Arizona Department of Transportation

Drywell Guidance and Best Practices

October 2024

1.1 Introduction

This manual has been developed as guidance to ensure that ADOT is in compliance with all applicable regulatory requirements pertaining to drywells on ADOT-owned properties. This manual does not supersede any local, state, or federal requirements.

Facilities ("sites") are required by City and County ordinances to have a site drainage plan that ensures no ponds of stormwater remain longer than 36 hours after a rain event so that vectors, such as mosquitoes, do not become a public health nuisance. In response to these requirements, facilities are designed and constructed to divert stormwater to centralized areas such as municipal storm drains, retention basins, and drywells.

Drywells differ from storm drains in that stormwater runoff is collected and disposed of "on-site" through infiltration, rather than directed to a network of pipes, channels, and culverts to a municipal separate storm sewer system (MS4).

A drywell, as the name implies, is typically dry and is not deep enough to reach groundwater. A drywell is a bored, drilled or driven shaft or hole whose depth is greater than its width and is designed and constructed specifically for the disposal of stormwater (Arizona Administrative Code R18-9-101(20). Their basic design includes a grate at the ground surface which allows stormwater to enter a settling chamber where heavy materials (debris, rocks, sediment) will sink to the bottom and lighter material (i.e., oils, grease, hydrocarbons) will float to the top. Some drywells may be constructed with a separate settling chamber which decants "settled" stormwater to another chamber for subsurface disposal.

Drywells provide an effective and environmentally safe method to dispose of stormwater, but can act as a conduit for pollutants to enter subsurface soils or groundwater. Proper siting, design, construction, and maintenance of ADOT's drywells are critical to ensuring adverse impacts to the environment and public health are avoided.

The aggregate net recharge to alluvial aquifers from drywells is significant, according to studies by municipalities in Maricopa County. The overall impact of drywell discharges on groundwater quality has been studied as well and is believed to be low if modern drywell designs are used and the drywells are properly operated and maintained. (Graf, 2010)

1.2 Purpose

Under Arizona State law, all aquifers "*shall be classified for drinking water protected use...*"(A.R.S. 49-224.B), and the Arizona Dept. of Environmental Quality (ADEQ) has regulatory authority to ensure that the state's water resources are protected from degradation. Facilities (such as drywells) which discharge or have the potential to discharge pollutants to groundwater are required to comply with the provisions in Arizona Revised Statute Title 49, Chapter 2, Article 3, otherwise known as the Aquifer Protection Permit (APP) program.

This document is intended for use by ADOT staff responsible for regulatory compliance activities and facility managers who operate and maintain drywells. It provides guidance for proper drywell identification, registration, permitting, decommissioning, routine inspections and maintenance. The goal of ADOT's Drywell Program is to ensure that we are fully compliant with all applicable federal, state and local requirements.

2.1 Drywell Program Responsibility

As of September 2022, ADEQ has repealed its Drywell Registration program, and drywell owners and operators are required to register all drywells with EPA Region 9 under the Underground Injection Control (UIC) Program. Drywells which receive runoff from areas where hazardous substances are used, stored, loaded or treated (Type 2.01 General Permit), and drywells that drain areas at facilities for dispensing motor fuel (Type 2.04 General Permit) are still required to be permitted through ADEQ.

As the owner/operator of multiple drywells (approximately 55) around the state, it is necessary for ADOT to institute a program which outlines critical roles and responsibilities in order to maintain compliance with the applicable regulations. Due to the vast nature of ADOTs structure and operations, establishing effective avenues for communication within and among the different operating groups plays an important role in ensuring compliance.

2.2 Agency Responsibilities

- Ensure that ADOT staff has the proper knowledge, skills, and experience to implement the program.
- Ensure that ADOTs program is compliant with the applicable regulations.
    - Identifying drywells is a key first step. Followed by determining the area that drains to the drywell, and then completing the registration process if the dry well has not yet been registered.
    - Site grading, drainage, and material storage plans are required as part of the registration process. After registration, there cannot be changes in the area that drains to the drywell that may result in the discharge of contaminants, such as the storage of hazardous substances, without first contacting Arizona Department of Environmental Quality (ADEQ).
    - If a facility intends to store hazardous materials in the area that drains to a registered drywell, the facility operator should notify ADEQ of the proposed change and may need to obtain a permit in addition to registration.

Supervisors

All supervisors are responsible for ensuring no pollutants are discharged to a drywell. This responsibility entails:

- Recognizing that certain activities may lead to a discharge of pollutants to a drywell such as; construction activities, washing vehicles, equipment and material storage and fuel dispensing.
- Developing, reviewing, and then implementing work practices that eliminate pollutant discharges to a drywell, and effectively managing stormwater.
- Provide job specific training on these work practices.
- Require that all employees understand and follow work practices and procedures that prevent pollutant discharge to drywells.
- Ensuring that all notification procedures for planned/scheduled changes to the area that drains to a drywell is followed as outlined in the program.
- Notifying contractors of the presence of a drywell in the area(s) where contractors store material or work.

Employees

Employees affected by the requirements of this program have a responsibility to:

- Inform supervisors of any hazardous material storage or work activities that could impact the drywell.
- Respond to small spills to prevent pollutants from entering drywells. Inform supervisors if the drywell becomes clogged and does not drain within 36 hours.
- View the *Drywell Awareness Training* PowerPoint presentation.
- Read and understand the applicable details of the program.
- Plan and conduct all work in accordance with the work practices and procedures outlined in the program.
- Stay informed about the types of materials stored and the activities that occur in the area(s) that drain to each drywell.

Contractors

Contractors shall take the necessary safeguards to prevent pollutants from entering any drywell and to not clog the drywell with sediment and debris. They shall report any incident resulting in discharge to a drywell to the applicable jurisdictional authority.

3.1 Operation and Maintenance

Facility Operation and Maintenance staff and supervisors are required to follow the procedures set out in this manual. Any contracted services should include, as part of the contract, a requirement that contracted workers be trained in the general requirements of working around drywells.

The Groundwater Programs Coordinator will ensure that petro-sponges are installed in drywells that require an ADEQ permit in addition to registration. Petro-sponges can also be installed in drywells that do not require a permit as a best management practice.

3.2 Drywell Assessment / Inspection Procedures

Visual inspections should be performed at least annually or if water remains standing on the surface of the drainage area or retention basin for longer than 36 hours. The visual inspection should focus on the following conditions to determine what, if any, maintenance is required to keep the drywell functioning properly:

-Amount of sediment or debris accumulated in the drywell;
-Evidence (such as staining, odors) of pollutants entering the drywell;
-Debris preventing run-on from entering the drywell or settling chamber;
-Physical integrity of the drywell and associated components (surface completion, concrete inside the chamber, etc.); and,
-Presence and condition of any chemical absorbing equipment.

Chemical absorbent sponges (hydrophobic petrochemical absorbents) are not required to be installed in every drywell; however they are a good best management tool to prevent groundwater contamination. Petro-sponges are a requirement for drywells that require a Type 2.01 or 2.04 General APP Permit. It is recommended that if in a heavy use industrial area, use a petro-sponge with a minimum capacity of 256 ounces per chamber. Other, non-industrial areas should use a petro-sponge with a minimum capacity of 128 oz.

Activities performed within the drainage area should be reviewed to ensure that hazardous substances are not used, handled or stored within that area. Visual observations should be made for indications of non-stormwater discharges such as unusual staining, pavement discoloration surrounding the drywell, residue coating the inlet grate, or the presence of unusual odors in the settling chamber.

Removing sediment helps to maintain the drywells performance by allowing captured stormwater to infiltrate into the ground. HydroVactor cleaning is a typical method employed to remove sediment from drywell chambers. The depth of the drywell settling chamber must

be known to determine how much sediment has accumulated. The thickness of accumulated sediment is determined by subtracting the depth to the top of the sediment and subtracting it from the depth of the settling chamber depth. Drywells that require a permit in addition to registration are required to remove sediment when the sediment chamber becomes more than 10% full for paved areas and 25% full for unpaved areas[1].

Figure 1- Debris accumulated inside a drywell should be removed

Figure 2- Sediment covering drywell inlet should be cleared

[1] Per R18-9-C301.E.1

Table 1 Drywell Inspection Considerations			
Frequency	**Condition**	**Check For**	**Desired State**
Monthly & After Storm Events	Trash & Debris		No trash or debris in the drywell
Monthly & After Storm Events	Stormwater not dissipating	Investigate and take corrective action, including repairs or replacement as necessary	No standing water within 36-hours of precipitation event
Monthly	Contaminants & pollution	Any evidence of oil, gasoline, or other contaminants in and around the facility	Remove any evidence of contamination. May require coordination with ADEQ
Monthly	Inlet or manhole cover damaged or difficult to remove	One person cannot remove the lid without excessive exertion. Lid corroded or deformed.	Cover can easily be removed by one person
Monthly	Excessive sediment	>10% for paved areas, >25% for unpaved areas of the chamber filled with sediment	Sediment should be removed from the drywell as needed
Monthly	Cover is clogged, out of place, or missing		Manhole covers should be in-place and secured
Annual or during routine inspections	Structural integrity	Cracks or other damage to surface completion and	Vault meets design specs and is structurally sound.

		concrete inside the drywell	No cracks or evidence of leaking

3.2 Confined-space Entry

If workers are required to enter a drywell, then the OSHA confined-space standard, 29 CFR 1910.146 must be followed.

3.3 Vegetation Management

The Arizona Department of Transportation (ADOT) manages vegetation along approximately 1,390 miles of highways across Arizona. The primary goals of roadside vegetation management are maintaining traffic safety, preserving highway infrastructure, and maintaining a resilient native roadside plant community. ADOT is required to control weeds that occur in the right-of-way as defined in Arizona Revised Statutes Title 3 and listed in Arizona Administrative Code Title 3, Chapter 4, R3-4-244 and R3-4-245) to comply with state law and to maintain good relationships with adjacent landowners. Executive Orders 13112 and 13751 direct federal agencies to prevent the introduction and spread of invasive species. ADOT has agreements with the US Forest Service and Bureau Land of Management under the Four Agency Partnership in Arizona regarding maintenance of transportation easements on their land (Guidelines for Highways on BLM and US Forest Service Land). The agreements with the BLM and USFS regarding vegetation management are reviewed annually and posted on the ADOT Roadside Resources webpage. (Roadside Resources, 2018)

As previously mentioned, drywells can become a potential pathway for pollutants to be introduced into groundwater unless they are properly operated and maintained. Certain products with beneficial uses for roadside vegetation management (I.e., herbicides, pesticides, and fertilizers) could have adverse impacts on the alluvial aquifer if runoff containing these products is able to infiltrate through a drywell in concentrations that exceed applicable Aquifer Water Quality Standards.

The language in Arizona Administrative Code[2] states that "*A discharge shall not cause a pollutant to be present in an aquifer which impairs existing or reasonably foreseeable uses of water in an aquifer*", and a comprehensive list of Numeric Aquifer Water Quality Standards

[2] Arizona Administrative Code R18-11-406.A

can be found in A.A.C. R-18-11-406(B) through (E). The following are the aquifer water quality standards for pesticides and polychlorinated biphenyls (PCBs):

Pollutant (mg/L)	
Alachlor	0.002
Atrazine	0.003
Carbofuran	0.04
Chlordane	0.002
Dalapon	0.2
1,2-Dibromo-3-Chloropropane (DBCP)	0.0002
*2,4,-Dichlorophenoxyacetic Acid(2,4-D)	0.07
Dinoseb	0.007
*Diquat	0.02
Endothall	0.1
Endrin	0.002
Ethylene Dibromide (EDB)	0.00005
*Glyphosate	0.7
Heptachlor	0.0004
Heptachlor Epoxide	0.0002
Lindane	0.0002
Methoxychlor	0.04
Oxamyl	0.2
*Picloram	0.5
Polychlorinated Biphenols (PCBs)	0.0005
Simazine	0.004
Toxaphene	0.003
2,4,5-Trichlorophenoxypropionic Acid (2,4,5-TP or Silvex)	0.05

*Listed in Attachment 1 of ADOT's Vegetation Management Guidelines

Products containing any of the chemical compounds listed above may cause or contribute to adverse impacts to groundwater, and should not be used for vegetation control in areas that drain directly to a drywell. Manual or mechanical methods (such as mowing) should be employed in accordance with ADOT's current Roadside Vegetation Management Guidelines. Maintenance personnel should exercise care to avoid driving vehicles or equipment on surface structures such as manholes, inlets, grates, or concrete, associated with a drywells components to avoid inadvertent damage to equipment or the drywell.

References-

Graf, C. (2010). Drywells: One County's Approach to Stormwater Management and Disposal. *Southwest Hydrology*, 22-23.

Roadside Resources, ADOT (2018). *Roadside Vegetation Management Guidelines.*