

Surface Water Swales

1. What kind of material is the Geocell material that will be used to line the proposed swales at critical locations?
High density polyethylene (HDPE). This material is ultraviolet (UV) light resistant and durable. Depending upon the design water velocity in a given section, Geocells will be infilled by soil, rock, and/or colored concrete. Over sections infilled by soil and/or rock, vegetation will establish itself in a relatively short time.
2. Can the Geocell material used in swale development be planted?
Yes, please see the response to #1. An area-specific plant palette could be selected and planted that is acceptable to the public and the conservancy.
3. What is the cost for maintaining the Geocell material?
Costs are still in development due to unknown agency review and permitting factors. However, the approximate costs for swale installation and maintenance presented in the 2018 feasibility study (FS) and still valid estimates at this time.
4. What is the estimated cost for surface water (swale) control construction with Geocell?
Please see response to #3.
5. Will the Geocell material be prone to degradation due, for example, to ultraviolet (UV) light?
The proposed Geocell product contains an inert inhibitor material (carbon black) that is specifically used to reduce degradation due to UV light. In addition, HDPE-based products are commonly used in environmental applications (composite landfill liners, landfill covers, pond liners) that require long-term (100-years+) exposure to sunlight and harsh weather conditions.
6. Won't the swales be prone to the same damage that vertical groundwater extraction wells and the former stormwater pipes experienced in the past?
As discussed in the 2018 feasibility study (FS) report, swale lining will be installed with overlapping segments of material specifically designed to accommodate large lateral displacement. In addition, long-term maintenance is considered by the City as an important component of the overall project.
7. Won't the swales be prone to vertical displacement (subsidence) near PVDS where subsidence has been observed in the past?
This potential issue will be addressed as a long-term maintenance task. As previously discussed, long-term maintenance is an important component of the overall project.
8. Will maintenance costs include monitoring surface water flow?
Yes. At this time it is anticipated that surface water flow monitoring will be included in routine maintenance costs.

Flow Reduction Area

9. Will the flow reduction area be gravity flow or are pumps proposed?
The flow reduction area is being designed to be gravity flow only and no pumps are planned.
10. For how long will ponded water accumulate in the flow reduction area after a rainstorm?
It is anticipated that stormwater will accumulate in the flow reduction area only for a period of several hours (less than one day once rain stops).
11. Will the weight of accumulated water be problematic for the stability of the flow reduction area?
It is anticipated that stormwater will accumulate in the flow reduction area only for a period of several hours (less than one day once rain stops). Due to its short duration, the additional weight will not have a significant effect on landslide stability.

Hydraugers

12. What kind of material will be used for hydrauger casing?
The hydrauger casing material anticipated to be used along the drilled borehole will be acrylonitrile butadiene styrene (ABS) which is a durable polymer. The first several tens of feet or more of each borehole will be supported with grouted-in-place steel conductor casing.
13. How long are the proposed hydraugers?
The length of the hydraugers will depend on field drilling conditions, however, at this time each hydrauger is anticipated to be approximately 1,200 feet long.
14. Won't hydraugers be prone to the same damage that vertical groundwater extraction wells have experience in the past? That is, won't hydraugers be sheared off after installation?
Because hydraugers will be installed under the landslide failure surface (fracture displacement surface) and not across it like vertical wells, it is anticipated that shearing will not be a factor. In addition, hydraugers will also be installed in areas above the landslide failure surface where significant horizontal displacement (shearing) has not been recorded recently in annual land movement surveys.
15. How will "success" be determined for hydraugers?
As previously discussed, groundwater production and pressure from the hydraugers will be the primary criterion for success.
16. Can a map be produced to show both mapped groundwater recharge areas and the proposed hydrauger installation areas so that hydraugers will only be installed where groundwater recharge is maximized?
Yes, groundwater recharge areas were considered during hydrauger siting.

17. Is the groundwater extraction associated with hydrauger installation anticipated to impact habitat due to water loss?

Most hydraugers will be installed far below the shallow water table away from the root zone so that habitat impacts should be minimal or non-existent.

General Project Issues

18. What is the cost of construction and maintenance of the proposed surface water control (swales) and groundwater extraction (hydraugers) compared to the ongoing cost for maintenance of PVDS?

Costs are still in development due to unknown agency review and permitting factors. However, the approximate costs for groundwater extraction presented in the 2018 feasibility study are still valid estimates at this time.

19. Is the Altamira Canyon feature noted in the hydrology slides the canyon near PVDS in Abalone Cove?

The Altamira Canyon feature noted in the hydrology slides should be labeled as the Altamira Complex which is a large regional historical landslide area.

20. Will the overall project be installed in phases or all at once?

The city is planning on implementing the various stages of the overall project in separate phases.

21. Where will contractors access the work areas and where will be equipment staging area be located?

At this time contractor access is anticipated to be from PVDS and the equipment and materials staging area will be outside of the preserve near the flow reduction area.

22. Will the land conservancy be involved with plan review?

Yes, the city is teaming with the conservancy during final plan preparation.

23. What is the proposed fracture sealing material?

A fly ash-based slurry is proposed to fill the existing fractures. This type of fill material has been used successfully at other sites to fill cracks opened due to settlement and slope movement. A key advantage of this material is its self-healing ability, that is, its ability to deform and maintain a seal if a crack continues to develop after infilling.