

Specifications

Scope of Work for the construction of 200' of board walk to be constructed at Telescope, St. Andrew's

1.0 GENERAL

The scope of works details the requirements and specifications for the installation of a new board walk through the mangrove with hand rails for bird watching.

1.1 General Scope of Works for Contractor

1. The Contractor will report to the Client's designated Project Coordinator and must supply all labor, tools, materials and equipment required to carry out works in accordance with the specifications and requirements outlined in this bidding document.
2. A work plan, which shall include a waste management plan, health and safety plan, and method statement must be developed and presented to the client's engineer/ project coordinator for review and approval.
3. The Contractor shall provide monthly progress reports and coordinate and facilitate weekly on-site meetings and inspections as required or as requested by the client's representative. It is the contractor's responsibility to provide secretarial services for the recording of all site meeting and for distribution of said meeting minutes.
4. The contractor is responsible for all site preparation, mobilization and logistics of all works.
5. The Contractor will liaise closely with the client's Project Coordinator and Social and Communications Specialist in order to ensure that affected communities are consulted, informed and forewarned of planned site activities in a timely manner. The communities are to be given opportunities to ask questions and kept informed of the nature, timing/duration, extent of activities and likely short, medium and long-term impacts on them. These consultations should be documented by the Project Coordinator and a log kept of all such communications.
6. The client will provide the contractor with all required technical specifications of materials, civil and infrastructural works, Bills of Quantities, engineering drawings, proposed designed layouts except those that would be supply by the manufacture for construction of specific items.

7. The contractor shall develop and submit as-built drawings including a maintenance manual for the affective maintenance and management of all erected structures. These as-built drawings and maintenance manual will form part of a construction completion report.
8. It shall be the responsibility of contractor to get each drawing approved by the Client's Engineer-in-Charge at least seven days prior to work commencement, with all the changes / rectifications as suggested / marked by the Client.
9. The Contractor is responsible for the preparation of Detailed Quality Assurance System plans/procedures and its subsequent submission for review and approval by the Client's Engineer/ Project Coordinator prior to commencement of work. The required competent man power, machinery, tools and equipments, etc required to execute the work as per the Approved Quality assurance plan shall be the responsibility of contractor. Due daily records will be maintained by contractor throughout the work period as per the instructions of the Client's Engineer.
10. In addition to ensuring that supplied and erected structures are free from defects and inadequate workmanship; and that all testing requirements are met and satisfied.

2.0 SPECIFIC SCOPE OF WORKS, MATERIALS AND DESIGN SPECIFICATIONS

1. Cut / clear work area with the supervision of the Ministry of Agriculture
2. Excavate 18" x 18" footing
3. Cast 4" x 4" greenheart post with 3" of concrete 12" high around the post
4. Construct board walk

SPECIFICATIONS FOR REINFORCED CONCRETE CONSTRUCTION

General

- A Concrete shall be made with cement, fine aggregate, coarse aggregate and water. No other agent or ingredients shall be added to the concrete without the prior approval of the Project Manager. The Contractor shall ensure that the use of such approved additive will not adversely affect the strength, durability or appearance of the finished concrete works.

Definition

- B The following terms whenever used in the specification shall be taken to have the meanings assigned to them below:
- C “Plain Concrete” shall mean concrete used in members made with a structural grade of concrete listed, but not containing steel reinforcement.
- D “Structural props” shall mean those components of the strutting to formwork which will be retained in position when the shuttering is removed from concrete faces.
- E “Satisfactory” shall mean to the satisfaction of the Project Manager
- F “Approved” shall mean approved by the Project Manager representatives.
- G “Required” shall mean required by the terms of this specification, or any other contract document.
- H “Passed by the Project Manager’s representative” shall mean accepted as complying with specification requirements as far as can be judged from visual inspection.
- I “Current issue” shall mean latest issued at the date of the tender invitation
- J “Failure to comply with this specification” shall mean failure to comply satisfactorily with all requirements of this specification.

Responsibility

- K No approval or acceptance by the Project Manager or his representative shall in any way relieve the Contractor of his responsibility for the quality of materials and the standard of workmanship in the finished works and for the strength, durability and appearance of the finished concrete works.

PLAIN CONCRETE

- A Plain concrete works shall comply with the relevant requirements for reinforced concrete

MATERIALS

General

- B All materials in the works shall comply in all respects to the best standard available locally based on the relevant standard except for any deviations specifically authorized in subsequent clauses of this specification.
- C The constituent materials of concrete shall be cement, aggregates and water. No admixtures to this concrete shall be permitted without the prior approval of the Project Manager.

Cement

- D Cement shall be ordinary Portland Cement complying with B.S. 12: 1991. All cement shall be delivered to site in bulk, cement lorries of approved design or in sealed bags.
- E Minimum cement content of concrete shall be 350kg/m³ for all work below ground level and 250 kg/m³ for all work above ground level. Maximum cement content of concrete shall not exceed 550kg/m³.
- F No rebaggage cement will be permitted to be brought on to the site. On no account shall a change in the type of source of supply be permitted during the course of construction and every endeavor shall be made to ensure that the colour of the cement is constant throughout the contract except with the permission of the Project Manager.

Aggregate

- G Aggregate shall comply with the recommendation of BS 99\882:1992. In special circumstance a deviation from BS 882: 1992 in respect of grading of aggregate may be accepted, subject to the prior approval of the project manager.
- H The nominal maximum sizes of coarse aggregate shall be 20mm, except where otherwise directed by the Project Manager

Water

Water to be used in the Works shall be clean and free from all harmful matter, in suspension or solution that would have adverse effects on setting, hardening and strength of Portland Cement. A continuous supply of water shall be available during all mixing, placing and curing operations.

Reinforcement

- A. Mild steel reinforcement shall be hot rolled mild steel with a specified characteristic strength of 250N/mm² complying with B.S. 785 or approved equivalent. Hot rolled high yield steel shall have a specified characteristic strength of 410N/mm² and comply with B.S. 4449 or approved equivalent. Cold rolled high yield steel shall have specified characteristic strength of 460N/mm² for bars up to and including 16mm diameter and 425N/mm² for bars exceeding 16mm in diameter. Cold rolled high yield steel shall comply with B.S. 4483 or approved equivalent. Only twisted cold marked high yield reinforcement shall be used in the reinforcement.

Admixture

- B Admixtures for improving the concrete may be permitted but only after the Contractors have satisfied the Project Manager that it will be to his advantage. Use of the admixtures shall be made only on the written permission of the Project Manager and in any case the permission to use the same shall not be construed to mean that extra will be paid.

Concrete Densifier and Chemical Hardener

- C Surface hardener to be LIQUI-HARD Concrete Densifier and Chemical Hardener as supplied by INTERCHEM LIMITED of 9th Avenue South, Barataria (868 638 3801) or any equal and approved by Project Manager applied by either manual sprayer, soft bristle broom or mechanical scrubber to the concrete surface as per manufacturer's specification.

Storage

- D All cements shall be approved in a weather proof shed of adequate size having a raised dry floor, or in silos of approved design.
- E Aggregates shall be stored on hard paved areas with adequate dividing walls, or in approved container, to prevent mixing of different types of aggregate and be kept clean and free from contamination.
- F Cements and aggregates shall be used in the order in which they are received on site and their storage shall be arranged to facilitate this procedure.
- G Reinforcement shall be stored in racks clear of the ground.
- H Where materials are to be stored in suspended floors or roofs the Contractor shall ensure that such storage will not overload or distort the structural frame.

Rejected

All materials which have been damaged or are contaminated , or have deteriorated or do not comply with the requirements of this specifications shall be rejected and shall be removed from the site immediately at the Contractor's expense.

TESTS

General

- A Before the commencement of the Contract, the Contractor shall submit to the Engineer, for his approval, the name of the Testing Authority he proposes to employ.
- B the Contractor shall provide all equipment necessary to carry out all tests on site specified or described in this specification, and he shall make and provide for all necessary arrangements for the delivery of all sample and test pieces to be tested by the approved Testing Authority.
- C The Contractor shall provide for maintaining all testing equipment on site in proper working order to the satisfaction of the Engineer.
- D The Contractor shall provide for sending copies of all tests results to the Engineer.
- E The Contractor will bear the cost of all tests specifically required in this specification.
- F The Contractor will not be paid for any special tests called for by the Engineer in consequence of any failure by the Contractor to comply with this specification.
- G The Contractor will be paid, at rates to be agreed, for any other special tests called for by the Engineer unless the tests results show failure by the Engineer to comply with this specification.
- H The Contractor shall state his source of cement to be used on the site and verify that these are of the relevant B.S.
- I The manufacturer's certificates of test including compressive strength tests, carried out in accordance with B.S. 12 for Portland Cement shall be supplied and kept on site for each consignment of cement delivered to the works. At the commencement of the Contract, the Contractor shall deliver a 22.68kg sample of each type of cement he intends to use to the approved Testing Authority.

Aggregates

- J Samples of aggregates to be used shall be supplied to the Project Manager and the source identified for approval by the Project Manager.
- K All sampling and testing of aggregates shall be carried out in accordance with the relevant recommendations of B.S. 882:1992
- L At the commencement of the contract, the Contractor shall deliver to the Approved Testing Authority for inspection and analysis, 3 separate samples of each type of aggregate the 3 sample shall be taken at the proposed source of supply at intervals of not less than one day. For fine aggregates the samples shall be 22.68 kg weight each and for coarse aggregates, the samples shall be 45.36 kg weight each.

Mixing plant

- D Weight batching plant shall be checked weekly in the presence of the Project Manager's representative. The checking shall be carried out with approved weights provided by the Contractor for this purpose.
- E The water gauge of the concrete mixer shall be inspected and tested daily when concreting is in progress.
- F If any fault in the mixing plant is detected by these tests or otherwise, the fault shall be rectified to the satisfaction of the Project Manager's representative before further use is made of the equipment.

Concrete tests

- G Concrete test cube shall be made, cured and tested and the results recorded, in accordance with the recommendations of the current issue of B.S. 1881, unless specifically modified in subsequent clauses of the specification.
- H The test specimens shall be 150mm cubes made in steel moulds of approved design. The test cubes shall be made from typical batches of concrete as directed by and in the presence of the Project Manager's representative without prior notice.
- J Slump test or compaction factors tests of the mixed concrete shall be carried out at regular intervals and the results recorded and kept on the site.

CONCRETE

Concrete Mixes

D For structural concrete mixes made with Ordinary Portland Cement, the average 28 day works strength shall be not less than specified in the table below:

E The following concrete mixes shall be required.

b. Grade	c. 28 Days Works Strength in N/mm²	d. Proportion	e. Fine Aggregate	f. Coarse Aggregate
g. Plain Concrete	i. No Strength	l. 1:8	o. -	r. 37mm all-in
h. 20	j. 20	m. 1:2:4	p. 100 – 4mm	s. 5mm-19mm
u. 25	w. 25	y. 1:1 ½ : 3	aa. 100 – 4mm	cc. 5mm - 19mm
ee. 30	gg. 30	ii. 1:2:2	kk. 100 – 4mm	mm. 5mm - 19mm
ff. 30	hh. 30	jj. 1:2:2	ll. 100 – 4mm	nn. 5mm - 19mm
nn. 30	pp. 30	rr. 1:2:2	tt. 100 – 4mm	uu. 5mm - 19mm
oo. 30	qq. 30	ss. 1:2:2	uu. 100 – 4mm	vv. 5mm - 19mm

Mix Proportions

F Mix proportions shall be designed by the Contractor for each structural concrete mix listed in the table:

G The concrete mixes shall be designed to have target mean strength which exceeds the required characteristic strength by the following margins:

vv. Grade 20	ww. 10N/mm ²
xx. Grade 25	yy. 13N/mm ²
zz. Grade 30	aaa. 15N/mm ²

H A reduction in the current margin specified above may be permitted subject to the following:

- (i) The Contractor shall satisfy the Project Manager that the standard of supervision and concrete control to be exercised on site for the duration of the structural works, justifies such a reduction.
- (ii) The average strength of the concrete used in the works shall be assessed accordingly to the statistical method, applied to works cube tests results.
- (iii) Trial mixes are made from each three separate batches of concrete which are prepared and four cube tests obtained from each batch.

The trial mix proportions will be approved provided that:

- (a) The mixes have sufficient workability to allow concrete to be placed and properly compacted by the methods to be used on site.
- (b) The average strength of the mix cubes tested at 28 days exceeds the specified characteristic strength by the current margin less 3.5N/mm^2

Tests at an earlier age may be permitted provided that satisfactory age-strength relationships have been established by experiment.

- A The mixes shall be designed to have sufficient workability to allow concrete to be placed and properly compacted by the methods to be used on site.
- B Complete calculations for the mix proportions and the information and assumptions on which they are based shall be submitted to the Project Manager, for each mix listed in the table, before the cubes for the preliminary strength tests are made.

Preliminary strength

- C Preliminary strength cube test shall be carried out to check the calculated proportions for each structural concrete mix.
- D Preliminary cubes shall be made for each mix from the three samples of aggregate and samples of cement sent to the approved Testing Authority. From each samples of aggregate 6 cubes shall be made, 3 for test at seven days and 3 for test at twenty eight days.
- E Each set of cubes at 28 days shall be accepted as satisfactory if, either all three cubes have a crushing strength greater than the preliminary design strength, or the strength or the average strength of the three cubes is greater than the preliminary design strength and the difference between the greatest and the least is not more than 20% of that average.
- F If for any mix in the table, the result in one test of three cubes tested at 28 days fall below this requirement, the mix shall be rejected, the proportions revised and the testing procedure repeated.
- G For each structural concrete mix, the 28 day preliminary strength shall be calculated as the average of the cubes tested at 28 days and the 7 day preliminary strength shall be calculated as the average of all the cubes tested at 7 days.

H Results for all preliminary tests shall be sent to the Project Manager as soon as they are available.

Work strength

- A Compliance with the specified characteristic strength shall be judged by test made on concrete cubes at 28 days. Test at an earlier age may be accepted provided that satisfactory age-strength relationships have been established by experiment.
- B The minimum rate of sampling shall be for every 20m² or every 20 batches of concrete supplied whichever is the lesser volume. No variation in this sampling rate will be permitted without the prior approval of the Project Manager.
- C Four cubes shall be made from each sample for testing at 28 days or at an earlier age approved by the Project Manager.
- D The samples where practicable shall be taken at the point of discharge from the mixer or in the case of ready-mixed concrete, at the point of discharge from the delivery vehicle.
- E Each set of four cubes tested at 28 days shall be accepted as satisfactory provide that:-
- (a) The average strength determined from any group of four consecutive test cubes exceed the specified characteristic strength by not less than 0.5 X the current margin.
 - (b) Each individual test result is greater than 85% of the specified characteristic strength.
- F If at any time the mean strength or the standard deviation fails to satisfy the requirements given above, the Project Manager shall be notified immediately and action shall be taken, as the Engineer shall direct
- G In all cases, an estimate of the corresponding 28 day strength may be obtained from the 7 day cube tests by assuming the ratio of 28 to 7 day strengths to be the same as that obtained from the average strengths of the tests for the trial mixes.
- H Results of all works cube tests and test analysis shall be kept on site and copies shall be sent to the Project Manager as soon as the results are available. All records of work cube tests shall indicate clearly which part of the structure each sample of concrete represents.

Works test failure

- I If any set of 7 day sub tests results indicate a low 28 day strength to be expected, the Project Manager shall be notified immediately and no props shall be removed from the affected part of the structure until the cause is determined.
- J If any set of 28-day cube results fall below the specified strength, the Engineer shall be notified immediately and the cause of the failure investigated.
- K The extent of the area of the structure affected shall be as defined by the Project Manager
- L All costs of and all charges in consequences of the course of action the Contractor is directed to follow, shall be borne by the contractor

Site Control

- A The water-cement ratio determined in the calculation of proportions for each mix shall be accurately maintained. The amount of water in each batch shall be controlled by direct measurement and due allowance shall be made for water content of the aggregate as determined by the daily test.
- B A slump of 75mm to 100mm or a compaction factor of 0.92 shall be used as a guide to the workability of the mixed concrete.
- C If a change in the grading of any aggregate is unavoidable, the proportions of all structural concrete mixes affected shall be revised to take account of the altered grading.

Ready-mixed Concrete

- D Permission must be obtained, and the name of the supplier submitted before the used of ready mixed concrete. Permission must also be obtained to change the supplier of ready-mixed concrete and also to revert back to site mixed concrete. The Concrete must be discharged into the formwork within 1 hour of mixing. All the requirements for site mixed concrete, previously given must be complied with, except for the time of discharge. Any ready mixed concrete that has not been deposited within 1 hour of mixing shall not be used and shall be removed form site. If required to do so, certificates showing batching records of the ready mixed concrete shall be produced by the contractor. Experienced ready mix truck drivers only will be allowed to deliver the ready mixed concrete and they, when told to mix up by the Contractor's Supervisor, will discharge into the mixer drum the exact amount of water required in accordance with previous clauses of this specification. The amount of water in the mix can only be changed on the Authority of the Project Manager.

- E Although testing is sometimes performed by the ready mixed concrete supplier, the Contractor must carry out his own testing in accordance with the requirements of the site mixed concrete. The concrete cubes shall be tested for strength by an independent authority and the results submitted to the Project Manager without delay.

Exposed concrete faces

- I Unless otherwise specified all concrete faces to be exposed in the finished works shall be left as struck with a fair face, true to line and level within the specified tolerances for the works.
- J After inspection, all superfluous fins and similar projection shall be carefully removed. No render or other applied finish shall be used to obtain a fair face to the concrete.
- K All concrete faces to be exposed in the finished works shall be adequately protected against damage and surface staining during the execution of subsequent works.

Exposed concrete faces (cont'd)

- A All finished works which the Project Manager shall judge inferior in any part to the standard of the relevant approved sample or which is subjected to subsequent damage or surface staining shall be rejected and treated as defective work.

Mixing

- H Concrete shall be mixed in an approved mechanical batch type concrete mixer. Mixing shall be continued until there is a uniform distribution of the materials in the mixer and the mass is uniform in colour. The mixing time for each batch shall not be less than the minimum period recommended by the mixer manufacturer.
- I The volume of mixed materials in each batch shall not exceed the rated capacity of the mixer. Each batch of concrete shall be completely discharged before the mixture drum is re-charged.
- J The mixer drum shall be thoroughly washed out whenever mixing ceases.

Transporting

- A Concrete shall be transported as rapidly as possible from the mixer to its final position without segregation or loss of any of the ingredients.
- B All plant and equipment used for transporting concrete shall be kept clean, all containers used for transporting concrete shall be thoroughly washed out whenever mixing ceases
- C Runs or gangways for concrete transporters and mains runs for foot traffic shall not be supported or allowed to bear on the fixed reinforcement.

Placing

- D Concrete shall be placed while still sufficiently plastic for adequate compaction without segregation or loss of any of the ingredients.
- E At all times when reinforced concrete is being placed, a competent steel fixer shall be in continuous attendance on the concretors, he shall adjust and correct the position of any reinforcement, which may be displaced.
- F The Contractor shall keep on site a complete record of the works showing the time and date when concrete is placed in each part of the works. These records shall be available at all times for inspection by the Project Manager.

Compacting

- G Concrete shall be thoroughly compacted during placing and shall be carefully worked around all reinforcement and embedded fixtures and into the sides and corner of the formwork, using a heavy duty poker type vibrator with minimum frequency of 12MHE. The Contractor shall have standby vibrators on site during pours.

Curing

- H All surfaces of freshly placed structural concrete shall be covered with an approved material and kept constantly wet for 7 days except that for concrete made with rapid hardening cement the minimum curing period shall be 3 days. Degradable clear plastic curing coating may be used with prior written approval by the Project Manager or his representative.
- I Soffits and side form left in position will be regarded as effective in keeping those surfaces wet.
- J The Contractor shall notify the Project Manager of the system and method of curing he proposes to use for all structural concrete members before the works are commenced.

STRIKING OF FORMWORK

- K The structure shall not be distorted, damaged or overloaded in any way by the removal of the formwork from concrete members.
- L The responsibility of the safe removal of any part of the formwork or strutting shall rest with the Contractor.

Record of temperatures

- A A maximum and minimum thermometer of approved design shall be kept on site close to the works for measuring atmospheric shade temperature.

Minimum striking times

- B The minimum striking times for removing formwork to structural members shall be determined from the table below. The times are given in days, where each day is to be 24 hours duration. Before the formwork is removed from any structural member the Contractor shall ensure that the concrete in that member has attained sufficient strength for striking to proceed.

Location	Minimum Time O.P.C Concrete
Slab soffits (structural props left in)	4
Beams soffits (structural props left in)	6
Slab structural props	10
Beam structural props	14

CONCRETE IN WATERTIGHT CONSTRUCTION

General

- C All work required to be watertight in the finished works will be so indicated in the drawings
- D The Contractor shall include in his rates for any waterproofing additives he proposed to use but the use of such additives shall be subject to the prior approval of the Project Manager
- E Where in the opinion of the Project Manager damp patches or leakage of water in the finished works are due to incorrect placing or inadequate compaction of the allowance for shrinkage, the affected works shall be made good at the Contractors expense.

Pricing

- A Prices for Concrete Works shall include:-
1. All Consideration arising from the specification
 2. Where concrete is cast in earth cuts (i.e not described as filled into formwork) for any additional concrete over the size stated or shown necessitated by the irregularity of the surfaces retaining the concrete.
 3. Cutting, bends, hooks, tying wire, distance blocks and ordinary spacers for reinforcement.

4. All cleaning and oiling of forms and making good of exposed concrete surface after removal of formwork eg cutting off projecting fins, filling out small voids and brushing to exposed aggregate.
5. Where formwork is described as “wrought” or “dressed” for producing a fair face finish either by lining the formwork with suitable material and/or filling in voids etc.; and rubbing down to a smooth finish to the Project Manager approval.
6. Transporting concrete, hoisting or lowering, placing in position, working around reinforcement where necessary and curing.
7. Formwork including all temporary supports and strutting, notches, overlaps and passing at angles, easing, striking and removing.
8. Precast units including hoisting and fixing in position and bedding, jointing and pointing where necessary in cement mortar similar to that used in adjoining work.

CARPENTRY AND JOINERY

Timber generally

- A Timber shall be sound with reasonably straight grain and at least 95% heartwood free from warp waney edges, post holes beetle, splits, fringes, decay, infestation or other deformation and from sign of rot. Worm and beetle and shall not contain large, loose or dead knot, sapwood, shakes or other defects to such an extent or so situated in the piece as to render it insufficient in strength or stiffness for the work to be done.
- B Timber, which is in the opinion of the Project Manager inferior in quality or condition or is not suitable for requirements of this work shall not be used. No piece of exceptionally light wood shall be permitted. Samples of materials shall be submitted to the Project Manager for his approval before the start of the operations.
- C Unwrought timber shall be sawn full to the dimensions stated, except that occasional variations in sawing are permitted. No variations in sawing shall be more than 5mm under the stated dimension when this is less than 200mm or more than 6mm under the stated dimension when this is more than 200mm.
- D Timber specified “dressed” on one or both opposite sides, shall be more than 12mm less than the nominal dimension, unless stated to be “actual dimension”. Timber shall be held to be dressed” by machine unless otherwise stated.

Pitch pine

- E Pitch pine shall be best imported quality of mature growth, free from gross defects, air seasoned and having a minimum density of 0.578kg/cubic meter at 25% moisture content.

Plywood

F Plywood shall conform to B.S.6566:1985 Grade 2 Veneer bonded with “weather and boil proof” synthetic resin adhesive unless otherwise described and shall be protected against infestation by the powder post beetle and like insect pests.

Teak

G Teak shall be prime quality, selected for appearance and left clean for oiling 100% free from sap.

Mahogany

H Mahogany shall be Honduras type local mahogany and of prime quality.

Greenheart

I Greenheart shall be Guyana type local greenheart and of prime quality.

Treated timber

J All timber is to be vacuum/pressure impregnated with “Wolmanised” preservative to a dry salt net retention of 8.009kg of “Wolmanol” per cubic metre of timber. Where timber is cross cut bored after treatment all surfaces exposed should be liberally treated with “Wolmanol” certificate of conformity with this specification.

Exposed faces

A Timber which is to be exposed in the finished work shall be ‘dressed’ unless otherwise described

Standards

B The following British Standards shall apply insofar as they refer:-

Isometric block hexagon bolts, screws and nuts	BS4190
Nails	BS1202
Wood screws	BS1210
Workmanship and Maintenance	BSCP 112: Part2
Preservative Treatment for constructional Timber	BSCP 98

Natural finish

- C When natural finish or staining clear polish or varnishing is specified, the timber in adjacent pieces shall be matched or uniform or symmetrical in colour and grain.

Shrinkage

- D Arrange, joint and fix all joinery work in such a manner that shrinkage in any part and in any direction shall not impair the strength and appearance of the finished work and shall not cause damage to adjoining material or structure.

Moisture content

- E The moisture content of timber as delivered for the work shall not be more than 15 percent for joiner's work, nor shall this content be allowed to increase whilst work is in progress.

Joints

- F The Contractor shall perform all necessary tenoning, grooving, matching, tonguing, housing rebating and all other works necessary for the correct jointing. He shall provide all metal plates, screws, nails and other fixing that may be ordered by the Project Manager or that may be necessary for the proper execution of the works unless otherwise stated on the drawing.
- G All joints are to be type specified or as is most appropriate in the circumstances. The joints shall be designed and secured so that the stresses to which they are subjected may be either resisted or compensated. Loose joints are to be made where provision must be made for shrinkage or other movements acting other than in the direction of the stresses of fixing or loading.
- H Glued joints are to be used where provision need not be made for shrinkage or other movement in the connection and here sealed joints are required. All glued joints shall be cross tongued or otherwise reinforced.
- I All nails, sprigs, etc and other joinery works shall be accurately scribed to fit the contours or any irregular surface against which they may be required to form a close butt connection.

Screws

- A All screws shall be non-corrosive, pre drilled and countersunk with dowel filling or matching timber.

Nails

- B All Nails used shall be for rough work only

Bolt holes

- C Bolt holes shall be large enough to permit easy access for the bolt but may not exceed $D + d/16$ for 4mm whichever is the larger, where D is the bolt diameter.

Tolerance

- D All structural timbers shall be sawn timbers to the section given on the drawings. Permissible tolerance on cross section dimension will be +6mm and -3mm with no allowance for wane.
- E Provided reasonable tolerance at all connections between joinery work and the building carcass so that any irregularities, settlement or other movements shall be adequately compensated for.

Fabrication

- F Joinery work shall be carried out by a competent craftsman. The Contractor shall check the exact dimensions of masonry openings to ensure that the rough grounds can absorb the tolerances of exact dimensions.
- G Free-standing or independent joinery shall be dimensioned from the Project Manager's drawings. Any discrepancies shall be brought to the attention of the Project Manager in writing before fabrication is commenced. Allowance shall be made for the production of prototype joinery units for testing and written approval by the Project Manager.
- H Put in hand all joinery work immediately on commencement of the Works and store in a dry place and put together without wedging up for the inspection and approval of the Project Manager. Care shall be taken in fabrication to avoid excessive wetting or drying of the timber.
- I Where joinery works are shown built in or erected in position before the surrounding or enclosing works of the main building carcass have been carried out, it shall be the responsibility of the Contractor to ensure that the works are set plumb and shall not be damaged or be displaced by subsequent operations.
- J Where necessary, the joinery shall be temporarily braced and encased. Provide and secure suitable anchors or other fixing so that these may be "built in" to the carcass while it is being constructed. The anchorage connections shall be constructed so that they shall permit settlements in the building carcass without stressing or otherwise loading the joinery works. No fixing of temporary strutting into the finished joinery will be allowed.
- K Joinery works shall not be fixed in position until after all floors, walls and ceiling surfaces have been formed and constructed unless otherwise specified.

Fixing

- A All fixing, plates, shoes or straps shown on the drawings shall be neatly formed of mild steel plate drilled and welded as necessary. Prior to erection, all mild steel components shall be wire brushed and prime with one coat of red lead zinc chromate primer. All surfaces in contact with the wood shall be painted with a further two coats of bituminous paint.

Shop drawings

B Shop drawings shall be produced for all joinery work for review and approval by the Project Manager.

Pricing

G Prices for Carpentry/Joinery shall include:-

1. All consideration arising from the specification
2. Pre finished built in joinery fitting including all frames, legs, bolts, screws, straps, spacer blocks, etc ironmongery and decoration.

4.0 Project Duration

It is expected that is project will last for duration of Seven (7) Weeks as follows:

Drawings

No.	Description of Drawings	Amount
A-01	Plan view, elevation section and details	1