

Water on the surface

- *Almost every project presents a choice—to keep storm water on the surface or send it below ground into pipes. Wherever possible, keep it on the surface so that it can percolate slowly into the soil.*

Surface drainage can complement the standard underground system of pipes and pumps. Rather than depending solely on either an above or below ground system, each method can be applied where appropriate. By choosing carefully, we can strike a better balance between our need to control the environment and our need to live in harmony with it. This can also reduce costly expenditures generated by conventional engineering solutions while increasing landscape diversity.

Flowing water is a fundamental element of the natural landscape, but is usually lost with urbanization. As architect Christopher Alexander writes,

We came from the water; our bodies are largely water; and water plays a fundamental role in our psychology. We need constant access to water, all around us; and we cannot have it without reverence for water in all its forms. But everywhere in cities water is out of reach....

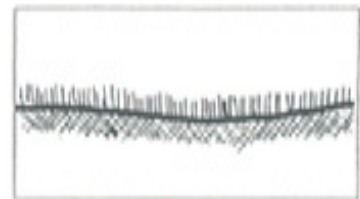
Each project can find ways to keep water on the surface.

Recommendations

- *Develop surface drainage systems including simple weirs, drywells, shallow swales in lawns and trench drains in concrete.*
- *Contribute to ground water restoration by allowing for slow percolation of storm water in ponds, lawns, or fields. A few hours after a rain, the water is absorbed or drained and the area returns to its usual state.*

Opportunities

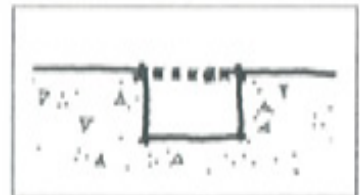
- *West Campus Region*
- *Stanford West project*
- *Arboretum/Palm Drive area*
- *Campus boundary along Stanford Avenue*
- *Serra Street/Galvez Street drainageways*



swale in lawn



swale with groundcover



trench drain with grate



trench drain

A surface drainage network already exists on Stanford lands. This network can be enhanced to improve its engineering value while also softening its edges and adding wildlife habitat.



Network of streams

- *Develop a campus-wide drainage network of seasonal streams and swales to provide landscape diversity, habitat value and a unifying campus element.*

At Stanford much of the campus is served by ditches that can be used as the foundation for a comprehensive network of seasonal streams and swales. This network supports the rural character of campus and contributes to habitat diversity. The network of streams also becomes a unifying landscape element that passes through a variety of academic settings. An economic benefit may also be realized by a reduction in the cost of conventional underground storm water systems.

To be successful, these seasonal streams will require a new maintenance approach. The current practice of cleaning the sides to ensure adequate flow will need to be modified so that riparian vegetation can be cultivated.

Recommendations

- *Transform ditches into swales that restore landscape habitats while continuing to carry storm water economically.*
- *Collect water from streets by modifying the curb to direct runoff to adjoining swales rather than into underground pipes.*
- *Design roofs, gutters, roadways, parking lots, plazas, and malls to contribute runoff to the swale system.*



A system of swales and temporary ponds could unify the campus.

Creeks are the most fragile environments on campus and need special protection. They can also provide a rich landscape experience if access is carefully provided.



Creek restoration

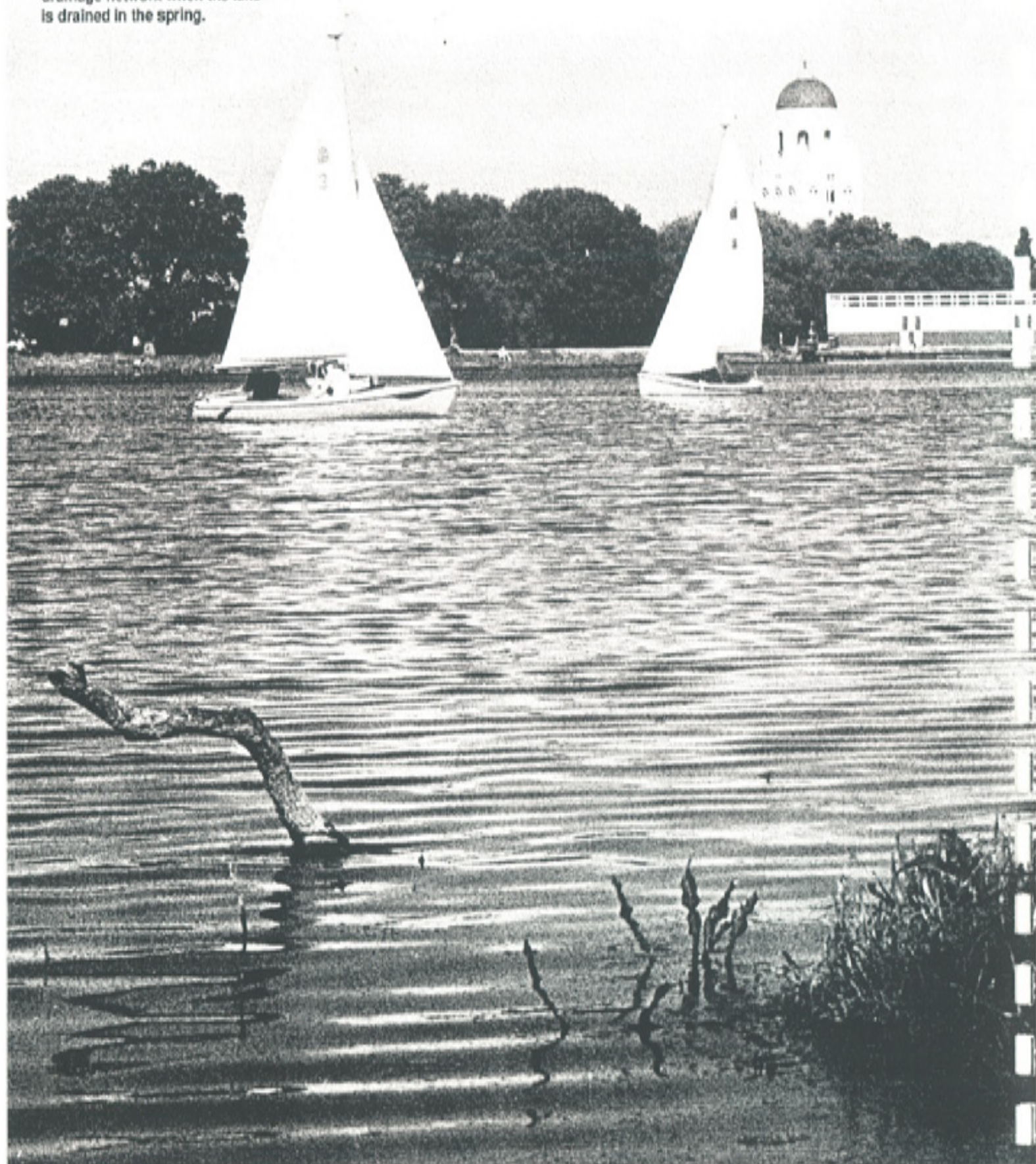
- *Creeks are fragile, rich environments presenting unique challenges and opportunities. Protect and restore them to preserve rural character and ensure their ecological vitality.*

Stanford has three major creeks on its lands: San Francisco, Matadero and Los Trancos. These creeks have cultural, archaeological, and ecological value. They offer a unique landscape experience. In the past, creeks were often ignored or fenced off. Today's trend is to embrace creeks and include them in the accessible landscape. Because of their fragile, changing nature, creeks require special care to be made accessible.

Recommendations

- *Work with local water districts on techniques for creek restoration.*
- *Provide access to creeks where feasible.*
- *Stop erosion of creek banks by the use of gabions, plant material and modest regrading.*
- *Establish a setback zone to protect creek edges and archaeological features.*
- *Plant native riparian species to attract wildlife.*

Originally a reservoir for agricultural activities, Lagunita today provides recreational opportunities. Its water could be channeled into a surface drainage network when the lake is drained in the spring.



Fountains for an arid climate

- *Design fountains that both celebrate water and reflect the arid nature of our climate.*

California lies within an arid climate, and water resources are becoming increasingly strained. Fountains can reflect this scarcity and still celebrate water as the source of life.

Campus fountains demonstrate a continuum of fountain design. The Tanner and Shumway (Hoop) Fountains express water and power in abundance. High volumes of water flow rapidly from the nozzles and each drop falls only once before being pumped again. The Demetrios (Claw) Fountain, on the other hand, uses low volumes and fine spray to create an intimate, cooling environment. Water in the fountain at the Old Green Library trickles slowly into a still basin, falls three times, and demonstrates that it only takes a little water to provide a place for contemplation and refreshment.

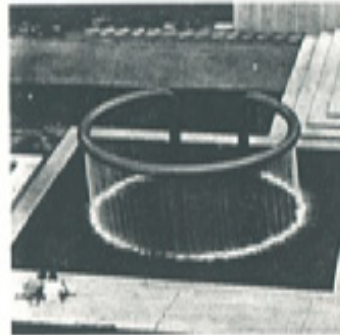
Though the absolute volume of water used by any recycling fountain is low, fountain design sends an important message about our attitude towards precious natural resources.

Recommendations

- *Design fountains to use low water volume and reduce water lost due to evaporation.*
- *Use fine spray to cool the area around the fountain. This fine spray requires a fine filter to prevent clogging.*
- *Greater efficiency can be realized by designing fountains so that each drop of pumped water falls repeatedly, yielding several splashes during a single cycle.*
- *Besides the visual character of the water, consider the quality of sound provided by a fountain as well as its appearance when turned off or dry.*
- *In addition to fountains, reflecting pools of still water can provide settings for pause, calm, and contemplation.*



Tanner Fountain



Shumway Fountain



This bridge at the Golf Course provides a dramatic crossing as it connects pathways on two sides of San Francisco Creek.

Bridges to cross

- *Take advantage of the surface drainage network to include bridges as part of the pathway experience.*

Bridges mark a transition, a crossing, and connection from place to place. We speak of building bridges between disciplines, concepts, and in relationships. By keeping water on the surface, the landscape holds many opportunities for bridges. These bridges can range from extensive engineered spans, like the ones over creeks, to simple flat boards placed over shallow swales across a lawn.

Recommendations

- *Preserve the bridges across the Campus Drive West median ditch between Parking Structure I and the Medical Center. Redesign the ditch to create a more natural appearance and preserve its water source.*
- *Connect pathways in the landscape using a variety of modest bridges over swales and streams.*



Simple wood plank bridge

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