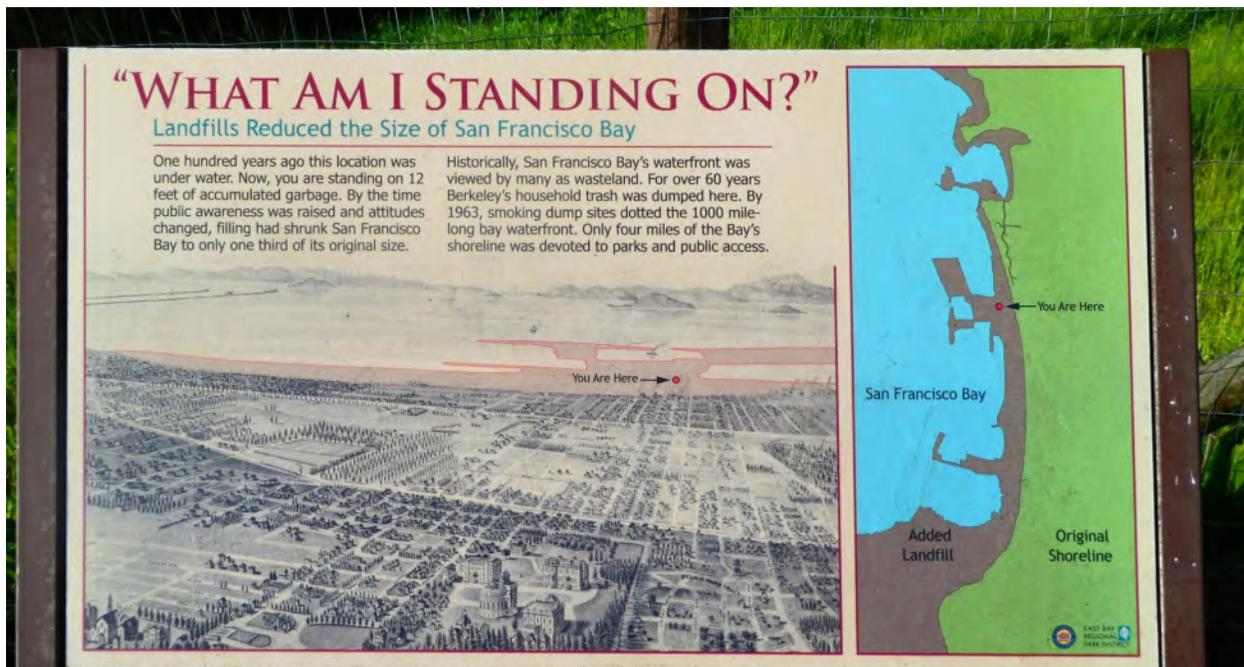


Can New Park Restrooms Be Built on Old Landfills?

Executive Summary: Building a traditional sanitary bathroom that requires a long and deep sewer connection on top of a landfill is risky and uneconomical. But modern sanitary bathrooms using a sewer-free flush-vault technology are well adapted for landfill installation; they are safe and cost a fraction of the traditional approach.

All of the Berkeley shoreline, including the entire Marina, is landfill. Most of these areas were closed to dumping and covered over with various layers of clean dirt before state and federal air quality regulations came into effect in the 1960s. This includes what is today the Gilman playing fields, the Berkeley Meadow (McLaughlin State Park), the University Avenue extension west of the freeway, and the whole of the Marina south of the boat basin.



This sign in the McLaughlin State Park (Berkeley Meadow) reminds visitors "You are standing on 12 feet of accumulated garbage."

The last local landfill to be closed is in the area north of the boat basin now occupied by the Hilton Doubletree Hotel and Cesar Chavez Park. The regional air quality agency, now named Bay Area Air Quality Management District (BAAQMD), took jurisdiction over this northern area in the 1980s and required installation of a landfill gas collection and management system. This system

consists of a series of more than 40 perforated plastic pipes sunk into the ground under the hotel area and the park. The pipes collect methane and other gases generated by decomposing buried garbage, and channel it through other plastic pipes to a flare station located near the middle of the park, where the gases are burned off. The City of Berkeley in 2016 replaced the original 1980s flare station with a newer, smaller model adapted to declining gas volume.

Can new park restrooms be built on former landfills? The answer is, it depends on the restroom design. Traditional park restrooms offer flush toilets and sinks for handwashing, the basic requirements for a sanitary facility. But they require a sewer connection. A trench must be cut to hold the sewer lateral running to the sewer main. The trench may have to be as much as ten feet deep and hundreds of feet long. As many homeowners know, even short sewer laterals in residential areas are known to become blocked or to leak due to soil settlement, requiring expensive maintenance. Long sewer laterals running through landfill material that is notorious for settling in normal times, and liquefying in earthquakes, are high-risk, high-maintenance installations. Cutting such a trench and laying the necessary lateral and making the connection to the main sewer is also an extremely expensive proposition. Therefore, common sense and prudence in the expenditure of public money speak against construction of this kind of old-style restroom over a landfill.

Traditional sewer-bound restrooms, however, are not the only option for sanitary restrooms in the parks. Technology has advanced in park restrooms, as it has in computers, cars, and so many other fields. Designs are available today that offer flush toilets and sinks for handwashing without requiring a sewer connection. The



Flush-vault unit installed by National Park Service in Pacifica, replacing two porta-potties

sanitary features remain: the toilet flushes and visitors can wash their hands. But the whole problem and expense of cutting a trench and running a lateral goes away. This design is called **flush-vault technology**.

Flush-vault technology deposits waste in a vault underneath the unit, but there is no visual opening to the vault and no odor, as there is with primitive campground vault units. The visitor experience is the same as

in a home or retail bathroom. The vault is sealed off from the user. Waste matter goes into the vault through a normal-looking restroom toilet. This toilet uses much less water than standard commercial or household toilets – one quart per flush as opposed to 1.6 gallons or more. The vault is much larger than a campground unit. Typical installations may go months before they need to be pumped out. Unlike campground units or porta-potties, the flush-vault units have a floor drain and can be easily cleaned with a pressure washer, should that be necessary.

Because these flush-vault units require no sewer hookup, they can be installed anywhere there is road access. Existing units are in service in the desert, in the mountains, and in parks far from sewer lines. For example, the flush-vault unit in Lathrop is a quarter mile from a sewer. The flush-vault unit in Pacifica is on a beach access road. The same vendor (greenflushrestrooms.com) has installed units on former landfills elsewhere in the U.S.



Flush-vault unit installed by City of Lathrop at new dog park went eight months before it needed pumping out

Installation of flush-vault restrooms on a landfill is possible because the excavation required for the vault at the base of flush-vault units is only two or three feet deep, depending on the model. A back-hoe operator digs a rectangular excavation two or three feet deep and as long and wide as the particular restroom model. The unit arrives on a truck. A crane lifts the prefabricated unit into the excavation. A concrete pad or apron may be added around the entrance if the setting requires it for access. The whole process can be completed in a few days.



Flush toilet and sink for handwashing are standard with flush-vault units. A urinal is also included.

Flush-vault units can either hook up to existing water lines for flush and sink water, or can be delivered with water tanks for remote locations. Electric hookups are not needed; a

solar panel and battery handles power for the flush mechanism and lighting. No sewer hookup, as mentioned, is required.

At Cesar Chavez Park, water lines run the length of Spinnaker Way, and water hookup to the new restroom units should be a routine plumbing job. The park has extensive electrical wiring but the units don't require it; they use solar power. No sewer trench is needed.

Excavations at landfills having gas collection systems, such as Cesar Chavez Park, require the permission of BAAQMD and the Water Board. These agencies' concern is to prevent buried garbage from being exposed to air or water. At the current location of the porta-potties along Spinnaker Way in Cesar Chavez Park, there is zero danger that a three-foot deep excavation will expose buried garbage. The two current sites are in line with the row of cedar trees at the edge of the roadway. The trees are planted on the original perimeter levy that was built with construction and demolition debris in the 1950s to support the roadway and to enclose the 90-acre area that became the dump. No matter how deep the excavation along that perimeter strip, it would not encounter garbage.

Even if the new flush-vault restroom units were set north of the cedar trees and north of the paved asphalt pathway, in an area over buried garbage, a three-foot excavation would not come close to exposing buried waste. Test drillings done in this area in the late 1980s showed eight feet of clean fill above the garbage in one location, twelve feet of clean fill in the other location.¹ About four more feet of clean fill was added in these areas after the test drillings.²

The area directly north of the paved trail now contains a set of storm drain boxes connecting a buried storm drain pipe running east-west. The storm drain box located nearest to the easterly set of porta-potties (across from



Restroom sites are in line with the row of cedar trees on the levy that supports Spinnaker Way



Existing storm drain box near restroom site is three feet deep and poses no exposure hazard

¹ Harding Lawson Associates, Berkeley Landfill Well Drilling Logs and Dailies, September-October 1988, Extraction Wells 1-6.

² Conceptual Master Plan, 1991, p. 12.

the hotel) measures three feet deep on the inside. The air and water boards have never expressed concern regarding exposure of buried garbage by this system, because the depth of clean fill cover is much greater. The excavation for a flush-vault restroom needs to be no deeper than this existing storm drain system.



One of more than two dozen excavations made in the park in early 2016, at least three feet deep, without objection from air quality board.

In 2016, the City overhauled the landfill gas collection system in Cesar Chavez Park as part of the installation of the new, smaller flare station. The contractors dug about thirty excavations at many different locations in the park, all in places where garbage lay buried underneath, below the clean cover fill. These excavations were typically more than three feet deep, and the boards raised no objections.

Conclusion: Installation over landfill of a traditional sanitary park restroom, requiring a long and deep sewer hookup, would be risky and extremely expensive. But installation over landfill of a modern sanitary flush-vault restroom, requiring no sewer hookup, would be safe, practical, and economical. To put it positively, modern flush-vault sanitary bathrooms are the option of choice for landfill installations.

-- Martin Nicolaus, <http://viva-cesar-chavez-park.org>
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