Washington State Department of Transportation

ADSC/WSDOT Team Meeting Minutes

The year 2021 continued to be a challenge due to COVID-19 and the ensuing pandemic. A number of the meetings scheduled for the year were canceled. The following meetings were planned and their status as of the end of the year is as indicated:

02/12/2021 – Meeting Held

05/07/2021 – Meeting Canceled

07/30/2021 – Meeting Canceled

10/22/2021 – Meeting Held

12/17/2021 – Meeting Held

The notes for the meetings are below.

-- Jim Cuthbertson,

Washington State Department of Transportation

ADSC/WSDOT Team Meeting Minutes

ADSC The International Association of Foundation Drilling

February 12, 2021, 8:30 A.M. – 11:30 A.M.

Team Members

Attended	Member	Company	Phone	E-mail
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X	Binnig, Bill	Kiewit	425-255-2376	bill.binnig@kiewit.com
X	Brunkhorst, Jim	Pacific Found.	360-301-0771	jim@pacific-foundation.com
	Carnevale, Robert	Kulchin Found.	253-888-4284	bob@kulchin.com
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X	Cuthbertson, Jim	WSDOT – HQ Constr.	360-709-5452	cuthbej@wsdot.wa.gov
	Deffenbacher, Jon	WSDOT – HQ Constr.	253-589-6100	deffenj@wsdot.wa.gov
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	Dinneen, Molly	DeWitt	360-576-8755	molly@dewittconst.com
X	Fiske, Andrew	WSDOT – Geotech.	360-709-5456	fiskea@wsdot.wa.gov
	Gaines, Mark	WSDOT – Bridge.	360-705-7827	gainesm@wsdot.wa.gov
X	**Glassford, Patrick**[1]	WSDOT – HQ Constr.	360-705-7828	glassfp@wsdot.wa.gov
	Groneck, Paul	DBM	206-730-4578	paul.groneck@dbmcontractors.com
	Hagy, Mike	PACO	805-746-6965	mike@pacoequip.com
X	Harkins, Brendan	CJA	425-988-2150	bharkins@condon-johnson.com
	Johnson, Darrel	PACO	206-786-7584	djohnson@pacoequip.com
X	Khaleghi, Bijan	WSDOT - Bridge	360-705-7181	khalegb@wsdot.wa.gov
	Kvinsland, John	Malcolm	253-395-3300	jkvinsland@malcolmdrilling.com
	Lehman, Debbie	FHWA	360-753-9482	debbie.lehmann@dot.gov
X	Leland, Amy	WSDOT - Bridge	360-705-7394	lelanda@wsdot.wa.gov
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X	Rasband, Lance	Michels Found.	206-305-3386	lrasband@michels.us
	Sexton, Jim	DBM	253-838-1402	jim.sexton@dbmcontractors.com
	Starcevich, John	Malcolm	253-395-3300	jstarcevich@malcolmdrilling.com
X	Thody, Ryan	DBM	206-730-0199	ryan.thody@dbmcontractors.com
X	Topham, Dale	Snohomish Cty	425-388-6668	dale.topham@co.snohomish.wa.us
X	Tuttle, John	Sinclair	661-212-1223	jtuttle@sinclairwp.com
	Uhlmeyer, Neal	WSDOT – HQ Constr.	360-705-7816	uhlmeyn@wsdot.wa.gov
X	Watt, Doug	CJA	425-988-2150	dwatt@condon-johnson.com

1 Team co-chair

Guest Sign-in

Attendee	Company	Phone	E-mail
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Malinak, Andrew	Kiewit		andrew.malinak@kiewit.com
Olson, Doug	WSDOT Bridge	360-705-7223	olsondo@wsdot.wa.gov
Petit, Piper	WSDOT NCR	509-664-0861	petitp@wsdot.wa.gov
Popoff, Lisa	WSDOT NCR	509-664-0860	popoffl@wsdot.wa.gov
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Ragaza-Bourassa, Ryan	WSDOT ER	509-324-6088	ragazar@wsdot.wa.gov

1. Welcome/Review of Agenda

Patrick Glassford opened the meeting, and everyone introduced themselves. We then quickly reviewed the agenda. No one had any revisions.

Agenda

1	**Welcome/Review of Agenda**	
2	**Approval of Previous Meeting Minutes**	
3	**Dextra CSL Tube Presentation**	**Kris Krabill**
4	**US 101 Tumwater, Lees, & Ennis – Constructability Review**	**Piper Petit**
5	**US 395 NSC Spokane River Crossing – Constructability Review**	**Amy Leland**
ACTION ITEMS		
a	**Force Account Obstruction Removal rates and cost/time**	**ADSC / Greg**
b	**Concrete Filled Steel Tube (CFST) / Casing Installation Pressure Data**	**ADSC / Lance Rasband**
c	**Soldier Pile Lagging Backfill Specs**	**Lance Rasband**
d	**Standard Soil Nail Anchorage Detail Revisions Regarding Washers**	**ADSC**
e	**ADSC/WSDOT Joint Training – Spring 2021**	**Group**
	Next Meetings: May 7, July 30, October 22	

2. Approval of Minutes

Patrick asked for edits to the meeting minutes from November's meeting. Hearing no comments, Patrick stated he will finalize and post them to the web site.

3. Dextra's Sonitec® CSL Tube Presentation
Kris Krabill, Dextra's US Sales Manager and Tim Knaus, Foundation Technologies

WEBSITE:
https://www.dextragroup.com/activities/technical-solutions-for-construction/solutions/32-ground-anchoring/piling/88-sonitec-csl-foundations

Kris Krabill, Dextra's US Sales Manager and Tim Knaus, Foundation Technologies, presented their CSL tube product Sonitec®. Dextra and Foundation Technologies have teamed to bring this technology to the US. Tubes are manufactured in Ontario, California and meet Buy America requirements. Distribution occurs out of CA or Georgia. Sonitec® CSL tubes have been successfully used internationally for over 20 years on some of the largest projects in the world. Since introduction, over 50,000,000 LF have been used in deep foundation applications. Sonitec® is the only CSL tube specifically designed for this application and has a unique "Push-fit" design. A representation of the tube is shown below.

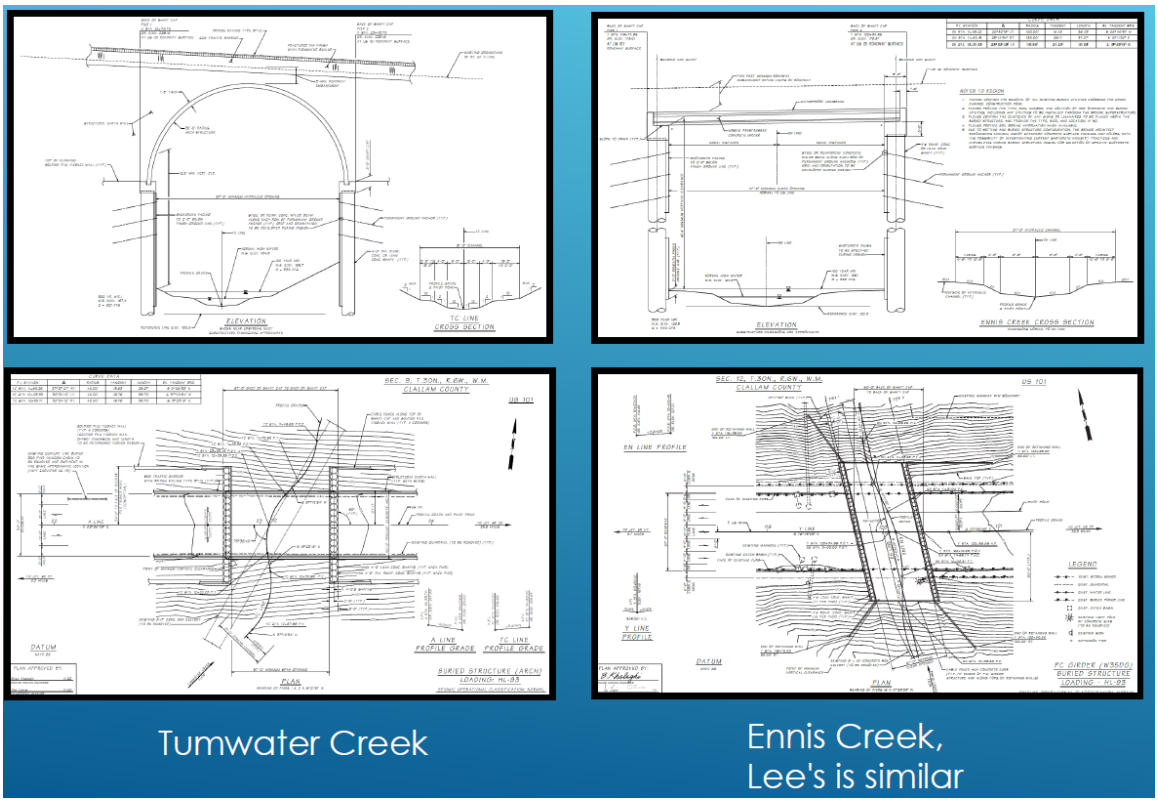
The tube weighs about one pound per lineal foot as opposed to schedule 40 pipe at about 3 pounds per lineal foot. The tube is 1/3 of the weight and pushes together. The tube is two-inch OD with 1.9 inch nominal ID. Wall thickness is 0.049 inches and tubes come in 20 foot lengths standard. The tie lugs are welded to the tube and can carry 100 pounds at each lug. The outer pressure capacity is 725 psi or 580 feet of depth when filled with water. The tube can be tied to the cage using the tabs and 16-gauge tie-wire. The joints are frictional, and it is recommended that tie-wire be used to tie the tubes together for added security. A rubber seal cap with a metal insert is used on the bottom. If necessary, the tube at the top of the shaft can be cut to length. Burs need to be removed to prevent damage to the seal when pressed together. Tubes are tied loosely to the cage to minimize bending when the cage is hoisted vertically; the tubes weight and gravity pulls the tube down a few inches and the tube swings up tight against the inside of the cage. Here is a photo of the tubes installed loosely. There is about 4-inches of space or about a fist's width.

Pricing - As it relates to typical schedule 40, depending on project location, prices vary from a bit below to a bit above, but in general it is competitive, according to Dextra. The cost savings for these tubes is reported to not be in the materials but in the labor to install them. A typical tube weighs 20 pounds compared to 70 pounds for pipe. This means you only need one person to handle and tie tubes instead of two. You can reportedly cut your labor man hours in half.

Use by WSDOT – Right now these tubes do not meet WSDOT specifications because we have specifications written around schedule 40 pipe. Amy Leland asked the contractors if they wanted WSDOT to revise the specifications to allow these. The contractors thought that having options would be good.

4. US 101 Tumwater, Lees, & Ennis – Constructability Review
Piper Pettit – Design Team Leader

The project is replacing three fish passages in Olympic Region near Port Angeles. The passages are on the fish passage injunction list. ADT on SR101 is 34,000 vehicles per day and two of the passages have no viable detours, Lee's and Ennis. All three sites have very deep fills. Ennis has about 50 feet of fill, Lees has about 45 feet, and Tumwater has 75 feet of fill. Fill slopes are all 1.5H:1V or steeper and wooded. The fills are a mix of materials: silty SAND, GRAVEL with silt, clayey SAND, SAND with silt, CLAY, and even fat CLAY. Beneath the fills, coastal SILTSTONE is present. The siltstone is variable and extremely weak to very weak with unconfined compression strength tests that range from 20 psi to 1,400 psi. Landslide scarps are present and are being buttressed by the fills, so the design team does not want to remove the fill in its entirety. The current design concept is to construct secant pile walls parallel to the stream channels and then support structures on top of the walls.



The planned construction sequence is as follows:

Foundation Construction (3 Stages):

- Shift traffic to drill shafts from roadway surface, patched over before next stage (4 lanes of traffic open)
- Shafts at center of bridge constructed during night shift single lane closures (2 lanes of traffic open) covered with steel plates for daytime traffic

Superstructure Installation & Backfill (2 Stages):

- 2 x 2 week-24 hr lane closures (2 lanes open to traffic) to excavate ~15' deep, install girders, and backfill/repave over bridge superstructure, half at a time.

Excavation and PGA's (Last Stage):

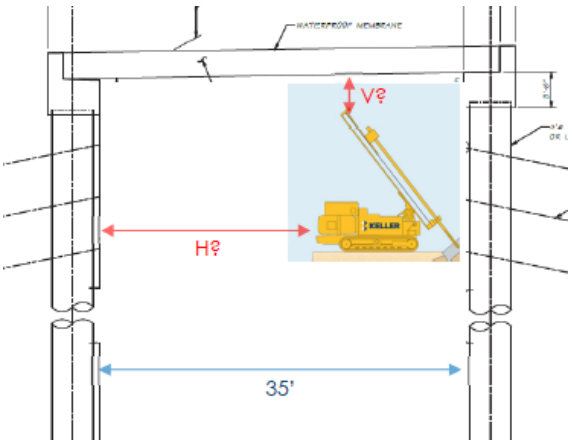
- With traffic fully restored over the new structure, access from the NE & SW side slopes to excavate beneath the finished bridge while installing PGA's, construct remainder of wing walls, remove the existing culvert, and grade new stream channel.

The Design team had some specific questions they wanted answered.

<u>Discussion Topic #1 – Ground Anchor Construction</u>

Q: Assuming the shafts are constructed and the lid structures are placed, the next step would be to partially excavate underneath the lids and begin ground anchor construction, possibly while traffic is using the structure. The smallest fish passage will be roughly 35 feet from wall face to wall face. How big of a drill rig can be used?

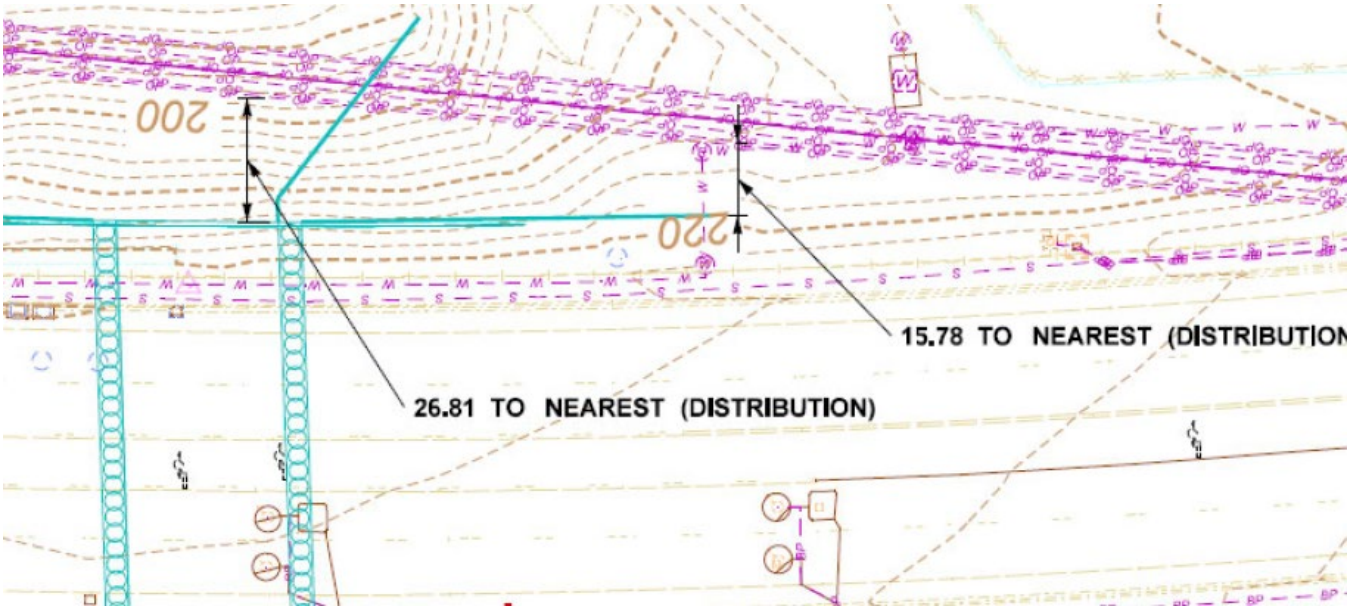
A: Doug Watt – All of the contractors are going to put the largest drill they can in the opening as larger drills equate to more production.
Q: Piper - Is there enough room for this to be constructible?
A: Doug most drill rigs have a 32 to 34 ft long mast, but shorter are available. Ryan with DBM concurred, but stated he was more concerned about headroom and anchor angle. It was suggested that having two to three feet of clearance to the mast be the minimum clear space both to a vertical wall or horizontal overhead obstruction. Masts as short as 8 feet can be used, but they greatly reduce production rates. To crawl a rig into the opening, at least 8 feet of space is required, but they may not be able to mast-up with only that amount of room. (Note taker insertion – from other constructability reviews anchor rigs typically need the anchor about 2 feet above the working grade elevation and no more than 8 feet above).

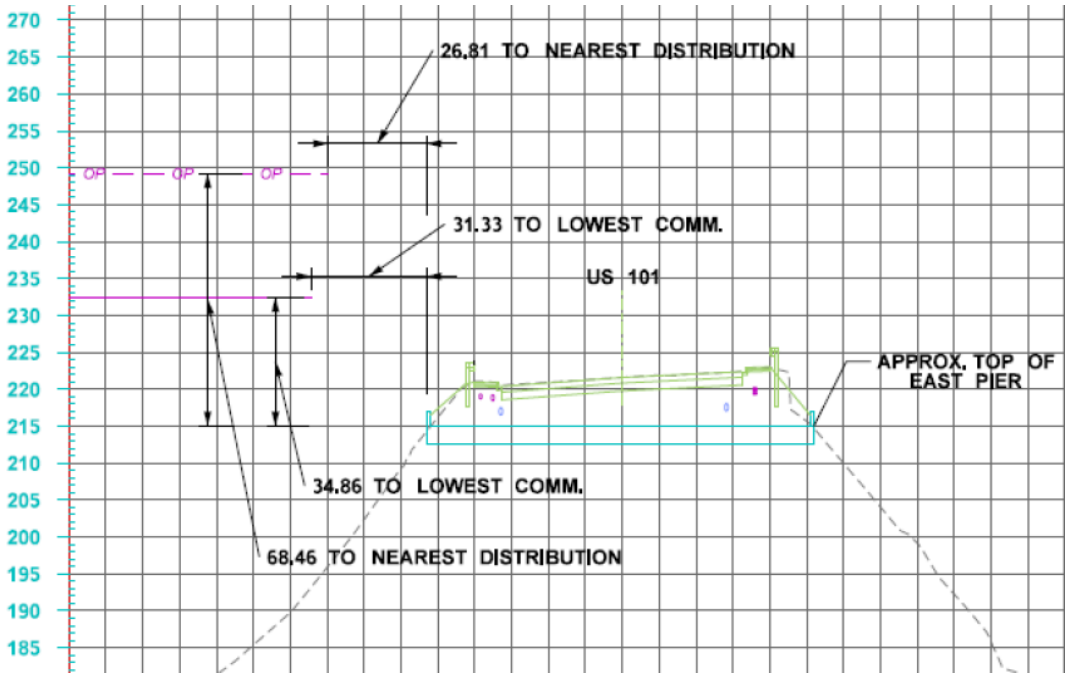


Q: Piper – Do you see anything that concerns you with this?
A/Q: Lance – Is there any way to stage this so that we could do some anchor work from the roadway, maybe through openings? Production for 100 ft anchors would be two for a shift.
A: Piper – Possibly but lane closures are a big deal for the community, and we are trying to limit the duration of lane closures.
Q: Jim Cuthbertson – These structures can be built with larger diameter shafts and fewer anchors, or smaller diameter shafts with more anchors. Which do you think would be faster to construct?
A: Greg (Malcolm) and Lance (Michels) both thought that larger diameter shafts with fewer anchors would be the fastest to construct.

<u>Discussion Topic #2 Utility Conflicts and Wingwalls</u>

There is overhead power distribution and communications on the outlet side of the current fish passages. Voltages are 12.5 Kv and 115 kv. The overhead clearance and position relative to roadway centerline changes with location and fish passage, but the design team had general questions for the site with the closest issues to help them better understand what is possible and what constrains construction. Note, the PUD does not want to move or de-energize the distribution lines.





Q: Piper – What are the limitations for dealing with OH power?
A: Unknown - We all have low OH rigs. Malcolm discussed recently completing a job with 2 m shafts under 30 ft of clearance using casing segments of about 6 ft to 8 ft in length. The shafts were 60 ft in depth, casing sections were conical bolted together. So, it can be done, but it was not something they want to do again. It takes specialized casing and tooling.
Q: Lance asked if the intent is to continue the secant pile walls out to form the wingwalls and if anchors would also be used on the walls.
A: Piper – That was our thinking. We are still undecided about the wall alignment though. We can run the walls out at an angle or run them back parallel to the roadway. Geotech is still designing but we are thinking anchors will be needed. Walls will be 30 to 35 ft in height.
Statement: Jim Cuthbertson suggested looking at soil nail walls if the fill is good enough or possibly using a tiered wall system so that a smaller wall could be constructed while close to the power lines, then stepping out and down in elevation to build a second bigger wall. By stepping out and down you can gain additional clearance from the lines.
A: Piper – stated the team considered tiered wall systems and is still evaluating geometry.
A: Lance – stated that using a soil nail rig even with face stabilization elements could be constructible depending on soil conditions.
Q: Piper – If soil nails didn't pan out could the contractors construct soldier pile walls with 60 or 65 ft soldier piles while maintaining 20 ft clear from the power lines.
A: Tate – Thought it was possible but recommended clearly identifying the conflicted soldier piles/shafts in the plans.
Q: Breyden Holoubek – Would you rather work with the OH clearance issue, or would you rather do the flanking wall and up the shaft diameter to possibly eliminate the anchors. Which would be preferable?
A: Tate – Going larger than 6 ft or 6.5 foot diameter and working under the power lines would not be preferable. If you were not under the power lines it would be more efficient to go with larger diameter shafts and minimize or eliminate the anchors if possible.
A: Doug Watt - Although the PUD does not want to move the lines and if it is a monetary issue, having the contractors work under the power lines with specialized equipment and curtailed production rates may actually cost more money than relocating the power. Moving the lines may be less expensive than constructing these specialty walls. The low overhead will likely result in the mobilization of a drill rig that

is different than the one used for the bridge shafts. Casings may need to be procured and modified or rented and those costs will definitely be passed on to WSDOT.

Discussion Topic #3 Access for Oscillator or Conventional Eq. for Wall Construction

Q: Piper – Assuming oscillator is used for the bridge shafts along the roadway, would you switch methods for the wall shafts?
Q: Lance – What is the distance from the edge of roadway to the center of the wall shafts?
A: Piper – about 12 feet
A: Lance and Tait – If it was 12 feet, we could probably drive four reaction piles around the shaft and set a reaction frame and reach from the roadway.
Q: Piper – What is the spacing of the piles?
A: Tait – Roughly 10 ft on center. For larger shafts 12 ft on center.
Q: Piper – Would the drill rig be parallel to the roadway or perpendicular to the roadway?
A: Perpendicular.
Q: Piper – If we had to cut an access road down to the bottom, what grade is traversable?
A: Unknown – 8% with a road width of 20 to 25 ft.
Q: Piper- Would you leave the support crane up on the roadway?
A: Unknown – Probably, we would leave the crane up on the road and the concrete pump. We would only move the drill down to the bottom.
Q: Piper – Does anyone have any comments or concerns about access?
A: Jim Cuthbertson – I have concerns, looking at the photo there is only two 11 ft lanes and some skinny shoulders.
A: Piper and Breyden – The photo is at Tumwater. We were planning on a full closure here, but we are limited on the duration. Tumwater is a bit different than the other two. At this location under the full closure, we need to dig down to get to the elevation where the shafts will be constructed. We are digging down 25 feet or so. We will have the road completely closed and the end result will be a work platform almost 150 ft wide. The other two passages we need to maintain traffic through them during construction.

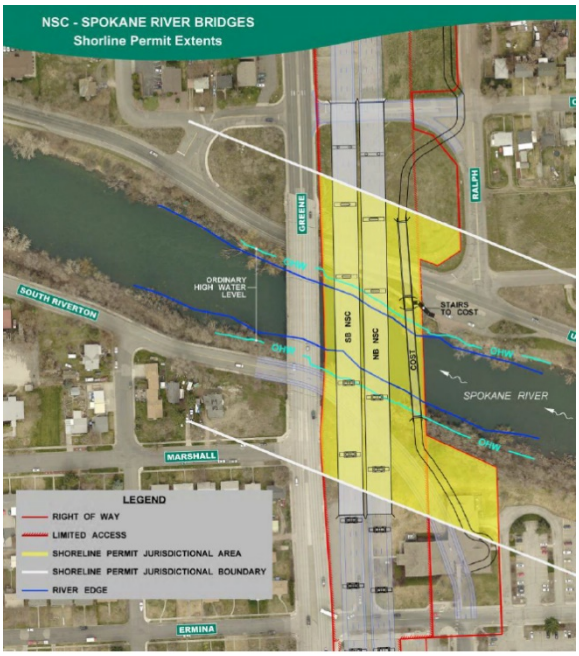
Discussion Topic #4 Old Concrete Roadway

Back when SR-101 was widened, the roadway was also re-profiled. Fill was placed over the existing concrete roadway to change the radius of the sag vertical curve at Lee's and Ennis. The old concrete was left in place. It is roughly 20 ft in width and up to one foot thick. At the deepest the fill is estimated to be 8 ft down.

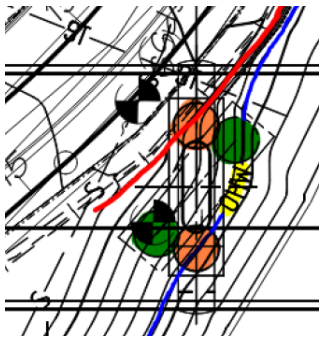
Q: Piper – Can you drill through the concrete?
A: Unknown – It shouldn't be a problem.
Q: Piper – If we did drill from the existing roadway elevation and the top of shaft was up to 15 feet below current roadway surface with casing shoring would that be a problem? Could you backfill from top of shaft to the roadway and open the road to traffic daily? Do you have any concerns about that approach when we are talking secant piles and overlapping casings?
A: Lance – We did something similar on the Alaska Way Tunnel project. We backfilled with lean mix though. Pea gravel probably wouldn't work well.

5. US 395 NSC Spokane River Crossing – Constructability Review
Amy Leland and Doug Olsen, Bridge Office

US 395 runs North-South through Spokane WA. The new highway will be a divided highway crossing over the Spokane River just east of the Greene St. Bridge. The bridges will be eight spans. There is also a pedestrian bridge that will be included in the contract. The separation between the NB and SB structures is 7'3" which matches the other structures on the corridor. The 395 structures will be higher in elevation than the Greene St. structure. Along the south bank of the river there is a metal bin wall that supports South Riverton Rd. Pier 5 of the SB new bridge will be located between the wall and the river in the clump of trees that are shown in the photo below.



Pier 5 location of SB bridge



We are in design now and we are evaluating options for the construction of pier 5. The ideal alignment of the shafts relative to the bridge is perpendicular to bridge as represented by the orange shafts in the figure, but the shafts could be constructed skewed to the bridge missing the wall, as shown in the green shafts. A shaft cap could be constructed, and the pier wall could be aligned perpendicular to the bridge. In plan view the shaft cap and pier wall would look like a skewed *X.* Shafts will likely be 10 foot in diameter.

Q: Amy – How close to the wall face can you construct 10 ft diameter shafts?

Q: Tait – Will temporary casing be required for these shafts?

A: Amy - Likely.

A: Tait – The distance from center of shaft to font edge of the oscillator is just under 10 feet, but the oscillator needs wiggle room so 11 feet from center of shaft is needed.

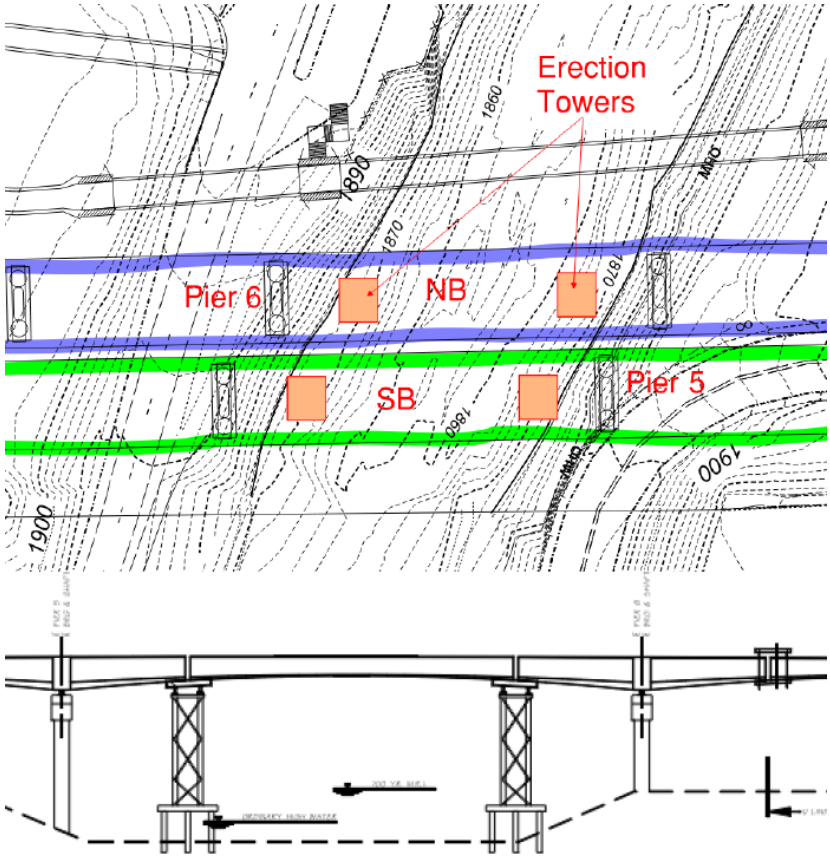
Q: Lance – Will we be constructing from the roadway?

A/Q: Amy – That is what we are wondering. If you couldn't work from the roadway, we think you might need a work trestle or something because you just wouldn't have the room. So, would you rather work from the road or build a trestle?

A: Unknown – You would probably need to build some sort of a platform anyway as the wall probably cannot take the loads from the drilling equipment. I would think you want to have a trestle. Amy – we will plan on work trestles then.

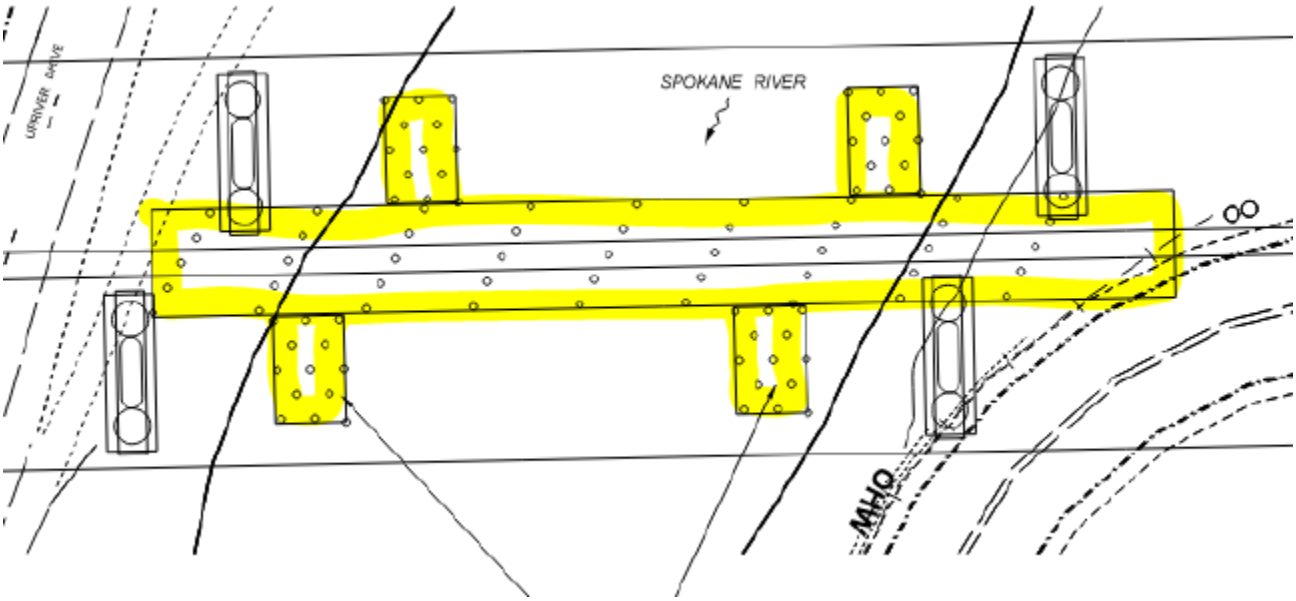
Q: Jim Cuthbertson – What are the in-water work windows, and do they complicate things?

A: Amy – Yes there are in water work windows June 16th to August 31st, but extensions have been obtained on other projects when requested. So, there may be the ability to modify them. We need to do more analysis to see if trestles can remain in place during high water season. In addition, the structure type necessitates the use of erection towers in the river. To construct the erection towers, work trestles will be needed.

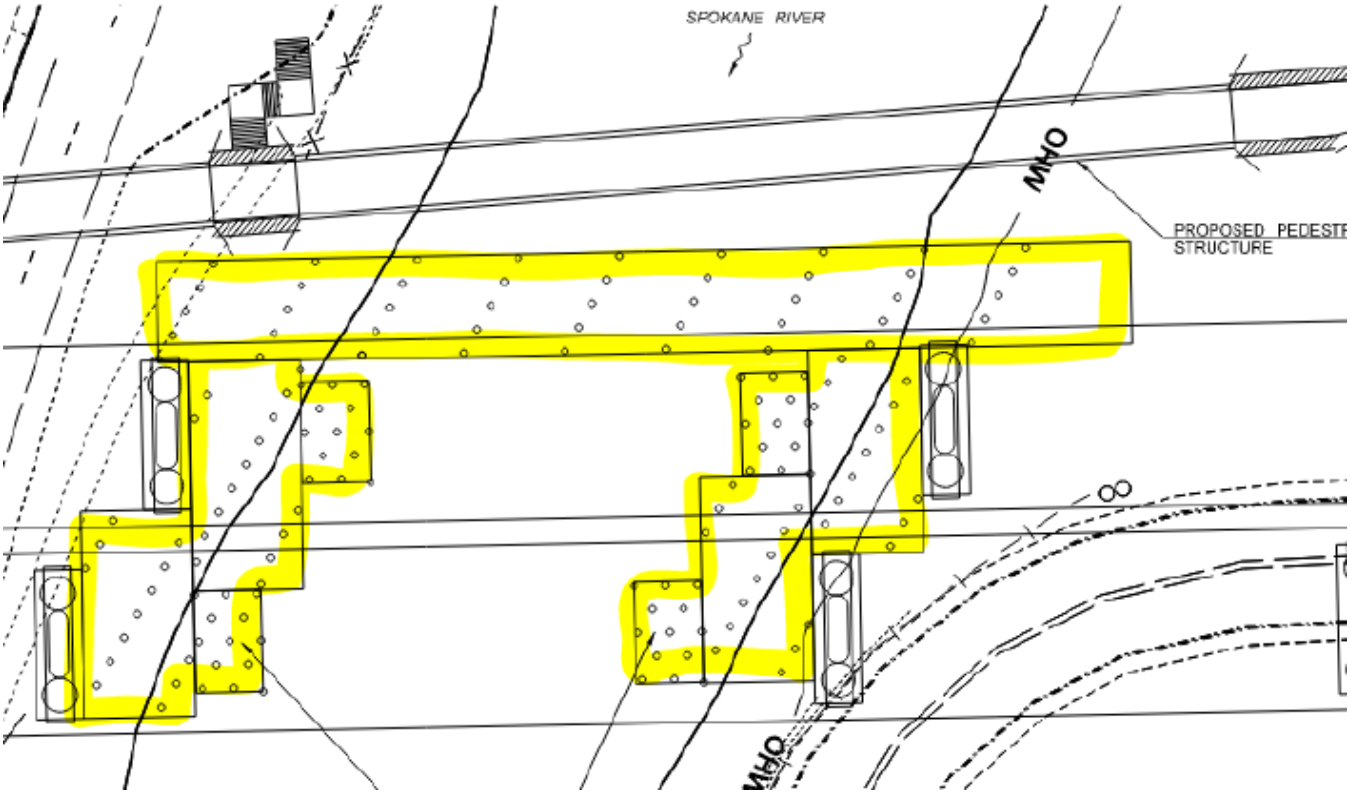


For the work trestle, we need to have a conceptual plan to discuss with the resource agencies. We are considering two options. One would have the trestle roughly centered between the new NB and SB structures. The other option would build the trestle to the east on the 395 bridges, closer to the pedestrian path bridge, and then finger piers would be used to access the erection towers and in-water piers of 395.

Option 1



Option 2



Q: Amy - Trestle Questions
- Are both trestle options feasible?
- Is one preferred over the other?
- Should an extension of the in-water work window be requested?
- Do you foresee issues with trestle pile removal when the girders are in place? Piles must be removed.

A: Lance – Those are questions better suited to the AGC group.

Topic Change

Q: Amy – The river shafts will likely be 10 ft in diameter, but some of the onshore piers with shorter spans could possibly be founded on smaller shafts, maybe 6 ft in diameter. Would it be better to keep shaft sizes the same or can different diameters be used?

A: Unknown - The same diameter would be easier, but different casing sizes could be shipped over if necessary.

6. Review of Agenda Action Items
Patrick Glassford

a. Force Account Obstruction Removal rates and cost/time
   This has been on here for a while, with no action so we will continue to leave this here for now.
b. Concrete Filled Steel Tube (CFST) / Casing Installation Pressure Data
   Greg was going to give an update on this, but it is not ready yet. Defer to next meeting.
c. Soldier Pile Lagging Backfill Specs
   Lance has talked with other members of the task force. The issue that we were having with local agency interpretation of the specs has seemed to go away for now, so we will be removing this.
d. Standard Soil Nail Anchorage Detail Revisions Regarding Washers
   No movement yet, Defer to next meeting.

e ADSC/WSDOT Joint Training – Spring 2021
Because of the pandemic we will cancel this year.

7. Next Meetings:

May 7, July 30, October 22

The End – Jim Cuthbertson

Washington State Department of Transportation

ADSC/WSDOT Team Meeting Minutes

ADSC

October 22, 2021, 8:30 A.M. - 11:30 A.M.

Team Members

Regular Attendees				
Attended	**Member**	**Company**	**Phone**	**E-mail**
	Allen, Tony	WSDOT	360-709-5450	allent@wsdot.wa.gov
	Binnig, Bill	Kiewit	425-255-2376	bill.binnig@kiewit.com
X	Brunkhorst, Jim	Pacific Found.	360-301-0771	jim@pacific-foundation.com
	Carnevale, Robert	Pacific Found.		
X	Cuthbertson, Jim[1]	WSDOT – HQ Constr.	360-709-5452	cuthbej@wsdot.wa.gov
	Deffenbacher, Jon	WSDOT – HQ Constr.	253-589-6100	deffenj@wsdot.wa.gov
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	Dinneen, Molly	DeWitt	360-576-8755	molly@dewittconst.com
X	Fiske, Andrew	WSDOT – Geotech.	360-709-5456	FiskeA@wsdot.wa.gov
	Gaines, Mark	WSDOT – Geotech.	360-705-7827	gainesm@wsdot.wa.gov
	Glassford, Patrick	WSDOT – Bridge	360-705-7828	glassfp@wsdot.wa.gov
	Groneck, Paul	DBM	206-730-4578	paul.groneck@dbmcontractors.com
	Hagy, Mike	PACO	805-746-6965	Mike@PacoEquip.com
	Harkins, Brendan	CJA	425-988-2150	BHarkins@condon-johnson.com
	Johnson, Darrel	PACO	206-786-7584	djohnson@pacoequip.com
X	Khaleghi, Bijan	WSDOT - Bridge	360-705-7181	khalegb@wsdot.wa.gov
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X	Olney, Chuck	Harris Rebar	206-949-7092	colney@harrisrebar.com
	Parmantier, Dominic	CJA	206-575-8248	dparmantier@condon-johnson.com
X	Radom, Greg[1]	Malcolm	253-395-3300	GRadom@malcolmdrilling.com
X	Rasband, Lance	Michels Found.	206-305-3386	lrasband@michels.us
	Sexton, Jim	DBM	253-838-1402	jim.sexton@dbmcontractors.com
	Starcevich, John	Malcolm	253-395-3300	jstarcevich@malcolmdrilling.com
X	Thody, Ryan	DBM	206-730-0199	ryan.thody@dbmcontractors.com
X	Topham, Dale	Snohomish Cty	425-388-6668	Dale.Topham@co.snohomish.wa.us
X	Tuttle, John	Sinclair	661-212-1223	jtuttle@sinclairwp.com
X	Watt, Doug	CJA	425-988-2150	DWatt@condon-johnson.com

1 Team co-chair

Guest Sign-in

Attendee	Company	Phone	E-mail
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Burnell, Joseph	WSDOT NCR	509-664-0860	BurnelJ@wsdot.wa.gov
Chappelle, Chase	Michels Foundation	N/A	cchappelle@michels.us
Perera, Nishanthi	WSDOT Geotech	360-709-5562	PERERAN@wsdot.wa.gov
Sawahata, David	WSDOT Bridge	360-705-6941	SAWAHAD@wsdot.wa.gov
Shell, Christopher	WSDOT NCR	509-664-0862	SHELLC@wsdot.wa.gov
Whitman, Jeffery	WSDOT Geotech	360-709-5457	WHITMAJ@wsdot.wa.gov

1. Welcome/Review of Agenda

Jim Cuthbertson opened the meeting and welcomed everyone. We then quickly reviewed the agenda. No one had any revisions.

Agenda

1	**Welcome/Review of Agenda**	**Cuthbertson**
2	**Approval of Previous Meeting Minutes**	**Cuthbertson**
3	**Member Updates and Personnel Changes**	**Cuthbertson/Radom**
4	**Project Reviews** **a) SR-16 Purdy Creek** **b) SR-116 Chimacum Creek**	**M. Anderson/K. Wakjira** **Perera/Whitman/Shell**
5	**6-19.3(3)I2 Alternate Language Discussion**	**Cuthbertson / Glassford**
6	**Submittal requirements for non-bridge shafts:** **Signs, signals, luminaires, noise walls, and … ?**	**Cuthbertson/All**
7	**6-19 GSP Review Discussion**	**Cuthbertson / Glassford**
	ACTION ITEMS	
a	**Standard Soil Nail Anchorage Detail Revisions Regarding Washers**	**ADSC**
b	**Force Account Obstruction Removal rates and cost/time**	**ADSC/Greg**
c	**Concrete Filled Steel Tube (CFST) / Casing Installation Pressure Data**	**Lance Rasband**
d	**ADSC/WSDOT Joint Training – Spring 2022**	**Group**
	Next Meetings: Switched to Fridays. Plan on scheduling every 12 weeks or so.	

2. Approval of Minutes

Jim asked for edits to the meeting minutes from February's meeting. Hearing no comments, Jim stated he will finalize and post them to the web site.

3. Member Updates and Personnel Changes

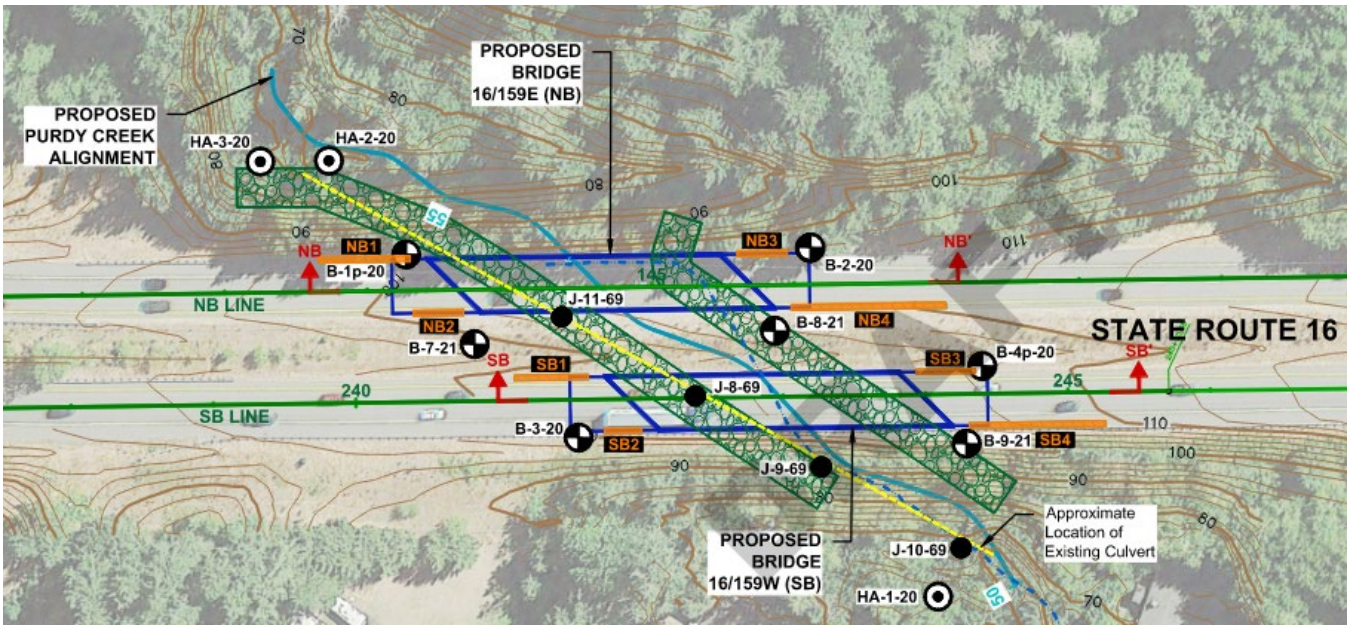
Jim reviewed the personnel listed as team members in the table at the beginning of these minutes. Bob Carnevale was identified as having changed firms and is now with Pacific Foundation. Jim Brunkhorst will forward new contact info for Bob.

For WSDOT, John Olk and Mark Szewick of the Bridge Office Construction Support unit both retired. They were the chief reviewers of Working Drawings and structure related submittals. Patrick Glassford has changed positions and will now be in the Bridge Office along with Chris Feely performing those working drawing and submittal reviews. Mike Bauer has retired from the Specifications Unit at the Bridge Office. He has been replaced by Michael Bressan, and Scott Sargent of that same unit will move to the State Construction Office as part of our rotational Assistant State Construction Engineer program which Patrick Glassford formerly held. Scott will start mid-November in that new role as an ASCE. Tony Allen of the Geotechnical Office will be retiring in June of 2022. His replacement has been selected. Andrew Fiske is the new State Geotechnical Engineer and will now be transitioning into leading the geotechnical group for WSDOT.

4. Project Reviews

a) SR-16 Purdy Creek – Monique Anderson

The Purdy creek project is located on SR-16 at MP 17.4 near SR-302. There will be two bridges constructed on the divided highway where Purdy Creek cross SR-16. Each bridge is planned to be a single span structure. The span lengths are fairly long at about 200 ft. Each abutment will be shaft supported, with three shafts at each abutment, for a total of 12 shafts on the project. The shafts are planned to be 10 ft in diameter. The three shafts for the SB bridge at pier 2 need permanent casing for structural reasons. The remaining nine shafts on the project would benefit from temporary casing during construction, but do not need permanent casing.



SR-16 is on an embankment through this area. The SR 16 embankment is estimated to be up to about 50 feet thick and consists of medium dense to very dense silty sand with gravel. Wood debris was encountered in some borings below the fill. Beneath the fill and a thin layer of alluvium, the site is underlain by coarse-grained glacial outwash that is dense to very dense. Locally this unit contains a finer grained subunit consisting of very dense sandy silt and hard clay. WSDOT expects the fill and the outwash unit to contain cobbles and boulders, although they were not specifically noted on the boring logs. The potential for wood, cobbles, and boulders has historically been encountered at the interface between the fill and underlying soils. Groundwater is located near the bottom of the fill, at the current stream elevation. The 1969 borings make note of artesian conditions, but the modern borings did not encounter artesian groundwater. The Geotechnical Office has recommended that the shafts for this project be installed using full depth temporary casing that is rotated or oscillated into the subsurface materials. Casing is being required to support the subsurface granular soils during drilling and prevent drilling fluid loss into permeable outwash materials. The question posed to the team is: Does the team

object to the recommendation from geotech that only the oscillator/rotator be used to install temporary casing for this job?

Lance Rasband indicated that Michels would pursue using casing to support the soils rather than slurry and that based on the dense soils conditions the preferred method of casing installation would be by oscillator/rotator. Jim Cuthbertson aske the group if they thought telescoping of casing would be necessary to install casing using a vibe hammer with drive and drill methods. The team felt that to install casing conventionally, telescoping would be required. The use of a dig crane with a grab along with oscillator or rotator would also afford the contractor the ability to use additional slurry head to counteract any artesian pressures should they be encountered. Overall, the team was agreeable to requiring the oscillator or rotator for this project. John Tuttle did point out that based on the logs, he thought slurry would be effective to stabilize the excavation.

For the three shafts that require permanent casing, it was asked if the oscillator casing would be left behind or if a slip casing would be used. Jim Cuthbertson explained that the contractors would not use the oscillator casing. They would use the permanent casing as the “dig” casing by welding teeth to its tip and advancing that. The bridge office plans to use casing with 1-inch wall thickness.

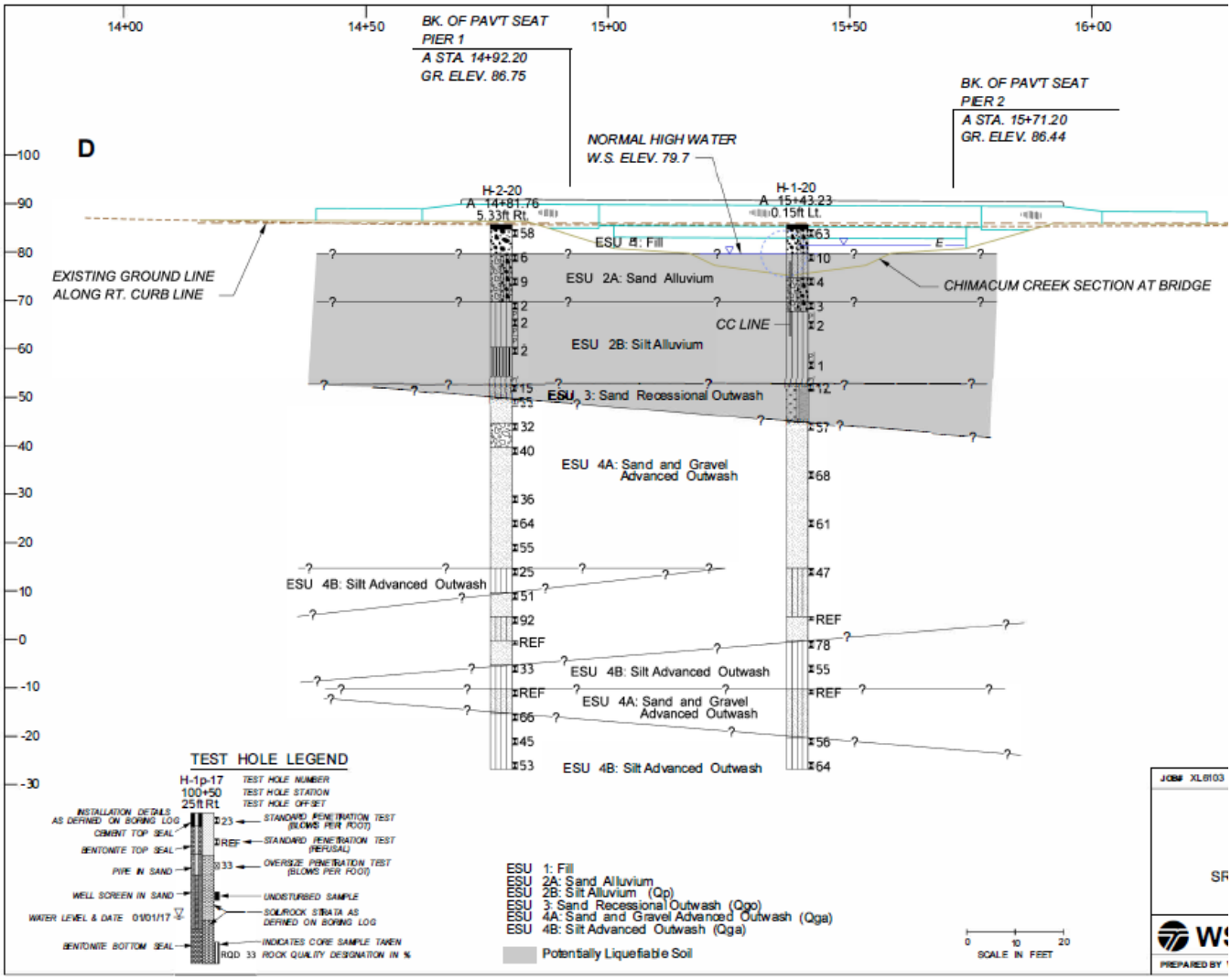
The contractors thought that drilling from the existing roadway would provide the best access. This will mean the top of shaft will be 30 to 40 feet below the ground surface. Jim Cuthbertson asked if casing shoring would be needed. The contractors thought that after shaft construction they would backfill the excavation with pea gravel and not need casing shoring.

Conclusion: The full depth permanent casing at pier 2 will necessitate that the oscillator or rotator be used to install the casing because of the very dense soil conditions. It is believed that conventional shaft construction methods to install the casings would be very difficult, and although slurry would be effective at maintain stability in the outwash materials utilizing the oscillator or rotator for the entire job is prudent.

b) SR-116 Chimacum Creek

The project is located on SR-116 near Port Townsend. The project will be replacing a fish barrier under a full closure of the road, since there is a viable detour available. Work is anticipated to occur between April and December. The inlet area is a wetland that is flooded throughout the year. The downstream side is also a wetland but does not have as much surface water as the inlet.

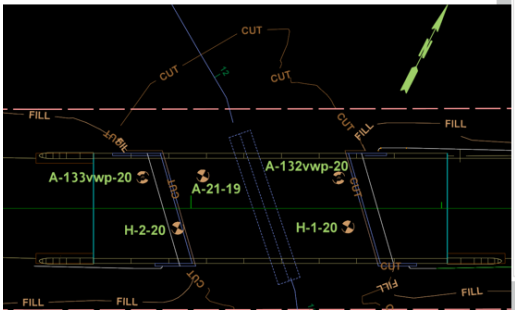
The fill for the roadway is only about 11 feet thick. The shallow depth of fill is one of the things driving structure selection as well as the subsurface conditions. The new hydraulic opening will be 70 feet. The bridge concept will use voided slabs to form the deck. The slabs will be supported at the ends by either abutments on deep foundations or on secant pile walls with a cap beam where the voided slabs will bear. The liquefiable soils at the site are what is driving the need for deep foundations or secant pile walls. Settlement is also a concern at the site so profile changes are not desired.

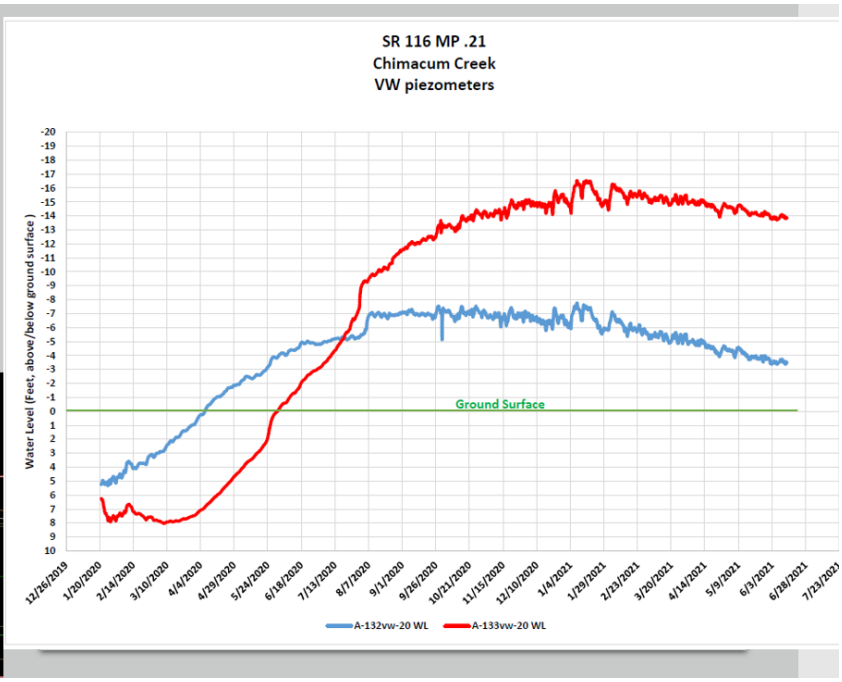


The site has significant artesian pressure. The Geotechnical office installed two vibrating wire pressure transducers in two different boreholes, indicated by vwp in the boring name. Pressure as high as 15 feet above the roadway surface was measured. The data is unusual in that it took several months for the artesian pressure to develop and be measured, and both have a lack of seasonal trends. Geotech is investigating the groundwater conditions further. During geotech drilling they did have artesian flow out of three of the borings.

Design Parameters Cont. (Groundwater/Artesian)

- High groundwater is a concern at the site.
- The first three bore holes experienced artesian conditions when drilling and two piezometers were installed.
- However, the final two bore holes did not encounter artesian pressures when drilling.

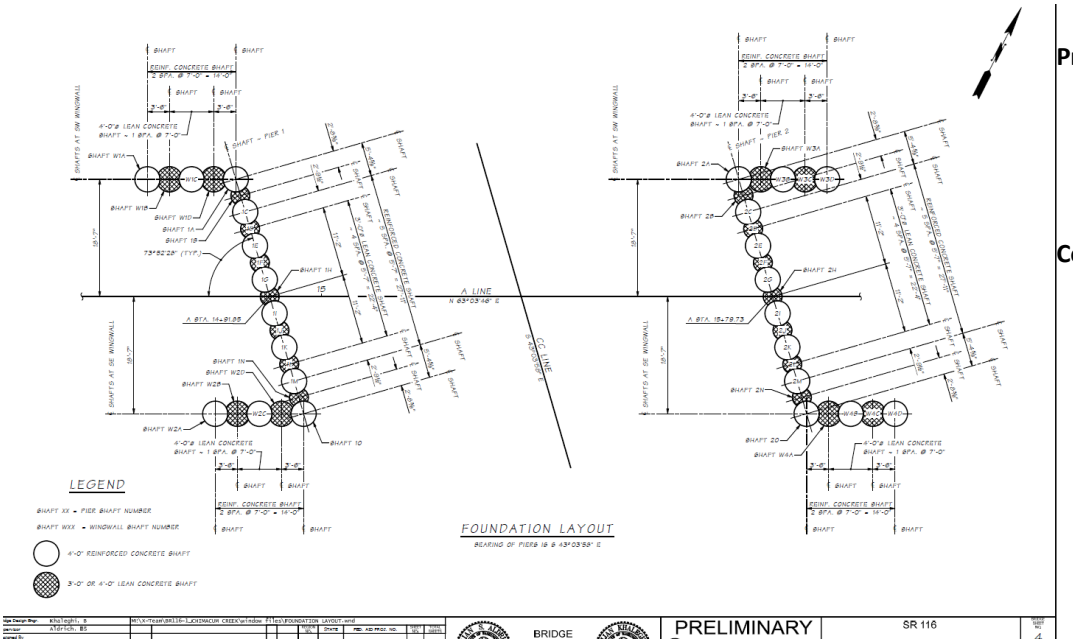




Artesian head is concern. Maintaining slurry head 10 feet above the artesian would be a significant constructability issue. Casings would be 25 to 30 feet above the roadway. There is also a concern that with that much head on the shaft during concreting the soft ESU 2B silt would essentially blow out and could cause a significant anomaly if permanent casing within that zone is not used.

The ADSC team though the casing length and head necessary to maintain stability is not feasible. They felt that depressurization wells would be necessary, but depressurization could also lead to settlement. Geotech acknowledged that this would take more investigation and design.

For the secant pile option, structural shafts are thought to be 4 feet in diameter with lean shafts at about 3 ft diameter and would extend about 7 feet below the thalweg for scour. The leans would likely be above the artesian source, but the structural shafts would still likely encounter the artesian source.



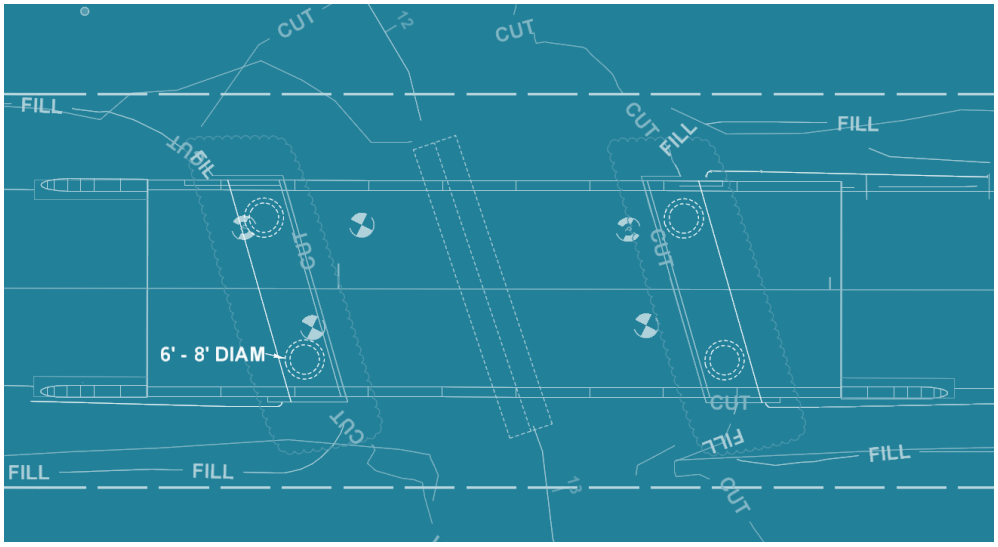
Pros

- Addresses scour and seismic concerns
- Allows for 70' hydraulic opening with an acceptable girder length

Cons

- Layout has 46 drilled shafts under possible artesian conditions
- Will add ~3.5 months of construction/detour time
- Is considerably more expensive than other foundation designs

The project office is also considering fewer larger diameter shafts, maybe two per abutment, with a more conventional abutment design. The abutment may or may not need a cofferdam for construction and containment since it is within a wetland.



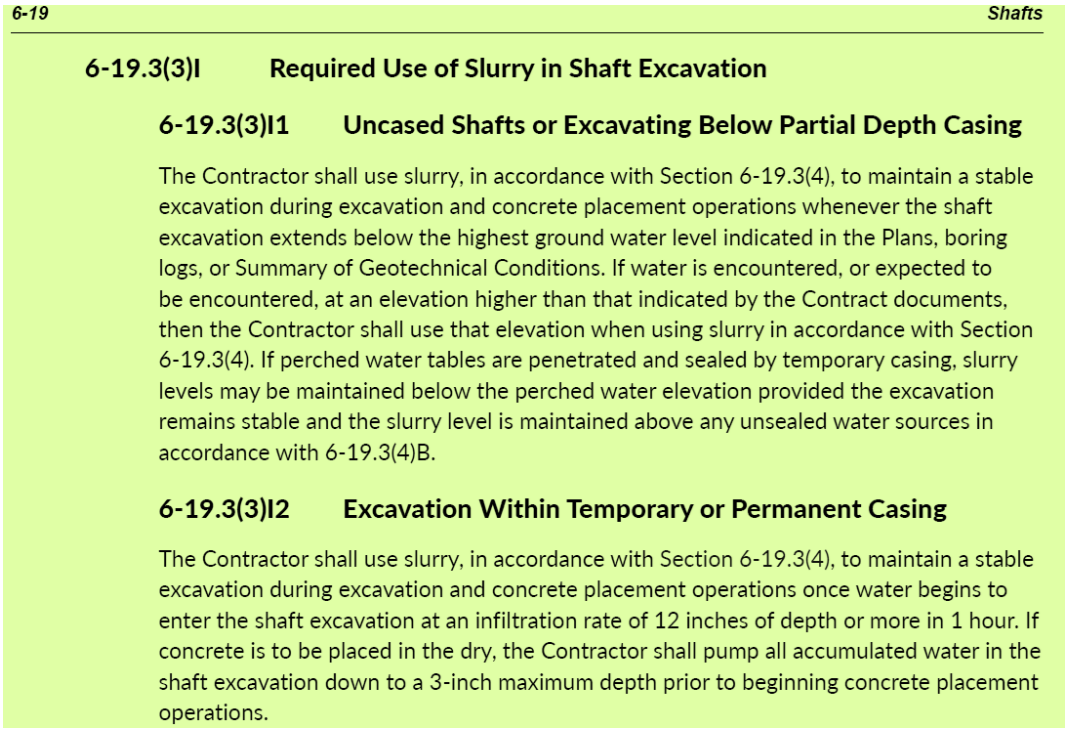
Of the options presented, the ADSC felt that the best option would be four shafts. The risks of doing 4 larger shafts is less than doing 46 smaller diameter shafts, based purely on the number being installed. A reasonable estimate for the shaft construction of the shafts would be one week per shaft. To contain the slurry during construction you would probably need three baker tanks on-site. Depressurization of the artesian is needed. With dewatering there would not need to be a restriction on the method of shaft construction, conventional construction would be possible.

5. 6-19.3(3)I2 Alternate Language Discussion

Several meetings ago, Jim Cuthbertson proposed making modifications to section 6-19.3(3). Jim wanted to eliminate the language that states:

> *The Contractor shall use slurry, in accordance with Section 6-19.3(4), to maintain a stable excavation during excavation and concrete placement operations once water begins to enter the shaft excavation at an infiltration rate of 12 inches of depth or more in 1 hour.*

Jim felt that it was very difficult to monitor the rate of flow while excavation was occurring as water would be removed along with the spoils as the excavation progresses. He had also heard that inspectors were requesting that excavation be paused to assess the inflow rate. Stopping excavation and not working the hole when water is in-flowing just seemed like a really bad idea to him. Ultimately, the changes that Jim proposed did not make it into the 2022 Standard Specifications. Because the changes Jim proposed were reviewed and approved by the team, but not incorporated into the 2022 Specifications he wanted the team to review the current specification. The current 2022 specification is as follows:



6-19 Shafts

6-19.3(3)I Required Use of Slurry in Shaft Excavation

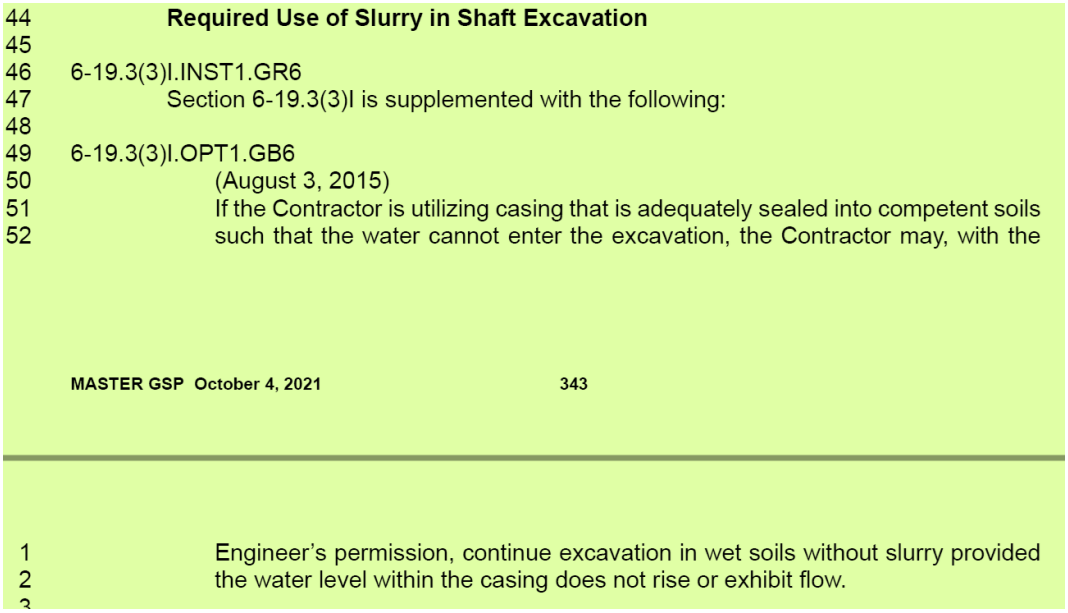
6-19.3(3)I1 Uncased Shafts or Excavating Below Partial Depth Casing

The Contractor shall use slurry, in accordance with Section 6-19.3(4), to maintain a stable excavation during excavation and concrete placement operations whenever the shaft excavation extends below the highest ground water level indicated in the Plans, boring logs, or Summary of Geotechnical Conditions. If water is encountered, or expected to be encountered, at an elevation higher than that indicated by the Contract documents, then the Contractor shall use that elevation when using slurry in accordance with Section 6-19.3(4). If perched water tables are penetrated and sealed by temporary casing, slurry levels may be maintained below the perched water elevation provided the excavation remains stable and the slurry level is maintained above any unsealed water sources in accordance with 6-19.3(4)B.

6-19.3(3)I2 Excavation Within Temporary or Permanent Casing

The Contractor shall use slurry, in accordance with Section 6-19.3(4), to maintain a stable excavation during excavation and concrete placement operations once water begins to enter the shaft excavation at an infiltration rate of 12 inches of depth or more in 1 hour. If concrete is to be placed in the dry, the Contractor shall pump all accumulated water in the shaft excavation down to a 3-inch maximum depth prior to beginning concrete placement operations.

There is also a GSP that goes along with this section that enables the contractor to seal casing into a competent layer and excavate below the tip of the casing without using slurry, but the inclusion of this GSP requires that the Geotechnical Office recommend its use.



Required Use of Slurry in Shaft Excavation

6-19.3(3)I.INST1.GR6
Section 6-19.3(3)I is supplemented with the following:

6-19.3(3)I.OPT1.GB6
(August 3, 2015)
If the Contractor is utilizing casing that is adequately sealed into competent soils such that the water cannot enter the excavation, the Contractor may, with the

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Engineer's permission, continue excavation in wet soils without slurry provided the water level within the casing does not rise or exhibit flow.

The team concluded that the current specification and GSP are adequate for now. No further revisions are needed at this time.

6. Submittal requirements for non-bridge shafts: Signs, signals, luminaires, noise walls, and … ?

The submittal requirements that are used for these shafts are the same as those used for the bridges. Recently, there have been a number of submittals for non-bridge shafts that have been severely lacking content. It was thought that the full 6-19 submittal requirements could be used for these shafts and that

contractors would “scale” their responses to the work that was needed. For example, regarding slurry mix design requirements, if a signal pole did not require slurry for construction, the submittal would simply state that slurry is not required and no mix design will be provided. However, contractors are not addressing all of the submittal requirements, necessitating that submittals be returned for correction as being incomplete. Jim would like to develop a GSP that can be used for non-bridge shafts that would modify and simplify the submittal requirements for these foundations; especially when soil conditions and construction methods do not require sophisticated methods. With poor soil conditions, high groundwater, or excessively deep foundations the full 6-19 requirements could still be used. Jim asked for volunteers to assist in developing a GSP for this. Tait McCutchan volunteered to assist. We will put something together and run it by the team.

7. 6-19 GSP Review Discussion

There are a number of General Special Provisions (GSPs) that are used in combination with the Standard Specifications. A list of them will be attached to the meeting notes along with their instructions for use, Appendix A. The team was asked to review all the GSPs and make any suggestions or necessary edits.

Jim wanted to run through a few of them in particular. The following were discussed in the meeting, but not reviewed in detail.

GSP 6-19.2(9-36.2(2)).OPT1.GB6 (Fresh Water For Synthetic Slurry) essentially requires that fresh water be used for mixing slurry. Jim thought that this GSP could be elevated to standard specifications and just be incorporated into the main specification. The team including John Tuttle agreed that it could be raised to the Standard Specs and eliminated as a GSP.

GSP 6-19.3(3).OPT1.GB6 (Variations In Bearing Layer Elevations) is used when there is ambiguity in the elevation of a bearing layer and the shafts are required to have a minimum penetration into that bearing layer. Lance thought this GSP could be elevated as well. Nobody else expressed an opinion either way. Recommendation: Leave as is for now.

GSP 6-19.3(3)B.OPT2.GB6 (Rotating/Oscillating Method Required) is the GSP that limits the installation of casing to non-vibratory means. This GSP’s use requires recommendation from the Geotechnical Office and should be accompanied by a review and preferably concurrence from the ADSC team. Recommendation: Leave as is for now.

GSP 6-19.3(3)B4.OPT1.GB6 (Temp. Telescoping Casing Not Allowed At End Piers) is used by the Structural Engineer when telescoping casing at bridge abutments even in low seismic areas is not allowed. Recommendation: Leave as is for now.

GSP 6-19.3(4)A.OPT1.FB6 (Slurry Manufacturer’s Representative’s Presence Required At Specific Shaft Sites). The current requirement in the Standard is that the rep is present for the first shaft of a bridge. This GSP requires the rep be present when we have multiple bridges on a project, essentially being present on the first shaft at all bridges listed in the Fill-in. Recommendation: Leave as is for now.

8. ACTION ITEMS

a) Standard Soil Nail Anchorage Detail Revisions Regarding Washers

Nobody remembers what the issue was. Jim will go back through old minutes and try to resurrect this item.

b) Force Account Obstruction Removal rates and cost/time

This is something the team will work on this winter, and will have a proposal this spring.

c) Concrete Filled Steel Tube (CFST) / Casing Installation Pressure Data

This is deferred until a later meeting.

d) ADSC/WSDOT Joint Training – Spring 2022

We will evaluate this later in the year before we decide to have or not have. This is TBD.

e) Shotcrete Spec for Soil Nail Walls (NEW ITEM)

Doug Watt from Condon identified a need to review the temporary shotcrete requirements for soil nail walls. He stated that they were recently involved in a local agency project where the contracting agency require them to follow all of the requirements in 6-18 for the temporary shotcrete facing.

f) CDF and Lean Conc. Rqmts. for Soldier Pile walls (NEW ITEM)

Taken from an e-mail Doug Watt sent to Jim after the meeting.

6-16.3(5) Item 3 clearly states that the lean mix is to have a MINIMUM compressive strength of 100psi. It also states that the lean mix will conform with the requirements of 2-09.3(1) for CDF. 2-09.3(1) states that the MAXIMUM 28 day strength of CDF (and therefor inferred for lean mix) of 300psi. Getting a pumpable lean mix that consistently falls between 50 and 300 psi is a challenge. We typically pick mixes that break higher than 300 psi to ensure we have a good mix. I suggest that we change 6.16.3(5) item 3 to state "Pumpable lean concrete shall be a Contractor designed mix providing a minimum 28-day compressive strength of 100 psi and no maximum 28-day compressive strength. Acceptance of pumpable lean concrete will conform to the acceptance requirements specified in Section 2-09.3(1) for CDF."

Jim will take this suggestion to the Bridge and Structures office, and we will include a discussion in our next meeting.

9. Next Meetings:

December 17th next meeting

The End – Jim Cuthbertson

Appendix A

GSPs for the 2022 Standard Specifications
(Instructions for use and GSPs)

6-19.GR6 Shafts

6-19.2.GR6 Materials

6-19.2(9-36.2(2)).GR6 Synthetic Slurry
(Section 9-36.2(2) is supplemented with the following)
Must use once preceding any of the following:

6-19.2(9-36.2(2)).OPT1.GB6 (Fresh Water For Synthetic Slurry)
(January 2, 2012)
Use in projects with shafts constructed in salt water when the geotechnical report specifies that the use of fresh water for synthetic slurry is feasible and when the Contracting Agency restricts the water for synthetic slurry to fresh water only. Include with **6-19.4.OPT3.GB6 and 6-19.5.OPT2.GB6.**

6-19.3.GR6 Construction Requirements

6-19.3(3).GR6 Shaft Excavation

6-19.3(3).INST1.GR6 (Section 6-19.3(3) is supplemented with the following)
Must use once preceding any of the following:

6-19.3(3).OPT1.GB6 (Variations In Bearing Layer Elevations)
(January 2, 2012)
Use in projects where shaft embedment to a minimum penetration into a bearing layer is required, and where the bearing layer elevation cannot be accurately specified with certainty. Include with **6-19.3(5).OPT1.GB6.**

6-19.3(3)B.GR6 Temporary and Permanent Shaft Casing

6-19.3(3)B.INST1.GR6 (Section 6-19.3(3)B is supplemented with the following)
Must use once preceding any of the following:

6-19.3(3)B.OPT2.GB6 (Rotating/Oscillating Method Required)
(January 2, 2012)
Use in projects where the geotechnical report for the project recommends, and the ADSC/WSDOT Shaft Task Force concurs, that site conditions dictate the use of the rotating/oscillating method for shaft excavation.

6-19.3(3)B4.GR6 Temporary Telescoping Shaft Casing

6-19.3(3)B4.INST1.GR6 (The second paragraph of Section 6-19.3(3)B4 is revised to read as follows)
Must use once preceding any of the following:

6-19.3(3)B4.OPT1.GB6 (Temp. Telescoping Casing Not Allowed At End Piers)
(January 2, 2012)
Use in projects where design conditions exist where the option of temporary telescoping casing for shafts at bridge end piers is not appropriate for the overall design behavior of the overall bridge.

6-19.3(3)I.GR6 Required Use of Slurry in Shaft Excavation

6-19.3(3)I.INST1.GR6 (Section 6-19.3(3)I is supplemented with the following)
Must use once preceding any of the following:

6-19.3(3)I.OPT1.GB6 (Exception For Casing Sealed Against Influx Of Water Into Excavation)
(August 3, 2015)
Use in projects where the geotechnical conditions, as documented in the geotechnical report for the project, allow the possibility of performing shaft excavation in a cased hole beneath the water table level without the need for slurry to ensure the stability of the bottom of the excavation.

6-19.3(4).GR6 Slurry Installation Requirements

6-19.3(4)A.GR6 Slurry Technical Assistance

6-19.3(4)A.INST1.GR6 (Section 6-19.3(4)A is supplemented with the following)
Must use once preceding any of the following:

6-19.3(4)A.OPT1.FB6 (Slurry Manufacturer's Representative's Presence Required At Specific Shaft Sites)
(January 2, 2012)
Use in projects where the geotechnical conditions vary enough from one shaft site to another to affect how the slurry is used at each shaft site. The fill-in identifies the specific shaft locations where the presence of the slurry manufacturer's representative is required.
(1 fill-in)

6-19.3(5).GR6 Assembly and Placement of Reinforcing Steel

6-19.3(5).INST1.GR6 (Section 6-19.3(5) is supplemented with the following)
Must use once preceding any of the following:

6-19.3(5).OPT1.GB6 (Variations In Bearing Layer Elevations)
(August 1, 2016)
Use in projects where shaft embedment to a minimum penetration into a bearing layer is

6-19.5.INST1.GR6 (Section 6-19.5 is supplemented with the following)
Must use once preceding any of the following:

6-19.5.OPT2.GB6 (Fresh Water for Synthetic Slurry)
(January 2, 2012)
Use in projects with shafts constructed in salt water when the geotechnical report specifies that the use of fresh water for synthetic slurry is feasible and when the Contracting Agency restricts the water for synthetic slurry to fresh water only. Include with **6-19.2(9-36.2(2)).OPT1.GB6 and 6-19.4.OPT3.GB6.**

2. The ambient temperature is, or is forecast to be, outside the temperature range of 40F to 90F during placement or initial curing.

3. Rain or seepage is washing cement out of the freshly placed shotcrete or is causing sloughs in the work.

Construction joints shall be tapered over a minimum distance of 12 inches to the thin edge. Square construction joints will not be permitted.

Shotcrete Finishing

Unless otherwise shown in the Plans or specified in the Special Provisions, the shotcrete facing shall be finished in accordance with Finish Alternative A in Section 6-18.3(8). Colorization, if required, shall conform to the requirements specified in Section 6-18.2 as supplemented in these Special Provisions.

6-18.4.GR6

Measurement

6-18.4.INST1.GR6

Section 6-18.4 is supplemented with the following:

6-18.4.OPT1.GB6

(April 5, 2010)

Shotcrete facing for rock/soil slope stabilization will be measured by the cubic yard of shotcrete placed.

6-18.5.GR6

Payment

6-18.5.INST1.GR6

Section 6-18.5 is supplemented with the following:

6-18.5.OPT1.GB6

(April 5, 2010)

"Shotcrete Facing For Rock/Soil Slope Stabilization", per cubic yard.

The unit contract price per cubic yard for "Shotcrete Facing For Rock/Soil Slope Stabilization" shall be full pay for performing the work as specified, including pre-production and production testing, surface preparation, weep hole drains, steel anchor bars, and shotcrete, mixing, application, curing and finishing, and, if required, shotcrete colorization.

6-19.GR6

Shafts

6-19.2.GR6

Materials

6-19.2(9-36.2(2)).GR6

Shaft Slurry

Synthetic Slurry

Section 9-36.2(2) is supplemented with the following:

6-19.2(9-36.2(2)).OPT1.GB6
(January 2, 2012)
Salt water shall not be used with synthetic slurry for shafts. Fresh water only shall be used.

6-19.3.GR6
Construction Requirements

6-19.3(3).GR6
Shaft Excavation

6-19.3(3).INST1.GR6
Section 6-19.3(3) is supplemented with the following:

6-19.3(3).OPT1.GB6
(January 2, 2012)
Variations in the bearing layer elevation from that shown in the Plans are anticipated. The Contractor shall have equipment on-site capable of excavating an additional 20 percent of depth below that shown in the Plans.

6-19.3(3)B.GR6
Temporary and Permanent Shaft Casing

6-19.3(3)B.INST1.GR6
Section 6-19.3(3)B is supplemented with the following:

6-19.3(3)B.OPT2.GB6
(January 2, 2012)
Shaft casing shall be equipped with cutting teeth or a cutting shoe, and installed by either rotating or oscillating the casting. Installing the casing by vibratory means will not be allowed.

6-19.3(3)B4.GR6
Temporary Telescoping Shaft Casing

6-19.3(3)B4.INST1.GR6
The second paragraph of Section 6-19.3(3)B4 is revised to read as follows:

6-19.3(3)B4.OPT1.GB6
(January 2, 2012)
Temporary telescoping casing will not be allowed for bridge end pier shafts.

6-19.3(3)I.GR6
Required Use of Slurry in Shaft Excavation

6-19.3(3)I.INST1.GR6
Section 6-19.3(3)I is supplemented with the following:

6-19.3(3)I.OPT1.GB6
(August 3, 2015)
If the Contractor is utilizing casing that is adequately sealed into competent soils such that the water cannot enter the excavation, the Contractor may, with the

Engineer's permission, continue excavation in wet soils without slurry provided the water level within the casing does not rise or exhibit flow.

6-19.3(4).GR6

Slurry Installation Requirements

6-19.3(4)A.GR6

Slurry Technical Assistance

6-19.3(4)A.INST1.GR6

Section 6-19.3(4)A is supplemented with the following:

6-19.3(4)A.OPT1.FB6

(January 2, 2012)

The slurry manufacturer's representative shall be present during construction and completion of the first shaft excavated at the following specific shaft sites:

*** $$1$$ ***

6-19.3(5).GR6

Assembly and Placement of Reinforcing Steel

6-19.3(5).INST1.GR6

Section 6-19.3(5) is supplemented with the following:

6-19.3(5).OPT1.GB6

(August 1, 2016)

For those shafts with a specified minimum penetration into the bearing layer and no specified tip elevation, the Contractor shall furnish each shaft steel reinforcing bar cage, including access tubes for non-destructive QA testing in accordance with Section 6-19.3(6), 20 percent longer than specified in the Plans. The Contractor shall add the increased length to the bottom of the cage. The Contractor shall trim the shaft steel reinforcing bar cage to the proper length prior to placing it into the excavation. If trimming the cage is required and access tubes are attached to the cage, the Contractor shall either shift the access tubes up the cage, or cut the access tubes provided that the cut tube ends are adapted to receive the watertight cap as specified.

6-19.3(6).GR6

Contractor Furnished Accessories for Nondestructive QA Testing

6-19.3(6)E.GR6

Thermal Wire and Thermal Access Points (TAPs)

6-19.3(6)E.INST1.GR6

Section 6-19.3(6)E is supplemented with the following:

6-19.3(6)E.OPT1.GB6

(January 2, 2018)

The thermal wire and associated couplers shall be obtained from the following source:

Pile Dynamics, Inc.
30724 Aurora Road
Cleveland, OH 44139
(216) 831-6131
FAX: (216) 831-0916
www.pile.com

6-19.3(7).GR6

Placing Concrete

6-19.3(7)D.GR6

Requirements for Placing Concrete Underwater

6-19.3(7)D.INST1.GR6

Section 6-19.3(7)D is supplemented with the following:

6-19.3(7)D.OPT1.GB6

(January 2, 2012)

The Contractor may use a tremie instead of a concrete pump, subject to the following conditions:

1. The tremie shall have a hopper at the top that empties into a watertight tube at least eight inches in diameter.

2. The discharge end of the tube on the tremie shall include a device to seal out water while the tube is first filled with concrete.

6-19.4.GR6

Measurement

6-19.4.INST2.GR6

Section 6-19.4 is supplemented with the following:

6-19.4.OPT3.GB6

(January 2, 2012)

Fresh water for shaft slurry will be measured in accordance with Section 2-07.4.

6-19.5.GR6

Payment

6-19.5.INST1.GR6

Section 6-19.5 is supplemented with the following:

6-19.5.OPT2.GB6

(January 2, 2012)

“Fresh Water for Shaft Slurry”, per M gal.

6-20.GR6

Buried Structures

Washington State Department of Transportation

ADSC/WSDOT Team Meeting Minutes

ADSC

DECEMBER 17, 2021

ADSC/WSDOT Joint Meeting - Sign in Sheet

Regular Attendees				
Attended	**Member**	**Company**	**Phone**	**E-mail**
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x	Brunkhorst, Jim	Pacific Found.	360-301-0771	jim@pacific-foundation.com
	Carnevale, Robert	Pacific Found.	425-358-0950	Robert@pacific-foundation.com
x	Cuthbertson, Jim[1]	WSDOT – HQ Constr.	360-709-5452	cuthbej@wsdot.wa.gov
	Deffenbacher, Jon	WSDOT – HQ Constr.	253-589-6100	deffenj@wsdot.wa.gov
	DiFabio, Vinnie	PACO	206-762-3550	vdifabio@pacoequip.com
	Dinneen, Molly	DeWitt	360-576-8755	molly@dewittconst.com
x	Fiske, Andrew	WSDOT – Geotech.	360-709-5456	FiskeA@wsdot.wa.gov
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	Groneck, Paul	DBM	206-730-4578	paul.groneck@dbmcontractors.com
	Hagy, Mike	PACO	805-746-6965	Mike@PacoEquip.com
x	Harkins, Brendan	CJA	425-988-2150	BHarkins@condon-johnson.com
	Johnson, Darrel	PACO	206-786-7584	djohnson@pacoequip.com
	Khaleghi, Bijan	WSDOT - Bridge	360-705-7181	khalegb@wsdot.wa.gov
	Kimball, Mike	Inland Foundation	208-367-1699	mkimball@inlandcrane.com
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	Starcevich, John	Malcolm	253-395-3300	jstarcevich@malcolmdrilling.com
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x	Topham, Dale	Snohomish Cty	425-388-6668	Dale.Topham@co.snohomish.wa.us
	Tuttle, John	Sinclair	661-212-1223	jtuttle@sinclairwp.com
x	Watt, Doug	CJA	425-988-2150	DWatt@condon-johnson.com

[1] Team Co-chair

Guests			
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1. Welcome/Review of Agenda

Jim Cuthbertson opened the meeting and welcomed everyone. We then quickly reviewed the agenda. One item was added to the agenda at the meeting; a project review. The added item has been included in the agenda below as Item 5. Nobody suggested other revisions.

1	**Welcome/Review of Agenda**	**Cuthbertson**
2	**Approval of Previous Meeting Minutes**	**Cuthbertson**
3	**Project Review - US 101 Ennis, Lees, & Tumwater** The Office has gone back to flanking wingwalls (65' tall secant pile walls), which will be designed for at rest earth pressures and need substantial lateral support. This has led them to the idea of drilling anchors through the face of one wall and using a waler on the opposite wall so they function as tensioned tie rods.	**P. Petit/M. Anderson**
4	**Project Review – May Creek** The Geotech Office wants to get the ADSC group's opinion of the feasibility/practicality of removing the soldier piles to be installed for the anchor testing program at May Creek. There is concern that the soldier piles from the testing program will be in conflict with the production anchors on the main northern May Creek wall. The soldier pile design currently has 2'-0" shafts with a 26' embedment, with about 260 kips of uplift resistance.	**J. Whitman/T. Mooney**
5	**Project Review - I90 Easton Hill to W Easton I/C Phase 3 – Add Lanes/Wildlife Bridges** The project contains 3 large fill walls that have heights up to nearly 70 ft and lengths exceeding 1000 feet. A significant portion of two of the walls will utilize an anchored soldier pile wall to support a MSE wall. Soldier piles will need to be socketed into rock.	**T. Mooney**
6	**CDF and Lean Conc. Requirements for Soldier Pile Walls** 6-16.3(5) Item 3 clearly states that the lean mix is to have a MINIMUM compressive strength of 100 psi. It also states that the lean mix will conform with the requirements of 2-09.3(1) for CDF. 2-09.3(1) states that the MAXIMUM 28 day strength of CDF (and therefore inferred for lean mix) of 300 psi. Getting a pumpable lean mix that consistently falls between 50 and 300 psi is a challenge. We typically pick mixes that break higher than 300 psi to ensure we have a good mix. Doug Watt suggests that we change 6.16.3(5) item 3 to state "Pumpable lean concrete shall be a Contractor designed mix providing a minimum 28-day compressive strength of 100 psi and no maximum 28-day compressive strength. Acceptance of pumpable lean concrete will conform to the acceptance requirements specified in Section 2-09.3(1) for CDF	**Cuthbertson/Watt**
7	**Shotcrete Spec for Soil Nail Walls** Discussion to identify issues to be addressed.	**Cuthbertson/All**
8	**Pending Action Items**	**Cuthbertson/Radom**
a	**Standard Soil Nail Anchorage Detail Revisions Regarding Washers** Nobody remembers what the issue was. Jim will go back through old minutes and try to resurrect this item. This is deferred until a later meeting.	**ADSC**

b	**Force Account Obstruction Removal rates and cost/time** This is something the team will work on this winter and will have a proposal this spring.	**ADSC/Radom**
c	**Concrete Filled Steel Tube (CFST) / Casing Installation Pressure Data** This is deferred until a later meeting.	**Rasband**
d	**ADSC/WSDOT Joint Training – Spring 2022** We will evaluate this later in the year before we decide to have or not have. This is TBD.	**Group**
e	**Shotcrete Spec for Soil Nail Walls (NEW ITEM)** Started at this meeting.	**Group**
f	**CDF and Lean Conc. Req. for Soldier Pile Walls (NEW ITEM)** Started at this meeting.	**Group**
g	**Submittal requirements for non-bridge shafts: Signs, signals, luminaires, noise walls, and… (NEW ITEM)** Not started yet. This is deferred until a later meeting.	**Cuthbertson/McCutchan**

2. Approval of Minutes

Jim asked for edits to the meeting minutes from the previous meeting. Hearing no comments, Jim stated he will finalize and post them to the web site. https://partners.wsdot-sites.com/agc/

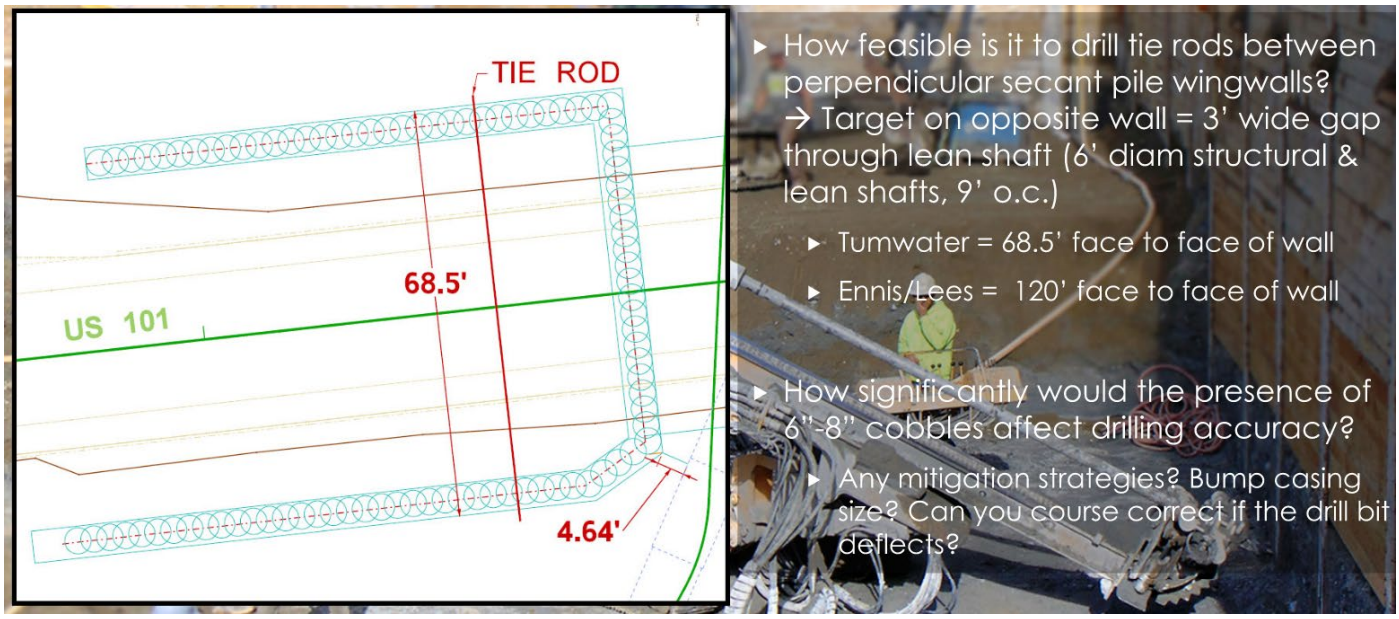
3. Project Review - US 101 Ennis, Lees, & Tumwater

The project is located on SR-101 near Port Angeles and was reviewed at the February 2021 meeting. The team has incorporated some of the feedback from that meeting and further design developments have led the team to have new constructability concerns. The team has the following questions:

1. Tie rod feasibility vs. PGAs
2. Oscillating vs. auger method & proximity to existing structures
3. Drilling through CL. 3000+ concrete shafts
4. Revisiting drill rig support on slopes & strategies for pouring shafts above grade

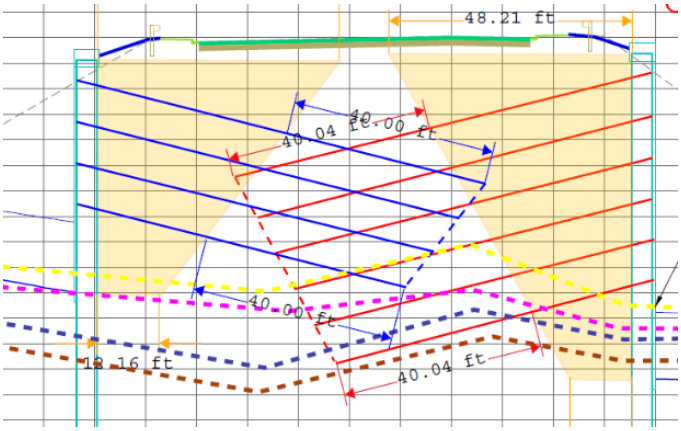
Topic 1 Tie rod feasibility vs. PGAs

The team has revised the wall alignments. The latest concept has the walls tucked tighter to the roadway shoulder and they are considering using tie rods between the walls. The walls are tall enough that they can't cantilever and the thought is that typical ground anchors in one wall will conflict with the anchors on the opposite wall. Drilling between the walls and using walers on both walls would eliminate the potential conflict. The figure below shows the concept being discussed.



The distance from face to face is 68.5 ft at Tumwater and 120 ft at Ennis. The top row would be 5 – 8 ft below the grade, and there would be multiple rows vertically. The consensus of the team was that conventional tieback drills would have a very difficult time trying to hit a 3 or 4 ft target (a non-structural shaft) with enough accuracy and elevation control. The casing segment joints and the casing itself would allow too much deflection for the accuracy expectation to be achieved.

There was discussion about doing this like more conventional inclined ground anchors bonded within the soil mass itself but there is a very significant risk of anchor interference and damage. With Tumwater having only 68 ft between walls, there were also concerns about having enough room for both a bond zone and no-load zone. As shown below:



Topic 2 Oscillating vs. auger method & proximity to existing structures

The design team was thinking this would be a metric oscillator job. The ADSC team confirmed that it would most likely be completed that way. The ADSC team also felt having 4 ft clear to the existing culverts would not be an issue.

Topic 3 Drilling through CL. 3000+ concrete shafts

For the secant pile concept, scour is a concern especially for the secant piles that are acting as an abutment parallel to the stream. There are concerns that the non-structural shafts could be prone to scour below the high water elevation. To eliminate that potential, the team is thinking about having the non-structural shafts be more conventional concrete (class 3000) from the toe to above scour elevation (the bottom 15 feet) and then be lean mix to the top of shaft. The team thought it would be better to pour the entire shaft as structural concrete and not try to change materials. Getting the material change to occur at

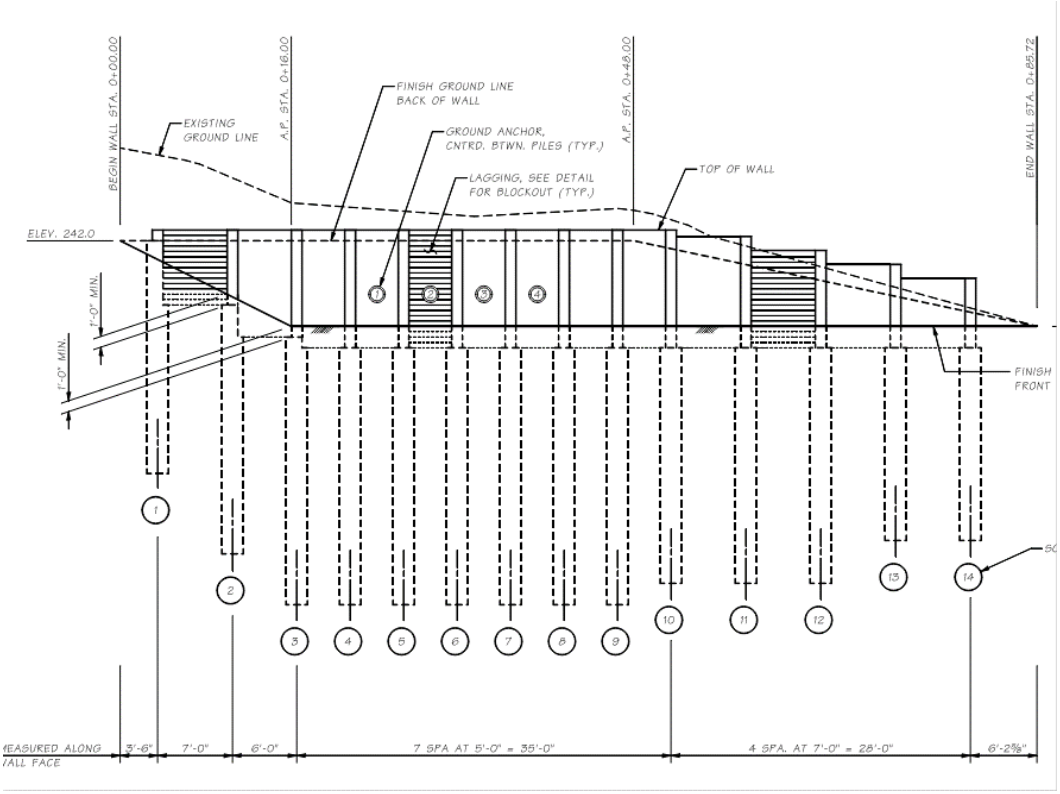
the proper location would be difficult when placing concrete by tremie methods. The structural and lean will have a mixing zone and creating a defined material change is very difficult.

Topic 4 Revisiting drill rig support on slopes & strategies for pouring shafts above grade

Because of the steep slope and the need to support the oscillator attachment the ADSC team confirmed that it would probably be best for the design team to plan on having a working platform constructed rather than trying to support the oscillator on temporary reaction piles driven at the corners of the attachment.

4. Project Review – May Creek

The project is on SR-101 near MP 184.7 about 6 miles south of Forks WA. The project has a soldier pile tieback wall where the anchors will be bonded within clay soils. As part of the construction the contractor will be required to perform long duration creep tests to verify the anchor design. On projects with similar soils, WSDOT and the geotechnical consultants have had issues with the reaction frame moving during the testing, mainly rotational movement. Because of this, the design team plans to install approximately 14 soldier piles and 4 verification anchors. After testing, the anchors will be abandoned and the soldier piles removed so that the soldier piles do not conflict with the permanent wall.

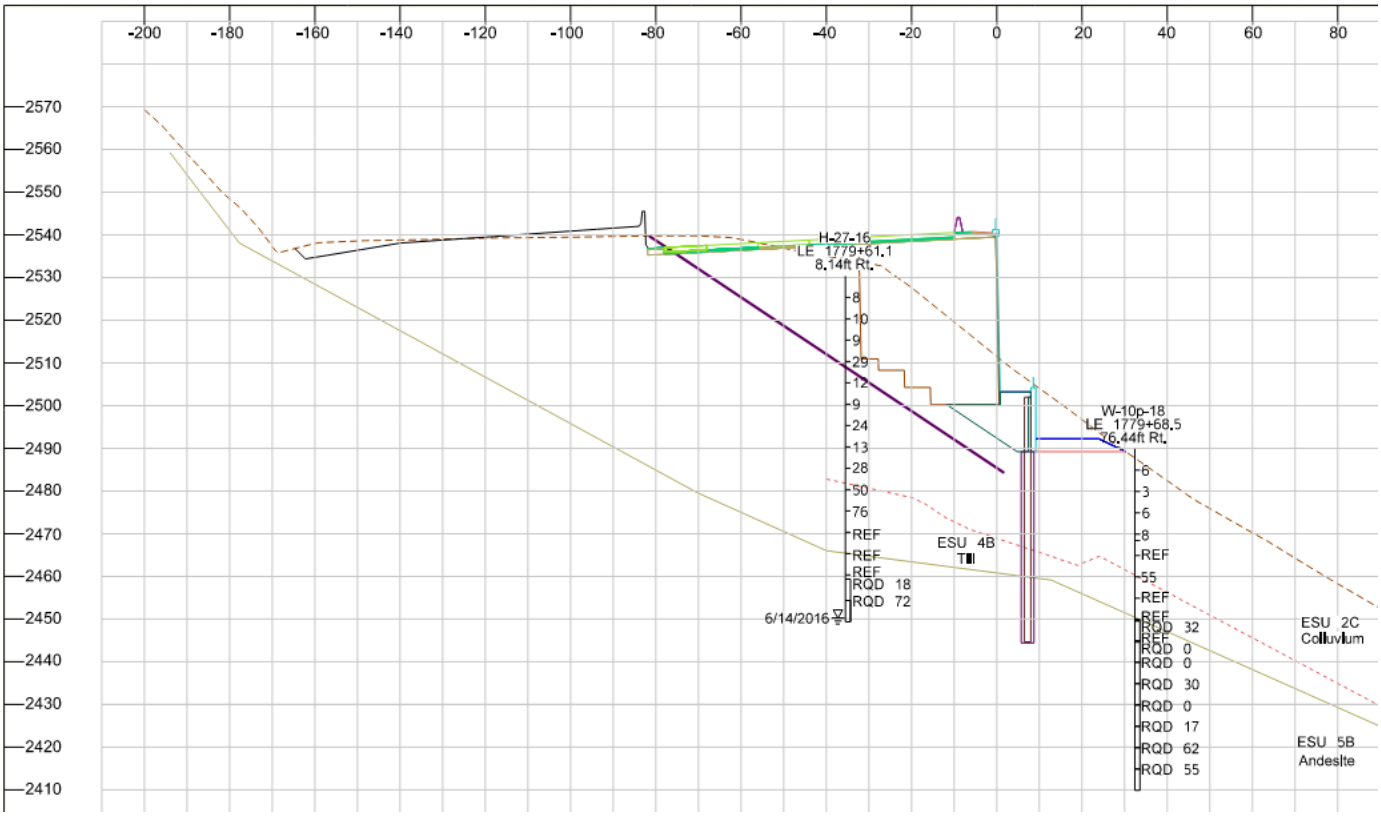


The design team is bringing this to the ADSC team to discuss the feasibility of extracting the soldier piles. The estimated skin friction for the soldier piles is 260 kips.

The initial reaction from the ADSC was to fill the soldier piles with pea-gravel so that the piles could be easily extracted using a vibe hammer. The design team stated that they felt that they needed a CDF or lean concrete backfill to get sufficient reaction and to limit deflection during testing. ADSC asked if there could be monitoring of the reaction frame to separate out reaction frame movement from anchor movement. ADSC also suggested using grade beam blocks that were 10' x 10' x 1.5' thick reinforced concrete. The design team specifically asked what would be the preferred method of extraction: static pulling with a large crane or over-reaming and then pulling. As for static pulling that would take a significant crane and they may not have access for a crane like that. In that case, you would be forced to over-ream and then pull. After all of the discussion, it was concluded that the likelihood of being able to extract the piles was low and that the design team needs to consider a different type of reaction frame.

5. Project Review - I90 Easton Hill to W Easton I/C Phase 3 – Add Lanes/Wildlife Bridges

This project has also been presented to the ADSC team previously. To recap, the project needs to construct very tall walls on a steep slope that is mostly colluvium over steeply dipping bedrock. To improve seismic stability, they plan to construct soldier pile tieback walls at the toe with the soldier piles socketed into the andesite bedrock. The soldier pile holes are expected to be three foot in diameter and piles are spaced at 9 ft center to center. When the shaft excavations encounter the rock it is expected that there will need to be a change in diameter to accommodate the change in tooling. The pile size is a W14x132 or W14x193 and the team wants to know if there will be enough room for placement tolerance and cover requirements if the shaft excavations “neck” down in diameter. Rock strength is variable. It varies between 5,000 psi and 15,000 psi with an overall average close to 10,000 psi.



Station 23+25 Wall 2

Malcolm thought this was doable. They would use a 36-inch or 1 m casing seated to top of rock and then go inside that with a 30-inch rock socket. The stated pile size is near 21-inches diagonal, so you have roughly 4+ inches of cover.

6. CDF and Lean Conc. Requirements for Soldier Pile walls

For soldier pile walls, the backfill for the soldier piles is required to be controlled density fill (CDF), if the shafts are dry, or pumpable lean concrete if the shafts are wet, Standard Specifications 6-16.3(5). Item 3 in that section states that the lean mix is to have a minimum compressive strength of 100 psi. It also states that the lean mix will conform with the acceptance requirements of 2-09.3(1) for CDF. Section 2-09.3(1) states that the maximum 28 day strength for CDF (and therefore inferred for lean mix) is 300 psi. So, the lean mix needs to be between 100 and 300 psi and also be flowable with an approximate slump of 3 to 10 inches. Getting a pumpable lean mix that consistently falls between 100 and 300 psi is a challenge for many contractors. Contractors typically pick mixes that break higher than 300 psi in part to ensure that they have a good mix, but also because more cement or fly ash content is necessary in order to get the pumpable characteristics required. The ADSC understands why WSDOT would want to have a cap on the strength when CDF is being used as a utility trench backfill or as a filler that must be excavated by another

contractor at a later date. However, in the case of soldier piles the contractor doing the soldier pile work is most often the same contractor who will be chipping and removing the lean mix to install lagging. The ADSC is recommending that WSDOT remove the 300 psi cap when the lean mix is being used for soldier piles. Doug Watt suggests that we change 6.16.3(5) item 3 to state "*Pumpable lean concrete shall be a Contractor designed mix providing a minimum 28-day compressive strength of 100 psi and no maximum 28-day compressive strength. Acceptance of pumpable lean concrete will conform to the acceptance requirements specified in Section 2-09.3(1) for CDF.*"

During the discussion, it was pointed out that there are lean concrete specifications in Division 6. Jim Cuthbertson asked if we were referencing Division 2 when we should be referencing Division 6. Jim will gather more information and make a proposal for the next meeting.

7. Shotcrete Spec for Soil Nail Walls

One of the contractor members indicated that the issue with shotcrete had to do with temporary facing being constructed for a soil nail wall on a job being administered by a local agency. The local agency wanted the contractor to provide their expansion joint details and curing details as those are elements required by Standard Specification section 6-18 Shotcrete Facing and shown in the plans in the case of joints. The contractor indicated that those were not required as the shotcrete was temporary, and the wall actually receives a CIP facia which is the structural facing. The local agency stated that the Standard Specifications made no allowances for temporary shotcrete and did not distinguish between temporary or permanent. Jim Cuthbertson and Scott Sargent will look into creating a GSP for the temporary facing. Currently there are no GSPs specific for temporary applications.

8. Pending Action Items

d ADSC/WSDOT Joint Training – Spring 2022

Jim Cuthbertson stated that with the current surge in COVID he doubted the Agency would be willing to participate or host an in-person event; likely the Agency would require a virtual event. The ADSC really prefers an in-person meeting. It was agreed that we would evaluate the situation at the Feb 4th meeting and decide if we would host in-person or cancel.

e Shotcrete Spec for Soil Nail Walls (NEW ITEM)

Action item for next meeting; see above.

f CDF and Lean Conc. Req. for Soldier Pile Walls (NEW ITEM)

Action item for next meeting; see above.

9. Next Meeting(s)

Confirmed dates 2/4, 3/18. Tentative dates 4/29, 6/10