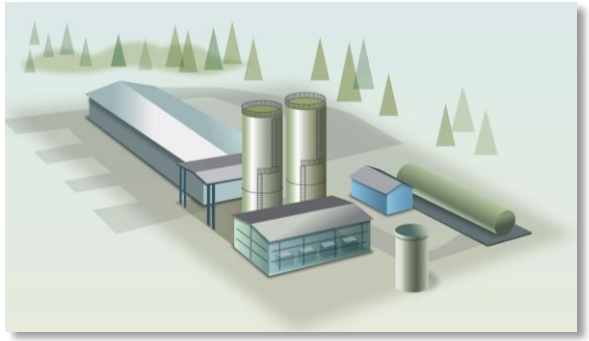
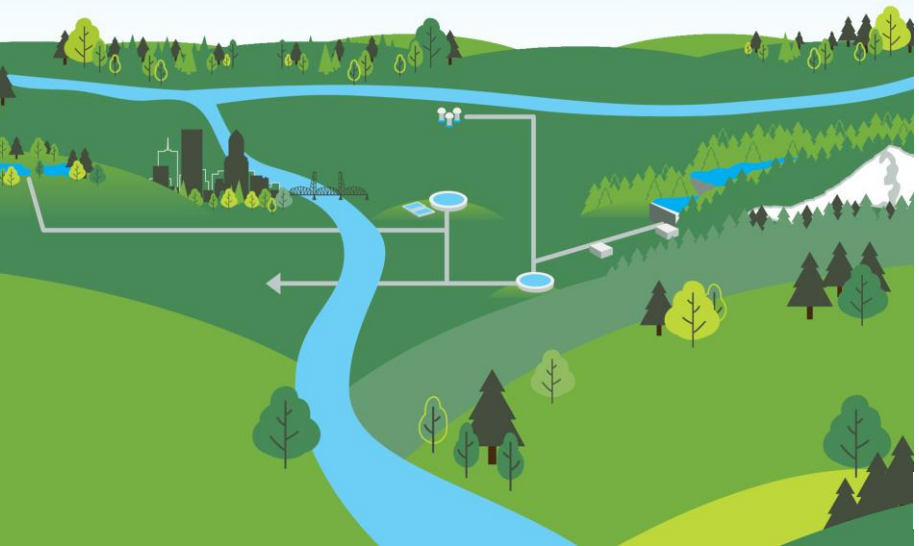





PORTLAND WATER BUREAU

Bull Run Treatment Program

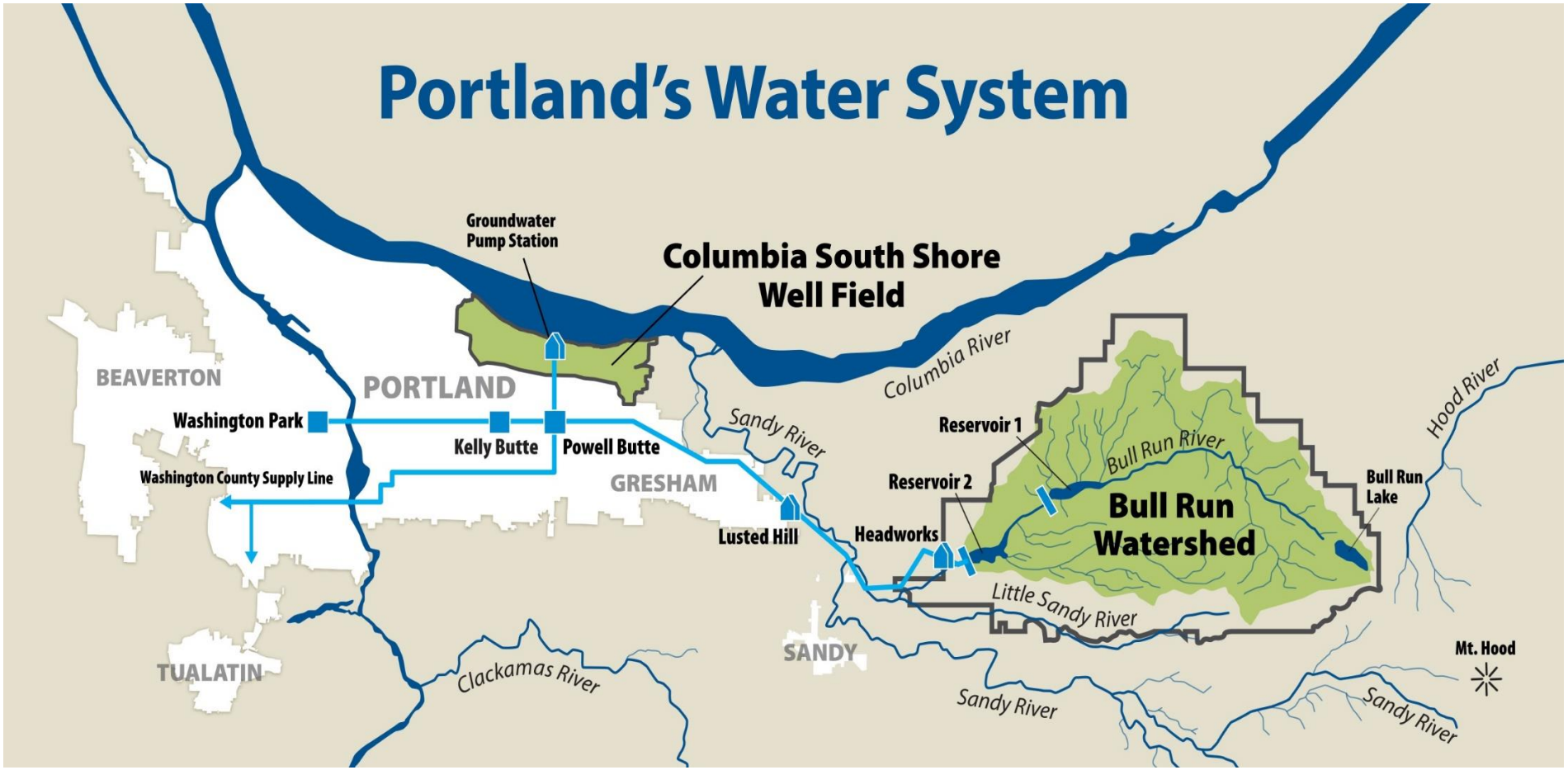
IMPROVED CORROSION CONTROL TREATMENT PROJECT



Michelle Cheek
May 2, 2019

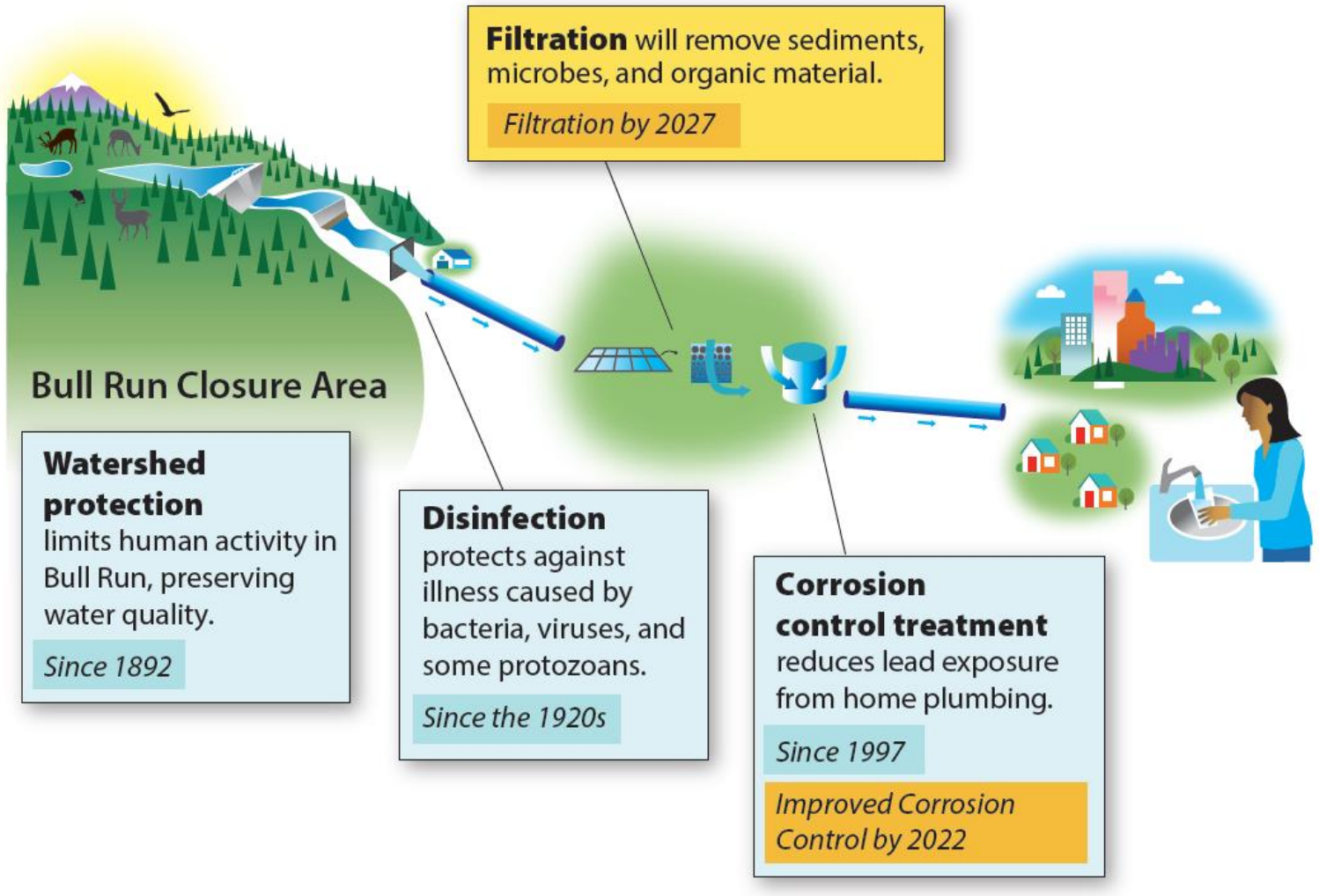
PORTLAND WATER BUREAU
FROM FOREST TO FAUCET

CITY OF PORTLAND, OREGON 1851



- Serves almost a million people
- Uses 100 million gallons of water on an average day
- Serves the City of Portland and 19 wholesale water districts

Bull Run Treatment Projects



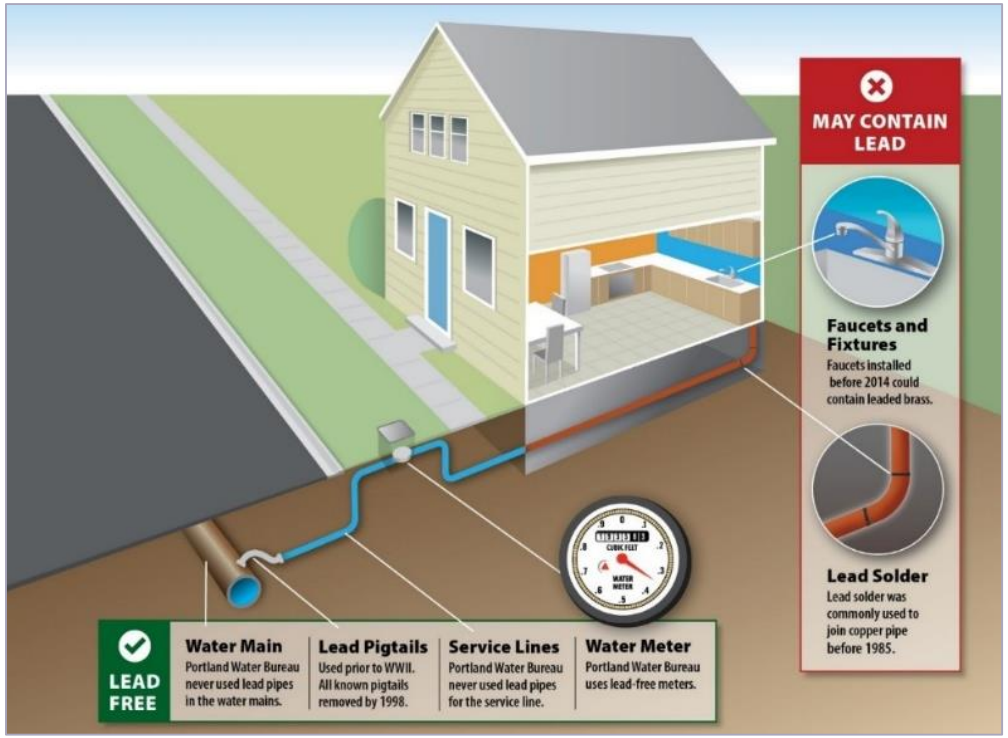
Why are the projects needed?

These projects are being built to comply with Environmental Protection Agency (EPA) regulations.

Oregon Health Authority has set compliance schedules.

Sources of Lead in Portland

- Portland never used lead service lines
- Removed all known lead pigtails
- Copper pipes with lead solder is the main concern for Portland's water
  - Most common in homes plumbed or built from 1983-1986 (per the LCR)
- In Portland, it is believed that lead paint is the greatest source of exposure to lead



Portland's Compliance with the LCR

1994

Optimized Treatment Study

- Recommends pH 9.0, alkalinity 20 mg/L as Optimized Corrosion Control Treatment
- City Council directs PWB to investigate alternatives to recommended treatment

1997

City proposes a comprehensive Lead Hazard Reduction Program (LHRP)

- Lead in Water Education Testing
- Public Education and Community Outreach
- Home Lead Hazard Control Program
- Water Treatment and Monitoring (pH adjustment only)

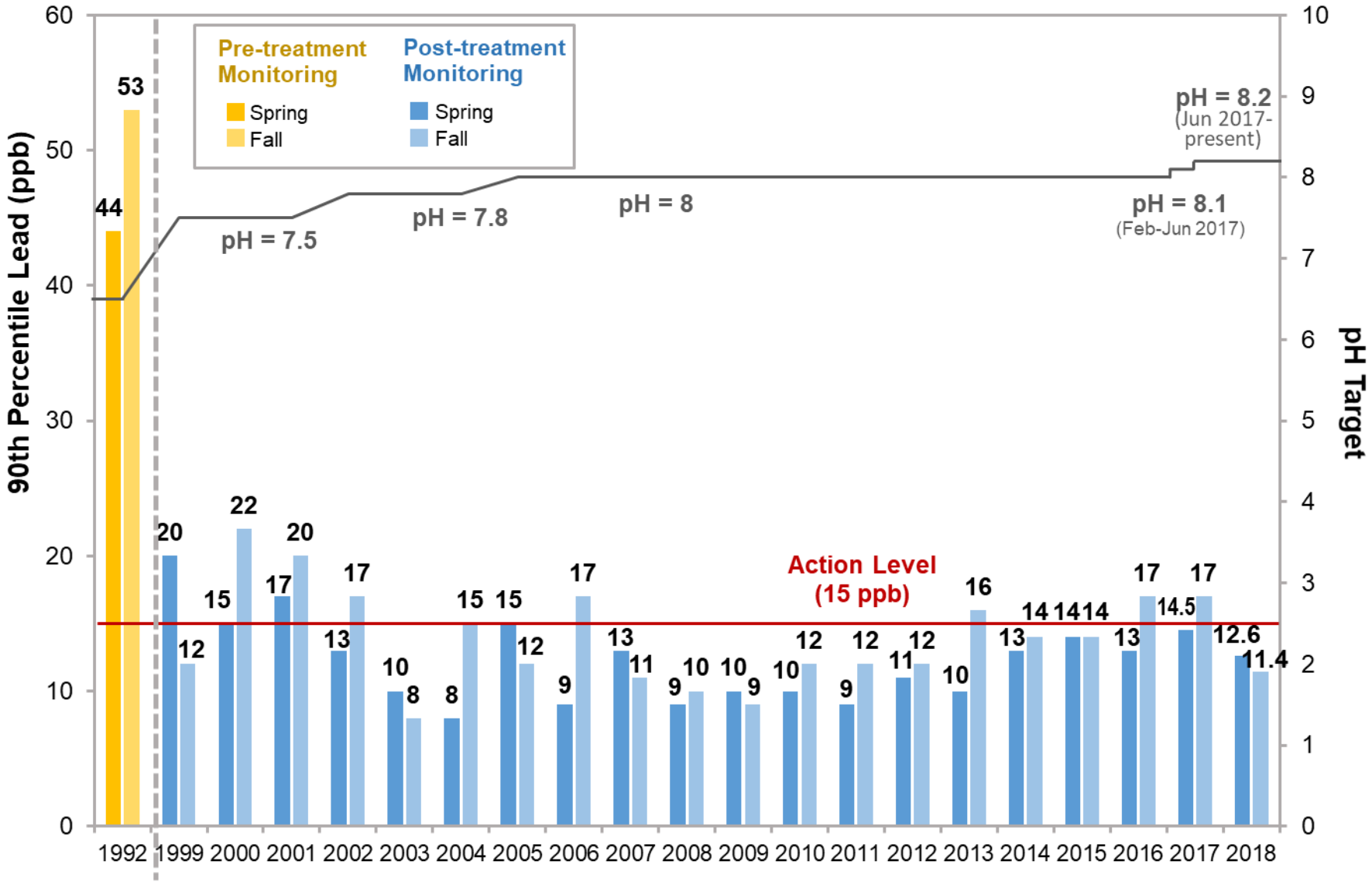
1997

State approves LHRP as Optimized Corrosion Control Treatment

1997-present

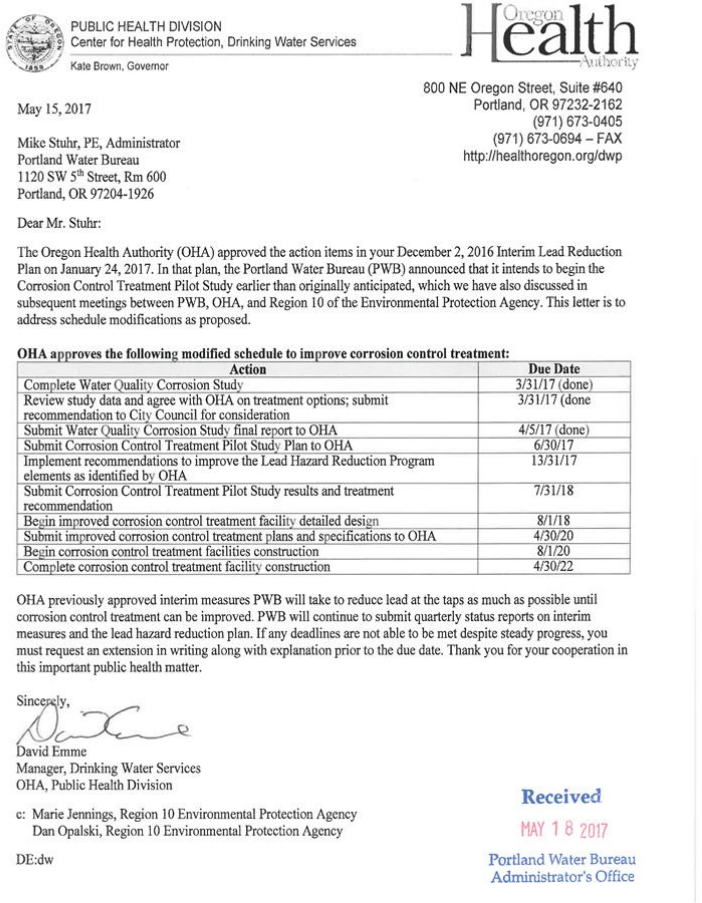
City operates under LHRP to remain in compliance with LCR

Portland Joint Monitoring 90th Percentile Lead Levels



Corrosion Control: Where We Are Today

- Completed Water Quality Corrosion Study – 2014 to 2017
  - Goal: better understand role of water quality on metals release
  - Not a treatment study
- OHA/PWB agree on compliance plan in 2016
  - Interim Lead Reduction Plan
  - pH to 8.2
  - Corrosion control pilot study
  - Compliance schedule for improved corrosion control treatment by 2022



PUBLIC HEALTH DIVISION
Center for Health Protection, Drinking Water Services
Kate Brown, Governor

Oregon Health Authority

800 NE Oregon Street, Suite #640
Portland, OR 97232-2162
(971) 673-0405
(971) 673-0694 – FAX
http://healthoregon.org/dwp

May 15, 2017

Mike Stuhr, PE, Administrator
Portland Water Bureau
1120 SW 5th Street, Rm 600
Portland, OR 97204-1926

Dear Mr. Stuhr:

The Oregon Health Authority (OHA) approved the action items in your December 2, 2016 Interim Lead Reduction Plan on January 24, 2017. In that plan, the Portland Water Bureau (PWB) announced that it intends to begin the Corrosion Control Treatment Pilot Study earlier than originally anticipated, which we have also discussed in subsequent meetings between PWB, OHA, and Region 10 of the Environmental Protection Agency. This letter is to address schedule modifications as proposed.

OHA approves the following modified schedule to improve corrosion control treatment:

Action	Due Date
Complete Water Quality Corrosion Study	3/31/17 (done)
Review study data and agree with OHA on treatment options; submit recommendation to City Council for consideration	3/31/17 (done
Submit Water Quality Corrosion Study final report to OHA	4/5/17 (done)
Submit Corrosion Control Treatment Pilot Study Plan to OHA	6/30/17
Implement recommendations to improve the Lead Hazard Reduction Program elements as identified by OHA	13/31/17
Submit Corrosion Control Treatment Pilot Study results and treatment recommendation	7/31/18
Begin improved corrosion control treatment facility detailed design	8/1/18
Submit improved corrosion control treatment plans and specifications to OHA	4/30/20
Begin corrosion control treatment facilities construction	8/1/20
Complete corrosion control treatment facility construction	4/30/22

OHA previously approved interim measures PWB will take to reduce lead at the taps as much as possible until corrosion control treatment can be improved. PWB will continue to submit quarterly status reports on interim measures and the lead hazard reduction plan. If any deadlines are not able to be met despite steady progress, you must request an extension in writing along with explanation prior to the due date. Thank you for your cooperation in this important public health matter.

Sincerely,

David Emme
Manager, Drinking Water Services
OHA, Public Health Division

c: Marie Jennings, Region 10 Environmental Protection Agency
Dan Opalski, Region 10 Environmental Protection Agency

DE:dw

Received
MAY 18 2017
Portland Water Bureau
Administrator's Office

Corrosion Control: Where We Are Today

- In 2018:
  - Completed corrosion pilot study
    - pH and alkalinity adjustment recommended
- In the meantime…*Cryptosporidium*


BLOGTOWN

NEWS • CITY HALL • $$$

Portland Is Going to Build a Massive Filtration Plant for Its Oft-Lauded Water Supply

by Dirk VanderHart · Aug 2, 2017 at 5:26 pm

Like 104 Share Tweet

The Bull Run Watershed, source of most of Portland's water. CITY OF PORTLAND


Local | News | Water

Portland City Council Moves Forward With Water Filtration Plant

by Ericka Cruz Guevarra Follow OPB Aug. 2, 2017 5:17 p.m. | Updated: Aug. 3, 2017 11:01 a.m.

#ThisWeekinHistory


Environment | Water | News | Local

Oregon Rules Port … tment Facility

… OPB May 23, 2017 10 a.m. | Portland

Bull Run Watershed

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Stay up to date on the day's top news headlines and OPB's in-depth reporting on issues

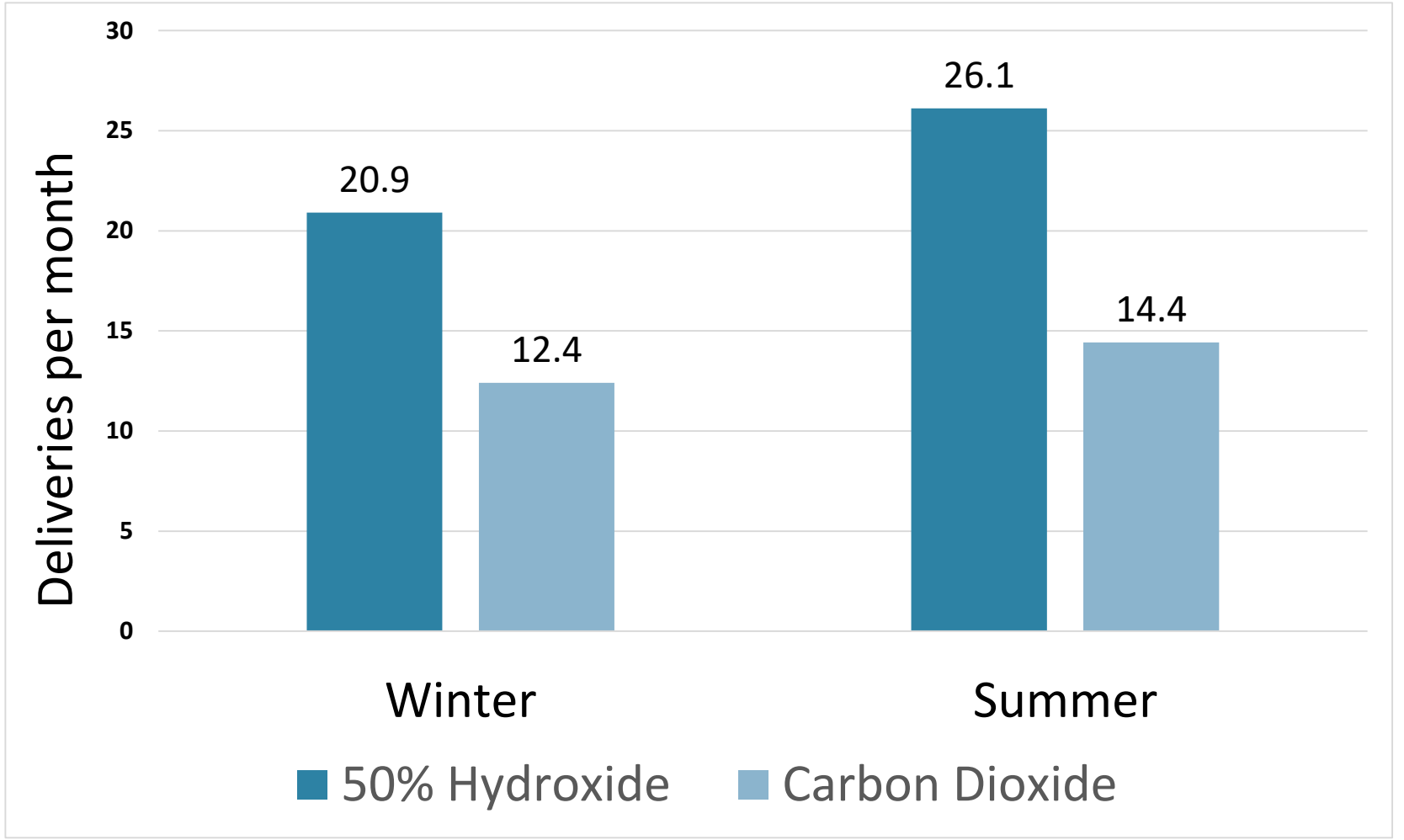
Improved Corrosion Control Treatment

- pH and alkalinity adjustment to Bull Run water
  - Minimum pH 8.5 and alkalinity 25 mg/L as $CaCO_3$ in distribution system
  - Accepted by Oregon Health Authority (OHA) in October 2018
- Located at existing Lusted Hill facility
- Temporary facility
- Designer: Stantec Consulting

Chemical System Considerations

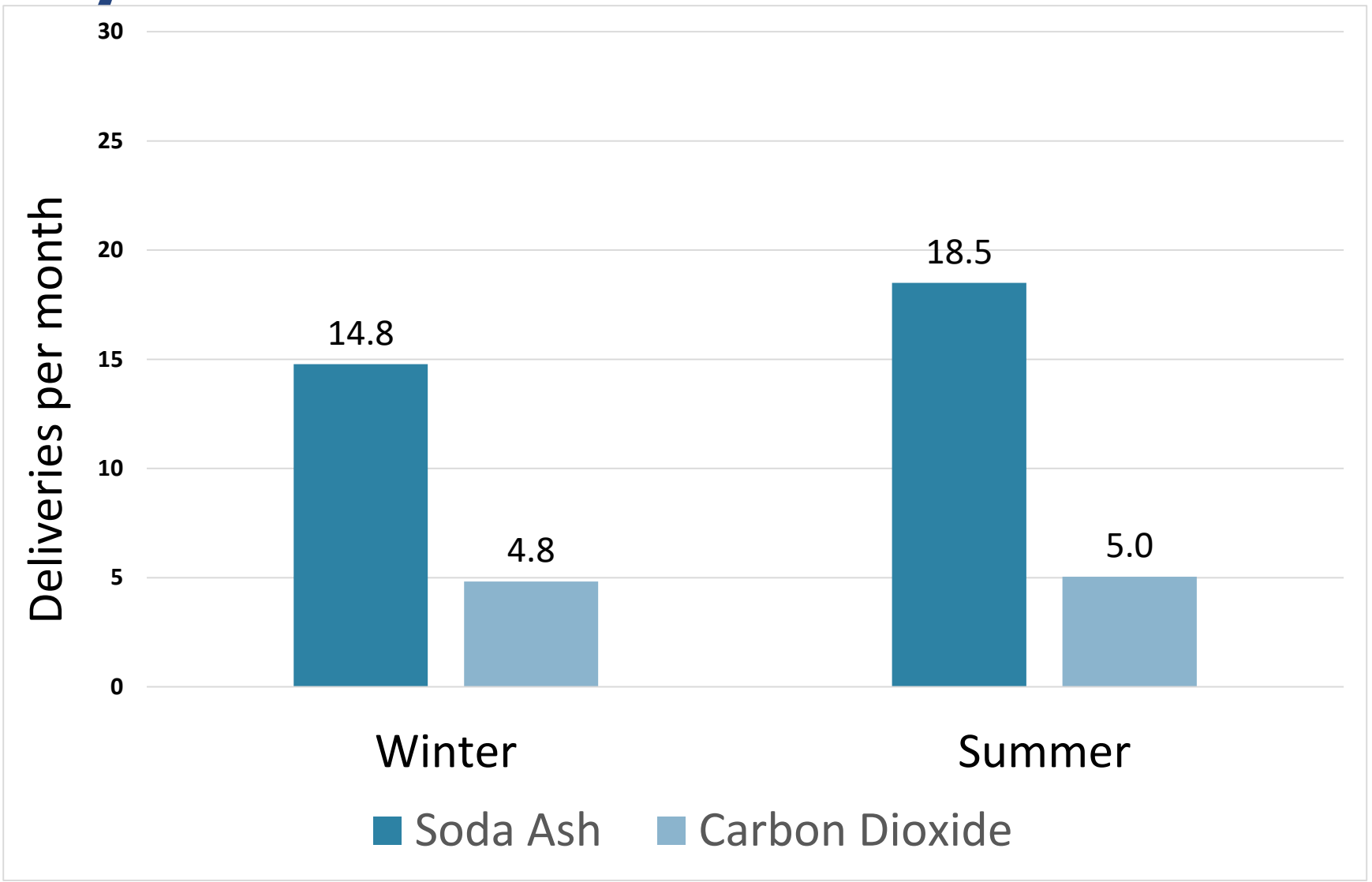
- Chemical Options
  - Sodium hydroxide and carbon dioxide
  - Soda ash and carbon dioxide
  - ~~Sodium hydroxide and sodium bicarbonate~~
- Chemical usage and deliveries
- Construction schedule – long lead items
- Capital, annual O&M, and 7-year lifecycle costs

Monthly Chemical Deliveries



Current system = 4 – 6 deliveries/month

Monthly Chemical Deliveries



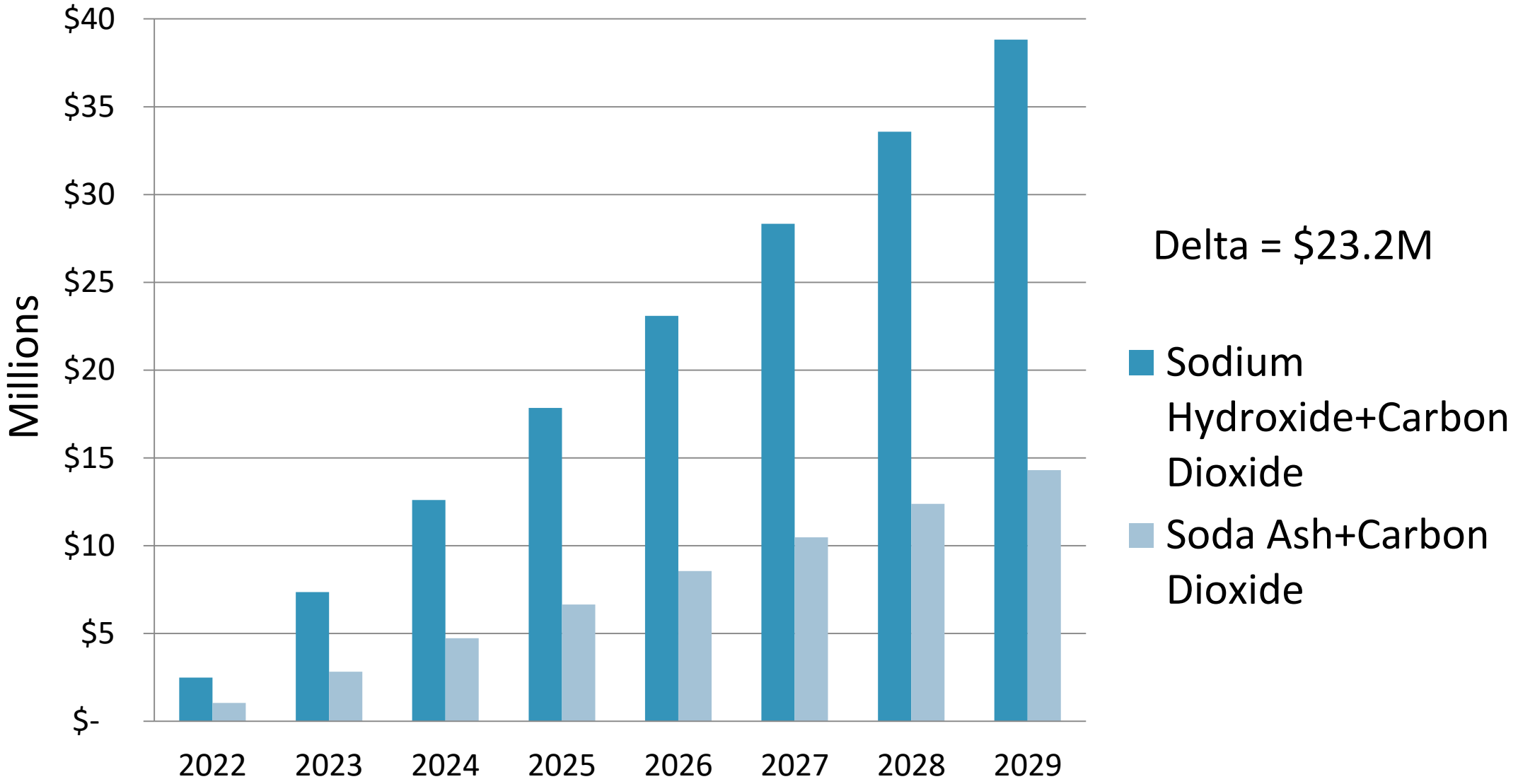
Long-Lead Items

Equipment	Shop Drawings after Purchase Order (Weeks)	Delivery after Approved Shop Drawings (Weeks)
Hydroxide Tanks	4	8 – 10
Hydroxide Pumps	2 – 3	6 – 10
CO2 Storage Tanks	3	6 – 12
CO2 Feed System	4 – 6	14 – 16
Soda Ash Silo + Feed System	***12 – 14***	16 – 18
Soda Ash Silo only	3	10

Annual Chemical Costs

Water Quality	Sodium Hydroxide and Carbon Dioxide	Soda Ash and Carbon Dioxide	Delta
pH 8.6 35 mg/L alkalinity	$4.9M	$1.8M	$3.1M

Cumulative Chemical Costs (fixed 2018 dollars)

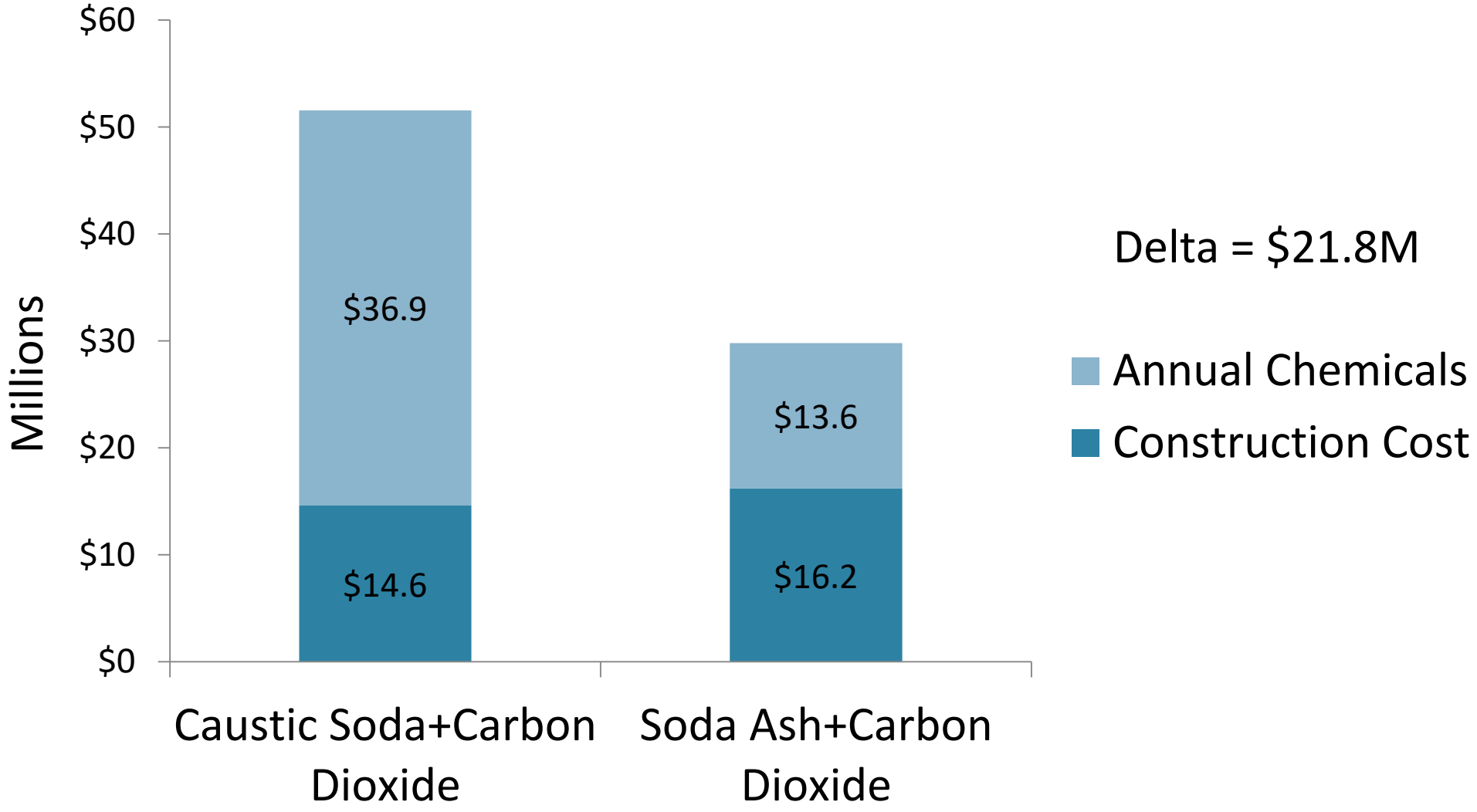


Conceptual Capital Costs

Chemical Option	Conceptual Construction Cost
Sodium Hydroxide + Carbon Dioxide	$14.6M
Soda Ash + Carbon Dioxide	$16.2M
Delta	($1.6M)

- Excludes carrier water pump station, new injection piping to conduits – common to both options
- No engineering, construction admin, PWB admin or permitting costs

7-Year Construction + Chemical Cost (fixed 2018 dollars)



Other Comparisons

- Operational Labor
  - Roughly equal
  - Sodium hydroxide: more deliveries, more hazardous to operators
  - Soda ash dry feed: more labor intensive?
- Energy cost
  - Soda ash cheaper
  - Does not require temperature controlled rooms like 50% sodium hydroxide
- Replacement part cost
  - Roughly equal
  - Sodium hydroxide – very corrosive
  - Soda ash – abrasive

Conclusions

- 7-Year Construction + Chemical Costs
  - Sodium hydroxide/carbon dioxide system = $51.5 M
  - Soda ash/carbon dioxide system = $29.8 M (approximately half NaOH)
- Monthly Truck Deliveries
  - Sodium hydroxide/carbon dioxide system = 33 – 41 (winter – summer)
  - Soda ash/carbon dioxide system = 20 – 27 (winter – summer)

Conclusions

- Health and Safety
  - Sodium hydroxide/carbon dioxide: More trucks, unloading needs supervision
  - Soda ash/carbon dioxide: Less trucks, unloading may not need supervision
- Operations
  - Sodium hydroxide/carbon dioxide: Staff to receive daily chemical deliveries; chemical handling
  - Soda ash/carbon dioxide: potentially more labor intensive; 24 hr operations needed?
- **Recommendation: Soda Ash & Carbon Dioxide**

Improved Corrosion Control Treatment - Design

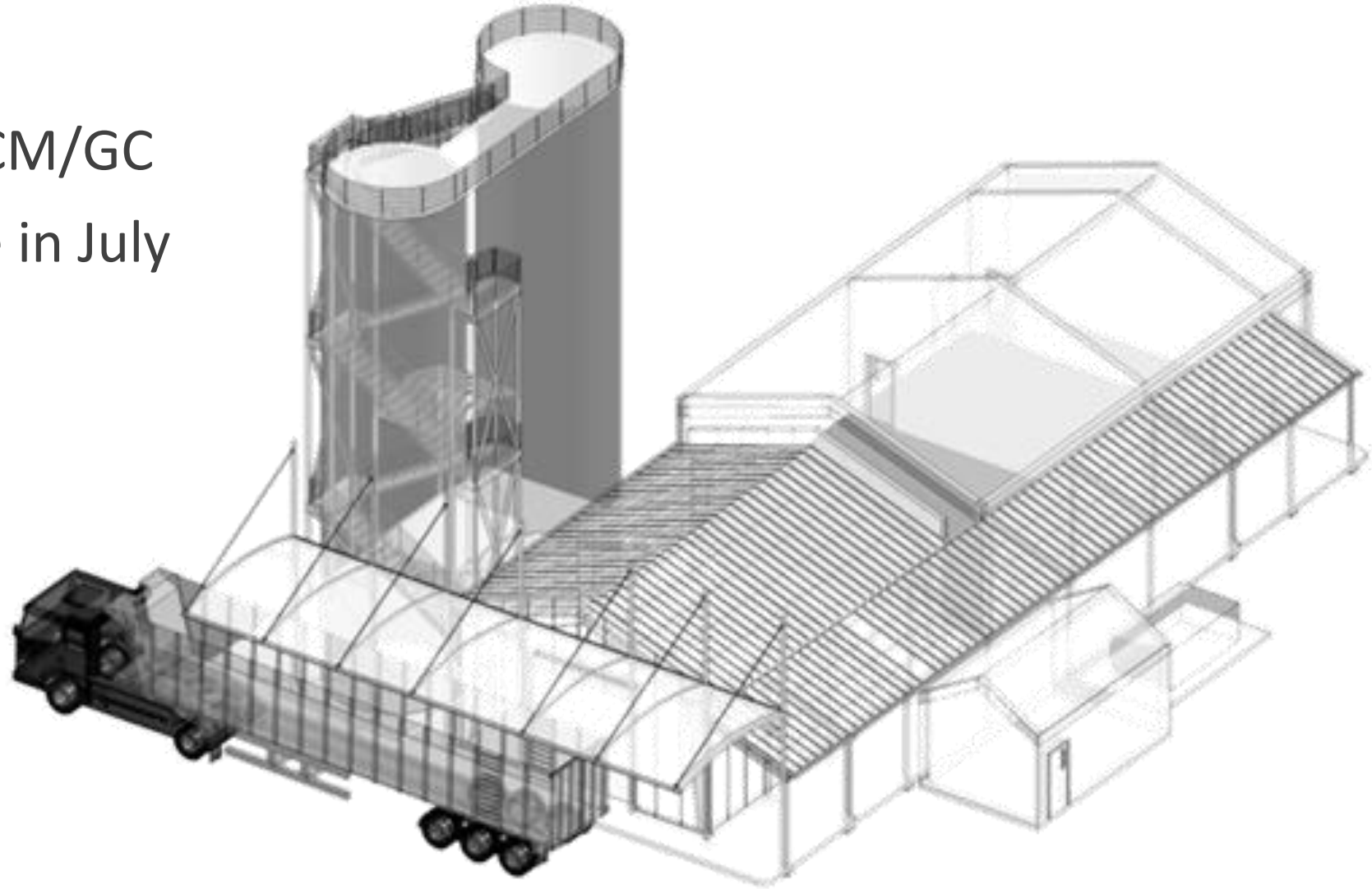
- Level of Service Goals
  - Uninterrupted regulatory compliance
  - Consider short-term system life in balancing capital costs and O&M requirements
- Guiding principles:
  - No single points of failure: provide redundant equipment of readily-available shelf spares
  - On-site chemical storage can be reduced if off-site storage is assured
  - Consider the ability to re-purpose equipment to future treatment plant
  - All equipment does not need to be indoors or in tightly climate-controlled areas, but weather protection appropriate for anticipated activities

Improved Corrosion Control Treatment - Design

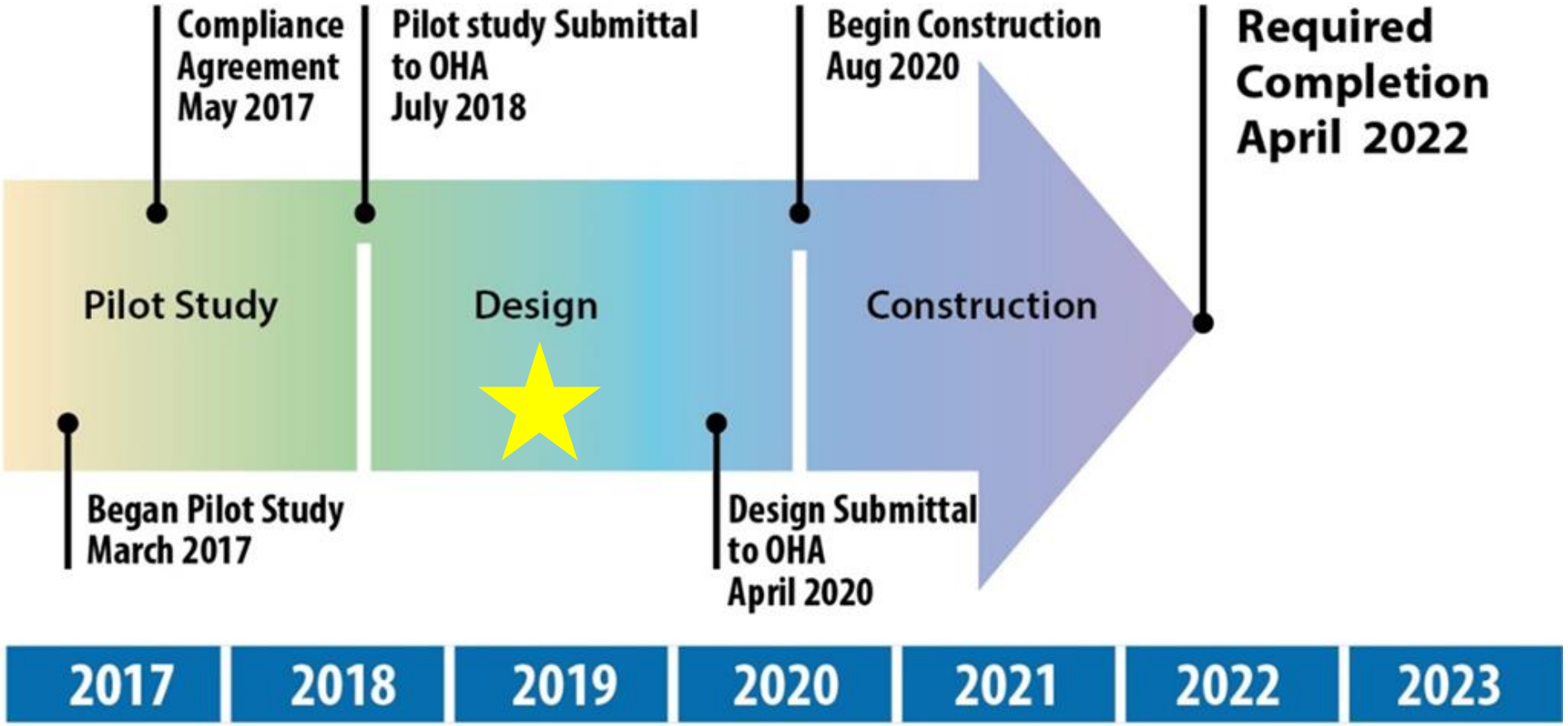
- Recent Activities
  - Completed 30% Design
  - Submitted land use application to Multnomah County
  - Selected Construction Manager/General Contractor (CM/GC)
    - 3 Proposers – Hoffman, Mortenson, MWH Constructors
    - After interviews, selected MWH Constructors

Improved Corrosion Control Treatment - Design

- Upcoming Activities
  - Kick-off meeting with CM/GC
  - 60% design – complete in July



Schedule Status

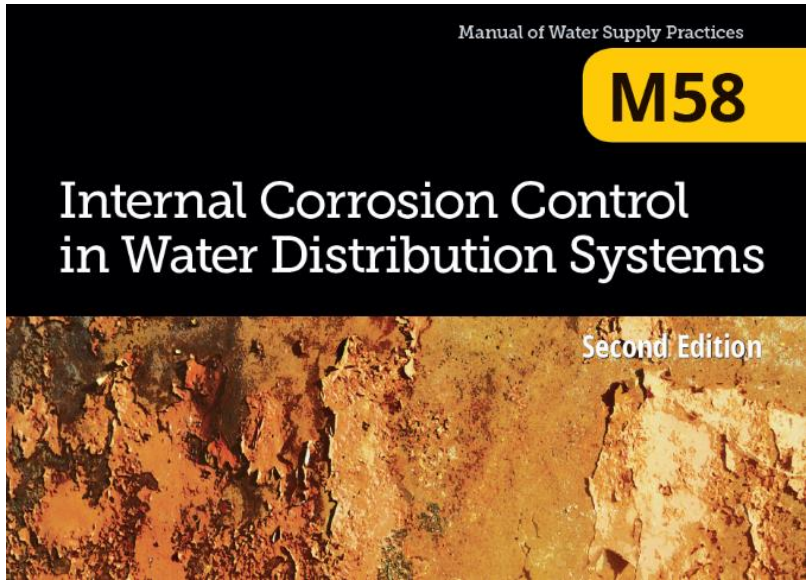


Corrosion Control will need to be revisited as part of the new filtration plant

Oregon Health Authority
Drinking Water
Oregon Drinking Water Services

OAR 333-061-0034 (2)(d)(C)(iii): At any water system considered to have optimized corrosion control treatment, water suppliers must notify the Authority in writing of any **upcoming, long term change in treatment** or if a new water source will be utilized.

- Selection of a corrosion control technique may not be a one-time event. **Any change in water treatment** or source water may require a system to reevaluate corrosion control…



Acknowledgements

- Black & Veatch – Water Quality Corrosion Study
- Confluence Engineering Group – Corrosion Control Pilot Study
  - HDR, Cornwell, Black & Veatch
- Stantec Consulting Inc. – Design
- PWB – Yone Akagi, Kimberly Gupta, Mac Gifford, Thomas Krause, Tony Re, PWB Lab