



A Scottsdale Homeowner's Guide to Drainage

City of Scottsdale
Stormwater Management



TABLE OF CONTENTS

Introduction.....	2
Drainage Around Your Home or Property.....	3-4
Driveways, Culverts, and Bridges.....	5
Landscaping, Grading, and Roof Runoff.....	6
Walls and Fences.....	7
Channel Lining, Roadside Ditches, and Pools.....	8
Pipes, Underground Storm Sewers and “On-Lot” Retention.....	9
Contacts.....	10



An example of a drainage easement running between homes

INTRODUCTION

Drainage and flooding problems in and around your home can be a costly and damaging nuisance. While developing your lot or landscaping your yard, you can inadvertently create flooding and drainage problems.

Fortunately, these problems can often be prevented by following the guidelines listed in this booklet. These guidelines are based on actual problems encountered in our suburban desert environment and in our urban neighborhoods near the heart of Scottsdale.

Scottsdale residents must comply with the city's *Stormwater and Floodplain Ordinance* which states that storm runoff should enter and leave your property in substantially the same manner as it did prior to development. The Ordinance (Chapter 37) also states that a watercourse may not be altered unless a professional engineer certifies that the alterations will not increase flood levels or flood hazards within, upstream or downstream of the watercourse.

The following guidelines are written in accordance with the city ordinance and are general in nature and may not fit all situations.



A Scottsdale homeowner's property floods due to drainage problems.

Remember, before any grading or structural work is done on your property and/or within a city drainage easement or right-of-way, an Encroachment Permit, Wall Permit, and possibly a Building Permit, will be required. Permits can be obtained from the city's One-Stop-Shop located at 7447 E. Indian School Road. A list of contacts to assist you with specific questions about drainage around your home can be found on page 10.

DRAINAGE AROUND YOUR HOME OR PROPERTY

How do I know if I have a potential drainage or flooding problem on my property?

If any of the following conditions exist, you could potentially have a flooding or drainage problem:

- Is any part of my house lower than the surrounding ground such that water cannot flow freely away from the house?
- Is your property located within a FEMA mapped floodplain?
- Is there a dedicated drainage easement on or near your property?
- Is there a natural wash (stream, swale, arroyo, or channel) or manmade drainage channel (ditch) on, or near, your property?
- Is there a storm water storage basin on or by your property?
- Can roof runoff flow safely away from your house?



A natural wash located behind homes



How do I determine if any of the above conditions exist on my property?

- Look for evidence of flow (erosion, debris), ponding (overgrown vegetation, water-stained walls) or drainage features (grates, drainpipes) on your property.
- Examine the deed and title to your property for disclosures and restrictions.
- Look for tracts and drainage easements on the recorded plat for your subdivision or lot and read their descriptions to understand their purpose and their maintenance responsibility.
- Check the FEMA flood insurance rate maps for major floodplain locations.
- Visit the city's website or contact the city's records department to view regulations, maps, aerial photos, records and plans. (Contact information can be found on page 10).

How do I find out if I do have drainage easements and where they are located?

You can obtain a copy of the dedicated drainage easement (public or private) for significant washes or channels at the city or county records department (see page 10 for contact information). In addition, request a copy of the current title report or plat of your lot or subdivision which will show the location and boundaries of any easements.

DRAINAGE AROUND YOUR HOME OR PROPERTY

Who is responsible for maintenance of drainage facilities on or next to my property?

Consult the plat, the grading and drainage plan and/or the covenants, conditions and restrictions (CC&Rs) for the subdivision. These documents outline maintenance responsibilities. In Scottsdale, it is generally the responsibility of the individual homeowner to maintain the portion of the channel on his/her property. On larger washes or regional drainage facilities the homeowners association, city or county may be responsible for maintenance.

If I am responsible for maintenance, what should I do?

For an individual property owner, maintenance responsibilities on a wash running through your property consist mainly of keeping it clean. This means free of trash, debris and sediment; clear of overgrown, choking or clogging vegetation; and free of obstructions or structures. The purpose is to maintain the free flow of water and not impede or reduce the water carrying capacity of the wash or channel. Washes must not be filled in, plugged, blocked, diverted or altered in any way.



Examples of areas requiring maintenance: A wash needs to be cleared of overgrown and dead vegetation (left), a grate needs to be cleared of debris (right).

What types of things should I avoid if I have a wash on my property?

- Avoid constructing walls or fences that cross over a wash. Walls should end at the edge of the drainage easement or the channel's floodplain and leave the wash area as common open space.
- Avoid placing primary access to your home (ex: the only driveway to your house) across a wash.
- Avoid diverting natural washes from their natural flow path. The city's *Stormwater and Floodplain Ordinance* requires that runoff should enter and depart from property in substantially the same manner as under pre-development conditions. If you must divert flow within your lot, avoid designing channels that turn the water flow more than 45 degrees.
- You must not alter a watercourse without city approval and certification from a professional engineer that any alterations will not increase flood levels or hazards within, upstream or downstream from the altered portion of the watercourse.

DRIVEWAYS, CULVERTS AND BRIDGES

What should I consider when building my driveway?

Driveways must not block or divert flow. They should not be constructed across roadside ditches without dipping them or installing a properly sized culvert. The minimum size required within the city right-of-way is 18 inches in diameter. When the driveway is dipped, it also needs to be slightly sloped and should be lower on the downstream side. If the driveway is not sloped, water will be diverted into the street and/or into your house or garage. If the dip in the driveway is installed flat, the sediment will slow down and deposit, possibly filling up your driveway.



The example above shows the necessary dip and slope of a driveway with culverts built over a wash.



Example of a culvert designed to carry runoff.

Can I install a culvert or bridge over a wash that flows through my property, but doesn't originate on my property?

Not without city approval. It should be designed by a professional engineer. A bridge or culvert will generally alter the flow characteristics of the wash and should be designed by a professional. Avoid locating culverts or bridges (even decorative foot bridges) over washes that originate upstream from your property. Homemade or improperly designed or installed culverts or bridges can be disastrous for the homeowner, the neighbors and adjacent streets.

What if the wash does originate on my lot? Then can I install a culvert or bridge over it?

Yes. Usually on small channels which only carry runoff originating onsite, bridges can be designed and installed by the homeowner. Rather than pipe culverts, shallow dip crossings (fords) or free span bridges are recommended.

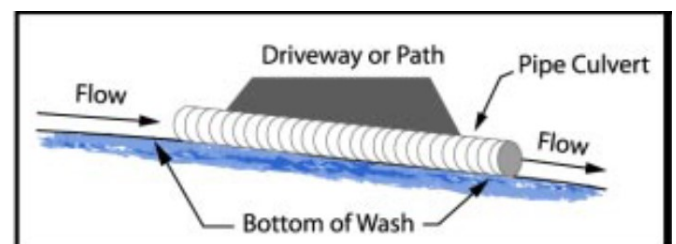


Example of bridge over a small channel.

If I do use a culvert, what should I keep in mind?

When culverts are used within city rights-of-way or easements, a minimum 18-inch diameter pipe is required to avoid clogging.

The bottom of the culvert (inlet and outlet) should be placed even with the bottom of the channel it is installed in, not above or below (see image). If installed below the channel bottom, the pipe will fill up with sediment during the first few runoff events. If installed above the channel bottom, water will pond and deposit sediment, possibly diverting water around the pipe and causing scour at the outlet.



Properly Installed Pipe Culvert

LANDSCAPING, GRADING AND ROOF RUNOFF



Does water drain away from all sides of my house?

Your house should be built on a pad (cut or compacted fill dirt) that is at least six inches above the adjacent ground. The pad should slope away from the house at a 5:1 slope, for a minimum of 10 feet. Any additional landscaping done after purchase of the house must not interfere with the drainage pattern established by the original lot grading plan.

Do I need to over-excavate before bringing in fill or landscaping material?

Generally, yes. The area to be filled or covered should be excavated to the depth or thickness of the proposed fill material if it would change drainage conditions. The excavated material can be hauled off or used for mound building (landscaping) in other parts of the yard as long as:

- the mound does not cause water to drain directly onto the house;
- the mound does not prevent water from draining away from the house; and
- the total storage capacity of any depressed storage area is maintained.



Can roof runoff flow safely away from my house?

Roofs can generate an enormous amount of runoff. When the runoff is concentrated onto small flat areas of the yard, where runoff cannot flow away from the house quickly enough, ponding or flooding of an entryway or patio can occur. Possible solutions include grading, re-landscaping, enlarging wall openings and/or removing obstructions to flow. All of these are designed to allow water to flow away from the house as quickly as it is running off the roof. Installing rain gutters on key sections of the roof, to collect and convey runoff to a safe location, is another possible solution, and in some cases may be the only practical solution.



When roof runoff cannot flow safely away from the house, it can pool and flood causing damage to both the inside and outside.

WALLS AND FENCES



A wall located within a wash fails due to erosion.

If I want to install a block wall or fence, are there any places I should avoid?

Block walls and fences can create some of the most serious flooding problems. If at all possible, avoid constructing walls across any channel or wash. Walls or fences should not extend beyond the designated building envelope of your lot or encroach into any drainage easement.

What if I can't avoid it - what if I have to cross a wash with a block wall or fence?

If you must cross a wash with a block wall or fence, you should maintain a clear, open span over the wash. If it cannot be left open, an inclined trash rack should be used. The city can provide information showing how to properly construct the opening and install the trash rack. A copy of the [City of Scottsdale: Standard Detail 2515-1, "Drainage Grate at Block Wall"](#) can be obtained from the city's One-Stop-Shop. An Encroachment Permit will be needed to construct a wall, or any structure, into or across a drainage easement. A Wall Permit is also required to build any type of wall greater than 3 feet in height within city limits.



A wall with a trash rack built over a drainage easement maintains a clear, open area from which water can travel.



Weep holes easily become clogged, preventing water from flowing through.

What about installing block walls or fences with weep holes or decorative block drains?

If possible, avoid or replace weep holes or decorative block drains with a clear opening per city standard details. Weep holes and decorative block openings are generally so small they easily catch debris and clog, causing water to pond or divert. This can result in backyard, pools and houses being flooded and walls being undermined and knocked over.

CHANNEL LINING, ROADSIDE DITCHES AND POOLS

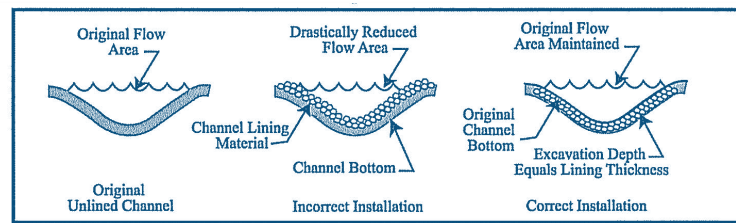
When installing gravel/river rock material in any wash, channel or roadside ditch -do I need to over-excavate?

Yes, definitely! This is one of the most common mistakes made in landscaping. Make sure that river rock or any channel lining is “inlaid.” When installing gravel or river rock lining material, you must first excavate to the depth of the material you are installing and then inlay the material (see figure below). Do not place material on top of the swale bottom, wash bed, retention basin or channel bottom. Do not dump or place fill material, landscaping gravel, or rip-rap material on top of the ground, bottom or sides of the drainage facility without first excavating (see example below).

If you don't over-excavate before placing landscaping or lining material in a drainage facility, water may not be able to enter the channel. At a minimum, the capacity of the channel or basin will be reduced. This can cause the drainage facility to overflow, and divert or back water upstream.



Properly inlaid river rock



What are my maintenance responsibilities if there is a roadside ditch on my property?

Roadside ditches are designed to carry street runoff to the nearest wash or culvert crossing. Although these ditches are normally located within the street's right-of-way, maintenance is usually the responsibility of the individual homeowner.

Vegetation must be kept out of roadside ditches or closely trimmed and maintained so as not to retard flows or trap debris and clog the ditch. Roadside ditches, if landscaped or lined, should only be landscaped with large diameter desert rock that will not be washed away. Landscaping or lining material must not fill up or reduce the capacity of the ditch. You must first excavate the thickness of the lining material before placing it in the ditch. Your driveway must not block flow within the roadside ditch, it must be dipped, have a pipe under it, or serve as a bridge (see image on page 5).



A maintained roadside ditch



A swimming pool fills with mud.

What should I consider when building a pool on my property?

Pools should not be placed in a low spot in the yard, block the natural flow path of a wash, or block the drainage in the yard or the flow of water around or away from your house.

Water should be able to flow away from your house and pool. Pools that get filled with mud are expensive to clean out.

PIPES, UNDERGROUND STORM SEWERS AND “ON-LOT” RETENTION

Can I intercept the flow from a natural wash or surface channel and put it directly into a pipe or underground storm sewer system?

You should avoid it whenever possible. Natural washes and man-made channels can carry an abundant supply of sediment and debris which can be a constant clogging and maintenance problem.

If there is no alternative to a piped system, water should first be routed into a basin which will allow debris and sediment to settle out before entering the inlet. You should also have an overflow channel available that can safely carry the overflow in case the inlet facility plugs or its capacity is exceeded.

Finally, these systems usually require periodic maintenance. Any grated cover over an inlet should have as large an opening as possible between the bars. A maximum distance of four inches between bars is recommended with the grate slanted 60 degrees away from the opening, rather than vertical or flush with the opening. Grated covers over an outlet should be hinged with break away bolts, and swing open during a flow event.



The image above shows how a piped system routes stormwater to a basin.

Why is my yard depressed or have a berm around it?

The purpose is to collect and retain runoff from the roof, driveways and the lot itself as required by city ordinance. This was a common practice in older subdivisions and today on some large individual lots. The CC&Rs for your subdivision or recorded plat should contain information on any on-lot retention requirements.

Do I have to keep the depression in my yard or can I fill it in?

In the process of landscaping or re-landscaping your yard, the storage capacity of any depressed areas designed to retain stormwater runoff must be maintained. If filled in, runoff from your lot may end up in your house or pool, your neighbor's yard, or overload downstream drainage facilities.



Examples of damage caused from water not running off properly

Contacts

To report a flooding or drainage related problem or obtain more information,
call one of the appropriate departments listed below.

You may also visit our website at ScottsdaleAZ.gov and search “Stormwater.”

Emergency Street Flooding

(When a road must be closed or emergency maintenance is needed)

Scottsdale Police Department: 480-312-5000

City of Scottsdale Stormwater Management	For information about drainage, private infrastructure maintenance, flood control projects, site evaluations, ordinance requirements, design standards, flood insurance requirements and stormwater pollution prevention	480-312-7740
City of Scottsdale One-Stop-Shop	For permits	480-312-2500
City of Scottsdale Planning & Development Records	For flood zone determinations and elevation certificates	480-312-2356
City of Scottsdale Street Operations	For public infrastructure maintenance, reports of street flooding and to obtain free sandbags	480-312-5620
City of Scottsdale Inspection Services	For field inspections of drainage problems related to construction projects	480-312-5750
Maricopa County Dept. of Public Health	Mosquito hotline (24hrs)	602-506-6616

If you have an unusual problem or have a specific question please contact
Stormwater Management at 480-312-7740.



Storm drains lead to many of our parks and lakes.
Please do not litter or dump anything in the city's drainage system.