Consultancy Services for Design Review and Supervision of construction works of

"Naushehro Feroz - Ranipur Section" of M-6 Motorway (Section 4) and "Ranipur - Sukkur Section" of M-6 Motorway (Section 5)

TERMS OF REFERENCE (TOR)

6(673)

Funded by:
Islamic Development Bank (IsDB)

Implemented by:
National Highway Authority, Ministry of Communication, Government of Pakistan

Contents

CHAPTER-1
INTRODUCTION

1.1 Overview

A robust and efficient transportation network is a cornerstone of national economic development. The establishment of such infrastructure is critical for a country's growth and economic vitality. Recognizing this, National Highway Authority (NHA), Ministry of Communication, Government of Pakistan, intends to construct Sukkur–Hyderabad Motorway (M-6). The six-lane, 306 Km long controlled-access motorway will form a critical connection between the port city of Karachi and the nation's interior, thereby facilitating trade links with the People's Republic of China, Afghanistan, and the Central Asian States. As the final segment of the Peshawar-Karachi Motorway (PKM), the M-6 project represents a transformative infrastructure initiative for Pakistan.

The M-6 Motorway originates at Km 130+000 of the existing Karachi-Hyderabad (M-9) Motorway and terminates at the commencement of the Sukkur-Multan (M-5) Motorway. Its route traverses multiple urban centers, including Jamshoro, Hala, Nawabshah, Dadu, Moro, Naushahro Feroze, Mehrabpur, Rasoolpur, Larkana, Khairpur, and Sukkur. The project design incorporates major interchanges at key points: the origin with the M-9, the Indus Highway (N-55) at Jamshoro, the National Highway (N-5) near Hyderabad and Nawabshah, and at the cities of Hala, Dadu, Miranpur, Mirabpur, Rasoolpur, and Khairpur, concluding with a terminal interchange at Sukkur. To ensure construction efficiency and permit phased development, the project is structured into following sections:

I. Hyderabad to Tando Adam (57.38 Km)

II. Tando Adam to Nawabshah (63.51 Km)

III. Nawabshah to Noushero Feroz (64.61 Km)

IV. Noushero Feroz to Ranipur (60.90 Km)

V. Ranipur to Rohri (59.88 Km)

Due to the Government of Pakistan's financial constraints, the National Highway Authority (NHA) is pursuing the M-6 Motorway through a multi-modes financing strategy, including hybrid models, foreign investment, and Public-Private Partnerships (PPP). Among the key international partners is the Islamic Development Bank (IsDB), of which Pakistan is a member. The IsDB's mandate to promote economic development and infrastructure in member countries has translated into partial funding for the M-6 project. Noushero Feroz to Ranipur, Section IV (60.90 Km) and Ranipur to Sukkur Section V (59.88 Km), is directly financed by the IsDB. Upon completion, the motorway is projected to substantially reduce travel

time, enhance road safety, stimulate economic growth, and improve the efficiency of trade logistics from Karachi Port to the interior of Pakistan and international borders.

Nestled within the Sindh province of Pakistan, Naushahro Feroze, Ranipur and Sukkur are neighboring towns intricately linked by geography and economy, yet each possesses a distinct character rooted in the region's rich history.

Naushahro Feroze, the larger district headquarters, serves as a vital administrative and agricultural hub, with its historical significance further underscored by the presence of the Kalhora Mosque in the village of Dali on the Kandiaro Road, a structure of notable architectural and historical importance.

Just a short distance away, the historic town of Ranipur is situated in northern Sindh, approximately 50 Km from Khairpur and 30 Km from the ancient Kot Diji fort. Ranipur has carved out its own significant niche, historically known for handicrafts and now for its burgeoning industry, but it is perhaps most notable as the home of the famous shrine of the Sufi poet Sachal Sarmast, a site of immense spiritual and cultural significance which showcases exquisite examples of traditional Sindhi tilework.

Sukkur is a major urban and commercial metropolis, strategically positioned on the banks of the Indus River. It serves as a critical transportation and trade nexus for the entire province, famous for engineering marvels like the Lansdowne Bridge and the Sukkur Barrage, which commands one of the largest irrigation systems in the world.

Together, the towns form a complementary pair, with Naushahro Feroze offering a blend of agrarian strength and historical legacy, while Ranipur contributes industrial energy and serves as a major spiritual and heritage center and Sukkur commands one of the largest irrigation systems in the world these twons/cities pulsating with the enduring cultural traditions of rural Sindh.

An initiative by the Islamic Development Bank (IsDB) to fund a motorway between Naushahro Feroze, Ranipur and Sukkur would be a transformative investment, catalysing multi-faceted development across the region. Ultimately, the IsDB's funding would not just build a road, but would lay the foundation for a dynamic economic zone, fostering sustainable growth, poverty alleviation, and improved living standards for the over 1.6 million people of the district by strategically leveraging the unique strengths of both cities.

This Terms of Reference (TOR) pertains to hire a consultancy firm (the "Consultant") for the purpose of carrying out design review and construction supervision of Noushero Feroz to Ranipur (60.90 km),

Section IV and Ranipur to Sukkur section-V (59.88 Km) of Hyderabad – Sukkur Motorway (M-6).

1.2 NEED OF ASSESSMENT

Noushero Feroz to Ranipur (Section IV) (60.90 km):

Section IV of Hyderabad – Sukkur Motorway (M-6) connecting Naushahro Feroze and Ranipur is a critical infrastructure necessity to fully unlock the region's integrated economic potential. Currently, the synergy between Naushahro Feroze's agricultural and administrative functions and Ranipur's growing industrial and spiritual tourism sectors is hampered by inadequate road links. A motorway would create a high-speed, efficient corridor, drastically reducing transport times and costs for goods. This would allow agricultural produce from Naushahro Feroze to reach Ranipur's industries and markets more reliably, while also facilitating the movement of manufactured goods and construction materials like ceramics. Furthermore, it would significantly boost tourism by providing seamless access for the thousands of pilgrims visiting the Sachal Sarmast shrine in Ranipur and tourists exploring the historical Kalhora Mosque in Naushahro Feroze, weaving these sites into a more accessible cultural circuit. Ultimately, such a project would transform two adjacent but distinct towns into a powerful, unified economic zone, attracting further investment, creating jobs, and driving regional development across northern Sindh.

The M-6 Motorway will establish unified, high-speed connectivity between Hyderabad the second-largest city in Sindh and the major commercial center of Sukkur. More than a mere highway, this project constitutes a strategic investment in Pakistan's economic future, engineered to facilitate the movement of goods and people, stimulate trade, and enhance logistical efficiency. By bridging this critical gap in the nation's infrastructure, the M-6 is dignified to play an indispensable role in consolidating Pakistan's national transportation network.

Ranipur to Sukkur (Section V) (59.88 km):

Section V of Hyderabad – Sukkur Motorway (M-6) connecting Ranipur and Sukkur is a critical infrastructure necessity to fully unlock the region's integrated economic potential. A motorway connecting Ranipur and Sukkur is a strategic imperative to bridge the economic and logistical gap between these two powerhouses. Currently, the potential synergy between Ranipur's spiritual tourism and industrial output and Sukkur's vast distribution networks and urban markets remains underutilized due to

inadequate road links. A modern motorway would dramatically reduce travel time, providing Ranipur's industries with efficient, high-speed access to Sukkur's national transport corridors, ports, and trade routes. Simultaneously, it would unlock a massive tourism potential, enabling a seamless flow of pilgrims and visitors from Sukkur and beyond to the Sachal Sarmast shrine. This vital infrastructure would not just connect two towns; it would fuse a center of culture and production with a center of commerce and distribution, catalyzing regional development, attracting investment, and creating a more integrated and prosperous economic zone in northern Sindh.

The M-6 Motorway will establish unified, high-speed connectivity between Hyderabad the second-largest city in Sindh and the major commercial center of Sukkur. More than a mere highway, this project constitutes a strategic investment in Pakistan's economic future, engineered to facilitate the movement of goods and people, stimulate trade, and enhance logistical efficiency. By bridging this critical gap in the nation's infrastructure, the M-6 is dignified to play an indispensable role in consolidating Pakistan's national transportation network. The anticipated benefits of construction of M-6 are multifold, encompassing:

a) The M-6 Motorway constitutes the final segment required to complete the 1,800-kilometer Peshawar-Karachi Motorway (PKM), a vital artery for uninterrupted national freight and passenger movement. Its completion will establish continuous, high-speed connectivity between the Port of Karachi and key metropolitan centers, including Lahore, Islamabad, and Peshawar. The corridor is projected to reduce travel time between Hyderabad and Sukkur from over six hours to approximately 3.5 hours, significantly enhancing logistical efficiency. Furthermore, the motorway will fortify Pakistan's position within regional trade networks by strengthening international linkages with China, Afghanistan, and Central Asia.

b) The initiative is expected to generate substantial employment opportunities throughout its construction and operational phases, providing direct socioeconomic benefits to local communities. Enhanced road infrastructure will improve access to essential services such as healthcare, education, and emergency response for populations along the corridor. By connecting rural and semi-urban areas to major commercial hubs, the project will foster local economic development and contribute to elevated living standards.

c) The access-controlled, high-speed design of the motorway will facilitate faster transit times, lower fuel consumption, reduced vehicle operating costs, reduced traffic congestion, and a corresponding decrease in greenhouse gas emissions. Currently, the overburdened

National Highway (N-5) serves as the primary route between Hyderabad and Sukkur, which is characterized by high accident rates and impeded cargo movement. The M-6 will alleviate this congestion by diverting heavy-goods vehicles, ensuring safer and more efficient travel. Incorporating controlled access, modern safety features, and dedicated service areas is anticipated to significantly reduce accident frequency and enhance overall travel comfort.

d) The segregation of traffic flows, combined with strategically located emergency response centers, will substantially elevate road safety standards along the corridor.

e) A fully operational, high-speed motorway network is critical for optimizing the national freight logistics chain and enhancing trade efficiency. This is particularly salient within the framework of the China-Pakistan Economic Corridor (CPEC), where the M-6 will function as a key conduit for regional commerce.

f) The province of Sindh, a hub for agriculture, industry, and commerce, is critically dependent on efficient transport links. The M-6 will expedite market access for businesses, thereby boosting industrial activity in urban centers such as Hyderabad, Tando Adam, Nawabshah, Moro, Khairpur, and Sukkur. The project is poised to stimulate broader economic growth by attracting investment in real estate, logistics, and industrial zones along its route. Concurrently, improved accessibility is expected to enhance provision of healthcare and education services for the population of interior Sindh, while also promoting local business and tourism.

g) The implementation of advanced systems including an Intelligent Transportation System (ITS), modern tolling, comprehensive surveillance, and the construction of numerous river crossings and major structures will facilitate significant technical skills transfer and enhance the engineering capabilities of Pakistan's workforce.

h) By diverting a substantial volume of traffic from the National Highway (N-5), the M-6 will alleviate congestion on the existing infrastructure. This reduction in load will result in less frequent road damage and lower long-term maintenance requirements for the N-5.

1.3 PROJECT DEFINITION

Construction of Noushero Feroz to Ranipur (60.90 km), Section IV and Ranipur to Sukkur section-V (59.88 Km) of Hyderabad – Sukkur Motorway (M-6).

1.4 Technical parameters

Configured as a dual three-lane carriageway with flexible pavement, Construction of Noushero Feroz to Ranipur (60.90 km), Section IV and

Ranipur to Sukkur section-V (59.88 Km) of Hyderabad – Sukkur Motorway (M-6) project encompasses engineering structures, including bridges, flyovers, and subways, to facilitate grade-separated movement. A summary of standards and specifications, the principal technical inputs and project scope is presented in subsequent sections.

1.4.1 Standards and Specifications

The following standards and specifications shall be adopted for the construction of Noushero Feroz to Ranipur (60.90 Km), Section IV and Ranipur to Sukkur (59.88 Km), section V of Hyderabad – Sukkur Motorway (M-6):

a) National Highway Authority (NHA) Specifications
b) International Best Practices and Guidelines for the Safe System Approach Design[1]
c) International Industry Practice (e.g., WBG EHS Guidelines, OSHA etc.).
d) American Association of State Highway and Transportation Officials (AASHTO): A Policy on Geometric Design of Highways and Streets (Latest) for Geometric Design.
e) Highway Capacity Manual, by the United States Transportation Research Board for the analysis of roadway capacity;
f) AASHTO: Guide for Design of Pavement Structures (1993) for the design of pavements.
g) Pakistan Highway Code of Practice for Bridges and American Society for Testing and Materials (ASTM) for the analysis and design of structures
h) Guide to Integrating Safety into Road Design, Transport Global Practice, 2022 such as:
   i. Guide for Safe Speeds, Managing Traffic Speeds to Save Lives and
   ii. Improve Livability, International Bank for Reconstruction and
   iii. Development / The World Bank, 2024.
   iv. Road Safety Manual, World Road Association (PIARC), 2003,
   v. iRAP specifications, manuals and guides, including Road Survey and crash risk mapping,

[1] International Best Practices and Guidelines include, but not limited to:
i. Guide to Integrating Safety into Road Design, Transport Global Practice, 2022
ii. Guide for Safe Speeds, Managing Traffic Speeds to Save Lives and Improve Livability, International Bank for Reconstruction and Development / The World Bank, 2024.
iii. Road Safety Manual, World Road Association (PIARC), 2003,
iv. iRAP specifications, manuals and guides, including Road Surey and crash risk mapping,
v. Practical Guide for Road Safety Auditors and Inspectors, PIARC, 2022,
vi. Road Crash Trauma, Climate Change, Pollution, and the Total Cost of Speed, Global
vii. Road Safety Facility – World Bank, 2020.

vi. Practical Guide for Road Safety Auditors and Inspectors, PIARC, 2022,
vii. Road Crash Trauma, Climate Change, Pollution, and the Total Cost of Speed, Global Road Safety Facility – World Bank, 2020.

1.4.2 Traffic

Based on comprehensive surveys and analysis, a traffic forecast for the new facility has been completed. This was accomplished through a detailed survey program, including three days of continuous 24-hour classified traffic counts and one day of 12-hour Origin-Destination (OD) surveys at key locations along the entire alignment. From this data, the section-wise modeled traffic, expressed as Annual Average Daily Traffic (ADT), has been calculated. This final ADT is the sum of the traffic diverted from existing routes and the new traffic expected to be generated by the new alignment itself.

Based on year 2025 traffic data, the volume between Naushahro Feroze and Ranipur is 14,06 vehicles per day. The vehicle composition is dominated by 3-axle trucks, which account for 33% of the traffic, while cars and jeep taxis make up 26%. This traffic volume is anticipated to grow significantly, with forecasts projecting it to reach 33,634 by 2050 vehicles per day by the year 2050 with increase of 58%.

Based on year 2025 traffic data, the volume between Ranipur and Sukkur is 14,582 vehicles per day. The vehicle composition is dominated by 3-axle trucks, which account for 36% of the traffic, while cars and jeep taxis make up 22%. This traffic volume is anticipated to grow significantly, with forecasts projecting it to reach 35,838 by 2050 vehicles per day by the year 2050 with increase of 59%.

1.4.3 Geometric Design

The following key parameters are the basis for the geometric design.

a) Design Speed : 130 Km/hr
b) Posted Speed : 120 Km/hr
c) Lane Width : 3.65 m each
d) Carriageway Width: 10.95 meters
e) Inner Shoulder : 1.0 meters
f) Outer Shoulder : 3 meters
g) Rounding of the slope: 0.5 meters
h) Pavement Cross Slope : 2.0%
i) Cross Slope Shoulder : 4.0%
j) Embankment Side Slope: 2 :1
k) Right of Way (On both sides): 100 m

l) Maximum Super Elevation: 6%
m) Min. Radius of Horizontal Curves: 951 meters
n) Min. K (in Crest) Vertical Curves: 124 meters
o) Min. K (in Sag) Vertical Curves: 73 meters
p) Ruling Gradient : 2~3%
q) Maximum Gradient : 6%
r) Minimum Gradient : 0.30

1.4.4 Pavement Design

The pavement structure has been designed for a service life of 10 years. Based on comprehensive soil classification and representative California Bearing Ratio (CBR) testing, the design CBR values have been adopted as 5% for Embankment, 25% for Improved Subgrade, 50% for Sub-base and 80% for Aggregate Base Course. Based on the accumulative 110.53/150.24/131.57 million are worked out for 10 years design life. The layer thicknesses for the pavement structure are detailed as follows:

a) Main Road

Asphaltic Wearing Course:	50 mm
Asphaltic Base Course:	200/210/222 mm
Aggregate Base Course:	200 mm
Granular Subbase:	150 mm
Improved Subgrade:	300mm

b) Shoulder (both Sides) of Main Road

Triple Surface Treatment (TST)	
Aggregate Base Course	400/410/420 mm
Subbase Course	180 mm

c) Interchanges

Asphaltic Wearing Course:	50 mm
Asphaltic Base Course:	130mm
Aggregate Base Course:	200 mm
Granular Subbase:	150 mm
Improved Subgrade:	300mm
CBR > 25%:	

d) Shoulder (both Sides) of Interchange

Triple Surface Treatment (TST)	
Aggregate Base Course	350mm
Subbase Course	150 mm

1.4.5 Hydrology:

Overall alignment lies in region, which has hot summer and mild winter. The alignment crosses by a number of irrigation channels and natural streams/nullahs. The size of cross-drainage structures at irrigation channels are fixed by their design discharges or keeping in view their planned or future remodeling requirements. The hydrological study for cross-drainage structures of various perennial and non-perennial natural streams/nullahs has been carried out. Estimation of design flood discharges have been made at each crossing location for various return period. Hydraulic analysis has been carried out to location and size of the cross-drainage structure against the peak discharge of the selected return period.

1.5 PROJECT OBJECTIVES:

The primary objectives of the project are:

a) To ensure the seamless flow of traffic along the Hyderabad–Sukkur segment of the Peshawar-Karachi Motorway (PKM).

b) To establish an intelligent, high-efficiency transport corridor that serves domestic and international traffic, thereby fostering balanced and sustainable economic development across Pakistan through tangible benefits such as minimized vehicle operating costs and intangible gains like time savings and congestion-free access.

c) To finalize the Peshawar-Karachi Motorway (PKM) by constructing its last segment, thereby guaranteeing seamless national road connectivity, reinforcing the transportation network between the provinces of Sindh, Punjab, and Khyber Pakhtunkhwa, and linking major urban and industrial centers to enhance the movement of goods, passengers, and commerce.

d) To augment regional economic integration by improving transportation efficiency for industries, thereby reducing freight costs, bolstering competitiveness, and supporting key sectors such as agriculture, manufacturing, and trade through streamlined logistics for raw materials and finished goods.

e) To stimulate long-term economic growth by attracting private investment in industrial zones, logistics hubs, and real estate developments along the motorway corridor.

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CHAPTER NO.2

DESCRIPTION OF THE PROJECT

2.1 Location of the project

The project is located in Sindh Province of Pakistan. The location is shown in Figure 2-1.

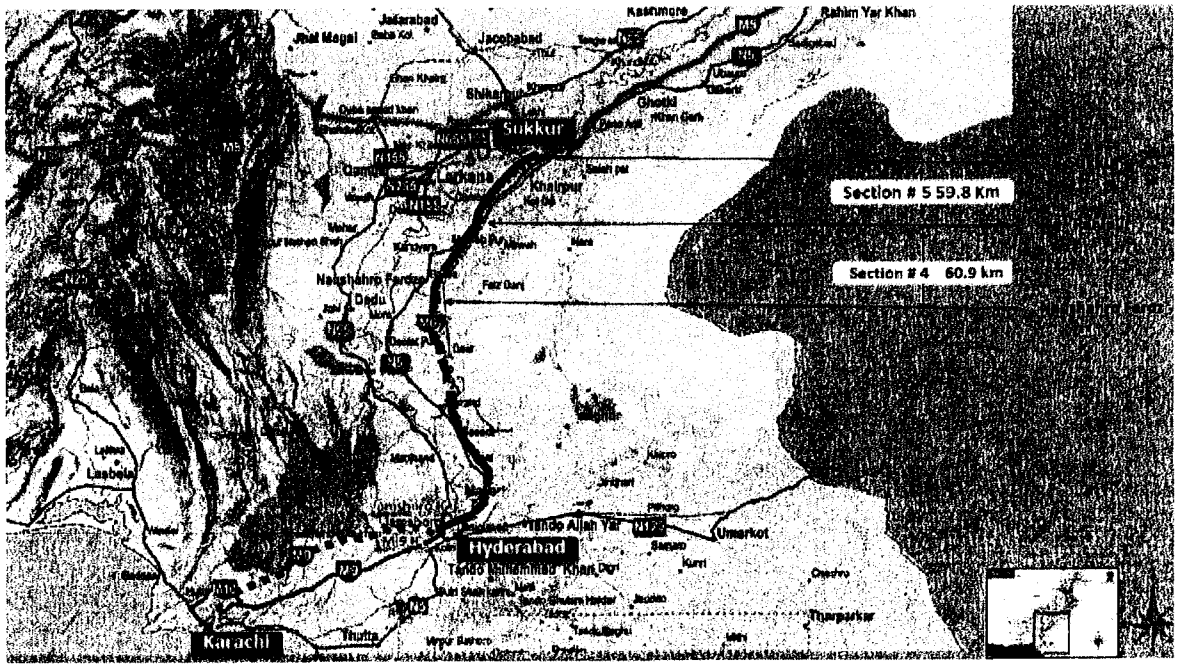

Figure-2-1 Location of Section IV and Section V

2.2 Consultant Services

The Consultant will be responsible for the design review and construction supervision. The consultant will (but not limited to) the following:

a) Review all the design elements of both sections.
b) Supervise the construction Works of both sections.
c) Demonstrate a comprehensive quality control and quality assurance process for the motorway design and supervision.
d) Supervise Contractor's Traffic management and comprehensive plan for diverting traffic keeping in view of the traffic safety and will assure same during the construction supervision.
e) Facilitate the NHA in implementing and monitoring the Resettlement and Relocation (R&R) of informal settlers and entities operating within the right-of-way as per the RAPs.
f) Assure safety of human life including client, contractor and consultant's own staff during execution of civil work and diversion traffic (when and where required).
g) Supervise occupational and community health, and safety management plans of the contractor to protect health and safety of the

Employer, the Contractor, workers, the Engineer and the members of the communities in close proximity of worksites during construction including traffic safety, and sexual exploitation abuse/sexual harassment (SEA/SH).

h) Assure environmental management during pre-construction, construction and decommissioning as per the Contractor's Environmental and Social Management Plan (C-ESMP).

i) Assist NHA in audit of the project. The consultant will be equally responsible for any ambiguity. The assistance of consultant will remain intact upto settlement of audit para.

j) Prepare revised PC-I up to approval and coordination with original Design consultant (if required) (cost will be built in its bid).

k) Prepare PC-IV (up to approval) (cost will be built-in its bid).

l) Final Payment Shall not be processed until PC-IV and PC-V prepared & Processed.

m) Provide along with the hard copies dually certified soft/scanned copies of all the documents prepared/used/referred etc. during the contract period. The soft/scanned copies shall be stored in the appropriate storage media like external hard disk in a secure and structured manner. The scanned copies must have proper file names/titles etc. in appropriate folders for quick retrieval. The soft/scanned provided by the consultant must have third party certification and traceability. The consultant will be responsible for maintaining confidentiality of the record of the project.

n) Be responsible for quality of work, timely execution (details are given in other chapters of TOR). However, it is highlighted that all expenditure for preparation of Revised PC-I and PC-IV up to approval from concerned forum will be built-in the consultants bid.

o) Be responsible to client without any extra expenditure in settlement of Audit Para's, preparation of Revised PC-I and PC-IV even after conducting construction activities up to finalization and approval of all subject documents.

2.3 TIME OF START

The services shall commence immediately after signing of the contract agreement.

2.4 TIME OF COMPLETION

The period of implementation for the project is 30 months.

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CHAPTER NO. 3
DESIGN REVIEW

3.1 INTRODUCTION

This chapter presents detailed scope of services in respect of design review, to be carried out by the Consultant under the supervision of NHA project authorities [GM(Project) or Project Director]. The consultant will submit all deliverables to the project authorities, and the project authorities will be required to ensure that the services are carried out by the consultant in a timely manner in accordance with project requirements, duly keeping in view the approved PC-I.

3.2 OBJECTIVES

The main objective of design review is to identify and accordingly address any discrepancies, ambiguities, deficiencies, errors/omissions in detailed design drawings and supporting reports in an unbiased manner to ensure the following:

- Improvement/optimization of design without any compromise on safety, soundness, and economy.
- Validity, practicality, and completeness of design.
- Compliance of design with applicable design codes, standards, policies, specifications, SoPs, and approved PC-I.
- Consistency between detailed design drawings and supporting reports.

3.3 SCOPE OF SERVICES

Consultant will be responsible for coordination among all stakeholders. Major tasks in scope of services include but are not limited to following:

a) Kick-off Meeting & Site Visit

The Consultant will hold kick-off meeting with NHA project authorities, and present approach & methodology along with detailed timelines for carrying out services under this ToR. Any other aspects may also come under discussion. Project authorities will issue Minutes of Kick-off Meeting. Subsequently, the Consultant will coordinate with the project authorities and conduct a detailed site visit. A **Site Visit Report** will subsequently be submitted by the Consultant.

b) Data Collection

The Consultant will develop effective liaison with the Design Consultant (M/s NESPAK) to collect all design data, reports, documents, and drawings to initiate design review in a timely manner. The project authorities will be required to check and ensure that the Design Review Consultant develops close liaison with the Design Consultant and collects relevant records in a timely manner.

c) Inception Report

The Consultant will carry out review of documents to determine appropriate Criteria, Codes, Standards, and Policies for Design Review to

ensure that the Design Review Criteria is in complete harmony with the original Design Criteria.

The Consultant will prepare and submit **Draft Inception Report** to project authorities which should contain but not necessarily limited to initial review findings and the recommended Design Review Criteria, Codes, and Standards etc. along with clear-cut recommendations.

The project authorities will develop direct timely liaison with Design Consultant and seek their comments/action on Draft Inception Report and then share their comments with Design Review Consultant for consideration and further appropriate action.

Subsequently, **Final Inception Report** will be prepared and submitted by the Design Review Consultant to project authorities.

d) Joint Cross-Sections

The project authorities may task the Consultant to read joint cross-sections with the Contractor by undertaking all necessary activities, especially related to traverse control network and benchmarks etc. besides other benefits, this may also help in verifying and improving the accuracy of BoQ.

e) Design Review Report

The Consultant will carry out comprehensive reviews of all drawings/ documents duly considering the approved PC-I, and site requirements/conditions, and accordingly update the detailed design. The aspects to be reviewed, checked, and updated include but NOT limited to the following: -

- Geometric design / Plan & Profile and supporting documents viz. Geometric Design Report, Topographic Survey Report and Plans (including validation of benchmarks/ monuments / Traverse control points, and addressing any errors in horizontal & vertical control etc.)
- Pavement design and related documents e.g. Traffic & Axle Load Survey, Soil & Material Investigation.
- Structural design and available supporting investigations e.g. Geotechnical Investigation Report.
- Cross-drainage and road surface drainage and supporting studies e.g. Hydrology & Hydraulic Study Report. The consultant will be responsible for comprehensively updating the Hydrology & Hydraulic Study Report and subsequently incorporating all necessary revisions into the detailed design to ensure climate and flood resilience.
- Environmental impact / management aspects.
- Road Safety aspects / features.
- Bill of quantities / Engineer's Estimate.
- Any other aspects not covered above.

A **Draft Design Review Report** will be prepared and submitted to project authorities which should be self-explanatory and identify any discrepancies, deficiencies, errors/omissions in the design along with clear-cut recommendations and related cost effect (if any).

The project authorities will develop direct liaison with Design Consultant and seek their comments/action in light of Draft Design Review Report and then share the same with Design Review Consultant for consideration and further appropriate action.

Subsequently, **Final Design Review Report** will be prepared and submitted by the Design Review Consultant to project authorities. Any need for revision of PC-I will be identified in a timely and responsible manner and appropriate action taken accordingly.

f) Construction Drawings

Construction Drawings, complete in all respects, will be prepared by Consultant in a timely manner and subsequently issued by *The Engineer* to the Contractor under relevant Conditions of Contract.

g) As-Built Drawings

As-built Drawings, complete in all respects, will be prepared by the Consultant in a timely manner and submitted to project authorities.

h) Audit Observations/Inquiries etc.

The Consultant will actively assist NHA in addressing any audit observations/inquiries/investigations related to design review aspect, when and where required.

3.4 DELIVERABLES & MODE OF PAYMENT

The Consultant is required to quote Lump Sum (LS) cost for the services mentioned in preceding paras by keeping in view that these services may be spread on the whole project duration. The LS cost must be exhaustive i.e., inclusive of all taxes, direct & indirect costs etc. The mode of payment is as under: -

Sr. No.	Deliverable / Service	Percentage of 'Lump Sum Cost'
(i)	Draft Inception Report	2.50%
(ii)	Final Inception Report	2.50%
(iii)	Draft Design Review Report	15.00%
(iv)	Final Design Review Report	30.00%
(v)	Construction Drawings *Note: As preparation of Construction Drawings will be an ongoing/progressive activity, therefore the project authorities may develop further breakdown for payment against this activity in order to suit project requirements and timelines.*	30.00%
(vi)	As-Built Drawings	10.00%
(vii)	Final Sets of hard & soft copies of all deliverables listed in Sr (i) to Sr (vi) above:	-
	Five (05) signed & stamped hard copies	*5.00%*
	Five (05) USBs containing soft copies (signed & stamped PDF format)	*2.50%*
	Five (05) USBs containing soft copy (Original editable format)	*2.50%*
	Total	**100.00%**

Payment will be processed/approved by Project Authorities by keeping in view the following: -

A. Any service reflected in ToR but not mentioned in Mode of Payment or vice versa should be duly carried out without failure. Moreover, if any service is mentioned in ToR but not reflected in Mode of Payment then its cost will be deemed to be built-in the services mentioned in the Mode of Payment.
B. A checklist should be attached by the consultant with each submission/deliverable which should correctly correlate the deliverable to the requirements spelled out in ToR.
C. Upon initial submission of deliverables, partial payment up to 50% may be approved by project authorities of NHA. Remaining payment against any deliverable/service may be approved when the following conditions are fulfilled:
    1. The consultant certifies that the deliverable is complete & correct in all respects, and compliant with the ToR, duly indicating any exceptions/deviations from ToR. If the consultant fails to provide said certificate or the final deliverable has any quality issues, then partial or full payment against the deliverable may be deducted besides adverse performance rating of consultant. This deduction will not absolve the consultant of any penalty on account of delayed submissions.
    2. The consultant certifies that comments (if any) from the Design Consultant and project authorities have been duly considered and incorporated where agreed.
    3. Project authorities reserve the right to retain some payment till the time services under this ToR are completed/concluded in all respects.

3.5 MANPOWER REQUIREMENT

For technical evaluation, the Consultant will provide CVs of the following key staff:

Sr. No.	Position	Nos.
1.	Senior Highway Engineer (Team Leader)	01
2.	Pavement Engineer/Expert	01
3.	Structural Engineer/Expert	02
4.	Geotechnical Engineer/Expert	02
5.	Hydrologist / Road Drainage Expert	02
6.	Certified Road Safety Auditor	01

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CHAPTER NO.4

CONSTRUCTION SUPERVISION

4.1 DETAILED SCOPE OF WORK COVERING CONSTRUCTION SUPERVISION FOR SUPERVISORY CONSULTANT

4.1.1 Supervision Manual

Within three (3) months after signing the Contract, or otherwise agreed with the NHA, but not later than two weeks prior to the commencement of construction works, the Consultant shall produce a Supervision Manual which includes but not limited to the following:

- Construction quality and quality assurance.
- Organization of site daily supervision (including team composition).
- Standard formats (correspondence, notifications, diaries, acts) to be used.
- Standard tests and forms.

4.1.2 Activities during the construction

The Consultant shall carry out the Construction Supervision in accordance with the FIDIC Conditions of Contract for Construction, MDB Harmonized Edition, June 2010, appointed by the Employer (NHA) to act as Engineer for purpose of this Contract.

The Consultant will ensure the mobilization of site-specific supervision teams for the supervision for the Project works as per the Contract.

4.1.3 Responsibilities

The responsibility of supervision shall rest with the Engineer as per FIDIC condition of contractor who shall issue instructions in writing to the Supervisory Consultants for the supervision of works as per the Contract. As the Engineer's Representative, the Consultants' authorized representative and other staff will implement the Works Contract and ensure that the Works are constructed in accordance with its provisions. The Consultant will have all the powers defined in the FIDIC Conditions of Contract as being the Engineer / Engineer's Representative. Supervisory Consultants shall carry out a revision in the plans and specifications as required by the Engineer and prepare all change orders instantly thereto and shall further assist the Engineer in negotiations necessary for execution of the

changes. Such revisions shall be encouraged which result in improved project performance, in accordance with the plans and conforming to the specifications.
The Supervisory Consultants shall carry out (but not limited to) the following tasks:

a) Make sure execution of works professionally as per design, standards, specification and technical construction drawings.

b) Intimate NHA in each matter and must obtain formal approval from NHA to proceed in the matter.

c) Assure quality of the works during execution by using suitable and tested construction material as per contract provision.

d) Ensure the good quality construction survey work, levels and grade achieved during and after construction.

e) Make sure the continuous supervision/inspection of the soils, materials construction operations and the works with regard to workmanship and compliance with the specifications.

f) Certify the payment bills of Contractor according to the approved procedure and also maintain the payment record maintaining consolidated project accounts and assist NHA for settlement of Audit Para's.

g) When and where required work closely with NHA, Construction Contractor(s),to improve the safety and efficiency of the Traffic Management Plans (TMPs) during construction. Make sure the existing traffic management and safety plan all times in a safe and secure manner. The TMPs should also minimize the disruptions to travelers and communities.

h) Monitor and appraise progress of the works for timely completion of work. Review and accept or reject Contractor's proposed work schedules.

i) Prepare the revised PC-I of the project and will be responsible to incorporate all changes up to final approval from the relevant forum.

j) Work closely to improve the Project's climate resilience, safety, environmental and social (ES), and digital project management:
   i. Review integration of climate mitigation and adaptation measures into the Project design and construction.
   ii. Work with to integrate safety improvement measures into the Project design and construction.

iii. Integrate environmental and social (ES) risk management measures identified in the ES assessments including ESIA, ESMP, RAP, RPF, GAPF, LMP, SEP, and ESAP, into Project design and construction.

iv. Work with to improve air quality and noise levels along the project. Verify the noise forecasts to the sensitive receptors and work with the contractor on the effective noise control measures in consultation with NHA.

v. Work in developing, deploying, and utilizing the DPMS for digital project management and control.

4.2 GOVERNING RESPONSIBILITIES AND DUTIES OF SUPERVISORY CONSULTANT

4.2.1 Application of Standards, Specifications and Engineering Decisions

The Supervisory Consultants will be fully responsible for the execution of work in accordance with standards and specifications and technical construction drawings. The Consultants shall supervise the Work's Contracts, make engineering decisions, be responsible for quality assurance, provide general guidance and furnish timely response to the Contractors in all matters relating to the Works.

4.2.2 Intimation and Approval by NHA

The Consultant shall:

a) Advise NHA on all matters relating to the efficient and successful execution of the Works Contracts, and shall act at all times so as to protect the interests of the project and shall take all reasonable steps to keep all expenses to a minimum, consistent with sound economic and engineering practices. Supervisory Consultants will intimate and will get approval of any decision from NHA regarding change in Design to initiate Variation Order, Extension of time etc.

b) Advise NHA on need for effective liaison with local authorities, police, landowners, utility owners, the public and other organizations affected by the Works in order to minimize or avoid unnecessary delays or disputes.

c) Assist for settlement of the Audit Paras and enquiries (if any) pertaining to the Project without any time restriction and

remuneration to be made separately on this account. The cost to be incurred may be built in the rates.

d) Jointly inspect with NHA the completed Works, and assist in formal taking over review and approve "as built" drawings and plans, provide report(s) testifying to the satisfactory completion of the contract.

e) After completion of work the consultant will prepare a punch list of all deficiencies (if exist) and will handover to NHA with proper remedial measures. Provide any other specialist services requested by NHA under conditions to be mutually agreed.

4.2.3 Project Management

The Consultants shall assist NHA in all matter related to proper execution of project as per contract and NHA Standard and specification but not being limited to the following:

a) Assist NHA for the establishment of the basic overall project construction schedule, budget and cash disbursement schedule.
b) Assist NHA for establishment and implementation of a project management system and procedures to monitor and control the cost and time schedule to enable timely corrective measures.
c) To coordinate, supervise, and support the decision-making actions by NHA concerning engineering and design matters during the construction stage in order to ensure that quality control and engineering standards are consistently maintained throughout the project within cost and time constraints.
d) Assist NHA for setting up of an effective reporting system of project progress and status to the management of NHA.
e) Prepare realistic construction schedules, showing the anticipated progress of Works and expenditures of the contract package.
f) Review and approval of proposal on variation orders and implementation schedule prepared by the Contractor.
g) Issue monthly-consolidated progress reports on a format to be agreed with NHA including payment estimates and comments on the Contractors' work program, and advise NHA of any problem or potential problems which might arise and cause delay in implementation and recommend corrective action(s) to be taken.
h) Monitor and control progress of Works and initiate corrective measures, if required.

4.2.4 Construction Supervision

The Supervisory Consultants shall be fully responsible that the Works

are executed in accordance with the plans, grade as per specifications of NHA as per contract. The Supervisory Consultants shall carry out the Construction Supervision ensuring the following items:

a) Stake the centerline, ROW limits and relocation of roadway structure and appurtenance;

b) Setting of Grade-stakes;

c) Relocation of Grade-stakes;

d) Soil Tests;

e) Concrete Tests;

f) Reinforced Bar Tests;

g) Structural Steel Tests;

h) Others Tests as deemed necessary;

i) Inspect and evaluate Contractors' facilities material testing laboratory items to ensure compliance with the specifications and terms and conditions of the Contract Agreement. Without relieving the Contractors of their obligations under the Contract, monitor the Contractors' laboratory testing, evaluate the Portland cement concrete and bituminous mixture designs prepared by the Contractors, and recommend improvements (if any), Monitor the concrete Batching and laying as per approved mix design & specifications, maintaining asphalt invoices record, transportation, Asphalt Mixing and laying as per Job Mix Formula and specifications, carry out the testing of steel and High Tensile wire / cable for Stressing as per Specifications and also monitor the Stressing activity as per approved procedure and Specifications and also ensure the desired performance, and accord approval thereof;

j) Assure quality of the works during construction, continuously inspect the soils and materials, construction operations and the Works with regard to workmanship and compliance with the specifications; and carry out independent testing in the field and/or in the "Engineer / Project Manager" laboratory, and approve or disapprove and certify the Works that conform with the specifications and maintain permanent records of results of all the tests made;

k) Give notice to the Contractors of any defects and deficiencies, and issue instructions for the removal and substitution of the improper works, where provided under the contract. If required, order suspension of the Work(s) and/or recommend to NHA other

recourse available under the Contract;

l) Without relieving the Contractors of their obligations under the Contract, review and approve the traffic management and safety plan, and ensure compliance such that the Works are carried out at all times in a safe and secure manner and damage or injury to persons or property is avoided;

m) Inspect quarries and borrow pits, and crushing plants and order tests of materials and ensure adherence to specifications, and approve the sources of materials.

n) Traffic disruptions during construction are a potential high risk to cause widespread disruptions to travelers and communities. Therefore, the Consultant shall work closely with NHA, Construction Contractor(s) to improve the safety and efficiency of the Traffic Management Plans (TMPs) during construction. To make sure the existing traffic management and safety plans have been implemented all times in a safe and secure manner.

o) The Consultant should work closely with NHA, Construction Contractor(s), and other relevant entities to develop Traffic Evacuation Plans (TEPs) for potential natural disasters such as floods and earthquakes. (This will be part of the Project's climate resilience aspect in Design Review Report).

4.2.5 Quantity Measurement and Quality Control

The Consultant shall:

a) Provide advance advice to NHA concerning the Schedule of handing over of sites, and possible delays due to lack of possession with a view to assure that the Contractors are given Possession of Site in accordance with the agreed work programs;

b) Review and approval of proposal on variation orders and implementation schedule prepared by the Contractor.

4.2.6 Approval of Construction Methodology and Equipment of Contractor

a) Review, evaluate and approve the planned construction methodology by the Contractor and ensuring that the Contractor has incorporated the most effective and expeditious methodology of carrying out the Works; and ensure in setting up a computerized project control system for reporting physical and financial progress by the Contractor as well as the forecasts, if included in the bids and/or if demanded

later on by the NHA. Subsequently, closely monitor the construction progress on regular basis to determine whether it is proceeding in accordance with the approved work program.

b) Advising on the selection of Contractor's equipment. Assess minimum construction equipment, plant and machinery requirements, by type and specification, and monitor, keep and regularly update a list of the Contractors' equipment, plant and machinery in order to keep a check on the Contractors' mobilization.

4.2.7 Payment Certificates and Claims of Contractor

The Consultant shall:

a) Verify the interim and final payment certificates submitted by the Contractor on the basis of measured work items as the case may be having regard to any contractual provision for advance payment and variation of price, certify the completion of the activities / Works or parts thereof and verify indices for Price Adjustment in costs as applicable after ascertaining ex-factory prices before recommending any amount on this account in interim payment certificates (IPCS).

b) Assist NHA in contractual matters with the Contractor (performance bonds, insurances, claims, advance payment guarantees etc.). Assist with interpretation of the Contract Documents, explain and or reconcile any ambiguities and or discrepancies in the Contract Documents, and apply various provisions of the contract documents; and provide NHA all relevant documentation needed for settling disputes (if any) with the Contractors, and make recommendations to NHA for resolving the Contractors' claims, contract time extensions, variation orders, subletting, quantification of claims, rate and price fixing etc.

4.2.7 Maintain Project Record

The Consultant shall:

a) Establish a comprehensive system of maintaining site records including site correspondence, survey data, inspection records, test data, site diaries, records of meetings, financial records, progress records etc.

b) Recommend any modification of complementary items to be necessary to Contractor.

c) Supervising information program on STDs and HIV/AIDs which the Works Contractors are required to carry out at construction campsites.

d) Consultant shall prepare movie by Drone Camera for record of all the activity on the project from the date of start to the end and hand over five copies of the same at the time of completion to the Client.

4.2.8 Reporting Requirements

The Consultants shall prepare and submit each of the under mentioned reports in Table 4-1 to NHA. The format of these reports shall be mutually agreed with NHA.

Table 4-1 Reports to be prepared by the consultant

a)	Inception Report	1 soft + 15 hard soft copies
b)	Contract Administration Report and Construction program	1 soft + 15 hard soft copies
c)	Annual Management Information Report at the end of each Financial Year	1 soft + 1 soft copies
d)	Technical Reports	1 soft + 15 hard soft copies
e)	Progress Reports (monthly)	1 soft + 1 5 hard soft copies
f) g)	Project Completion Report (PC-IV)	1 soft + 10 hard soft copies
h)	Project Documentary	5 copies (soft and hard)
i)	Updated construction program as required.	1 soft + 5 hard soft copies
j)	Roughness Survey reports at substantial completion and expiry of defect liability period	1 soft + 5 hard copies
k)	Revised PC-1	1 soft + 50 hard copies

Specific requirement of following reports is given below:

i. Inception Report

The Consultants will submit an Inception Report to NHA after conducting site visit and meetings with NHA officials which indicate the possible design changes observed during design review exclusive supervision methodology, possible sites / Reaches ready to handover to contractor and any other important detail related to project.

ii. Final Project Completion Report

The Consultants will prepare a comprehensive final Completion Report within thirty (90) days after completion of project (as described in the contract). The Final Completion Report for the project shall summarize the method of construction, as built record of executed work and certification of the satisfactory correction of defects, the construction supervision performed, and recommendations for future projects of similar nature to be undertaken by NHA. This will also include a brief on the performance of the Contractor with particular emphasis on planning and job management at site. His weak and strong points need to be emphasized with clarity.

Project Documentary Report (Drone movie in CD)

The Consultant has to make documentary of all major activities during constructions as well as that of completed project sections to be submitted towards the end of the project. These should also include;

a) Laying and compaction of various pavement layers;
b) Operation of Asphalt and concrete Plants;
c) Quarry sites and laboratory activities;
d) Road after completion showing road furniture;
e) Various important stages in construction of structures;
f) Any other major activity involved requiring specific mention.

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CHAPTER NO.5

STAFFING FOR DESIGN REVIEW AND CONSTRUCTION SUPERVISION

5.1 STAFFING BY CONSULTANTS

- Staff details given at 5.1.2 of TOR.
- The staff as given in section 5.1.2 of TOR has been provided for the said assignment. However, design review and key personnel for construction supervision staff will be considered for evaluation purpose. The staff of consultant will perform duty as per contract.
- The qualification and experience required of Key Personnel's are detailed at the end of TOR.
- The construction period of project is 30 months. Mobilization of staff schedule is given as under:

  i. Advance mobilization of Design Review personnel's = 3 month.
  ii. Supervision construction period = 30 months
  iii. Book / account closing and handing over taking over period = 3 months
  iv. Defect Liability Period = 12 Months

  Total Duration of Assignment = 48 months

- The mobilization and de-mobilization of Key Personnel shall be with prior written consent of the Client.
- The facilities of Consultants regarding office and residential accommodation at site, site transport project laboratory with requisite equipment & furniture etc. will be provided as admissible under Works Contract's Bill No.7

5.1.1 **The mobilization of staff will be as per following: -**

Mobilization of staff on the project will be done with the approval of project authorities keeping in view the commencement of contractor. Advance Mobilization of key personnel and Design Review taken as under: -

However, The Consultant is required to carefully ascertain all the direct and indirect expenses that may be incurred to ensure comprehensive review of design to complete satisfaction of NHA and project requirements as Lump/Sum mode of payment for design review as refer to (Chapter-3) therefore consultant will mobilize its design review team as per project requirement.

For the purpose of evaluation, the consultant will provide CV's of following personals for Design Review as shown in Table 5-1;

Table 5-1 Personals for Design Review

Sr. No.	Description of Personnel	Nos.
Design Review Staff Proposed by Design Section		
1.	Team Leader/Senior Highway Engineer	01
2.	Pavement Engineer	01
3.	Structure Engineer	02
4.	Geotech Engineer	02
5.	Hydrologist / Road Drainage Expert	02
6.	Certified Road Safety Expert	01
	Sub-Total:	**09**

5.1.2 **Staff Requirements**

The Services shall be provided by the local Key and Non-Key Personnel as mentioned in Table 5-2, which shall include but not be limited to the following:

Table 5-2 local Key and Non-Key Personnel

Noushero Feroz to Ranipur (Section IV) (60.90 km)

Sr. No.	Description of Personnel	No. of Persons	Months	Person-Months
A.	**For Supervision (Key Personal)**			
1	Resident Engineer*	1	45	45
2	ARE (Highways) Engineer	2	30	60
3	ARE (Structure / Bridge) Engineer	1	30	30
4	Material Engineer	1	30	30
5	Contract Specialist (on intermittent basis)	1	12	12
6	Environmental Specialist (on intermittent basis)	1	12	12
7	Slope Stabilization Expert/ Geotech Engineer (on intermittent basis)	1	12	12
8	Drainage Engineer/Hydrologist (on intermittent basis)	1	12	12
9	Quantity Surveyor**	1	33	33
	Sub Total	**10**	_	**246**

B.	Non Key Personnel			
1	Site Inspector (Material)	5	30	150
2	Site Inspectors (Highways)	5	30	150
3	Site Inspectors (Structures)	5	30	150
4	Surveyors	5	30	150
5	CAD Operator	3	30	90
6	Computer Operator**	3	1*33 2*30	93
7	Accountant	2	30	60
8	Office Assistant**	4	1*33 3*30	123
9	Helpers	5	30	150
10	Office Boys	5	30	150
11	Trainee Engineer ***	3	30	90
12	Junior Engineer*** for NHA, HQ only	3	30	90
	Sub-Total:	**48**	**-**	**1446**

Ranipur to Sukkur (Section V) (59.88 km)

Sr. No.	Description of Personnel	No. of Persons	Months	Person-Months
A.	**For Supervision (Key Personal)**			
1	Resident Engineer*	1	45	45
2	ARE (Highways) Engineer	2	30	60
3	ARE (Structure / Bridge) Engineer	1	30	30
4	Material Engineer	1	30	30
5	Contract Specialist (on intermittent basis)	1	12	12
6	Environmental Specialist (on intermittent basis)	1	12	12
7	Slope Stabilization Expert/ Geotech Engineer (on intermittent basis)	1	12	12
8	Drainage Engineer/Hydrologist (on intermittent basis)	1	12	12
9	Quantity Surveyor**	1	33	33
	Sub Total	**10**	_	**246**

B.	Non Key Personnel			
1	Site Inspector (Material)	5	30	150
2	Site Inspectors (Highways)	5	30	150
3	Site Inspectors (Structures)	5	30	150
4	Surveyors	5	30	150
5	CAD Operator	3	30	90
6	Computer Operator**	3	1*33 2*30	93
7	Accountant	2	30	60
8	Office Assistant**	4	1*33 3*30	123
9	Helpers	5	30	150
10	Office Boys	5	30	150
11	Trainee Engineer ***	3	30	90
12	Junior Engineer*** for NHA, HQ only	3	30	90
	Sub-Total:	**48**	**-**	**1446**

* Staffing months given for Construction Supervision, Handing, Overtaking period and Defect Liability Period.

** Staffing months given for Construction Supervision and Handing, Overtaking period.

*** Appointment of Trainee & Junior Engineer with approval of Member (Planning).
The carry home salary of Junior Engineer not be less then Rs. 120,000/- and for Trainee Engineer not be less then Rs. 80,000/- after deducting all type of applicable taxes and Consultants Overheads approval will be granted by the Member (Planning).

5.2 SERVICES AND FACILITIES TO BE PROVIDED BY THE CLIENT

For Supervision purpose of the project Accommodation, Offices, utilities, material testing laboratories and field transportation for consultant staff will be provided under the Works Contracts.

5.3 INDEMNITY OF CLIENT

The Consultants will indemnify the Client against any inaccuracies / deficiencies in the Services of the team of Consultants. The Consultants will be required to obtain and maintain professional indemnity insurance

at its own cost as per the latest Pakistan Engineering Council regulations, as reflected in the consultancy agreement, from the date of the appointment of the Consultants till the end of project duration also keeping in view Public Procurement Regulations.

5.4 REVISION OF PC-1 & Preparation of PC-IV

It shall be the responsibility of the construction supervision Consultant to prepare the revised PC-1 of the respective project, before completion of the project, by incorporating all changes in the scope of work and prepare completion report (PC-IV) at completion of the project. To ensure compliance an amount of two per cent (02%) of construction supervision cost will be withheld from interim (monthly) invoices and released along with the final payment of the Consultants on completion of this job.

5.5 TRAFFIC DIVERSION PLAN AND SAFETY MEASURE'S

The Construction Supervision Consultant will make ensure to finalize the proper traffic diversion plan when and where required of contract and to provide proper guidelines to contractor to maintain smooth traffic flow and to make ensure proper safety measures to save human life and to avoid any traffic accident during construction.

5.6 QUALIFICATION AND EXPERIENCE REQUIREMENT OF PERSONNEL

The engineering services shall be provided by the local Key Personnel, who will be assisted by Non-Key Personnel. Engineers hired must have valid Pakistan Engineering Council (PEC) certificate for local engineers or similar valid certification from engineering bodies outside Pakistan. The responsibilities of Professional Engineer (PE) and Registered Engineer (RE) must be in accordance with PEC criteria for practice entitlement. The Qualification and Experience requirements of these Personnel as shown in Table 5-3 shall include but not be limited to the following:

Table 5-3 local Key Personnel Qualification and Experience requirements

S.No	Title, Experience, Qualification & Responsibilities	
	Design Review Staff	
1.	**Team Leader/Highway Engineer**	
	General Experience	20 Years
	Qualification	B.Sc. (Civil Engineering). Preferably M.Sc./Ph.D. (Highway/Transportation Engineering as major)
	Marking criteria for qualification	Ph.D. - 100%, M.Sc. with additional relevant trainings/courses– 100%; M.Sc. – 90%; B.Sc. with additional relevant trainings – 80%; B.Sc. – 70%.

		2.5% for each course/training from recognized institute upto max 10% for 4 training/courses
	Specific Experience	Proven fifteen (15) years' design Review experience as Highway Design Engineer on Highways and Motorways Projects.
	Responsibilities	He/She will be responsible (not limited to) design review involving geometric, pavement, Geotech designs for road features and road safety/traffic control features, drainage designs, rehabilitation and repair plan, traffic plans and amenities including detailed drawings and specifications. He/she will propose if required, during construction any modification and change in design, construction method and alternate technology of construction.
2.	**Pavement Engineer**	
	General Experience: 15 years	
	Qualification	B.Sc. (Civil Engineering) preferably M.Sc./PHD Highway Engineering / Transportation Engineering.
	Marking:	PHD – 100%; M.Sc. with additional relevant trainings– 100%; M.Sc. – 90%; B.Sc. with additional relevant trainings – 80%; B.Sc. – 70%.
	Specific Experience	10 years' experience in major roads or highway designing with a focus on Traffic / pavement analysis.
	Responsibilities	He/She will be responsible for design review of Pavement Design. He/She shall demonstrate a working knowledge in the design and construction.
3.	**Structure Engineer**	
	General Experience:	15 years
	Qualification:	B.Sc. (Civil Engineering). Preferably M.Sc./Ph.D. (Structure Engineering)
	Marking criteria for qualification	Ph.D - 100%, M.Sc. with additional relevant trainings/courses– 100%; M.Sc. – 90%; B.Sc. with additional relevant trainings – 80%; B.Sc. – 70%. 2.5% for each course/training from recognized institute upto max 10% for 4 training/courses

	Specific Experience	Proven (8) years' design Review experience as Structure Engineer on Highways and Motorways Projects.
	Responsibilities	He/She will be responsible for design review of structures/Bridges. He shall demonstrate a working knowledge in the design and construction of bridges, the design of all required earthworks, retaining walls, drainage and any other required structures for road projects.
4.	**Geotechnical Engineer**	
	General Experience:	12 Years
	Qualification:	B.Sc. (Civil Engineering) / M.Sc. (Geology) preferably Masters/PhD in Geo-Tech Engineering /Civil Engineering.
	Marking criteria for qualification:	Ph.D – 100%; M.Sc. Geotechnical Engineering/Civil Engineering with relevant trainings from recognized organizations – 100%; M.Sc. (Geo-Technical Engineering – 90%; B.Sc. Civil/M.Sc. Geology with relevant trainings from recognized organizations 80%; B.Sc. Civil/M.Sc. Geology 70%; 2.5% for each course/training from recognized institute upto max 10% for 4 training/courses.
	Specific Experience:	Eight (08) years' relevant experience as Geotech Engineer on construction supervision projects of National Highways involves asphalt concrete mix design in countries with hot climate and/or truck overloading problems including having experience to control testing at site, material testing and road pavement formation and other all related construction activities including concrete and highway embankment formation. He should have good command on internal and structure code closure e.g. AASHTO, ASTM and specification and standard of NHA along with field testing, concern Asphalts related all testing and mix design.
	Responsibilities:	He/she will assist and ensure that the design, lay out and requirement of retaining walls, breast walls, other retaining structures, and slope stability/ slide control measures are as per the geotechnical requirement and site conditions.

5.	**Hydrologist / Road Drainage Expert**	
	General Experience	15 years
	Qualification	B.Sc. (Civil Engineering). Preferably M.Sc./PHD (Hydraulic/Hydrology/water resource Engineering as major)
	Marking criteria for qualification:	Ph.D - 100%, M.Sc. with additional relevant trainings/courses– 100%; M.Sc. – 90%; B.Sc. with additional relevant trainings – 80%; B.Sc. – 70%. 2.5% for each course/training from recognized institute upto max 10% for 4 training/courses
	Specific Experience	Proven (8) years' design Review experience as Structure Engineer on National Highways and Motorways Projects.
	Responsibilities	He/She will responsible for carrying out the Hydrological study of the area and submits the Hydraulic Report. He also has to perform Hydrologic Analysis. Hydrology and Hydraulic design of the structures are his responsibility. Draining Engineer has also make sure to take measure for the proper disposal of the water. Preparation of Detailed Design Drawing, Technical Specification B.O.Q for Hydraulic Structure work element based on the Design Drawings, Specifications and site investigations are his responsibility.
6.	**Certified Road Safety Auditor**	
	General Experience: 20 years	
	Qualification	B.Sc. (Civil Engineering). Preferably M.Sc./PHD Transportation University Degree in road engineering, transportation, traffic engineering or related road safety engineering trainings.
	Marking:	PHD – 100%; M.Sc. with additional relevant trainings – 100%; M.Sc. – 90%; B.Sc. with additional relevant trainings – 80%; B.Sc. – 70%.
	Specific Experience	10 years' experience in a related road safety field including crash investigation. At least ten (10) Road Safety Audits (RSAs) conducted within last 5 years.
	Supervision (key personal)	
7.	**Resident Engineer**	
	General	15 years

	Experience:	
	Qualification:	B.Sc. (Civil Engineering) preferably M.Sc./PHD (Highway / Transportation Engineering).
	Marking criteria for qualification	Ph.D - 100%, M.Sc. with additional relevant trainings/courses– 100%; M.Sc. – 90%; B.Sc. with additional relevant trainings – 80%; B.Sc. – 70%. 2.5% for each course/training from recognized institute upto max 10% for 4 training/courses
	Specific Experience	Ten (10) years of relevant experience including experience as a Resident Engineer on construction supervision of National Highway projects.
	Responsibility	RE will be responsible for construction supervision of the road and ensuring that the subject project is implemented in accordance with the required specification and approved drawings. He will be responsible for construction supervision and review and approval of contractor's bills. RE will assist the Project Coordinator in the performance of his tasks. The main responsibilities of the position will include but not limited to the following: - • Inspect the site and collect the condition data for the design review and necessary changes if any. • Preparation of technical details such as specifications and estimates. • Provide details about existing pavement, damages and assessment. • Assist the Project Coordinator and recommend approval of contractor's work program, method statements, material sources, etc. • Assist the Project Coordinator in preparing and issuing reports as defined subsequently. • Review and recommend approval and/or issuing working drawings, approval of the setting out of the works, and instruction to the contractor. • Taking measurements and keep measurement records.

		• Maintaining records, correspondence, and diaries. • Certifying work volume and recommending interim certificates for progress payments. • To proceed & implement the project as per specifications, standards, Contracts & TOR's.
8.	**ARE (Highways) Engineer**	
	General Experience	12 Years
	Qualification	B.Sc. (Civil Engineering) preferably M.Sc./PHD (Highway / Transportation Engineering).
	Marking criteria for qualification	Ph.D - 100%, M.Sc. with additional relevant trainings/courses– 100%; M.Sc. – 90%; B.Sc. with additional relevant trainings – 80%; B.Sc. – 70%. 2.5% for each course/training from recognized institute upto max 10% for 4 training/courses
	Specific Experience	(08) years' relevant experience of supervising construction of National Highways projects as ARE (Highways) on National Highways projects.
	Responsibility	His/her responsibilities shall include but not limited to the following tasks: He/she will assist the Resident Engineer (R.E) and will be responsible for quality of Road works. He will perform his/her duties as per consultant. To ensure quality execution and timely completion of project.
9.	**ARE Structure / Bridge Engineer**	
	General Experience	12 Years
	Qualification:	B.Sc. (Civil Engineering) preferably M.Sc./PHD (Structure Engineering).
	Marking criteria for qualification	Ph.D - 100%, M.Sc. with additional relevant trainings/courses– 100%; M.Sc. – 90%; B.Sc. with additional relevant trainings – 80%; B.Sc. – 70%. 2.5% for each course/training from recognized institute upto max 10% for 4 training/courses
	Specific Experience	(08) years' relevant experience of supervising construction of National Highways projects as ARE (Structure/ Bridge) on National Highways projects.

	Responsibility	The AER Structure / Bridge Engineer will perform duties under the guidance of the Team Leader. He/she will assist the Team for the Design Review particularly the bridges and structures so that the project is implemented in accordance with the required specifications and approved drawings. She/he will set up supervision systems, and train the consultant's national staff in their use.
10.	**Material Engineer**	
	General Experience:	12 Years
	Qualification:	B.Sc. (Civil Engineering) / M.Sc. (Geology) preferably Masters/PhD in Geo-Tech Engineering /Civil Engineering.
	Marking criteria for qualification	Ph.D – 100%; M.Sc. Geotechnical Engineering/Civil Engineering with relevant trainings from recognized organizations – 100%; M.Sc. (Geo-Technical Engineering – 90%; B.Sc. Civil/M.Sc. Geology with relevant trainings from recognized organizations 80%; B.Sc. Civil/M.Sc. Geology 70%; 2.5% for each course/training from recognized institute upto max 10% for 4 training/courses.
	Specific Experience	Eight (08) years' relevant experience as Material Engineer on construction s supervision projects of National Highways involves asphalt concrete mix design in countries with hot climate and/or truck overloading problems including having experience to control testing at site, material testing and road pavement formation and other all related construction activities including concrete and highway embankment formation. He should have good command on internal and structure code closure e.g. AASHTO, ASTM and specification and standard of NHA along with field testing, concern Asphalts related all testing and mix design.
	Responsibilities:	He/she will assist and will be responsible for quality of materials used in construction by performing field and laboratory tests and certifying their acceptance based on recommended specifications for the material, will

		also identify the sources of material and query sites. Main responsibilities of the position will include but not limited to the following: - • Stipulate Material Testing Procedures and Specifications. • Identify sources of materials, quarry sites and borrow areas. • Confirm the suitability and availability of material in the borrow pits and quarries for earthwork and pavement. • If required, identify and evaluate additional sources of materials. • Undertake field and laboratory testing of the materials to determine their suitability for various components of the work. • Prepare mass haul diagram for haulage purposes giving quarry charts indicating the location of detected borrow areas, quarries and the respective estimated quantities. • Be responsible for material Testing and specification and certification of material quality.
11.	**Contract Specialist**	
	General Experience	12 Years
	Qualification:	B.Sc. (Civil Engineering) Master degree with a major in Civil Engineering or Law
	Marking criteria for qualification	M.Sc. with additional relevant trainings– 100%; M.Sc. – 90%; B.Sc. with additional relevant trainings – 80%; B.Sc. – 70%.
	Specific Experience	08 years' experience as Contract Specialist on major road projects based on FIDIC form / conditions of contract, Experience and knowledge of procurement procedures of foreign funded projects is essential. Proven credentials in contract administration, evaluating contractor's claims and dispute resolution, preferable experience/track record of an arbitrator,

		mediator, adjudicator and/or dispute resolution adviser.
	Responsibilities	• Assist to organize meetings for negotiating and resolving technical and contract completion issues; • Assist Employer and TL in effect the timely distribution of reports and pertinent commercial information to and from Contractors in accordance with agreed schedule. • Assist in schedule turnover meetings with Site Personnel, where required. • Assist to check timesheets for contract conformance (rates, backup and extensions). • Assist in review of Contractors' invoices and prepare Progress Payment Certificates with Cost Control. • Assist in review of Contractors' costs, forecasts and requests for extras. • Assist in review and issue for approval and post Substantial Performance documents. • Participate in contract cost review meetings and regular Project progress and assist with preparation of monthly contracts and Project progress reports.
12.	**Environmental Specialist**	
	General Experience	12 Years
	Qualification	B.Sc. (Environmental Engineering) preferably M.Sc. / PHD (Environmental Engineering).
	Marking criteria for qualification	Ph.D - 100%, M.Sc. with additional relevant trainings/courses– 100%; M.Sc. – 90%; B.Sc. with additional relevant trainings – 80%; B.Sc. – 70%.
	Specific Experience:	08 years' experience as Environmental Specialist on major road projects supervising and monitoring environmental management plans.
	Responsibilities	Responsible for preparing Environmental monitoring check list, reviewing and endorsement of Site Specific Environmental Management Plan (SSEMP), review of Bi-Environmental monitoring reports, prepare corrective action place in case of

		noncompliance. The Senior Environmental Specialist will set up environmental management and monitoring system (EMMS), train the national staff and ensure that the EMMS is in place.
13.	**Slope Stabilization/Geotech Expert**	
	General Experience:	12 Years
	Qualification:	B.Sc. (Civil Engineering) / M.Sc. (Geology) preferably Masters/PhD in Geo-Tech Engineering /Civil Engineering.
	Marking criteria for qualification:	Ph.D – 100%; M.Sc. Geotechnical Engineering/Civil Engineering with relevant trainings from recognized organizations – 100%; M.Sc. (Geo-Technical Engineering – 90%; B.Sc. Civil/M.Sc. Geology with relevant trainings from recognized organizations 80%; B.Sc. Civil/M.Sc. Geology 70%; 2.5% for each course/training from recognized institute upto max 10% for 4 training/courses.
	Specific Experience:	Eight (08) years' relevant experience as Slope Stabilization/Geotech Expert on construction supervision projects of National Highways involves asphalt concrete mix design in countries with hot climate and/or truck overloading problems including having experience to control testing at site, material testing and road pavement formation and other all related construction activities including concrete and highway embankment formation. He should have good command on internal and structure code closure e.g. AASHTO, ASTM and specification and standard of NHA along with field testing, concern Asphalts related all testing and mix design.
	Responsibilities:	He/she will assist and ensure that the design, lay out and requirement of retaining walls, breast walls, other retaining structures, and slope stability/ slide control measures are as per the geotechnical requirement and site conditions.
14.	**Drainage Engineer/Hydrologist**	
	General Experience	15 years

	Qualification	B.Sc. (Civil Engineering). Preferably M.Sc./PHD (Hydraulic/Hydrology/water resource Engineering as major)
	Marking criteria for qualification:	Ph.D - 100%, M.Sc. with additional relevant trainings/courses– 100%; M.Sc. – 90%; B.Sc. with additional relevant trainings – 80%; B.Sc. – 70%. 2.5% for each course/training from recognized institute upto max 10% for 4 training/courses
	Specific Experience	Proven (8) years' design Review experience as Structure Engineer on National Highways and Motorways Projects.
	Responsibilities	He/She will responsible for carrying out the Hydrological study of the area and submits the Hydraulic Report. He also has to perform Hydrologic Analysis. Hydrology and Hydraulic design of the structures are his responsibility. Draining Engineer has also make sure to take measure for the proper disposal of the water. Preparation of Detailed Design Drawing, Technical Specification B.O.Q for Hydraulic Structure work element based on the Design Drawings, Specifications and site investigations are his responsibility.
15.	**Quantity Surveyor**	
	General Experience	B.Sc. 08 Years DAE 12 Years
	Qualification:	B.Sc. (Civil Engineering) or DAE (Civil).
	Marking criteria for qualification	B.Sc. with additional relevant trainings from recognized organizations – 100%; B.Sc. – 90%; DAE (Civil) – 70%.
	Specific Experience:	Eight (08) years' relevant experience as Quantity Surveyor on Civil Works projects on Highway construction projects. He should have the experience to handle claims variation order's and other quantity related issues.

	Responsibility:	His/her responsibilities shall include but not limited to the following tasks: He/she will assist Resident Engineer in verification of payment certificates. He/she will be responsible for verification of executed quantities. He should having good command on his working.
	Non-Key Personnel	
16.	**Site Inspectors (Material)**	
	General Experience	02 Years B.Sc Civil/Geology or 05 Years DAE Civil.
	Qualification	DAE (Civil) / B.Sc. (Civil Engineering).
	Specific Experience	Involved in construction of Highway projects as Material Inspector.
	Responsibility	His job description and duties will be defined by the Resident Engineer and approved by the Client. However he has experience of field testing of Highway embankment an pavement structure and Asphalt testing.
17.	**Site Inspectors (Highways)**	
	Qualification	B.Sc. (Civil Engineering).
	Specific Experience	02 years
	Responsibility	His job description and duties will be defined by the Resident Engineer and approved by the Client. However he has experience of field testing of Highway embankment an pavement structure and Asphalt testing.
18.	**Site Inspectors (Structures)**	
	Qualification	B.Sc. (Civil Engineering).
	Specific Experience	02 years
	Responsibility	His job description and duties will be defined by the Resident Engineer and approved by the Client. However he has experience of field testing of Highway embankment an pavement structure and Asphalt testing.
19.	**Surveyors**	
	General Experience	12 Years

	Qualification	DAE – Civil from the Board of Technical Education's recognized institute preferably B.Sc. (Civil Engineering). .
	Specific Experience	Eight (08) years' experience of surveying/leveling and related activities on National Highway Projects. He is enable to
	Responsibility	His job description and duties will be defined by the Resident Engineer and approved by the Client. He is enable to hand survey related activation independently e.g ready of cross-section , Maintain survey, level book, structure layout as per drawing, to check structure layout as per drawing.
20.	**CAD Operator**	
	General Experience	05 Years
	Qualification	DAE – Civil from the Board of Technical Education's recognized institute. Certificate Auto-CAD Software Operator.
	Specific Experience	Three (03) years' experience of drafting engineering drawings/ designs on Auto-CAD software.
	Responsibility	His responsibilities shall include but not limited to the following tasks: His job description and duties will be defined by the Resident Engineer and approved by the Client.
21.	**Computer Operators**	
	General Experience	5 Years
	Qualification:	B.A and have computer relevant certificates.
	Specific Experience	Three (03) years' experience of office management, typing with 30 words per minute typing speed.
	Responsibility	His responsibilities shall include but not limited to the following tasks: His job description and duties will be defined by the Resident Engineer and approved by the Client. Generally he will assist the Consultants and Client's representative in all drafting, reports preparation and like activities as per demand.
22.	**Accountant**	

	General Experience	05 Years
	Qualification	B.Com from recognized institute preferably Master's Degree in Accounts.
	Specific Experience	Five (05) years of relevant experience in case of B.Com or three (03) years of relevant experience in case of Master's Degree in Accounts.
	Responsibility	His responsibilities shall include but not limited to the following tasks: His job description and duties will be defined by the Resident Engineer and approved by the Client. Generally he will be responsible for monitoring of the project accounts.
23.	**Office Assistants**	
	General Experience	5 Years
	Qualification	B.A./ B.Sc.
	Relevant	Three (03) years' experience of office management/ training of computer software (M.S. Office) and typing with 40 words per minute typing speed.
	Responsibility	His responsibilities shall include but not limited to the following tasks: His job description and duties will be defined by the Resident Engineer and approved by the Client.
24.	**Junior Engineer**	
	Qualification	B.Sc. (Civil Engineering from recognized university of Pakistan.
	Experience	2-3 years of relevant experience.
25.	**Trainee Engineer**	
	Qualification:	B.Sc. (Civil Engineering from recognized university of Pakistan.

Special Note:

Final selection of the Personnel shall be made on successful interview by the Client.