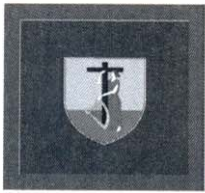


GEOHERMAL PROJECT

Tender for Site Preparation Works

January 2016



MINISTRY OF COMMUNICATION, WORKS & LABOUR

P O BOX 344, BRADES, MONTSERRAT, W I

◆ Tel: (664) 491-2521/2522 ◆ Fax: (664) 491-6659 ◆ E-mail: mew@gov.ms

January 21st, 2016

Dear Sir/Madam,

Re: Tender for Construction of Geothermal Exploratory Drill Pad – Well No.3

You are invited to submit a tender for the above captioned project. Included are the tender documents consisting of:

1. Instruction to Tenderers
2. Form of Tender
3. Document Checklist
4. Bill of Quantities
5. Specification
6. Tender Evaluation Criteria
7. Anti-Collusion Statement
8. Tender Drawings

Tender packages can be accessed on the Government of Montserrat website at www.gov.ms. Please return a complete document of the priced and signed Form of Tender, Bill of Quantities, Completed Document Check List, signed anti-collusion certificate and a copy of your **tax compliance certificate**. These should be placed in an inner envelope and addressed to the **Chairman, Public Procurement Board, Ministry of Finance and Economic Management, Brades, Montserrat**. The name of the project should also be written on this inner envelope and should read, "**Tender for Construction of Geothermal Exploratory Drill Pad – Well No.3**". The name of the tenderer should also be written on the inner envelope.

The inner envelope should be placed in a sealed outer envelope addressed to **The Chairman, Public Procurement, Ministry of Finance and Economic Management, Brades, Montserrat**. The name of the project should also be written on this outer envelope and should read, "Tender for Construction of Geothermal Exploratory Drill Pad – Well No.3". The outer envelope should bear no identification of the tenderer. Tenders are to be received no later than **2:00p.m on Wednesday February 10th 2016**. Please ensure that no additional marks are placed on the outer envelope.

Tenders are to be taken to the bottom floor of the Premier building where the tenderer would place their tender in the Tender Box and be given a receipt after this is completed.

A site visit will be arranged for **10:00 am on Thursday, January 28th, 2015**. Interesting persons are asked to meet at the **Roundabout in Cork Hill** then everyone would be taken to the site. Any queries relating to the tender or works included should be made in writing to the Director, Public Works Department.

Yours faithfully,

Beverley Mendes (Mrs.)

Chairperson

Departmental Tender Committee

Ministry of Communication, Works and Labour

Instructions to Bidders

1. The Montserrat General Conditions of Contract will be adopted for this contract.
2. Bidders must complete the **Form of Tender, Document Check List, Anti-Collusion statement** and **Cost Estimate** for the works. Failure to fully complete these documents will lead to their bid becoming non-compliant and rejected.
3. **The bidder must submit a Tax Compliance Certificate from Inland Revenue along with the bidding documents if locally based.**
4. The tenderer should submit a detailed programme of works with his tender showing a list of proposed activities and the duration. The time for completion of works will be no more than _____ **weeks** from the award of contract.
5. The bidder will be deemed to have inspected the site and be familiar with the environment and working conditions on the site.
6. All works undertaken will be the subject of taxation in accordance with the current legislation. The bidder must submit a Tax Compliance Certificate from Inland Revenue along with their tender, if locally based. If not locally based, bidders must make provision in their bid for a 20 percent withholding tax on contract payments.
7. The **successful tenderer** should submit details of their current insurance sufficient to satisfy the requirements for insurance given in the Conditions of the Contract and the Specification. The insurance shall jointly indemnify the Contractor and GOM in the amount not less than **EC\$450,000.00**. **This will be requested before the signing of the contract.**
8. Tenders should be returned in a sealed envelope, no later than **2:00p.m on Wednesday February 10th 2016**. Tenders and all supporting documents should be enclosed in an inner envelope duly sealed and bearing the words, **“Tender for Construction of Geothermal Exploratory Drill Pad – Well No.3”** and addressed to **The Chairman, Public Procurement Board, Ministry of Finance and Economic Management, Brades, Montserrat**. The name of the tenderer should also be placed on the inner envelope. The inner envelope should be placed in a large outer envelope and addressed to **The Chairman, Public Procurement Board, Ministry of Finance and Economic Management, Brades, Montserrat**. The name of the project should also be written on the outer envelope and should read, **“Tender for Construction of Geothermal Exploratory Drill Pad – Well No.3”**. The outer envelope should bear no identifiable mark of the tenderer. Tenders should not have any additional marks on the envelope. **Late tenders will not be considered.**
9. No more than one tender can be submitted by a natural or legal person whatever the form of participation (as an individual legal entity or as leader or member of a consortium submitting a tender). In the event that a natural or legal person submits more than one tender, all tenders in which that person has participated will be excluded.
10. Tenderers are to provide all documents or information requested as part of the Tender Evaluation with their tender submission.

11. All tenders will be arithmetically checked, any errors will be brought to the tenderers attention. The rates supplied would be the basis for the arithmetic correction and would be the determining factor for any queries about the corrected price.
12. Tenderers are not allowed to submit alternative tenders.
13. The Employer is not bound to accept the lowest tenderer and has the right to accept or reject any tender offers.
14. There are no utilities in the area so contractor will need to make his own arrangement for provision of power, water and communications.
15. A Government of Montserrat approved safety plan will be required for work within the exclusion zone (Zone "V").

Description of the Works

- Construction of drill pad
- Construction of water holding tank

Ministry of Communications, Works and Labour
Tender Document Checklist

Project Title: **Tender for Construction of Geothermal Exploratory
Drill Pad – Well No.3**
Date scheme advertised: ***Thursday 21st January 2016***
Tender Deadline Date: ***Wednesday 10th February 2016***
Tender Deadline Time: ***2:00pm***

Below are the following documents that should be provided for a contractor's bid to be valid. Bidders are asked to supply and tick off the following information. Failure to provide any of the stated documents will result in the bid being considered non-compliant and rejected.

The below documents should be presented with their bid to ensure that their bid is valid.

Signed Form of Tender (**Including time for completion and notice period**) ☐

Completed Cost Estimate ☐

Tax Compliance Certificate (*if locally based*) ☐

Programme of Works ☐

Signed Anti-Collusion Statement ☐

Details of Contractor Experience. The contractor should provide details of at least two (2) previous contracts of a similar nature completed within the past 10 years by his company with a value of a minimum \$300,000.00. ☐

.....
Signed on behalf of Contractor

.....
Date

FORM OF TENDER

The Chairperson
Public Procurement Board
Ministry of Finance and Economic Management
Brades
Montserrat

Dear Sir/Madam;

Re: Tender for Construction of Geothermal Exploratory Drill Pad – Well No.3

I/We the undersigned undertake to construct and complete the above Works in accordance with the General Conditions of Contract, Specifications and Drawings for the sum of:

EC\$

.....
(words).....
.....
.....

If my/our tender is accepted, I/We undertake to commence the Works within _____ **weeks** from the date of receipt by me/us of the official order and complete the works within _____ **weeks** from the date of receipt by me/us of the official order.

I/We understand I/We shall not be reimbursed for any cost that may have been incurred in compiling this tender. I/We confirm this tender shall remain valid for a period of 90 days from the date of submission of this tender.

Name.....

Signed.....

Name of firm (If Applicable)

Address.....

.....

Tel. nr.....

Fax nr.....

Email Address

Date.....

Well Site Three (3) - MON-03					
Tender for Construction of Geothermal Exploratory Drill Pad - Well No.3 within Lower St. Georges					
Item	Description	Units	Quantity	Rate	Total
A	Preliminaries				
a.1	Contractor's preliminaries, mobilisation/demobilisation and insurance cost. The contractor shall be responsible for the safety of the employees during the construction phase. Further, it is the contractor's responsibility to make contact with all utilities prior to commencement of works and where necessary shall make provision for re-routing any utilities which may interfere with the works. <i>Proposed Construction Site</i> The proposed drill site has been identified within the Lower St George's found in zone "C". It is the responsibility of the contractor to make the necessary site visit/s and ascertain the soil condition for the proposed excavation works. For this purpose, the client has invited the contractor to a site visit in order for the contractor to carry out an assessment of the soil condition and site location. Sheet No.01 provides a location of the proposed third well. Nb: Contractor's Safety Operational Plan The contractor will need to produce a safety plan suitable for working within the location. The proposed plan shall form part of the tender document and must be approved by the GOM before the contractor can commence operation at the proposed site location.	item			
B	Setting out works				
	The client will provide the bench mark point for the Drillhole. The contractor shall be responsible for setting out the complete site location (65.0mx43.0m) to include the drainage plan layout details and water holding tank. Proposed site layout sheet provides an overview for the proposed works.	item			
C	Reinforced Concrete Slab				
c.1	In accordance with Sheet No.2, excavate for the proposed drill pad and oil trap box area. Contractor shall be responsible for setting out the profile to receive the proposed slab, drainage gradient around concrete slab and drainage layout.	m ³	200.0		
c.2	Supply hard crushed rock, place in 100 mm thick layer, shape and compact in accordance with details on Sheet No.2 in preparation for placing in-situ concrete.	m ³	45.0		
c.3	Supply and place No.66 Brc fabric over compacted fill to reinforce concrete slab in accordance with Sheet No.2.	m ²	450.0		
c.4	In accordance with Sheet No.2 supply, place and poker vibrate 250mm thick in-situ concrete for drill loading and oil collection area. Concrete strength shall be specified 3500psi @ 28-days. Include for the necessary formwork and shoring required for a level concrete surface finish.	m ³	115.0		
	Drill Pad Drainage				
c.5	In accordance with Sheet No.5 details, supply the necessary materials and construct the 200mm thick reinforced hollow concrete block for the sand and oil trapment box. It is reinforced with T12mm rebar placed into every other core and concrete filled. The base shall be 200mm thick reinforced with T12mm bar placed at 200mm bothways.	item			
c.6	In accordance with Sheet No.2, supply and place 150mm diameter size pressurised pvc pipes to channel oil spills runoff from the drill pad into the sand and oil trapment box.	m	20.0		
c.7	In accordance with Sheet No.2 and No.5, supply and place 150mm diameter perforated pressurised pvc pipes lined with pond liner or an approved impermeable layer around slab perimeter to collect and channel runoffs into the sand and oil trapment box.	m	120.0		
c.8	Construct boulder/sump catchment in accordance with details on Sheet No.5.	item			
D	Water Holding Tank				
	Excavation				
d.1	In accordance with Sheet No.02, excavate the proposed water holding tank area. Area shall be marked out through PWD for contractor to excavate. Contractors shall be further responsible for supplying the necessary equipment to complete this activity. Provision must be made for for trucking away excavated material from the construction site to spread over Crown owned land within 300 metres proximity from the construction site. Proposed location is shown on site layout.	m ³	1092.0		
	Reinforced slab, Foundation and Ground Beam				
d.2	In accordance with Sheet No.02 and No.03, construct the concrete slab of water holding tank. Concrete slab of water holding tank shall be 150 mm thick in-situ concrete reinforced with No.66 brc fabric and reinforced at corners with T12mm bar as shown on Sheet No.03. Concrete for under ground beam shall be included into this activity and shall be poured in-situ. Concrete strength is specified at 3000 psi @ 28-days.	m ³	72.0		
d.3	Supply and place No.66 brc fabric to reinforce concrete base of water holding tank as shown on Sheet No.03 and No.04. Include for 305mm lapping length.	m ²	420.0		
d.4	In accordance with Sheet No.03, provide and fabricate foundation base reinforcement: 4T12mm transverse bars equally spaced and transverse bars spaced @ 200mm centres within bottom zone of foundation base. Include for the necessary formwork and shoring to complete this activity	kg	900.0		
Sub-total carried forward to page 2					

	<i>Sub-total brought forward from page 1</i>				
d.5	In accordance with Sheet No.04, provide and place hydrophilic waterstop strip along perimeter of 2"x4" keyed joint. Include for forming the 2"x4" joint at the interface of foundation base and wall.	m	100.0		
d.6	Supply and place T12mm @ 300mm bothways to top of foundation base and corners of concrete slab joining No.66 brc fabric. Details are shown on Sheet No.03 and No.04.	kg	2150.0		
d.7	In accordance with Sheet No.2 and No.3, provide T16mm rebar and fabricate underground beam. Include for the necessary formwork and shoring for pouring concrete to complete this task.	Kg	400.0		
d.8	In accordance with Sheet No.2 and No.3, provide T10mm tensile links for underground beam.	kg	115.0		
d.9	Supply 13mm - 19mm (1/2" to 3/4") gravel, place in 102mm layer and and compact for base of holding tank.	m ²	500.0		
E	Reinforced Concrete Wall				
e.1	In compliance with drawing details on Sheet No.3&4, supply T12mm rebar and fabricate prior to placement of in-situ concrete. T12mm bars are placed at 200mm centres bothways.	kg	2180.0		
e.2	In compliance with drawing details on Sheet No.3&4 supply and place in-situ concrete to comply with 3000 psi @ 28-days to walls of holding tank. Include for formwork and shoring necessary for placing in-situ concrete and shall be poker vibrated to prevent honeycombing.	m ³	52.0		
e.3	In accordance with drawing details on Sheet No.02 holding tank layout, supply and apply an appropriate concrete pool paint to interior face of reinforced wall.	m ²	242.0		
	Reinforced Concrete Stiffener				
e.4	Supply, place and fabricate T12mm (1/2") for structural concrete stiffeners as shown on Sheet No.04. Include for column starters from foundation. Placement of in-situ concrete should be monolithic with the in-situ concrete for wall.	kg	135.0		
e.5	Supply, place and include for T10 (3/8") tensile links to column stiffeners.	kg	220.0		
	Safety fence				
e.6	In accordance with drawing details on Sheet No.3, supply and place 1. metres high fencing wire of 9 gauge pvc coating specification, around the perimeter of water holding tank; 50mm size dia. heavy duty galvanise poles shall be used at 3.05 metres spacing interval. Additionally, anti-corrosive paint shall be applied to metal poles.	m	90.0		
F	Cellar Box Construction				
	Overburden casing and Mousehole				
f.1	In accordance with Sheet No.2; excavate for placement of casement pipes (305mm x 6.0m long) overburden casing) and (305mm by 3.0m long - mousehole) as detailed in the cellar box.	item			
f.2	In accordance with Sheet No.2; supply, place and poker vibrate 20 N mm-2 in-situ concrete around 6.0m long by 762mm diameter casement pipe and mousehole. Include for setting up profile, shoring, formwork and all other material necessary to complete this task.	m ³	25.0		
f.3	In accordance with Sheet No.2&5, supply 19mm gravel, place in 610 mm layers and compact around concrete overburden casement and mousehole pipes.	m ³	60.0		
f.4	In accordance with cellar side view details as shown on Drawing Sheet No.2, provide certified welder to connect mousehole and overburden casing before installation. Include for using 50mm angle iron. Also provide the necessary equipment to lift and set in place casing and mousehole.	item			
	Nb: Pipes for overburden casing and mousehole shall be supplied by the client.				
	Reinforced Concrete Cellar Box				
f.5	In accordance with drawing details on Sheet No.2, construct the cellar with sump for drainage pipe. Cellar shall be constructed using T12 (1/2") rebar placed at 200mm (8") bothways in the walls and base of cellar. Include for in-situ concrete to wall and base of cellar box. Drainage pipe from cellar shall be 150mm dia pressurised PVC. Drainage pipe shall be placed at a 1% gradient covering a 35m total length and then discharges into a sump catchment. Sump catchment details as shown on drawing.	item			
	Nb: Contractor shall be responsible for providing its own power and transportation of water to site.				
G	Laboratory Testing				
g.1	Administration of quality controls as it relates to works undertaken inclusive of concrete, soil, aggregate etc.	P.Sum		\$	12,080.00
	Nb: Testing certificate must be presented for approval of work quality for preparation of payment certificate.				
	Total value to form of tender				

GOVERNMENT OF
MONTSERRAT
PUBLIC WORKS DEPARTMENT
GENERAL CONDITIONS
OF
CONTRACT

GENERAL CONDITIONS

1 Definitions

- a) The “Contract” means these General Conditions together with the Specification drawings and includes the contract agreement
- b) The “Employer” means the Government of Montserrat
- c) The “Engineer” means a duly authorized representative of the Employer
- d) The “Contractor” means the company appointed to carry out the works
- e) The “colony” means the colony of Montserrat
- f) The “Site” means the lands and/or other places on under or through which Works are to be carried out
- g) The “Works” means the works to be executed in accordance with this Contract as described in the Specification
- h) The “language” of the Contract shall be English
- i) The “Law” applicable to the Contract, shall be the Laws of Montserrat

2 Contract Document - Priority

- 1) Contract Agreement
- 2) The Drawings
- 3) Specifications
- 4) Conditions of Contract
- 5) Any other document forming part of the Contract

3 Extent of Contract

The Contract comprises of the construction and completion of all Works described in the Specifications, Drawings and Bill of Quantities and to supply all necessary labor, plant and temporary works to complete the described works together with such materials as are required by the Specifications.

4 Power to Vary or Omit

- a) The Employer reserves the right to vary from time to time during the progress of the works, the Specifications or Drawings and shall in writing, notify the Contractor of such variation. If the instructions are given orally, they shall, within two days be confirmed in writing by the Engineer, in the event of any such variation involving an alteration in the cost, or in the period required for completion an agreed revision of contract price and/or time of completion may be made, any such alterations should be deemed part of the Contract.
- b) No variation, alteration or addition to the work indicated in the Specification and/or Drawing shall be made unless the written instruction of the employer has been obtained.

5 Assignment of Contract

- 1) The Contractor shall remain responsible to the Employer for workmanship and manner of workmanship defaults and neglects of any sub-contractor or agent or workman employed by him.

6 Supply Materials

- 1) The Contractor shall within the agreed contract price, supply such materials as required and detailed by the Specifications

7 Setting Out

- 1) The Contractor shall be responsible for setting out of the work.

8 Workmanship

- i. The Contractor shall at all times carry out his works in accordance with the laws of the Colony.
- ii. The Employer may from time during the course of the Contract inspect any completed or part-completed work of the Contractor. If the Employer is not satisfied with such work, he in writing, inform the Contractor of his dissatisfaction.
- iii. Notwithstanding any such progress inspection by the Employer the Contractor shall at all times carry out the Contract in a workman-like manner. On completion of the works, the Contractor shall satisfy the Employer as to the quality and fitness of the work.

9 Removal of Debris

The Contractor shall remove all debris caused by their work from time to time as it accumulates and shall leave the site clean on completion of the Contracted Works.

10 Supervision of Works and Skilled Workmen

- a) The Contractor shall provide all necessary superintendence during the execution of the works.
- b) The Contractor shall employ in and about the execution of the Works only such persons who are carefully skilled and experienced in their several trades.
- c) The Supervising Officer may (but not unreasonably or vexatiously) issue instructions requiring the exclusion from the Works of any person employed thereon.

11 Contractor's Plant

The Contractor shall provide at their own cost all tools, and other plant necessary for the purpose of carrying out the specified Work in an organized and expeditious manner.

12 Payment Fees

The Contractor shall be responsible for the payment of all fees necessary for the completion of the Contract required by an Statutory Authority within or without the Colony.

13 Safety

- a) The Contractor is responsible for the safety of all persons employed by him.
- b) He shall in no way carry out any work that could be seen to endanger the life of any of his employees or of any member of the general public, including any other employee of the employer.

14 Injury to or death of a person

The Contractor shall be liable for and shall, indemnify the Employer against any expense, liability, loss, claim or proceedings whatsoever arising under any statute or at Common Law in respect of personal injury to or death of any person whomsoever arising out of or in the course of or caused by the carrying out of the Works.

15 Damage to Property

The Contractor shall be liable for and indemnify the Employer against any expense, liability, loss, claim or proceedings in respect of any damage whatsoever to any property real or personal insofar as such damage arises out of or in the course of or by reason of the carrying out of the Works and is due to any negligence, omission and default of the Contractor is responsible.

16 Evidence of Insurance

The Contractor shall produce such evidence as the Employer may reasonably require that the insurance's referred to herein have been taken out and are in force at all material times.

17 Traffic Control

Due to the nature of the Works it will be the responsibility of the Contractor to ensure that a system of traffic control is in operation, including no vehicular access, if necessary.

18 Payment to the Contractor

Payment to the Contractor will be made after the issue of an Engineer's certificate based on the amount of work completed to date. A retention of 5% will be held from the value of each certificate up to a maximum of 3% of the contract sum. Such retention money will be released at the end of the warranty period provided that all works and repairs have been executed to the satisfaction of the employer.

19 Warranty Period

A warranty period of 12 months is part of the Contract agreement, during which time the Contractor bears the full responsibility for the execution of maintenance of the works and any repair or correction which might become necessary due to the failure and incorrect performance of the Contractor.

20 Handing Over Completed Works

The Contractor shall notify the Employer in writing of his completion of the contracted Works. Said work shall be subject to the satisfaction of the employer and the statutory body having jurisdiction that all the works is completed and in good order. The supervising Officer shall certify the date when in his opinion, the works have reached practical completion. This date shall be the date of commencement of the warranty period.

21 Failure to Meet Completion Date

Should the contractor fail to complete the contracted works within the agreed time he shall be subject to a fine of 1% of the contract price a day, for every day the completion is overdue.

22 Matters not Contained in the Contract

Any matter not explicitly provided for within this Contract shall be in the matter of a separate agreement between the Employer and Contractor. Any such agreement shall be part of his Contract.

23 Matter of Disagreement

If a dispute arises under this Contract, the parties agree that they would first exhaust the provisions outlined in sections 46, 47 and 48 of the Public Finance (Management and Accountability) Procurement regulations 2012. If the parties fail to come to an amicable resolution through the provisions outlined above, then the dispute shall be settled with the help of a mutually agreed-upon mediator in Montserrat. The parties shall share any costs and fees other than attorney fees associated with the mediation equally.

24 Contracts Documents

- a) The Contractor shall receive two complete copies of Contract Documents
- b) Subsequent to the commencement of the Contract, the Contractor shall receive a copy of all additions to and amendments to the Specifications or drawings.

25 DETERMINATION OF THE CONTRACT

- 1) Default by the Contractor

If, before the date for practical completion, the Contractor shall make a default in any one or more of the following respects:

- a) Without reasonable cause he wholly or substantially suspends the carrying out

of the works, or

- b) He fails to proceed regularly or diligently with the works, or
- c) He refuses or neglects to comply with a written instruction given by the Engineer and by such refusal or neglect the works are materially affected

The Engineer may give to the Contractor a notice specifying the default or defaults.

If the Contractor continues with the default for 14 days from the issue of the notice under the contract the Employer may by a further notice to the Contractor determine the employment of the Contractor under this Contract. Such determination shall take effect on the date of receipt of such further notice.

A notice of determination shall not be given unreasonably or vexatiously.

2) Consequences of determination under clause 25 .i.

The Engineer shall determine the amount due to the Contractor which shall include loss, damage or expenses incurred by the Employer as a direct consequence of the determination. A final payment certificate will be prepared accordingly.

3) Determination by the Contractor or Employer

If, before the date of practical completion, the carrying out of the whole or substantially the whole of the uncompleted works is suspended by reason of one or more of the events stated below for a period of three months or more

- a) Force majeure, or
- b) The Engineers instruction

Then the Contractor or the Employer may upon expiry of the period of the suspension gives notice to the other that unless suspension is terminated within 7 days after the receipt of such notice.

The Employer shall pay to the Contractor, the total value of the work properly executed at the date of determination of the employment of the Contractor, such value ascertained in accordance with the conditions as if the employment of the Contractor had not been determined

A notice of determination shall not be given unreasonably or vexatiously.

26 SUSPENSION OF THE UNCOMPLETED WORKS

- a) The Engineer may issue instructions in regard the postponement of any or all the works to be executed under this contract.

Government of Montserrat
Public Works Department

Specifications
of
Labour and Materials
for

Construction of Geothermal Exploratory Drill Pad – Well No.3

CONTENTS

Section

- | | |
|---|-------------------------------|
| 1 | General Items |
| 2 | Earthworks |
| 3 | Road Pavement |
| 4 | Drainage |
| 5 | Concrete for Structural Works |

SECTION 1 — GENERAL ITEMS

1.1 SITE SERVICES

Any arrangements that the Contractor enters into regarding the provision of electricity, water and other services shall be the sole responsibility of the Contractor. The Contractor shall take all reasonable care to ensure that water is not wasted. The Contractor shall be liable for all charges arising from such arrangements

1.2 SITE POSSESSION

The contractor is responsible for obtaining permission to enter private lands.

1.3 PLANT HIRE

The contractor shall be responsible for payment of all plant hire charges from PWD or others for plant the contractor uses on this project. The Employer shall not be responsible for delays or costs attributable to the delivery, performance or workmanship of plant or equipment under hire from PWD. The Contractor shall be responsible for the actions of any plant on hire and shall provide adequate instruction and supervision of drivers, plant, and machines.

1.4 DISRUPTION

The Contractor is responsible for arranging the Works to minimise disruption to, local residents and commercial activities in the vicinity of the site. Full and sufficient precautions to ensure the safety of all traffic through and around the work site and of traffic that is diverted by the Works shall be taken at all times, such measures to be approved by the PWD Engineer. Signs shall be erected and maintained on the Site and at prescribed points on the approaches to the Site for the direction and control of traffic. The sizes of all such signs and the lettering and wording thereon shall be approved before erection. Construction and excavations shall be signed posted and, during periods of darkness lighted.

In the event of the operation of single-way traffic becoming necessary on any particular length of the Works or on the approaches to the Works, through traffic routes shall be maintained by providing a width of at least 3m for single-way traffic. Manually “Stop/Go” signal shall be used and be of an approved colour and type.

The Contractor is obliged to seek the approval of the Engineer before occupying any area of the site for the storage of materials, plant or equipment or welfare facilities.

1.5 UTILITY COMPANY SERVICES

The Contractor shall be responsible for contacting the utility companies to arrange for location of their plant at the site. The Contractor shall also notify the companies of any excavation in the vicinity of their plant and give sufficient notice to allow them to attend on site if required.

The contractor shall locate all buried plant in the vicinity of any area of excavation and mark the position clearly on site. The Contractor shall locate buried service within any area of excavation by hand digging before mechanical excavation is used.

The Contractor shall be deemed to be in control of all plant hired to him and shall be responsible for its actions. Should any utility company equipment be damaged by the Contractor or plant hired to him, the Contractor shall be responsible for paying any charges or costs associated with its repair. The Contractor shall also allow free and unhindered access to utility company employees carrying out any such repair work.

1.6 **INSURANCE**

The Contractor is required to obtain contractors all risk insurance to cover at least public liability and damage to property and persons. The Contractor shall be required to prove that he has such insurance and that the sums insured are sufficient for the works in hand prior to commencement of the works. The Contractor shall ensure that the insurance remains valid throughout the period of the works and that any premiums due are paid. The Engineer may request proof of insurance at any time during the works.

SECTION 2 — EARTHWORKS

2.1 GENERAL

This work shall comply with the General Conditions.

2.2 WORK INCLUDED

Any and all excavation, filling, backfill and grading required to accomplish work in this Section as can be reasonably inferred from the drawings and as hereinafter specified.

If necessary, any loose shallow material, soft organic deposits or similar unsuitable material shall be excavated prior to backfilling ditch to the required level.

Locate and mark all services in the vicinity of any excavation in consultation with the utility company concerned. Where any utility is thought to cross an area of excavation it is to be located by hand digging prior to the use of mechanical excavation.

Remove, protect, cap or otherwise dispose of, as approved by utility company or local authorities, any utilities, sewers or any underground obstructions encountered.

All necessary shoring and bracing.

Provide and maintain all required pumping to keep excavation sufficiently dry until completion of foundation work and backfilling.

2.3 SURVEYS

Bench marks, monuments and other reference marks shall be properly maintained and if destroyed, accurately and properly replaced by the Contractor.

The Contractor will be responsible for all setting out. Relevant information will be available from PWD on award of contract.

2.4 STRIPPING OF TOP SOIL

All suitable topsoil to be reused shall be stripped and stockpiled where directed within the limit lines of the contract premises or as directed by the Engineer.

Top soil shall be spread or disposed of as directed or indicated by the Engineer and/or drawings.

2.5 EXCAVATION

2.5.1 **General.** This work shall consist of excavation, disposal or compaction of all materials not being removed under some other item which is encountered within the limits of the Contract in accordance with the specifications and in close conformity with the lines, grades, thickness and cross-sections shown on the plans or established by the Engineer.

2.5.2 **Unsuitable Material.** Material that is unsuitable for the planned use shall be excavated and disposed of as directed by the Engineer. The removal and disposal of such unsuitable material will be paid for in the actual quantities removed to construct the works only if such removal is required to carry out the works shown on the Plans or in the Specifications.

2.6 **STRUCTURE EXCAVATION AND BACKFILL**

- 2.6.1 **General.** Structure excavation shall consist of the removal of material for the construction of foundations for bridges, retaining walls, head-walls, culverts, or other structures, and other excavation designated on the Plans or in the Specifications as structure excavation.

Structure backfill shall consist of furnishing material, if necessary, and placing and compacting backfill material around structures to the lines designated on the Plans.

Structure excavation and structure backfill shall include the furnishing of all materials and equipment; the construction or installation of all cofferdams and other facilities which may be necessary to perform the excavations and to place and compact the backfill; and the subsequent removal of such facilities, except where they are required or permitted by the Plans or Specifications to remain in place.

- 2.6.2 **Inspection.** Whenever any structure excavation is completed, the Contractor shall notify the Engineer who will make an inspection of the foundation. No concrete or masonry shall be placed until the foundation has been approved by the Engineer.

- 2.6.3 **Structure Backfill Requirements.** Structure backfill shall not be placed until the structure has been inspected by the Engineer and approved for backfilling. No backfill material shall be deposited against the back of concrete abutments or concrete retaining walls, until the concrete has developed not less than the specified 28-day compressive strength. Backfill at the inside of bridge wing-walls shall be placed before railing bases on the wing-walls are constructed.

Material used for structure backfill shall have a sand equivalent of not less than 20 and shall have the following grading:

Sieve Size	Percent Passing
4"	100
No. 4	35-100
No. 30	20-100

Structure backfill shall be placed in 8-inch horizontal lifts and shall be mechanically compacted to a minimum relative compaction of 90 percent.

- 2.6.4 **Pervious Backfill.** Pervious backfill material shall be placed behind bridge abutments, wing-walls and retaining walls as shown on the Plans and in accordance with the following requirements.

Pervious backfill material shall consist of gravel, crushed gravel, crushed rock, natural sands, manufactured sand, or combinations thereof and shall conform to the following grading requirements:

Sieve Size	Percent Passing
3/4"	100
3/8"	80-100
No. 100	0-8
No. 200	0-3

That portion of filter material passing a No. 4 sieve shall have a sand equivalent of not less than 60.

Sand and gravel sourced from beaches shall not be permitted unless it has been thoroughly washed in clean water. Such sand and gravel shall be tested for the presence of salts before placing.

All weep holes shall be backed with 2 cubic feet of course aggregate — with no more than 50% of all faces fractioned — securely tied in a burlap sack and placed in such a manner that the backing covers the weep holes and extends at least 12 inches above the bottom of the opening. An 8-inch square section of 1/4-inch galvanized or aluminium screen having a minimum wire diameter of 0.03 inches shall be firmly attached at the back of each weep hole before the material is placed.

Pervious backfill material shall be placed in layers along with and by the same methods specified for structure backfill. Pervious backfill material at any one location shall be approximately the same grading, and, at locations where the material would otherwise be exposed to erosion, shall be covered with at least a 1-foot layer of earthy material approved by the Engineer.

2.7 **SHORING AND BRACING**

Include all shoring and bracing necessary to retain earth banks, adjoining buildings and prevent caving in or displacement of adjacent soil, improvements or buildings.

SECTION 3 — ROAD PAVEMENT

3.1 GENERAL

This Work shall comply with the General Conditions.

3.2 WORK INCLUDED

This Work shall consist of the shaping, trimming, compacting and finishing of the sub-grade, the grading and finishing of all unpaved shoulders and slopes, and the preparation of all areas for topsoil, loam, riprap or slope paving as shown on the Plans or as directed, shall be constructed in accordance with these specifications and in close conforming with the lines, grades and typical cross-sections shown on the Plans or established by the Engineer.

3.3 SUBGRADE PREPARATION

3.3.1 General. This section shall govern the preparation of natural, filled, or excavated roadbed material prior to the placement of sub-base or base material, pavement, curbs and gutters, driveways, sidewalks or other roadway structures.

3.3.2 Preparation of Subgrade. Scarifying and cultivating will be required for dry soils which are impervious to the penetration of water, for soils which contain excessive amounts of moisture which may result in unstable foundations, for soils which are non-uniform in character which may result in non-uniform relative compactions and subsequent differential settlements of finished surfaces, or when pavement is to be placed directly on the roadbed material. Unsuitable material found below the processing depth for subgrade specified herein shall be excavated and disposed of as directed by the Engineer.

After rough grading has been completed, when scarifying and cultivating are required, the roadbed shall be loosened to a depth of at least six (6) inches. The loosened material shall then be worked to a finely divided condition and all rocks larger than three (3) inches in diameter shall be removed. The moisture content shall be brought to optimum by the addition of water, by the addition and blending of dry suitable material or by the frying of existing material. The material shall then be compacted by approved equipment to the specified relative compaction.

Uniform pervious soils that allow the immediate penetration of water or uniform impervious soils which will allow the penetration of water to a depth of at least six (6) inches after the addition of a suitable wetting agent, will not require scarifying and cultivating unless a condition previously set forth in this sub-section requires such processing. When scarifying and cultivating are not required, the moisture content of the top six (6) inches of the subgrade material shall be brought to optimum by the addition of water at the surface, and the material shall be compacted by approved equipment to the specified relative compaction.

3.3.3 Relative Compaction. Except when pavement is to be placed directly on subgrade material, the top six (6) inches of subgrade material shall be compacted to a relative compaction of 95%. When base or sub-base material, curb, gutter, driveways, or sidewalks are to be placed on the subgrade material, the top six (6) inches of such subgrade material shall be compacted to a relative compaction of 90 percent.

After compaction and trimming, the subgrade shall be firm, hard, and unyielding.

3.3.4 Subgrade Tolerances. Subgrade for pavement, sidewalk, curb and gutter, driveways, or other roadway structures shall not vary more than 0.02 foot from the specified grade and cross-section. Subgrade for sub-base or base material shall not vary more than 0.04 foot from the specified grade and cross-section. Variations within the above specified tolerances shall be compensating so that the average grade and cross-section specified are met.

3.3.5 **Grading of Areas Not To Be Paved.** Roadway areas where "grade only" is called for on the Plans shall be graded to meet the tolerances for base subgrade. The surface shall be constructed to a straight grade from the finish pavement or curb elevations shown on the Plans to the elevation of the existing ground at the extremities of the area to be graded.

3.3.6 **Adjustment of Manhole Frame and Cover Sets to Grade.** Utility manhole and vault frames and covers within an area to be paved or graded will be set by the owners thereof to finish grade.

The Contractor shall remove all debris attributable to his work from manholes.

3.4 **UNTREATED BASE**

3.4.1 **General.** Untreated base for pavement, curb, drains and similar types of improvements, shall be constructed as specified.

3.4.2 Material used for untreated base shall have the following grading:

Sieve Size	Percent Passing
1-1/2"	100
3/4"	90-100
3/8"	50-80
No. 4	35-55
No. 30	10-30
No. 200	2-9

3.4.3 **Spreading.** Imported aggregate bases shall be delivered to the roadbed as uniform mixtures and each layer shall be spread in one operation. Segregation shall be avoided and the base shall be free from pockets of coarse or fine material.

Aggregate bases shall be deposited on the roadbed at a uniform quantity per linear foot, which quantity will provide the required compacted thickness within the tolerances specified herein without resorting to spotting, picking up or otherwise shifting the aggregate base material. At the time aggregate base is spread, it shall have a moisture content sufficient to obtain the required compaction. Such moisture shall be uniformly distributed throughout the material.

Where the required thickness is six (6) inches or less, the base material may be spread and compacted in one layer. Where the required thickness is more than six (6) inches the base material shall be spread and compacted in two or more layers of approximately equal thickness, and the maximum compacted thickness of any one layer shall not exceed six (6) inches. Each layer shall be spread and compacted in a similar manner.

The use of motor graders will be permitted during depositing, spreading and compacting operations, except where self-propelled spreaders are specified.

When the subgrade for aggregate base consists of cohesion-less sand and written permission is granted by the Engineer, a portion of the aggregate base may be dumped in piles upon the subgrade and spread ahead from the dumped material in sufficient quantity to stabilize the subgrade. Segregation of aggregates shall be avoided and the material as spread should be free from pockets of coarse or fine material.

3.4.4 **Compacting.** Rolling shall always be commenced along the edge of the area to be compacted and the roller shall gradually advance toward the centre of the area to be compacted.

Rollers shall be operated along lines parallel or concentric with the centreline of the road being constructed, and no material variation there from will be permitted. All rollers must be maintained in good mechanical condition.

The relative compaction of each layer of compacted base material shall not be less than 95 percent, except in the areas back of curb (under sidewalks and driveways). Compaction in the excepted areas shall have a minimum relative compaction of 90 percent.

The surface of the finished aggregate base at any point shall not vary more than 0.02 foot above or below the grade established by the Engineer.

Base which does not conform to the above requirements shall be reshaped or reworked, watered and thoroughly compacted to conform to the specified requirements.

3.5 **CEMENT CONCRETE PAVEMENT**

3.5.1 **General.** Unless otherwise specified, Portland Cement concrete pavement shall be constructed of concrete prepared as prescribed below:

- a. All concrete shall be to working strength of 3000 PSI in 28 days, shall have as a minimum OPC content of 500 lbs per cubic yard and a maximum free water/cement ratio of 0.5.
- b. Cover to reinforcement shall be 2 inches. Reinforcement shall be round mild steel bars unless shown otherwise on the drawings.
- c. All reinforced concrete shall be fully compacted by means of power-driven immersion type vibrators. The concrete shall be vibrated until the section is a solid mass entirely free of voids and cavities. Care should be taken to ensure excessive vibration does not occur. Vibrators shall not be allowed to come into contact with the reinforcement, shutter ties or shutter faces.
- d. The concrete must not be loaded or otherwise worked on until the period of curing is complete or the concrete has reached an adequate strength, whichever comes later.
- e. Construction joints at positions where no contraction or expansion joint is to be constructed shall have the full area of reinforcement continuing across the joint. The surface of the joint shall be scabbled to remove surface laitance prior to casting the adjacent section.

3.5.2 **Forms and Headers**

3.5.2.1 **General.** The formwork must be sufficiently rigid and tight to prevent loss of grout or mortar from the concrete at all stages and for the appropriate method of placing and compacting the concrete. Formwork (including supports) shall be sufficiently rigid to maintain the forms in their correct position and to correct shape and profile so that the final concrete structure is within specification. All formwork shall have its surface scraped smooth and clean before re-use. Any damage to formwork shall be repaired before re-use.

Forms and headers shall be either wood or metal. They shall be set plumb and true to line and grade, with the upper edge thereof set to the grade of the pavement to be constructed; and shall be rigidly installed on a true alignment and so maintained for a distance in advance of placing the pavement to provide for at least a one-day run of concrete. Headers shall rest firmly on the subgrade or base. They shall be oiled immediately prior to the placing of the concrete and shall remain in place for at least 12 hours after concrete has been placed. Forms and headers must be removed before the work will be accepted.

3.5.2.2 **Wooden Forms.** Wooden forms shall be constructed of 3-inch nominal lumber in pieces not less than eight (8) feet long, except where changes in alignment or grade necessitate the use of material of smaller dimensions. The lumber used shall be free from warp and other imperfections which would impair the strength for the use intended; shall have square edges (which shall be slightly bevelled) and square ends; shall be surfaced on the upper edge; and shall be not more than 1/2-inch in depth than the specified thickness of the edge of the pavement.

Such forms shall be secured by nailing to side stakes spaced not more than four (4) feet apart and driven into the subgrade vertically to a depth not less than twelve (12) inches, and so that the tops will be below the upper edge of the header. The stakes shall be of sufficient length and cross-sectional area to adequately resist lateral displacement of the headers during the paving operations.

Wooden headers shall be spliced by nailing a board to the outside of the headers. The board shall be at least four (4) feet long, one (1) inch thick, and at least six (6) inches wide (or the depth of the header, whichever is least), and shall be centered on the joint.

3.5.2.3 **Metal Forms.** Metal forms shall be free from warp, have sufficient rigidity to resist springing during the paving operations, and shall be not less in depth than the specified thickness of the edge of the pavement being constructed. They shall be secured by means of metal stakes spaced not more than five (5) feet apart and driven below the top of the forms. They shall be designed so as to be driven through openings in the forms to lock them in position.

3.5.3 **Mixing**

- a. Concrete shall be mixed by purpose-made, power-driven concrete mixers. Hand-mixing of concrete will not be permitted.
- b. Each batch shall be mixed until the concrete is uniform in colour and consistency and for not less than three (3) minutes, which shall be measured from the time when all the solid material is in the mixing drum. All the mixing water shall have been introduced before 25 percent of the mixing period has elapsed. No further water shall be added to the mix once it has left the mixer. Any concrete which has become partly set or too stiff to compact properly shall be discarded.
- c. Volume batching shall be done in purpose-made boxes or by calibrated concrete mixers or with carrying handles which shall be carefully supervised to ensure that the boxes are struck level each time. Water must be measured by volume.
- d. The mixer and associated batching and placing equipment shall be thoroughly cleaned out at the end of each day's work.
- e. The concrete shall be transported from the mixer to the position of placing quickly and in such a way that segregation does not occur. The time between mixing and placing shall not exceed 10 minutes.

3.5.4 **Placing Concrete**

3.5.4.1 **General.** Concrete shall be placed on a subgrade sufficiently dampened to ensure that no moisture will be absorbed from the fresh concrete.

- a. Before any concrete is placed, an inspection shall be made to ensure that no dirt, shavings, loose stones, etc. have been allowed to remain in or about the formwork. Formwork and reinforcement shall also be well watered immediately prior to placing the new concrete.
- b. Immediately after being mixed, the concrete shall be deposited on the subgrade to the required depth over the entire width of the section.
- c. Concrete shall be placed gently in position to avoid segregation and not allowed to fall freely from a height greater than six (6) feet.
- d. At the end of each day's run, or at any time when operations are stopped for a period of more than 40 minutes, a rigid transverse header shall be placed vertically and at a right angle across the pavement at the location designated by the Engineer and the pavement shall be finished to form a square vertical joint against which the work may be resumed. Hand-mixing may be used only if necessary to provide sufficient concrete to compete paving to the expedient header.

Great care shall be taken to ensure that reinforcement and embedded structural steel is not displaced during concreting or disturbed after the initial set has taken place.

3.5.5 **Finishing**

3.5.5.1 **General.** The concrete shall be consolidated, and the surface finished true to grade and cross-section. Upon completion the surface shall be free of any unevenness greater than 1/8 inch when checked with a 10-foot straightedge placed on the surface of the pavement. The 10-foot straightedge shall be furnished by the Contractor and shall be at the Work site prior to the commencing of the placing of the concrete.

3.5.5.2 **Tamping.** The concrete shall be distributed uniformly between the side forms as soon as it is placed, after which the concrete shall be struck off and tamped by means of a mechanical tamper. The tamper shall be operated at right angles to the centreline of the pavement, and tamping continued until the concrete is thoroughly consolidated to the specified cross section and sufficient mortar for finishing purposes has been brought to the surface.

Steel-shod hand tampers or vibrating bars may be substituted in those cases where the use of a mechanical spreader and tamper would be obviously impracticable.

Approved concrete vibrating equipment shall be used in conjunction with the mechanical tamper to consolidate the concrete adjacent to the forms or existing pavement.

3.5.5.3 **Floating**

a. **General.** After tamping, the surface of the concrete shall be floated by either the finishing machine method or the transverse-float method described below.

b. **Finishing-machine Method.** The concrete shall be floated smooth and true to grade with an approved finishing machine.

c. **Transverse-float Method.** The concrete shall be floated at least twice with a long-handled float at least 5 feet wide, following which the surface of the concrete shall be finished smooth and true to grade, with a wooden float 8 feet long, 2 inches thick, and 6 inches wide. It shall be rigidly ribbed and with adjustable screws between the rib and float board to ensure a true and flat surface on the under side at all times. The float shall be operated from the side of the pavement, and parallel with the centreline.

The edge of the float shall be used to cut down all high areas, and the material so removed shall be floated into the depressions until a true surface is obtained. Each successive pass of the float shall half-lap the previous pass.

3.5.5.4 **Final Finishing.** After being finished, the outside edges of pavement shall be rounded to 1/2-inch radius; and transverse joints, expansion joints, and joints adjacent to an existing pavement shall be rounded to 1/4-inch radius.

After working to a smooth finish, draw a stiff bristled broom across the surface of the slab to produce an even non-slip finish of fine parallel lines free from ridges and depressions.

3.5.6 **Transverse Expansion Joints**

3.5.6.1 **General.** Unless otherwise specified all transverse joints shall be constructed perpendicularly to the centerline of the pavement and the face of all joints shall be perpendicular to the finished surface of the pavement.

Transverse expansion joints shall be installed at 20-foot centres. Expansion joint filler material shall have a minimum thickness of 1/2-inch, a maximum thickness of 3/4 inch. After the concrete has been finished, an edger of 1/4-inch radius shall be used on each side of the expansion joint filler. The expansion joint filler shall be cleaned of all concrete mortar.

3.5.7 **Curing.** Immediately after the finishing operations have been completed and as soon as marring of the concrete will not occur, the entire surface of the newly placed concrete shall be covered

and cured. Curing may be accomplished by flooding or by polythene sheeting in close contact.

SECTION 4 — DRAINAGE

4.1 GENERAL

This Work refers to the Specification and Construction of curbs, slipper drains, U drains and culverts.

4.2 CURBS

Shall be precast concrete units 5" wide 9" high and 30" in length and shall be laid in accordance with the drawings with a 1/2" mortar joint between curbs. Curbs may either be laid on a mortar bed on the kerb bedding or laid directly on to the concrete curb bedding before it has cured, curbs are to be tapped down into the concrete bedding to achieve the correct levels. All curbs are to have a curb backing placed behind the laid curb as shown on the drawings.

4.3 SLIPPER DRAIN

Concrete mixing and placing shall meet the requirements of that for concrete for structural works. The size and layout shall be as shown on the drawings. The exposed face shall be troweled to a smooth finish.

4.4 PERIMETER DRAIN

Concrete mixing and placing shall meet the requirements of that for concrete for structural works. The size, layout and reinforcement shall be as shown on the drawings. The exposed faces shall be troweled to a smooth finish.

4.5 CULVERT

The requirements for concrete and associated works shall be that for concrete for structural works. The size, layout and reinforcement shall be as shown on the drawings. The exposed faces shall be troweled to a smooth finish. The contractor shall ensure that all formwork inside the culvert is removed before requesting approval of the completed works

4.6 CONCRETE HEADWALLS, PARAPETS AND SLABS

The concrete slabs and headwalls shown on the drawings shall be constructed according to the requirements given for concrete for structural works in this Specification. The reinforcement for the slabs, parapets and headwalls shall be as shown on the drawings. All exposed surfaces shall be given a smooth trowelled finish.

5. **CONCRETE FOR STRUCTURAL WORKS**

5.1. **General.** Unless otherwise specified, headwalls, drains, culverts and other structural elements shall be constructed of concrete prepared as prescribed below:

- a. All concrete shall be to working strength of 3000 PSI in 28 days, shall have as a minimum OPC content of 500 lbs per cubic yard and a maximum free water/cement ratio of 0.5.
- b. Cover to reinforcement shall be 1.5 inches. Reinforcement shall be deformed type 2 high yield steel reinforcing bars unless shown otherwise on the drawings.
- c. All reinforced concrete shall be fully compacted by means of power-driven immersion type vibrators. The concrete shall be vibrated until the section is a solid mass entirely free of voids and cavities. Care should be taken to ensure excessive vibration does not occur. Vibrators shall not be allowed to come into contact with the reinforcement, shutter ties or shutter faces.
- d. The shutters shall not be stripped until the concrete has cured sufficiently to not require the support of the shutters. The concrete must not be loaded or stressed until it has reached an adequate strength to prevent damage occurring. If the Contractor wishes to strip shutters or load the concrete at an early age he must have concrete cubes tested to show that sufficient strength has been attained.
- e. Construction joints at positions where no contraction or expansion joint is to be constructed shall have the full area of reinforcement continuing across the joint. The surface of the joint shall be scabbled to remove surface laitance prior to casting the adjacent section.

5.2. **Forms and Headers**

5.2.1. **General.** The formwork must be sufficiently rigid and tight to prevent loss of grout or mortar from the concrete at all stages and for the appropriate method of placing and compacting the concrete. Formwork (including supports) shall be sufficiently rigid to maintain the forms in their correct position and to correct shape and profile so that the final concrete structure is within specification. All formwork shall have its surface scraped smooth and clean before re-use. Any damage to formwork shall be repaired before re-use.

5.2.2. Formwork shall be either wood or metal. They shall be set plumb and true to line to the profiles shown on the drawings. They shall be oiled immediately prior to the placing of the concrete and shall remain in place until the concrete has reached sufficient strength as described in section d above. Formwork must be removed before the work will be accepted.

5.3. **Materials for Reinforced Concrete**

5.3.1. **Cement** - Cement shall be Ordinary Portland Cement from a reputable supplier. All cement is to be stored in dry conditions. Any bag opened shall be completely used on the same day or discarded. Any bag found to have become damp or where the cement has partly hardened shall be discarded and not used in the works.

5.3.2. **Admixtures** - Admixtures shall not be used in concrete without the express consent of the P.W.D. Engineer.

5.3.3. **Aggregate**

5.3.3.1. Coarse aggregate shall be clean hard gravel or crushed rock with no deleterious properties. Before the use of aggregate from any source the Contractor shall obtain the P.W.D. Engineers approval of that source, if the Contractor intends to change the source during the works fresh approval of the new source shall be sought. Where

required by the Engineer samples of the proposed aggregate shall be tested to ensure that it has satisfactory properties for the proposed use.

5.3.3.2. Fine aggregate shall be sand or crushed rock fines with no deleterious properties, the requirements for testing and approval shall be as noted for coarse aggregate.

5.3.3.3. Aggregate extracted for sea beaches shall not be used unless it has been thoroughly washed in clean water and tested to show no salt remains.

5.3.4.Reinforcement

5.3.4.1. Reinforcing bar or mesh is to be from a reputable supplier and quality certificates shall be supplied when requested by the P.W.D. Engineer.

5.3.4.2. Reinforcement is to be fixed in the positions shown on the drawings. Reinforcement is to be firmly tied to prevent movement when concrete is placed. Purpose made cover blocks and spacers shall be used as required.

5.3.4.3. No steel element, reinforcing steel or tie wire shall intrude into the specified cover of the section.

5.3.4.4. All reinforcement is to have adequate lap where bars join and adequate anchorage into concrete at the free ends of bars, all as shown on the drawings. Consult with the P.W.D. Engineer in the event of any doubt as to the structural requirements.

5.3.4.5. The contractor shall give the P.W.D. Engineer at least 24 hours notice before casting any element to allow for inspection of the fixed reinforcement and shutters.

5.4. Formwork

5.4.1. Formwork shall be set up to give a smooth surface with no visible joints between sheets and no significant marking of the concrete surface with imperfections in the formwork. Formwork oil shall be selected to avoid any staining or marking of exposed surfaces.

5.5. Mixing

5.5.1. Concrete shall be mixed by purpose-made, power-driven concrete mixers. Hand-mixing of concrete will not be permitted.

5.5.2. Each batch shall be mixed until the concrete is uniform in colour and consistency and for not less than three (3) minutes, which shall be measured from the time when all the solid material is in the mixing drum. All the mixing water shall have been introduced before 25 percent of the mixing period has elapsed. No further water shall be added to the mix once it has left the mixer. Any concrete which has become partly set or too stiff to compact properly shall be discarded.

5.5.3. Volume batching shall be done in purpose-made boxes or by calibrated concrete mixers or with carrying handles which shall be carefully supervised to ensure that the boxes are struck level each time. Water must be measured by volume.

5.5.4. The mixer and associated batching and placing equipment shall be thoroughly cleaned out at the end of each day's work.

5.5.5. The concrete shall be transported from the mixer to the position of placing quickly and in such a way that segregation does not occur. The time between mixing and placing shall not exceed 10 minutes.

5.5.6. Where requested by the P.W.D. Engineer, the Contractor shall cast concrete test cubes in British Standard cube test moulds using the methods specified in the British Standard. The Engineer can supply copies of the cube making instructions if requested. The Contractor shall be responsible for ensuring that the moulds are available on site when required. The Contractor shall be responsible for ensuring that the cubes are stored in an environment similar to the environment of the structure. The Contractor shall permanently label each cube and keep records indicating where within the structure the concrete represented by the cubes was placed. The Engineer will be responsible for testing of cubes.

5.6. Placing Concrete

5.6.1. Before any concrete is placed, an inspection shall be made to ensure that no dirt, shavings, loose stones, etc. have been allowed to remain in or about the formwork. Formwork and reinforcement shall also be well watered immediately prior to placing the new concrete, but standing water in the base of the shutter will not be permitted.

5.6.2. Immediately after being mixed, the concrete shall be deposited in the shutter to an even depth across the entire width of the section. The production and placing of concrete shall be a continuous operation until the position of agreed construction joints is reached.

5.6.3. Concrete shall be placed gently in position to avoid segregation and not allowed to fall freely from a height greater than six (6) feet.

5.6.4. Great care shall be taken to ensure that reinforcement and embedded structural steel is not displaced during concreting or disturbed after the initial set has taken place.

5.6.5. The concrete shall be compacted using a powered vibrating poker until the material is satisfactorily compacted and the release of air bubbles has ceased.

5.6.6. At the end of each day's run, or at any time when operations are stopped for a period of more than 20 minutes, a rigid transverse stop end shall be placed at any vertical construction joint formed. All construction joints either horizontal or vertical shall be scabbled to remove any surface laitance before adjacent concrete is cast.

5.6.7. Hand mixing of concrete for structures will not be permitted.

5.6.8. Finishing

5.6.8.1. Unformed surfaces shall be finished to a smooth trowelled finish worked to give a dense, blemish free surface with no trowel marks.

5.6.8.2. Application of mortars or screeds to concrete surfaces to fill blow holes or other surface blemishes will only be permitted with the express consent of the P.W.D. Engineer.

5.6.8.3. All Exposed corners of headwalls, U drains and other concrete elements shall have the corners chamfered with a 1" x 1" (25mm x 25mm) chamfer.

5.6.9. Curing

Immediately after the finishing operations have been completed and as soon as marring of the concrete will not occur, the entire surface of the newly placed concrete shall be covered and cured. Curing may be accomplished by flooding or by polythene sheeting in close contact.



Government of Montserrat

CONTRACT PERFORMANCE REPORT

GoM Contract Ref	Start Date	Contractual Completion Date				
Service/Item Code	Contractor & VDB No (if known)					
Delivery Point	Project & Contract Title					
Original Contract Value	Original Programme (weeks)	Actual Completion Date:				
Completion Value (if agreed)	Final Programme (weeks)	Would you use them again? Yes / No				
Any problems with performance or advance payment guarantees?		Yes / No				
Comments	CP score ✓ as appropriate	5 - good	4 - good	3 - poor average	2 poor	1 awful
Organisation						
Quality						
Personnel						
Environment						
Safety						
Commercial						
Manufacturing						
Technical						
Time						
Additional information (if necessary amplifying comments, eg why would you use them again if they had scored poorly, were delays/increases in cost the fault of the supplier):						
Signed (Project Officer)			Date:			

GOVERNMENT OF MONTSERRAT

TENDER SUBMISSION ANTI-COLLUSION CERTIFICATE

I/WE CERTIFY THAT THIS TENDER IS MADE IN GOOD FAITH, AND THAT WE HAVE NOT FIXED OR ADJUSTED THE AMOUNT OF THE TENDER BY OR UNDER OR IN ACCORDANCE WITH ANY AGREEMENT OR ARRANGEMENT WITH ANY OTHER PERSON. I/WE ALSO CERTIFY THAT WE HAVE NOT AND I/WE UNDERTAKE THAT WE WILL NOT BEFORE THE AWARD OF ANY CONTRACT FOR THE WORK:

DISCLOSE THE TENDER PRICE OR ANY OTHER FIGURES OR OTHER INFORMATION IN CONNECTION WITH THE TENDER TO ANY OTHER PARTY (INCLUDING ANY OTHER COMPANY OR PART OF A COMPANY FORMING PART OF A GROUP OF COMPANIES OF WHICH I AM/WE ARE A PART OF) NOR TO ANY SUB-CONTRACTOR (WHETHER NOMINATED OR DOMESTIC) NOR SUPPLIER (WHETHER NOMINATED OR DOMESTIC) OR ANY OTHER PERSON TO WHOM SUCH DISCLOSURE COULD HAVE THE EFFECT OF PREVENTING OR RESTRICTING FULL COMPETITION IN THIS TENDERING EXERCISE

ENTER INTO ANY AGREEMENT OR ARRANGEMENT WITH ANY PERSON THAT THEY SHALL REFRAIN FROM TENDERING, THAT THEY SHALL WITHDRAW ANY TENDER ONCE OFFERED OR VARY THE AMOUNT OF ANY TENDER TO BE SUBMITTED OR OTHERWISE COLLUDE WITH ANY PERSON WITH THE INTENT OF PREVENTING OR RESTRICTING FULL COMPETITION

PAY, GIVE OR OFFER PAY OR GIVE ANY SUM OF MONEY OR OTHER VALUABLE CONSIDERATION DIRECTLY OR INDIRECTLY TO ANY PERSON FOR DOING OR HAVING DONE OR CAUSING OR HAVING CAUSED TO BE DONE IN RELATION TO ANOTHER TENDER OR PROPOSED TENDER FOR THE WORK ANY ACT OR THING OF THE SORT DESCRIBED AT I), II) OR III) ABOVE.

I/WE FURTHER DECLARE THAT I/WE HAVE NO KNOWLEDGE EITHER OF ANY SUM QUOTED OR OF ANY OTHER PARTICULARS OF ANY OTHER TENDER FOR THIS CONTRACT BY ANY OTHER PARTY.

I/WE FURTHER CERTIFY THAT THE PRINCIPLES DESCRIBED ABOVE HAVE BEEN, OR WILL BE, BROUGHT TO THE ATTENTION OF ALL SUB-CONTRACTORS, SUPPLIERS AND ASSOCIATED COMPANIES PROVIDING SERVICES OR MATERIALS CONNECTED WITH THE TENDER AND ANY CONTRACT ENTERED INTO WITH SUCH SUB-CONTRACTORS, SUPPLIERS OR ASSOCIATED COMPANIES WILL BE MADE ON THE BASIS OF COMPLIANCE WITH THE ABOVE PRINCIPLES BY ALL PARTIES.

I/WE ACKNOWLEDGE THAT ANY BREACH OF THE FOREGOING PROVISIONS SHALL LEAD AUTOMATICALLY TO THIS TENDER BEING DISQUALIFIED AND MAY LEAD TO CRIMINAL OR CIVIL PROCEEDINGS. THE GOVERNMENT OF MONTSERRAT SHALL TREAT ANY TENDER RECEIVED IN CONFIDENCE BUT RESERVES THE RIGHT TO MAKE THE SAME AVAILABLE TO ANY OTHER FUNDING ORGANISATION OR STATUTORY REGULATORY AUTHORITY EITHER HAVING JURISDICTION OVER THE WORKS OR WHO MAY NOW OR AT ANY TIME IN THE FUTURE HAVE STATUTORY POWER TO REQUIRE DISCLOSURE OF THIS TENDER.

IN THIS CERTIFICATE, THE WORD 'PERSON' INCLUDES ANY PERSONS AND ANY BODY OR ASSOCIATION, INCORPORATED OR UNINCORPORATED; ANY AGREEMENT OR ARRANGEMENT INCLUDES ANY TRANSACTIONS, FORMAL OR INFORMAL AND WHETHER LEGALLY BINDING OR NOT; AND 'THE WORK' MEANS THE WORK IN RELATION TO WHICH THIS TENDER IS MADE.

SIGNATURE..... IN CAPACITY OF

DATE.....2016

DULY AUTHORISED TO SIGN TENDERS AND ACKNOWLEDGE THE CONTENTS OF THE ANTI-COLLUSION CERTIFICATE FOR AND ON BEHALF OF:

NAME OF FIRM.....

FULL POSTAL ADDRESS.....

TELEPHONE No..... FAX No

EVALUATION OF TENDER

Evaluation Criteria

The following evaluation criteria will be used to evaluate tenders received in response to this Invitation to Tender. The Administrative Compliance would be applied before the remaining criteria and is either pass or fail with failure meaning that bids would be deemed Non-compliant. **Tenders must achieve a minimum score of 65% to be considered for award of contract.**

Criteria Description	Weight (%)
Administrative Compliance	0
Financial Compliance	50
Completion Time	20
Technical Compliance & Tenderer's Experience	30

Tenderers that fail to meet the above qualifying score will be rejected and not considered for award of contract.

Administrative Compliance (0%)

Tenderers must submit all the documents requested in the tender document. The tender checklist provides a list of requirements which need to be fulfilled. All Tenderers are required to fully complete the Form of Tender including the commencement time and the proposed completion time which are highlighted. In addition they need to fully complete the Bill of Quantities provided. A valid Tax Compliance Certificate need to be submitted with their submission. Tenderers should sign and date the Anti-Collusion statement. In addition details of previous must be submitted in accordance with the Technical Compliance below. This is a pass/fail criteria. If **all** the above requirements are fulfilled then the tenderer would move onto the other evaluation criteria. If any of the above mentioned items are not submitted then the tender would be deemed non-compliant and not assessed any further.

Financial Compliance (50%)

Tenderers must complete the Form of Tender and the Bill of Quantities and return them with their tender submission. The tendered price is a significant factor and the Government of Montserrat will seek to ensure that the works are undertaken at the most economically advantageous price. However, there are other factors which comprise the criterion and these will be considered proportionately. Government of Montserrat is not bound to accept the lowest or any tender. The percentage for this criterion will be calculated proportionately in comparison to other price submissions from tenders.

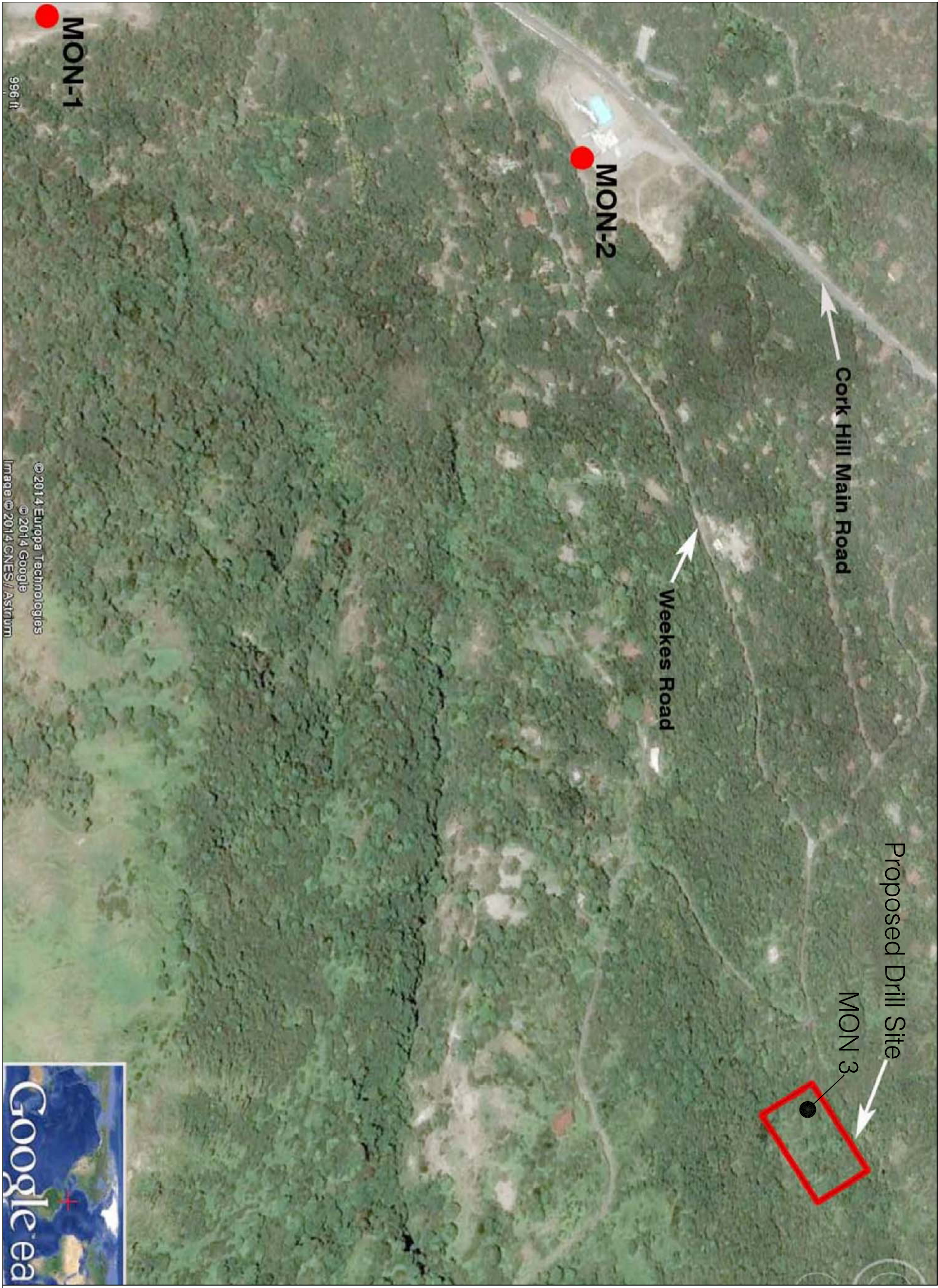
Completion Time (20%)

The procuring entity is desirous for the works to be completed as soon as possible. Marks will be awarded to the tenderer who proposes to complete the works soonest. The percentage for this criterion will be calculated proportionately in comparison to other price submissions from tenders.


Technical Compliance & Experience (30%)

Adherence to technical specification is paramount. Prospective tenderers need to provide details of at least 2 previous contracts completed within the past 10 years of a similar nature to the scope of works of this tender with a value of a minimum \$300,000.00 for material and labour. These details should include but are not limited to the following; the entity or person for which the work was completed, contact information for the entity or person, the value of the works, the location of the works. In addition the prospective tenders can submit award letters for works in lieu of the above mentioned information. The percentage for this criterion will be calculated proportionately in comparison to other submissions from tenders.

Start Date or Date of Award	Description of Works	Name of Client	Price of Contract	Date Completed



No.	Revision / Issue	By	Chk	Date



Public Works Department
P.O. Box 344
Montserrat
West Indies
Tel: 664- 491 -2521/2
Fax: 664- 491 - 3475
Email: gov.eng@candw.ms

PROJECT: GEOTHERMAL PROJECT

TITLE: SITE LOCATION

DESIGN: PWD JOB #: 0

DRAWN: OREENU

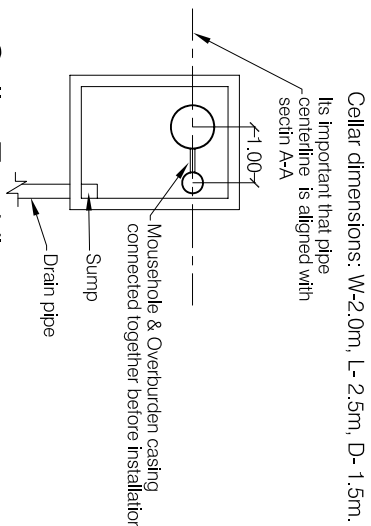
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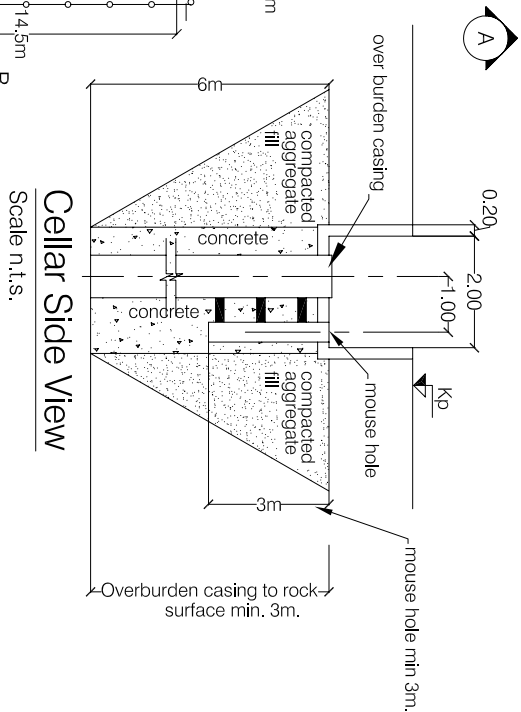
DATE: 08/12/15

SHEET NO.:
01

SCALE: 0

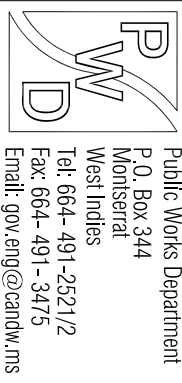


Cellar Top View



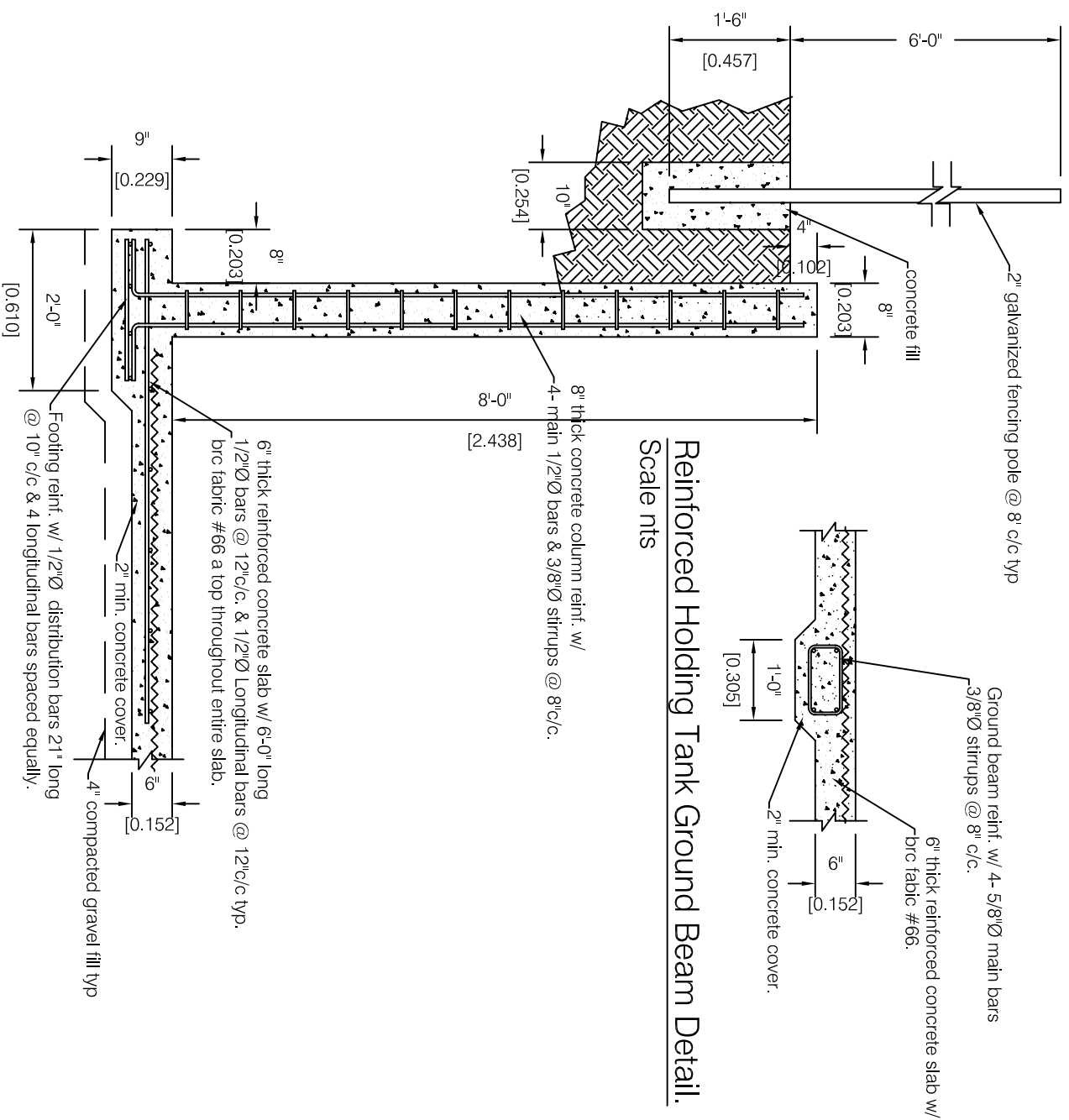
Cellar Side View

Scale n.t.s.

[illegible]

PROJECT: GEOTHERMAL PROJECT	
TITLE: SITE/SLAB	
DESIGN: P.W.D	JOB #: 0
DRAWN: OREENU	
CHECKED: P.W.D	

FILE PATH: 0	SHEET NO.: 02
DATE: 03/12/12	
SCALE: 0	



Reinforced Holding Tank Ground Beam Detail.

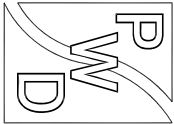
Scale nts

Reinforced Holding Tank Column Sectional Detail

Scale nts

GENERAL NOTES

No.	Revision / Issue	By	Chk	Date

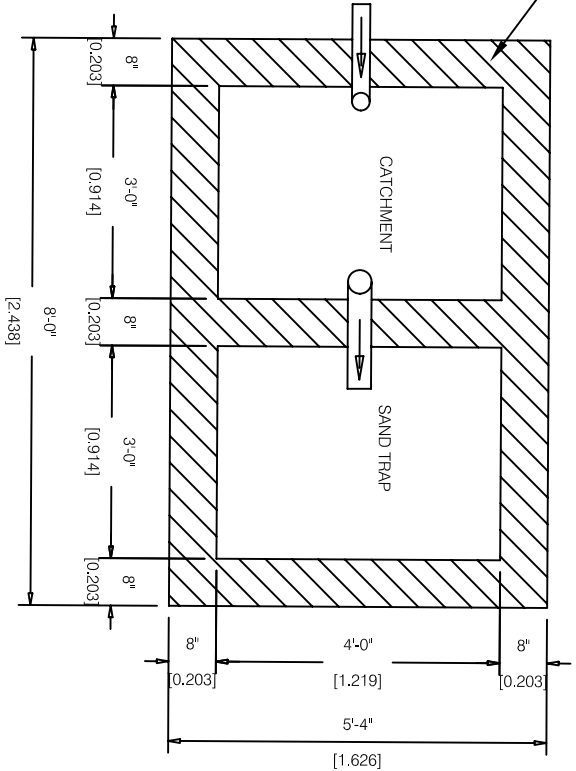


Public Works Department
P.O. Box 344
Montserrat
West Indies
Tel: 664- 491-2521/2
Fax: 664- 491 - 3475
Email: gov.eng@candw.ms

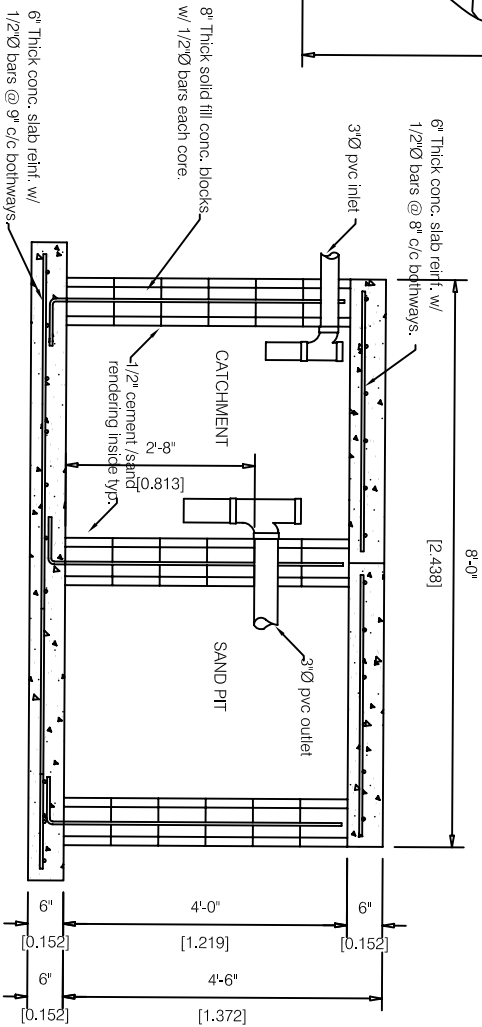
PROJECT: GEOTHERMAL PROJECT	
TITLE: HOLDING TANK COLUMN	
DESIGN: OREENU	JOB #: 0
DRAWN: OREENU	
CHECKED: P.W.D.	

FILE PATH:	SHEET NO.:
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DATE: 03/12/15	
SCALE: AS SHOWN	

GENERAL NOTES

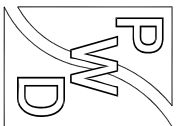


Oil Trap Box Plan



Longitudinal Section

Scales

[illegible]

Public Works Department
P.O. Box 344
Monterrat
West Indies
Tel: 664- 491-2521/2
Fax: 664- 491- 3475
Email: gov.eng@candw.ms

PROJECT: GEOTHERMAL PROJECT

TITLE: OIL TRAP BOX

DESIGN: OREENJ

JOB #: 0

DRAWN: OREENJ

CHECKED: P.W.D.

FILE PATH:
0

SHEET NO.:

DATE: 04/12/15

05

SCALE: AS SHOWN