

## 22.11 Stormwater Quality and Low Impact Development

New development and redevelopment sites are required to manage the design standard volume. The design standard volume (first flush) is stormwater runoff from small storms and the initial portion of runoff from larger storms. The design standard volume to be used is the value cited in the Drainage Control Ordinance, currently defined as the runoff from a 0.44 inch storm. Since there will be little to no runoff from pervious areas with a 0.44 inch storm or less, only runoff from impervious areas is considered in the design standard volume. Therefore, to calculate the design standard volume, multiply the proposed impervious area by 0.34 inches.

The design standard volume to be captured is that which is generated by the disturbed area.

This section will outline principles to apply Low Impact Development strategies to effectively design stormwater quality features to treat the design standard volume as part of the development process.

- a. **Consider stormwater quality needs early in the design process.** This will provide for stormwater capture and treatment throughout the site rather than “shoe-horning” the facility resulting in a forced, constrained approach.
- b. **Take advantage of the entire site when planning for stormwater treatment.** Spreading the runoff over a larger portion of the site can help to avoid less desirable treatment strategies that rely on underground capture and deep basins that can be difficult to maintain.
- c. **Reduce runoff to the maximum extent practicable.** Drain impervious areas to landscape areas and minimize directly connected impervious areas. Reduce the amount of impervious areas (e.g. use porous pavement or gravel for low-use or emergency access) and select treatment techniques that promote infiltration.
- d. **Integrate stormwater quality management and flood control, when practical.** If the site is required to detain runoff for flood control purposes, the facility used for flood control can be modified for stormwater quality by establishing the overflow elevation above the design standard volume.
- e. **Landscape stormwater management facilities.** A stormwater management facility can be an attractive addition to the site, rather than just an unimproved dirt area. In addition, landscaping will minimize the potential for erosion and therefore minimize the amount of required maintenance.
- f. **Consider surface conveyance as an alternative to pipes.**
- g. **Design facilities for easier maintenance.** Fine soils may clog void spaces with time. The designer should consider a capture area for fine soils where stormwater enters the facility that can be easily replaced or maintained.
- h. **Amend the soil** to allow for improved infiltration.

### 22.11.1 Effective strategies for Stormwater Treatment

There is a variety of methods to improve stormwater quality. Not all methods are appropriate for all development types. See Table 22.11.1 for development types.

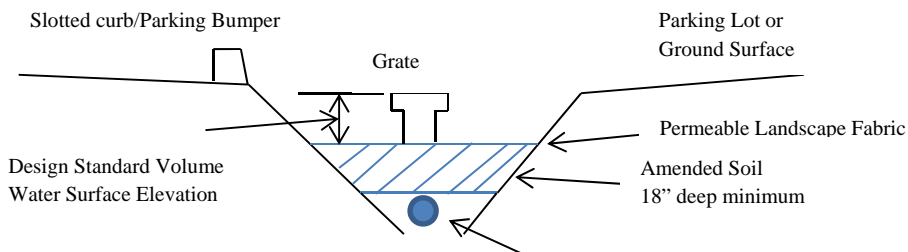
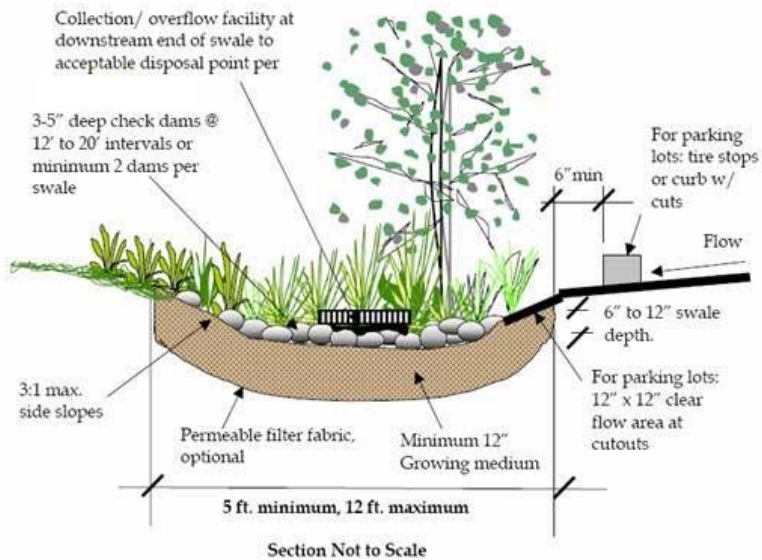
Table 22.11.1 Development Types

| Development Type              | Percentage Landscaping | Percentage Parking/Paving | Building Footprint | Parking                           |
|-------------------------------|------------------------|---------------------------|--------------------|-----------------------------------|
| Dense Urban                   | 0-5%                   | 0-5%                      | 90-100%            | Structure<br>On-street            |
| High Density Mixed Use        | 0-10%                  | 0-15%                     | 80-90%             | Structure<br>Surface<br>On-street |
| Commercial/Industrial         | 5-15%                  | 40-60%                    | 25-50%             | Surface                           |
| Low Density Mixed Use         | 10-25%                 | 30-50%                    | 25-60%             | Surface                           |
| Residential                   | 30-70%                 | 5-20%                     | 30-70%             | Surface                           |
| Educational/<br>Institutional | 15-60%                 | 10-25%                    | 25-60%             | Surface                           |
| Parks/Open Space              | 80-95%                 | 5-15%                     | 0-10%              | surface                           |

The following methods can be used to improve stormwater quality:

1. Landscape Category:

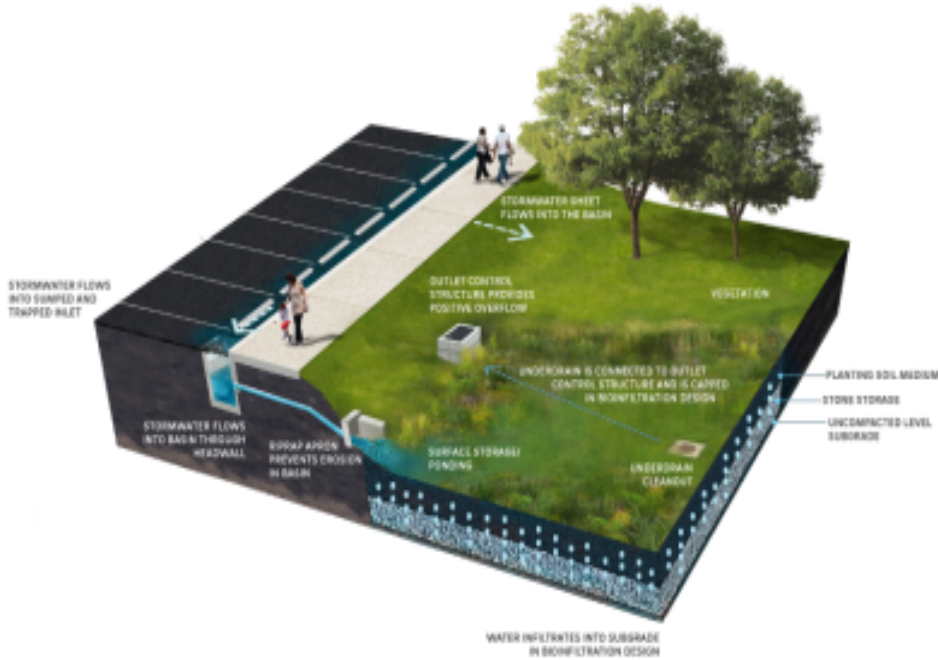
- a. Depressed parking islands or planters with curb cut(s)



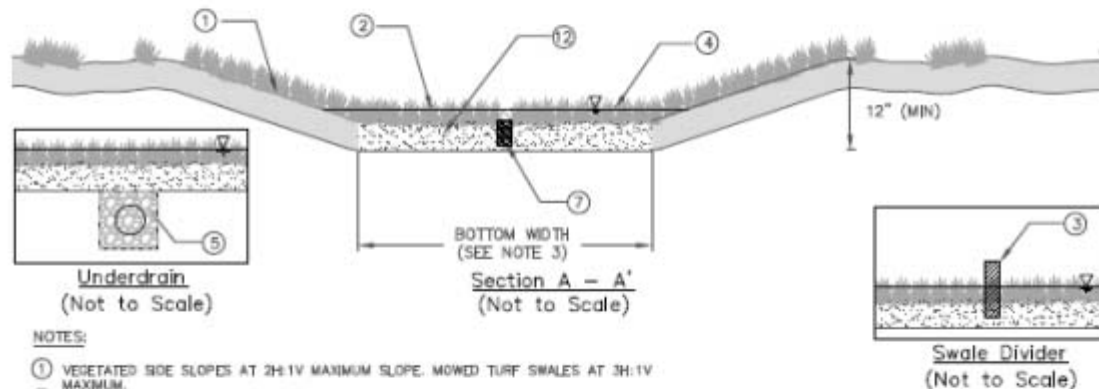
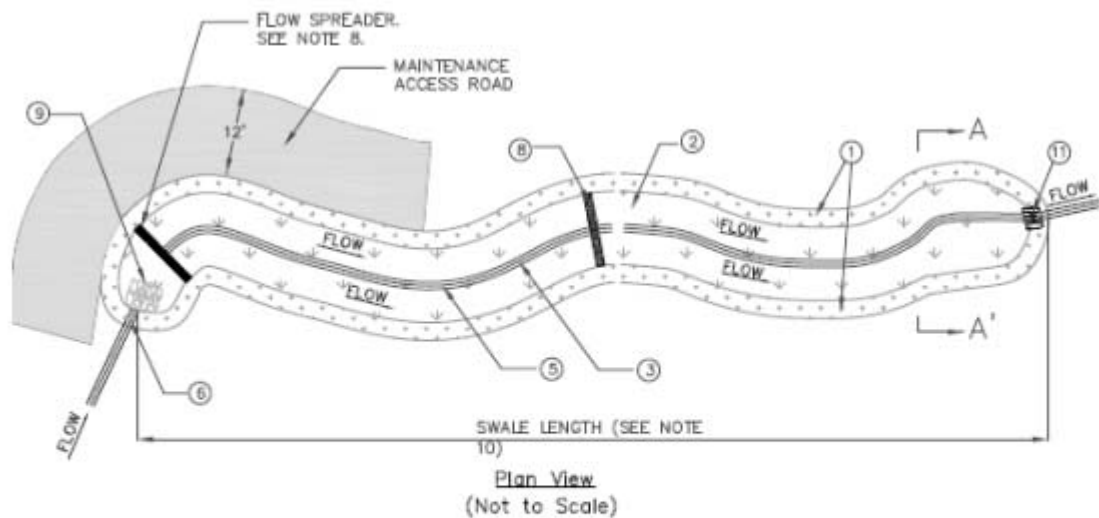
Outlet Drain

If perforated pipe is used, the pipe is to be wrapped in landscape fabric.

b. Depressed landscape/bioretention areas



c. Landscape Conveyance-Bioswale



NOTES:

- ① VEGETATED SIDE SLOPES AT 2H:1V MAXIMUM SLOPE. MOWED TURF SWALES AT 3H:1V MAXIMUM.
- ② GRASS HEIGHT SHALL BE 4" - 6" HIGH.
- ③ SWALE DIVIDER REQUIRED FOR BOTTOM WIDTHS > 10'. MINIMUM REQUIRED BOTTOM WIDTH IS 2' EXCLUDING WIDTH OF LOW FLOW CHANNEL. MAXIMUM BOTTOM WIDTH WITH DIVIDER IS 16'.
- ④ DEPTH OF FLOW FOR WATER QUALITY TREATMENT MUST NOT EXCEED TWO-THIRDS OF THE GRASS HEIGHT AND NOT GREATER THAN 4" (INFREQUENTLY MOWED) OR 2" (FREQUENTLY MOWED).
- ⑤ 6" PERFORATED UNDERDRAIN IN 9" DEEP COARSE AGGREGATE BED CONNECTED TO STORM DRAIN. REQUIRED FOR SLOPES < 1.5% OR AS NEEDED.
- ⑥ INLET PIPE WITH INLET PROTECTION.
- ⑦ IF NO UNDERDRAIN, LOW FLOW DRAIN SHALL EXTEND ENTIRE LENGTH OF SWALE AND SHALL HAVE A DEPTH OF 6" MINIMUM AND WIDTH NO MORE THAN 5% SWALE BOTTOM WIDTH. ANCHORED PLATE FLOW SPREADER IF USED, SHALL HAVE V-NOTCHES (MAX TOP WIDTH = 5% OF SWALE WIDTH) OR HOLES TO ALLOW PREFERENTIAL EXIT OF LOW FLOWS.
- ⑧ INSTALL CHECK DAMS OR GRADE CONTROL STRUCTURES FOR SLOPES > 6% AT 50' MAXIMUM SPACING TO ACHIEVE A MAXIMUM EFFECTIVE LONGITUDINAL SLOPE OF 6%. FLOW SPREADERS SHALL BE PROVIDED AT INLET AND AT THE BASE OF EACH CHECK DAM SEE FIGURE 3-2.
- ⑨ INSTALL ENERGY DISSIPATOR AT THE INLET OF VEGETATED SWALE.
- ⑩ SWALE LENGTH SHALL BE 100' OR LENGTH REQUIRED TO PROVIDE 10 MINUTES RESIDENCE TIME, WHICHEVER IS GREATER.
- ⑪ INSTALL APPROPRIATE OUTLET STRUCTURE. ACCOMMODATE LOW FLOW CHANNEL AND/OR UNDERDRAIN (IF PRESENT).
- ⑫ AMEND SOILS WITH 2" OF COMPOST TILLED INTO 6" OF NATIVE SOIL UNLESS NATIVE SOIL ORGANIC CONTENT > 10%.

#### d. Infiltration Trench

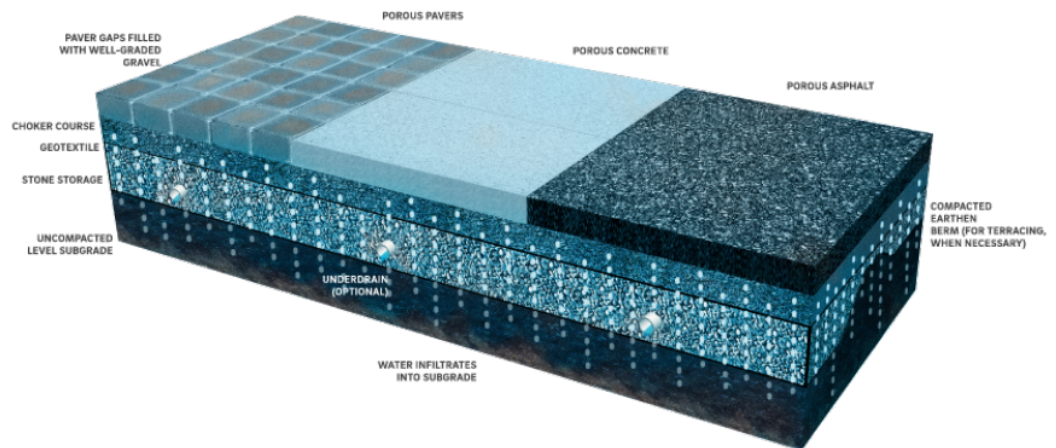
An infiltration trench is an effective means of capturing the design standard volume underground in the void space of the media (e.g. sand, rock). Maximum porosity (void space) to be used is 30%. A replaceable filter (e.g. pea gravel, ) shall be used to prevent the build-up of fine material in the trench.

The length or width dimension must be greater than the depth dimension so that the trench is not considered an injection well.

## 2. Paving Category:

### a. Pervious pavers, concrete or asphalt

**Figure 4.2-1: Porous Pavement with Typical Features**

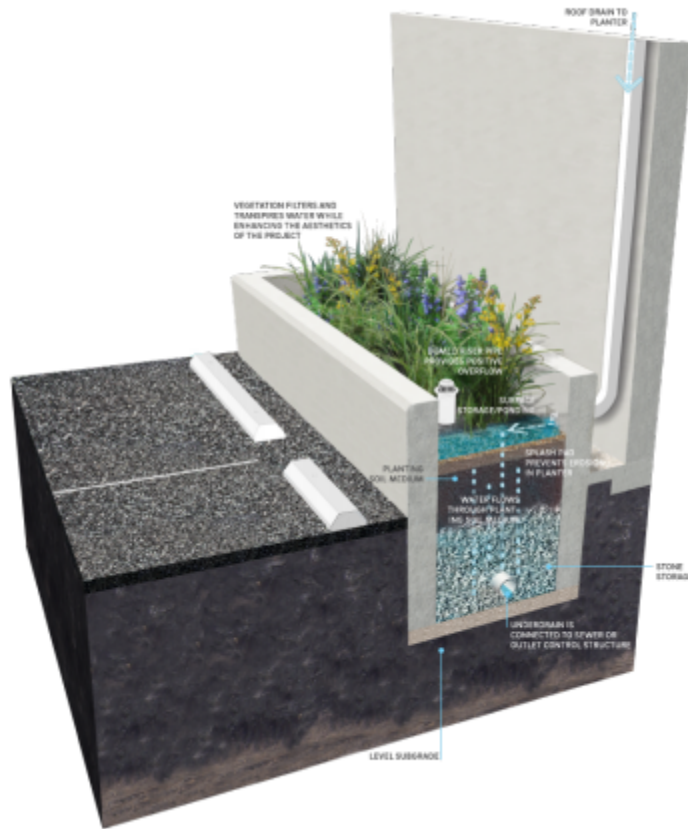


### b. Open-cell structure with gravel

### c. Gravel parking lots

### d. Underground cisterns

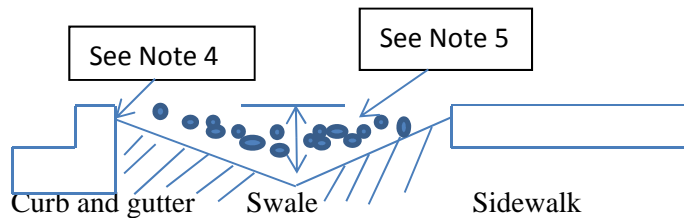
- 3. Elevated category:
  - a. Planter boxes



- b. Cisterns
- c. Green/brown roofs

4. Streetscape Category:

- a. The landscape area between the sidewalk and back of curb is to be depressed and covered in rock to prevent erosion. See the detail and notes below:



1. Swale to be 6” deep when the distance between back of curb and the sidewalk is 5 feet.
2. Swale to be 1” deeper than the distance in feet between the back of curb and the sidewalk for landscape buffers different than 5 feet wide.
3. For wide landscape buffers, greater than 10 feet, the maximum depth is 10 inches.
4. Final grade of dirt to be 1 to 2 inches below top of curb and top of sidewalk grade.
5. Surface between back of curb and sidewalk to be covered with gravel mulch (minimum ¾”), cobbles or rip-rap. Do not fill entire swale.
6. A check dam will be required for swales on steeper longitudinal slopes and longer sections. The engineer will determine the location.
7. Landscape fabric is recommended, but not required, between the dirt and the stone. If landscape fabric is to be used it is to be permeable.
8. Detail is to be built for all new construction. In the case where the sidewalk is existing and the landscape buffer is improved with landscaping and/or some form of erosion protection, this requirement does not apply.

b. Street medians

On arterial streets, the designer may choose to drain the street into the median. This is a change from the City standard drawing, approval from the City Engineer is required. The minimum median width is 8 feet. Check dams will be required in the median on streets with slopes greater than 2.5% to reduce velocity.

The grate elevation is to be perched to allow the runoff from smaller storms to infiltrate.

5. Offsite Mitigation Category:

Constructing stormwater quality improvements outside the project boundaries is only available for redevelopment projects after the Variance criteria discussed later in this chapter is demonstrated.

6. Payment-in-Lieu

After the Variance criteria discussed later in this chapter is demonstrated, payment-in-lieu may be approved by the City Engineer. The amount of payment-in-lieu (dollars/cubic foot) is to be determined by the City Engineer.

### 22.11.2 Recommended Method Implementation Matrix

All development types are to manage the design standard volume with one or more of the methods listed in paragraph 22.11.1. Table 22.11.2 shows the development types and which categories of methods are most appropriate.

Table 22.11.2 Recommended Implementation Matrix

| Development Type       | Paving Category | Landscape Category | Elevated Category | Streetscape Category | Flood Control Category | OffSite Mitigation Category |
|------------------------|-----------------|--------------------|-------------------|----------------------|------------------------|-----------------------------|
| Dense Urban            | X               |                    | X                 | X                    |                        | X                           |
| High Density Mixed Use | X               | X                  | X                 | X                    |                        | X                           |
| Commercial/Industrial  | X               | X                  | X                 | X                    | X                      |                             |
| Low Density Mixed      | X               | X                  |                   | X                    | X                      |                             |
| Residential            |                 | X                  |                   | X                    | X                      |                             |
| Campus                 | X               | X                  |                   | X                    | X                      |                             |
| Parks/Open Space       | X               | X                  |                   | X                    | X                      |                             |

| Key   | Recommended |
|-------|-------------|
| X     | Yes         |
| Blank | No          |

22.11.3 Variance from on-site design standard volume requirements

Due to site characteristics, a Variance to the design standard volume must be clearly requested, stated and justified as part of a formal drainage submittal. A Variance from satisfying design standard volume requirements may be appropriate for one of more of the following conditions with justification:

- a. a building in an existing parking lot, without zoning requirement for landscaping
- b. 1000 sq ft or less addition to existing building, without zoning requirement for landscaping
- c. Landscaping not required by zoning
- d. Less capture than 0.44 inch storm
- e. sites steeper than 8%-existing grade
- f. contaminated soils



g. geotechnical constraint- a geotechnical report, stamped by a registered Professional Engineer, is to be submitted to the City.

h. Sites where offsite mitigation is recommended per Table 22.11.2

22.11.3.1 If a Variance to the design standard volume is requested, it must be clearly stated and justified in the formal drainage submittal. The City Engineer will consider requests on a case-by case basis.

For sites that applied for a Variance, Payment-in-lieu is required. In cases where the design standard volume cannot be met in total, Payment-In-Lieu is required for the difference between the design standard volume and the proposed volume. Runoff from streets and sidewalks in the ROW are excluded.

The City Engineer or designee will provide the cash value amount of the required Payment-in-lieu for City stormwater quality improvements.

If it is determined by an Engineer's Certification acceptable to the City that the design standard volume was not met during construction of the project, the owner may choose to reconstruct the facility to meet the design capture volume or to make Payment-in-lieu for the volume difference.

22.11.4 Land uses that require additional stormwater controls

- Automotive Repair and Parts Shops
- Restaurants and Commercial Food processing
- Gas Stations/Fueling Facilities

The goal of this section is to significantly reduce pollutants from entering the MS4.

Submittals for the land uses listed above require a predesign meeting with the City Engineer or designee to identify appropriate controls.

22.11.5 Post-Construction Maintenance and Responsibilities

The following Post-Construction Maintenance and Responsibilities shall be performed in perpetuity:

Private Stormwater Facilities shall be maintained per the City approved drainage submittal by the facilities' (property) owner or responsible party. Critical maintenance and operation items shall be identified on the City approved drainage submittal and recorded by Covenant with the County Clerk.

The Covenant is required prior to issuance of Permanent Certificate of occupancy for commercial projects and prior to building permit approval for residential projects as identified on the City approved drainage submittal.

The property owner may choose to document the stormwater quality facility requirements on the plat including benefit and maintenance responsibility language as identified on the City approved drainage submittal.

#### 22.11.6 Stormwater Control Permit for Erosion and Sediment Control

All grading within the City of Albuquerque must be performed in a manner which prevents the movement of significant and damaging amounts of sediment onto adjacent property and public facilities by both water and wind, and minimizes the impacts to stormwater runoff quality.

To conform with EPA stormwater regulations, the property owner and general contractor must file an eNOI with the EPA for sites disturbing 1 acre or more of land, or is part of a larger common plan of development that will disturb greater than one acre of land, 14 days prior to commencing earth disturbing activities.

In addition, a City issued Stormwater Control Permit for Erosion and Sediment Control (ESC Permit) is required prior to earth disturbance or construction on projects that disturb 1 acre or greater of land or the following :

1. The site is part of a larger common plan of development that will disturb greater than one acre of land.
2. The site is identified as having a significant potential for erosion, based on observation or site characteristics including very steep (8% or greater) topography.
3. The site is known to contain contaminated soils.
4. The site lies directly adjacent to an arroyo or the Rio Grande or directly discharges directly to an arroyo or the Rio Grande.

The ESC Permit is to be approved prior to The City approving a Building Permit(s) for the project.

1. The ESC Permit can be issued for earth disturbance and for Building Permit individually or together. The ESC Permit is the responsibility of the property owner.
2. The following approvals are required in advance of City approval of the ESC Permit:
  - a. Grading and Drainage Plan,
  - b. Erosion and Sediment Control Plan
  - c. Floodplain Development Permit, if construction activities will occur in a mapped floodplain.
3. BMPs identified on the Erosion and Sediment Control plan are to be in place prior to earth disturbance/construction. If the Erosion and Sediment Control Plan is implemented in phases, the BMPs identified for that phase are to be in place prior to earth disturbance/construction for that phase.
4. A permit application is available on line or at the City Engineer's office.
5. For sites that are a larger common plan of development, the last lot in the development will not need an ESC Permit if it less than 0.45 acres.

### 22.11.7 Construction Site Maintenance and Inspections

1. Self-inspections by permittee. At a minimum a routine compliance self-inspection is required to review vegetation, erosion and sediment control measures, and other protective measures identified by the Erosion and Sediment Control Plan and the associated SWPPP. Sites must to be maintained per the EPA NPDES Construction General Permit and the City Drainage Control Ordinance.
2. The City will conduct inspections of construction sites for compliance with the EPA NPDES Construction General Permit and the Drainage Control Ordinance.
3. Sites located in priority areas will be inspected by the City more frequently. A site is located in a priority area if the site drains to a Waters of the U.S. without passing through a public detention or retention facility that removes sediment, debris and floatables between the site and a Waters of the U.S.

### 22.12 Drainage Right-of-Way and Easements

#### **(old)Section 6. RIGHTS-OF-WAY AND EASEMENTS**

##### **A. Rights-of-Way**

Whenever no beneficial use can be derived by an owner from continued retention of that land necessary for permanent drainage, flood control or erosion control facilities or when the facilities involve a major arroyo, the land required for the operation and maintenance of the facilities must be dedicated to AMAFCA or the City.

##### **B. Easements**

Easements for drainage, flood control and erosion control facilities are acceptable (except where prohibited in Subsection A. above) as long as a clear agreement exists as to other acceptable uses and that no permanent facilities are constructed within them (including masonry fences and retaining walls but excluding pavement) without an agreement between the owner and the City, governing the permitted uses.

##### **C. Configuration**

Rights-of-way and permanent easements required for drainage, flood control and erosion control facilities will conform to the following criteria: