



**Guidance for Design, Installation,  
Operation, Maintenance and  
Inspection  
Of  
DRYWELLS**

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**Arizona Department of  
Environmental Quality**

# WATER QUALITY DIVISION

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**In the event of a non-storm water or non-surface runoff discharge that has a potential to impact groundwater quality, the drywell owner or operator should notify ADEQ in writing within 30 calendar days from the date of occurrence or date of discovery and report any actions taken to mitigate the impact.**

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## GENERAL

1. Drywells should be installed to dispose of only stormwater and urban surface run-off as defined in this guidance. Other discharges to a drywell may trigger requirements for regulation as an underground injection well under state and federal regulations.
2. No drywell should be installed closer than 100 feet from any water well. Drywells should be installed as far as possible, but no closer than 20 feet, from underground storage tanks or fuel loading areas.
3. Installation of drywells where hazardous or toxic materials are used, handled, stored, loaded or treated, or where a spill of such materials could drain into the drywell system is not recommended. If it is necessary to install a drywell in such areas, an Aquifer Protection Permit (APP) is required. If a permit is necessary, an engineered design such as the Envibro system or equivalent, which utilizes interceptors, sumps or other devices to remove, intercept and collect pollutants, may be necessary to meet the required Best Available Demonstrated Control Technology (BADCT).
4. Drywells should be at least 10 feet above the water table. In the event perched water tables are encountered, drywell systems may be constructed by an installer licensed by the Arizona Department of Water Resources (ADWR) as long as the perching formation is sealed per ADWR requirement
5. Drywell installers shall meet the licensing requirements of the State Registrar of Contractors and the Arizona Department of Water Resources.
6. If the above conditions cannot be met, please consult with ADEQ.

## INSPECTION

1. Inspection 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.
2. Activities performed within the drainage area should be reviewed to ensure that chemicals are not used, handled or stored within that area. Visual observations should be made for non-stormwater discharges such as unusual stain or pavement discoloration surrounding the drywell, residue coating the inlet grate or within drywell sediments, or the presence of unusual odors in the settling chamber.
3. Settling chambers and interceptor compartments should be visually inspected for type and quantity of debris and condition of drainage components. Remove debris and sediment as required under "Maintenance."
4. If chemical absorbents are discolored and/or submerged beneath the water surface, they should be replaced.
5. ADEQ recommends retaining a copy of all inspections and a record of findings and maintenance activities on file at the property where the drywell is located. An inspection checklist that may be helpful when performing annual inspections is available from ADEQ.

6. During construction, drywell inlets (including any remote inlets or connected catch basins) should be sealed with two layers of U.V. protected geotextile fabric to prevent sediments from entering the drywells until paving and landscaping are complete.
7. A solid manhole cover should be installed on the drywell to insure flow is through the interceptor inlet only. The cover should be bolted in at least two locations and marked in raised cast letters "*stormwater only.*"
8. Best Management Practices Plan (BMPPs) should be followed for drywells located in industrial areas. A separate BMPP guidance document is available from ADEQ.

## **MAINTENANCE**

1. The drainage system, including settling chambers and interceptors should be inspected annually.
2. Removal of deposited silt and sediment may be performed with the annual inspection, or at a minimum as follows:
  - In paved areas when the sediment level fills 10 percent of the effective settling capacity.
  - In landscaped areas when the sediment level fills 25 percent of the effective settling capacity.
  - When ownership of the property changes.
  - When material not resulting from storm water or urban surface runoff enters the drainage system interceptor or drywell settling chamber.

Maintenance should include removal of all sediment, cleaning of all filters and screens and replacement of chemical absorbents. Removed material should be disposed of at a landfill or facility that is approved to accept it. Records concerning drywell cleaning and sediment disposal should be maintained.

## **DEFINITIONS:**

*Stormwater* means runoff resulting from rainfall.

*Urban surface runoff* means other common water discharges such as fire hydrant flushing, potable water system releases, foundation or footing drains that are not contaminated by pollutants, naturally occurring seeps, springs, wetlands or riparian areas, non-agricultural irrigation water, individual vehicle washing, evaporative cooler discharge, air conditioning condensate, swimming pool releases, water well backflushing and dust control watering.

*Effective settling capacity* means the volume resulting from the distance

*between the bottom of a settling chamber to the height of the overflow outlet.*

*Heavy use/industrial* means areas exposed to manufacturing and industrial operations or large drainage areas that would generate additional sediment or debris loading to a drainage system. This includes high truck traffic and loading areas such as public right-of-ways, shipping facilities and truck docks except where hazardous materials are used, handled or stored.

## **DESIGN AND INSTALLATION IN GENERAL AREAS:**

1. For drainage systems draining: **paved areas**, a minimum of one standard drywell is recommended for each 6,000 cubic feet (cf) of drainage volume. [*Calculations are based on use of the Rational formula for a 10 year design storm with a two hour duration.*]
2. For drainage systems draining *landscaped areas*, a minimum of one standard drywell is recommended for each 15,000 cf of drainage volume.
3. The standard drywell system is a MaxWell Type IV or approved equal with a minimum effective settling capacity of 1,000 gallons per chamber. (Effective settling capacity = distance from bottom of settling chamber to the height of overflow outlet. For a four foot ID chamber this would be the equivalent of a 16 foot deep chamber inclusive of five feet of freeboard.)
4. Systems should use a shielding device to enhance separation of petrochemicals from water by gravity differentials. Such devices are to be vented to prevent siphoning or skimming of floating petrochemicals.
5. Systems should use a hydrophobic petrochemical absorbent with a minimum capacity of 128 ounces.
6. Systems should include a device to screen floating debris such as paper, leaves and other trash to retain such material in the settling chamber.
7. The system must be accessible from the surface for maintenance and inspection. Standard minimum opening is a 24 inch diameter nominal size cast iron grating or manhole cover bolted in at least two locations. All inlets are to be marked in raised cast letters "*storm water only.*"
8. Excavation and/or drilling is to be performed in a manner to maintain and protect the integrity of drainage soils.
9. A minimum penetration of 10 continuous feet into permeable porous soils is recommended for standard installations. In unstable sandy, gravelly soils where "belling out" is a problem, an equivalent of 200 square feet (sf) of sidewall area is acceptable (bottom area is not to be included). If such penetration is not achieved or if the required design performance rate is greater than 0.25 cubic feet per second (cfs), a constant head percolation test should be performed on the completed system to determine performance.
10. Drywell inlets should be located at least 20 feet from retention basin surface inlets.

11. Multiple drywells should be spaced a minimum of 100 feet apart center to center.
  12. Inlet connecting pipes to drywell systems should be a maximum of six inches in diameter.
  13. Drywell surface grates should be raised a minimum of three inches above bottom of landscaped retention basins.
  14. During construction, drywell inlets (including any remote inlets) should be sealed with two layers of U.V. protected geotextile fabric to prevent sediments from entering the drywells until paving and landscaping are complete.
2. The interceptor should be a sealed unit with an effective settling capacity of at least 500 gallons and a maximum outflow capacity of 0.25 cfs.
  3. Systems should use shielding devices to enhance separation of petrochemicals from water by gravity differentials.
  4. Systems should use hydrophobic petrochemical absorbents with a minimum capacity of at least 256 ounces per chamber.
  5. A device to screen floating debris such as paper, leaves and other trash should be used to retain such material within the settling chambers.
  6. The system must be accessible from the surface for maintenance and inspection. Standard minimum opening is a 24 inch diameter nominal size cast iron grating or manhole cover bolted in at-least two locations. All inlets are to be marked in raised cast letters "*stormwater only.*"

## **DESIGN AND INSTALLATION IN HEAVY USE/INDUSTRIAL AREAS**

1. A MaxWell Plus System or equivalent design using a pretreatment . Interceptor should be installed as a standard drywell system for the following drainage area applications.
  - When draining public right-of-ways or heavy use areas such as trucking facilities or maintenance areas.
  - When draining areas impacted by industrial or manufacturing operations (except where hazardous chemicals are used, handled or stored).
  - When more than one acre and up to a maximum of two acres of paved surface drains to a single drywell.
  - When more than 2.5 acres and up to a maximum of 5 acres of landscaped surface drains to a single drywell.

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*\*Any use of trade, product or firm names in this document is for descriptive purposes only and does not constitute endorsement by ADEQ.*