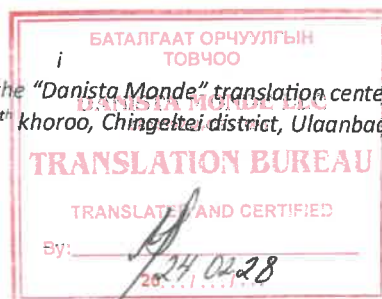


APPROVED:  
FIRST DEPUTY GOVERNOR OF  
ULAANBAATAR CITY IN CHARGE OF  
ECONOMY AND INFRASTRUCTURE  
SAINZORIG.P

## TERMS OF REFERENCE

The project management consulting service of The High-capacity public  
transportation Project 'Metro' in Ulaanbaatar

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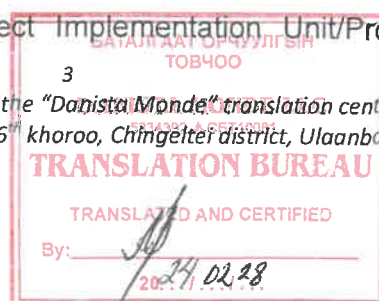
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## A. Background

1. Government Decree and Long-Term Policies: The Government of Mongolia demonstrated its commitment to enhancing the urban transportation infrastructure of the capital city by issuing decree 411 on November 22, 2023. This decision has strategically aligned with Mongolia's "Vision-2050 Long Term Development Policy" and other applicable policy documents. These frameworks collectively aim at sustainable urban development and improved public transportation in Ulaanbaatar to meet the needs of its growing population and evolving urban landscape.
2. The "High-capacity public transportation Project 'Metro'" represents a pivotal endeavor to modernize Ulaanbaatar's transit infrastructure with the introduction of a metropolitan railway. The planned metro line is set to forge a path from the Amgalan area in Bayanzurkh, traversing major arteries such as Peace Avenue and Tolgoit station at Songolon Street, 20th khoroo of Songinokhairkhan district. Integral to the project is a sizeable rail depot designated for maintenance. Additionally, Proposals and solutions will be meticulously crafted, considering potential avenues for the project's further implementation and factors such as the establishment of a depot.
3. The comprehensive design and oversight of the project's implementation are entrusted to a Project Management Consultant, who will align their efforts with the directives set forth by the Governor's office of the Capital City Ulaanbaatar.
4. The Governor's office of the Capital City Ulaanbaatar is set to form a Project Steering Committee /PSC/ tasked with the directional supervision and oversight of the Metro project, ensuring adherence to timelines and budgetary constraints.
5. The Integrated Project Implementation Unit of the Capital of Ulaanbaatar, acting under the Governor's Office of the Capital City Ulaanbaatar, has been designated as the central Project Implementation Agency for the metro construction project. This agency will ensure that the project is guided by operational protocols. It will develop and implement management plans, prepare and will prepare and submit progress reports for PSC, and supervise all activities in line with the instructions provided. In addition to these roles, it will also serve as the Project Implementation Unit/Project Management

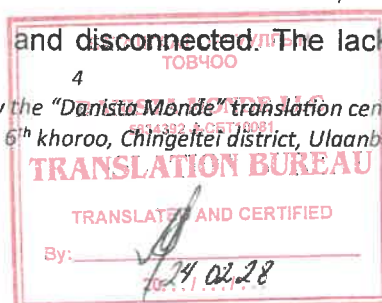
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Consultant (PMC), assuming comprehensive management responsibilities for the project. The Project Steering Committee (PSC) will collaborate directly with these.

6. The Governor's Office of the Capital City Ulaanbaatar is going to select an international consulting firm that specializes in overseeing metro system projects and related urban transportation infrastructure. The consultant is committed to fostering the advancement of innovative public transport solutions aimed at addressing the challenges within the public transport sector of Ulaanbaatar city.
7. In 2011, South Korea's "Suson Engineering" JSC completed the "Technical and Economic Basis for Ulaanbaatar Metro Construction" study aimed at developing public transport infrastructure and conducting fundamental research. Building on this study, a comprehensive investigation of the Ulaanbaatar metro project was undertaken in 2013 as part of the "Ulaanbaatar City Public Transport" project, implemented by the "JICA" International Organization. As a result of the feasibility study and research, recommendations were made for the implementation of the 'Public Transport High-Capacity Metro Project', aimed at increasing the number of public transport vehicles in the capital and updating the transport infrastructure.
8. Rapid Population Growth in Ulaanbaatar: A Projection from 1990 to 2045: The population density of Ulaanbaatar, the capital of Mongolia, has increased rapidly since 1990, and the population of Ulaanbaatar, which had a population of 560,600 in 1990, is expected to triple to 1.6 million in 2023, and to 2,779,642 by 2045. As of 2023, 1.6 million people, or half of the country's total population, live in the capital city of Ulaanbaatar, which occupies 0.3% of Mongolia's territory, while 56% of all vehicles registered in the country are registered in Ulaanbaatar. Due to the growth of the city's population, urbanization, urban sprawl and the number of vehicles accompanying it, the traffic congestion in Ulaanbaatar has been increasing significantly in recent years.
9. Current Transportation System in Ulaanbaatar: The city's transportation infrastructure primarily consists of public buses, with 1,200 buses from 21 companies serving the populace on 79 routes. However, the existing 1,200-km-long street network is sparse and disconnected. The lack of sufficient traffic

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management and road safety facilities leads to delays, traffic accidents, and congestion<sup>1</sup>. In a broader context, Mongolia's transportation system includes a network of railways, roads, waterways, and airports<sup>2</sup>. A notable feature is the Trans-Mongolian Railway, which connects the Trans-Siberian Railway from Ulan Ude in Russia to Erenhot and Beijing in China, passing through Ulaanbaatar.

10. Weather and geographical conditions: The city of Ulaanbaatar is situated in the valley of the Tuul River, surrounded by the Bogdhan, Songinohairkhan, Chingeltei, and Bayanzurkh mountains, which are 1950-2265m (about 1.41 mi) above sea level. Ulaanbaatar is in a region characterized by dry, cool summers and harsh winters. The average annual air temperature ranges from 0°C to 2°C. In the first month, temperatures range from -17°C to -27°C, while in the seventh month, they range from +19°C to +23°C. The absolute maximum and minimum temperatures are +40.1°C and -46.7°C, respectively, and the temperature variance reaches approximately 80°C. The annual precipitation amounts to 300-400 mm, with 70-80% falling in the warm season. Winds predominantly come from the west and northwest, with an average speed of 4-6 m/s.

## **B. Project context**

### **I. General information**

1. Approved by the Government of Mongolia, the primary objective of the High-capacity public transportation Project "Metro" is to reduce traffic congestion, improve city traffic flow, lay the foundation for economic development and prosperity, and minimize environmental impact
2. The Governor's Office of the Capital City Ulaanbaatar is soliciting competitive bids for a Project Management Consultant (PMC), to be awarded to an international consulting firm. This firm will comprise both international and national experts with extensive global and regional experience in managing the construction and development of metro projects and infrastructure facilities.
3. The consultant's role will be to provide support to the Project Management Unit (PMU) and Project Implementation Unit (PIU) for various project-related tasks, including project mobilization, Feasibility Study (FS) investigation, conceptual design, project management and implementation, construction

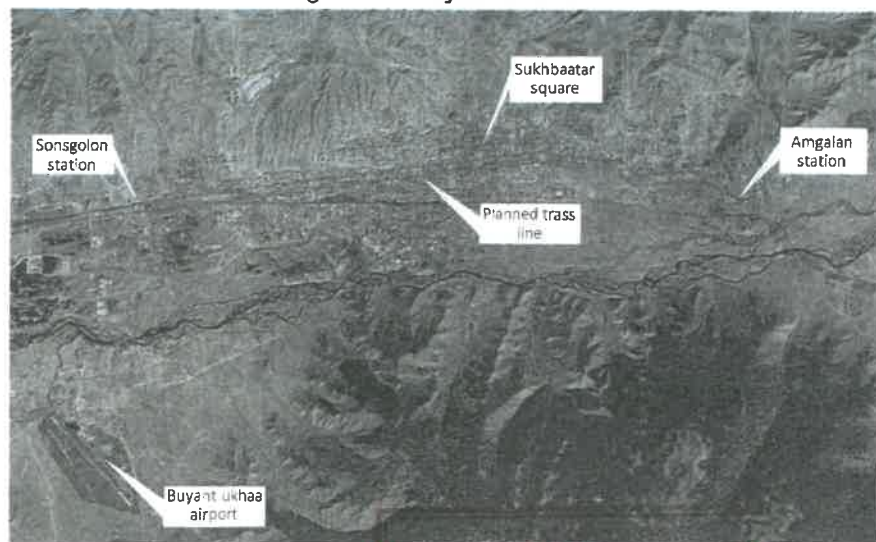
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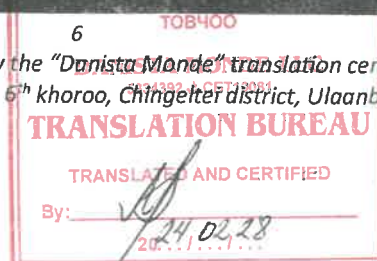
supervision, quality control, and progress and safeguards monitoring and reporting.

4. The project contractors are tasked with thoroughly assessing the risks and challenges encountered during project implementation, adapting to the environment, and devising suitable solutions such as:
  - a) Formulate recommendations for the strategic organization of construction activities in alignment with the prevailing circumstances of both above-ground and below-ground engineering infrastructures and construction parameters. Integrate input from engineering infrastructure providers regarding the harmonization of engineering network utilization with construction operations
  - b) The intended route is correlated with the most significant commuter traffic flow originating from the six central districts of Ulaanbaatar city, specifically during the project's operational phase.
  - c) Limited construction time, restricted transport regulations for construction logistics, and limited space for temporary works areas;
  - d) Challenges stemming from geological factors, geodetic intricacies, location-specific considerations, and extreme weather phenomena (including earthquake and vibration susceptibilities of aged structures along the project site, flood vulnerabilities, etc.) pose significant obstacles;
5. Project Location: WGS 1984 UTM Zone 48N

Figure-1: Project Location



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6. Project outline is summarized as shown in Table -1.

Table-1: Project Outline

No.	Item	Description
1	Project Name	High-capacity public transportation metro construction project implementation consulting service in Capital city, Ulaanbaatar
2	Length	From Amgalan, located in the 10th khoroo Bayanzurkh district through Peace Avenue and Songolon street, to Tolgoit station at 20th khoroo of Songinokhairkhan district approximately 17.7 km (about 11 mi)
3	Station	The designation of metro line stations will be contingent upon exhaustive evaluations, integrating demographic assessments, household density analyses, and baseline surveys, in accordance with the strategic blueprint for mixed use urban developments.
4	Depot	The proposed rolling stock repair and maintenance depot, with the specific location and planning subject to determination by the consultant.
5	Period	Approximately 6 years, from June 2024 to August 2030 (75 months)
6	Contract Scheme	EPC
7	Operator	To be established under City Consul of Ulaanbaatar
8	Administrative Jurisdiction	Ulaanbaatar, Chingeltei District, 1 <sup>st</sup> khoroo, GOCCUB
9	Procurement of PMC	February–May 2024 (Planned commencement of the PMC Services: June 15, 2024)

## 7. Project impact and outcomes:

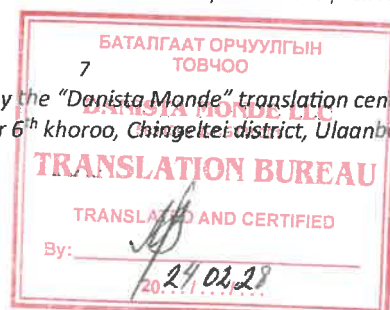
### o Traffic Congestion Reduction:

The project aims to alleviate gridlock, notably by diverting a portion of the vehicular load to the new metro system, which, in turn, can significantly expedite traffic flow and minimize commute durations throughout Ulaanbaatar.

### o Improved Public Transportation:

Introducing a metro provides a swift, reliable, and accessible public

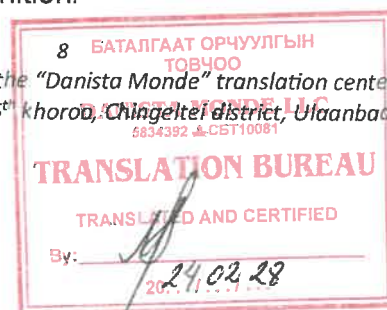
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transportation network, promoting a shift from personal vehicle reliance to public transit usage, thereby supporting a sustainable transportation model city-wide.

- Environmental Benefits:  
Reduced traffic congestion and fewer vehicles on the road would lead to lower emissions, contributing positively to the city's air quality and environmental sustainability efforts.
- Socio-Economic Development:  
Improved transportation infrastructure often correlates with economic growth. The metro could facilitate easier movement of people, goods, and services, potentially boosting economic activities along its route and in surrounding areas.
- Enhanced Livability:  
A well-planned metro system could improve the overall quality of life for residents by providing convenient and efficient transportation options. It could also stimulate urban development around metro stations, creating vibrant and accessible urban hubs.
- Integration and Connectivity:  
The metro could integrate various parts of the city, linking residential, commercial, and industrial areas, fostering greater connectivity and accessibility for residents and businesses.
- Long-Term Urban Planning:  
Introducing a metro system could influence future urban planning, encouraging more efficient land use, reducing sprawl, and directing development around transit-oriented hubs.
- Social Inclusion:  
A well-designed and accessible metro system can enhance social inclusion by providing transportation options for everyone, including those with disabilities or limited mobility.
- Tourism and City Image:  
A modern and efficient metro system can positively impact the city's image and attractiveness to tourists and potential investors, contributing to the city's global recognition.

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## 8. Project Output

1. The first Metro line to be built under the multi-mass transit system development program.
2. The construction of multiple stations featuring Transit-Oriented Development (TOD) is a key output under the multi-mass transit system development program.
3. The implementation schedule will be updated and finalized prior to the basic design period. Project phases are set tentatively as shown in Table-2

*Table B-2 Project Phase*

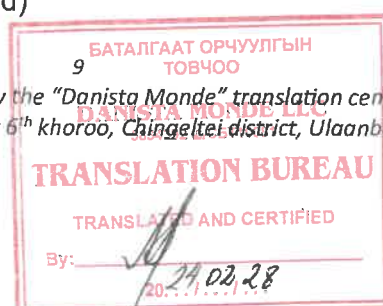
Phase	Name	Month	Expected Time
Commencement of PMC Services	15 June 2024		
Phase 0	Mobilization of PMC	Month 1	June 2024
Phase 1	Basic Design and Preparation of Bidding Documents	Month 2 – Month 7 (6 months)	July – December 2024
	Procurement preparation of EPC Contractor(s)		
Approval by The Government of Mongolia and The Governor's Office of the Capital City Ulaanbaatar. Authorization to commence operations		Month 8 (1 month)	January 2025
Phase 2	Mobilization of EPC Contractor(s)	Month 9-Month 14 (6 months)	February – July 2025
Commencement of Construction Works supervision		---	August 2025
Phase 3	Construction Supervision	Month 16 – Month 63 (48 months)	September 2025 – August 2029 (48 months)
Phase 4	Operation and Maintenance (O&M) Training	Month 51 – Month 75 (24 months)	September 2028 – August 2030 (24 months)
Transfer to Metro Operator		Month 75	August 2030

## II. Scope of the project

The Project consists of the following works:

1. PMC services (referred to this TOR)
2. Engineering works preparation
3. Civil works (Underground)
4. Civil works (Elevated)

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5. Construction of Depot (Civil works and Building works)
6. Electrical and Mechanical works
7. Provision of Rolling stocks
8. O&M Training Services (to Metro Operator under MUB)

The construction contractor will be selected according to the conditions of the EPC contract, and the scope of work and responsibilities shall be confirmed by PMC during the basic design phase and approved by the PIU.

### **III. Studies Carried out to Date**

The following studies have been carried out to date:

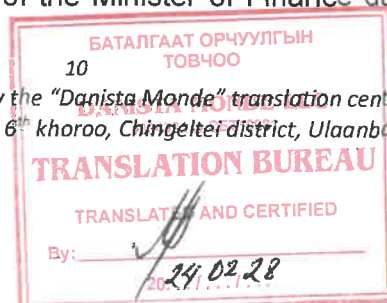
- a) Feasibility Study on Metro Construction Project in Ulaanbaatar City (Soosung Engineering Co., Ltd., 2011);
- b) The Study on Implementation of Ulaanbaatar City Urban Transportation Project in Mongolia (JICA, 2013);
- c) OD matrix 2022 (15,000 households, MMCG);
- d) Data collection study on transportation and infrastructure development in Ulaanbaatar final report (Almec & JICA) 2022.
- e) A preliminary survey of topographical mapping along the route

### **C. Legal framework to be referred**

For the preparation of the bidding documents, adherence to the following local laws and regulations is mandated, ensuring compliance with both national standards and consideration of international bidding practices. The following law and regulations shall be referred to the preparation of the bidding document:

- 1) Law of Mongolia, "On procurement of goods, works and services with state and local funds" dated November 10, 2023;
- 2) Law of Mongolia, "On environmental impact assessment" dated May 17 2012;
- 3) Annex of Decree No. A/252 of the Minister of Finance dated December 25, 2023 (Issuing tender guarantees and making state revenue procedure);
- 4) Annex of Decree No. A/255 of the Minister of Finance dated December 25, 2023 (Methodologies and instructions for evaluating tenders);
- 5) Annex of Decree No. A/259 of the Minister of Finance dated December 25, 2023 (Tender document for work procurement);
- 6) Annex of Decree No. A/260 of the Minister of Finance dated December 25,

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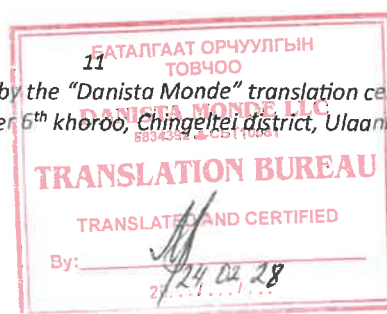


2023 (Tender document for service procurement)

**D. Objective of the Consulting Services**

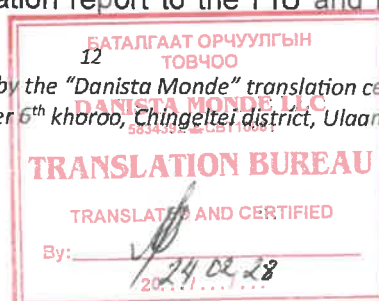
1. The consultant's role is to ensure that all tasks are executed to the highest professional standards and provide universal support as required by the project and as outlined in the scope of work of PMC.
2. The consultant is responsible for project preparation, management, implementation, construction monitoring, quality control, progress monitoring, social protection monitoring and reporting, and support for procurement, within the framework of project basic research design, management, implementation, monitoring support and capacity building activities. They will provide consulting services such as determining requirements and providing necessary support to the Project Management Unit and Project Implementation Unit for project implementation.
3. The consultant shall facilitate the identification and vetting of engineers, procurement, and construction contractors (EPC), ensuring alignment with the client's specifications. Also, they will oversee the drafting of tender documents to meet the client's exacting standards, while furnishing essential aid to the Project Implementation Unit (PIU) as mandated by the Governor's office of the Capital City Ulaanbaatar.
4. The Project Implementation Unit (PIU) pledges seamless and expeditious collaboration with all project contractors and consultants, endeavoring to foster an environment conducive to the triumphant culmination of the undertaking.
5. The overarching aim of the Project Management Consulting services is to bolster the project's successful execution through meticulous oversight, rigorous monitoring, comprehensive reporting, strategic management support, and to secure the endorsement of the Project Implementation Unit.
6. The PMC will conduct rigorous evaluations to identify any potential issues that could precipitate cost escalations, unwarranted supplementary cost demands, schedule extensions, or new price requests as the work progresses. In the event such issues are discovered, the Consultant is tasked with presenting the PIU a detailed assessment and recommendations for the resolution or perpetuation of these concerns, supplemented by a substantiated opinion.

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7. Should substantial technical challenges arise, the Consultant is obliged to propose the most cost-effective solutions or viable alternatives. This process involves the formulation of technical reports—personally prepared by the Consultant or attained via external specialist expertise—and accompanying them with the Consultant's professional judgment for the PIU's approval.
8. The consultant is expected to provide a comprehensive range of services that include, but are not limited to, the following:
  - a) Technical and Professional Support: The consultant will provide all necessary technical and professional support related to the tasks outlined in the scope of work for the Project Management Consultant (PMC) and the Terms of Reference. This includes project mobilization, Feasibility Study (FS) investigation, conceptual design, project management and implementation, construction supervision, quality control and project commencement.
  - b) Project Monitoring and Reporting: The consultant will closely monitor project implementation activities, provide technical and management advice, and submit monthly, quarterly, and annual progress reports on overall project implementation. This includes a bi-annual environmental safeguards monitoring report and any other reporting required to all stakeholders including MUB and GoM within the required time.
  - c) Management Support to the PIU: The consultant will provide day-to-day management support to the Project Implementation Unit (PIU), develop an annual work program for PIU approval, and prepare a guideline to ensure the project's compliance with Mongolian laws, policies, relevant regulations, social and environmental safeguards requirements, procurement procedures, performance indicators, physical achievements, expenditures, and preparation plan.
  - d) Procurement Support: The consultant will support procurement procedures and assist in the preparation of employer requirements and bidding documents for the Engineering, Procurement, and Construction (EPC) contractor.
  - e) Monitoring and Evaluation: The consultant will prepare and submit a monitoring and evaluation report to the PIU and introduce the Project

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Steering Committee.

**E. Scope of the Consulting Services**

1. The consultancy services provided span the entire project lifecycle, beginning from the Pre-Construction phase, continuing through the Construction phase which signifies the initiation of Project Implementation, and extending into the commencement of project operation
2. The Consultant's team is mandated to execute their duties in adherence to recognized professional standards, leveraging robust international engineering, management, and economic methodologies.
3. To meet the stipulated objectives outlined in the document, the requisite consulting services delineated in Table-3 will be rendered accordingly.

*Chart-3: Consulting services*

No	Consulting service	Abreviation
1.	Project Management Services	PMS
2.	Engineering Services	ES
3.	Social and Environmental Services	SES
4.	Procurement Services	PS
5.	Legal and Financial Services	LFS
6.	Administrative Services	AS
7.	Knowledge Transfer Services	KTS
8.	O&M Training Services	OMS

**F. Requirement of key personnel and subcontractors**

1. The consultant must assemble a requisite cadre of experts to ensure timely completion of the project
2. Table 3-1 delineates the specialist positions necessary, presenting projected man-hours for the project alongside corresponding estimates
3. For the procurement purpose, the following qualification of Key Personnel shown in Table 3-2 should be satisfied in the proposal:

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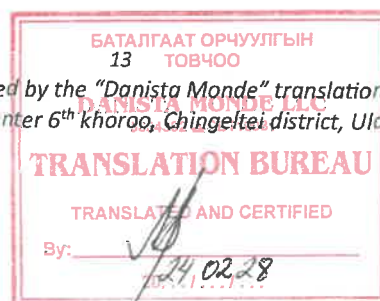
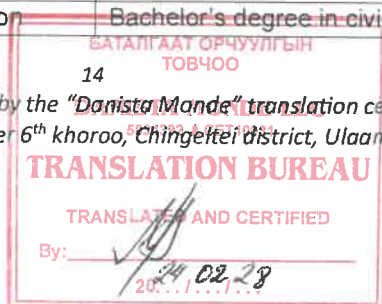


Table 3-2 Required Qualification of Key Personnel

No	Key Personnel	Item	Qualification Required
1	Project Manager	Education	Bachelor's degree in civil engineering or relevant fields. - Preferably master's degree.
		Experience	<ul style="list-style-type: none"> <li>- No less than 20 years' working experience in the relevant field of railway planning, engineering and implementing</li> <li>- 10 year or more in an international environment</li> <li>- Having worked as Project Director or Project Manager or Team Leader for at least 1 railway project of a comparable scale</li> <li>- Underground metro experiences in the region are of advantage</li> </ul>
2	Project Coordinator	Education	Bachelor's degree in urban development or relevant fields. - Preferably master's degree.
		Experience	<ul style="list-style-type: none"> <li>- Mongolian national preferably</li> <li>- International working experience</li> <li>- High skill of Mongolian and English</li> </ul>
3	Head of Basic Design Team	Education	Bachelor's degree in civil engineering or relevant fields. - Preferably Master's degree.
		Experience	<ul style="list-style-type: none"> <li>- No less than 10 years' working experience in the relevant field railway planning and design</li> <li>- 10 year or more should be in an international environment</li> <li>- Having worked as Project Manager or Senior Engineer for at least 1 railway project of a comparable scale</li> <li>- Extensive underground metro experiences in the region are of advantage</li> </ul>
4	Head of Construction Supervision Team	Education	Bachelor's degree in civil engineering or relevant fields. - Preferably master's degree
		Experience	<ul style="list-style-type: none"> <li>- No less than 10 years' working experience in the relevant field railway construction supervision</li> <li>- 10 year or more should be in an international environment</li> <li>- Having worked as Project Manager or Resident Engineer or Specialist Engineer for at least 1 railway project of a comparable scale</li> <li>- Underground metro experiences in the region are of advantage</li> </ul>
5	Head of PM Team	Education	Bachelor's degree in civil engineering or relevant fields. - Preferably Master's degree
		Experience	<ul style="list-style-type: none"> <li>- PMP holder for more than 10 years</li> <li>- No less than 20 years' working experience as Project Director or Project Manager</li> <li>- 10 year or more should be in an international environment</li> </ul>
6	TOD Specialist	Education	Bachelor's degree in civil engineering or



No	Key Personnel	Item	Qualification Required
			relevant fields. - Preferably master's degree.
		Experience	<ul style="list-style-type: none"> <li>- No less than 15 years' working experience as TOD Specialist or similar</li> <li>- 10 year or more should be in an international environment</li> <li>- TOD specialist experiences in the region are of advantage</li> </ul>
7	Procurement Specialist	Education	Bachelor's degree in civil engineering or relevant fields. - Preferably Master's degree
		Experience	<ul style="list-style-type: none"> <li>- No less than 10 years' working experience as Procurement Specialist or Contract Specialist or similar</li> <li>- 10 year or more should be in an international environment</li> <li>- Underground metro experiences in the region are of advantage</li> </ul>
8	Deputy PM	Education	Bachelor's degree in civil engineering or relevant fields. - Preferably master's degree.
		Experience	<ul style="list-style-type: none"> <li>- Mongolian national</li> <li>- No less than 15 years' working experience as Project Manager or Senior Engineer</li> <li>- High skill of English</li> </ul>

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