ADSC/WSDOT Joint Meeting

February 25th, 2016, 8:30 A.M. - 11:30 A.M.
Fife Project Engineering Office
6610 16th St. E., Suite A
Fife, WA 98424

Meeting Minutes

Attended	Member	Company	Phone	E-mail
	Allen, Tony	WSDOT	360-709-5450	allent@wsdot.wa.gov
X	Armour, Tom	DBM	253-838-1402	tom.armour@dbmccontractors.com
X	Bauer, Mike	WSDOT	360-705-7190	bauerm@wsdot.wa.gov
X	Bill Bennig	Kiewit IWC	253-255-2376	bill.binnig@kiewit.com
X	Carnevale, Robert	Kulchin Foundation	425-358-0950	bob@kulchin.com
	Cuthbertson, Jim	WSDOT	360-709-5452	cuthbej@wsdot.wa.gov
X	Deffenbacher, Jon	WSDOT	253-589-6100	deffenj@wsdot.wa.gov
	DiFabio, Vinnie	PACO	206-762-3550	vdifabio@pacoequip.com
X	Dinneen, Molly	DeWitt	360-576-8755	molly@dewittconst.com
	Ellis, Susan	FHWA	360-753-9412	Susan.Ellis@dot.gov
X	Foster, Marco	WSDOT	360-705-7824	fosterm@wsdot.wa.gov
X	Frye, Mark	WSDOT	360-709-5469	fryem@wsdot.wa.gov
X	Gaines, Mark[1]	WSDOT	360-705-7827	gainesm@wsdot.wa.gov
	Groneck, Paul	DBM	206-730-4578	Paulg@dbmcm.com
	Hagy, Mike	PACO	805-746-6965	Mike@PacoEquip.com
X	Kvinsland, John	Malcolm	253-395-3300	jkvinsland@malcolmdrilling.com
X	Johnson, Darrel	PACO	206-786-7584	djohnson@pacoequip.com
	Khaleghi, Bijan	WSDOT	360-705-7181	khalegb@wsdot.wa.gov
	Lehman, Debbie	FHWA	360-753-9482	Debbie.Lehman@dot.gov
	McCutchan, Tait	Malcolm	253-395-3300	tmccutchan@malcolmdrilling.com
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X	Mizumori, Anthony	WSDOT	360-705-7228	mizumoa@wsdot.wa.gov
	Morin, Dave	DMI	206-793-4470	dave@dmidrilling.com
	Olney, Chuck	Rainier Steel	206-949-7092	paul@rainiersteel.com
X	Owen, Geoff	Kiewit	360-690-6548	Geoff.owen@kiewit.com
X	Parmantier, Dominic[1]	CJA	206-575-8248	dparmantier@condon-johnson.com
	Radom, Greg	DBM	206-730-1317	Gregr@dbmcm.com
	Rasband, Lance	Malcolm	253-395-3300	lancerasband@malcolmdrilling.com
	Sexton, Jim	DBM	253-838-1402	jims@dbmcm.com
	Simmons, Greg	Kiewit	253-943-4000	GregSimmons@kiewit.com
X	Starcevich, John	Malcolm	253-395-3300	jstarcevich@malcolmdrilling.com
X	Topham, Dale	Snohomish Co	425-388-6668	dale.topham@snoco.org
X	Tuttle, John	Sinclair	661-212-1223	jtuttle@sinclairwp.com

1 Team co-chair

Guests

Attendee	Company	Phone	E-mail
Russ Blount	Fife	253-922-2489	rblount@cityoffife.org
Ken Gill	Fife	253-922-9315	kgill@cityoffife.org
Ken Horton	PCL	425-394-4232	khorton@pcl.com
Jim Guarre	Berger ABAM	206-431-2324	jim.guarre@abam.com
Stuart Bennion	Berger ABAM	206-431-2396	stuart.bennion@abam.com
Doug Watt	CJA	425-988-2150	dwatt@condon-johnson.com

1. Welcome/Review of Agenda

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Action Items: No action needed.

2. Review December 17th meeting minutes

Mike Bauer provided comment/correction – no additional comments were received.

Action Items: Mark to incorporate corrections and posted the minutes to the web.

3. Constructability Review – Fife 54th. Ave Grade Separation

Stuart Bennion from Berger ABAM provided an overview of the project along with briefly summarizing the geotechnical conditions.

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It was commented that the shaft cap could also be used as a guide wall to drill the secant wall. The guide wall is used as a template to insure good alignment of the shafts and to insure the secant wall is water tight. There was a strong recommendation that a combination shaft cap/guide wall be considered as this may be a good opportunity to save money and eliminate some throw away work.

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Action Items: Mark will keep this topic on the agenda and update members on discussions with the AGC.

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Mark shared recent progress with regards towards developing a specification for permanent shotcrete fascia. WSDOT is currently using permanent shotcrete on the AWV North Access contract and it appears to be working well.

Mark asked team members if the use of shotcrete as a permanent wall feature more of a Drilling Contractor issue or a Prime Contractor issue. The team members commented it can be either (- sometimes the Prime and sometimes the Drilling subcontractors).

Action Items: Mark will keep on the agenda and update the team as we obtain more information.

h) Update on drilled shaft testing

Mark provided a brief update on a recent conference call between WSDOT Bridge, Fabrication and Geotech to discuss the responsibility of shaft testing. Currently WSDOT fabrication does the CSL testing and WSDOT Geotech analyzes the data.

WAQTC was also discussed. The attempt with WAQTC is that testing requirements be standardized so that all testing is done the same regardless of who the owner is (State, City, County, Sound Transit, etc.) Once WAQTC is implemented, WSDOT anticipates more QA responsibility will be shifted to the Contractors and owners will assume more of a quality verification role.

Mark believes that we will be shifting CSL the testing requirements to the Contractors in the future. A specification would be developed to describe guidance/expectations for the testing. The prime contractors stated they already do this for DB projects and it works well. It places the Contractor in more control of the project schedule as they do not need to wait for the owner to evaluate the shaft. Oregon is already doing this. It was generally recognized that having a licensed engineer review the data and stamp the acceptance report would work. Dale Topham from Snohomish County (representing local agencies) also felt this would be acceptable.

Thermal Integrity Profiling (TIP) was also discussed with at the conference call. There was no consensus at the conclusion of the meeting, however Mark felt both methods will remain as tools for evaluating drilled shaft competency. Most likely – CSL will remain our primary method for evaluating drilled shafts. The benefits of TIP are in evaluating the adequacy of cover on the outside of the cage. However, the data we have collected to date has been inconclusive and our confidence in the thermal results is in question. If WSDOT continues to move forward with TIP it will most likely be a WSDOT responsibility.

Team members did not have a strong opinion with regards to TIP, but John K. did state he appreciated being able to view the pour in real time.

Mark F. felt there is still value in conducting both TIP and CSL to give a more complete picture of an anomaly as TIP alone is a bit inconclusive.

Action Items: Mark will continue to keep this item on the agenda.

5. Discuss and Review BDM Shaft Section

Mark briefly reviewed and discussed the section of the BDM that identify shaft diameters and available oscillator casing diameters. He requested the team revisit the information in the BDM to insure it is still accurate and applicable to current industry practice.

Action Items: Team members to review the information in the BDM for discussion at our next meeting.

6. ADSC/WSDOT Joint Annual Training

The annual joint training is scheduled for March 31. The ADSC has developed an agenda and Dominic will send the agenda out to the team later today. A brief review of the agenda was done with the team.

Action Items: No further action required.

7. Update on Personnel Changes at HQ Construction

Mark provided an update on recent changes in roles and responsibilities in the Construction office. With the recent departure of several ASCE's and the addition of a new funding package (and more work) – availability of ACSE support has been stretched thin.

Action Items: No further action required.

8. Additional Items

Tom announced that a local Geotech group will be hosting a seminar on Saturday, April 2nd for those that are interested.

Action Items: No further action required.

9. Discuss potential agenda items for future meetings

Anthony requested the team have further discussion with regards to the compressive strength of drilled shaft concrete. We consistently see higher compressive strength in shaft concrete so there may be opportunity reduce shaft sizes based on these higher compressive strengths.

Action Items: Mark will be add this item to the agenda for the next meeting.

Future meeting date: April 28th

ADSC/WSDOT Joint Meeting

June 16th, 2016, 8:30 A.M. - 11:30 A.M.
Conference call and Lync meeting

Meeting Minutes

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WAQTC was also discussed. The attempt with WAQTC is that testing requirements be standardized so that all testing is done the same regardless of who the owner is (State, City, County, Sound Transit, etc.) Once WAQTC is implemented, WSDOT anticipates more QA responsibility will be shifted to the Contractors and owners will assume more of a quality verification role.

Mark believes that we will be shifting CSL the testing requirements to the Contractors in the future. A specification would be developed to describe guidance/expectations for the testing. The prime contractors stated they already do this for DB projects and it works well. It places the Contractor in more control of the project schedule as they do not need to wait for the owner to evaluate the shaft. Oregon is already doing this. It was generally recognized that having a licensed engineer review the data and stamp the acceptance report would work. Dale Topham from Snohomish County (representing local agencies) also felt this would be acceptable.

Thermal Integrity Profiling (TIP) was also discussed with at the conference call. There was no consensus at the conclusion of the meeting, however Mark felt both methods will remain as tools for evaluating drilled shaft competency. Most likely – CSL will remain our primary method for evaluating drilled shafts. The benefits of TIP are in evaluating the adequacy of cover on the outside of the cage. However, the data we have collected to date has been inconclusive and our confidence in the thermal results is in question. If WSDOT continues to move forward with TIP it will most likely be a WSDOT responsibility.

Team members did not have a strong opinion with regards to TIP, but John K. did state he appreciated being able to view the pour in real time.

Mark F. felt there is still value in conducting both TIP and CSL to give a more complete picture of an anomaly as TIP alone is a bit inconclusive.

Action Items: Mark will continue to keep this item on the agenda.

5. Discuss and Review BDM Shaft Section

Mark briefly reviewed and discussed the section of the BDM that identify shaft diameters and available oscillator casing diameters. He requested the team revisit the information in the BDM to insure it is still accurate and applicable to current industry practice.

Action Items: Team members to review the information in the BDM for discussion at our next meeting.

6. ADSC/WSDOT Joint Annual Training

The annual joint training is scheduled for March 31. The ADSC has developed an agenda and Dominic will send the agenda out to the team later today. A brief review of the agenda was done with the team.

Action Items: No further action required.

7. Update on Personnel Changes at HQ Construction

Mark provided an update on recent changes in roles and responsibilities in the Construction office. With the recent departure of several ASCE's and the addition of a new funding package (and more work) – availability of ACSE support has been stretched thin.

Action Items: No further action required.

8. Additional Items

Tom announced that a local Geotech group will be hosting a seminar on Saturday, April 2nd for those that are interested.

Action Items: No further action required.

9. Discuss potential agenda items for future meetings

Anthony requested the team have further discussion with regards to the compressive strength of drilled shaft concrete. We consistently see higher compressive strength in shaft concrete so there may be opportunity reduce shaft sizes based on these higher compressive strengths.

Action Items: Mark will add this item to the agenda for the next meeting.

Future meeting date: April 28th

ADSC/WSDOT Joint Meeting

September 22, 2016, 8:30 A.M. - 11:30 A.M.
WSDOT Lakewood Maintenance Facility

Meeting Minutes

Attended	Member	Company	Phone	E-mail
X	Allen, Tony	WSDOT	360-709-5450	allent@wsdot.wa.gov
X	Armour, Tom[1]	DBM	253-838-1402	tom.armour@dbmccontractors.com
X	Bauer, Mike	WSDOT	360-705-7190	bauerm@wsdot.wa.gov
X	Bill Bennig	Kiewit IWC	253-255-2376	bill.binnig@kiewit.com
	Carnevale, Robert	Kulchin Foundation	425-358-0950	bob@kulchin.com
	Cuthbertson, Jim	WSDOT	360-709-5452	cuthbej@wsdot.wa.gov
X	Deffenbacher, Jon	WSDOT	253-589-6100	deffenj@wsdot.wa.gov
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	Owen, Geoff	Kiewit	360-690-6548	Geoff.owen@kiewit.com
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	Radom, Greg	DBM	206-730-1317	Gregr@dbmcm.com
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1 Team co-chair

Guests

X	Todd Mooney	WSDOT Geotech	360-709-5463	mooneyt@wsdot.wa.gov
X	Cesar Mayor	WSF	206-515-3732	mayorc@wsdot.wa.gov
X	Lei Lu	WSF	206-515-3848	lulei@wsdot.wa.gov
X	Eric Robinson	WSF	206-515-3897	robinse@wsdot.wa.gov

1. Welcome/Review of Agenda

Mark Gaines opened the meeting and provided a quick review of the agenda. Tom Armour will be assuming the role of co-chair of the team. Mark thanked Dominic for his hard work and dedication as co-chair for the past 3 years. No additional topics were added to today's meeting

2. Review and Approval of the June 2016 meeting Minutes

Mark asked the team if anyone had comments or corrections to the June 2016 minute. No comments or correction were provided.

Action Items: Mark will post the minutes to the web.

3. Constructability review – WSF Bainbridge Overhead Loading

WSF team (Lei Lu, Eric Robertson and Cesar Mayor) presented a project that will replace the obsolete overhead loading (OHL) walkway at the Bainbridge Ferry terminal. The project is budgeted for approximately $12M and is at approximately the 30% design level. Lei provided some aerial photos of the current condition. The existing structure was built out of timber and is seismically deficient. Some of the project constraints are;

- sailings depart every 50 or 60 minutes between 4:30am and 1:00 am (nearly 24hr/day operation).
- Contractors will most likely need to use slurry
- Condominiums/residents are nearby to the south (night time noise restrictions)
- There is minimal laydown area upland

Cezar provided an overview of the project goals – the primary goal is to complete the project while maintaining operations. Other Project goals include;

- Maintain use of the OHL during construction
- No delay to sailing schedule
- Complete project in a single fish window (7/16 thru 2/15)
- Deliver under budget

The team then provided further detail on the proposed staging and constraints of the project via a power point presentation. Constructability questions poised to the Team were;

- What would be the Contractors preferred work access?
- Would the Prefabricated OHL be barged or trucked
- How would drilled shaft spoils be disposed of
- How would process water be dealt with
- How much night work would be needed?

The ADSC team offered up the following comments.

Load capacity of the existing trestle is limited. WSF asked the team what the weight is on some of the typical drill rigs. It was noted that the prime contractor will probably need a larger crane for setting prefabricated spans. The ADSC noted typical requirements are a 150-ton crane for conventional drill equipment and a 230-ton crane for the oscillator. Due to weight limit restrictions it may be prudent to require conventional drilling.

Marco asked for clarification on the scope of work that needs to be accomplished within the weekend closure. It is simply the connection from the temporary walkway to the existing OHL walkway.

Mark G asked some clarifying questions with regards to access for pile driving for temporary walkway. Trees will need to be trimmed and it is a very steep hill side. There was some open discussion on where cranes could be staged to drive temporary piling.

It appears that water access for equipment and materials is not feasible due to shallow water. Spoils would most likely be trucked and baker tanks would be stored upland. There would be a lot of benefit for shifting lanes for the 3 to 4 weeks needed to construct the shafts. The additional room is needed for baker tanks and spoils removal. The current plan of providing 25’ of staging area should be increased to 35’.

Mark G suggested the team may want to consider precast column caps to accelerate the project schedule.

The two end piles should be considered as drilled shafts since drilling equipment will already be there. It was recommended by ADSC that the shafts be a minimum 3’ diameter. Lei asked some clarifying questions for handling the truss spans.

There was more discussion on how the new OHL spans could be transported and placed due to weight restrictions on the existing trestle. It was suggested that WSF consider presenting the project to the AGC. Since this project is still early in development, getting more feedback on constructability should not be a problem.

Action Items: No action needed.

4. Preliminary WSU research results on Shotcrete

Mark provided a PowerPoint presentation developed by Professor Pizhong Qiao from Washington State University on the Best Practices for using shotcrete for permanent applications. The new specification is being developed for construction of permanent shotcrete fascia and retaining walls in lieu of CIP. The benefits of using shotcrete are recognized in cost saving and time during construction. The main structural concern with using shotcrete is with regards to long term durability (freeze/thaw durability and shrinkage cracking).

Mark went thru the presentation to highlight some of the preliminary findings of the study. The preliminary result shows that shotcrete properties are comparable or slightly better than conventional Class 4000 concrete when comparing the lab results. The testing was done strictly to evaluate typical mix designs for shotcrete and Cl 4000. Recognizing that the placement of shotcrete will influence the properties of the hardened shotcrete - the second phase of the research will focus more on the in place shotcrete properties.

Marco requested the ADSC let us know if they are performing any shotcrete in the future so that WSDOT have the opportunity to collect more data to compare wet shotcrete properties to hardened shotcrete properties. Tom will email Marco/Mark of any upcoming shotcrete work.

Action Items: Mark will update the Team with any new developments.

5. Action Items;

a) OSU study of high-strength bar as shaft reinforcing

As discussed at previous meetings, this project focuses on performance of shafts with high-strength steel reinforcing and permanent casing considered as providing structural capacity. This project is being handled as a collaborative project with contributions from the drilled shaft contracting industry. John S. provided an update stating that the lateral testing has been completed and we are waiting on results. Preliminary results look favorable. The completed study will be published soon.

Mark discussed the option of putting alternate designs for 80ksi steel for drilled shafts to determine if the economy is there. Tom A. acknowledged that 80ksi steel is being used on some projects. Bill noted that couplers currently fail to meet the 125% requirement for 80ksi bars. Anthony will discuss in the Bridge office and we will keep this topic on the agenda or the next meeting. If we have future projects that would not require coupled cages, we could possibly detail both 60ksi and 80ksi shafts and allow the market to dictate which option is most economical.

Action Items: Mark will keep this topic on the agenda for an update at a future meeting. Anthony to discuss further within the bridge office.

b) FHWA/Texas A&M base grouting

No new updates. Tom said the field work is done and the report is being completed. Tom will update at the next meeting.

Action Items: Mark will keep on the agenda for the next meeting.

c) F.A. Obstruction removal rates and contract time

Mark asked the team if they are still having challenges when it comes to FA rates. Lance confirmed there are still challenges with some of the equipment rates. Lance suggested it would be helpful if we could develop an agreed upon equipment list with rates. Reaching agreement and disclosure of equipment rates amongst the team has been a sensitive issue in the past. ADSC will discuss as a group and come back to the team for further discussion.

Mark reminded the team of a proposed spec changes to address critical path impacts for obstruction removal. The proposed change would allow our Project Engineers to grant unworkable days if FA obstruction removal impacts the critical path of the project. WSDOT still needs to further discuss this with the AGC.

Action Items: Mark will bring these proposed changes to the AGC team this fall and then follow up with ADSC at our next meeting. ADSC to review and evaluate if any additional effort on standardized FA rates is needed.

d) Continuous Flight Auger cast piling

Anthony reviewed the DFI spec provided by Dominic. Anthony has taken the spec and provided comments and he would like to further vet thru WSDOT before bringing it back to the ADSC team.

Action Items: Mark will keep on the agenda for the next meeting.

e) Strength of Shaft Concrete

It has been generally recognized that we consistently obtain higher compressive strength in our shaft concrete than what is required (4000 psi). Going to a 5000P mix was supported by WACA and the concrete suppliers take no exception to WSDOT requiring 5000 psi minimum compressive strength. The suppliers would not make any revisions to their current mix designs as they currently and consistently attain 7500 psi with the current mix designs. Anthony suggested making this revision will most likely result in reduced reinforcing steel in our drilled shafts.

The 15% reduction factor for concrete strength was also discussed. The reduction factor was developed a long time ago and it is now being removed due to advancements in drilled shaft construction quality and the fact we are not seeing many anomalies.

Anthony said the bridge office is considering some design changes to consider eccentricity of the cages within the shaft which may negate some of the gains but those proposed revisions would not be that significant.

Action Items: No further action required

6. Discuss and Review BDM Shaft Section

Mark asked the team to please let us know if there is anything that is currently included in the BDM which may not be applicable or needs changing.

For example – the deep water shaft detail – is anyone using this? Lance stated that Malcolm did recently use this detail on a project. Anthony also suggested you may still may need to use this detail for various structural reasons. There was also discussion about including the more common deep-water detail where the drilled shaft extends above the water line.

Action Items: Anthony will review if additional details should be included in the BDM. Mark to keep on the agenda for the next meeting.

7. PDI SQUID shaft inspection devise

Mark provided literature about new equipment that measures the capacity of the soils at the bottom of the shaft. Lance stated there is other equipment out there to accomplish the same thing. This topic didn't generate much interest amongst the team.

Action Items: No further action required

8. Update to specification Section 8-01 regarding slurry disposal

Mark shared with the Team revisions to Section 8-01 regarding upland infiltration of water slurries. The Construction Stormwater General Permit (CSWGP) was recently updated and it now allows the upland infiltration. As a result of this change, WSDOT is able to relax some of the infiltration requirements. One item the CSWGP didn't address is how flocculants in a water slurry are handled. Based on WSDOT's discussions with the Department of Ecology, our Specifications continue to allow infiltration when flocculants have been used. Future revisions to the CSWGP will address flocculant additives to water slurries. The Team had no comments.

Action Items: No further action required

9. Changes to Construction Office staff

Mark mentioned that the Construction Office is currently looking to fill two vacant ASCE positions. The need for additional staff is driven by increasing workload associated with the Connecting Washington funding package and the likelihood of more project delivery using design-build. The design-build group in the Construction office anticipates increasing to a staff of four employees.

There is also support to add a Bridge Engineer in a rotational position to help with Bridge Construction issues. Once this position is filled, it is anticipated the new position would eventually chair the ADSC and AGC structure teams. Mark would continue to participate as time allowed.

Action Items: No further action required

Future meeting date: November 17th, January 19th.

ADSC/WSDOT Joint Meeting

November 17th, 2016, 8:30 A.M. - 11:30 A.M.
WSDOT Lakewood Maintenance Facility

Meeting Minutes

Attended	Member	Company	Phone	E-mail
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	Bauer, Mike	WSDOT	360-705-7190	bauerm@wsdot.wa.gov
X	Bill Bennig	Kiewit IWC	253-255-2376	bill.binnig@kiewit.com
	Carnevale, Robert	Kulchin Foundation	425-358-0950	bob@kulchin.com
	Cuthbertson, Jim	WSDOT	360-709-5452	cuthbej@wsdot.wa.gov
	Deffenbacher, Jon	WSDOT	253-589-6100	deffenj@wsdot.wa.gov
	DiFabio, Vinnie	PACO	206-762-3550	vdifabio@pacoequip.com
X	Dinneen, Molly	DeWitt	360-576-8755	molly@dewittconst.com
	Ellis, Susan	FHWA	360-753-9412	Susan.Ellis@dot.gov
X	Foster, Marco	WSDOT	360-705-7824	fosterm@wsdot.wa.gov
X	Frye, Mark	WSDOT	360-709-5469	fryem@wsdot.wa.gov
X	Gaines, Mark[1]	WSDOT	360-705-7827	gainesm@wsdot.wa.gov
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1 Team co-chair

Guests

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1. Welcome/Review of Agenda

Mark Gaines opened the meeting and provided a quick review of the agenda. There were several guest in attendance so introductions were quickly made. Mark requested the team please review the sign in sheet closely as he is attempting to update and make sure all the information is current.

2. Review and Approval of the June 2016 meeting Minutes

Mark asked the team if anyone had comments or corrections to the September 2016 minute. No comments or correction were provided.

Action Items: Mark will post the minutes to the web.

3. Constructability review – S. Lander Street

The project team provided a brief update on the scope of the S. Lander Street grade separation project. The purpose of the project is to provide a grade separation of S Lander St over five BNSF tracks. S Lander St will be closed during construction; however, local access to businesses within the work zone will be necessary. Although there are significant utilities within the S Lander St corridor, the new structure will minimize impacts to the greatest extent possible. A major goal of the project is that pedestrian access be maintained. This is a very high priority project for the City of Seattle. The project is at approximately 60% design level. Expected start of construction is early 2018.

Shaft proximity to large sewer and storm mains (96” and 90” diameter utilities -the 90” storm line is very old) presents both construction and operational concerns for the large sewer and storm pipes. Relocation of these utilities was determined to be more costly than the cost of protecting them during construction. Additionally, relocations would be time consuming and would probably have a major impact on project schedule. Consequently, design of the bridge structure assumes that both large utilities will be protected in-place, although adjustment or relocation of associated services, laterals, access points, appurtenances, and the like are probable. The 10 foot-diameter drilled shaft may be within one foot of both the sewer and storm pipes. To minimize the risk to the existing utilities, the 10-foot-diameter casings will be installed with drilling methods that minimize vibration (oscillator or rotator). Additionally, the smaller-diameter structural column that extends above grade will begin at

the invert elevation of these pipes. The drilled shaft casing will be left in-place, providing an annular (isolation) space inside the casing that will prevent transfer of load from column vibration or movement due to earthquake loads to the sewer or storm pipes. The design team is assuming that temporary construction platforms will need to be installed in order to prevent damage to the underground utilities during shaft construction. The design team is also assuming that several of the utilities will be monitored for vibrations and movement during the construction of the shafts. The Bridge approaches will be geofoam.

The team discussed the geotechnical conditions and proposed drilled shaft locations. Questions asked of the team;

What are the construction concerns/risks for the proposed shafts at this project site?
It was commented by the team that there would be a lot of room needed for staging of all the casing and cages. Maintaining business access and pedestrian access will be challenging. The clean gravels at the bottom of the holes did not pose a concern.

Is it more cost effective to construct:

- ***A heavily reinforced shaft with a relatively thin permanent casing?***
- ***A lighter reinforced shaft with a relatively thick permanent casing?***

The ADSC commented that it would be nice if steel thickness could be reduced where possible. Contractors seemed to prefer heavier permanent casing vs. heavier bundled cages. Concern was raised that the length of permanent casing may make it very difficult to extract oscillator casing. Possible consideration – permanent casing could be used as temporary casing and simply extracted to the elevation that permanent casing is to be left.

We are considering using 80 ksi reinforcing bars in the drilled shafts. Are there cost and availability concerns?
The team liked 80 ksi concept to reduce weight on these very large shafts. There is no concern acquiring the 80 ksi bars, just need to insure there is adequate time to order 80ksi bars. Due to the length of the bars there will be a need to use mechanical couplers to splice the bars. Getting couplers to pass the testing requirements has been a challenge in the past.

Can either Cross-hole Sonic Log (CSL) or Thermal Integrity Profiling (TIP) be used for nondestructive testing for this project shaft size (3-meter diameter x 200-ft Long)? Is one method preferred over the other? If so, why?
The team did not have a lot of experience with doing TIP at this depth. It was mentioned that the Tacoma project had 180' deep shafts and using TIP worked. Mark G. mentioned to the Lander Team that our specification was revised in August to allow the Contractor to use their preference/option on the testing. There was some open discussion on the pros and cons of the 2 types of testing and some best practices. It was asked if specifications should require prior experience with TIP prior to using. Mark suggested that he did not think this was necessary as Contractors are required to check the integrity of the wires prior to lowering the cage and

after the cage was set but prior to testing. Also more durable wire is being manufactured and industry is gaining more experience with how to tie the wire onto the cage.

Assuming the site conditions allow for increasing the number of shafts at each pier:

- ***Is it more cost effective to construct four smaller diameter shafts with little permanent casing?***
  Team commented that less shafts are better unless the diameter is dramatically smaller.

- ***Construct two larger shafts with permanent casing as shown in the attached details?***
  Yes – larger shafts with permanent casing preferred.

- ***Is there a construction/risk preference for constructing:***
  i. Two large diameter, heavily reinforced drilled shafts at each bent
  ii. Three large diameter drilled shafts at each bent with lighter reinforcement
  iii. Four medium diameter drilled shaft at each bent with lighter reinforcement.
  Less shafts will reduce risk.

There was follow-up discussion with regards to protection of the utilities. It will be left up to the Contractor to design the drill platform to not damage the utility. Most likely micro-piles will be needed to support the drill platform. Restrictions to train traffic was also discussed – it needs to be clear if/what restrictions get imposed by the RR as this could have a significant impact on the cost/time to construct the drilled shafts.

Action Items: No action needed.

4. Phase 2 Shotcrete Research Proposal

Mark provided an overview of the proposed Phase 2 research project in support of shotcrete. Specifically – Phase 2 will focus on:

- Cracking in shotcrete (causes and mitigating strategies, including curing practices and mixture designs with shrinkage reducing admixture, silica fume, fibers, etc.)
- Best curing practices (wet curing, curing compounds, lab vs. field comparisons, etc.)
- Short and long term performance (field test methods, effect of air contents of different construction stages)
- Schedule and cost benefits of shotcrete (vs. CIP concrete)
- Potential for other applications such as fish passage work

Both laboratory and field tests will be performed, and it includes characterization and comparisons of field-placed shotcrete and shotcrete at different stages of construction (out of truck, at nozzle, hardened concrete).

Mark mentioned that the Bridge Office is considering the use of shotcrete for wing walls on upcoming fish passage projects. Using shotcrete in locations with very limited work windows is a good application due to the inherent time saving associated with this type of construction.

Action Items: Mark will update the Team with any new developments.

5. Action Items;

a) OSU study of high-strength bar as shaft reinforcing

As discussed at previous meetings, this project focuses on performance of shafts with high-strength steel reinforcing and permanent casing considered as providing structural capacity. This project is being handled as a collaborative project with contributions from the drilled shaft contracting industry.

Action Items: Mark will keep this topic on the agenda for an update at a future meeting.

b) Providing Grade 80 rebar as an alternative

Anthony provided an update on providing separate details for using standard 60ksi bars or high strength 80 ksi bars for shaft reinforcing cages. By providing both details on several projects we can determine which option is most economical and is preferred by industry.

Action Items: Mark will keep this topic on the agenda for an update at a future meeting.

c) FHWA/Texas A&M base grouting

No new updates. Tom said the field work is done and the report is being completed. Tom will update at the next meeting. The report is supposed to be done by the end of December.

Action Items: Mark will keep on the agenda for the next meeting.

d) F.A. Obstruction removal rates and contract time

Mark asked the team if they are still having challenges when it comes to FA rates. Lance confirmed there are still challenges with some of the equipment rates. Tom mentioned that the ADSC has not had a chance to discuss internally FA rates for tooling. ADSC will review and bring this back to WSDOT for our next meeting.

Mark reminded the team of a proposed spec changes to address critical path impacts for obstruction removal. The proposed change would allow our Project Engineers to grant unworkable days if FA obstruction removal impacts the critical path of the

project. Mark mentioned that this item will be discussed with the AGC team tomorrow. If supported by AGC (as anticipated), Mark will have further discussion internally within WSDOT and try to include in January update.

Action Items: Mark will bring these proposed changes to the AGC team. ADSC to review and evaluate if any additional effort on standardized FA rates is needed.

e) Drilled shafts const. with Continuous Flight Auger

Anthony has taken the ADSC specification and is still discussing further within the WSDOT Bridge Office. Consideration is being given to a pilot project to try out the proposed specification to see how much comfort there is with an expanded use.

Action Items: Mark will pull this off the agenda until the Bridge office has had a chance to vet further.

f) Discuss and Review BDM Shaft Section

After further consideration on the topic of temporary casing shoring - Anthony stated the detail will remain in the BDM. There are situations when Structural Engineer would require column shaft connections below the water line and then this detail would be needed. Its use in contracts will be done with a special provision on case by case basis. There was also discussion about including the more common deep-water detail where the drilled shaft extends above the water line.

Action Items: Mark to keep on the agenda for the next meeting.

6. Changes to Construction Office staff

Mark mentioned that the Construction Office has currently filled two vacant ASCE positions. The need for additional staff is driven by increasing workload associated with the Connecting Washington funding package and the likelihood of more project delivery using design-build. The design-build group in the Construction office anticipates increasing to a staff of four employees. Neil Uhlmeyer has recently joined the HQ Construction office and will cover SW Region and e-construction. E-construction is evolving with technology and more focus will be spent incorporating the technology into tour documentation process. Neil has been a Project Engineer in the Olympic Region for many years. Jerry Moore is also joining the Construction Office on a rotational assignment. Jerry has also been a PE in the Olympic Region for many years and has vast practical WSDOT Construction experience. Jerry will be covering a portion of NW Region and also NC Region.

We have also added a Bridge Engineer in a rotational position to help with Bridge Construction issues. Brian Aldrich has been the Concrete Specialist in the Bridge Office and has also been a member of the AGC structure team. Mark anticipates Brian will be assuming

the role of co-chair on both the ADSC and AGC teams. Mark would continue to participate as time allowed but Brian will lead those efforts with Tom.

Action Items: No further action required

7. Additional Items

Mark reminded the Team that future projects will have shaft testing outsourced to the Contractor. WSDOT will continue to complete CSL testing on current projects but our testing role will be going away as new projects are awarded.

Schedule of upcoming projects are now listed on WSDOT web site. Mark highlighted the location so that Contractors can follow along – determine which contracts will be advertised in the future and what type of Method of Delivery will be used to deliver the projects. Mark reviewed the current list to demonstrate the information available in the link.

Future meeting date: January 19th. March 16th, & May 25th.