Water Authority of the Cayman Islands

Red Gate Water Works
Construction of a
Water Distribution Pump Station

CTC/15-16/WAC/015

PLEASE READ THIS IMPORTANT NOTE

The Tender Documents for the above project can be obtained from the Deputy Director, Water Authority, 13G Red Gate Road, George Town.

The Tender Documents can also be downloaded directly from the Water Authority's website at www.waterauthority.ky or from the Cayman Islands Central Tender Committee's website at www.centraltenders.gov.ky .

All companies who obtain a set of the Tender Documents from the above websites must immediately acknowledge receipt of these documents by sending an e-mail to ContractReview@waterauthority.ky, and include the company name, company physical address and contact e-mail address.

This acknowledgement is essential in order to be able to provide potential tenderers with the Tender Drawings and with any Tender Addenda when issued.

For additional information contact us at ContractReview@waterauthority.ky .

Water Authority of the Cayman Islands

Red Gate Water Works
Construction of a
Water Distribution Pump Station

CTC/15-16/WAC/015

Tender Documents

October 2015

INDEX

Contractor's Initials or Stamp :

INTRODUCTION

This document is the standard document for the construction of civil engineering works used by the Water Authority of the Cayman Islands, in connection with the Contract for the Construction of a Water Distribution Pump Station at the Red Gate Water Works, George Town.

It is based on, and should be read in conjunction with the "Short Form of Contract, First Edition (1999)", as prepared by the Federation Internationale Des Ingenieurs Conseils (FIDIC), modified and added to as indicated. (A copy of these conditions is attached to this document),

BRIEF DESCRIPTION OF THE WORKS

The Works comprise the construction of an approximately 1,100 square foot single-storey building at the Water Authority - Cayman Red Gate Water Works in George Town and includes the following:

Excavation and construction of foundations at suitable level
Engineered fill material
Reinforced concrete floor, roof slab and beams
Reinforced concrete masonry walls
The supply, delivery, installation, commissioning and testing of a 200 KW (250KVA), 277/480V, 60 HZ, 3Ø Diesel type Generator, and Automatic Transfer Switch.
Electrical installation, including all power distribution and control wiring.

All finishes will be as specified on the drawings and in the specifications. Mechanical pumping equipment and pipework will be supplied and installed by Water Authority and will not form part of this contract, unless otherwise indicated on the Tender Drawings.

INSTRUCTIONS FOR TENDERING

Introduction

1. These instructions for Tendering are to be used as a guide to Tendering for this project. Failure to comply with any of these Instructions may result in the rejection of the Tender.

Eligibility Criteria

2. Tenderers shall meet the following eligibility criteria in order to be considered and evaluated:
   a. Companies must comply with the latest revisions of all applicable Cayman Islands laws including, but not limited to, the Labour Law, Pensions Law and the Immigration Law.
   b. Companies must satisfy all insurance, financial, and bonding requirements as specified in the Tender Documents.
   c. Companies must provide references that will confirm the company's performance and quality on five (5) separate completed and similar sized projects.
   d. The job superintendent/foreman for this project shall have at least five (5) years of documented experience of construction of buildings of size and scope similar to that required for this project. Companies must provide a resume of the job superintendent/foreman that will confirm the individual's performance on previously completed projects.

Relevant Documents

3. Tenderers shall study all the "Tender Documents" comprising the Conditions of Contract, Specifications, Tender Drawings, Agreement (comprising Offer, Acceptance and Appendix) and Bill of Quantities. The whole of the Tender Documents shall be read and their true intent and meaning ascertained before the Bill of Quantities is priced.

4. No unauthorised alteration or addition is to be made to the Specifications, Tender Drawings, Agreement and Bill of Quantities. Any qualification made to a Tender may result in the Tender being rejected.

5. Except in so far as may be directed by the Water Authority in writing neither the Water Authority, nor any agent or servant in their employment has any authority to make any representation or explanation to Tenderers as to the meaning of these Tender Documents, or as to anything to be done or not to be done, or as to these instructions, or as to any other thing or matter, so as to bind the Water Authority as to the execution of these proposals.

6. Should any alteration or addition to the Tender Documents be deemed necessary prior to the date for submission of Tenders, these shall be issued by e-mail by the Deputy Director of the Water Authority to Tenderers in the form of a Tender Addendum.

   If a Tenderer is in doubt about the meaning of any item in the Tender Documents, or if a Tenderer discovers any discrepancy between the Work as shown on the Drawings and the Bill of Quantities he shall notify the Water Authority by e-mail not later than 14 days before the due date for tender submission. (ContractReview@waterauthority.ky).

   The Deputy Director of the Water Authority shall then issue to **all** Tenderers an **explanation and/or correction** in the form of a Tender Addendum.

   Each Tender Addendum shall have a serial number and Tenderers shall acknowledge receipt of each Tender Addendum by e-mail to ContractReview@waterauthority.ky Failure to acknowledge may result in a Tender being rejected. All Tender Addenda so issued become a part of the Tender Documents.

7. The Contract shall be carried out on a Firm Price basis and no adjustment shall be made to any amounts payable by the Water Authority to the Contractor as a consequence of any variations in the cost of labour, plant, materials or transport.

8. Tenders shall only be accepted for the whole of the Works.

9. Tenderers shall treat the Tender Documents and all details contained therein as private and confidential.

Prices to be Inclusive

10. The prices or rates to be inserted in the Bill of Quantities are to be the full inclusive value of the work described in the Specification and under the several items, including all costs and expenses which may be required in and for the construction of the work described, together with all general risks, liabilities and obligations set forth or implied in the documents on which the tender is based.

Measurement

11. All measurements shall be as indicated in the contract.

12. Persons tendering are cautioned that no variations or extras whatsoever shall be acknowledged or paid for by the Water Authority unless an order in writing signed by the Engineer and specifying the nature, extent and character of each particular item or items to be paid for as an extra has been obtained by the Contractor before such work has been carried out.

Prices to be Entered

13. All items in the Bill of Quantities shall either be priced or alternatively the word "included" should be entered in the rate column, whether quantities are stated or not. If neither of these two alternatives are adopted the Tenderer shall be held to have included for any such item left blank in his other prices or rates in the Bill of Quantities.

14. All rates and prices submitted shall be in **Cayman Islands Dollars (CI$).**

Time for Completion

15. Attention is directed to the fact that if the Contractor shall fail or neglect to complete the works within the time specified in the Appendix he shall pay to the Water Authority as liquidated and ascertained damages and not by way of penalty a sum detailed in the Appendix for each day during which any part of the work shall, by the Contractor's default, remain unfinished after the expiration of the period for completion. If in the opinion of the Water Authority the work has been delayed owing to abnormally bad weather, the Water Authority may extend the time for completion of the work as it may consider fair and reasonable.

Preparing Tender

16. Companies who submit a Tender shall be held to have by their own independent observations and enquiries fully informed and satisfied themselves as to the nature, extent and practicability of the Works, the means of access to the Works, the places where materials can be obtained and disposed of, the levels of the ground water and seasonal/tidal variation thereof, the character of soil and strata in or on which the works are to be constructed, and all other points which can in any way affect the prices inserted in the Bill of Quantities.

It is strongly recommended that Contractors arrange a visit to the site to familiarize themselves regarding the site conditions, the extent of the work etc. Please make any request for a site visit by e-mail (ContractReview@waterauthority.ky).

17. The Water Authority shall not be responsible for any costs or expenses incurred in the preparation and submission of the Tender.

18. The Water Authority shall not be responsible for the omission of any items that are detrimental to the successful completion of the works.

Return of Tenders

19. Tenderers shall be supplied with an electronic copy of the following documents: the Tender Documents, which includes the Specifications, the FIDIC Short Form of Contract, and the Tender Drawings.

    One copy of the Tender Documents, which for the purpose of identification shall have each page signed by the Contractor, shall be duly completed, and sealed in an envelope. On the outside of the envelope or courier box the tender # and title ("CTC/15-16/WAC/015 Red Gate Water Works - Construction of a Water Distribution Pump Station 2015") shall be clearly written as the first lines of the address.

    The sealed envelope or package shall be delivered, no later than 12:00 p.m. on Wednesday 2 December 2015, directly to:

    The Central Tenders Committee
    c/o Treasury Department
    Government Administration Building
    97 Elgin Avenue, George Town
    Grand Cayman KY1-9000
    Cayman Islands

20. Only tenders received on time will be accepted. No Tenderer shall withdraw his tender after the opening time unless a period of 42 days has elapsed without any tender being accepted. Faxed summaries of tenders shall not be accepted as a substitute. Tenders may be delivered by courier service, but the Water Authority shall not be responsible for the failure of any courier service to deliver on time and any such late tender shall not be accepted.

21. The opening of the sealed offers by the Central Tenders Committee will take place on Wednesday 2 December 2015

22. All entries and signatures shall be in indelible ink. No tender may be altered or amended after having been opened other than those alterations necessary to correct any arithmetic errors. Rates shall prevail where there is an arithmetic error in extension. Discrepancies in the quantity multiplied by unit price and the extended total amount will be resolved in favour of the quantity multiplied by unit price. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favour of the correct sum.

Information to be submitted by the Tenderer.

23. The Tenderer shall submit with his tender the following information:

    a) A detailed Schedule (Programme) indicating the proposed start and end dates of the principal construction tasks required for completion of the Works.

b) Description of company's personnel to be used on this contract (e.g., number of staff, qualifications, experience, etc.)) and details on the constructional plant that the Tenderer intends to use for the various components of the Works.
c) A list of Sub-Contractors that the Tenderer proposes to use on the Works and the activities that each of the Sub-Contractors is to carry out. Tenderer shall submit with the Tender an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Sub-Contractor.

i. Any Sub-Contractor listed and to whom the Employer makes written objection prior to the giving of the Letter of Acceptance will be deemed unacceptable to the Employer and shall be substituted with a Sub-Contractor acceptable to the Employer. If the Successful Tenderer declines to make a substitution of Sub-Contractor acceptable to the Employer, the Employer may award the contract to the next highest assessed responsible Tenderer that proposes to use acceptable Sub-Contractors.

24. The Water Authority shall not be seen to have approved all or any part of the information submitted by the Tenderer unless the Tenderer is so notified in writing.

Award of Contract

25. Tender Evaluation Criteria: Certain elements of the Tender are mandatory, the submission of these will determine whether a Tender is "compliant or not", failure to submit any mandatory items will result in a "failed" Tender and will not be assessed further.

a. Mandatory items (Pass or Fail):
1. Completed Agreement and Offer (see page 10)
2. Cost proposal (completed Bill of Quantities (see page 19))
3. Acknowledgement of receipt of Tender Addenda (if any)
4. Company and Sub-Contractor Information (i.e., experience, references etc.)
5. Staff Experience
6. Other required information (see Item 23 of these Instructions)
7. A copy of e-mails sent to ContractReview@waterauthority.ky acknowledging receipt of the Tender Documents in order to be a registered potential Tenderer (*) and any tender addenda (**)

Note*: This only applies to those Tenderers who downloaded the Tender Documents directly from the Water Authority's website or the Cayman Islands Central Tender Committee's website.
Note** This applies to all tenderers

b. Costing Analysis

c. Technical Assessment
1. Standard of Tender Submission (i.e., Quality/Completeness)
2. Contractor and Sub-Contractor Information, including References
3. Experience of superintendent/foreman

Note: The Company and Sub-Contractor Information referred to in this item should be relevant to this contract

26. The Water Authority shall not be bound to accept the lowest or any of the Tenders. The Water Authority reserves its right to reject any or all Tenders, including without limitation the right to reject any or all non-conforming, non-responsive, unbalanced or conditional Tenders, and to reject the Tender of any Tenderer if the Employer believes that it would not be in the best interest of the Employer to make an award to that Tenderer, whether because the Tender is not responsive or fails to meet any other pertinent standard or criteria established by Employer.

27. The award will be made on the basis of that Tender from the responsive Tenderer with the highest score for the Tender using the Tender Evaluation Criteria (see Item 25) and which will best serve the interest of the Employer.

28. The Employer will give the Successful Tenderer a Letter of Acceptance within forty two (42) days after the Tender Opening.

29. In the event of failure of the Successful Tenderer to provide any required documents (e.g., Trade and Business license, insurance certificate(s), information of Sub-Contractors), the Employer may award the Contract to the next highest assessed responsive Tenderer.

30. All Tenders will be evaluated and all tenderers will be notified by e-mail of the outcome of the evaluation.

CONDITIONS OF CONTRACT

Conditions of Contract

The Conditions of Contract shall be Clauses 1 through 15 of "Short Form of Contract, First Edition (1999)", as prepared by the Federation Internationale Des Ingenieurs Conseils (FIDIC), modified and added to as shown below. A copy of the Conditions of Contract is attached to this Document.

Modifications and additions to Clauses

PARTICULAR CONDITIONS

Clause 1 General Provisions

Add Sub-Clause 1.6.a: Labour

i. The Contractor shall comply with all applicable Cayman Islands laws relating to employment including the Labour Law (latest revision) and the Immigration Law (latest revision).

ii. The Contractor shall pay rates of wages and observe conditions of labour not less favourable than those established by the Labour Law (latest revision).

Clause 7 Time for Completion

Add the following at the end of sub-clause 7.2

“The Contractor shall maintain adequate staff and plant to comply with the approved Programme for the Works.

Add Sub-Clause 7.5 Restriction on Working Hours

Subject to any provision to the contrary contained in the Contract, none of the Works shall, save as hereinafter provided, be carried out during the night or on locally recognized days of rest without the consent of the Engineer, except when work is unavoidable or absolutely necessary for the saving of life or property of for the safety of the Works, in which case the Contractor shall immediately advise the Engineer.

Clause 11 Contract Price and Payment

Delete sub-clause 11.8 and substitute with:

“In the event of the failure of the Employer to make payment within the times stated, the Employer shall pay to the Contractor interest upon all sums unpaid at a rate per annum equivalent to the interest rate at which the Cayman National Bank and Trust Company Limited would pay for such a deposit on the date upon which such payment first becomes overdue. In the event of any variation in the said Bank Rate being announced whilst such payment remains overdue the interest payable to the Contractor for the period that such payment remains overdue shall be correspondingly varied from the date of each such variation.”

Clause 15 Resolution of Disputes

Delete the entire clause and replace with the following:

"Unless settled amicably, any dispute or difference which arises between the Contractor and the Employer out of or in connection with the Contract shall be settled by arbitration in accordance with the Cayman Islands Arbitration Law (Latest Revision)"

Note: The "Engineer" as referred to in the various sections of the Specifications shall be deemed to mean the "Employer's Representative", as defined in the Contract.

AGREEMENT

The Employer is The Water Authority of the Cayman Islands, P.O. Box 1104, 13G Red Gate Road, George Town, Grand Cayman KY1-1102, Cayman Islands.

The Contractor is _____ of _____

The Employer desires the execution of certain Works known as **Red Gate Water Works – Construction of a Water Distribution Pump Station (2015)**

OFFER

The Contractor has examined the documents listed in the Appendix, which forms part of this Agreement, and offers to execute the Works in conformity with the Contract for the sum of _____(in words)

_____ (in figures)

or such other sum as may be ascertained under the Contract.

This offer, of which the Contractor has submitted one signed original, may be accepted by the Employer by signing and returning it to the Contractor before 13 January 2016.

The Contractor understands that the Employer is not bound to accept the lowest or any offer received for the Works.

Signature: _____ Date: _____

Name: _____ Authorized to sign on behalf of:
(organization name)

_____ _____

Capacity: _____

ACCEPTANCE

The Employer has, by signing below, accepted the Contractor's offer and agrees that in consideration for the execution of the Works by the Contractor, the Employer shall pay the Contractor in accordance with the Contract. This Agreement comes into effect on the date when the Contractor receives a copy of this document signed by the Employer.

Signature: _____ Date: _____

Name: _____ Authorized to sign on behalf of the

Water Authority of the Cayman Islands

Capacity: _____

In the presence of:

Name: _____

Capacity: _____

APPENDIX

This Appendix forms part of the Agreement.

Item	Sub-Clause	Data
Documents forming the Contract listed in the order of priority	1.1.1	
The Agreement		
Conditions of Contract		
The Specification		
The Drawings		See Attached List
The Contractor's design		
The Bill of Quantities		
Time for Completion	1.1.9	154 days
Law of the Contract	1.4	Cayman Islands Law
Language	1.5	English
Provision of Site	2.1	28 days after the Commencement Date
Authorized person	3.1	Director of the Water Authority
Name and address of Employer's representative	3.2	Deputy Director Water Authority - Cayman PO Box 1104 Grand Cayman KY1-1102
Performance security	4.4	None
Requirements for Contractor's design	5.1	None
Programme:		
Time for submission	7.2	Within 14 days of the Commencement Date
Form of programme	7.2	Gantt Chart with (as a minimum) detailed information on the activities identified in the Bill of Quantities
Amount payable due to failure to complete	7.4	CI$ 400.00 per day up to a maximum of 10% of the sum stated in the Agreement
Period for notifying defects	9.1 & 11.5	365 days calculated from the date stated in the notice under Sub-Clause 8.2

Continued on next page .....

Item	Sub-Clause	Data
Valuation of the Works		
Lump sum price	11.1	As per completed Bill of Quantities
Percentage of value of materials and Plant	11.2	Not Applicable
Percentage of retention	11.3	10% of Total Work Done
Limit of Retention	11.3	10% of Tender Amount
Currency of payment	11.7	Cayman Islands Dollars (CI$)
Insurances	14.1	

Type of Cover	Amount of Cover
The Works, Materials, Plant and fees	The sum stated in the Agreement plus 15%
Third Party injury to persons and damage to property	CI$ 500,000 for any one incident, and unlimited number of incidents

Contractor's Initials or Stamp :

BILL OF QUANTITIES

Brief Description of the Works

The Contractor shall construct the Works, comprising the following:

- The construction of an approximately 1,100 square foot single-storey building at the Water Authority – Cayman's Red Gate Water Works in George Town, as detailed on the Drawings and in strict compliance with the Specifications.
- The supply, delivery, installation, commissioning and testing of a 200 KW (250KVA), 277/480V, 60 HZ, 3Ø Diesel type Generator with aluminium sound enclosure. Generator shall have an integral 1,000 US gallon fuel tank
    - Supply, deliver, install, commission and test a 3 pole, 4 wire, solid neutral, 400 amp service entrance rated programmed transition Automatic Transfer Switch.
    - All necessary equipment shall be housed in NEMA 4x aluminium enclosures

The Employer shall provide access to the storage and working areas as indicated on the Tender Drawings.

All materials necessary for the Works shall be supplied and installed by the Contractor. The cost of all materials shall be included in the Contractor's prices. The Contractor shall satisfy himself about the materials he is to supply.

The Contractor shall ensure that all of the supplied equipment complies with the requirements of the Building Control Inspector and the Petroleum Inspectorate of the Cayman Islands Government.

The Employer shall provide a 120 Volt, single phase, 60 Hz power supply, located within 100 feet from the working area boundary, for use by the Contractor during the construction of the Works. The power supply shall consist of two (2) outlets, equipped with a 20 A breaker and a ground fault interrupt (GFI).

The Water Authority shall provide an elevation benchmark for vertical control prior to the Commencement Date.

The following materials shall be provided by others, and the Contractor shall include in his rates for incorporating them in the Works:

- A three phase, 277/480 Volt pad-mounted transformer shall be sized, provided and installed by C.U.C. (The Contractor shall construct the transformer vault as per C.U.C. requirements).
- Eye bolts, ground rods and manhole cover for transformer vault shall be provided by C.U.C.

Programme of Works

The Contract shall be completed in 154 days, or 22 weeks.

Preamble to Bill of Quantities

Introduction

This Preamble has been provided to clarify the intent that the Water Authority of the Cayman Islands had in the preparation of the Bill of Quantities and to clarify the method of measurement and the work that each billed item covers. This intent is to provide clearly such information as shall enable Tenderers to submit bids that are readily comparable.

To avoid unnecessary length, item descriptions in the Bill of Quantities generally identify the component of the Works and not the tasks to be carried out by the Contractor. The exact nature and extent of the work is to be ascertained from the Tender Drawings, Specification and Conditions of Contract.

The Contractor shall provide all necessary materials, labour, equipment and services required to properly and satisfactorily complete the Works, unless explicitly stated otherwise.

All items required to complete the works specified or shown on the Drawings but not included in the Bill of Quantities shall be considered incidental to those set forth in the Bill of Quantities.

The Bill of Quantities shall be used for the preparation of Interim Certificates of Payment. The Contractor shall submit with each interim payment request, a revised Bill of Quantities that shows the percentage of each pay item completed as of the submission date.

> **No** payment shall be made for any goods or materials delivered on the Site, and not yet incorporated in the Works.

All Insurances

This item is to cover all the costs of providing and maintaining all the insurances required by the Contract (see Clause 14 of the Conditions of Contract). The Contractor shall not be allowed to proceed without proof of the insurances being submitted and approved by the Engineer.

The Contractor shall include for this item on his first Monthly Statement.

Mobilization/ Demobilization

This item is to cover all the costs associated with the Contractor providing his crew and other staff, equipment, plant and other resources that he may require to satisfactorily carry out the Works. The Contractor shall include in his price the cost of any items that he may rightfully incur in this matter.

This item is also to cover the cost of removing all equipment, plant and any other resource, that the Contractor may require to satisfactorily carry out the Works, from the Red Gate Water Works.

This item shall not exceed ten percent (10%) of the total tender amount for this contract.

Seventy percent (70%) of this item shall be included in the Contractor's first Monthly Statement, after the Contractor has fully mobilized his equipment and work force as set out in his approved method. The remaining thirty percent (30%) shall be paid once all field activities have been successfully completed and approved by the Engineer (i.e., upon the successful completion of the Works).

Building Works

The sums entered in the Bill of Quantities against the items shall include for the provision of equipment and necessary materials, the installation of same, and for all the work involved in the

satisfactory completion of the item in compliance with the Drawings and Specification, which includes restoring any adjacent facilities affected by the Work to a condition acceptable to the Engineer.

The sums entered in the Bill of Quantities against the items shall include for delivery of all materials, and for the uplift and transport of all materials to the position where they are to be incorporated in the Works. Facilities for loading and unloading vehicles shall be provided by the Contractor and included for in the rates. The sums shall include the following: cost of loading, export boxing (such as is required to prevent any damage to, or deterioration of, the equipment during transit), All Risk insurance, freight, harbour and port dues, wharfage, delivery, demurrage charges, double handling, and unloading of the equipment and all other costs incurred both at the place of Origin, and in Grand Cayman.

NOTE: All shipments must be consigned to the Water Authority – Cayman, and all Customs Importation Forms must be stamped and signed by the Water Authority to avoid import duties being levied.

The prices for building works incorporating concrete works shall be held to cover the cost of mix design, trial mixes, preliminary testing and statistical control procedure during concreting operations; also the cost of increased use of cement where statistical data indicates that the required degree of control is not being maintained.

The Contractor shall be responsible for obtaining all necessary approvals (from electrical inspector, building inspector, plumbing inspector, etc.), and his rates shall be deemed to include for any costs related to the preparation of the necessary submittals, obtaining the necessary approvals and liaising with the various inspectors and entities.

Testing and Quality Control

The sums entered in the Bill of Quantities for the testing of the Works shall be held to include the expense of all work involved in carrying out remedial measures and of all temporary work including the use of any materials and equipment. No payment shall be made in respect of losses or delays occasioned by the application of the test or the carrying out of remedial works.

Miscellaneous

The Employer shall provide a 120 Volt, single phase, 60 Hz power supply for use by the Contractor during the contract. The power supply shall consist of two (2) outlets, each one equipped with a 20 Amp breaker and a ground fault interrupt (GFI).

The Employer shall provide a potable water supply for use by the Contractor on the Works for the duration of the contract. A ¾-inch hose bib will be provided adjacent to the construction site.

List of Tender Drawings

Drawing #	Drawing Title
P50-01	Masterplan - Site Plan
P85-01	Laydown and Working Area
P85-22	Pump House General Arrangement
P85-23	Pump House Internal and External Door Schedule
P85-26	Discharge and Suction Pipelines (for information only)
GEN-RG-01	Generator Access Platform
GEN-RG-02	Generator Access Platform – Construction Details
S-1	Structural Notes and Specifications
S-2.1	Structural Plans and Building Sections
S-2.2	Structural Details
S-10	Structural Schedules
P85-E1	Electrical Title Page
P85-E2	Symbols and Abbreviations
P85-E3	Electrical Site Plan
P85-E4	Electrical One Line Diagram
P85-E5	Electrical Riser Diagram
P85-E6	Floor Plans - Lighting, Outlets and Mechanical
P85-E7	Floor Plans - Grounding, Instrumentation and Telemetry and Equipment
P85-E8	Electrical Installation Details
P85-E9	Conduit Installation Details – Sheet 1
P85-E10	Conduit Installation Details – Sheet 2
P85-E11	Panel Drawing
P85-E12	Load Calculation

Contractor's Initials or Stamp :

List of Tender Specifications

Specification #	Specification Title
01300	Submittals
01430	O & M Data
01500	Construction Facilities Temporary Controls
02100	Site Preparation
16210	Generator
16921	Enclosures
16926	Corrosion Inhibiting Requirements

Contractor's Initials or Stamp :

BILL OF QUANTITIES

Currency: Cayman Island Dollars (CI $)

Item	Item Description	Unit	Amount (CI $)
	Part I : Preliminary		
1.1	All Insurances as required by the Contract	SUM	_____
1.2	Mobilization (not to exceed 10% of Tender Sum)	SUM	_____
	SUB-TOTAL (Part I) :		
	Part II : Building Works – General Construction		
2.1	Site Clearance and Excavation	SUM	_____
2.2	Reinforced concrete foundations and pipe ducts, (including footings, Link-Seal Modular Seals, etc.)	SUM	_____
2.3	Engineered fill material below floor slabs	SUM	_____
2.4	Reinforced concrete ground floor slab (including outside steps)	SUM	_____
2.5	Reinforced CMU Walls (including concrete fill to blocks, lintels, etc.)	SUM	_____
2.6	Reinforced concrete roof slab and beams (including roof membrane and insulation)	SUM	_____
2.7	Doors, windows, extractor fan louver and acoustic louver	SUM	_____
2.8	Plumbing (including floor drains and connection to existing surface water pumping station)	SUM	_____
2.9	Pad-mount transformer vault	SUM	_____
2.10	Emergency generator foundation	SUM	_____
2.11	Emergency generator access platform	SUM	_____
	SUB-TOTAL (Part II) :		

Part III : Building Works – Finishes and Miscellaneous

3.1	Exterior finish (including stucco and painting)	SUM	_____
3.2	Interior finish (including drywall, insulation and painting)	SUM	_____

SUB-TOTAL (Part III) : | |

Part IV : Electrical and Mechanical Works

4.1	PVC Conduit in floor slab	SUM	_____
4.2	Exterior underground conduit (includes conduits to transformer vault, power pole, generator, telephone conduit, etc.)	SUM	_____
4.3	Power distribution (includes connection to transformer, wiring, conduits, lighting fixtures, receptacles, panels, etc.)	SUM	_____
4.4	HVAC (air conditioning to control room)	SUM	_____
4.5	Extractor fan	SUM	_____
4.6	Emergency generator with aluminium sound enclosure and integral 1,000 US gallon fuel tank. (includes ATS, wiring, testing, etc.)	SUM	_____
4.7	Control wiring (excludes pump control panel)	SUM	_____

SUB-TOTAL (Part IV) : | |

TOTAL TENDER AMOUNT (PART I THROUGH PART IV) **(TO PAGE 10) :**	

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Requirements and procedures necessary for scheduling, preparation and submission of submittals.

B. Requirements for preparation of progress schedules.

1.2 RELATED WORK SPECIFIED UNDER OTHER SECTIONS

A. Individual Specification Sections in these Contract Documents contain additional and special submittal requirements. Individual sections shall take precedence in the event of a conflict with this Section.

1.3 SUBMITTAL PROCEDURES - GENERAL

A. The Contractor shall schedule and make submissions in accordance with the requirements of individual Specification Sections and in such sequence as to cause no delay in the work.

B. Engineer reserves the right to modify the procedures and requirements for submittals, as necessary to accomplish the specific purpose of each submittal. Direct inquiries to Engineer regarding the procedure, purpose, or extent of any submittal.

C. Review, acceptance, or approval of substitutions, schedules, shop drawings, lists of materials, and procedures submitted or requested by Contractor shall not add to the Contract price, and additional costs which may result therefrom shall be solely the obligation of Contractor.

D. Employer is not precluded, by virtue of review, acceptance, or approval, from obtaining a credit for construction savings resulting from allowed concessions in the work or materials therefor.

E. Engineer is not responsible to provide engineering or other services to protect Contractor from additional costs accruing from submittals.

F. Submittals processed by Engineer do not become part of the Contract Documents and are not Variation Orders; the purpose of submittal review is to establish a reporting procedure and is intended for Contractor's convenience in organizing the work and to permit Engineer to monitor Contractor's progress and understanding of the design, and to ensure compliance with the Contract Documents

G. Delays caused by the need for resubmittal or multiple resubmittals shall not constitute basis for claim.

H. After checking and verifying all field measurements, make submittals to Engineer, in accordance with the schedule of submittals for review.

1. Complete, sign and transmit with each Submittal package, one Transmittal of Contractor's Submittal Form. A copy of this Form is attached at the end of this Section

2. Submittals shall bear a stamp or specific written indication that Contractor has satisfied his responsibilities under the Contract Documents with respect to review of the submittal.

3. Data shown shall be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to enable Engineer to review the information.

I. Check samples, and before submission of each submittal, determine and verify quantities, dimensions, specified performance criteria, installation requirements, materials, catalog numbers, and similar data with respect thereto; review and coordinate each submittal with other submittals, requirements of the work, and the Contract Documents.

J. At the time of each submission, give Engineer specific written notice of each variation that the submittal may have from the requirements of the Contract Documents; in addition, make specific notation on each shop drawing submitted to Engineer for review and approval of each such variation.

K. Engineer's review will be only for conformance with the design concept of the project and for compliance with the information given in the Contract Documents not extending to means, methods, techniques, sequences, or procedures of construction (except where a specific means, method, technique, sequence, or procedure of construction is indicated in or required by the Contract Documents) nor to safety precautions or programs incident thereto. The review of a separate item as such will not indicate review of the assembly in which the item functions.

L. Engineer's review of submittals shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has in writing called Engineer's attention to each such variation at the time of submission, and Engineer has given written approval of each such variation by a specific written notation thereof incorporated in or accompanying the shop drawing or sample approval; nor will any approval by Engineer relieve Contractor from responsibility for errors or omissions in the shop drawing or from responsibility for having complied with the provisions herein.

M. Where a shop drawing or sample is required by the Specifications, related work performed prior to Engineer's review and approval of the pertinent submission shall be the sole expense and responsibility of Contractor.

1.4 ADMINISTRATIVE SUBMITTALS

A. Administrative Submittals are submittals that are not Shop Drawings or Samples, or that do not reflect quality or product or method of construction. They may include, but are not limited to, those Submittals identified below:

1. Monthly Statement: in accordance with Clause 11.2 of the Conditions of Contract.

2. Submittals required by Laws, Regulations, and Governing Agencies.

3. Schedule of Submittal Submissions: described in Paragraph 1.5 SCHEDULE OF SUBMITTAL SUBMISSIONS below.

4. Progress Reports: described in Paragraph 1.6 PROGRESS SCHEDULE below

B. Make required submittals promptly to the applicable Government Department or authority, as required by law. Failure to comply with this requirement may make the Contractor liable for sanctions and other prescribed action.

The Contractor shall be responsible for procuring, and paying all costs associated with, all requisite permissions and approvals as required by the Building Control Unit, the Electrical Inspector, the Plumbing Inspector, and any other Government Department , for the construction of the Works. The Employer shall provide reasonable assistance to the Contractor in procuring these permissions and approvals.

1. Submit to Engineer one copy of all letters relative to the Contract including notifications, reports, certifications, and the like, that are submitted directly to a governing agency.

C. During performance of the Contract, maintain on a weekly basis and submit to the Engineer as required, full and correct information as to the number of persons employed in connection with each subdivision of the Work; and the cost, source, and amount of the materials and equipment received, in a format approved by Engineer.

D. When submitting the Monthly Statement, also submit an estimate of the Statements for the following two monthly billing periods corresponding to the submitted schedule.

1.5 SCHEDULE OF SUBMITTAL SUBMISSIONS

A. Prepare and submit preliminary list of submissions grouped by Contract Document article/paragraph number of Specification section number.

B. Include only the following required submissions:

1. Shop Drawings and Samples.
2. Training plans.
3. Test procedures.
4. Operation and Maintenance Manuals.
5. Record documents.
6. Specifically required certificates, warranties, and service agreements.

C. Coordinate with progress schedule and prepare submissions to show, for each Submittal, at a minimum, the following:

1. Estimated submission date to Engineer.
2. Specifically requested and clearly identified Engineer review time if shorter than that set forth herein, with justification for such request and critical dates.

D. For the first 6-month period from the date the Contract commences or following any update or adjustment of the submissions, the estimated submission date shall be week and month; for submissions beyond this 6-month time period, show closest month.

E. Submit to Engineer on a monthly basis:

1. Updated list if changes have occurred, otherwise submit a written communication confirming existing list, and

2. Adjusted submissions reflecting submission activity planned for forthcoming 6-month time period and beyond. Coordinate with progress schedule updates.

1.6 PROGRESS SCHEDULE

A. General

1. Prepare and submit to the Engineer at the preconstruction conference a Preliminary Progress Schedule in as much detail as possible. The Preliminary Progress Schedule shall indicate completion dates of major tasks and shall include a complete list of all submittals with submittal dates.

2. Prepare and submit to the Engineer within 14 days from the Commencement Datee, a Detailed Progress Schedule. The Detailed Progress Schedule shall be comprised of construction operations covering all work to be done in connection with the Contract.

3. The Detailed Progress Schedule covering work to be executed under the Contract shall be of sufficient detail and shall indicate the minimum of individual work activities to perform the work of this Contract. The final total number of activities shall be subject to the approval of the Engineer. A work activity is defined as an activity for which manpower is required and must be performed before the project is considered complete. Dummy restraints are not considered as work activities.

4. The Detailed Progress Schedule shall indicate the sequence of work and the time of starting and completion of each part. It shall include, but not be limited to, the following items:

   a. Permits, if required.

   b. Submittals, with review time: Shop drawing receipt from Contractor, submitted to the Engineer, review and return to Contractor.

   c. Material and equipment order, manufacture, delivery, installation, and check-out; Particular emphasis on early procurement activities for long lead equipment and materials.

   d. Initial site work

   e. Construction of the various facilities (civil, structural, mechanical, electrical, and architectural work)

   f. Performance tests and supervisory service activities.

   g. Backfilling, grading, paving, landscaping etc.

   h. Electrical work including instrumentation and control work.

   i. Specified Work sequences and construction constraints.

   j. Equipment and system startup and test activities.

   k. Subcontractor’s items of work.

   l. Final cleaning.

B. Progress Schedule:

1. The Contractor shall submit a Detailed Progress Schedule in the form of a Gantt chart. The Contractor shall submit the Gantt chart in electronic format, on CD-ROM or flash drive, in Microsoft Project or similar format. The chart shall show the sequence and interdependence of activities required or complete performance of all items of work.
2. Activities related to a specific physical area of the project shall be grouped on the chart for ease of understanding and simplification. In addition, each activity of the Schedule shall be labeled with a complete description as well as an estimated duration in working days. Chart shall include Title Block showing: name of Project: Red Gate Water Works – Construction of a Water Distribution Pump Station, Employer: Water Authority - Cayman, date submitted, revision or update number. Provide a legend to describe standard and special symbols used.
3. The Progress Schedule shall be sufficiently detailed to indicate such activities as shop drawing receipt from manufacturer, submittal to the Engineer, review and return to the Contractor and manufacturer, equipment order, manufacture, delivery, installation startup and testing, concrete pours, and subcontractors' items of work.
4. Exclusive of those for submittal to the Engineer for approval and material fabrication/delivery, activity durations shall not be less than 1 or more than 28 days, unless otherwise approved by the Engineer.
5. Schedule shall begin with the Commencement Date and conclude with the date of Final Completion.
6. Identify Work calendar basis using days as a unit of measure.
7. The "critical path" of activities shall be indicated on the Gantt chart by a heavy line.
8. The Contractor shall number the events (nodes) in the Schedule chart such that they flow from left to right and from top to bottom, and shall, in addition, provide an index to facilitate location of logically grouped activities for specific physical areas of the project.
9. Each listing shall show activity node numbers, description, responsibility, total duration in days, percent completion, Early-Start date (Actual start on Updated Progress Schedules), Late-Start date, Early-Finish date (Actual finish on Updated Progress Schedules), and Total Float for each activity in the Schedule chart.

C. Progress Reports:

1. At the regular progress meetings the current and updated Progress Schedules will be reviewed. Immediately prior to the meeting, the Contractor shall obtain the necessary information to update the Detailed Progress Schedule to reflect progress to date:
    a. To identify those activities started and completed during the previous period.
    b. From the date of update, the period required to complete each activity started, but not completed.

c. From the date of update, a review of remaining durations for selected activities not yet started.

2. Conditions under which a revision to the Progress Schedule will be required, are as follows:

   a. When a delay in completion of any work item or sequence of work items results in an indicated extension of the project completion by 28 days or more.

   b. When delays in submittals or deliveries or work stoppages are encountered which make replanning or rescheduling of the work necessary.

   c. When the schedule does not represent the actual sequence and/or progress of the Works.

3. Whenever revised scheduling documents are submitted to the Engineer, they shall be accompanied by a written narrative report. The narrative report shall include a description of the amount of progress during the last month in terms of completed activities in the plan currently in effect, a description of problem areas, current and anticipated delay factors and their estimated impact on performance of other activities and completion dates and an explanation of corrective action taken or proposed.

4. The Contractor shall make requested corrections to the scheduling documents and resubmit them within 14 days.

5. If at any time during the project, the Contractor fails to complete any activity by its latest completion date, he will be required, within 7 days, to submit to the Engineer a written statement as to how he plans to reorganize his work force to return to the acceptable current progress schedule.

6. The Engineer may require the Contractor, at the Contractor's expense, to add to his plant, equipment, or construction forces, as well as increase the working hours, if operations fall behind schedule at any time during the construction period.

D. Schedule of Submittals:

1. Submit one electronic copy of the Detailed Progress Schedule and each subsequent revision. The latest revised Progress Schedule shall reflect the actual progress of the project to within 7 days prior to submittal. The revisions shall include minor levels of paths on the Progress Schedule in addition to the "critical path". Failure to submit the Detailed Progress Schedule as well as revisions will be considered cause for withholding of any Interim Payments otherwise due under the Contract.

2. Preliminary Schedule of Submittals: Indicate submittals required by Specification section number with brief description, starting and completion dates for respective submittal preparation, and submittal review by the Engineer.

1.7 SHOP DRAWINGS

A. General:

1. Shop drawings, as defined herein, consist of all drawings, diagrams, illustrations, schedules, and other data which are specifically prepared by or for Contractor to illustrate some portion of the work; and all illustrations, brochures, standard schedules, performance charts, instructions, diagrams, and other information prepared by a manufacturer and submitted by Contractor to illustrate material or equipment for distinct portions of the work.

2. Submittal of incomplete or unchecked shop drawings will not be acceptable. Shop drawing submittals which do not clearly show Contractor's review stamp or specific written indication of Contractor's review, or which are transmitted with an unsigned or uncertified submission form or as may otherwise be required, will be returned to Contractor unreviewed for resubmission.

3. Submittal of shop drawings not required under these Contract Documents and not shown on the schedule of submittals will be returned to Contractor unreviewed and unstamped by Engineer.

B. Procedures:

1. Submit to Engineer for review and approval in accordance with the accepted schedule of submittals, four (4) copies of shop drawings.

2. Schedule and combine submittals specified in each Specification section into a single package. Partial packages will not be reviewed until all submittals required for the section have been received.

3. Transmit each submittal on Engineer accepted form. A copy of the Transmittal of Contractor's Submittal Form is attached at the end of this Section.

4. Sequentially number the transmittal forms; resubmittal shall have the original number with sequential alphabetic suffix.

5. Identify project, Contractor, Specification section number, pertinent drawing sheet and detail number(s), products, units and assemblies, and the system or equipment identification or tag number as shown.

6. Identify and indicate critical field dimensions and relationships to other critical features of work. Make notation of each deviation of variation from Contract Documents.

7. Present in a clear and thorough manner and of sufficient detail to show kind, size, arrangement, and function of components, materials, and devices and compliance with Contract Documents, such as:

a. Performance characteristics and capacities.

b. Dimensions and clearances required.

c. Wiring or piping diagrams and controls

d. External connections, anchorages, and supports required

8. When specified, provide project-specific information as required and as necessary to clearly show calculations, dimensions, logic and assumptions, and referenced standards and codes upon which design is based.
    a. Delete information from manufacturer's standard schematic drawings and diagrams that is not applicable to Works.
    b. Supplement standard information to provide information specifically applicable to Works.
9. Apply Contractor's stamp, signed or initialed certifying that review, verification of products required, field dimensions, adjacent construction work, and coordination of information, is in accordance with the requirements of the Contract Documents.
10. Transmit submittals and deliver as follows: Deputy Director, Water Authority – Cayman, P.O. Box 1104 GT, Grand Cayman, Cayman Islands.
11. Revise and resubmit submittals as required; clearly identify all changes made since previous submittal.
12. Engineer will review, stamp, and indicate acceptance or requirements for resubmission not later than 28 days after receipt, unless otherwise specified. Resubmittals will be subject to the same review time.
13. When shop drawings have been reviewed by Engineer, two (2) copies will be returned to Contractor appropriately annotated.
    a. If major changes or corrections are necessary, shop drawing may be rejected and one set will be returned to Contractor with such changes or corrections indicated.
    b. Correct and resubmit the shop drawings in the same manner and quantity as specified for the original submittal.
14. When Shop Drawings have been approved by Engineer as submitted, the Contractor may begin to implement activities to incorporate specific products or work covered by the Submittal.
15. When Shop Drawings have been approved by Engineer as noted, the Contractor may begin to implement activities to incorporate specific products or work covered by the Submittal, in accordance with Engineer's notations.

1.8 SAMPLES AND TEST SPECIMENS

A. Where required in the Specifications, or as determined necessary by Engineer, submit test specimens or samples of materials, appliances, and fittings to be used or offered for use in connection with the work. Include information as to their sources, prepay cartage charges, and submit such quantities and size for proper examination and tests to establish the quality or equality thereof, as applicable.

B. Submit samples and test specimens in ample time to enable Engineer to make tests or examinations necessary, without delay to the work.

C. Submit additional samples as required by Engineer to ensure equality with the original approved sample and/or for determination of Specification compliance.

D. Tests required by the Specifications to be performed by an independent laboratory shall be made by a laboratory approved by the Engineer. Certified test results of specified tests shall be submitted in duplicate by the laboratory directly to Engineer.

E. Approved sample items (fixtures, hardware, etc.) may be incorporated into the work upon approval and when no longer needed by Engineer for reference.

1.9 QUALITY CONTROL SUBMITTALS

A. Manufacturer's Certification of Proper Installation: The manufacturer shall provide, when specified in individual Specification Sections, certification stating the following:

1. The product or system has been installed in accordance with the manufacturer's recommendations.

2. The product or system has been inspected by a manufacturer's authorized representative.

3. The product or system has been serviced with the proper lubricants.

4. Applicable safety equipment has been properly installed.

5. Proper electrical and mechanical connections have been made.

6. Proper adjustments have been made and the product or system is ready for functional testing, plant startup, and operation.

B. Manufacturer's Certification of Compliance:

1. When specified in individual Specification Sections or where products are specified to a recognized standard or code, submit prior to shipment of product or material to the site.

2. Engineer may permit use of certain materials or assemblies prior to sampling and testing if accompanied by accepted certification of compliance.

3. Certifications shall be signed by the manufacturer of the product, stating that the components involved comply in all respects with the requirements of the Specifications.

4. Furnish certification of compliance with each lot delivered to the jobsite and clearly identify the lot so certified.

5. Products used on the basis of certification of compliance may be sampled and tested at any time. The fact that a product is used on the basis of a certification of compliance shall not relieve the Contractor of responsibility for incorporating products in the work which conform to requirements of the Contract Documents. Products not conforming to such requirements will be subject to rejection whether in-place or not.

6. Engineer reserves the right to refuse permission for use of products on the basis of a certification of compliance.

C. Functional Test Certification: Where a certification of functional testing is specified in the individual Specification sections for certain equipment, Contractor shall state in writing that:

1. All elements necessary for the installation of the equipment, such as backfill compaction, piping systems, valves, and base compaction, have been successfully tested.
2. Necessary equipment systems and subsystems have been checked for proper installation, started, and successfully tested to indicate they are operational.
3. Adjustments and calibrations have been made.
4. The systems and subsystems are capable of performing their intended functions.
5. The facilities are ready for performance testing, or for startup and intended operation, as applicable.
6. The manufacturer has reviewed and acknowledged this certification.

D. Performance Test Reports: Prepare and submit performance test reports where specified for equipment and systems. As a minimum provide the following:

1. Date of test and date issued, Project title and number, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.
2. Date and time of sampling or inspection and record of temperature and weather conditions.
3. Identification of product and Specification section, location of Sample, test or inspection in the Project, type of inspection or test with referenced standard or code, certified results of test.
4. Compliance with Contract Documents, and identifying corrective action necessary to bring materials and equipment into compliance.
5. Provide an interpretation of test results, when requested by Engineer.

1.10 OPERATION & MAINTENANCE (O&M) MANUALS

A. Maintenance Summary Forms

1. Provide Maintenance Summaries for all equipment items as specified in the individual Specification sections in the format of the form bound at the end of Section 01430, OPERATION AND MAINTENANCE DATA.
2. Compile individual Maintenance Summary Form for each equipment item following the outline provided; submit copies in duplicate for review by Engineer. The manufacturer’s standard form will not be acceptable as a substitute for the Maintenance Summary.
3. The term “Maintenance Operation” as used in the TYPICAL MAINTENANCE SUMMARY FORM is defined to mean any routine operation required to ensure the satisfactory performance and longevity of the equipment. Examples of typical Maintenance Operations are lubrication, belt tensioning, adjustment of pump packing glands, and routine adjustments.
4. The Maintenance Summary may take as many pages as required; however, the order and format shown must be adhered to. Use 8-1/2-inch by 11-inch paper.

1.11 CONSTRUCTION RECORD SUBMITTALS

A Each month, or as otherwise agreed, submit to Engineer a current listing and description of each change incorporated into the work since the preceding submittal. Engineer will prepare a set of record drawings for the project which will include the changes made in materials, equipment, locations, and dimensions of the work.

B Submit complete sets of reproducible final shop drawings before, or at the time of, delivery of equipment to the site.

C Deliver service records maintained of each item of equipment, prior to final acceptance of the project.

1.12 SUPPLEMENTS

A The supplements listed below, following “END OF SECTION”, are part of this Specification:

1. Forms: Transmittal of Contractor's Submittal

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

TRANSMITTAL OF CONTRACTOR'S SUBMITTAL

(ATTACH TO EACH SUBMITTAL)

Date:_____

To: _____ Submittal No.: _____

_____ □ New Submittal □ Resubmittal

_____ Previous Submittal No. _____

From: _____ Specification Section No.: _____

_____ (Cover only one section with each submittal)

_____ Schedule Date of Submittal:

_____ _____

SUBMITTAL TYPE: □ Shop Drawing □ Administrative □ Sample

□ Quality Control □ Contract Close-Out □ "Or-Equal"/Substitute

The following items are hereby submitted:

Number of Copies	Description of Item Submitted (Type, Size, Model, Number, etc.)	Specification Paragraph No.	Drawing or Brochure Number	Contains Variation to Contract	
				No	Yes

CONTRACTOR hereby certifies that (i) CONTRACTOR has complied with the requirements of Contract Documents in preparation, review, and submission of designated Submittal and (ii) the Submittal is complete and in accordance with the Contract Documents and requirements of laws and regulations and governing agencies.

By:_____

CONTRACTOR (signature)

SECTION 01430

OPERATION AND MAINTENANCE DATA

PART 1 GENERAL

1.1 DEFINITIONS

A. Maintenance Operation is defined to mean any routine operation required to ensure satisfactory performance and longevity of equipment.

1.2 QUALITY ASSURANCE

A. Manuals for equipment shall be prepared by equipment manufacturer.

1.3 SEQUENCING AND SCHEDULING

A. Manuals for Equipment: Submit three (3) copies not less than 28 days prior to equipment field testing or startup.

1.4 GENERAL

A. Manual Format:

1. Size: 8-1/2 inches by 11 inches.
2. Text: Manufacturer's printed data, or neatly typewritten.
3. Three-hole punch data for binding and composition; arrange printing so that punched holes do not obliterate data.
4. Provide fly-leaf for each piece of operating equipment, with typed description of major component parts of equipment and provide with heavy section dividers with numbered plastic index tabs.
5. Provide each manual with title page, and typed table of contents with consecutive page numbers.
6. Cover: Identify each volume with typed or printed title "OPERATION AND MAINTENANCE MANUAL, VOLUME NO __ OF___ " if applicable, and list:
   a. Project title.
   b. Designate the equipment for which it is intended.
7. Material shall be suitable for reproduction, with quality equal to original. Photocopying of material will be acceptable, except for material containing photographs.
8. Binders: Commercial quality, substantial, permanent, three-ring or three-post binders with durable, cleanable, plastic binders.
9. Table of Contents: Neatly typewritten, arranged in a systematic order.
10. Product Data:
    a. Include only those sheets that are pertinent to specific product.
    b. Clearly annotate each sheet to:
       1) Identify specific product or part installed.
       2) Identify data applicable to installation.
       3) Delete references to inapplicable information.
11. Drawings: Supplement product data with Drawings as necessary to clearly illustrate:

a. Control and flow diagrams.

b. Provide reinforced punched binder tab, bind in with text.

c. Reduce to 8-1/2 inches by 11 inches, or 11 inches by 17 inches folded to 8-1/2 inches by 11 inches.

d. Where reduction is impractical, fold and place in 8-1/2-inch by 11-inch envelopes bound in text.

12. Instructions and Procedures: Within text, as required to supplement product data.

a. Handling, storage, maintenance during storage, assembly, erection, installation, adjusting, testing, operating, shutdown in emergency, troubleshooting, maintenance, interface, and as may otherwise be required.

b. Organize in a consistent format under separate heading for each different procedure.

c. Provide a logical sequence of instructions for each procedure.

d. Provide information sheet for Employer's personnel, including:

1) Proper procedures in the event of failure.

2) Instances that might affect the validity of warranties or Bonds.

13. Warranties

a. Provide Warranties prior to submitting Final Statement in accordance with Clause 11.6 of the Conditions of Contract.

B. Manual Content:

1. Description of unit, including controls, accessories, and appurtenances:

a. Function, normal operating characteristics, and limiting conditions.

b. Performance curves, engineering data, nameplate data, and tests.

c. Complete nomenclature and commercial number of replaceable parts.

d. Interconnection wiring diagrams, including all control and lighting systems.

e. Circuit Directories of Panel boards (e.g., Electrical service, Controls)

2. Operating Procedures:

a. Startup, break-in, routine, and normal operating instructions.

b. Test procedures and results of factory tests where required.

c. Regulation, control, stopping, and emergency instructions.

d. Description of operation sequence by control manufacturer.

e. Shutdown instructions for both short and extended durations.

f. Information on hazards associated with the system and appropriate safety precautions.

g. Special operating instructions.

3. Maintenance and Overhaul Procedures:

a. Routine operations.

b. Guide to troubleshooting.

c. Adjustment and checking.

d. Disassembly, removal, repair, re-installation, and re-assembly.

4. Installation Instructions: Including alignment, adjusting, calibrating, and checking.
5. Original manufacturer's parts list, illustrations, detailed assembly drawings showing each part with part numbers and sequentially numbered parts list, and diagrams required for maintenance.
6. Spare parts ordering instructions.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

A Temporary utilities required during construction.

B Requirements for security and protection of facilities and property.

C Requirements for access to the work.

D Temporary controls for protection of the environment.

1.2 CONTRACTOR'S USE OF PREMISES

A. Land furnished by Employer upon which Contractor shall perform the Work as shown in the Drawings.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 TEMPORARY CONSTRUCTION

A. Storage Areas:

1. Store reinforcing and structural steel on pallets or racks, off the ground.
2. Store combustible materials (paints, solvents, fuels, etc.) in a well-ventilated building, as per manufacturer’s recommendations, while meeting safety standards, and remote from other buildings.

B. Barricades:

1. Provide barricades as necessary to prevent unauthorized entry to construction areas. Locate barriers to enable access for normal facility operation.

3.2 TEMPORARY UTILITIES

A. Power:

1. Electric power is available on the site, located just outside the working area, and all electrical power required during construction shall be provided by the Employer at no charge to the Contractor.

B. Water:

1. A potable water connection shall be provided at the location specified on the Drawings. Water for construction purposes shall be provided by the Employer at no charge to the Contractor.

C. Sanitary Facilities.

1. Provide chemical toilets of suitable types and maintain them in a sanitary condition at all times, acceptable to the health authorities.

2. Service, clean and maintain facilities and make arrangements for frequent emptying of toilets with septage haulers. Upon completion of the work, remove toilets and restore area to original condition.

3.3 SITE ACCESS

A. Ensure ready access to Employer's and its other contractor's (if present) facilities. Do not close or obstruct access road.

B. Control vehicular parking to preclude interference with emergency vehicles, or Employer's operations.

C. No employee or equipment parking will be permitted on Employer's facility outside the specified working area.

3.4 ENVIRONMENTAL CONTROLS

A. Waste Material Disposal:

1. Maintain the areas covered by the Contract free from accumulations of waste, debris, and rubbish caused by construction operations.

2. Provide acceptable containers for collection and disposal of waste materials, debris, and rubbish.

3. Clean site and, at least at weekly intervals, dispose of waste materials, debris, and rubbish to assure that site is maintained free from accumulations of waste materials.

B. Air Pollution and Noise Control:

1. Use proper combustion emission control devices on construction vehicles and equipment.

2. Shutdown motorized equipment when not in use.

3. Trash burning will not be permitted on the construction site.

END OF SECTION

SECTION 02100

SITE PREPARATION

PART 1 GENERAL

1.1 DEFINITIONS

A. Interfering or Objectionable Material: Trash, rubbish, and junk; vegetation and other organic matter, whether alive, dead, or decaying.

B. Clearing: Removal of interfering or objectionable material lying on or protruding above ground surface.

C. Stripping: Removal of vegetation and other organic matter including stumps, buried logs, and roots to a depth no more than 3 inches below grade.

D. Project Limits: Areas, as shown or specified, within which Work is to be performed.

1.2 QUALITY ASSURANCE

A. Obtain Engineer's approval of staked clearing and stripping limits, prior to commencing clearing and stripping.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 GENERAL

A. Clear and strip areas actually needed for Works.

B. Do not injure or deface vegetation that is not designated for removal.

3.2 DISPOSAL

A. Clearing of Objectionable Material:

1. Dispose of objectionable material offsite.
2. Burning of any material onsite will not be allowed.
3. Limit offsite disposal of objectionable material to locations that are approved by local authorities.

B. Strippings:

1. Dispose of strippings that are unsuitable for topsoil as approved by Engineer
2. Stockpile topsoil on site within specified work area.

END OF SECTION

SECTION 16210

GENERATOR

PART 1 GENERAL

1.1 Provide generator new and to the best industry standard of construction and design and as intended.

1.2 The engine-generator set shall be suitable for the corrosive area for its installation and shall comply with Section 16926 – CORROSION INHIBITING REQUIREMENTS in addition to these specification requirements.

1.3 SUBMITTALS: The submittals shall include:

A. Specification sheets showing all standard and optional accessories to be supplied.

B. Schematic wiring diagrams.

C. Dimension drawings locating accessories, anchor bolt and mounting dimensions, fuel, exhaust and cooling piping connections.

D. Interconnection diagrams identifying by terminal number, each required interconnection between the generator set, the transfer switch, and the remote annunciator panel if it is included elsewhere in these specifications.

E. Current applicable literature completely describing the engine generator set.

F. Furnish the following information:

1. Engine Manufacture.
2. Number of cylinders/inline or vee.
3. Bore and stroke/piston speed @ rated rpm.
4. Displacement in cubic inches.
5. Brake Mean Effective Pressure (BMEP) @ rated capacity (KW).
6. Generator Capacity (prime duty) in KW, KVA and power factor.
7. Temperature rise rating of generator.
8. Type of generator exciter.
9. Certified engine horsepower at the ambient temperature and elevation.

1.4 QUALITY CONTROL: All tests shall be performed in accordance with the following test methods: IEEE 115 or MIL STD 705 and any other applicable standards. The certified test of the engine-generator shall be provided. The factory tests shall include but not limited to the following:

A. Product Testing: The following shall be included:

1. Single-step load pickup
2. Transient and steady-state governing
3. Safety shutdown device testing
4. Voltage regulation
5. Rated Power @ 0.8 PF
6. Maximum Power

B. Prototype Testing: Conducted on preproduction models which will not be sold, and consisting of the following:

1. Maximum Power (kW)
2. Maximum motor starting kVA
3. Governor speed regulation
4. 3-phase short-circuit test
5. Alternator temperature rise per NEMA MG1-22.40
6. Harmonic analysis and waveform deviation
7. Endurance
8. Voltage regulation and transient response
9. Fuel consumption

1.5 WARRANTY: The generator set shall be guaranteed against defective material and workmanship for one year from date of start-up with optional warranties of 2, 3, and 5 years available.

1.6 MAINTENANCE:

A. The generator set manufacturer and its distributor shall maintain a 24-hour parts and service organization with 24-hour parts availability.

B. The provider shall be regularly engaged in a maintenance contract program to perform preventive maintenance and service on equipment similar to that specified.

C. A service agreement shall be available and shall include system operation under simulated operating conditions, adjustment to the engine-generator set and switchgear controls as required, and certification in the owner's maintenance log of repairs made and proper functioning of all systems.

1.7 DEFINITIONS:

A. NEMA - National Electrical Manufacturer’s Association

B. IEC - International Electrotechnical Commission

C. UL - Underwriters Laboratories

D. NEC - National Electrical Code

E. NFPA – National Fire Protection Association

PART 2 PRODUCTS

2.1 Generator shall be 480V, 3ϕ, 4-wire, 60Hz, mounted on a skid base.

2.2 Export packaging as required.

2.3 Generator shall have a 3-pole circuit breaker sized in accordance with the emergency backup power requirements and with the intent to protect the feeder conductors.

2.4 PROTECTION:

A. Shutdown: As a minimum, the following faults shall shutdown the generator and alarm:

1. Low oil pressure
2. High coolant temperature

3. Overspeed
4. Fail to crank
5. Overcrank

B. Alarm: A normally closed contact shall open on any alarm for annunciation to other control systems. As a minimum, the following shall be alarmed on the operator display in addition to any warnings:

1. Low oil pressure
2. High coolant temperature
3. Oil pressure signal failure
4. Temperature signal failure
5. Low fuel level

2.5 RATINGS: Rated ambient temperature up to 104° F and elevations up to 1,000 ft.

A. Rated for providing standby and/or prime power

B. Power Factor: 80% minimum

C. Load Starting: Able to start motor loads with a kVA inrush of not less than 200% of nameplate kVA.

D. Voltage Regulation: ± 2% of nominal at 0-100% rated output with a constant load.

E. Frequency Regulation: Isochronous under varying loads up to 100% load with a random variation of ± 0.5% of mean value from 0 – 100% load.

F. Total Harmonic Distortion (THD): Less than 5% for linear loads.

G. Telephone Influence Factor (TIF): Less than 50 per NEMA MG1-22.43

H. Telephone Harmonic Factor (THF): Less than 3

I. Single-step, full load pick-up in compliance with NFPA 110.

2.6 FUEL TANK:

A. Provide above-ground (sub-base) dual wall fuel tank (fuel capacity no less than 1,000 US gallons), which shall be UL Listed as secondary containment generator base tank and meet the requirements of UL142.

B. Normal venting shall be sized in accordance with the American Petroleum Institute Standard No 2000, Venting Atmospheric and Low Pressure Storage Tanks. A 1 -1/4" atmospheric mushroom cap shall be furnished.

C. The emergency vent opening shall be sized to accommodate the total capacity of both normal and emergency venting and shall be not less than that derived from NFPA 30, table 2-8, and based on the wetted surface area of the tank.

2.7 ENGINE:

A. 24-volt, two-wire, local/remote starting

B. Local emergency stop button with one set of jumpered dry contact for installation of emergency stop button.

C. Critical grade stainless steel exhaust silencer with exhaust piping package for indoor installation.

D. Water cooled to operate at not less than 120° F ambient

E. No. 2 diesel fueled

F. Dry-element air cleaner with restriction indicator

G. Forged steel crankshaft and connecting rods

H. Cast iron block

2.8 ALTERNATOR:

A. Class H insulation per NEMA MG1 - 1.65

B. Surge protection for rectifier diodes

C. Temperature rise per NEMA MG1 – 22.40 and IEEE 115

D. Anti-condensation heater

E. The generator shall be inherently capable of sustaining at least 250% of rated current for at least 10 seconds under a 3-phase or single-phase short circuit.

2.9 UNIT MOUNTED RADIATOR:

A. A unit –mounted radiator shall be furnished with blower (pusher) fan cooling.

B. Provide air intake louver for cooling and combustion air as intended.

C. Provide air exhaust louver for radiator discharge as intended.

D. The cooling system shall be supplied with corrosion inhibitor and or ethylene glycol base antifreeze.

2.10 INSTRUMENTS:

A. Voltmeter with ± 2% accuracy

B. Ammeter with ± 2% accuracy

C. Battery charging voltmeter

D. Running time meter (hours) – non resettable.

E. Frequency meter with ± 0.5% accuracy

F. Coolant temperature gauge

G. Fuel level gauge

H. Oil pressure gauge

2.11 NAMEPLATE DATA: Shall include manufacturer, frequency, power factor, phases, kW and kVA rating, voltage, full-load amperes, rpm, insulation system class and rated ambient temperature or rated temperature rise, and time rating.

2.12 MANUFACTURERS:

A. Onan-Cummings

B. Caterpillar

C. Kohler

D. IEM/Lee Technologies

E. Supplier approved by Engineer.

PART 3 EXECUTION

3.1 Remove shipping blocks and pins to free up vibration dampeners.

3.2 Mount generator on a concrete pad of suitable size and strength.

3.3 Coordinate with the engine-generator set supplier for installing air intake and exhaust louver/vents, exhaust systems, fuel piping, air vents etc.

3.4 Install generator and fuel tank in accordance with NFPA 30, 37, and 110.

3.5 Pipe venting cap above the highest fill point as a minimum.

3.6 ON-SITE TESTING: Perform an installation check, start-up, and building load test. The Engineer shall be notified of the time and date of the site test. The tests shall include:

A. Fuel, lubricating oil, and antifreeze shall be checked for conformity to the manufacturer's recommendations, under the environmental conditions present and expected.

B. Accessories that normally function while the set is standing by shall be checked prior to cranking the engine. These shall include: block heaters, battery charger, generator strip heaters, remote annunciator, etc.

C. Start-up under test mode to check for exhaust leaks, path of exhaust gases outside the building, cooling air flow, movement during starting and stopping, vibration during running, normal and emergency line-to-line voltage and frequency, and phase rotation.

D. Automatic start-up by means of simulated power outage to test remote- automatic starting, transfer of the load, and automatic shutdown as required. Prior to this test, all transfer switch timers shall be adjusted for proper system coordination. An external load bank shall be connected to the system if sufficient building load is unavailable to load the generator to the nameplate kW rating.

3.7 DOCUMENTATION: Provide documentation (see Section 01300 SUBMITTALS and Section 01430 OPERATION AND MAINTENANCE DATA) including but not limited to the following:

A. Operation and Maintenance Manual

B. As built drawings.

C. Spare parts and materials list

3.8 TRAINING:

A. Provide hands on training session to cover general aspects of operating, maintenance, safety and overview of the engine-generator set.

B. Provide a complete classroom training session for Employer’s personnel that will cover all aspects of engine-generator.

END OF SECTION

SECTION 16921

ENCLOSURES

PART 1 GENERAL

1.1 All enclosures shall meet these requirements unless these conflict with Section 16926 CORROSION INHIBITING REQUIREMENTS, in which case Section 16926 shall take precedence.

PART 2 PRODUCTS

2.1 Enclosures shall be constructed of painted mild steel with a minimum thickness of 12 gauge.

2.2 NEMA 4X enclosures shall be stainless steel, aluminium or fiberglass.

2.3 In no case shall the structural strength of the enclosure be less than required to support the weight of the equipment to be mounted.

2.4 All hinges shall be suitable for the loads to be supported.

2.5 All seams shall be of welded construction and all welds shall be ground smooth.

2.6 A sub-panel shall be provided and mounted inside the enclosures. The enclosure surface and subpanel shall be free of waves and imperfections.

2.7 The front panel shall be designed to support operator controls without incurring permanent or noticeable warping or deflection.

2.8 All enclosures shall be provided with an equipment ground bus with lugs for termination of grounding conductors.

PART 3 EXECUTION

3.1 Door shall be removed to be punched.

3.2 Metal stiffeners shall be added to the doors, if necessary, to support devices and to prevent warping.

3.3 Punches for control devices shall be in accordance with the control devices' manufacturers and shall include necessary keys.

3.4 FINISH:

A. The finish of the enclosures shall be suitable for the environment. All enclosures shall be cleaned and sanded and coated with primer per manufacturer’s specification.

B. After priming, the enclosures shall be spotted and glazed to fill all pits and remove deep scratches.

C. Apply one (1) tack coat and two (2) finish coats of finish paint, per manufacturer’s specification.

D. All finish paint shall be Polyurethane, unless otherwise approved. Follow recommendation of paint supplier to prepare surfaces and apply paint.

END OF SECTION

SECTION 16926

CORROSION INHIBITING REQUIREMENTS

PART 1 GENERAL

1.1 Requirements in this specification shall take precedence over conflicting requirements specified elsewhere.

1.2 This section requires that all enclosures and terminations shall meet these corrosion-inhibiting requirements.

1.3 All control panels shall have NEMA 4X integrity. The panels shall be designed such that the motor control hardware, instrumentation and other electrical components shall be isolated and protected from corrosion.

PART 2 PRODUCTS

2.1 The enclosure shall meet NEMA 4X requirements.

2.2 All parts not completely enclosed by a NEMA 4X enclosure (switches, pushbuttons, pilot lights, etc.,) shall be NEMA 4X quality.

2.3 Enclosures with vents installed shall meet NEMA 4X requirements apart from the vent, which shall meet NEMA 3R requirements. Vented enclosures shall be used only to relieve corrosive gases accumulations or to reduce temperature. They shall not allow corrosive gases to come in contact with any electrical component except terminations. Electrical components, other than terminations that are housed in vented enclosures shall be separately housed in sealed enclosures.

2.4 Molded case circuit breakers shall be used instead of fuses for short-circuit protection and ground fault protection of all motors unless otherwise noted.

2.5 Motor starters shall be NEMA rated with eutectic alloy overloads from Allen-Bradley or equivalent manufacturer approved by Engineer. IEC rated motor starters and bimetallic thermal overloads are not acceptable.

2.6 Conductors shall be tinned copper, THWN, 600V. Control circuits conductors may be 300V multi-conductor cable provided the conductors are no smaller than #18AWG and are tinned, and are approved by Engineer. Where multi-conductor cables are used between enclosures inside vented enclosures, they may be run without conduit provided NEMA 4X gland seals are used where the cable enters an enclosure.

2.7 Terminals for control shall be nickel-plated by Phoenix or equivalents approved by Engineer.

2.8 Terminals for power shall be tin-plated copper, NEMA style by Allen Bradley or approved equal by Engineer.

2.9 Selector switches, pushbuttons, pilot lights and all other operator controls shall be heavy duty NEMA 4X, Allen Bradley or equal approved by Engineer. They shall have sealed contacts for Division 2 hazardous locations to prevent infiltration of corrosive gases.

2.10 Control relays shall be solid state.

2.11 Conduit shall be non-metallic PVC schedule 80 plus manufactured by Carlon or approved equal.

2.12 Where conduit enters or exits enclosures, provision shall be made using galvanized steel conduit nipples or other appropriate corrosion resistant fittings to provide a connection to rigid steel conduit used outside the enclosures.

2.13 Use silicone sealing compound to seal conduit.

2.14 Legend plates for all selector switches, pushbuttons, and pilot lights shall be NEMA 4X, engraved laminated plastic.

2.15 All incidental hardware required to assemble the enclosures shall be non-metallic or stainless steel. Carbon steel screws and bare copper bus bars are not acceptable. All bare copper must be nickel plated and any exceptions shall be brought to Engineer's immediate attention.

2.16 Cortec VCI Emitters and VCI-236 Electrical Spray shall be used for corrosion protection of devices mounted inside the enclosure. Confirm in writing that components will not be negatively affected by the use of these chemicals. The Contractor, at no cost to the Employer, shall replace any component damaged in the first year of use by these chemicals.

2.17 The products shall meet the requirements intended by the Specifications.

PART 3 EXECUTION

3.1 All wiring shall be neatly bundled, routed with right angle bends, and secured with plastic ties or run in wireway. Wireway shall be used on subpanels.

3.2 For corrosion prevention, all wires shall be dipped in Burndy Penetrox-E before placing under any terminal.

3.3 All current carrying parts including electronic boards shall be sprayed with Cortec VCI-236 Electrical spray after assembly.

3.4 All enclosures shall have Corrosion Inhibiting Emitters installed and spare Emitters stored in their original packages.

3.5 Conduits from field devices shall be properly sealed with silicone sealing compound to prevent the entry of corrosive gases.

END OF SECTION