

Status Report on Settlement



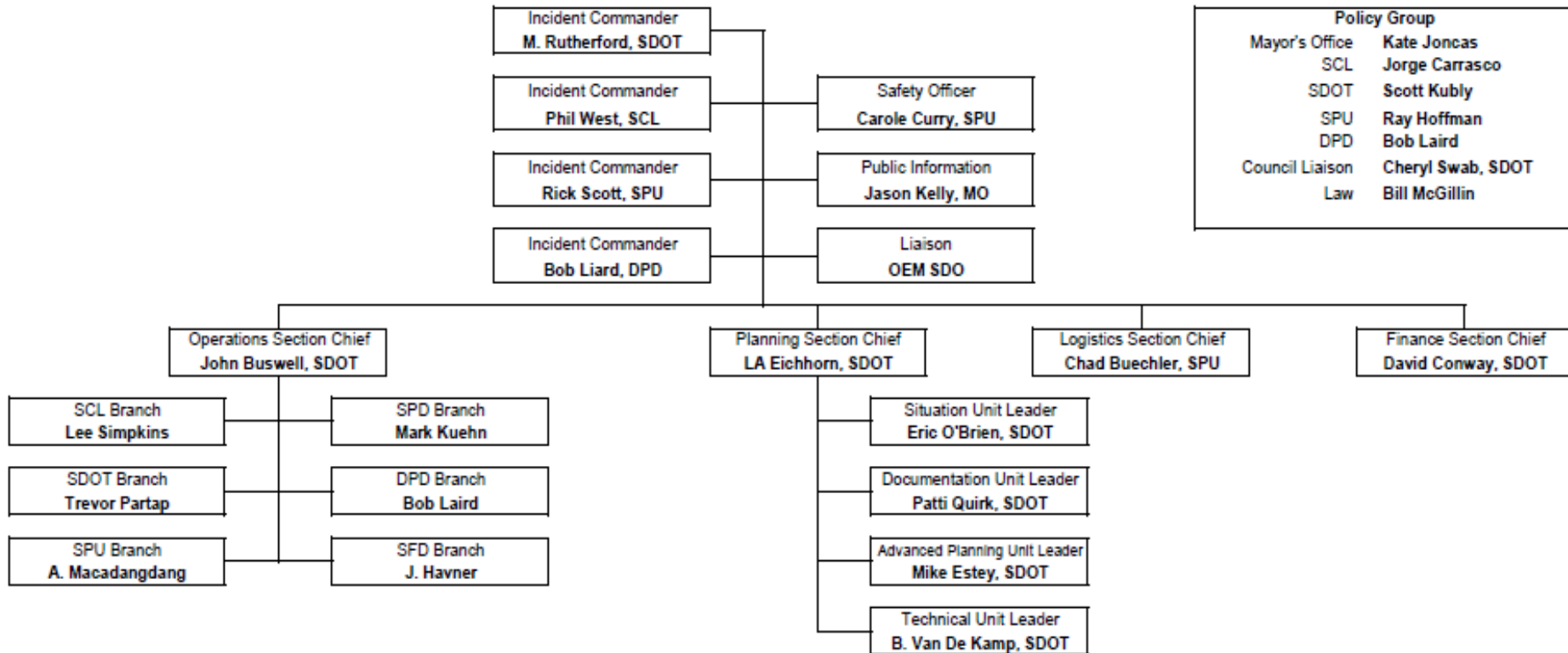
City Council Briefing
December 15, 2014



City Response

- Timeline
 - November 21: SDOT informed of minor settlement (~0.1")
 - December 3: SDOT informed of "measurement anomaly" in deep benchmarks (~1.2")
 - December 4: SDOT informed "measurement anomaly" was less likely
 - December 4: Activated Unified Command Structure
 - December 5: 1st Operational Period and meeting with public and private agencies
- Key risks of ground settlement:
 - Potential damage to utilities, buildings and roadways
 - Potential viaduct weight restrictions or closure
- Immediate Actions:
 - Activation of City's emergency response
 - Identify risks to asset owners in area of settlement
 - Request and evaluate data from WSDOT
 - Assess magnitude of settlement and resulting risks

Unified Command Structure



- Benefits of Unified Command Structure
 - High state of situational awareness and readiness
 - Ability to respond to operational issues and advance planning
 - Ability to respond to multiple incidents

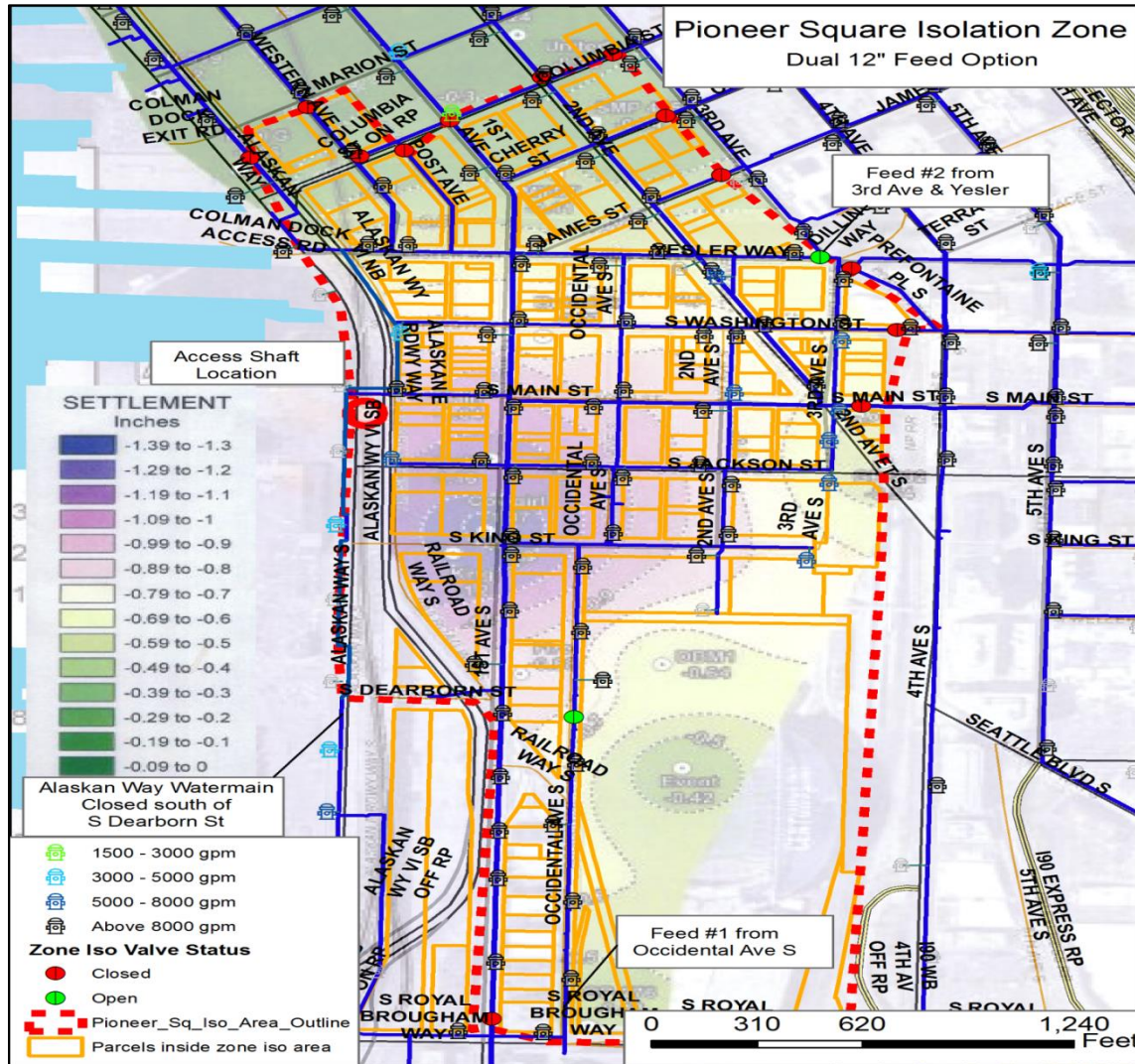
Unified Command Structure

- City Departments
 - Seattle Department of Transportation
 - Seattle Public Utilities
 - Seattle City Light
 - Department of Planning and Development
 - Department of Emergency Management
 - Office of the Waterfront
- Public Agencies
 - Washington State Department of Transportation
 - King County Wastewater
 - King County Metro
- Private Partners
 - Puget Sound Energy
 - Seattle Steam

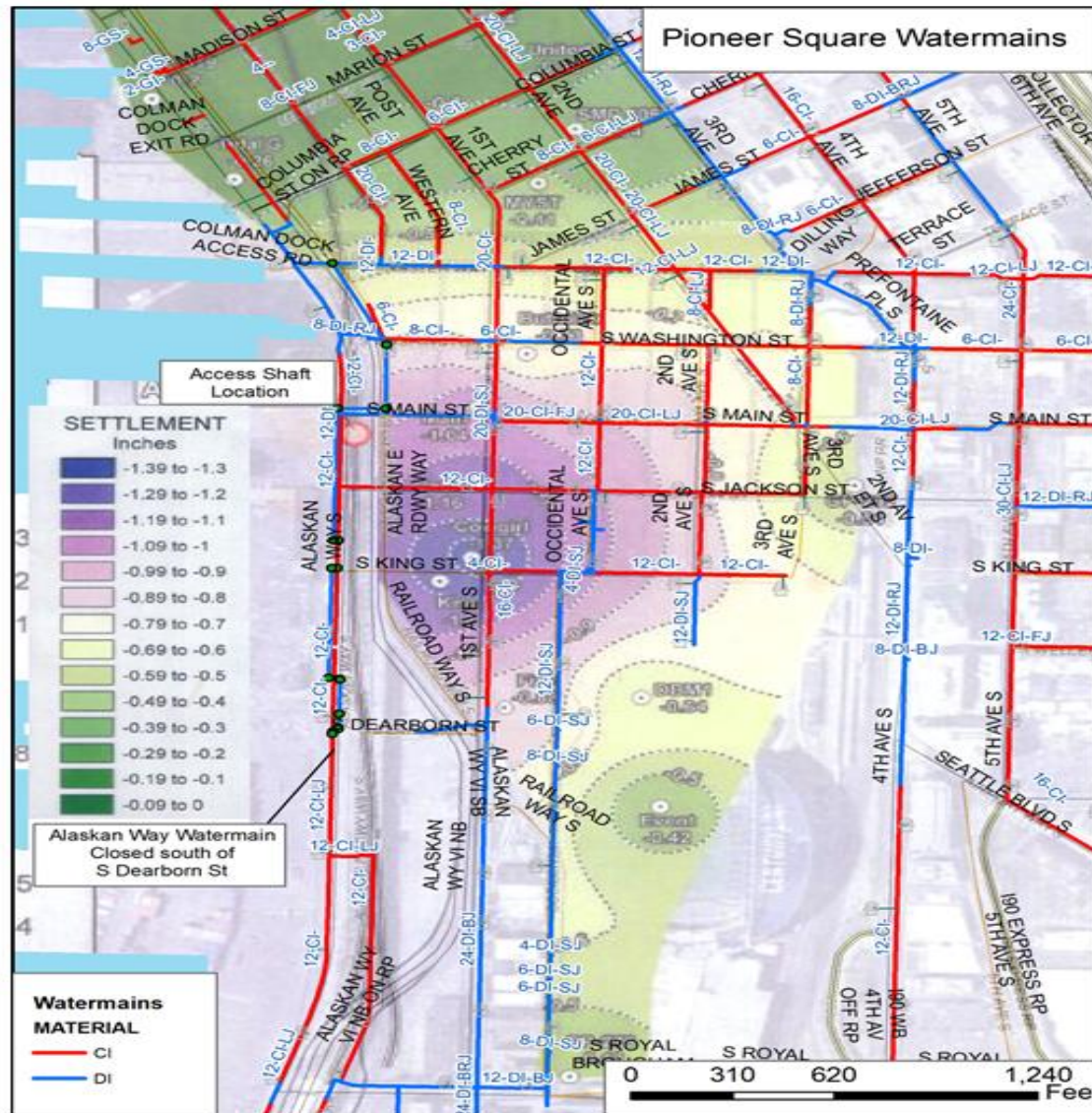
Key Objectives – Near Term

- Collection and analysis of additional data
 - City resources in addition to Washington State Department of Transportation and Seattle Tunnel Partners data sharing include:
 - SPU checking for water main leaks, CCTV check of sewers
 - SDOT survey of areaways, First Hill Streetcar, Seawall
 - SPU Survey Response Plan
- Addressing the most immediate risks
 - Readiness to implement emergency viaduct closure plan (materials on hand, equipment and crews available, etc.)
 - “Zone isolation” for key water mains
 - Planning for sewer pump and bypass if needed
- Near term actions
 - Independent collection of data and assessment of risk
 - Underground infrastructure and viaduct
 - Plan for potential mid/long-term transportation impacts

Water Distribution Facilities



Cast Iron vs. Ductile Iron Pipe



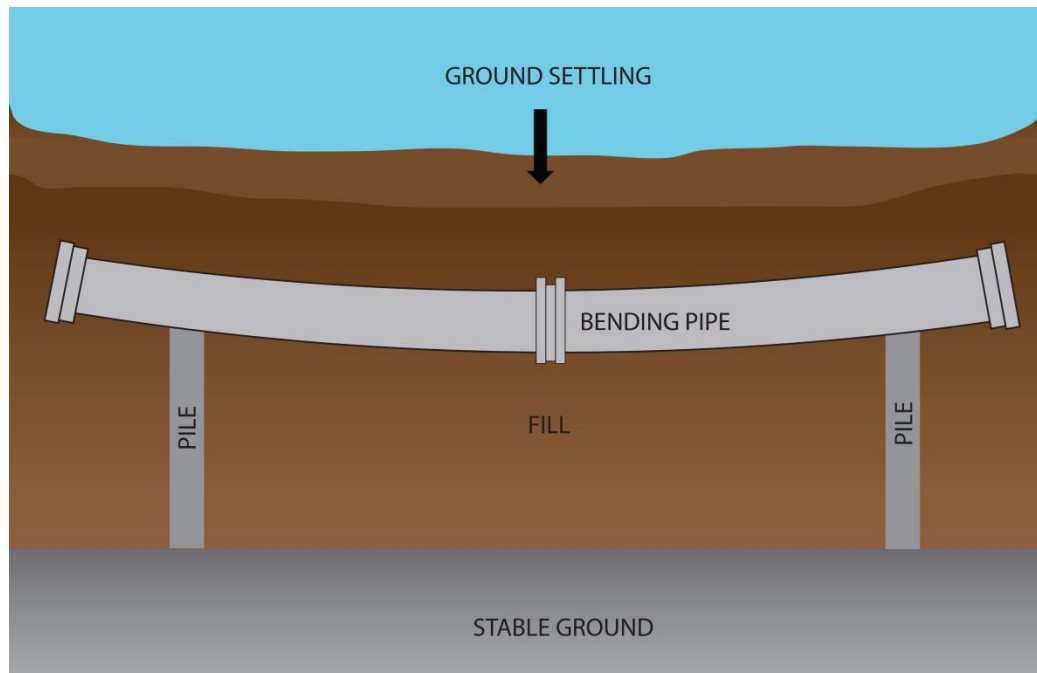
Thresholds for Repair and Replacement

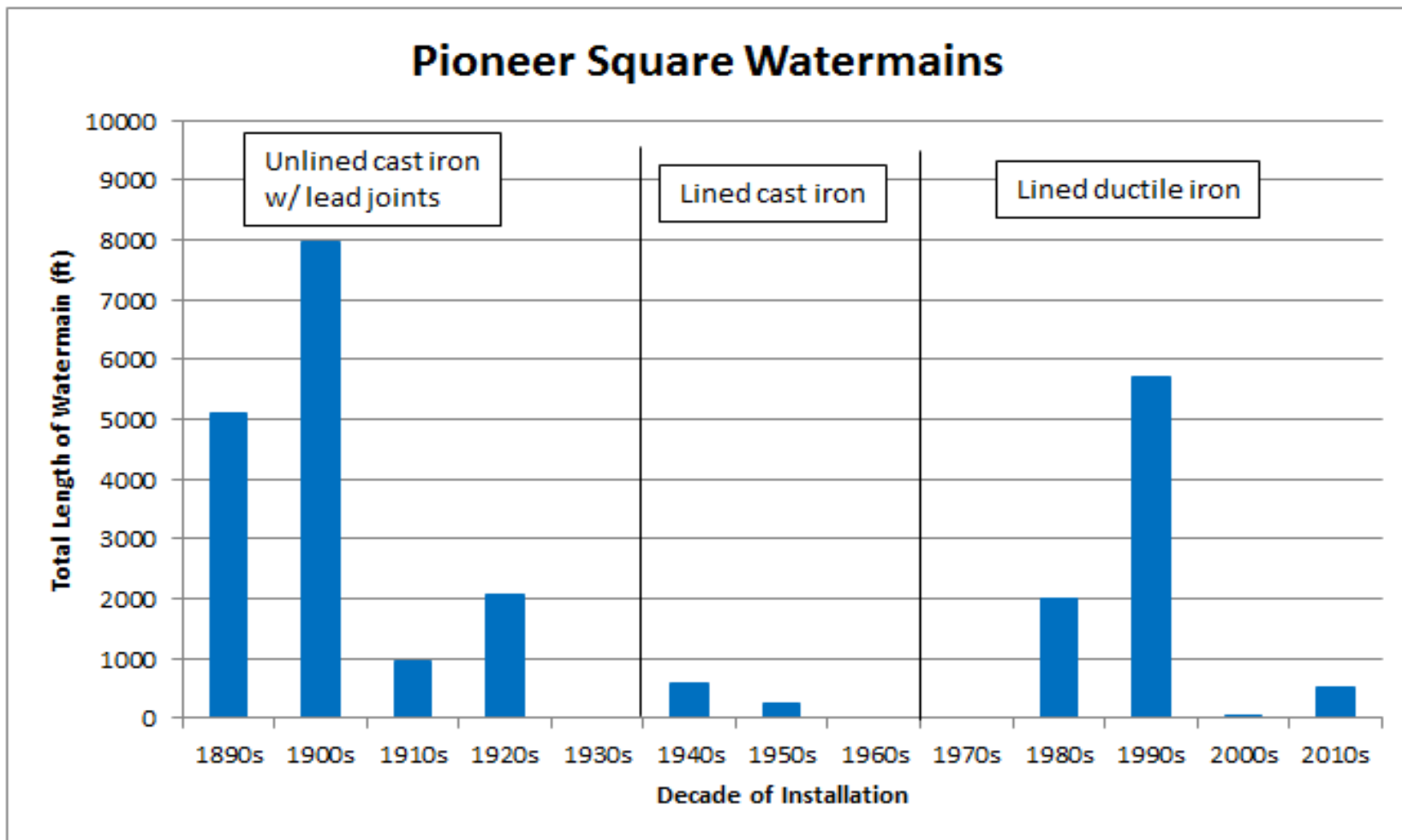
4.8 The STATE agrees to perform Deformation Mitigation Work on watermain that are subject to displacement in excess of the criteria established in the tables below.

Table 1. Maximum Total Displacement Criteria

Max Total Displacement at any one point (inches)

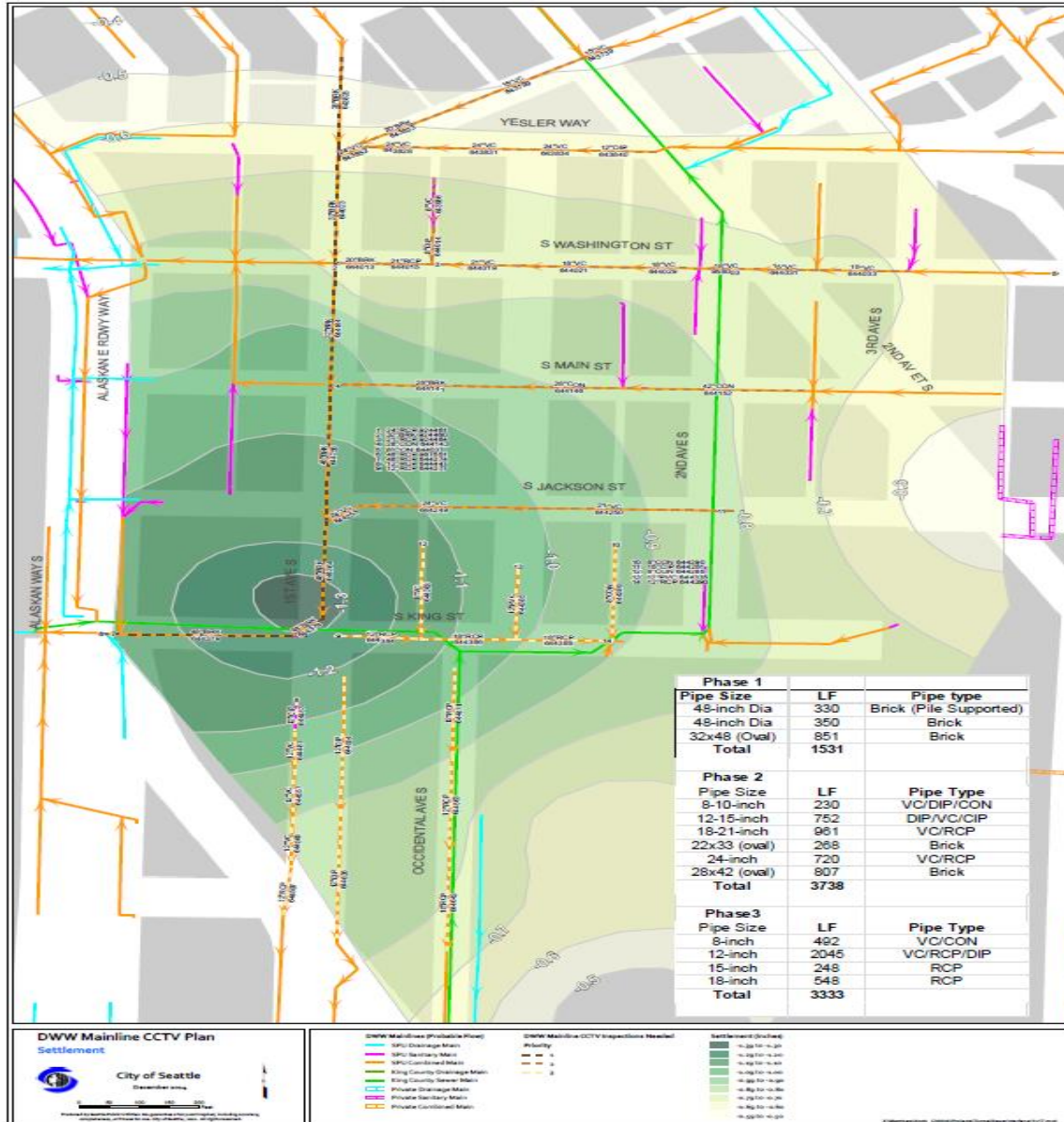
Pipe Size	4"	6"	8"	10"	12"	16"	20"	24"	30"	36"
Ductile Iron Pipe	5.5	4.0	3.7	2.5	1.5	1.2	1.0	1.0	1.0	0.9
Cast Iron	N/A	2.86	2.28	N/A	1.66	1.24	0.92	0.68	0.50	N/A



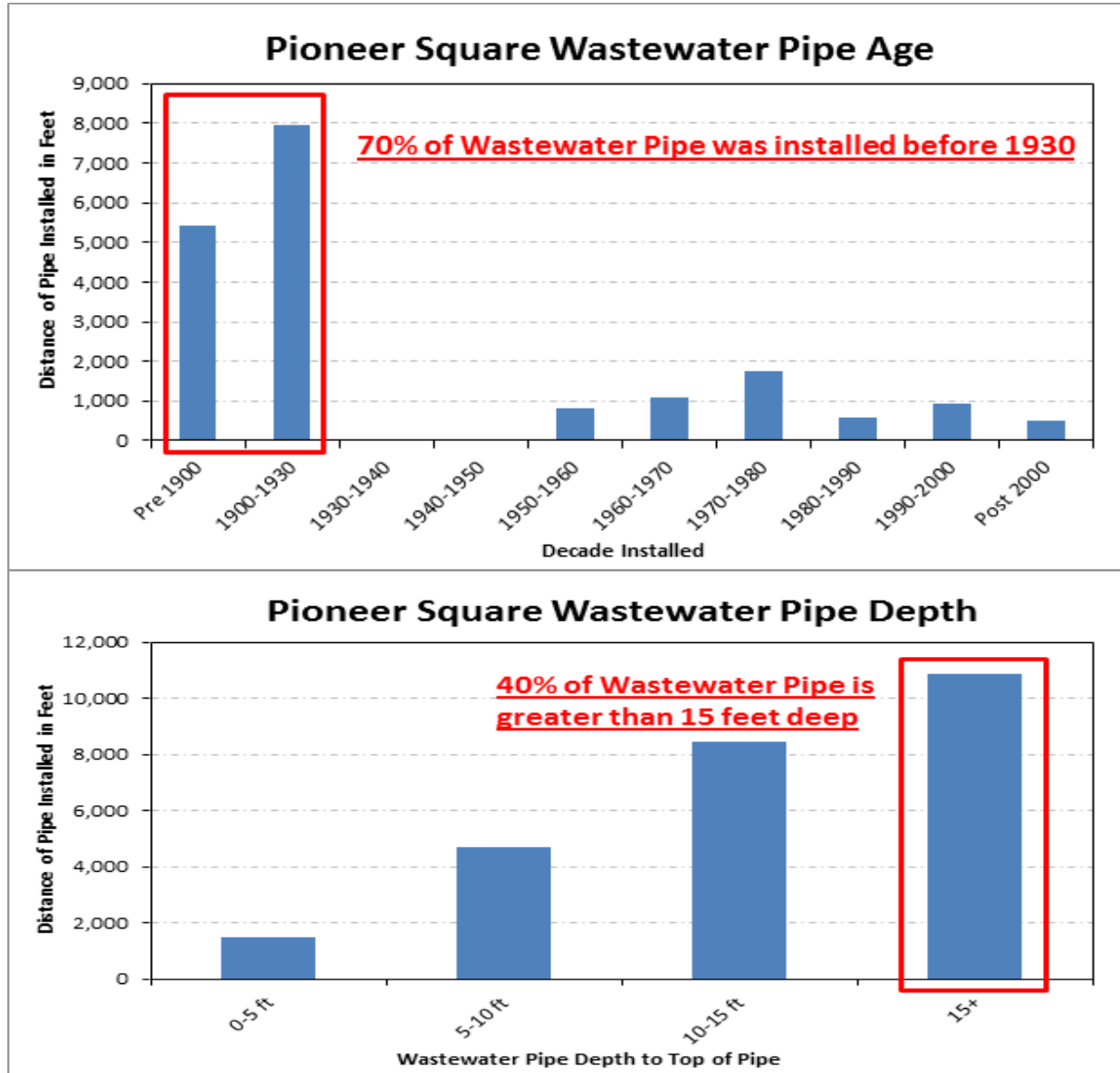


Average Depth of Water Facilities: 3 to 5 ft.

Drainage and Wastewater Facilities



Age of Drainage and Wastewater Facilities



Survey Response Plan

What we intend to do and how

- Conventional Survey techniques, additional GPS base stations, ground based radar

Why?

- Independent assessment of surface and utility movement

Where?

- Centered in Pioneer Square, extending in all directions to stable ground

When?

- SPU Surveyed Pioneer Square in early November 2014
- Surveying will continue until situation stabilizes

Who?

- 5 SPU survey crews
- 2 contract survey crews

Key Objectives – Moving Forward

- City independent analysis of viaduct structure
 - Quality assurance review of Washington State Department of Transportation and Seattle Tunnel Partners analysis
 - Independent structural analysis
- Continued response to most immediate risks
 - 1st/King Street roadway pavement cracking
- Advance planning for potential longer term viaduct weight restrictions or closure

AWV Emergency Traffic Management and Closure Plan

- Developed in 2005 and updated regularly
- Used in implementation of planned and unplanned viaduct closures since 2005
- Key principles for the action plan:
 - Prioritized actions for clearing streets for emergency response and access
 - Plan to intercept and reroute local and regional traffic
 - Established transit detour plan
 - Downtown traffic management plan
 - Notification agreements and communication protocol

AWV Emergency Traffic Management and Closure Plan

- Adapting closure plan for potential longer term weight restrictions or closure
- Transit and freight routing to and through downtown
- Maintain and enhance transit
- Minimize use of right-of-way for public and private construction
- Expand Transportation Demand Management programs
- Consider changes to increase HOV priority facilities



Seattle City Light

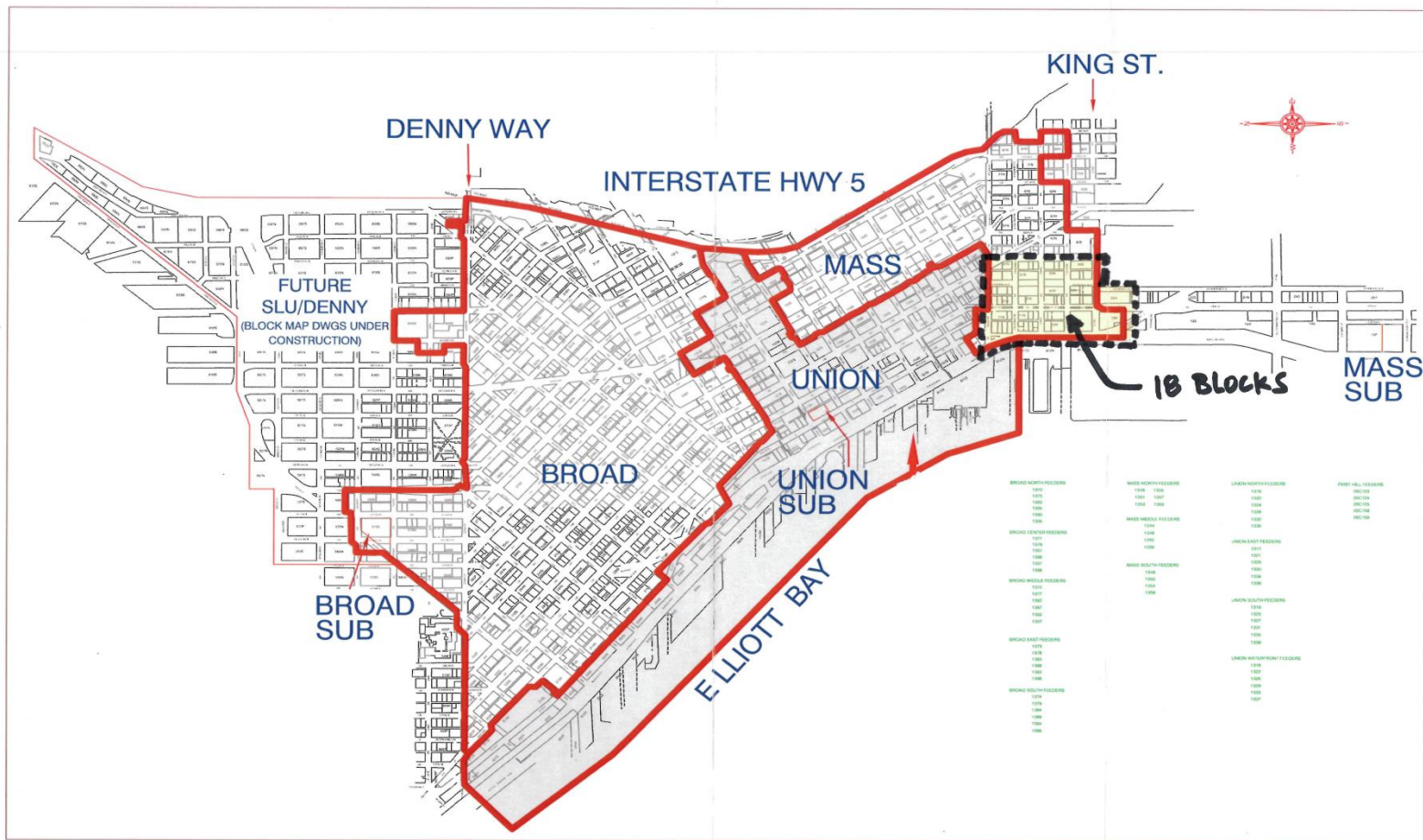
Risks:

- Transmission line on viaduct
- Settlement impacts to vault/duct bank connections
- Union substation
- Distribution system for 100 square-blocks (Waterfront and Central Business District)

Contingency Plans:

- Transmission Line Outages
- Distribution System Outages
- Substation Outages
- Building Service Connections

Seattle City Light



Department of Planning and Development

- Washington State Department of Transportation and the State Historic Preservation Officer working with the Seattle Historic Preservation Officer as they review survey data and meet with building owners
- Settlement risks for building damage or collapse
 - Large differential settlement will cause damage to buildings, particularly unreinforced masonry (brick)
 - City can use authority in Seattle Building Code if needed for unsafe buildings (structurally unsound, dangerous to human life, hazard to safety)



Questions?

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<http://www.seattle.gov/transportation>

