

Aquifer Protection Permit 511628
 Place ID #147575, LTF #61327
**South Houghton Area Recharge Project
 (SHARP)**

The Arizona Department of Environmental Quality (ADEQ) proposes to issue an Aquifer Protection Permit for the subject facility that covers the life of the facility, including operational, closure, and post-closure periods unless suspended or revoked pursuant to A.A.C. R18-9-A213. This document gives pertinent information concerning the issuance of the permit. The requirements contained in this permit will allow the permittee to comply with the two key requirements of the Aquifer Protection Program: 1) meet Aquifer Water Quality Standards at the Point of Compliance; and 2) demonstrate Best Available Demonstrated Control Technology (BADCT). The purpose of BADCT is to employ engineering controls, processes, operating methods or other alternatives, including site-specific characteristics (i.e., local subsurface geology) to reduce discharge of pollutants to the greatest degree achievable before they reach the aquifer, or to keep pollutants from reaching the aquifer.

I. FACILITY INFORMATION

Name and Location

Name of Permittee:	City of Tucson - Tucson Water Department (TWD)
Mailing Address:	P.O. Box 2721 Tucson, Arizona 85726
Facility Name and Location:	City of Tucson - South Houghton Area Recharge Project (SHARP) 5700 South Houghton Road Tucson, Arizona 85747 Pima County

Regulatory Status

The South Houghton Area Recharge Project (SHARP) is a new facility. The Individual Aquifer Protection Permit application was received on June 26, 2015.

Facility Description

The City of Tucson – Tucson Water Department (TWD) is authorized to operate the South Houghton Area Recharge Project (SHARP) recharge/underground storage facility. The SHARP is designed to recharge up to 7,414,460 gallons per day (gpd) with a maximum total of 4,000 acre-feet per year (ac ft/yr) of Class A Reclaimed Water from the TWD - Houghton Reclaimed Reservoir (HRR) (APP #100147) and in addition to a minor amount of water will be pumped directly into the reclaimed distribution system from recovery well EW-007A. The SHARP Basins (recharged basins) are located within a 40-acre desert landscaped parcel (141-01-007G) owned by TWD adjacent to the HRR approximately 0.4 miles west of Houghton Road, south of Drexel Road.

The SHARP will consists of three (3) recharge basins that cover 6.8 acres total of wetted surface area. The individual basins are laid out in a triangular pattern to conform to local topography. Reclaimed water will be gravity fed through TWD’s distribution systems 30-inch transmission pipeline, which runs along the west and south boundaries of the SHARP site to the basins where the water will percolate through the vadose zone to the regional aquifer. The permittee has underground Storage Facility and Water Storage Permits issued by Arizona Department of Water Resources (ADWR) for this facility.

The recharge basins will be operated using alternating wetting (filling) and drying cycles. Based on the results of recharge parameters and maintenance operations from other facilities, the sustainable infiltration rates at SHARP are projected to average over 7 feet per day. With a projected 50-percent duty cycle, and six months of recharge per year, and an estimated average sustainable infiltration rate greater than 7 feet per day, the proposed permit volume of 4,000 AF/YR can be accommodated at the facility.

The depth to groundwater at the site is approximately 350 feet below land surface (bls). The overall direction of groundwater flow is to the west-northwest.

The site includes the following permitted discharging facilities:

Facility	Basin Size	Latitude	Longitude
Recharge Basin #1	2.21 acres	32° 08' 50" North	110° 46' 55" West
Recharge Basin #2	2.23 acres	32° 08' 46" North	110° 47' 05" West
Recharge Basin #3	2.34 acres	32° 08' 50" North	110° 46' 06" West

II. BEST AVAILABLE DEMONSTRATED CONTROL TECHNOLOGY (BADCT)

Not applicable per A.A.C. R18-9A201(C) for a storage facility.

Recharge Basin # 1

The basin is irregular in shape with minimum 60-foot diameter radius and is approximately 2.21 acres in size. The basin is approximately 6.75 feet deep (average) with a bottom elevation of 2866.0 (low end). Basin side slopes will be 3H:1V (Horizontal:Vertical); one foot of aggregate base (3-inch minus) with compacted subgrade (95-percent); with a geotextile filter fabric (on-slope) in contact with the aggregate base. A 15-foot wide access ramp with 6H:1V slope will be provided into Recharge Basin 1.

Recharge Basin # 2

The basin is irregular in shape with minimum 60-foot diameter radius and is approximately 2.23 acres in size. The basin is approximately 9.50 feet deep (average) with a bottom elevation of 2861.0 (low end). Basin side slopes will be 3H:1V; one foot of aggregate base (3-inch minus) with compacted subgrade (95-percent); with a geotextile filter fabric (on-slope) in contact with the aggregate base. A 15-foot wide access ramp with 6H:1V slope will be provided into Recharge Basin 2.

Recharge Basin # 3

The basin is irregular in shape with minimum 60-foot diameter radius and is approximately 2.34 acres in size. The basin is approximately 9.00 feet deep (average) with a bottom elevation of 2857.5 (low end). Basin side slopes will be 3H:1V; one foot of aggregate base (3-inch

minus) with compacted subgrade (95-percent); with a geotextile filter fabric (on-slope) in contact with the aggregate base. A 15-foot wide access ramp with 6H:1V slope will be provided into Recharge Basin 3.

III. HYDROGEOLOGIC SETTING

The SHARP site is located within the Tucson Active Management Area in the upper Santa Cruz River sub-basin alluvial aquifer. The SHARP site is near the eastern boundary of the Tucson Basin, which is a structural depression of the Basin and Range physiographic province that covers approximately 1,000 square miles.

Site specific data available from sixteen (16) exploratory boreholes, one deep production well and one deep test well indicate that the geology of the SHARP site consists of unconsolidated to loosely consolidated basin fill alluvium dominated by sands and gravels to a depth of at least 1,200 feet. No significant fine-grained units were intercepted by any of the boreholes or either well. The vadose zone at the SHARP site is approximately 350 feet thick, based on the static water level measured in well F-008A (Tucson Water potable supply well) in March 2014.

The depth to groundwater at the site is approximately 350 feet below land surface (bls), based on a March 2014 measurement at well F-008A, which is located adjacent to the site. Well F-008A is adjacent to the SHARP site and provides a reliable indication of the current water level trend at the site. At F-008A, the water level dropped approximately 58 feet between February 2000 and March 2014. The overall direction of groundwater flow is to the west-northwest. East of the site, the hydraulic gradient is 0.015 or 80 feet per mile and the flow direction is toward the west. West of the site the hydraulic gradient is 0.008 or 43 feet per mile and the flow direction is toward the northwest.

Ambient groundwater quality data are available for Tucson Water potable supply well F-008A, which is screened in the upper 700 feet of the aquifer. The concentrations of common, naturally occurring inorganic contaminants such as arsenic, fluoride, and nitrate, are below Numeric Aquifer Quality Standards. Concentrations of organic constituents were below laboratory reporting limits in sample collected in March 2013.

The source water for the project will be Class A reclaimed water. The current levels of nitrates in the source water are less than 3 mg/L based on 2014 Self-Monitoring Review Forms. Based on the submitted APP application, the land has not been used in the past for agricultural or industrial purposes or waste disposal. The nearest area of known groundwater contamination is at the Broadway-Pantano Water Quality Assurance Revolving Fund (WQARF) Site. The only wells within one mile of the site are owned by the City of Tucson (CoT).

For wells within a one-mile radius of the SHARP site, there are nine wells according to ADWR records. According to the Wells-55 registry records, one well (55-636857) is unlikely to exist; and one well (55-592929) is a cathodic protection well for Southwest Gas. All of the remaining wells are owned by the City of Tucson. Of the City-owned wells, one is potable supply well F-008A and the rest are monitor wells.

POLLUTANT MANAGEMENT AREA (PMA)

Arizona Revised Statutes (A.R.S.) § 49-244(1) defines the pollutant management area (PMA) as “the limit projected in the horizontal plane of the area on which pollutants are or will be placed.” The boundary of the PMA coincides with the boundary of the proposed recharge basins.

DISCHARGE IMPACT AREA (DIA)

The DIA is defined by ARS §49-201(13). The DIA means the potential aerial extent of pollutant migration, as projected on the land surface, as the result of a discharge from a facility. The boundary of the DIA encompasses approximately 34 square miles. It extends approximately 7 miles downgradient (northwest) from the site, 1.5 miles upgradient, 5 miles north, and one mile south.

The projected maximum groundwater level rise in the regional aquifer during simulated recharge and recovery operations at 4,000 AF/YR is approximately 151 feet after 20 years, and projected minimum depth to groundwater level in the regional aquifer is approximately 200 feet bls. Based on the submitted report, these model projections indicate that the storage capacity of the aquifer is more than adequate to accommodate the proposed recharge volume.

The federal NPL or DoD sites that are located within the calculated DIA includes the Davis-Monthan AFB. RW-16 (facility of concern) within the Davis-Monthan AFB Site is located outside the DIA, approximately 2.5 miles west- southwest of SHARP. The other facilities within the the Davis-Monthan AFB Site are within the DIA, but they are more than 5 miles west-northwest of SHARP. In this area, the model predicts that SHARP will contribute less than 2 feet to the regional water table rise and the depth to water will remain at roughly 300 feet bls. No other federal NPL or DoD sites are located within the DIA.

The southern part of the Broadway-Pantano WQARF site is located roughly 5 miles north of SHARP along the north edge of the DIA; it includes Broadway South Landfill. The model predicts that SHARP will contribute only 1.1 feet to a regional water level rise of approximately 25 feet in this area, and the groundwater flow direction is not predicted to change as a result of recharge at SHARP.

IV. STORM WATER/SURFACE WATER CONSIDERATIONS

The SHARP basins will be out of the 100-year floodplain. No perennial, intermittent, or effluent dependent streams are located on the SHARP site. Pantano Wash, an ephemeral stream located more than 1.5 miles east and northeast of the site, is the nearest major watercourse. A small, unnamed ephemeral wash is present along the northeast edge of the site. The flow direction in this wash is to the northwest. The depth of the channel bottom below the surrounding land surface is less than 10 feet in the immediate vicinity of SHARP.

V. COMPLIANCE WITH AQUIFER WATER QUALITY STANDARDS

Monitoring and Reporting Requirements

To ensure that Aquifer Water Quality Standard will be met at the points of compliance in the aquifer, representative samples of the groundwater will be collected from Monitor Well WR-705A (MW-X) and Monitor Well WR-706A (MW-Y) and will be sampled monthly for total coliform,

total nitrogen, nitrate-nitrite as N, and total Kjeldahl nitrogen (TKN), quarterly for metals, and semi-annually for volatile and semi-volatile organic compounds.

Facility inspection and operational monitoring shall be performed on a routine basis.

Point of Compliance (POC)

Points of Compliance (POCs) are established at the following designated locations:

POC #	POC Locations	Latitude	Longitude
1	POC Well WR-705A (MW-X) is located approximately 330 feet northwest (down- gradient) of Recharge Basin No. 3.	32°08'51.96" N	110°47'06.56" W
2	POC Well WR-706A (MW-Y) is located approximately 650 feet southeast (up-gradient) of Recharge Basin No. 2	32°08'45.27" N	110°46'48.14"W

Groundwater monitoring is required at the point of compliance wells.

The Director may amend this permit to designate additional points of compliance if information on groundwater gradients or groundwater usage indicates the need.

VI. COMPLIANCE SCHEDULE

CSI	Description	Due by:	Permit Amendment Required?
3.1	The permittee shall submit a signed, dated, and sealed Engineer's Certificate of Completion in a format approved by the Department that confirms that the recharge basins were constructed according to the Department-approved design report or plans and specifications, as applicable.	Prior to discharging under this permit and within 90 days of completion of construction.	No
3.2	Permittee shall notify ADEQ, of the installation of the two POC wells per Section 2.7.4.2 Well Installation Reports. The wells shall be appropriately screened, with 10 feet above the water table and 30 feet below the water table in the uppermost aquifer, unless an alternative screen length is pre-approved by the Water Permits Section.	Within 90 days of completion of installation.	No
3.3	The permittee shall begin conducting 12 monthly rounds of ambient groundwater monitoring at the two POC wells for the parameters listed in Section 4.2, Table IIA.	Within 30 days after receiving approval of the POC Wells Installation Report from ADEQ.	No
3.4	Monitoring under Table IIA may be discontinued upon completion of 12 rounds of monthly sampling. Notify the Compliance Data Unit to receive SMRFs and begin monitoring per Section 4.2, Table IIB.	Within 30 days of completion of ambient groundwater	No
3.5	If an exceedance of Aquifer Water Quality Standard (AWQS) in POC #1 is analyzed during the ambient monitoring period, the WPS must be notified in writing. In response to the exceedance, the WPS may require the submittal of a hydrological report to evaluate the cause of the exceedances. Alert levels and Aquifer Quality Levels shall be submitted to ADEQ.	In accordance with Section 2.5.4.2 and 2.7.3	No

3.6	The permittee shall submit an APP Amendment Application to set Alert Levels (ALs) and Aquifer Quality Limits (AQLs) at POC wells, along with copies of all laboratory analytical reports, including chain of custody and QA/QC. Submit with the lab reports a field sampling report describing the sampling procedures and sample collection QA/QC. The permittee may calculate the alert levels and aquifer quality limits for those constituents in section 4.2, Table IIA, or may request GWS to perform the calculations. The alert level for the groundwater level measurement in Table IIB shall be based on the screened interval of the POC well.	Within 30 days of receipt of laboratory report for final ambient sample.	Yes
3.7	Submit Annual Report in accordance with Sections 2.7.4.2. and 2.7.3	January 30 and yearly thereafter	No

VII. OTHER REQUIREMENTS FOR ISSUING THIS PERMIT

Technical Capability

The City of Tucson - Tucson Water Department has demonstrated the technical competence necessary to carry out the terms and conditions of the permit in accordance with A.R.S. § 49-243(N) and A.A.C. R18-9-A202(B).

The permit requires that appropriate documents be sealed by an Arizona-registered Geologist or Professional Engineer. This requirement is a part of an on-going demonstration of technical capability. The permittee is expected to maintain technical capability throughout the life of the facility.

Financial Capability

The City of Tucson - Tucson Water Department has demonstrated the financial responsibility necessary to carry out the terms and conditions of the permit in accordance with A.R.S. § 49-243(N) and A.A.C. R18-9-A203. The permittee is expected to maintain financial capability throughout the life of the facility.

Zoning Requirements

The SHARP has been properly zoned for the permitted use and the permittee has complied with applicable zoning ordinances in accordance with A.R.S. § 49-243(O) and A.A.C. R18-9-A201(B)(3).

VIII. ADMINISTRATIVE INFORMATION

Public Notice (A.A.C. R18-9-108(A))

The public notice is the vehicle for informing all interested parties and members of the general public of the contents of a draft permit or other significant action with respect to a permit or application. The aquifer protection program rules require that permits be public noticed in a newspaper of general circulation within the area affected by the facility or activity and provide a minimum of 30 calendar days for interested parties to respond in writing to ADEQ. The basic intent of this requirement is to ensure that all interested parties have an opportunity to comment on significant actions of the permitting agency with respect to a permit application or permit.

The public notice was published in the Arizona Daily Star on XXXXXXXXXX, under public notice No. 16-XXXX.

Public Comment Period (A.A.C. R18-9-109(A))

The Department shall accept written comments from the public before a significant permit amendment is made. The written public comment period begins on the publication date of the public notice and extends for 30 calendar days. After the closing of the public comment period, ADEQ is required to respond to all significant comments at the time a final permit decision is reached or at the same time a final permit is actually issued.

Public Hearing (A.A.C R18-9-109(B))

A public hearing may be requested in writing by any interested party. The request should state the nature of the issues proposed to be raised during the hearing. A public hearing will be held if the Director determines there is a significant amount of interest expressed during the 30-day public comment period, or if significant new issues arise that were not considered during the permitting process.

IX. ADDITIONAL INFORMATION

Additional information relating to this permit may be obtained from:

Arizona Department of Environmental Quality
Water Quality Division – Water Permits Section – APP Unit
Attn: Monica Phillips
1110 West Washington Street, Mail Code 5500E-3
Phoenix, Arizona 85007
Phone: (602) 771-2253