

Bog won't sink this eco-friendly project

■ A pile system and smart stormwater management keep Greenwood's Piper Village afloat.

The single most defining characteristic of Seattle is its eclectic neighborhoods.

As an urban-based engineering firm we are committed to creating sustainable neighborhoods. Projects like South Park's new library, Yesler Terrace's new LEED gold community center and Amazon's new urban campus at South Lake Union will help knit these neighborhoods together for years to come.

By **JEFF PETERSON**

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Piper Village in Greenwood is a project that gets to the heart of sustainable design by contributing to the overall health, prosperity and longevity of its neighborhood.

There are several unique things that come into play at Piper Village: It's on a peat bog; it took a village's worth of stakeholders to create; and it has a committed owner who ties the success of the project to sustaining the neighborhood for years to come.

Working with the owner, design team, city officials and neighbors brought up the expected design issues, like blending the project into the feel of the neighborhood. But it also raised some issues related to neighboring properties whose foundations have sunk due to the then-unknown effects of building on peat.

The impacts can be seen by simply walking around the neighborhood: Houses have

shifted, roadways have sunk.

Building on a bog

So how do you sensitively develop a mixed-use building atop a peat bog without further impacting your neighbors' property? By being committed to the neighborhood and not settling for easy answers.

Numerous development alternatives were reviewed in an effort to find the best balance between maximizing the development area and minimizing the impacts to the environment. Providing for parking was a recurring dilemma.

The tried-and-true method of locating parking below grade and using detention vaults to manage stormwater had already proved to be an unsatisfactory solution for the surrounding developments.

So we went back to basics. Peat soils need water to maintain stability. Detaining the water elsewhere dries out the soil, allows the peat to compress and heightens the potential to cause the surrounding areas to sink.

Solution: Keep the peat wet. Combining stormwater management and a parking system gave us the right balance.

Rather than working against the natural soils, the stormwater management system we designed uses the sub-base of the porous pavement in the parking area for water storage. A series of perforated pipes diverts water into the rock area for detention as soon as the groundwater area is fully charged.

To maximize contact with the groundwater year-round, we surfaced both the parking lot



Perforated pipes divert stormwater into the rocky substrate beneath the parking lot's porous pavement, where it can be safely stored.
 Photo by Coughlin Porter Lundeen

and adjacent Greenwood Lane with porous pavement.

Foundation on stilts

A solution to the foundation design revealed itself after working closely with the geotechnical engineers and our own structural engineers.

A pile foundation system drives 20 feet below the sensitive peat and aquifer. It is a structural concrete foundation on stilts that will stay there regardless of what happens in the upper layers of the soil.

Our stormwater management strategy also became the means through which we could realize the owner's and neighborhood's vision for a walkable, community-oriented development.

A small park was created around a pond designed to collect discharge from the underground systems. The addition of an interpretive center for Piper's Creek where the water discharged into the creek headwaters serves as both an educational and gathering area.

To further enhance connec-

tivity to the neighborhood, frontage sidewalks with swales buffering the roadway were designed into the site. These "green streets" contribute to the overall stormwater management system by helping to clean and slow runoff, rehydrating the underlying peat and creating a natural aesthetic boundary.

The city, after working with the stakeholders, also amended its environmental critical areas ordinance to include development over peat soils.

Projects like Piper Village demonstrate how effective it can be to collaborate with all the stakeholders and take a pragmatic, thorough approach to problem solving that places longevity, function and economy at the center of discussions. This lesson in sustainability speaks volumes: Sustainable designs need to fit the project and solve the problems.

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