



City of Portland Water Bureau Downtown Water Mains Improvement Project Design and Construction of Large Diameter Waterlines in Congested Corridor



CITY OF PORTLAND WATER BUREAU

DOWNTOWN WATER MAINS IMPROVEMENT PROJECT

Presented by:

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Assistance from:

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Tim Hall, City of Portland Water Bureau (Public Relations)

Project team:



Owner:
City of Portland
Water Bureau



Engineer:
Murray, Smith & Associates, Inc.



Prime Contractor:
Moore Excavation



❑ Project description and objectives

- Critical infrastructure through heart of downtown Portland
- 7,000 feet of 36-inch diameter transmission line connecting Mt. Tabor Reservoir to Washington Park Reservoirs
- Replaces 60-year old 32- and 36-inch diameter CI pipe
- Improves system capacity, reliability and adds redundancy
- Places water transmission lines in separate corridors to reduce vulnerability due to potential damage during seismic event
- Eliminates 24-inch line that conflicts with proposed light rail
- Two control valve vaults and improvements at existing vault at Sam Jackson Reservoir
- Public safety during construction
- Minimize impacts to public and businesses



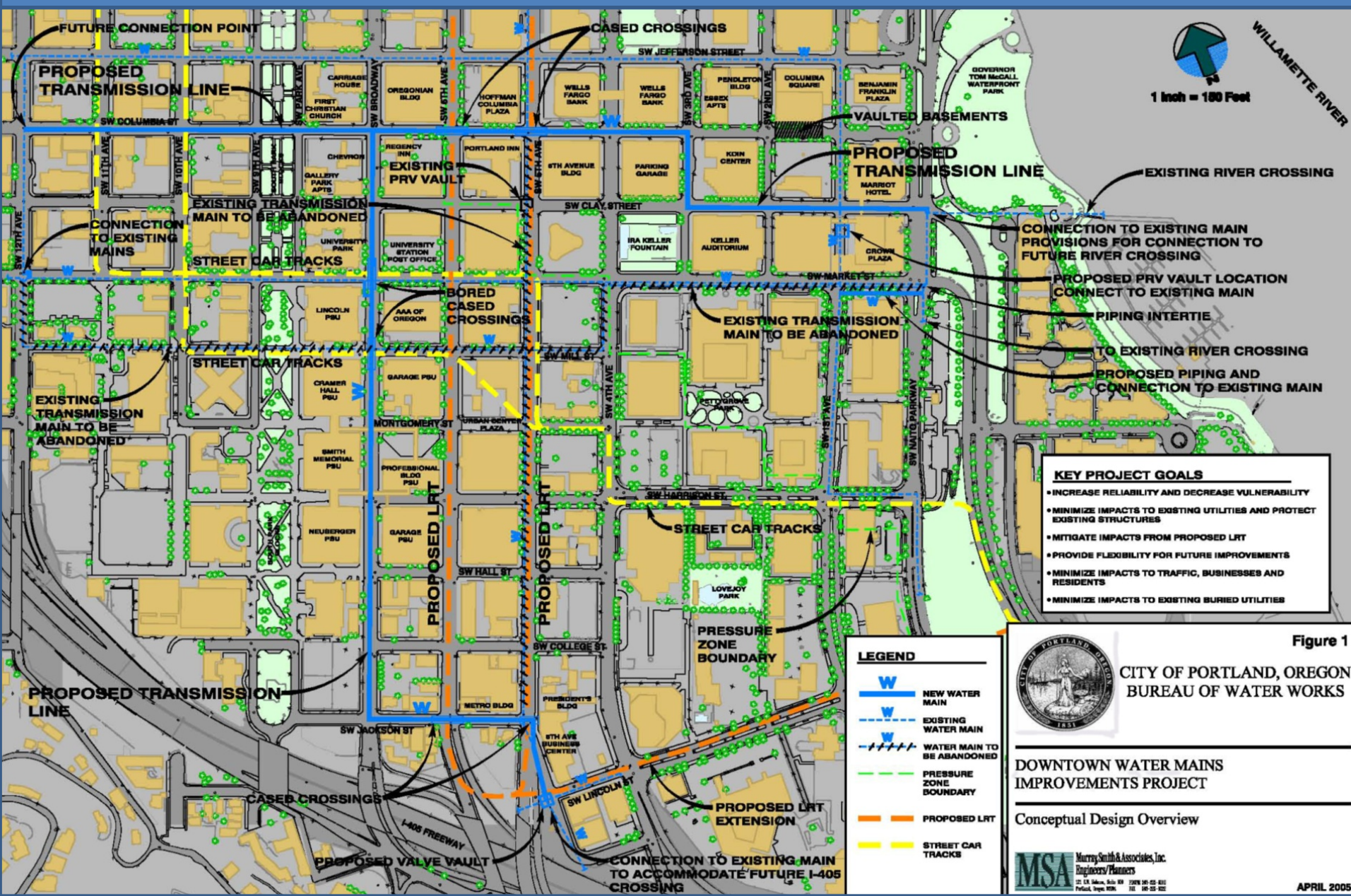


Figure 1
CITY OF PORTLAND, OREGON
BUREAU OF WATER WORKS

DOWNTOWN WATER MAINS IMPROVEMENTS PROJECT

Conceptual Design Overview



❑ Success factors

- Meet project objectives, schedule and budget
- Minimize impacts to business, public and traffic
- Complete project while maintaining safe work site for Contractor, City employees and public
- Coordination with TriMet Mall and Naito Parkway Improvements project
- Minimize relocation of existing utilities (29 utility companies)
- Coordination with construction moratoriums
- Achieve proper stakeholder input

❑ Fatal flaws

- Choosing an incorrect alignment that would not work and require modifications during construction
- Relocation of utilities that would significantly impact schedule
- Upsetting public and business owners



❑ Extremely complex and extensive coordination efforts

❑ Numerous stakeholders

- Portland Water Bureau
 - Operations
 - SCADA
 - Water quality
 - Engineering
 - Planning
 - Construction
- City of Portland Bureau of Environmental Services
- Portland Department of Transportation
- Oregon Department of Transportation
- TriMet
- Portland State University
- Keep Portland Moving
- Rose Festival
- 29 private utilities
- Businesses
- Public



- Internal City stakeholder involvement
- Other stakeholder involvement
- Concept review meeting
- Design criteria input
- Design reviews
- Construction coordination
- Getting the right people at the table



❑ Selecting an alignment

- Develop route selection criteria
- Alternate alignments analyzed against the criteria
- Optimize routing
- Congested corridor – parking garage undercrossings, utilities, trees, overhead walkways, etc.
- Reviewed City utility composite mapping
- Abandoned steam pipe route – asbestos-insulated steel



□ Alignment selection criteria

- Minimize interface with proposed light rail and street car improvements
- Avoid vaulted basements
- Minimize conflict with existing utilities
- Minimize traffic impacts
- Minimize impacts to pedestrian/architectural surfacing areas
- Minimize disruption of recently paved streets
- Minimize impacts to residents and businesses

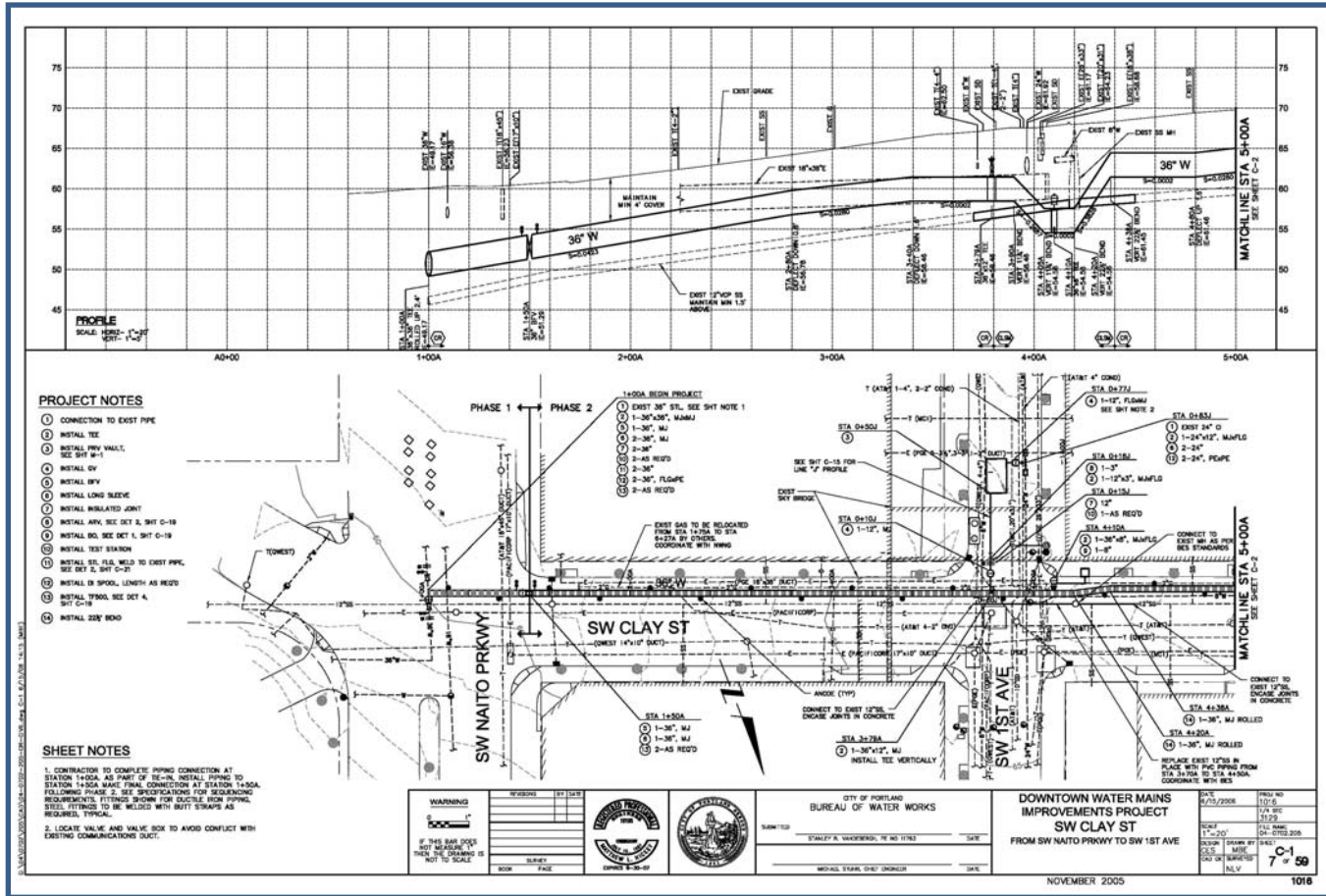


- ❑ Light rail and street car impacts
- ❑ Piping to 22 feet deep at one rail crossing



KEY DESIGN FEATURES

- ❑ Cased Crossings Under Rail Tracks
- ❑ Challenging Tie-ins in Busy Intersections



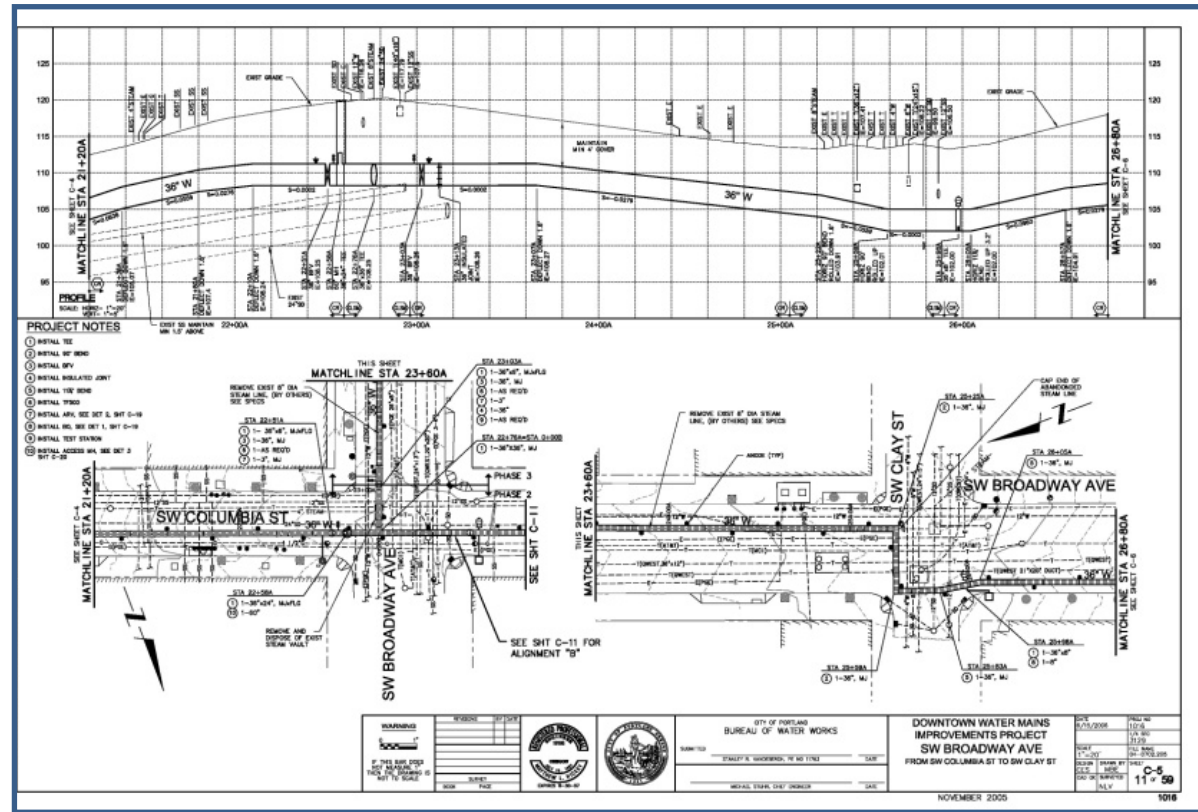
- ❑ Replacement of existing sanitary sewer adjacent to waterline
- ❑ Paving – moratorium considerations
- ❑ Control valve vault
 - Water quality
 - PRV vault – between pressure zones
 - Sam Jackson valve vault modifications



- Phased construction to maintain supply and coordinate shutdowns**
- Alternate Materials**
 - Steel
 - D.I.
- Placement A.R.V.s and B.O.s and C.P. test stations**
- Cathodic protection**
- Pipe access ports**
- TF 500 – Blow offs**
- 250 PSI test pressures**



- ❑ 29 utilities
- ❑ Utility maps acquired
- ❑ Preliminary mapping distributed to utilities
- ❑ Potholing/SUE
- ❑ Coordination meetings
- ❑ Several bored utilities
 - not as-built
- ❑ Existing building structural tie-backs
- ❑ Overhead light stanchions impacting cranes used at cased crossings





- ❑ “Keep Portland Moving”
- ❑ Being downtown, traffic control and minimizing impacts critical
- ❑ Challenging traffic control plan
- ❑ Restricted closure to two locations two blocks long with five blocks in between to accommodate two crews while limiting long, continuous shut-downs in one area
- ❑ Staging challenges – pay for parking meters, etc.
- ❑ Worked during off peak times and night times, especially at highway off ramps – I-405, I-5



PUBLIC INVOLVEMENT, COORDINATION AND COMMUNITY RELATIONS

- ❑ PWB saw early the public would need to be well informed
- ❑ Once the preliminary alignment was established, neighborhood groups and businesses were brought into the discussion – public meetings and door-to-door
- ❑ Noise impacts – meeting with Noise Board

- ❑ Impacted scheduling and work sequencing
- ❑ Safety one of the main considerations
- ❑ Parking garage access – when to stop and start work
- ❑ Water service disruption
- ❑ Accommodating businesses
- ❑ Public outreach during design and construction



MULTIPLE APPROACHES WERE USED TO COMMUNICATE TO THE PUBLIC

Upgrades to the Water System in Downtown Portland

March 2006-October 2007



What you need to know if you live, work, or visit downtown Portland.

Temporary closure of SW 3rd Ave. required


The contractor for the Portland Water Bureau's Downtown Mains Improvement Project must close SW 3rd Ave. between SW Clay and SW Columbia streets in order to install a large pipeline down the center of the street.

The street closure will start on **Wednesday, April 4** and end by **Saturday, April 14**.

The Water Bureau and City Center Parking have made arrangements that will allow parking customers access to the garage entrance on SW 3rd Ave. Signs and flaggers will direct vehicles into the garage. **Entry on SW 4th is recommended.**

You will be directed to exit the garage from SW 4th Ave. Flaggers will be onsite during peak hours to assist your entering heavy traffic.

The Water Bureau appreciates your patience and cooperation as we work to improve the City's century-old water system. Thank you.



Postcard notices as work advanced


Construction Outside of Hotel

Starting at 7:00 pm on Friday, a contractor for the Portland Water Bureau will work around-the-clock in the intersection of Naito Parkway at SW Clay Street, outside the Marriott Hotel. The work may continue until early morning on Monday.

The crew will install a key section of large pipe that will connect to a supply main from under the Willamette River.

Water service will not be affected and noise will be kept as low as possible.

The Portland Water Bureau appreciates the public's cooperation as we work to improve the City's century-old water system.



Posters in buildings to inform tenants and customers



Water Main Project Comes to SW Broadway
December 11 to January 5, 2007

The Portland Water Bureau is replacing old pipes with new, larger water supply mains on SW Broadway while the PSU campus is closed for the holidays.

The work will shut down three lanes in one-block sections of the street, starting at SW Hartness St. Some parking will be retained. Sidewalks will remain open.

The Water Bureau appreciates the public's cooperation and apologizes for any inconvenience.

The new infrastructure, Street Connectivity Structure at SWB SW 10th, is set for installation in early 2008.

Signs on street to explain work to passersby

From Forest to Faucet . . .

Portland Water Bureau delivers the best drinking water in the world.

Share your thoughts.

Receive the Water Blog through an RSS feed. Join the conversation.

Tight Fit for Vault Installation

On Saturday morning, February 24, the contractor for the Portland Water Bureau's Downtown Mains Improvement Project, installed a water utility vault on SW 17th Ave., between SW Clay and SW Market St. The 18x24 foot vault houses large valves that reduce the high pressure from water through the City's supply pipeline.

The work required the use of a large crane to lift the 48,000 pound structure into place. The work was more complex as the crane had to lift it between two sky bridges from the Crown Building. The crane operator had the concrete vault set and lift off the truck in the ground in less than one hour!

Tim Hall
Community Outreach
February 26, 2007

Blog and neighborhood association E-bulletins

Take extra step to deal with roads

By FRED LEESON
TRISTAR MEDIA

When sewer, water and transit projects give downtown streets a make-over feel, some pedestrians are tempted to take shortcuts.

Like jaywalking across a street that is closed. Or walking against the light on a street where traffic is down to one lane.

Motorists aren't perfect, either. Some try to dodge signs that say "street closed" or attempt turns that could put them in the middle of a construction project.

"I'm more concerned about pedestrians who walk through the middle of work zones," said Tim Hall, community outreach coordinator for the Portland Water Bureau. He said the bureau places top priority on pedestrian safety but it takes cooperation from walkers to make it work.

Hall urged pedestrians to use designated crosswalks and to obey flaggers and traffic signals in work areas. Though sidewalks remain open in construction areas, Hall said, pedestrians shouldn't make the mistake of crossing streets in mid-block.

"A lot of utilities are doing things," he said. "You can have two projects going on in the same street."

The Water Bureau is installing some 7,000 linear feet of 36-inch-diameter water supply mains downtown, replacing smaller, old lines. The work currently is focused on Southwest Columbia Street east of Broadway.

The Columbia Street handle factor will increase Monday when workers will invade the intersection at Southwest Broadway, allowing only a single lane for vehicles. The intersection work is expected to last two weeks.

Mary Feusch, a TriMet spokeswoman, said contractors doing utility work in advance of Transit Mall renovations were using customary safety procedures with signs and flaggers. She said no serious problems with pedestrians had been brought to Tribler's attention.


However, she said, the transit agency would make special efforts to alert motorists and pedestrians to bus-route changes starting in mid-January. More buses will be running on Southwest Third and Fourth avenues and Southwest Co-

hamba and Jefferson streets while construction unfolds on Southwest Fifth and Sixth avenues.

First Lesons: 503-294-5946; frederic@news.oregonian.com

Downtown construction update

A recap of street, transit, utility and private building projects with the most significant traffic impact. Transit mall remodeling will cause the most havoc. On Monday, the Southwest Columbia Street water main project begins work at Broadway, reducing traffic to one lane on Broadway for about two weeks.



Project	Completion date
1 SW Naito Parkway construction	January '07
2 SW Columbia water main	January '07
3 W Burnside sewer project	March '07
4 The Benson Tower	March '07
5 The Wyatt	Spring '07
6 Street extension	Summer '07
7 First Unitarian Church	Summer '07
8 The Civic	Summer '07
9 The Metropolitan	August '07
10 The Casey	Fall '07
11 Hotel project	Late '07
12 Burnside Bridge deck replacement	December '07
13 Park Block 5 underground garage	July '08
14 Meyer & Frank remodel	September '08
15 1937 Concourse/arena	September '08
16 Morrison Bridge bike, pedestrian work	October '08
17 Transit mall redesign for light rail	September '09

Source: Portland Office of Transportation, Portland Bureau of Environmental Services, Portland Water Bureau, Metropolitan Planning Org.

By FRED LEESON
TRISTAR MEDIA

Planted news stories, including a focus on pedestrian safety



PUBLIC INVOLVEMENT, COORDINATION AND COMMUNITY RELATIONS EXAMPLES

- ❑ PSU work during Christmas break
- ❑ Arranged for valet parking pick-up at Morton's
- ❑ Timed construction to work around shows at Keller Auditorium
- ❑ Coordinated with Marriott deliveries
- ❑ Marriott patrons slept on north side of building during work on south side
- ❑ Extensive sidewalk signs



- Mall project and Naito Parkway project
- TriMet bus rerouting
- Holiday moratorium
- Rose Festival
- Public events
- Private business events
- Low water demand times for tie-ins
- Schedules met



- ❑ Extensive coordination efforts
- ❑ Creative ideas and teamwork to meet challenges of the project
- ❑ Unknown utilities, conflict with FBI fiber optics
- ❑ Hydraulic Jacking – (Moore Excavation)
- ❑ Pipe alignment adjustments
- ❑ Pipe joint welding
- ❑ Flange bolts and gaskets critical



Utility challenges



Pipe bursting existing sanitary sewer



Asbestos-insulated steam pipe removal



Maintain access to parking garages



Coordination with PSU



PROJECT FUN FACTS

- ❑ History Channel filmed at the site – old rails and cobblestones
- ❑ Oldest water main in the City replaced – installed in 1880s
- ❑ 100 year-old Ladd house was moved four blocks during construction
- ❑ Cobbles salvaged – additional construction time
- ❑ Steam lines, fire cisterns at intersections, steam line vaults
- ❑ One of DJC's top projects 2008
- ❑ A delegation of civil engineers from sister city Khabarovsk, Russia toured the project



- ❑ Important reliability enhancement project for the Water Bureau
- ❑ Complexities due to congested utility corridor and working in busy downtown streets and around businesses and public
- ❑ Project schedule and objectives met as a result of extensive coordination efforts and excellent team work



