

Meeting Summary

Project: ODOT | K19786 I-205: I-5 to OR 213

Subject: Abernethy Bridge Drilled Shaft Constructability Meeting with ADSC

Date: Friday, May 21, 2021

Meeting Q & A

Question (Q): How much clearance is there from the edge of the existing bridge to the location of the new drilled shafts? Cannot maneuver equipment if too close.

Answer (A): For the largest shafts being drilled from the work platforms, approximately 25" clear. Some shafts on land are closer.

Q: How have the existing battered pile locations been accounted for?

A: New shafts were located a set clear distance from the theoretical location of the existing battered pile.

Q: How has the location of the existing riprap been determined?

A: Bathymetric survey was conducted. That information is shown on the plans.

Contractor Comment: Much of the equipment for the 12-foot diameter shafts is located in Europe, so some contractors will need a longer lead time to procure their equipment in order to make the first season in-water work window. Further, there are only perhaps three contractors in the U.S. with the equipment and experience to construct 12-foot diameter shafts. Subsequently, another contractor stated they have all the equipment needed for this project on the West Coast.

Q: Can this project be completed by means other than with oscillators?

A: Contractor stated that this project should only be done with oscillators. Another contractor stated that the project should allow other means to facilitate more contractors to participate.

Q: Plans show permanent casings, but we are asking questions about temporary casings. Which is it?

A: There are some of each depending on the depth of the casing. In general, we have assumed that casings 150' or shorter can be extracted.

- *This was generally confirmed by the group.*

Q: Are oscillators necessary for smaller shafts on the project?

A: This will depend on if artesian conditions exist in the given pile.

- Contractor stated non-oscillator methods run the risk of a cave in. For this project, there is no redundancy, so it is not wise to risk a cave in.
- “If a cave in occurs without casing you are done, there is no recovery.”

Q: Can the work bridge be constructed higher than shown on the plans to accommodate taller casings needed to mitigate artesian conditions?

A: Elevations shown are the minimum elevation to meet permitting requirements to be above ordinary high water. It is the contractor’s option or choice to construct the bridge higher.

- Contractor comment: To counter the artesian conditions, suggests to work 10 feet above artesian elevation and five feet above that for oscillator, or 15 feet above artesian elevation. This would be the preferred work bridge height.
- Make clear on the plans the variability of the artesian elevations. It is very expensive to raise the work bridge.

Q: Are there any other methods to address artesian conditions besides using a standpipe?

A: Relief wells have been used on some projects.

- Artesian conditions are a risk. The Agency is considering a Geotechnical Baseline Report, risk sharing clause, and other methods.

Q: How well known are the artesian conditions? Can they vary from those shown on the plans?

A: The information shown on the plans was developed during drilling. That said, a boring has not been drilled at each shaft location so water elevations can vary.

Q: What are the best practices to get casings to prescribed depths?

A: Polymer drilling slurry is effective to prevent or minimize casing freeze during pauses in drilling for casing and reinforcement splicing. Is polymer slurry allowed for this project?

- Contractor comment: For casing freeze question, allow polymers. Polymers will lubricate the exterior of the casing

Q: What is the longest casing that can be pulled/extracted?

A: Generally, 150 feet in length and under can be pulled, but there are many factors that determine this (such as drilling conditions)

Contractor Comment: Suggest using the WSDOT drilled shaft spec for handling obstructions. This is viewed by the industry as a fair way to pay for obstructions.

- Moving away from standard language that has protected the agency for years is precedent setting. There are other ways to manage and/or share risk.

Q: How will equipment and materials be brought to the site? By land, barges, or from the existing bridge? What are the maximum grades from land to work bridge since this will determine if concrete can be delivered in trucks?

A: In general, equipment will be brought by land and assembled on land then walked to the bridge. Barges will be a good method to remove drilling spoils and possibly bring reinforcing and casings. Concrete will likely be brought in by land.

- *Contractor Comment: Drilling equipment is very large and will need larger staging areas to unload and assemble equipment. Overhead clearance will be a factor on where equipment is assembled.*

Q: What is the maximum size for work bridge piling? How many piles will be permitted?

A: Two-foot diameter is the maximum size for work bridge piling per programmatic agreement with the National Marine Fisheries Service. The team developed a conservative estimate of the number of piles for the work bridge and then added a cushion to determine the number of piles.

- *Contractor comment: 36-inch would normally be used at the corners of the trestle where the oscillators would sit.*

Q: If only two-foot diameter piles are allowed, the work bridge will need battered piles to resist drilling equipment forces. Can the battered piles be extended into the shipping channel or outside the right of way?

A: It is not clear if piling can extend outside of these limits below the mudline. We will look into this.

Q: How long will it take to construct a single shaft?

A: There are too many factors to consider that have not yet been evaluated.

Q: Are there any noise restrictions?

A: Unknown. The team will follow up on this.

Q: How will shaft main reinforcing be spliced?

A: Mechanical splices. The team will follow up on this to verify. .

Q: Are the welding inspection requirements different for permanent casing and structural casing?

A: Yes.

Q: Will the contractor be granted additional working days for delays due to obstruction?

A: The Agency is assessing the approach to this issue.

Q: Will video inspection be used for the bottom of the shaft?

A: Yes.

Q: What are the long lead time items?

A: Permanent casing (currently this is taking 16-20 weeks to get casing) and rebar (not as long a casing, but for this amount and size, will take a while to acquire). Right now, these items are taking about five months.

Q: Will the contract have steel escalation?

A: Specs are under development now, and steel escalation is being considered. This can lead to de-escalation as well as escalation.

Q: Can the steel plate for casings be paid for as material on hand so that it can be purchased earlier to ensure availability for the project?

A: This will be considered as the specs are developed.

Q: What are the high-risk or contingency items that should be considered to facilitate construction of the shafts and mitigate potential issues?

A: With the nature of the large, deep shafts, this project is pushing the boundaries for the industry and there are no known contingencies for such a condition. One contractor noted they have all the equipment needed for this project.

Q: What level of contractor experience should be required to bid on this project?

A: It should require experience with large diameter (10-foot), deep, drilled shafts constructed for work bridge or trestles. This is very different than working from the ground.

Q: What are the DBE opportunities for drilled shaft work? Drilled shaft work is mostly self-performed, so not too many options.

A: DBE opportunities for drilled shaft work may include concrete pumping, trucking (material disposal), and rebar.

Q: Most of the drilled shaft equipment is from Europe and metric based. What tolerance or alternatives will be allowed? Most metric equivalents are larger than U.S. dimensions, except 10-foot diameter shafts, which would usually be substituted with a 3-meter casing (9.84 feet).

A: This will be evaluated and addressed in the contract documents.

- *WSDOT has an "equivalent table" of diameters in metric to use.*

SLIDO Q & A

Q: How did the 12-foot diameter shaft design manifest, e.g. why such a large diameter, considering an oscillator and a 3.8M oscillator is owned by very few contractors.

A: The design seismic motions cause the underlying soils to liquefy and then flow into the river. This resulted in large lateral forces on the drilled shafts that drove the structural need for the 12-foot diameter shafts.

Q: Is there room to take a lane in the center of the bridge and drop a smaller shaft in the middle of the super bents? For example, three 8-foot shafts versus two 12-foot shafts.

A: The outriggers are used to enable the drilled shafts to be constructed outside the shadow of the bridge because they are so long. We investigated the construction of a shaft between the bridge, but the amount of space available between the bridges was judged to be inadequate for the equipment to operate. A smaller shaft was also not structurally sufficient.

Q: How will the risk of the unknown extent of existing riprap removal be addressed?

A: The team understands this is a risk and is currently developing an approach.

Q: Has it been considered to install two smaller side-by-side shafts (with a cap) to obtain the flexural capacity needed in place of one 12-foot shaft?

A: This was evaluated as part of the design process and found to be ineffective.

Q: What is the mileage in each phase of roadway?

A: Phase 1 is from MP 6.4 (10th Street interchange) to MP 10.1 (OR 213 interchange). Phase 2 is from MP 3.2 (Stafford Road interchange) to MP 6.4.

Q: When is this job bidding and when do you anticipate drilled shaft construction to start?

A: The project will bid in early 2022. The first in-water work period is anticipated for July 1, 2022. In-water work is allowed July 1 – October 31, but there will be an extension of the in-water work the first construction year, to December 31, for Pier 3.

Q: Considering metric equipment will be used for this, what is the acceptable diameter for the 12-foot casing?

A: The 3.8m casing is likely within tolerance and would be allowed as a substitution. Sizes smaller than 12 feet would likely be rejected as structurally insufficient.

Q: Why not require an oscillator if vibration is a non-starter in 12-foot shafts? Which other, smaller shafts will vibrating casings be allowed for?

A: We are in the process of determining if oscillator methods will be required. Feedback from today's meeting will inform this decision. We are still evaluating the vibration issue and will have

more information on this in future discussions, including an answer to the question on vibrating casing.

Q: Ask TriMet about their DSC risk sharing spec on Tillicum shafts. It was very fair.

A: Thank you for that suggestion.

Q: Does ODOT plan to include a Geotechnical Baseline Report as one of the contract documents?

A: The Agency does not anticipate issuing a Geotechnical Baseline Report.

Q: What constraints will be imposed on contractor re: work bridge piling installation methods and environmental work windows?

A: All in-water work must be completed between July 1 and October 31 except for the first year of construction (2022) where there is an allowed extension to December 31.

Q: What if the loads demand more 24-inch pile than permitted?

A: The contractor would need to work with ODOT to obtain approval for additional piles.