ATTACHMENT D:

D1: SWCP TEMPLATE FOR SMALL PROJECTS

Stormwater Control Plan for Small Projects

Instructions

This **Stormwater Control Plan (SWCP)** template for the project:

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_____

is to be used as a guide for compliance with Section F.5.g.1 of the Phase II Small MS4 General Permit. As a Permittee, VTA is required to implement measures for runoff reduction for all development and redevelopment projects that create and/or replace 2,500 to 5,000 square feet or more of impervious surface (Small Projects).

A registered Professional Engineer (P.E.) must complete this SWCP. The template must be filled out during the planning stages of the project. Complete the form on **last page** of this document and submit a SWCP that includes the following:

- ❑ Project Data Form & Project Setting
- ❑ Design strategies to limit disturbance (if applicable)
- ❑ Completed Runoff Reduction Checklists
- ❑ SMARTS or OWP LID screenshots of completed Post-Construction Water Balance (or equivalent)
- ❑ Site Plan Drawings and supporting details and specifications
- ❑ O&M Plan for runoff reduction measures
- ❑ Explanation of Runoff Reduction Installation Infeasibility (if applicable)
- ❑ Competed VTA Signoff for Stormwater and Landscaping Design

STEP 1: Complete all fields of the Project Data Form.

Project Data Form	
Project Name/Number	
Application Submittal Date [to be verified by VTA staff]	
Date Design Initiated [to be verified by VTA staff]	
Project Approval Date [to be verified by VTA staff]	
Project Location	
Name of Owner or Developer	
Project Type and Description	
Total Project Site Area	*Acres*
Total Pre-Project Impervious Surface Area	*Square Feet*
Total Post-Project Impervious Surface Area	*Square Feet*
Total New or Replaced Impervious Surface Area	Click or tap here to enter text. *Square Feet*

STEP 2: If applicable, include documentation in your submittal demonstrating that the following design strategies have been incorporated into your project (Check which strategies apply):

- ❑ Limit disturbance of creeks and natural drainage features
- ❑ Minimize compaction of highly permeable soils
- ❑ Limit clearing and grading of native vegetation at the site to the minimum area needed to build the project, allow access, and provide fire protection
- ❑ Minimize impervious surfaces by concentrating development on the least-sensitive portions of the site, while leaving the remaining land in a natural undisturbed state.

STEP 3: Select one or more Site Design Runoff Reduction Measure (at least one Option is required):

☐ Option 1: Soil Quality Improvement & Maintenance

This is the simplest option. Amend project soils to increase permeability and promote creation of a microbial community.

Confirm the following standard specifications are met:

- ❑ Soils for landscaping meet the following bulk identities:
  - ❑ Sands, loamy sands: <1.6
  - ❑ Sandy loams, loams: <1.4
  - ❑ Sandy clay loams, loams, clay loams: <1.4
  - ❑ Silts, silt loams: <1.3
  - ❑ Silt loams, silty clay loams: <1.1
  - ❑ Sandy clays, silty clays, some clay loams (35-45% clay): <1.1
  - ❑ Clays (>45% clay): <1.1

☐ Option 2: Tree Planting & Preservation

Plant and or preserve healthy established tress that include both evergreens and deciduous, as applicable. Install Environmental Sensitive Area (ESA) fencing to protect trees.

On the site plan, show:

- ❑ Location of each preserved tree/ new planted tree
- ❑ Species of each preserved tree/ new planted tree
- ❑ Diameter of each preserved tree
- ❑ ESA fencing locations
- ❑ Irrigation if applicable

☐ Option 3: Porous/Permeable Pavement

Permeable pavements may include pervious concrete, pervious asphalt, porous pavers, crushed aggregate, open pavers with grass or plantings, open pavers with gravel, or solid pavers.

Permeable paving maybe substituted for conventional pavement on parking lots or other areas with light traffic.

Show on your site plan:

- ❑ Location, extent, and types of pervious pavements.

Confirm the following standard specifications are met:

- ❑ No erodible areas drain on to permeable pavement.
- ❑ Geotechnical investigation required to identify soil infiltration rate and to design the subgrade to support the anticipated traffic load. If known soil contamination is present, infiltration is not allowed.
- ❑ When infiltrating, 10 feet of separation between bottom of bed and seasonal high-water table.
- ❑ Subgrade compaction is minimal.
- ❑ Reservoir base course is of open-graded crushed stone. Base depth is adequate to retain rainfall (3 inches is adequate) and support design loads (more depth may be required).
- ❑ No subdrain is included or, if a subdrain is included, outlet elevation is a minimum of 3 inches above bottom of base course.

- ❑ Subgrade is uniform, and slopes are not so steep that subgrade is prone to erosion. Slopes of pervious pavement surface should not exceed 5% or up to 16% with underdrains. Slopes exceeding 3% typically require berms or check dams placed laterally over the soil subgrade to slow the flow of water and provide some infiltration.
- ❑ 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-inch gaps between the pavers. Joints are filled with an open-graded aggregate free of fines.
- ❑ Permeable concrete or porous asphalt, if used, are installed by industry-certified professionals according to the vendor's recommendations.
- ❑ Selection and location of pavements incorporates *Americans with Disabilities Act* requirements (if applicable), site aesthetics, and uses.

☐ Option 4: Self-Retaining Area- Rooftop & Impervious Area Disconnection

Downspouts can be directed to vegetated areas adjacent to buildings or extended via pipes to reach vegetated areas further away. Paved areas can be designed with curb cuts, or without curbs, to direct flow into surrounding vegetation.

On the site plan, show:

- ❑ Each impervious area from which runoff will be directed, and its square footage.
- ❑ The vegetated areas that will receive runoff, and the approximate square footage of each.
- ❑ If necessary, explain in notes on the plan how runoff will be routed from impervious surfaces to vegetated areas.

Confirm the following standard specifications are met:

- ❑ Tributary impervious square footage in no instance exceeds twice the square footage of the receiving pervious area.
- ❑ Roof areas collect runoff and route it to the receiving pervious area via gutters and downspouts.
- ❑ Paved areas are sloped so drainage is routed to the receiving pervious area.
- ❑ Runoff is dispersed across the vegetated area and energy dissipator is installed at downspout to avoid erosion and promote infiltration.
- ❑ Vegetated area has amended soils, vegetation, and irrigation if needed to maintain soil stability and permeability.

- ❑ Any drain inlets within the vegetated area allow for a maximum of 3 inches of ponding.
- ❑ Area of rooftop connecting to each downspout is 600 SF or less.
- ❑ The maximum contributing impervious flow path is less than 75 ft *OR* if ≥ 75 ft, then storage device is implemented to achieve required disconnection length.
- ❑ The impervious area to any one discharge location is less than 5,000 SF.
- ❑ Complete and Attach to this SWCP:
  - ❑ ***Self-Treating Area Calculations Worksheet*** – found at the end of this Attachment.

☐ Option 5: Self-Retaining Area- Vegetated Swales

This option includes vegetated shallow channels that collect and slowly convey runoff to downstream discharge points.

Show on your site plan:

- ❑ Location and impervious area that will drain into swale.

Confirm the following standard specifications are met:

- ❑ Vegetated side slopes at 2H:1V max slope. Mowed turf swales at 3H:1V max.
- ❑ Grass height 4”-6”. Do not install trees if liner is present.
- ❑ Swale divider required for bottom widths > 10’. Min. required bottom width is 2’ excluding width of low flow channel. Max. bottom width with divider is 16’.
- ❑ Depth of flow for water quality treatment must not exceed 2/3 of the grass height and not greater than 3” (infrequently mowed) or 2” (frequently mowed).
- ❑ Perforation pipe should have perforations set at 120 degrees and perforation slots should be pointed down.
- ❑ 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. If used, anchored plate flow spreader shall have v-notches (maximum top width 5% of swale width) or holes to allow preferential exit of low flows.
- ❑ Install check dams or grade control structures for slopes >6% at 50” max spacing to achieve a max effective longitudinal slope of 6%. Flow spreaders must be provided at inlet and at base of each check dam.

- ❑ Install energy dissipator at the inlet.
- ❑ Swale length shall be 100' or length required to provide 10 minutes residence time, whichever is greater.
- ❑ Tributary impervious square footage in no instance exceeds twice the square footage of the receiving pervious area.
- ❑ Install appropriate outlet structure to accommodate low flow channel and/or underdrain, if present.
- ❑ Amend soils with 2" compost tilled into 6" of native soil unless native soil organic content is >10%.
- ❑ Maximum flow velocity for the runoff from the design storm event is less than or equal to 1.0 ft per second.
- ❑ 10-ft setback from foundations, 100-ft from septic fields and water supply wells, and 50-ft from steep slopes.
- ❑ BMP footprint is approximately 10-20% of the drainage area, drainage area less than 2 acres.

Complete and Attach to this SWCP:

- ❑ ***Self-Treating Area Calculations Worksheet*** – found at the end of this Attachment.

☐ Option 6: Green Roofs

Installing a vegetative layer on a roof can reduce the impervious coverage of the project.

Show on your site plan:

- ❑ Location and area of green roof that is impervious.
- ❑ Confirm the following standard specifications are met:
  - ❑ Roof slope less than 15% OR has grid to hold the substrate in place until it forms a thick vegetation mat.
  - ❑ PE has assessed the necessary load reserved and designed a roof structure to meet state and local needs.
  - ❑ Include irrigation plan, if necessary, to sustain the green roof during extended dry periods.
  - ❑ Incorporate watertight liner to prevent rainwater from intruding the underlying structure.

☐ Option 7: Rain Barrels & Cisterns

Use of cisterns or rain barrels to comply with this requirement is subject to municipality approval. Planning and Building Permits may be required from other agencies.

Show on your site plan:

❑ Impervious areas tributary to each cistern or rain barrel.

❑ Location of each cistern or rain barrel.

Confirm the following standard specifications are met:

❑ Rain barrels are sited at grade on a sound and level surface at or near gutter downspouts.

❑ Gutters tributary to rain barrels are screened with a leaf guard or maximum ½-inch to ¼-inch-minimum corrosion-resistant metallic hardware fabric.

❑ Water collected will be used for irrigation only.

❑ Openings are screened with a corrosion-resistant metallic fine mesh (1/16-inch or smaller) to prevent mosquito harborage.

❑ Large openings are secured to prevent entry by children.

❑ Rain barrels and gutters are to be cleaned annually.

❑ The local *mosquito and vector control* district is informed of the installation. The district will be provided additional information and/or rights of entry if they request.

☐ Option 8: Stream Setbacks & Buffers

A stream buffer is a vegetated area that exists or is established to protect a stream system, lake reservoir or coastal estuarine area.

Show on your site plan:

❑ Location of water body in proximity to project.

❑ Area of impervious area that will drain into a stream buffer.

Confirm the following standard specifications are met:

❑ Runoff from project enters flood prone width as sheet flow or within 500 ft of a stream channel as sheet flow (whichever is larger).

- ❑ Contributing overland slope is 5% or less *OR* if greater than 5% then a level spreader is used.
- ❑ The buffer area is protected from vehicle or other traffic barriers to reduce compaction.

Stream buffer will be maintained in an ungraded and uncompacted condition and vegetation will be maintained in a natural condition.

STEP 4: Prepare a Site Plan- which includes the following details on the plan:

- ❑ Locations of runoff reduction measures (indicate if the reduction measure was installed offsite)
- ❑ Show the impervious area—i.e. a roof, or portion of a roof, or a paved area—that will drain to your runoff reduction measure (typically these delineations follow roof ridge lines or grade breaks)
- ❑ Show the type and extent of pervious and impervious area both before and after construction.

STEP 5: Complete the Site Design Runoff Reduction Checklists and related calculations for each Runoff Reduction Measure selected in **Step 4**.

- ❑ Attach only the completed checklists for the Options(s) selected to this SWCP.
- ❑ Check to complete the ***Self-Treating Area Calculations Worksheet*** was selected as part of your option.
- ❑ Attach related CAD files for all drainage drawings with this SWCP.

STEP 6: To determine the Post-Construction Water Balance for the project, use the **State's Storm Water Multiple Application & Report Tracking System (SMARTS)** system or use the **Office of Water Programs (OWP) online California Phase II LID Sizing Tool- v1.1**. To use the SMARTS system, refer to Attachment G. To use the OWP Low Impact Development (LID) Sizing Tool refer to **Attachment H.**

- ❑ Take screenshots of the Water Balances and attach to this SWCP.

STEP 7: Designers must specify how to operate and maintain the BMPs selected by developing an **Operation and Maintenance (O&M) Manual**. The O&M Plan should include the Runoff Reduction Measures selected in the SWCP. Refer to **Attachment L** for a Template O&M Manual.

- ❑ Attach the completed O&M Manual to this SWCP.

STEP 8: If runoff reduction measures are not implemented for the required amount of runoff reduction, explain why such measures were not technically feasible and why stormwater treatment measures must be used.

❑ Explanation of why measures are not implemented for the required amount of runoff reduction:

STEP 9: Complete the **VTA Signoff for Stormwater and Landscaping Design**, **Attachment F** to this manual, and submit with this SWCP. Submittal of the Draft(s) and Final Stormwater Control Plans (SWCPs) should be concurrent with every major design submittal (i.e., 35%, 65%, 95%, and As-Built Record Documents after construction).

❑ Attach the VTA Signoff for Stormwater and Landscaping Design to this SWCP.

Self-Retaining Area Calculations Worksheet

Self-retaining areas are pervious areas that retain rainfall on itself and runoff from an adjacent impervious area, up to a maximum 2:1 ratio (impervious: pervious). The entire self-retaining area must be designed to retain an inch of rainfall without flowing off-site. Drains, if any, should be set to allow a maximum of 3" of ponding.

Sizing calculations for self-retaining areas use a runoff coefficient to determine the amount of contributing runoff from different surfaces. Use the table below to determine the runoff coefficient for the impervious area contributing runoff to the self-retaining area. Then complete the calculations table below to determine the sizing criteria for each drainage management area using self-retaining areas to treat stormwater.

Estimated Runoff Coefficient for Surfaces During Small Storms	
Type of Surface Contributing Run-Off	**Runoff Coefficient [A]**
Roofs	.90
Concrete or Asphalt	
Stone, Brick, or Concrete Pavers with mortared or sand joints and bedding	
Grass	.10
Permeable Pavement	
Crushed Aggregate	

Worksheet next page

Project Title/ Number/ & Design Unit	DMA ID (as referred to on drawings)	Total Drainage Management Area (SF)	Post Project Imperv. Surface Type	Runoff Coefficient [A]	Impervious Surface Area (SF) [B]	Contributing Runoff (SF) [C] = [A] x [B]	Receiving Pervious Self-Retaining Area (SF) [D]	Ratio [C]: [D]	Meets requirement of max. 2:1, impervious to pervious?
									❑ Yes ❑ No
									❑ Yes ❑ No
									❑ Yes ❑ No
									❑ Yes ❑ No
									❑ Yes ❑ No
									❑ Yes ❑ No
									❑Yes ❑ No