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July 30, 2019

ORANGE COUNTY
REGISTER

Car runs into construction equipment in Anaheim, knocking worker into 20-foot-deep hole

By Alma Fausto | afausto@scng.com | Orange County Register
PUBLISHED: July 30, 2019 at 1:00 am | UPDATED: July 30, 2019 at 8:09 am

Firefighters rescued an injured worker from a 20-feet-deep hole he was knocked into after a car crashed into a construction site in Anaheim Monday night, July 29, authorities said.

Urban search-and-rescue teams from Anaheim and Orange were called out to the scene, at State College Boulevard and Ball Road, shortly after the 10:30 p.m. crash, said Battalion Chief Tim Sandifer of Anaheim Fire & Rescue.

"The victim had been performing some shoring work in preparation for some sewer reconstruction," Sandifer said.

A driver then crashed into the construction site, hitting some equipment, and caused the worker to fall into the hole.

He had some musculoskeletal injuries and couldn't get out himself, Sandifer said.

Within about an hour, rescuers were able to lift the worker out using a basket and take him to a trauma center.

The uninjured driver left the car but was taken into custody by police about a block away. The cause of the crash was under investigation.

Forester Media
July 24, 2019

Wastewater Treatment With Reverse Osmosis for Sustainability

As the world moves further towards dangerously low water levels, it demands a solution that can quench the thirst of millions while still maintaining ecological balance.

FORESTER MEDIA

JULY 24, 2019

Earlier in June, a large aquifer was found just off the northeast shore of the U.S. near New York. It is said that the aquifer contains enough water to fill 1.1 billion Olympic swimming pools. This new finding has opened a door to the possibility of more such aquifers hidden beneath the seabeds across the globe. While it is definitely some good news, it is important to note that this cannot be the only alternative to the ever-increasing problem of shortages. And after years of experimenting with various methods, ignoring the idea of recycling wastewater for drinking, it turns out the world today is turning towards just that.

Sammy Farag, CEO of AMPAC USA agrees, "*Using rejected water through sewage treatment was not acceptable by many around 10 years ago. But look at the situation today, countries and companies have begun using it to fulfill their needs and not many have a problem. The change from the past 10 years is that the shortage of such an essential element was not a pressing matter then. Today, you cannot turn a page in the newspaper or ignore a post on your phones about the water crisis and climate change.*"

And it seems to be as real as it can get. BBC released a possible list of cities that are in danger of running out of essential water to drink, and in the past year, more cities have been added to the list. All over the world, cities are either waiting for the dark clouds to pour some rain in a drought or struggling for their lives while running from floods. The climate has gone haywire all over the world and the mismanagement of water could be a contributing cause. Here is where sewage treatment can help with the troubles.

Wastewater Treatment

This is a procedure where rejected water from industries, or possibly an entire city, is brought to a facility to be treated. The water goes through an elaborate process of filtration, which, today, is most commonly reverse osmosis. While the process does have its own downsides related to rejection, it never disappoints in quality, which is probably why the requirements to get such plants or systems installed in industries is a topic gaining heat.

"AMPAC USA, for the past 30 years, has been serving customers with the best quality wastewater treatment systems. And we can easily say the orders have skyrocketed in the past five years. Before, not many customers opted for these products because of the taboo associated with it," says Farag.

But what could be the reason for a sudden change in its popularity?

"The major reason can be associated with the increasing price of water for industries and the decreased availability. Countries and businesses both began working out strategies that could help them save water and money, respectively. Additionally, for industries, it could be a way of getting in the good graces of their customers and regulatory authorities, as governments began giving incentives for sustainability. It is a good cause, and so it had to eventually gain popularity," added Farag.

And this does reflect in the number of industries that have opted for a wastewater treatment solution as part of their strategy to satisfy their needs.

The Rejected Becomes The Accepted

The acceptance began when a large beer brewing company showcased its products made from reclaimed water. Stone Brewing Company is near San Diego and is one of the largest in California. They worked with the treatment plant in the city to make beer. The program, called Pure Water San Diego, led to the launch of Full Circle Pale Ale, which was a beer made from reclaimed waters in San Diego. This was in 2017 when San Diego officials, including Mayor Kevin Faulconer, were happy with the experiment and hoped, together, they could achieve their goal of providing one-third of the city's demand from reclaimed waters by 2035. Although

this experiment was only for the event, local brewery owners did take notice. Coming from a big company like Stone, other smaller breweries began investing in treatment systems that turn waste into pure drinking water.

"And especially for beer breweries, it is a win-win! Every brewer will tell you that water controls the taste of beer and so if they could use reclaimed water for their production, it could give their beer unique taste. This can easily give them an edge over their other competitors," says Farag.

Positive Reception

It seems that countries all over the world are now warming up to this process that employs reverse osmosis for purification. The two biggest industries in China, for instance, currently employ reverse osmosis for recycling their waste. The coal and chemical industry in the country faced many challenges while employing the process, but it eventually led them to innovative RO elements. Even in India, the capital New Delhi has now installed new sewage treatment plants to provide for the city each day. The good news is now everyone is working towards making potable water available, not only to people or for industries but for the planet too.

Disneyland recycles wastewater for all its rides and has been in partnership with the Orange County Water District (OCWD) for 10 years now. The water used in the park goes to the OCWDs Groundwater Replenishment System, which ensures regular refills of aquifers. The County does it by using state-of-the-art treatment systems. While Disneyland takes a different approach, most of the entertainment parks install industrial Reverse Osmosis Systems for clean and healthy rides each day.

Indeed, it seems if countries put their resources into building such treatment facilities, the growing distress on the world could decrease to an extent. If this alternative has positive effects on the issues of today, it can help build a sustainable future for everyone.

WATER EDUCATION
FOUNDATION

Western Water June 13, 2019 Gary Pitzer

As Californians Save More Water, Their Sewers Get Less and That's a Problem

WESTERN WATER NOTEBOOK: Lower flows damage equipment, concentrate waste and stink up neighborhoods; should water conservation focus shift outdoors?

Corrosion is evident in this wastewater pipe from Los Angeles County. (Image: Los Angeles County Public Works Department)

Californians have been doing an exceptional job reducing their indoor water use, helping the state survive the most recent drought when water districts were required to meet conservation targets. With more droughts inevitable, Californians are likely to face even greater calls to save water in the future.

However, less water used in the home for showers, clothes washing and toilet flushing means less water flowing out and pushing waste through the sewers. That has resulted in corroded wastewater pipes and damaged equipment, and left sewage stagnating and

neighborhoods stinking. Less wastewater, and thus more concentrated waste, also means higher costs to treat the sewage and less recycled water for such things as irrigating parks, replenishing groundwater or discharging treated flows to rivers to keep them vibrant for fish and wildlife.

It's a complex problem with no easy answers. Some water agencies even have suggested the state needs to push more conservation efforts to outdoor water use rather than indoor use to keep wastewater flowing. For now, local sanitation agencies are beginning to assess how best to respond with changes in how they operate – and how they plan for a future that will inevitably include more droughts.

"Indoor water savings are good, but the flip side is, as you get lower [use] … at what point are you causing more harm than the benefit you are getting from saving those drops of water?" said Adam Link, director of operations with the California Association of Sanitation Agencies.


Adam Link, director of operations with the California Association of Sanitation Agencies (Image California Association of Sanitation Agencies)

Link said his organization had heard anecdotal accounts of problems, but that they varied depending on location. Wastewater agencies generally handled problems through operational changes such as increased chemical treatment.

A recent report by the Public Policy Institute of California (PPIC) quantified the problem, finding in a survey of wastewater agencies, that one-fifth of respondents indicated increased corrosion of collection systems due to declining influent quality.

The PPIC's report released in April, *Managing Wastewater in a Changing Climate*, said the wastewater treatment sector "is at a turning point," with drought posing the biggest challenge. The report suggested action is needed to improve coordination between water suppliers and wastewater agencies to ensure that water conservation efforts in the urban sector can be accounted for as part of the short- and long-term planning on the treatment side.

"Wastewater managers would benefit from knowing which demand management strategies are deployed, when and where the strategies are being implemented, and how much indoor

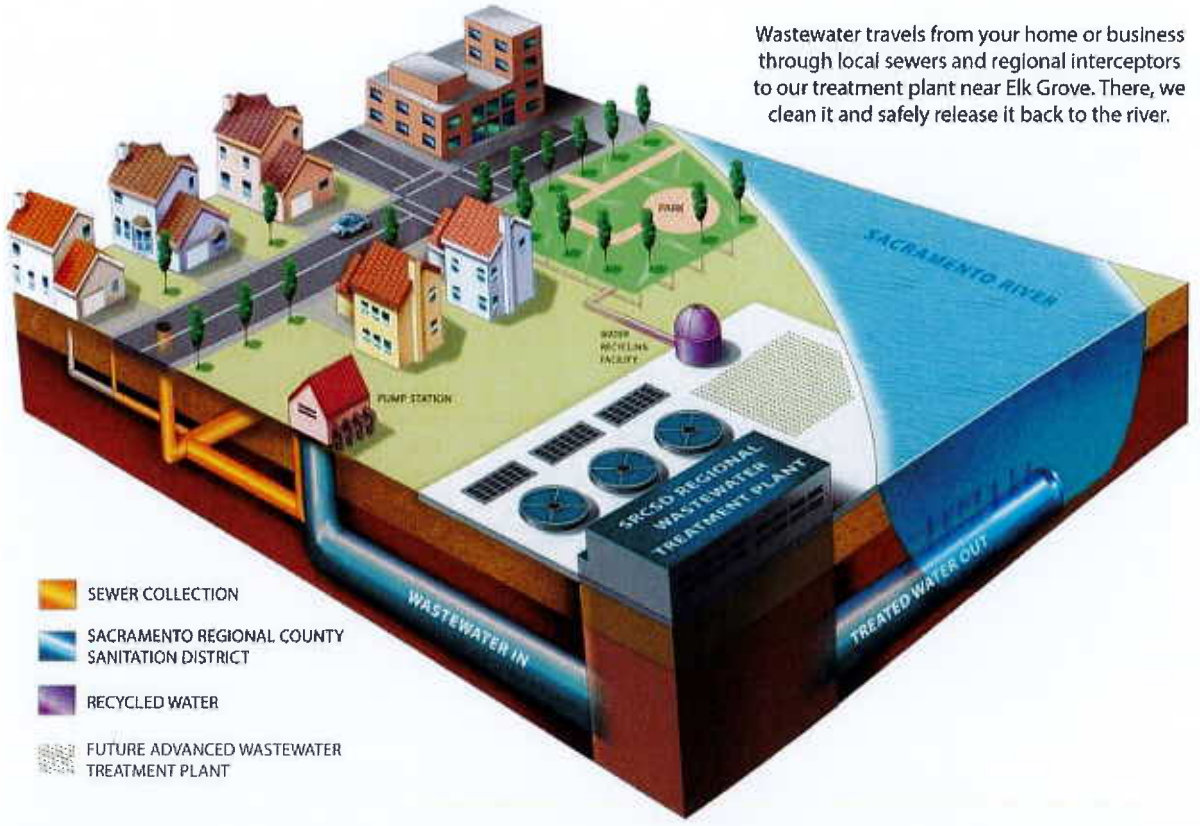
water savings are expected over time," according to the report. It noted that the California Department of Water Resources and the State Water Resources Control Board could help facilitate better exchange of information and provide guidance for integrating water supply and wastewater planning.

"Indoor water savings are good, but the flip side is, as you get lower [use] ... at what point are you causing more harm than the benefit you are getting from saving those drops of water?"
~Adam Link, director of operations with the California Association of Sanitation Agencies

Link agreed that as wastewater agencies plan for future treatment capacity and the projected demand for recycled water, they should be included in discussions about further reductions in water use — and how reduced flows affect the planning and sizing of recycled water projects. The state has set a goal of developing at least 2.5 million acre-feet a year of recycled water by 2030.

Rob Thompson, assistant general manager of the Orange County Sanitation District, said his agency has planned for changing flow patterns based on factors such as economic activity and the amount of rain received.

"When people talk about low flow, it's really one of a plethora of items which are really about resilience," he said. "We are consistently planning ... with our operations, maintenance and engineering to deal with those changes."



This schematic from Sacramento Regional County Sanitation District is an example of how wastewater systems work. (Image: Sacramento Regional County Sanitation District)

The district receives about 185 million gallons of sewage each day from more than 2 million people in north central Orange County (185 million gallons would fill a football field 515 feet deep). One hundred million gallons of that treated wastewater is put back to work to irrigate parks, schools and golf courses and help combat seawater intrusion.

The district's collection system and manholes have been protected from corrosion since the 1960s and for the last decade, chemical treatment has been used to block formation of odorous and corrosion-causing compounds, said Thompson, noting that the district has been granted patents for its processes.

Re-evaluating Water Conservation Strategies

The 2012-2016 drought was the driest in recorded state history. The extent of the impacts from reduced sewage flows – corrosion, odor problems as sewage pools in neighborhood pipes and increased salinity – surprised some people. The episode highlights what's needed in the future.

"We know the next drought is coming. This is our reality to manage and adapt to," said Jelena Hartman, senior scientist with the State Water Board, at PPIC's April panel presentation on the report.

"California policy on long-term water use efficiency should prioritize outdoor water use restrictions, which will have a lower impact on interconnected water systems, to achieve statewide demand management goals."
~ 2017 California Urban Water Agencies white paper, Adapting to Change: Utility Systems and Declining Flows

Because many rivers rely on treated wastewater for water quality and flow, reductions in discharges can add to the environmental impacts on rivers when drought strikes, Hartman said. Less water flowing to rivers — whether from treatment plants, street runoff or stormwater flows — affects overall environmental quality.

"It's not just water recycling," she said. "We are talking about low-impact development, capturing storm flows and reducing urban runoff."

Meanwhile, the drive to ratchet down water use in California begs the question of whether conservation efforts could eventually shift because of the impacts to the wastewater sector. A 2018 law sets indoor consumption goals at 55 gallons per person per day, with the figure dropping to 52.5 gallons in 2025 and 50 gallons in 2030. It's up to water agencies to work with users to meet the goals.

In a 2017 white paper, *Adapting to Change: Utility Systems and Declining Flows*, California Urban Water Agencies (CUWA) noted that while saving water indoors is an important element of water management programs, more must be done to manage all future water demands. CUWA is an association of 11 major California urban water agencies.

"California policy on long-term water use efficiency should prioritize outdoor water use restrictions, which will have a lower impact on interconnected water systems, to achieve statewide demand management goals," the white paper said.

Outdoor water use varies greatly in the state, accounting for as little as 25 percent of a household's use in coastal areas and as much as 80 percent in the hotter inland regions.

Treated wastewater flows into the Los Angeles River. These types of wastewater discharges are important sources of water to help maintain river vitality. (Image: Southern California Coastal Water Research Project)

On the environmental side, work is underway to quantify the impact of reduced discharges to surface waters. In Los Angeles, a coalition of state and local agencies are collaborating with the Southern California Coastal Water Research Project on a two-year study launched last fall to determine what happens when treated wastewater effluent and runoff usually sent to the Los Angeles River is diverted for recycling.

Researchers are looking at how vulnerable species and habitats along a 45-mile stretch of the lower reach of the river respond to flow reductions with an eye toward developing recommended flow targets by season and section of the river.

What's Next

When drought returns to California and people do their part to conserve water, use levels will again drop, perhaps even to record-low levels. Wastewater treatment agencies will again be faced with even less flows. Thompson, with the Orange County Sanitation District, said agencies should use their regular retrofit and upgrade schedule to measure their resilience.

Part of a wastewater treatment plant in Contra Costa County. (Image: File)

"You don't design for one little problem," he said. "You look at the overall condition of your treatment plant and look at opportunities to replace outdated infrastructure with more focused infrastructure that meets the new needs you are facing."

The state, PPIC said, should help the wastewater sector and direct its funding assistance toward regional approaches to planning and research.

"The state also has a responsibility to evaluate its own policies for areas of conflict between water use efficiency, recycled water production and environmental flows," the report said. "The state needs to be clear about the inevitable tradeoffs associated with these goals and help set priorities."

There also needs to be better delineation between what's happening with the long-term trend of reduced indoor water use and the impact drought has on that use.

"That is one of the unanswered questions," Link said. "Is there going to be a bounce back [in water use after a drought] or is there where we are and what we have to plan for?"

OC Register
June 26, 2019

ORANGE COUNTY
REGISTER

HEAL THE BAY REPORT CARD

LOCAL BEACHES GET HIGH MARKS

Good news:
Orange County beats statewide rate for A and B grades, while 10 locations make group's honor roll

Bad news:
Far fewer receive top scores on wet winter days, and two are among 10 worst 'Beach Bummers'

By Martin Wisckol >> *mwisckol@scng.com* **>>** *@MartinWisckol on Twitter*

The good news is that 97% of Orange County beaches scored an A or a B for summer water quality in Heal the Bay's 2018-2019 Beaches Report Card to be released today, higher than the statewide A and B rate of 94%. Of the 33 California beaches making the environmental group's honor roll with perfect grades, 10 were in Orange County.

The bad news is that the 17 inches of rain this winter — nearly twice the historical average — resulted in just 56% of county beaches receiving top grades on wet winter days. Statewide, just 54% of all beaches received an A or a B during wet weather. Additionally, two Orange County beaches were among the 10 worst "Beach Bummers" in the state. Also, four county beaches that last year made the group's honor roll fell off the 2019 list.

"Rain washes pollutants and contaminants into the ocean thus lowering water quality," says the report, which used water quality data from county health agencies.

"Beachgoers who recreate at beaches after a rain event have an increased risk of contracting ear infections, eye infections, upper respiratory infections, skin rashes and gastrointestinal illness.

"Approximately 1 million ocean beachgoers contract illnesses each year in Los Angeles and Orange counties, with total healthcare costs of $20 [billion] to $50 billion."

Contributing to the region's dirty water over the past year were 28 sewage spills in Orange County, 96 in Los Angeles County and November's Woolsey fire in the Malibu area.

Heal the Bay recommends avoiding the water at beaches with a C grade or below and staying out of the ocean at all beaches for three days after it rains. The Santa Monica based group's Now Cast app and Now Cast online site predicts daily water quality at more than 20 beaches.

Climate change

With scientific assessments that climate change is leading to more extreme periods of rainfall, and more extreme wildfires, the report notes a domino effect resulting in dirtier ocean water.

"Major wildfires … can have a big impact on water quality because fires damage sewage infrastructure and increase the amount of runoff due to vegetation loss," the report says.

After the Woolsey fire — during a seasonal period Heal the Bay defines as "dry winter" — only 57% of the Malibu beaches received grades higher than C. That was a marked change from the previous five years, when the 87% of those beaches received an A or B during dry winter months.

"Governments, leaders and the public must take immediate action to mitigate the effects of climate change and pollution," the report says. "Many local governments have made enormous efforts to identify and eliminate runoff entering the ocean, but across the board there are still improvements to be made."

The report notes steps that have been taken at specific locations to improve water quality. On a larger scale, more than two thirds of Los Angeles County voters last year approved Measure W, which will result in $300 million in new annual parcel taxes to be used to capture storm runoff and reduce pollutants entering the ocean.

Beach Bummers

The report defines three types of beaches and how they differ in water quality. Open beaches without obstructions or urban runoff tend to get the best scores in both wet and dry weather. Meanwhile, those that have stream, river and storm drains flowing into the ocean tend to score poorly. So do enclosed beaches, which include those found at marinas, harbors and lagoons.
Topping the report's 10 Beach Bummers statewide is the San Clemente Pier, which is affected by runoff during rains and dry periods because of a nearby storm drain. Another problem for San Clemente Pier — one that's common for many piers — is birds congregating and defecating into the ocean.

The study noted steps the city has taken to try tackle the problem, including installing bird netting under the pier. Additionally, a city Ocean Water Quality Subcommittee was formed in April and the city is conducting a tracking study to help identify sources of bacteria in the water.

Also on the Beach Bummers list is Monarch Beach at Salt Creek, near Dana Point's five-star Ritz-Carlton resort. The beach is also affected by dry weather storm pipe runoff. The city has installed a facility to treat water flowing from Salt Creek and has implemented a bird abatement program, according to the report.

Honor roll

Orange County led the state last year with 14 beaches on the honor roll, meaning they received perfect scores year-round. The count fell to 10 beaches in this year's report and was surpassed by San Diego County's 12 beaches with perfect scores.
The total number of honor roll beaches statewide dropped to 33 from 37 last year. Los Angeles went from having eight on the list to two.

Orange County's 20182019 honor roll beaches are:

• San Clemente: Avenida Pico, Avenida Calafia and Linda Lane Beach.

• Dana Point: Dana Strands Beach, Dana Point Harbor Youth Dock and-South Capistrano Bay Community Beach.

• Laguna Beach: Victoria Beach and El Moro Beach.

• Huntington Harbour in Huntington Beach: Trinidad Lane Beach and Coral Cay Beach.

OC Register
July 19, 2019

ORANGE COUNTY REGISTER

ENVIRONMENT

Seal Beach prepares for flooding

Extreme scenario deemed possible because of a rising sea level

By Martin Wisckol

mwisckol@scng.com @MartinWisckol on Twitter

Seal Beach residents got a look Wednesday at what sea level rise could mean to them, thanks to a city presentation showing that large swaths of the small municipality could flood by 2050 and that the odds of even greater inundation will increase throughout the century.

Though there was significant concern among the 40 or so residents on hand at the Marina Community Center, there was also criticism that projections of sea level rise showed flooding far sooner than was probable.

The state's sea level projections used at Wednesday's workshop have just a 0.5% chance of occurring as quickly as the city is expected to prepare for. State officials say those projections are recommended to accommodate factors not taken into account in the calculations, including indi-cations that water rise may accelerate faster than previously thought.

"I think that's a bit aggressive," said Robert Goldberg, whose Clipper Way home is in an area projections show will be among the first to flood. "I'm not going to sell my house based on a 1-in-200 chance. I think something like 1% or 2% might be more appropriate."

The workshop is part of the city process in developing its Local Coastal Plan, which will outline development and resource protection rules in Seal Beach's coastal zone. The document will incorporate requirements of the state Coastal Act and allow the city to give final approval to new development. Because it lacks a Local Coastal Plan, the city currently must send new coastal development to the state Coastal Commission for review.

One component of the Local Coastal Plan will be how the city intends to adapt to rising seas. A preliminary report outlines a possible mix of protections such as seawalls and sand berms, accommodations such as putting buildings on stilts, and retreat, which could include abandoning and demolishing current structures.

The probability debate

Seal Beach is already susceptible to flooding, with a sand berm constructed on the beach each winter as protection against high tides and big surf.

According to recommended state projections, a 1.6-foot sea level rise could occur by 2050. Combined with a 100-year storm and without new mitigation, flooding from the San Gabriel River northwest of the city and Anaheim Bay to the southeast would spill over into neighborhoods inland from the beach — particularly low-lying areas south of Pacific Coast Highway.

With a 3.3-foot sea level rise by 2070, similar flooding would occur without a storm. With a 6.6-foot seal level rise by 2100 and no storm, the inundated area would roughly double, with water coming from the ocean and nearby wetlands as well as from the San Gabriel River and Anaheim Bay.

But those projections have just a 0.5% chance of occurring, according to the Coastal Commission. The "likely" scenario outlined in the city's Sea Level Vulnerability Report is a half foot to a foot of sea level rise by 2050 and 1.3 feet to 3.2 feet by 2100.
The projections of faster sea level rise were developed by the state Ocean Protection Council and are used as recommendations by the state Coastal Commission, which must approve Local Coastal Plans.

"We want to make sure we're not underestimating future sea level rise because the consequence to coastal resources, development, life and safety could be severe," said commission spokeswoman Noaki Schwartz.

She said that the science of projecting sea level rise has continued to evolve since the state projections were established, including indications that ice sheet melt may cause seas to rise faster than previously thought. That means the 0.5% probability "may, in reality, be higher," she said.

A harbinger

Anticipation of future sea level rise already id affecting development plans in Seal Beach.

A proposal to build two houses on a vacant lot on 17th Street, five blocks from the beach and four blocks from Anaheim Bay, has been staunchly opposed by Coastal Commission staffers, which note that 3.3 feet of sea level rise would inundate the lot.
"The proposed subdivision and construction of two single-family residences is not designed or engineered for the changing water levels and associated impacts that are anticipated over the life of the development," says the staff report. "It is important to note that at 5.7

feet of (sea level rise), inland flooding is so severe that the beach fronting portion of Old Town may become an island and that whole sections of sandy beach may disappear."

At the request of the builder, a commission vote on the project scheduled for July 10 was postponed.

That situation is likely a harbinger for all coastal cities as they develop statemandated climate adaptation plans and update their Local Coastal Plans.

"What we're after is what adaptations are most appropriate for Seal Beach," city consultant Chris Johnson told the workshop gathering Wednesday. "The most appropriate fix."

"We want to make sure we're not underestimating future sea level rise because the consequence to coastal resources, development, life and safety could be severe"

— *Noaki Schwart, Coastal Commission spokeswoman*

Looking for the Light.com
July 31, 2019

Looking For The Light.com

Would you drink desalinated seawater? Recycled sewage water? Get ready to find out

IDEAS.TED.COM

Jul 31, 2019 / Amanda Little

Our planet is getting hotter and drier. Drinking water is in short supply, but there are two largely untapped sources: the ocean and sewage. To get a taste of what might be in store for our faucets and understand the pros and cons, journalist Amanda Little goes to California.

The summer of 2019 has seen heat records tumble like dominoes across the Northern Hemisphere. On May 26, the thermometer climbed to 102 in Savannah, Georgia, an all-time high for that month; the same day, it hit an unprecedented 103.1 in Hokkaido, Japan's northernmost island. Then, in June, a three-week heat wave tore through Pakistan and India, where it reached 123.4 in the central city of Churu. In July, it was Western Europe's turn when the temperature soared to 108.7 in Paris and 102.2 in Brussels.

Of course, intense heat doesn't occur in a vacuum. It's accompanied by water shortages and drought, which are expected to be the new norm on our planet. In the US, drought has become associated with California. In fact, from December 20, 2011, through March 5, 2019, some form of drought existed somewhere in the state. This prolonged parching has resulted in billions of dollars in agricultural losses and the death of over 100 million trees in state forests alone.

Below, journalist Amanda Little goes to Southern California to learn more about two sources of drinking water which the state — and our planet — will be tapping in coming years.

Almost all of the water consumed by the 22 million people of California's water-stressed southern region is imported. Much of it is pumped long distances, over mountains, from Northern California. Southern California also draws heavily from the Colorado River, the beleaguered waterway that supplies six other states and Mexico. As these freshwater sources have dwindled, the cost of water imported to Southern Californian cities has been climbing nearly 10 percent a year. The changing economics of water have forced utilities to turn in a new direction for relief: westward to the Pacific Ocean.

California has 840 miles of coastline adjoining the world's largest ocean, an oversupply of brine lapping up against an increasingly thirsty landscape. In order to tap this massive reservoir, the San Diego Water Authority partnered with the Israeli company IDE to build a $1 billion desalination plant in Carlsbad, a suburb of San Diego. It opened in 2017, the largest desalination facility in the Western Hemisphere.

"If we could ever competitively, at a cheap rate, get freshwater from salt water, that … would really dwarf any other scientific accomplishments," President John F. Kennedy told the Washington press corps in the 1960s.

Mark Lambert, the head of IDE's U.S. division, who oversaw the building of the Carlsbad plant, describes desalination as "the most significant kind of modern alchemy. About 97 percent of the earth's water is in the ocean, yet only recently have we been able to tap that resource to grow crops or quench human thirst."

"Desalination may seem like a panacea, but from a cost and energy standpoint it's the worst deal out there," says Sara Aminzadeh of the California Coastkeeper Alliance.
Desalination has been around for millennia if you count the evaporation techniques pioneered by the ancient Greek. Sailors in the 4th century BC boiled salt water and then captured the steam. When cooled, steam condenses into distilled water that's free of virtually all contaminants. This same basic technology — thermal desalination — is still used in places like Saudi Arabia, where fuel for boiling the water comes cheap. Since the 1960s, most desalination operations use reverse osmosis (RO), a method that simulates the biological process that happens within our cells as fluids flow across semipermeable membranes.

There remain big challenges for desalination, and number one is the energy cost. A NASCAR vehicle does about 700 horsepower at full throttle. By contrast, the series of pumps at the Sorek plant near Tel Aviv — the world's largest desalination facility, which processes some 200 million gallons daily — collectively exert roughly 7000 horsepower of energy (or 1100 pounds per square inch of pressure) night and day.

Improvements in the pumps, pipe design and membranes have cut the total amount of energy used in desalination by about half in the past two decades. The energy demands will come down further as efficiencies improve, but many see it as a sticking point.

Sara Aminzadeh, the executive director of the California Coastkeeper Alliance, one of many environmental groups that have opposed the development of desalination plants in California, tells me, "Desalination may seem like a panacea, but from a cost and energy standpoint it's the worst deal out there."

The Carlsbad desalination plant provides nearly 1/10th of San Diego County's total water supply — enough for about 400,000 county residents. Up the coast, another large desalination plant is under construction in Huntington Beach, which will supply drinking water to LA suburbs. More than a dozen similar plants have been proposed along California's southern and northern coastlines.

Daily, the Orange County plant pumps out 100 million gallons of drinking water. The sewage moves through eight stages of filtration before it is drinkable.
But there's another source that's becoming even more critical to the future water supply, one that officials call "recycled wastewater," a pleasant term for human sewage. This is one of the harder realities I've come to accept about modern agriculture — that everything we're now flushing down our toilets and pouring down our drains may have to play an important role in feeding us and growing our food.

"We call it the big tooth comb — step one of the filtration process!" Snehal Desai, Global Business Director of Dow Water & Process Solutions, shouts above the sound of sluicing water. There's a visible torrent of raw sewage water flowing through a channel below us at the Orange County Sanitation District, a facility that treats waste from the toilets, showers, sinks and gutters of 1.5 million suburban Californians. An enormous rake descends into the depths of the sewage flow and brings up cardboard, wet wipes, tampons, eggshells, marbles, toys, tennis balls, sneakers — all the detritus that can't fit through the screen covering the plant's intake.

The flow that passes through the screen has begun a journey through an advanced purification process that culminates in a stage of RO filtration. Daily, the plant pumps out 100 million gallons of drinking water — enough to supply 850,000 county residents — which makes this the largest "toilet-to-tap" facility on the planet. The sewage moves through eight stages of filtration, including a gravel-sand filter and a bacterial "bioscrubbing" process used in Israeli plants. Orange County also has a "microfiltration" stage, in which the water is sucked through thousands of tiny porous straws. In the final and most critical stage, the water is forced through a massive hive of cylinders containing the RO membranes.

This Orange County facility is setting a precedent for the use of sewage to produce drinking water every bit as pure as the water that comes from desalination. This process is cheap compared to desalination — about half the cost. Sewage has much lower salinity than seawater, which makes it easier to process. "Recycled wastewater is the fastest-growing area in the water industry. Why? Because not every city has an ocean, not everyone has good lakes and rivers, but everybody's got sewage," says Desai. "That's the megatrend."

"Accepting recycled wastewater is kind of like being asked to wear Hitler's sweater," says social psychologist Paul Rozin.
San Diego recently announced plans to produce 35 percent of its water from recycled sewage by 2030 — not just for irrigation but for drinking. It has completed designs on a toilet-to-tap facility larger than Orange County's. Still, there are barriers to overcome, and the gross factor is first among them. Even the desperation of drought can't eliminate the fact that drinking your own waste is nobody's first choice, unless you're a resident of the international space station.

"Accepting recycled wastewater is kind of like being asked to wear Hitler's sweater," says Paul Rozin, a social psychologist at the University of Pennsylvania who has consulted water utilities on marketing toilet-to-tap programs to residents. "No matter how many times you clean the sweater, you just can't take the Hitler out of it."

But the purity you get from the RO process is quantifiably better than the water you get from conventional treatments — better even than some bottled water. "What flows from our membranes is the Rolls-Royce of municipal water," says Desai. Whereas tap water is often treated with chemical coagulants and chlorine, RO filtration is a mechanical filtration of water contaminants that cuts the need for those chemicals. It's analogous to the mechanical removal of weeds in a field practiced by organic farmers in lieu of chemical pesticides: "Think of it as 'organic' tap water," says Desai.

For now, Dow is focused on making membrane products for big industrial and municipal water systems, but it envisions micro-scale systems down the line. Bill Gates made a pitch for a similar approach when he blogged a few years back about watching a pile of human feces on a conveyor belt enter a small-scale waste-treatment plant built to serve a community of a few thousand people in Senegal, and, in minutes, get converted into "water as good as any I've had out of a bottle. I would happily drink it every day."

Desai predicts that water filtration technology will become decentralized everywhere. We'll control and regenerate our own water supplies farm by farm, neighborhood by neighborhood, or household by household. Eventually the water production could become, like the food production, circular — a closed-loop system in which 100 percent of water that goes down commercial and

residential drains is recycled; whatever is lost in evaporation or leakage can be made up for with desalinated salt water that moves through shared networks. Although the vision is at least decades from becoming a reality, it may be necessary to our future food security and critical to our survival.

At the end of my tour of the Orange County plants, we arrive at a shining stainless-steel sink where water that hours earlier had begun as raw sewage was now flowing crystal clear from the tap. Desai filled up two Dixie cups. "To the future!" he toasted. I shuddered as I knocked mine back. But somehow, the stuff tasted every bit as good as water that had bubbled up from a spring in the Alps. I poured myself a second cup.

Excerpted with permission from the new book The Fate of Food: What We'll Eat in a Bigger, Hotter, Smarter World *by Amanda Little. Published by Harmony Books, an imprint of the Crown Publishing Group, a division of Penguin Random House LLC. Copyright © 2019 Amanda Little*

Watch her TEDxNashville talk now.

ABOUT THE AUTHOR

Amanda Little is a professor of journalism and writer-in-residence at Vanderbilt University. Her reporting on energy, technology and the environment has taken her to ultra-deep oil rigs, down manholes, and inside monsoon clouds. Little's work has appeared in publications ranging from The New York Times and The Washington Post to Wired, Rolling Stone and Bloomberg Businessweek. She is also the author of the book Power Trip: From Oil Wells to Solar Cells — Our Ride to the Renewable Future.

Michelle Steel
August 5, 2019

August 5, 2019 Volume 5 Issue 11

Orange County Sanitation District's Centrifuge Facility Ribbon Cutting Ceremony

I had the honor of giving the welcoming and introductory remarks for the Orange County Sanitation District's Centrifuge Facility Ribbon Cutting Ceremony, as well as the District's 65th Anniversary.

The new facility brings online some of the largest centrifuges in the world used in wastewater treatment, and implements technology that reduces the volume of biosolids produced. This will not only save the District approximately $4 million per year, it also reduces their environmental footprint.

After the Ribbon Cutting and tour of the new facility, I greeted OCSD staff and constituents at their 65th Anniversary Open House.

Congratulations Orange County Sanitation District on both major milestones! Your staff did a great job at both events and were great hosts!


CAUTION
65

Twitter Posts
July/August 2019

Jul 2019 · 31 days

TWEET HIGHLIGHTS

Top Tweet earned 2,439 impressions

Pee, poo and paper. Yes, we said it, the P words. The only three things that should go down the pipe. Do you know what doesn't start with a P? Flushable wipes. I hope you know what that means.

#NoWipesInThePipes #What2Flush #ToiletTipTuesday
pic.twitter.com/7r4ohrGouq

17 27

View Tweet activity View all Tweet activity

Top Follower followed by 1,562 people

Tevora
@tevora FOLLOWS YOU

Tevora is a risk and compliance management consulting firm that specializes in information security, governance, and compliance.

View profile View followers dashboard

Top mention earned 143 engagements

City of Anaheim
@City_of_Anaheim Jul 10

#Traffic alert: Overnight sewer work by **@OCSewers** continues this morning through early afternoon, impacting intersection of Ball and State College. No left turns. Please take alternate routes.

Intermittent work at this intersection will continue for the next several weeks.
pic.twitter.com/GPKY8LsfBB

2 4 11

View Tweet

Top media Tweet earned 623 impressions

Clear skies and blue water, what more could you ask for? The Ocean Monitoring group goes out about 100 days a year to collect samples and test for water quality, ocean sediments, and fish tissue.

#OCSDatWork #OCSD #ProtectingTheOcean
pic.twitter.com/2jUhxBslzy

JUL 2019 SUMMARY

Tweets	Tweet impressions
12	12.3K
Profile visits	**Mentions**
276	23
New followers	
5	

28 day summary with change over previous period

Tweets	Tweet impressions	Profile visits	Mentions	Followers
15 ↑50.0%	12.4K ↑14.6%	219 ↓3.5%	31 ↑106.7%	1,592 ↑14

Aug 2019 • 22 days so far...

TWEET HIGHLIGHTS

Top Tweet earned 1,542 impressions

Thank you @LVMWD for coming and taking a tour of our Plant No.1 facility in #FountainValley! We hope you enjoyed your time!

#OCSD #What2Flush #TourTime
pic.twitter.com/bEOeVRUvX9

1 ♥2

View Tweet activity View all Tweet activity

Top Follower followed by 57.1K people

CBSLA Assignment Desk
@KCBSKCALDesk FOLLOWS YOU

The Assignment Desk at KCBS/KCAL

View profile View followers dashboard

Top mention earned 201 engagements

John Wayne Airport
@JohnWayneAirp · Aug 2

Please be advised that southbound MacArthur Blvd. will be impacted due to construction 🚧 activity performed by @OCSewers beginning this evening at 8 p.m. and continuing through Aug. 8 at 8 p.m. JWA encourages guests to plan ahead to avoid delays. #FlyJWA
pic.twitter.com/WNF6MIoH3f

3 ♥10

View Tweet

Top media Tweet earned 438 impressions

OCSD is looking for a Principal Safety & Health Rep! You will coordinate and oversee activities in support of our safety and emergency response needs. Interested? Visit ocsd.com/about-us/jobs to find out more. pic.twitter.com/5vwI1KMI8f

1 ♥2

View Tweet activity View all Tweet activity

ADVERTISE ON TWITTER

Get your Tweets in front of more people

Promoted Tweets and content open up your reach on Twitter to more people.

Get started

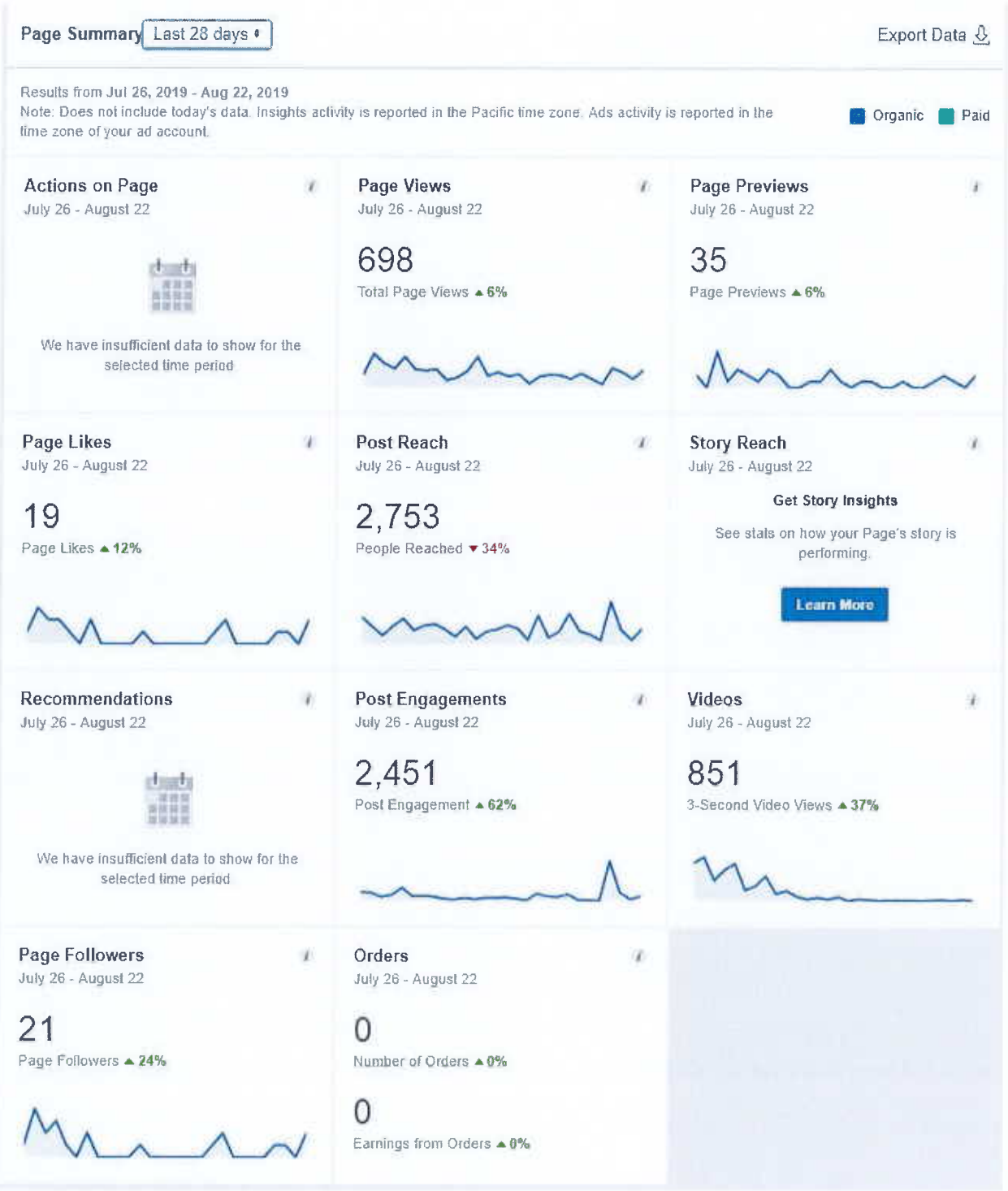
AUG 2019 SUMMARY

Tweets	Tweet impressions
11	9,470

Profile visits	Mentions
151	20

New followers
12

Facebook Posts
July/August 2019



All Posts Published

Reach: Organic / Paid | Post Clicks | Reactions, Comments &

Published	Post	Type	Targeting	Reach	Engagement
08/22/2019 2:40 PM	 Today, OCSD staff attended the California Association of Sanitation			195	29 12
08/22/2019 9:08 AM	 Thank you Beth Hammon and Kate Alegria from Rep. Harley Rouda			196	15 10
08/19/2019 1:00 PM	 Happy Monday! Help us congratulate Jennifer Cabral on her			861	453 357
08/19/2019 12:00 PM	 At OCSD we are dedicated to protecting the environment and			267	18 18
08/16/2019 9:00 AM	 Sewer installation continues on State College Blvd. in the City of Anaheim-			331	4 4
08/15/2019 11:45 AM	 Thank you California State University, Fullerton for coming and			406	59 36
08/14/2019 7:43 AM	 Reminder, tomorrow night is the second public scoping meeting for			180	5 5
08/12/2019 11:06 AM	 OCSD is currently seeking a maintenance worker that has a			671	123 44
08/09/2019 11:10 AM	 Ever wonder what our Huntington Beach facility looks like? What goes			575	20 20
08/09/2019 9:00 AM	 We are proud of our past in Orange County. Take a look at this invitation			245	12 18
08/08/2019 12:00 PM	 We want to hear from you. We have two public scoping meetings for our			299	11 6
08/08/2019 9:00 AM	 August is #waterqualitymonth, and we'll be sharing water quality facts			254	15 16
08/07/2019 4:34 PM	 Happy Professional Engineers Day! Without you OCSD wouldn't be			267	30 27
08/05/2019 3:01 PM	 OCSD is looking for a Principal Safety & Health Rep! You will			342	31 37
08/02/2019 9:52 AM	 The winners have been chosen! A HUGE thank you to everyone who			193	15 5
08/01/2019 1:15 PM	 Thank you Las Virgenes Municipal Water District for coming and taking			299	32 26

07/30/2019 1:32 PM		Centrifuge Ribbon Cutting Ceremony		237	92 7	
07/30/2019 11:14 AM		Thank you Director Andrew Nguyen from Midway City Sanitary District for		156	11 5	
07/30/2019 9:00 AM		Sometimes people lie. we would never lie to you. Believe us when we		756	49 45	
07/29/2019 12:57 PM		Celebrating 65 years of impressions. OCSD aims to not just make a good		319	36 18	
07/29/2019 8:06 AM		Construction Alert in City of Anaheim- Municipal Government.		263	12 6	
07/27/2019 10:00 AM		Us rushing to OCSD for the Open House happening TODAY! Come		193	14 13	
07/26/2019 4:00 PM		When we weren't listening to the Spice Girls in the 90's, we were busy		478	81 48	
07/26/2019 1:37 PM		We thought this might be helpful. Just in case you weren't 100% sure		355	26 18	
07/25/2019 4:45 PM		The 80's were about more than just spandex and leg warmers. At OCSD		259	23 19	
07/24/2019 4:55 PM		Tonight at Plant No. 1 our Steering Committee and Board meeting will		185	9 3	
07/24/2019 3:10 PM		As we moved into the 70's we were busy constructing. The new 5-mile		315	30 24	
07/23/2019 7:16 PM		In the 60's the Sanitation District continued to expand. With the short		544	41 31	
07/23/2019 11:56 AM		Are you as excited as we are about the Open House this Saturday?		310	17 14	
07/22/2019 4:01 PM		As we get ready to celebrate our anniversary let's go down memory		1.1K	103 74	
07/19/2019 1:03 PM		Us inviting our friends to come visit us at our Open House on Saturday,		237	8 6	
07/19/2019 12:00 PM		Did you know that in 2016 the Governor of California signed		201	0 6	
07/17/2019 7:07 PM		Disneyland: 64. OCSD: 65. Basically twins! Which means we must be		227	10 7	
07/17/2019 3:23 PM		Happy National Sanitation Workers' Day! We work with a purpose.		354	40 18	

07/16/2019 11:21 AM		Treating wastewater, as easy as 1,2,3. #bottlecapchallenge			357	41 16	
07/12/2019 9:00 AM		Number 83 on our bucket list: skateboarding inside a newly built			454	58 51	
07/10/2019 10:24 AM		Thank you City of Anaheim-Municipal Government for helping us			228	15 7	
07/10/2019 7:34 AM		Traffic delays at State College and Ball Rd in City of Anaheim-			186	2 2	
07/09/2019 4:15 PM		Join us for OCSD's Operations Committee meeting on Wednesday,			170	5 1	
07/09/2019 12:00 PM		Construction Alert for City of Anaheim- Municipal Government at			147	1 2	
07/09/2019 9:00 AM		Pee, poo and paper. Yes, we said it, the P words. The only three things			766	45 49	
07/08/2019 11:40 AM		Do you like to visit the beach? If so, you'll be glad to hear that Heal the			383	23 32	
07/05/2019 12:00 PM		Happy #FlashbackFriday! This photo is from the 1960's and shows then			286	25 25	
07/05/2019 9:00 AM		OCSD's Legislative & Public Affairs Committee meeting is next Monday,			158	1 1	
07/04/2019 11:11 AM		Happy 4th of July! Wishing everyone a safe and fun holiday with family			216	5 15	
07/02/2019 12:00 PM		Clear skies and blue water, what more could you ask for? The Ocean			342	22 31	
07/01/2019 3:07 PM		Congratulations to Us! We have once again been recognized for our			227	2 12	

Instagram Posts
July/August 2019

ocsewers Edit Profile

229 posts 593 followers 65 following

OC Sanitation District
The OC Sanitation District provides wastewater collection, treatment, and recycling for approx 2.6 million people in central & north Orange County.
www.ocsd.com

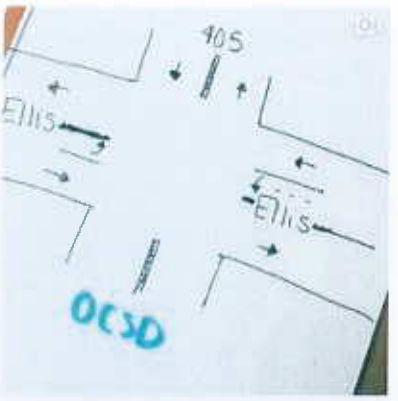
POSTS IGTV SAVED TAGGED








TION DISTRICTS
in Orange County
1954
COUNTY

ORANGE COUNTY
PROTECTING THE

405
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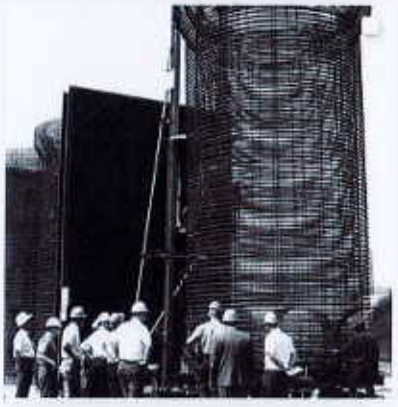
OCSD

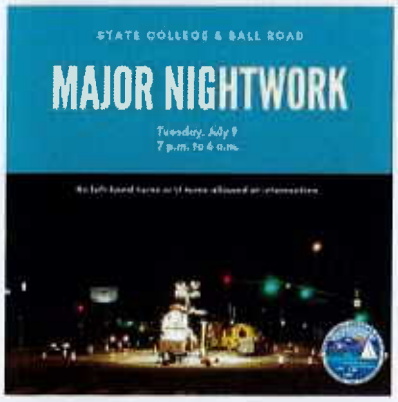








celebrate!


STATE COLLEGE & BALL ROAD
MAJOR NIGHTWORK
Tuesday, July 9
7 p.m. to 4 a.m.


You can't sit with us


HAPPY 4TH OF JULY