

State Politics, Water Supply, and Systems Engineering

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Abstract. Tarrant Regional Water District (TRWD) was established in 1924 with two primary missions – flood control and water supply in and around Tarrant County, Texas. TRWD’s current 11 county service area population of 1.8 million is projected to be 2.25 million by 2050. Sustainability will be key in meeting these growing demands. In 1997, the 75th Texas Legislature passed Senate Bill 1 aimed at improving development and management of the state’s water resources by establishing a regional water planning process. In terms of systems engineering doctrines, Texas basically established a state wide water resources super system or system of systems and provided the associated concept development stage process for the state’s designated planning regions to execute on an iterative and recurring five year cycle. With respect to sustainability, Senate Bill 1 also directed that water conservation options and actions be integral to the water supply planning, permitting and operational developments. Part of TRWD’s sustainable water supply is a 2,000 acre constructed wetlands put online in 2013. This paper examines TRWD’s constructed wetlands from the systems engineering and sustainability perspectives. From the systems engineering standpoint, the Richland Chambers (RC) Wetlands Facility was designed and constructed using a multi-phased prototype approach allowing TRWD to research and evaluate treatment performance, operation and maintenance issues, and design criteria through actual field trials and implementation. The RC Constructed Wetland meets the State’s conservation (sustainability) requirement in that the developed indirect reuse system successfully treats and enhances the quality of the Trinity River return flows from TRWD’s service area prior to discharging back into Richland Chambers Reservoir for the return trip to the service area. The net achievement is adding the equivalent of a new source to TRWD’s water supply inventory without building a new reservoir or transmission conveyance (system capacity upgrade), achieving the State required conservation (recycling) mandate in Senate Bill 1 with indirect reuse, and maintaining the existing environmental water quality in Richland Chambers Reservoir with the removal of nutrients and sediments.