

February 19, 2016

Mr. Richard Kahn

HBRK Associates, Inc.

575 Lexington Ave., 4<sup>th</sup> Floor

New York, NY 10022

Dear Mr. Kahn,

**Subject: Water Supply Options for Great St. James Island**

On February 9, TSG visited the island and assessed the existing conditions as regards water supply. Our findings and recommendations are contained herein. The island at present only has one main, 3 bedroom residence and a small caretaker's cottage on the hill above the main residence. A small pool and deck are located on the hillside between the caretaker's cottage and the main residence.

**Existing facilities:**

At present, a small Marine sized RO plant is located on the island in an 8 X 10 foot shed near the main house. It is a Tomar SW-500 unit and is assumed to be designed to produce 500 gallons per day (GPD) on house current of 120/240 voltage. It is fed seawater from a 1.5 inch diameter pipe located under the existing dock and pumped up to the plant by a 2hp pump located at the corner of the tennis court. It was not operational at the time of our visit and a former caretaker of the property who was onsite that day stated that he had never seen it running. A small, oval shaped, above ground cistern is located behind the RO plant shed. This cistern is estimated to hold about 6,000 to 7,000 gallons and only had a few inches of water in it.

The main residence has a cistern located under the master bedroom pod that was measured at approximately 24 ft long by 15 ft wide by 6 feet deep and has a capacity of about 17,000 gallons. It had about 5 feet of water in it at the time of the survey and is likely replenished by rainfall. Two other smaller cisterns were located on the hillside above the house and only hold about 500-600 gallons each. The caretaker's cottage has 3 separate plastic tanks of similar capacity and are fed

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by rainfall. Any further development on the island should include additional storage in a purpose built cistern.

The existing dock is constructed of wood pilings and decking, is 6 feet wide, about 70 feet long and is built about 7.5 feet above the bay bottom. The water depth at the end of the dock (where the current RO plant intake screen is located) is about 4.5 feet deep and was stirred up and cloudy during the inspection dive. Water clarity improves about 100 feet further out into the bay, although water depth only reaches about 6-7 feet in this area and the bay bottom is sand and sea grass. The bay faces north and is subject to the north swells prevalent in the winter, but is protected by a shallow reef off shore. Deeper water of about 18-20 feet is found on the back side of the reef, between the reef and the bay shoreline.

#### Proposed Water Supply Options:

Option 1 – Temporary Containerized RO plant – This option proposes a 25,000 GPD seawater RO plant installed in a 20 ft container. This approach has been used successfully on several other island projects in the Caribbean (including LSJ island) and allows a mobile plant to be sited temporarily to provide water for development until a final plant location, building, and production size has been determined. Depending on the location of the container, a small concrete pad or vault would need to be built near the shoreline and would house a seawater intake pump and priming system that would provide raw seawater to the plant.

We would assume a 200 ft long intake pipe of 4-inch diameter would be needed and the intake pump and container would be no more than 500 feet apart and at roughly the same elevation. A temporary “bladder tank” of 15,000 gallons could be located adjacent to the container plant to store the plant’s production and a forwarding pump would be located inside the container to transfer the water from the bladder tank to the main residence cistern. The following assumptions are taken with budgetary costing for this option:

- Due to the numerous uncertainties as to plant location, cost is only budgetary. We have attempted to price out all intake and RO equipment, bladder tank, and container. We have made assumptions on the intake installation and yard piping.
- GSJ would provide equipment for unloading placing the container on site and for all trenching and restoration.
- Pricing is FOB Miami and GSJ is responsible for shipping, clearing, excise, duty, and local delivery to the island.
- GSJ to obtain all local and federal permits for the plant construction and seawater intake.

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- GSJ to provide a reliable source of three phase power, either 208 volt or 480 volt for the plant and intake pump, with a properly sized conduit and wire set to each location. If WAPA power is not available, a trailer mounted generator would be required.
- Seawater Supply, including estimation of intake piping installation: \$65,000
- 25 Kgals/day SWRO installed in 20 foot container: \$207,000
- Bladder Tank: \$18,000

Option 2 – Temporary Containerized RO plant with Expansion Capacity – This option proposes an initial 25,000 GPD seawater RO plant installed in a 20 ft container until the final plant building and production size has been determined. Depending on the size selected for the final plant, a small concrete pump house would be built near the shoreline and would house a priming system, seawater intake pump that would provide raw seawater to the plant with additional space for more intake pumps and controls. The seawater intake suction pipe and screen would be sized for the final build out plant. Depending on the interval between the temporary plant install and the final plant building completion and the condition of the “temporary “ plant, the temporary plant could be removed from the container and the equipment installed inside the building alongside a new 25,000 GPD RO skid, although this approach poses some installation issues. This would result in two identical “trains” of 25,000 gpd capacity each for a combined capacity of 50,000 gpd.

We would assume a 200 ft long intake pipe of 6-inch diameter would be needed and the intake pump house and container would be no more than 500 feet apart and at roughly the same elevation. A temporary “bladder tank” of 15,000 gallons could be located at the plant to store the plant’s production and a forwarding pump would be located inside the container to transfer the water from the bladder tank to the main residence cistern. The following assumptions are taken with budgetary costing for this option:

- Due to the numerous uncertainties as to plant location, cost is only budgetary. We have attempted to price out all intake and RO equipment, bladder tank, and container. We have made assumptions on the intake installation and yard piping.
- GSJ would provide equipment for unloading placing the container on site and for all trenching and restoration.
- Pricing is FOB Miami and GSJ is responsible for shipping, clearing, excise, duty, and local delivery to the island.
- GSJ to obtain all local and federal permits for the plant construction and seawater intake.

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- GSJ to provide a reliable source of three phase power, either 208 volt or 480 volt for the plant and intake pump, with a properly sized conduit and wire set to each location. If WAPA power is not available, a trailer mounted generator would be required.
- Seawater Supply, including estimation of intake piping installation: \$101,000
- 25 kgals/day SWRO installed in 20 foot container: \$207,000
- Equipment for additional 25,000 GPD (total of 50,000 GPD) capacity and moving existing containerized equipment to new building: \$165,000
- Bladder Tank: \$18,000

Option 3 – Final Build-out Full Capacity Plant – This option proposes a single train plant of 50,000 GPD RO plant installed inside the fully completed island maintenance facility. A small concrete pump house would be built near the shoreline and would house a priming system and two seawater intake pumps that would provide raw seawater to the plant. The seawater intake suction pipe and screen would be sized for the final build out plant

We would assume a 200 ft long intake pipe of 6-inch diameter would be needed and the intake pump house and purpose built facility no more than 500 feet apart and at roughly the same elevation. A completed cistern would be located at or near the maintenance facility with a capacity of approximately 100,000 gallons. Forwarding pumps would be located inside the plant building to transfer the water from the storage cistern to the main residence cistern or other areas on the property. The following assumptions are taken with costing this option:

- Due to the numerous uncertainties as to plant location, cost is only budgetary. We have attempted to price out all intake and RO equipment, bladder tank, and container. We have made assumptions on the intake installation and yard piping.
- GSJ would provide equipment for unloading placing the container on site and for all trenching and restoration.
- Pricing is FOB Miami and GSJ is responsible for shipping, clearing, excise, duty, and local delivery to the island.
- GSJ to obtain all local and federal permits for the plant construction and seawater intake.
- GSJ to provide a reliable source of three phase power, either 208 volt or 480 volt for the plant and intake pump, with a properly sized conduit and wire set to each location. If WAPA power is not available, a trailer mounted generator would be required.

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- Seawater Supply, including estimation of intake piping installation: \$101,000
- 50,000 GPD SWRO: \$295,000

We understand that much thought needs to be taken with how the island infrastructure will grow and selecting which path to take forward. We trust this budgetary pricing will help in that decision. We look forward to working with GSI on this project and will be happy to adjust our approach as needed.

Best Regards,

*Robert J. Petersen*

Robert J. Petersen, TSG Water Resources, USVI, Inc.

General Manager

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Chip Harris- TSG

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