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**MATRIC NUMBER: 18/ENG05/015**

**DEPARTMENT: MECHATRONICS ENGINEERING**

**ENG284 (ENGINEERING-IN-SOCIETY) ASSIGNMENT**

**DATE OF SUBMISSION: 16-04-2020**

1. **SCOPE OF WORK**

**JOB SUMMARY:**

**NOTE:** it is intended that speed with efficiency, cleanliness of job site and an overall professional well finished hall will be attained. The rehabilitation project is to be completed from the outside in. Quote should include all labor and materials including hauling and removal of unwanted and unused contraction debris. Lastly, before inspection of the hall for final punch list, the hall should be prepped with a thorough cleaning of all windows and floors.

**BUILDING DETAILS:**

1. The length of the overhang depends on the cost although required overhang is between 2’ minimum and 4’ maximum.
2. The edifice width and length shall be measured from outside to outside face of the sidewall girts.
3. The eave height shall be measured from the bottom of the base channel to the intersection of the lines representing the inside wall covering and the roof covering.
4. The building should be water and weather tight.
5. Purlins and grits shall be plumb and to the specified spacing by the manufacturers specification.

**CONSTRUCTION EQUIPMENT:**

1. All construction equipment should be secured, locked and grounded after each day’s work.
2. The project manager is to be provided with a list of all construction equipment that remains on site at each construction stage.

**CLEARING AND GRUBBING:**

All vegetation and debris within the limits of the construction, except as designated to remain, shall be cleared, grubbed, removed and disposed of. All vegetation and object to remain shall be protected.

**DELIVERABLES FOR THE ALFA BELGORE REHABILITATION CONTRACT**

The contractor will provide site design services. The services provided will include:

1. **Site design development documents**

Site analysis/existing conditions

On-site circulation

5xisting features

Existing infrastructure

1. **Scaled site design drawings**

The format of the architectural document

Identification and description of specific features and architectural elements.

Description and quantity of proposed hardscape and plant materials.

Providing an executive style summary of each project.

1. **Additional design development documentation**

Construction drawings illuminating prominent rehabilitation features.

Project phasing schedule.

Cost estimates based on project phasing.

**PARTIAL DEMOLITION:**

Partial demolition of the areas of the belgore hall that need to be amended. Support the cut, if necessary to avoid slope failures. Any damage to the slope and the cut is the responsibility of the contractor.

**ROOF:**

1. Pressure wash the roof
2. Check for any shingles that are missen or needed for repair.
3. Check for any leaks
4. Check seal around chimney.

**Thermal effects**

1. Standing seam roof panels shall be free to move in response to the expansion and contraction forces resulting from a temperature variation.
2. Assembly to permit movement of components without buckling, failure of joint seals and undue stress on fasteners; insulation shall be provided to the underside of the roof to prevent excessive expansion and contraction.

Since the roof will be removed, the exterior has to be properly furnished upon fixing of roof.

**EXTERIOR:**

**West side of hall**

1. Complete the wooden deck on porch/stamped concrete to match under rear porch
2. Complete the ceiling porch (headboard).
3. Add a porch light on north side of door (it was present before partial demolition of Alfa belgore hall)

**East side of hall**

1. Create back porch area with either stamped concrete under cover or with concrete tiles.
2. Complete ceiling with headboard to match front porch
3. Install 3-4 canned lights in the ceiling. This is due to the use of the belgore multi-purpose hall for academic activities to ensure proper illumination during night classes.
4. Install 1 porch light to the north and 1 porch light to the south of the door. This is to ensure proper illumination at the exit for safety.

**SIDING:**

1. Repaint all trims to its initial light brown color.
2. Complete the installation of the water barrier under the siding.
3. Finish remaining siding (around all parts of the house).
4. Paint siding taupe.
5. Cedar shakes in all peaks (the example in back under porch roof will be used)
6. Remove the wasp nest (which was a fault before partial demolition) from peak in south-west corner of belgore hall.

**INTERIOR**

1. Patch all walls and trim preparation for paint. Paint entire interior.
2. Fix/replace outlet/covers as necessary [ensure the previous color is restored].
3. Fix/replace switches/switch-plate covers as necessary [ensure its connected in the previous position].
4. Clean/scrape all windows and ensure proper operation. Replace non-functional windows.
5. Replace all belgore hall entry doors with a new 6-panel door. This is to ensure longevity or durability.
6. Use entry doors in best condition to replace the closet doors. This is due to the creaks realized in the previous closet doors in belgore hall.

**Belgore hall adjustments**

1. The use of carpets and laminated hardwood is to be adopted.
2. Light fixtures are to be replaced. A lot of spoilt light fixtures were recorded during enumeration.
3. Fix or replace windows (those not seated properly).

**CONSTRUCTION DEBRIS:**  
All construction debris may be placed in containers and removed from the site.

2. **GANTT CHART REPRESENTATION**

3**. HUMAN RESOURCES REQUIRED**

Automotive and transportation engineers

Environmental and building technologists

EPC (engineering, procurement and construction) contractors

Power and machine engineers

Masons

Structural engineers

Environmental health engineers

Maintenance engineers

Metallurgy engineers

Ventilation engineers

Electronics engineers

Control engineers

Architects

Architectural engineers

**THE PROJECT TEAM**

LEAD CONSULTANT-the project manager

**Project manager (project leader):** he represents the interest of the real property branch or the key sponsor on the project team. He is accountable for all aspects of the project through the entire National Project Management System (NPMS) lifecycle from the initiation stage to the construction stage.

**FUNCTIONS**

1. Calling, chairing and recording minutes from team meetings.
2. Ensuring client approvals and funding are acquired within the project timeframe.
3. Making requests to each business line to have team members assigned and initiating the first project team meeting following the SoR (statement of requirement).
4. Identification, planning and development of the project in terms of client requirements, scope, in-service date and budget (including all relevant project costs i.e. communications, stakeholder activities, environmental, real estate, etc.) and the preparation and submission of progress reports to the appropriate authority.

**Financial analyst:** he is responsible for the project monitoring to ensure the project is within the funding approval levels. He also seeks out approval and funding to implement the project with the support of the project manager.

**FUNCTIONS**

1. Ensures there’s an audit trail to validate the figures used in the building analysis.
2. Provides financial analysis
3. Ensures appropriate structure for implementing approvals.

**Accommodation manager/client accommodation service advisor:** he is intimately familiar with the operation. The accommodation manager is instrumental in assisting and articulating operational requirements to the project team.

**FUNCTIONS**

1. Validating the planned project end project
2. Ensuring approvals and funding are acquired within the project timeframes.
3. Researching and gathering information in order to support the preparation of the IAR (instruction approval release).
4. He is responsible for acquiring revised approvals and funding from the authorities.

**Architectural and engineering design manager**: the design manager is primarily responsible for providing strategic and technical design advice in development and delivery of projects, ensuring the design service requirements of the project are of a level and quality that meet expectations.

**FUNCTIONS**

1. Consulting project manager to establish the scope of design management services and the composition of the design management team.
2. Providing input or preparing terms of reference (scope of work) for consultants’ contracts.
3. Coordinating with the technical team and their activities within A&E (architecture and engineering).

**Architectural and engineering subject matter technical expert:** he ensures that the technical and conceptual design aspects of the project are well defined and correctly expressed and communicated. He ensures through quality assurance and quality control processes that service providers and consultants understand and apply these requirements at all stages of the project.

Leasing officer: he is responsible for the space acquisition process for leased accommodation.

**FUNCTIONS**

1. Maintaining the integrity of the lease and tender process
2. Proceed with Expression of Interest (EOI) in order to gather market information/availability.
3. Tender process comprising of Invitation to Offer (ITO) and irrevocable offer to lease or build-to-lease for space acquisition.
4. Reviewing EOI responses against the buyandsell posting/public notices to ensure compliance and to potentially screen our non-compliant sites.

**Acquisitions-supply officer/specialist:** he provides advice/guidance on the procurement tools available (e.g. standing officers and supply arrangements, Buyandsell) for the various categories and services and edifice furniture and furnishing.

**FUNCTIONS**

1. Providing estimated timelines for the entire furniture procurement process during the requirement definition stage.
2. Providing expertise advice to the project team during the requirement definition phase on furniture procurement tools and processes available.
3. Providing advice to the project manager and design manager with the development of statement of work for the required furniture.

**Asset/property and facilities manager:** he is responsible for the management of property and facility operations and maintenance, leased or custodians’ assets/facilities.

**FUNCTIONS**

1. Accountability for delivery of asset based projects
2. Authorizing lease rent payments and reviewing/authorizing the lease escalation claims.
3. Providing advice to the project manager(s) concerning proposed scopes of work.

**Move officer:** he provides specific technical assistance to the project team in preparing and implementing all personnel, furniture and equipment moves.

Commissioning manager

**FUNCTIONS**

1. Coordinating commissioning activities during all project stages.
2. Providing quality assurance
3. Reviewing commissioning documentation at all stages of project delivery.
4. Verifying accuracy of product information and performance verification forms.

4. **REASONS WHY THE SITE WAS SECURED**

A secure construction site is an Occupational Health and Safety (OHS) requirement. This is due to its utmost significance.

1. Unsecure building sites can present significant risks to the public, especially children, as it is a dangerous zone for individuals without the necessary training and suit up or PPE (personal protective equipment).
2. A secure site will help to deter building site theft and vandalism. Theft of raw materials such as copper, handheld tools, whitegoods and heating and water systems etc. may put work in the site in a state of intense dilemma.
3. Entry of an unauthorized individual may result in the ceasing of construction work, thus leading to wastage of valuable time.
4. Criminal activity as a result of unauthorized entry may lead to disruption of ongoing works and schedules to which cost millions each year.
5. This could lead to injury, maim or death of trespassers as ripped out fixtures, exposed live wires, threat posed by open excavations, suffocation, crushing from collapsing materials could all cause life threatening damage.
6. **BEME (Bill of engineering measurement and evaluation)**

The total estimated cost (TEC) set out for the Alfa belgore rehabilitation project is ~~N~~4,500,000.

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| --- | --- | --- |
| **S/N** | **DESCRIPTION** | **COST(~~N~~)** |
| 1 | Miscellaneous | 450,000 |
| 2 | Consultancy fee | 675,000 |
| 3 | Site preparation and clearing after completion | 225,000 |
| 4 | Transport cost | 540,000 |
| 5 | Profit | 900,000 |
|  | Total cost | 2,790,000 |

1. **PAYMENT SCHEDULE**

The total estimated cost (TEC) set out for the Alfa belgore rehabilitation project is ~~N~~4,500,000.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **MOBILISATION**  **(30% TEC)** | **50% COMPLETION (30% TEC)** | **FINAL PAYMENT AT COMPLETION AND HANDOVER**  **(40% TEC)** | **RETAINED PAYMENT [FOR 6 MONTHS DEFECT LIABILITY PERIOD(10% TEC) ]** | **TOTAL PAYMENT** |
| **PAYMENT**  **(~~N~~)** | 1,350,000 | 945,000 | 882,000 | 132,300 | 3,309,300 |

7. **DEFINITION OF TERMS**

**BEME:** this is an acronym which stands for Bill of Engineering Measurement and Evaluation. It is also referred to as ‘Bill’.

It is a tool used before, during and post-construction to assess and value the cost of construction works. This includes the cost of materials, labor, equipment and all other resources required for the success of any construction endeavor based on a predetermined scope and specification.

**Defect liability period:** this is also known as rectification period. It is a set period of time after a construction project has.

It is a period of time following practical completion during which a contractor remains liable under the building contract for dealing with any defects which become apparent. It’s usually a period of about 6-12 months but it can vary depending on the contract used.

**Lead consultant:** this is the consultant that directs the work of the consultant team and is the main point of contact for communication between the client and the consultant team except for on significant design issues where the lead designer may become the point of contact. They are normally in charge of supervising a team of junior consultants.

**Project life cycle:** This is the sequence of phases that a project goes through from its initiation to its closure.

The number and sequence of the cycle are determined by the management and various other factors like needs of the organization involved in the project, the nature of the project and its area of application. The phases have a definite start, end and control point and are constrained by time.

Although projects are unique and highly unpredictable, their standard framework consists of the same generic lifecycle structure, consisting of;

1. The initiation phase
2. The planning phase
3. The execution phase
4. The termination phase

**Environment impact assessment(EIA):** This is a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse.

It’s a tool to identify the environmental, social and economic impacts of a project prior to decision making. It aims to predict environmental impacts at an early stage in project planning and design, find ways and means to reduce adverse impacts, shape projects to suit the local environment and present the predictions and options to decision makers.