

A project profile from geoengineers.com

I-405 Bellevue Braids Design-Build Project

New braided freeway ramps replace dangerous traffic weaves for safer, faster commutes



A design rendering illustrates the braided ramps feature on I-405 south of SR-520.

Overview

More than 800,000 people a day travel Interstate 405, the 30-mile-long freeway that serves Bellevue, Kirkland, Redmond and other communities east of Seattle. The I-405 Bellevue Braids Design-Build project is one of the most critical projects in the Washington State Department of Transportation (WSDOT) Master Plan to reduce traffic congestion and improve mobility for users of this busy I-405 corridor.

As a member of the I-405 Bellevue Braids design-build project team, GeoEngineers provided geotechnical design and construction support services to contractor Atkinson Construction, lead designer Jacobs Engineering and the Washington State Department of Transportation (WSDOT).

The project's purpose was to reduce congestion and eliminate the dangerous "weave" of traffic between major freeway entrances and exits. New multi-level "braided" ramps now separate vehicles entering and exiting northbound I-405 through Bellevue. The project also added a bypass lane for I-405 traffic headed eastbound to SR 520, and a new ramp from the NE 10th Street overpass gives drivers direct access to SR 520 from downtown Bellevue, decreasing on-ramp traffic jams and surface street backups. Project improvements included seven new bridges, 26 retaining walls and numerous drainage improvements, as well as miscellaneous structures such as sign bridges and illumination poles.

Approach

GeoEngineers has partnered on many design-build projects and is committed to adding value to the team from bid stage through project completion. Dan Campbell, PE, Principal Geotechnical Engineer for the Bellevue Braids project, explains, "GeoEngineers knows that to be successful with design-build projects, teams must come up with a better design than presented in the concept plans—otherwise it becomes a low bidder's game. For this project, we helped our team out-think the competition, not just compete head-to-head on price. When we looked at the concept drawings, our first question was, 'Can we find a better geotechnical approach to the project?'"

For I-405 Bellevue Braids, GeoEngineers managed the geotechnical staff, collaborated and coordinated with other design and construction team members and maintained schedule and budget. The project is only feet away from a major medical center, so construction noise and vibration were a concern. To minimize the impact to the sensitive hospital equipment and procedures, GeoEngineers completed a detailed vibration plan and prepared mitigation strategies for the construction period.

Our geotechnical team provided design services, utilizing American Association of State Highway and Transportation Officials (AASHTO) Load & Resistance Factor Design (LRFD) design specifications, and provided construction observation for all significant geotechnical engineering elements.

GeoEngineers completed geotechnical designs for every element of the project that touched the ground, from foundation systems for walls and bridges to utilities.

EXPERTISE

- Geotechnical

MARKET

- Transportation

LOCATION

- Bellevue, Washington

Results

The design-build team completed the project on budget and seven months ahead of schedule, with the new ramps and bridges opened to traffic in May 2012.

The I-405 Bellevue Braids project:

- Constructed substantial infrastructure within feet of a major medical center with no adverse impacts to the hospital or its patients.
- Speeds travel time for motorists, accommodates more trips per day and improves highway safety in the I-405 corridor.
- Unblocks an infamous traffic choke point between two of western Washington's most traveled freeways.

Design rendering and on-ramp photo courtesy of Jacobs Engineering Group, Inc.



The project included several new bridges and scores of retaining walls to create grade-separated on- and off-ramps.



Tie-back walls provide temporary shoring and underpinning of an existing bridge.



This temporary soil-nail retaining wall, shown during construction, is one of several installed.



GeoEngineers monitors the lowering of the rebar cage into a drilled shaft.



The new braided ramps eliminate the dangerous weave of traffic entering and exiting I-405.

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