Washington State Department of Transportation
Lynn Peterson
Secretary of Transportation

Alaskan Way Viaduct Replacement Program Office
999 3rd Avenue, Suite 2424
Seattle, WA 98104
206-805-2987/ fax 206-805-2899
TTY: 1-800-833-6388
www.wsdot.wa.gov

Jan. 27, 2015

To: Interested Parties

From: Todd Trepanier, Administrator, Alaskan Way Viaduct Replacement Program

Last week, we shared with the public that the dispute review board for the SR 99 tunnel contract had made recommendations on a request by Seattle Tunnel Partners for a differing site condition in the launch pit at the south portal. A differing site condition or DSC can occur when: 1) actual subsurface or latent physical conditions encountered at the site differ substantially or materially from those indicated in the contract, or 2) unknown conditions at the site are unusual in nature and differ materially from those ordinarily encountered in the type of work.

To clarify, this recommendation is related to a differing site condition experienced while building the launch pit; it is not related to the stoppage of the tunneling machine or recent settlement near the access pit. And, there is a fund set aside within the design-build contract to deal with differing site conditions.

There has been interest from the public in being able to review the board's recommendations and they are attached to this memorandum. Because these recommendations are technical in nature, there may be questions about what they mean.

At the Washington State Department of Transportation, our goal is to protect taxpayer dollars while ensuring that people and goods move safely and efficiently through our state. This is true whether we're building a roundabout in Snohomish County or a tunnel under downtown Seattle.

One important way we're protecting taxpayers as we build the SR 99 Tunnel Project is by relying on our design-build contract with STP. The contract includes a clearly defined process for resolving disputes between us and the contractor. When a dispute arises, the contract provides for a panel of three independent experts, known as a dispute review board, to review the dispute and then provide non-binding recommendations in an effort to help resolve disputes.

As we review the board's recommendations on the differing site condition in the launch pit and determine our next steps, we will use the terms in the contract to reach the best possible outcome for taxpayers as we continue to build this critical safety project. We will not be offering our opinions of the board's recommendations or speculating on next steps until our analysis is complete.

It is also important to remember that the board's recommendations are just that, recommendations. They are not binding. While STP requested $20 million in compensation for this differing site condition, the board's recommendations did not address the cost and schedule impacts. Thus it is too early to speculate as to the cost and schedule impacts of this recommendation, should it be accepted by WSDOT.

For this dispute, the board made the following recommendations:

> Recommendation on Position #1: "The Board recommends that the Parties accept the basis for determining a Differing Site Condition in this dispute to be based on the project's GBR [Geotechnical Baseline Report] report and related geotechnical information, if not addressed in the GBR report."
>
> Recommendation on Position #2: "In conclusion, the DRB considers that a DSC was encountered in the glacial soils and that STP is entitled to relief as it pertains to the impacts on dewatering of these soils within this southern area. The DRB, however, is not sufficiently knowledgeable at this time on the particulars of what efforts were expended, as compared to what was planned, to accomplish the necessary dewatering of these soils to provide much in the way of guidelines on what compensation in time or cost that STP is entitled to. As noted earlier in the referral of this dispute to the DRB, issues related to the time and money impacts of the alleged DSC are outside the scope of this hearing."
>
> Recommendation on Position #3: "The Board believes that the supplemental information available to STP, prior to beginning of the dewatering operations in October 2012, may not have been sufficient to provide a reliable determination of a DSC and therefore considers STP was not in violation of the timely notice requirements included in the Contract."

The board's report has been incorporated into this document and includes a summary of WSDOT and STP's positions.

The dispute review board has provided recommendations on one other issue related to the SR 99 Tunnel Project. In June 2013 the board heard arguments related to strengthening the viaduct in the vicinity of Yesler Way prior to tunneling beneath it. The board recommended that STP's request for a $5.5 million change order be denied, however STP has asked for reconsideration. The board has not yet determined whether they will reconsider their recommendation.

Again, the board's recommendations are not binding and they do not assign cost or schedule impacts. Here's what they recommended:

> DRB Findings: "While it is undisputed that the instant settlement information as made known in June 2011 was not formally transmitted until well after STP signed its contract, the bare timing of the transmittal is not tantamount to reasonable evidence that STP was indeed damaged. STP maintains that the impact

> of the new information was to preclude the use of EDM and if it is to receive additional compensation, STP must reasonably support its case. To-date, STP has fallen short."

To better understand the dispute and the board's recommendation, we have also enclosed their report in this document.

ALASKAN WAY VIADUCT REPLACEMENT PROGRAM

WASHINGTON STATE DEPARTMENT OF TRANSPORTANTION
SR 99 BORED TUNNEL PROJECT
CONTRACT N0. 007999
SEATTLE TUNNEL PARTNERS

LAUNCH PIT DIFFERING SITE CONDITION DISPUTE POSITIONS NO. #1, #2 AND #3

DISPUTE REVIEW BOARD RECOMMENDATION

(January 15, 2015)

BACKGROUND AND SUMMARY OF EVENTS RELATED TO THE CLAIMED DIFFERING SITE CONDITIONS AT LAUNCH PIT

This dispute involves the excavation and support work and related activities in the open cut and TBM launch pit work in the southern portion of the project. This was necessary preliminary work for the installation of the TBM and facilities for the main tunnel drive from this location.

The description of this dispute was jointly identified by the Parties to the Board by letter dated September 5, 2014, as:

STATEMENT OF DISPUTE:

> "Does the presence of sand (Qpgo, ESU 5 sand/gravel) within ESU 4 till and ESU 7 clay/silt in the Launch Pit constitute a Differing Site Condition for which STP is entitled to relief pursuant to the terms of this Contract?"

It is the DRB's understanding that STP submitted its first written notice of a Potential Differing Site Condition (DSC) to WSDOT on November 2, 2012, over two years ago. It is also the Board's understanding that the Parties have endeavored to resolve this dispute during the ensuing period, but now ask the DRB for assistance in resolving this matter.

This dispute has been expanded in WSDOT's Position Paper for Hearing purposes into three separate position elements which are identified in STP's Rebuttal Paper as follows:

Position # 1 – In accordance with the definition of a DSC that applies to Alternative Technical Concepts (ATCs), there is no geotechnical baseline applicable to the launch pit, and therefore, there is no basis for STP's DSC claim.

Position # 2 – The presence of sand within the ESU 4 and ESU 7 units in the launch pit does not constitute a DSC because the Geotechnical Baseline Report (GBR) discloses the presence of layers and lenses of cohesionless sand within the ESU 4 and ESU 7 soils.

Position # 3 – STP did not provide timely notice of the claim and is therefore not entitled to relief pursuant to the terms of the Contract.

Two of these dispute elements, Positions #1 and #3, were added as new elements to the original dispute submitted to the DRB and were therefore not addressed in STP's Position Paper. It was stated at the Hearing by STP that until WSDOT's Position Paper was received, these additional issues had not been raised in their prior discussions or during settlement efforts.

The DRB's analysis and findings will follow this Position #1, #2 and #3 sequence in its analysis and recommendations. STP in their rebuttal paper addressed the two new elements and agreed to the statement of the dispute, which is Position #2.

The scope of the dispute previously agreed to by the Parties, now an element identified as Position #2, was limited to entitlement issues only.

Issues related to the time and money impacts, if a DSC is found by the DRB, are outside of the scope of this specific hearing.

INTRODUCTION

This project was bid as a Design-Build (DB) contract in an effort to save time and money relative to a Design-Bid-Build (DBB) contract. Under this type of contract, the Contractor (STP) is responsible for the final design (subject to approval by the Owner (WSDOT)) and the project goes out to bid when final design efforts by the Owner have only progressed to roughly the 30% level. Design-Bid-Build (DBB) projects, where the Owner is responsible for performing the final design, typically goes out to bid when the design efforts by the Owner are on the order of 90% complete. The current type of contract (DB) puts both Parties at added risk (based on a completed design level of effort of only 30%) but generally saves substantially in the time and cost for completion of the project.

For the Owner, considerable design time (and associated cost) is saved by overlapping efforts in design and construction. The Contractor, on the other hand, must submit a competitive bid price and time schedule for completion of the entire project and, in order to do so, must select an approach based solely on preliminary (30%) design level efforts expended to date.

It is noteworthy in this regard, especially on tunnel projects, that considerable effort and dollars are expended on subsurface explorations during this initial 30% phase in an effort to determine soil conditions that may limit the design and construction concepts that are practical and worth pursuing. Even though the Launch Pit itself does not have many of the considerations that must be addressed for a tunnel, the depth (approaching 90 feet in the Launch Pit) and size of the TBM

(largest of its type in the world) require an understanding of the soil conditions that will likely be encountered during construction.

The Geotechnical Baseline Report (GBR) approach was developed in the late 1980s and early 1990s in an effort to limit (or avoid) the very large time and dollars expended on the resolution of DSC claims that had become commonplace within the tunneling industry. It was recognized that a reasonable boring exploration program (say borings spaced 200 to 500 feet along the length of a tunnel) still only encountered a very small percentage (often less than 1 billionth) of the soils that would be encountered during tunnel construction. Hence, multiple yet reasonable interpretations of the ground conditions that might be encountered during construction, based on such limited subsurface information, was understandable and to be expected. Further, it was recognized that the Owner determined the location and size of the tunnel and therefore "owned the ground" where the project would be constructed.

The GBR approach was developed to enable the Owner to identify a single "baseline" interpretation of the conditions that would be encountered with the understanding (and direction) that identification of a DSC condition would be based on that single interpretation (right or wrong). This further enabled the Owner to assume conditions in the GBR that were conservative (thereby limiting claims but paying for contingencies in the bid that covered a wide range of "possible" conditions, whether such conditions were encountered or not) or defining conditions in the GBR that were optimistic (with an increased

possibility of claims but paying for such worse conditions only if they were actually encountered).

With the advent of DB contract provisions that eliminated the GBR interpretation as the "baseline" for assessing possible DSCs for Contractor ATCs, the Owner was understandably protecting itself against claims that were outside of the area of identified conditions presented in the GBR.

However, in the current situation, the Contractor's ATCs were essentially located within the area (vertically and horizontally) covered in the GBR. One very small area located in the very Southwest corner of the ATC was identified as not covered in the GBR, but the DRB considers this small area to be inconsequential to the dispute before the Board.

BOARD'S ANALYSIS AND FINDINGS RELATED TO DISPUTE POSITION #1:

The dispute identified under Position #1 is based on the question of the geotechnical information used by STP in their evaluation and selection of two Alternative Technical Concepts (ATCs); ATC #2 and ATC #5. These ATCs were reviewed and approved by WSDOT for use in STP's Bid Proposal and final design. The time lines for consideration of these ATCs are listed below:

ATC #2; STP submittal date September 8, 2010, (including; backup information on WSDOT form dated August 9, 2010); and WSDOT approval, dated September 9, 2010.

ATC #5; STP submittal date October 18, 2010; (including backup information on WSDOT form dated August 23, 2010; and WSDOT approval, dated October 18, 2010.

The use of possible ATC's was provided for in the Contract provisions in Section 1.2 **Order of Precedence:** which states;

> "In Addition, if the Proposal includes statements or incorporates Alternative Technical Concepts ("ATCs") that can reasonably be Interpreted as offers to provide higher quality items than otherwise required by the Contract Documents or to perform services in addition to those otherwise required, or otherwise contain terms that are more advantageous to WSDOT than the requirements of the Contract Documents, Design-Builder's obligations hereunder shall include compliance with all such statements, offers and terms "

The significant effect of ATC # 2 was to incorporate the open cut secant wall system in the southern portion of the project and the launch pit as part of the final structural design of these facilities. It also identified STP's intent to limit drawdown exterior to the excavation during dewatering (essentially create a "bath tub") by extending the secant piles into the relatively impervious glacial till.

ATC #5 relocated the TBM launch pit 450 LF South of WSDOT's proposed conceptual design location by using crossover (stacked) geometry for the NB and SB roadways. The overall change reduced the structure

footprint in the Project's Right of Way (ROW) work area while deepening the Launch Pit.

The impact of these approved ATC's resulted in significant cost saving changes in STP's proposal by decreasing the amount of the open cut excavation in the South Portal area by roughly 50% and reducing the dewatering requirements. Other major cost benefits associated with the reduced footprint were the greatly reduced unknown potential project costs for both archeological and contaminated soil impacts in the upper (non-glacial) soils.

A secondary project benefit was that the 450 LF of additional tunneling to the South allowed the TBM-EPB tunneling system to be tested and fine-tuned before entering the supporting soil zone under the seismically damaged Alaskan Way Viaduct.

The significance of Position # 1 goes to the basic question of the purpose and use of the Owner's prepared GBR and GEDR and related supporting geotechnical information. In particular, the extent of these documents applicability, in conjunction with the various elements of the GBR's established Baselines for use in the project, and how and when they may be used for establishing possible DSC conditions.

BOARD'S SUMMARY OF PARITES POSITIONS REGARDING POSITION # 1:

WSDOT:

In accordance with the definition of DSC that applies to Alternative Technical Concepts (ATCs) there is no geotechnical baseline applicable to the launch pit, and therefore, no basis for STP's DSC claim.

STP:

STP has taken the position that additional borings and related explorations were unnecessary prior to bid date as the project's GBR and related studies covered the project areas in which their ATC's would be constructed (both horizontally and vertically). In addition, the information provided from existing site specific geotechnical studies was adequate on which to base their new design solutions for reducing the overall project cost and area impacts.

STP has also taken the position that WSDOT's acceptance and approval of these ATC's in the review and approval process, has provided WSDOT's approval of STP's geotechnical basis of using the existing GBR and GEDR information in preparing its bid.

The Contract Provision agreed to by the Parities, as related to the ATC's geotechnical information to be used in this Dispute is contained on Exhibit 1 of WSDOT's Position Paper which states:

"Differing Site Condition relating to an ATC, means (1) subsurface conditions or latent physical condition at the Site that are substantially

or materially different from conditions indicated in Design-Builder's geotechnical investigation conducted for purposes of the ATC prior to the Proposal Date (to the extent said investigation complies with the WSDOT Geotechnical Design Manual), and which are not discoverable from a reasonable investigation and analysis of the site, or (2) unknown physical conditions at the Site that are of an unusual nature, differing materially from those ordinarily encountered and generally recognized as inherent in the type of Work provided for in the Contract and the worksite characteristics and that could not have been reasonably anticipated as potentially present by an experienced civil works contractor. The foregoing definition shall not apply to utilities."

DRB'S ANALYSIS, FINDINGS AND RECOMMENDATION REGARDING POSITION #1;

The Board has reviewed Appendix G1, dated June 2010, which contains the GBR developed for the project and its related GEDR included in Appendix G-2 of the RFP, and other related geotechnical information referenced in the Contract documents.

The GBR study area covers the entire area of both WSDOT's conceptual plan and also the proposed and accepted ATC's that have now been constructed successfully. The Board can find no limitations on the use of the provided GBR and its Baseline values as to any specific locations covered by the GBR report. It is reasonable that the geotechnical information provided covers the entire South Portal Retained Cut and the Cut–and-Cover area, as noted on page 3 of the report, for a length

of 1500 LF. The project GBR was done over a long period of time and meets all the requirements for a proper report of this type based on the standards used by WSDOT for this type of Design-Build project.

The Board believes the specification as to a "Design-Builder's geotechnical investigation conducted for purposes of the ATC prior to the Proposal Date" was complied with upon STP's review and evaluation of the geotechnical information provided for the Site in the contract documents.

The Design-Builder, as a requirement of the contract, must implement any additional exploration and geotechnical evaluations as deemed necessary to further delineate subsurface conditions to satisfy the requirements for his final design. As the responsible designer for the final structures, this responsibility is clearly that of the Design-Builder and his professional judgment of what will be needed to comply with this responsibility. This was done by STP as part of their final design responsibilities.

The overall benefits of these ATC's satisfied the cost benefit requirements provide to WSDOT with the changes offered as identified in contract specification section **1.2 Order of Precedence**.

The supporting documentation that allowed ATC #5 to be included in STP's bid proposal was received from WSDOT by letter dated, October 18, 2010 with eight pages of descriptive narrative by STP on a WSDOT form prepared for this special purpose.

Information on the subject of the geotechnical information to be used by STP in this proposal to WSDOT is extracted from page 2 of 11:

Subsurface Investigation: Describe Proposer's plan for conducting and completing a Pre-Proposal geotechnical Investigation, If applicable.	No additional pre-proposal subsurface investigation will be required. Additional subsurface investigation may be need to be completed for the Section 106 Clearance

The proposal submittal information and the excerpt above clearly indicates no additional subsurface work will be required Pre-Proposal and indicates the existing geotechnical information provided in the Contract was used for ATC # 5.

WSDOT acknowledged in their acceptance the basis of STP's geotechnical information used in making their proposal for this ATC without any expanded questions as to the merit of the stated geotechnical basis to be used by STP. The WSDOT clearance letter above identified numerous issues that needed to be considered when implementing this ATC, if used in STP's bid proposal, but was silent on the subject of geotechnical information. The Board finds the statement above of " if applicable" to be a clear indication that this requirement is to be based on STP's engineering judgment of the need, which is clearly stated as, none will be required.

It is unreasonable in the Board's opinion that this question of the use of the Contract's GBR for this ATC should only have come up after the two year period since the DSC was filed, over four years since it was

approved by WSDOT and now only after the successful completion of the work in question.

In addition, WSDOT's own statement " That there is no significant or material difference in the conditions in the constructed launch pit location and the information in the Project's GBR", as stated in their following Position #2 arguments, is supportive of STPs reliance on the GBR information.

Appendix 11 of the contract, **Dispute Review Board,** includes specific procedures for the Board in making their recommendations which states: "The recommendations shall be based on the construction contract provisions and the facts and circumstances involved in the dispute".

BOARD RECOMMENDATION ON POSITION #1:

The Board recommends that the Parties accept the basis of determining a Differing Site Condition in this dispute to be based on the project's GBR report and related geotechnical information, if not addressed in the GBR report.

POSITION #2

INTRODUCTION

As explained in the previous section of this report, the GBR is considered by the Board as applicable for serving as the basis for defining DSC conditions for ATC's 2 and 5, in large part because these ATCs fall within the horizontal and vertical limits defined by GBR Figures A1, A2 and A3. The GBR presents the subsurface conditions that the Owner (WSDOT) has directed all bidders to assume in preparing their bids for the Owner's preliminary design concept for construction of the Launch Pit.

Although engineering judgment is used in setting GBR baselines, these baselines also reflect the Owner's desires to be conservative, or optimistic, or simply provide a realistic representation of anticipated ground conditions. The geotechnical consultants responsible for preparing the GBR are experienced in the Seattle area subsurface conditions and any DRB comments made in this report are not intended as criticism of their engineering judgment. The glacial soils in the Seattle area are the subject of this dispute (the upper boundary of which is shown on each of the GBR baseline profiles) and these soils are highly variable over short distances (both horizontally and vertically) having been deposited during at least three major glacier advances and retreats.

The following paragraphs address what the DRB considers the salient positions taken by each of the Parties in their submittals to the DRB and in the DRB hearing. This is followed by a discussion of the Board's findings and rationale in arriving at their conclusions and recommendations regarding Position #2.

PARTIES POSITIONS RELATIVE TO QUESTION #2 and DRB FINDINGS

Question #2, as jointly agreed to by WSDOT and STP says:

Does the presence of sand (Qpgo, Engineering Soil Unit (ESU) 5 sand/gravel) within ESU 4 till and ESU 7 clay/silt in the Launch Pit constitute a Differing Site Condition for which STP is entitled to relief pursuant to the terms of the Contract?

WSDOT points out that this is a two part question that first asks if the conditions encountered constitute a DSC and second if STP is entitled to relief pursuant to the terms of the Contract. The Board will deal with the first part of the question in this section of the report and the second part in the section presenting its recommendation.

WSDOT goes on to state that the GBR points out the presence of layers and lenses of cohesionless sand within the ESU 4 and ESU 7 soils. The Board is of the opinion that "layers and lenses of sand" represent relatively limited thicknesses of such sand, especially since the GBR also points out that thicknesses less than two feet are not identifiable in the explorations, but do exist. In this regard, the GBR gives both vertical and horizontal permeability baseline values for each of these units and specifies that less than 10% of each unit (by volume) is comprised of

such sand. These baseline permeability values (in cm/sec) for each of the soil units is given as:

- for the ESU 4 soil unit as 1E-05 (horizontal) and 1E-07 (vertical)
- for the ESU 7 soil unit as 1E-05 (horizontal) and 1E-06 (vertical)

In both cases the baseline horizontal permeability is 10 to 100 times greater than the vertical permeability, but both are relatively impermeable, in the Board's opinion. The Board also believes that these permeability values include the 10% by volume of sand layers and lenses.

However, for the ESU 5 soil unit the GBR baseline permeability values provided (again in cm/sec) are 5E-03 (horizontal) and 1E-03 (vertical) which indicates that the bidder is to assume this unit is 5 times more permeable in the horizontal direction than it is in the vertical direction and, in either case, to assume that ESU 5 is on the order of 500 to 1,000 times greater permeability than the ESU 4 or ESU 7 units.

Based on the above GBR baselines, the Board cannot equate "the presence of sand" to the presence of "ESU 5" within the ESU 4 or ESU 7 soil units. If the bidders are to assume that the ESU 5 soil unit is present within an ESU 4 or ESU 7 soil unit, then it should be shown on the GBR profile as a separate ESU 5 unit. The fact that ESU soil units may exist between borings is acknowledged, but the GBR is written to advise the bidders what they should assume in preparing their bid (right or wrong).

WSDOT refers to STP's proposal dated 10/28/10, approximately 4 months after WSDOT requested that STP provide a proposal and only 10 days after WSDOT approved ATC #5 on 10/18/10, but then goes on to criticize STP for not conducting its own separate subsurface investigations to confirm conditions in the ATC 5 area prior to bidding the project. Essentially all of the deep borings (extending into the glacial soils in the Launch Pit area as shown on the GBR profiles) were completed by mid-2008, even though other deep borings outside this area were completed in 2009 and 2010. Apparently WSDOT was comfortable with the extent of deep borings accomplished for their preliminary design in the Launch Pit area, even though this design concept required some excavations at least 50 feet deep into the glacial soils. Granted, the deep excavations for the RFP launch pit were roughly 450 feet further North than the ATC 5 launch pit and the apparent presence of the pervious ESU 5 soils was less pervasive in that area.

WSDOT goes on to point out that STP boring S-6 (completed 06/16/11) encountered ESU 5 (Cohesionless Sands and Gravels) in the same depth interval (approximately 80 to 96 feet in depth) where the GBR baseline profiles indicate the presence of ESU 4 (till deposits). WSDOT further states that this may be due to the normal geologic variability of the soils or poor soil sample recovery in the original deep borings supporting the GBR profile interpretation. In either case, this additional STP information tends to support the presence of a DSC because the bidders were instructed to assume the soil conditions as presented in the GBR baseline figures in the preparation of their bids (roughly 8 months prior to STP's boring S-6 information became available). STP stated that they considered this new information was not definitive enough to declare a

DSC at the time, but gave it to their designers for their consideration in final design.

WSDOT pointed out that STP's secant piles in the southwest corner of the Launch Pit actually penetrated into an area where the GBR Profile A2 (West Side) was blank (no ESU symbol was provided). However, the Board noted that this profile also indicated at least 10 feet of penetration of the piles through low permeability soils (ESU 4 and ESU 7 soils) before entering this blank area. STP made it clear in their proposal that there objective was to essentially create a "bath tub" by penetrating the low permeability soils surrounding the excavation with their secant piles and thereby isolate the excavation from a hydraulic connection with the permeable ESU 5 soils that were pervasive in the surrounding area. In the Board's opinion, the pile penetration indicated by this GBR profile should have been adequate to accomplish the desired effect.

The DRB also noted that the deep boring information presented on GBR Fig. A2 (West Side) included borings IB-209 and IB-208 (south and north of the southern limits of the ATC 5 Launch Pit) and both borings indicated the presence of ESU 4 and ESU 7 soils in roughly the same depth interval below roughly 80 feet. These two borings were both projected approximately 70 to 80 feet west of their actual location, but indicated a relatively level top surface for the low permeability soils at this depth, and these soils continued to the full depth of those borings (as much as 110 feet in depth).

Interestingly, the next two deep borings to the North (actually located on the same line as IB-209 and IB-208 and at 200 foot spacings north of IB-208) were omitted from this GBR Fig. A2 and CB-35B (located 500 feet north of IB-208 and projected 85 feet East) was inserted on the profile. The resulting GBR Fig. A2 indicated that the ESU 4 soils thickened steadily upward to the north of IB-208. GBR Fig. A1 (located roughly 50 feet further East of Fig. A2, closer to the centerline of the NB and SB new roadways and closer to the actual location of all of the IB deep borings) presents a different distribution of soil units in this area, including the presence of ESU 5 soils from immediately below the glacial boundary to a depth of nearly 75 feet.

These variations between GBR profiles (roughly 50 feet apart) is entirely within the rights of the Owner in producing the GBR figures that are presented in the RFP, since the GBR baseline profiles present the interpretation of subsurface conditions that each bidder is directed to assume in preparing its bid. It does underscore, however, the variability over short distances that is present within these glacial soils.

In the Board's opinion, these differences in the GBR baseline profiles (Figures A1 and A2) were intended by WSDOT to indicate that low permeability soils existed along the western limits of the Launch Pit, even though this westerly direction is closer to Puget Sound (the low point that was the likely destination of glacial meltwater). It is also apparent from both GBR profiles that the deposits of ESU 5 soils (deposited by fast moving water) are considerably thicker and deeper South of the Launch Pit area and were encountered immediately below the upper glacial soils boundary in this area.

STP's southern limits of the ATC 5 Launch Pit (450 feet to the South) is slightly North of the apparent drop off of ESU 4 and ESU 7 soils to depths greater than roughly 80 feet, as shown on these GBR figures. In the Board's opinion, this further supports STP's reliance on the GBR Baseline Figures in preparing its bid.

In Position #1 the Board has recommended that the project's GBR is appropriate to be used for determining DSCs for the reasons provided. Further, the Owner (WSDOT) enjoyed several benefits from this ATC 5, including:

- Reducing the footprint of the required excavation in an area of recent deposits of a largely unpredictable nature and potential contaminant and archeological delays;

- Reducing the volume of required excavation (especially in these upper soils) by roughly 50 percent and the associated reduced time and cost of the project;

- Moving the Launch Pit further from an area of potentially sensitive structures and limiting the magnitude of the impacts of construction on these areas, as well as providing additional adjacent space for construction activities;

- Providing space for the initial start up (learning curve) of tunneling equipment and operations further from sensitive structures, including the active portions of the Alaskan Way Viaduct; and

- Potentially minimizing the amount of dewatering required and reducing the potential impacts on sensitive structures in the area.

Even though STP identified in their proposal that they felt the GBR explorations were adequate for the inclusion of ATC 5 in their bid, WSDOT chose not to point out the added risks inherent in moving the Launch Pit 450 feet to the South at that time. WSDOT has since stated that the high variability of the glacial deposits and/or poor sample recovery in the glacial deposits accounts for the differences between STP's boring S-6 and the GBR borings. In the Board's opinion, this explanation of the cause of such differences between actual STP borings and the subsurface conditions presented in the GBR underscores STP's apparent reliance on the GBR profiles and their analysis of the information provided. There was no particular benefit to performing limited additional subsurface investigations prior to the bid date if, as noted in the GBR, the highly variable ground conditions may result in changed ESU soils within a few feet of their new boring locations.

On the other hand, actual dewatering experience (dewatering volumes and reported drawdown in surrounding areas) takes into account the variability of the subsurface conditions and, in the Board's opinion, provides a reasonable measure that a differing site condition exists, especially when there is such a significant difference in the permeability of the different soil units (ESUs) involved.

The Board recognizes that leakage through the secant pile wall (whether imperfections in the wall itself or tie-back holes drilled thru the wall) will

add to the volume of dewatering, but considers such infiltration to be localized. The Board also considers the inflows from such features are not attributable to a DSC.

The upper soils above the glacial boundary were saturated and provided inflow into the excavation as the excavation progressed from the ground surface downward. These soils were highly variable and normally consolidated, as pointed out in the GBR, and the Board sees no basis for including these soils in STP's claim for a DSC.

WSDOT stated that the subsurface conditions encountered during the installation of the secant piles was not reported nor submitted in defense of STP's position that a DSC was encountered. STP noted that this information was collected for much of the West wall, but STP also pointed out, and the DRB agrees, that the equipment and methodology used in installing these secant piles is not intended for subsurface exploration and no controlled sampling of the soils encountered is accomplished. Such logging of subsurface conditions during secant pile installation is largely based on the operators assessment of the resistance encountered as the piles are installed and is not a reliable indicator of the fines content within the soils, which largely controls the permeability of the soils.

Other discussions and positions taken in this dispute tended to address issues pertinent to the design, which is not considered particularly relevant to the question of whether a DSC was encountered or not. It does seem noteworthy that preparation of the Launch Pit area for assembly of the TBM was critical in maintaining the desired schedule for

completion of the entire project by the end of 2015 (a significant benefit to WSDOT). In this regard, STP's schedule for beginning installation of secant piles in the Launch Pit area was January 2012, less than one year after NTP on February 7, 2011. Once this pile installation began, STP was committed to the ATC 5 approach, even though the final dewatering design was not submitted until March 2012. Actual completion of the secant pile installation was reported as July 2012 with the beginning of dewatering reported as October 2012.

Another point raised by WSDOT was that the high variability of the glacial soils was pointed out in the text of the GBR and, as such, is part of the GBR baseline. Further, since this variability includes the ESU 5 materials, how can there be a DSC? The GBR also states that the GBR Profiles are baselines themselves. To the Board this means that the bidders are directed to rely on the GBR Profiles and base their bids on the distribution of soils as represented on the profiles. To suggest that the bidders must base their bids on variations over short distances that differ from what is shown on the GBR Profiles, in the Board's opinion, makes the GBR Profiles worthless, which is certainly not the intent of the GBR approach.

BOARD RECOMMENDATION ON POSITION #2;

In conclusion, the DRB considers that a DSC was encountered in the glacial soils and that STP is entitled to relief as it pertains to the impacts on dewatering of these soils within this southern area. The DRB, however, is not sufficiently knowledgeable at this time on the

particulars of what efforts were expended, as compared to what was planned, to accomplish the necessary dewatering of these soils to provide much in the way of guidelines on what compensation in time or cost that STP is entitled to. As noted earlier in the referral of this dispute to the DRB, issues related to the time and money impacts of the alleged DSC are outside the scope of this hearing.

BOARD'S ANALYSIS AND FINDINGS AND RECOMMENDATION REGARDING POSITION #3

Position #3: As stated by STP in their Rebuttal Paper in response to WSDOT's claim in WSDOT's Position Paper – "STP did not provide timely notice and is therefore not entitled to relief pursuant to the terms of the Contract."

As previously noted this subject was not addressed in STP's position paper. STP indicated at the Hearing that the first identification that this was an issue in the dispute was upon receipt of WSDOT's position paper. STP did address this expanded element of the dispute in their rebuttal paper after receipt of WSDOT's position paper.

BACKGROUND:

Notice of a Differing Site Condition was made by STP on November 2, 2012, and a response was received from WSDOT by letter dated on November 21, 2012, in which WSDOT requested a written report due within 30 days as required by Contract specifications Section 5.7.3.3. WSDOT stated they would start their formal investigation of this potential DSC upon receipt of this supplemental report.

The Board has reviewed the history of the dispute which was documented in a series of letter exchanges and reports up to the date of September 5, 2014, when this dispute was submitted to the Board for a Formal Hearing. These exchanges are contained in a hearing document titled: WSDOT/STP Common Exhibits, STP PCO # 162, DSC Soil and

Groundwater at Launch Pit, September 18, 2014. This documentation contains fifteen (15) separate communications.

No mention of this current WSDOT Position # 3 was made in the above extensive information exchanges.

WSDOT cited the following specification in support of their position:

5.7.3 Notice of and Report Regarding Differing Site Conditions

5.7.3.1 Notice

Design-Builder shall exercise due diligence and the standard of care of an experienced global tunneling contractor in continually evaluating site conditions as they are encountered, including subsurface geological conditions, so to ensure prompt identification of potential Differing Site Conditions. If, in the exercise of such due diligence and standard of care Design-Builder determines or reasonably should have determined that it has encountered Differing Site Conditions, Design-Builder shall provide written notice to WSDOT. Such notice shall be provided within seven days (for the tunnel or promptly (for all other areas) after the date such determination or date that Designer-Builder should have known of the conditions (such time frame being subject to any event beyond the reasonable control of Design-Builder which might materially impairs Design-Builder's ability to prepare and deliver such notice, in which case the time frame shall be extended by the period of time in which Design-Builder is so materially impaired.

5.7.3.4 Waiver

Failure of Design-Builder to provide notice to WSDOT strictly in accordance with the provision of this Section 5.7.3 shall result in the waiver of Design-Builder's right, if any, to the relief described in this Section 5.7.

BOARD'S SUMMARY OF PARTIES POISTIONS REGARDING POSITION # 3

WSDOT Position Paper:

"It is clear that STP should have known if physical conditions were substantially or materially different from the conditions indicated in the GBR far in advance of its notice to WSDOT on Nov. 2, 2012. If a DSC existed, STP had the opportunity to provide notice in mid-2011, when it conducted it subsurface investigations, or at the very latest, in mid-2012, when it installed secant piles and dewatering wells at the launch pit. By not providing WSDOT notice of the alleged DSC until November 2, 2012, well after the secant pile wall system and dewatering system were designed and installed, STP prejudiced WSDOT by denying it the ability to mitigate any impacts. Consequently, pursuant to Contract Section 5.7.3.4, STP waived its rights to make a DSC claim and therefore is not entitled to relief under the terms of the Contract"

STP's Rebuttal Paper was their first opportunity to address this newly identified Position #3 challenge being advanced by WSDOT to the question of timely notice of a possible DSC:

Mid-2011 time period response by STP in their Rebuttal Paper:

"With respect to STP's subsurface investigations, WSDOT knows that STP performed subsurface investigations, as required by the Contract, after execution of the contract. These explorations provided additional information related to the soil conditions in the launch pit. At the time STP performed these investigations, STP concluded that it had not identified any conditions that constituted a DSC, and thus provided no notice of a DSC to WSDOT. The results of the investigations were provided to STP's designers for consideration in developing the plans and specifications for the launch pit. Variable soils, including layers and lenses of sand and gravel, were specifically anticipated by STP, because these conditions were indicated in the GBR and confirmed by STP's subsurface investigations. Such conditions are not a DSC."

Mid-2012 time period response by STP in their Rebuttal Paper:

"With respect to secant pile installation, WSDOT knows that it is very difficult to accurately define variable soil conditions during secant pile installation. WSDOT's Position Paper (page 16) notes that "" STP logged soils excavated from some of the secant piles on the west side of the launch pit""" and that ""Project records do not indicate that the secant piles on the east side of the launch pit were logged"", demonstrating that STP made an attempt to define soil conditions during secant pile installations, however, the logging of the soils during secant pile installation were inconclusive with respect to the existence of a DSC, and thus STP did not provide of a DSC to WSDOT. Without any evidence to the contrary, STP assumed that the secant piles penetrated into the

underlying ESU 4 Till and ESU 7 Clay/Silt layers indicated by the GBR profiles shown on the attached GBR Figures A2 and A3."

STP's provided additional comments on this subject as partially summarized by the Board below:

a) ----------timely notice is not relevant to the question of whether or not a DSC exists----------.

b) STP had no incentive to delay giving a potential DSC notice to WSDOT once STP determined that a DSC had been encountered----------.

c) ----------variable soil boring information from STP S-6 and STP S-7 encountered in June 2011. STP considered the apparent variability of soil conditions could reasonably be handled and since groundwater cutoff was anticipated to be taken care of by the current secant pile wall design, there was no reason or basis for STP to provide notice of a DSC to WSDOT.

d) ----------STP filed timely notice on November 2, 2012, when large concentrated local drawdown responses in observation wells adjacent to the west wall occurred after the dewatering system began operation on October 19, 2012----------.

e) ---------subsequent borings for monitoring and additional dewatering wells were performed after November 2, 2012, that showed significant volumes of ESU 5 type soil conditions ----------

f) -----WSDOT was or should have been aware of the conditions which were being encountered.

g) "WSDOT was not prejudiced by untimely notice."

Oral Hearing Information from the Parties:

Most of the information in the Oral presentations was focused on Position # 2 discussions and rebuttals and this subject of timeliness was basically limited to the information contained in the written submittals and general comments.

DRB'S ANALYSIS AND FINDINGS REGARDING POSITION # 3:

The Board has reviewed the two specific time periods sighted by WSDOT as potential subsurface informational events for filing a possible notice of a DSC.

MID- 2011:

The Board finds that STP's stated position of the information being consistent with the GBR description of the ground conditions in this area is reasonable and supports the complex nature of the glacial soils. While noting some concern, it did not raise to the level of requiring a notice of a potential DSC in STP's opinion, but was provided to their designer's to account for this type of condition at this specific location.

STP's planned secant cutoff walls extended 20 feet below the structures base slab and the GBR's Baseline Values, especially the GBR's low permeability's of soil Units ESU 4 Till and ESU 7 Clay/Silt layers support their design approach. In the Board's opinion, it was not unreasonable

for STP to still anticipate this system would be adequate to provider a suitable water isolation wall from the surrounding ROW areas. The Baseline limit of 10% by volumes of more pervious sand layers and lenses within these Units, in the Board's judgment, were considered by WSDOT and included in the Unit #4 and Unit #7 Baseline permeability's values.

MID- June 2012

As noted in STP response to the question of the quality of the information from drill cuttings, from both secant and production well drilling, it is the Board's opinion that this type of information is of limited value in such determinations, as these are production excavation methods and not used for subsurface exploration. WSDOT has agreed in their Position #2 arguments that these construction methods do not support definitive answers related to the evaluation and determination of DSC conditions. Further, if STP did not believe this information alone was sufficient to support a DSC claim, it was totally within their rights to not submit a notice of a potential DSC. Once the dewatering information was available, STP apparently believed that this was adequate proof that a DSC was encountered.

STP was basically relying on the GBR information in their design. The Board in Position #1 supports STP's use of the GBR in planning and executing their work in the South Portal zone including the Launch Pit area.

Appendix 11 of the contract, Dispute Review Board includes specific procedures for the Board in making their recommendations which states: “The recommendations shall be based on the construction contract provisions and the facts and circumstances involved in the dispute”

BOARD RECOMMENDATION ON POSITION # 3:

The Board believes that the supplemental information available to STP, prior to beginning of the dewatering operations in October 2012, may not have been sufficient to provide a reliable determination of a DSC and therefore considers STP was not in violation of the timely notice requirements included in the Contract.

DRB RECOMMENDATIONS

The Board Recommendations to the Dispute Positions identified as: Position #1, Position # 2 and Position #3 are based on the construction contract provisions and the facts and circumstances involved in the dispute. In support of their positions the Parties provided; Position Papers, Rebuttal Papers, Oral and Printed materials from the Hearing.

The Board's Recommendations to the above three Positions are located in the preceding sections of this document.

Joseph Keating, Chairman Joseph Keating

Russell Clough, Member Russell G. Clough

Peter Douglass, Member Peter M Douglass

Date: 1/15/2015

ALASKAN WAY VIADUCT REPLACEMENT PROGRAM

WASHINGTON STATE DEPARTMENT OF TRANSPORTATION

CONTRACT 007999

SEATTLE TUNNEL PARTNERS

ALASKAN WAY VIADUCT STRENGTHENING DISPUTE

DISPUTE REVIEW BOARD

RECOMMENDATION

(August 12, 2013)

I. BACKGROUND AND SUMMARY LEVEL DESCRIPTION OF DISPUTE

The project work is design-build in nature and involves ~10,000 lf of ~58 foot diameter concrete lined vehicular tunnel, north approach structures, south approach structures, ventilation buildings, other miscellaneous appurtenances and all systems such as lighting, ventilation and the like. The tunnel itself will be constructed entirely in soils and at some points of the alignment passes directly beneath the Alaska Way Viaduct (AWV), which was substantially damaged during the Nisqually earthquake of 2001 and subsequently repaired and re-opened to traffic.

The project owner is the Washington State Department of Transportation (WSDOT) and the contractor is Seattle Tunnel Partners (STP), a joint venture between Tutor Perini Corporation and Dragados USA, with Howard Needles (HNTB) providing design services for the contractor. STP was awarded a Design-Build contract on December 17, 2010 (executed on January 6, 2011) in the amount of $1.35B. Notice to Proceed (NTP) 1 (issued on February 7, 2011) allowed STP to commence with preliminary engineering and NTP 2 (issued on August 23, 2011) allowed STP to commence with final design and construction.

The instant dispute (reportedly on the order of $5 M) is related to the effect of WSDOT's post-award transmittal of certain Alaskan Way Viaduct (AWV) settlement information to STP. This information transmittal occurred in June 2011, some 6 months after contract award. The parties have asked for only a merit report from the Board.

STP contends that the specification requires the use of elastic design methods (EDM) and receipt of the June 2011 information precluded use of the same, given the specific contract requirements along with adherence to engineering codes, good professional practice and the like. The effect of the post-award settlement information and its bearing on the AWV strengthening design process caused STP to design and install some ~142,000 square feet (sf) of Carbon Fiber Reinforced Polymer (CFRP) on the AWV reinforced concrete structure and support beams. The installation of CFRP serves to strengthen the above structure so the entire 1950s era elevated roadway structure can sustain TBM related settlements in its footing areas, all while staying open for traffic. Based on the contract documents and information made available before contract award, STP allowed for only ~14,000 sf of CFRP in its bid price and it now seeks payment for the quantity in excess of that.

WSDOT contends that STP exaggerates the significance of the June 2011 information transmittal since, in essence, there was no new information provided. Further, STP should have determined the actual AWV conditions through its various pre-award site walk-downs and visits – it was all there to see. The structure dates from the 1950s and

was obviously damaged (stressed, cracked and settled) by virtue of the 2001 Nisqually earthquake and possibly other events. The entire AWV Replacement Tunnel Project was conceived because the existing AWV structure was well known as damaged and had only a limited remaining life. WSDOT contends that STP distorts the facts, circumstances and practice related to ground rules concerning the use of the EDM and accordingly, STP is due no money because existing practice codes would allow STP to use EDM notwithstanding its current protests. In any event, STP merely chose to adopt other more *conservative* engineering analyses and this conservative choice resulted in the CFRP quantity overrun. WSDOT also stresses that certain pre-award information revealed that significant settlements had occurred before STP received its contract.

STP was aware of the above but ignored the same as a consideration when preparing its Deformation Management Submittal (DMS) yet now retrospectively makes much of the June 2011 settlement information.

A DRB hearing was conducted adjacent to the jobsite in Seattle WA on June 17, 2013. Each party submitted initial position papers and rebuttal papers prior to the hearing. During the course of the hearing, the parties submitted and used additional exhibits and rebuttals, primarily in the form of certain PowerPoint presentations.

In the course of preparing and submitting hearing papers, the parties have advanced a plethora of structural engineering technical arguments, calculations, graphics and the like. It is not the intention of the Board to delineate each and every aspect of the parties' assertions and defenses in regard to the instant dispute but rather to merely summarize the most salient aspects of the same. Nevertheless, the Board has considered all of the documents and contentions set forth prior to the hearings as well as the testimony and documents provided during the hearing. For those seeking more texture and nuance, particularly in regard to the engineering arguments, the Board refers the readers to the various position papers, rebuttal papers, hearing day handouts, hearing testimony and other documentation.

II. STP POSITION

The most salient aspects of STP's position can be summarized as follows. First, from an engineering consistency perspective, STP contends that it independently satisfied itself (through use of EDM; site reviews related to WSDOT's damage repairs; absence of shoring; structure not weight-posted, etc.) that the D/C ratio (Demand divided by Capacity) of the existing AWV was not greater than 1.0 and was in sync with mandatory standards, codes and WSDOT's own Bridge Design Manual (BDM).

Second, STP emphasizes that in developing its design, it did not rely upon *Appendix S8* (S8) which is merely a contract *Reference Document* as opposed to a contract document, per se. Rather, STP only validated its own independent design conclusions (see above) as evidenced in its DMS. STP further argues that there were no contract ambiguities existing at the time of its contract award as related to the appropriate role of pre-existing AWV settlements and thus WSDOT's notice argument is off mark and of no consequence.

Third, specification *Technical Requirements 252* at ¶*2.52.5.4.3 - Methodology* calls for the use of the EDM in connection with the project's design and related analyses with a key result being a quantification of the type and amount of AWV strengthening necessary (CFRP) in order to meet a D/C ratio of less than or equal to 1.0. The significance of the above metric is that if met, the structure is deemed adequate for continuing service during the life of the instant project, according to the contract's *Technical Requirements* (TRs) and good engineering practice. STP concluded that in light of the above specification, it reasonably inferred that the AWV did in fact meet the D/C requirement (on bid day) and STP only had to thereafter maintain the ratio for TBM-induced settlement.

Fourth, STP contends that the settlement information received in June 2011 was late-issued and otherwise not able to be determined in the pre-bid time period by any reasonable site investigation and in particular not by virtue of WSDOT's *drive-by* argument in regard to site visits. STP contends that WSDOT withheld superior information and STP should not be damaged as a result.

Fifth, STP contends that in light of the excessive AWV settlements (as evidenced in the June 2011 information) it drew the sound engineering conclusion that the structure was behaving in a *plastic* manner and thus the use of the EDM was improper, according to codes and practice. Central to its case, STP asserts that ¶*2.52.5.4.3 - Methodology* became inapplicable thus rendering the contract specification as defective.

Sixth, the actual condition of the AWV forced STP to treat the structure's beams as *simple beams* since in light of the June 2011 information, it was now clear that *plastic beam hinges* had formed. In its analysis, STP was forced to draw upon complex engineering calculations to determine the existence of such hinges and other problematic aspects of the AWV. According to STP, the use of EDM is not compatible with plastically acting material.

Seventh, as a result of the post-bid June 2011 WSDOT information, STP reconsidered its view of the tolerable amount of vertical Longitudinal Differential Settlement (LDS) between AWV support bents. For a variety of reasons, STP concluded that the planned for settlement caused by tunneling should be increased to 1.00 inch instead of 0.50

inches that was used in the original analysis. This decision was made in deference to incomplete calibration with the TBM operations as related to AWV induced settlement modeling; the new-found structural failures at the AWV and more. According to STP, had the new-found AWV damage not eliminated the use of EDM and redundant load path considerations in failure analysis, STP would not have increased the LDS to 1.00". Here, STP notes that the June 2011 information contained settlements up to six times the estimated TBM induced movements. STP also cites that the number of bents exceeding the TR-provided vertical LDS target of 0.50" increased by 225%; the number of bents exceeding the TR-provided differential transverse target of 1.00" increased by 500%; and the magnitude of the maximum differential transverse vertical movement increased by 550%.

Eighth, STP also contends that WSDOT represented in S8 that it had already restored the AWV to a condition wherein D/C is less than or equal to 1.0 (e.g., repairs at Bents 97-100 and foundation underpinning at Bents 93-94) but the June 2011 information exposed that representation as errant. The June 2011 information indicated a D/C ratio of up to 3.0 which is well in excess of *Technical Requirements 252* at ¶*2.52.5.4.5 – Technical Requirement* amounts.

Ninth, STP also maintains that given the newly revealed seismic movements, it could not use imposed TBM movements that were less than those already sustained in the earthquake while keeping square with good engineering practice and related codes. Thus, STP was first forced to bring the AWV into compliance with a D/C of less than or equal to 1.00 and then maintain that criterion while mining the tunnel. This two-phase scenario is not the contract bidding condition.

Tenth, STP contends that since it is now readily recognized that the AWV had sustained heretofore unknown and significant deterioration, the amount of CFRP required for mitigation became considerable and was used throughout the structure.

Eleventh, STP asserts that while WSDOT was watching over STP's shoulder during the design phase of the work, in fact, WSDOT issued a Work Directive letter to STP in regard to STP making its engineering determinations based on the June 2011 information. For WSDOT to now complain about the cost aspects of the outcome is simply self-serving – it knew what was transpiring at all times.

In summary, STP contends that its DMS validated its approach to the AWV strengthening program and was consistent with WSDOT-supplied information at bid time along with the relevant CDs. WSDOT then provided post-bid information that was new and different and resulted in a condition wherein STP could not use the contract specified EDM and the CFRP overruns resulted solely from this scenario. STP wants its money for the defective specification.

From time to time, STP characterized this dispute as being contractual in nature not a technical engineering disagreement.

III. WSDOT POSITION

The most salient points of WSDOT's position can be summarized as follows.

First, as a general matter, WSDOT contends that any and all costs that STP incurs in the process of deriving a contractually compliant design are its own to bear and thus WSDOT owes STP nothing in regard to this dispute. Here, WSDOT cites a plethora of specifications including:

- *Article 3.1.1 – Design Requirements* – STP assumes responsibility for completeness
- *Article 3.1.2 Obligation to Correct Errors* – No reliance on Reference Documents and the like
- *Article 3.3 – Reference Documents* – provided for information only and not to relied upon, no WSDOT liability
- *Article 5.9 – Deformation Mitigation and Repair* – STP responsibility with no added cost
- *Article 26.7 – Interpretation of Contract Documents* – STP responsibility to review all CDs; bring ambiguities to WSDOT attention

Second, as for STP's general contentions in regard to the use of EDM and plastic design methodologies (PDM), WSDOT asserts that either STP does not understand the inherent workings of the above methods or is just trying to muddy the water. On a summary level, WSDOT has asserted the following with respect to good-practice-use of EDM:

1. *TR 2.52* requires STP to use EDMs in determining structural demands and use of that methodology is underpinned by parameters such as cross-section area; the cracked section moment of inertia and modulus of elasticity, none of which are settlement determined. The capacity/strength of an element is simply not a factor in the demand side of the equation and the above three properties are not altered based on settlement amounts. Thus, the settlements about which STP makes much did not drive this aspect of STP's design and resultant cost - STP has no valid claim.

2. STP has wrongly assumed that the contract's EDM requirement to determine demands also requires bridge elements to be within the elastic limit of the material. This is neither true nor is it a contract requirement.
3. Member capacity and strength is determined from concrete properties, rebar size and placement, not settlement. Capacity determination includes *Ultimate Resistance* which is also in the contract at *TR 252.5.4.6.1*.
4. *AASHTO Extreme Events Limit State* (LRFD 3.10.7) relies on plastic hinges to form strength, stability and prevent collapse. The AWV was damaged by an extreme event and STP's protestations in regard to settlement, EDM and PDM ring hollow.
5. Moment-Curvature concrete section analysis to determine the Ultimate Capacity of plastic hinges requires determination of plastic rotations by an elastic step-by-step analysis. The apparent point here is that there is not always a bright line between EDM and PDM and STP knows it.

As another example relating to STP's application of design principles, WSDOT points out that the AWV is riddled with plastic hinges and yet it performs – there is no real problem, here. WSDOT also points to one certain plastic hinge at Span 98 that is nearly elastic but yet STP applied 6 layers of CFRP wrapping in engineering overkill. WSDOT points to such examples as being further illustrative in regard to the profound implications of increasing the vertical LDS to 1.00" from 0.50".

Third, WSDOT does not dispute that it transmitted certain settlement information to STP in June 2011 but asserts that none of the information was materially new or different in that it was all available at bid time. WSDOT contends that there were no material and significant changes to the physical aspects of the AWV structure when compared to bid time conditions.

Fourth, to the extent that STP contends that via S8 or otherwise, WSDOT somehow mislead it in regard to important aspects of the pre-existing conditions of the AWV and also regarding the nature of the earlier-executed WSDOT repairs, the conditions were all there to see in plain sight at bid time (e.g., 3 ½ inch bent leaning). Here WSDOT draws upon specification ¶*2.3.4 – Review of Site Information* and other similar specifications concerning STP's duty to make reasonable site determinations. Had STP fully complied with its site determination obligations, it would have readily concluded at bid time that the AWV structure had sustained the very June 2011 settlements that are now in play. WSDOT emphasizes that it paid STP a bid stipend of ~$4M and gave it 5 months to assess site conditions and given that fact, STP had a heightened duty to reasonably evaluate the AWV and its history, which it apparently did not do. This is not a run-of-the-mill D-B construction with short bid preparation times.

Fifth, WSDOT asserts that it made no misrepresentations about the earlier WSDOT repair work being *restorative* in nature – the reasonableness of this assertion becomes obvious upon a review of the work site, S8 and other CDs. Related to this issue, WSDOT also contends that merely because it identified certain past AWV repairs does not mean that there were no other repairs to be made – the contract is ripe with clear risk allocation rules. In support of the above, WSDOT introduced exhibit **WSDOT1** during the hearing which indicates that STP analyzed not only areas of damage identified by WSDOT but also considered other portions of the structure in its bid-day analysis.

Sixth, WSDOT also contends that even though S8 is not a CD and cannot be relied upon (a matter not in dispute) WSDOT still contends that the S8 analysis is not applicable to the work at Bents 94-100, the cost of which is included in STP's claim. (The Board here notes that during the hearing, STP objected to WSDOT's contention but did not offer clear and meaningful testimony as to why it objected other than making a broad statement about being misleading). As for STP's DMS, WSDOT asserts that therein STP merely mimicked the S8 information, used linear interpolation and other types of analyses, all at its own risk. WSDOT stresses that STP did not perform a linear-elastic design analysis while preparing its proposal and now STP is just posturing in regard to descriptive design terms.

Seventh, WSDOT further contends that STP was not required under the terms of the contract to account for pre-existing settlements including those transmitted in June 1011. Rather, STP was only required to *do no additional harm*, that is, don't make things worse for the AWV. Here, WSDOT contends that upon review of the STP DMS, it is abundantly clear that STP knew of settlements in excess of 4 inches (3.4 to 4.6 inches at Bent 93 and 4.0 inches at Bent 94) which is a matter not factually disputed but yet STP ignored the same in its engineering assessment. In short, STP only had to address tunnel induced movements not pre-existing ones, contractually. STP merely went above and beyond the call of duty.

Eighth, STP on its own chose to treat the AWV beams as *simple span* in nature and as a result ensured that the structure would become unnecessarily freighted with CFRP. Simple beam assumptions, de facto, result in higher amounts of strengthening. Thus, WSDOT asserts that it should not have to compensate STP for work performed in excess of contract requirements.

Ninth, STP on its own decided to plan for *TBM induced movements* up to 1.00 inch instead of the contractually required 0.50 inch which in turn prompted STP to increase the AWV's *vertical LDS* to 1.00 inch from 0.50 inch. WSDOT contends that, here, STP was simply facilitating TBM operations by designing for more differential settlement in the AWV, a matter that should not contractually be at WSDOT's door-step – this was

STP's trade-off to make. WSDOT points out that the above ½ inch increase actually resulted in a doubling of shear demand which, again, is extra-contract in nature and thus non-compensable.

Tenth, from inception, WSDOT denies that issuance of its directive letter implied that WSDOT might be liable for any or all of the disputed costs – WSDOT has always denied STP's request for additional compensation.

In summary, WSDOT contends that its contractual additional compensation filters effectively block STP's request for more money. Further, as the Engineer of Record (EOR), STP had the duty to determine relevant site conditions along with contract compliant means & methods. Further, the RFP documents are consistent with existing AWV existing field conditions, all of which were available for determination at bid-time. The contract embraces only minimum requirements and STP's choice to go above contract requirements was its own and WSDOT owes it no addition compensation.

IV. DRB FINDINGS AND CONSIDERATIONS

The Board has reviewed the facts and circumstances before it and finds the following.

While it is undisputed that the instant settlement information as made known in June 2011 was not formally transmitted until well after STP signed its contract, the bare timing of the transmittal is not tantamount to reasonable evidence that STP was indeed damaged. STP maintains that the impact of the new information was to preclude the use of EDM and if it is to receive additional compensation, STP must reasonably support its case. To-date, STP has fallen short.

Key DRB Findings and Considerations

For openers, STP contends that for a variety of engineering reasons, the contract's representation that EDM could be used for design ultimately turned out to be false. Based on all the evidence before us, we find that the contract does indeed reference the use of EDM at ¶*2.52.5.4.3 – Methodology*.

However, we find that neither the CDs nor the June 2011 information nor good engineering practice prevented STP from using EDM. Here, on these technical issues, WSDOT's testimony has been more convincing than that of STP.

The most salient aspects of the engineering testimony that have persuaded us to find as noted above include but are not limited to the following:

- Bridge element behavior does not have to remain within the elastic behavior range in the instant setting for application of EDM (see item 2 at page 6). STP asserts to the contrary and we do not agree, based on testimony.
- Settlement is not the driving metric in determining the demand side of the D/C ratio because the working parameters such as cross sectional area (see item 1 at page 6) are not settlement determinative. STP asserts to the contrary and we do not agree, based on testimony. *Late* settlement information should not have restrained STP's use of EDM.
- Member capacity and strength are not determined by settlement but rather concrete properties and rebar considerations (see item 3 at page 6). STP asserts to the contrary and we do not agree, based on testimony. *Late* settlement information should not have restrained STP's use of EDM.
- *ASSHTO's Extreme Event Limit State* embraces plastic hinges to form strength, stability and prevent collapse (see item 4 at page 6). The AWV is an earthquake damaged structure (Extreme Events) and the design falls under ASSHTO.

Given the above findings and STP's testimony to-date, the merits of STP's keystone argument are considerably diminished. In short, there need not have been a material and significant *engineering-so-what* to receipt of the June 2011 settlement information.

Of equal importance, STP's own pre-award actions in regard to the materiality and use of settlement information appear to undercut its current position. To wit, STP had pre-award knowledge that settlements in excess of 4" inches existed but did not include that consideration in its engineering DMS. Now, during the hearing, STP sought to minimize the importance of the 4" settlement by citing that only one such bent existed and to address the matter, STP simply would have *shored* the elements at issue. If posting were so acceptable, design-wise and cost-wise, given STP's rebuttal, one might have expected STP to shore the entire structure which it did not – the to-date STP testimony on the significance of the June 2011 settlement information is just not convincing.

As important as the above, WSDOT has staked out the position that STP exercised an engineering trade-off as between TBM operations and the AWV strengthening work by virtue of reassessing TBM induced movements to be 1.00" (instead of 0.50") and then moving the AWV vertical LDS in a lockstep manner to 1.00" from 0.50". Here the Board has no quarrel with STP's trade-off but cannot conclude that the above *for-convenience-action* contractually draws WSDOT to the compensation table even though the project should benefit from such action. WSDOT asserts that this incremental increase of 0.50" alone resulted in a doubling of flexure CFRP and STP has failed to convincingly challenge such testimony. The above engineering trade-off was made at STPs' election and was not mandatory under the terms of the contract. Thus, it is not compensable.

Our review of the CDs also indicates no convincing evidence that WSDOT contractually characterized past work that it had performed on the AWV as being *restorative* in nature. For whatever its worth, a reasonable review of S8 which is not a CD suggests that WSDOT was merely listing what had been prior done as opposed to underwriting the restorative efficacy of those listed actions. Thus, in our view, risks associated with the *restorative* aspects of this dispute and the associated acceptability of the as-standing structure at the time of contract award ran with STP not WSDOT.

Now, STP also analyzed portions of the AWV in its DMS that WSDOT had not prior-identified as being damaged. Regardless of the location of such other AWV features (e.g., tunnel-in-a-box), the fact remains that STP considered non-WSDOT-identified areas of damage while performing various aspects of its DMS engineering analysis yet now appears to reject the reasonableness of doing so. Here, STP is inconsistent because its pre-award actions speak volumes in regard to what it contemporaneously viewed as its reasonable obligations in a non-claim setting. Simply stated, STP's argument that it had a right to conclude that the only strengthening required went exclusively to bridge elements specifically identified by WSDOT is just not credible.

As for the role of site investigations in this dispute, WSDOT contends that all was there in plain view, in pre-bid space, and STP could have, accordingly, determined the actual condition of the AWV. WSDOT emphasizes that STP was paid ~$4M to bid the job and had a 5-month assessment period – this is not a design-bid-build contract with short bid preparation time periods and no bid stipend. Further, the 3 ½ inch column leans and such were hard to miss, given reasonable attention.

STP has countered that the WSDOT position is a stretch in regard to realistic pre-bid inquiry and it is not reasonable to expect STP to have WSDOT's level of knowledge in regard to the AWV that WSDOT has owned for 60 years or so. In particular, STP objects to the practicality of a D/C determination via a *site fly-by* without detailed as built surveys that would be difficult if not impossible for it to perform, all as a private contractor bidding on a project.

In summary, although the site investigation issue has been the subject of considerable stage time in this dispute, the DRB does not find the issue as being overall dispositive in regard to this dispute. We thus render no finding, here, and focus on other aspects of the dispute, as set forth above.

[Balance of page intentionally left blank]

V. DRB RECOMMENDATION

Based on the contract documents and the bulk of evidence and testimony before us, the Board does not recommend that STP is entitled to any additional compensation as a result of WSDOT's June 2011 settlement information.

Daniel F. Meyer – Chair

_____

Russell Clough – Member

_____

Peter Douglass – Member

_____

Date

_____

[Balance of page intentionally left blank]