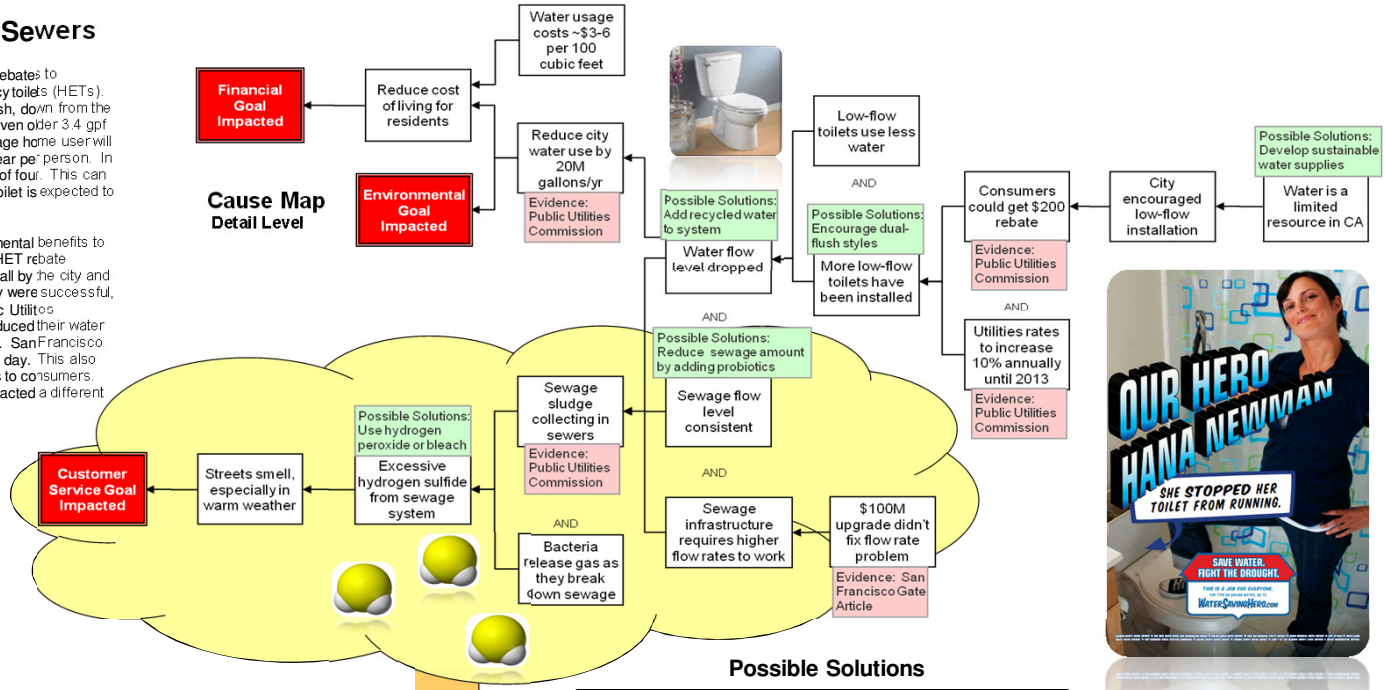
San Francisco's Stinking Sewers

Recently San Francisco began offering substantial rebates to homeowners and businesses to install high efficiency toilets (HETs). These types of toilet use 1.28 gallons or less per flush, down from the 1.6 gpf versions required today by federal law and even older 3.4 gpf toilets from decades ago. That means that an average home user will save between 3,800 to 5,000 gallons of water per year per person. In dollars, that's a savings of $90 annually for a family of four. This can quickly justify the cost of a new commode, since a toilet is expected to last 20 years.

Aside from cost savings, there are obvious environmental benefits to reduced water use. The city initially undertook the HET rebate initiative to decrease the amount of water used overall by the city and the amount of wastewater requiring treatment. They were successful, and water usage decreased. In fact, the city's Public Utilities Commission stated that San Francisco residents reduced their water consumption by 20 million gallons of water last year. San Francisco last year used approximately 215 million gallons per day. This also met other goals the city had, such as reducing costs to consumers. Unintentionally though, the HET rebate initiative impacted a different goal – Customer Service.



Why?

Effect ← Cause

NOTE: Read the Cause Map from left to right with the phrase "Was Caused By" in place of each arrow.

As shown on the associated Cause Map, reduced water flow had a series of other effects. While water consumption - and presumably waste water disposal - shrank significantly, waste production has remained constant. Despite $100M in sewage systems upgrades over the past five years, current water flow rates are not high enough to keep things moving through the system. As a result sewage sludge builds up in sewer lines. As bacteria eat away at the organic matter in the sludge, hydrogen sulfide is released. Hydrogen sulfide is known for its characteristic "rotten egg" smell.

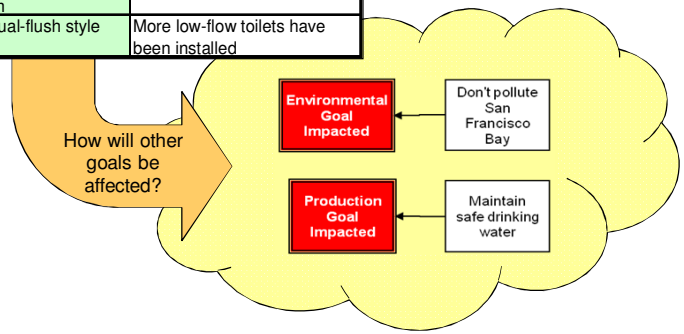
This creates an unfortunate situation. No one wants to walk through smelly streets. Further, slow sewage means a build-up of potential harmful bacteria. However, everyone agrees San Francisco should strive to conserve water. Water is a scarce and increasingly expensive resource in California. What's the next step in solving the stinking sewer problem?

What to do now?

Possible Solutions

No.	Action Item	Cause
1	Reduce sewage amount by adding probiotics	Sewage flow level consistent
2	Use hydrogen peroxide to kill bacteria	Excessive hydrogen sulfide from sewage system
3	Use bleach to kill bacteria	Excessive hydrogen sulfide from sewage system
4	Introduce recycled water into system	Water flow level dropped
5	Promote dual-flush style toilets	More low-flow toilets have been installed

How will other goals be affected?



Cause Maps can help all parties come to agreement because they focus problem solvers on the goals, not the details of the problem. In this case, all parties are trying to protect the environment and reduce costs to city residents. Based on those goals and the Cause Map, potential solutions have been developed and placed with their corresponding causes. The next step is to proactively consider how these new actions might affect the stakeholders' goals. Perhaps other goals could be impacted, such as the safety of drinking water and potential contamination of San Francisco Bay. Financial goals will surely be impacted to varying degrees with each solution. Revising the Cause Map can help identify the pros and cons of each approach and narrow down which solution best satisfies all parties.

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