

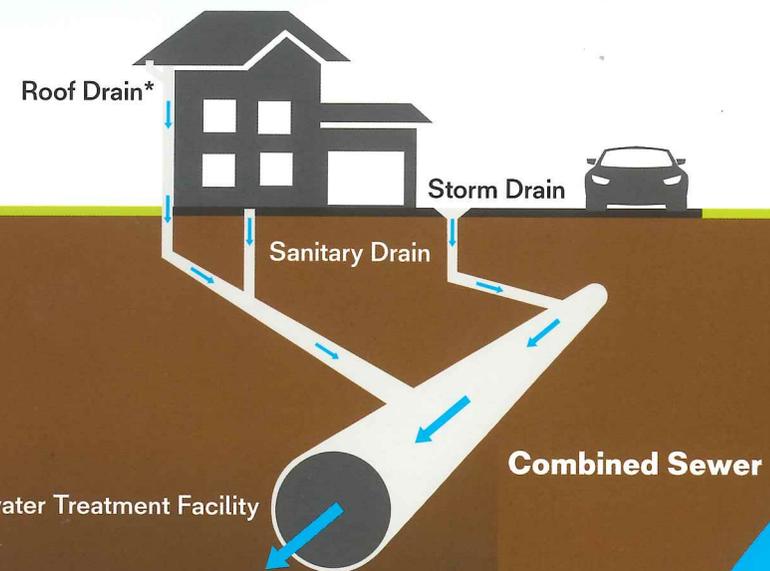
Where does it go?

A Snapshot of the City's Combined Sewer System

You turn on the tap and the water flows. You press the lever and the toilet flushes. Rainwater flows off of roofs and streets and down rain gutters.

Find out where it goes...

If you live within the 7,500 acres of City of Sacramento's Land Park, Oak Park, downtown grid and eastern neighborhoods, **you live on top of a pipeline network** that currently channels the water flow from our streets, homes and businesses to a complex web of pumping stations, holding chambers and treatment facilities.



The City's combined sewer system is perhaps the most important and complex component of the City's infrastructure. It captures, carries and treats a combination of sanitary waste and stormwater runoff in the same pipeline, hence the name "**Combined Sewer System.**"

The original system was designed and built more than 100 years ago. Smart planning, capacity enhancements, upgrades and operational modifications throughout the years have resulted in a combined sewer system today that can:

- Better handle seasonal fluctuations in volume
- Reduce the potential for street flooding
- Successfully manage the modern day needs of the City's growing downtown and adjacent neighborhoods

An added safety and water quality feature of the City's combined sewer system, unlike separated systems, is that virtually all stormwater goes through the filtration and treatment system.

* See *Green Infrastructure* under the Value of Our Combined Sewer System section of this brochure for residential improvements to reduce stormwater run off.

Value of Our Combined Sewer System

Investments in the City's combined sewer system pay substantial dividends to public health, the environment and the economy. Wastewater treatment plants prevent millions of tons of pollutants each year from reaching our rivers, lakes and coastlines. They also prevent water-borne disease, making our waters safe for fishing and swimming, and preserve our natural treasures.

The City continues to prioritize performance and management improvements and preventive maintenance programs that increase the system's effectiveness. This, in turn, reduces operations and maintenance costs as well as the frequency and volume of untreated sewage discharges and outflows.



Highlights of System Improvements

COMPLETED:

- **State-of-the-art monitoring** to provide real-time information, allowing for improved operational flexibility.
- **Enhanced management tools**, such as dynamic system models that can simulate specific storm scenarios to identify critical "core" wastewater infrastructure needs.
- **Completion of the Combined Sewer System Improvement Plan Update (2014)** which provides a long-term plan to alleviate flooding and untreated outflows during a 5-year and 10-year storm event and prevent structure flooding during a 100-year storm event.

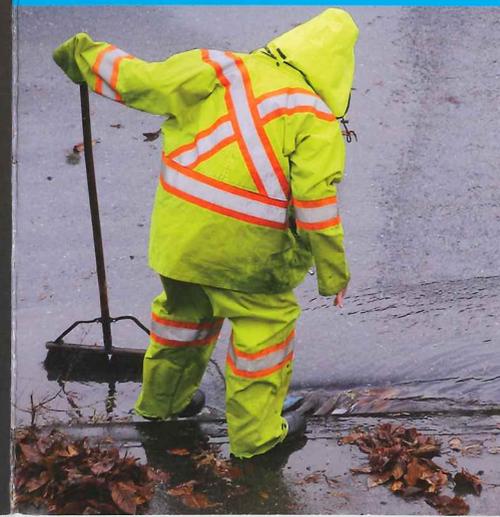
PENDING:

- **Implementation** of the Combined Sewer System Improvement Plan.
- **Green Infrastructure:** The best way to reduce flooding and discharges to the combined sewer system is to reduce the amount of stormwater entering the system. Green infrastructure is a natural way to make this happen, by allowing the stormwater to filter into the ground. The City will be performing pilot studies to determine best practices to meet the City's needs.
- **Storage Capacity:** Through more detailed modeling efforts, the City is evaluating storage projects throughout the system to maximize capacity during storms and provide flood reduction benefits immediately upstream or downstream of the projects.

What you can do...

to help protect the City's Combined System

- Keep storm drains free of debris.
- Practice water conservation measures.
- Incorporate river-friendly landscaping, efficient irrigation and Smart irrigation controllers into your landscape.
- Install high-efficiency toilets, washing machines and dishwashers.
- Use permeable pavement in your driveways and yard's hardscape.
- Incorporate rain gardens or bioretention into your landscape.
- Disconnect your roof's downspouts from the combined system and route them to your landscape and rain garden.
- Properly dispose of your fats, oils and grease (FOG).



City of
SACRAMENTO
Department of Utilities

1395 35th Avenue | Sacramento, CA 95822 | (916) 264-5011



STAGE 2 a+b - Storage + Treatment Operations

Moderate to heavy rainfall
60 to 410 mgd flows + 410 to 540 mgd flows

STAGE 2b:
410 to 540
mgd flow

STAGE 2 a + b

- When a storm event results in flows exceeding 60 mgd, the City's combined system begins storing the excess flows in its storage and treatment facilities. If the storm's intensity and/or duration fill the system's storage capacity, the City's treatment facilities will commence the treatment process — including primary treatment, disinfection and dechlorination — before discharging to the river.

Operationally, the discharge is limited, and is intended to relieve the system's storage capacity enough to allow for the remaining storm volume to be contained within the pipe. The volume that is stored in the City's combined system collection system and treatment plants is then conveyed to the County's treatment plant (Regional San) as the storm flows diminish.

The average volume of the treated discharge to the river is less than three percent of the total combined wastewater/stormwater volume that is captured annually.

Combined Sewer System Stage Operations

| STAGE 1: | STAGE 2a: | STAGE 2b: | STAGE 3: |
|--|--|----------------------|----------------------|
| up to 60 mgd flow | 60 to 410 mgd flows | 410 to 540 mgd flows | 540 to 740 mgd flows |
| to REGIONAL SAN (Wastewater Treatment Plant) | | | |
| | to the Pioneer Reservoir & Treatment Plant | | |
| | | to the CWTP | |
| | | to the river | |

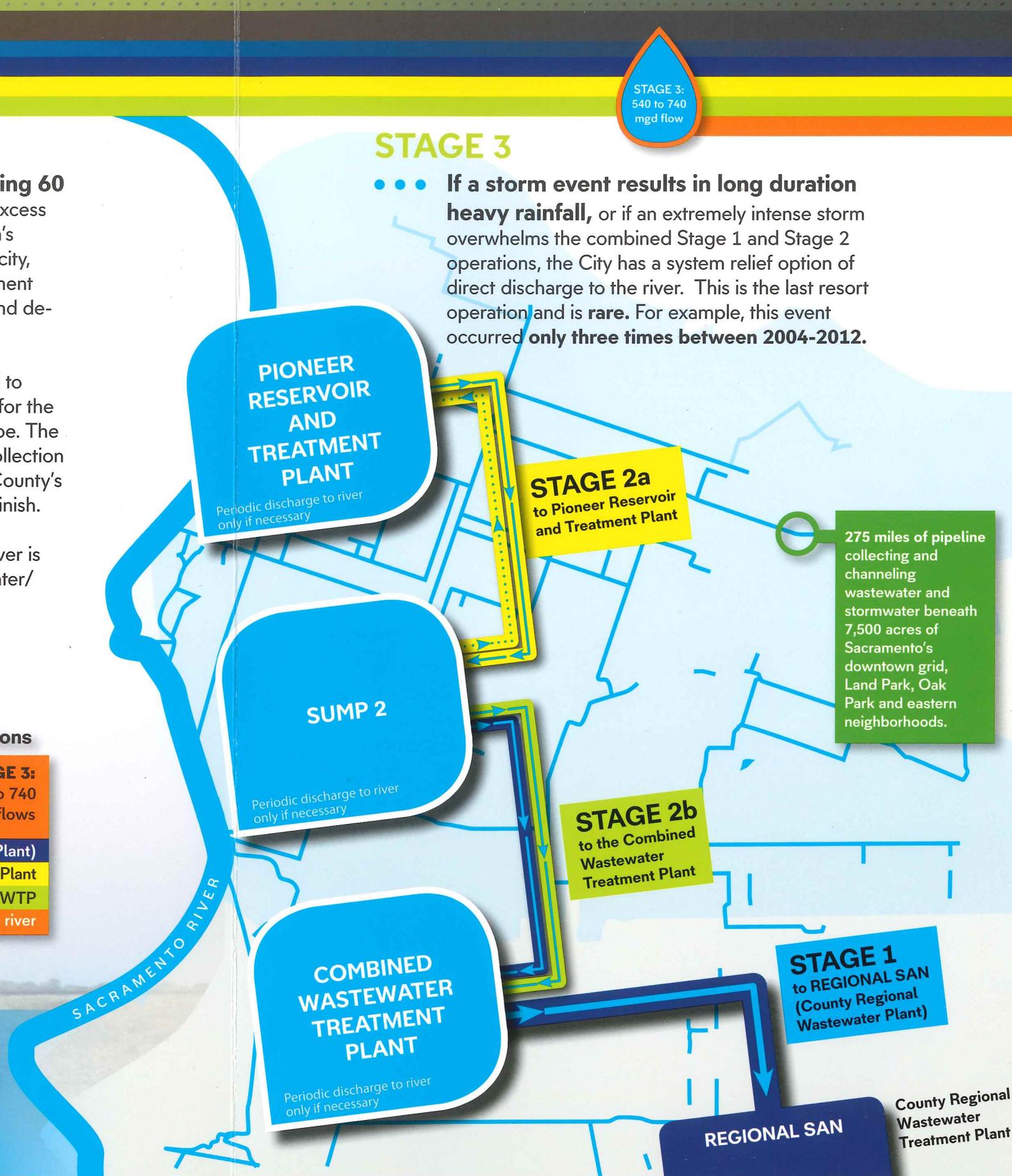
STAGE 3 - Untreated Overflow Operations

Heavy to extreme rainfall
540 to 740 mgd flows

STAGE 3:
540 to 740
mgd flow

STAGE 3

- If a storm event results in long duration heavy rainfall, or if an extremely intense storm overwhelms the combined Stage 1 and Stage 2 operations, the City has a system relief option of direct discharge to the river. This is the last resort operation and is rare. For example, this event occurred only three times between 2004-2012.



daily
within
em:

ASON

ily Flow
ons a day
(May 2014)

The City sends the majority of flow to Sacramento County's wastewater treatment plant (Regional San) and operates two treatment plants as backup:

Pioneer Reservoir
and Treatment Plant
treatment capacity = 250 mgd

Combined Wastewater
Treatment Plant
treatment capacity = 130 mgd

County Regional
Wastewater
Treatment Plant

How It Works

Operational Stages of the Combined Sewer System

Transporting both stormwater and wastewater in the same pipe means the volume of flow is **significantly affected by rainfall**. During dry weather, almost all of the flow is sanitary waste. But intense rainfall can significantly increase the volume of water in the pipeline.

Operational stages – the pumping, storing, treating and discharging of water – are cumulative, with the stages increasing based upon a combination of a storm's intensity and duration.

Sewage first flows through service pipelines that take the sewage away from a home or business and into sewer mains that run under streets, alleys or other rights-of-way. Mains serve as part of the collection system, which feed trunk lines, all larger and larger pipes that eventually become interceptor sewers – the largest pipes in the City's system. The interceptors are often over eight feet in diameter and carry millions of gallons per day. These huge pipes convey the sewage either to the County's wastewater treatment plant or the City's storage and treatment facilities.

COMPONENTS OF THE COMBINED SEWER SYSTEM

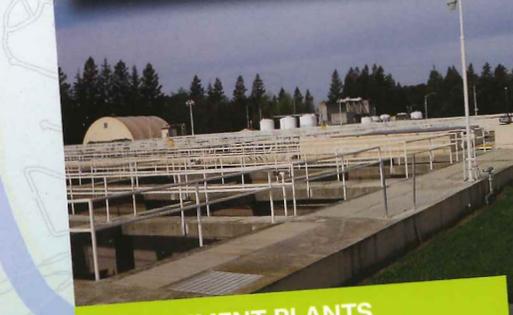
275 MILES OF PIPELINE



SUMP STATIONS



ANCILLARY HOLDING FACILITIES



TREATMENT PLANTS



STAGE 1 - Normal Operations

Dry weather, light and moderate rainfall
up to 60 mgd flow

STAGE 1:
up to 60
mgd flow

STAGE 2:
60 to 43
mgd flow

STAGE 1

Under normal operations the City's combined sewer system conveys all of the wastewater collected to Sacramento County's wastewater treatment plant, **Regional San**. This facility provides primary treatment, secondary treatment and disinfection of the wastewater before discharge to the Sacramento River.

The City's daily flow ranges between 16–18 million gallons a day (mgd). The City/Regional San conveyance system has the capacity to pump up to 60 mgd from the combined system to the Regional San treatment plant.

This is the operation for over 97% of the combined wastewater/stormwater flows captured by the system.

Average daily water flow within the system:

DRY SEASON

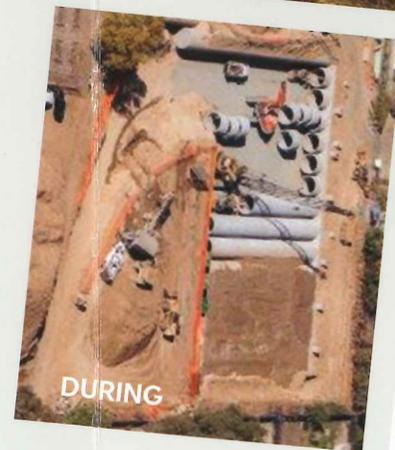
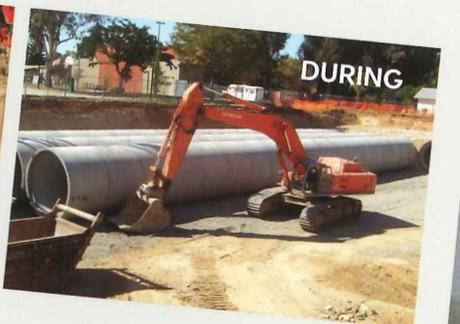
Average Daily Flow
16 million gallons a day
(June – Aug. 2013)

Average water flow within the system:

WET SEASON

Average Daily Flow
17 million gallons a day
(Sept. 2013 – May 2013)

OAK PARK STORAGE PROJECT



As part of system upgrades, additional storage capacity was created that provides multiple benefits to the community. The City took a vacant parcel next to a school and turned it into a community asset, a storage facility below ground and park above.