

A closer look at the Alaskan Way Viaduct Replacement Program

David Sowers

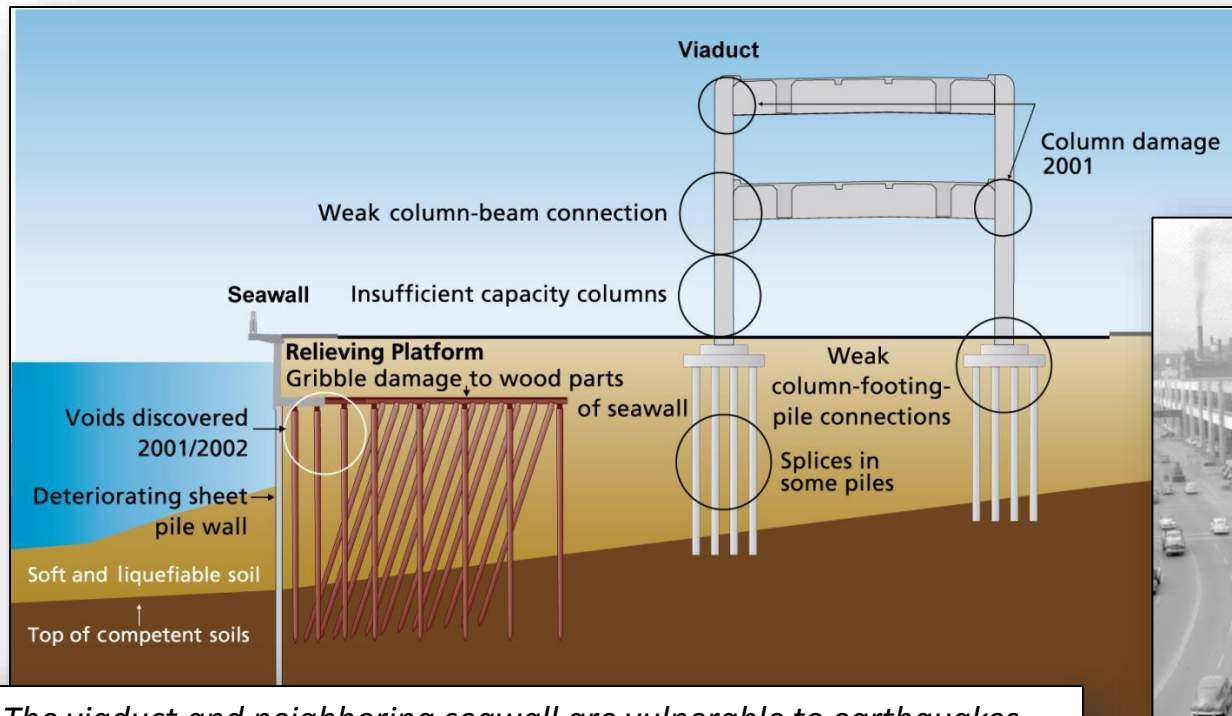
AWV Deputy Program Administrator
Engineering and Program Management

Today's **FOCUS**

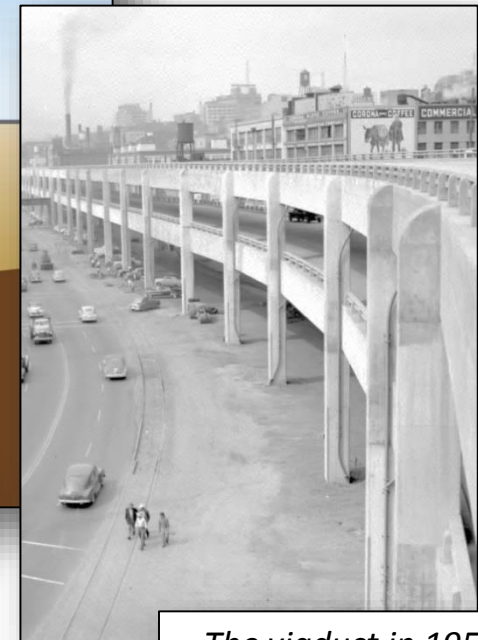


- **The big picture**
 - Continuing progress
 - Understanding Bertha
 - Risk management

This is a **SAFETY** *project*



The viaduct and neighboring seawall are vulnerable to earthquakes



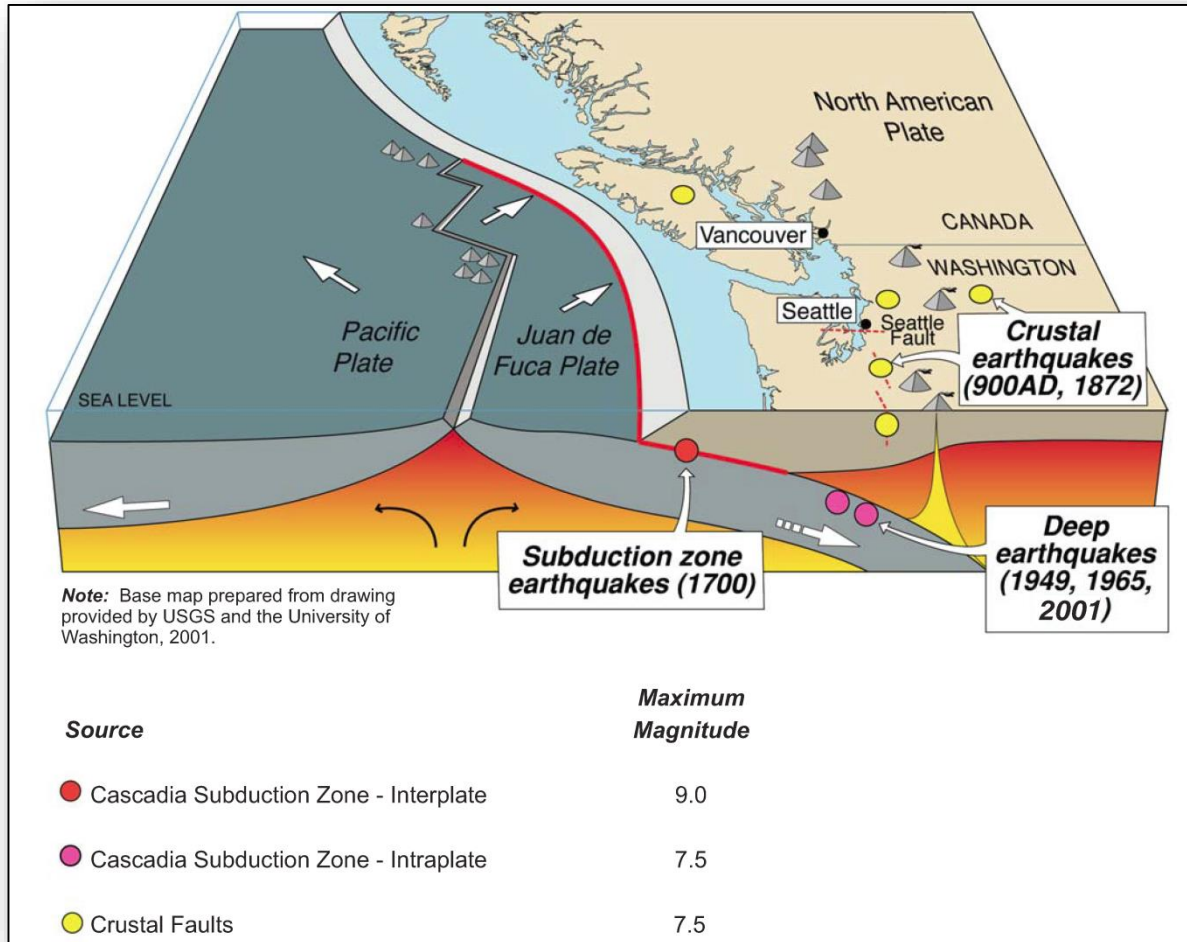
The viaduct in 1953

Geography

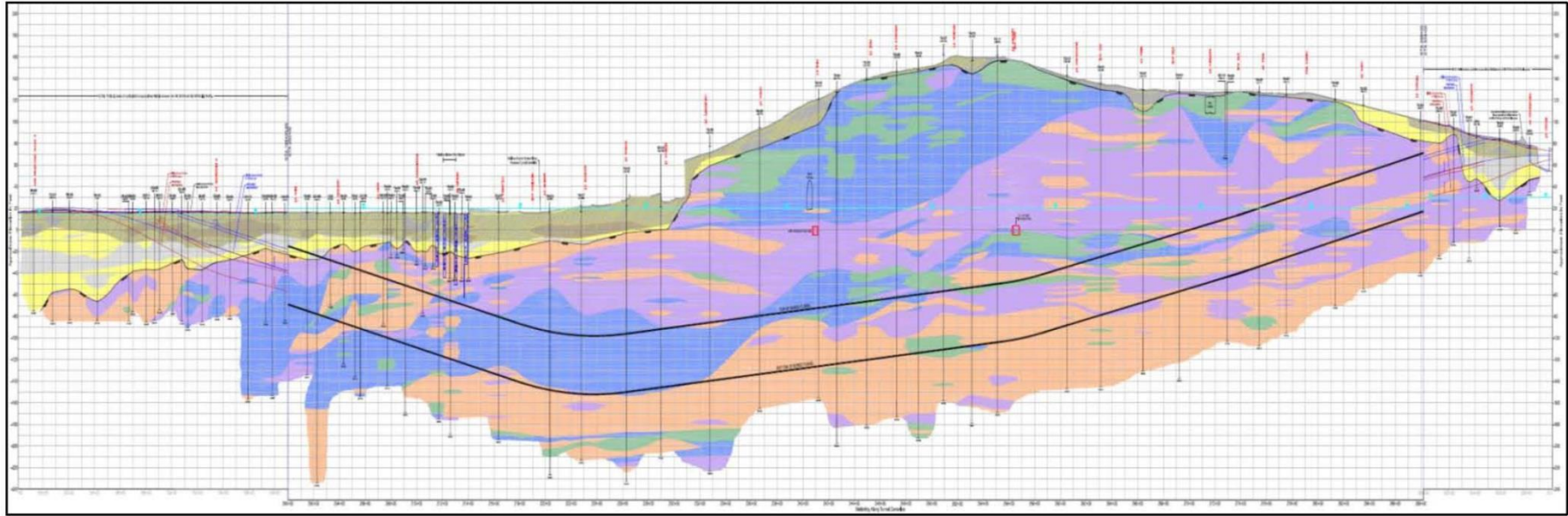


vs. **drivers**





REGIONAL SEISMICITY



RECENT GRANULAR DEPOSITS:
Loose to dense SILT and SAND with gravel; includes normally consolidated alluvium, granular fill, beach deposits, reworked glacial deposits, and recessional ice-contact deposits.

RECENT CLAY AND SILT:
Soft to very stiff CLAY and SILT with fine sand beds; includes normally consolidated cohesive fill, estuarine deposits, and recessional lacustrine deposits.

PEAT AND WOOD:
Very soft to hard PEAT, silty PEAT, organic SILT and WOOD; includes fill, normally consolidated peat and overconsolidated peat and buried soil deposits.

TILL:
Dense to very dense, silty SAND and GRAVEL, and hard, silty CLAY with sand and gravel; cobbles and boulders are common in these deposits; includes glacially overconsolidated till and glaciomarine drift.

TILL-LIKE DEPOSITS:
Dense to very dense, silty SAND and GRAVEL, and hard, silty CLAY with sand and gravel, interbedded and intermixed with cohesionless sand and gravel; cobbles and boulders are common in these deposits; includes lenses and layers of glacially overconsolidated till and glaciomarine drift.

COHESIONLESS SAND AND GRAVEL:
Very dense SAND and GRAVEL to SAND with variable silt; cobbles can be found in these deposits; includes glacially overconsolidated fluvial and glacial outwash deposits.

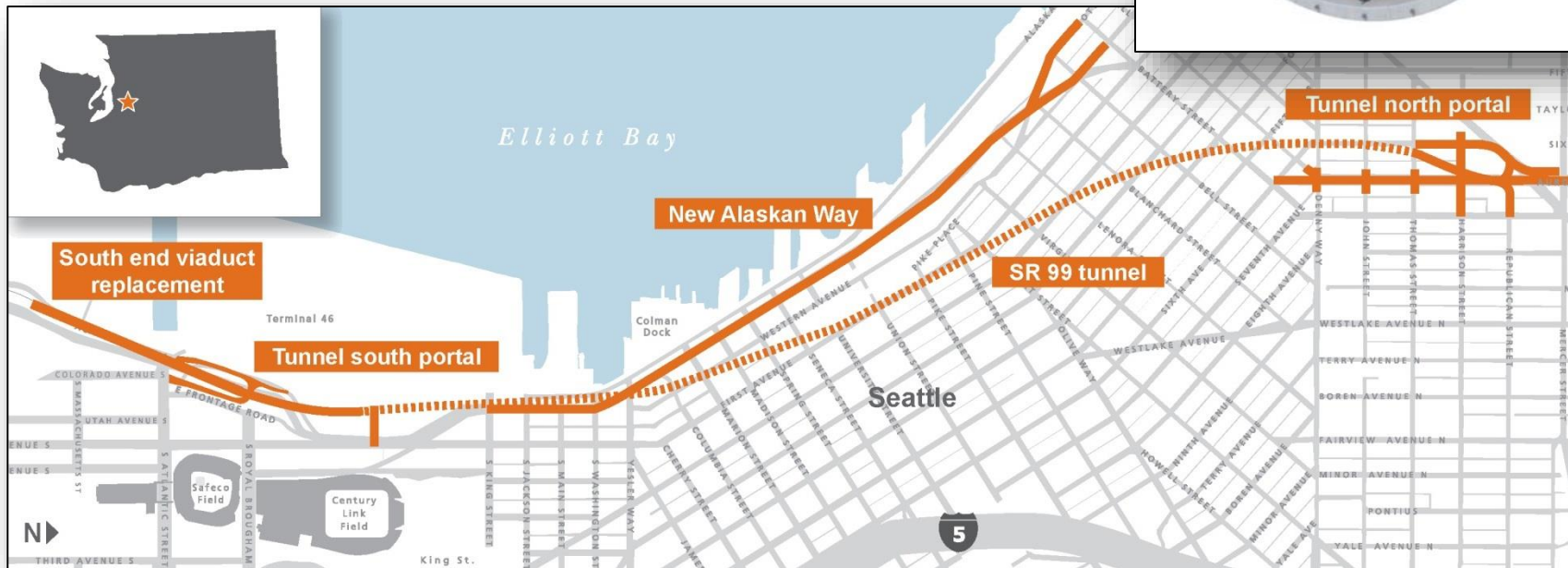
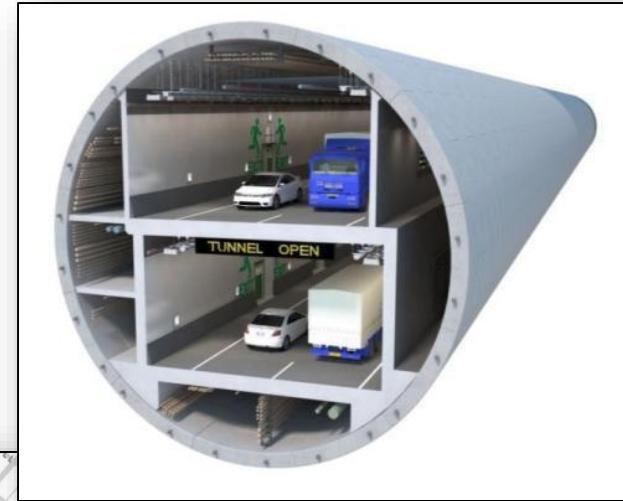
COHESIONLESS SILT AND FINE SAND: Very dense SILT, silty fine SAND, and fine sandy SILT with trace of clay; predominantly cohesionless; includes glacially overconsolidated lacustrine deposits.

COHESIVE CLAY AND SILT:
Very stiff to hard, silty CLAY and clayey SILT with trace of sand and gravel; scattered cobbles and boulders can be found in these deposits; includes glacially overconsolidated lacustrine, peat, and paleosol deposits.

Baseline geologic

PROFILE

Building a new **SR 99**
Corridor

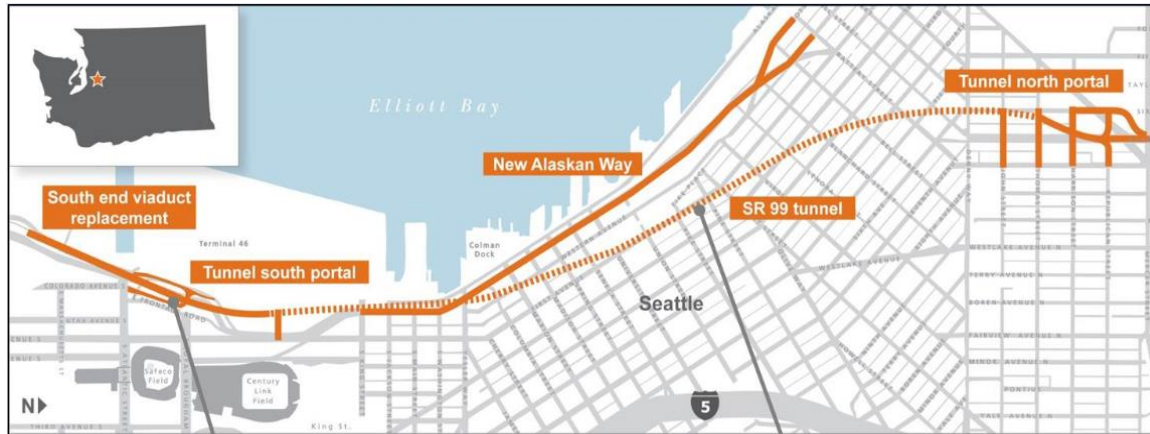


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Alaskan Way Viaduct REPLACEMENT PROGRAM



South-end replacement	Start	End
Electrical line relocation ✓	2008	2009
Holgate to King (stage 1) ✓	2009	2009
Holgate to King (stage 2) ✓	2010	2012
Holgate to King (Stage 3) ✓	2012	2014

* Partially funded by the state

** Per 2014 legislation, additional mitigation funding is being provided by WSDOT from funds outside the AWW Program

SR 99 tunnel	Start	End
SR 99 tunnel main contract	2011	TBD
North Access Project	2014	2017
North Surface Street Connections	TBD	TBD
South Access Project (main contract)	TBD	TBD
South Access (S. Dearborn Street off-ramp)	2016	2017
South Access (drilled shafts)	2014	2014

✓ = completed project □ = in progress

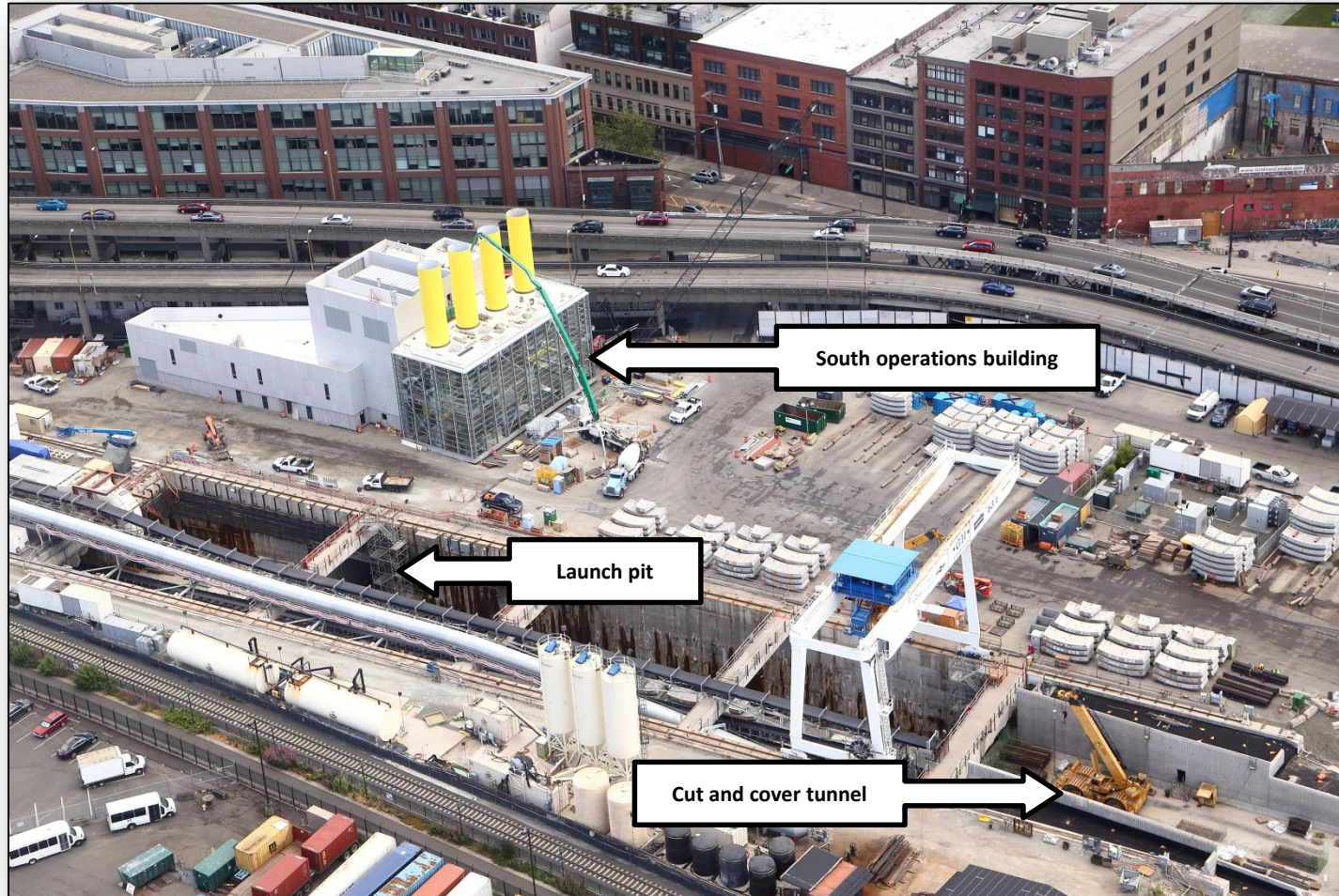
Miscellaneous projects	Start	End
Trager Building demolition ✓	2007	2007
Viaduct column stabilization near Yesler Way ✓	2007	2008
WOSCA Building demolition ✓	2009	2009
Pier 48 warehouse demolition ✓	2010	2010
Automated viaduct closure gates ✓	2010	2011
Western Building structural work ✓	2011	2016
SR 99 south-end fiber replacement ✓	2011	2011
Alaskan Way widening ✓	2012	2012
Cedarstrand Building demolition ✓	2012	2012
Waterfront viaduct removal ✓	TBD	TBD
Battery Street Tunnel decommissioning ✓	TBD	TBD
New Alaskan Way ✓	TBD	TBD

Mitigation projects	Start	End
SR 519 Phase 2 ✓	2008	2010
Spokane Street Viaduct Fourth Ave. off-ramp* ✓	2008	2010
I-5 active traffic management ✓	2009	2010
I-5 active traffic management sign bridges ✓	2009	2009
I-5 travel time signs ✓	2009	2009
City street intelligent transportation systems ✓	2009	2010
SR 99 intelligent transportation systems ✓	2010	2011
Enhanced transit/demand management** ✓	2010	2014
Parking mitigation for central waterfront ✓	2011	2019

Completed Work



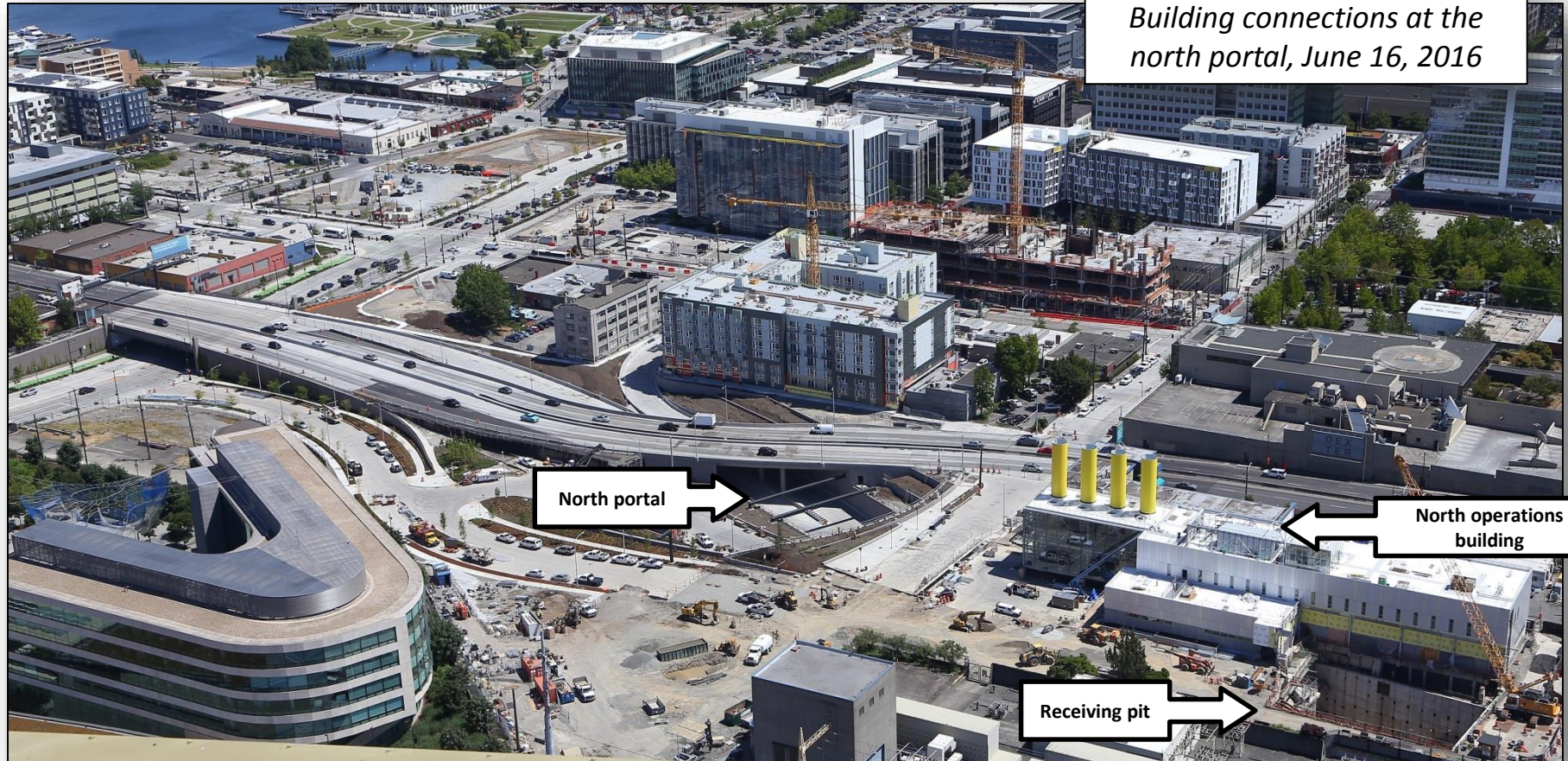
Future **SOUTH**
PORTAL



Building the **SOUTH**
PORTAL



Future **NORTH
PORTAL**



*Building connections at the
north portal, June 16, 2016*

North portal

North operations
building

Receiving pit

Building the **NORTH
PORTAL**



*North portal receiving pit,
August 31, 2016*

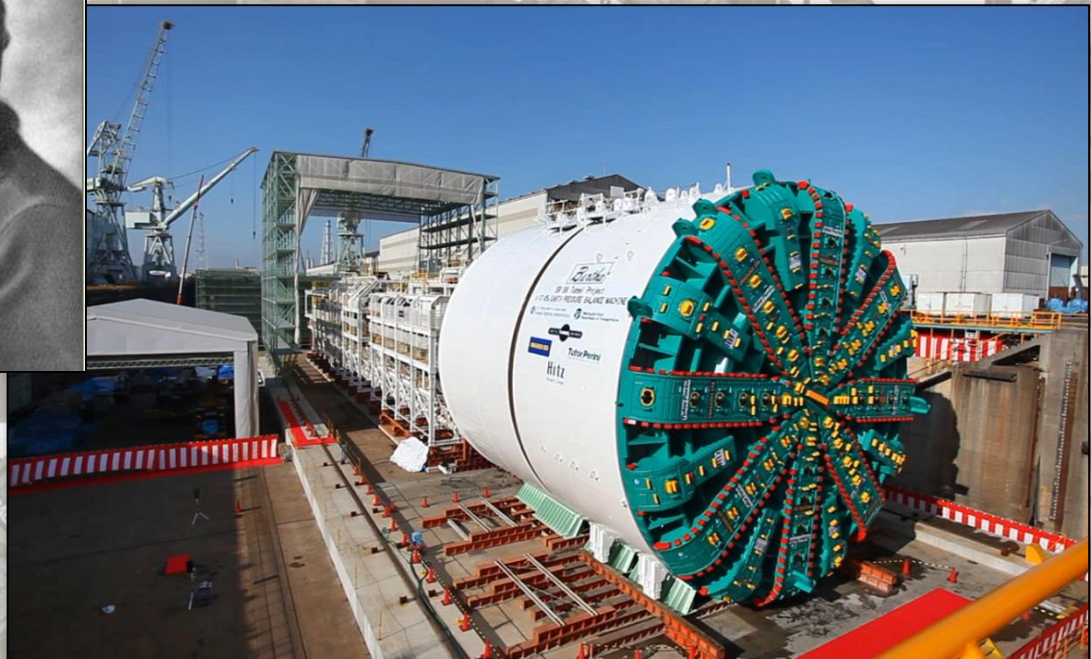
Building the **NORTH
PORTAL**

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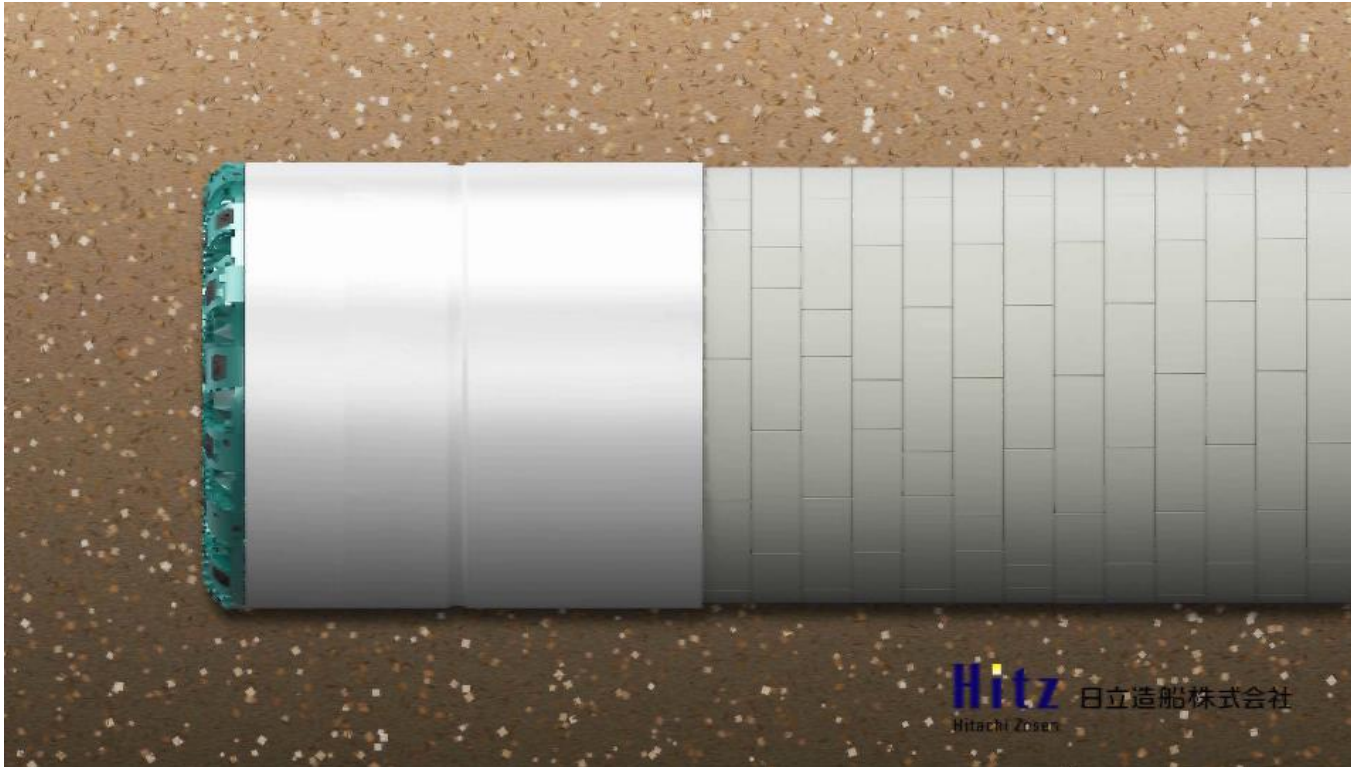
About **Bertha**



Vital stats:

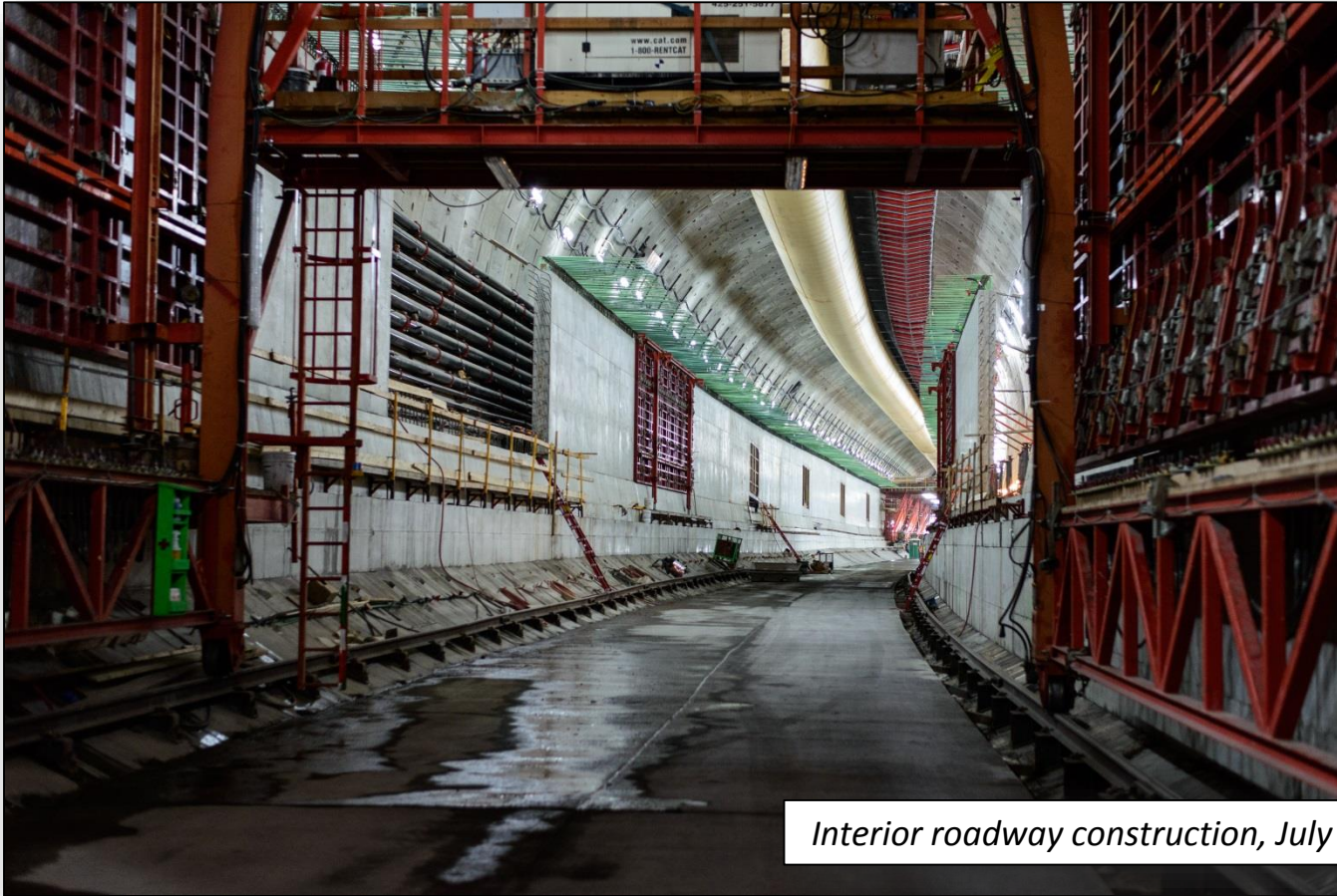
- 57.5 feet in diameter
- 326 feet long
- Nearly 7,000 tons

UNDERSTANDING BERTHA



Understanding

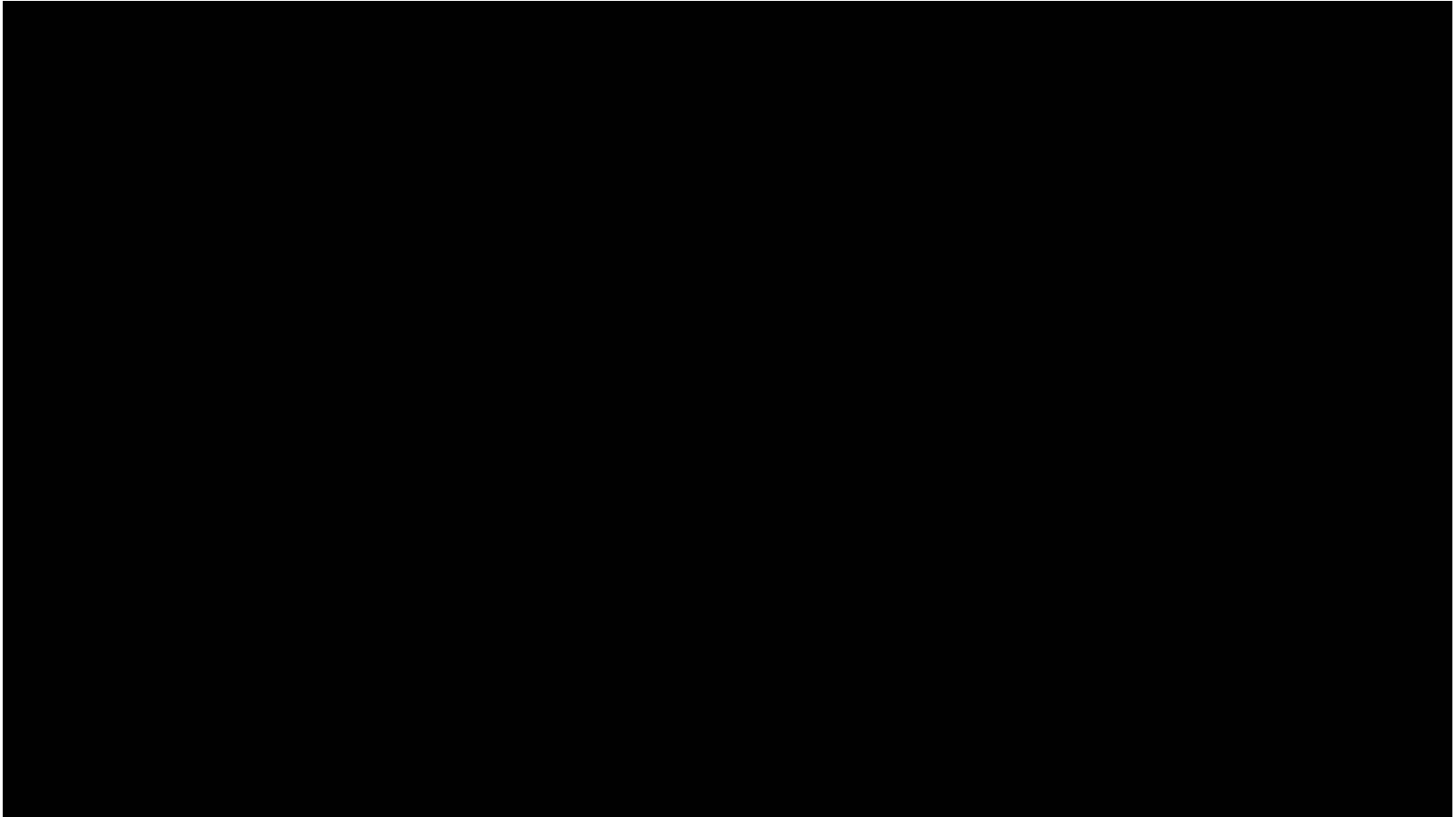
BERTHA



Interior roadway construction, July 13, 2016

BUILDING THE HIGHWAY

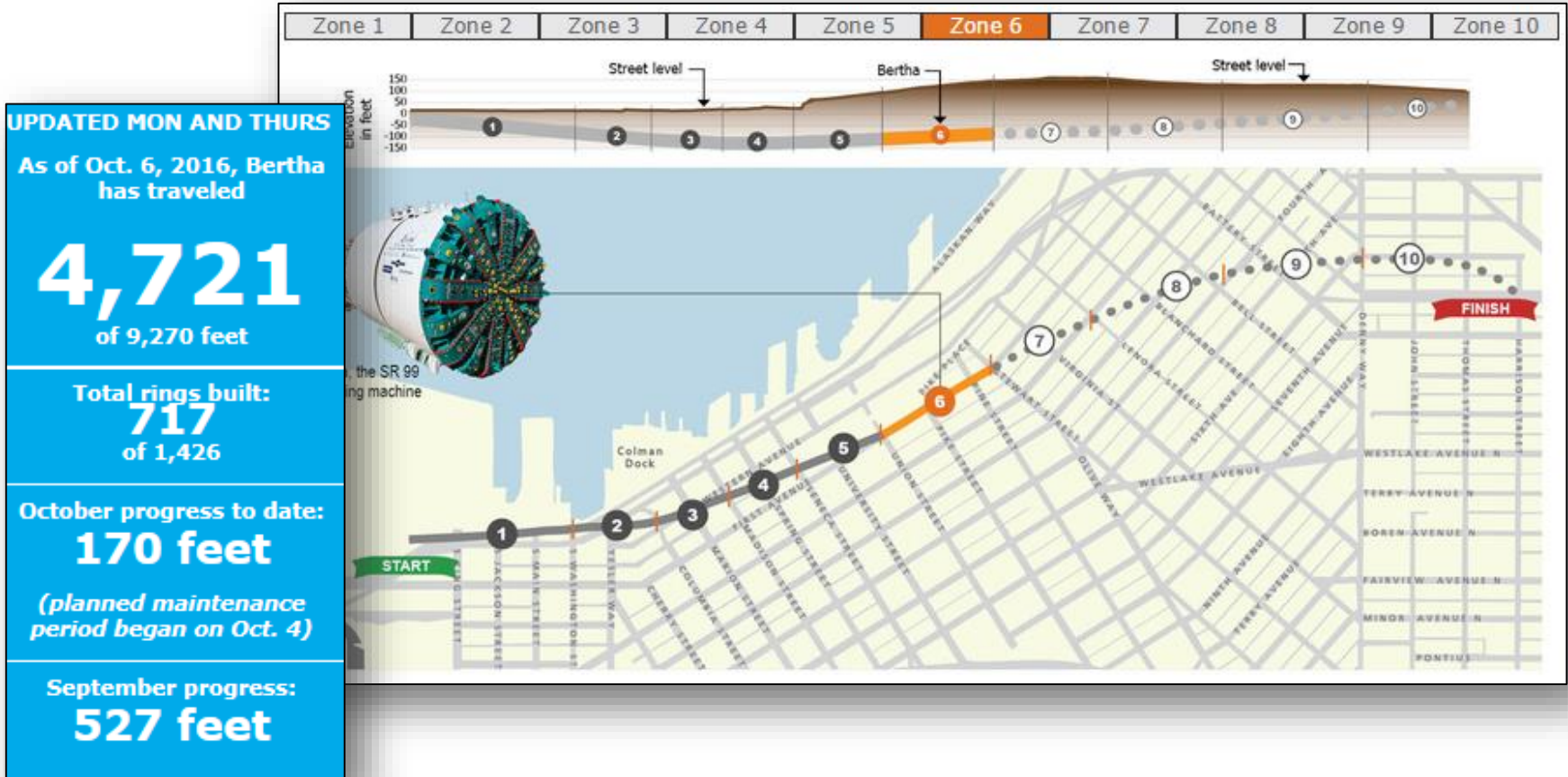
inside the tunnel



BUILDING THE HIGHWAY

inside the tunnel

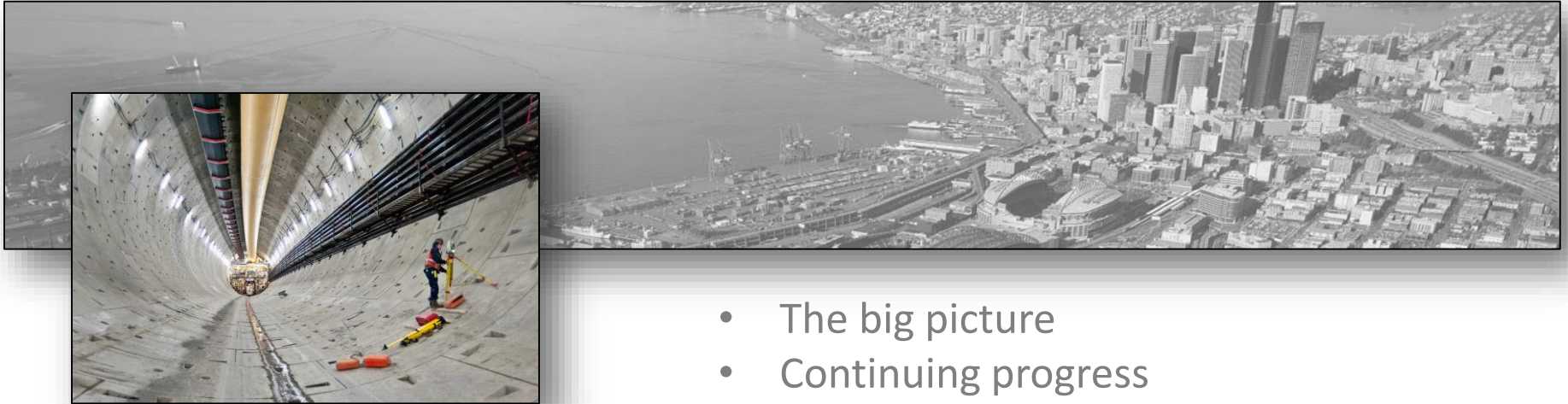
Alaskan Way Viaduct REPLACEMENT PROGRAM



Following

BERTHA

Today's **FOCUS**

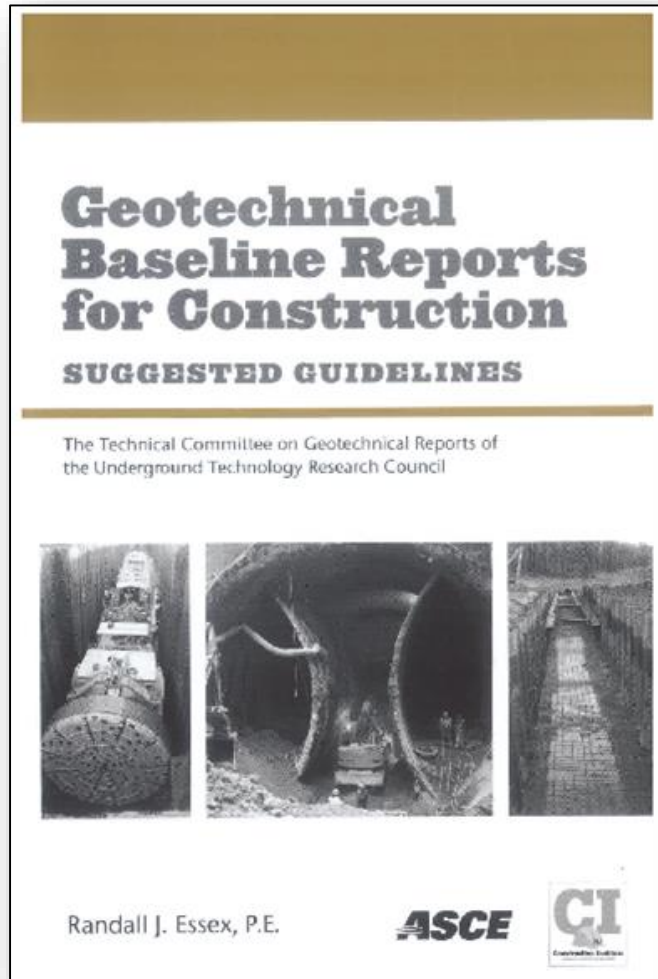


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- **Risk management**



Outcome =
Risk-based budget

- Comprised of two components: base and risk/opportunities.
 - Base estimate and schedule if project goes as planned.
 - Risk register.
- Scalable.
- Use independent subject matter experts to minimize bias.

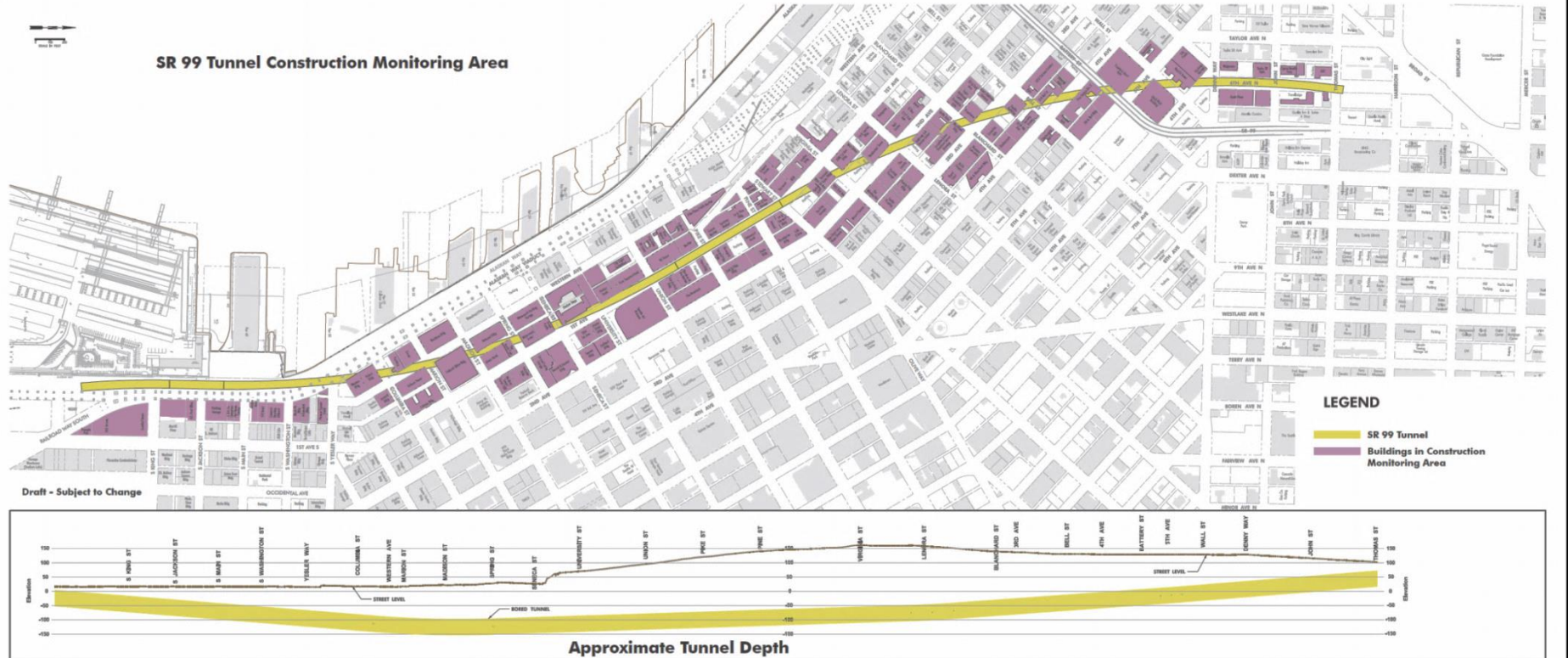


- Used to baseline subsurface conditions along tunnel alignment.
- Factual field and laboratory data in Geotechnical Data Report (GDR) in contract documents.
- Requires clear, concise and measurable baselines for assessing differing site conditions (DSC) – NOT a geotechnical design report.
- Included along with Geotechnical Data Report as part of the contract documents.

Geotechnical baseline

REPORT

SR 99 Tunnel Construction Monitoring Area



Ground

MONITORING



Monitoring equipment installed on a rooftop. Photo by Soldata.

- Install monitoring equipment on nearly 200 buildings.
- Install 700 instruments under streets and sidewalks to measure any ground changes.
- Track measurements of excavated material as tunnel boring machine progresses.
- Use satellite images to assess any changes in ground condition.

Protecting

STRUCTURES

- Construction monitoring task force meets daily to review data.
- From the tunneling machine
- From the surface



Collecting

DATA



Courtesy of Waterfront Seattle

How to **REACH US**



*Our information center,
Milepost 31, is located
at 211 First Ave. S. in
Seattle's Pioneer Square
neighborhood.*

Website:
www.AlaskanWayViaduct.org

Twitter:
[@BerthaDigsSR99](https://twitter.com/BerthaDigsSR99)

Email:
viaduct@wsdot.wa.gov

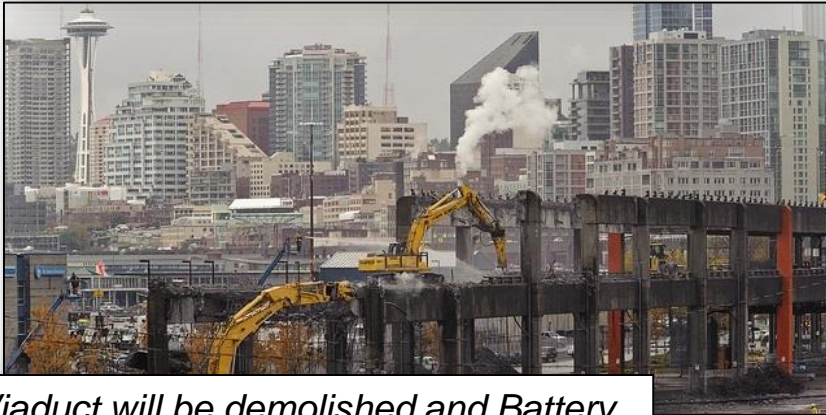
Hotline:
1-888-AWV-LINE



Tunnel connections and surface streets at the south tunnel portal



Reconnecting surface streets near the north tunnel portal



Viaduct will be demolished and Battery Street Tunnel will be decommissioned



City of Seattle rebuilds Alaskan Way along the waterfront