Our Ocean Backyard—Santa Cruz Sentinel columns by Gary Griggs, Distinguished Professor of Earth Sciences, UC Santa Cruz

#299 October 13, 2019
The Future of West Cliff Drive

West Cliff has been one of Santa Cruz’ most favored places for well over a century. Even in recent surveys, many locals typically list West Cliff Drive as their favorite place to hang out. Before there was a paved street, visitors would take wagon rides out “along the cliffs” for a close view of the Pacific Ocean and watch the breaking waves.

When a drought hit the area in 1897-1898, however, tourists were faced with clouds of choking dust as they took their scenic buggy rides along the cliffs. Visitation dropped so the city hired two local engineers and entrepreneurs, the Armstrong brothers, to solve the dust problem. They built what was called a “wave motor” out on West Cliff Drive near Natural Bridges in 1898. One of the two shafts is still visible on the rock terrace below the bike path just south of Chico Avenue, although it now has a large circular concrete cap over it. You can look down and hear and sometimes feel the wave surge underneath the cap at high tide, and then watch the spray blown skyward through the vents in the cap. Sitting on this cap isn’t recommended, however.

Although the Armstrong brothers didn’t actually generate any power, they did figure out a way to use the energy in the surging waves to pump seawater. Taking advantage of a cave and perhaps a natural blowhole, they bored two large-diameter vertical shafts from the cliff top down into the cave. Two 6-foot-diameter, 600-pound pistons were placed in the shafts, and as large waves surged in at high tide, they pushed the pistons up. As the pistons dropped back down under the force of gravity, they forced seawater up a pipe into an elevated water tank at the top of a derrick. The saltwater was drained into a horse-drawn tank that was used to water down the coastal wagon road and keep the dust under control until the drought ended.

West Cliff has remained an iconic symbol of Santa Cruz with its natural bridges and arches, waves crashing over the cliffs during winter storms, small pocket beaches for those who want a quieter spot than Cowells or Main Beach, and a large number of surf breaks.

One of the things that makes West Cliff special for residents and visitors is that with a single exception, there are no houses to block the view of the coast for walkers, bikers, skaters, joggers or drivers. This is somewhat unique along California’s coast where homes often line the cliff tops and there aren’t the unrestricted views that West Cliff provides to everyone.

The crashing waves that have sculpted the rocks and created the arches, bridges and seastacks have been taking their toll on the cliffs for centuries, however. The same forces
that have created this scenic stretch of coast as they have eroded the rocks, have also led to the gradual collapse of those features at the same time as they are carving new arches and caves. It’s a constant battle between the impact of the waves and the resistance of the cliffs to wave attack. The waves are slowly winning, however. But in an effort to halt or slow the erosion and protect West Cliff Drive, human intervention began to occur back in the 1950s and has continued intermittently virtually to the present.

Today, of the approximately 2.7 miles of West Cliff Drive, nearly 50% has been armored with rip-rap or large rocks; in many cases a lot of very large rocks. And to be clear, in general, most of these rocks have done their job relatively effectively. The rocks take the impact of the wave and the erosion of the cliffs has been halted temporarily or reduced. There are many areas where the rocks were stacked too steeply or were too small to withstand the wave attack and have rolled down onto the beach during storms. In addition, these rocks have taken up a large amount of beach area along a stretch of shoreline without a lot of beaches for the public to enjoy.

The city is now engaged with a consulting team in developing a long-term management plan. What are the values that are most important to the public along this scenic stretch of coast? Should the sidewalk and roadway be protected so public access is guaranteed for the future, even if this means some additional armoring or protection and potential loss of small pocket beaches? Or should some of the rocks be removed or replaced with near vertical tie-back faux-rock walls as were built along East Cliff Drive at Pleasure Point a few years ago, so that more beach area is recovered for public use.

These are the issues now being studied and evaluated along with public input. If you are interested in learning more about the West Cliff Drive Adaptation and Management Plan please see cityofsantacruz.com/ResilientCoast and email climateaction@cityofsantacruz.com to be added to the City’s outreach list for this project.

1998 Wave Motor out on West Cliff.