



STATE OF WASHINGTON  
DEPARTMENT OF ECOLOGY  
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February 13, 2019

Ron King, President  
3 Kings Environmental, Inc.  
PO Box 280  
Battle Ground, WA 98604

Re: **Contract C1800176** – (Aladdin Plating Site Remediation Project, Tacoma, Washington)  
Final Offer Change Order 2 (Equitable Adjustment for Quantity Overruns)

Dear Ron King:

The Washington State Department of Ecology (Ecology) is providing this Final Offer, Notice of Equitable Adjustment CO-2, to 3 Kings, who requests an additional contract sum of \$71,530 and contract time of 7 days for additional quantities of soil removed and installed for the project. Ecology's Final offer is \$5,600 in additional Contract Sum and no additional Contract Time. An explanation of the Final Offer is provided below.

***Summary of 3 Kings Request for Equitable Adjustment in CO-2***

3 Kings states in CO-2 that the density of subsurface soil was far greater than surface soil at the site. CO-2 states that no adjustment is warranted for surface soil since the density of surface soil that comprised the top 2.5 feet of soil at the site was approximately 1.5 tons per cubic yard, which matched the density used in the Project Manual to develop quantities for the project.

CO-2 states that the denser subsurface soil was present from 3 to at least 16 feet below ground surface, and 3 Kings has stated that the density of the glacially derived material comprising the subsurface soil generally ranges from 1.8 to 2.1 tons per cubic yard. 3 Kings claims that the greater density of the subsurface soil, over what was specified in the Project Manual, explains the increase in the subsurface soil quantity from 330 tons (specified in the Project Manual) to 620 tons, disposed of by 3 Kings.

CO-2 states that 3 Kings considers 20 percent (%) of the increased volume to be associated with over-excavation (i.e., extra excavation) for installation of the shoring selected for the project by 3 Kings. 3 Kings did not provide documentation in CO-2 for their consideration of how 20% was determined to be the quantity associated with extra excavation to install shoring.

### *Summary of the Evaluation of Subsurface Soil Quantities*

An evaluation was performed to identify the source(s) of soil that contributed to the quantity removed by 3 Kings from the site. The results of the evaluation are presented in enclosed Table 1 and on Figure 1. The evaluation has determined that all but a limited amount of the difference between the quantity specified in the Project Manual (330 tons) and what was disposed of by 3 Kings (620 tons) was due to the actual volume of material removed by 3 Kings as extra excavation for installation of shoring and sloping that 3 Kings elected to use for the project.

Note that Pay Item M, Excavation Support and Protection (Section 00 41 43, Summary of Pay Items and Quantities) in the Project Manual includes Contractor costs for extra excavation. The evaluation has identified that there was approximately 40 tons of soil that may have been attributed to slightly denser subsurface soil or that may have been due to over-excavation or extra excavation that was not identified in the evaluation.

The project manual specified the area and depth of excavation of subsurface soil at six locations. The area, depth, and quantities specified in the Project Manual are summarized in Table 1. The density used to calculate the quantity of subsurface soil requiring disposal presented in the Project Manual Summary of Pay Items and Quantities was 1.5 tons per cubic yard.

As shown in Table 1 and on Figure 1, the extra excavation performed by 3 Kings for sloping and to install the shoring 3 Kings elected to use includes the following:

- Extra excavation consisting of sloping of un-shored excavations at remediation areas A1 and B1.
- Extra excavation resulting from the surface area encompassed by the shoring 3 Kings elected to use for excavation at areas A2, A3, B2 and B3.
- Extra excavation due to 3 Kings methods used to install the shoring used for the project.
- Extra excavation that included re-excavation of soil backfill at areas A1, B1, and B3 as a result of the overlapping surface area encompassed by the shoring 3 Kings elected to use.
- Extra excavation where 3 Kings dug to a depth greater than specified in the Project Manual.

The volume of subsurface soil excavated by 3 Kings that is attributable to the extra excavation described above and presented in Table 1 and on Figure 1 totaled 167 cubic yards. The tonnage of subsurface soil excavated by 3 Kings that is attributable to extra excavation based on the density of soil utilized in the Project Manual (1.5 tons per cubic yard) is 250 tons. The quantity of soil removed by 3 Kings as extra excavation (167 cubic yards/250 tons) was an increase of 76% over the quantity specified in the Project Manual (220 cubic yards/330 tons), not 20% as stated in 3 Kings' CO-2. The costs associated with a 76% increase in the soil quantity attributed

to 3 Kings' extra excavation is included in Pay Item M. Therefore, no additional Contract Sum or Contract Time is warranted for 3 Kings' extra excavation.

Pay Item M also specifies that the contractor shall supply an equal quantity of backfill to replace soil removed as a result of extra excavation. Therefore, no additional Contract Sum or Contract Time is warranted for 3 Kings' for backfilling the areas of extra excavation.

The total quantity of subsurface soil excavated from the site based on the density of soil used in the Project Manual (1.5 tons/cubic yard) is 580 tons. 3 Kings' records identify that 620 tons of soil were disposed off-site. Therefore, there is 40 tons of subsurface soil that is not accounted for based on the evaluation. The 40 tons may be due to greater density of subsurface soil or may be due to additional excavation or extra excavation that has not been identified. The 40 tons of soil is an increase of approximately 7% over total quantity (580 tons) based on the density used in the Project Manual. The 7% increase, if it was due to increased density, would result in an average increased density of 0.1 tons per cubic yard for subsurface soil. Therefore, the average density of subsurface soil may be 1.6 tons per cubic yard.

3 Kings has stated that the subsurface soil at the site consisted of glacially derived, cemented material with a density ranging from 1.8 to 2.1 tons per cubic yard. However, the Nalley Valley, where the site is located, consists of 20+ feet of recessional outwash known as the Steilacoom Gravels.

Recessional outwash, by definition, is not glacially compacted/cemented which was consistent with what was observed during the subsurface excavations. Furthermore, standard penetration tests with blow counts were performed to record the density in the soil borings completed at the subsurface excavation locations at the site.

The blow count values recorded indicate that the soil density did not significantly change between the surface and 15 feet below ground surface. The blow counts indicate that the density increased at 15 feet below grade, which comprised the lower 1-foot of one of the excavation areas (A3). The data provided by the standard penetration tests confirm that the density was not a significant contributor to the quantity of subsurface soil removed from the site.

### ***Cost Increase Evaluation***

The list of costs associated with subsurface soil excavation, stockpiling, loading, hauling, and disposal is provided in 3 Kings' Final Schedule of Values, dated October 8, 2018. The total cost for these activities listed in the Schedule of Values is \$80,000. Based on the evaluation presented above, the increase in tonnage that may be attributed to increased soil density is 7%, which would increase the total cost for handling and disposal of subsurface soil from \$80,000 to \$85,600. Therefore, an increase in the Contract Sum of \$5,600 is the Final Offer for excavation, stockpiling, loading, hauling, and disposal of subsurface soil.

Additionally, the quantity of imported soil was dependent on the volume of the excavations and not the density of the excavated soil. The volume of soil removed from the site over what was

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specified in the Project Manual was the result of the methods of shoring and sloping performed by 3 Kings; therefore, the quantity of imported soil that was installed greater than what was specified in the Project Manual is included in the Pay Item M. The increase in the excavated quantity of subsurface soil (40 tons) would not significantly affect the total number of days required to complete the work; therefore, no increase in contract time is warranted.

If you have any questions or concerns please contact me at (360) 407-6256 or [mohsen.kourehdar@ecy.wa.gov](mailto:mohsen.kourehdar@ecy.wa.gov).

Sincerely,



Mohsen Kourehdar, P.E.  
Project Manager  
Southwest Regional Office  
Toxics Cleanup Program

Enclosures

cc: Iain Wingard, GeoEngineers, Tacoma Office  
John Zinza, P.E., Contract Officer, Ecology TCP

**Table 1**  
**Subsurface Excavation Quantities Specified in Project Manual**  
Former Aladdin Plating Site  
Tacoma, Washington

Excavation Area	Excavation Surface Area (sf) <sup>1</sup>	Excavation Depth (ft)	Excavation Volume (cf)	Excavation Volume (cy)	Calculated Tonnage at 1.5 tons/cy	Project Manual Volume (cy)	Project Manual Tonnage (tons)
A1	157.54	2.5	393.86	15	22		
A2	162.77	8.5	1,383.54	51	77		
A3	168.72	13.5	2,277.77	84	127		
B1	89.95	2.5	224.88	8	12		
B2	96.36	6.5	626.31	23	35		
B3	157.25	6.5	1,022.15	38	57		
<b>Total Quantities</b>				<b>220</b>	<b>329</b>	<b>220</b>	<b>330</b>

**3 Kings Subsurface Excavation Quantities Including Extra Excavation**

Excavation Area	Unshored Excavation Surface Area (sf) <sup>2</sup>	Shored Excavation Surface Area (sf) <sup>3</sup>	Excavation Area Outside Shoring (0.5 ft observed) (sf) <sup>4</sup>	Clean Backfill Excavated and Disposed of with Contaminated Soil (sf) <sup>5</sup>	Average Excavation Depth by Area (ft) <sup>6</sup>	Calculated Excavation Volume (cf)	Calculated Excavation Volume (cy)	Calculated Tonnage at 1.5 tons/cy	Exported Tonnage <sup>7</sup> (tons)	Difference of Calculated and Exported Tonnage (tons)
A1	219.36	0.00	0.00	32.13	2.69	677	25	38		
A2	0.00	201.75	14.45	0	9.10	1,967	73	109		
A3	0.00	260.02	16.48	0	13.70	3,788	140	210		
B1	103.28	0.00	0.00	19.73	3.16	389	14	22		
B2	0.00	210.25	35.05	0	6.48	1,590	59	88		
B3	0.00	263.13	21.47	9.43	6.91	2,032	75	113		
	<b>322.64</b>	<b>935.15</b>	<b>87.45</b>	<b>61.29</b>		<b>Total Quantities</b>	<b>387</b>	<b>580</b>	<b>620</b>	<b>40</b>

	Increased Volume from Shoring and Extra Excavation <sup>8</sup> (cy)	Increased Tonnage from Shoring and Extra Excavation <sup>9</sup> (tons)	Difference Between Calculated and Exported Tonnage <sup>10</sup> (tons)	Density Based on Additional Tonnage <sup>13</sup> (tons/cy)
<b>Increased Quantities From 3 Kings Shoring and Extra Excavation</b>	<b>167</b>	<b>250</b>	<b>40</b>	<b>1.60</b>
<b>Percentage Increase from Project Manual Volume/tonnage From 3 Kings Shoring and Extra Excavation</b>	<b>76%<sup>11</sup></b>		<b>7%<sup>12</sup></b>	

**Notes:**

- <sup>1</sup> Surface area with 6 inch setbacks from the property lines as specified in Project Manual.
- <sup>2</sup> Extra excavation where shoring was not installed.
- <sup>3</sup> Excavation surface area based on 3 Kings selected shoring and extra excavation approach which was greater than area identified in Project Manual.
- <sup>4</sup> 3 Kings excavated an average of 6-inches beyond the limits of the shoring area within the site (on 3 sides) to install shoring. Shoring was installed against the east property boundary.
- <sup>5</sup> Areas where shoring or excavations overlapped and clean backfill was removed and hauled away as export.
- <sup>6</sup> Average excavation depth by area based on 3 Kings survey.
- <sup>7</sup> Tonnage exported based on weigh tickets provided by 3 Kings.
- <sup>8</sup> Calculated excavation volumes based on 3 Kings shoring and extra excavation minus volume in Project Manual (387 cy - 220 cy = 167 cy).
- <sup>9</sup> Calculated tonnage using 1.5 tons/cy and volume based on 3 Kings shoring and extra excavation minus tonnage in Project Manual (580 tons - 330 tons = 250 tons).
- <sup>10</sup> Difference (i.e., subtraction) of total calculated tonnage based on 3 Kings shoring and extra excavation and total tonnage exported by 3 Kings (620 tons - 580 tons = 40 tons).
- <sup>11</sup> Percentage increase in volume and tonnage based on 3 Kings shoring and extra excavation (167 cy/220 cy = 0.76 and 250 tons/330 tons = 0.76 or 76%).
- <sup>12</sup> Percentage difference between calculated total tonnage and exported total tonnage (1-[580 tons/620 tons] = 0.07 or 7%).
- <sup>13</sup> An evaluation of density that could be associated with the difference in tonnage indicated that the density of subsurface soil could be an average of 1.6 tons per cubic yard. However the difference in tonnage may also be associated with over-excavation by 3 Kings that is not included in previous calculations.

sf = square feet  
ft = feet  
cf = cubic feet  
cy = cubic yards  
tons = 2,000 pounds

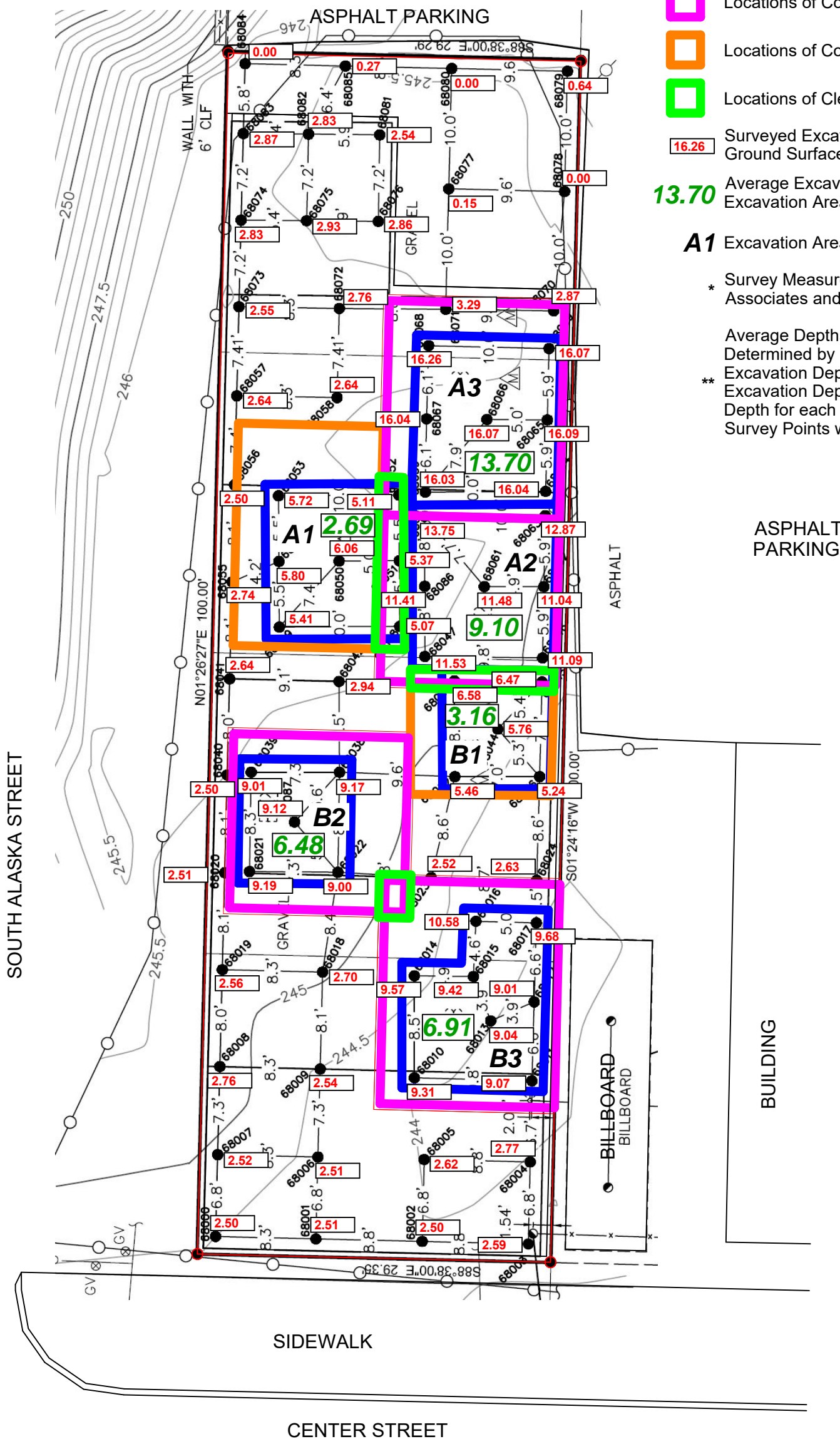
**Legend:**

- Property Boundary
- Locations of Original Excavation Areas
- Locations of Contractor Shoring
- Locations of Contractor Unshored Excavations
- Locations of Clean Backfill that was Re-Excavated
- 16.26** Surveyed Excavation Depths in Feet Below Original Ground Surface\*
- 13.70** Average Excavation Depths in Feet for Subsurface Excavation Areas\*\*

**A1** Excavation Area Identification

\* Survey Measurements Completed by David Evans and Associates and Provided to Ecology by 3 Kings

Average Depths of Subsurface Excavation Areas were Determined by Subtracting the Surveyed Surface Excavation Depth from the Surveyed Subsurface Excavation Depth for Each Survey Point. The Average Depth for each Excavation Area Includes All of the Survey Points within Each Excavation Area.



The locations of all features shown are approximate. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.