# City of Vallejo

## Stormwater Control
## C.3 Compliance Information

Addendum to **C.3 Guidebook by Contra Costa Clean Water Program**

**June 2018**

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# I. PLANNING AHEAD FOR C.3 COMPLIANCE

In order to ensure that you comply with C.3 requirements and minimize costly redesign of a project, it is imperative that stormwater treatment measures be considered **from the earliest stages of the project**. The requirements are complex and technical. Most applicants will require the assistance of a qualified civil engineer, architect, or landscape architect. Because every project is different, you should begin by scheduling a pre-application meeting with City of Vallejo planning staff.

Plan ahead to avoid the three most common (and costly) mistakes:

1. Not planning for C.3 compliance early enough. You should think about your strategy for C.3 compliance before completing a conceptual site design or sketching a layout of subdivision lots.
2. Assuming underground or proprietary stormwater treatment facilities will be adequate for compliance. A complete Low Impact Development design, typically including bioretention facilities dispersed throughout the development, and integrated with the site plan and landscaping plan, is now required for nearly all projects.
3. Not planning for periodic inspections and maintenance of treatment and flow-control facilities. Consider who will own and who will maintain the facilities in perpetuity and how they will obtain access, and identify which arrangements are acceptable to your municipality.

## A. DOES PROVISION C.3 APPLY TO YOUR PROJECT?

**Exclusions**

- Interior remodels and routine maintenance or repair such as replacement of a roof or exterior wall surface.
- Pavement resurfacing within the existing footprint. Generally, resurfacing is interpreted to mean work on existing pavement that does not involve changes to grading or drainage; however, municipal staff determines applicability on a case-by-case basis.
- Pervious pavements constructed to the C.3 compliant criteria in **Chapter 4 of C.3 Guidebook**.
- Swimming pools and other features that overflow and drain to the sanitary sewer.

## B. IMPERVIOUS AREA THRESHOLDS

C.3 Provision requirements are based on the sum of impervious area created or replaced in connection with your project. Here are the applicable thresholds.

TABLE 1. Thresholds, effective dates, and requirements of C.3 Provision

| | Impervious Area Threshold | Effective Date | Requirement |
|---|---|---|---|
| Non-Regulated Projects | All projects requiring municipal approvals or permits (includes single-family residences) | 5/1/2010 | As encouraged or directed by City of Vallejo staff, preserve or restore open space, riparian areas, and wetlands as project amenities, minimize land disturbance and impervious surfaces (especially parking lots) cluster structures and pavements, include micro-detention in landscaped and other areas, and direct runoff to vegetated areas. Use Bay-friendly landscaping features and techniques. Include Source Controls specified in **C.3 Guidebook Appendix D**. |
| | Projects between 2,500 and 10,000 square feet requiring approvals or permits (includes single-family residences) | 12/1/2012 | Using the template in **C.3 Guidebook Appendix C**, prepare and submit a Stormwater Control Plan for a Small Land Development Project. Implement one of three options: (1) Disperse runoff from some amount of roof or paved area to a vegetated area; (2) incorporate some amount of permeable pavement into your project; or (3) incorporate a bioretention facility or planter box. |
| Regulated Projects | Auto service facilities, gas stations, restaurants, and uncovered parking lots over 5,000 square feet | 12/1/2011 | Prepare and submit a Stormwater Control Plan as described in **C.3 Guidebook Chapter 2**, including features and facilities to ensure runoff is treated before leaving the site. Use the LID Design Guide in **Chapter 3**, including sizing factors and criteria for "treatment only." |
| | All projects between 10,000 square feet and one acre[1] | 8/15/2006 | |
| | Projects an acre and larger, unless exempted. See text.[1] | 10/14/2006 | Where required, design LID features and facilities for hydromodification management (HM, flow-control) as well as stormwater treatment. Prepare and submit a Stormwater Control Plan as described in C.3 Guidebook Chapter 2 and use the LID Design Guide in Chapter 3, including the sizing factors and criteria for "treatment and flow control." See Appendix E for additional information. |

[1] Detached single-family homes that are not part of a larger plan of development are specifically excluded. For road widening projects, count only the impervious area associated with new traffic lanes.

## C. THE "50% RULE" FOR PROJECTS ON PREVIOUSLY DEVELOPED SITES

- If the new project exceeds a threshold shown on Table 1 and results in an alteration of **more than 50%** of the impervious surface of a previously existing development, and the existing development was not subject to stormwater treatment measures, then the entire project must be included in the treatment measure design to meet the C.3 requirements.
- If the new project exceeds a threshold shown on Table 1 and results in an alteration of **less than 50%** of the impervious surface of a previously existing development, and the existing development was not subject to stormwater treatment measures, then only the new and replaced impervious surface must be included in the treatment system design to meet the C.3 requirements.

## D. STORMWATER CONTROL PLAN

If you are required to comply with the C.3 Provision, **submit Stormwater Control Plan and its Narrative with your application for entitlements and development approvals**.

## E. OPERATION AND MAINTENANCE PLAN

Prepare and submit Operation and Maintenance Plan. Your Stormwater Control Operation and Maintenance Plan will be a living document. It must have the up-to-date records of changes throughout the project: O&M personnel changes, mechanical equipment replacements, and any additional maintenance procedures as needed, etc. Updates may be transmitted to Vallejo staff at any time. However, at a minimum, updates to the O&M Plan must accompany the annual inspection report. These updates should reference the sections of the Plan being changed and should be placed in reverse chronological order (most recent at the top) in Section II of the binder. If the entire O&M Plan is updated, as it should be from time to time, these updates should be removed from the first section, but may be filed (perhaps in the back of the binder) for possible future reference.

# II. C.3 COMPLIANCE PROCESS

Coordinate your submittals at each stage so that your proposed **site plan, landscape plan, and stormwater compliance design are congruent**.

1. In a **pre-application meeting** with City of Vallejo municipal staff:
   - Show a conceptual plan that incorporates site drainage, including self-treating and self-retaining areas, and the locations and footprints of any treatment and flow-control facilities
   - Present the completed Project Data Table

| | |
|---|---|
| **Project Name/Number** | |
| **Application Submittal Date** | [to be verified by municipal staff] |
| **Project Location** | [Street Address if available, or intersection and/or APN] |
| **Name of Owner or Developer** | |
| **Project Type and Description** | [Examples: "Single Family Residence," "Parking Lot Addition," "Retail and Parking"] |
| **Total Project Site Area (acres)** | |
| **Total New Impervious Surface Area (sq ft)** | [Sum of currently pervious areas that will be covered with new impervious surfaces] |
| **Total Replaced Impervious Surface Area** | [Sum of currently impervious areas that will be covered with new impervious surfaces] |
| **Total Pre-Project Impervious Surface Area** | |
| **Total Post-Project Impervious Surface Area** | |
| **Runoff Reduction Measures Selected** (Check one or more) | ☐ 1. Disperse runoff to vegetated area<br>☐ 2. Pervious pavement<br>☐ 3. Cisterns or Rain Barrels<br>☐ 4. Bioretention Facility or Planter Box |

   - Discuss C.3 compliance for your project—including how C.3 compliance review will be coordinated with review of site plans, architectural plans, landscaping plans, and tentative maps
   - Determine facility ownership and maintenance responsibility

- Identify typical maintenance requirements
- Upon municipal staff's recommendation, prepare and submit a preliminary site design prior to formally applying for planning and zoning approvals

2. **Review the instructions** in **C.3 Guidebook** before you prepare your tentative map, preliminary site plan, drainage plan, architectural plan, and landscaping plan.

3. Prepare a **Stormwater Control Plan and its Narrative** and submit it **with your application for development approvals (entitlements)**. Use the Stormwater Control Plan template available on **Contra Costa Clean Water Program website**. Preparation of a complete and detailed Stormwater Control Plan is the key to cost-effective C.3 compliance and expeditious review of your project. Instructions for preparing a Stormwater Control Plan are in **C.3 Guidebook Chapters 2 and 3**.

4. Use **Stormwater Control Plan Checklist** (see Page 7) to include all required information. Mark up this checklist and include in your submittal.

5. Following development approval, create your **detailed project design**, incorporating the features described in your Stormwater Control Plan. Follow the design criteria in **C.3 Guidebook Chapter 4**.

6. In a **table on your construction plans**, list each stormwater control feature and facility and the plan sheet where it appears (see **C.3 Guidebook page 19**).

7. Prepare a draft Stormwater Facility **Operation and Maintenance Plan** (see **C.3 Guidebook Chapter 5**) and submit it with your application for building permits. Download the O&M Plan template from **Contra Costa Clean Water Program website** to complete your document.

8. Generate **Operation and Maintenance Agreement** with City of Vallejo, the legal document assigning responsibility for operation and maintenance of stormwater facilities. Attach the legal description and the plat of the project. Get this agreement notarized to finalize the commitments of the responsible parties.

9. Submit the **Final Operation and Maintenance Plan** before building permit final and applying for a **Certificate of Occupancy**.

10. **Maintain stormwater facilities during and following construction** in accordance with required warranties.

11. During or following construction, submit a final Stormwater Facility Operation and Maintenance Plan and **formally transfer responsibility** for maintenance to the owner or permanent occupant.

12. The occupant or owner must **maintain the facilities in perpetuity**. Municipal staff will periodically verify the facilities are maintained.

## STORMWATER CONTROL PLAN CHECKLIST

### CONTENTS OF EXHIBIT:

- ❒ Existing natural hydrologic features (depressions, watercourses, relatively undisturbed areas) and significant natural resources.
- ❒ Existing and proposed site drainage network and connections to drainage off-site.
- ❒ Layout of buildings, pavement, and landscaped areas.
- ❒ Impervious areas proposed (roof, plaza/sidewalk, and streets/parking) and area of each.
- ❒ Entire site divided into separate Drainage Management Areas, with each DMA identified as self-treating, self-retaining (zero-discharge), draining to a self-retaining area, or draining to an IMP. Each DMA has one surface type (roof, paving, or landscape), is labeled, and square footage noted.
- ❒ Locations, footprints, and square footage of proposed treatment and flow-control facilities.
- ❒ Potential pollutant source areas, including refuse areas, outdoor work and storage areas, etc. listed in **C.3 Guidebook Appendix C** and corresponding required source controls.

### CONTENTS OF REPORT:

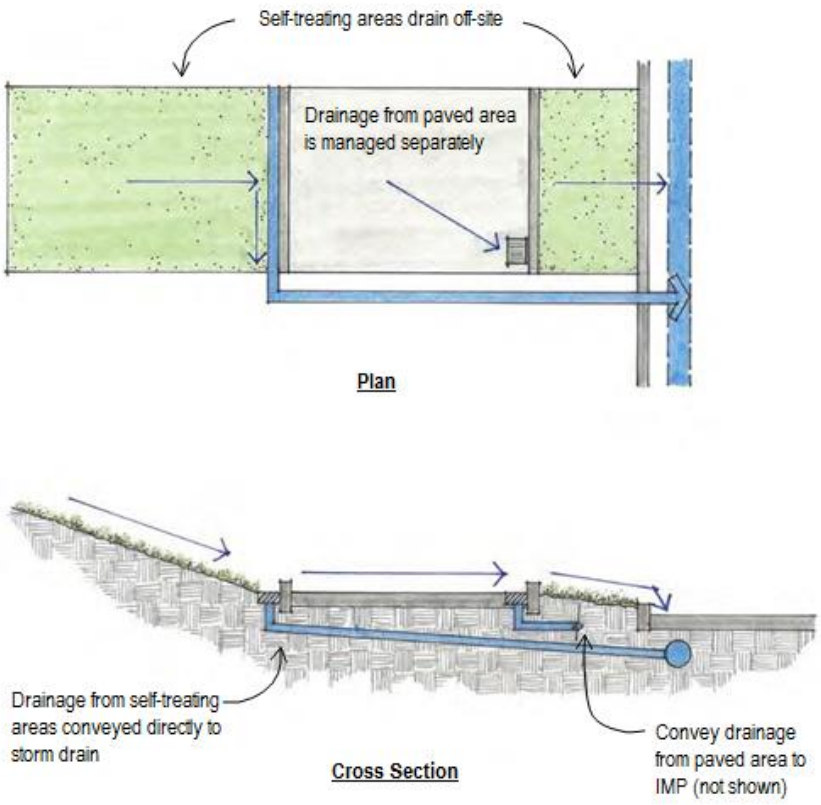
- ❒ Narrative analysis or description of site features and conditions that constrain, or provide opportunities for, stormwater control. Include soil types (including Hydrologic Soil Group), slopes, and depth to groundwater.
- ❒ Narrative description of site design characteristics that protect natural resources.
- ❒ Narrative description and/or tabulation of site design characteristics, building features, and pavement selections that minimize imperviousness of the site.
- ❒ Tabulation of DMAs, including self-treating areas, self-retaining areas, areas draining to self-retaining areas, and areas tributary to Integrated Management Practices (IMPs), in the format shown in **C.3 Guidebook Chapter 4**. Output from the IMP Sizing Calculator may be used.
- ❒ Sketches and/or descriptions showing there is sufficient hydraulic head to route runoff into, through, and from each IMP to an approved discharge point.
- ❒ A table of identified pollutant sources and for each source, the source control measure(s) used to reduce pollutants to the maximum extent practicable. See **C.3 Guidebook Appendix D**.
- ❒ General maintenance requirements for infiltration, treatment, and flow-control facilities.
- ❒ Means by which facility maintenance will be financed and implemented in perpetuity.
- ❒ Statement accepting responsibility for interim operation & maintenance of facilities.
- ❒ Identification of any conflicts with codes or requirements or other anticipated obstacles to implementing the Stormwater Control Plan.
- ❒ Construction Plan C.3 Checklist.
- ❒ Certification by a civil engineer, architect, and landscape architect.
- ❒ Appendix: Compliance with flow-control requirements
  (if using an HM compliance option other than the design guidance in **C.3 Guidebook Chapter 3**).

# III. COMPLIANCE DESIGN CRITERIA

Your Stormwater Control Plan must include an exhibit and calculations showing the site drainage, proposed treatment, and flow-control facilities that meet the criteria of C.3 Provisions. C.3 Guidebook contains step-by-step directions and Stormwater Control Plan template to help you comply with the C.3 Provisions. Here is a quick overview of potential designs that meet the requirements.

## A. RUNOFF REDUCTION MEASURES

### 1. Self-Treating Areas

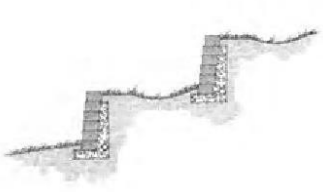



- Best for sites with extensive landscaping.
- Advantages: low cost, no maintenance verification, complements site landscaping.
- Requires substantial square footage.
- Runoff from the self-treating area does not enter an IMP or another drainage management area, but goes directly offsite or to the storm drain system.

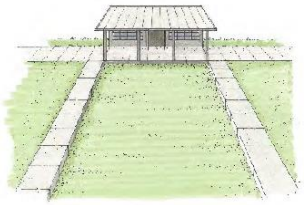
- The self-treating area is at least 95% lawn or landscaping (not more than 5% impervious).
- Re-graded or re-landscaped areas have amended soils, vegetation, and irrigation as may be required to maintain soil stability and permeability.

**2. Self-Retaining Areas**

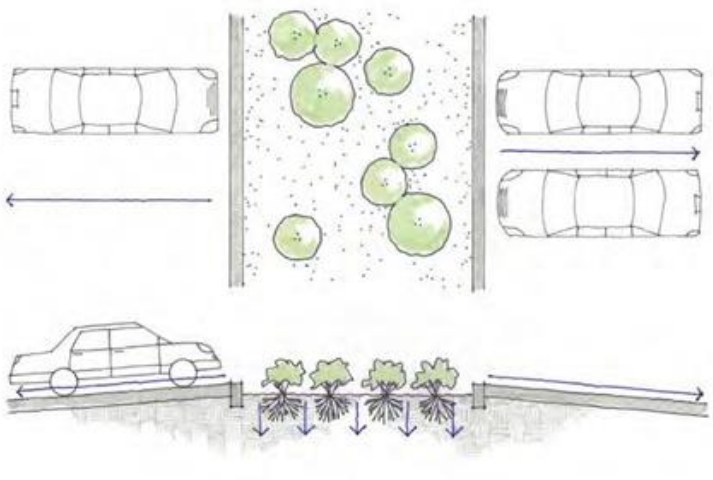
- Depressed pervious areas that produce no runoff. The area is bermed all the way around or graded concave.
- Best for sites with extensive landscaping.
- Advantages: low cost, no maintenance verification, complements site landscaping.
- Requires substantial square footage.
- Slopes do not exceed 4%.
- Entire area is lawn, landscaping, or pervious pavement.
- Area has amended soils, vegetation, and irrigation as may be required to maintain soil stability and permeability.
- Any area drain inlets are at least 3 inches above surrounding grade.
- Overflow (which may occur during high-intensity events) is conveyed safely.



Slope terraced to create a self-retaining area

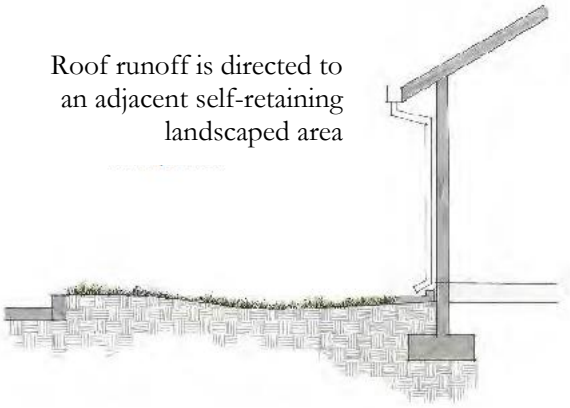


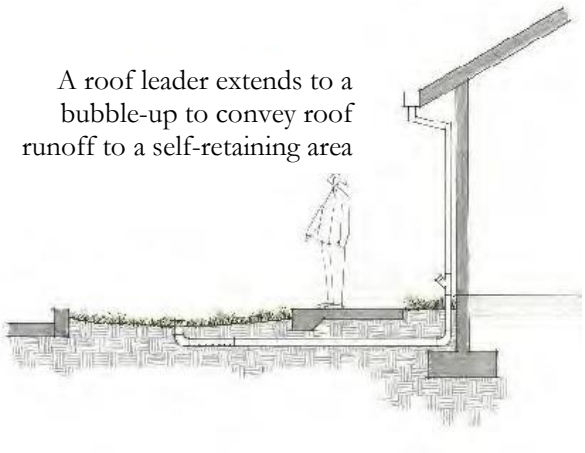
Lawn depressed to create a self-retaining area

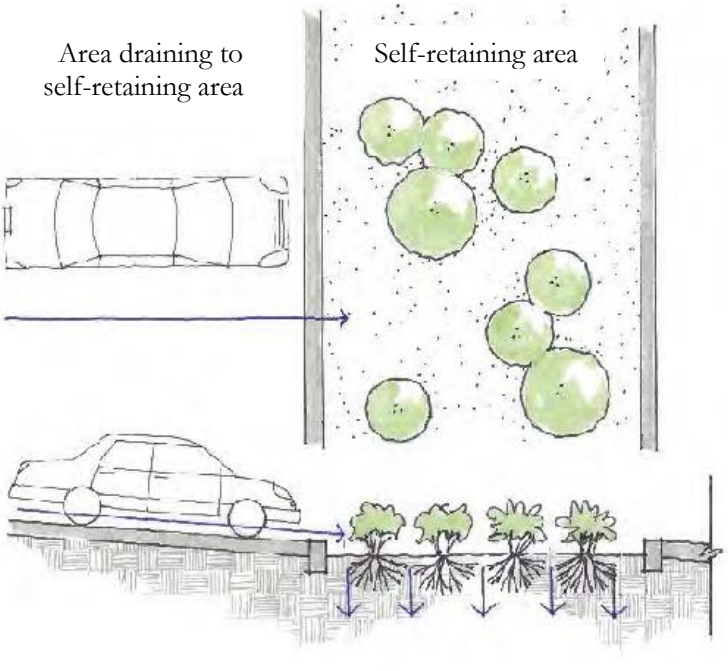


### 3. Areas Draining to Self-Retaining Areas

- Best for sites with extensive landscaping
- Advantages: low cost, no maintenance verification, complements site landscaping
- Requires substantial square footage
- Ratio of tributary impervious area to self-retaining area is not greater than 2:1 (1:1 if flow-control requirements apply).
- Roof leaders collect runoff and route it to the self-retaining area.
- Paved areas are sloped so drainage is routed to the self-retaining area.
- If runoff is concentrated where it enters the self-retaining area, there are appropriate measures to protect against erosion and promote flow across the self-retaining area.

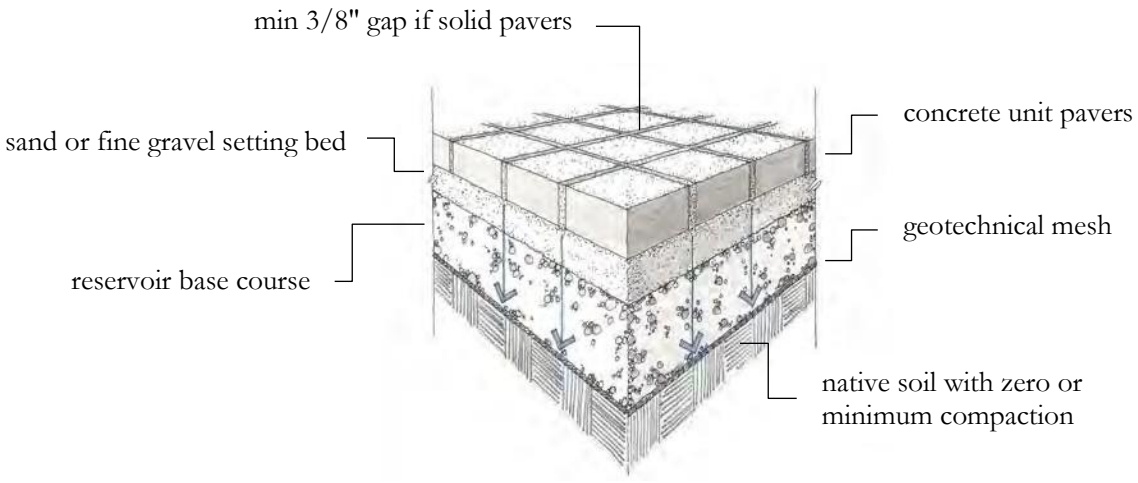


## B. PERVIOUS PAVEMENTS

- Allows rainfall to collect in a gravel or sand base course and infiltrate into native soil instead of creating runoff.
- Installation is flat or < 2% grade.
- No erodible areas drain on to pavement.
- Subgrade is uniform and slopes are not so steep that subgrade is prone to erosion. Compaction is minimal.
- Reservoir base course is of open-graded crushed stone. Base depth is adequate to retain rainfall and support design loads.
- If a subdrain is provided, outlet elevation is a minimum of 3 inches above highest point of bottom of base course.
- Rigid edge is provided to retain granular pavements and unit pavers.
- Solid unit pavers, if used, are set in sand or gravel with minimum 3/8" gaps between the pavers. Joints are filled with an open-graded aggregate free of fines.
- **Permeable concrete and porous asphalt, if used, are installed by qualified professionals according to vendor's recommendations.**
- Selection and location of pavements incorporates Americans with Disabilities Act requirements, site aesthetics, and uses.
- Pavement design and/or grading design incorporates management of design flows to avoid local flooding (typically a 10-year storm).
- High initial cost
- Geotechnical concern, especially in clay soils
- Concerns about pavement strength and surface integrity

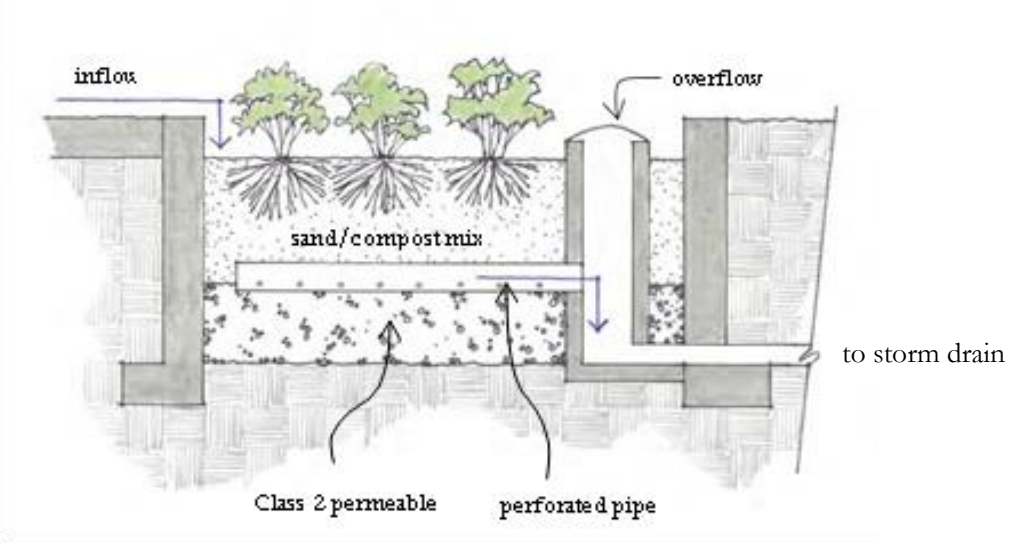



## C. LOW IMPACT DEVELOPMENT DESIGN OPTIONS

### 1. Bioretention Facilities

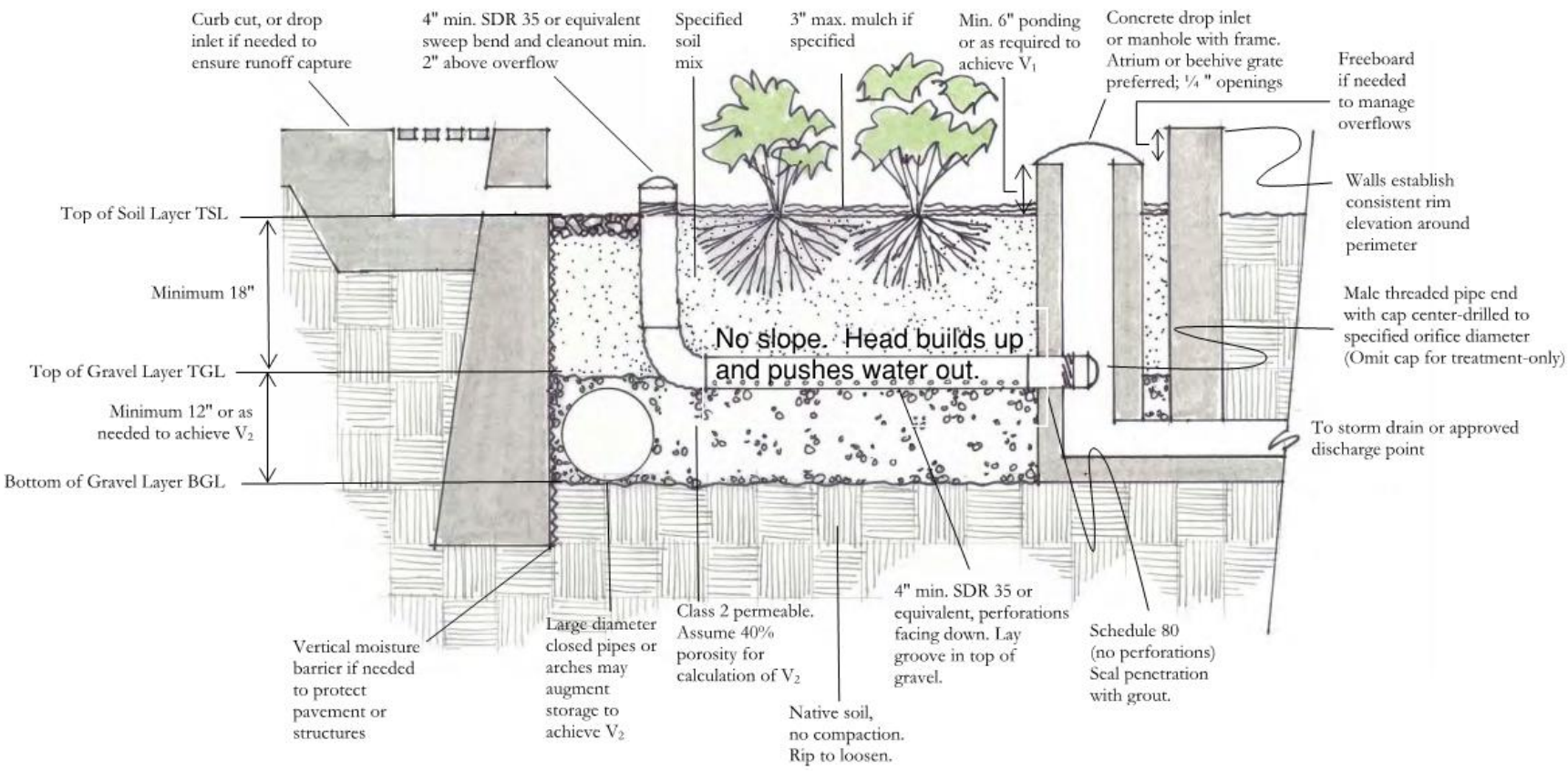
- Advantages: can be any shape to fit in a landscaped area, low maintenance
- Limitations: typically requires 3-4 feet of head, irrigation may be required
- Bioretention facilities are located in a visible, well-trafficked area where possible.
- Top of soil elevation is as high as possible. High walls and steep slopes adjacent to the facility are avoided.
- Location and footprint of facility are congruent on site plan, landscaping plan, and grading plan.
- Bioretention area is designed as a basin (level edges) or a series of basins, and grading plan is consistent with these elevations. Check dams, if any, are set so the lip or weir of each dam is at least as high as the toe of the next upstream dam.
- Volume or depth of surface reservoir meets or exceeds minimum. Freeboard above overflow (1"-2" recommended) is not included in surface reservoir volume.
- 18" depth specified soil mix (reference **C.3 Guidebook Appendix B**).
- Area of soil mix meets or exceeds minimum.

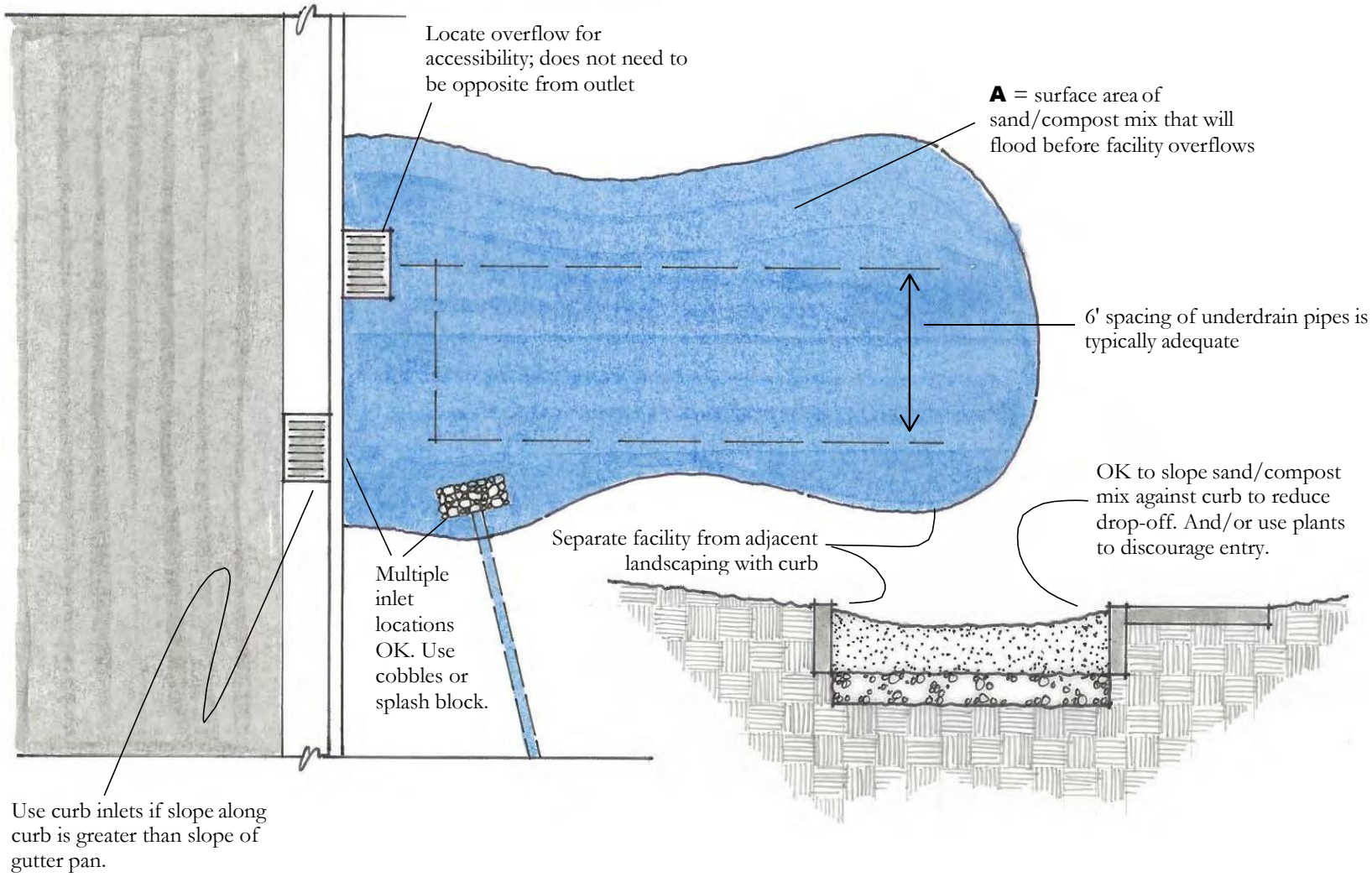
- Perforated pipe (PVC SDR 35 or approved equivalent) underdrain with discharge elevation at the top of the "Class 2 perm" layer. Holes facing downward. Connection and sufficient head to storm drain or approved discharge point.
- No liner, no filter fabric, no landscape cloth.
- Underdrain has a clean-out port consisting of a vertical, rigid, non- perforated PVC pipe, with a minimum diameter of 4 inches and a watertight cap.
- Curb inlets are 12" wide, have 4"-6" reveal and an apron or other provision to prevent blockage when vegetation grows in, and energy dissipation as needed.
- Overflow catch basin or manhole connected to a downstream storm drain or approved discharge point.
- Emergency spillage will be safely conveyed overland.
- Plantings are suitable to the climate, exposure, and a well-drained soil, and occasional inundation during large storm events.
- Irrigation system with connection to water supply, on a separate zone.
- Vaults, utility boxes, backflow preventers, and light standards are located outside the minimum soil mix surface area.



# Bioretention Facility

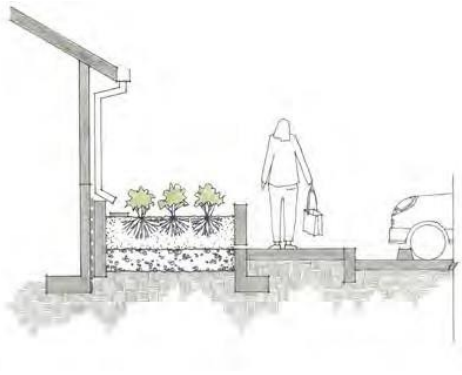
Cross-section
Not to Scale



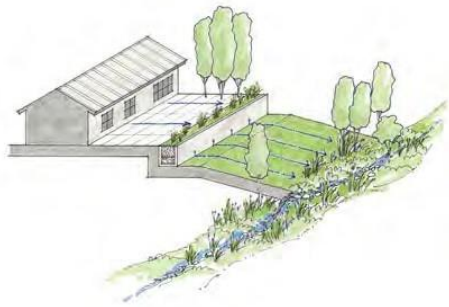

Locate overflow for accessibility; does not need to be opposite from outlet
**A** = surface area of sand/compost mix that will flood before facility overflows
6' spacing of underdrain pipes is typically adequate
OK to slope sand/compost mix against curb to reduce drop-off. And/or use plants to discourage entry.
Separate facility from adjacent landscaping with curb
Multiple inlet locations OK. Use cobbles or splash block.
Use curb inlets if slope along curb is greater than slope of gutter pan.

## 2. Flow-Through Planter

Flow-through planters on the plaza level of a podium-style development.



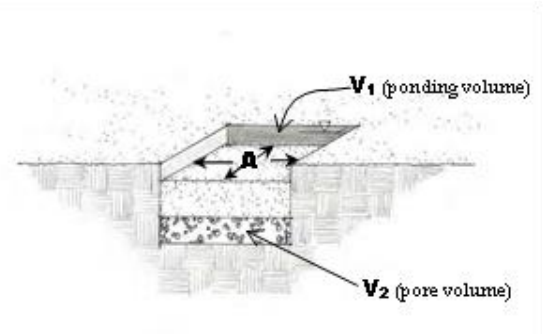
Bioretention facility adjacent to building. And impermeable cutoff wall between the facility and the building may be incorporated.



Flow-through planter built into a hillside. Flows from the underdrain and overflow must be directed in accordance with City of Vallejo requirements.

- Best for management of roof runoff, podium-style developments, and building plazas
- Advantages: versatile, can be any shape, low maintenance
- Limitations: requires underdrain, requires 3-4 feet of head
- Location and footprint of facility are shown on site plan and landscaping plan.
- Planter is set level.
- Location is on an upper-story plaza, adjacent to a building foundation, where mobilization of pollutants in soil or groundwater is a concern, or where potential geotechnical hazards are associated with infiltration

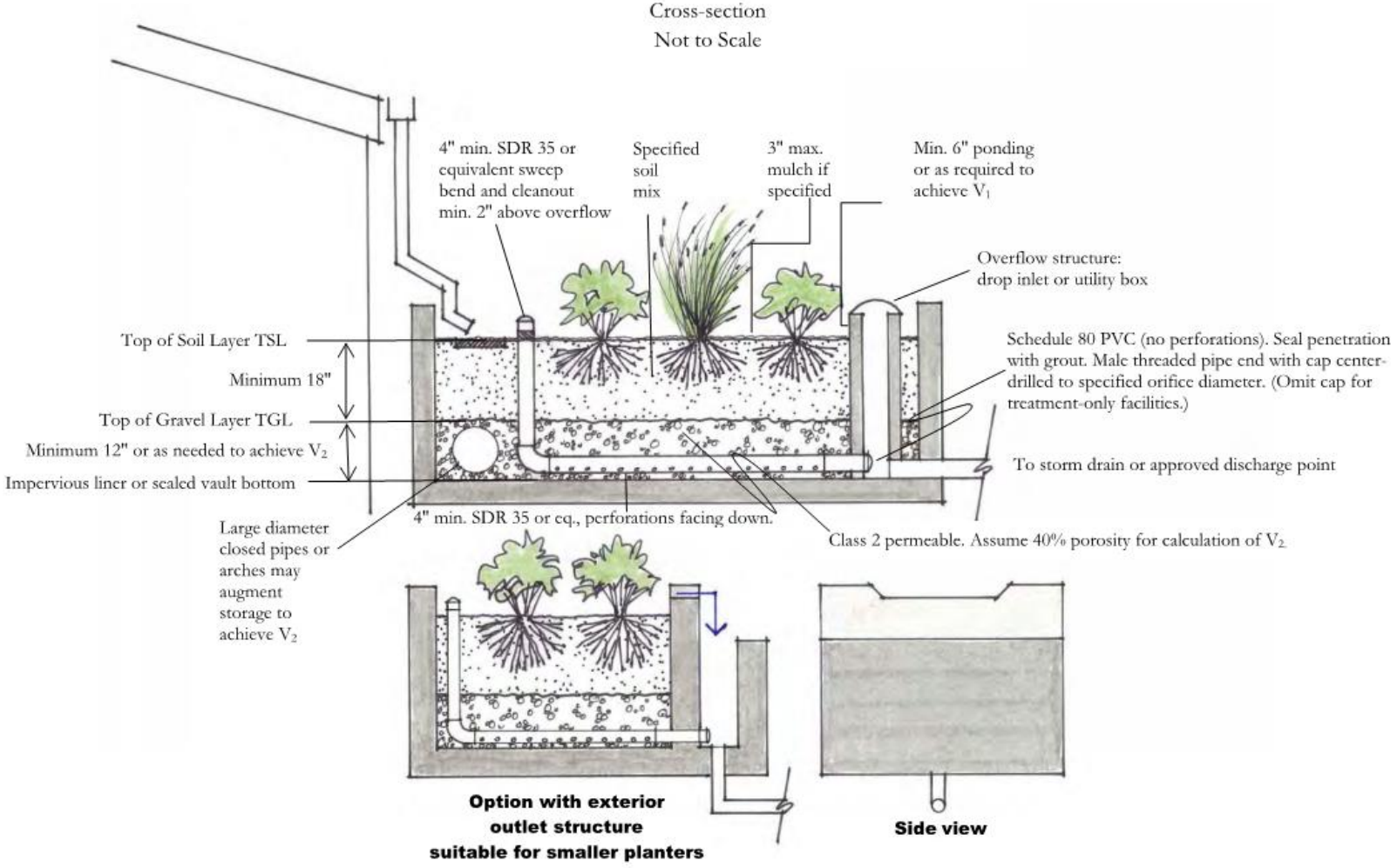
- Must meet the minimum surface area (A), surface volume ($V_1$), and subsurface volume ($V_2$). The IMP sizing Calculator should be used.




- In a vertical-sided box-like planter for treatment-and-flow-control with the minimum surface area A, the minimum surface volume V 1 can be achieved with an overflow height of 10" (12" total height of walls with 2" of freeboard).
- 18" depth specified soil mix (reference **C.3 Guidebook Appendix B**).
- Area of soil mix meets or exceeds minimum.
- "Class 2 perm" drainage layer.
- No filter fabric.
- Perforated pipe (PVC SDR 35 or approved equivalent) underdrain with outlet located flush or nearly flush with planter bottom.
- Connection with sufficient head to storm drain or discharge point.
- Underdrain has a clean-out port consisting of a vertical, rigid, non- perforated PVC pipe, with a minimum diameter of 4" and a watertight cap.
- Overflow outlet connected to a downstream storm drain or approved discharge point.
- Emergency spillage will be safely conveyed overland.
- Plantings are suitable to the climate, exposure, and a well-drained soil.
- Irrigation system with connection to water supply, on a separate zone.
- For treatment-and-flow-control flow-through planters only
- Volume of surface storage meets or exceeds minimum.
- Volume of subsurface storage meets or exceeds minimum.
- Underdrain is connected via an appropriately sized orifice or other flow-limiting device.

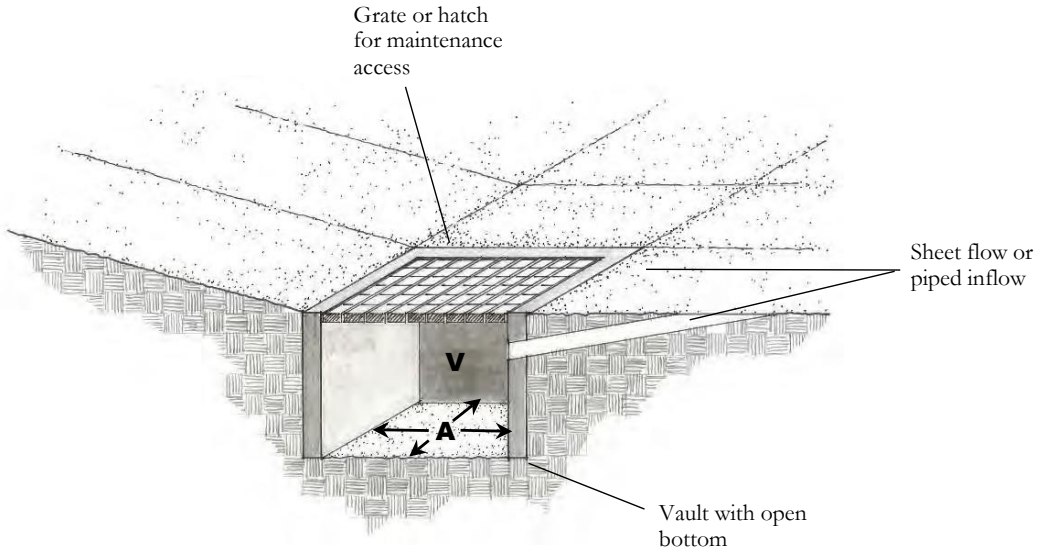
# Flow-through Planter

Cross-section
Not to Scale



### 3. Dry Wells and Infiltration Basins

- Best for sites with permeable soils (Group A or Group B soils)
- Advantages: compact footprint, can be installed in paved areas
- Requires minimum of 10' from bottom of facility to seasonal high groundwater
- Not suitable for drainage from some industrial areas or arterial roads
- Must be maintained to prevent clogging
- Typically not as aesthetically pleasing as bioretention facilities
- Volume (V) and infiltrative area (A) meet or exceed minimum.
- Emergency spillage will be safely conveyed overland.
- Depth from bottom of the facility to seasonally high groundwater elevation is ≥10'.
- Areas tributary to the facility do not include automotive repair shops; areas subject to high vehicular traffic (25,000 or greater average daily traffic on main roadway or 15,000 or more average daily traffic on intersecting roadway), car washes; fleet storage areas (bus, truck, etc.); nurseries, or other uses that may present an exceptional threat to groundwater quality.
- Underlying soils are in Hydrologic Soil Group A or B. Infiltration rate is sufficient to ensure a full basin will drain completely within 72 hours. Soil infiltration rate has been confirmed.
- 10' setback from structures or as recommended by structural or geotechnical engineer.

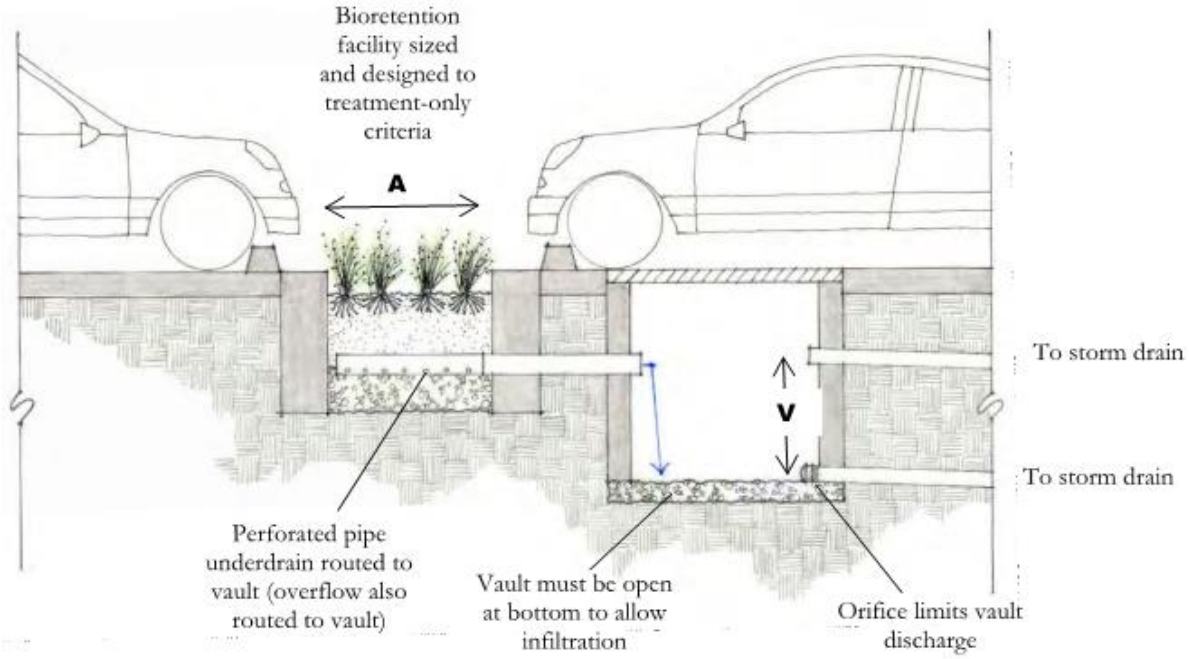


**4. Cistern + Bioretention Facility**

Cisterns are not allowed in City of Vallejo.

**5. Bioretention + Vault**

- Works best to meet flow-control requirements in limited space
- Bioretention facility is designed to the treatment-only criteria.
- Vault retention volume meets or exceeds calculated minimum.
- Vault outlet with orifice or other flow-control device restricts flow to calculated maximum.
- Bioretention facility underdrain is routed to the vault.
- Bioretention facility overflow is routed to the vault.
- Sufficient head exists to convey flow from the underdrain to the vault and from the vault to the discharge point.
- Bottom of vault is open to allow infiltration.
- Vault design provides for exclusion of debris and accessibility for maintenance.
- Vault outlet and overflow are connected to a downstream storm drain or approved discharge point.
- Emergency spillage will be safely conveyed overland.



# IV. "IN-LIEU" TREATMENT

Sometimes onsite treatment of runoff from the disturbed surfaces in your project is not feasible due to various site conditions. Some examples are:

- Existing drainage pattern
- Unsuitable location for IMP
- Frontage slope towards roadway (when driveway or sidewalk at project entrance is modified)

If this is the case in your project, you may choose an "in-lieu" treatment option, which in essence swaps the untreated onsite flow for an adjacent offsite flow. This prevents accumulation of untreated drainage downstream from the project location. This is accomplished by these steps:

1. Calculate the disturbed area (in sq ft) that is not feasible to be treated onsite
2. Find an offsite area greater than or equal (in sq ft) to this untreated onsite area
3. Direct the runoff from this offsite area to enter the project site
4. Treat this offsite flow in a C.3 compliant facility

Be sure to include in the Stormwater Control Plan Narrative your explanation of the factors that have led to "in-lieu" treatment and how your design was performed.