

# K H A T



project management group

## PROJECT CHARTER

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### MAYARO REVERSE OSMOSIS PACKAGE DESALINATION PLANT

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## *Purpose and Justification*

Water is very important to sustain human life. In Trinidad and Tobago, decreasing the gap between the demand and supply of water because of leakages of the network has proven to be difficult. Alternative ways to increase the supply of water that has been affected by seasonal variation, high per capita demand and increased demand due to economic growth, has to be developed. Rural areas particularly experience severe water shortages such as Mayaro which has a population of approximately 3000 persons of 700 households and 100 business places (CSO, 2000). As a result, the Water and Sewerage Authority has undertaken a project to improve the availability of a reliable supply of potable water to the area, the Authority has embark upon a project to set up a Package Desalination Water Treatment Plant (fully containerized) at Mayaro that will have a proposed production output of 750,000gal/day.

Based on the population statistics and projections, for a steady increase in population growth there would be added pressure on the existing water sources that has already been if full use and a network that is experiencing leakages. Desalination plants are as such more economically feasible, as technology improves, and is currently being used in the following countries: Middle East, Africa, Europe, China, Singapore, United States and many island of the Caribbean. Desalination is an option to provide potable water.

Desalination of sea water for a potable water supply is increasingly being accepted worldwide in areas where demand has increased beyond sustainable supply, where water sources are overextended and climate change is making water supplies unreliable. Desalination can continue to produce water even during periods of low rainfall, which can result in reservoir storage and rivers declining and ground water aquifers dwindling.

TTWS proposes to install a package desalination Plant at Mayaro and has contracted the KHAT Project Management Group to construct, erect and commission a Reverse Osmosis Package Desalination Plant at the said area. This water treatment plant will serve as a measure that can be used in the interim to address the need for an increased level of potable water supply in the Mayaro area.

## *Project Objectives*

To construct, erect and commission a functional (package) Reverse Osmosis Desalination Plant:

- Within a twelve month deadline and TT\$6,000,000 budget and;
- With a guaranteed working life span of 20 years, utilizing anti-corrosive equipment and chemicals.
- To ensure the water quality meets the necessary water quality requirements;
- To meet the project deadline of 1 year;
- To produce potable water with a reliable output of 750,000 gal/day;
- To cause minimal impact to the environment;
- To meet the ISO 9001 Quality Standards.

## *High-level Requirements*

The RO desalination package plant will have the following requirements and desired outcomes:

- Project deadline: 1 year
- Reliable Output: 750,000 gal/day
- Minimal impact to the environment
- ISO 9001 Quality Standards

## *High-level Project Description*

- Business needs: water for a population of approximately 3000 persons. For commercial and residential purposes.
- Deliverables (project needs and requirements):
  - Review of detailed engineering drawings of foundations, tanks and feed waste and product piping;
  - Production of potable water according to the WHO water quality standards;

- Production of water supply five (5) days a week;

### **Assumptions**

- Minimal residential areas nearby to be affected by noise pollution and project works
- Desalination plant has acceptance by neighbouring communities
- Water quality at intake is suitable (e.g not high in iron etc increase chemical usage)
- Feasibility study takes into consideration impact on wildlife and marine life
- Environmental Management Authority and Town and Country Planning regulations and law requirements are met
- Geography and topography are suitable for the construction and erection of various structures at a reasonable cost.

### **Dependencies**

- Accessibility
- Payment schedule
- Site clearing
- Proximity to power supply grid
- Obtaining approvals
- Supplier (supplying desalination plant on time)
- Feasibility study (proper location)

### **Constraints**

- Time: weather patterns (rainy season)
- Availability of specialized labour
- Financial resources
- Proximity to a suitable salt water intake

## *Project Scope*

This containerised reverse osmosis desalination plant will be the first of its kind in Mayaro. This proposed plant will have with a capacity of supplying 750,000 gallons of potable water per day with its first delivery by the first quarter of 2012. The plant will ensure a reliable, flexible, efficient, cost effective and consistent supply of drinking water to the residents and businesses alike of Mayaro. This project will allow for a water supply independent of rainfall as well as intake from the Mayaro River and Navet Reservoir. The water produced from this reverse osmosis desalination plant will be of the highest quality in adherence to the World Health Organisation's set standards. The proposed containerised desalination plant has a modular design comprising of two 40-foot containers with each housing a separate part of the plant, this feature enables easy transport and installation in a much shorter period of time as opposed to the building of a desalination plant. The containerised modular design also guarantees protection from the elements of the weather. There will be long tunnels for intake and outlet to protect the coast and beach as well as four storage tanks.

TTWS has sub-contracted KHAT to for the construction, erection and commissioning phase of the project of the package desalination plant. In this respect, the project scope entails:

- The review of detailed engineering drawings of foundations, tanks and feed waste and product piping.

### **Construction**

Mobilization

Foundations for treatment units

Tanks and equipments foundation

Road and fence within treatment plant boundary

### **Erection**

Pretreatment units

Two stage RO units

Intake works

Piping and valves

Final Water storage and pump stations

Brine disposal

Electrical switchgear and control panel

Instrumentation

Standby power generation units

PLC/SCADA equipment

### **Test and Trial**

Tank Hydraulic Test

Pre-Treatment Checks

Test Trial Run of RO

Commissioning

## Project Schedule

Task Name	Duration	Start	Finish
<b>Mayaro Reverse Osmosis Package Desalination Plant</b>	<b>200 days</b>	<b>Mon 30/05/11</b>	<b>Fri 02/03/12</b>
<b>Construction Phase</b>	<b>60 days</b>	<b>Mon 30/05/11</b>	<b>Fri 19/08/11</b>
Review TTWS Engineering Drawings	5 days	Mon 30/05/11	Fri 03/06/11
Mobilization	5 days	Mon 06/06/11	Fri 10/06/11
Container Foundations	2 mons	Mon 13/06/11	Fri 05/08/11
Tanks, Storage and other Foundations	2 mons	Mon 13/06/11	Fri 05/08/11
Road and Wirewall Fences	2 wks	Mon 08/08/11	Fri 19/08/11
Construction Phase Complete	0 days	Fri 19/08/11	Fri 19/08/11
<b>Installation Phase</b>	<b>100 days</b>	<b>Mon 22/08/11</b>	<b>Fri 06/01/12</b>
Pre-treatment Units	2 wks	Mon 22/08/11	Fri 02/09/11
Two Stage Reverse Osmosis Units	2 wks	Mon 05/09/11	Fri 16/09/11
Intake Works	3 wks	Mon 22/08/11	Fri 09/09/11
Piping and Valves	1 mon	Mon 12/09/11	Fri 07/10/11
Final Water Storage and Pumping	2 mons	Mon 22/08/11	Fri 14/10/11
Brine Disposal	2 mons	Mon 22/08/11	Fri 14/10/11
Electrical Switchgear and Control	2 mons	Mon 22/08/11	Fri 14/10/11
Instrumentation	3 mons	Mon 17/10/11	Fri 06/01/12
Standby Power Generation Units	3 wks	Mon 17/10/11	Fri 04/11/11
PLC/SCADA Equipment	3 mons	Mon 17/10/11	Fri 06/01/12
Installation Phase Complete	0 days	Fri 06/01/12	Fri 06/01/12
<b>Test and Trial</b>	<b>40 days</b>	<b>Mon 09/01/12</b>	<b>Fri 02/03/12</b>
Tank Hydraulic Test	1 mon	Mon 09/01/12	Fri 03/02/12
Pre-treatment Checks	1 mon	Mon 09/01/12	Fri 03/02/12
Test Trial of Reverse Osmosis	1 mon	Mon 06/02/12	Fri 02/03/12
Commissioning	0 days	Fri 02/03/12	Fri 02/03/12

## *Budget Summary*

Fixed Cost	\$324,104.00
Material Cost	\$4,990,670.00
Contractor Costs	\$116,966.00
Prime costs and Provisional Costs (5% of \$6 mill)	\$300,000.00
Estimated Total Project Cost	<b><u>\$5,731,740.00</u></b>

## *Project Acceptance Requirements and Criteria*

Upon completion TTWS will assume control of the project based on the following criteria:

- Contract: Ad-measurement contract
- Materials
- Dimensions
- Electrical Connections
- Access Roads to plant
- Internal roads to support plant operations
- Piping and equipment specs
- Emergency alarms
- Storage facilities

*Project Manager*

*Approval*

## *Project Authorization*

### **FOR OFFICIAL USE ONLY**

Sponsor:

Approved By:

Date:

Project Manager's Name:

Project Manager's Signature:

Date: