

Section 6 – Employer's Requirements

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Specifications

6. GENERAL

Interpretation: -The Standard Specifications are extracted from Specifications for Building and Road Works – 2009 of Standard and Quality Control Authority. In the event of discrepancy in the laid specification the Specifications for Building and Road Works – 2012 of Department of Engineering Services, MoWHS should be referred to for interpreting the meaning of the laid specifications.

Materials: - All materials to be provided by the contractor shall be in conformity with the specification laid down in the contract document. The contractor shall ensure that the materials are suitable and to the satisfaction of the Engineer-in-charge and nothing shall be paid extra on this account. Wherever BIS marked material is available, such material will be used subject to fully satisfying other requirements of the specifications.

Testing of materials:- Samples whether submitted to govern bulk supplies or required for testing before use shall be provided free of charge by the contractor. Suitable packages to contain the samples shall also be supplied free of charge. Testing charges, if any, and all other expenditure required to be incurred for taking the samples, conveyance, packaging etc. shall be borne by the contractor himself. The time loss in the process shall be incorporated in the work programming and no additional time will be considered.

Safety on works: - Safety precautions pertaining to construction works such as excavation, trenching, blasting, demolition, provision of scaffolds, ladder, working platforms, gang ways, mixing of asphalt materials, electric arc and gas welding, use of hoisting and construction machinery shall be taken as directed by the Engineer.

Antiquities and useful materials: - Any finds at the time of excavation such as relics of antiquity, coins, fossils or other articles of value shall be delivered by the contractor to the Engineer and shall be the property of the Government. Any materials obtained from the excavation which in the opinion of the engineer are useful, shall be stacked separately in regular stacks as directed by the engineer and shall be the property of the Government.

Bench marks: - Temporary site bench mark shall be constructed at the construction site by the Contractor, where so required by the Engineer.

Reference to I.S: - Wherever I.S (Indian Standard) specifications issued by the Bureau of Indian Standards is referred to, it shall be taken as reference to the latest edition with all amendments issued thereto. However, in the event of any variation between the DES, MoWHS Specification and that in the I.S., the DES, MoWHS specification shall take precedence over the I.S.

PARTICULAR SPECIFICATIONS

6.1 General

All the works unless otherwise specified hereinafter or permitted by Engineer-in-Charge shall be done in accordance with the latest editions of Department of Engineering Services, MoWHS Specifications, with up to date correction slips & relevant IS Codes as applicable, issued up to the date of issue of Tender.

Unless otherwise expressly stated the method of measurements and other guide lines as generally laid down in the IRC Specifications and Department of Engineering Services, MoWHS specifications shall equally be applicable for this contract.

6.2 Work Programme

Whereas the specific schedule and programme to be followed for the various work items comprising this project will be at the discretion of the Contractor, the impacts of the Works Restrictions and Specific Requirements must be considered and included in the Works Programme to be prepared by the Contractor.

The Works Programme must be prepared by the Contractor using Excel or Project software within 15 days of award of the Contract. The Works Programme must be approved by the client before all significant works commence. The Programme shall be detailed enough to give, in addition to construction activities, detailed network activities for the submission and approval of materials, procurement of critical materials, procurement/rental/leasing of equipment, progress milestones, fabrication of special products/equipments if any, and their installation and testing, and for all activities of the Contractor that are likely to affect the progress of work. It shall be prepared so as to permit revisions, inclusion of additional detail and regular updates as the work progresses. In all respects the Contractor shall pay particular attention to seasonal weather patterns including rainfall and the construction sequencing while preparing the Programme and executing the Works in accordance with this. Any proposal for night working shall also be stated in the Programme.

If the Contractor requests a change in the sequence and such change is approved by the Engineer, the Contractor shall have no claim for delay arising from such revisions to the Program.

The Contractor shall update all activities in accordance with the decisions taken at the periodic site review meetings, or as directed by the Engineer.

6.3 WORKS RESTRICTIONS

On a day to day basis, the Contractor must adhere to certain specific requirements and restrictions to ensure the continued and safe movement of aircraft on the **movement area** of the airport, namely:

- Discuss with the Works Supervisor, Airport Manager and ATC Controllers, on a daily basis any matters necessary to ensure the safe conduct of the works and the safe movement of aircraft on the airport.
- Ensure that vehicles, plant equipment and materials not directly in use on the Works, are parked or stored outside the **movement area**, and do not obstruct the approach, take off or transition OLS, or interfere with radio navigational and landing aids.
- Ensure that access routes to the work sites for the movement of staff, equipment and vehicles within the airport are well defined and communicated to all Contract staff.
- Ensure that the **movement area** is safe for normal aircraft operations following removal of markers, vehicles, plant equipment and personnel from the Works area.
- Avoid crossing of the runway at any time unless it is essential as part of the implementation of the works.

Note: (1) **Movement Area** is defined as “That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft ... and the apron(s)”.

6.4 Site Installation

(Facilities, tools, plant, equipment and so forth)

- 6.4.1 The contractor shall be deemed to have made himself fully acquainted with the full nature of work, the location and character of the site and means of access to the site, including any restrictions imposed.
- 6.4.2 All necessary accommodations, stores, workshops, etc. required for proper execution of the works shall be provided, built, maintained and removed by the contractor at his own costs and within the working time program. In this context, the following requirements are essential:
- all necessary safety measures and efforts to avoid accidents and damage to the property and people need be in place for the duration of the contract period.
 - a labor camp with sufficient and well maintained sanitary facilities, sufficient drinking water and an adequate supply of electric power needs to be provided at a site to be approved by the client. Sufficient drinking water has also to be available at the construction site.
 - proper waste management facilities and processes need to be provided at the site and labor camp.
- 6.4.3 The client shall inspect the contractor's site infrastructure and give instructions in terms of the operation and maintenance of this infrastructure. These instructions are binding and shall be strictly implemented by the contractor.

- 6.4.4 The contractor shall make his own connections for water and electric supply and energy whatsoever and pay for it. The contractor has to check for water and electricity availability at or around the work site, and if necessary to make his own connections and/or install generators to produce the level of electricity required. The client will not pay any costs to the contractor.
- 6.4.5 The contractor cannot use the existing infrastructure such as telephone, fax, photocopies, etc. from the client. The contractor has to set up his own equipment and necessary infrastructure.

6.5 Material and its protection

The construction materials for the works are to be deposited and stored well under constructed shed conditions to avoid quality drops and loss.

The contractor shall build sufficient shelter buildings, so that all material can be stored without being exposed to rain and hot sun. The material has to be protected from these elements. This is required for the materials of any kind. The crushed stones and gravel as required as aggregate for concrete have to be cleaned and washed. The contractor has to secure the site for the storage of these materials with an adequate fence and security system.

6.6 Tools, Plant and Facilities

- 6.6.1 The contractor shall supply and provide all materials, plants, equipment, spare parts, whatsoever, to execute the works in accordance with the contract and all descriptions in the Bill of Quantities.
- 6.6.2 The contractor has to provide sufficient spare parts and equipment so that the work can be executed without delay. The tools, materials and plants to erect all temporary building and scaffolding have to be on site. Tools, equipment and plant have to be provided in sufficient numbers and in good working condition. The contractor is responsible for the maintenance of all the equipment. The client reserves the right to stop on-going work in any situation where materials, tools or plants do not meet these requirements and/or are judged to be in an unsafe condition.
- 6.6.3 The contractor has to construct a separate office space for his own use and he will not be allowed to use the office provided to the client for any reason so as to maintain the confidentiality and safeguarding of office documents.
- 6.6.4 The contractor has to provide sufficient equipment, welding installation and so forth at the place to fulfill work execution and to cope up with the construction schedule. This consideration has to be put in the site Installation item.
- 6.6.5 Field Office for the Engineer and his Staff and other facilities: In addition to the office space required for his own use, the Contractor shall provide and maintain a furnished field office for the use of the Engineer and his staff. Requirements for the office, including overall size, number and size of individual rooms, construction and furniture are stated below;

- 6.6.6 The size of the Engineer's Field office will be 50 square meter plinth area having more than one rooms and meeting hall to meet the requirements for accommodating 10(ten) persons of the Client/Consultants Field staffs. The field office shall be maintained in a secure and watertight condition by the Contractor until completion of the Works or as otherwise instructed by the Engineer and shall be provided with electricity, continuously running water and sewerage. All doors shall be fitted with approved locks, and windows shall be provided with mosquito screens and shall have interior locking devices.
- 6.6.7 The Contractor shall arrange for the field office to be regularly and properly cleaned. All furnishings and fittings in the field office shall also be maintained by the Contractor in working condition and to the approval of the Engineer.
- 6.6.8 The Contractor shall provide adequate water-borne sanitation and refuse collection and disposal, complying with the Laws of Bhutan and all local By-Laws, and to the satisfaction of the Engineer, for all offices, laboratories, workshops, houses etc. erected on the Site.
- 6.6.9 The following standard quality equipment and furnisher shall be provided and fixed/installed by the contractor for the field office. All furniture are to be made from acceptable quality of hardwood.
- 6.6.10 List of Furniture and Equipment

Items of equipment/furniture	Number required
Computers	- 1
A3 mono Laser Printer	- 1
UPS	- 1
Mobile Telephone	- 2
Photocopier, A3	- 1
Electronic Digital Calculators	- 2
Engineer's Representative Desk (1.5mx0.9m)	- 1
Senior Site Engineer's Desk + plus site Engineer + Visiting official	- 4
Computer Table (1.5m x 0.8m)	- 1
Printer Desk	- 1
Photo Copier Desk	- 1
Armed Chairs for Desks	- 4
Armless cushioned chairs (meeting/visitors)	- 10
Computer Chairs	- 1
Steel Filing Cabinets with 4 drawers each(1.4m x1.2m x 0.8m)	- 1
White board (1.5m x 1.0m)	- 1
Pin-board (1.5m x 1.0m)	- 1
Conference Table 2.4mx1.2m	- 1
All stationery and Bathroom Consumables	: As directed by the Engineer

- 6.6.11 Monthly telephone bills for making call for project related communications shall be paid by the contractor and after completion of works the telephones shall be the property of the contractor.
- 6.6.12 One photocopy machine is capable of making A3 size photo copies.
- 6.6.13 Desktop computers shall be of the following specifications (minimum) networked to each other and all peripherals:-

- Pentium Core i-5 with original Intel Mother Board.
- 500 GB hard disk
- 4 GB RAM
- Combo DVD drive
- 17" LCD Monitor
- Complete with Windows 8/10, Microsoft Office, AutoCAD and the latest version of Microsoft Project & Antivirus Software.

6.6.14 Laser Jet printer automatic sheet feeder taking up to paper size A3

6.6.15 Uninterruptible Power Supply for use with computers and photocopiers

6.6.16 After completion of the construction works, field offices with all service facilities shall be the property of the Contractor all the furniture and equipment with its peripherals and associated software etc. will be formally handed over to the DoA Airport Manager at Gelephu.

6.7 Providing and Maintaining Vehicles for the Engineer

6.7.1 Scope :The work covers providing and maintaining of pick-ups for use by the Engineer as described under Bill of Quantities.

6.7.2 Description: The pick –stroke–ups shall be diesel driven and shall be double-cabin type, Mahindra Bolero, NEF, 4WD or equivalent. The Contractor shall purchase and provide vehicle as indicated above, within four weeks from the date of order by the Engineer. The vehicles shall be purchased through DoAT with DoAT's support in the process of application and approval for import license. The vehicle will be registered in the name of DoAT. The Contractor will maintain and service the until the Taking over Certificate for the completed work has been issued. After taking over of site the vehicle will be handed over to DoAT/ Airport Manager, Gelephu. All necessary taxes for operating the vehicles shall be fully paid and all necessary papers shall be provided by the Contractor as required by prevailing laws and regulations in Bhutan. Comprehensive insurance cover shall be provided by the Contractor. The vehicle shall be provided day and night as required by the Engineer. The Contractor shall make available drivers for the pick-up who have a valid licence at such times and such duration as required by the Engineer. Contractors shall allow for the fact that use of the vehicle provided for the Supervising Engineer will include use to travel from Gelephu to destinations associated with project works for which the Supervising Engineer has responsibility, as well as duty visits to Paro/Thimphu.

6.7.3 Maintenance: The vehicles shall be maintained in a smooth running condition. All expenses required for keeping the vehicles in smooth running condition such as fuel, lubrication oil and other consumables, necessary service and maintenance, drivers, repairs and replacement etc. are to be met by the Contractor. In the event of any vehicle being off the road for maintenance or on account of breakdown, the Contractor shall provide substitute vehicle(s) immediately. If the Contractor at any time fails to provide vehicle(s) or substitute vehicle(s) as specified above, an amount of Nu.2500 per day or part thereof for each vehicle (that the Contractor failed to provide) shall be debited to the Contractor's account. Also the number of days for which the vehicle(s) were not provided shall not be included for payment.

- 6.7.4 If the Contract Works are not completed within the stipulated period or within the granted extended time of completion, provision and maintenance of vehicles in accordance with clause 6.7.1 through 6.7.3 shall be carried out by the Contractor at his own cost and no payment shall be made for the same. In case of any failure by the Contractor to do so, an account of Nu. 2500 per day or part thereof per vehicle shall be debited to the Contractor's account.
- 6.7.5 Measurements for Payment: The measurement for payment for providing and maintaining of vehicles shall be on day basis for actual number of days the vehicles were provided in satisfactory working order. No payment shall be made for the period of withdrawal as per clause 4.4 above irrespective of the fact whether the vehicle was available or not.
- 6.7.6 Rates: The Contract unit rate for providing and maintaining vehicle for Engineer shall include all expenses towards providing and keeping the vehicles in smooth running condition including taxes etc.

6.8 Project Sign Board – The contractor shall provide a project Sign Board of 1.8m wide x 1.20m high which should be maintained at a prominent location/entrance to the site with project details such as funding source, client, contractor, project value and etc. in the format and wording as per the direction of the Engineer. The Project sign board shall be erected within 14 days after the contractor has been given the Possession of Site. The contractor shall not erect any advertisement sign board on or along the work site without the written approval of the client. All sign boards shall be removed by the contractor by the end of the Defects Liability Period.

Measurement and Payment - No separate measurement and payment shall be made to the contractor for this work. The expenses in connection with the work specified herein shall be distributed/adjusted into other items of works specified within the Bill of Quantities.

6.9 Health and Safety

- 6.9.1 The contractor shall take due care and ensure that medical staff, first aid room with first aid kit along with proper medical supplies are available at the camps, housing and on the jobsite at all times throughout the period of the contract and that suitable arrangements are made for the prevention of epidemics and for all necessary welfare and hygiene requirements. If imported laborers are required for construction, proper medical tests of the laborers shall be carried out to prevent the spread of diseases such as STD and HIV/AIDS amongst the communities near the construction sites.
- 6.9.2 The Contractor shall provide on-site such life-saving apparatus as may be appropriate and an adequate and easily accessible first aid outfit, or such outfits as may be required in any Government Ordinances, Factories, Acts as subsequently published and amended from time to time.
- 6.9.3 In addition an adequate number of persons permanently on the Site shall be instructed in their use, and the persons so designated shall be made known to all employees by the posting of their names and designations in a prominent position on Site.

6.9.4 Measurement and Payment

No separate measurement and payment shall be made for the works described in this Clause. All costs in connection with the work specified herein shall be considered included in the related items of the work specified within the Bill of Quantities.

6.10 Public Utilities

6.10.1 The contractor shall be responsible to coordinate and liaise with underground and over ground service provider / concerned authorities / local authorities for shifting of utilities and removal of encroachments etc. and for making the site unencumbered during the project construction period until the completion of work. This shall include initial and frequent follow-up meetings / actions / discussions with each involved service provider / concerned authorities. The contractor will not be entitled to any additional compensation for the delay in shifting of utilities, and removal of encroachments by the service provider / concerned authorities.

6.10.2 The contractor will make payments to the respective service provider/authorities for any costs required for the relocation of utilities, wherever required. The contractor will obtain the necessary approvals from such authorities including cases where payments are not required to be made for such relocations.

Information on any utilities likely to be affected by the contractor's work shall be brought to the notice of the Engineer, and any work required shall be undertaken only after receiving written clearance from the Engineer/Client.

6.10.3 Arrangements shall be made for the continuity of all public services such as power lines, telephone lines, water mains, sewerage, drainage, etc., if the existing services are likely to be affected during the period of construction.

6.10.4 Measurement and Payment

No separate measurement and payment shall be made for the work of temporarily supporting; maintaining and protecting the government, public and privately owned services. All the expenses in connection with the work specified herein shall be distributed/adjusted into other items of works specified within the Bill of Quantities.

6.11 Insurance

6.11.1 The contractor shall provide and maintain the insurance cover in accordance with Clause 19 of the General Conditions of Contract from an approved insurance company from the commencement of project to the end of the Defects Liability Period.

6.11.2 Measurement and Payment

No separate measurement and payment shall be made for this item. All expenses in connection with Insurance coverage shall be distributed/adjusted into other items of works specified within the Bill of Quantities.

6.12 Submittals

6.12.1 General Requirements

- The contractor shall maintain an approved system of recording and tracking submissions, indicating dates, status (i.e. approved, not approved, approved subject to conditions), quantities, and other details as required.
- Copies of all approved submissions will be retained securely and properly filed on site, available for reference by the Engineer at any time.

6.12.2 Contractor's Monthly Progress Report

- The contractor shall report monthly progress to the Engineer showing actual work done superimposed upon copies of the program. He shall furnish an explanation of any deviation from the Programme stating his proposals for improving progress should this be lacking in any respect, and he shall furnish the Engineer with his amended critical path analysis. The contractor shall comply with the reporting requirements on implementation of Environmental Management Plan and record this information in the monthly report following the guidelines provided by the Engineer.
- The contractor shall submit monthly Laboratory/Field test report including cumulative number of tests completed in the prescribed format. If required, the Engineer shall ask the contractor to submit quarterly Funds Expenditure Statement.

6.12.3 Samples

- The Engineer may at his discretion request or take samples of any material or product intended for use in the Works. Where samples are requested in the Specifications they shall be submitted in the number requested or if not specified then as directed by the Engineer.
- Samples shall be of the type and size specified and fully representative of the materials proposed to be used.
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- Samples shall be indelibly and clearly marked with the date of submission, material reference and any other data required to determine the source and kind of sample.
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- The Engineer may reject any materials and goods which in his opinion are inferior to the samples thereof previously approved, and the contractor shall promptly remove such materials and goods from the Site.

6.12.4 Copies of Orders

- The contractor shall provide the Engineer with one copy of all orders for the supply of materials and goods required in connection with the Works, as the Engineer may require.

6.12.5 Site Trials

- In some cases site trials/mock-up of works as specified shall be prepared by the contractor for review and acceptance of the Engineer. They shall be in a location agreed with the Engineer, and if so specified, may be incorporated into the work in a clearly identified position upon approval of the Engineer. The Contractor shall carry out such changes or carry out field trials as required in obtaining the Engineer's approval. Approved field trials shall form the standard of acceptance of subsequent materials and workmanship.

6.12.6 As Built Drawings

- The Contractor shall submit As Built Drawings prior to the final Handing over/completion date. It is advisable that the Contractor prepares the as-built drawings as the work is completed at the site to facilitate checking and verification.
- The drawings shall be prepared in the latest version of auto CAD and shall include all available information. The As Built Drawings shall include the informations according to the tender drawing pattern as directed by the Engineer.

6.12.6 *Measurement and Payment*

No separate measurement and payment shall be made for all above items under 'Submittals'. All the expenses in connection with the work specified herein shall be distributed/adjusted into other items of works specified within the Bill of Quantities.

6.13 Environmental Protection Works

The environment has been defined to mean surrounding area in the vicinity of the construction site, including human and natural resources which should be affected by execution of the works and after completion of works.

The contractor shall take all precautions for safeguarding the environment during the execution of the contract. He shall abide by all prevailing laws, rules and regulations governing environmental protection. In particular, the Contractor shall fully comply with the Environmental Codes of Practice. The Contractor shall follow the requirements specified in the Environmental Management Plan for the environmental protection and management of the works carried under the contract. The Contractor shall be responsible for the implementation of the Environmental Management Plan (EMP) and compliance with it. As part to this requirement the contractor shall follow the guidelines and submit required information on a monthly basis for monitoring of the EMP implementation by the Engineer. The Contractor at all-times shall ensure that requirements of EMP are fulfilled.

The contractor shall prohibit employees from unauthorized use of explosives, poaching wildlife, fishing and cutting trees. Where possible the workers must be provided with kerosene for cooking. Where it is not possible to access kerosene, firewood must be provided by purchasing it through the local firewood contractor. Where there is no local firewood contractor, proper forestry permits must be obtained for collection of firewood. The Contractor shall be responsible for the actions of his employees at all times..

6.13.1 Reinstatement of Environment

After completion of the works the contractor shall clear away and remove from the site all tools and plant, surplus materials, rubbish, garbage, temporary constructions, and temporary work of any kind and leave the whole site clean and to satisfaction of the client. The site area of the camp, storage area, access road and so forth shall be rebuilt and brought into the same shape, state and condition as before starting the work. The Contractor shall be required to carry out filling, removal and disposal works along with plantation of grass and trees as directed by the Engineer at his own costs at identified locations to reinstate environment.

6.13.2 *Measurement and Payment*

No separate measurement and payment shall be made for the works described in this Clause. All costs in connection with the work specified herein shall be considered included in the related items of the work specified within the Bill of Quantities.

For Item Specific Technical Specifications

Please refer

SPECIFICATIONS FOR BUILDING AND ROAD WORKS (CIVIL) -2015

and

SPECIFICATION FOR ELECTRICAL MATERIALS AND WORKS (ELECTRICAL) 2015

of

DEPARTMENT OF ENGINEERING SERVICES,
MINISTRY OF WORKS AND HUMAN SETTLEMENT,
ROYAL GOVERNMENT OF BHUTAN

Drawings

(Provided in Separate Volume)

Supplementary Information Regarding Works to Be Procured

(None)

Personnel Requirements

Using Form PER-1 and PER-2 in Section 4 (Bidding Forms), the Bidder must demonstrate that it has personnel who meet the following requirements:

No.	Position	Total Work Experience [years]	Experience In Similar Work [years]
1	<i>Project Manager – 1 No, Degree in Civil Engineering</i>	10	5
2	<i>Project Engineer – 1 No, Degree/Diploma in Civil Engineering</i>	7/10	3/5
3	<i>Site Engineer – 1 No, Diploma in Civil Engineering</i>	7	3
4	<i>Site Supervisors – 2 No, Vocational Training Institute graduate</i>	5	5

Equipment Requirements

Using Form EQU in Section 4 (Bidding Forms), the Bidder must demonstrate that it has the key equipment listed below:

No.	Equipment Type and Characteristics	Minimum Number Required
1	Backhoe (bucket capacity of 0.6cum or more)	1
2	TATA tipper 1612SE or equivalent	2
3	Compactor, plate type	1
4	Mixer Machine 10/7	2
5	Concrete Vibrator (5.5hp & 3600rpm)	4
6	Survey Equipment (total station)	1