS 2720 part IV), atterberg limits, field density, moisture content, shrinkage limit test (if required), deleterious constituents as per relevant IRC standard.
- (x) Determine composition and thickness of existing pavement .
- (xi) Identification of borrow area as per IRC 10 and carryout necessary soil tests to determine suitability of soil.
- (xii) Conduct representative CBR test on the existing sub-grade as per IRC : 37 in alternative kms.
- (xiii) Carry out deflection test by Benkelman beam method (IRC : 81) for 200m length in alternative kms.
- (xiv) Trial pits (a) for culverts at an interval of 5 kms.(b) for minor bridges (length less than 60m.) at each location.
- (xv) Carry out geo-technical investigations and sub-surface exploration by digging bore hole at one location for major bridges (length more than 60 m.)
- (xvi) Collect information about hydrology e.g. catchment characteristics, rainfall stream/channel characteristics and silt factor for all cross drainage works (existing as well as new).
- (xvii) Determine the need of bypass and other re-alignments and geometric improvements and suggest suitable alignments.
- (xviii) Preliminary proposals for widening, strengthening, raising etc.
- (xix) Identify Railway level crossing its type which require up-gradation or construction of R.O.B. on the basis of no. of closures, period of closure and expected traffic. The details of level-crossing may be furnished.
- (xx) Identification of suitable location for lay by, truck parking places and way side amenities.
- (xxi) Preparation of rough cost estimates based on
  - (a) typical cross section of road.
  - (b) GAD for bridge structures
  - (c) Standard typical drawing for culverts
  - (d) Widening
  - (e) Strengthening
  - (f) any other improvement required
  - (g) Analysis of Rates based on Ministry of Road Transport & Highways data book and current rates.

- (xxii) Identification and need based Prioritization of the required works to be taken up for execution in a phased manner
- (xxiii) Provide a computer system and requisite original software for keeping computerised inventory and digitized maps.

## **5. Sequencing of Report Preparation:**

Report preparation activities will be split into stages as brought out below.

### **Stage 1 : Inception Report.**

The consultant is required to submit his inception report within 15 days of award of the work. The report shall cover the following:

- i) Project preparation
  - ii) Detailed methodology to meet the requirement of the T.O.R. including number of teams mobilized for deployment, scheduling of various activities to be carried out for completion of different stages of work within the stipulated time schedule.
  - iii) Task assignment and work schedule
  - iv) Work programme
  - v) Proforma for data collection (suggested proforma is given at appendix II).
  - vi) Key personnel to be employed
  - vii) Time frame for submission of various reports
- The consultant shall carryout the modification, if required in the inception report. The approval of inception report will generally be given with in 30 days of its submission.

### **Stage 2 : Final Report**

The consultant may commence the work of preparation of inventory of the existing National Highway and feasibility studies for their up-gradation as per their inception report in anticipation of its acceptance but shall modify their programmes and procedures in the light of comments of Ministry of Road Transport & Highways on the inception report if any. They shall submit the draft report with in 120 days from the approval of inception report. The draft report shall cover the entire scope of services required from the consultant, which inter-alia include :

1. Strip plans
2. Alignment plan showing proposals for alignment
3. Need / justification of bypass
4. Need / justifications for replacements of level crossing by R.O.B.
5. Siting of bridges and type of bridges
6. Hydraulic data for minor & major bridges
7. Road inventory
8. Bridge inventory
9. Typical cross section of existing / proposed road pavement
10. Standard typical cross section of culverts
11. GAD for bridges
12. Preliminary cost estimates
13. Phasing and prioritisation economic analysis

14. Comments of Ministry of Road Transport & Highways on the draft report shall be given within 30 days of its receipt. Thereafter the consultant shall carry out, whatever, modifications are required in the draft report and submit within 60 days the modified draft report for approval. The approval comments on their report will generally be given within 30 days of its submission.

**6. Services and Facilities to be provided by the Govt.**

The Govt. shall not provide any services and/or facilities to the appointed consultant during the feasibility studies. The consultants will have to arrange for all facilities/services required to carry out the assigned work on this project at their cost. The financial proposal shall include all the required costs with break-ups. However, introductory recommendation letters shall be provided to the consultants on request for obtaining desired services and facilities from concerned authorities for which the consultants shall make payments if any required, to the concerned authorities directly.

**7. Man Month Requirement:**

Suitable and adequate personnel shall be deployed by the consultant for the work. However, the following man month have been indicated for reference.

<u>A. Key Personnel</u>	<u>Man-month</u> <u>(for every 200 kms of highway)</u>
Senior Highway Engineer-cum- Team Leader	6
Highway Engineer	1
Material-cum- Geotech / Foundation Engineer	1
Bridge Engineer	1
Senior Survey Engineer	1
	----
	10
	----
<u>B. Specialist</u>	
Traffic Engineer	2
Hydrology-cum-Drainage Engineer	1
Estimate Surveyor	1
(for every 400 km of highway)	
	---
	4
	---
	<b>14 man months</b>

- C. Other Personnel (As per requirement assessed by the Consultants supported with details.

Notes :

- (1) Minimum Qualification of Key Personnel/Specialist should be as per appendix-I.
- (2) Suggested proforma for data collection are given at appendix-II.

**8. Reports :**

The consultants shall furnish to the client the following report and documents. All reports and documents shall be in English.

- |       |                  |   |          |
|-------|------------------|---|----------|
| (i)   | Inception report | - | 6 copies |
| (ii)  | Draft report     | - | 6 copies |
| (iii) | Final report     | - | 6 copies |

\* Reports are to be furnished National Highway-wise/State-wise (in case National Highway passes through different States).

**9. Schedule of Services :**

- |      |                                |   |   |
|------|--------------------------------|---|---|
| i)   | Submission of inception report | - | 15 days from the date of start                          |
| ii)  | Submission of draft report     | - | 120 days* from the date of approval of inception report |
| iii) | Submission of final report     | - | 60 days from the date of approval of draft report.      |

Note : \* Consultant is required to make a presentation of work done after 60 days.

**10. Payment Schedule :**

Payment schedule for the work will be as follows:

- |      |                                |     |                         |
|------|--------------------------------|-----|-------------------------|
| i)   | Submission of Inception Report | 10% | of the total bid amount |
| ii)  | Approval of draft Report       | 40% | - do-                   |
| iii) | Submission of Final Report     | 25% | - do -                  |
| iv)  | Approval of final Report       | 25% | -do-                    |

Any under prepared, incomplete/inadequate or part submittal shall be deemed as invalid submittal. The adequacy of the submittal shall be determined at the sole discretion of the client. Client will, generally accord approval with in 30 days of submission of reports.

**11. Performance security:**

Within 21 days of the letter of acceptance, the consultant shall deliver to the employer a performance security in the form of bank guarantee for an amount equivalent to 5% of the contract price. The bank guarantee will be released at the time of final payment to the consultant.

**12. Responsibility for Accuracy of Project Reports:**

The consultants shall be responsible for accuracy of all the data used in project preparation and estimates prepared by him as part of the project. He shall indemnify the client against any inaccuracies in the work. For this purpose he shall furnish bank guarantee for an amount to the extent of 20% of the total consultancy fees to be received by him. The bank guarantee shall be valid for a period of 2 years from the date of submission of the final DPR. The final instalment of 25% of the fees shall be released only on receipt of this bank guarantee.

**Appendix-I**

**Minimum Qualification of Key Personnel**

**1. SENIOR HIGHWAY ENGINEER CUM TEAM LEADER**

This is the senior most position and the expert engaged will function as Team Leader and will be responsible for the entire project preparation activities including timely completion. The expert will undertake frequent project site visits and shall guide, supervise, co-ordinate and monitor the work of other experts. The candidate should have a proven record of supervising, organising and managing of project preparation and construction of Highway projects. This position requires a senior Highway Engineer who shall be at least a graduate in Civil Engineering with at least 20 years of professional highway engineering experience.

**2. HIGHWAY ENGINEER**

The Engineer will be a graduate in Civil Engineering with at least 15 years of professional highway engineering experience of handling project preparation and construction of Highway projects (preferably National Highway projects) in India or similar developing countries including project preparation/construction of major Highway/Bridge projects.

**3. HYDROLOGIST CUM DRAINAGE ENGINEER;**

The candidate should have relevant Masters degree or equivalent with minimum 15 years experience of which at least 10 years should be on hydrological studies. Experience of 2 years in highway and bridge projects is essential. The person should be fully familiar with the acceptable study methods, 'best practices' and must have experience of successfully using various methods in different situations.

**4. BRIDGE ENGINEER:**

The position requires an engineer, preferably with a Masters degree or equivalent in structural/bridge engineering, with minimum 15 years experience. The candidate must have capability to design bridges with various alternative materials and structural arrangements. He should have designed independently at least two major bridges (200m length). Experience in designing and implementing bridge rehabilitation is required. The candidate must have the experience of planning & monitoring geo-technical and hydraulic investigations for the bridges and interpreting the findings thereof.

**5. TRAFFIC ENGINEER**

The position requires a graduate civil engineer preferably with higher qualifications in Traffic Engineering with at least 15 years of professional experience including at least 5 years on projects of similar nature in developed/developing countries. The candidate must have wide experience of Junction design and road safety.



**6. MATERIAL ENGINEER-CUM GEOTECHNICAL ENGINEER:**

This position requires an Engineer who should be graduate in civil engineering or science with at least 15 years professional engineering experience including 5 years in supervising sub soil investigations for roads and bridges and testing and evaluation of highway construction materials used in modern highway construction techniques. The candidate must be thoroughly familiar with all the standard laboratory testing procedures adopted in case of highway projects. Better qualification and experience on above lines will be considered for higher rating in evaluation.

**7. SENIOR SURVEY EXPERT:**

This position is of specialist nature and the expert is expected to have thorough understanding of modern computer based methods of surveying like total stations, use of satellite imagery, digital terrain model etc. as being practiced in project preparation of modern highway construction. The candidate is expected to contribute significantly by guiding/supervising the surveyors in improving the quality of survey works for achieving maximum possible accuracy without any gap in survey based details. The candidate should at least be a qualified Surveyor. He should have minimum 15 years professional experience including at least 5 years in highway related projects. He should have experience of training other Surveyors.

**8. ESTIMATE SURVEYOR :**

He should be graduate in Civil Engineering/Quality Surveying from a recognized University/Institution. Diploma in Civil Engineering with at least 20 years work experience at responsible position will also be acceptable. He should have expertise in quality surveying and tender documentation. He should be conversant with the use of computer software for computing unit rates, quantities and costs.