CITY OF DAVIS
STORMWATER UTILITY 101
PUBLIC WORKS – UTILITIES & OPERATIONS

UTILITY COMMISSION
SEPTEMBER 16, 2020
**What is Stormwater?**

**Stormwater** is water from precipitation that flows across the ground and pavement when it rains.

**Where Does Stormwater Go?**

Unlike wastewater that goes down the drain inside a home (via sinks, showers, toilets, etc.), stormwater is not treated; it flows directly into wetlands and waterways.

North of I-80 in Davis, most stormwater flows from the streets to local detention ponds (West Area Pond, Evergreen Pond, Julie Partansky Pond, Sutter Davis Hospital Pond, the Cannery Pond and the Core Area Pond), then to the Willow Slough Bypass where it discharges to the Yolo Bypass and eventually to the Sacramento River. In South Davis (South of I-80), the stormwater flows to the drainage channels (Former Putah Creek and the El Macero Drainage Channel) and then is pumped into the Yolo Bypass.

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**Did You Know:** Stormwater runoff is one of the leading causes of water pollution in the United States.

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**The Stormwater Utility**

The City’s Stormwater Utility is housed in the Public Works Utilities and Operations Department. The support for the utility is divided among two divisions within the department: the Streets Division and the Environmental Resources Division.

**Operations and Maintenance**

*Stormwater Division*

This team manages the City’s stormwater infrastructure to ensure the protection of life and property from flooding.

**Stormwater Quality**

*Environmental Resources Division*

This team is responsible for monitoring and protecting stormwater quality in accordance with federal, state, and local environmental regulations.
The City’s **stormdrain system** is composed of:

- on-street and public parking area stormdrain inlets
- underground stormwater pipes
- stormwater detention ponds
- drainage channels
- stormwater lift stations

These facilities are all designed to convey stormwater and prevent flooding as they move stormwater away from properties and streets.

The city’s stormwater flows by gravity into six City detention ponds and two detention basins. Nine stormwater drainage pump stations lift stormwater from the ponds and basin into several main drainage channels. These channels are tributaries to the Willow Slough Bypass and the Yolo Basin Wetlands. The City has approximately 15 miles of access roads that are used to gain access to ponds and drainage channels for on-going maintenance tasks.

### City’s Stormwater Infrastructure

The City operates and maintains the following infrastructure.

<table>
<thead>
<tr>
<th>Asset</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stormdrain Line</td>
<td>130 miles</td>
</tr>
<tr>
<td>Drainage Inlets</td>
<td>3,100+</td>
</tr>
<tr>
<td>Stormdrain Laterals</td>
<td>33 miles</td>
</tr>
<tr>
<td>Maintenance Holes</td>
<td>2,000</td>
</tr>
<tr>
<td>Drainage Channels</td>
<td>16.7 miles</td>
</tr>
<tr>
<td>Detention Ponds/ Basins</td>
<td>7 (65+ acres)</td>
</tr>
<tr>
<td>Drainage Pump Stations</td>
<td>9</td>
</tr>
<tr>
<td>Bike Tunnel Sump Pumps</td>
<td>10</td>
</tr>
<tr>
<td>Force Mains</td>
<td>0.5 miles</td>
</tr>
<tr>
<td>Siphon Structures</td>
<td>8</td>
</tr>
<tr>
<td>Access Roads</td>
<td>15 miles</td>
</tr>
</tbody>
</table>

**Did You Know:** In Davis, our drainage channels, detention ponds and wetlands all have natural soil surfaces and vegetation, which act as a natural water treatment filtration system. Some of the stormwater will remain in the channels, ponds and wetlands, providing habitat for aquatic plants and wildlife. The remaining stormwater flows into the Yolo Bypass and eventually the Sacramento River and the San Francisco Bay.
Mission

The mission of the City's Stormwater Division is to operate and maintain the City's stormwater infrastructure to ensure stormwater is collected and discharged in accordance with federal, state, and local environmental regulations while protecting life and property from flooding. This division maintains the stormwater conveyance system, consisting of 9 pump stations, 127 miles of storm drainage lines, 16 miles of open channels, and 8 detention basins and ponds. The division also operates and maintains the El Macero Maintenance District Stormwater Pump Station.

Operations and Maintenance Crew

The operations and maintenance (O&M) crew for the Stormwater Division consists of 3 regular full time staff. This crew includes two maintenance workers and a working supervisor who report to the Streets Division Manager.

Stormwater Team Tasks

• Clear and maintain the City’s drainage channels annually.
• Hydro clean and video inspect underground drainage pipes as part of a preventative maintenance program.
• Maintain the maintenance access roads to pump stations and along drainage channels on an annual basis.
• Clearing channels, plugged storm drain inlets, and other stormwater structures when blocked during storm events.
• Removing downed trees which may be a hazard adjacent to storm facilities or in the public right of way to assist the City’s Streets crew when necessary.
• Monitoring storm drain pump stations and adjusting pump operations to keep up with storm demands.
• Providing traffic control signage when flooding impacts streets.

Did You Know: Every year before the rainy season, the Stormwater team cleans out all the stormwater drainage inlets along the gutters throughout the City. This ensures that the stormdrains are cleared in problem areas to prevent flooding.
Understanding the Need
The current stormwater rates do not cover the costs for capital investment needs within the Stormwater Enterprise, which is typical for cities with stormwater enterprise funds that are separate from general funds.

Funding restrictions create a largely reactive operations program with little room for operational studies or infrastructure upgrades. This can cause a number of issues, not the least of which is the lack of funding available to assess how the needs of the utility has changed over the many years of operation.

More than half of the City’s drainage piping is over 40 years old, and 18 percent is over 60 years old. While there have been no piping failures thus far, replacements and repairs (assessed by pipeline conditions) will be critical moving forward.

As the system continues to age, and investments in infrastructure are deferred, failures within the stormwater system are more likely to occur, causing property damage via flooding, as well as incurring emergency repair costs.

What’s the Deal with Stormwater Rates?
See Page 9 of this booklet for more information on the rate setting process for stormwater utilities in California.
Education, Outreach and Enforcement

Stormwater starts as just rainwater, but as it runs off roofs, yards, driveways, and any impervious surface, it can pick up pollutants such as dirt, trash, animal waste, oil, gas, fertilizers, pesticides, metals, and other materials in its path. When stormwater carries pollutants into waterways, it not only harms aquatic plants and animals, but can also cause adverse effects on our use of water for swimming, fishing, drinking, and agriculture.

Stormwater Pollution Prevention Tasks:
- Review development plans for stormwater quality best management practices and regulatory compliance.
- Perform annual training for City field staff on pollution prevention detection, elimination, and hazmat response procedures.
- Perform public outreach to residents and businesses.
- Conduct inspections on pollutant spills and work with property owners to oversee clean-up.
- Develop and amend City Municipal Code to ensure compliance with State and Federal stormwater quality regulations.
- Monitor and sample the City’s stormwater outfalls.
- Monitor and survey litter accumulation and waste storage.
- Conduct inspections of construction, industrial, and municipal sites and private sites with stormwater treatment controls.
- Develop and implement and spill response plans, pollution prevention plans, sampling and monitoring plans, and trash implementation plans.
- Provide annual records to the State to show compliance with stormwater quality regulations.

Stormwater Quality Staff

The stormwater quality staff consists of one Environmental Program Specialist within the Environmental Resources Division. In addition, the city’s Wildlife Resource Specialist, Conservation Coordinators, and other Environmental Program Specialists assist as needed.

Stormwater Pollution Prevention Online Games

In order to reach a broader audience and help customers understand more about the importance of protecting stormwater, city staff worked with senior computer science students at Sacramento State to develop online stormwater games. These two games are suitable for all ages and show how everyday actions can either protect or pollute our waterways.

The games are available online at Stormwater.CityofDavis.org
**Stormwater Regulations**

Stormwater is regulated under the Federal Clean Water Act and under multiple state regulations. The State Water Resources Control Board (SWRCB) is charged with enforcement of stormwater quality requirements in California.

The City is required by the Phase II Small MS4 General Permit to monitor all activities that discharge to the stormdrain system and to report annually on permit compliance. The permit also requires the city to monitor construction activities by conducting plan reviews and inspecting all construction activities, ensuring that the construction is complying with best management practices (BMPs) to keep material out of the stormdrains.

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**Phase II Small MS4 General Permit**

The Phase II Small MS4 General Permit regulates the operation of each stormwater permittee with the State. There are two different phases of the Permit. Davis is a Phase II permittee, which applies to stormwater discharge requirements for cities with populations between 25,000 and 100,000. The Permit provides the regulations and standards for all land uses and discharger’s activities (including municipal activities) within the City’s boundaries.

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**Regulatory Hierarchy**

- Clean Water Act – Fed EPA
- State Water Resources Control Board
  - CV Water Quality Control Board
    - Construction General Permit
    - Construction BMPs
    - Industrial General Permit
    - Industrial BMPs
    - General Permit
      - City NPDES Permit
        - O & M
        - SWO
          - Enforce All Permits

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**Stormwater Quality Inquires and Concerns**

**Stormwater Quality Testing**

Stormwater that travels downstream is used for drinking water for other cities, for recreation, agriculture and for aquatic plant and wildlife habitat. Required stormwater quality monitoring varies by region and may include monitoring for pesticides and herbicides, bacteria, mercury, pH, temperature, turbidity, and dissolved oxygen.

**Illegal Dumping**

Dumping trash or pouring carpet cleaning water, motor oil, pesticides or any other materials into gutters, drain inlets, creeks, wetland or other waterbodies is an illegal activity.

If you see someone in the act of illegal dumping (into the storm drains or yard waste into the street), call Public Works Utilities and Operations at 530-757-5686 or call 911.
What are the Trash Amendments?

In 2015, the State Water Resources Control Board (SWRCB), the agency that monitors stormwater quality, adopted statewide trash regulations (called “amendments,” as they modify the MS4 General Permits) requiring the full capture of litter down to 5mm in diameter (the size of a cigarette butt) from specific land uses in regulated stormwater systems. These rules are required to be fully implemented by 2030, using new and enhanced management actions and capture devices aimed at achieving the requirement of capturing 100% of litter in stormwater.

Litter reduction in the stormdrain systems will result in less litter in surface water from the direct discharges of MS4s. While trash originating from other sources, such as illegal dumping and wind dispersion, are not addressed by the Trash Amendments, it is anticipated that the litter control programs implemented by municipalities will result in a significant decrease in trash traveling into creeks, rivers, lakes, and the ocean.

The Trash Amendments accomplish the following:

- Establish water quality objectives for litter
- Establish restrictions on the discharge of litter in stormwater
- Provide implementation requirements for permitted stormwater and other dischargers
- Set a time schedule for compliance
- Provide a framework for monitoring and reporting requirements

The City will diligently perform measures on its own properties, and will work in partnership with stakeholders and private properties in order to meet the state-mandated goals (see sidebar).

What is the City’s Plan?

In order to meet the requirements of the amendments, in 2018 Environmental Resources Division staff performed an ‘On Land Visual Assessment Survey’ and mapped out the areas of town and sections of streets that have the most litter. Only those areas determined to be ‘high-trash generating land use’ sites are required to be surveyed. These sites include multifamily apartments, industrial and commercial properties, public transportation hubs, and public schools.

Staff has devised an implementation plan to facilitate trash reduction that will likely include the following:

- Installation of devices that capture and remove litter from stormwater
- Improved waste collection bins
- Signage and public outreach to increase awareness of and reduce littering
- Improved waste enclosures and trash and recycling containers
- More frequent pick up of waste containers and increased street sweeping in high litter generating areas

Did You Know: Just as there are many kinds of trash, there are many methods to prevent it from reaching waterways.
While it is possible to clean up most pollutants that end up in stormwater, it can be very difficult and expensive. The best way to protect our stormwater quality is to keep pollutants out of the water. There are simple actions we can all take to help keep our stormwater clean and avoid pollution.

**Pollution Prevention at Home**
Here are some tips to help protect our stormwater at home.

- Keep lids on trash, recycling and organics carts closed to keep rainwater out and to prevent wind from blowing out waste.
- Never leave litter on the ground.
- Recycle and compost as much of your waste as possible.
- Securely bag any trash so that it doesn’t blow out of the cart when it’s being emptied.
- When possible, limit the use of single-use plastics. Single-use plastics, including water bottles and straws, are a significant source of plastic pollution.
- Always pick up pet waste, seal it in a bag, and put it in the trash bin. Pet waste contains harmful bacteria that can kill fish and make animals and humans sick.
- Wash off painting equipment and brushes in the sink.
- If you need to wash your vehicle, car wash facilities are best choice because the water is recycled and sent to the wastewater treatment plant for cleaning. If you wash your car at home, use a small amount of water and make sure the dirty water flows into your landscaping and not into the street.
- Clean oil spills and leaks from your car with kitty litter or a rag. Never wash it off.
- Keep your car in good repair and ensure that it is not leaking oil or other fluids.
- Make sure that your irrigation sprinklers do not spray onto pavement and create runoff that reaches the street.
- Use less toxic pesticides and fertilizers.
- Wherever possible, ensure that drainage from roofs flows into landscaping areas. Disperse the energy and spread the water out at the bottom of the roof drain by using rock cobble at the base.
- Consider capturing roof drainage in cisterns or rain barrels for future supplemental irrigation for landscaping.

**Pollution Prevention at Work:**
- Make sure that all waste ends up in containers and bins and that the lids are closed on all outdoor trash, recycling and organics bins.
- Encourage everyone at work to recycle and compost.
- Encourage carpooling, cycling, and other low-polluting travel methods.
- Participate in a creek clean-up event or volunteer to pick up litter at a nearby park or greenbelt.
- Follow your workplace guidelines when handling and storing materials and wastes to keep yourself and co-workers safe, and prevent pollutants being discharged into the stormdrain system.
- Never wash anything down the stormdrain system.
- Report any suspected discharges of anything other than pure rain water into the stormdrain system to the City. Take a picture, observe time, date, and location in reporting what you see.
Proposition 218 allows for trash, water, and wastewater rates to be set without a vote by the public. However, many consider stormwater fees to be “property related fees” which are different than sewer or trash fees. Under Proposition 218, if an agency wants to implement a new property related fee or raise the rate of an existing one, it must go through a process which includes a written notice to property owners, a public hearing at which property owners may object to the new or increased fee, and if fewer than 50% of the property owners object by the time of the public hearing, a ballot is mailed to the property owners so they can vote on the proposed new or increased fee. A majority of those voting on the ballot must vote in favor of it before the new or increased fee can be implemented.

Did You Know: Proposition 218 was written by the Howard Jarvis Taxpayer’s Association, and was called the ‘Right to Vote on Taxes Act’ even though it applies to fees and assessments as well as taxes.

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Who Gets to Vote for a Property Related Fee?

The authors of Proposition 218 felt that since property owners are the ones who are obligated to pay property related fees, they should be the ones who get to vote on it. As a result, these fees are not voted on by registered voters at a polling place. Instead, Proposition 218 calls for ballots to be mailed to property owners, whether or not they are registered to vote, and whether or not they live within the City limits. Property owners who may oppose any proposed new or increased property related fee actually get two chances to stop it: First, if a majority of them object to it in writing or in person at the public hearing, it cannot go to ballot and cannot be implemented. Second, if it does go to ballot, if a majority of them vote “No,” it cannot be implemented.

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Current Rate Structure

In the City’s current utility rates, there are two line items that create one charge on the utility bill to fund the stormwater utility: Storm Sewer and Drainage. Both of these fees are calculated based on a monthly fee per square foot of each parcel.

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Monthly Rate per Sq. Ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-family dwelling unit through quadplex dwelling unit</td>
<td>$0.0002321</td>
</tr>
<tr>
<td>Multi-dwelling units, 5 or more</td>
<td>$0.0004643</td>
</tr>
<tr>
<td>Mobile home unit</td>
<td>$0.0004643</td>
</tr>
<tr>
<td>Churches</td>
<td>$0.0004643</td>
</tr>
<tr>
<td>Private day care and Group Living</td>
<td>$0.0002321</td>
</tr>
<tr>
<td>Commercial</td>
<td>$0.0004643</td>
</tr>
<tr>
<td>Industrial</td>
<td>$0.0008357</td>
</tr>
<tr>
<td>Open space and irrigation</td>
<td>$0.0002321</td>
</tr>
<tr>
<td>Agriculture</td>
<td>$0.0009284</td>
</tr>
</tbody>
</table>

Storm Sewer

The Storm Sewer rate has remained the same since 2005. Revenue derived from these fees are used for the operations and maintenance of the detention ponds, the conveyance channel, the wetlands, sampling and testing of stormwater, studies, reporting, and permitting. Vacant parcels are exempt from the storm sewer water quality charge.

Drainage

Revenue from the storm drainage and flood control rate (referred to on utility bills as “drainage”) are used for the acquisition, construction, reconstruction, maintenance and operation of storm drainage water systems and related facilities.

Unlike the Storm Sewer rate, the drainage fee can increase 3% each August, unless waived by City Council resolution.

Sample Rate Calculations

The samples below show how these rates are calculated.

Example 1: Single Family home on a 5,800 sqft lot
Storm sewer Rate: 5,800 x $0.0002321 = $1.35 per month
Drainage Rate: 5,800 x $0.000544 = $3.16 per month
Total Storm Sewer Rate: $4.51

Example 2: Multi-Family property on a 12,000 sqft lot
Storm sewer Rate: 12,000 x $0.0002321 = $2.79 per month
Drainage Rate: 12,000 x $0.000544 = $6.53 per month
Total Storm Sewer Rate: $9.32
Planning for a Resilient (& Evolving) Utility Infrastructure

The City’s stormwater system changes as the City evolves. What was initially a system for the small university farm town of Davisville in 1917 has grown to drainage basins, pump stations, and stormwater infrastructure for 10 square miles of Davis, California. With slow and steady growth, each section of town was designed as the City was developed. New developments under construction have been required to mitigate any increases in stormwater and pollutants contribution, leading to the installations of on-site treatment measures, ponds and pump stations over the years.

The Changing Nature of Storms

As the climate continues to change, weather events may become more extreme and move away from the type of precipitation and storms that the City infrastructure was designed to accommodate. While small localized flooding will occur in predictable areas, recent weather events have demonstrated the increased potential for more frequent substantial flooding. In 2016, the City performed a condition assessment of all stormwater pump stations. This was the first step in developing a plan to ensure these facilities can not only handle current demand, but allow for increased stormwater from unanticipated storm events. As funding is available, staff will perform hydrology studies for each basin, and the information will be used to appropriately size improvements to City pump stations.

The City has also started to look at overall rainwater management capacity. A survey of the City’s detention ponds was recently completed to determine what volume of storage was still available after years of sedimentation. With these volume calculations being completed, we now know how much material needs to be removed to return the detention ponds to their original design capacity. In addition, as future hydrology studies are completed and with projections for increases in rainfall due to climate change, we will have topography available to plan for potential future projects to increase to the capacity of these ponds.

The Most Important Protector of Our Stormdrains, Wildlife Habitat, and Water Quality? Us.

Stormwater runoff is one of the leading causes of water pollution in the United States. Efforts are underway across the State (like the Trash Amendments to the City’s MS4 General Permit) to educate the community on the impacts of pollutants such as animal waste, litter (especially plastics), motor oil, antifreeze and much more on the delicate ecosystems that link to the stormwater drainage channels. Much of stormwater protection relies on the simple act of keeping these pollutants out – something we all have the power to do right now.

Emerging Regulations

Staff are carefully monitoring new stormwater quality management trends and regulations coming from the Regional Water Quality Control Board, including efforts to expand the use of recycled water to increase drought resilience, adopting regulations to increase the collection of urban stormwater, and efforts to reduce flood risk and enhance water supply.
Plans, Studies & Assessments

Within the limited resources of the Stormwater Utility, it is a priority for staff to assess the equipment and staffing levels to understand the needs of the utility, and develop plans should the utility funding allow for necessary upgrades and equipment replacements, or organizational restructuring.

Stormwater and Sewer Stations Assessment (2016)

To develop a plan for capital improvement needs within the utility, an assessment of the stormwater infrastructure was undertaken to further understand the anticipated timelines, cost and priority for each project. This review looked at the City’s sewer lift stations as well as the stormwater drainage stations. The report presented planning level recommendations for improvements the City’s stormwater drainage stations. The reports recommended that two storm drainage stations past their useful life be replaced and that another be upgraded (stations and their components have a useful life of between 20-50 years depending on the equipment and maintenance levels). The remaining five stormwater drainage stations are in good condition.


Seeking guidance on moving from a reactive operational model to a proactive one, staff worked with a consultant to conduct a Stormwater Operations Assessment Report (completed in 2018). This report reviewed the City’s stormwater operations and maintenance activities, infrastructure management, and staffing, and provided recommendations on adequate program staffing levels, stormwater infrastructure maintenance frequencies, and priority task setting to meet best practices and/or the City’s desired level of service, as well as benchmarks from similar agencies. Chiefly the report recommended a more robust preventative maintenance program, to “maximize the useful life of all system facilities and minimize emergency conditions by performing system maintenance in a regularly scheduled and timely manner.”

Stormwater Resources Plan for Yolo County (2018)

In 2018, the Water Resources Association (WRA) of Yolo developed a Storm Water Resource Plan (SWRP) to inform future water management decisions and promote effective conjunctive use as well as alleviate flooding, groundwater, and water quality issues through stormwater management throughout Yolo County. The City of Davis participated in the development of this plan. The plan can be viewed on the WRA’s website (yolowra.org).

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