A photograph of a water treatment facility. In the foreground, a large circular floating platform with mechanical equipment is on a body of water. In the background, there are metal walkways and railings. The sky is blue with some clouds.

water world

A QUARTERLY PUBLICATION OF THE WATER AND SEWERAGE AUTHORITY OF TRINIDAD AND TOBAGO

ISSUE 4

AROUND THE WORLD,

78 

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CONTENTS

ISSUE 4

Cover Image - Warren Bourne
Beetham Wastewater Treatment Plant

- 03. Message from CEO
- 08. IDB Funded Wastewater Expansion and Rehabilitation Programme – to help safeguard the Environment
- 11. Sustaining the New Customer-Centred Business Model
- 17. Sustaining 24/7 in Tobago's Water Sector
- 19. Corporate Governance Improvement and Corporatisation Plans
- 20. Introducing Emerging Technologies at WASA
- 22. WASA Launches Online Bill Payment Service
- 23. Building Capacity in the Water and Wastewater Sector
- 26. Dry Spell Conditions in Southern Caribbean and Future Outlook
- 29. Know Your Internal Auditors
- 32. Benefits of Good Health and Safety Management
- 34. WASA Plays major Role in Solomon Hochoy Highway Extension to Point Fortin
- 39. Public Education Critical to WASA's 24/7 Plans
- 43. WASA Sports & Cultural Club Hosts Fellow Caribbean Utilities Employees

Feature
p:04




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MESSAGE FROM THE CHIEF EXECUTIVE OFFICER



Gerard Yorke
Ag. Chief Executive Officer

In the few months since our last publication, much has occurred in the sector and WASA, as we continue to strive toward achieving our mandate of **'water security for every sector' and the goal of being 'the best performing utility in this hemisphere'**. These pursuits are predicated on the Authority's four developmental pillars of Human Resource Development; Customer Care; Revenue Enhancement; and Cost Optimisation.

A look at this fourth issue of Waterworld through the lens of the above-mentioned pillars, reveals a few of the major strides made in these areas, as we continue on course to fulfilling our mandate and goal. Some of these include efforts to maintain our new customer centred business model, even as we move to meet and sustain 24/7 service delivery, in Tobago in the first instance and then Trinidad. We have also been moving to build capacity in the sector through a partnership with the National Training Agency that is positioned to have a regional impact.

WASA has also made it easier for customers to pay their bills and transact business with us through the launch of a new Online Bill Payment System. While, progress with the Inter-American Development Bank funded Wastewater Rehabilitation Programme, will not only have a positive impact on the environment and public health, but also broaden the Authority's customer revenue base in relation to seweraged customers. Furthermore, we are accomplishing greater cost and production optimization through a clearly defined audited approach, as well as through the introduction of new technology that has enhanced some of our key business practices.

While this publication provides some insight into the many developments taking place in WASA and the sector, it is also important for readers to be cognizant of the challenges that form the backdrop of these developments. One such challenge has been the changing weather pattern that has been adversely impacting water resources availability. The harsh 2014 Dry Season, which was followed by a Dry Spell that persisted into what should be our Rainy Season, is a most recent example.

Approximately 58% of WASA's water is derived from surface water sources such as rivers and reservoirs; and in some instances water treatment plants supplied by these sources were impacted by as much as 50%. This led to the implementation and adjustments to water schedules in order to ensure that all our customers were able to receive an adequate supply to meet their needs. This also meant that some of the progress made toward achieving our 24/7 goal, had to be temporarily curtailed, as new scheduling systems were implemented.

The weather phenomena, for which we have no control, points to the importance of having redundancy in our water delivery systems. This has received active consideration and as we move toward accomplishing full 24/7 delivery in Tobago firstly, measures such as the introduction of more ground water sources, are already being employed to sustain this service even during the Dry Season and peak visitor periods. Likewise in Trinidad, projects such as the current Caroni South Truck Main Dualling Project, drilling of new wells and the installation of new service reservoirs, are some of the measures that will assist in achieving sustainability of supply during times of adverse weather.

It is my hope that this publication will provide a greater appreciation of the advances being made by WASA as we diligently pursue our mandate of **'water security for every sector' and the goal of being 'the best performing utility in this hemisphere'**.



A QUARTERLY PUBLICATION OF THE WATER AND SEWERAGE AUTHORITY

ISSUE 4

Publisher

Water and Sewerage Authority
of Trinidad and Tobago

Editor

Daniel Plenty
Senior Manager Corporate Communications

Contributors

Doodnath Bohola
Director Customer Care

Ken Mahabir
Director Human Resources

Wendell Diaz
Director Corporate Services

Dion Abdool
General Counsel and Corporate Secretary

Dial Ramkissoon
Head Information and Communication Management

Penelope Williams
Head Internal Audit and Compliance

Denise Lee Sing Pereira
Head Wastewater Projects

Daren Gazez
Head Water Projects

Roger Karim
Head Regulatory Management

Majid Mohammed
Senior Manager Customer Care

Rachel Lewis
Corporate Communications

Lemmy Joseph
Customer Care

Reisha De Gale
Customer Care

Lennon Jones
Sports and Cultural Club

Anthony A. Bagalue
Publisher, CDRM

Proofreading

Gregory Roxborough
Asst. Manager Corporate Communications

Advertising Inquiries

Allysa la Touche
Corporate Communications

Art Direction/ Design

Kenneth Henry

Photography

Warren Bourne
WASA Stock Footage

Printer

Scrip - J

Contact information

Water and Sewerage Authority
of Trinidad and Tobago

Head Office:

Farm Road, St Joseph

Trinidad and Tobago, WI

Ph: 868-662-2302-7 Ext. 2310

Fax: 868-662-8184

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Conversations with Water Leaders:
Indar Maharaj, Chairman, Water and
Sewerage Authority (WASA) and
President, National Gas Company (NGC)
on Trinidad and Tobago's Water
Challenges as an Island Nation

Conversation with Water Leaders

Dialogues with water leaders
to share and co-create solutions

This feature news is part of Singapore International Water Week's (SIWW) series of 1 on 1 interviews with global water industry leaders, **Conversations with Water Leaders**. In this edition, Indar Maharaj, Chairman, Water and Sewerage Authority (WASA) and President, National Gas Company (NGC), shares with OOSKANews correspondent, Renee Martin-Nagle, the water issues of Trinidad and Tobago as an island nation with limited resources, WASA's financial challenges, inefficiencies in the local water sector and more.

Indar Maharaj also spoke about Trinidad and Tobago's desalinated water for industrial use, and the need for more wastewater treatment infrastructure to protect Trinidad and Tobago's ecological environment.

The **Conversations** series is part of SIWW's initiative on practical discussions and solutions. In line with this, Water Leaders Summit will continue to engage policy makers, utilities, governments, industry experts and water leaders with aims to identify and craft solutions to pertinent water issues. Discussions from the **SIWW Water Utilities Leaders Forum** will also be further deliberated at the summit.

Finally, do log onto Virtual Water Expo to view the solutions showcase and keep abreast of the latest products, equipment and services available from global water players!

Thank you for taking time to speak with me. In Trinidad you have two positions – Chairman of the Water and Sewerage Authority (WASA) and President of the National Gas Company (NGC). Are there synergies in having these two positions?



In Trinidad and Tobago there is a clear connection between water and energy. Trinidad is becoming a resource economy, and, if NGC shuts down, then a huge portion of the country also shuts down. So it is important to have water not only for domestic users, but also for customers of the gas company.

“ ... it is important to have water not only for domestic users, but also for costumers of the gas company ”

How does being government-owned affect WASA financially?

The regulatory commission dictates the price of water, which is always less than the operating costs. With low prices and high operating costs, WASA has never been able to be self-sufficient financially. So, at the beginning of the year, WASA goes to the government and asks for money based on projections. The government then gives us what it can afford. When you're in that situation, trying to develop a five-year plan becomes a challenge.

The government contribution for operating expenses doesn't address capex or expansion of the system. That's the challenge of WASA – how do we address the low revenues and high operating expenses, and at the same time put new capital into the business to make it efficient and modern?

Are there plans to bring in private investors?

Private investment would let us grow the Authority and secure water supply. If we are going to attract private sector participation in WASA, we have to enhance revenue, trim costs and improve efficiency. The whole water sector is grossly underdeveloped, and we've had no expansion in the last decade or decade and a half. I can't say that private investment is where we are going, but we want to improve the Authority's financial operation to be ready.

“ If we are going to attract private sector participation in WASA, we have to enhance revenue, trim costs and improve efficiency ”

In order to provide a return on investment, you will probably have to increase tariffs.

The problem is that it is very difficult to increase tariffs if we are not operationally or financially efficient. It's a real conundrum for us. As we improve our operational effectiveness and efficiency, there will be small adjustments in tariff.

Do you have any PPPs at this point?

We have a desal plant that produces around 30 million gallons per day via reverse osmosis. This desal operation could be viewed as a PPP, in the sense that it's owned privately by Desalcott – Desalination Company of Trinidad and Tobago -- and WASA its only customer. Originally, the plant was a joint venture between Ionics and a local entrepreneur. GE bought out Ionics, and recently the local company purchased the GE shares from GE, so now the desal plant is totally a locally-owned, private investment.

Why did you have a need for a desal plant?

In the wet season, we have a lot of fresh water coming from rainfall, but some dry seasons are harsh with no rainfall for months. Therein lies the challenge – how do we make water from the wet season available in the dry season? We have some dams and reservoirs that store huge volumes of water. About 60-70% of our water supply comes from those facilities, but they can't take us fully through a dry season. In that situation, our industrial sector would be in a very insecure position with respect to water. That's where the idea of a desalination plant came from. The desalinated water is really expensive compared to freshwater sources, so the desal water was intended for the industrial sector that is willing to pay a premium for a secure water source. With time, the plant has slowly increased its capacity, and, as extra water became available, we put it into the domestic system.

“ One of them is non-revenue water ... Another is old structure and staffing ”

How do you manage the use of groundwater sustainably?

I must say that the water authority has managed its water resources very prudently. We are very careful about over-producing wells and about replenishing. In fact, at times wells are taken out of service to allow the aquifer to recharge. The rainy season helps us, as well as the actual geology of the island that has blessed us with significant volumes of groundwater. Even so, the temptation to overproduce from groundwater is always there.

With desal, reservoirs and groundwater, do you feel you have an adequate supply for the future?

The island is continuing to grow industrially. Therefore the demand for water will continue to increase, so we will have to look at other sources. In addition, there's a proportion of the population with no piped supply or only a limited supply, so we have to continue to try to serve those persons.

What is your plan to increase domestic supply?

We started off with a 24/2 plan, where anyone not getting water for 24 hours at least 2 days a week would be brought up to that level. Essentially, we achieved that sometime last year. We are now looking at going to five days a week, and of course then to seven days per week.

How do you manage wastewater treatment?

There are only three parts of the island that have centralised wastewater treatment facilities, while these are small treatment plants targeting several real estate developments with 100 families or less. The rest of the island depends on septic tanks. As population density increases, septic tanks could become a threat to the environment and also to our water supplies. So far it hasn't been a problem, but, if we don't start putting the infrastructure in place to collect and treat this waste, we will be in an extremely tenuous situation. Tobago's ecology is very sensitive, and we are also working on a program there.

“ As population density increases, septic tanks could become a threat to the environment and also to our water supplies ”

What are the unique issues you face as an island nation?

As an island nation, financial and other resources can be limited. Second, in an island with an energy-based economy, you are always competing with the energy sector for people; energy pays better so it always gets the best labor. The third thing is technology. We need to be able to switch from older technologies to newer ones before we get into a bottomless pit of inefficiencies. Local content is always an issue. Ideally it would be nice if the money we spend on these projects could remain in the island. However, we don't manufacture steel pipes, valves or pumps. What we have available are labor and energy. Other than that, almost everything has to be imported.

In your 3 years as chair of WASA, are there things that have surprised you?

Well, I will say that I was taken aback by the condition of the business and the systems. Some were very good but some were not what you would expect in a contemporary organization. Also, the customer focus was not there, so that was also a challenge. Another pleasant surprise was WASA's huge asset base – the reservoirs, the piping systems, the pumps and so on, a lot of which are underground and must be maintained and upgraded. In addition, we had people who had worked at WASA for 25-30 years, so they were not aware of other ways of doing business and operations.

Where do you look for ideas?

We look in the private sector and in the energy sector, both here and abroad. Whether it's a petrochemical plant or a water treatment plant, some principles are universal and can be applied to transmission issues.

We have also been talking to international water organizations, like PUB. I was in Singapore in September 2011 for the Singapore International Water Week because I was told so much about the event. When we got there, we were very impressed with what we saw. This led to us engaging PUB to assist us. It's a small island, they are water-deficient, but they use their water efficiently and effectively.

There is also the Uganda water authority, which has a lot of cultural similarities to Trinidad. At one time WASA brought in an English company, but what works there may not necessarily work in Trinidad because of cultural differences.

“ It's (Singapore) a small island, they are water-deficient, and they use their water efficiently and effectively ”

What about recycling water?

The largest plant in Trinidad will be able to produce 10-12 million gallons per day of recovered, recycled water. We are considering using that water in the industrial sector. For cultural reasons, it's difficult to explain to people that we are not putting it into the domestic water system. But for the industrial plants, the desal water will be displaced by recycled water, which will then go to the domestic system.

How do you address demand?

We use the media, and we educate through the schools. For example, we have a WASA school competition where students in secondary schools participate in a televised competition based on water. The competition generates a huge amount of excitement. Right now we're targeting secondary schools – children between 15 and 17 – and we are hoping to roll out another program next year that will target children in elementary schools between 7 and 11.

What final message do you have for our readers?

In a society like ours where water is not easily available, we need to appreciate that we have to control demand. If we do not address the demand side of the business, I think we will never be able to solve the problems.

Courtesy: Singapore International Water Week 2014 online publication.



Denise Lee Sing Pereira
Head Wastewater Projects



The recently completed access road and bridge to the San Fernando Wastewater Plant.

IDB Funded Wastewater Expansion and Rehabilitation Programme – to help safeguard the Environment

In a previous issue of the Waterworld publication readers were informed of major capital investment into the wastewater sector in Trinidad and Tobago. This capital investment relates to an IDB funded Wastewater Rehabilitation Programme that aims to commitment to safeguard the environment by curbing the uncontrolled discharge of wastewater into catchments in Malabar, San Fernando and Maloney.

At present, the Wastewater Projects Unit (WWPU) under the leadership of the Director Programmes and Change Management is implementing various Inter-American Development Bank (IDB) initiatives, including two (2) multi-million dollar loans and grant funding under two (2) Technical Co-operations. This second article is geared toward capturing the ongoing works heralded by the signing of Loan No. 2890/OC-TT (TT-L1026) Multi-Phase Wastewater Rehabilitation Programme – Phase 1 valued at US \$246,500,000.00 and Loan No. 2600/OC-TT (TT-L1018) Wastewater Infrastructure Improvement Programme valued at US \$50,000,000.00.

These two loans combined are expected to increase wastewater coverage in Trinidad and Tobago by 18%. Phase 1 Works in the

Malabar is estimated to benefit a population of 108,630, with 12km of new sanitary sewer pipes and 180 new service connections. Works in San Fernando will include installation of 21km of new sanitary sewer pipe and 140 new service connections that is expected to benefit 111,600 persons.

Loan No. 2890/OC-TT (TT-L1026) Multi-Phase Wastewater Rehabilitation Programme – Phase 1

San Fernando

The existing San Fernando Wastewater Treatment Plant and associated wastewater collection system, built in the 1960's, was originally designed to treat 20 million litres per day (ML/d), while a receiving station was built in the 1980's. Since then, major growth and development in the San Fernando catchment area has created a need for an expanded system that can cope with both current and future wastewater treatment requirements. Several privately-owned packaged wastewater treatment plants have emerged over the years, but most are not properly maintained and the majority are either not functioning or partially functioning. As a result, the city's waterways are being polluted by untreated or partially treated wastewater.

Cleaner water entering the environment would also promote healthier surroundings and improvements in the quality of life for not just the flora and fauna but for humans



San Fernando WWTP site

The projects to be executed under this programme, are expected to improve the wastewater sector in San Fernando and environs, with the expansion of the sewered area and improvement in the level of wastewater treatment. The intended result would be an integrated and centralized wastewater system that provides cost-effective, sustainable, high quality wastewater treatment for the San Fernando catchment area.

The project area has been divided into the following sub-catchments based on natural topography, drainage and physical boundaries:

- Marabella
- Tarouba – Cocoyea
- Cocoyea South
- Pleasantville – Corinth
- Vistabella – Gulf
- San Fernando South
- Ste. Madeline
- Bel Air – Gulf View
- Green Acres
- Duncan Village
- Union Hall
- Retrench – Golconda
- La Romain North
- La Romain Central
- La Romain South
- Palmiste

The proper collection, treatment and disposal of wastewater from the above-mentioned areas is anticipated to have a positive impact on the surrounding environment, in particular the Guaracara, Marabella, Vistabella and Ciperu Rivers. The public health risk associated with the untreated or poorly treated discharges from existing plants would also be significantly reduced for the city of San Fernando. Another potential benefit of this project is the possible reuse of up to 45ML/d of high quality effluent which can be suitable for irrigation and industrial uses.

Malabar

Over in North-East Trinidad, the 2,766 hectare Malabar catchment has a resident population of 69,687 (recorded in 2005), with a projected population of 108,630 inhabitants by 2035. The existing Malabar Wastewater Treatment Plant was built in 1983 with a designed capacity of 5,400m³/day. At present, approximately 29% of the population in the Malabar catchment have access to sewerage facilities, with the majority of the existing systems either abandoned or in a state of disrepair.

Under the IDB loan arrangement, the project area has been divided into thirteen sub-catchments, which splits the 2,766 hectare catchment into manageable areas, based on the natural topography, drainage and physical boundaries. The sub-catchments are as follows:

- Calvary Hill
- Mausica/Olton Road
- Cleaver Road/Andrews Lane
- Lower O'Meara Road
- Arima Proper
- Mt. Pleasant/Maturita
- Upper Pinto Road/ Gills View
- Upper Malabar/Tumpuna Road
- Upper O'Meara Road
- Santa Rosa East/West
- Malabar
- Peytonville/Caparo
- La Horquetta/Greenvale

The project in Malabar will entail the construction of a new conventional activated sludge plant, south of the existing plant; while the current Arima Wastewater Treatment Plant will be decommissioned. This new plant will be able to treat wastewater from all existing treatment plants in the catchment area, as well as, the un-sewered portions of the catchment. The treated effluent will be discharged into a creek which drains into the Mausica and then Caroni Rivers.

The construction and commissioning of this treatment plant and collection system, will significantly contribute to the protection of water resources from the potential transmission of water-borne diseases, since a much cleaner effluent will be entering the waterways.

Progress to Date

On Wednesday February 19, 2014, WASA accomplished a major milestone in the implementation of Loan 2890/OC-TT, when the tender - MULTI-PHASE WASTEWATER REHABILITATION PROGRAM – PHASE I, was closed. This tender, is the major component for the IDB Loan 2890/OC-TT valued at US \$246.5 Million. Upon completion of tender evaluation, major international contractors in the wastewater sector will be engaged with an estimated combined contract valued at US \$210 Million or approximately TT \$1.35 Billion, over the next five (5) years. In stark comparison, the entire Public Sector Investment Programme (PSIP) allocation for WASA for



2013/2014 is only US \$31 Million or TT \$200 Million.

It is noteworthy that this tender represents the largest single tender ever evaluated in the history of WASA. This is likewise a historic package of works, as it represents the major component of the largest single IDB Loan ever provided in the English Speaking Western Hemisphere. Additionally, it is the largest ever single investment in Trinidad and Tobago's wastewater sector.

Works on the access road and bridge which is a prerequisite to the works at the San Fernando Wastewater Treatment Plant has been completed.

Institutional Strengthening

In addition to the works delineated above, Component II of Loan 2890/OC-TT aims to implement key actions to improve WASA's corporate governance such as:

- Development of comprehensive corporate governance policies;
- Improvement of the current information management policies and disclosure practices;
- Training on risk management and control systems; and
- Establishment of a permanent financial statements team to strengthen auditing and internal control practices.

Furthermore, Component II of the loan also aims to implement key actions to improve commercial management services (including the purchase, installation, integration and implementation of a new billing system); and fund training activities on contract management of outsourced operations, operation and maintenance, and environmental management.

Loan No. 2600/OC-TT – WASA Modernization and Wastewater Infrastructure Rehabilitation

Maloney

WASA has also received funding from the IDB for interventions in the Maloney Catchment. The Maloney Sewerage Catchment is a high population density urbanized area spanning 924 hectares, from the Caroni plains to the foothills of the Northern Range.

Consisting mainly of residential buildings, the Maloney area is surrounded by cultivated lands, pastures and secondary forests, which contain a wide range of flora and fauna, including woody forested areas, fruit trees, 31 species of birds and aquatic macro-fauna in the streams.



The catchment has 10 wastewater treatment facilities that treats wastewater from the following areas:

- Maloney Gardens;
- Piarco Old Road
- Development bounded by Piarco Old Road, Priority Bus Route, Eastern Main Road & La Resource Road South
- Timberland Park Development
- La Florissante
- Lillian Heights
- Arima Old Road
- Lynton Gardens
- Bregon Park
- Signature Park

Similar to the other catchments mentioned above, over the years, these facilities have either been abandoned or are only partially functioning, which results in the discharge of poorly or untreated wastewater into the environment.

Under Loan 2600/OC-TT, the existing Maloney Wastewater Treatment Plant (WWTP) will be rehabilitated and expanded to accommodate the flows originally treated by the aforementioned smaller WWTPs, as well as provision for future growth. The upgraded Maloney WWTP will utilize some of the structures at the existing Maloney Gardens WWTP, which will be expanded. In addition, the following works are to be carried out:

- (i) Bregon Park, Lynton Gardens, Lillian Heights, La Florissante and Timberland WWTPs will be decommissioned and converted to sewage lift stations;
- (ii) A new system of sewer mains will be constructed to convey waste water from these plants to the Maloney WWTP;
- (iii) Flow from the existing lift stations at Santa Monica and La Resource will be routed into the new sewer mains.

The implementation of a functional wastewater treatment system would ensure reduction or prevention of untreated effluent from entering into the environment. This increases the amount of raw water available for treatment and use and decreases risk of water-borne diseases, which may be transferred via aquifers, water streams in the surrounding area and water used for irrigation in agriculture. The cleaner water entering the environment would also promote healthier surroundings and improvements in the quality of life for not just the flora and fauna but for humans who depend on its use.



Doodnath Bhola
Director Customer Care

Sustaining the New Customer-Centred Business Model

The Water and Sewerage Authority (WASA) operates in a rapidly changing environment, which is ripe with investment and business expansion opportunities, developing economic zones, as well as evolving environmental and social systems. The Authority's Management Team is fully cognizant of the need for the organisation to be customer-centred in its focus since water is a critical component in the foundation of Trinidad and Tobago's economy.

As the Authority works toward attaining the goal of becoming the best performing utility in the hemisphere, it has been pointed in its efforts to steadily improve the level of its customers' satisfaction throughout Trinidad and Tobago. In order to track and measure these improvements, the Authority commissioned a customer satisfaction survey in 2013, conducted by HHB & Associates, which provided an update on the last poll done in 2008.

The following table highlights the Authority's scorecard in 2013, in relation to five key performance areas, compared to previous scores obtained in 2008:

Water Supply	Delivery of a consistent 24/7 water supply.	50% of our customers now receive a 24/7 water supply, up from 18% in 2008.
Corporate Image	How customers view WASA as a good corporate citizen.	49.25%, up from 42.5% in 2008.
Overall Quality of Service	Dependability of our water supply.	65%, up from 54% in 2008.
Overall Satisfaction	Satisfaction with all our services.	69% up from 55% in 2008.
Staff & the Customer Service Experience	Enhancement of the Customer Service Experience	67%, up from 61% in 2008.

Customer Care Training

Possessing a workforce at all levels that is trained and committed to delivering on the principles of good customer care, is a critical component in the Authority's drive to improve its level of customer satisfaction. To this end, in 2013 the organisation exposed all its managers, frontline staff, pipeline maintenance and pipe laying crews, as well as contractors, who have direct interaction with customers, to a specially developed Customer Care Training Programme. With this training all of our staff are now better equipped to lead the customer care turnaround at WASA.

WASA launched its Online Payment Service, taking away the need to face traffic and join lines to perform this simple task



L-R Doodnath Bhola, Director, Customer Care; Martin "Terry" London, Chairman, Sangre Grande Regional Corporation; Dr. The Honourable Rupert Griffith, Minister of Science and Technology and Member of Parliament for Toco/Sangre Grande; The Honourable Collin Partap, Member of Parliament for Cumoto/Manzanilla; Senator the Honourable Ganga Singh, Minister of the Environment and Water Resources; and Gerard Yorke, Acting CEO, WASA, cut the ribbon to officially open the Sangre Grande Customer Service Center on Wednesday 5th February 2014.

Decentralisation of Services

The Authority has developed a decentralised approach to the delivery of services with the aim of bringing access to those services closer to our customers. In this regard, the number of Customer Service Centres has been expanded from nine to eleven, with the opening of two new centres in Trincity and Sangre Grande. Aside from this, the capacity at our regional centres has been increased in order to provide customers with the same services available at our Head Office.

In an effort to make doing business with the Authority more convenient, some of our major Customer Service Centres, such as St. Joseph, Port of Spain, Chaguanas and San Fernando, are now open on Saturdays to cater to our customers, who may have difficulty accessing our services during the normal work week. Coupled with this, in June 2014, WASA launched its Online Payment Service, which can be accessed through our website at www.wasa.gov.tt/WASAPaymentPortal. This new service, allows customers to pay their WASA bills at their own convenient locations, taking away the need to face traffic and join queues to perform this simple task.

Customer Engagement

WASA's customer centred approach has also seen the Authority utilizing new innovative ways of engaging customers to partner with us to achieve certain goals and functions. To this end, the Authority has carried out three customer engagement campaigns that have successfully contributed to the organization's revenue collection, leak detection and repair, as well as the promotion of water conservation.

The first was the Report A Leak Promotion that ran from July – September 2013. This campaign assisted the Authority immensely in its bid to identify and repair leaks along the pipeline network, as customers were encouraged to report leaks via telephone, Facebook or twitter, with the incentive of weekly prizes for the most verified leaks reported; while weekly winners had the further opportunity of winning the grand prize for the most leaks reported throughout the promotion.

This was followed by the Pay Your Bill Promotion, which took place from October – December 2013. This promotion engaged customers from the perspective of providing the opportunity for recognition and reward to those loyal customers who paid their WASA bills at least two payment cycles in advance. This exercise not only assisted WASA with its revenue collection drive, but also encouraged and showed appreciation to customers who are faithful to upholding the requirement of paying their WASA bill in a timely manner.

The third and most recent customer engagement campaign was the Water Conservation Radio Promotion that ran between March and May 2014. Reduced rainfall and extended dry periods during the Dry Season usually means less run-off into our rivers and reservoirs, which ultimately impacts production levels at WASA's surface water treatment plants. It is therefore important for customers to employ prudent water use habits, particularly during this period.

With this in mind, the Water Conservation Radio Promotion ran during the driest months of our Dry Season i.e. March to May. The promotion was used to build awareness of proper water conservation habits, as customers called into select radio stations with examples of measures they used to conserve water. The conservation message was therefore delivered by our customers.

Social Media

In our bid to become more customer centred, WASA has developed a strong social media presence, utilizing platforms such as Facebook, Twitter, Youtube and the company's website. This has provided additional mechanisms for the Authority to disseminate valuable information to customers, as well as other avenues by which customers can communicate problems or challenges they may be facing concerning their WASA service. With over 50,000 likes since its launch in April 2013, WASA's Facebook presence in particular has been a regular hive of activity. This is evident by the regular postings from the Authority on service related information, ads, promotions and campaigns; while customers frequently use this mechanism to inform the company of leaks and other service issues, which are addressed and feedback provided to the customer.

The above-mentioned measures have been instrumental in WASA's thrust to not just become more customer centred, but also to sustain this focus as a new business model approach for the organisation.

New Sangre Grande Customer Service Centre located at River Street, Sangre Grande.



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Raffie David
Head Tobago Affairs

Sustaining

24/7

in Tobago's Water Sector

Tobago has become a definitive vacation location for both foreigners and locals alike. For locals from Trinidad, it seems like Tobago has become overwhelmingly popular as a leisure destination during holidays and long weekends in particular.

Over the years, the island has been attracting many visitors to its Annual festivals and events such as the Great Race, Tobago Jazz Experience, Blue Food Festival and Heritage Festival. According to the Tobago House of Assembly, Tobago received over one million visitors to the island in 2013. But how does this high number of visitors impact the water supply?

Head Tobago Services, Raffie David, has stated that the heavy visitor influx often puts the water distribution system under pressure to meet the burgeoning demands during these periods, since the demand for water increases by as much as 50%, particularly on the South Western side of the island.

Existing Initiatives

Currently, 70 percent of customers in Tobago receive a water supply 24 hour, 7 days a week (24/7). This is up 43 percentage points from the mere 23% of customers on the island that received a 24/7 supply in 2010.

According to Mr. David, WASA embarked on a number of key projects, which resulted in improvement to system pressures and service levels to customers. He outlined that areas such as Castara, and the high points in Parlatuvier and Bloody Bay, now have a 24/7 water supply, moving from 24/2, 24/4 or 24/5 in some instances.

Additionally, some 17.8 kilometres of pipeline was laid, which benefitted areas in Lambeau, Hampden, John Dial, Hope, Mt. St. George, Moriah, Mt. Thomas, Culloden, Golden Lane and Runnemed. The following are further projects that have been completed:

- **Bloody Bay Pipelaying Project:**

Installation of 9 kilometers of transmission mains from Bloody Bay Water Treatment Plant to Englishman's Bay, at a cost of \$27million. Improving the level of service to an estimated 1600 persons.

- **Moriah to Culloden Pipelaying Project:**

Construction of 3 kilometers of transmission mains from Culloden Junction to Board Road, Mt. Moriah, at a cost of \$3.2 million, resulting in an improved supply to an estimated 1,836 persons

Works are also underway to commission the new Bloody Bay Well#3, along with the refurbishment and upgrade of the Bloody Bay Water Treatment Plant and the Parrot Hill Booster Station.

Vision Toward Sustainability

As we approach the end of 2014, the completion of these projects, will place the Authority at the cusp of achieving full 24/7 delivery in Tobago. However, sustaining the improvement in supply, in the face of challenges associated with reduced production during the dry season and increased water use at the height of the tourist season, are areas that must be addressed.

To this end, the Authority has developed a strategy for a sustainable water supply aimed at maintaining supply levels during peak demand periods, particularly in the dry season. This strategy will focus on the following areas:

- Water Catchment Protection
- Increased Groundwater Production, with emphasis on Chartlotteville/Campleton, Moriah, Castara and Lowlands
- Introduction of a grid network
- Implementation of a network and pressure management system
- Installation of service reservoirs at Bloody Bay, King's Bay, Chateau and Sou Sou Lands
- Refurbishment of production facilities at Highlands Road, King's Bay, Courland and Richmond
- Water quality improvement
- Upgrade and desilting of the Hillsborough Reservoir
- Upgrade of Campleton Intake

16 groundwater development zones have been delineated throughout the island. These zones have the potential to boost the supply to Tobago by 4 mgd.



Additionally, WASA is currently undertaking a groundwater hydrogeological study to determine other possible groundwater sources in Tobago. The study, which is in the exploration phase, has thus far, delineated 16 groundwater development zones throughout the island. These zones have the potential to produce an estimated 4 mgd.

Presently, total water production in Tobago stands at 12.5 mgd, which is derived from surface water sources, which accounts for 55% and groundwater sources, which accounts for 45%.

The availability of potable supplies from ground water sources, which are not adversely affected by dry season conditions, are crucial to the goal of maintaining service levels on a year round basis, irrespective of spikes in demand during visitor peak seasons.

70%

of customers in Tobago receive
a water supply 24 hour
7 days a week

Bloody Bay Pipeline Project



Corporate Governance Improvement and Corporatisation Plans



Dion Abdool
General Counsel and
Corporate Secretary

In 2012 the Government of Trinidad and Tobago and the Inter-American Development Bank entered into a loan arrangement that would open the doors for the Water and Sewerage Authority (WASA) to transform the organisation through institutional strengthening.

A major aspect of these plans include transforming the Authority into a corporatised entity. This, when properly implemented along with a sound ownership policy, would see key objectives being accomplished such as: establishment of a distinct legal identity for the corporatised entity "WASA", under which the government's role is clearly defined; implementation of private sector commercial orientation; and managerial independence with required systems of accountability.

This model has been successfully implemented throughout the world in a number of utilities, including the globally recognised Public Utilities Board (PUB) of Singapore. Locally, the Trinidad and Tobago Postal Service was corporatised in July 1999, which resulted in performance achievements such as universal delivery service; improvements in transit time, and customer satisfaction; revenue growth in new business; and total revenue growth.

On March 23rd, 2012 WASA's Board of Commissioners approved the implementation of a Corporatisation Framework, thereby marking the Authority's first steps in the thrust toward achieving this goal. Within the scope of the framework are a number of practices and attributes that would be implemented in the future. Those practices would ultimately aid in the sustained turnaround of the organisation.



Figure 1 Corporate Governance Practices

After gaining approval for the implementation of the framework; the Authority required a strategy that would ensure the accomplishment of the key objectives of the framework. The approach selected is one that is synergistic in which there are three (3) key drivers i.e. Corporate Governance (CG) Taskforce (chaired by the General Counsel and Corporate Secretary, Dion Abdool), internal and external consultants that coordinate the implementation of practices and attributes.

The CG Taskforce is a composition of managers, representative of the six (6) Divisions of the Authority. Underscored in this approach is the interconnectivity of internal actions guided by external best practices.

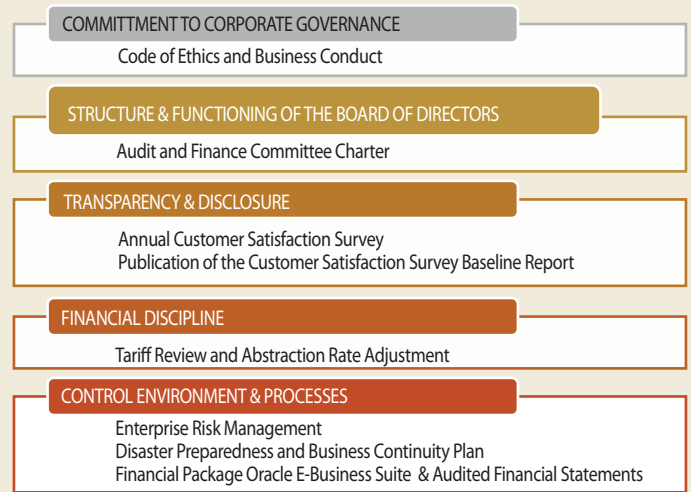


Figure 2: Internal Actions merged with External Best Practices

To date a number of milestones have been attained through the implementation of those practices and corresponding attributes. The joint efforts and outputs of each Division are the inputs of Corporate Governance and the achievements derived there from operate to drive the organisation forward. These achievements are

detailed in Figure 3 below.

Figure 3: Divisional Achievements within the scope of the CG Practices



For the Authority, Corporate Governance is an imperative undertaking and ranked amongst the highest priority of strategic initiatives; given that this translates into business value for the organisation. It is anticipated that the Authority's sustainable future would be secured through the ultimate goal of full implementation of the Corporatisation Framework. Moreover, our stakeholders can expect to obtain the benefits from this turnaround, which are as follows:

- **Stable water supply and wastewater services and excellent goodwill among customers;**
- **Enjoyment of the advantages of a company managed and operated with private sector best practices with the expected efficiency, productivity and financial sustainability;**
- **An organisation that is performance driven;**
- **Large-scale investment in infrastructural development according to a long-term plan that is aligned to strategic objectives;**
- **Ongoing communication to increase stakeholder awareness and buy-in for the transformation initiatives under the Corporate Governance Action Plan (CGAP).**



Corporate Governance Taskforce meeting – with opening remarks being delivered by the General Counsel and Corporate Secretary - Dion Abdool; while at the head table is the C.E.O (Ag) Gerard Yorke and Internal Consultant - Fidel H. Cuéllar



Introducing emerging technologies at Wasa



Wendell Diaz
Director Corporate Services



The Water and Sewerage Authority remains committed to introducing emerging technologies in its continued efforts to improve its internal and external customer service. With this in mind, the Authority has successfully implemented a new Financial Package of an Enterprise Resource Planning (ERP) Solution, Oracle E-Business Suite R12.

Implementation of Oracle E-Business Suite R12

The Oracle E-Business Suite Financial System went live as scheduled on June 9, 2014, following months of hard work and dedication from the Project Team, which comprised staff members and implementation consultants. The system integrates WASA's core business processes through a common IT platform and includes modules such as Project Costing, Fixed Assets, Accounts Payable, General Ledger and Purchasing & Inventory Management System. These modules can be easily integrated with other applications which have been identified for future implementation. These include the Customer Information System (CIS), Human Resource Management System (HRMS) and Payroll Solution and Work/Job Management Packages.

Oracle EBS has given the Authority the ability to leverage technology in order to standardize its business processes allowing staff to work faster and smarter. The system facilitates the seamless integration of data between business functions, thereby reducing the time and effort taken to complete tasks. For instance, if data is entered into one module, all related modules are automatically updated, which eliminates the need to re-enter the same data several times. This minimizes human error thus providing the most efficient and accurate real time information for users to support data driven decision processes.

The synchronization of data also improves efficiency and productivity as it assists Management with planning and resource allocation. Furthermore, with the integration of the Inventory and Procurement modules of the system, stock levels can now be better managed.

The new system has led to the re-engineering of the Authority's processes related to procurement and financial management. For example, some major processes have been automated and are now paperless having been replaced by electronic documents. Oracle EBS has also assisted with enhanced auditing and accountability, through the use of security profiles that define each user's access to a specified group of operating units, whereby tasks can be monitored and controlled. It also performs automatic checks on funds availability prior to the approval of requisitions, which ensures budget compliance and effective expense control.

The Oracle system provides the capability for a faster and easier tendering process, through which contractors can remotely access the Authority's tender documents online, have their queries addressed, upload proposals and even receive Purchase Orders via



email. Suppliers are therefore now benefitting from a simplified and enhanced customer experience.

Implementation of the system has not only improved business processes and work flows in the organization, but has also taken the Authority's customer care delivery to another level; while reducing operating costs by eliminating redundant processes, standardizing business practices, automating processes and leveraging self-service.

WASA Launches Online Bill Payment Service




The Honourable Ramona Ramdial, Minister in the Ministry of the Environment and Water Resources, demonstrates the easy use of WASA's new Online Payment Service, at the launch of the service in June 2014, at the Hyatt Hotel, Port of Spain. Looking on are WASA CEO, Gerard Yorke and Head Information & Communication Management, Dial Ramkissoon



Dial Ramkissoon
Head Information and Communication
Management

payment option offers
24/7 payment
services to customers
local and foreign with
updates to accounts
within 24 hours

 On 11th June 2014, WASA's Online Bill Payment Service was officially launched at the Hyatt Regency Hotel, Wrightson Road, Port-of-Spain. This payment option offers 24/7 payment services to customers local and foreign alike, with updates to accounts within 24 hours. Customers can now enjoy a convenient and flexible payment process that saves time and money by paying their bills without having to commute to one of WASA's Customer Service Centres or one of the other available payment options.

To access the service simply, just log on to the Authority's website www.wasa.go.vtt and click the "Payment Portal" link on the left bar.

According to Head Information and Communication Management, Dial Ramkissoon, the website is user-friendly as it guides customers throughout the entire payment process. Customers can simply register online without having to visit any of WASA's Payment Centres. Multiple accounts can be added to a single user profile and account balances can be viewed prior to making payments.

Upon completion of the payment process, customers will receive an automatic electronic receipt via email or can opt for a printed receipt.

In keeping with proper security standards, the website, which is Payment Card Industry (PCI) compliant, provides assurance to customers that their credit card information is protected during and after every financial transaction. The facility is a tokenized credit card system in which customers' payment details are safely stored by an industry standard process. In addition, a variety of techniques have been implemented to prevent cyber-attacks such as brute-force and spam, among others.

The provision of this quick and secure bill payment facility, is yet another demonstration of WASA's commitment to improving the level of customer care delivered to its valued customers by employing appropriate technology and sound business practices. This is all in keeping with the Authority's efforts toward becoming more customer-focused and ultimately becoming the best performing utility in this hemisphere.



Ken Mahabir
Director Human Resources

BUILDING CAPACITY IN THE WATER AND WASTEWATER SECTOR



In January 25th 2012, WASA in partnership with the National Training Agency (NTA) established a Workforce Assessment Centre (WAC) at WASA's Head Office, St. Joseph, aimed at developing competencies in the water and wastewater sector. The WAC as it is commonly called, is part of an initiative of the Ministry of Tertiary Education and Skills Training, in support of the Government's Policy Framework for sustainable development through human resource development efforts.

WASA has contributed to this initiative through the development of water and wastewater related occupational standards for the conduct of assessment, training and certification of individuals in the sector. Through assessment and training, the Authority anticipates that a cadre of competent and certified individuals will be created and readily available to ensure the continuity of operations internally, whilst building capacity nationally.



In an effort to expand this capacity building thrust, WASA also established a Satellite Centre in Tobago at its Lowlands Office in March, 2012.

Since its inception in January 2012, the WAC has developed fourteen (14) water and wastewater related occupational standards. To achieve this, a number of Lead Bodies were created comprising employees, who were deemed 'experts' in the areas for which standards were being developed. The Lead Bodies met weekly with NTA's Standards Development Officer, to develop the occupational standards.

Water Process Plant Operations Lead Body Meeting in progress
From left to right: David Benny, Stephen Thomas, Keith Thomas
Absent in photo: Lalchan Bissram, Irwin Gill, Cassius Mills

WASA's WAC has been working along with the NTA to obtain regional endorsement for its occupational standards through the Caribbean Association of National Training Agencies (CANTA) and CARICOM. This has been partially achieved thus far, with two (2) of the occupational standards, namely Water Treatment Plant Operations and Wastewater Treatment Plant Operations (level 1), having attained regional occupational status as at August 2014. This means that these occupational standards are now being used throughout CARICOM countries for the conduct of assessment, training and certification.

The following table lists the occupational standards developed to date and the progress of each standard towards the achievement of regional occupational status:

OCCUPATIONAL STANDARDS	DRAFT (in progress)	LEAD BODY REVIEWED	SAC APPROVED	CANTA APPROVED	CARICOM APPROVED	CERT. STATUS
1. Water Treatment Plant Operations - Level I		✓	✓	✓	✓	CVQ
2. Wastewater Treatment Plant Operations - Level I		✓	✓	✓	✓	CVQ
3. Water Distribution Operations - Level I		✓	✓			TTNVQ
4. Wastewater Collection System Operations - Level I		✓	✓			TTNVQ
5. Plumbing - Level III		✓	✓			TTNVQ
6. Quality Control - Level I		✓	✓			TTNVQ
7. Hydrological Monitoring and Data Processing - Level I		✓	✓			TTNVQ
8. Asset Maintenance (water) - Level I		✓	✓			TTNVQ
9. Asset Maintenance (wastewater) - Level I		✓	✓			TTNVQ
10. Pipelaying - Level I		✓	✓			TTNVQ
11. Pipelaying - Level II		✓	✓			TTNVQ
12. Road Restoration – Level I	✓					TTNVQ
13. Road Restoration – Level II	✓					TTNVQ
14. Road Restoration – Level III	✓					TTNVQ

Table 1 – Water, Wastewater and Related Occupational Standards

The Water and Sewerage Act Chp. 54:40; 69 part 1, vested WASA with the authority to grant licenses authorising persons to construct, execute repair or perform work required on any property, in connection with house sewers or plumbing systems. These licenses are subject to renewal at the expiration of two (2) years.

In an effort to ensure that customers are receiving workmanship of a high quality and standard, WASA's Management Team in 2011, took a decision to validate the competencies of all existing Licensed Sanitary Constructors (LSC), as well as new persons seeking licenses, against the Plumbing Occupational Standard. In this regard, WASA's WAC has formally validated the competencies of two hundred and fifty-four (254) persons in the field of Plumbing as depicted in Table 2.

Since the commencement of the validation exercise, one hundred (100) existing LSCs and one hundred and one (101) new persons seeking licenses, have been formally validated and awarded Caribbean Vocational Qualification (CVQ) in Plumbing by WASA's WAC.

WAC Training Programmes

Consistent with the Authority's human resource development agenda, WASA's WAC has successfully provided the following water, wastewater and related training to the general public:

- Licensed Sanitary Constructor Training - 72 trained
- AutoCAD Drafting for Plumbers (Tobago) - 11 trained

The WAC is also preparing to conduct the following training programmes in the 4th quarter of 2014:

- Licensed Sanitary Constructor Training - Tobago
- AutoCAD Drafting for Plumbers
- Isometric Drawing and Reading for Plumbers

Apart from the above-mentioned training programmes, WASA's WAC is equipped to facilitate the assessment and certification of skilled and experienced workers, who are desirous of validating their skills and obtaining certification in the following areas:

- Plumbing
- Masonry
- Carpentry
- Electrical Installation
- Welding
- Auto Maintenance
- Pipe-laying
- Water Process Plant Operations (Treatment & Distribution)
- Wastewater Process Plant Operations (Collection & Treatment)
- Hydrological Monitoring and Data Processing

DESCRIPTION	EMPLOYEES	LSC'S	HDC	WALK IN'S	TOTAL
COMPETENCY LEVELS VALIDATED	9	201	38	6	254
COMPETENCY LEVELS TO BE VALIDATED	73	51	66	3	193
TOTAL	82	252	104	9	447

Table 2 – Competency Validation



- Asset Maintenance (water & wastewater)
- Quality Control
- Road Restoration (commencing October 2014)

Persons desirous of obtaining certification in the preceding areas can visit WASA's Workforce Assessment Centre, located at its Head Office, Farm Road, St. Joseph or call 662-2302 Ext. 2794, 2826 or 2827.

DRY SPELL CONDITIONS IN SOUTHERN CARIBBEAN AND FUTURE OUTLOOK



A

another westerly wind burst/Kelvin wave may finally push the Pacific toward a full-fledged El Niño:

The climate pattern known as the El Niño-Southern Oscillation, or “ENSO” for short, is the biggest cause of large-scale climate variability in the tropics. During an El Niño episode, the central and eastern Pacific Ocean are warmer than normal. The above-normal sea surface temperatures are maintained by gentle but giant waves of warm water that slosh across the Pacific from Indonesia toward South America.

This series of globes shows the eastward progression of one of these deep Kelvin waves in February 2010. The globes show sea surface height anomalies, which means places where the water surface is higher (red) or lower (blue) than average. A higher-than-average sea surface height at a given location indicates that there is a deeper-than-normal layer of warm water. Lower-than-average sea surface height indicates a shallower layer of warm water. The globes are based on 10 days of data centered on January 15, January 30, and February 15.

In January sea surface heights across the central and eastern equatorial Pacific were elevated (red), but not extremely so, potentially a sign that El Niño was weakening. But in early February, a strong sea level anomaly appeared northeast of Australia (center

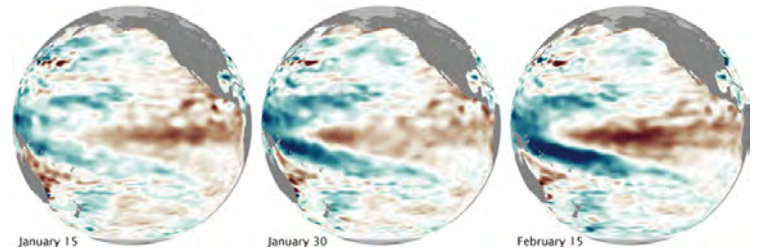
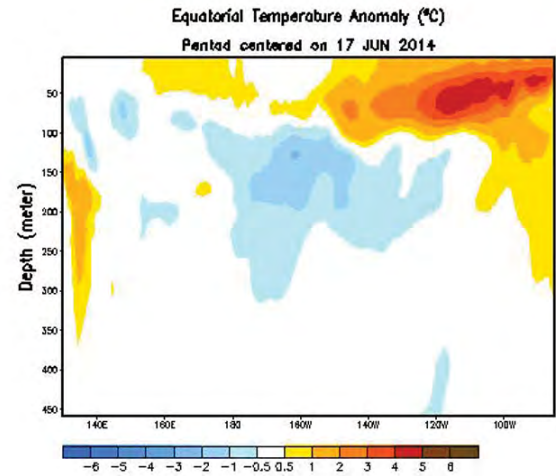


Anthony A. Bagalue
Publisher, Caribbean/Latin America
Disaster Readiness Manual

globe). This swell of deep, warm water is the start of the Kelvin wave, and by late February, it had spread eastward into the central Pacific (right-hand globe) and re-invigorated the current El Niño.

Where do Kelvin waves come from? Under normal conditions, the tropics' prevailing easterly winds push sun-warmed surface waters across the Pacific from the Americas toward Indonesia, creating a deep pool of warm water in the western Pacific. During an El Niño, the trade winds falter, and sometimes even reverse, for months. When the winds that maintain the warm pool falter, a large pulse of warm water from the western Pacific slides back toward the east. As El Niño piles up warm water in the eastern Pacific, the thermocline ... Warm water also increases the occurrence of Coral bleaching in the Caribbean; the region also experiences significant inter-annual variations in rainfall.

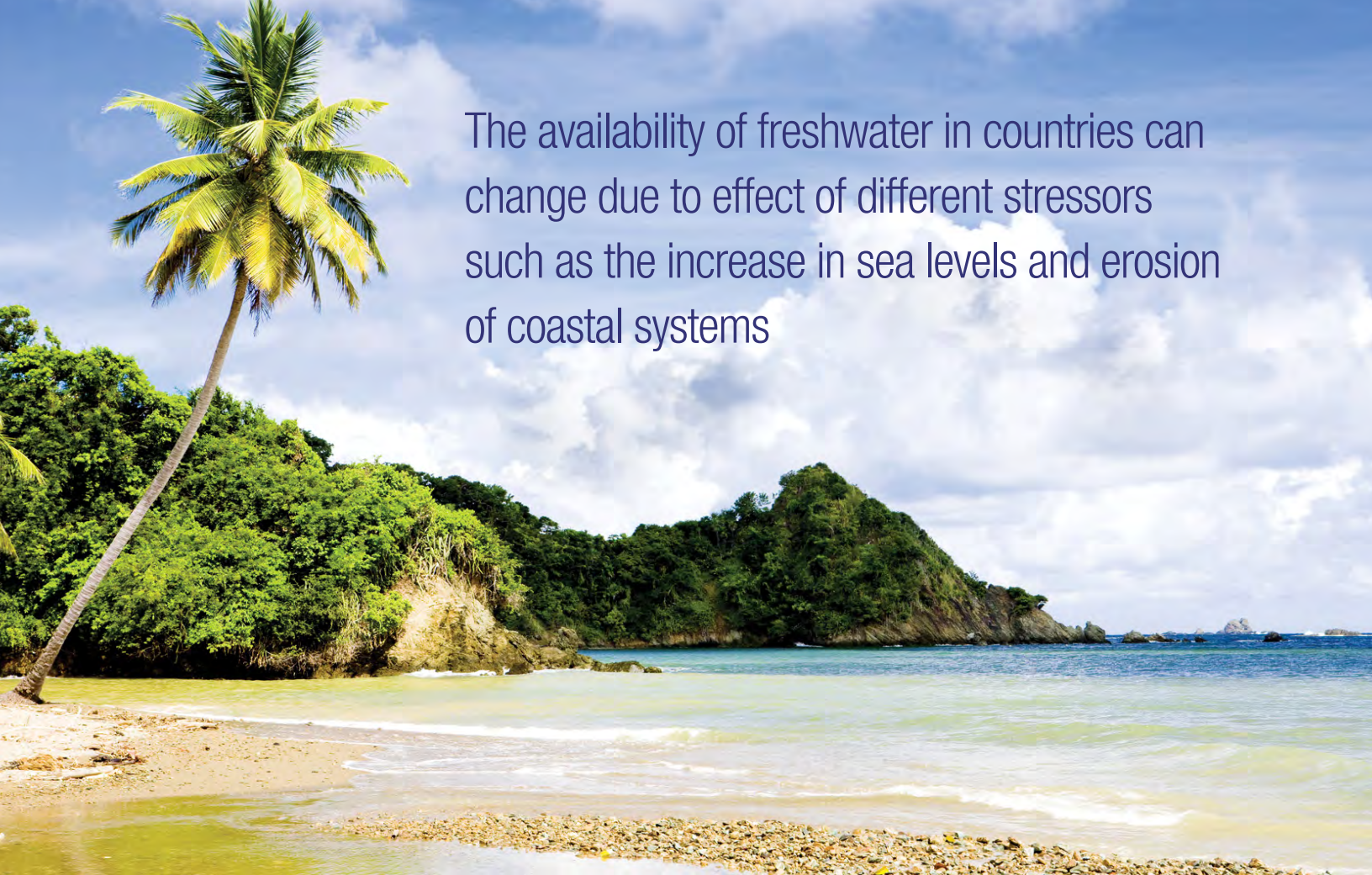
Small Island Developing States (SIDS) are a group of island-based countries spread between the Caribbean Sea and the Atlantic, the Indian and the Pacific Oceans.



A country is classified as “water scarce” if available water resources are insufficient to satisfy long-term average requirements

Among them, water security is one of the most important issues requiring attention. Freshwater availability and quality has been a major issue on many small islands, but especially the south-eastern Caribbean sub-region, which is quoted to be very water scarce. A country is classified as “water scarce” if available water resources are insufficient to satisfy long-term average requirements. Some Caribbean SIDS like Barbados, St. Kitts, Antigua and Barbuda are already quoted as very scarce. However, IPCC highlights a lack of both reliable records of climatic observation and properly developed regional projections. Moreover, this region shows a strong inter-seasonal and inter-annual variability in terms of water availability due to cyclonic meteorological phenomena, such as ENSO, which hinders the identification of a climatic trend.





The availability of freshwater in countries can change due to effect of different stressors such as the increase in sea levels and erosion of coastal systems

Effective water management aimed at water security requires an analysis of both supply and demand patterns of a country and the climatic and non-climatic drivers that determine them, though the amount of rainfall over the island is the first limiting factor of availability. The availability of freshwater in these countries can change due to effect of different stressors:

- **Altered precipitation, runoff and recharge patterns and rates leading to increased drought periods frequency, intensity and duration.**
- **Increase in sea level, erosion of coastal systems and salinization of aquifers.**
- **Increase in storms frequency and intensity, with tidal extremes and storm surges causing inundation and disruption of water infrastructures.**
- **Increase in deforestation rate, amplifying soil erosion and reducing infiltration.**
- **Issues in the management and distribution of the resource (leakages, pollution).**
- **Increased demand due to socio-economic factors, such as population growth, tourism trends, agricultural activities.**

Conclusion

Climate, agriculture and tourism are strong drivers influencing the development process in Caribbean SIDS, and these are sensible to external effects. The reliability of water supply during dry periods and after disastrous events is a critical problem on many islands at

present, and this will likely worsen in the future. Projected changes in availability, coupled with changes in demand, suggest that pressure over the resource will increase. Tourism pressure will likely be part of the increase, but still as a minor share of total national consumption, while it strongly contribute to the national GDP as well as to the water service billings. On the other side, distribution issues and agricultural management depend on policy and its regulatory enforcement and should be addressed as no-regret measures. The implementation of an integrated national water security plan to reduce vulnerability and to cope with increasing variability and growing demand is a priority for SIDS.

In relation to climate, the outlook for August - September – October, according to the Caribbean Institute for Meteorology & Hydrology website www.cimh.edu.bb/?p=precipoutlook: There is imminent drought risk for the following: Barbados, Guyana, Martinique, Dominica, St. Vincent and Trinidad & Tobago. Other areas under drought watch, except Bahamas and northern Leeward Islands. There is also long-term drought concern and reduced water availability beyond the wet season, especially in Jamaica, as well as Eastern and Southern Caribbean.

This further supports the need for SIDS to develop water security plans that will effectively assist each territory in overcoming the challenges associated with water security.

KNOW YOUR INTERNAL AUDITORS

A LOOK AT THE RESPONSIBILITIES OF WASA'S INTERNAL AUDITORS



Penelope Williams
Head Internal Audit and Compliance

The overall aim for any organisation is to achieve its objectives with the highest degree of efficiency and effectiveness. This includes the deployment of its People, Process and Technology to achieve a high standard of business performance. The Water and Sewerage Authority (WASA) is no different as it pursues efficient organisational performance through four (4) developmental pillars: Customer Care, Human Capital Development, Cost Optimisation and Revenue Enhancement; while the Authority's Board and Senior Management are responsible for providing oversight and strategic direction, in order to guide the organisation into achieving its corporate objectives.

To do this, the Board and Management must receive timely, accurate information on organisational risks (i.e. strategic, operational, financial, compliance and reputational), as well as assurance that these risks are being well managed.

Due to the independence of the Authority's Internal Audit function, the Board and Management can rely on the Department for advice on current business processes; insight and objective assurance that existing internal controls are adequate to mitigate the Authority's

risks; assurance that governance and risk management processes are appropriate to meet organisational needs; and organisational goals and strategic objectives are met.

This important role has been further confirmed by the Institute of Internal Auditors that has illustrated the Internal Audit Function's (IAF) valuable contribution to the organisation in the diagram below:



- **Assurance** that the Organisation is operating as management intends.
- **Insight** into improving controls, WASA's processes, procedures, performance standards and risk management; and ways to enhance revenue, optimize costs, improve customer care and develop our human resources.
- **Objective** assessments of operations.

One of IAF's key roles is to identify current and emerging risks and proactively recommend improvements to mitigate these risks. IAF is therefore instrumental in assisting Management in the implementation of the necessary improvements to governance, risk management and controls as the organization moves closer to achieving its vision.

To this end, the IAF has improved its practice in WASA and has raised its visibility and audit approach in conformity with the International Professional Practices Framework for Internal Auditing (IPPF). With an injection of qualified audit professionals, the IAF has expanded and evolved to perform a variety of services and is often considered the catalyst for improving Governance and Risk Management and

Control processes in the Authority. To be effective at what we do, the IAF enjoys an independent reporting line to the Board Audit Committee, which affords the required authority to unrestricted access to all areas of the organization (including: personnel, property, information, records, files, information systems).

Below are some of the services performed through the IAF, while keeping a watchful eye on the corporate climate and business operations:

Insight and Advice – IAF's expertise, allows for participation on project teams to ensure that risks are considered and controls are built into processes on the front-end. Some examples include: new technology implementation such as roll-out of the e-Business Suite Financial Package; development of new processes such as introduction of integrated ERM process; project working groups for re-engineering road restoration; and the new Performance Management System.

Evaluate Risks – There are a number of risks that the Authority must be prepared to contend with, which include among others: harsh dry season conditions, inability to supply potable water to current and potential customers, property damage due to leaking pipes, ageing infrastructure, water wastage, outdated rate structure and illegal connections. It's the internal auditor's job to assess the significance of these risks and the effectiveness of risk management efforts. This must then be communicated to Management and the Board, along with recommendations to improve risk management.

Assess Controls – The IAF identifies the Authority's greatest risks (both current and future potential) and these risks inform the Annual Risk Based Plan of audit projects. Arising from continuous assessments of control efficiency and effectiveness, the IAF identifies operating inefficiencies, wasteful spending, employee fraud and cases of non-compliance with laws and regulations that can save the organisation substantial funds, as well as protect its reputation.

Ensure Accuracy – The Authority's Internal Audit and Compliance Department (IACD) ensures financial statement accuracy through pre-audit of financial schedules and direct external audit assistance. The department also examines the reliability and integrity of financial and operational information including executive compensation and bonuses.

Improve Operations – With a solid understanding of the Authority's objectives, IACD is able to examine its operations to determine whether they are efficient and effective. Where there is lack, recommendations are made to Management for improvement.

Promote Ethics – As members of the Institute of the IIA, the Authority's Internal Auditors required to uphold the principles of integrity, objectivity, confidentiality, and competency. Red flags are therefore raised whenever improper conduct is discovered such as: use of Authority's assets for personal gain, and unethical behaviour e.g. fraud, corruption, collusion, etc.

Review Business Processes and Procedures (SOPs) – The Authority's business processes and procedures are reviewed by Internal Auditors to assess whether they are designed appropriately to help the organisation achieve its goals.

Monitor Compliance – IACD assesses the Authority's compliance with applicable laws, regulations, and contracts to ensure that Management is addressing these requirements adequately and also advise regarding the impact that noncompliance would have on the organisation.

Assure Safeguards – Internal Auditors evaluate the procedures used to safeguard tangible property, human resources, and intellectual property assets from theft, fire, illegal activities, or other types of loss. Deficiencies are brought to light and recommendations made to enhance protection through Business Continuity Management, Emergency Response Management, Health and Safety Reviews and Annual Stock Count Audits.

Assure Safeguards – Internal Auditors evaluate the procedures used to safeguard tangible property, human resources, and intellectual property assets from theft, fire, illegal activities, or other types of loss. Deficiencies are brought to light and recommendations made to enhance protection through Business Continuity Management, Emergency Response Management, Health and Safety Reviews and Annual Stock Count Audits.

Investigate Fraud – Because fraud can affect any level of the organization, the Board of Commissioners has granted the IAF access to all records and the authority to conduct audits and where necessary request investigations into possible fraudulent behavior throughout the Authority.

Communicate results – During and after each audit engagement, internal auditors report findings and recommend appropriate courses of action which are discussed and agreed upon by Management for implementation. All significant issues are reported to the Audit Committee of the Board, along with ratings on the adequacy of the controls in responding to the risks.

In order to effectively fulfill its varied responsibilities, the IACD has set itself the strategic departmental goal of attaining 100% of the IIA's competency model for each level of staff. This will ensure that staff possess the right mix of skills as risk control experts, efficiency specialists and problem solvers; and are continuously developed and trained to be critical thinkers, excellent communicators, while continuing to meet the expectations of both the Board and Management.



BENEFITS

of Good Health and Safety Management



here are three commonly accepted reasons for reducing accidents at work: 1) to ensure compliance with legislation; 2) humanistic and moral considerations; and 3) economic considerations. Of these, quite often economic considerations, tends to be forgotten.

Employers that invest in workplace safety and health can expect a corresponding reduction in fatalities, injuries, and illnesses. This in turn results in cost savings in a number of areas such as: lower workers' compensation costs and medical expenses, reduction in penalties, reduced costs to train replacement employees and conduct accident investigations. In addition, employers often find that changes made to improve workplace safety and health, can result in significant improvements to their organization's productivity and financial performance.



Roger Karim
Senior Manager, Regulatory Management

One of the reasons that the financial impact of poor safety is not known could be that managers do not always realise the true cost of accidents since the responsibility for safety is often seen as belonging to the Safety Department and not as a line function.

Accident costs can place a heavy financial burden on organizations. Accidents result in both direct and indirect or hidden costs. The relationship between direct and indirect costs can be compared to an iceberg with the indirect costs ranging from 8-36 times the direct costs as illustrated in the Iceberg Theory below:



Managing safety results in reduced accidents and significant financial benefits through the following:

- Lower employee absence and turnover
- Reduced injury and illness costs
- Decreased threat of legal action
- Improved corporate image and reputation
- Increased productivity, because employees are healthier, happier and better motivated
- Reduced sick pay costs
- Reduced insurance and workers' compensation premiums
- Reduced product and material damage
- Fewer production delays

Once employees observe that the organisation is actively putting measures in place to improve health and safety, employee relations and morale will improve. As such, addressing health and safety needs should not be seen as a regulatory burden. Additionally, the organisation's public image will improve and insurers may reduce premiums, if there is evidence that risks are being effectively controlled in the organisation. This can also result in banks and investors providing financing at lower rates.

Safer and healthier workplaces translate into increased productivity, more job satisfaction and stronger bottom-line results. Good Safety is Good Business.

WASA PLAYS MAJOR ROLE IN SOLOMON HOCHOY HIGHWAY EXTENSION TO POINT FORTIN



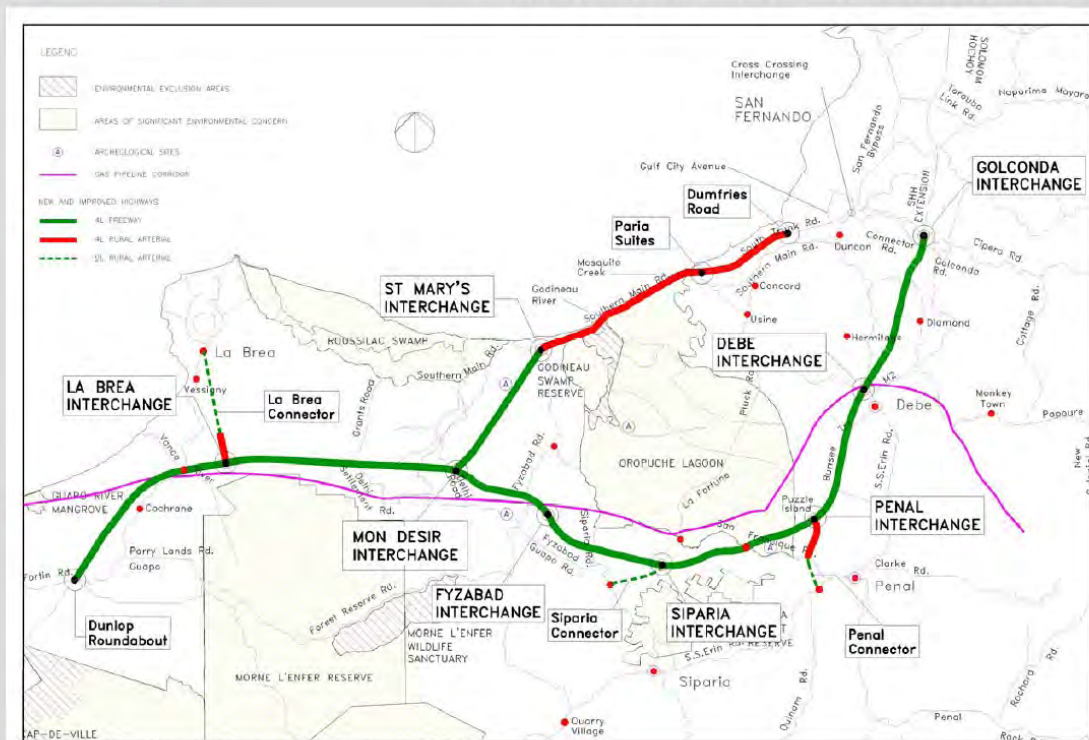
Daren Gazez
Head, Water Projects

The Solomon Hochoy Highway Extension to Point Fortin Project is one of the largest and most complex infrastructure development projects to be undertaken in Trinidad and Tobago and as a key stakeholder, WASA has been providing critical support toward its completion. The project comprises the design and construction of a new highway to international freeway standards.

On completion of this project the country will benefit from 47 km of four-lane dual carriageway and 2.5 km of two-lane roadway. The construction of this stretch of the Solomon Hochoy Highway, will allow for connectivity between the city of San Fernando and the southern towns of Debe, Penal, Siparia, Fyzabad, and Point Fortin; and will support the establishment of new economic space in the South-Western



National Highways Programme Solomon Hochoy Highway Extension to Point Fortin



Proposed Highway Route

The project falls under the purview of the Ministry of Works and Infrastructure, with the National Infrastructure Development Company Limited (NIDCO), overseeing its execution. The design and construction of the highway is being undertaken by Brazilian firm Constructora OAS and its various sub-contractors, while AECOM was contracted as consultants on this project.

The table below outlines the various phases of the project:

PHASE	DESCRIPTION
Phase 1	Golconda to Debe Dumfries Road to Godineau River
Phase 2	North of the Tarouba River Bridge to Mon Desir Interchange, inclusive of Tarouba River Bridge and Mon Desir Interchange; Siparia Interchange and Connector Road; Fyzabad Interchange and Connector Road. La Brea Interchange to Dunlop Roundabout Point Fortin (Inclusive of La Brea Interchange).
Phase 3	Godineau River to Tarouba Bridge not inclusive of Godineau River Bridge and the Tarouba River Bridge
Phase 4	Penal Interchange and all other segments not previously identified in Phases 1, 2 and 3. La Brea Interchange to Mon Desir Interchange, not inclusive of La Brea Interchange and the Mon Desir Interchange.

Alignment of the extension to the Solomon Hochoy Highway passes through numerous roadways, communities and rural areas, where WASA's pipeline infrastructure are located. In some instances, the route of the highway was adjusted to minimise the impact, however where it is unavoidable, the existing infrastructure has to be relocated to allow for construction of the highway.

Among the stakeholders impacted by the project are Water and Sewerage Authority (WASA), Trinidad and Tobago Electricity Commission (T&TEC), Telecommunication Services of Trinidad and Tobago Limited (TSTT), British Petroleum (BP), National Gas Company (NGC), Petroleum Company of Trinidad and Tobago (Petrotrin), and FLOW.

Monthly meetings have been held between the consultants (AECOM) and stakeholders to discuss all matters of concern relative to the passage of the highway. These discussions are held to determine the route and sequencing of infrastructure relocations. Frequent site visits are conducted along the route, to determine the impact and the most feasible way forward for relocation of infrastructure, with the intent of maintaining or improving services to customers.

The impact of the Solomon Hochoy Highway Extension on WASA's infrastructure is significant. Some of the major pipeline infrastructure affected by the highway construction works are:

- 700mm transmission main on the verge of the South Trunk Road (south side) from Dumfries Junction, La Romain to the Old Southern Main Road
- 300mm and 600mm distribution mains on the verge of

the South Trunk Road (north side) from Sunset Ridge to Compere River (Mosquito Creek Bridge)

- Interconnection between 600mm and 700mm mains at Paria Suites.(TJ's interconnection),
- 750mm and 300mm mains from Godineau River to St Mary's Junction, Oropouche
- 300mm and 500mm distribution mains from Dumfries to Debe at the Debe Interchange
- Air valves and pump out on Mosquito Creek
- 500mm, 200mm, and 125mm transmission and distribution mains on the Southern Main Road at Dunlop Roundabout, Pt. Fortin
- Point Fortin Well #12

Apart from these, there are pipelines located along secondary roads and agricultural roads that will also be rerouted to allow for the construction of the Highway. In total there are some fifty-two (52) areas that have been identified, which may require pipeline relocation along the Highway Extension to Point Fortin.

The Project Appraisal and Planning Department, under the Programmes and Change Management Division, has been leading WASA's representation at the monthly stakeholders meetings, with other members of the team coming from departments such as:

- Operations Division
- Construction Department
- Water Loss Control
- Legal Department
- Water Resources Agency
- Geographic Information Systems (GIS)



Some members of the WASA team engaged in a planning meeting.

The WASA team has been involved in site visits and site investigations conducted with other stakeholders to discuss, plan and collect costing data that will allow for feasible solutions to issues related to relocation of infrastructure. These site visits also allow for other utilities to identify their infrastructure and finalise the sequencing of the relocation exercises.

Engineering planning workshops have been an important part of the process to ensure timely solutions to the relocation of WASA's infrastructure. Additionally, the team has been engaged in discussions and analysis of highway drawings and design details, in order to develop sound engineering solutions for relocation works. In many instances, these meetings have occurred on location to ensure that the final designs are well engineered and meet all the necessary requirements.

All infrastructure relocations with respect to the highway extension, are done using WASA's in-house construction crews, with site visits carried out with the implementation team before the start of any infrastructure relocations. During these site visits the plans and methodology for execution of the works are usually discussed and finalised by the team.

To date, the Authority has successfully completed pipeline relocation works in the following areas:

- Papourie Bridge
- Hermitage Road
- Debe Interchange
- Dumfries to Alley's Bridge (southern side)
- Dumfries to Alley's Bridge (northern side)
- Alley's Bridge to Bel Air Road (southern side)



All infrastructure relocations with respect to the highway extension, are done using WASA's in-house construction crews

Valve installation along South Trunk Road



Pipeline relocation at Dumfries Junction, La Romaine

52 areas that have been identified, which may require pipeline relocation along the Highway Extension to Point Fortin

The WASA Project Team is currently in the process of preparing scope of works, drawings and estimates for relocation of pipelines and infrastructure at various segments of the highway construction.

Some of these include:

- The relocation and replacement of 4.11 km of 700mm DI main from Bel Air Road to Mosquito Creek Bridge.
- The relocation and replacement of 3.52 km of 750mm and 300mm pipelines from Godineau Bridge to St. Mary's Junction.
- The relocation of 1.2 km of water lines at Delhi Road, Silver Stream Road, Grants Road, Eccles Trace, No. 8 Road and Dunlop Round-About.
- The relocation and replacement of 554 m of 200mm PVC main from Gandhi Village Road to E-Teck Park Debe.
- The replacement of appurtenances along the Mosquito Creek.

As expected with a project of this magnitude, there have been a number of challenges. These include modifications to the highway project, which has required the reworking of designs, scope of works, drawings, and estimates. However, the Authority's team has been working closely with Ministry of Works officials, contractors and other stakeholders to ensure that the Authority fulfills its requirements on the project.

Some of the pipeline relocations and replacements undertaken during this project, involves shutdowns of key Booster Stations, resulting in water supply interruptions to many of our customers. To minimize the number and impact of such shutdowns, the Authority has been planning and coordinating its works schedule to ensure that these are completed simultaneously by various teams during system shutdowns.



Completed pipeline relocation along the Highway Extension



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PUBLIC EDUCATION CRITICAL TO WASA'S 24/7 PLANS



Daniel Plenty
Senior Manager
Corporate Communications

As WASA presses forward with various infrastructural development works designed to achieve full 24/7 water service delivery to customers throughout Trinidad and Tobago.

It is important to highlight another critical side to this achievement that rests squarely on the shoulders of our customers and the citizens of this country. This refers to the need for proper water and environmental conservation and preservation habits which must be practiced by all.

WASA has been a major exponent of the need for proper public education on water conservation and preservation of the country's water resources. The Authority has demonstrated this on several fronts, one has been the establishment of a first of its type in this hemisphere, Public Education Centre (PEC), at its Head Office, St. Joseph, dedicated to providing information on the water and wastewater sector. WASA has further backed this up with the establishment of a similar PEC on the site of the Hillsborough Dam in Tobago.



Live broadcast of the Secondary Schools' In the Know With H2O Quiz Competition, from WASA's Public Education Centre, St. Joseph

An integral part of the Authority's public education programme, has been the staging of it's Annual National Secondary Schools' In the Know With H2O Quiz Competition, which began in 2011. This competition serves as a means of educating the nation's young people and the wider community about issues impacting the provision of water and wastewater services; and to develop a better informed and more responsible consumer in the future.

After just three years, the WASA quiz has become a leader in the staging, production and broadcast of such programmes in the Caribbean due to the following:

- The utilisation of modern technology such as computerised online testing and scoring systems; used for the qualification round and a state-of-the-art wireless lock-out buzzer system used through the preliminary to final of the competition
- Competition is carried live from the quarter-final round with preliminaries pre-recorded for subsequent broadcast
- Viewer inter-active element during the live rounds
- Production of special video features and documentaries on the subject matter of the particular competition
- An effective and penetrative marketing strategy that targets all Secondary Schools throughout Trinidad and Tobago that includes use of social media such Facebook; Twitter and YouTube

- A well designed competition format and structure that provides excellent support to schools with the provision of resource material as well as logistical assistance through the competition
- The most lucrative prizes of any local competition which includes: TT\$100,000.00 for 1st Place, TT\$50,000.00 for 2nd Place and TT\$25,000.00 for 3rd Place

The competition targets Forms 3 and 4 students (ages 13 -16) from Secondary Schools throughout Trinidad and Tobago. This group was targeted as socio-cultural change agents since behaviours learned and practiced at this age are likely to be carried over to adulthood. Additionally, young people are also excellent change agents in their homes where they can influence the habits of adults within their households.

It's also interesting to note that the success of the WASA quiz has drawn the attention of other organisations that are seeking to use it as a model for the development of similar initiatives.



Students involved in completing the online questionnaire during the qualification round of Quiz Competition.

116
secondary schools
participated in the competition
or 75% out of a total
154 private and public
secondary schools
in Trinidad and Tobago

In the inaugural year of the Quiz Competition (2011), WASA sought to expose students to some of the basic and fundamental issues related to the water sector. The competition was therefore launched under the theme *"In the Know with H2O"*, with the students being tested on topics such as watershed management, water production and distribution, pollution and water conservation. One hundred and sixteen secondary schools participated in the competition or 75% out of a total 154 secondary schools in Trinidad and Tobago. In 2012 this moved to 77%.

In keeping with Trinidad and Tobago's efforts toward achievement of Millennium Development Goal (MDG) #7 to 'Ensure Environmental Sustainability', the second year of the quiz competition sought to address the subject of wastewater and the concept of reuse with the theme *"In The Know with H2O: Wastewater & Re-Use"*. The competition was therefore launched with the following objectives:

- To promote education amongst the secondary school population and by extension, the wider community on the wastewater sector, its systems and treatment processes through the following topics:
 - *The nature of wastewater*
 - *Wastewater collection, treatment and disposal systems*
 - *Wastewater management*
- To promote the wastewater sector as a viable career choice
- To deepen the appreciation of emerging technologies relating to the linkages between advanced wastewater treatment and increased water availability for improving water supplies, through wastewater reclamation and reuse
- To promote best wastewater management practices relating to health, sanitation and the environment through increased knowledge and awareness

The third edition of the competition in 2013, occurred under the theme *"In The Know with H2O; Adopt-a-River"*. In direct relation to MDG #7 again, the competition focused on issues related to water resources and environmental sustainability, as it addressed topics such as:

- *Ecosystem dynamics and the status of ecosystems in Trinidad and Tobago*
- *Watershed assessments and quality*
- *Integrated Water Resources Management and*
- *WASA's Adopt-A -River Programme*

The competition also served as a launching pad for WASA's Adopt-A-River programme, which has been endorsed by the Ministry of the Environment and Water Resources and line Minister Senator the Honourable Ganga Singh, Minister of the Environment and Water Resources. This initiative aims to build awareness concerning local watershed issues and facilitate the participation of public and private sector entities in sustainable and holistic projects that would improve the status of rivers and watersheds in Trinidad and Tobago.

After the first three years of WASA's Secondary Schools' Quiz Competition, a wide cross-section of the country's secondary school students, as well as the wider population would have been exposed to information that would help to develop more environmentally conscious citizens, which will benefit the long term sustainability of our water resources and environment.

In 2014, the competition has taken a new turn under the theme *"In The Know with H2O: Design & Build"*, which encourages students to use the knowledge gained over the past three years of the competition, to develop practical applications and systems that would help to conserve water in the following categories: Domestic; Agriculture; Industrial; and Tourism.

A wide cross-section of the country's secondary school students, as well as the wider population would have been exposed to information that would help to develop more environmentally conscious citizens, which will benefit the long term sustainability of our water resources and environment since the introduction of WASA's Secondary Schools' Quiz Competition



The competition, which is currently ongoing has already proven to be a tremendous success, with students from the twenty (20) finalist schools demonstrating their ingenuity in developing noteworthy water conservation systems; some attracting the attention of various organizations for possible future adoption.

Right: Minister of State in the Ministry of the Environment and Water Resources, the Honourable Ramona Ramdial and member of WASA's Board of Commissioners, Hewlett Waldron, present the first place prize in WASA's 2013 'In the know with H2O: Adopt A River Quiz Competition' to winners - Presentation College Chaguanas; L-R: Marc Bhopalsingh, Mikel Rajkumar, Reece Bajnathsingh and Joshua Manickchand.

WASA Sports & Cultural Club Hosts Fellow Caribbean Utilities Employees



Opening Night - Former CUEA Presidents awarded for their contributions to the organisation. From Right: Kelvin Whittaker, CUEA President and former presidents, Sherrol Stoute of Barbados, Martha Archer and Raymond Piggot of Trinidad & Tobago, Junette Spencer of Antigua and Winston Roach of Barbados



ASA's Sports & Cultural Club successfully hosted some 300 members of the Caribbean Utilities Employees Association's (CUEA), during the 25th Anniversary of the Annual Easter Festival, which was held in Trinidad from 16th – 21st, April, 2014.

The CUEA represents a combination of numerous sporting, cultural and recreational clubs from utilities throughout the Caribbean, which come together to foster regional camaraderie through culture and sports. Currently the CUEA consists of eighteen (18) member clubs from water, electricity and telephone utilities in thirteen (13) Caribbean countries. These include: **Anguilla; Antigua; Barbados; Dominica; Grenada; Jamaica; Montserrat; Nevis; St. Kitts; St. Lucia; St. Maarten; St. Vincent and the Grenadines; Trinidad and Tobago.**

The Easter Festival, which began in 1989, represents five days filled with fun and exciting activities. The event is hosted by a different Caribbean member country each year and activities usually reflect the culture of each host country.

Following the 2013 festival held in Curacao, WASA's Sports & Cultural Club won the bid to host the 2014 Festival, against a strong proposal from the Jamaica National Water Commission. Both clubs were asked to submit proposals to host the 25th Anniversary of the Festival in 2014.

The WASA Sports Club proposal was based on the premise that while the Association should celebrate its past accomplishments, the 25th Anniversary was also an opportunity to look toward the future of the CUEA. As such the occasion should be used to help boost member awareness, strengthen stakeholder support and increase organizational visibility within the many regional island communities. This was the major influence behind the 2014 Festival theme: *"Celebrating our Silver Jubilee – Past Experiences... Future Dreams"*.

The WASA Sports Club, Local Organizing Committee (LOC), put together a schedule of activities aimed at displaying the diversity of Trinidad and Tobago's culture, which left little time for the visiting contingent to sleep. Each of the featured activities providing a uniquely enjoyable experience; these included:

- Opening Ceremony and After Party at National Academy for the Performing Arts (NAPA)
- Technology Seminar
- Island Tour
- Til Sunrise Party
- Community Project – Special Olympics Torch Run Committee Walk for the eradication of the R word (Retard)
- Shopping Experience
- Caribbean Night
- Inter-faith Service
- Festival Cookout

- Games Night
- Sports Day
- Aloha Boat Ride
- Closing Ceremony

At the CUEA's Annual General Meeting held on Sunday 21st April, 2014, WASA's Sports & Cultural Club President, Leon Elliott, was elected as President of the Association for a term of two (2) years, replacing the out-going Kelvin Whittaker, of Barbados. In assuming the position, Mr. Elliot has indicated that he hopes the CUEA will not only encourage inter-island networking on a personal level, as it has done, but on an organizational level as well. Thus creating opportunities for Caribbean Utilities to share solutions to common problems.



Community Project2 - Law Enforcement Torch Run Awareness March through the streets of Port of Spain.



Caribbean Night1 - some of the visiting contingents enjoying the show.



Sports Day3 - Ready for the CUEA Mega Relay! This event comprised 5 legs and saw participants from each country grouped together to participate.

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