

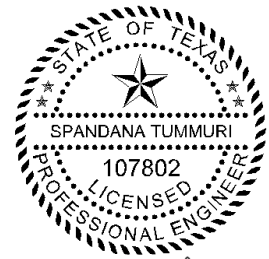
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**FROM:** Spandana Tummuri

**SUBJECT:** Detailed Strategy Evaluation (Task 1105)

**DATE:** 2017/11/30

**PROJECT:** Raw Water Supply Master Plan 16-015-1 (SJR15616)



FREESE AND NICHOLS, INC.  
TEXAS REGISTERED  
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F-2144

## INTRODUCTION

The San Jacinto River Authority (SJRA) retained Freese and Nichols, Inc. (FNI) to develop a raw water supply master plan (RWSMP) for their Highlands and Lake Conroe Divisions which, in turn, serves the Groundwater Reduction Plan (GRP) and The Woodlands Divisions. The initial scope of work included completion of Tasks 1102 through 1105 listed below. An amendment was issued to the initial scope of work to perform additional work in Task 1105 and for the completion of Task 1107.

1. Task 1102: Evaluation of Demand Scenarios
2. Task 1103: Evaluation of Supply Scenarios and Needs
3. Task 1104: Preliminary Strategy Identification and Evaluation
4. Task 1105: Strategy Evaluation and Selection
5. Task 1107: Strategy Portfolio and Implementation Plan Development

The purpose of this technical memorandum is to summarize the analyses developed for the various water supply strategies considered for detailed strategy evaluation. Technical Memoranda for Tasks 1102, 1103, and 1104 summarize the evolution of the RWSMP by way of describing the future demands for the SJRA service area, available supplies, the projected needs/surplus in the SJRA service area, and the preliminary strategy identification and evaluation. The objective of the detailed strategy evaluation task was to conduct a detailed review of select strategies of particular interest to SJRA and determine the feasibility of considering these strategies as potential future source of supply to be included in the SJRA supply portfolio.

In Task 1104, preliminary strategy identification and evaluation, a list of approximately 30 projects were developed for the Lake Conroe and Highlands service areas. The purpose of Task 1104 was to identify the most promising supply options for detailed evaluation and a screening process was developed to uniformly evaluate the universe of supply options on a high-level, preliminary basis. Of the 30 projects identified in Task 1104, SJRA will eventually select the supply option that is most viable for its planning triple bottom line approach (economics, environment, and social benefits). Evaluation of each and every supply options in a detailed manner and determination of the feasibility of the supply option in meeting

the planning triple bottom line is an expensive process. Therefore, SJRA has selected a short list of strategies to be considered for detailed review and additional strategy evaluation.

## **Supply Strategies**

SJRA's Montgomery County service area includes the current and potential future Groundwater Reduction Plan (GRP) Participants. SJRA's Highlands service area includes various industrial, irrigation, and municipal customers in eastern Harris County. The Task 1104 Technical Memorandum includes the list of future supply sources or strategies considered as the potentially viable sources for meeting SJRA's future needs in the two service areas. Below, is a short list of the strategies that SJRA has selected for a detailed strategy evaluation and feasibility analysis for the Montgomery County and Highlands service areas.

### **A) Projects to supply water to the Montgomery County service area**

- 1) Transfer of water from Lake Livingston to Lake Conroe
- 2) Catahoula Aquifer Supplies
- 3) Regional return flows above Lake Conroe and within West Fork San Jacinto River for collection and transmission to Lake Conroe
- 4) Water Conservation

### **B) Projects to supply water to the Highlands service area**

- 1) Regional return flows above Lake Houston
- 2) Transfer of water from Lake Livingston to Highlands

## **Strategy Descriptions**

Lake Livingston Transfer – SJRA has signed an agreement with the Trinity River Authority (TRA) for the option to purchase up to 50,000 acre-feet of water per year from TRA's existing supplies within Lake Livingston. The 50,000 acre-feet of supply is apportioned from TRA's existing rights associated with Lake Livingston and the Wallisville Saltwater Barrier. The supplies from the Lake Livingston agreement with TRA could potentially be delivered using existing means or through a new conveyance. In the Highlands system, SJRA currently contracts with CWA to convey its Trinity River Basin run-of-river rights to the Highlands system service area through the existing CWA Main Canal. An additional new conveyance system is required to deliver the water from Trinity River Basin to the Montgomery County service area. Water may be delivered to Lake Conroe or directly to the treatment plant SJRA owns and operates for the GRP Division. A new inter-basin transfer permit is required to move these Livingston supplies to Lake Conroe.

Catahoula Aquifer Supplies – This project represents various options for the development of groundwater wells in the Catahoula Aquifer in Montgomery County. Some approaches to the project can be implemented by SJRA customers within the county while others will require active development by SJRA. A previous study focused on multiple strategies that would be developed by SJRA. The Catahoula groundwater supplies can be discharged to Lake Conroe as a raw water supply, transferred to the existing (expanded) Water Treatment Plant (WTP) to develop treated supplies, or blended with the WTP product water to develop a combined supply of adequate quality. Similarly, the participants can develop the Catahoula groundwater supplies either as a treated option or a blended option.

Regional Return Flows – The projected population growth in Montgomery and Harris Counties is expected to result in the generation of significant volumes of future return flows. Three different scenarios are considered in this study for using this supply strategy: permitting return flows generated in the

Montgomery County service area for diversion at Lake Conroe for treatment at the GRP treatment plant, permitting return flows generated in the Lake Houston watershed for diversion at Lake Houston for use in the Highlands system, and permitting return flows in the Lake Creek watershed area for treatment at the SJRA water treatment plant for use by GRP customers. Opportunities exist through existing contractual arrangements to acquire these return flows and others may be developed through other contractual terms.

Conservation – Water conservation decreases or attenuates future supply needs through demand reduction. The demands projected for SJRA and all of Montgomery County as part of the 2016 Regional Water Plan for Region H have an embedded quantity of conservation savings. This quantity has been estimated by the Texas Water Development Board (TWDB) based on the assumption that water will be saved as a result of anticipated future, natural installation of plumbing fixtures and appliances. The reduction in demands because of these basic efforts is termed as the baseline conservation recommended by TWDB. Regional conservation estimates were developed as part of the Goldwater Study and included in the Region H regional plan. These estimates provide an additional set of conservation savings owing to regional efforts. These opportunities were considered along with the specific targets in SJRA's current water conservation plan to evaluate opportunities at water demand reduction.

### **Detailed Strategy Evaluation**

Each of the strategies described in the previous section were considered for the detailed strategy evaluation. In the detailed strategy evaluation, the multiple alternatives for developing the strategy were considered and discussed. The detailed strategy evaluation includes defining the strategy, determining the infrastructure required to develop the strategy, identifying potential environmental and permitting requirements, estimate planning level opinions of probable costs, and a revised screening of the strategy to determine the feasibility of the strategy to serve as the most viable alternative for SJRA's future needs compared to the others.

A strategy technical memorandum was developed for each of the strategy types and are attached to this memorandum. It should be noted that the purpose of Task 1105 is to provide information on the strategies based on a detailed technical evaluation. Selection of preferred strategies amongst those evaluated in Task 1105 and sorting of these strategies into various portfolios (groups of strategies) will be addressed in Task 1107 Technical Memorandum.

Each strategy type considered for detailed evaluation was analyzed for the multiple alternatives in which the strategy could be implemented either by SJRA or their customers. The detailed strategy Technical Memoranda include strategy definition, infrastructure requirements, cost estimates, environmental and permitting requirements, and an overall scoring of the strategy based on the multiple scoring criterion identified by SJRA in Task 1104. The planning-level cost estimates were based on August 2017 price indices. Where applicable, pipeline routes and the associated environmental and permitting issues were identified and discussed. However, it should be noted that the pipeline alignments were routed based on preliminary information available from a desktop survey and these routes and the analyses must be refined during feasibility phase of the strategy evaluations. The strategy Technical Memoranda are attached to this section.