



Development Services

Stormwater Treatment Facility Checklist

Information

This checklist has been created by the City to assist the design engineer in preparing a Stormwater Treatment Facility (STF) report and plans. Be advised the below information is not all-inclusive; therefore, the City has the right to require additional information based on the scope of each project.

Submittal Requirements

1. Final Stormwater Treatment Facility Report
2. Stormwater Treatment Facility Plans
 - a. Single Lot Development Projects: include STF plan sheets in the site civil plan set
 - b. Subdivision Projects: include STF plan sheets in the stormwater public improvement plan set.
3. Signed copy of the Stormwater Treatment Covenant
4. Signed copy of the Stormwater Treatment Agreement
5. Stormwater Management Easements (submitted once easement locations have been finalized)

Final Stormwater Treatment Report Requirements

Section I: Background

- Brief history of project
- Written or graphical inventory of natural resources on the site.
- List of impacts to existing streams and/or bodies of water, and permits required by state and federal agencies prior to construction
- Identification of "Hot Spots"
- Soils Information gathered from soils report (if required)
 - Data regarding nature, strength and permeability
 - Subsurface conditions and soil boring results
 - Recommendation for grading and construction procedures
 - Recommendation of the suitability of the soils for the proposed use

Section II: Design and Construction

- Level of Service Calculations
- Summary of the STF
 - Why was the STF selected for this site
 - How does the STF function
 - What benefit does the STF provide
- Design calculations for each STF
- 11 x 17 inch copies of the STF plans sheets approved by the City
- Itemized construction cost estimate for each STF
- Construction Schedule for each STF
 - For Single Lot Developments, the STFs shall not be constructed until the building and site improvements are complete, unless otherwise approved by the City
 - For Subdivision Developments, the STFs shall not be constructed until 90% of the tributary area for the STF is stabilized, unless otherwise approved by the City

- Provide information on how each STF will be protected from runoff, erosion, and construction traffic during installation

Section III: Maintenance and Repair

- Description of maintenance responsibilities the proposed STF's will impose on Landowners
- List of maintenance and replacement costs and timeframes
 - Projected yearly maintenance cost outlined
 - Potential replacements costs of each STF
 - Anticipated life expectancy for each STF
- Maintenance and Repair Plan for each STF
 - List responsible party for ongoing maintenance obligations (i.e. Landowner, HOA, BOA etc); include statement that subsequent Landowners are responsible for continued maintenance.
 - Schedule of required maintenance for each STF
 - Detailed maintenance and repair procedures, state if specialized equipment and/or training is necessary
 - Landscape Management Plan prepared by a Registered Landscape Architect
 - List and pictures of invasive species to be removed and how
 - Instructions on yearly maintenance requirements for landscaping
 - Procedures for replacing dead landscaping

General Plan Requirements

The below items are required to be shown on the plans, regardless of the type of STF's being utilized:

- Treatment area for each STF identified with a dashed line and acreage called out
- STF Setbacks are shown and meet City standards
 - 10-feet from Right-of-Way
 - 20-feet from existing or proposed property line
 - 60-feet from residential structures and 20-feet from nonresidential structures
- Level of Service calculations provided in a table format matching the MARC BMP Manual
- Engineering calculations provided in table format; method to design each type of STF should reflect the design example provided in the MARC BMP Manual
- Construction notes and construction phasing plan for each STF
- Location and dimensions of all Stormwater Management Easements (SMEs) and/or Tracts that will contain a STF
- Grading Plan with bottom and overflow elevations called out, and contours shown in one foot increments
- Locations of STF informational signs called out and a detail of the sign is provided
- Landscaping Plan
 - Plan view of proposed plantings and seeding areas
 - Planting schedule with planting season for each species provided
- Percolation test results

STF Specific Plan Requirements

Native Vegetation, Value Rating = 9.25

Rain Garden, Value Rating = 9.0

- Plan View:
 - Minimum 20' from WQv pool to building foundation
 - Filter strip of grass, except as noted below
 - Filter strip of river rock at least 12-inches wide for flows entering from paved areas
 - Overflow path or structure provided

- Design Requirements:
 - 1-acre maximum treatment area
 - 24- to 48-hour ponding time
 - 6-inch maximum ponding depth
- Detailed cross-section:
 - 24-inch minimum engineered soil mix of 1:1 sand/compost mix (if required based on percolation test results)
 - 6-inch planting soil layer composed of top soil or compost placed on top of engineered soil mix
 - 3 inches of shredded hardwood mulch placed on top of planting soil layer
- Landscape plan
 - Plant species are tolerant of periods of inundation and drought and are native with deep root systems (i.e. native wetland or mesic wetland species)
 - Use of trees and shrubs is encouraged

Infiltration Basin, Value Rating = 9.0

- Plan View:
 - Minimum 100 foot up-gradient from building foundation
 - Minimum 10 foot down-gradient from building foundation
 - Pretreatment provided
 - Emergency spillway shown and designed to pass 1% storm
 - Basin is placed off-line of storm system
- Design Requirements
 - 2-acre maximum treatment area
 - 72-hour maximum ponding time
 - 2-foot maximum ponding depth
 - 3:1 length to width ratio (or greater)
 - 3:1 side slopes or flatter

Infiltration Trench, Value Rating = 9.0

- Plan View:
 - Minimum 20 foot to building foundation
 - Observation well provided at center of trench
 - 20-foot wide grass filter strip precedes trench
 - Trench is placed off-line of storm system
- Design Requirements:
 - 5-acre maximum treatment area
 - 6 to 72-hour required detention time
 - Infiltration rate of soil is between 0.5 to 2.0 inches/hour
 - Soil has less than 40% clay content
 - 3- to 8-foot trench depth
 - 5% maximum slope
- Detailed cross-section:
 - 2-inch pea gravel filter layer
 - Trench filled with 1.5 inch to 2.5 inch clean stone, no limestone or shale
 - Filter fabric on all four sides of clean stone
- Not for use in commercial and industrial developments

Bioretention, Value Rating = 8.5

- Plan View:
 - 15 foot x 40 foot minimum dimensions
 - Minimum 20 foot to building foundation
 - Pretreatment required, recommend 10-foot minimum vegetated filter strip
 - Overflow path or structure provided

- Limits of ponding area and limits of BSM clearly defined
- Underdrain layout shown
- Design Requirements:
 - 4-acre maximum treatment area
 - Inflow velocity less than 3 ft/sec
 - 12-inch maximum ponding depth
- Detailed cross-section
 - 3 inches of shredded hardwood mulch placed on top BSM
 - 30-inch minimum BSM, refer to MARC BMP Manual for specifications
 - 8-inch minimum gravel bed over underdrain
 - Filter fabric placed on top of gravel bed
 - 4:1 side slopes or flatter
- Underdrain Requirements:
 - 4-inch minimum perforated pipe
 - 10-foot max longitudinal spacing
 - Minimum grade of 0.5%
 - Transverse underdrains required if width is greater than 20 feet
 - Cleanout provided every 50 feet and at end of pipe runs
 - Downstream connection elevation provided
- Landscape plan
 - Plant species are tolerant of periods of inundation and drought and are native with deep root systems (i.e. native wetland or mesic wetland species)
 - Use of trees and shrubs are encouraged

Permeable Pavement, Value Rating = 7.5

- Plan View:
 - Limits of permeable pavement shown
 - Joint layout provided (if required)
- Include mix design and technical specifications in plan set, or provide a copy and reference them in the plan set
- Detailed cross-section
 - Depth of aggregate called out, required to be ¾ inch clean rock
 - Pavement thickness called out
 - Filter fabric location shown
 - Intake pipe and/or underdrain shown
 - Water surface elevations for WQv, 10%, 4%, and 1% storm events shown
- Aggregate has 30% open pore space with fractured surfaces
- Design area ratio does not exceed 3:1 (contributing impervious area divided by pervious pavement area)
- Overflow path and structure provided

Extended Detention Wetland, Value Rating = 7.0

- Plan View:
 - Sediment forebay:
 - separated by earthen berm, rip rap wall, or gabion wall
 - 4-6 feet deep (hold 10% WQv)
 - maintenance access provided
 - capacity to contain 5 years of sediment
 - inlet dissipation provided
 - Micropool:
 - 4-6 feet deep (hold 10% WQv)
 - Reverse slope pipe or broad-crested weir for outlet control, placed 1-foot below normal pool surface elevation

- Trash racks provided
 - 12-foot safety bench provided with slopes no steeper than 6:1
 - Wetlands:
 - Varying water depths, very shallow (<6 inches) and moderately shallow (< 18-inches)
 - Wetland planting mix or suitable soil materials
 - Species are appropriate for time periods and depths of inundation
 - Vegetation covers 50% to 75% surface area
 - Shape of EDW
 - Flowpath 3 times greater than width of facility
 - Undulated bottom
 - Wedge shaped, narrowest at inlet and widest at outlet
 - Overflow path and structure provided
- Design Requirements:
 - Separate drain pipe with valve to drain permanent pool for maintenance
 - 40-hour release period for WQv
 - 4:1 or flatter vegetated slopes
 - Near-zero longitudinal slope to slow velocity

Sand Filter, Value Rating = 6.0

- Plan View:
 - Refer to Figures 8.10, 8.11 and 8.12 in the BMP Manual
- Design Requirements:
 - Sand conforms to ASTM C-33 or AASHTO M-6 ranging in size from 0.02 to 0.04 inch
 - Treat highly impervious stabilized areas only (i.e. parking lots, rooftops, etc)

Wetland Swale, Value Rating = 6.5

- Plan View:
 - Less than 2% longitudinal slope (provide profile to confirm)
 - Check dams at intervals of every 50 to 100 feet
 - Forebay provided
- Design Requirements:
 - 5-acre maximum treatment area
 - 24-hour drawdown time
 - 12-inch maximum storage depth
 - 4 ft/sec maximum velocity during 50% storm
- Detailed Cross-Section:
 - 2 to 8 foot bottom width
 - 3:1 or flatter side slopes
 - Seasonal high water table shown
 - WQv, 10% (residential), 4% (commercial) and 1% depths and elevations shown

Bio-Swale, Value Rating = 6.5

- Plan View:
 - Less than 4% longitudinal slope (provide profile to confirm)
 - Check dams at intervals of every 50 to 100 feet
 - Forebay provided
- Design Requirements:
 - 5-acre maximum treatment area
 - 40-hour drawdown time
 - 12-inch maximum storage depth
 - 5 ft/sec maximum velocity during 50% storm
- Detailed Cross-Section:
 - 2- to 8-foot bottom width

- 3:1 or flatter side slopes
- 30-inch permeable soil layer over 6-inch clean gravel layer
- 4-inch perforated underdrain placed at bottom of swale and covered with clean gravel
- WQv, 10% (residential), 4% (commercial), and 1% depths, and elevations shown

Vegetated Filter Strip, Value Rating = 5.0

- Plan View:
 - Show limits of filter strip with hatch
 - Dimension inflow approach length
- Design Requirements:
 - 1% to 6% grades across filter strip
 - Runoff enters and exits strip as sheet flow
 - 130-foot maximum approach length
 - Inflow areas use Value Rating of 5.0

Extended Wet Detention, Value Rating = 5.0

- Plan View:
 - Sediment forebay:
 - separated by earthen berm, rip rap wall, gabion wall
 - 4 to 6 feet deep (hold 10% WQv)
 - maintenance access provided
 - capacity to include storage for 5 years of sediment
 - inlet dissipation required
 - Permanent Pool:
 - 4- to 6-foot optimal depth, 12-foot maximum depth
 - 10-foot minimum depth required to support aquatic life
 - 3:1 or flatter side slopes below littoral bench
 - WQv, 10%, 4%, and 1% depths, and elevations shown
 - Emergency spillway provided and sized to pass 1% storm
 - Multiple stage outlet structure required if being used for detention
 - Littoral Bench
 - 10-foot width minimum
 - 6 to 12 inches below permanent pool elevation
 - 6:1 or flatter side slopes
 - Bench comprises 25% to 50% permanent pool surface area
- Design Requirements:
 - Separate drain pipe with valve to drain permanent pool for maintenance
 - Flowpath length is 3 times greater than width of facility
 - 1000-acre maximum treatment area
 - 40-hour release period for WQv

Native Vegetation Swale, Value Rating = 4.0

- Plan View:
 - Less than 2% longitudinal slope (provide profile to confirm)
 - Check dams at intervals of every 50 to 100 feet
 - Forebay provided
 - Show limits of native plantings (reference Appendix A of BMP Manual for approved species)
- Design Requirements:
 - 5-acre maximum treatment area
 - 4-inch maximum depth of flow for WQv
 - 100-foot minimum length of swale
 - 1 ft/sec maximum velocity for WQv
 - 4 ft/sec maximum velocity during 50% storm
- Detailed Cross-Section:

- 2- to 8-foot bottom width
- 3:1 or flatter side slopes
- Show WQv, 10% (residential), 4% (commercial), and 1% water surface elevations

Extended Dry Detention, Value Rating = 4.0

- Plan View:
 - Sediment forebay:
 - separated by earthen berm, rip rap wall, gabion wall
 - 4 to 6 feet deep (hold 10% WQv)
 - maintenance access provided
 - capacity to include storage for 5 years of sediment
 - inlet dissipation required
 - Basin:
 - WQv, 10%, 4%, and 1% depths, and elevations shown
 - Low flow channel provided
 - 4:1 or flatter side slopes (3:1 if also used for detention)
 - Emergency spillway provided and sized to pass 1% storm
 - Multiple stage outlet structure provided if being used for detention
- Design Requirements:
 - Inlet and outlet located at opposite ends of basin to avoid short-circuiting
 - 2 to 5 foot depth for WQv
 - 40-hour release period for WQv

Turf Grass Swale, Value Rating = 3.0

- Plan View:
 - Less than 2% longitudinal slope (provide profile to confirm)
 - Check dams at intervals of every 50 to 100 feet
- Design Requirements:
 - 5-acre maximum treatment area
 - 4-inch maximum depth of flow for WQv
 - 100-foot minimum length of swale
 - 1 ft/sec maximum velocity for WQv
 - 4 ft/sec maximum velocity during 50% storm
- Detailed Cross-Section:
 - 2 to 6 foot bottom width
 - 3:1 or flatter side slopes
 - Show WQv, 10%(residential), 25% (commercial), and 1% water surface elevations