Rail Systems

HATCH

RAIL SYSTEMS ENGINEERING

CENTRAL PUGET SOUND REGIONAL TRANSIT AUTHORITY (SOUND TRANSIT)

LOCATION
Seattle, Washington, USA

NAME OF CLIENT
Central Puget Sound Regional Transit Authority (Sound Transit)

PROJECT TIMELINE
1998- 2024

PROJECT COST
$12 billion

PROJECT OVERVIEW

Hatch has provided nearly two decades of systems engineering and vehicle design support to Sound Transit in Seattle, Washington, commencing with Alternatives Analysis and Environmental Impact Statement for the original University Link in Seattle and preliminary engineering design for Sounder (commuter rail) station communications. Since that time, numerous projects have been completed and are in service:

+ Tacoma Link/Streetcar (1.6 miles) in service in August 2003
+ Central Link (13.9 miles) from downtown Seattle to Tukwila opened in July 2009
+ Airport Link (1.7 miles) from Tukwila to Seattle-Tacoma International Airport in service, December 2009
+ University Link (3.2 miles) from downtown Seattle to the University of Washington campus opened in March 2016
+ South Link (1.6 miles) which began service in September 2016
+ Northgate Link from the University of Washington campus to Northgate which began service in October 2021

Currently, Hatch is providing systems engineering services for the East Link, Lynnwood Link, Downtown Redmond Link, and the Tacoma Hill top extension projects. Additional light rail extensions and new lines totaling approximately $32B are planned as part of the Sound Transit 3 (ST3) initiative passed by the voters in the three-county region in November 2016.

Hatch's engineering team has worked with Sound Transit and their consultants to resolve several challenging issues. These included the retrofit of the Downtown Seattle Transit Tunnel (DSTT) for combined rail and bus operation, implementation of a unique 1500 Vdc traction electrification system, and integration of substation and signals facilities along the alignment through a dense and highly urbanized light rail corridor. Hatch supported retrofitting the first floating bridge in the world to be transformed from a highway corridor to a light rail right-of-way.

In addition to our systems engineering design work, Hatch has provided continuous operations planning and design work for all corridors.

For the projects noted above, Hatch developed design criteria and provided engineering and design services for:

+ Vehicle specifications, procurement support, and manufacturer quality control for a fleet of 62 light rail vehicles from Kinkisharyo, and 152 light rail vehicles from Siemens
+ Traction electrification substations, distribution, and overhead contact system
+ Train (and DSTT bus) control and wayside traffic signal coordination
+ Communications network fiber-optic backbone
+ Supervisory control and data acquisition (SCADA) system
+ Link Control Center design and expansion
+ Operations and maintenance facility and yard design project management
+ Corrosion-protection systems engineering for utilities and structures

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Hatch worked alongside architects, artists, and engineers on the design of power, lighting, emergency power and ventilation, fire alarm, and intrusion detection and access control systems for at-grade, aerial and underground stations as well as associated plazas and parking facilities.

Recently, Hatch completed the construction stage for University Link (U Link), a 3.2-mile extension from Seattle's central business district and DSTT to the University of Washington's Husky Stadium. Hatch engineers faced and resolved new challenges for U Link including a state-of-the-art electromagnetic interference (EMI) mitigation system, an EMI and vibration monitoring system, a dedicated power distribution system, and traction electrification and system-wide raceways for a prototype floating track-slab.

Hatch is providing final engineering systems design for the East Link light rail line to Redmond via Mercer Island and Bellevue. Challenges with this project include connections to the south end of the DSTT in Seattle, installation of light rail overhead contact system on the Interstate 90 floating bridge, and corrosion mitigation of the concrete structure of the bridge.

Hatch is providing final design support during construction for all systems on the Northgate Link extension from UW Stadium at the terminus of U Link to Northgate Transit Center, the East Link extension, from the International District Station to the Redmond Technology Center Station located on the Microsoft Campus, and the Lynnwood Link extension, which will extend the systems from Northgate Mall to the Lynnwood City Center.

Several additional projects are in the planning phase buoyed by successful passage of 'Sound Transit 3' in 2016. These projects include West Seattle and Ballard Project (approximately 15 miles), Tacoma Dome Link extension (10 miles), and Everett Link extension (16.3 miles). Hatch provided preliminary and final design services during construction for the systems elements for Central Link, Tacoma Link, Airport Link, University Link, North Link, East Link and Lynnwood Link. The systems elements included traction power (medium voltage ac power distribution and substations), overhead contact system, train control, central control, SCADA, traffic signal coordination, communications, fare collection, and the O&M facility. Hatch also provided vehicle engineering services for Sound Transit's entire LRV fleet.

PROJECT HIGHLIGHTS

- Multi-year rail systems engineering support across Sound Transit's expanding light rail network
- Systems design and integration for urban, suburban, and constrained operating environments
- Traction power substations, medium-voltage distribution, and overhead contact system (OCS) engineering
- Train control, signal, and communications systems supporting safe and reliable operations
- SCADA and central control systems design for corridor-wide monitoring and control
- Rail systems engineering for tunnel, aerial, at-grade, retained cut, and complex guideway configurations
- Systems support for major light rail extensions and corridor expansions
- Integration of rail systems within dense urban corridors and shared rights-of-way
- Operations and maintenance facility and yard systems engineering
- Vehicle interface coordination and systems compatibility support
- Design support during construction, testing, and commissioning activities
- Long-term partnership supporting phased delivery of one of North America's largest transit expansion programs