Vegetated Swale Factsheet

1.0 General Description

Figure 1. Vegetated swale (SSQP 2018)

Potential Treatment Mechanisms								
I	ET	FA	B	RH	S	F	P	T
✓	✓	✓	✓		✓		✓	

Legend:
I = Infiltration
ET = Evapotranspiration
FA = Filtration and/or Adsorption
B = Biochemical Transformation
RH = Rainfall and Runoff Harvest
S = Sedimentation
F = Floatation
P = Plant Uptake
T = Trash Capture

Vegetated swales are gently sloped vegetated channels. Plants slow the flow, which enhances settling, filtration, and infiltration. In some cases, the soil underlying the swale is amended with compost or replaced with a permeable soil/compost mix. This allows more runoff to infiltrate into the ground, thus reducing runoff volumes. An example schematic of a vegetated swale is shown in Figure 2.

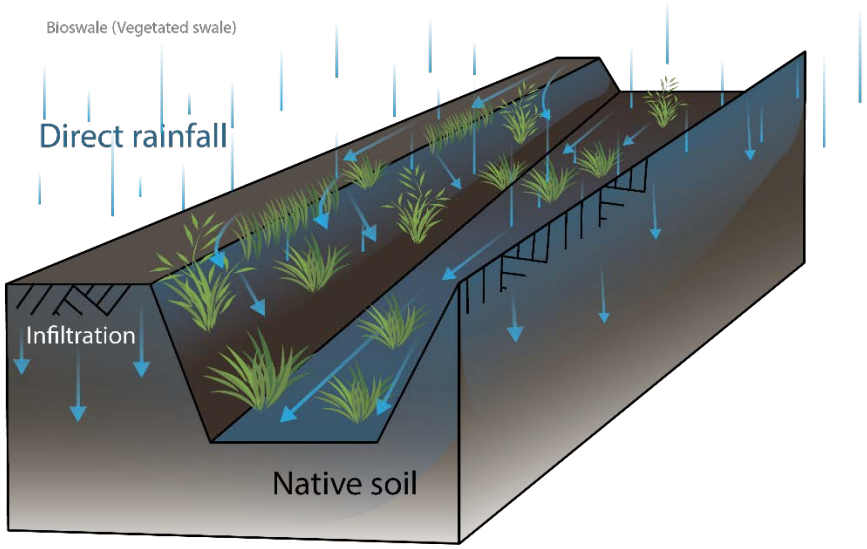

Figure 2. Schematic of an example vegetated swale

1.1 Variations and Alternative Names

- Swales
- Bioswales

2.0 Advantages & Limitations

2.1 Advantages

- ✓ Usually vegetated with grasses or other low maintenance plants, swales often require little maintenance.
- ✓ When done well, swales can both be inexpensive and add an aesthetic appeal.
- ✓ If sized correctly, provides adequate drainage and removal of particulate pollutants.
- ✓ Requires minimal elevation change

2.2 Limitations

- Prone to erosion and channelization if vegetative cover is not properly maintained.
- One swale is not suitable for large treatment areas or areas with high velocity flows.

3.0 Siting

According to the California Stormwater Quality Association and the Sacramento Stormwater Quality Partnership, one vegetated swale is limited to treating up to 10 acres of contributing drainage area (CASQA 2003, SSQP 2018).

4.0 Design Considerations

When designing a vegetated swale, the following parameters should be considered:

- ❑ Contributing drainage area
- ❑ Total inundated area (for estimating infiltration)
- ❑ Hydraulic residence time
- ❑ Bottom width
- ❑ Slope in flow direction (longitudinal slope)
- ❑ Side slopes
- ❑ Slope of invert perpendicular to flow
- ❑ Flow depth
- ❑ Vegetation type and height
- ❑ Underdrains
- ❑ Design volume (depth)
- ❑ Design rate (intensity)

5.0 Construction Considerations

- ❑ Install when vegetation will receive sufficient watering from rainfall to become established without irrigation. Only apply irrigation when incidental rainfall is insufficient for vegetation establishment.
- ❑ Divert runoff until plants are established

6.0 Maintenance

- ❑ Plant management
  - o mowing grass
  - o pruning non-grasses
  - o removing woody vegetation
  - o removing weeds (if desired for aesthetics)
- ❑ Inspections for erosion
- ❑ Litter removal (for areas prone to litter)
- ❑ Inspections for standing water to prevent mosquitos and other vector breeding

7.0 References

California Department of Transportation (Caltrans 2017). *Project Planning and Design Guide* (PPDG). July 2017.

California Stormwater Quality Association (CASQA 2003). *Stormwater Best Management Practice Handbook: New Development and Redevelopment*. January 2003.

California Stormwater Quality Association (CASQA 2017). *Draft Stormwater Best Management Practice Handbook: New Development and Redevelopment*. April 2017.

County of Placer, City of Roseville, City of Auburn, City of Lincoln, and Town of Loomis (County of Placer et al. 2016). *West Placer Storm Water Quality Design Manual*. April 2016.

Sacramento Stormwater Quality Partnership (SSQP 2018). *Stormwater Quality Design Manual*. July 2018.

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