

Modified Appendix-O

DETAILED EVALUATION CRITERIA

1. **First Stage Evaluation -Proof of Eligibility (Para 5.1 of Data Sheet)**
2. **Second Stage Evaluation -Technical Evaluation (Para 5.1 of Data Sheet)**
- 2.1 **Firm's Relevant Experience**

Following is the break-up:

| S. No. | Description | Maximum marks |
|--|--|---------------|
| I | Year of establishment of the firm (in case of JV, year of establishment of lead member shall be considered). | 2 |
| (i) | Up to 5 years: 1.5 marks | |
| (ii) | More than 5 years: 2 marks | |
| II | Average Annual Turnover (last three years) from consultancy business | 2 |
| (i) | < Rs 22.39 crore: 0 marks | |
| (ii) | Rs 22.39crore: 1.5 | |
| (iii) | Add for additional turnover 0.25 (zero point two five) mark for every Rs 11.19 crore above Rs 22.39 crore subject to maximum 0.5 marks. | |
| III | Experience in construction supervision/Independent Engineer/Authority's Engineer of a tunnel project** during the last 7 years of minimum length equal to or more than 1.94 km in a single stretch | 16 |
| (i) | < 1.94 km = 0 | |
| (ii) | ≥1.94 Km to 4.00 Km = 12 | |
| (iii) | >4.00 to 6.00 Km = 13 | |
| (iv) | >6.00 to 8.00 Km = 14 | |
| (v) | > 8.00 and equal to 10.00 Km = 15 | |
| (vi) | >10 and above = 16 | |
| IV | Experience in DPR preparation/Design/Feasibility Study of tunnel projects** of length equal to or more than 1.94 Km in a single stretch in last 7 years. | 5 |
| (i) | 1 project: 4 marks | |
| (ii) | Add 0.5 (zero point five) marks extra for each additional project subject to maximum 1 mark. | |
| Total | | 25 |
| Note 1: In case of JV the turnover and experience details of Lead and JV partners | | |

will be added for evaluation. Credentials of associate firm, except key personnel.

Note 2: Employer's certificate should be submitted substantiating the experience claimed by the firm.

****Tunnel Works** for road/rail/metro/Hydro Tunnel will be considered as applicable for the project for which the RFP is invited.

Note: (i) Weightage to be given when experience by a Firm as Sole Firm/Lead Partner in a JV/ Other Partner in a JV/As Associate

| Sl No. | Status of the firm in carrying out DPR/ Feasibility Study | Weightage for experience |
|--------|---|--------------------------|
| 1 | Sole firm | 100 % |
| 2 | Lead partner in a JV | 60%* |
| 3 | Other partner in a JV | 40 %* |
| 4 | As Associate | 25% |

* if the JV share is not available in the proposal.

2.2 Qualification and Competence of the Key Staff for adequacy of the Assignment. (Para 12.2 of Data Sheet and Enclosure II of TOR)

2.2.1 Team Leader cum Senior Tunnel Expert:

| Sl. No. | Description | Maximum Points |
|-----------|---|----------------|
| I | General Qualification | 25 |
| (i) | Graduate in Civil/Mining Engineering or equivalent | 20 |
| (ii) | Post-Graduate or chartered engineer in civil/Mining Engineering or equivalent | 5 |
| II | Adequacy for the Project | 70 |
| a i) | Total Professional Experience <25 years - 0 marks 25 years - 5 marks Add 1 mark extra for each additional year of experience subject to maximum 2 (two) marks. | 7 |
| a ii) | Total professional experience in handling major tunnelling projects (Road/Rail/Metro/Hydro Tunnel) <15 years - 0 marks 15 years - 6 marks Add 1 mark extra for each additional year of experience subject to maximum 2 (two) marks. | 8 |

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| a iii) | Experience in major tunnel construction/construction supervision projects (Road/Rail/Metro/Hydro Tunnel) in Developed countries & Middle East Countries. <10 years - 0 marks 10 years - 7 marks Add 1.5 marks extra for each additional year of experience subject to maximum 3 marks. | 10 |
| b | Experience in Similar Capacity | |
| b i) | Experience as Team Leader or similar capacity in construction supervision of major tunnel projects (Road/Rail/Metro/Hydro Tunnel) of length equal to or more than 1.94 Km <5 years - 0 marks 5 years - 7 marks Add 1.5 marks extra for each additional year of experience subject to maximum 3 marks. | 10 |
| b ii) | Experience as Team Leader or similar capacity of project Preparation/ Design of tunnel projects(Road/Rail/Metro/ Hydro Tunnel) of length 1.94 Km or more 1 Project - 8 marks Add 1 mark extra for each additional projects subject to maximum 2 marks. | 10 |
| b iii) | Experience as Team Leader or similar capacity in construction supervision of tunnels (Road/Rail/Metro/Hydro Tunnel) of length 1.94 km or more < 2 projects - 0 marks 2 Projects - 15 marks Add 1.25 mark extra for each additional projects subject to maximum 5(five) marks. | 20 |
| c) | Experience in construction supervision of major tunnel projects (Road/Rail/Metro/Hydro Tunnel) using NATM 1 project - 4 marks 2 or more projects - 5 marks | 5 |
| III | Employment with the Firm < 1 year - 0 marks > 1 year to 2 years - 2 marks > 2 years to 3 years - 3 marks > 3 years - 5 marks | 5 |
| | Total : | 100 |
| | Max Age = 65 Years | |

Note: As per RFP, Definition of Team Leader includes Project Manager/Resident Engineer/ or any equivalent position.

** tunnel projects, unless specifically mentioned, to be considered for evaluation has to be major tunnels of length equal to or more than 1.5 Km

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2.2.2 Resident cum Tunnel Excavation Expert:

| Sl. No. | Description | Max. Points |
|----------|--|-------------|
| 1 | General Qualification | 25 |
| | i) Graduate in Civil/Mining Engineering | 20 |
| | ii) Post graduate or Chartered in Civil/Mining Engineering | 5 |
| 2 | Adequacy for the Project | 70 |
| a i) | Total Experience in supervision of major Tunnel Projects (Road/Rail/Metro/Hydro Tunnel) < 15 years - 0 15 years - 12 marks Add 1 mark extra for each additional year of experience subject to maximum 3 (three) marks. | 15 |
| a ii) | Experience in construction supervision of major tunnelling projects (Road/Rail/Metro/Hydro Tunnel) in developed countries & Middle East Countries. < 7 years - 0 7 years - 7 marks Add 1.5 marks extra for each additional year of experience subject to maximum 3 (three) marks. | 10 |
| | Similar Capacity | |
| b i) | Experience as Tunnel Excavation Expert or similar capacity in construction supervision of major tunnelling projects (Road/Rail/Metro/Hydro Tunnel) < 10 years - 0 10 years - 7 marks Add 1.5 marks extra for each additional year of experience subject to maximum 3 (three) marks. | 10 |
| ii) | Experience as Tunnel Excavation Expert or similar capacity in construction supervision of tunnel projects (Road/Rail/Metro/Hydro Tunnel) of minimum length of 1.94 km (minimum one year supervision in a project) < 2 projects - 0 2 projects - 15 marks Add 2.5 marks extra for each additional projects subject to 5 (five) marks. | 20 |
| iii) | Experience as Tunnel Excavation Expert or similar capacity in tunnel design/ DPR/ preparation / feasibility study/design review involving major tunnel projects (Road/Rail/Metro/Hydro Tunnel) (minimum 1 year experience in a project) 1 project - 7 marks Add 1 mark extra for each additional projects subject to maximum 3 (three) marks. | 10 |

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| c | Experience in construction of major tunnel projects(Road/Rail/Metro/Hydro Tunnel) using NATM 1 project - 3 marks Add 1 mark extra for each additional projects subject to maximum 2 (two) marks. | 5 |
| 3 | Employment with the Firm < 1 year - 0 > 1year & upto 2 years -2 marks > 2 years & upto 3 years -3 marks > 3 years -5 marks | 5 |
| | Total : | 100 |
| | Note:- Max Age = 65 Years ** tunnel projects, unless specifically mentioned, has to be major tunnels of length equal to or more than 1.5 Km to be considered for evaluation | |

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2.2.3 TUNNEL DESIGN ENGINEER:

| Sl. No. | Description | Max. Points |
|---------|--|-------------|
| I | General Qualification | 25 |
| | i) Graduate in Civil Engineering | 20 |
| | ii) Post-Graduate in Structural Engineering | 5 |
| II | Adequacy for the Project | 70 |
| a. i) | Total Professional Experience <20 years - 0 20 years - 11 marks Add 1 mark extra for each additional year of experience subject to maximum 4 (four) marks. | 15 |
| a. ii) | Experience of design/ project preparation/ preliminary study involving major Tunnel (Road/Rail/Metro/Hydro Tunnel) projects in developed countries & Middle East countries. <10 years - 0 10 years- 7 marks Add 1 mark extra for each additional year of experience subject to maximum 3 (three) marks. | 10 |
| | Similar Capacity | |
| b. i) | Experience in tunnel design (Road/Rail/Metro/Hydro Tunnel) works in similar capacity <12 years - 0 12 years - 7 marks Add 1 mark extra for each additional year of experience subject to maximum 3 (three) marks. | 10 |
| b. ii) | Experience in similar capacity in Project Preparation/DPR involving design of tunnels (Road/Rail/Metro/Hydro Tunnel) of more than 1.94 km length (Min. 1 year experience in a project) < 3 projects - 0 3 projects - 11 marks Add 1 mark extra for each additional projects subject to maximum 4 (four) marks. | 15 |



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| b. iii) | Experience in similar capacity in construction/construction supervision projects involving design/design review of tunnels of more than 1.94 Km length (Min. 1 year experience in project) <2 projects - 0 2 projects - 7 marks Add 1.5 mark extra for each additional projects subject to maximum 3(three) marks. | 10 |
| c. i) | Experience in innovation tunnel design (Road/Rail/Metro/Hydro Tunnel) like immersed tunnel and sub-sea bored tunnel 1 projects - 4 marks 2 or more projects -5 marks | 5 |
| c. ii) | Experience in design tunnel projects(Road/Rail/Metro/Hydro Tunnel) using NATM 1 project - 4 marks 2 or more projects - 5 marks | 5 |
| III | Employment with the Firm < 1year - 0 >1 year to 2 years - 2 marks >2 years to 3 years - 3 marks > 3 years - 5 marks | 5 |
| | Total : | 100 |
| | Max Age =65 Years ** tunnel projects, unless specifically mentioned, has to be major tunnels of length equal to or more than 1.5 Km to be considered for evaluation | |

2.2.4 TUNNEL SAFETY EXPERT:

| Sl. No. | Description | Max. Points |
|---------|---|-------------|
| I | General Qualification | 25 |
| | i) Graduate in Civil/Mining Engineering | 20 |
| | ii) Diploma in Safety Measures from a recognized/statutory body on safety/health/shot firer. | 5 |
| II | Adequacy for the Project | 70 |
| a. i) | Total Professional Experience <20 years - 0 20 years - 11 marks Add 1 mark extra for each additional year of experience subject to maximum 4 (four) marks. | 15 |
| a. ii) | Experience Tunnel (Road/Rail/Metro/Hydro Tunnel) Safety Works <10 years - 0 10 years - 11 marks Add 1 mark extra for each additional year of experience subject to maximum 4 (four) marks. | 15 |
| a. iii) | International exposure in tunnel safety works in developed countries & Middle East Countries. <7 years - 0 7 years - 7 marks Add 1 mark extra for each additional projects subject to maximum 3 (three) marks. | 10 |
| | Similar Capacity | |
| b. i) | Experience in similar capacity of Tunnel Safety Audits during construction stage of tunnel projects(Road/Rail/Metro/Hydro Tunnel) of minimum length of 1.94 Km < 2 projects - 0 2 projects - 15 marks Add 1.25 mark extra for each additional projects subject to maximum 5 (five) marks. | 20 |

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| b. ii) | Experience in similar capacity of Tunnel Safety Audits in design stage on tunnel projects (Road/Rail/Metro/Hydro Tunnel) 1 project - 8 marks 2 or more - 10 marks | 10 |
| III | Employment with the Firm < 1year - 0 >1 year to 2 years - 2 marks >2 years to 3 years - 3 marks > 3 years - 5 marks | 5 |
| | Total : | 100 |
| | Max Age = 65 Years ** tunnel projects, unless specifically mentioned, has to be major tunnels of length equal to or more than 1.5 Km to be considered for evaluation | |

2.2.5 Senior Geotechnical Expert:

| Sl. No. | Description | Max. Points |
|---------|---|-------------|
| I | General Qualification | 25 |
| | i) Graduate in Civil Engineering / Masters in Engineering Geology or equivalent from a recognized university | 20 |
| | ii) Post Graduate in Rock Mechanics / Foundation Engineering/ Tunnel Engineering/Geotechnical Engineering | 5 |
| II | Adequacy for the Project | 70 |
| a. i) | Total Professional Experience <20 years - 0 20 years - 11 marks Add 1 mark extra for each additional year of experience subject to maximum 4 (four) marks. | 15 |
| a. ii) | Experience in Construction/ Construction Supervision of major tunnel projects(Road/Rail/Metro/Hydro Tunnel) in developed countries & Middle East Countries. < 12 years - 0 12 years - 10 marks Add 1 mark extra for each additional year of experience subject to maximum 5 (five) marks. | 15 |
| | Experience in similar capacity | |

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| b. i) | Experience as Geotechnical engineer or similar capacity in construction/ construction supervision of at least 4 tunnel projects(Road/Rail/Metro/Hydro Tunnel) of length equal to or more than 1.94 km < 4 projects - 0 4 projects - 17 marks Add 2 mark extra for each additional project subject to maximum 8 (eight) marks. | 25 |
| b. ii) | Experience as Geotechnical engineer or similar capacity in design/project preparation of tunnel projects(Road/Rail/Metro/Hydro Tunnel) of at least 1.94 km length < 2 projects - 0 2 projects - 11 marks Add 2 marks extra for each additional projects subject to maximum 4 (four) marks. | 15 |
| III | Employment with the Firm < 1 year - 0 > 1year & upto 2 years - 2 marks > 2 years & upto 3 years - 3 marks > 3 years - 5 marks | 5 |
| | Total : | 100 |
| | Note:- Max Age =65 Years ** tunnel projects, unless specifically mentioned, has to be major tunnels of length equal to or more than 1.5 Km to be considered for evaluation | |

2.2.6 SR. GEOLOGIST:

| Sl. No. | Description | Max. Points |
|---------|--|-------------|
| I | General Qualification | 25 |
| | i) Masters in Geology /Applied Geology from recognized university | 25 |
| II | Adequacy for the Project | 70 |
| a. i) | Total Professional Experience <20 years - 0 20 years - 15 marks Add 1 mark extra for each additional year of experience subject to maximum 5 (five) marks. | 20 |

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| a. ii) | Experience in major Tunnel construction/construction supervision Projects (Road/Rail/Metro/Hydro Tunnel) in Himalayan Region using NATM technology < 5 years - 0 5 years - 12 marks Add 1.5 marks extra for each additional year subject to maximum 3 (three) marks. | 15 |
| | Similar Capacity | |
| b. i) | Experience in major Tunnel(Road/Rail/Metro/Hydro Tunnel) Construction works in similar capacity < 7 years - 0 7 years - 12 marks Add 1 mark extra for each additional year of experience subject to maximum 3 (three) marks. | 15 |
| b. ii) | Experience in similar capacity in project preparation/DPR involving of major tunnel projects(Road/Rail/Metro/Hydro Tunnel). (Min 1 year experience in a project) <2 projects - 0 2 projects -7 marks Add 1.5 marks extra for each additional projects subject to maximum 3 (three) marks. | 10 |
| b. iii) | Experience in similar capacity in highway/ Rail/Metro/Hydro tunnel construction/construction supervision with minimum length of 1.94 Km < 2 projects - 0 2 project - 7 marks Add 1.5 marks extra for each additional projects subject to maximum 3 (three) marks. | 10 |
| III | Employment with the Firm <1 year -0 >1 year to 2 years - 2 marks >2 years to 3 years - 3 marks > 3 years - 5 marks | 5 |
| | Total : | 100 |

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| Max Age = 65 Years | |
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| ** tunnel projects, unless specifically mentioned has to be major tunnels of length equal to or more than 1.5 km to be considered for evaluation. | |
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2.2.7 TUNNEL VENTILATION CUM E&M EXPERT:

| Sl. No. | Description | Max. Points |
|---------|---|-------------|
| I | General Qualification | 25 |
| | i) Graduate in Electrical/Mechanical Engineering | 20 |
| | ii) Post-Graduate in Electrical/Mechanical Engineering | 5 |
| II | Adequacy for the Project | 70 |
| a. i) | Total Professional Experience <15 years - 0 15 years - 15 marks Add 1.25 mark extra for each additional year of experience subject to maximum 5 (five) marks. | 20 |
| | Similar Capacity | |
| b. i) | Experience as Tunnel Ventilation Expert or similar capacity in Construction Supervision/IC of major tunnel works(Road/Rail/Metro/Hydro Tunnel) < 7 years - 0 7 years - 10 marks Add 2.5 marks extra for each additional year of experience subject to maximum 10 (ten) marks. | 20 |
| b. ii) | Experience as Tunnel Ventilation Expert or similar capacity in construction supervision of tunnel (rail/road/metro/Hydro Tunnel) projects of minimum length of 1.94 km (Min 1 year experience in project) <3 projects - 0 3 projects - 10 Add 2.5 marks extra for each additional projects subject to maximum 5 (five) marks. | 15 |
| b. iii) | Experience as Tunnel Ventilation Expert or similar capacity in Designing of Tunnel (rail/road/metro/hydro) projects of minimum length of 1.94 km (Min 1 year experience in project) <3 projects - 0 3 projects - 10 Add 2.5 marks extra for each additional projects subject to maximum 5 (five) marks. | 15 |

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| 3 | Employment with the Firm < 1year - 0 >1 year to 2 years - 2 marks >2 years to 3 years - 3 marks > 3 years - 5 marks | 5 |
| | Total : | 100 |
| | Max Age =65 Years ** tunnel projects, unless specifically mentioned, has to be major tunnels of length equal to or more than 1.5 Km to be considered for evaluation | |

2.2.8 Contract Specialist:

| Sl. No. | Description | Max. Points |
|-----------|--|-------------|
| I | General Qualification | 25 |
| | i) Graduate in Civil Engineering | 20 |
| | ii) Post-Graduate in Law/ Dispute Resolution/Contract Management | 5 |
| II | Adequacy for the Project | 70 |
| a. i) | Total Professional Experience in Contract Management <20 years - 0 20 years - 15 marks Add 1 mark extra for each additional year of experience subject to maximum 5 (five) marks. | 20 |
| | Similar Capacity | |
| b. i) | Experience as Contract Expert or similar capacity in major roads/ highway projects < 10 years - 0 10 years - 10 marks Add 1 mark extra for each additional year of experience subject to maximum 5 (five) marks. | 15 |
| c. i) | Experience of contract management of major roads/ highway projects over Rs 500 crore including experience of handling variation orders, claims of the contractor < 4 projects - 0 4 projects - 12 Add 1 mark extra for each additional project subject to maximum 3 (three) marks. | 15 |

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| c. ii) | Experience of Handling Arbitration cases/Dispute resolution/Adjudication in respect of any road/highway project 1 project - 10 marks Add 2.5 marks extra for each additional project subject to maximum 10 (ten) marks. | 20 |
| III | Employment with the Firm <1year-0 >1yearto2years-2marks >2yearsto3years-3marks > 3 years - 5 marks | 5 |
| | Total : | 100 |
| | Max Age =65 Years | |

2.2.9 INSTRUMENTATION AND CONTROL (SCADA) EXPERT:

| Sl. No. | Description | Max. Points |
|------------|--|-------------|
| I | General Qualification | 25 |
| | i) Graduate in IT/ Comp Sc./ Electrical/ Electronics/Civil/ Instrumentation/ Mechanical | 20 |
| | ii) Post-graduate in Engineering | 5 |
| II | Adequacy for the Project | 70 |
| i) | Total Professional Experience <15 years - 0 15 years - 12 marks Add 1 mark extra for each additional year of experience subject to maximum 3 (three) marks. | 15 |
| ii) | Experience in system requirement, installation and commissioning of all the subsystems and equipment required for remote operation and control devices similar to SCADA in any infrastructure project. < 10 years - 0 10 years - 15 marks Add 2.5 marks extra for each additional year of experience subject to maximum 10 marks | 25 |
| iii) | Experience in at least 7 years experience in hardware configuration, system tuning, application development, documentation including operation and maintenance < 7 years - 0 7 years - 10 Add 1.25 marks extra for each additional year of experience subject to maximum of 5 marks | 15 |
| iv) | Experience in handling at least 2 surveillance and security systems projects 2 project - 10 marks Add 2.5 marks extra for each additional project subject to maximum 5 (Five) marks. | 15 |
| III | Employment with the Firm < 1year - 0 >1 year to 2 years - 2 marks >2 years to 3 years - 3 marks > 3 years - 5 marks | 5 |
| | Total : | 100 |
| | Max Age = 65Years | |

List of Developed Countries & Middle East Countries

Ref: 1. Enclosure-B (Qualification and Experience) of Section-6(Terms Of Reference) of RFP.
2. Modified Appendix-O (Detailed Evaluation Criteria) of section-7(Draft Form Of Contract)

| | |
|------------------------------|--------------------------|
| 1. United States | 26. Luxembourg |
| 2. Germany | 27. Cyprus |
| 3. Italy | 28. Japan |
| 4. Netherlands | 29. Canada |
| 5. Austria | 30. Australia |
| 6. Portugal | 31. Sweden |
| 7. Ireland | 32. Hong Kong SAR |
| 8. Slovenia | 33. Czech Republic |
| 9. Estonia | 34. Israel |
| 10. Malta | 35. New Zealand |
| 11. United Kingdom | 36. Egypt |
| 12. Korea | 37. Iran |
| 13. Taiwan Province Of China | 38. Turkey |
| 14. Switzerland | 39. Iraq |
| 15. Singapore | 40. Saudi Arabia |
| 16. Norway | 41. Yemen |
| 17. Denmark | 42. Syria |
| 18. Iceland | 43. Jordan |
| 19. Euro Area | 44. United Arab Emirates |
| 20. France | 45. Israel |
| 21. Spain | 46. Libya |
| 22. Belgium | 47. Lebanon |
| 23. Greece | 48. Oman |
| 24. Finland | 49. Kuwait |
| 25. Slovak Republic | 50. Qatar |
| | 51. Bahrain |



Modified Enclosure B

QUALIFICATION OF KEY PERSONNEL

TEAM LEADER CUM SENIOR TUNNEL ENGINEER

Duties: The Team Leader will reside at project site throughout the period of construction supervision services. He will be overall in-charge of the project supervision of the construction package. He shall act as representative of the consulting firm appointed by the Authority. His duties will involve overall superintendence over the Resident Engineers and other experts of the construction package. He will guide, monitor, supervise and control all the activities related to supervision for the construction package. He will interact with the Project Director/ General Manager and the other officials of the Authority.

He should have the following qualification / experience

(1) Essential Qualifications.

- (a) Graduate in Civil/Mining Engineering or equivalent from a recognized university.
- (b) Total professional experience 25 years
- (c) Professional Experience of 15 years in handling major tunnelling projects (Road/Rail/Metro/Hydro Tunnel)
- (d) He should be involved in at least 10 years in construction/construction supervision of major tunnel projects in developed countries & Middle East countries.
- (e) At least 5 years' experience as Team Leader/Resident Engineer/Project Manager or similar capacity in transportation tunnel projects of length equal to or more than 1.94 km
- (f) He should have handled as Team Leader/Resident Engineer/Project Manager or similar capacity of at least two projects in Construction Supervision of tunnel projects (Road/Rail/Metro/Hydro) equal to more than 1.94 Km length
- (g) Not more than 65 years of age.

(2) Preferential Qualifications.

- (a) Post Graduate in civil/mining engineering or chartered engineer in civil/Mining Engineering or equivalent.
- (b) Supervision experience of Tunnel projects (Road/Rail/Metro/Hydro) constructed through NATM methodology

Note: (1) Similar Capacity includes the following positions

- i) On behalf of Consultant : Team Leader / Resident Engineer/Professional Engineer/Chartered Engineer (Construction Supervision/IE/AE).



- ii) On behalf of Contractor : Project Manager/ Professional Engineer/Chartered Engineer (Construction/ Construction Supervision)
- iii) In Government Organizations : Superintending Engineer (or equivalent) and above
- (2) Only those projects will be considered for evaluation at Sl no 1(d), 1(e) and 1(f) where the input of the personnel is at least of one year.



RESIDENT ENGINEER CUM EXCAVATION SPECIALIST

Duties: He shall oversee construction supervision of the project stretch and shall coordinate with all other experts of the project and shall report to the Team Leader. He shall be directly responsible for regulating the construction process. He shall be assisted by Tunnel Engineers, Tunnel Lining Experts and Tunnel ventilation Expert and other support engineers/personnel. He shall deal directly with the tunnel engineers/experts and other support staff attached with the Team Leader to ensure that the construction process is well controlled as per established specification controls to avoid later quality control stage problems. Expert shall be responsible for checking and verifying the excavation plan and methodology submitted by the Contractor. He shall monitor the tunnel excavation activities including blasting. He shall also monitor the tunnel lining activities including installation of water proofing layers. He will be required to be fielded throughout the Currency of the project. The candidate is expected to be thoroughly familiar with various standard/specifications, contract procedures, Primavera or other project management software, design and quality control etc. In addition he will be responsible for tunnel works during Operation & Maintenance period of the project.

He should have the following qualification / experience.

(1) Essential Qualifications.

- (a) Graduate in Civil/Mining Engineering from a recognized University.
- (b) Total Professional Experience of 15 years in supervision of major Tunnel construction Projects
- (c) He should have atleast 10 years experience in similar capacity for major tunnel construction projects (Road/Rail/Metro/Hydro)
- (d) Atleast 7years' experience in major transportation tunnel construction projects in developed countries & Middle East Countries.
- (e) Should have handled construction/construction supervision of atleast 2 Tunnel projects(Road/Rail/Metro/Hydro) of length equal or more than 1.94 km
- (f) Should have experience of NATM technology in construction of at least 1 major tunnel project (Road/Rail/Metro/Hydro).
- (f) Not more than 65 years of age.

(2) Preferential Qualifications.

- (a) Post Graduate or chartered engineer in civil/mining



TUNNEL DESIGN ENGINEER

Duties: The Tunnel Design Engineer shall be responsible for checking the designs of tunnel/design review and other incidental works to be constructed in the Project using sophisticated computer software. He shall be responsible for Detailed Design Calculation and drawing for tunnels. He shall be responsible for comprehensive assessment of structural condition of all the tunnel assets. His expertise shall include computer aided design methods for Tunnel Engineering with particular reference to Tunnel design

He should have the following qualification / experience.

(1) Essential Qualifications.

- (a) Graduate in Civil Engineering from a recognized University.
- (b) Professional Experience of 20 years out of which 7 years should be in transportation tunnel design as design expert
- (c) Experience of 10 years in design of major tunnel projects (Road/Rail/Metro/Hydro) in developed countries & Middle East Countries.
- (d) Experience in similar capacity in construction/construction supervision of 2 tunnel projects (Road/Rail/Metro/Hydro) of length atleast equal to 1.94 Km each
- (e) Experience in similar capacity in design of 3 tunnel projects (Road/Rail/Metro/Hydro) of length atleast equal to 1.94 Km each
- (f) Experience in design of transportation tunnel using NATM technology
- (g) Not more than 65 years of age.

2) Preferential Qualifications.

- (a) Post Graduate in Engineering in structural engineering
- (b) Innovative transport tunnel design like immersed tunnel and sub-sea board tunnel

SENIOR GEO-TECHNICAL EXPERT

Duties: He will be responsible for supervising all the tests to be done in different stages of construction, besides ensuring that specified tests are done as per codal stipulations and as per the specifications laid down in the contract for all the different stages of construction. The Senior Geotechnical Engineer shall be responsible for checking and verifying the Specifications for Geotechnical investigations and the geotechnical details submitted by the Contractor. He shall assist the Team Leader & Tunnel Design Engineer in design of tunnel. He shall monitor the tunnel excavation activities including blasting.



He should have the following qualification / experience.

(1) Essential Qualifications.

- (a) Graduate in Civil Engineering/masters in engineering geology or equivalent from a recognized University.
- (b) Professional Experience of 20 years
- (c) Experience of 12 years in Construction / Construction Supervision of transportation tunnel projects in developed countries
- (d) Experience as Geotechnical Engineer in Construction/Construction Supervision of at least 4 transportation Tunnel projects of length equal to or more than 1.94 Km
- (e) Experience in similar capacity in project preparation of at least 2 major tunnel projects (Road/Rail/Metro/Hydro) each of minimum 1.94 Km in length
- (f) Not more than 65 years of age.

2) Preferential Qualifications.

- (a) Post Graduate in Rock Mechanics/ Foundation Engineering/ Tunnel Engineering/Geotechnical Engineering.

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TUNNEL SAFETY EXPERT

Duties: The Tunnel Safety Expert shall be responsible for checking and verifying the Safety Plan prepared by the Contractor. He will also ensure effective implementation of the Safety Plan, undertake safety audits during Construction, Operation and Maintenance of the Tunnel.

(1) Essential Qualifications.

- (a) Graduate in Civil/Mining Engineering from recognized university.
- (b) Total Professional Experience of 20 years
- (c) Experience of 7 years in transportation tunnel safety management in developed countries & Middle East Countries.
- (d) At least 10 years' experience in tunnel safety works (Road/Rail/Metro/Hydro).
- (e) Experience in similar capacity of tunnel safety audits during construction stage of at least 2 tunnel projects (Road/Rail/Metro/Hydro) each of which should be minimum 1.94 km in length
- (f) Not more than 65 years of age.

(2) Preferential Qualifications.

- (a) Diploma in Safety Measures from a recognized/statutory body in safety/health/shot firer/ Explosives.



SENIOR GEOLOGIST

The Senior Geologist shall be responsible for checking and verifying the geological details submitted by the Contractor. He shall assist Team Leader & Tunnel Design Engineer in design of Tunnel. He shall monitor the tunnel excavation activities including blasting. The candidate should have exposure of working in Himalayan region and good understanding of rock and soil mechanics. He should have experience of tunnel works with appropriate design software.

The candidate should be a Post Graduate in Geology preferably with exposure in Himalayan region. He should have a minimum 20 years of professional experience of geological works, out of which 5 years should be in similar capacity for tunnelling design/ construction projects in the Himalayan region.

(1) Essential Qualifications.

- (a) Masters in Geology/Applied Geology from recognized university.
- (b) Total Professional Experience of 20 years
- (c) At least 7 years experience in similar capacity in construction/construction supervision of tunnel projects (Road/Rail/Metro/Hydro)
- (d) Experience of 5 years of construction/construction supervision of major tunnel projects (Road/Rail/Metro/Hydro) in the Himalayan region using NATM technology
- (e) He should have handled at least 2 major tunnel projects (Road/Rail/Metro/Hydro) of construction/construction supervision in similar capacity of 1.94 Km length each
- (f) Not more than 65 years of age

(2) Preferential Qualifications.

- (a) He should have handled at least 2 major tunnel projects (Road/Rail/Metro/Hydro) in similar capacity in project preparation/DPR.

CONTRACT SPECIALIST

Duties: He will be deployed for obtaining his expert opinion on emerging contractual issues. His key responsibilities will be to guide and assist Team Leader/Employer in all aspects of contract management in proper implementation of contract provisions including controlling the project cost of the construction package. He will also be required to offer his advice on contractual complications arising during the implementation on the request of the employer. He will be required to prepare manuals/schedules for the consultants team/employer based on the provisions of the contract document. He will be responsible for giving appropriate suggestions in handling claims of the contractors and any dispute arising thereof.



(1) Essential Qualifications.

- (a) Graduate in Civil Engineering from a recognized University.
- (b) Professional Experience of 20 years in Contract Management.
- (c) Experience of at least 10 years as Contract Specialist on Highway or major road projects.
- (d) Experience in similar capacity of Contract Management of 4 large Highway or major road contracts of over Rs.500 crores including experience of handling Variation orders, claims of the contractor.
- (e) Experience of handling Arbitration cases/Dispute Resolution/Adjudication in similar capacity for major roads or Highway projects.
- (e) Not more than 65 years of age.

(2) Preferential Qualifications.

- (a) Masters/Post graduate in Law/contract management/Dispute resolution

TUNNEL VENTILATION CUM E&M EXPERT

Duties: The Tunnel Ventilation Cum E&M Expert shall be responsible for checking and verifying the adequacy of design of Ventilation system during construction and O&M Period. He shall be responsible for checking and verifying the Specifications for Ventilation equipments. He will also monitor the installation, testing and operation and maintenance of the Ventilation equipments and system as a whole

(1) Essential Qualifications.

- (a) Graduate in Electrical/Mechanical Engineer from a recognized university.
- (b) Total Professional Experience of 15 years
- (c) At least 7 years experience in similar capacity in construction/construction supervision of tunnel projects (Road/Rail/Metro/Hydro)
- (d) He should have handled in similar capacity in construction/ construction supervision of at least 3 tunnel projects (Road/Rail/Metro/Hydro) each of minimum 1.94 Km in length
- (e) He should have handled in similar capacity in designing of Tunnel at least 3 tunnelling projects (Road/Rail/Metro/Hydro) each of minimum 1.94 Km in length
- (f) Not more than 65 years of age.

(2) Preferential Qualifications.

- (a) Post graduate in Electrical/Mechanical

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INSTRUMENTATION AND CONTROL (SCADA) EXPERT

Duties: He will be reporting to the Team Leader and give input as and when required during the work. He should have comprehensive knowledge of application of current technologies, standards and best practices relating to SCADA system in infrastructure projects. He should have experience in CCTV, AID dynamic, LAN and WAN. The Instrumentation and Control (SCADA) Expert shall be responsible for checking and verifying the adequacy of design, installation and maintenance of SCADA related applications and databases of the tunnel during construction as well as during operation and maintenance. He shall ensure the application of modern standard technologies and best practices relating to Tunnel SCADA system.

He should have the following qualification / experience.

(1) Essential Qualifications.

- (a) Graduate in IT/ Comp Sc./ Electrical/ Electronics/Civil/ Instrumentation/ Mechanical from a recognized university.
- (b) Total Professional Experience of 15 years
- (c) He should have minimum of 10 years experience in system requirement, installation and commissioning of all the subsystems and equipment required for remote operation and control devices similar to SCADA in any infrastructure project
- (c) He should have handled at least 2 surveillance and security systems projects
- (d) Atleast 7years experience in hardware configuration, system tuning, application development, documentation including operation and maintenance
- (e) Not more than 65years of age.

(2) Preferential Qualifications.

- (a) Post Graduate Degree in engineering



Note: Guidance for uploading CVs on INFRACON:

(i) TEAM LEADER CUM SENIOR TUNNEL ENGINEER

| Preferential Qualifications | | |
|-----------------------------|---|--|
| 1 | Supervision experience of transportation Tunnel projects constructed through NATM methodology | The relevant experience of NATM methodology to be mentioned under Description of Duties. |

(ii) RESIDENT ENGINEER CUM EXCAVATION SPECIALIST

| Essential Qualifications | | |
|--------------------------|--|--|
| 1 | Should have experience of NATM technology in construction of transportation tunnel | The relevant experience of NATM methodology to be mentioned under Description of Duties. |

(iii) TUNNEL DESIGN ENGINEER

| Essential Qualifications | | |
|-----------------------------|--|---|
| 1 | Experience in design of transportation tunnel using NATM technology | The relevant experience of NATM methodology to be mentioned under Description of Duties. |
| Preferential Qualifications | | |
| 2 | Innovative transport tunnel design like immersed tunnel and sub-sea board tunnel | Experience in Innovative transport tunnel design like immersed tunnel and sub-sea board tunnel to be mentioned under Description of Duties. |

(iv) TUNNEL SAFETY EXPERT

| Essential Qualifications | | |
|--------------------------|---|--|
| 1 | Experience of 7 years in transportation tunnel safety management in developed countries & Middle East Countries | Experience in Transportation Tunnel Safety Management to be mentioned under Description of Duties. |
| 2 | At least 10 years' experience in transportation tunnel safety works | Experience in Transportation Tunnel Safety Works to be mentioned under Description of Duties. |

(v) SENIOR GEOLOGIST

| Essential Qualifications | | |
|--------------------------|--------------------------|----------------------------------|
| 1 | Experience of 5 years of | Experience in Tunnel Projects in |

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| | | |
|--|---|--|
| | construction/construction supervision of major transportation tunnel projects in the Himalayan region using NATM technology | Himalayan region using NATM methodology to be mentioned under Description of Duties. |
|--|---|--|

(vi) CONTRACT SPECIALIST

| Essential Qualifications | | |
|---------------------------------|--|--|
| 1 | Experience in similar capacity of Contract Management of 4 large Highway or major road contracts of over Rs.500 crores including experience of handling Variation orders, claims of the contractor | Experience in Handling Variation orders, claims of the contractor to be mentioned under Description of Duties. |

(vii) INSTRUMENTATION AND CONTROL (SCADA) EXPERT

| Essential Qualifications | | |
|---------------------------------|--|---|
| 1 | He should have minimum of 10 years experience in system requirement, installation and commissioning of all the subsystems and equipment required for remote operation and control devices similar to SCADA in any infrastructure project | Such experience to be mentioned under Description of Duties. |
| 2 | He should have handled at least 2 surveillance and security systems projects | The relevant experience is to be mentioned under Description of Duties. Experience certificate should also be uploaded. |
| 3 | At least 7years experience in hardware configuration, system tuning, application development, documentation including operation and maintenance | The relevant experience to be mentioned under Description of Duties and experience certificate should be uploaded. |

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SUB PROFESSIONAL (To be evaluated for their suitability by Employer's Representative, before deployment)

A. Quantity Surveyor

He will be reporting to the Resident Engineer in day to day working and will work under his guidance and shall abide by the directions/procedures/formats of reporting and approvals settled by the Sr. Quantity Surveyor. He will be responsible for reporting all measures required to control the project cost and time over-runs. He will examine the claims of the contractor, variation orders, if any, and will prepare the progress reports as per the project requirements. For the purpose, he will be required to get the levels and quantity measurements checked in all items of works executed in different stages for calculations required for payment purpose. He will be required throughout the currency of the project.

The candidate should be a graduate in Civil Engineering with relevant experience in the field of estimating, preparation and processing of the invoices, analysing rates, checking survey details etc. of the projects. He should have about 10 years of relevant professional experience involving resource planning and scheduling, quantity survey, cost control, contract management etc in any National/State Highway Projects. He should not be more than 65 years of age.

B. Tunnel Engineer:

The Tunnel Engineer shall be responsible for checking and verifying construction methodology. He shall be monitoring the construction activities.

The candidate should be a graduate Civil/Mining Engineer from a recognized university. He should have 10 years of total professional experience and should have worked for at least 5 years as Tunnel Engineer for tunnel construction projects. He should have handled at least 2 major tunnelling projects in similar capacity. He should not be more than 65 years of age.

C. Tunnel Excavation Expert:

The Tunnel Excavation Expert shall be responsible for checking and verifying the excavation plan and methodology submitted by the Contractor. He shall monitor the tunnel excavation activities including blasting.

The candidate should be a graduate civil/Mining Engineer from a recognized university. He should have 10 years of total professional experience and should have worked for at least 5 years as Tunnel Excavation Expert for tunnel construction projects. He should have handled at least 2 major tunnelling projects in similar capacity. He should not be more than 65 years of age.



D. Tunnel Lining Expert:

The Tunnel Lining Expert shall be responsible for checking and verifying the adequacy of lining plan and methodology submitted by the Contractor. He shall monitor the tunnel lining activities including installation of water proofing layers.

The candidate should be a graduate Civil/Mining Engineer from a recognized university. He should have 10 years of total professional experience and should have worked for at least 5 years as Tunnel Lining Expert for tunnel construction projects. He should have handled at least 2 major tunnelling projects in similar capacity. He should be not more than 65 years of age.

E. Geologist:

The Geologist shall be responsible for checking and verifying the geological details submitted by the Contractor. He shall assist the Senior Geologist during the construction of the tunnel. He shall monitor the tunnel excavation activities including blasting. The candidate should have degree in Geology/applied Engineering geology preferably with exposure in Himalayan region. He should have a minimum 10 years of professional experience of geological works, out of which 5 years should be in similar capacity for tunneling design/construction projects. He should have handled at least 2 major tunneling projects in similar capacity. The candidate should have good understanding of rock and soil mechanics and have experience with appropriate design software. He should be not more than 65 years of age.

F. Material Engineer:

He will be responsible for supervising all the tests to be done in different stages of construction, besides ensuring that specified tests are done as per codal stipulations and as per the specifications laid down in the contract for all the different stages of construction. He will be coordinating and controlling the support personnel placed with him and will report to the Resident Engineer and to the Team Leader/Employer's representative as and when required. He must be familiar with material property of road construction material, technical specifications and procedures of material tests and testing equipments. He should be Graduate in Civil Engineering from a recognized University. He should have Professional Experience of 10 years in construction of Highways / Roads / Airfield Runways. He should also have experience as Material / Geotechnical Engineer in Construction/Construction Supervision of at least 2 Highway projects/Tunnel Projects. He should not be more than 65 years of age.



G. Safety Engineer:

The Safety Engineer shall assist the Tunnel Safety Expert in checking and verifying the Safety Plan prepared by the Contractor. He will also ensure effective implementation of the Safety Plan, assist the Tunnel Safety Expert in undertaking safety audits during Construction, Operation and Maintenance of the Tunnel. He/She should be Graduate in Civil Engineering from recognized university and a Total Professional Experience of 15 years. He/She should have at least 5 years' experience in transportation tunnel safety works and Experience in similar capacity of tunnel safety audits during construction stage of at least 1 transportation tunnel projects each of which should be minimum 2.5 km in length. He/She should not more than 65 years of age. Any professional Certification from a recognized/statutory body in safety/health/shot firer/ Explosives shall be preferred.

H. Environmental Expert:

He will be responsible effective implementation of the EMP during Construction, Operation and Maintenance of the Tunnel. The Candidate should be post Graduate in Civil Engineering/Environmental Engineering or other relevant qualification with experience of working in the Himalayan region for at least 2 projects. He should have at least 15 years experience out of which 3 years in highway projects. He should have good knowledge of MOEF guidelines/requirements for mitigation measures. He should be not more than 65 years of age.

I. Cad Expert:

He should be Graduate in Civil Engineering/Computer Science having experience in computer related design method for highway engineering. The incumbent should have 3 years experience and should have handled at least 1 road project/Tunnel Project. He should be not more than 60 years of age.

J. Lab Technicians:

They should be at least Diploma-holders with about 5 to 6 years of experience in handling the quality control tests laboratories for road/Tunnel/Bridge works or Graduates in Science with about 1 to 2 years of relevant experience in the field of testing of Road/Tunnel/Bridge projects.



K. Bridge/Structural Engineer

Duties: His duties will involve understanding the design provisions of both bridges/ROBs/flyovers and culverts guiding and checking of reinforcement/cable laying operations, rectifying any apparent mistakes in respect of them, checking and controlling the proper form work, laying/compacting of concrete including curing operations. He will be responsible for minor modifications in design of bridges/culverts, whenever required during execution. He should be graduate in Civil Engineering from a recognized University. He should have Total professional Experience of 10 years out of which 7 years experience in Construction / Construction Supervision of Bridge/interchange/ any other structure. He should have supervised at least two projects in similar capacity and should demonstrate experience of working in hill region along with knowledge of design of bridges using computer aided bridge design software. He should be not more than 65 years of age.

L. Highway Engineer:

Duties: He shall be responsible for the review of highway design and drawing using sophisticated computer software. He shall be responsible for supervising the work of highway and pavement to be constructed by the contractor for the project.

The highway engineer requires a graduate degree in civil engineering. He should have 15 years of professional experience out of which at least 10 years in highway projects in similar capacity and should demonstrate experience of working in hill region.



(V.K.Singh)
Executive Director (T)