Washington State Department of Transportation

SR 520 Bridge Replacement and HOV Program

Water Quality Monitoring & Protection Plan For Section 401 Water Quality Certification Order # 9011

SR 520 – West Connection Bridge MP 1.96 to MP 2.33

For Approval by Ecology

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List of Abbreviations/Acronyms

Abbreviation/ Acronym	Definition
BMP	Best Management Practice
CSWGP	Construction Stormwater General Permit
ECAP	Environmental Compliance Assurance Procedure
ECM	Environmental Compliance Manager
Ecology	Washington State Department of Ecology
ECP	Environmental Compliance Plan
HPA	Hydraulic Project Approval
HRM	Highway Runoff Manual
I-5	Interstate 5
ITS	Intelligent Transportation Systems
MP	Mile Post
NGCS	Next Generation Concrete Surface
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Unit
OHWM	Ordinary High Water Mark
RCW	Revised Code of Washington
SPCC Plan	Spill Prevention, Control, and Countermeasures Plan
SR 520	State Route 520
SR 520 WCB Project	State Route 520 West Connection Bridge Project
SR 520 WCB Site	State Route 520 West Connection Bridge Site
USFWS	U.S. Fish and Wildlife Service
WAC	Washington Administrative Code
WCB	West Connection Bridge
WQC	Water Quality Certification
WQMPP	Water Quality Monitoring and Protection Plan
WSDOT	Washington State Department of Transportation

Water Quality Monitoring and Protection Plan (WQMPP)
SR 520, West Connection Bridge Project, (a part of
SR 520, I-5 to Medina Bridge Replacement and HOV Project)
Order #9011

1.0 Introduction

This document pertains to the in-water and over-water construction activities within the SR 520 limits of construction for the West Connection Bridge Project (SR 520 WCB Project) within Lake Washington.

A WQMPP is required per the SR 520, I-5 to Medina Bridge Replacement and HOV Project 401 Water Quality Certification Order #9011 (WQC Order #9011) . It is intended to provide information on activities that shall be performed within and over waters of the state. It will also provide a description of best management practices (BMPs) for meeting water quality standards and a monitoring schedule for tracking the performance of BMPs used during in-water and over-water construction work within the project limits.

The Contractor shall implement the BMPs described in the plan and shown on the plan sheets. WSDOT will be responsible for performing the monitoring and submitting the sampling documentation to the Washington State Department of Ecology (Ecology). Any changes to BMPs must be submitted to WSDOT for approval by Ecology prior to conducting the work at that location.

The procedures defined in this WQMPP will achieve the following goals:

- Document the performance of BMPs and procedures used within and over Lake Washington in meeting state water quality standards.
- Determine if Water Quality Standards are being met at the edge of the area of mixing (i.e., point of compliance) as defined in WAC Chapter 173-201A-200, "Fresh water designated uses and criteria."
- Help to ensure compliance with the conditions identified in the WQC Order #9011 for construction activities conducted below the Ordinary High Water Mark (OHWM) and over water.

This WQMPP identifies the appropriate parameters to be monitored, monitoring locations, monitoring and sampling procedures, and the frequency of monitoring. It also contains the BMPs that shall be used to protect waters of the state during specific identified construction activities over water and below OHWM. These elements are described in detail in the following sections.

2.0 Project Information

The SR 520 WCB Project is located in the city of Seattle at the west end of the Evergreen Point Floating Bridge between MP 1.96 and MP 2.33. The West Connection Bridge (WCB) will connect the existing SR 520 west approach bridge to the west end of the new floating bridge. The new floating bridge is part of the Floating Bridge and Landings contract that is scheduled to be open to traffic in fall of 2014. The WCB will maintain the current lane configuration of two general purpose lanes each way from I-5 to the floating bridge. Construction of the approximately 1,350-foot-long by 54-foot-wide WCB will include 11 spans on drilled shaft bridge piers in Lake Washington. The western 500 feet involves widening the existing west approach structure to the north, while the eastern 850 feet constitutes an independent bridge structure as shown on the WQMP Plan sheet in Appendix A.

The SR 520 WCB Project will begin construction in June of 2013 and end construction in summer of 2014 and will include one wet season.

2.1 In-Water/Over-Water Construction Activity Description

All the work associated with the SR 520 WCB Project will occur in and over Lake Washington. The lake is the only surface water within the project area. The discharge of polluting matter to waters of the state is a violation of the Washington State Water Pollution Control Law (RCW 90.48.080). This WQMPP is intended to help meet compliance with this regulation.

All in-water work shall be conducted during the Hydraulic Permit Application (HPA) approved in-water work windows as presented in Table 1. The construction and water quality monitoring locations are shown on the WQMP Plan sheet in Appendix A.

Table 1. In Water Work Window

In-water work shall only occur as follows:

Construction Activity	Work Window
Impact Pile Driving (including pile proofing):	October 8 through April 15
Drilled shaft - vibratory installation only:	August 1 through April 15
Pile removal:	August 31 through April 15

During in-water and over-water construction activities, the Contractor shall maintain compliance with the *SR 520, I-5 to Medina Bridge Replacement and HOV Project* 401 WQC Order #9011 provided in the Environmental Compliance Notebook which is submitted to the Contractor. There are three types of water associated with bridge construction activities and they all require management:

- **Concrete Process Water:** concrete slurry resulting from drilled shafts, grinding residue water, and any other concrete-derived slurry. Any stormwater that mixes with concrete process water becomes concrete process water. It shall be contained and collected for off-site upland disposal at a licensed facility.
- **High pH Stormwater:** rainwater that falls on uncured "green" concrete during the first 7 days of the curing process and water that is used for curing the concrete bridge decks. It shall be contained, tested, and treated as necessary to ensure

compliance with pH and turbidity water quality standards prior to discharge to the lake. If high pH stormwater mixes with concrete process water, it becomes concrete process water.

- **Work Area Stormwater**: rainwater that falls into bridge work areas that contain debris and/or stockpiled materials. These work areas are those that shall require the use of BMPs to block scuppers and bridge drains for water containment and collection. Work area stormwater shall be contained, tested, and treated as necessary to ensure compliance with pH and turbidity water quality standards prior to discharge to the lake.

If rainwater falls onto clean, cured concrete surfaces and bridge work areas, it may be allowed to run off the structure or surface directly to the lake. Fully cured concrete surfaces, such as the bridge roadway or piers, shall be regularly cleaned (e.g., sweeping, debris collection and removal, etc.) to allow stormwater to run off these structures directly to the lake.

The BMPs that shall be implemented during the project and apply to all in-water and over-water construction activities are presented below:

- Daily inspection of equipment, storage area, and structure inspections and maintenance practices shall be conducted prior to commencing work activities to prevent drips, leaks, or failures of hoses, valves, fittings, containers, pumps, or other systems that contain or transfer hazardous materials to prevent spills into state waters.
- All fueling locations and procedures shall be approved by Ecology and described in the SPCC Plan (to be prepared by the Contractor).
- For crane storage overnight, BMPs, such as diapers and plastic, shall be placed underneath the crane engines and maintained daily.
- Eco-friendly lubricants (e.g., vegetable-based hydraulic fluid) shall be used for in-water construction.
- Eco-friendly fuel sources shall be used for in-water construction where practicable.
- Each barge and vessel shall have spill response kits and containment booms on board. These kits and booms shall be maintained, immediately accessible and located near all hazardous materials and equipment.
- Absorbent materials shall be placed under all vehicles and equipment on barges or other over-water structures. Absorbent materials shall be applied immediately on small spills, and promptly removed and disposed of properly. An adequate supply of spill cleanup materials, such as absorbent materials, shall be maintained and available in multiple locations on-site.
- Containment shall be provided for spill sources. Secondary containment containing 110% of the volume of the largest tank shall be used under fuel tanks

and during fueling of equipment. Double walled tanks will not require additional secondary containment.

- Water tight curbing, bull rails, toe boards or other containment devices shall be installed around the perimeter of work trestles, barges, platforms and any floating surface where equipment is or where work is occurring, to prevent spills and materials, tools, and debris from entering waters of the state. These applications shall be installed with a minimum vertical height appropriate to contain runoff water.
- Barges shall be used to transport construction materials or demolition debris, temporarily store and stockpile materials, and temporarily store or transport liquid or sediment removed during construction of drilled shafts. The work surface of the barge deck shall include containment to prevent any discharges to waters of the state.
- Barges shall be swept, as necessary, and kept free of material that could blow into the water.
- Portable restrooms shall be anchored down to prevent losing these structures into state waters during high wind events.
- Throughout all in-water and over-water work the Contractor shall ensure that all construction-related debris is collected and contained and that no debris, garbage, or fuel shall enter the lake via the implementation of the BMPs.
- Visual monitoring for floating debris (trash, oil sheen, etc.) shall be conducted and boats shall be available during construction for debris retrieval.
- Over-water work areas and temporary stockpile materials shall be covered when not in use. Nets, tarps, platforms, scaffolds, blankets, barges, and/or floats shall be used as necessary to contain and control debris beneath structures being constructed.
- Concrete shall be poured in the dry or concrete pours shall be protected from adverse weather.
- All forms for concrete shall be completely sealed to prevent the possibility of fresh concrete entering waters of the state. Formwork soffit systems shall have water tight edge forms and containment curbing systems that shall contain concrete cure water, concrete process water and rainfall on curing concrete, so that the water can be collected and treated.
- Concrete pumps and pipelines shall be equipped with emergency cut-off valves so that no uncured concrete comes into contact with waters of the state.
- The WSDOT inspector will inspect all concrete pour events for construction quality control, formwork integrity, and containment of all concrete process water.

- "Pour Watches" shall be conducted by the ESC Lead and shall occur during all concrete pour events for release and spill prevention. Pour Watches shall include inspection of containment of all concrete process water.
- A separate area shall be set aside, which does not have any possibility of draining to surface waters, for the wash-out of concrete delivery trucks, pumping equipment, and tools.
- When not in immediate use, Eco-Pans (or similar) shall be covered to prevent rainwater accumulation and minimize the amount of water requiring handling, treatment, and disposal, and to minimize the risk of a release of high pH stormwater or concrete process water.
- Containment BMPs shall be set up before pigmented sealer spraying begins, to catch any drips.
- Dry stockpiled materials shall be covered at the end of each day to prevent them from entering waters of the state.
- Barges used for construction shall not be allowed to ground within the project area.
- Barges and other floating equipment shall be operated so that there is minimal suspension of near shore sediments.

2.1.1 Existing Bridge Removal and Electrical/ITS System Relocation

A portion of the existing medium voltage power infrastructure shall be relocated to the south side of the existing west approach bridge. This task shall involve drilling holes into concrete over the water to attach new runs of electrical and ITS conduit to the structure.

Portions of the existing bridge rail on the north side of the WCB shall be removed between piers 25 and 31. First the bridge deck is saw cut and then the bridge rail is removed with a track hoe-mounted hydraulic ram and/or hydraulic shear. Any remaining excess concrete is chipped with hand-held pneumatic hammers down to the top of the girder, where necessary. Work also includes placement of temporary concrete barrier attached to the existing bridge deck by drilling holes and placing expansion bolts.

No bridge deck, piers or columns will be removed as part of the WCB project. Demolition of the existing structure will be performed by the Floating Bridge and Landings contractor. The new bridge widening section shall be connected to the existing bridge from pier 25 to pier 30 (see the WQMP Plan sheet in Appendix A) by splicing the new deck rebar to the old deck rebar, and by pouring concrete between the new bridge widening section and the existing bridge.

In addition to the BMPs described in section 2.1 above, the following BMPs shall be implemented prior to beginning the electrical system relocation, bridge removal and temporary concrete barrier attachment:

- Nets, tarps, platforms, scaffolds, blankets, barges, and/or floats shall be used when cutting or drilling over water to prevent debris from entering the lake.

- Dust, saw cut water and drill water shall be sprayed down and this concrete process water shall be captured and transferred to covered, water tight storage tanks for disposal.

2.1.2 Construction of Temporary Work Platforms and the Use of Barges

Temporary work platforms may be constructed adjacent to the new WCB pier locations in Lake Washington. The Work Platform Figure in Appendix B shows the conceptual extents of the work platforms. The actual extents shall be determined by the Contractor subject to constraints (e.g. remaining within the right of way, proximity to existing structures, coordination with other contractors, environmental permit requirements, etc.) communicated in the contract documents.

The actual location and orientation of each work platform depends on the contractor's construction technique and available equipment. Each work platform will be oriented so that the shaft or shafts can be reached by the drilling equipment and also in such a way that barges and skiffs carrying workers, equipment and supplies can also access the platform.

The likely sequencing of the platforms would include a completed work platform being actively used by a drilled shaft rig with other platforms in various stages of construction or removal. After removal, the work platform elements would be "leapfrogged" ahead to the next pier so that the drilling equipment always has an available work platform to move to. Each work platform would be in use (not including installation and removal) for about 1 to 2 weeks at a time.

A substantial amount of work and equipment storage is likely to be done from barges even with work platforms in place. Most heavy construction barges have a draft (hull depth below the waterline) of 6 to 10 feet. Water depth in the vicinity of the WCB is generally 12 to 16 feet, depending on lake level, with one shallower area that is approximately 6 to 8 feet deep between Piers 33 and 34. The maximum water depth, at Pier 35, is about 20 to 25 feet deep. Other than the area between Piers 33 and 34, construction barges should have no limit to access as needed throughout the WCB project.

The work platforms shall likely consist of heavy timber decking supported by steel beams. The platforms are likely to be supported by no more than 300 18-inch to 30-inch diameter steel pipe piles. A vibratory hammer may be used to initially insert the temporary steel piles; however, an impact hammer may be used to complete the installation and confirm the load-bearing capacity of each pile at the end of the pile-driving process. During impact pile driving a bubble curtain sound attenuation device shall be employed to completely surround the piles with air bubbles during impact driving.

The work platforms shall include a template at each drilled shaft location. The template is a frame supported by temporary piles that surrounds the drilled shaft casing and is used as a guide during casing installation.

Water quality monitoring for turbidity will be conducted during pile installation (vibratory and impact) for the construction of any temporary work platforms.

In addition to the BMPs listed in Section 2.1 above, the following in-water and over-water BMPs shall be implemented during construction of any temporary work platforms:

- Pile driving shall occur only during approved in-water work windows shown in Table 1 and identified in the HPA.
- Temporary piles for work platforms and shaft templates adjacent to Piers 25 to 31 of the existing west approach bridge shall be cut off a minimum of two feet below the mud line. All other temporary piles shall be removed by conventional methods, such as attaching a vibratory pile driving hammer to the top of the pile and simultaneously vibrating and lifting the pile. Exceptionally stubborn piles that cannot be pulled out shall instead be cut off a minimum of 2 feet below the mud line.
- If turbidity exceeds the limits outlined in section 3.0 of this plan (and in the 401 WQC Order #9011) during pile installation, a turbidity curtain shall be installed around the piles.
- Work platforms shall be swept, as necessary, and kept free of material that could blow into the water.
- Any welding or cutting that is done while building or dismantling the work platforms (including cutting piles) shall be done over barges or otherwise shielded to prevent debris from entering the water.

2.1.3 Drilled Shaft Construction

The bridge will be supported by nineteen reinforced concrete drilled shaft foundations (See the WQMP Plan sheet in Appendix A for shaft locations).

Drilled shaft construction requires an initial installation of temporary piling and construction of a template to facilitate the precise placement of the shafts. (This work is described in section 2.1.2 above.) Then a steel casing of specified diameter and length is installed using a vibratory hammer or oscillator, and the interior of the steel casing is excavated to a specified depth. The shaft is filled with slurry to prevent caving or uplifting of the surrounding soils as the shaft is excavated. Then a steel reinforcing cage is set inside the shaft casing and hung at elevation, and the interior of the shaft is backfilled with concrete. As the shaft is filled with concrete, the slurry is pumped to tanks for storage and re-use on other shafts or hauled off-site for disposal.

There is concern that the presence of a pressurized aquifer in the vicinity of the WCB may require deep drilled shaft casings in order to prevent caving and undermining of

existing pilings during excavation. This is particularly an issue for drilled shafts that will be constructed adjacent to existing SR 520 bridge columns. The drilled shafts will be constructed deeper than the existing bridge columns; which will expose the existing bridge to risk of settlement if undermining occurs. Oscillators provide a means of torsionally installing deep casings for stability in certain soil conditions or where debris is anticipated that could hamper installation by conventional means (i.e. vibratory pile driving). Oscillators will likely be needed to install these casings near the existing bridge in order to mitigate the risk of damage to the existing in-service bridge. Because oscillators produce more torques and reaction forces than can safely be resisted by a barge or other floating work platform, a highly stable work platform would be required.

The interior of the shaft casing is excavated using an auger or clamshell bucket supported by a floating derrick. The excavated or augured spoils shall be fully contained and shall be loaded onto receiving barges and transported to an off-site transload facility for disposal at an Ecology approved site. As the drilled shafts are backfilled with concrete, displacing water and sediment material, and the slurry is re-circulated with the auger, the resulting waste slurry and all associated slurry waters and sediment shall be pumped into covered, water tight barge-mounted waste bins (such as Baker tanks). Slurry that is not re-used in other shafts shall be hauled by barge to a transloading facility for off-site disposal at an Ecology approved site. Water tight ramps shall line the path the auger or clamshell bucket takes from the casing to the receiving barge to catch any drips from the auger or bucket. After the shaft casing is backfilled with concrete, the shaft casing shall be cleaned out and then cut off at the top of the concrete.

The aquifer is at a greater hydrostatic pressure than the lake level. This means that the shaft casings shall extend high enough above the lake level to contain enough drilling slurry to offset the uplifting force of the aquifer. The casing height needed to contain the slurry could be too high for drill rigs working from barges to accommodate. Work platforms can accommodate higher casings because the platforms can be constructed to any height that is determined to be necessary depending on field conditions.

Water quality monitoring for turbidity will be conducted during the installation of the drilled shaft casings and pH monitoring will be done while the concrete is being poured and cured. All other drilled shaft construction activities are contained within the casing, and all excavated sediments, concrete slurry, drilling mud and slurry waters shall be contained, collected for offsite disposal, and shall not be allowed to discharge to the lake, waters of the state or catch basins.

In addition to the BMPs listed in Section 2.1 above, the following in-water BMPs shall be implemented during drilled shaft construction:

- Material excavated from within the casing (slurry and sediment) shall be loaded onto receiving barges. The barges shall not be overfilled to the point where material overflows directly back to the lake.

- The shaft casings shall be cleaned prior to cutting them off at their final elevations by vacuum, agitation and pumping or air lift, depending on the depth of the drilled shafts.
- Barges, work platforms and ramps shall have water tight temporary curbing, bull rails or toe boards to prevent slurry and other contaminants from entering the lake. These devices shall be installed at a minimum vertical height of 10 inches and with a height sufficient to contain runoff water.
- Eco-Pans (or similar) and plastic sheeting with a berm shall be used to contain and collect any concrete or slurry drips to prevent spills.
- Wattles shall be placed around the base of the shaft casing to contain slurry compound, concrete and spoils.
- Areas with covered, water tight, barge-mounted slurry waste bins (such as Baker tanks) that receive concrete and/or slurry water shall be lined to contain leakage.
- When the auger or clamshell bucket or any dripping equipment is not in use, it shall be suspended over, or stored in a water tight, contained area.
- Portable containment pools shall be placed under any hose joint that must be disconnected in order to catch residual slurry that may run out of the hose during that operation.
- Hose openings shall not be allowed to lay flat on the deck; they shall be propped up above the level of the hose to prevent spillage.
- Valves shall be installed in the slurry line that shall be shut to prevent flows from as much of the hose as is practicable when not in use.
- If turbidity exceeds the limits outlined in section 3.0 of this plan (and in the 401 WQC Order #9011) during drilled shaft installation, work shall stop and a turbidity curtain shall be installed around the shaft.
- Any welding for shaft casing extensions shall be done over work platforms or barges or with containment under the shaft casing to prevent welding debris from entering the lake.

2.1.4 Column, Crossbeam and Superstructure Construction

The remaining bridge construction involves the following construction activities:

- Columns are installed on top of the drilled shafts. The Contractor may use pre-cast or cast-in-place columns. Pre-cast columns are secured to the drilled shafts with the following method: the shaft is cast up to the elevation of the bottom of the pre-cast column, the pre-cast column is placed on top of the hardened concrete in the shaft, and finally concrete is poured around the pre-cast column inside the shaft to connect the two.
- Cast-in-place pier crossbeams are installed on top of the columns at all piers.

- Pre-cast girders are set with floating cranes for each bridge span. The girders span the distance between the pier crossbeams.
- The bridge deck, diaphragms and expansion joints are cast-in-place on top of the girders. The driving surface of the bridge deck is concrete. The portion of the structure from Spans 30 to 35 will have a textured surface finished made by diamond grinding. This treatment involves grinding down the cured concrete bridge deck to make a grooved surface.
- A closure pour is located between the new deck and existing deck in the widening section from pier 25 to pier 30.
- Bridge rail is cast-in-place on top of the bridge deck edges.
- Luminaires and ITS infrastructure attached to fixtures on the bridge are placed during the cast-in-place work.

Cast-in-place work is typically done by first building forms and installing steel reinforcing. Then fresh concrete is pumped into the forms, the concrete is allowed to cure, and finally the forms are stripped from the cured concrete.

Concrete may be provided via moored barges with concrete trucks on them or by truck delivery on the existing highway. A barge with a concrete pump truck may be spudded down adjacent to the concrete pour location. Additional concrete trucks may be delivered to the barge. Alternately, a concrete truck may drive on the existing highway to the pour location. The fresh concrete is pumped into the cast-in-place forms and drilled shaft casings.

A portable grout mix plant may be set up on a barge and spudded down adjacent to the grout placement location. The grout is then pumped to where it is needed.

In addition to the BMPs listed in Section 2.1 above, the following in-water BMPs shall be implemented during column, cross beam and superstructure construction.

- Dust and grinding residue shall be sprayed down and this concrete process water shall be captured and transferred to covered, water tight storage tanks for disposal.
- All grout ingredients and equipment shall be covered when not in use and shall be removed from the work areas and from the lake as soon as they are no longer needed.
- The grout mix plant shall be installed on a barge with water tight temporary curbing or equivalent, of a sufficient height to capture any potential spills.
- All cleanup activities shall be done in Eco-pans, or equivalent, to prevent spills.
- Concrete line cleaning shall be conducted by hand on the waste bin barges or other contained areas to minimize potential releases. Grout, followed by water, and then a final sponge "rabbit" shall be pushed through the concrete line to ensure removal of all concrete within the line for line maintenance and prevention of line failures after each pour.

- To the maximum extent practicable, stormwater shall be kept separate from uncured concrete and process water. Any stormwater that can be kept separate may be discharged to the lake.
- Stormwater that comes into contact with uncured concrete shall be considered High pH Stormwater.
- Stormwater that comes into contact with concrete process water shall be considered Concrete Process Water. See section 2.1 for more information.
- Concrete process water shall be contained by water tight curbing, or the equivalent, and pumped to covered, water tight barge-mounted waste bins (such as Baker tanks). See section 2.1 for more information.

3.0 Water Quality Monitoring Protocols

Ecology classifies the aquatic life use of Lake Washington as a salmonid spawning, rearing, and migration water body. Water quality standards identified in WAC 173-201A-200 apply to all in water work activities associated with this water body.

Turbidity analysis for in-water work activities shall not exceed 5 nephelometric turbidity units (NTUs) over background turbidity of 50 NTUs or less, or have more than a 10 percent increase in turbidity if background is more than 50 NTUs. Analysis for pH shall be in the range of 6.5 to 8.5 with a human-cause variation of less than 0.2 units. Water bodies that are classified as for the use of salmonid spawning, rearing and migration that are lakes, ponds or other non-flowing waters have a turbidity mixing zone identified in WAC 173-201A-200 as 150 feet.

WSDOT will be responsible for all required water quality sampling, document submittals and notifications to Ecology identified in the certification.

3.1 Sampling Schedules and Locations

Turbidity Monitoring

Turbidity samples shall be collected from Lake Washington at sampling locations that are 150 feet from each in-water work activity (see WQMP Plan sheet in Appendix A). Sampling locations will be located and mapped by noting GPS coordinates on a plan sheet like the WQMP Plan Sheet in Appendix A. Any new sampling locations that arise as construction progresses will be located and mapped the same way. Sampling will be done daily while in-water work or over-water work is occurring at Lake Washington. A background sample will be collected each day prior to the start of work and one sample will be collected at each work location after work begins each day.

Turbidity sampling will be conducted at 30-minute intervals from the start of sediment generating activities. The sediment generating activities are vibratory pile installation, impact pile driving and drilled shaft casing installation. If turbidity levels measured over the course of three consecutive 30- minute sample intervals do not exceed the defined limits, then sampling during sediment-generating activities will be conducted for the remainder of the workday at a frequency of once every 6 hours. For more details on sampling, see table below. Visual monitoring will be done for turbidity. If there is a visually appreciable increase in turbidity, contingency sampling as defined in section 3.1.1 below will occur. See table below for the monitoring schedule.

pH Monitoring

Anytime fresh concrete is placed in or over water, visual monitoring and/or pour watches are required and shall be implemented as stated in the plan. See table below for the monitoring schedule.

Table 2. Water Quality Monitoring Schedule

In-Water/Over-Water Activity	Monitoring Point Location	Frequency	Parameters	Water Quality Standard
Pile Installation (for work platforms)	150-foot radius (Points A, B, C)	**Intensive:** Every 30 minutes from the start of activity for each work day, for three 30-minute intervals. **Normal:** If no WQ exceedances for three samples at every 30 minutes, then sample every 6 hours for the rest of the work day.	Turbidity	5 NTUs over background when background is 50 NTUs or less
Drilled Shaft Casing Installation (at all West Connection Bridge piers)	150-foot radius (Points A, B, C)	**Intensive:** Every 30 minutes from the start of activity for each work day, for three 30-minute intervals. **Normal:** If no WQ exceedances for three samples at every 30 minutes, then sample every 6 hours for the rest of the work day.	Turbidity	5 NTUs over background when background is 50 NTUs or less

Whenever water comes in contact with curing concrete, a pH sample must be taken prior to discharge, if discharge is allowed. Only High pH Stormwater and Work Area stormwater as defined in section 2.1 may be discharged to waters of the state and only if the pH of these waters is inside the range of 6.5 to 8.5 pH units. Any discharge must be followed by a sample to verify that water quality standards are achieved. There is no mixing zone for pH and sampling must be done at the discharge location. If water quality standards are not achieved, this will immediately trigger the implementation of WSDOTs Environmental Compliance Assurance Procedure (ECAP). If the water to be discharged is outside the range of 6.5 to 8.5 pH units, the water cannot be discharged to waters of the state. Water outside of this range shall be neutralized by approved methods such as with dry ice or CO_2 sparging. If the pH cannot be neutralized, the water shall be sent to a sanitary sewer system or a permitted facility that is licensed to accept this material.

3.1.1 Contingency Sampling Schedules and Locations

If there is a change in receiving water turbidity due to work activities or a potential increase in pH (including concrete issues), contingency sampling is required. Contingency sampling is also required in the event of an unauthorized discharge. If contingency samples are taken in response to an unauthorized discharge, Ecology will be notified immediately.

If monitoring results for turbidity are out of compliance with state water quality standards, the Contractor shall modify or stop the activity causing the problem and

WSDOT will notify Ecology. Another background sample will be taken and WSDOT will commence monitoring every half hour to determine the duration and magnitude of the event. Sampling will continue at this interval until standards are met for two consecutive hours. Contingency sampling will be done at 150' from the activity for turbidity (see WQMP Plan Sheet in Appendix A). Once compliance with water quality standards is achieved, the standard sampling schedule will resume.

If there is an unauthorized discharge of concrete process water (e.g., concrete slurry, slurry waters, grinding residues, etc.) or High pH Stormwater to the lake, the Contractor shall modify or stop the activity causing the problem and the discharge will be reported to Ecology in accordance with section 3.3 of this plan. Discharge information to be documented includes the following: why/how the unauthorized discharge occurred (e.g., BMP failure), approximate volume of the release, associated construction activity, steps taken to minimize the release or prevent additional discharge, and any resulting monitoring.

WSDOT will test the pH of the discharged water, or the pH of water that is representative of what was released (e.g., waters still remaining in containment in addition to that volume that was discharged) to characterize the quality of the discharge. WSDOT will also test the pH of the receiving lake water at the point of the discharge. There may be circumstances where sampling is not possible, such as when there are safety concerns. In these situations, this information will be included in the report.

Any sampling data collected from these discharges will be included in the monthly monitoring report to be submitted to Ecology (see section 3.3 of this plan).

3.1.2 Preconstruction Baseline Sampling

WSDOT will perform preconstruction background water quality sampling for turbidity and pH in Lake Washington. Preconstruction baseline sampling data will be available at the WSDOT Project Engineer's office.

3.2 Sampling Procedures

The following sampling procedures will be used:

- Testing of samples will occur at the designated sampling locations (see WQMP Plan Sheet in Appendix A for typical sampling locations) whenever possible. If sampling cannot occur at these locations the project inspector will document why it could not occur. Any alternative sites identified will be shown on the plan sheets.
- Samples will be representative of the flow and characteristic of the discharge.
- The sampling bottle will be filled at least once prior to collecting the sample, to remove possible contaminants. The sample bottle will be inverted to re-suspend particles prior to turbidity testing.
- pH sampling will always occur prior to turbidity testing, as temperature affects pH.

3.2.1 Sampling Equipment

The following equipment will be used to collect and analyze samples:

- GPS to locate sampling sites,
- Turbidity: Hach Model 2100 p portable turbidimeter with sampling bottles,
- pH and temperature: Hach Model SensION portable pH meter or HQ11D pH meter capable of measuring a 0.2 unit change in pH,
- Water sampling: rod & cup (12-foot extendable),
- Boat and personal floatation device (PFD) vests,
- Field observations field notebook/recording equipment,
- De-ionized water for rinsing equipment (distilled),
- WSDOT-approved safety vest and hardhat,
- Camera, and
- Cellular phone and contact phone numbers.

The inspector will follow the manufacturers' recommendations for equipment operations. Equipment will be calibrated according to the manufacturer's recommendations and specified schedules, at a minimum. Additional calibrations will be performed immediately if data appear suspect.

3.2.2 Sampling Information Documentation

Sampling information for each sampling event needs to be documented in the field notebook. Each entry should include the following information:

- Date, time, and location of the sample,
- Project name and contract number,
- Name(s) of personnel who collected the sample,
- Field conditions (weather, temperature, pertinent construction activities, any prior disturbance of the water body, etc.),
- Testing results for measured parameters,
- Date and time of the last calibration of sampling equipment,
- Notes summarizing critical activities, unusual conditions, corrective actions, and
- Photographs taken as supporting documentation of turbidity and damaged BMPs.

All project water quality monitoring forms, maps, and pictures of the sampling stations are kept in the site log book along with copies of the WSDOT Environmental Compliance Inspector's reports, the ESC Lead reports and the pour watch reports. The site log book must be kept on-site to provide easy access for inspections from Ecology.

3.3 Reporting

All water quality monitoring will be recorded on the Water Quality Reporting Form (Appendix C). The monitoring form will be used to document the following:

- the person conducting the monitoring
- date
- time
- weather
- activity prompting monitoring
- location of monitoring
- monitoring results
- applicable comments

In addition to the monitoring form, a copy of the site map and any applicable drawings may also be provided to Ecology. These records will be in a form that is accessible by interested individuals upon request, such as Ecology's Federal Project Coordinator. All monitoring results, including reporting forms, will be submitted monthly to the Ecology Federal Project Coordinator per Condition A2 (Order No. 9011) by WSDOT. The completed monthly Water Quality Monitoring reports will be sent to the Department of Ecology no later than the 5th day following the month they are due.

If monitoring results indicate a violation of water quality standards or if conditions of the 401 WQC Order #9011 or the CWQMPP are not being followed, ECAP will be triggered and notification shall be made immediately (within 24 hours) to Ecology's Federal Project Coordinator via phone or e-mail (e-mail is preferred). Notifications shall be identified with Order No. 9011 and will include the project name, project location,

project contact, and the contact's phone number. In addition to the phone or e-mail notification, WSDOT will submit a detailed written report to Ecology within 5 Calendar days that describes the nature of the non-compliance event, corrective action taken and/or planned, steps to be taken to prevent a recurrence, results of any samples taken, and any other pertinent information (see section 3.1.1 for a complete description of the sampling documentation).
Monitoring results and notification will be sent to:

Penny Kelley
Federal Project Coordinator
(360) 407-7298
pkel461@ecy.wa.gov

3.4 Inspections

The WSDOT Environmental Compliance Inspector for this project is responsible for leading the water quality monitoring and reporting the results to permitting agencies. A list of personnel responsible for managing and implementing this plan are identified in Appendix D.

The Contractors (ESC) Lead and the WSDOT inspector will be responsible for inspecting the project daily. Any work activities that are out of compliance with the 401 WQC Order #9011 shall be fixed immediately.

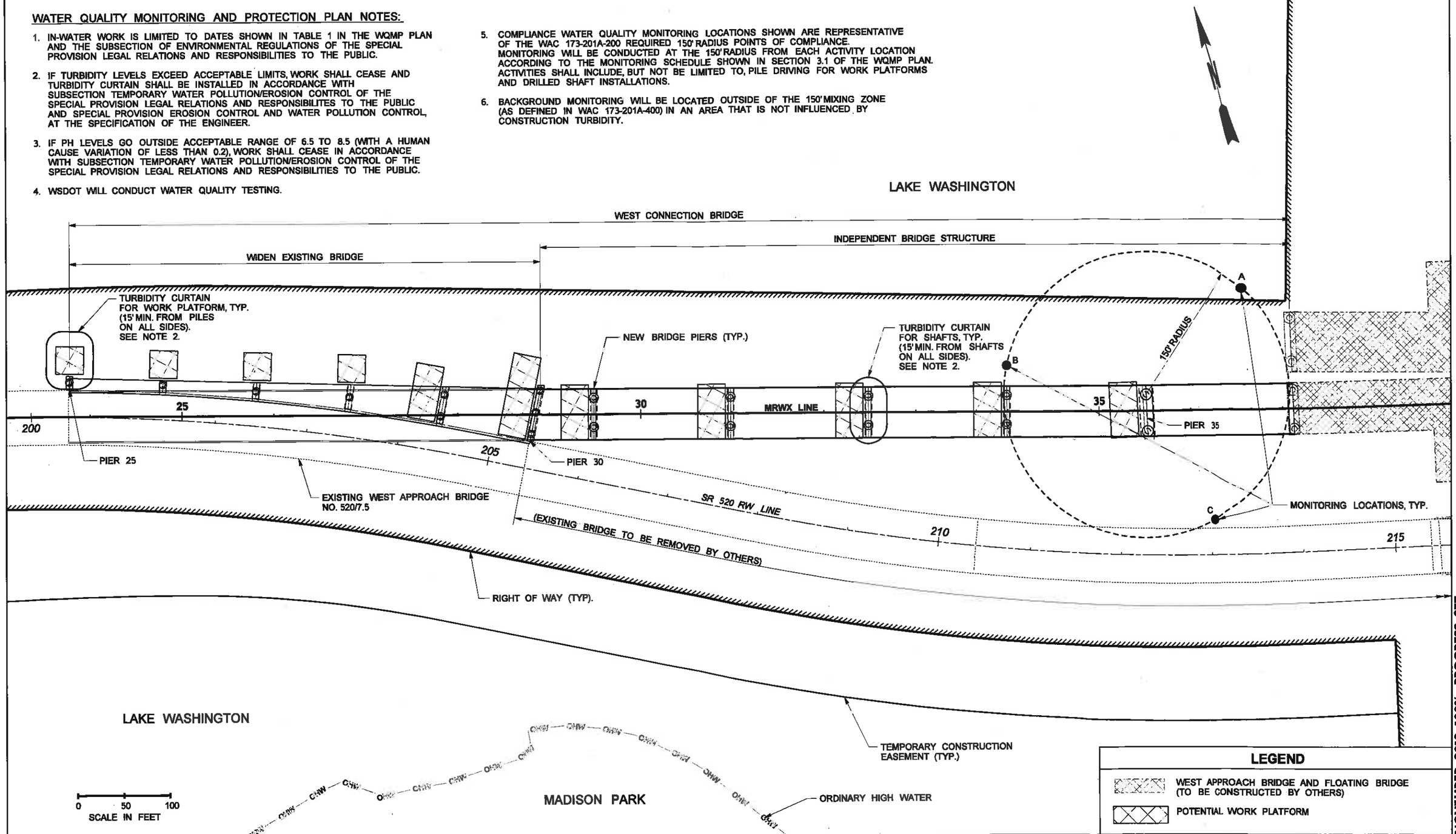
Attached:

Appendix A: WQMP Plan sheet and Vicinity map
Appendix B: Work Platform Figure
Appendix C: Water Quality Reporting Form
Appendix D: Contact Information

Appendix A: WQMP Plan sheet and Vicinity map

WATER QUALITY MONITORING AND PROTECTION PLAN NOTES:

1. IN-WATER WORK IS LIMITED TO DATES SHOWN IN TABLE 1 IN THE WQMP PLAN AND THE SUBSECTION OF ENVIRONMENTAL REGULATIONS OF THE SPECIAL PROVISION LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC.
2. IF TURBIDITY LEVELS EXCEED ACCEPTABLE LIMITS, WORK SHALL CEASE AND TURBIDITY CURTAIN SHALL BE INSTALLED IN ACCORDANCE WITH SUBSECTION TEMPORARY WATER POLLUTION/EROSION CONTROL OF THE SPECIAL PROVISION LEGAL RELATIONS AND RESPONSIBILITES TO THE PUBLIC AND SPECIAL PROVISION EROSION CONTROL AND WATER POLLUTION CONTROL, AT THE SPECIFICATION OF THE ENGINEER.
3. IF PH LEVELS GO OUTSIDE ACCEPTABLE RANGE OF 6.5 TO 8.5 (WITH A HUMAN CAUSE VARIATION OF LESS THAN 0.2), WORK SHALL CEASE IN ACCORDANCE WITH SUBSECTION TEMPORARY WATER POLLUTION/EROSION CONTROL OF THE SPECIAL PROVISION LEGAL RELATIONS AND RESPONSIBILITIES TO THE PUBLIC.
4. WSDOT WILL CONDUCT WATER QUALITY TESTING.
5. COMPLIANCE WATER QUALITY MONITORING LOCATIONS SHOWN ARE REPRESENTATIVE OF THE WAC 173-201A-200 REQUIRED 150' RADIUS POINTS OF COMPLIANCE. MONITORING WILL BE CONDUCTED AT THE 150' RADIUS FROM EACH ACTIVITY LOCATION ACCORDING TO THE MONITORING SCHEDULE SHOWN IN SECTION 3.1 OF THE WQMP PLAN. ACTIVITIES SHALL INCLUDE, BUT NOT BE LIMITED TO, PILE DRIVING FOR WORK PLATFORMS AND DRILLED SHAFT INSTALLATIONS.
6. BACKGROUND MONITORING WILL BE LOCATED OUTSIDE OF THE 150' MIXING ZONE (AS DEFINED IN WAC 173-201A-400) IN AN AREA THAT IS NOT INFLUENCED BY CONSTRUCTION TURBIDITY.



NOVEMBER 2012 100% PROGRESS SET

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DATE	9/21/2012
PLOTTED BY	nelsonk
DESIGNED BY	K. NELSON
ENTERED BY	J. BEAN
CHECKED BY	A. LAMSEK
PROJ. ENGR.	K. WILCOX
REGIONAL ADM.	J. MEREDITH

PRELIMINARY
NOT FOR CONSTRUCTION

REVISION | DATE | BY

REGION NO.	STATE	FED.AID PROJ.NO.
10	WASH	BR-0520(051) NH-BR-STP-0520(043)
JOB NUMBER 12A009		
CONTRACT NO.		LOCATION NO.

ATTILA I. LASZLO, STATE OF WASHINGTON, REGISTERED PROFESSIONAL ENGINEER
DATE
P.E. STAMP BOX

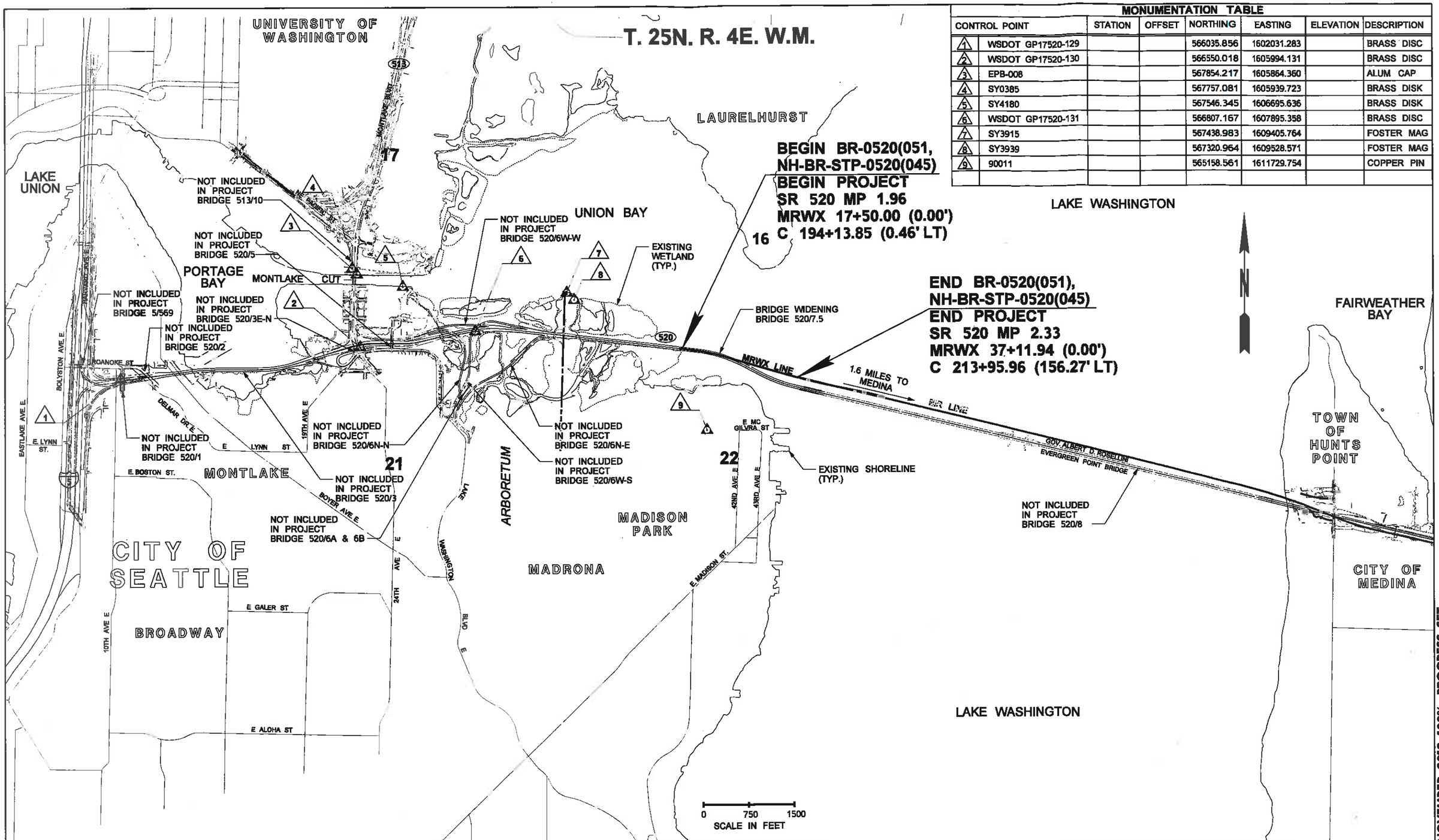
DATE
P.E. STAMP BOX

Washington State Department of Transportation

SR 520
WEST CONNECTION BRIDGE
APPENDIX A pg 1/2
WQMP PLAN

PLAN REF. NO. WQ01
SHEET OF SHEETS

MONUMENTATION TABLE							
CONTROL POINT		STATION	OFFSET	NORTHING	EASTING	ELEVATION	DESCRIPTION
1	WSDOT GP17520-129			566035.856	1602031.283		BRASS DISC
2	WSDOT GP17520-130			566550.018	1605994.131		BRASS DISC
3	EPB-008			567854.217	1605864.360		ALUM CAP
4	SY0385			567757.081	1605939.723		BRASS DISK
5	SY4180			567546.345	1606695.636		BRASS DISK
6	WSDOT GP17520-131			566807.167	1607895.358		BRASS DISC
7	SY3915			567438.983	1609405.764		FOSTER MAG
8	SY3939			567320.964	1609528.571		FOSTER MAG
9	90011			565158.561	1611729.754		COPPER PIN



NOVEMBER 2012 100% PROGRESS SET

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DATE	1/4/2013
PLOTTED BY	nelsonk
DESIGNED BY	S. DHAR
ENTERED BY	J. BEAN
CHECKED BY	G. GOLPHENEE
PROJ. ENGR.	K. WILCOX
REGIONAL ADM.	J. MEREDITH

PRELIMINARY
NOT FOR CONSTRUCTION

REVISION | DATE | BY

REGION NO.	STATE	FED.AID PROJ.NO.
10	WASH	BR-0520(051) NH-BR-STP-0520(045)
JOB NUMBER 12A009		
CONTRACT NO.		LOCATION NO.

P.E. STAMP BOX — DATE

P.E. STAMP BOX — DATE

Washington State Department of Transportation

SR 520
WEST CONNECTION BRIDGE
APPENDIX A pg 2/2
VICINITY MAP

PLAN REF. NO. VM01

SHEET 4 OF 271 SHEETS

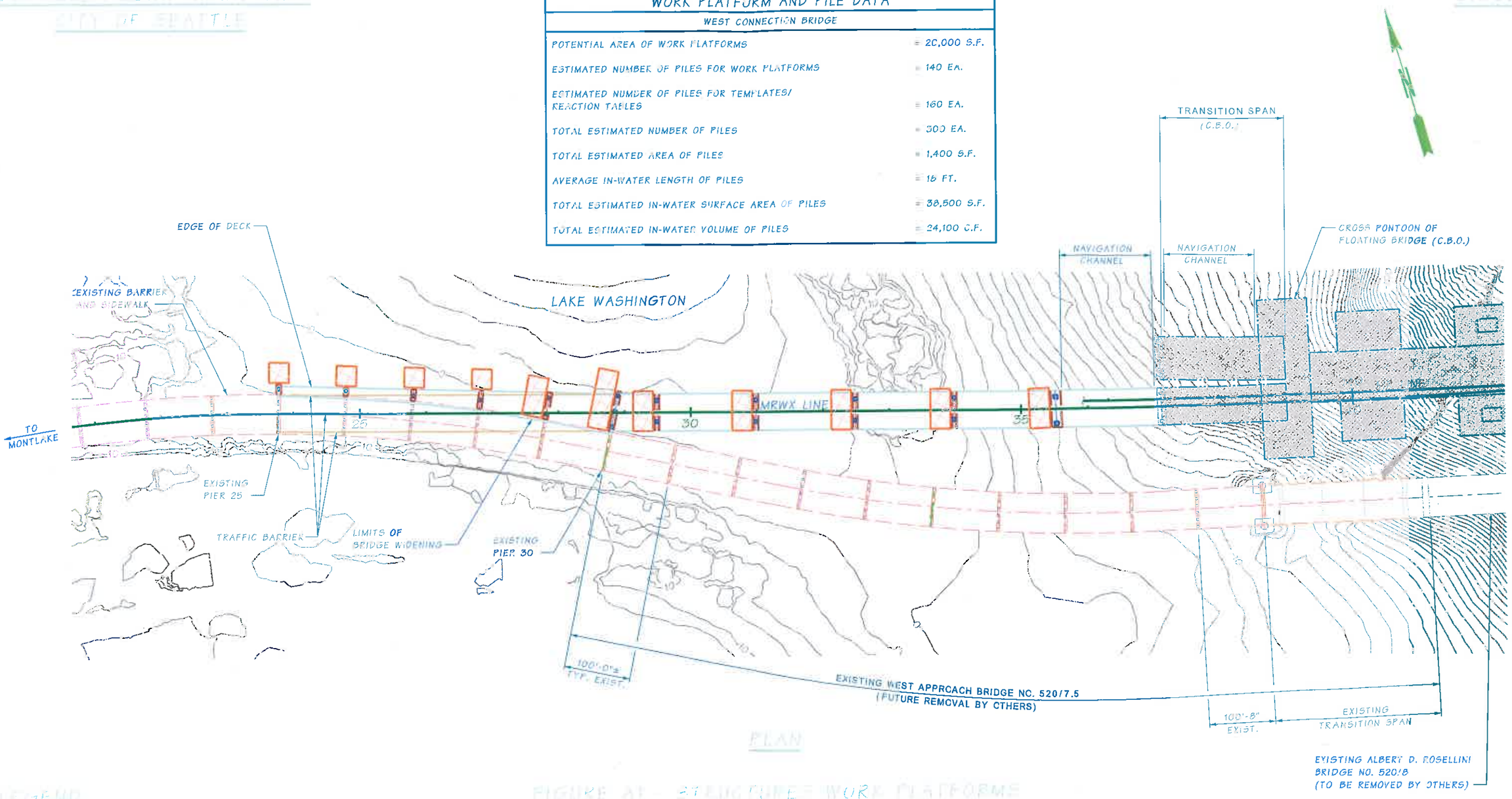
Appendix B: Work Platform Figure

SR 520

WORK PLATFORM AND PILE DATA

WEST CONNECTION BRIDGE

POTENTIAL AREA OF WORK PLATFORMS	= 20,000 S.F.
ESTIMATED NUMBER OF PILES FOR WORK PLATFORMS	= 140 EA.
ESTIMATED NUMBER OF PILES FOR TEMPLATES/ REACTION TABLES	= 160 EA.
TOTAL ESTIMATED NUMBER OF PILES	= 300 EA.
TOTAL ESTIMATED AREA OF PILES	= 1,400 S.F.
AVERAGE IN-WATER LENGTH OF PILES	= 18 FT.
TOTAL ESTIMATED IN-WATER SURFACE AREA OF PILES	= 38,500 S.F.
TOTAL ESTIMATED IN-WATER VOLUME OF PILES	= 24,100 C.F.



PLAN

FIGURE A1 - EXISTING WORK PLATFORMS
GENERAL LAYOUT

LEGEND

POTENTIAL WORK PLATFORM

DATUM
NAVD 1988

C.B.O. = CONSTRUCTED BY OTHERS

APRIL 2012 60% PROGRESS SET

Bridge Design Engr.		PW:\CADDProj\WestsideCADD\Displays\WCB\L3877_WCB_EH_BG_FigA1.dgn		REGION NO.	STATE	FED. AID PROJ. NO.	SHEET NO. / TOTAL SHEETS
Supervisor	Bott, P.	PRELIMINARY		10	WASH		
Designed By	Harris, B.	NOT FOR CONSTRUCTION		JOB NUMBER			
Checked By	Werts, C.			12A009			
Detailed By	Vyplel, M. O						
Bridge Projects Engr.							
Prelim. Plan By	Harris, B.						
Architect/Specialist		DATE	REVISION	BY	APP'D		

HDR ENGINEERING INC.

Washington State Department of Transportation

SR 520
WEST CONNECTION BRIDGE

APPENDIX B pg 1/1

GENERAL LAYOUT
FIGURE A1

BRIDGE SHEET NO.

SHEET OF SHEETS

SR 520 FILE NO. 7052 SHEET
Projectwise Vault: WCB
04/18/2012 11:51:33 AM

Appendix C: Water Quality Reporting Form

APPENDIX C pg 1/1

Water Quality Reporting Form

SR 520 West Connection Bridge over Lake Washington

WQ Tester: _____

Date of Last Calibration for Turbidity Meter: _____

Date of Last Calibration for pH Meter: _____

Construction Activity: _____

Start Time: _____ Stop Time: _____

Sample Location	Monitoring Point	Date/Time	Turbidity	pH	Notes (weather, observations of waterbody, etc.)
Background (outside of 150-foot radius)[1]	1A				
	1B				
	1C				
Background (adjacent to concrete surface)					
Compliance (150-foot radius)	1A				
	1B				
	1C				
Compliance (150-foot radius)	1A				
	1B				
	1C				
Compliance (150-foot radius)	1A				
	1B				
	1C				
Compliance (150-foot radius)	1A				
	1B				
	1C				
Compliance (150-foot radius)	1A				
	1B				
	1C				

Notes:

1) Background monitoring will be located outside the 150-foot area of mixing (point of compliance) in an area that is not influenced from construction turbidity.

Appendix D: Contact Information

APPENDIX D pg 1/1

Contact Information for SR 520 West Connection Bridge WQMPP

Penny Kelly
Federal Project Coordinator
Washington State Department of Ecology
PO Box 4700
Olympia, WA 98503-7600
PKel461@ecy.wa.gov
(360)407-7298

John Chi
WSDOT Project Construction Engineer
(425)225-8741 (work)
206-650-8494 (cell)
ChiJ@wsdot.wa.gov

Carl Barker
WSDOT Assistant Project Construction Engineer
(425)225-8742 (work)
206-919-4385 (cell)
BarkerC@wsdot.wa.gov

Bryan Dabbs
WSDOT Chief Inspector
(425)225-8743 (work)
206-478-9696 (cell)
DabbsB@wsdot.wa.gov

Joe Collins
WSDOT Environmental Compliance Inspector and Environmental Technical Advisor
(425)225-8744 (work)
(206)478-9622 (cell)
CollinJ@wsdot.wa.gov

For Spills
Department of Ecology
Northwest Regional Spill Response Office
(425)649-7000

24-hour and Emergency Contacts
WSDOT Highway Radio (206)440-4490