A MODEL
TERMS OF REFERENCE FOR ENGAGEMENT OF CONSULTANTS FOR PREPARATION OF DPR FOR LONGDING-NOKJAN ROAD

1. Background:

PWD Arunachal Pradesh through the Executive Engineer, PWD, Longding Division intended to engage consultant for undertaking detailed survey and preparation of project report for the works of construction of road from Longding to Nokjan (Nagalad) connecting the villages in between by making best possible alignment. The road shall conform to intermediate standard of IRC and shall be constructed following the MoRT&H specifications and IRC standard.

2. Project Information:

The proposed road from Longding to Nokjan is located in Tirap District of Arunachal Pradesh under Longding Sub-Divisional Administrative Centre. The proposed road starts from Longding to Nokjan. The total length of the road is tentatively 31 Km of which there is an existing road on the proposed alignment from Longding to Chatting for a total length of 12 Km.

3. Objective:

The main objective of the study are as under:-

(i) To evolve the best possible alignment of the proposed road connecting possible obligatory points.

(ii) To carry out the engineering, economic and initial environmental and social studies of the proposed road.

(iii) To carry out the detailed engineering design of proposed road and bridge works and prepare cost estimates for obtaining sanction of the project.

4. Scope of the Consultancy Services:

The scope of the consultancy service is to:

(i) Conduct preliminary and detailed survey including reconnaissance, preliminary survey, pegging and trace cutting, final survey etc. as per IRC:52 and IRC:SP:48.

(ii) Collect inventory data and to conduct condition survey of roads, bridges, culverts etc as per IRC SP: 19-2001 and compile the information in the proforma given in appendix of IRC SP:19-2001 and in an acceptable computerized 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 disc of the present construction of the road in particular to the existence of authorized/unauthorized structures on either side of the road, existing road width and pavement condition.

(v) Collect Socio economic data of the project area.

(vi) Digging test pits at least 1m below the underside of the lowest pavement layer or upto 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), and deleterious constituents as per relevant IRC standard.

(vii) Determine the composition and thickness of existing pavement.

(viii) Conduct representative CBR test on the existing sub-grade as per IRC:37 in alternative kms.

(ix) Collect information about hydrology e.g. catchment characteristics, rainfall, stream/channel characteristics, design discharge, linear waterway, scour depth etc., for all cross drainage works and bridges. For bridge the project works shall comply with the IRC special publication No.54 "Project Preparation Manual for Bridges".

(x) Do drainage studies indicating general drainage pattern, HFL, water level, seepage flow, etc and prepare drainage design as per IRC guidelines.

(xi) Do investigate for naturally occurring materials and identify suitable quarries for these materials..

(xii) Conduct tests for the physical strength characteristics of aggregate materials as per relevant IRC standard.

(xiii) Trial pit should be dug at each culvert location as per IRC SP:13.

(xiv) Carry out geo-technical investigation and sub-surface exploration at all the proposed location of bridge (generally one boring may be done at each location of abutment and also at pier as per (IRC:78).

(xv) Carry out studies for environmental clearance requirement as per the guidelines of MOEF and IRC SP-19-2001, and assist the department by providing the data required like environmental clearance required, forest clearance required with numbers of trees to be cut etc.

(xvi) Prepare Detailed Design of road in all respect including the geometric design of road, pavement, culverts and bridges.

(xvii) Prepare detailed working drawings good for construction, prepared in international standard using CAD, containing all details required for execution of the project.

(xviii) Prepare Bill of Quantities and estimate on current SOR of the Arunachal Pradesh PWD.

(xix) Conduct economic analysis and sensitivities test for the project.

5. Quality Assurance Plan:

The consultant should have to ensure quality assurance in his work. All his work should be checked by a quality assurance team, which will be different from the team for the project. The consultant should submit the quality assurance plan and his team to the Chief Engineer (East Zone) AP PWD for approval at the time of submission of inception report.

6. Sequencing of Report Preparation:

The project preparation activities will be split into stages as brought out below. Each stage will covet a set of activities and shall be followed with a detailed report in respect of each stage. Time schedule in respect of all such activities will be indicated. Consultant shall be required to complete, to the satisfaction of the client all the different stages of study with the time frame indicated in the schedule of submission.

The stages are:

Stage I : Inception Report

A comprehensive inception report shall cover the following:-

i) Survey and investigation methodology.

ii) Project engineering

iii) Cost benefit and economic analysis.

iv) Schedule of works indicating various activities.

v) Quality assurance plan and team.

vi) Key persons to be engaged in the projects.

Stage II : Preliminary Project Reports

The preliminary project report shall cover the following:

(i) Alignment plan, longitudinal plan and representative cross section of formation work.
(ii) Siting of new bridge if any and the type of bridge to be provided showing with GAD of bridges.
(iii) Hydraulic data for major bridges and minor bridges.
(iv) Existing Road inventory and pavement condition assessment in standard format prescribed by IRC:SP 19:2001.
(v) Type of pavement proposed .
(vi) Typical design calculation of design of relevant components and structures.
(vii) Preliminary cost estimation.
(viii) Economic analysis.
(ix) Initial environmental clearance plan.

In nutshell the preliminary report shall be prepared as per the guidelines for preparation of project report contained in IRC: SP: 19 – 2001 covering the points mentioned above which need approval of the client for further detailed project preparation.

Stage III : Final Report

On convey of approval on the draft report by the department the final report of the project shall be prepared incorporating the modification and correction suggested by the department. The detailed final project report shall be prepared as per the guidelines given in IRC: SP: 19-2001, Para 17 covering the relevant points of reports, estimate and drawings. The action for forest and environmental clearance plan shall be brought out clearly.

7. Services and Facilities to be provided by the Govt.:

The department shall provide the facilities like, topographical maps and detailed statistics of the area as available in the department. Further the department will also liaise with the relevant department for collection of relevant data pertaining the socio economic status, forest regulation/act etc. The financial proposal of the consultant appointed is deemed to be inclusive of all other incidental to the survey and preparation of the projects reports.

8. 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.

A.	Key Personnel	Man-month
	Senior Highway Engineer-cum-Team Leader	3
	Highway Engineer	1
	Material-cum-Geotech / Foundation Engineer	1
	Bridge Engineer	1.5
	Senior Survey Engineer	1
B.	Specialist	
	Hydro-cum-Drainage Engineer	0.50
	Estimate Surveyor	1
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.

9. Reports:

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

(i)	Inception report	-	3 copies
(ii)	Draft report	-	3 copies
(iii)	Final report	-	7 copies (including one soft copy in CD)

10. Schedule of Services:

i)	Submission of inception report	-	15 days from the date of start
ii)	Submission of draft report	-	45 days from the date of approval of inception report
iii)	Submission of final report	-	30 days from the date of approval of draft report.

11. Payment Schedule:

Payment schedule for the work will be as follows:

i)	Submission of inception Report	-	20% of the total bid amount
ii)	Approval of draft Report	-	50% -do-
iii)	Submission of Final Report	-	20% -do-
iv)	Approval of final Report	-	10% -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.

12. 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.

13. 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 10% of the total consultancy fees to be received by him. The bank guarantee shall be valid for a period of 1 years from the date of submission of the final DPR. The final installment of 10% 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, organizing and managing of project preparation and construction of Road 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 10 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 10 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 10 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 (100 m 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.

6. MATERIAL ENGINEER CUM GEOTECHNICAL ENGINEER:

This position requires an Engineer who should be graduate in civil engineering or science with at least 10 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 line 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 10 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 commuting unit rates, quantities and costs.