



MEMORANDUM

To: SR 520 Program Files

From: Randy Everett, FHWA Major Projects Oversight Manager;
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**Subject: SR 520, I-5 to Medina: Bridge Replacement and HOV Project –
Additional Geotechnical Investigations**

The purpose of this memorandum is to document National Environmental Policy Act (NEPA), State Environmental Policy Act (SEPA), Endangered Species Act (ESA), and Section 106 and 4(f) compliance for the SR 520, I-5 to Medina: Bridge Replacement and HOV Project (project) associated with proposed geotechnical investigations, that are now needed in addition to those investigations already completed during preliminary design.

Environmental documentation for the SR 520, I-5 to Medina: Bridge Replacement and HOV Project includes the Final Environmental Impact Statement (June 2011) and supporting discipline reports, the Record of Decision (August 2011), SEPA Addenda (October and November 2011), NEPA Environmental Reevaluations (December 2011, January 2012, and July 2012), as well as subsequently filed memoranda. The proposed additional geotechnical investigations have been compared to findings in the Final Environmental Impact Statement

(FEIS), Record of Decision (ROD), and other existing reports and documentation. The proposed changes and potential environmental effects are described below.

Description of Proposed Additional Geotechnical Investigations

The FEIS stated that additional geotechnical work would be required as the Washington State Department of Transportation (WSDOT) refines the engineering design for the Preferred Alternative. As design has advanced for project components west of the floating bridge, WSDOT has determined that exploratory geotechnical work would be necessary to collect data on subsurface soil and groundwater conditions. The data collected would be used to advance design and to better determine the appropriate construction methods for the bridge pier and retaining wall foundations, as well as for stormwater facilities.

The following discussion provides context for the typical construction techniques used as part of both over-water and land-based geotechnical explorations.

Overwater borings (below Ordinary High-Water) are conducted from barges that are typically moved to the boring location with a skiff. The WSDOT barge measures 28 feet by 18 feet, while rented barge sizes will vary depending on the need. Drilling equipment and materials would typically be loaded and unloaded from the barge(s) at an existing dock facility. Barge access from land would be consistent with operations at the selected facility. In some unique situations, it may be necessary to lower a component barge and drilling equipment directly from existing bridge structures.

Land-based borings would be done using one of three types of drill rigs: a truck-mounted rig, a track-mounted rig, and a skid rig. The truck-mounted drill rig will be used only when there is easy vehicular access. This will be mainly on asphalt or dense surfaces. If the ground is in question of being soft the track-mounted rig will be used for access. The skid drill will be used on all difficult access sites which can't be driven to such as steep inclines. The skid drills will be set in place with a crane on to a prepared site or platform. In some instances the drill will be set as close to the boring location as possible and then pulled to the site by a winch. This causes minimal disturbance. Mats can be used with all three drill rig types if the locations require the protection of soil or landscaping.

All borings will be drilled using a casing advancer, mud rotary method. For this method, the driller will use approximately a four-inch-diameter casing to maintain the sides of the borehole. To advance a boring, a center drill section will be lowered to the bottom of the four-inch-diameter casing and latched into place. As the casing is rotated, the center drill section and bit rotate as well, grinding the soil below the casing. Bentonite slurry is circulated into the borehole bottom to assist with advancement of the core barrel and drill bit and to extract soil from the casing. Split- spoon or undisturbed samples are obtained by removing the casing advancer from the drill casing and lowering a sampler through the center of the casing.

For borings conducted overwater, a five- or six-inch-diameter outer steel casing will first be installed through the water column and about five to ten feet below the mudline to contain drilling operations.

Vibrating wire piezometers (VWP) may be installed at variable depth intervals in some boreholes to monitor groundwater conditions. After each boring is complete, the holes would be grouted (filled) to about five feet above the top of the upper VWP. Bentonite chip seal would be used for the upper portion of the hole above the grout, in an effort to keep the grouted portion of the installation as far beneath the lake bottom or ground surface as possible. A small cable would be routed from the VWPs to a data logger (e.g. across the lake bed and up a bridge column in water). The monitoring equipment would remain in place long-term to maximize the data set for groundwater conditions at each location. It is likely that the cables and data loggers would be removed during the demolition of the existing structures. However, the VWPs will remain buried and be abandoned in place.

Each boring could take from several hours to up to three days to complete, depending on the depth and soil conditions encountered. The drill cuttings and mud slurry would be collected in drums and transported to a WSDOT-provided storage area. Throughout the boring and grouting process, all fluids would be contained and re-circulated within the drill. A site restoration plan will be implemented for the truck-mounted rig drills and the skid-mounted rig drills to replace disturbed vegetation and stabilize denuded soils at upland locations. The track rig drills leave little trace of disturbance when a mat is used, so site restoration is typically not necessary and would be employed on an as-needed basis.

Consistency with Existing Environmental Documents

To ensure that the proposed geotechnical work remains in compliance with the project's suite of local, state, and federal permits, the following actions are proposed where appropriate:

- Modification to the project's Hydraulic Project Approval, which is administered by the Washington Department of Fish and Wildlife (WDFW);
- Modification to the project's Department of Army Permit, which is issued by the United States Army Corps of Engineers (USACE);
- Informal administrative update to the project description, as required for Endangered Special Act compliance.
- Request for a Shoreline Substantial Development Permit Exemption, or administrative project update for existing Shoreline Substantial Development Permits, from the Cities of Seattle or Medina, as appropriate.

If borings are proposed in locations already covered by the project's permitted impact footprint these updates may not be necessary.

Potential effects from the proposed geotechnical work are limited to habitat disturbance (terrestrial and aquatic vegetation, and lakebed substrates) and small increases in turbidity from disruption of substrate during in-water drilling and anchor placement and removal activities. The anticipated habitat disturbance would result in only short-term, temporary impacts on wetland, buffer, or aquatic habitat or water quality. These impacts would be similar to the types, locations and volumes of those already approved for the project and would not require additional mitigation. Work would be conducted using best management practices to avoid and minimize

