

University Link U230 Contract – Light Rail TBM Tunnels Washington Sound Transit

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| Location: | Seattle, Washington |
| Date: | 2011 – 2012 |
| Structure: | Light Rail Transit (LRT) Tunnel, Five (5) Sequential Excavation Method (SEM) Cross-Passages |
| Length: | Cross-Passages are Approximately 40 feet (12 meters) |
| Cross-Section: | 130 square feet (12 square meters) |
| Geology: | Soft Soils with Intermittent Lenses of Granular Soils; High Groundwater Table |
| Cost: | Approximately \$220 Million |
| Client: | Jaydee / Coluccio / Michels JV (JCM) |
| Owner: | Sound Transit |

Design and Construction Support Services For SEM Cross Passages:

University Link is a 3.15 mile (5.1 kilometer) extension of Washington Sound Transit's light rail system. The line will connect downtown Seattle with the University of Washington via Capitol Hill. Construction began in late 2008, and the line is scheduled to begin operation in 2016.

Gall Zeidler Consultants (GZ) provided expert consulting to the contractor including the development of construction drawings for the cross passage excavation. The geological conditions on site called for the development of a systematic depressurization scheme to lower the groundwater pressure in the immediate area of the cross passage excavation. The prevailing geology is comprised of soft cohesive and non-cohesive soils with intermittent lenses of granular soils that are prone to running. The SEM cross passage design includes systematic pre-support with self-drilling grouted pipe spilling as required by the ground conditions.

GZ provided expert advice on the installation sequence for the temporary support frames within the Tunnel Boring Machine (TBM) driven tunnels and on the selection of suitable excavation equipment. GZ assigned SEM experts to provide site support services during cross passages construction.

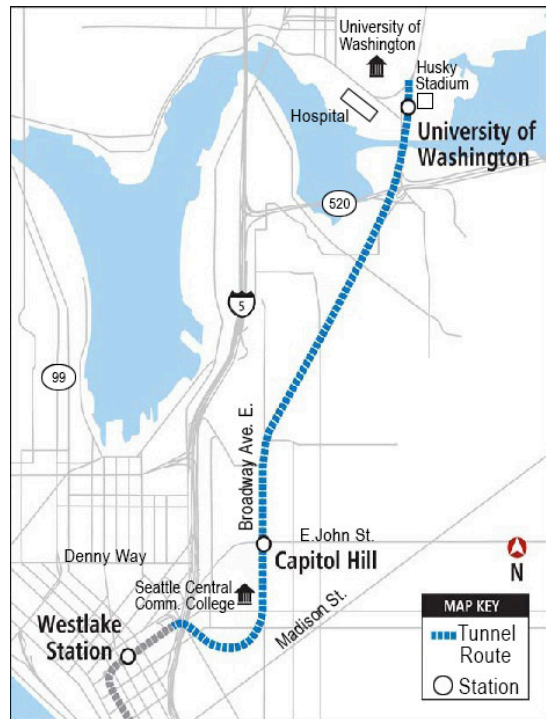
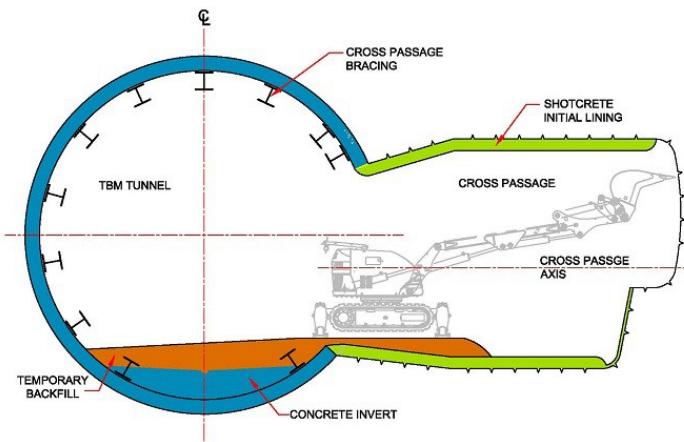


Figure 1. SEM schematic cross-passage excavation.

Figure 2. University Link LRT alignment.