

## DISPUTE REVIEW BOARD RECOMMENDATION

September 14, 2011

E-Mailed September 14, 2011

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RE: SR 50 (W COLONIAL DR) FROM A PT W OF HANCOCK RD  
TO A PT W OF REMINGTON RD  
FIN No.: 238429-4-52-01  
Contract No. T5271  
Disputes Review Board

Issue: Hard Driving Sheet Pile Entitlement at TW-1 and TW-3

Gentlepersons:

The Owner, Florida Department of Transportation (Department), and Contractor, Prince Contracting, LLC (Prince), requested a hearing on the above issue in accordance with the Dispute Review Board (DRB) Operating Procedures:

Prince stated in its August 16<sup>th</sup> 2011 request:

*Prince would like to set up a DRB hearing for the above referenced project on Wednesday, September 14, 2011. Prince is requesting this DRB hearing because of a hard sheet pile driving condition Prince has encountered on the project. Prince encountered this hard driving condition at sheet pile walls TW-1 and TW-3 located at station 1388 LT and 1490 RT respectively. Prince considers this a differing site condition as the borings in the plans are not accurate. This Issue has been escalated to the proper personnel within Prince and the FDOT and it appears a DRB hearing is necessary to resolve the issue.*

On August 16<sup>th</sup> 2011 the DRB e-mailed the Department inquiring:

*The Board is in receipt of a request from the Contractor to conduct a hearing on an issue described in the e-mail ....*

*Please confirm that the issue has been properly escalated, that all prerequisites have been met and the issue is ripe for a hearing.*

The Department stated in its August 18<sup>th</sup> 2011 response:

*The issue has been properly escalated, all prerequisites have been met and the issue is ripe for a hearing.*

Pertinent issues, correspondence and other information relating to the Department's and the Contractor's positions were forwarded to this Board for review and discussion at the hearing that was held on September 14<sup>th</sup> 2011. Should entitlement be established, the DRB was not to decide the quantum of such entitlement at this time, as the parties would attempt to negotiate the value of entitlement.

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## CONTRACTOR'S POSITION:<sup>1</sup>

### *Issue Summary*

*PRINCE experienced harder driving conditions than were anticipated based on the borings provided in the plans at temporary sheet pile walls TW-1 and TW-3 during the dates of September 25, 2009 through October 13, 2009 and February 9, 2010 through March 10, 2010 respectively. PRINCE did not experience hard driving conditions when it installed wall TW-2.*

### *Anticipated Conditions*

*Wall TW-2 is located on the north side of SR 50 from station 1490+25 to 1497+30 which is directly across from the road wall TW-3. The plan SPT borings at wall TW-2 show maximum values of 31, 28, and 33 blows per foot. These values are slightly less than the values at wall TW-3, however they are similar. With the SPT boring values being so close between walls TW-2 and TW-3, the driving conditions would be presumed to be similar at both wall locations. If the SPT borings on the plans were accurate, the driving conditions at both walls would be relatively similar. Plans show maximum N-values for borings taken at walls TW-1, TW-3, and TW-2 to be 48 blows per foot, 45 blows per foot, and 33 blows per foot, respectively.*

### *Actual Performance*

*PRINCE drove 1400 SF of sheet piles on Friday, September 25, 2009 at Wall TW-1 which was a typical pace; therefore PRINCE believed there would be no issues with driving the sheet piles at this wall. On Monday, September 28, 2009 PRINCE started to encounter difficult driving conditions in which only 760 SF of sheet piles were driven. After observing the hard driving conditions PRINCE rented a hydraulic impact hammer on Tuesday, September 29, 2009 to see if it would perform any better than the vibratory hammer. PRINCE worked all day Tuesday driving with the vibratory hammer while setting up the impact hammer. PRINCE again only installed 760 SF on Tuesday. PRINCE continued using a combination of the vibratory hammer and impact hammer until October 13, 2009 when wall TW-1 was completed.*

*PRINCE drove 945 SF of sheet piles on Tuesday, February 9, 2010 at Wall TW-3. PRINCE continued driving the sheets at this sluggish pace until Friday, February 19, 2010. PRINCE had all the sheets in the ground as of February 19, but many of the sheets had not been driven to their plan depth. PRINCE then rented an impact hammer and power drill unit on March 3, 2010 and used the impact hammer and power drill unit until March 10, 2010 when all the sheets were finally driven to their plan depth.*

### *Investigation*

*Due to difficult driving conditions experienced in the field at TW-1 and TW-3, PRINCE hired Professional Services Industries, Inc. (PSI) to perform Standard Penetration Test borings (attached) on February 17, 2010. PSI took borings at wall TW-3, at the same stations that the plan borings were taken, however PSI took its borings closer to the wall. These borings showed a maximum N-value of 71 blows per foot. PSI's SPT borings were only*

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<sup>1</sup> For exhibits or pages referenced the reader should refer to the Parties full position papers.

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*5 feet away from wall TW-3 and the plan SPT borings were 11.5 feet and 8.5 feet away from wall TW-3. Because of this, PRINCE believes that PSI's SPT borings are more representative of the actual subsurface conditions.*

*PRINCE used CZ-128 sheet piles for all the temporary sheet pile walls on the project. PRINCE selected these sheet piles based on the shop drawings and the sheet pile data table on sheet 551 (attached) of the plans. The sheet pile data table included several parameters that the sheet piles were required to meet. Since the CZ-128 sheet piles are cold formed, the section modulus of the sheets needed to be 20% greater than the table indicated. PRINCE met and exceeded all the parameters in the sheet pile data table with ease. Because of the unforeseen hard ground conditions, the sheets were damaged extensively due to excessive driving. These damages were far greater than normal wear and tear and would not have happened if the borings in the plans were accurate, especially given that PRINCE followed all the parameters in the sheet pile data table.*

*PRINCE also noticed a difference in the soil strata between the PSI borings and the borings shown in the plans. The plan borings show fine to medium sand for all the walls in the upper layers. There are a couple of borings in the plans that show fine to medium sand with a trace of clayey fine sand near the bottom of the borings. The PSI borings show fine sand in the upper layers and fine sand to fine sand with silt near the bottom of the borings. Fine sand would be more dense when compared to fine to medium sand. A greater effort would need to be applied to drive the sheet piles through fine sand rather than through a fine to medium sand.*

*PRINCE hired PSI to perform an analysis (attached) to determine if the CZ-128 sheets would have been damaged if the boring information in the plans were accurate. PSI found that minimal to no damage would have occurred if the borings in the plans accurately reflected the subsurface conditions in the field. PSI also suggested that a different kind of temporary wall be constructed based on the subsurface conditions that were actually encountered.*

### **Supporting Specification**

*PRINCE contends that it encountered a subsurface differing site condition, in accordance with Specification 4-3.7 at walls TW-1 and TW-3. Based on the SPT borings shown in the contract plans, PRINCE should have been able to drive the CZ-128 sheets with the same vibratory hammer at each wall without any issues and causing minimal if any damage to the sheet piles.*

*Although PRINCE suffered productivity and time impacts as a result of the actual conditions encountered, PRINCE is only requesting additional compensation for the damage to the sheets and the professional service fees incurred during the investigation. A detailed compilation breakdown of the amount of additional compensation sought is attached.*

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## DEPARTMENT'S POSITION:

### *Issue Summary*

*Prince Contracting (Prince) has submitted a request for additional compensation due to an alleged differing site condition at the temporary wall locations TW-1 and TW-3. While driving sheet piles at these two locations, Prince believes they experienced more difficult conditions than they anticipated based on the borings provided in the plans. Prince selected a vibratory hammer at these locations initially to drive the sheet piles. When that equipment failed to perform they replaced it with an impact hammer to drive the sheet piles. While using the impact hammer at the two locations noted previously, damage took place to the sheet pile being driven. Prince was renting the sheet pile material being driven and expected to return these rented sheet piles without being damaged.*

*Prince assumed the SPT N-Values for temporary walls TW-2 and TW-3 were similar. The sheet piles at TW-2 were driven without the need for additional effort and assumed that TW-3 should have driven the same way. Prince brought in Professional Services Industries (PSI) to perform tests at temporary wall TW-3. They contend there is a difference in the SPT N-Values and the soil strata classification between PSI's findings and the original borings. Prince contends they had to use different equipment and more labor at walls TW-1 and TW-3 than originally anticipated. Prince stated they selected the sheet pile material based on the parameters provided in the plans and met or exceeded each parameter. Prince states the sheet piles were damaged extensively caused by excessive driving due to the hard ground conditions and contends the damage is far greater than normal wear and tear for pile installations that would not have occurred if the borings were accurate since they met all the parameters in the sheet pile data table provided in the plans. In conclusion, Prince contends they encountered differing site conditions and based on the SPT boring values shown in the plans, they should have been able to drive the CZ-128 sheets with the same vibratory hammer at each wall location without any issues or damage to the sheet pile material.*

### *Facts from Relevant Contract Documents*

- 1. Plan Sheet Nos. 552, 555 and 556 (Attachment A, Page Nos. 6, 7, & 8) contain the borings for Walls 1, 4 and 5 which are also the locations for temporary sheet pile walls TW-1, TW-3 and TW-2. In the upper right hand corner of each plan sheet a table under the heading "Engineering Classification" is provided showing the relative density of the material as defined by the SPT N-Value for an automatic hammer in blows per foot. "Dense" material is noted with an SPT N-Value between 21 and 35 blows per foot. "Very Dense" material is noted with an SPT N-Value of greater than 35 blows per foot.
  - A. The three borings at TW-1 on plan sheet 552 (Page No. 6) indicate upper limits of SPT N-Values of 40, 48 and 33 which indicate one should expect "Very Dense" material.*
  - B. The two borings at TW-3 on plan sheet 555 (Page No. 7) indicate upper limits of SPT N-Values of 38 and 45 which also indicate one should expect to encounter "Very Dense" material.*
  - C. The two borings at TW-2 on plan sheet 556 (Page No. 8) indicate upper limits of SPT N-Values of 31, 28 and 33 which indicate one should expect to encounter "Dense" material.**

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2. *Plan sheet 551 (Attachment A, Page No. 5), under “Sheet Pile Walls:”, “General:”, Note No. 3 states: Installation of the sheeting may require equipment (vibratory, impact, or both) of sufficient size to overcome soil resistance and achieve the required tip elevations. No jetting will be allowed and no open excavations will be allowed.*
3. *Plan sheet 551 (Attachment A, Page No. 5), under “Sheet Pile Walls:”, “Payment:”, Note No. 3 states: Pay Items 455-133-2 and 455-133-3: in addition to the requirements of sub article 455-12.6 of the Specifications, these pay items include all cost associated with stopping and resuming sheet pile installation operations; any necessary sheet pile extractions or cutting; and mobilization of preforming equipment or other special equipment required to facilitate sheet pile installation and installation of headed stud anchors. **Also includes all cost associated with sheet pile hole preforming and all operations associated with preforming, removal, and/or penetration of rock and/or strong material for the installation of the sheet piling.***
4. *Specification 455-12.6.2 Temporary Sheet Piling (Attachment B, Page No. 14): For critical temporary steel sheet pile walls, walls which are necessary to maintain the safety of the traveling public or structural integrity of nearby structures, roadways and utilities during construction, that are detailed in the plans, **price and payment will be full compensation for all labor, equipment, and materials required for furnishing and installing steel sheet piling** including preformed holes when shown in the plans, and including wales, anchor bars, dead men, soil anchors, proof tests, creep tests, and other incidental items when an anchored wall system is required. Removal of the sheet piling, anchors, and incidentals will be included in the cost per square foot for Steel Sheet Piling (Critical Temporary).*
5. *Specification 2-4, Examination of Plans, Specifications, Special Provisions and Site of Work (Attachment B, Page No. 15): Examine the Contract Documents and the site of the proposed work carefully before submitting a proposal for the work contemplated. **Investigate the conditions to be encountered, as to the character, quality, and quantities of work to be performed and materials to be furnished and as to the requirements of all Contract Documents. The Department does not guarantee the details pertaining to borings, as shown on the plans, to be more than a general indication of the materials likely to be found adjacent to holes bored at the site of the work, approximately at the locations indicated. The Contractor shall examine boring data, where available, and make his own interpretation of the subsoil investigations and other preliminary data, and shall base his bid on his own opinion of the conditions likely to be encountered. The bidder’s submission of a proposal is prima facie evidence that the bidder has made an examination as described in this Article.***

### **Findings**

*The borings in the plans at both temporary wall locations **indicate that very dense material would be encountered** when driving the sheet piles. Contrary to Prince’s assumption, there is a difference between the SPT N-Values for borings at TW-2 and TW-3. The material at TW-3 is classified as very dense while the material at TW-2 is classified as dense. While the original borings classify most of the material as “fine to medium” sand and PSI classifies the material as “fine” sand, this is similar classifications with the notation of “fine” being*

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*included in the description “fine to medium” which is covered in the original classification and should be anticipated. The sheet pile sections noted in the plans are the minimum required. Being critical temporary sheet piling due to public safety concerns, a minimum required section must be provided and met by the contractor to support the loads of the earth it is retaining; however, a thicker and stronger section of sheet piling could have been used which might have helped to avoid or reduce the damage that occurred.*

*It appears the Engineer of Record also anticipated the contractor encountering “strong material” as they included the note stating that vibratory, impact or both type hammers may be required to install the sheet piling. The information to make a proper assessment for driving this sheet piling was provided in the contract documents. The means and methods for bidding, obtaining, handling, driving and removing the temporary sheet piles are the contractor’s responsibility. Per the specifications all costs for this work is to be included in the bid item. The specifications also state the contractor is responsible for investigating the conditions to be encountered and is to base his bid on his own opinion of the conditions likely to be encountered. From the borings and the notes in the plans the contractor should have expected to encounter a strong, very dense material. Whether he could return the piles undamaged or not after driving them or include that cost of repair or loss due to damage of the sheet piles in their bid was their decision to make, but either way it is ultimately their responsibility.*

*Due to the soil conditions shown in the borings in the plans and using past experience in driving sheet piling in such soil conditions, one must consider that difficulties and damage would be expected during the installation or removal of such sheet piling.*

***Based on these findings, we conclude the only logical decision which can be obtained is that the request for additional compensation be denied.***

### **CONTRACTOR’S REBUTTAL:**

*Prince Rebuttal to FDOT/DRMP Position Paper for Differing site conditions at sheet pile walls TW-1 and TW-3*

*The FDOT’s position paper finds that the borings in the plans at walls TW-2 and TW-3 differ because they have different relative density classifications. The material at wall TW-3 is classified as very dense while the material at TW-2 is classified as dense. The FDOT calls out the similarity of the soil classifications between the plan borings and PSI’s borings. The plan borings call out fine to medium sand and the PSI borings call out fine sand. They also bring up the point that the plans call for a minimum sheet pile section and that PRINCE could have chosen a thicker more durable sheet. Their position paper also talks about the engineer of record anticipating the contractor encountering strong material.*

*In regards to the relative density classification, The SPT N- values at wall TW-2 are in the upper limits of the dense category and The SPT N-Values at wall TW-3 are in the lower limits of the Very Dense category and thus the reason PRINCE deemed the borings at both locations similar. Although the soil classifications given are similar in regards to their naming, fine sand would be harder to drive sheets through when compared to a fine to medium sand. The fine sand would include smaller particles which would contain less air voids between the particles and cause a harder driving condition. A fine to medium sand would include larger air voids between*

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*particles and cause an easier driving condition. PRINCE furnished sheet piles that did meet the minimum requirements as the FDOT has stated. PRINCE believes that if the minimum requirements for the sheets are achieved then there should not be any issues with the sheets because the minimum requirement in the plans is input into the plans to ensure that no issues arise. PRINCE understands that the Engineer of Record may have anticipated the contractor encountering strong material but we do not believe that the EOR could have anticipated the very strong material that PRINCE actually encountered.*

*In conclusion, the borings performed by PSI were much closer to the sheet pile wall than the plan borings, meaning PSI's borings were more representative of the actual subsurface conditions at the sheet pile wall. The actual SPT N-Value at the wall was 80 whereas the plan SPT N-Value was 45. This indicates that the actual boring SPT N-Values are 78% harder than the plans indicate which is an enormous difference. PRINCE could not have reasonably expected at bid time that the actual boring SPT N-Values would be 78% harder. Also, a professional geotechnical engineer found that the sheets PRINCE used were sufficient based on the plan borings and should not have been damaged. The geotechnical engineer even went out of his way to state that a cantilever soldier pile wall system utilizing wood lagging and HP 12x53 pile sections would have been more practical considering the actual encountered subsurface conditions. Based on the information PRINCE has provided it is clear that a subsurface differing site condition was encountered.*

### **DEPARTMENT'S REBUTTAL:**

*The contractor's position, per their position paper, comes down to differences in SPT-N values and soil classifications taken by an engineering firm after the fact, the supposed similar SPT-N values between areas with easier driving and more difficult driving areas, and meeting all minimum design requirements for the sheet pile system itself.*

*While all this is arguable, the real issue to consider is if the contractor had the proper information in the contract documents at the time of bid to anticipate encountering hard driving conditions in very dense material while driving the sheet piling. As noted in our original position paper, there are several indications in the contract documents for a contractor to be forewarned of the possibility of hard driving conditions in very dense material.*

- 1. There is clear indication from the SPT-N values in the original plans that the material in question is VERY DENSE. This is shown in both locations in question. There is no greater or more dense classification than "Very Dense".*
- 2. The soil is classified as "fine to medium sand" which does include a potential for a majority of the soil to be classified as "fine".*
- 3. The engineer of record's notes also indicates there was a potential for the necessary use of an impact hammer along with the vibratory equipment when installing these sheet piles. He also notes that no jetting or open excavations would be allowed to overcome soil resistance.*

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*All these reasons provide a strong case for the potential to encounter hard driving conditions in dense material while installing these sheet piles and if reviewed, allows the contractor to make the proper decisions during bid preparation for the use of the temporary sheet pile material.*

*In rebuttal to the contractor's position, we make these points. Although differences were derived in the SPT-N values at these boring locations, which could be due to a number of factors unrelated to the actual soil conditions, encountering "Very Dense" material is noted in both sets of borings. Also, both borings resulted in the classification of the soil as containing fine sands. The similar comparison of borings between TW-2 and TW-3 is invalid as the borings at TW-3 indicate the material as "Very Dense" while the borings at TW-2 indicate the material as only "Dense". Finally, meeting the minimum requirements of the sheet pile data table does not in any way validate the performance of the sheet piling to ensure it from being damaged while being driven. These parameters are for the proper performance of the sheet piling after it is driven for the critical nature of safely upholding the earth while excavation occurs on one side for the permanent wall installation.*

*The condition of the sheet piles while being driven or removed is always under the contractor's control. The size of vibratory or impact hammer used, maintaining proper vertical alignment while driving, maintaining proper joint connections, storage, handling, and transportation are all under the contractor's control and could all also play a part in the potential damage of this sheet pile material. This is why specification 455-12.6.2 (page no. 14 in original position paper) states "...price and payment will be full compensation for all labor, equipment, and materials required for furnishing and installing steel sheet piling".*

*In conclusion as stated earlier, the real issue to consider is if the contractor had the proper information in the contract documents at the time of bid to anticipate encountering hard driving conditions in very dense material while driving the sheet piling. As provided as facts in our original position paper and this rebuttal, one can only determine the contract documents do contain this information.*



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## BOARD FINDINGS/EXPLANATION:

Plan Sheet 551 contains in part:

### SHEET PILE WALLS:

#### GENERAL:

1. Contractor is responsible for the means and methods of construction. Refer to general Notes and Index of Sheets for additional notes.
2. The Contractor shall install horizontal graduated markers near the top of the sheet pile wall. The markers shall be capable of measuring total deflection up to 2'-0" and within 1/2" intervals. Markers shall be spaced 50'-0" apart each wall section at locations determined by the Engineer. Contractor shall monitor wall deflections and report to the Engineer as directed by him/her.
3. Installation of the sheeting may require equipment (vibratory, impact or both) of sufficient size to overcome soil resistance and achieve the required tip elevations. No jetting will be allowed and no open excavations will be allowed.
4. Temporary sheet piling shall remain the property of the contractor and shall be removed from the site upon completion of work. The contractor shall submit his method of sheet piling removal and soil treatment at the removal site to the Engineer for approval.
5. All Steel Sheet Piling shall meet the minimum requirements shown in the Steel Sheet Pile Data Table.

#### MATERIALS:

1. Steel Sheet Pile: Provide in accordance with ASTM A328 or ASTM A572 (Grade 50) as appropriate.
2. Structural Steel and Anchorage Cover: AASHTO 270 (ASTM A709) Grade 36 or superior.
3. Bolting: ASTM A307 or superior.
4. If cold formed steel sheet piling is used, the required section modulus should be increased by 20%.

SHEET PILE DATA TABLE														
CONSTRUCTION INFORMATION ****									DESIGN PARAMETERS ****					
* WALL LOCATION			Minimum Wall Tip Elevation (ft)	Min. Sect. Modulus (in <sup>3</sup> /ft of wall)		Maximum Allowable Bending Moment (k-ft)	Minimum Required Moment of Inertia (in <sup>4</sup> )	*** Maximum Scaled Deflection (lb-in <sup>3</sup> )	Wall Top Elev (ft)	Critical Soil Elevation		Water Elevation		Design Live Load (psf)
WALL	STATION (Begin to End)	OFFSET (ft)		** A-328 (Fy=38.5 ksi)	** A-572 (Fy=50.0 ksi)					Front of Wall (ft)	Back of Wall (ft)	Front of Wall (ft)	Back of Wall (ft)	
8	420+00 to 424+00	61.50 (Rt.)	105.0	31.0	23.8	64.5	187.5	8J5E9	varies	varies	varies			240
△ TW-1	1385+02 to 1390+95	45.50 (Lt.)	varies	18J	13.9	31.9	84.4	4.90E9	varies	varies	varies			240
TW-2	1490+25 to 1497+30	45.50 (Lt.)	73.0	18J	13.9	31.9	84.4	4.90E9	varies	varies	varies			240
TW-3	1488+30 to 1492+00	45.50 (Rt.)	varies	18J	13.9	31.9	84.4	4.90E9	varies	varies	varies			240

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**NOTES:** For table values listed as "varies" see WALL B and TEMPORARY SHEET PILE WALLS

- \* See Individual wall plans. Offset measured to exterior face of Wall, (from  $\bar{C}$ ), unless otherwise noted in the Individual wall plans.
- \*\* Allowable design stress, based on 55 % of the yield stress (Fy). All values per foot of wall
- \*\*\* Divide maximum scaled deflection by Modulus of Elasticity in (psi) times Moment of inertia in (in<sup>4</sup>) to obtain deflection in inches. Temporary Sheet Pile Wall deflections shall be limited to 6 inches or less. Sheet Pile Wall Deflections will cause distress of the adjacent pavement during construction. The roadway pavement conditions behind the Sheet Pile Walls shall be maintained by the Contractor during construction and all costs associated with this shall be included in the cost of MOT.
- \*\*\*\* The Design Parameters Indicated in this table were used in the sheet pile wall analysis. If the Contractor plans operations which exceed the design parameters shown above, it will be the Contractor's responsibility to redesign and construct the walls accordingly. Safety factors of 1.5 and 1.0 were applied to the passive and active soil pressures, respectively. The Sheet Pile Analysis and Section Properties are per 1.0 ft of wall

**PAYMENT:**

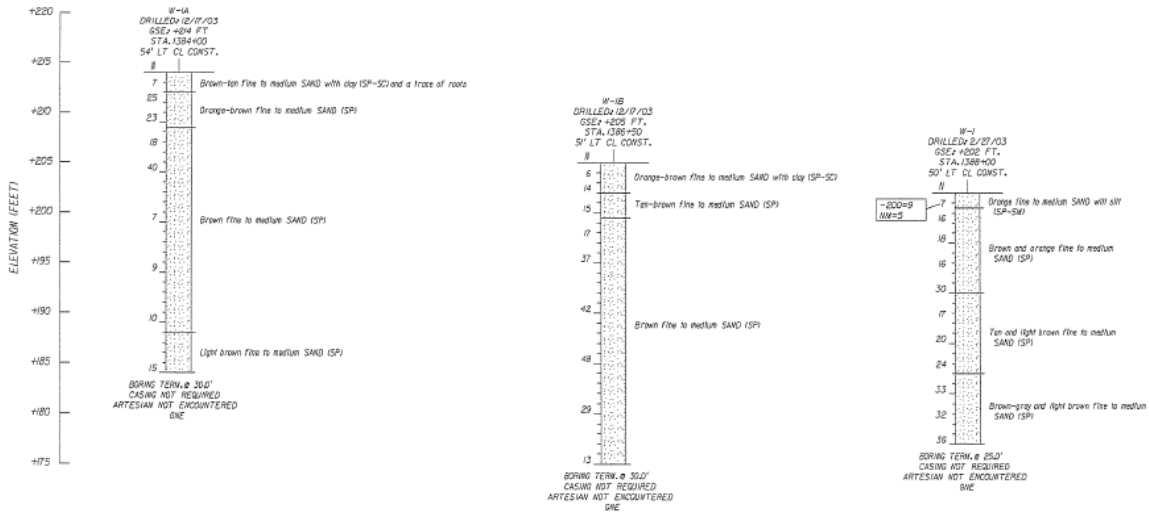
1. Temporary sheet pile wall shall be paid for under Pay Item No. 455-133-2 that includes the cost of monitoring outlined in the general notes. Also includes the cost of temporary formings shown on plans.
2. Permanent sheet pile wall be paid for under Pay Item No. 455-133-3.
3. Pay Items 455-133-2 and 455-133-3: In addition to the requirements of Sub Article 455-12.6 of the Specifications, these pay items include all cost associated with stopping and resuming sheet pile installation operations; any necessary sheet pile extractions or cutting; and mobilization of preforming equipment or other special equipment required to facilitate sheet pile installation and installation of headed stud anchors. Also includes all cost associated with sheet pile hole preforming and all operations associated with preforming, removal, and / or penetration of rock and / or strong material for the installation of the sheet piling.

Plan sheet 552, 555 and 556 each contain in part:

**ENGINEERING CLASSIFICATION**

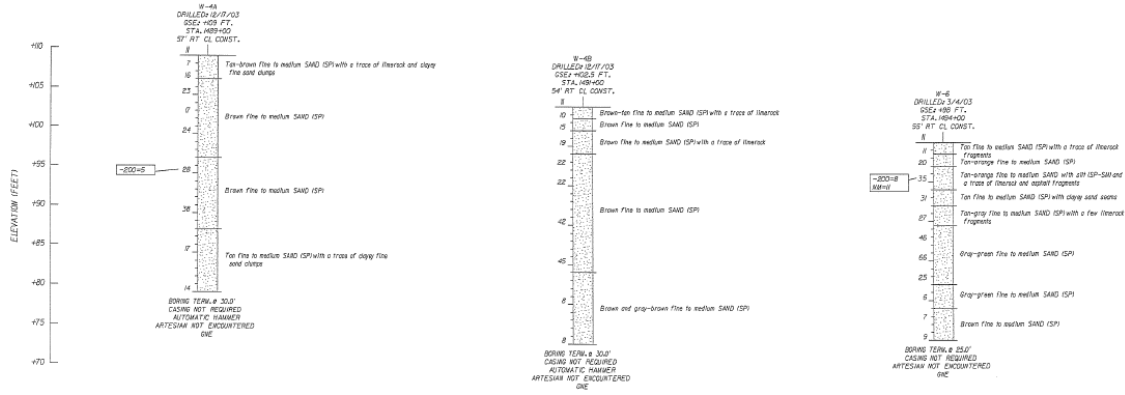
GRANULAR MATERIALS		
Relative Density	Safety Hammer SPT N-Value (Blows/Feet)	Automatic Hammer SPT N-Value (Blows/Feet)
VERY LOOSE	Less than 4	Less than 3
LOOSE	4 - 10	3 - 7
MEDIUM DENSE	10 - 30	7 - 21
DENSE	30 - 50	21 - 35
VERY DENSE	Greater than 50	Greater than 35

Plan sheet 552 contains FDOT furnished borings at TW-1:

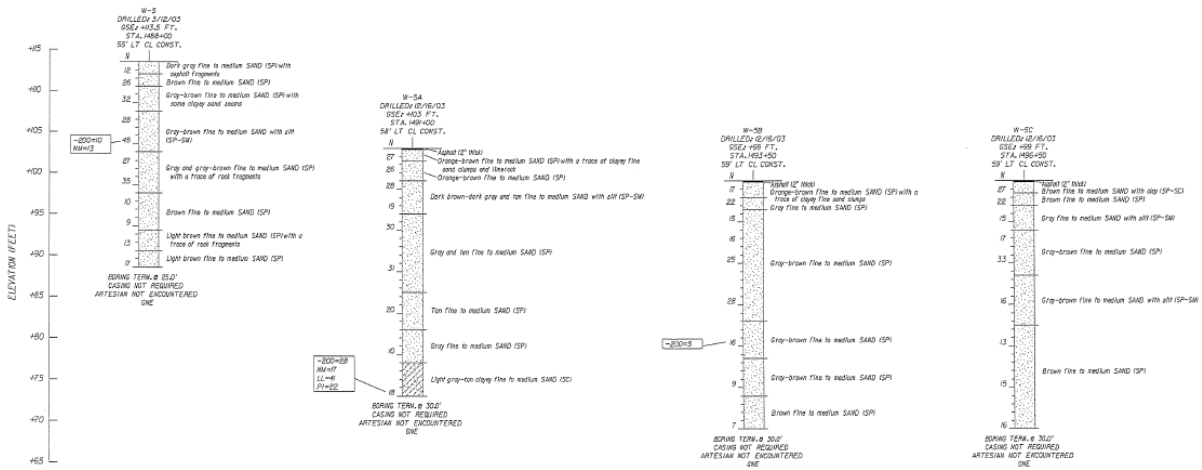


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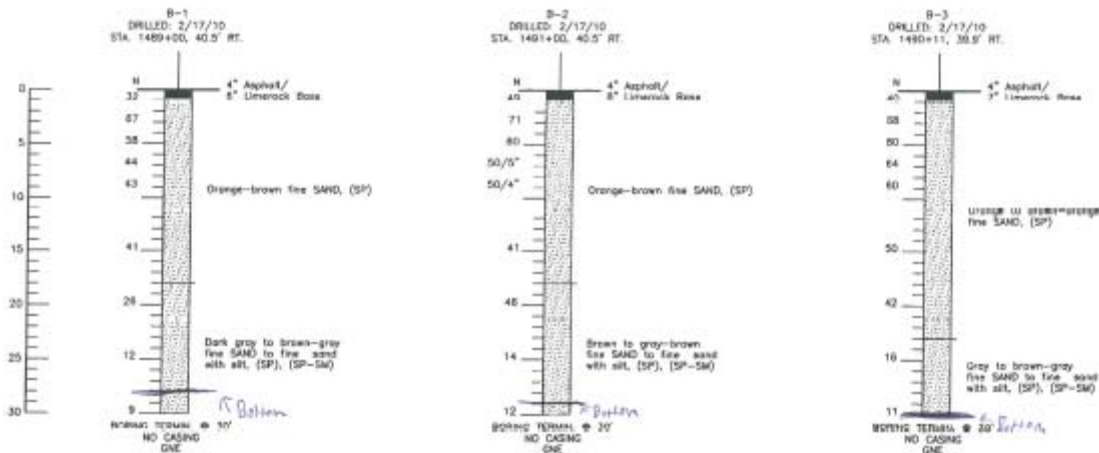
Plan sheet 555 contains FDOT furnished borings for TW-3:



Plan sheet 556 contains FDOT furnished borings for TW-2:



PSI's borings and report to Prince of August 18<sup>th</sup> 2011 states in part:



*In our opinion, the relative soil densities encountered in the borings performed by PSI do not correlate with the relative soil densities as encountered in the previous borings performed by Mactec Engineering and Consulting, even though PSI's borings were performed in close proximity to the borings performed by Mactec Engineering and Consulting Inc.*

...

*Based on our review and analysis, it is our opinion the selected steel section (i.e. CZ-128) is generally acceptable and would have been appropriate during installation based on the subsurface soil conditions as*

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*encountered in Mactec's borings, even though these subsurface conditions could have caused some installation challenges such as potential minor damage to the tip of the sheet piles during construction (specifically when penetrating the dense soils between elevations +80 and +90 feet NA VD). However, based on the borings performed by PSI, Inc., the same sheet pile wall design would not have been considered appropriate for construction in our opinion due to the presence of very dense and refusal soil conditions in the upper soil profile as discussed previously. Based on our experience, the sheet pile wall installation in this case would have been problematic and would have caused significant damage to the sheet piles as was the case during construction of wall TW-3.*

*Considering the unforeseen subsurface soil conditions identified in PSI's borings, it is our opinion that an appropriate wall alternative would have been a cantilever soldier pile wall system utilizing wood lagging and HP 12x53 pile sections or equivalent. The design would dictate the soldier pile spacing and other details. In our experience, the installation of HP piles would have been more practical considering the encountered subsurface conditions in PSI's borings.*

Contract specifications state in part:

**4-3.7 Differing Site Conditions:** *During the progress of the work, if subsurface or latent physical conditions are encountered at the site differing materially from those indicated in the Contract, or if unknown physical conditions of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in the work provided for in the Contract are encountered at the site, the party discovering such conditions shall promptly notify the other party in writing of the specific differing conditions before the Contractor disturbs the conditions or performs the affected work.*

*Upon receipt of written notification of differing site conditions from the Contractor, the Engineer will investigate the conditions, and if it is determined that the conditions materially differ and cause an increase or decrease in the cost or time required for the performance of any work under the Contract, an adjustment will be made, excluding loss of anticipated profits, and the Contract will be modified in writing accordingly. The Engineer will notify the Contractor whether or not an adjustment of the Contract is warranted.*

*The Engineer will not allow a Contract adjustment for a differing site condition unless the Contractor has provided the required written notice. The Engineer will not allow a Contract adjustment under this clause for any effects caused to any other Department or non-Department projects on which the Contractor may be working.*

...

**455-12.6.2 Temporary Sheet Piling:** *For critical temporary steel sheet pile walls, walls which are necessary to maintain the safety of the traveling public or structural integrity of nearby structures, roadways and utilities during construction, that are detailed in the plans, price and payment will be full compensation for all labor, equipment, and materials required for furnishing and installing steel sheet piling including preformed holes when shown in the plans, and including wales, anchor bars, dead men, soil anchors, proof tests, creep tests, and other incidental items when an anchored wall system is required. Removal of the sheet piling, anchors, and incidentals will be included in the cost per square foot for Steel Sheet Piling (Critical Temporary). When the temporary steel sheet pile walls are not detailed in the plans, the cost of furnishing and installation shall be incidental to cost of other related items and no separate payment shall be made. If the wall is not shown in the plans, but deemed to be critical as determined by the Engineer, then a design shall be furnished by the Department and paid for separately under Steel Sheet Piling (Critical Temporary).*

On February 19<sup>th</sup> 2010 Prince submitted its notice of claim stating:

*Pursuant to Section 4-3.7, PRINCE hereby submits its notice of intent to claim for differing site conditions related to the subsurface conditions encountered at Temporary Sheet Pile walls, TW-1 and TW-3.*

*As you are aware, PRINCE experienced harder driving conditions than were anticipated based on the borings provided in the plans. PRINCE hired Professional Service Industries, Inc. ("PSI") to perform SPT borings at the approximate locations of the borings included in the plans shown on Sheet 555 of the Contract Plans within the sheet pile wall limits. As soon as PRINCE receives the report from PSI, PRINCE will provide additional details.*

*PRINCE intends to claim for all costs incurred by this differing site condition, including but not limited to additional crew time caused by slowed production, damage to the sheets, and the SPT borings.*

The Parties are in agreement that pursuant to sections 8-13.1 and 8-13.2 of the special provisions, the DRB's Recommendation is binding under the terms of the contract.

## DISPUTE REVIEW BOARD RECOMMENDATION

Prince alleges hard driving at both TW-1 and TW-3. Prince employed PSI to perform test borings at TW-3. The N-values of these borings differ substantially from those furnished in the plans.

It is generally accepted practice for geotechnical engineers to classify the relative density of granular materials in accordance with the table below:

ENGINEERING CLASSIFICATION

GRANULAR MATERIALS		
Relative Density	Safety Hammer SPT N-Value (Blows/Foot)	Automatic Hammer SPT N-Value (Blows/Foot)
VERY LOOSE	Less than 4	Less than 3
LOOSE	4 - 10	3 - 7
MEDIUM DENSE	10 - 30	7 - 21
DENSE	30 - 50	21 - 35
VERY DENSE	Greater than 50	Greater than 35

While this gives a general idea of the driving resistance to be expected, the Board finds that review of the blow counts recorded on the borings at the various depths is a more accurate means of determining the anticipated pile driving resistance and productivity.

It is sometimes argued that a DRB will provide a recommendation that ignores the contract or is somewhere in between the positions taken by each party; in effect, a compromise. **It is not the DRB's prerogative to substitute its own ideas of fairness and equity for the provisions of the contract. ...<sup>2</sup>**

### **BOARD RECOMMENDATION:**

**Therefore, based on the materials supplied to the Board and presentations to the Board at the DRB hearing:**

The DRB finds that the borings furnished in the plans are not representative of the actual conditions at TW-3. The Board finds that Prince did encounter a changed condition at that wall. Therefore, the Board finds entitlement to additional compensation for additional cost due to alleged hard driving at TW-3.

As to TW-1, Prince did not furnish documentation to the Board that adequately substantiates its allegation of a changed condition. Therefore, the Board finds no entitlement to additional compensation for additional cost due to alleged hard driving at TW-1.

This Board sincerely appreciates the cooperation of all parties and the information presented for its review in making this recommendation.

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<sup>2</sup> DRBF Practices and Procedures Section 1 – Chapter 6

## DISPUTE REVIEW BOARD RECOMMENDATION

Please remember that a response to the DRB and the other party of your acceptance or rejection of this recommendation is required within 15 days. Failure to respond constitutes an acceptance of this recommendation by the non-responding party.

I certify that I have participated in all of the meetings of this DRB regarding this issue and concur with the findings and recommendations.

Respectfully Submitted  
Disputes Review Board

John H. Duke Sr.; DRB Chairman  
Peter A. Markham; DRB Member  
Ted H. McRae; DRB Member

SIGNED FOR AND WITH THE CONCURRENCE OF ALL MEMBERS:

A handwritten signature in black ink, appearing to read "JH Duke", written over a horizontal line.

John H. Duke, Sr.  
DRB Chairman