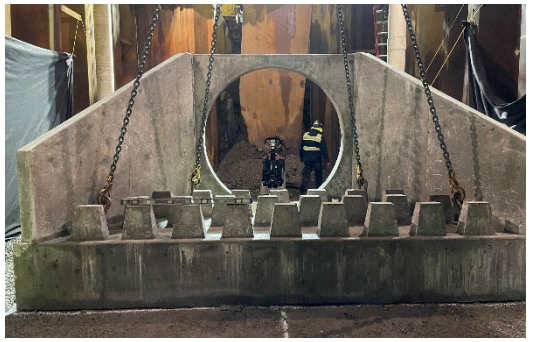
April 2022

Couldn't Have Done It Any Other Way: Progressive Design-Build of an Urban Stormwater Pipeline



Tacoma

Christa Lee, PE
253.502.2256
clee@cityoftacoma.org

Brown AND Caldwell

Patrick Weber, PE, PMP, DBIA
206.749.2891
pweber@brwncald.com

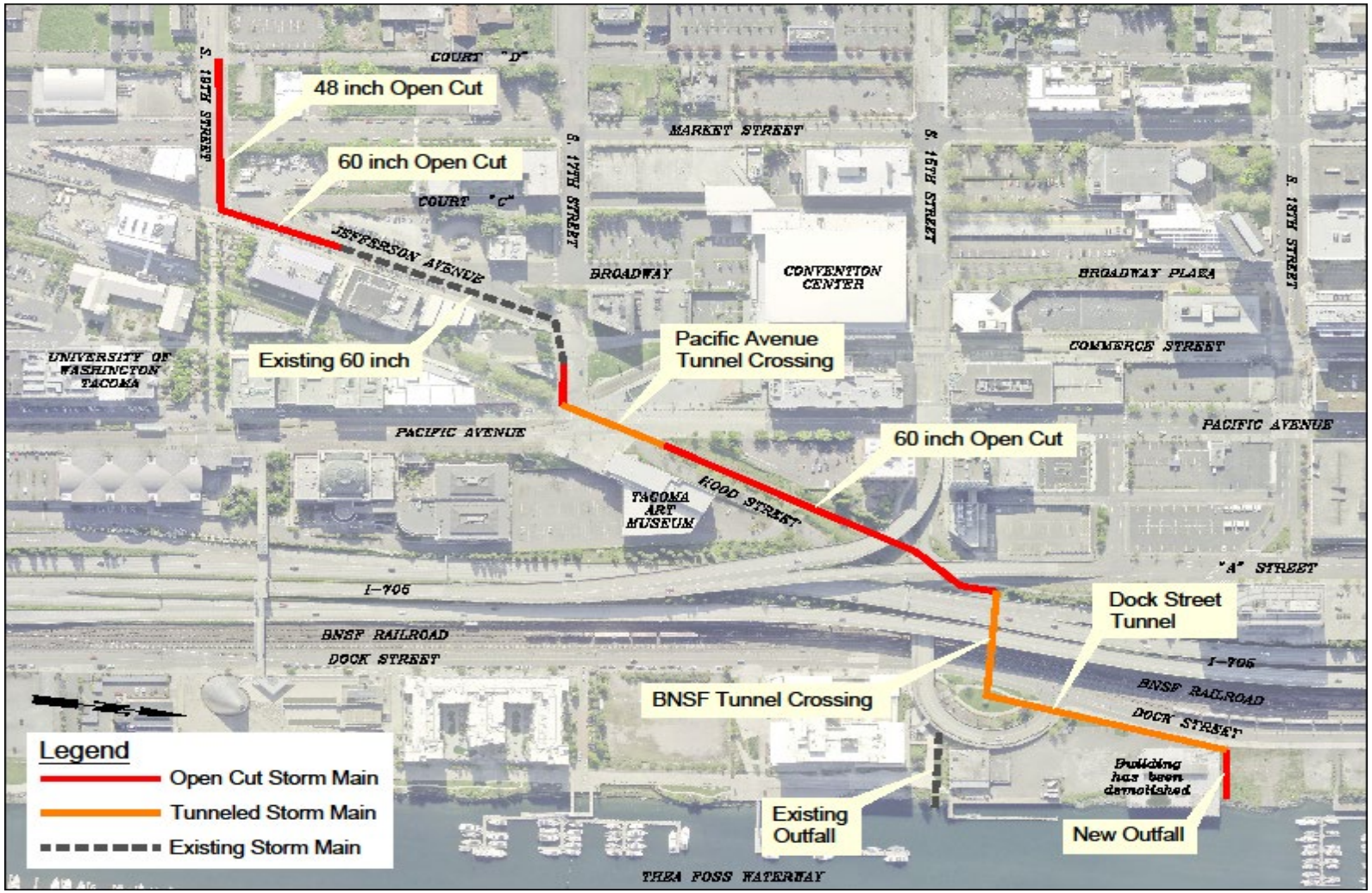
Introduction and Project Background

Jefferson and Hood Street Storm Interceptor and New Outfall Project

Introduction – Key Roles

- Owner: City of Tacoma Environmental Services
- Owner's Advisor:
  - Brown and Caldwell
  - McMillen Jacobs Associates
- Owner's Geotechnical Advisor:
  - GeoEngineers
- Design-Build Team:
  - J.W. Fowler
  - Kennedy Jenks
  - Staheli Trenchless
  - Others

Project Location



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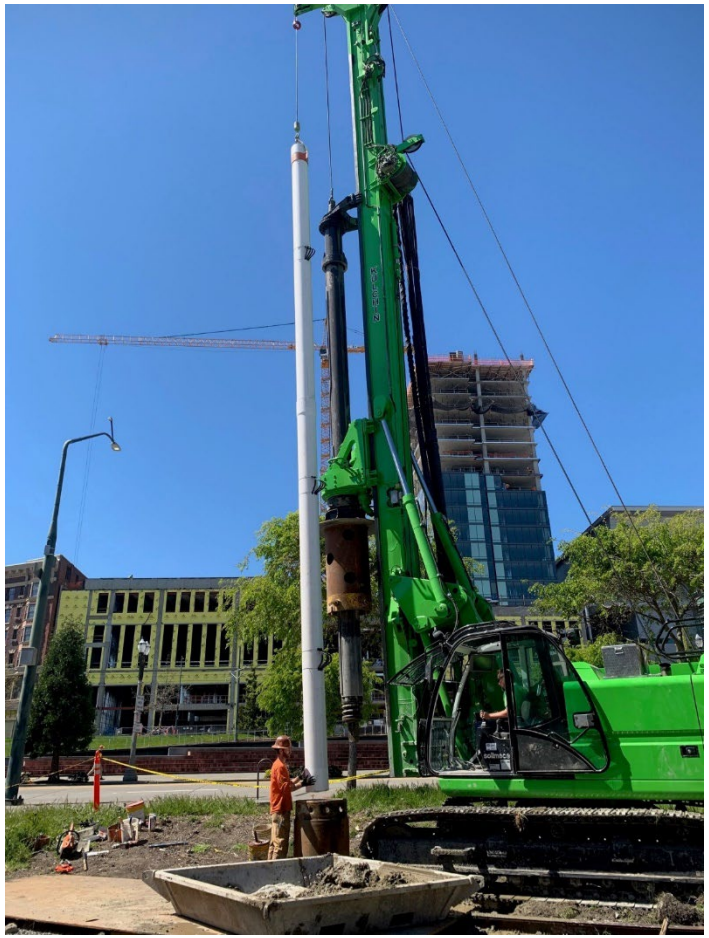
City Objectives

- Improve and provide excess stormwater conveyance capacity for future growth in the downtown area
- Minimize stormwater flooding in the lower downtown area
- Provide outreach program to mitigate construction impacts on the downtown community, adjacent businesses and the traveling public
- Deliver project improvements that represent the “best value” to Tacoma’s ratepayers



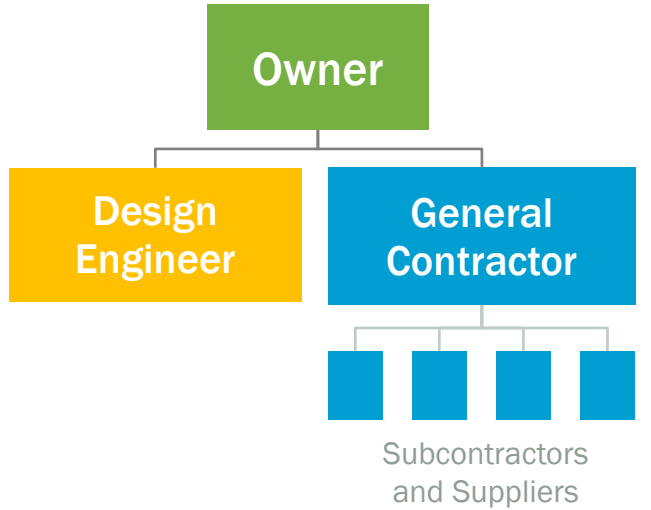
Project Features

- 3,000+ LF new 48-inch and 60-inch storm interceptor
- New stormwater outfall to Thea Foss waterway
- 3 microtunneling drives, including 2 crossings of transportation corridors
- Assorted utility relocations and re-routes

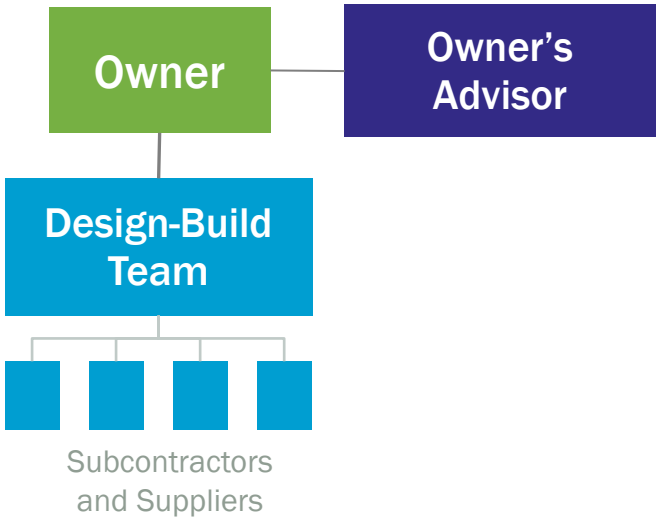
Progressive Design-Build Delivery

- Progressive Design Build has a single contracting entity
- City works closely with the design build team
- Progresses in two phases
  - Phase 1 - Preliminary services develops a design to 60%
  - Guaranteed Maximum Price (GMP) Agreement
  - Phase 2 - 60% design to final design and through complete construction
- Provides increase in opportunities for innovation during design and construction by having the contractor and designer on the same team

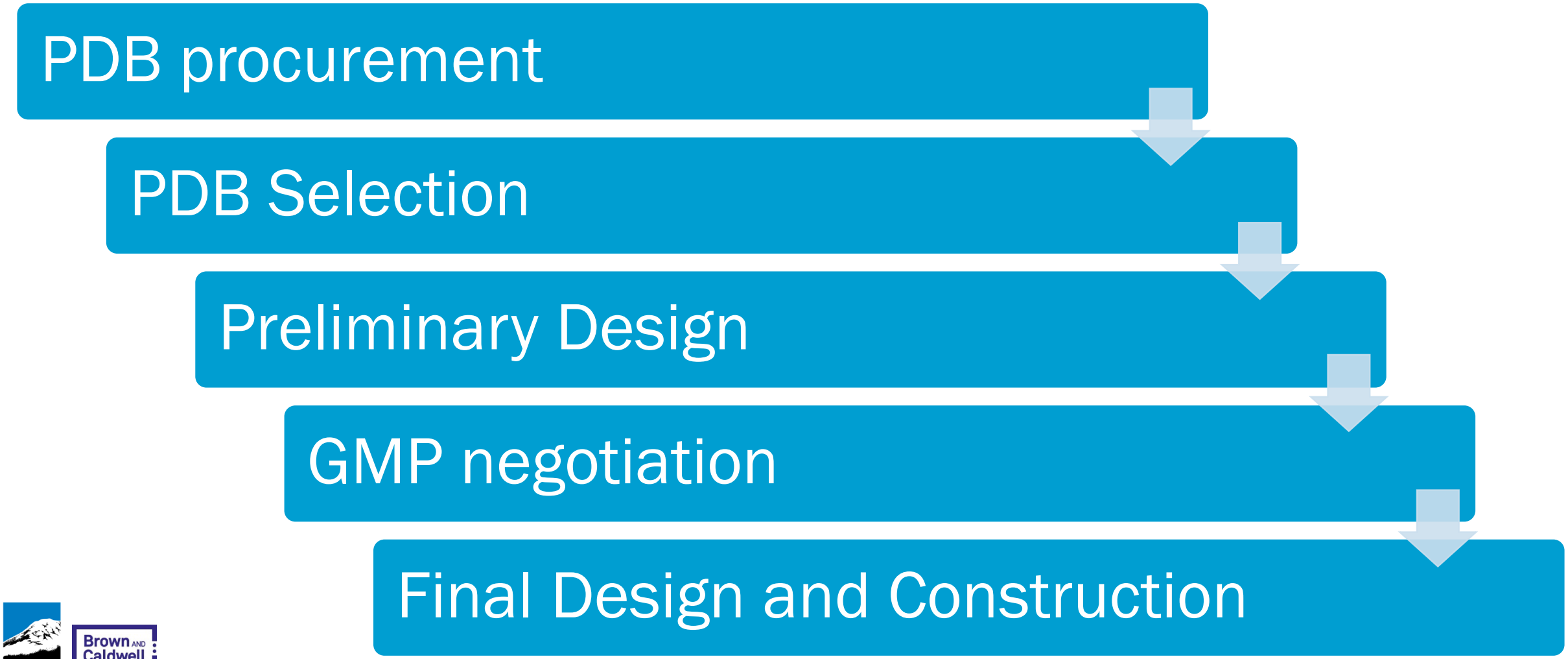
Traditional Design-Bid-Build (DBB)



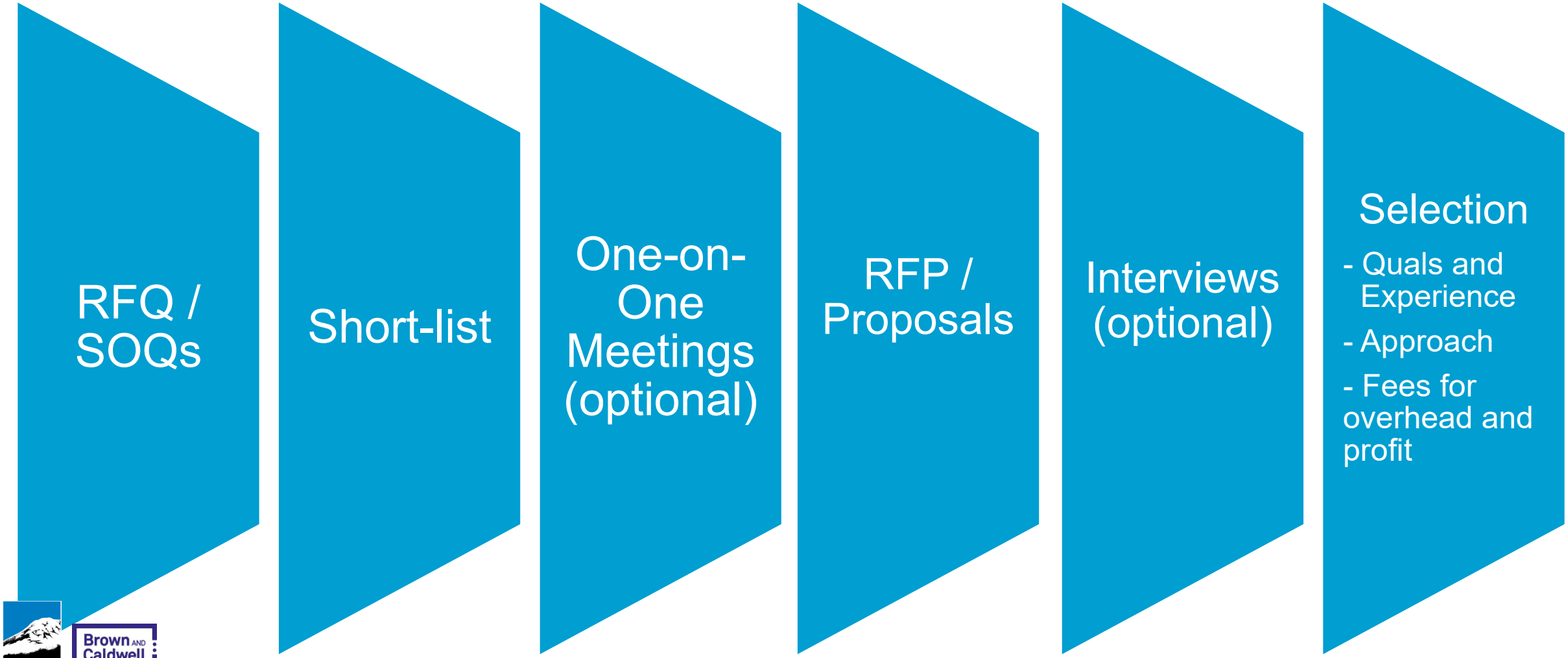
Progressive Design-Build (PDB)



PDB Project Process

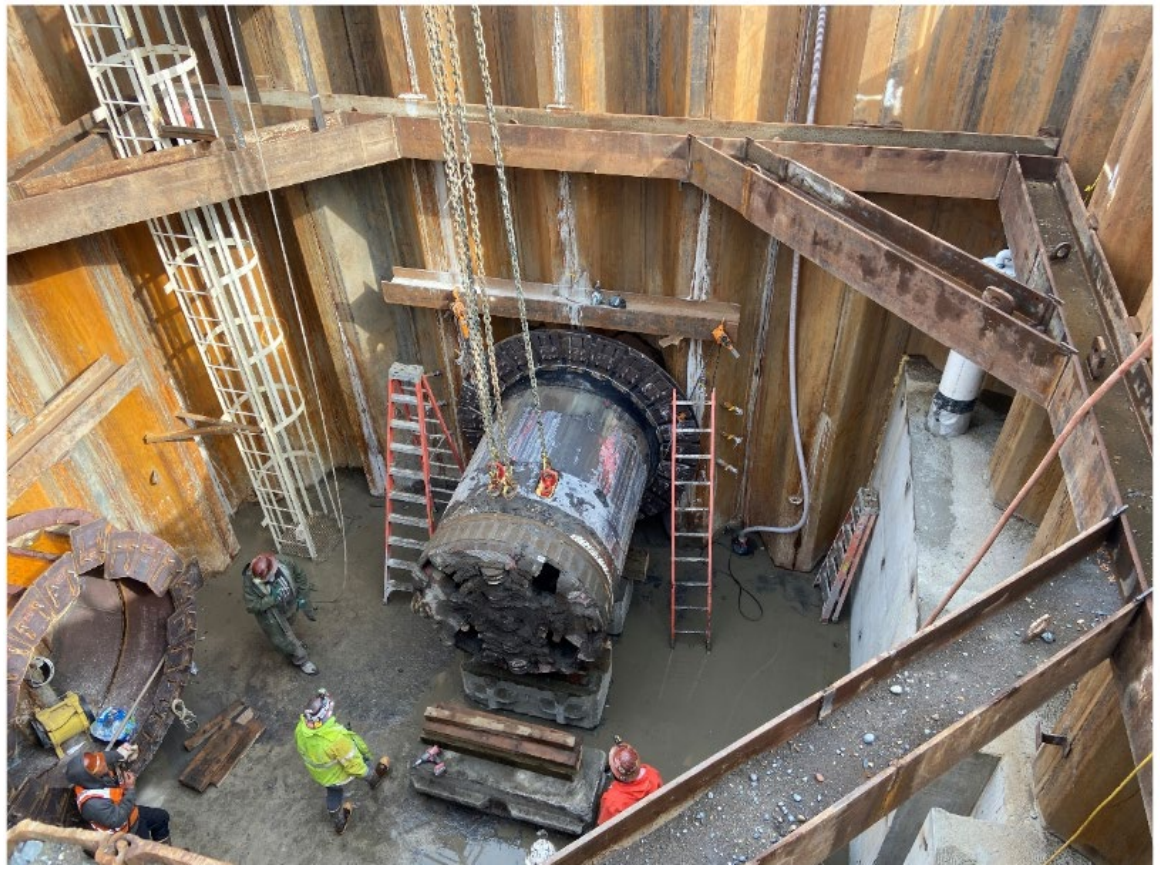


PDB Procurement Process



Project Delivery Method Objectives

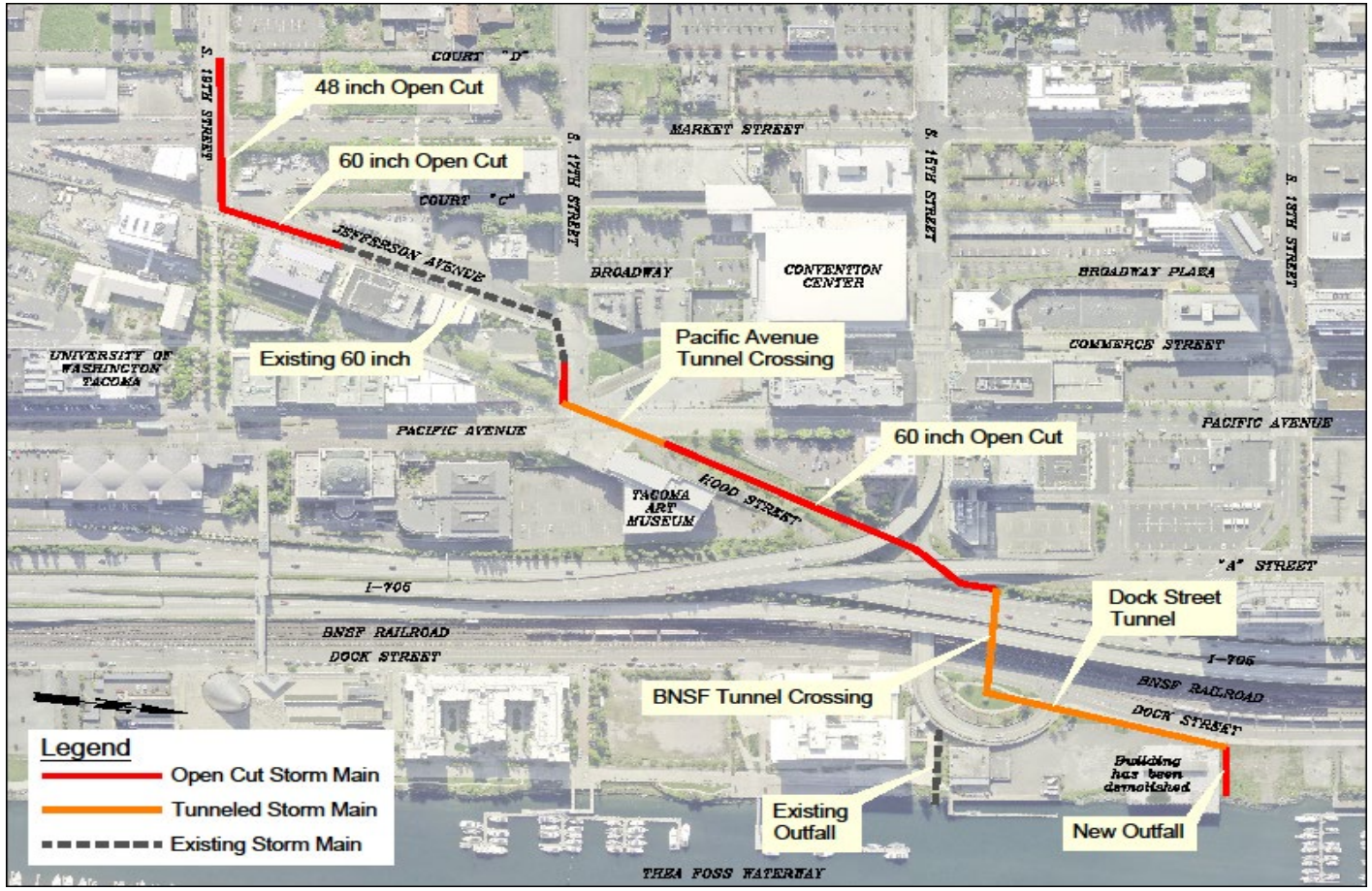
- Highly qualified team with hands-on expertise in micro-tunneling
- Single point of accountability
- Collaboration and teamwork
- Transparency
- Innovation in both design and construction



Why Progressive Design-Build?

Why Progressive Design-Build?

- Challenging site conditions:
  - Steep slopes
  - Complex soils
  - Soil and groundwater contamination
  - Railroad, light rail, arterial, and freeway crossings, requiring tunneling
  - Proximity to downtown businesses
  - Potential cultural resources



Why Progressive Design-Build?

- Challenging permitting, including:
  - U.S. Army Corps of Engineers
  - NOAA Fisheries
  - US Fish and Wildlife Service
  - Washington State Department of Fish and Wildlife
  - US EPA
  - Puyallup Tribe
  - Washington State Department of Ecology
  - Washington State Department of Archaeology and Historic Preservation
  - City of Tacoma Shorelines
  - City of Tacoma Metropolitan Parks

- Challenging transportation approvals:
  - Burlington Northern (BNSF)
  - Sound Transit
  - Washington State Department of Transportation (WADOT)
  - Federal Highways Administration

Flexibility and adaptability were major drivers

- Wanted to bring on the design-build team very early (before conceptual design) to assist with:
  - Site investigations
  - Alternatives analysis
  - Design, permitting, and construction
- Anticipated that PDB delivery could respond to evolving understanding of permitting and site conditions without the need to stop and negotiate numerous change orders

Benefits of PDB for this project

Early DB team input helped address project challenges:

- Determine optimal route relative to existing utilities, ground conditions, and crossings (and engage BNSF and WSDOT early)
- Permitting agility:
  - Input from design and construction firms to provide requested information for permits and approvals (e.g., Nationwide permit process, BNSF and WSDOT crossing approvals)
  - Adapt to address unexpected discoveries (e.g., shell midden discovery)
- Early procurement of selected equipment and materials:
  - Manage challenging supply chain environment, and some transit issues that arose

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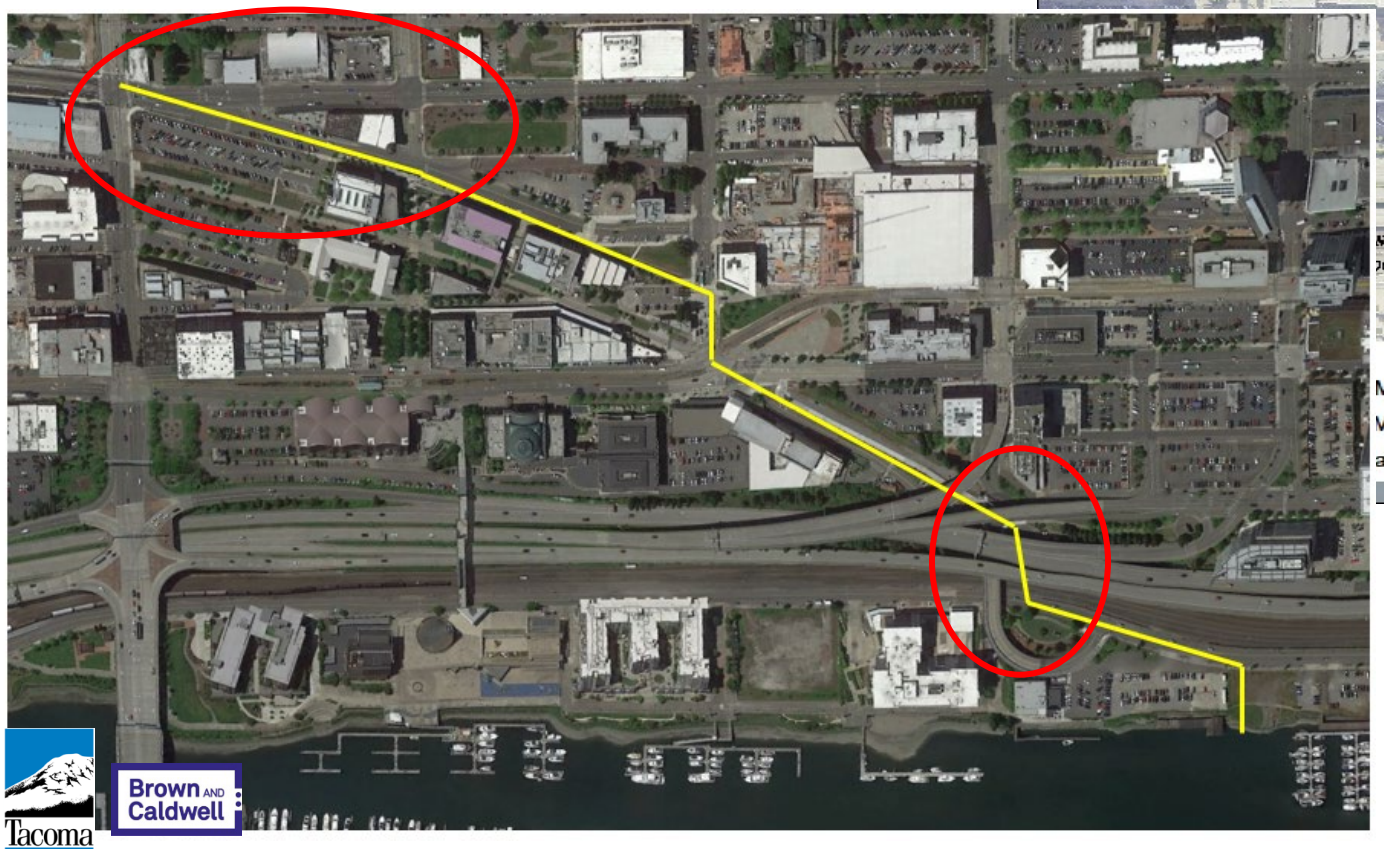
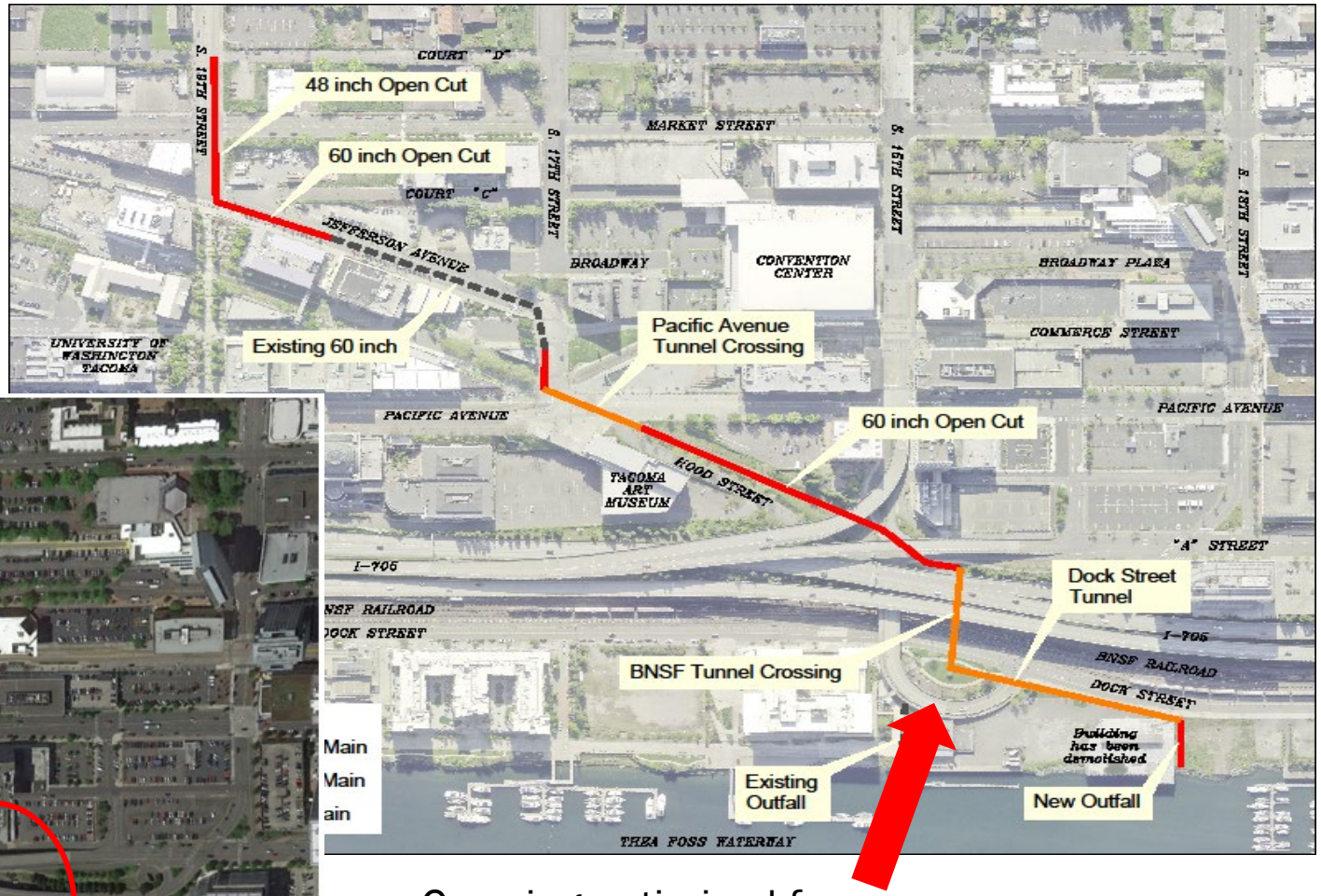
Refined alignment





Crossing optimized for:

- BNSF switch locations
- WSDOT piers
- Shell midden location
- Constructability

Tips and Lessons Learned

- Owner's Advisor
- Coordinate closely with legal for consistency across contract, procurement documents, and technical requirements
- Involve permitting agencies as early as possible
- Use of partnering sessions: help team start out well, or get back on track
- Proactively prepare to oversee the different bodies of work


Questions?