6.3 Hydrological Monitoring

At the STP site, both surface water and groundwater are used for station purposes. Groundwater provides onsite drinking water for station personnel, replenishes the Essential Cooling Pond, and is used for other onsite industrial purposes. Surface water provides cooling water for the units. Under provisions of Section 402 of the Clean Water Act (CWA) and Chapter 26 of the Texas Water Code (TWC), STPNOC is permitted to treat and discharge wastewater from the plant to the Main Cooling Reservoir (MCR) and Colorado River. This section discusses the hydrological monitoring program that will be implemented to monitor the effects of STP 3 & 4 at the site on surface water, groundwater, and storm water. ER Sections 2.3, 4.2, and 5.2 discuss hydrologic conditions, water related construction impacts, and water related operational impacts, respectively.

ER Section 2.3.1 discusses the locations of surface waters and surface water features, geomorphic and regional geology, including several figures. The permits covering withdrawal of water from the Colorado River and discharges to the Colorado River and the MCR focus on protecting the Colorado River. The MCR is operated as part of a closed-cycle cooling water system, and there are no routine discharges from it to the Colorado River. Consequently, the potential impacts to the Colorado River are limited and the hydrologic monitoring requirements in the applicable permits focus on these potential impacts. As a result, the bathymetry information mentioned in NUREG-1555 would not be useful in designing or reviewing the hydrologic monitoring systems for STP 3 & 4, and has not been obtained. Similarly, since the design of these monitoring systems would not be affected by the velocity of flows in the river or groundwater, STPNOC has not obtained such data.

6.3.1 Existing Hydrological Monitoring

Hydrological monitoring at STP includes surface water, groundwater, and storm water. Each program is discussed below.

6.3.1.1 Surface Water

Presently, STPNOC conducts hydrological monitoring of surface waters (effluents) in accordance with Texas Pollutant Discharge Elimination System (TPDES) Permit No. WQ0001908000 (Reference 6.3-1). Surface water monitoring includes monitoring flow from permitted outfalls as summarized in Table 6.3-1. Flow totalizers, which are calibrated annually, are used to record flow at each outfall. The total flow is tabulated on a daily basis and reported to Texas Commission on Environmental Quality (TCEQ) on a monthly basis. Figure 6.3-1 depicts the existing hydrological surface water effluent monitoring locations. It is important to note that all outfalls, with the exception of Outfall 001, discharge internally to the MCR. Also, while the final treated effluent from the plant (via the MCR) is designed to be discharged via Outfall 001, no discharge at this outfall has occurred since March 1997. In compliance with the TCEQ Water Rights, STPNOC monitors monthly surface water diverted and consumed from the Colorado River and reports it to TCEQ on an annual basis. STPNOC also monitors the volume of surface water diverted from the Colorado River and reports this data on an annual basis to the Texas Water Development Board (TWDB) (Reference 6.3-2).

6.3.1.2 Groundwater

STPNOC monitors groundwater usage from the five water supply wells that serve the facility (Well 5, 6, 7, 8, and Nuclear Training Facility [NTF] Well) and submits the results to the Coastal Plains Groundwater Conservation District, the TCEQ, and TWDB. Table 6.3-2 summarizes the parameters monitored for groundwater supply-wells. As part of the pre-construction phase, groundwater levels will be monitored at the tritium sampling locations as identified in Table 6.3-3. Figures 6.3-2 and 6.3-3 depict the groundwater monitoring well locations. Also, the nuclear industry, in conjunction with the Nuclear Energy Institute, has initiated a program to collect groundwater data at commercial nuclear sites. STPNOC has participated in this program, and anticipates further participation as guidance is developed. Measurements of groundwater elevations are obtained via either a water level indicator or a portable well sounder. Water elevation is a reference elevation at the well head minus the marked distance on the probe.

6.3.1.3 Storm Water

Storm water is monitored and sampled as described in STPNOC's Industrial Storm Water Pollution Prevention Plan (SWPPP), in accordance with the TPDES Multi-Sector General Permit (Permit No. TXR050000) (Reference 6.3-3). The objectives of the SWPPP are to ensure that potential sources are evaluated and that appropriate measures are designed and implemented to prevent/control the discharge of pollutants in storm water. There are eight storm water outfalls (A-H), but only four are associated with industrial activity (A, E, F, G). The outfalls are monitored for flow (discharge) during precipitation events in accordance with the SWPPP. Figure 6.3-4 depicts the location of the outfalls.

6.3.2 Construction and Preoperational Monitoring

6.3.2.1 Surface Water/Storm Water

Before construction of the new units, STPNOC will prepare an SWPPP as required by TPDES General Permit (TXR150000) (Reference 6.3-4) for Storm Water Discharges from Large Construction Activities. The plan will provide for periodic visual inspection of erosion and sediment control best management practices. The plan will also describe a monitoring program that meets specific criteria outlined in the General Permit. U.S. Army Corps of Engineers permits will be obtained as needed for impacts to rivers, wetlands, and other water bodies affected by construction. Any monitoring of the Colorado River required in conjunction with permits associated with construction/upgrades of the barge facility or the water intake or discharge structures will be conducted in accordance with a Water Quality Certification issued under Section 401 of the Clean Water Act.

Surface water flow monitoring will continue at the TPDES monitored outfalls for STP 1 & 2 throughout the construction and preoperational period to determine effects, if any, of the construction and preoperation of STP 3 & 4 on effluent flows from the STP site.

6.3.2.2 Groundwater

As part of preconstruction activities, 28 groundwater observation wells (13 pairs, 2 single) were installed at the STP site in 2006 to establish groundwater levels, flow paths, and gradients near the new units in the shallow and deep aquifers. ER Section 2.3.1 discusses the results of this monitoring of the new wells, which are summarized in Table 6.3-3 and depicted on Figures 6.3-2. Monthly water level measurements from these groundwater observation wells began in December 2006. Monthly groundwater levels were collected through December 2007 from the STP 3 & 4 observation wells. The results of the monitoring program are discussed in Subsection 2.3.3. These monitoring programs support the baseline groundwater hydrological conditions for the new units. As part of the detailed design for STP 3 & 4, the current STP groundwater programs will be evaluated with respect to the addition of STP 3 & 4 to determine if any modification of the existing programs is required to adequately monitor plant effects on the groundwater. Groundwater level measurements in the Deep and Shallow Aquifers will be collected starting during construction. Groundwater monitoring will continue throughout plant construction to monitor for changes in groundwater/surface water due to potential construction effects, including dewatering. Although no significant long-term impacts to groundwater aquifers are anticipated during construction, monitoring will provide a means of detecting any unanticipated changes should they occur. STPNOC will use best management practices to protect the deep aquifer from impact during the construction process, such as controls for wellhead protection, cross connection, etc. In the event impacts to the groundwater resource are discovered by monitoring or other means, and these impacts are significantly different from those previously analyzed by the NRC, this information will be provided to the NRC for review, as appropriate

6.3.3 Operational Monitoring

Operational monitoring programs for surface water, groundwater, and storm water will be developed in coordination with the TCEQ, TWDB, and the NRC and incorporated into new or amended surface water (TPDES) permit(s), groundwater use permits, and storm water monitoring permit(s). These permits and/or requirements will address required monitoring. Based on the current operational monitoring for STP 1 & 2, it is anticipated that similar surface water and storm water monitoring programs will be implemented for STP 3 & 4, specifically effluent and flow monitoring at new relevant outfalls/drainage discharge points from the new plant area and at any new site outfalls into the MCR. Before initiation of new unit operations, the existing STP SWPPP will be revised and submitted to TCEQ to include the new units, as required by the TPDES Permit for Industrial Stormwater Discharges. Groundwater monitoring relevant to reporting requirements for water use will also be similar to existing reporting requirements for STP 1 & 2.

6.3.4 References

6.3-1 Texas Commission on Environmental Quality, Texas Pollutant Discharge Elimination System (TPDES) Permit to Discharge Wastes under provisions of Section 402 of the Clean Water Act and Chapter 26 of the Texas Water Code – Permit No. WQ0001908000, Austin, Texas, July 27, 2005.

6.3-2 Texas Commission on Environmental Quality, TCEQ; Texas Water Development Board, TWDB Annual Water Use Reports - 2006, South Texas Project Electric Generating Station, February 22, 2007.

6.3-3 Texas Commission on Environmental Quality, Multi-Sector Permit– Permit No. TXR050000, Austin, Texas, August 20, 2001.

6.3-4 Texas Commission on Environmental Quality, TPDES General Permit No. TXR150000, Austin, Texas, March 5, 2003.

Table 6.3-1 TPDES Effluent Hydrological Monitoring Program

Monitoring Location (STP 1 & 2)	Constituents (units)	Frequency	Sample Type
001 (Final Plant Discharge [combined waste streams from STP 1 & 2])	Flow (MGD)	Continuous [1]	Record
001 (Final Plant Discharge [combined waste streams from STP 1 & 2]) – at Colorado River	Flow (MGD)	1/day [1]	Estimate
101 (STP 1 & 2 low volume waste sources/metal cleaning waste system discharge)	Flow (MGD)	1/day	Estimate
201 (Units 1 and 2 low volume waste discharges and storm water)	Flow (MGD)	1/day	Estimate
401 (Units 1 and 2 sanitary waste, car wash discharge, and air conditioning condensate)	Flow (MGD)	1/day	Estimate
501 (Units 1 and 2 metal cleaning waste)	Flow (MGD)	1/day	Estimate
601 (Units 1 and 2 sanitary sewage, air conditioning condensate, and HVAC blowdown)	Flow (MGD)	1/day	Estimate

[1] When discharge occurs

MGD – million gallons/day

Source - Reference 6.3.1

Table 6.3-2 Existing Groundwater Pumping Wells

Well Number	Capacity, gpm	Construction Well Depth, ft Below Ground	Parameters Monitored
5	500	700	Gallons Pumped/minute
6	500	700	Gallons Pumped/minute
7	500	700	Gallons Pumped/minute
8	250	600	Gallons Pumped/minute
NTF Well	200	600	Gallons Pumped/minute

Table 6.3-3 Preconstruction Groundwater Hydrological Monitoring Program

Well ID	Monitoring Program		Parameter
	Operational	Combined Operating License	Water Elevation
~~TRITIUM WELLS~~			
~~Piezometer Well # 415 (Station #255)~~	~~√~~		~~√~~
~~Piezometer Well # 417 (Station #256)~~	~~√~~		~~√~~
~~Piezometer Well # 421-02 (Station #257)~~	~~√~~		~~√~~
~~Piezometer Well # 435-01 (Station #258)~~	~~√~~		~~√~~
~~Piezometer Well # 435-02 (Station #259)~~	~~√~~		~~√~~
~~Piezometer Well # 437 (Station #260)~~	~~√~~		~~√~~
~~Piezometer Well # 446 (Station #205)~~	~~√~~		~~√~~
~~Piezometer Well # 446A (Station #206)~~	~~√~~		~~√~~
~~Piezometer Well # 447 (Station #263)~~	~~√~~		~~√~~
~~Piezometer Well # 447A (Station #264)~~	~~√~~		~~√~~
~~Piezometer Well # 602A (Station #266)~~	~~√~~		~~√~~
~~Test Well B-3 (Station #235)~~	~~√~~		~~√~~
~~Windmill North of Heavy Haul Rd near Well #417 (Station #267)~~	~~√~~		~~√~~
~~Windmill East of MCR (Station #268)~~	~~√~~		~~√~~
~~Water well located on private property approx.1 mile south of MCR reservoir on private land (Station #245)~~	~~√~~		~~√~~
~~Windmill South of the East corner of STP MCR on private land (Station #269)~~	~~√~~		~~√~~
~~Test Well B-4, upper aquifer (Station #251)~~	~~√~~		~~√~~
PRE-APPLICATION WELLS			
OW-308 U/L		√	√
OW-332 U/La		√	√
OW-348 U/L		√	√
OW-349 U/L		√	√
OW-408 U/L		√	√
OW-420 U		√	√
OW-438 U/L		√	√
OW-910 U/L		√	√
OW-928 U/L		√	√
OW-929 U/L		√	√
OW-930 U/L		√	√
OW-931 U		√	√
OW-932 U/L		√	√
OW-933 U/L		√	√
OW-934 U/L		√	√

U – Upper aquifer
L – Lower aquifer

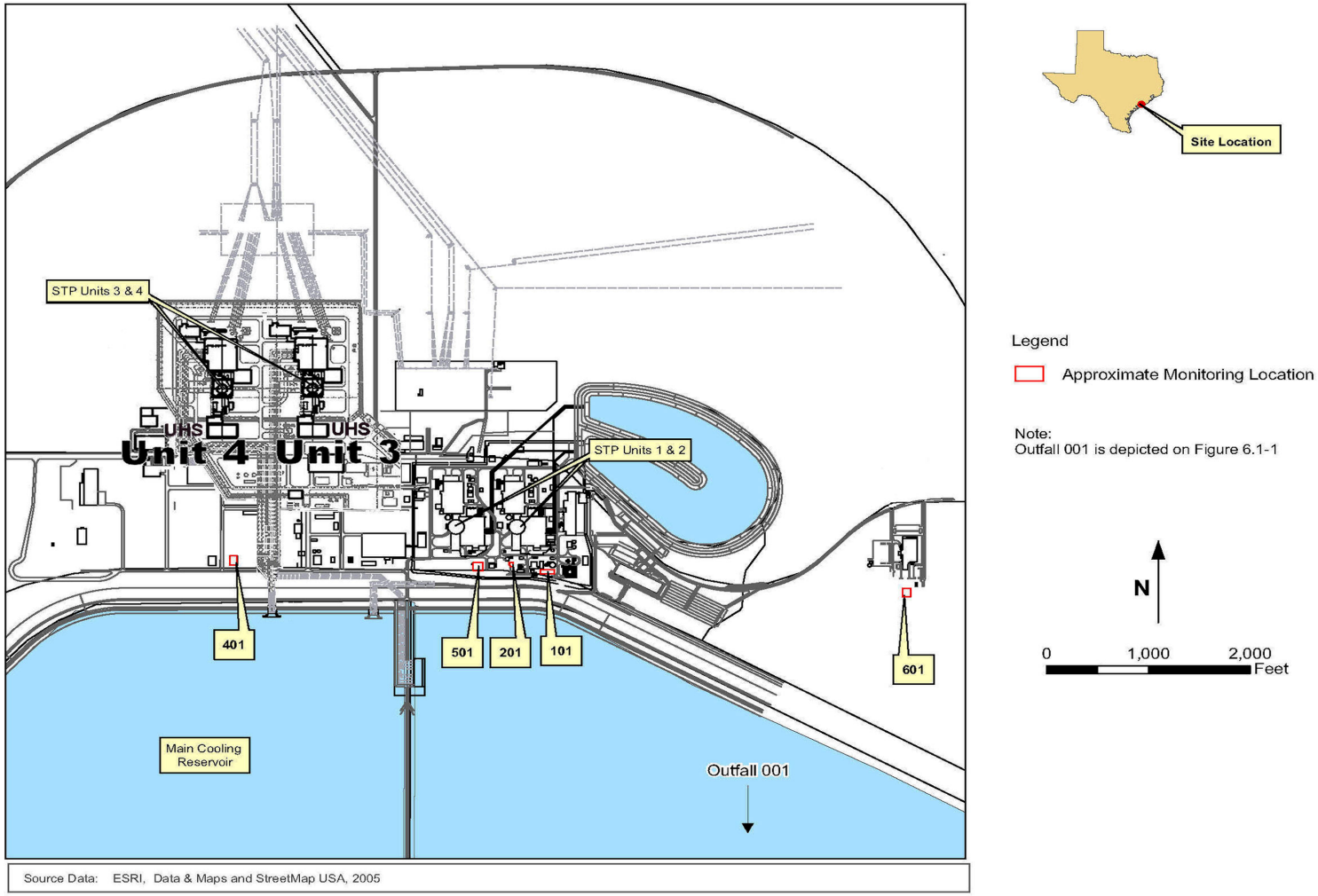
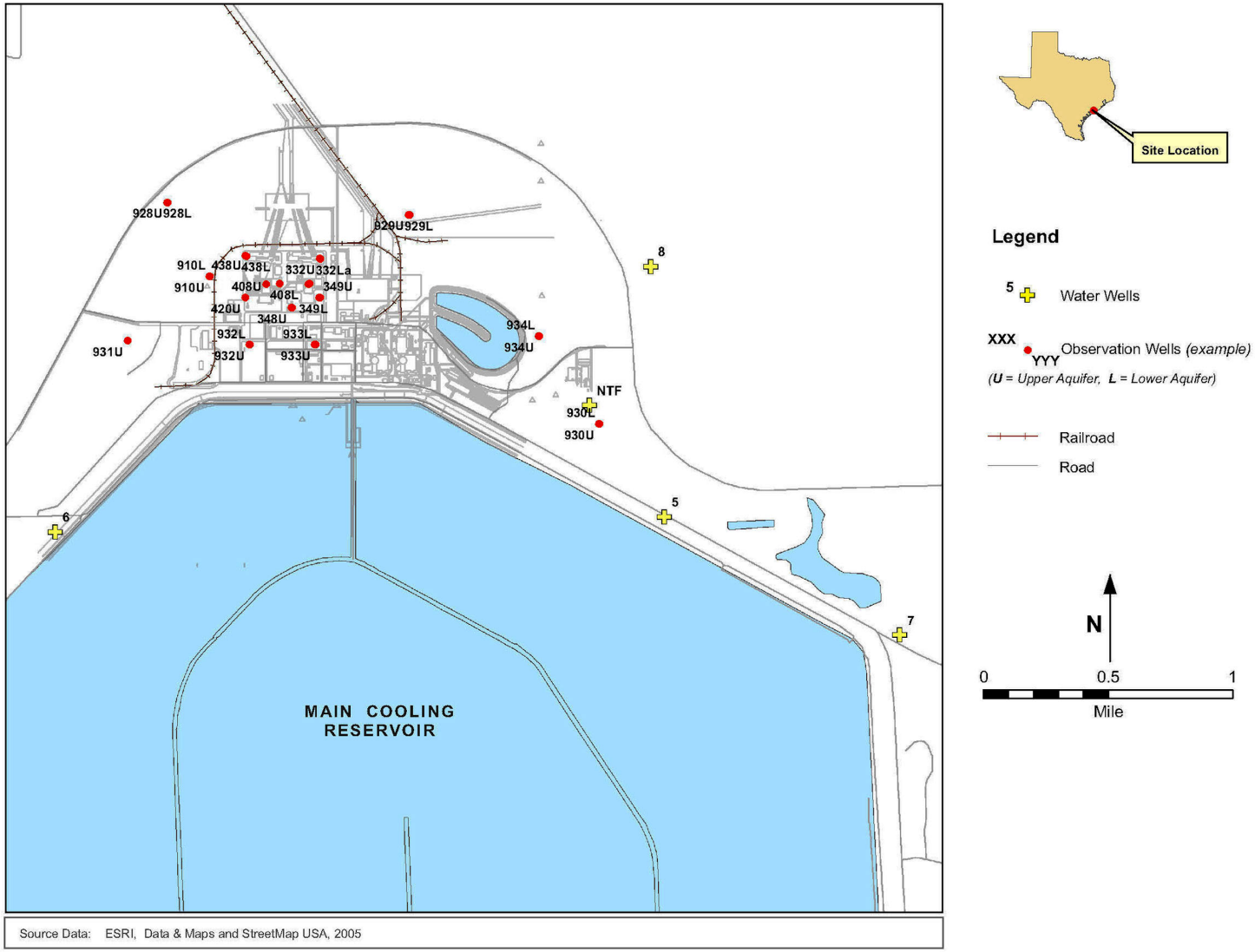


Figure 6.3-1 Existing Hydrological Monitoring Locations – Surface Water



Source Data: ESRI, Data & Maps and StreetMap USA, 2005

Figure 6.3-2 Hydrological Monitoring Locations - Groundwater

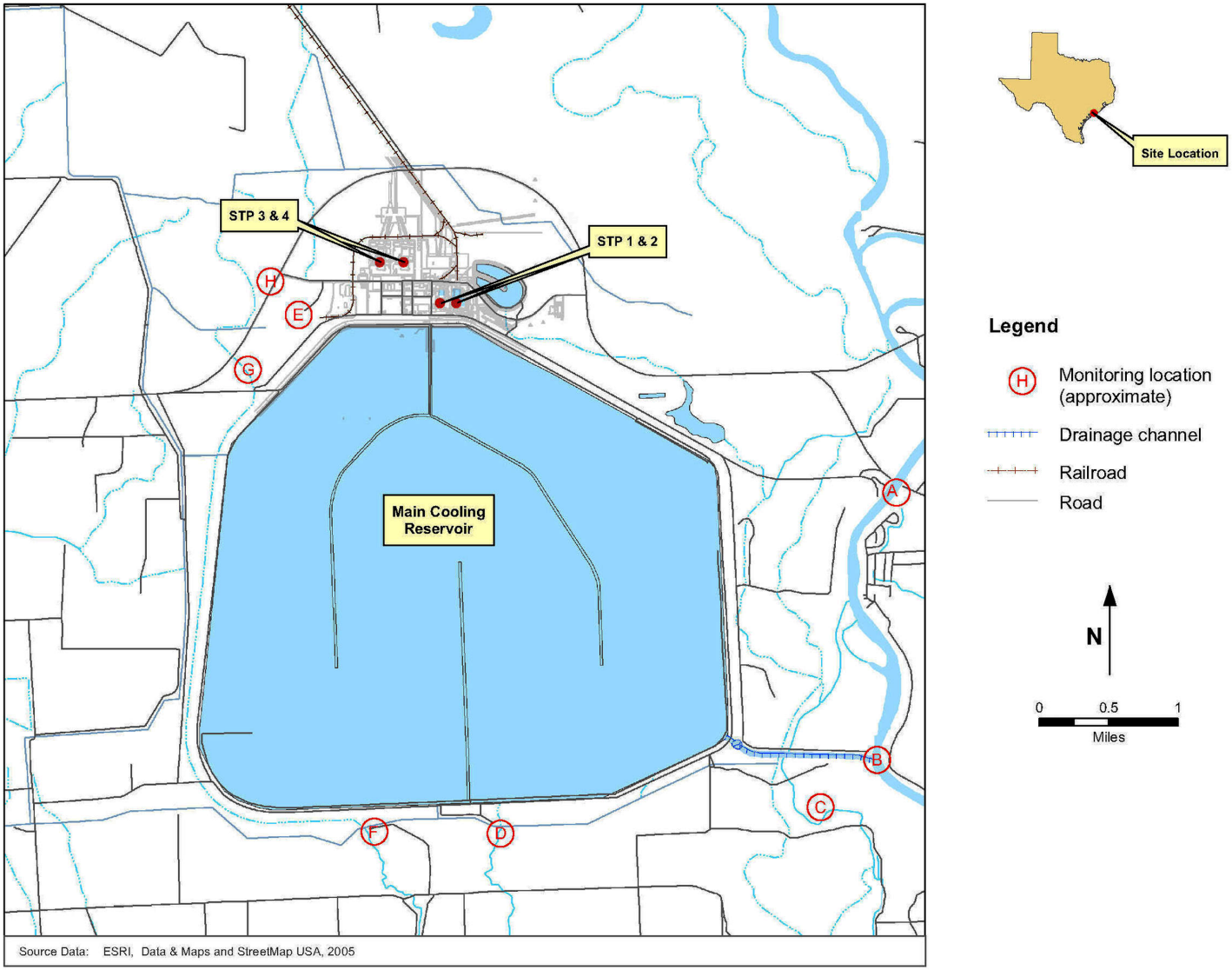


Figure 6.3-3 Storm Water Monitoring Locations