

MEMORANDUM

To: SR 520 Program Files

From: Anthony Sarhan, FHWA Major Projects Oversight Manager;
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Date: January 6, 2015

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Subject: SR 520, I-5 to Medina: Bridge Replacement and HOV Project – Geotechnical Investigation Update

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 associated with proposed updates to the methods and locations of geotechnical investigations needed to advance the design and implementation of the SR 520, I-5 to Medina: Bridge Replacement and HOV Project.

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, July 2012, October 2012, February 2013, and February 2013), and other memoranda. As the project proceeds with final design and construction, proposed modifications to design and delivery methods have been compared to findings in the Final Environmental Impact Statement (FEIS), Record of Decision (ROD), and other existing reports and documentation.

The Final EIS 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.

WSDOT prepared a memorandum in July 2012 which described typical construction techniques that were used as part of over-water and land-based geotechnical explorations, and compared those techniques to findings in the Final Environmental Impact Statement (FEIS), Record of Decision (ROD), and other existing reports and documentation. As described in the July 2012 memorandum, WSDOT and FHWA found that the geotechnical investigations would not result in additional effects beyond those described in the FEIS, ROD, and subsequent Environmental Reevaluations, and that no additional environmental review was required.

Additional geotechnical investigation techniques and locations beyond those described in the July 2012 memorandum have been identified as necessary to collect data on subsurface soil and groundwater conditions. This memorandum provides an update to the July 2012 memorandum, describing the additional techniques and locations, and comparing them to findings in the FEIS, ROD, and other existing reports and documentation.

Description of Proposed Additional Geotechnical Investigation Techniques

The July 2012 memorandum described the mud rotary method of drilling geotechnical borings. In addition, the sonic core method is proposed for some borings. The sonic core method of drilling uses high frequency vibration and rotational and down force of the drill casing to advance the bore holes. This method would only be used for upland borings. The inner core barrel is advanced several feet ahead of the sonic drill casing, taking the first section of the continuous sample. No fluid, air, or mud is used during this coring process, allowing for the most undisturbed sample possible. The overriding outer casing is then advanced over the inner core barrel. Small amounts of water may be used to lubricate the outer sonic casing. The inner core barrel is then extracted while the outer sonic drill casing remains, allowing the sample to be brought to the surface and extruded into a storage bag. The remaining sonic casing keeps the borehole open and minimizes water intrusion into the bore hole. This process is then repeated to the desired depth of the boring. All drill cuttings would be collected and transported to a WSDOT-provided storage area. After completion of each boring, groundwater pressure and slope stability monitoring instrumentation may be installed to provide additional data. The remaining hole would be filled up to the surface with bentonite clay.

In addition to geotechnical borings, WSDOT proposes to conduct geophysical testing to collect electrical current and passive vibration data. These data are used to evaluate variations in soil layers and soil type, density, and stratigraphy. The following two geophysical test methods would be performed:

- Electrical resistivity tomography (ERT): ERT involves transmitting an electric current into the ground between two electrodes and measuring the voltage between two other electrodes. The electrodes are spaced approximately five feet apart, connected by a cable, and staked about 6 to 8 inches into the ground, except in paved areas. ERT uses 200 volts and the current depends on the soil conductivity. The current is normally less than 0.1 AMP. Water is added to the electrodes to reduce contact resistance.
- Multi-channel analysis of surface waves (MASW): MASW measures seismic vibrations in the ground using sensors (geophones) inserted into the ground. Twenty-four geophones will be inserted as deep as two feet into the ground, except in paved areas

where sensors will be placed on the surface. The geophones are connected by cables and spaced 5 to 10 feet apart. Seismic vibration data detected by geophones is transmitted to a portable seismograph. After data are collected, the geophone and cable array is moved ten feet down the transect and data are collected again. The process is repeated until the transect is complete. A vibration source is required for the MASW to be effective. Typically, ambient vibrations from local traffic would likely be sufficient for an effective MASW survey. If ambient vibrations are not sufficient, technicians would generate vibrations by dropping a sandbag (about 30 pounds) from a height of approximately five feet.

As each type of test is completed, a series of stakes or pin flags will mark the transects for land surveyors to precisely locate.

Finally, WSDOT intends to install observation wells to monitor groundwater levels at various locations in the project vicinity, and inclinometers to monitor ground movement over time in the vicinity of the historic Delmar Landslide area. The methods used to install this monitoring equipment are similar to those used to install the vibrating wire piezometers (VWP) described in the July 2012 memorandum.

Consistency with Existing Environmental Documents

The additional geotechnical methods described above remain consistent with the analysis of existing environmental documents described in the July 2012 memorandum. As described in the July 2012 memorandum, 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 Species 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 investigations 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 potential effects to the natural environment. Given the temporary and minor amount of habitat affected by the proposed activities, effects from the geotechnical investigations are considered insubstantial for regulated natural resources and ESA-listed fish.

The geotechnical investigations for the Project were evaluated through a separate consultation with the Services in December 2010 (NMFS Tracking No. 2001/00017; USFWS No. 16410-2011-I-0098). A WSDOT Biologist has reviewed the proposed additional geotechnical investigation techniques, and has provided an administrative update to the U.S. Fish and Wildlife Service and National Marine Fisheries Service (Services). Through this update, the Services and WSDOT have determined that reinitiation of informal consultation would not be required for ESA compliance. If additional geotechnical investigations are proposed in the future, WSDOT will coordinate with the Services as needed to ensure ESA compliance.

The proposed additional geotechnical investigation techniques would not require extensive upland ground disturbing activities, and are not expected to affect adjacent historic resources. Some of the proposed geotechnical investigations are located outside of the Area of Potential Effect (APE) for the SR 520, I-5 to Medina Project. The need for additional geotechnical investigations for the SR 520, I-5 to Medina project was evaluated in the project's Archaeological Treatment Plan and these investigations are not subject to additional external review or monitoring unless they will affect identified archaeological historic properties. A WSDOT Cultural Resources Specialist has determined that no additional analysis or consultation is necessary for Section 106 compliance or Section 4(f) compliance for historic properties at this time. An Unanticipated Discovery Plan is in place to address any unanticipated impacts to archaeological resources.

The changes described above will not result in additional effects beyond those described in the FEIS, ROD, and subsequent Environmental Reevaluations. Therefore, the project remains compliant with current federal, state, local, and departmental regulations and directives with regard to NEPA/SEPA processes, the Endangered Species Act, Section 106 and 4(f). Therefore, no additional environmental review is required. If additional types or locations of geotechnical investigations are needed, the proposed borings will be evaluated to determine if any additional environmental review is needed.

We have reviewed and agree with the contents of this memorandum.

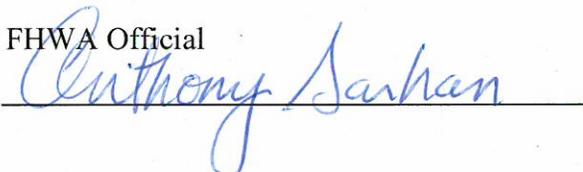
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