

# GETTING RID OF LEAD: REMOVING TACOMA WATER'S LAST LEAD GOOSENECKS

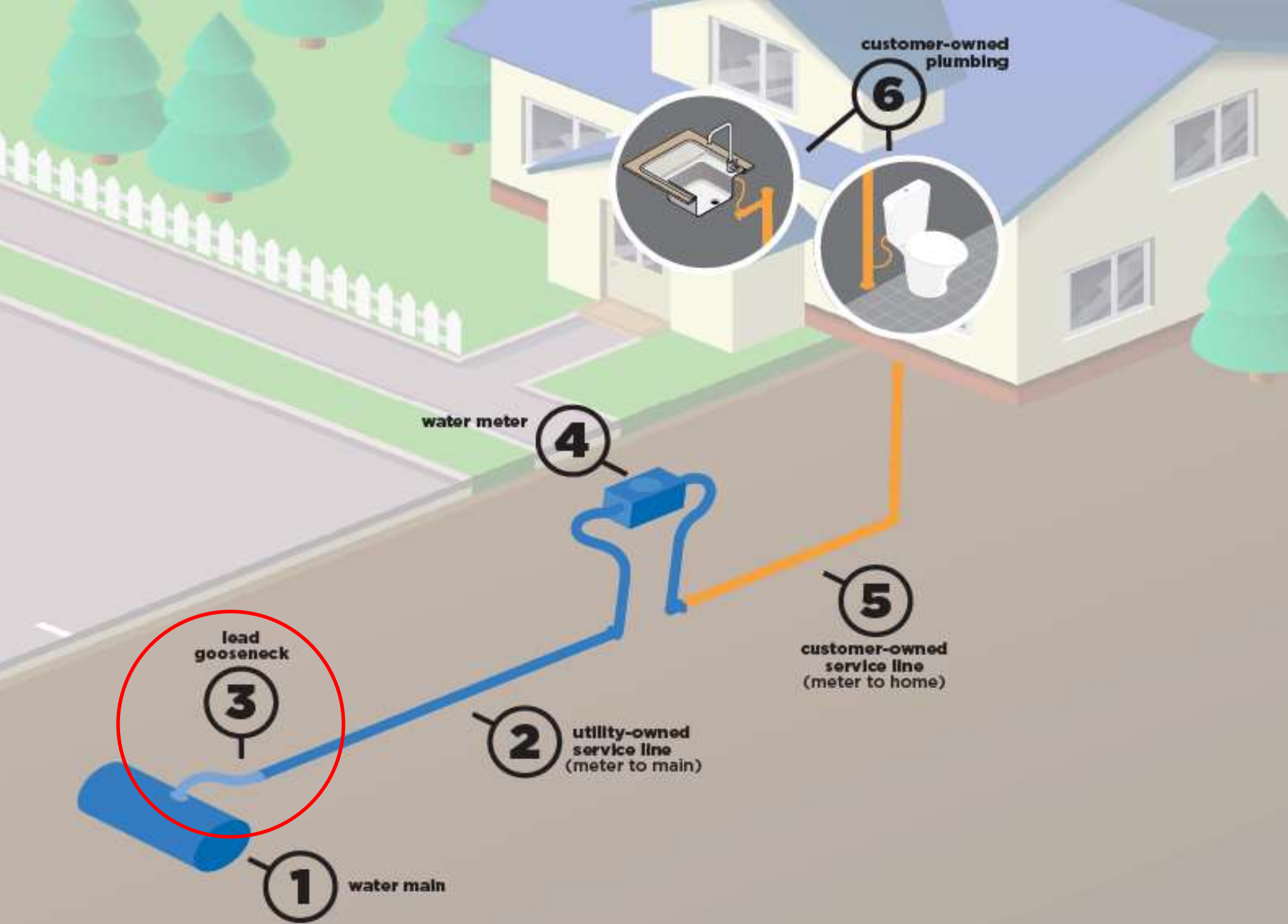


PNWS-AWWA SECTION CONFERENCE  
TACOMA, WA  
APRIL 27, 2018

# OUTLINE

1. BACKGROUND
2. ORIGINAL SEARCH
3. DEVELOPING A PLAN
4. PLAN OBJECTIVES
  - Timing
  - Geographical Equity
  - Communication
  - Coordination/Planning
  - Minimize Disruptions
5. REPLACEMENT STATUS
6. NEXT STEPS

# WHAT IS A LEAD GOOSENECK?





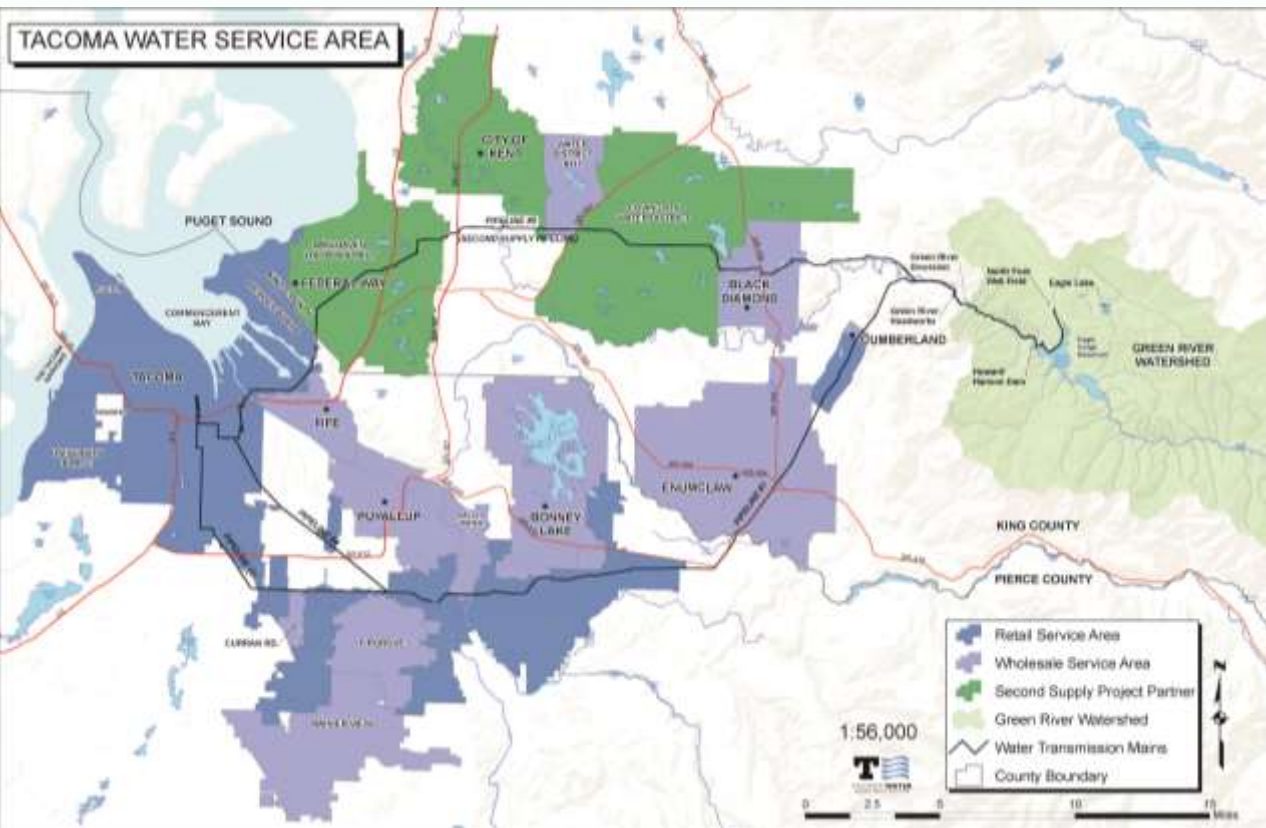
# BACKGROUND



# ABOUT TACOMA WATER

## Customers

Direct Service to approximately:  
101,000 connections / 320,000 population  
Peak Day Demands in excess of 100 MGD



## Sources of Supply

### Green River:

- Previously Unfiltered
- 150 MGD Filtration Facility completed 2015
- 73 MGD capacity prior to 2005 completion of Second Supply Pipeline

### 20 Major Groundwater Wells:

- Up to 55 MGD capacity
- South Tacoma Wellfield has 13 wells with current approximate capacity of 45 MGD

# STORM ON THE HORIZON - FLINT

**Closing the valve on history: Flint cuts water flow from Detroit after nearly 50 years**



Officials in Flint, Mich., raised glasses of treated water to celebrate the city's breakup with Detroit's water system. Samuel Wilentz/The Flint Journal, via Associated Press



← April  
2014

CBS/AP January 31, 2016, 9:03 PM

**Officials urge Flint residents to have water tested for lead levels**

← January  
2016



February  
2016 →

The City of Flint Water Plant is illuminated by moonlight on January 23, 2016 in Flint, Michigan. bncett CARLSEN, GETTY IMAGES

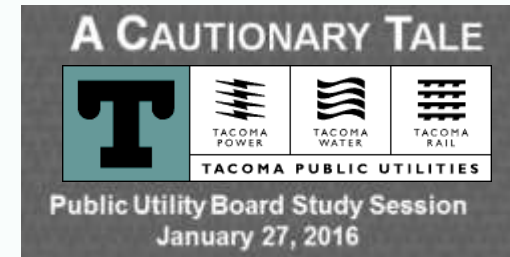


**TACOMA WATER**  
TACOMA PUBLIC UTILITIES



# CALM BEFORE THE STORM

January / February 2016 – “A Cautionary Tale” Presentations given to Public Utility Board and Tacoma Water staff on recent events in Flint



February 6, 2016 – The News Tribune Interview & Story



February 18, 2016 – Live Interview on TV Tacoma's CityLine program



February 2016 – Increased interest by regulators and EPA issues guidance to states

**TACOMA WATER**  
TACOMA PUBLIC UTILITIES

# ORIGINAL SEARCH

# TACOMA'S WILD GOOSENECK CHASE

PHOTOS TAKEN APRIL 23, 2016 (SATURDAY)



# MEDIA STORM

## Tacoma Parks now testing water fountains for lead contamination

REPORTED BY APRIL 12, 2016 AT 10:45AM, UPDATED AT 11:02AM APRIL 12, 2016

Facebook Twitter Email Print



## Tacoma utility hunting for old pipes that could be elevating lead levels in water

REPORTED AT 11:34 PM APRIL 12, 2016 BY STEVE MOORE, UPDATED AT 12:45 PM APRIL 12, 2016

Facebook Twitter Email Print



10p News  
MIDWEST FOR NEWS AND 4

KOMONews.com

NEWS WEATHER TRAFFIC SPORTS ENTERTAINMENT TV & MOVIE LIVE RETRIEVE

## New study finds high lead levels in Tacoma neighborhood's water supply

BY MORGAN CHESEY & STEVE MCCARRON | 3:40PM APRIL 12, 2016



## TPU goes hunting for lead goosenecks



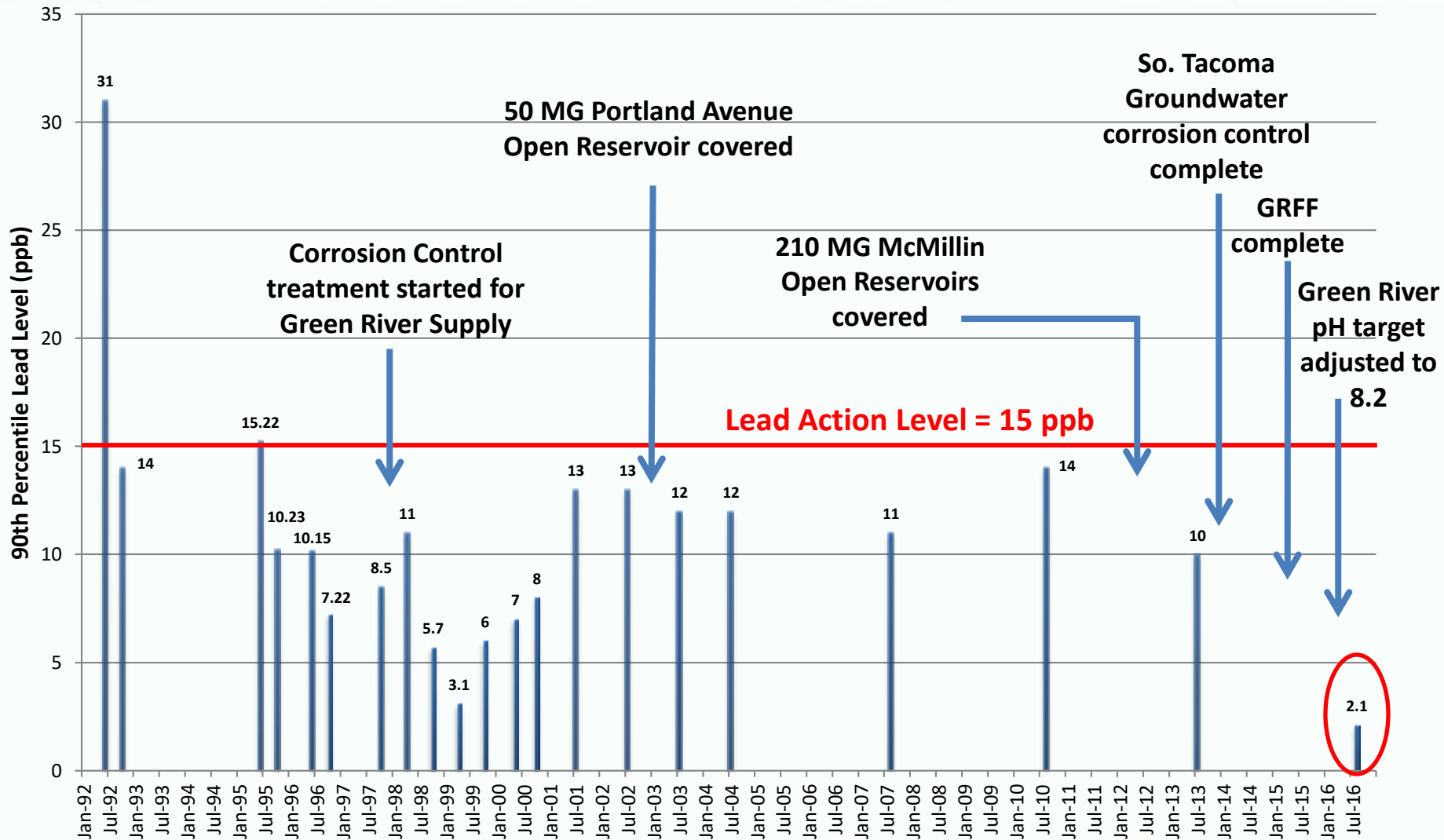
# WHAT WE LEARNED

- TACOMA WATER IS SAFE TO DRINK AND OUR CORROSION CONTROL EFFORTS ARE WORKING
- PLANNING IS IMPORTANT AND PLANS NEED TO CONSIDER ADDRESSING WORST CASE POSSIBLE RESULTS



- THE VALUE OF EFFECTIVE RISK COMMUNICATION
  - **“Tell the truth, and tell it fast”**
- OPERATING METER VALVES AND DISRUPTING PLUMBING CAN CAUSE METAL PARTICULATES CONTAINING LEAD TO BE RELEASED IN THE WATER
- FLUSHING AFTER THIS DISRUPTION IS EFFECTIVE TO CLEAR HIGH LEVELS OF LEAD

# TACOMA LCR RESULTS 1992 - 2016



# SIGNIFICANT OUTCOME...

JAY INSLEE  
Governor



STATE OF WASHINGTON

OFFICE OF THE GOVERNOR

P.O. Box 40002 • Olympia, Washington 98504-0002 • (360) 902-4111 • www.governor.wa.gov

DIRECTIVE OF THE GOVERNOR

16-06

## Inslee tells agencies to reduce lead risks in wake of crisis

BY MELISSA SANTOS  
msantos@thenewstribune.com

Gov. Jay Inslee issued a seven-part directive Monday aimed at reducing lead exposure in Washington, following the detection of lead in water at 13 Tacoma schools and in water lines leading to a handful of homes in the city.

The wide-ranging order directs the state Department of Health to review health and safety regulations for schools, as well as prepare a plan for the Legislature to implement a policy that requires testing of schools' drinking water.

A plan to require such monitoring by the state Board of Health was adopted in 2009, but put on hold and never funded by the Legislature.

important," Wiesman said Monday.

Inslee's directive also tells the Health Department to prioritize removing lead service lines when granting low-interest loans for drinking water projects and to look into creating a registry for older rental properties that are likely to have lead paint. He is charging the department with developing a plan to remove all lead service lines and lead components from larger public water drinking systems within 15 years.

At the same time, health officials emphasized that contaminated soil and lead paint contribute more to elevated blood-lead levels than lead in drinking water. Wiesman said Inslee's directive takes steps to address those sources of lead contamination as well,

## GOVERNOR'S DIRECTIVE PART 6

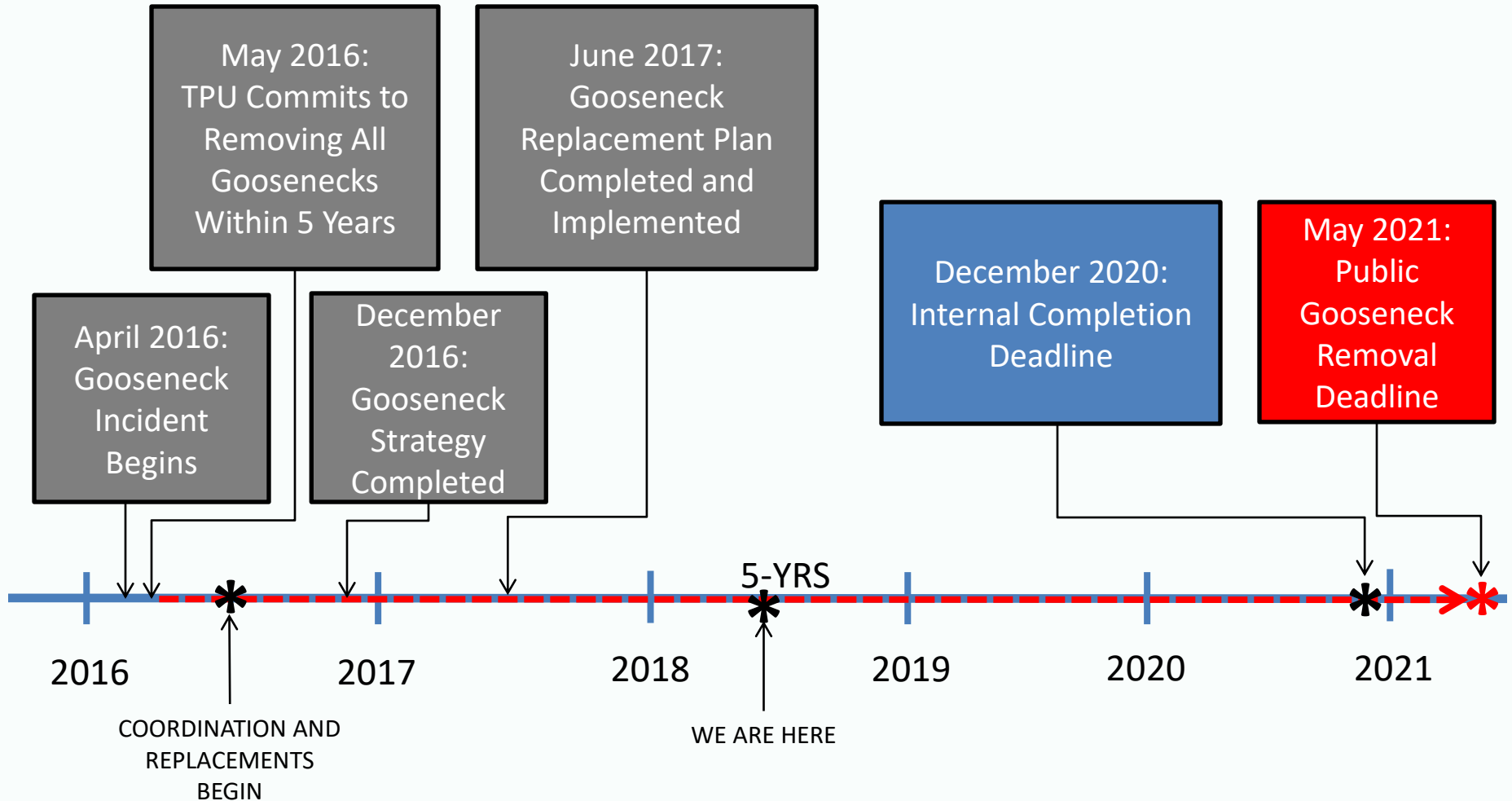
- "DOH shall prioritize the removal of lead service lines and other lead components in water distribution systems..."
- "...DOH shall work with stakeholder groups to develop policy and budgetary proposals with a goal of **removing all lead service lines and lead components in Group A Public Water drinking systems within 15 years.**"
- "DOH shall work with each Group A Public Water system to **identify all lead service lines and lead components within two years.**"

**TACOMA WATER**  
TACOMA PUBLIC UTILITIES

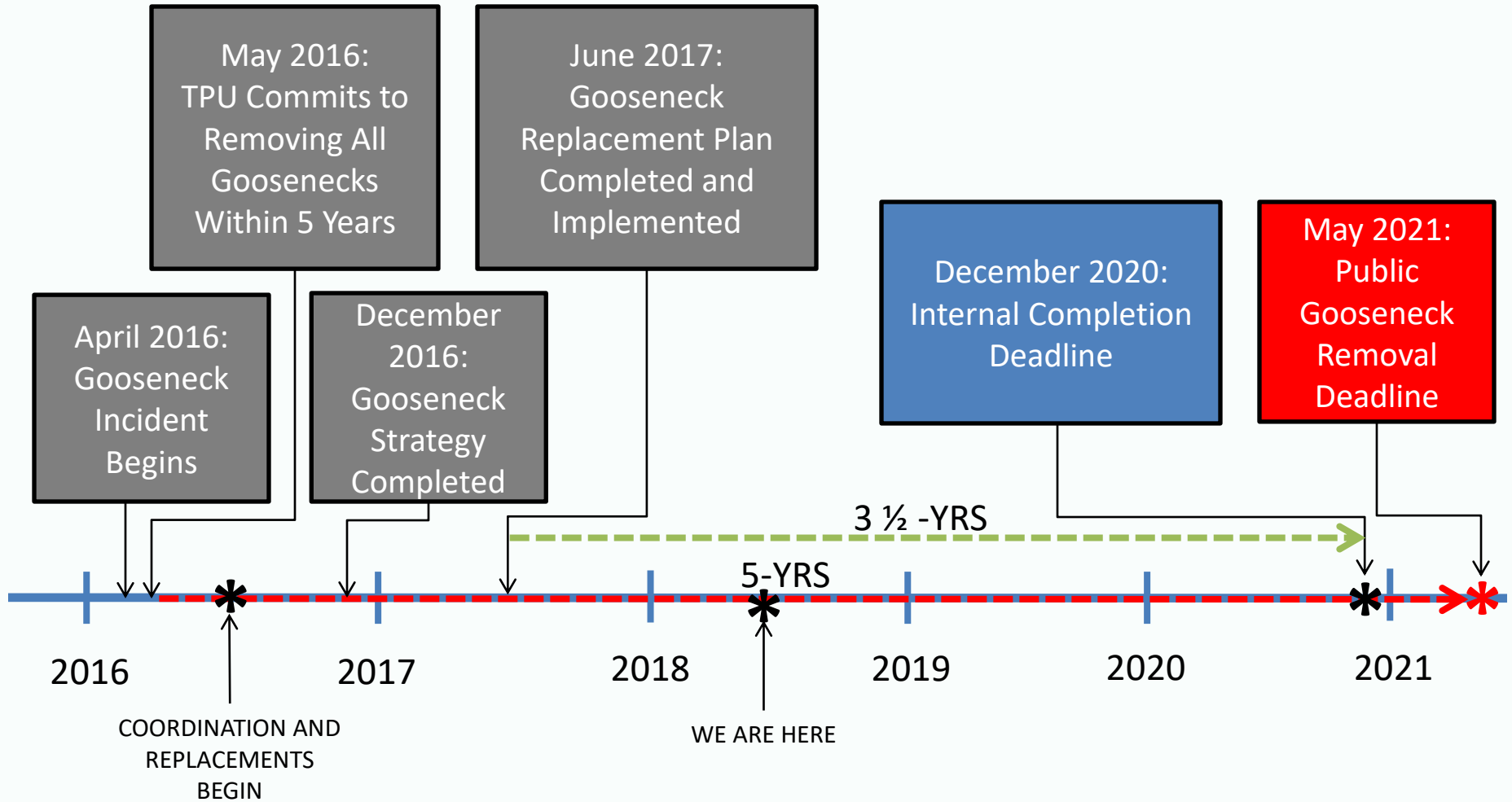
# POTENTIAL LEAD GOOSENECK SERVICE REPLACEMENT PLAN



# PLAN DEVELOPMENT AND TIMING



# PLAN DEVELOPMENT AND TIMING



# REPLACEMENT PLAN DOCUMENTATION



**FINAL**

## **Potential Lead Gooseneck Service Replacement Plan**

June 30, 2017

Authors: Matt Hubbard, Seth Doull, Corey Bedient, Ryan Flynn



Page 1 of 17

## PLAN

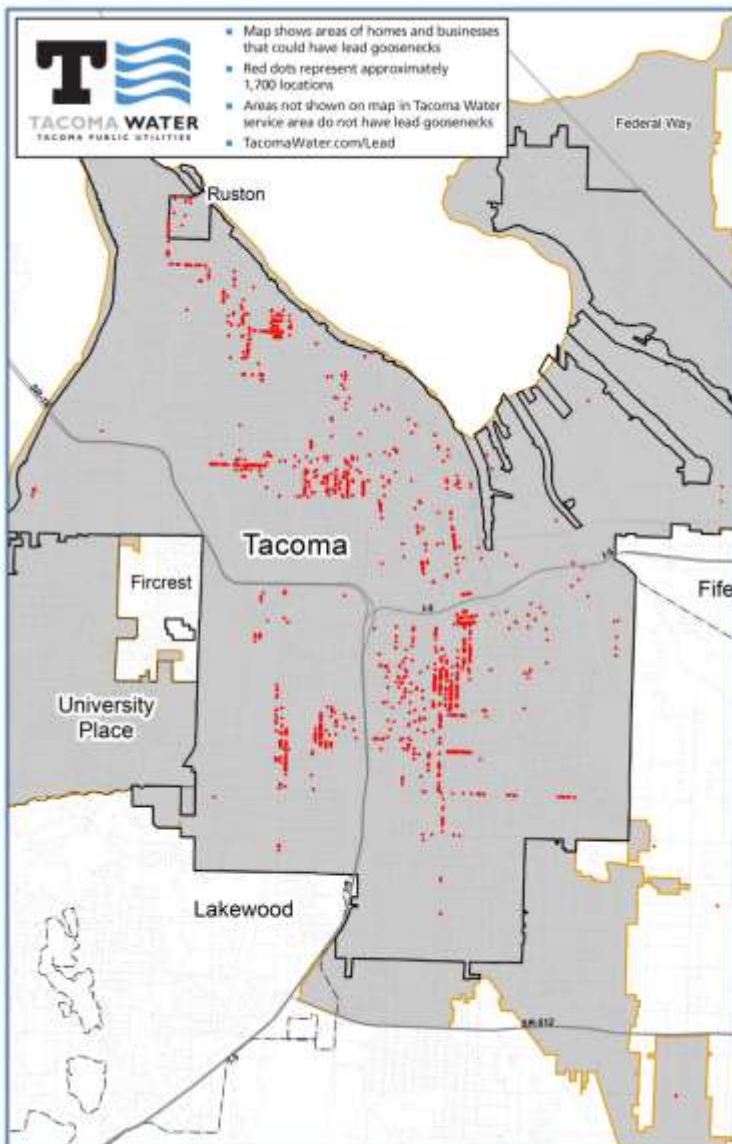
- **17 PAGES**
- **7 APPENDICES**
- **5 OBJECTIVES**

# OBJECTIVES

- A. REPLACE ALL LEAD GOOSENECKS WITHIN 5-YEARS**
- B. COMPLETE WORK IN A GEOGRAPHICALLY EQUITABLE MANNER**
- C. PROVIDE RELEVANT REGULAR COMMUNICATION**
- D. TACTICALLY COORDINATE AND PLAN SERVICE REPLACEMENTS**
- E. MINIMIZE DISRUPTIONS TO STAFFING LEVELS AND PLANNED WORK**

**OBJECTIVE A. REPLACE ALL  
LEAD GOOSENECKS WITHIN  
5-YEARS**

# THE “1700” ...WELL MORE LIKE 1200



## POTENTIAL LEAD GOOSENECK LOCATIONS (TACOMA'S CRITERIA)

### Services that were:

- 2-inches or smaller **AND**
- Classified in records as “galvanized”, “unknown”, or “blank” **AND**
- Installed earlier than 1940 **AND**
- Installed on mains that were older than 1940 **AND**
- Where no service renewal had occurred beyond this timeframe

*Note: Dates prior to 1940 selected to allow 10 years beyond oldest known lead gooseneck installation in Tacoma (1929)*

# ANNUAL REPLACEMENT TARGETS

## Gooseneck Replacements by Year

| Year             | Milestone | Cumulative Replacements | Cumulative Percentage |
|------------------|-----------|-------------------------|-----------------------|
| 2017 and Earlier | 203       | 203                     | 17%                   |
| 2018             | 405       | 608                     | 50%                   |
| 2019             | 405       | 1,013                   | 83%                   |
| 2020             | 202       | 1,215                   | 100%                  |
| Total            | 1,215     | 1,215                   | 100%                  |

\*Resolved means service replaced or confirmed no gooseneck

OBJECTIVE B. COMPLETE  
WORK IN A  
GEOGRAPHICALLY  
EQUITABLE MANNER



# REPLACEMENT STRATEGY

- **EVENLY DISTRIBUTED THROUGH TIME**
- **EQUITABLY DISTRIBUTED GEOGRAPHICALLY (NEIGHBORHOOD DISTRICTS)**
- **PROJECT BLOCKS:**
  - **City Pavement Restoration Policy**
  - **Pavement Condition**
  - **Project Coordination**



# OBJECTIVE C.

PROVIDE RELEVANT REGULAR  
COMMUNICATION

# COMMUNICATION PLAN

- DEVELOPED IN COLLABORATION WITH TPU COMMUNITY AND MEDIA SERVICES (CMS)
- OUTLINES METHODS FOR REACHING OUT TO SPECIFIC AUDIENCES WITH SPECIFIC MESSAGING

## TACOMA WATER TACOMA PUBLIC UTILITIES

### Gooseneck Replacement Communication Plan

#### SUMMARY

Tacoma Water publicly committed to finding and replacing all lead goosenecks left in our system; that includes replacing the service pipe from the meter to the water main. Now that the work is underway, we will communicate the details.

**Background:** Between 1900 and 1940, short pieces of lead pipe were sometimes used to connect the water main to customers' service lines. These lead pipes could be easily bent and allowed for a flexible connection between the rigid pipes. The bent segments of pipe often took the shape of a goose's neck, and are referred to as "lead goosenecks." Over time, Tacoma Water has removed an estimated 30,000 of the lead goosenecks while replacing old service connections.

There are still hundreds of old service connections from this timeframe for which we have little information. When these lines were installed, details of where lead goosenecks were installed were not recorded. We now estimate that there may be up to 1,200 service connections that may have lead goosenecks. Since they are underground, lead gooseneck locations are challenging to confirm. To help identify lead goosenecks in our system, we collected multiple water samples from the service connection pipes outside four customers' homes in early April. We found elevated levels of lead. Soon after, it was determined that the source of the lead was not the gooseneck, but the act of opening the valve at the meter, which allowed lead particulates to be released. Still, it's important for Tacoma Water to remove remaining lead goosenecks, which we are doing as quickly and efficiently as possible.

#### COMMUNICATION GOALS

- Maintain the utility's credibility by letting people know we are following up on the actions we committed to in 2016
- Support the utility's desire to successfully implement the replacement plan by providing "excellent customer communication"
- Inform different audiences with information appropriate for their needs (broad to tailored)

**TPU INTERNAL DOCUMENT**

# PUBLIC COMMUNICATION

## ALL CUSTOMERS

- **Water Quality Report (June 2017)**
- **Web Pages, Updated Q&A**
- **U\* - Utilities & You (October 2017)**
- **Community Council Update (January 2018)**

## TARGETED LIST OF 1,200 CUSTOMERS WHO MIGHT HAVE A GOOSENECK CONNECTION

- **Postcard (September 2017)**
- **Direct mail letter**

| AUDIENCE  | TOOL   | MESSAGES   |
|---|--|--|
| All Customers   | Water Quality Report   | <ul style="list-style-type: none"> <li>• Water is safe</li> <li>• Still advising to flush pipes</li> <li>• Replacement process completed by 2021</li> </ul>  |
|   | Web Pages, Update QA   | <ul style="list-style-type: none"> <li>• Water is safe</li> <li>• Still advising to flush pipes</li> <li>• Replacement process completed by 2021</li> </ul>  |
| Targeted List of 1,200 Customers Who Might Have A Gooseneck | Direct Mail Letter   | <ul style="list-style-type: none"> <li>• Either: No gooseneck found; service is copper</li> <li>• Or: No gooseneck found; service has been replaced</li> <li>• Or: Gooseneck found; service has been replaced</li> </ul>   |
| Public Utility Board/City Council                           | Study Session  | <ul style="list-style-type: none"> <li>• Replacement plan update</li> <li>• How replacements are scheduled in accordance with geographic equity</li> <li>• How replacements work in coordination with City or other utility work</li> </ul>                      |
| Employees   | Ubits<br>Staff Talking Points  | <ul style="list-style-type: none"> <li>• Water is safe</li> <li>• Still advising to flush pipes</li> <li>• Replacement process completed by 2021</li> </ul>  |
| Utility Crews   | Talking Points + Diagram of Utility Owned Infrastructure vs Customer Owned | <ul style="list-style-type: none"> <li>• Water is safe</li> <li>• Still advising to flush pipes</li> <li>• Crews will either discover you have no gooseneck or replace your service if you do</li> <li>• Service replaced if made of galvanized steel</li> </ul> |
|   | Small Handout (Half Page)  | <ul style="list-style-type: none"> <li>• Water is safe</li> <li>• Still advising to flush pipes</li> <li>• Crews will either discover you have no gooseneck or replace your service if you do</li> <li>• Service replaced if made of galvanized steel</li> </ul> |

# TACOMA'S WATER IS SAFE

## FREE CUSTOMER LEAD TEST KITS

### LEAD TEST KIT WATER SAMPLING RESULTS

- 1,141 test kits mailed
- 570 test kits returned
- 90.0 % of samples contained less than 1.1 parts per billion (ppb) of lead
- 99.6 % less than 15 ppb (EPA action level is 15 ppb)

### REQUEST A KIT:

[TacomaWater.com/TestKit](http://TacomaWater.com/TestKit)



# WEBPAGE Q&A

The screenshot shows the Tacoma Public Utilities website. The top navigation bar includes links for Tacoma Power, Click! Cable TV, Tacoma Water, and Tacoma Rail. The main content area is titled "REPLACING LEAD GOOSENECKS" and contains the following text:

Home > Water Quality > Replacing lead goosenecks

## REPLACING LEAD GOOSENECKS

Last year, Tacoma Water identified that about 1,200 short pieces of lead pipe may exist in the water system. Called lead goosenecks, the pipes connect the water main to a pipe that leads to the water meter at customers' homes.

Tacoma Water generally has very little lead pipe in its system, and it employs effective corrosion control of its water sources to reduce the amount of lead in the water to levels well below EPA standards. Still, the utility is committed to removing all lead goosenecks from the water system because it's the right thing to do. This is consistent with a national and state movement to eliminate pure lead components from utility infrastructure. Our highest priority is providing clean and reliable water.

### Find and Replace

Some of Tacoma's water system is old - so old that installation of some service connections weren't even recorded at the time, which presents a challenge in finding the lead goosenecks.

Tacoma Water is digging for additional records and digging for actual pipe in the street to verify the type of pipe material. If we find a lead gooseneck, we'll replace the service line and gooseneck with a new pipe made of copper. This work has already started and is expected to be complete by the end of 2020.

When it makes sense, we'll coordinate with other agencies to ensure the work coincides with other projects that require digging up the streets.

### What You Can Do

If you ever want to have your water tested for lead, you can do it for free by ordering a kit at [TacomaWater.com/TESTKIT](http://TacomaWater.com/TESTKIT). We'll send you a kit to collect the water. You send it back to Tacoma Water (at no postage cost to you) and we'll send it to a lab for testing.

Tacoma Water recommends people flush their pipes - running the water for a couple of minutes - after the water is shut off at the meter. It's also a good idea to flush pipes after prolonged periods without use, like after a vacation.

### Who Owns What?

Tacoma Water owns the pipe from the water main to the water meter, so when the utility replaces a service, it's done up to the water meter. The pipe from the meter to the home is

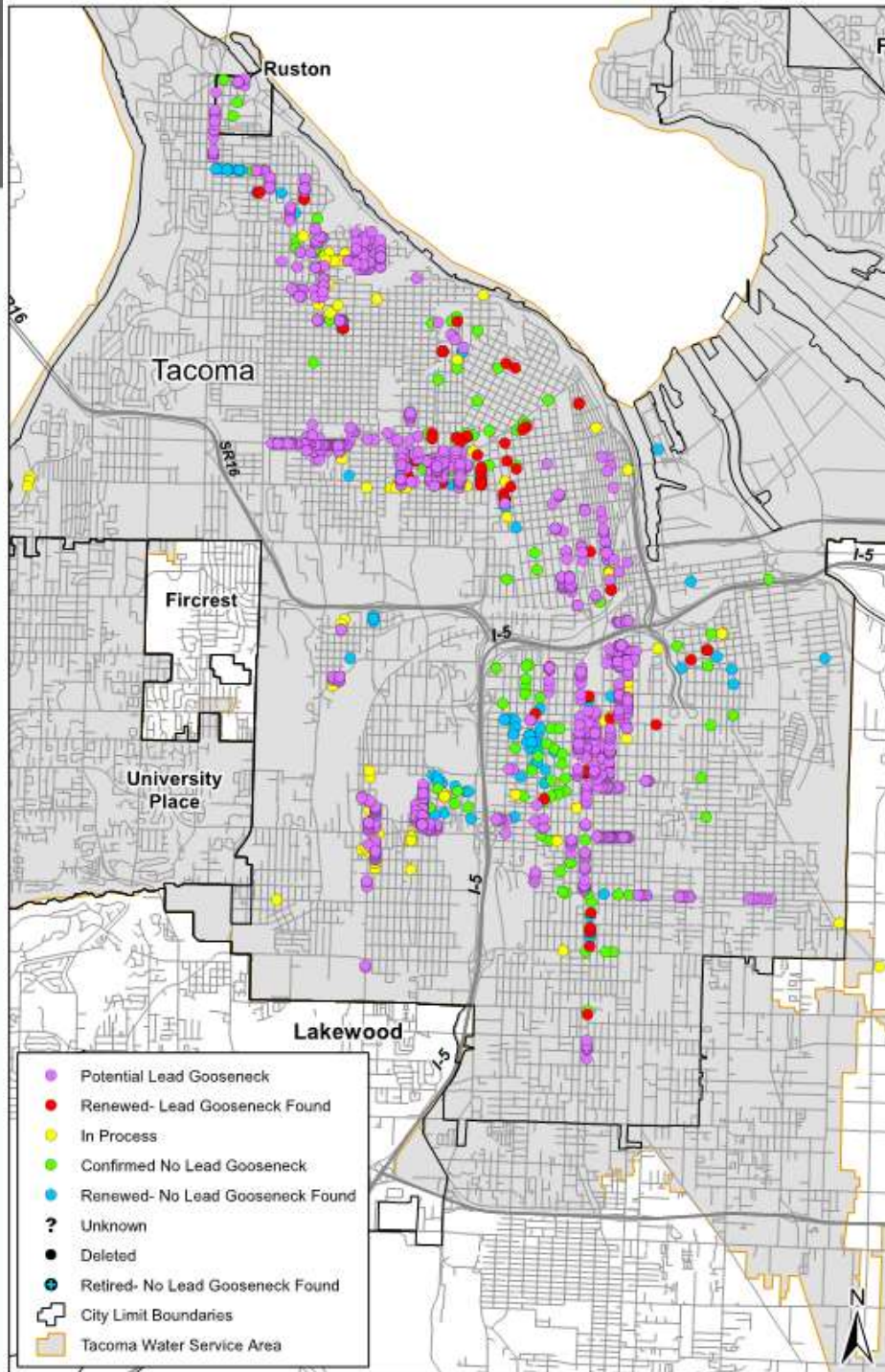
The left sidebar contains a navigation menu with the following items:

- TACOMA PUBLIC UTILITIES
- Water Home
- For Your Home
- For Your Business
- Water Quality
  - Water Test Kit
  - Replacing lead goosenecks
  - Possible Gooseneck Locations
  - Lead Questions & Answers
  - Discolored or Dirty Water
  - Taste and Odor Issues
  - Filtering the Water
  - Cross Connection Control
  - Corrosion Control, Lead & Copper
  - Chromium and Legionella
  - Water Main Flushing
- Water Source
- About Tacoma Water
- Contact Us
- News & Publications
- Event Calendar
- Sitemap

# OBJECTIVE D.

TACTICALLY COORDINATE AND  
PLAN SERVICE REPLACEMENTS





Gooseneck Feature Count    Total Estimated Cost    Actual Total Cost

# Gooseneck Count

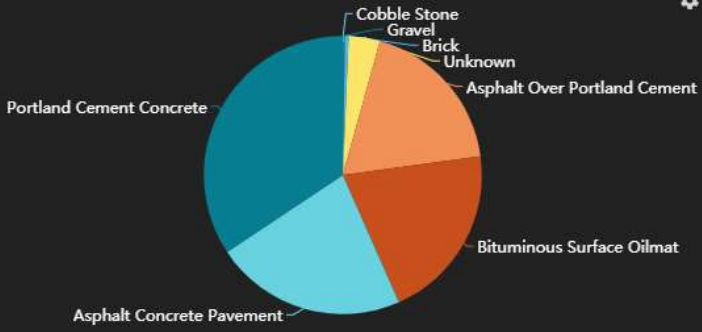
# 1,203

Lateral Status Filter    Project Filters    Neighborhood District

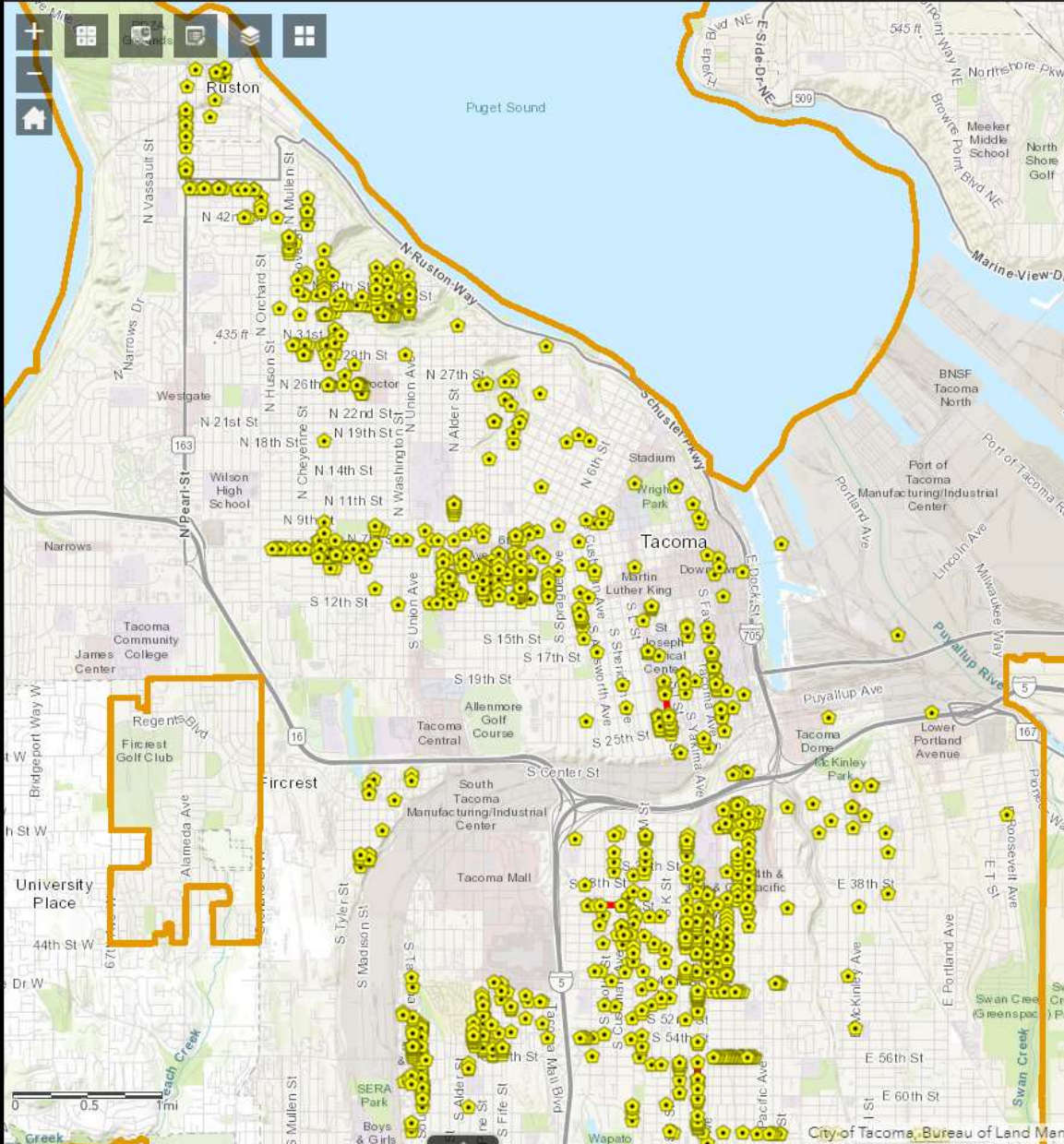
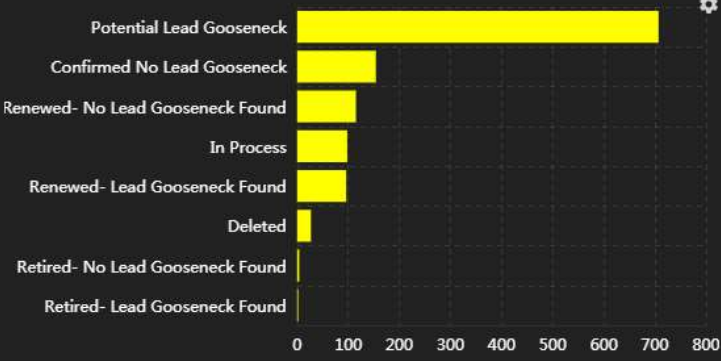
Gooseneck Status Filter

Service Status is  
 Renewed- Lead Gooseneck Found

Pavement Type    Service Status Doughnut Graph    Average Pavement Condition



Service Status    Street Types    Project Status Analysis



# COORDINATION

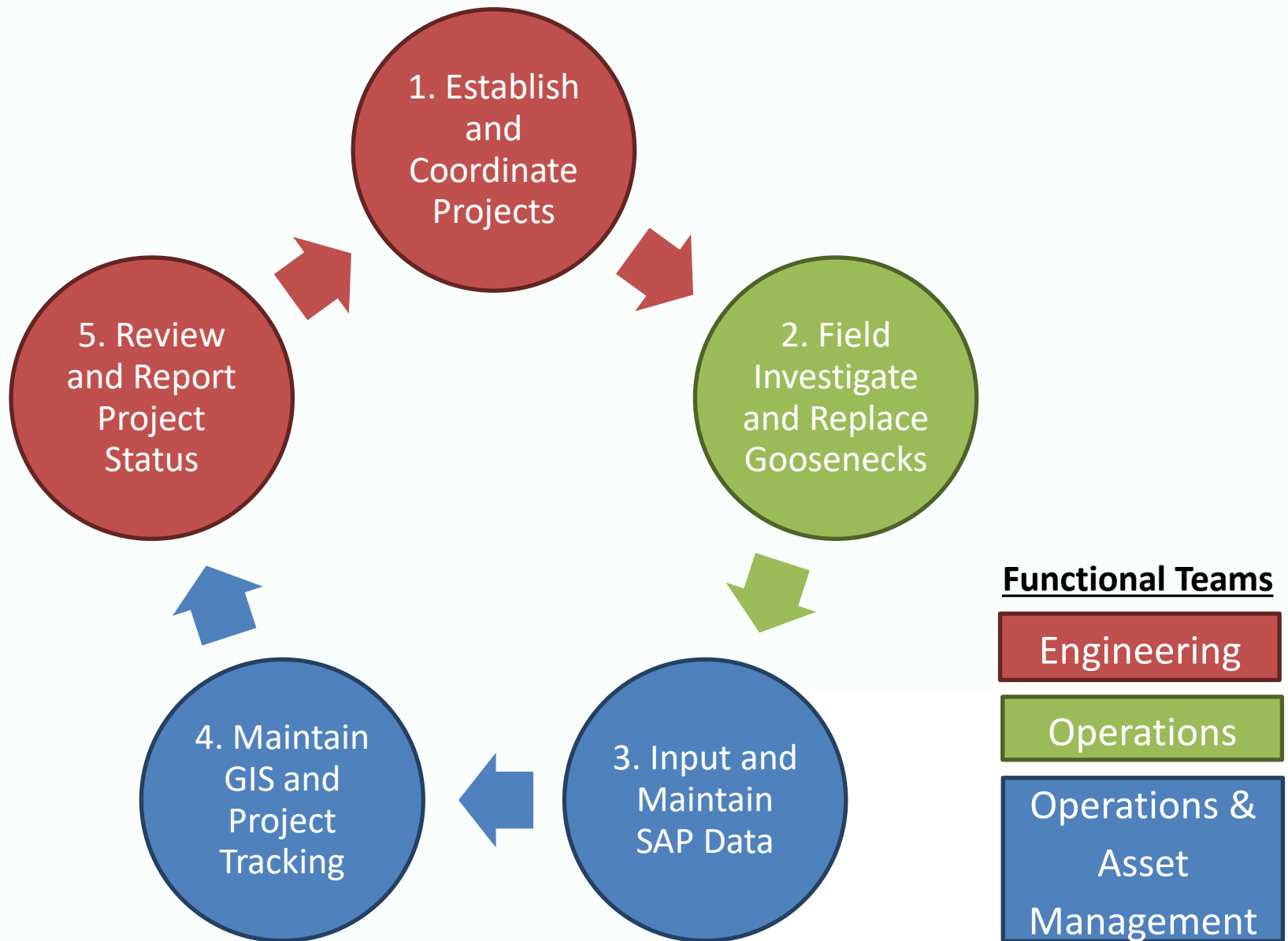
- **COORDINATION WITH CITY OF TACOMA PUBLIC WORKS – STREETS OPERATIONS**

- N 45<sup>th</sup> Street, N Pearl Street to N Baltimore Street
  - 16 potential lead goosenecks
- 6<sup>th</sup> Ave, N Proctor Street to N Huson Street
  - 58 potential lead goosenecks
- S Thompson Ave, South of S 38<sup>th</sup> Street
  - 21 potential lead goosenecks

- **CONTINUED COORDINATION**

- Concrete Street Panels
- City of Tacoma Public Works - Streets
- Environmental Services (Storm/Sewer)
- Puget Sound Energy (PSE)

# GOOSENECK REPLACEMENT WORKFLOW



# OBJECTIVE E.

MINIMIZE DISRUPTIONS TO  
STAFFING LEVELS AND PLANNED  
WORK

# PROJECT TRACKING

## Project Budget (updated 7/24/2017)

| Budget      | Total Spent For Gooseneck Removal | Projected Spending | Projected Percent of Budget | Projected Variance |
|-------------|-----------------------------------|--------------------|-----------------------------|--------------------|
| \$9,900,000 | \$ 350,141                        | \$ 9,107,428       | 92%                         | \$ (442,431)       |

## Gooseneck Replacements by Year

| Year      | Milestone | Resolved* To-Date | Remaining to Reach Milestone | Percent of Milestone Completed |
|-----------|-----------|-------------------|------------------------------|--------------------------------|
| 2016/2017 | 203       | 126               | 77                           | 62%                            |
| 2018      | 405       | -                 | 405                          | 0%                             |
| 2019      | 405       | -                 | 405                          | 0%                             |
| 2020      | 202       | -                 | 202                          | 0%                             |
| Total     | 1,215     | 126               | 1,089                        | 10%                            |

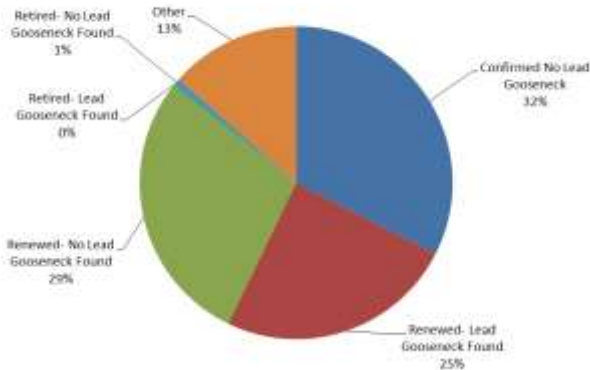
\*Resolved means service replaced or confirmed no gooseneck

## Key Statistics

| Statistic                             | Quantity |
|---------------------------------------|----------|
| Total Potential Goosenecks Identified | 1,215    |
| Goosenecks Resolved                   | 126      |
| Potential Goosenecks Remaining        | 1,089    |
| Project Completion Percent            | 10%      |

\*Resolved means service replaced or confirmed no gooseneck

## Breakdown of Resolved Goosenecks



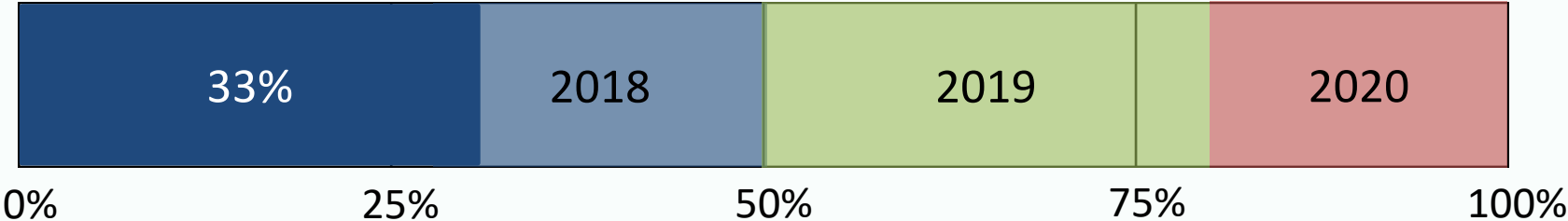
| Breakdown of Resolved Goosenecks | Quantity   | Percent of Resolved |
|----------------------------------|------------|---------------------|
| Confirmed No Lead Gooseneck      | 41         | 32%                 |
| Renewed- Lead Gooseneck Found    | 31         | 25%                 |
| Renewed- No Lead Gooseneck Found | 36         | 29%                 |
| Retired- Lead Gooseneck Found    | 0          | 0%                  |
| Retired- No Lead Gooseneck Found | 1          | 1%                  |
| Other                            | 17         | 13%                 |
| <b>Total</b>                     | <b>126</b> | <b>100%</b>         |

# REPLACEMENT STATUS

# PROGRESS

**33% COMPLETE**

**397 RESOLVED OUT OF 1,215 IDENTIFIED**

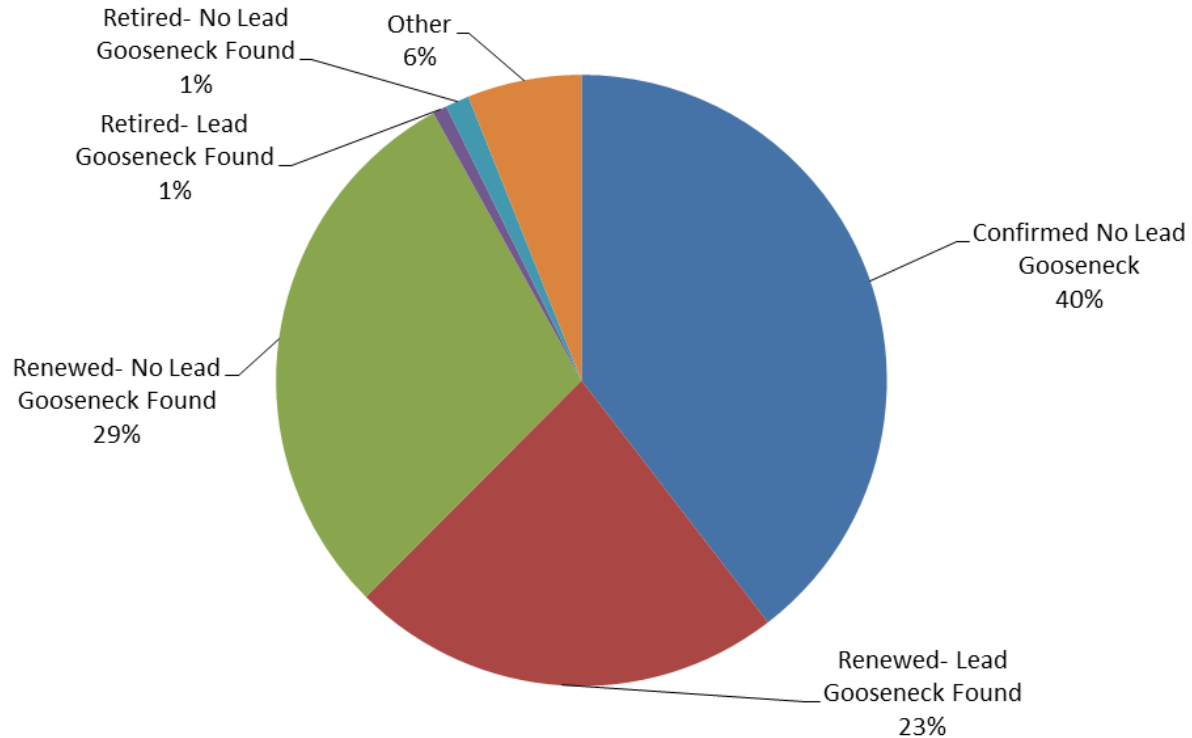




# MONTHLY TRACKING

| Status Date Tracking             |              |  |          |       |       |     |      |      |
|----------------------------------|--------------|--|----------|-------|-------|-----|------|------|
|                                  | 4/19/2018    |  |          |       |       |     |      |      |
|                                  |              |  |          |       |       |     |      |      |
|                                  |              |  |          |       |       |     |      |      |
|                                  |              | <b>2018</b>                                |          |       |       |     |      |      |
| Status                           | Status Count | January                                    | February | March | April | May | June | July |
| In Process                       | 93           | -  | 39       | -     | 25    | -   | -    | -    |
| Confirmed No Lead Gooseneck      | 157          | 15   | 14       | 27    | 9     | -   | -    | -    |
| Renewed- Lead Gooseneck Found    | 91           | 12   | 6        | 13    | 6     | -   | -    | -    |
| Renewed- No Lead Gooseneck Found | 117          | 8  | 1        | 11    | 20    | -   | -    | -    |
| Retired- Lead Gooseneck Found    | 3            | -  | -        | 1     | -     | -   | -    | -    |
| Retired- No Lead Gooseneck Found | 5            | 2  | -        | -     | 1     | -   | -    | -    |
| Deleted                          | 24           | 4  | -        | -     | -     | -   | -    | -    |
| <b>Resolved Subtotal</b>         |              | 41   | 21       | 52    | 36    | -   | -    | -    |
| <b>Monthly Goal</b>              |              | 34   | 34       | 34    | 34    | 34  | 34   | 34   |
| <b>Resolved Running Total</b>    |              | 288  | 309      | 361   | 397   | 397 | 397  | 397  |
| <b>Totals</b>                    | 490          |  |          |       |       |     |      |      |
|                                  |              | <u>Monthly Goals Implemented July 2017</u> |          |       |       |     |      |      |
|                                  |              | Green = Goal Met                           |          |       |       |     |      |      |
|                                  |              | Yellow = Future Status                     |          |       |       |     |      |      |
|                                  |              | Red = Goal Unmet                           |          |       |       |     |      |      |

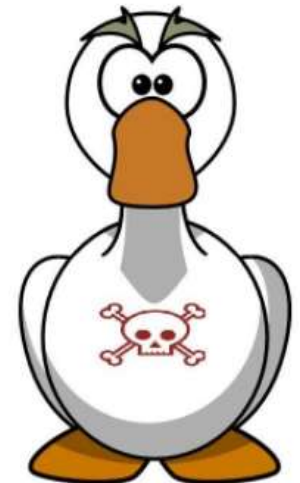
## Breakdown of Resolved Goosenecks



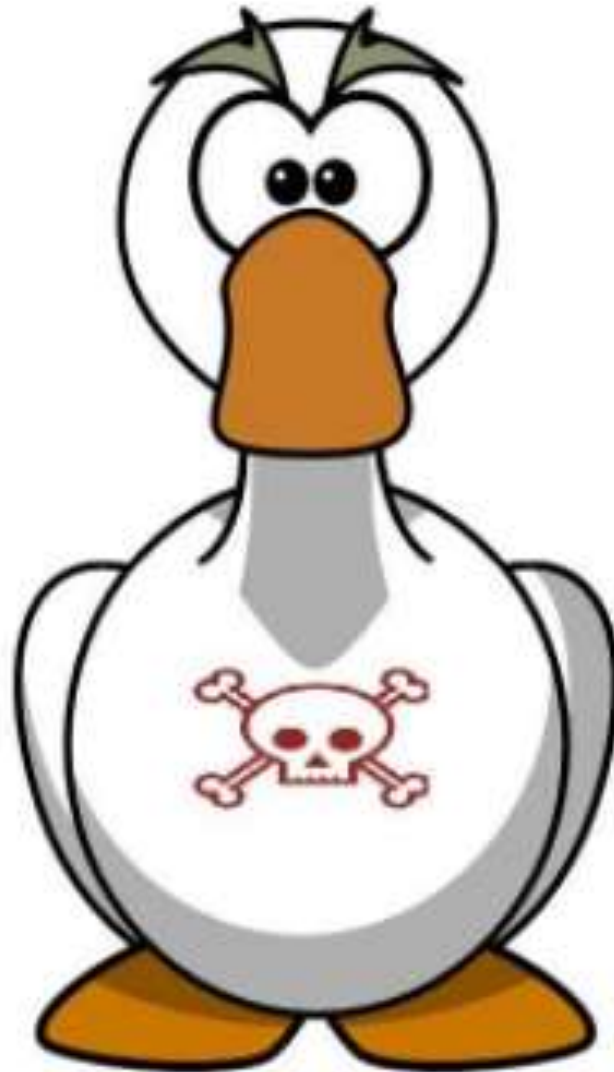
| Breakdown of Resolved Goosenecks | Quantity   | Percent of Resolved |
|----------------------------------|------------|---------------------|
| Confirmed No Lead Gooseneck      | 157        | 40%                 |
| Renewed- Lead Gooseneck Found    | 91         | 23%                 |
| Renewed- No Lead Gooseneck Found | 117        | 29%                 |
| Retired- Lead Gooseneck Found    | 3          | 1%                  |
| Retired- No Lead Gooseneck Found | 5          | 1%                  |
| Other                            | 24         | 6%                  |
| <b>Total</b>                     | <b>397</b> | <b>100%</b>         |

# WHAT WE'VE LEARNED SO FAR

- **SAFETY FIRST - IS YOUR WATER SAFE?**
- **CLEAR, CONSISTENT, RELEVANT, REGULAR COMMUNICATION IS VITAL**
- **UPFRONT PROJECT ARCHITECTURE IMPROVES EFFICIENCY**
  - Planning/Tracking – What's the end game?
  - Consider exactly which staff will be keeping records
  - How will decision be made?
  - What information is lacking? Can I obtain it? Is it needed?
  - Which records do you want to retain?
- **EQUITABILITY MATTERS**
- **SETTING ATTAINABLE GOALS GETS RESULTS**
- **DETAILS ARE CRUCIAL**
  - How does this affect me?
  - What exactly is getting replaced and when?
  - How much will this cost?



# HAVE YOU SEEN ME?



# NEXT STEPS

- **EXECUTE REPLACEMENT PLAN**
  - **Continue Communication**
  - **Track Costs**

# QUESTIONS?

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**Corey Bedient**  
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**Website:**  
[TacomaWater.com/Lead](http://TacomaWater.com/Lead)

**Email:**  
[WaterQuality@cityoftacoma.org](mailto:WaterQuality@cityoftacoma.org)

# BACKUP SLIDES

# POTENTIAL GOOSENECKS BY DISTRICT

| Neighborhood District | Suspected Gooseneck Services |
|-----------------------|------------------------------|
| <b>OUTSIDE TACOMA</b> | 12                           |
| <b>CENTRAL</b>        | 242                          |
| <b>EASTSIDE</b>       | 42                           |
| <b>NEW TACOMA</b>     | 63                           |
| <b>NORTH END</b>      | 249                          |
| <b>SOUTH END</b>      | 404                          |
| <b>SOUTH TACOMA</b>   | 160                          |
| <b>WEST END</b>       | 43                           |
| <b>TOTALS</b>         | <b>1215</b>                  |



# LEAD AND COPPER RULE (LCR)

**IN FIRST ROUNDS OF LCR TESTING IN 1992, TACOMA EXCEEDED FOR BOTH LEAD AND COPPER.**

## KEY WATER QUALITY PARAMETERS

| <b>GREEN RIVER</b>                      | <b>Typical Range</b> | <b>Mean</b> |
|---|----------------------|-------------|
| pH                                      | 6.8 - 7.6            | 7.2         |
| Alkalinity (mg/l as CaCO <sub>3</sub> ) | 11 - 34              | 23          |

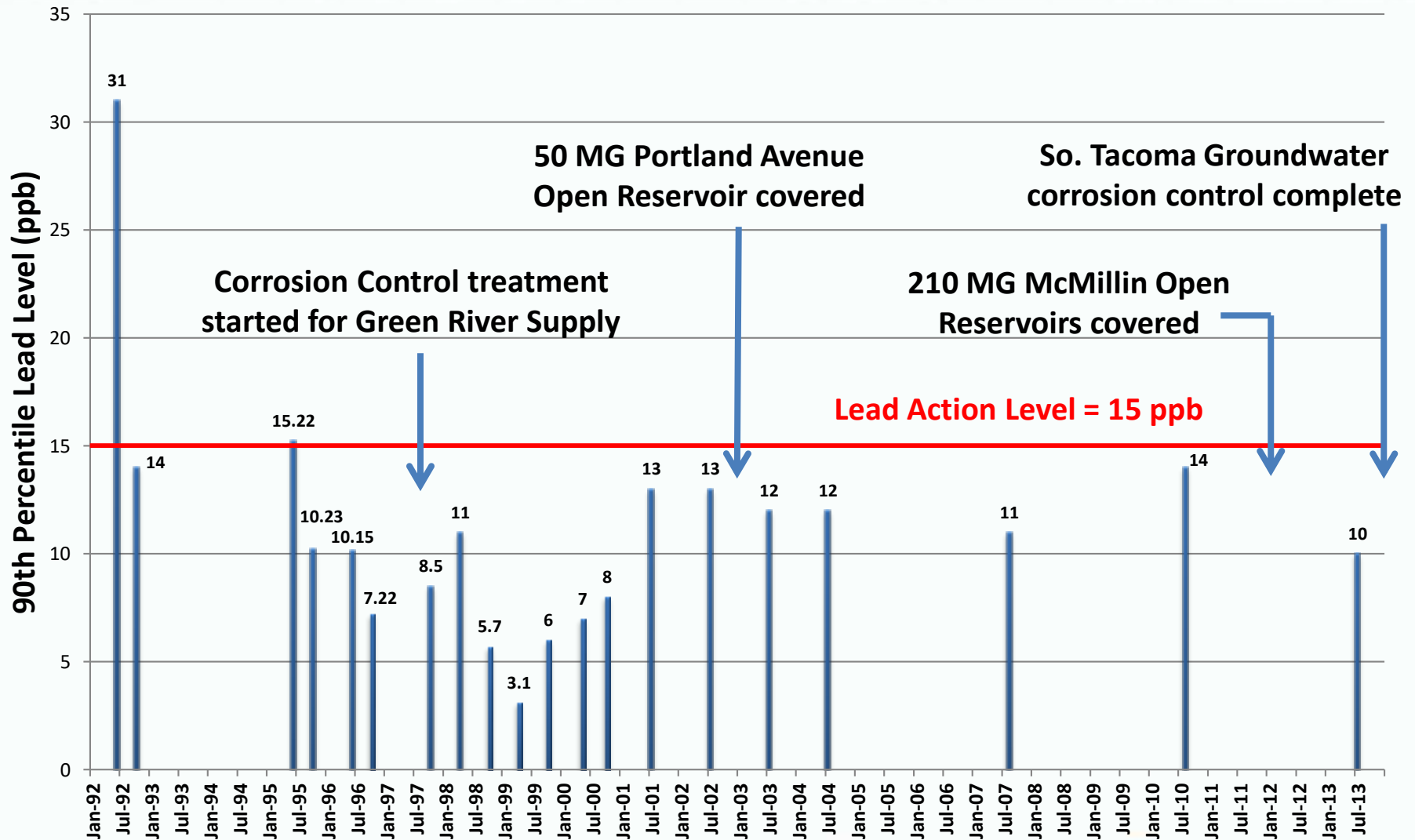
  

| <b>GROUNDWATER</b>                      | <b>Typical Range</b> | <b>Mean</b> |
|---|----------------------|-------------|
| pH                                      | 6.6 - 7.4            | 7.0         |
| Alkalinity (mg/l as CaCO <sub>3</sub> ) | 72 - 84              | 78          |

## THE 1994 CORROSION CONTROL STUDY RECOMMENDED:

- Treatment initially only on the Green River supply
- pH adjustment (Sodium Hydroxide selected)
- Initial adjustment to pH 7.5 - 7.6
- Final adjustment to pH 8.2

# TACOMA LCR RESULTS 1992 - 2013



# CORROSION CONTROL TREATMENT – GREEN RIVER

## GREEN RIVER SUPPLY TREATMENT – STARTED JULY 1997

- As an unfiltered supply Tacoma was required to meet 3-Log *Giardia* inactivation through disinfection (free chlorine) for Green River
- Sodium hydroxide initially added at 214<sup>th</sup> Ave Corrosion Control Facility along Pipeline 1 after CT Contact Time requirements met for 3-Log *Giardia* Inactivation
- Treatment transitioned to Green River Headworks and 214<sup>th</sup> Corrosion Control Facility shutdown following startup of Pipeline 5 in 2005



DESIGNATED LEAD AND COPPER  
RULE WATER QUALITY PARAMETER

pH

Min. 7.5

# CORROSION CONTROL TREATMENT - GROUNDWATER

## SOUTH TACOMA WELLFIELD TREATMENT – STARTED LATE 2013



**South Tacoma Pump Station:**  
In basin aeration using bubble diffusers to strip carbon dioxide and raise pH to ~7.5



**Hood Street Reservoir  
Groundwater Treatment Facility:**  
Sodium hydroxide (25%) added to raise pH to selected target level

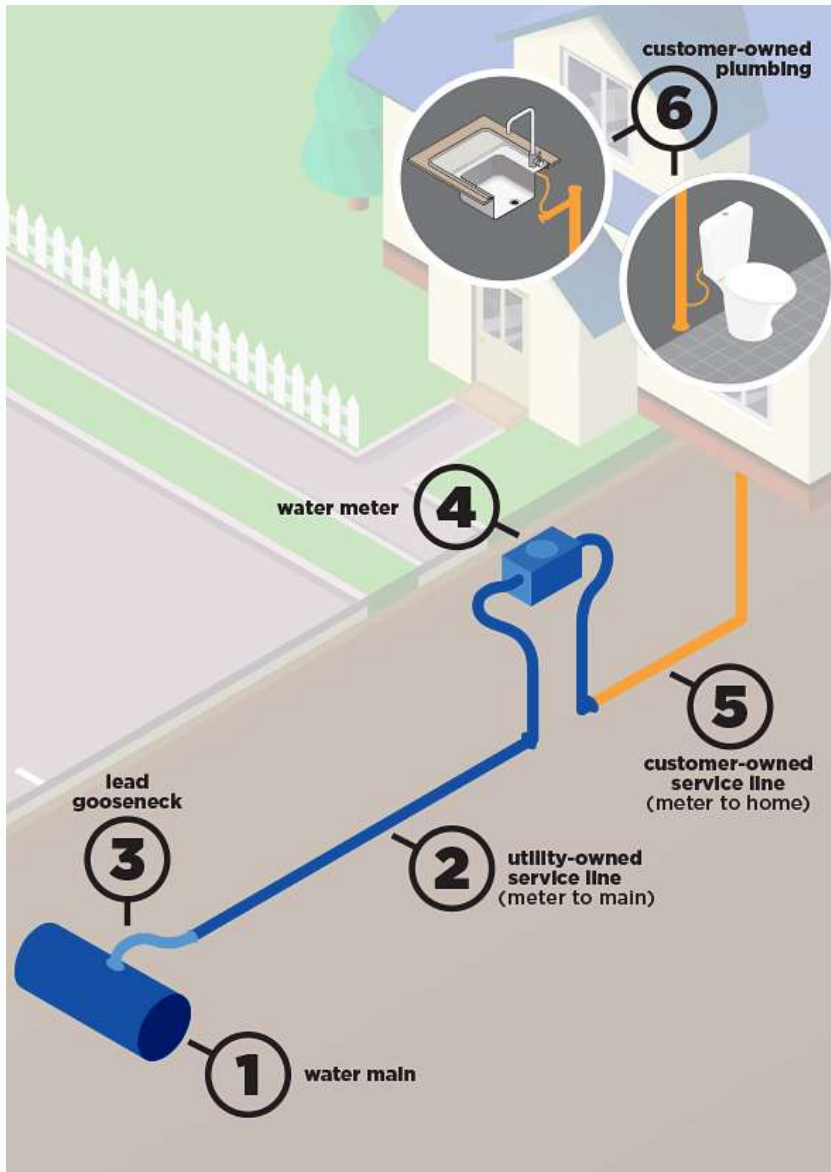
(Photo from News Tribune / Lui Kit Wong lwong@thenewstribune.com)

**TACOMA WATER**  
TACOMA PUBLIC UTILITIES

# LEAD GOOSENECKS – THE KNOWNS

## THE KNOWN

- Typically used to provide a flexible connection between galvanized service lines and the water main
- As part of Service Line and Water Main replacement projects Tacoma Water had **removed an estimated 30,000 Lead Goosenecks over the past few decades**



# LEAD GOOSENECKS – THE UNKNOWNS



## GOOSENECK STATUS CIRCA 2004:

*"WE GOT ALL THOSE OUT OF THE SYSTEM YEARS AGO..."*

## MORE CORRECTLY (AND PROBABLY WHAT WAS INTENDED):

*"WE GOT **NEARLY** ALL THOSE OUT OF THE SYSTEM YEARS AGO..."*

*"...AND WE DON'T REALLY KNOW WHERE THEY ARE FOR SURE..."*



# THE GOOSENECK PROBLEM

- **GOOSENECKS WERE INSTALLED IN TACOMA AS LATE AS 1929 (LATEST HISTORICALLY FOUND), AND ALL WERE ASSOCIATED WITH GALVANIZED SERVICE PIPES**
- **NOT ALL GALVANIZED SERVICES WERE INSTALLED WITH LEAD GOOSENECKS**
- **NO SEPARATE OR SPECIFIC RECORDS KEPT REGARDING LEAD GOOSENECKS**
- **RECORDS ARE OLD, INCOMPLETE, AND IN MULTIPLE PLACES**
- **MANY REMAINING GALVANIZED SERVICES ARE UNDER CONCRETE STREETS**
- **HOW CAN WE PRACTICALLY FIND THEM?**

# NATIONAL REGULATORY DIRECTION

## MARCH 2016 – WATER RESEARCH FOUNDATION (WRF) HOSTS SYMPOSIUM IN PHILADELPHIA

- 2015 National Drinking Water Advisory Council (NDWAC) recommendations to EPA for the long term revisions to the Lead and Copper Rule (made with unanimous agreement)

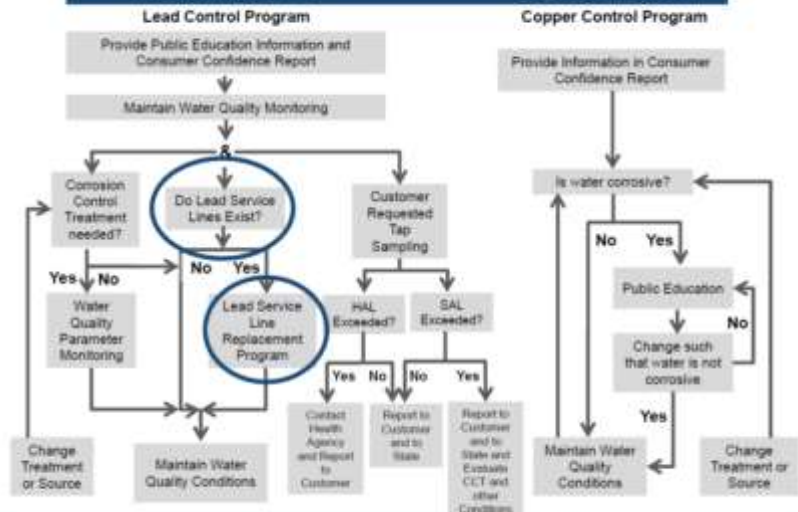
**THE CURRENT LCR WOULD KEEP US RUNNING IN A CIRCLE, FOREVER!**

The revised LCR can set a long-term goal to get us to a place where such a Rule may no longer be needed !



© 2016 Water Research Foundation. All Rights Reserved.

### Find and Remove LSLs as Long-term Goal



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Slides from Gary Burlingame (Philadelphia Water) WRF Symposium presentation



# GET THE LEAD OUT

## UNDER CURRENT LCR:

- **Lead Service Lines (LSL)** – No requirement for proactive replacement unless system violates Lead Action Levels and optimized corrosion control treatment insufficient
- **Lead Goosenecks** – Not considered a “Lead Service Line” unless connected to a Lead Service Line

## NDWAC RECOMMENDATION:

- **Lead Service Lines (LSL)** – Proactive LSL replacement programs required with water systems working with customers (shared responsibility) to implement full replacement of all LSL’s by 2050
- **Lead Goosenecks** – Included in definition of LSL and replaced as they are encountered

## AMERICAN WATER WORKS ASSOCIATION (AWWA)

- **March 7, 2016** – Board voted unanimously to support the NDWAC recommendations and forge on a path toward removal of all LSL’s

# THE IDEA

Could collection of sequential samples of water in service lines be used to identify the presence of a lead gooseneck?

**PILOT STUDY GROUP:** Four homes suspected to have lead goosenecks, and scheduled for service line replacement

Before replacing service line:

- Disconnect home at meter, and connect home to adjacent service
- After stagnation, collect sequential samples at meter setter to see if lead gooseneck can be detected
- April 4-8 – done!



## How the tests were conducted

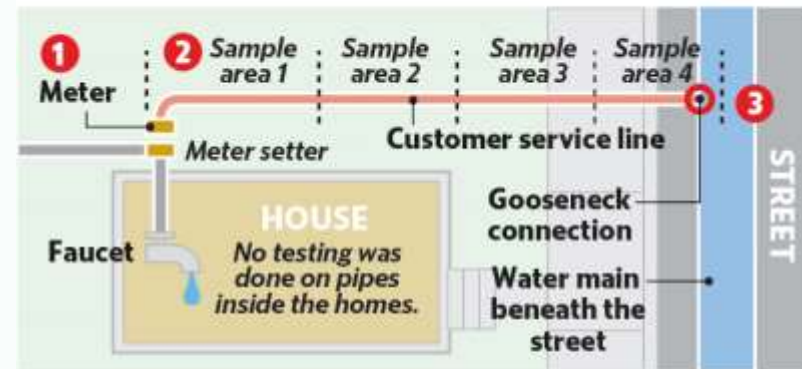
To find lead goosenecks that connect customer service lines to the water main below the street, Tacoma Water tested the water going to four homes for lead. This is an example of how:

### 1. Customer removed from meter, service line

During testing and service line renewal, the meter was removed and the customer was connected to an adjacent service connection.

### 2. Samples collected from service line

The service line was sectioned into four sample areas, one liter of water was removed from each and tested — some after agitating the water line.



### 3. Lead gooseneck detection

The readings from the samples showed levels of lead higher than the EPA action requirement of 15 ppb. Three of the four homes had a lead gooseneck connection to the water main. Those were removed and replaced with new copper service line.

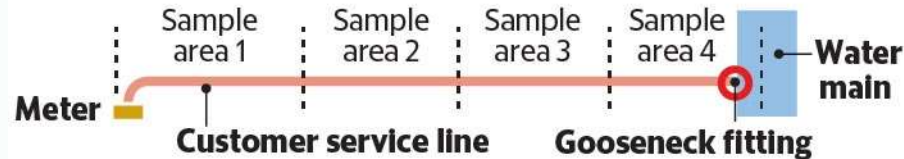
Source: Tacoma Public Utilities

Staff Graphic from The News Tribune

# WHAT TACOMA FOUND (WTF)

## The lead test results

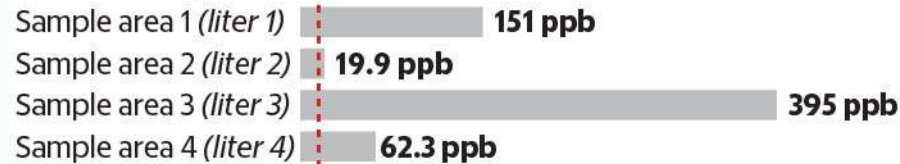
Samples collected by Tacoma Water were consecutive one-liter volumes. For the second sample set, the service line was flushed at max flow and cycled on and off several times.



### HOUSE 1 (1893 12-inch cast iron, lead gooseneck found)

#### First testing

— EPA benchmark: 15 ppb



#### Second testing

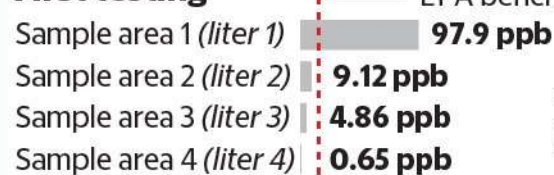


NOTE: House 2 was renewed prior to the second round of testing.

### HOUSE 2 (1893 12-inch cast iron, lead gooseneck found)

#### First testing

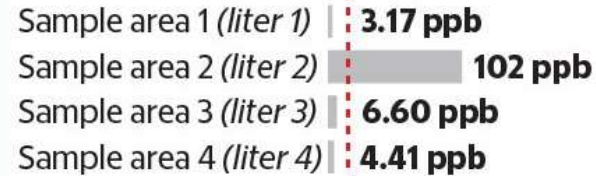
— EPA benchmark: 15 ppb



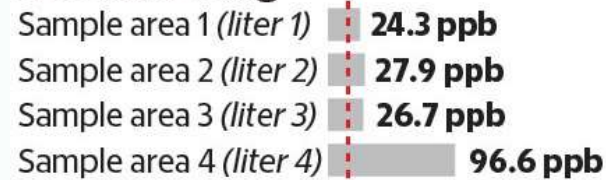
### HOUSE 3 (1905 10-inch cast iron, lead gooseneck found)

#### First testing

— EPA benchmark: 15 ppb



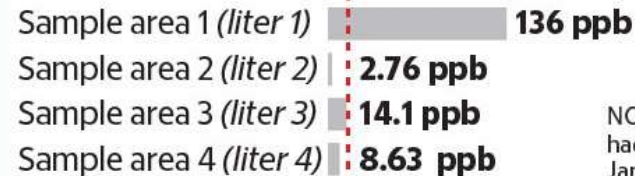
#### Second testing



### HOUSE 4 (1909 12-inch cast iron, no lead gooseneck found)

#### First testing

— EPA benchmark: 15 ppb



#### Second testing



NOTE: House 4 had not had water service since January 2014. No gooseneck fitting was found but entire service line was galvanized.

Source: Tacoma Public Utilities

Staff Graphic from The News Tribune

# IMPENDING STORM

## MONDAY 4/18/16 RESULTS AVAILABLE AND UNDER REVIEW

- Very high lead levels at all four pilot study locations, including site without lead gooseneck
- Meter setter samples with very high lead levels
- We had NO data from inside the homes prior to disruption
- We had NO historical record from lead gooseneck fed homes
- We had NO historical record from galvanized pipe fed homes

## REALIZATIONS SET IN

- This is potentially a VERY BIG problem – real or perceived
- Our Executive Management must be briefed immediately
- We must inform the residents of the involved homes
- We need to inform Washington Department of Health (WDOH) and Tacoma Pierce County Health Department (TPCHD)
- Potential regional implications – contact SPU & Everett

# STORM PREPAREDNESS

## COMMUNICATION NEEDS:

- What do we know
- What don't we know
- How will we find out what we don't know?

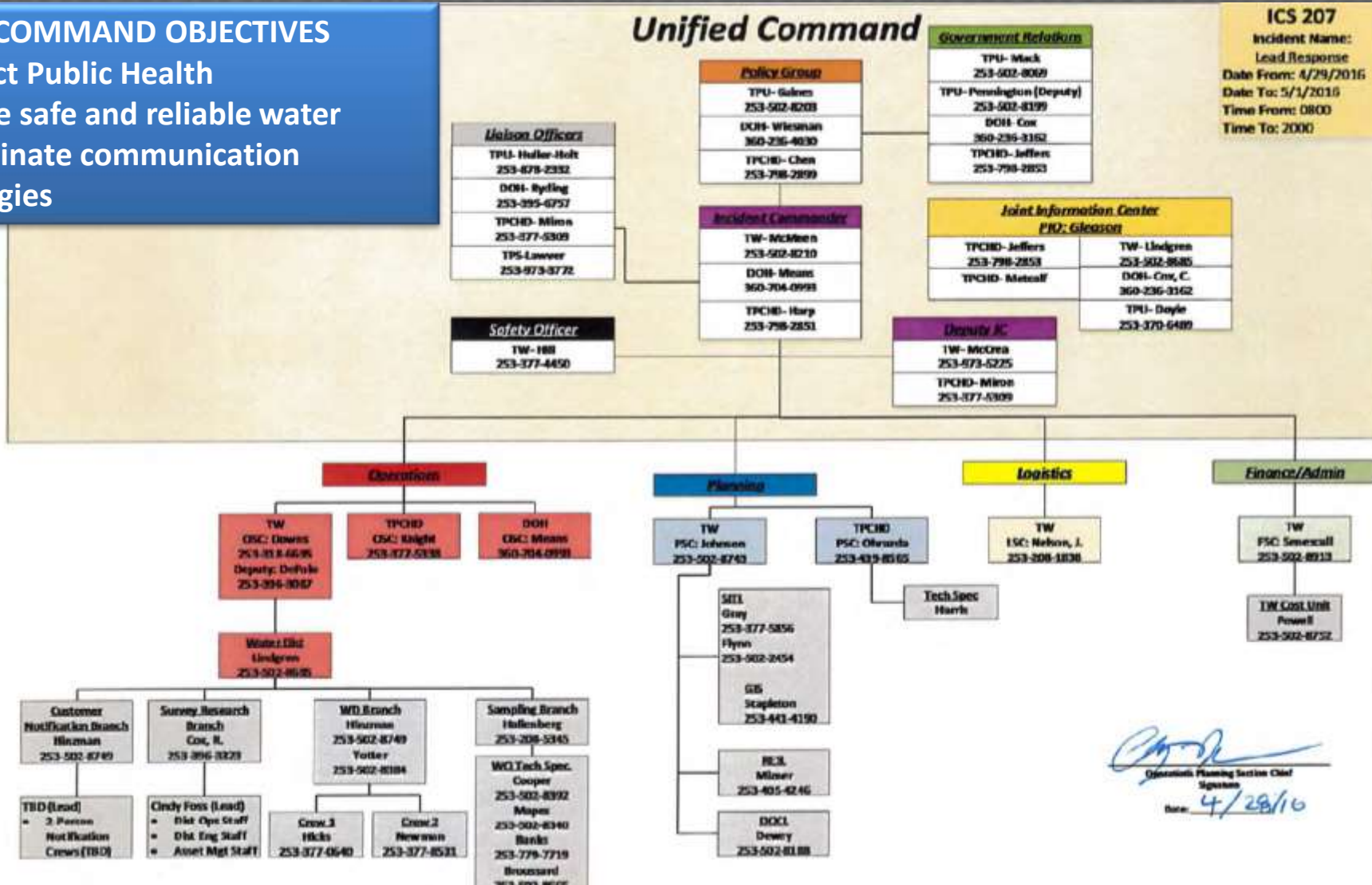
## COMMUNICATION CHALLENGES:

- Incomplete information
- Need for simultaneous notification
- Layers of policy-makers
- Incident command structure challenges
- Privacy questions

# INCIDENT COMMAND – THIS IS NOT A DRILL

## UNIFIED COMMAND OBJECTIVES

- Protect Public Health
- Ensure safe and reliable water
- Coordinate communication strategies



# TELLING OUR STORY FIRST

## NEWS TRIBUNE

- Provide complete context
- Balance legitimate concern with uncertainty
- **April 20** – 1.5 hour briefing with the News Tribune’s editorial leadership & reporters, WDOH, and TPCHD
- **April 20** – News coverage began with video release on News Tribune website & TV interview
- **April 21** – Full article on front page



High levels of lead found in samples at 4 Tacoma homes



# 15 MINUTES OF FAME

## Tacoma utility hunting for old pipes that could be elevating lead levels in water



## 100-year-old data making hunt for old, lead water pipes difficult in Tacoma



## Community receives update about lead testing in Tacoma



## Tacoma's goosenecks at times elusive in century-old records



## Tacoma's goosenecks at times elusive in century-old records



## Tacoma water technicians still determining severity of lead problem



**TACOMA WATER**  
TACOMA PUBLIC UTILITIES

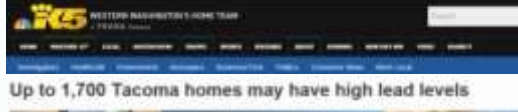


# MEDIA "MVP" – CHRIS MCMEEN

## New tests: Lead level in Tacoma home's tap water a whopping 25 times higher than EPA threshold



## TPU goes hunting for lead goosenecks



## Up to 1,700 Tacoma homes may have high lead levels



## Tacoma water technicians still determining severity of lead problem



## Tacoma businesses, homeowners growing concerned after lead found in water



## Tacoma utility hunting for old pipes that could be elevating lead levels in water



## High levels of lead found in samples at 4 Tacoma homes



# TACOMA SCHOOL SUPERSTORM

## THE NEWS TRIBUNE REQUESTED TACOMA SCHOOL WATER TESTING RECORDS ON APRIL 22...



**April 26**  
2015 results found from 2 schools (up to 2330 ppb)

**April 27**  
Additional 2015 results released

**April 28**  
Additional school fixtures added



Shawn McNeil, Hearst Daily Environmental Services of Federal City, looks up at a clock while waiting a faucet run in a classroom at Mann Elementary School early Tuesday morning before children arrived. McNeil was collecting water samples to test for lead.



# THE CASCADING CRISIS



**13 elementary schools with high lead levels**

Sources: ESRI; Tacoma Public Schools

Staff Map from The News Tribune

**April 29**  
From 2 schools to 13 schools in less than a week

**April 30**  
Metro Parks Tacoma joins in

## Lead scare leads to tests at Metro Parks

BY KATE MARTIN  
kmartin@thenews Tribune.com

Metro Parks Tacoma will test all of its water fountains and several other water sources after concern sparked by a regional lead scare last week.

Spokesman Hunter George said the parks

district could have results from the tests by late next week.

Locations include community centers, water fountains in parks and Tacoma Public Schools' Science and Math Institute at Point Defiance.

Earlier this week, The News Tribune filed a records request with the parks district for the past

three years of lead testing results.

George said only Northwest Trek Wildlife Park in Eatonville has tested water. Water from its groundwater well must be tested for other possible contaminants, but officials there have tested for lead as well, George said. And the amount of lead in that water would not trigger a public health concern.

Concern about lead in water emerged last week, when Tacoma Public Utilities revealed there could be up to 1,700 short lead pipes called goosenecks

that connect water mains to water service lines leading to homes and businesses. None of Metro Parks' buildings are thought to be connected to a gooseneck, George said.

"We never had any reason for a concern until TPU alerted the community (to the possible lead connectors)," George said. "... We want to cover the whole district, and depending on results we will be prepared to act swiftly."

Kate Martin:  
253-597-8542,  
@KateReports

# COMMUNICATION PLANNING

## COMMUNICATION MESSAGES:

- Customer's health is the highest priority
- We have data that suggests a possible problem
- We have a plan in motion to answer the questions
- There is something customers can do – flushing works
- We WILL fix this problem

**WE DEPENDED ON THE HEALTH AGENCIES TO PROVIDE DEEPER  
LEAD EXPOSURE CONTEXT**

# LET'S TRY THIS AGAIN

## LEAD INVESTIGATIVE SAMPLING PLAN DEVELOPED IN COORDINATION WITH WDOH AND TPCHD

### 3 OCCUPIED PILOT STUDY HOMES (GROUP 1)

- Post-renewal, in home, normal flow, no stagnation
- Post-renewal, in home, normal flow, stagnation (> 6 hours)
- Post-renewal, in home, flush flow, stagnation

### 12 POTENTIAL LEAD GOOSENECK HOMES (GROUP 2)

- Pre-renewal, in home, normal flow, stagnation
- Pre-renewal, in home, flush flow, stagnation
- Pre-renewal, service line, stagnation (similar to original Pilot Study)
- Post-renewal, in home, normal flow, stagnation

# SAMPLING OBJECTIVES

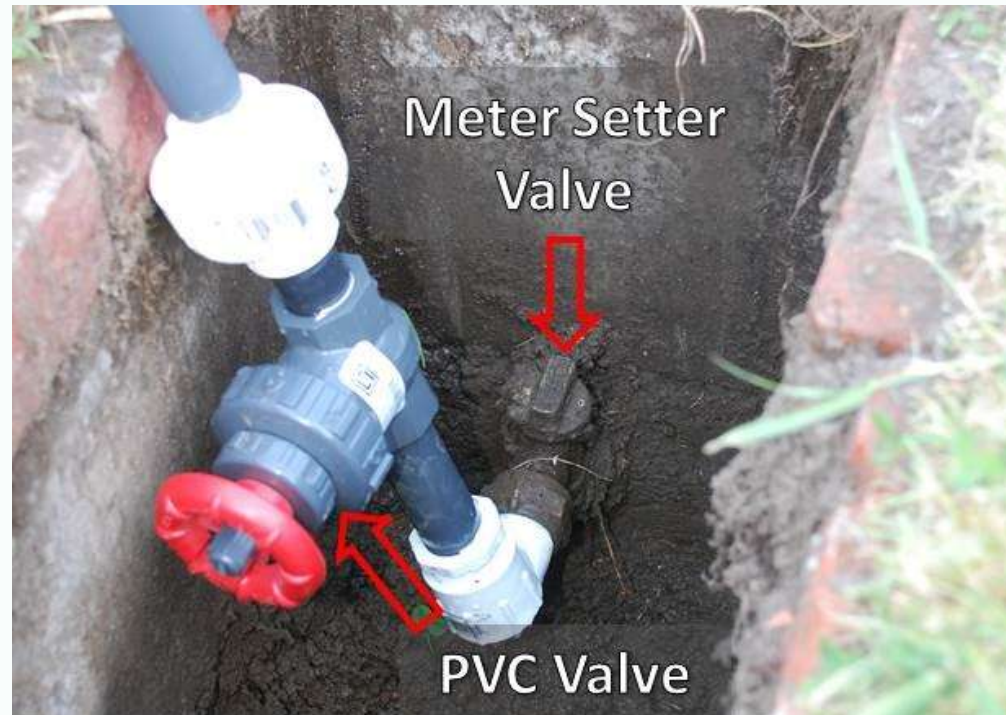
1. Understand if lead is present in first draw (after a stagnation period) samples, and subsequent flowing samples at levels of concern
2. Identify, if possible, the most likely source of lead that is detected (particulate vs. dissolved)
3. Verify if customer flushing recommendations are adequate, or excessive, to mitigate any detected lead
4. Specifically help identify if a lead gooseneck is present
5. Better inform broader sampling plan for the remaining homes and businesses with potential lead goosenecks

# ELIMINATING VARIABLES

## SERVICE LINE SAMPLE PROCEDURE MODIFIED FOR 6 OF THE 12 “GROUP 2” HOMES FOLLOWING ELEVATED LEAD LEVELS FROM THE INITIAL “NON-FLUSHED” SERVICE LINE SAMPLES

### MODIFIED “FLUSHED” PROCEDURE

- Following meter removal, downstream PVC valve installed on meter setter
- Meter setter valve opened and flushed for 2 minutes
- Meter setter valve left open and undisturbed until after stagnation samples were collected
- PVC valve closed to allow isolation for stagnation
- PVC valve used for collection of samples following stagnation



# OBJECTIVE OUTCOMES

1. Understand if lead is present in first draw (after a stagnation period) samples, and subsequent flowing samples at levels of concern

**OUTCOME:** THIS DOES NOT APPEAR TO BE THE CASE

- PILOT STUDY IN-HOME FOLLOW UP TESTS
  - All below 1 ppb
- 12 ADDITIONAL HOMES TESTED (6 WITH LEAD GOOSENECKS)
  - 464 Total Samples Analyzed
  - All well below 15 ppb Action Level for lead
  - 92% of the results were less than 1 ppb
  - Highest result was 4.31 ppb





# MORE OBJECTIVE OUTCOMES

2. Identify, if possible, the most likely source of lead that is detected

**OUTCOME:** ONLY SAMPLES ABOVE LEAD ACTION LEVEL WERE THOSE COLLECTED AT THE SERVICE LINE AND APPEARED TO BE ASSOCIATED WITH METER SETTER VALVE MANIPULATIONS

3. Verify if customer flushing recommendations are adequate, or excessive, to mitigate any detected lead

**OUTCOME:** LOW IN HOME SAMPLE RESULTS INDICATED THAT ROUTINE CUSTOMER FLUSHING MAY NOT BE NECESSARY, ALTHOUGH THIS IS STILL BELIEVED TO BE BEST PRACTICE AFTER WATER HAS NOT BEEN IN USE FOR LONGER PERIODS OF TIME

SERVICE LINE SAMPLES DEMONSTRATED IMPORTANCE OF FLUSHING FOLLOWING DISTURBANCES OR DISRUPTION WITHIN THE PIPING SYSTEM

# FINAL OBJECTIVE OUTCOMES

## 4. Specifically help identify if a lead gooseneck is present

**OUTCOME:** RESULTS WERE INCONCLUSIVE WITH A GREAT DEAL OF VARIABILITY FROM IN HOME SAMPLES BELIEVED TO BE RELATED TO INTERFERENCES FROM PLUMBING AND FIXTURES

POTENTIAL MAY EXIST FOR METER SETTER SAMPLING BUT ADDITIONAL SAMPLING WOULD BE REQUIRED TO VALIDATE

## 5. Better inform broader sampling plan for the remaining homes and businesses with potential lead goosenecks

**OUTCOME:** NO CLEAR “SIGNATURE” SEEN FROM IN HOME SAMPLING TO INDICATE PRESENCE OF LEAD GOOSENECK

DECISION MADE TO OFFER A LEAD SAMPLE TEST KIT PROGRAM TO PROVIDE ADDITIONAL ASSURANCE FOR CONCERNED CUSTOMERS

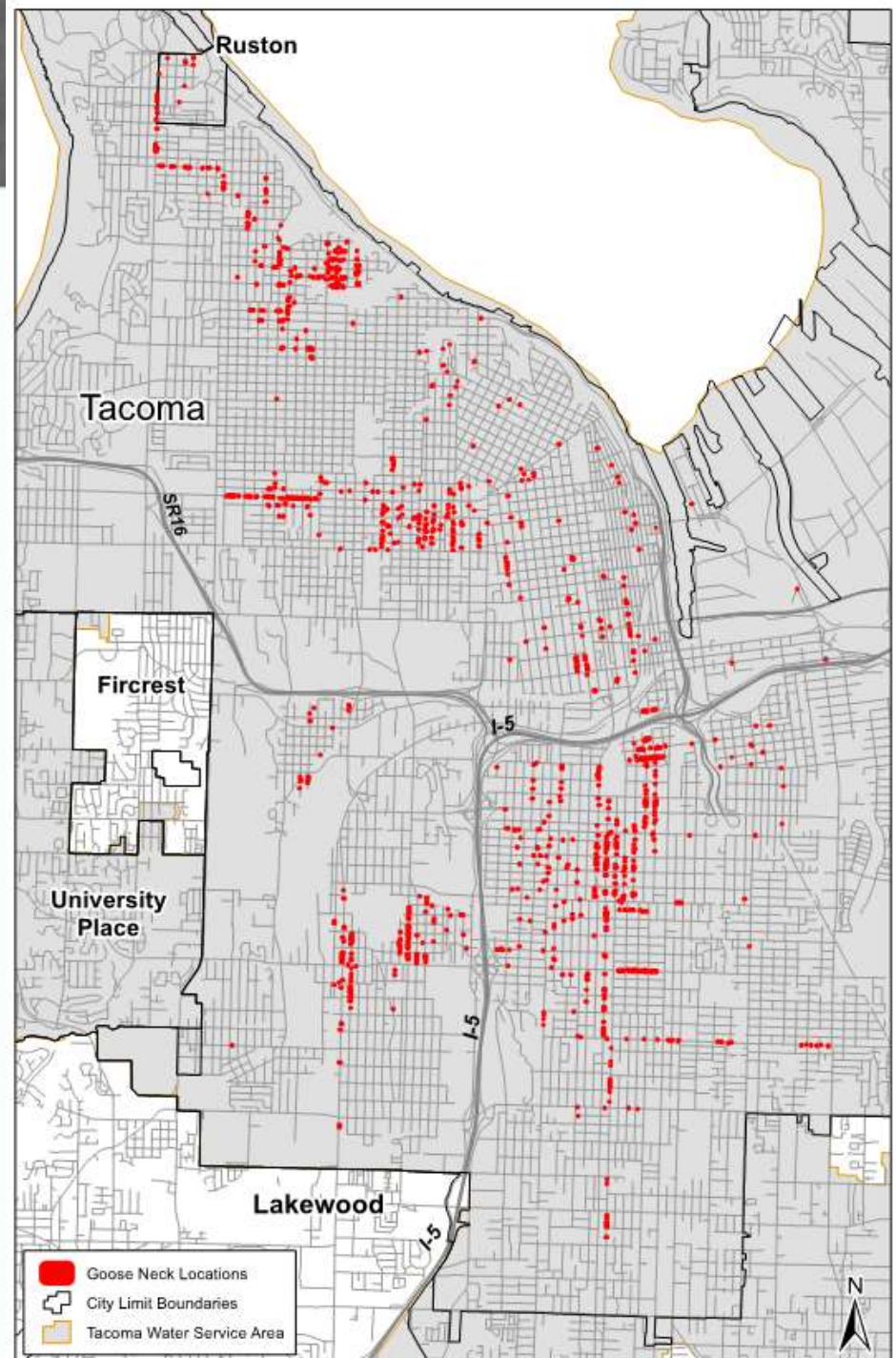
# HOW MANY?

## APRIL 2016

- ESTIMATED **1,700**

## MAY 2016

- REDUCED TO APPROXIMATELY **1,200** THROUGH DATA COLLECTION
- USED FOR BUDGET PLANNING



## Key Statistics

| Statistic                             | Quantity |
|---------------------------------------|----------|
| Total Potential Goosenecks Identified | 1,215    |
| Goosenecks Resolved                   | 397      |
| Potential Goosenecks Remaining        | 818      |
| Project Completion Percent            | 33%      |

\*Resolved means service replaced or confirmed no gooseneck

