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FACT SHEET

HAZARDOUS WASTE FACILITY PERMIT PAGE TROWBRIDGE RANCH LANDFILL, UNIVERSITY OF ARIZONA ORACLE/ORACLE JUNCTION AREA PINAL COUNTY, ARIZONA EPA I.D. NO. AZD 980 665 814

This fact sheet was prepared in accordance with the Arizona Administrative Code (A.A.C.) R18-8-271.E(e) and R18-8-271.G. A fact sheet must accompany every Arizona Hazardous Waste Management Act (AHWMA) draft permit that the Arizona Department of Environmental Quality (ADEQ) has prepared that either raises major issues or involves a new facility. All references to the A.A.C. hereafter refer to the A.A.C. R18-8-260 et seq., made effective on June 30, 2010, which incorporates and/or modifies parts of Title 40 Code of Federal Regulations (CFR) Parts 260 et seq. (July 1, 2006, Edition).

The University of Arizona (UA) has applied for a renewal of its Permit for the Page Trowbridge Ranch Landfill (PTRL). ADEQ has drafted a renewal to the Permit for PTRL (the Draft Permit), and has made the Draft Permit available for public comment. This Fact Sheet describes the PTRL facility, summarizes the Draft Permit, and provides information on how to find out more about the Draft Permit. At the end of the fact sheet are the procedures for public participation and the ADEQ contact information.

FACILITY DESCRIPTION

The UA manages the PTRL, a closed hazardous waste landfill located north of State Highway 77, approximately seven miles west of Oracle and 30 miles north of Tucson. A site location map is shown in *Figure 1*. The PTRL is located in Township 9 South, Range 14 East, Gila and Salt River Base and Meridian, and includes the southern half of Section 27 and the northern half of Section 34. Land to the north and northeast of the PTRL is owned by the State of Arizona and is used as open range grazing land. The UA owns and uses the land to the north, northwest and east for agricultural research. Property owned by Robson Ranch Mountains, L.L.C., a developer, to the southwest, south, and southeast of the PTRL is used for residential development. There are currently approximately 100 homes and a clubhouse constructed in the Saddlebrooke Resort Community.

UA used the PTRL to dispose of low-level radioactive material and chemical waste generated at UA, Northern Arizona University, Arizona State University, and Veterans Hospital in Tucson from the early 1960s through 1986. The chemical waste primarily consisted of solvents, ignitables, acids, bases, heavy metals, pesticides, and photographic compounds.

The landfill site occupies a total of 3.25 acres and consists of two areas: Area A (northern unit, 200 feet by 200 feet) and Area B (southern unit, 200 feet wide by 500 feet long) as shown in *Figure 2*. In both areas, wastes were placed in individual cells (pits) that were approximately 15 feet deep. A final cover system was constructed over each area to prevent percolation through the

landfill. It includes a final earthen cover on top that supports native grass vegetation. The landfill is surrounded with a six-foot-high chain-link fence with barbed wire along the top. Culverts and storm water channels were installed to divert rainwater from the surface of the site to minimize percolation into the subsurface soil.

A solar-powered soil vapor extraction (SVE) system was installed at the landfill and has been operating since June 2006 between Areas A and B (*Figure 2*). The system is used as a soil vapor monitoring system to detect potential releases from the landfill areas. If a release is detected, actions will be taken in advance of any contamination reaching ground water, which is at approximately 640 feet below ground surface (bgs). The system injects air into the soil through one well (SGD-Well) at a rate of approximately 43 feet³/min and a depth of approximately 435 to 605 feet bgs, while soil vapor is extracted from another well (SGS-Well) at a rate of approximately 90 feet³/min from a depth of approximately 98 to 225 feet bgs. The vapor is then directed through an activated carbon treatment system (two 2,000-pound units) where air emissions monitoring is conducted weekly, using a photoionization detector (PID), and samples are collected monthly to check for breakthrough of the granular activated carbon to determine when it needs to be replaced and to monitor the mass removal of any Volatile Organic Compounds (VOCs) from the subsurface. A photograph of the system is shown in *Figure 3*.

In addition to the SVE wells, there are four active ground water wells used for monitoring chemical and radionuclide contaminants, as well as vapor monitoring points to measure VOCs. The ground water monitoring wells and soil vapor monitoring points are located within the fenced enclosure surrounding the two landfill areas and finished with protective steel casings installed in cement with locking well head covers (*Figure 4*). Ground water monitoring wells MW-2, MW-3, MW-4, and MW-5 are approximately 800 feet bgs. For sample collection, a submersible pump was installed in each well, with power supplied by a generator. Six on-site soil vapor monitoring points, SGS-WELL, SGS-SP, SGD-WELL, SGD-SP, SGD-MP, and SGD-DP cover soil vapor monitoring intervals across a range of 75 to 600 feet bgs. In order to also use MW-2 and MW-5 as soil vapor monitoring points, inflatable packers were installed with soil vapor monitoring intervals extending to the ground water table. A well construction drawing example of MW-2 is shown as *Figure 5*. Ground water and soil vapor sampling will be conducted semi-annually.

The facility is not located in a 100-year floodplain.

HISTORY OF THE SITE

Disposal operations for low-level radioactive wastes began in Area B in 1962 after UA received and maintained approval from the Arizona Atomic Energy Commission. Mixed waste (hazardous chemical and low-level radioactive) disposal was added in the late 1960s and continued through 1986. Cells within Area B were first utilized as open neutralization and burn pits. Subsequently, they were used for direct burial of one- and five-gallon containers (bottles, cans, boxes, bags) and 55-gallon drums with absorbent material (i.e., lab packs) in the unlined cells.

Area A was designed and constructed in 1982 for disposal of chemical wastes only, in accordance with applicable Resource Conservation and Recovery Act (RCRA) standards at the time. It replaced Area B for hazardous chemical waste only. Disposal cells within Area A were individually double-lined with a chemically resistant synthetic liner. Wastes were received in

sealed, 55-gallon drums (DOT 17C). These drums were placed into the cells in single layers, sealed with the plastic liner, and covered with soil. Area A was also operated through 1986.

From mid-1983, the quantity of materials disposed at the site was reduced due to the addition of a chemical waste incinerator and neutralization facilities at the UA campus. As a result, when landfill operations ceased, less than half of the predetermined capacity of Area A had been actually used.

For final closure of the landfill in 1997, which was conducted in accordance with an ADEQ-approved closure plan, a final cover system was constructed over each area to prevent percolation through the landfill. Fencing and surface water run-on/run-off controls were also installed.

In December 1997, the UA submitted a post-closure permit application to ADEQ. On November 6, 2001, ADEQ issued a final Permit for the landfill under RCRA and the AHWMA. The landfill continues to be regulated under the existing Permit.

Five ground water monitoring wells were installed surrounding the two landfill areas at the site. MW-1, MW-2, MW-3, and MW-4 were installed in 1984 and 1985. MW-5, which replaced MW-1, was installed in 1990. Based on collection of ground water data from these wells, the ground water flow direction is predominantly to the southwest and the ground water level is approximately 640 feet bgs. Groundwater sampling began in November 1984, and continued until 1997 on an infrequent basis. Following closure of the PTRL in 1997, UA sampled ground water monitoring wells MW-2 through MW-5 for VOCs, semi-volatile organic compounds (SVOCs), pesticides, radionuclides, manganese, sodium, sulfate and chloride on a semi-annual basis. The post-closure monitoring program has not indicated the presence of organic or inorganic contaminants in ground water at the site that would affect human health and the environment.

Several soil vapor surveys were conducted in 1988, 1994, 2003, and 2007 to assess contaminant migration potential to the surrounding area and to determine the nature and extent of landfill impacts. Although VOCs were present in pore space immediately surrounding the landfill, VOC concentrations diminished substantially with increased distance. Vapors were present in shallow soil immediately surrounding the landfill and areas with higher VOC concentrations were identified along the western and southern perimeter of the landfill. Trichloroethene (TCE), tetrachloroethene (PCE), and benzene, toluene, ethylbenzene, and xylenes (BTEX) were detected in shallow soil vapor samples, with TCE and PCE detected at depths from 50 to 130 feet bgs. The quantity of hazardous constituents that may have migrated into the soil beneath the landfill due to unlined Area B is unknown. However, VOCs were not detected in soil samples below 140 feet bgs and no analytes were detected below 190 feet bgs.

Pursuant to the 2001 Permit, and as a result of the soil vapor investigations, a solar-powered SVE system was installed at the landfill as a Corrective Action "Interim Measure" in June 2006. It continues to be operated to monitor and remove VOCs from the subsurface soil using a set of dedicated SVE wells. Sampling results indicate that VOC concentrations have been decreasing over time.

In addition to the Interim Measure, the 2001 Permit required UA to perform a risk assessment for the PTRL. UA contracted with Hydro Geo Chem, Inc. (HGC) to prepare a preliminary screening risk assessment for the landfill in 2005. This was followed by the preparation of a human health

risk assessment (HHRA) in 2009, by AMEC. The HHRA included a registered well survey. At that time, the nearest drinking water wells were located between two and three miles away. Of the five municipal and private drinking water wells, the nearest well owned by Arizona Water Company is located approximately two miles southwest of the landfill and provides water for Oracle and Oracle Junction. The results of the HHRA show that the chemical and low-level radionuclide contamination at the landfill do not pose noncarcinogenic effects or unacceptable cancer risk or hazards to researchers, recreational users, or potential residents within or at the edge of the PTRL property, based on a conservative quantitative risk characterization. Due to uncertainty regarding the nature of the hazardous waste materials disposed of in the PTRL and the potential for future environmental impact(s), the HHTR does recommend continued on-site monitoring and collection of soil vapor, continued monitoring of ground water for chemical contaminants, and continued ground water monitoring for radioactive contamination.

The site is undergoing renewal of the Permit in accordance with A.A.C. R18-8-264.A (40 CFR § 264.117) and A.A.C. R18-8-270.A (40 CFR § 270.50), but remains under the current Permit pending re-issuance.

TYPE AND QUANTITY OF HAZARDOUS WASTES TREATED AND DISPOSED

Types of Hazardous Wastes (40 CFR § 261, Subpart C & D)

Virtually all listed wastes from 40 CFR § 261 Subpart D, except K coded wastes, may be present in waste streams generated at UA. The Part A permit application reflects this by including almost all existing EPA waste codes as candidates for disposal at the PTRL.

The waste primarily disposed of in the PTRL consisted of low-level radioactive waste and chemical wastes primarily consisting of solvents, ignitables, acids, bases, heavy metals, pesticides, and photographic compounds from Arizona universities and a hospital.

Potentially contaminated soil vapor, associated with the former landfill, is currently being extracted by the SVE system and pumped through an activated carbon vapor treatment system to strip the VOCs from the air. Among the VOCs detected in soil gas surrounding the landfill were TCE, PCE, and BTEX. Periodically, the treatment carbon is replaced and shipped off site for regeneration. Condensate from the SVE system will be managed appropriately in accordance with applicable regulations.

More specific information on the waste types and codes is found in Permit Appendix C and in the federal hazardous waste rules in 40 CFR § 261 Subpart C, "Characteristics of Hazardous Wastes" and 40 CFR § 261 Subpart D, "Lists of Hazardous Waste."

Quantities of Hazardous Waste Disposed

The total quantity of low-level radioactive waste and chemical waste that was disposed of in Area B prior to 1978 is unknown because record keeping did not start until then. Based on the manifests and earlier UA disposal records, 280 tons of hazardous wastes were disposed in Area A and in the hazardous portions of Area B between the late 1960s and 1986. In addition, based on additional complete records, there was also a total of 312 tons of radioactive wastes disposed in Area B from 1962 to 1986. However, this inventory does not include any undocumented radioactive or chemical wastes. The PTRL is a closed landfill, and no further waste has been disposed in the PTRL since 1986.

DESCRIPTION OF THE DRAFT PERMIT

The Permit requires the UA to continue to maintain the PTRL for up to 30 years, or until it is demonstrated that the hazardous waste is removed from the site and conditions at and surrounding the site are protective of human health and the environment. UA submitted its initial permit application renewal in July 2011.

For the post-closure period, a ground water detection monitoring program will be implemented with samples collected from four monitoring wells no less frequently than semiannually. Laboratory analyses for chemicals will include VOCs (EPA Method 524.2), SVOCs (EPA Method 8270C), organochloride pesticides (EPA Method 8081), and inorganic constituents, manganese (EPA Method 200.7), chloride (EPA Method 300.0), sulfate (EPA Method 300.0), and sodium (EPA Method 200.7). Radionuclides will also be tested and include gross alpha (EPA Method 900.0), gamma (EPA Method 901.1), tritium (liquid scintillation), and carbon (liquid scintillation). Soil vapor samples will continue to be collected semi-annually from the two retrofitted ground water monitoring wells and six soil vapor monitoring points, and monthly for the SVE system. Field measurements will include depth to ground water, pH, temperature, specific conductance, and visual appearance for ground water. For the vapor monitoring points, a PID will be used to monitor total organic vapors. Semi-annually, vapor monitoring will be conducted using a portable photoionization detector and battery-operated portable vacuum pump prior to each sample collection. Quality control field duplicates will be collected and analyzed for ground water, and field duplicates and field blanks will be collected and analyzed for soil vapor. Trip blanks will also be analyzed for both. Actions will be taken if detections or exceedances of standards occur. When statistically valid detections of certain parameters or constituents are made in ground water, the Permittee would be required to submit a Permit modification to establish a compliance monitoring program for ground water at the site. Further exceedances of parameters or action levels would require the Permittee to undertake corrective action.

The Draft Permit consists of four sections and their attachments. All conditions are based on the Permit Application submitted July 2011, with supplements and updates provided by the applicant through April 1, 2012. The Permit re-establishes a post-closure care period of 30 years from the date of permit issuance.

The following are brief descriptions of the Permit Parts and their regulatory basis:

Part I contains general permit conditions. These conditions are authorized by A.A.C. R18-8-270 A and L and 40 CFR § 270.30.

Part II contains post-closure facility conditions. These conditions are authorized by A.A.C. R18-8-264.A and 40 CFR §§ 270.32 and 264, Subpart H.

Part III contains specific conditions related to the ground water monitoring and soil vapor monitoring. These conditions are authorized by A.A.C. R18-8-264.A and 40 CFR § 264.100.

Part IV contains conditions regarding corrective action. These conditions are authorized by A.A.C. R18-8-264.A and 40 CFR § 264.101(corrective action for solid waste management units).

Director-Established Permit Conditions

As required by A.A.C. R18-8-270.A, M, N, and O (40 CFR § 270.32), the Director has established site-specific permit conditions as necessary to conform to state and federal rules and regulations. These conditions, known as “Omnibus Conditions,” are as follows:

1. UA must maintain a contact list of K-12 public and private schools within 1.0 mile of the landfill and to provide such a list to the fire department, when requested and when the emergency provisions of the Contingency Plan are implemented by UA.

This Permit Condition is found at Part II.I.5 of the Draft Permit.

2. The Director has re-established the 30-year post-closure care period effective the date of the Permit.

This Permit Condition is found at Part II.B.2 of the Draft Permit.

3. UA shall operate and maintain the SVE system and conduct soil vapor monitoring for the purpose of monitoring subsurface conditions, capture of soil vapors in the vadose zone below the landfill, and for early detection of increasing vapor concentrations at the facility.

This Permit Condition is found at Part II.B.1.e and Part III of the Draft Permit.

APPLICANT REQUESTED VARIANCES

None have been requested by the applicant.

PROCEDURES FOR REACHING A FINAL DECISION ON THE DRAFT PERMIT

The administrative record for Draft Permit contains all data submitted by the applicant. A copy of portions of the administrative record, including the Draft Permit, is available for public review at the Oracle Public Library, 565 E. American Ave., Oracle 85623, on Monday, Thursday and Saturday 9 a.m. – 3 p.m.; and Tuesday, Wednesday, and Friday 8 a.m. – 3 p.m. Note that hours may vary depending on volunteers, so please call 520-896-2121 beforehand. It is also available at the Joel D. Valdez Main Library, 101 N. Stone Ave., Tucson 85701, on Monday, Tuesday and Wednesday 9 a.m. – 8 p.m.; Thursday 9 a.m. – 6 p.m.; Friday 9 a.m. – 5 p.m.; Saturday 10 a.m. – 5 p.m.; and Sunday 1 – 5 p.m. The full administrative record is available at the ADEQ Phoenix office at 1110 West Washington Street and may be viewed from 8:30 a.m. to 4:30 p.m., Monday – Friday (excluding state holidays). To arrange an appointment to review this record at ADEQ, contact the ADEQ Records Center at (602) 771-4380.

As required by A.A.C. R18-8-271.L and 40 CFR § 124.13, all persons, including applicants, who believe any condition of the Draft Permit or the tentative decision to prepare and issue this draft proposed Permit is inappropriate, must raise all reasonable ascertainable issues and submit all reasonably available arguments and supporting materials by the close of the public comment period. All comments submitted during the public comment period shall discuss the appropriateness of the Draft Permit.

The 45-day public comment period will open on issuance of the public notice on May 6, 2012 and will close on June 21, 2012. During the public comment period, any interested person

may submit written comments on the Draft Permit. These comments and supporting materials must be delivered or postmarked by the last day of the public comment period to:

Arizona Department of Environmental Quality
Anthony Leverock – Manager
Hazardous Waste Permits Unit
1110 West Washington Street, Mail Code 4415C-1
Phoenix, Arizona 85007

All written comments delivered or postmarked by the last day of the public comment period will be considered in ADEQ's final determination regarding the Draft Permit. After all comments have been considered, a final permit decision will be made by the Director. The applicant, each person who has submitted written or oral comments, and each person who has so requested will receive a notice of this final permit decision. This notice shall include reference to procedures for appealing a decision on a draft permit. The final permit decision shall become effective on the date specified in the final permit notice.

At the time that the final decision is made, the Director shall also issue a response to any significant comments. The response to comments shall consider all items as specified in A.A.C. R18-8-271.O and 40 CFR § 124.17. The response to comments shall be made available to the public for review. Any person who desires to be placed on the mailing list for all future permitting activities for this facility or for facilities in a specific geographic area may request so in writing to the above address, pursuant to A.A.C. R18-8-271.I(c)(1)(ix) and 40 CFR § 124.10(c)(1)(ix)(a).

In addition to submitting public comment, any person may request the ADEQ Director to schedule a public hearing. Written requests for a public hearing must be submitted to ADEQ by not later than close of the comment period, **June 21, 2012**, and must state the nature of the issues proposed to be raised in the hearing. The Director will hold such a hearing if: 1) he finds, on the basis of requests, a significant degree of public interest in the Draft Permit, or 2) he finds that the hearing might clarify one or more issues involved in the permit decision, or 3) a formal written notice of opposition to the Draft Permit is received within the comment period.

If you would like a copy of the facility fact sheet or wish to be put on a mailing list for permit activity, you can make this request to the ADEQ contact person listed above. Please bring this notice to the attention of anybody who might be interested in this matter.

PERSONS TO CONTACT FOR ADDITIONAL INFORMATION

For additional information concerning the Draft Permit, please contact:

Anthony Leverock – Manager
ADEQ - Hazardous Waste Permits Unit
1110 West Washington Street
Phoenix, Arizona 85007
E-mail: acl@azdeq.gov
(602) 771-4160 or Toll Free: 1-800-234-5677, extension 7714160

Mark Shaffer
ADEQ Communications Director
E-mail: ms15@azdeq.gov
(602) 771-2215

Hearing-impaired individuals call our TDD line: (602) 771-4829
Web site: www.azdeq.gov

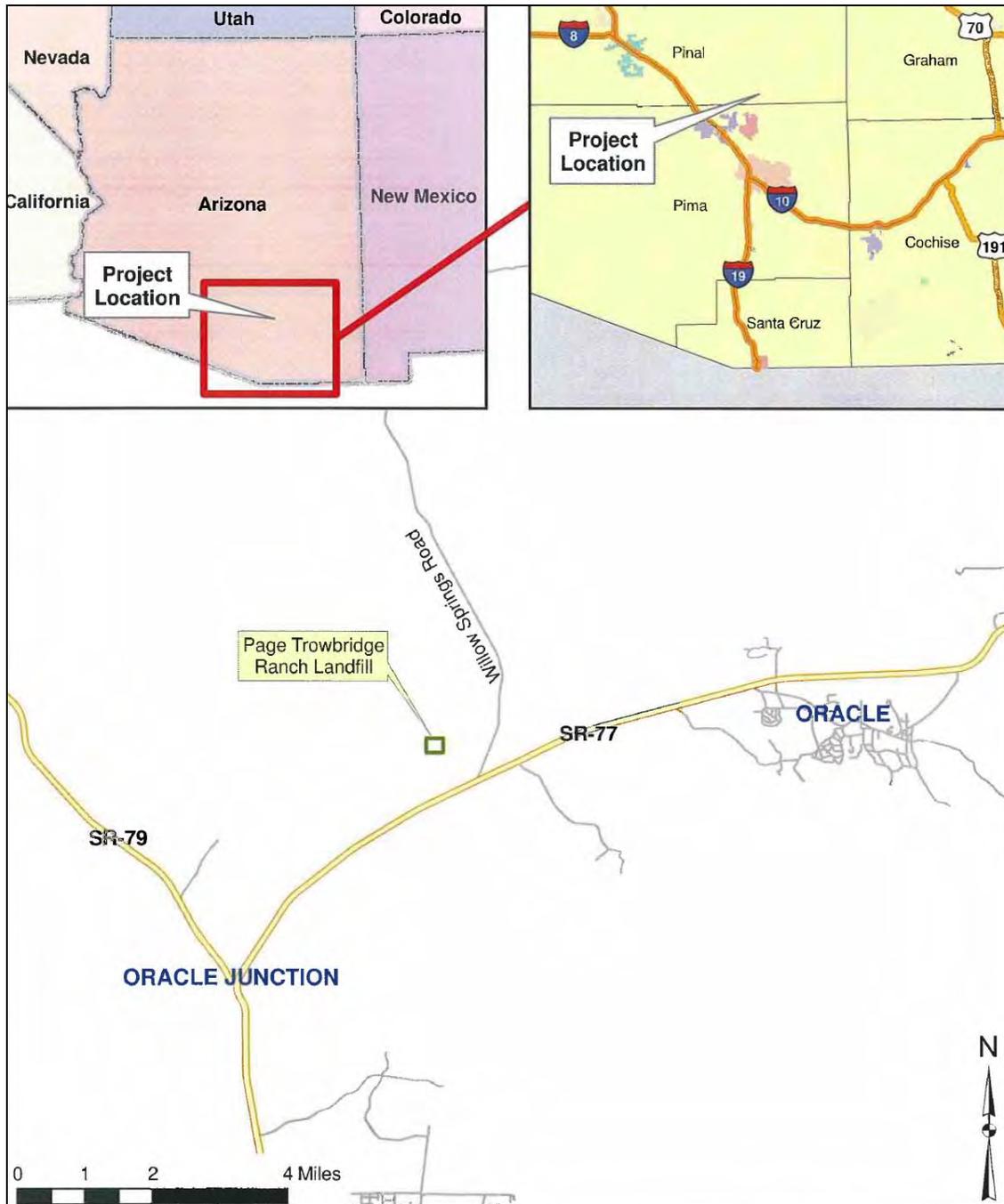


Figure 1. Location of applicant's site relative to Oracle Junction and the Town of Oracle, Arizona.

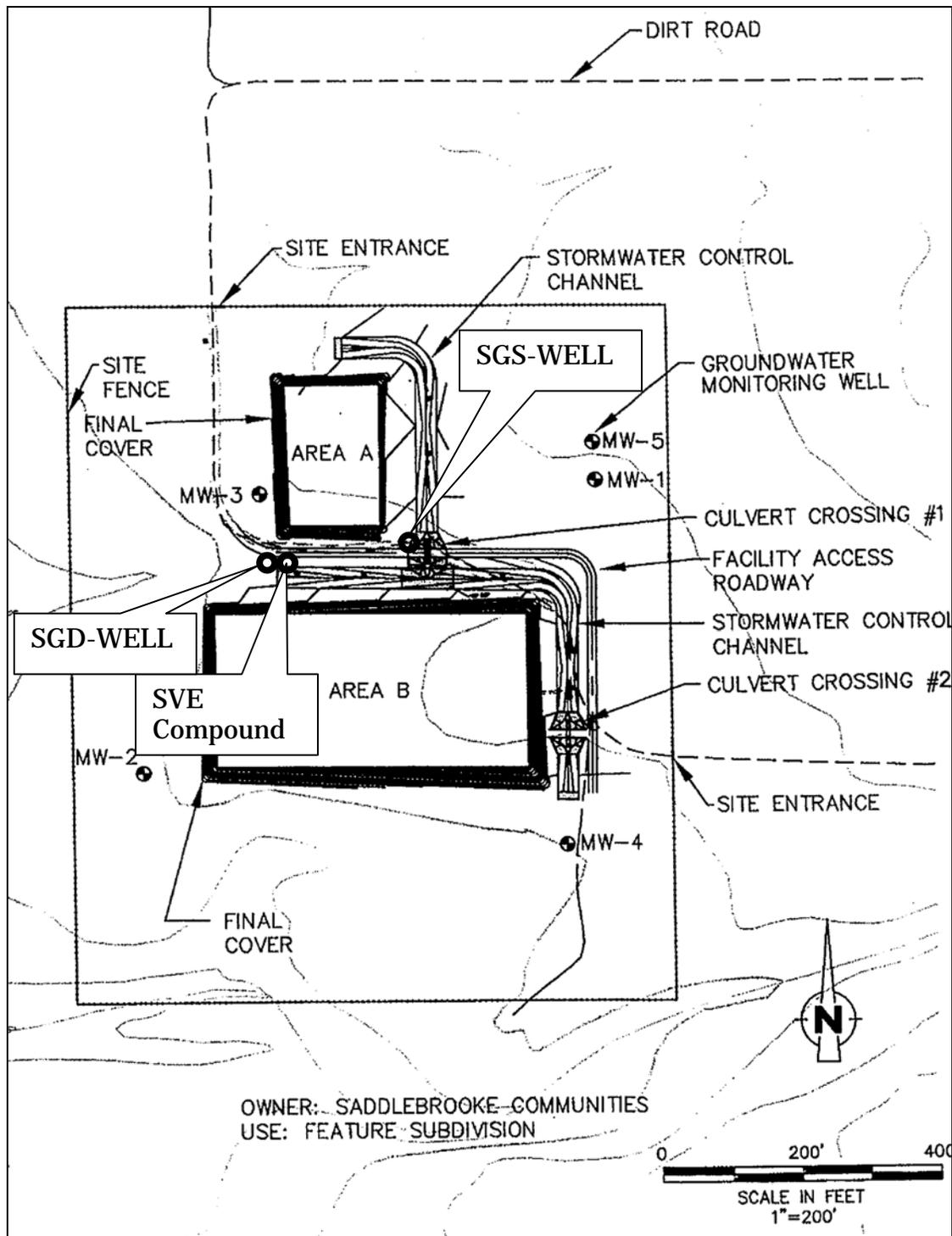


Figure 2. University of Arizona Page Trowbridge Ranch Landfill ground water and vapor monitoring system near Oracle Junction and the Town of Oracle, Arizona.



Figure 3. Photograph of the Soil Vapor Extraction system.

University of Arizona Page Trowbridge Ranch Soil Vapor Extraction System (SVE); Pinal County, Ariz. The solar-powered SVE injects air at approximately 435 to 605 feet below ground surface (bgs) through SGD-Well. Soil vapor is extracted from SGS-Well at approximately 98 to 255 feet bgs and then through an activated carbon vapor treatment system. This SVE is used for vapor monitoring beneath the landfill to detect potential releases in advance of contamination potentially reaching groundwater at a level of approximately 640 feet bgs.



Figure 4. Photograph of the SGD well with steel casing and locking well head cover located west of the soil vapor extraction system.

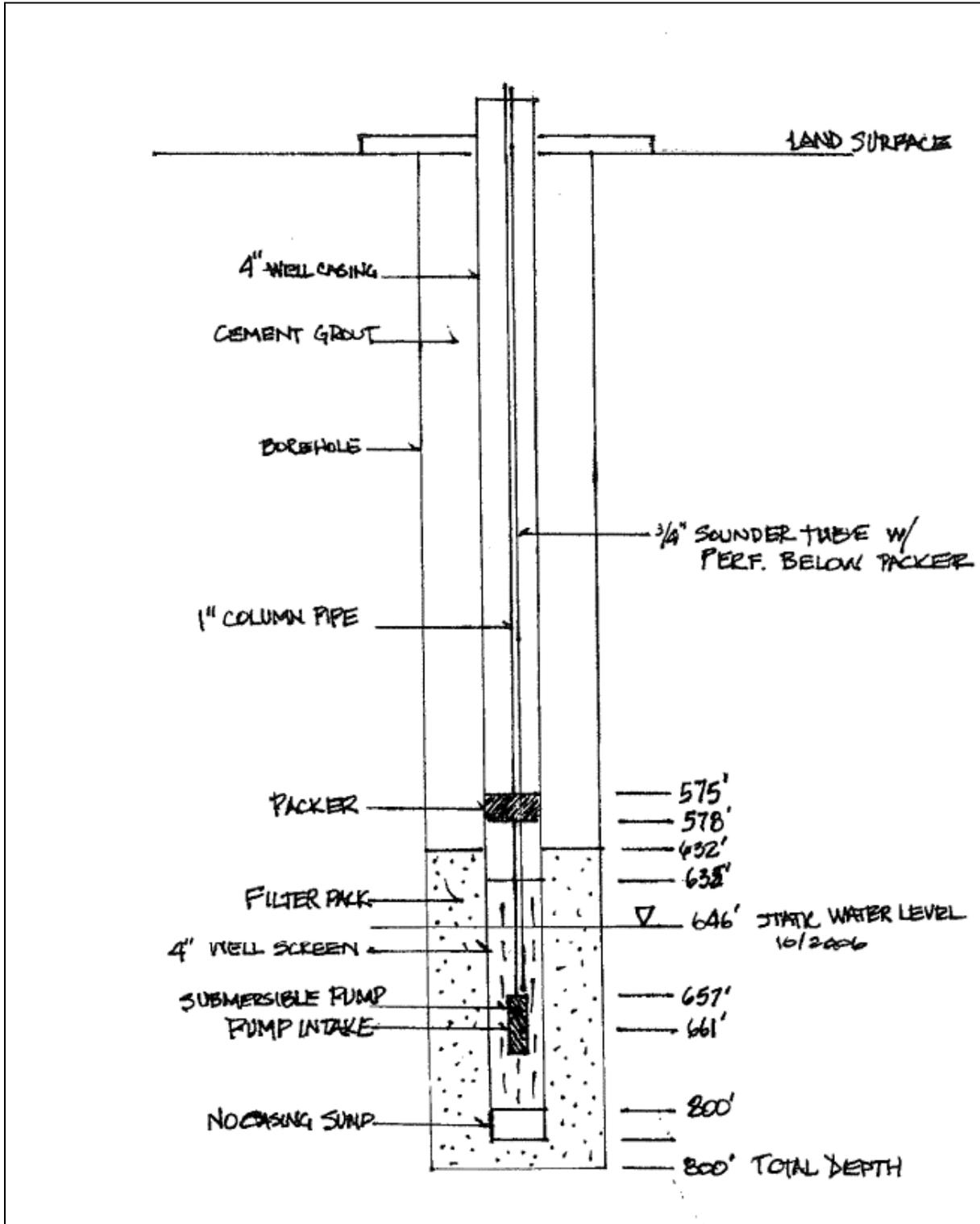


Figure 5. PTRL ground water monitoring well MW-2 construction drawing showing the inflatable packer installed so that the well may also be used as a soil vapor monitoring point.