CONTRACT CHANGE ORDER 2
City of Tempe Division of Engineering

Contract No. C2018-293

Date: 5/23/2019

Project No.: 3205851
Contractor: PCL Construction, Inc.

Project Name: Water Storage Tank Rehabilitation-Bell Butte

Contract Expiration Date: 6/28/2019
Time Ext. Required: X

Original Contract: $2,066,213.00
Previous Change Orders: $0.00
Contract to Date: $2,066,213.00
This Change Order: $775,814.00
New Contract Total: $2,842,027.00

Change(s): 1.) Installation of new 24" Valve and Vault with line stop 2.)TTHM equipment upgrades 3.) repairs to existing 18" drain line and subgrades

Reason for Change(s): 1. valve vault and valve to control flow 2. TTHM upgrade to 15hp 3. While draining the tank to begin work, the 18" CMP failed

Cost Analysis: Check if change order to be paid from (or to) Owners Contingency.
X Check if additional funding is required. Source of funding: 

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit Type</th>
<th>Unit Cost</th>
<th>Total</th>
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<tr>
<td>1</td>
<td>See attached document</td>
<td>1</td>
<td>Unit</td>
<td>$775,814.00</td>
<td></td>
</tr>
<tr>
<td>2</td>
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<tr>
<td>3</td>
<td></td>
<td>1</td>
<td>Unit</td>
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<tr>
<td>4</td>
<td></td>
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<tr>
<td>5</td>
<td></td>
<td>1</td>
<td>Unit</td>
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</table>

Total Change Order: $775,814.00

In conjunction with this change order, the Contract Term is hereby extended 101 calendar days establishing a revised contract completion date of 10/7/2019.
The dollar value of this change order is full and complete compensation for any and all costs associated with the impact on the project schedule and extended conditions.

Prepared by: [Signature] Date
Reviewed by: [Signature] Date
Reviewed By: Senior Engineering Associate / Senior Civil Engineer (initial) Date
Reviewed By: [Signature] Date
Accepted By: [Signature] Date
Approved By: [Signature] Date

Deputy Engineering and Transportation Director/City Engineer

[Stamp] ENTERED
May 22, 2019

James Cooper  
Sr. Civil Associate  
City of Tempe  
311 W. Guadalupe Rd  
Tempe, AZ, 85283

Re: Water Storage Tank Rehabilitation – Bell Butte Construction Manager at Risk – Construction Services Project NO. 3205851

Dear Mr. Cooper:

Please find attached our price proposal for Change Order #002, for additional work to install a new 24” valve and vault with line stop, TTHM equipment upgrades and repairs to the existing 18” drain line and subgrade.

We also request a contractual completion date modification to October 7, 2019, to complete the new additional work. This represents an extension of 101 calendar days from our current completion date of June 28, 2019, please see attached schedule section for more detailed information.

The following documents are attached to this letter:

1. Scope of work clarifications and assumptions  
2. Pricing estimate summary and detail  
3. Schedule update with new work and time extension analysis narrative.  
4. Quotes for valve vault pricing  
5. Quotes for TTHM upgrade pricing  
6. Quotes for drain line repair pricing  
7. Field Orders #002, #003 and #004 for reference

Please do not hesitate to contact me if you have any questions or comments.

Jesus G Angulo  
Project Manager  
E-mail: janguolo@pcl.com  
Mobile:(480)-493-8706

cc: Erich Bonz, COT; Adam Gordon, PCL; Greg Maciag, PCL; Jon Abbey, PCL; Jesse Udall, Dibble; Jake Nelson, Dibble; Project File
All Pricing in this submission is based on the negotiation of mutually acceptable contract terms and conditions.

**Valve Vault Pricing - Clarifications / Assumptions:**

1. Pricing includes labor, equipment and materials necessary to install a new vault valve for a 24” butterfly valve and new bypass piping and hydrant and it is based on Field Order #002 drawings received by Dibble Engineering and dated February 2019 (attached).
2. Pricing does not include drainage system
3. Pricing includes a temporary line stop to stop flows to the existing 24” pipe and perform the work.
4. Work duration is expected to be 10 working days, no weekend or night shift work is included.
5. Traffic control plan and traffic control systems are included for the duration of the work, including an off-duty cop during work hours.
6. An NTP for this work is needed no later than June 20, 2019 to complete the work on-time for tank commissioning.
7. It is assumed that SRP will relocate the existing 4” conduit no later than July 5 for the work to be complete on time for the tank commissioning.
8. An allowance of $15,000 is included for repairs to the paving and sidewalk.
9. An allowance of $20,000 is included for relocating the existing 4” SRP conduit.
10. An allowance of $10,000 is included for repairing or relocating the fiberoptic line if needed.
11. An allowance of $15,000 is included for a new manhole to be installed on top of the 16” stub up left by the linestop system for future access to the 24” pipe.

**TTHM Upgrade Pricing - Clarifications / Assumptions:**

1. Pricing includes labor, equipment and materials necessary for the upgrade to 15HP and relocation of the new TTHM removal equipment and systems, and it is based on Field Order #003A, received by Dibble Engineering and dated May 8, 2019 (attached).
2. Pricing includes a deduction for the original price from Medora to supply the 5 HP system.
3. Pricing includes an option to purchase control panels from Medora, total price of $8,140.

**Repair slope and 18” drain pricing – Clarifications / Assumptions:**

1. Pricing includes labor, equipment and materials necessary to repair and stabilize the slope on top of the butte from damage created by a blow out from the existing 18” drain pipe and includes repair of the 18” drain pipe by installing a pipe-liner and partial replacement, and in accordance with Field Order #004, received by Dibble Engineering, and dated May 20, 2019.
2. Pricing includes a shotcrete mock-up on a selected slope side for review and approval by the City and other project stakeholders.
3. Pricing assumes that the proposed slope repairs using shotcrete are acceptable to the City of Tempe and SRPMIC.
4. Pricing includes a pipe liner to repair the existing 18” drain pipe.
5. Pricing assumes that the lower downstream portion of the 18” drain pipe is plugged and will need to be excavated and replaced. From Station 11+60 to 12+10.

6. Pricing includes a $10,000 allowance for additional landscaping and re-vegetation.

7. Pricing includes a $25,000 contingency for unforeseen conditions.
CHANGE ORDER #002 REQUEST

ESTIMATE DETAIL
### General Estimate Summary

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<th>Description</th>
<th>Quantity</th>
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<td><strong>DIRECT PRICE</strong></td>
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<tr>
<td>24&quot; Valve Vault</td>
<td>1 LS</td>
<td></td>
<td></td>
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<tr>
<td>Upgrade TTHM System to 15HP and Relocate</td>
<td>1 LS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Repair slope and 18&quot; drain pipe</td>
<td>1 LS</td>
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<td>Project Management and Support -</td>
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<td>Add. Duration</td>
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<td><strong>GENERAL EXPENSE PRICE</strong></td>
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<tr>
<td><strong>FIXED GENERAL EXPENSE</strong></td>
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<tr>
<td>GE 8 F6 BOND %</td>
<td>100 %</td>
<td></td>
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<tr>
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<td><strong>GENERAL EXPENSE PRICE</strong></td>
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<td>GE 22 TAXES %</td>
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<tr>
<td><strong>GROSS RECEIPTS TAX</strong></td>
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<tr>
<td>Fee</td>
<td>8.00%</td>
<td>T.C.</td>
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<td><strong>TOTAL BID</strong></td>
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## Item Analysis Sheet

### Bell Butte Tank Rehabilitation - Additional Work

#### Tempe, AZ, USA

**BE Number**: BE170006  
**Opportunity No**:  
**Owner File No**:  
**Project**: Bell Butte Tank Rehabilitation - Additional Work  
**Location**: Tempe, AZ, USA

### 24" Valve Vault

**Description**: Construction Manager at Risk (CMAR) Services

The PCL 100% Cost Model for the Bell Butte Rehabilitation project is based on the following:

- Standard Equipment Watch, 2017 Blue Book equipment rates have been utilized in the development of this cost model.
- Labor rates utilized in this cost model are estimates of projected market conditions at the time the work will be performed and may not reflect PCL's actual labor cost.

### Valve Vault & Line Stop

**Quantity**: 1 LS

- **Work Schedule**: 2 weeks (10 Working Days), M-F, during normal working hours
- **8 Hour shifts**
- **Crew to be used**: 1 Operator, 3 Laborers

### Excavate Valve Vault

**Volume**: 120 CY

- **Excavate for shoring**: Assuming soil is class C and will need to be shored
- **Area to be excavated**: 18' x 12' x 14' Deep (~120 CYD)

- **Due to limited size of project a smaller excavator will be used**
- **A 40-ton crane will be used to set and remove shoring**
- **12k Forklift will be used to assist during the time crane is not on site**

#### Labor Costs

<table>
<thead>
<tr>
<th>Labor Description</th>
<th>Hours</th>
<th>Rate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator 120 CY</td>
<td>16.09</td>
<td>53.29</td>
<td>853.17</td>
</tr>
<tr>
<td>2 DA</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>3 Yard Pipe Crew</td>
<td>48.00</td>
<td>53.42</td>
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#### Equipment Costs

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<tbody>
<tr>
<td>12k Forklift</td>
<td>1.00</td>
<td>30.00</td>
<td>30.00</td>
</tr>
<tr>
<td>Matt Brown Trucking</td>
<td>16 HR</td>
<td>95.00</td>
<td>1,520.00</td>
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</table>

#### Service/Tools/Supplies Costs

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<th>Hours</th>
<th>Rate</th>
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</thead>
<tbody>
<tr>
<td>Setting the Shoring using crane and Excavator for Assistance</td>
<td>2.50</td>
<td>100</td>
<td>250</td>
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<tr>
<td>Day use of crane for building and setting shoring</td>
<td>2x 10' x 16' Inside dimension 6' high</td>
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<td></td>
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<tr>
<td>40T RT crane rent for 8 hour day</td>
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</table>

### Total Costs

- **Total Cost**: $7,118.53
## Item Analysis Sheet

### Bell Butte Tank Rehabilitation - Additional Work

**Location:** Tempe, AZ, USA

### 24" Valve Vault

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Quantity</th>
<th>UOM</th>
<th>Units Per Hour</th>
<th>Manhrs Per Unit</th>
<th>Labor $/hr</th>
<th>Total Labor</th>
<th>Equipment $/hr</th>
<th>Total Equipment</th>
<th>Sentin/Tools/Supplies</th>
<th>Perm. Material</th>
<th>SubContract</th>
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<td>1,000</td>
<td>1,000</td>
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<td>---</td>
<td>1,803.60</td>
<td>1,804</td>
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<td>1,803.60</td>
</tr>
<tr>
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<td>1,920 SF</td>
<td>260.000</td>
<td>0.004</td>
<td>24 hrs</td>
<td>53.29</td>
<td>426</td>
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<td>0.667732</td>
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<td>1,920 SF</td>
<td>240.000</td>
<td>0.004</td>
<td>8 hrs</td>
<td>53.29</td>
<td>426</td>
<td>---</td>
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<td>0.222045</td>
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<tr>
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<td>1 DA</td>
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<td>---</td>
<td>---</td>
<td>373.00</td>
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<td>373.00</td>
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**TSR Quote below is for 2 weeks**
**Number below includes Line Stop Box**

**Excavate Valve Vault**

<table>
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<tr>
<th>Item</th>
<th>Quantity</th>
<th>UOM</th>
<th>Labor $/hr</th>
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<tr>
<td>40T RT Crane</td>
<td>1 EA</td>
<td>1,000</td>
<td>1,000</td>
<td>1,803.60</td>
</tr>
<tr>
<td>3 Labor to build &amp; Set</td>
<td>1,920 SF</td>
<td>260.000</td>
<td>0.004</td>
<td>1,282</td>
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<tr>
<td>Operator</td>
<td>1,920 SF</td>
<td>240.000</td>
<td>0.004</td>
<td>426</td>
</tr>
<tr>
<td>CAT 315FL per Day</td>
<td>1 DA</td>
<td>1,000</td>
<td>1,000</td>
<td>373.00</td>
</tr>
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</table>

**Fine Grade Valve Vault**

**Excavate till subgrade 3.5' below bottom of pipe**

**Placement of 6" of AB**

3 Laborers to spread and compact AB and place to correct grade

**Spread AB at a footprint of 10' x 10' x 5' deep = 4 ton**

**Operator**

<table>
<thead>
<tr>
<th>Item</th>
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<tr>
<td>Operator</td>
<td>1,920 SF</td>
<td>240.000</td>
<td>0.004</td>
<td>426</td>
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<tr>
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**Furnish AB, CL2**

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<tr>
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<tr>
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<td>CAT 315FL per Day</td>
<td>1 DA</td>
<td>1,000</td>
<td>1,000</td>
<td>373.00</td>
</tr>
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</table>

**After Ab is set Gravel sump will be hand dug**

3 Hand Dig sump pit

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>UOM</th>
<th>Labor $/hr</th>
<th>Total Labor</th>
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<tr>
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<td>240.000</td>
<td>0.004</td>
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<tr>
<td>CAT 315FL per Day</td>
<td>1 DA</td>
<td>1,000</td>
<td>1,000</td>
<td>373.00</td>
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</table>

**Hand Dig sump pit**

<table>
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<tr>
<th>Item</th>
<th>Quantity</th>
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<td>1,000</td>
<td>373.00</td>
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</table>

**Fine Grade Valve Vault**

<table>
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<tr>
<th>Item</th>
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<td>0.004</td>
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<td>240.000</td>
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<tr>
<td>CAT 315FL per Day</td>
<td>1 DA</td>
<td>1,000</td>
<td>1,000</td>
<td>373.00</td>
</tr>
</tbody>
</table>

**After Finegrading the excavation for the line stop will begin**

**Excavate for Line Stop**

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
<th>UOM</th>
<th>Labor $/hr</th>
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<td>260.000</td>
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<tr>
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<td>240.000</td>
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<td>1,000</td>
<td>1,000</td>
<td>373.00</td>
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**Item Analysis Sheet**

**24" Valve Vault**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Quantity</th>
<th>UOM</th>
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<th>Total Labor $</th>
<th>Total Equipment $</th>
<th>Total $</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Excavation is 15' x 10' x 10' (~40CYD) Saw cut for line stop and paving cost is an Allowance placed at bottom of estimate 15' x 10' x 10'</td>
<td>1.00 LS</td>
<td></td>
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<td></td>
<td>60.00 CY</td>
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<td>After excavation is complete the shoring is set with Excavator and Forklift</td>
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<td>***Trench Box cost in VV</td>
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<td>4' Op 53.29</td>
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<td>373.00</td>
<td></td>
<td>373.00</td>
<td>745</td>
<td>745.00</td>
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</table>
# Item Analysis Sheet

**Bell Butte Tank Rehabilitation - Additional Work**

**Location**
Tempe, AZ, USA

## 24" Valve Vault

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Quantity</th>
<th>UOM</th>
<th>Units Per Hours</th>
<th>Manhrs Per Unit</th>
<th>Hours</th>
<th>Labor $/hr</th>
<th>Total $/hr</th>
<th>Total $/ItemUnit</th>
<th>Total $/ItemUnit</th>
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<tr>
<td>3</td>
<td>Yard Pipe Crew</td>
<td>8 HR</td>
<td>1.000</td>
<td>1.000</td>
<td>24</td>
<td>53.42</td>
<td>1,282</td>
<td>550.00</td>
<td>550</td>
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<tr>
<td></td>
<td>12k Forklift per Day</td>
<td>1 DA</td>
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<td>1.000</td>
<td>1</td>
<td>550.00</td>
<td>550</td>
<td>550</td>
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<td>550.00</td>
</tr>
</tbody>
</table>

**Material to Remove section and mitigate nuisance water**
Partner Saws, Blades, Pumping Accessories
Small Tools & Piping for Pumps
1 LS

| 2   | Removal of Nuisance water                       | 1.50 WK  | 1.000| 1.000          | ---             | ---   | --- 3.80   | 456        | ---           | ---            |
|     | Pump 8" Trash (Hyd/Diesel) - O                  | 1.50 WK  | 1.000| 1.000          | ---             | ---   | --- 12.37  | 742        | ---           | ---            |
|     | Haul off of removed section of Pipe             | 1 LD     | ---  | ---            | ---             | ---   | --- 200.00 | 200        | ---           | ---            |

**Remove 24" section of pipe**

| 1.00 LS | --- | 32 | 53.39 | 1,708 | --- | 2,121 | --- | 400 | --- | 200 | --- | 4,429 |

**Installation of New 24" Line & BFV**

| 1 LS | --- | 24 | 53.38 | 1,281 | --- | 923 | --- | --- | 39,043 | --- | 41,247 |

After section is removed Valve Vault Base will be set then New section placed

**Operation**
Olson will set the base of Vault, with the help of PCL and then PCL will set rest of vault
Once Vault is set Olson will return and grout vault
PPS will install new section with BFV through subsidiary company WACO

**PPS Precast Supply / Install**
1 LS

| 8 HR | 1.000 | 1.000 | 8   | 53.29 | 426 | --- | --- | 53.29 | 426 |
| 1 DA | 1.000 | 1.000 | --- | ---   | 373.00 | 373 | --- | --- | 373.00 | 373 |
| 12k Forklift per Day | 8 HR | 1.000 | 1.000 | 16 | 53.42 | 855 | --- | --- | 106.84 | 855 |
| PPS Install | 1 LS | --- | --- | --- | --- | 550.00 | 550 | --- | --- | 550.00 | 550 |

**Installation of New 24" Line & BFV**

| 1.00 LS | --- | 24 | 53.38 | 1,281 | --- | 923 | --- | --- | 39,043 | --- | 41,247 |

After new section is installed, mechanical ductile fittings and backfill will begin

**Backfill and Mechanical Piping**
1 LS
### Item Analysis Sheet

**PCL Construction, Inc.**  
**Water Infrastructure Group**  

#### Bell Butte Tank Rehabilitation - Additional Work  
**Location**: Tempe, AZ, USA

#### 24" Valve Vault

<table>
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<tr>
<th>No.</th>
<th>Description</th>
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<th>Units Per Manhrs Per Unit</th>
<th>Labor</th>
<th>Total</th>
<th>Equipment</th>
<th>Services/Tools/Supplies</th>
<th>Perm. Material</th>
<th>Subcontract</th>
<th>Total Cost</th>
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<tbody>
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<td>Hours</td>
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<td>Total $/Unit</td>
<td>Total $/Item</td>
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<td>Total Unit</td>
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<td>PCL will install spool pieces off 6&quot; steel flanges to 90 elbows 3' below finish grade</td>
<td>1 EA</td>
<td>0.333</td>
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<td>OP 53.29</td>
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<tr>
<td></td>
<td>Operator</td>
<td>1 EA</td>
<td>0.333</td>
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<td>3</td>
<td>OP 53.29</td>
<td>160</td>
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<td>90 CY</td>
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<td>Operator</td>
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<td>0.200</td>
<td>5.000</td>
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<td>OP 53.29</td>
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#### Backfill and Mechanical Piping

- Slurry backfill will stop 6" below grade and DG will be placed
- DG Placement around Valve Vault
- 1 LS
  - backfill last 6" with DG 18"x12"x5" (6 tons[1.5 conversion])

#### 24" Valve Vault

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<th>No.</th>
<th>Description</th>
<th>Quantity UOM</th>
<th>Units Per Manhrs Per Unit</th>
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<tr>
<td></td>
<td>Form/Place and Finish Concrete Collars</td>
<td>3 CY</td>
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<tr>
<td></td>
<td>Backfill and Mechanical Piping</td>
<td>1.00 LS</td>
<td>-</td>
<td>-</td>
<td>40</td>
<td>53.39</td>
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**Andrew Durda**  
**Proprietary and Confidential**
## Item Analysis Sheet

### Bell Butte Tank Rehabilitation - Additional Work

**Location**: Tempe, AZ, USA

**Opportunity No**: No

**Project**: Bell Butte Tank Rehabilitation - Additional Work

---

### 24" Valve Vault

| No. | Description | Quantity | UOM | Hours Per Unit | Manhrs Per Unit | Labor $/hr | Total Labor $ | Equipment $/hr | Total Equipment $ | Service/Tools/Supplies | Perm. Material $/Unit | Total Perm. Material | SubContract $/Unit | Total SubContract | Total Cost $/Unit | Total Total
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<td>6</td>
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<td>107</td>
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<td>Matt Brown Haul onsite</td>
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<td>1.00</td>
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<td>285</td>
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### DG Placement around Valve Vault

1 LS

- **Backfill of the Linestop hole will take place**
- **Backfill Linestop excavation**: 1 LS
  - Backfill with 1/2 Slurry to 6" below TCP
  - 14.5' x 10' x 10'
- **Cemex Half Sack Slurry**: 54 CY
- **2 Yard Pipe Crew**: 10.00 0.100 11.54 0.53 0.42 85 500.00 500.00 150.00 150.00 1,630.37 1,630.00

### Backfill Linestop excavation

1.00 LS

- **Cost to test and disinfect line**
- **Test / Disinfect**: 1 EA
  - Test Crew: 1 EA 0.125 8.000 16.54 53.42 855 150 150 500.00 500.00 1,630.37 1,630.00
  - Comp 185 CFM Diesel: 1 EA 0.125 8.000 16.54 53.42 855 150 150 500.00 500.00 1,630.37 1,630.00
  - Testing STS: 1 LS 500.00 500.00 1,630.37 1,630.00

### Test / Disinfect

1.00 EA 0.063 16.000 16.54 53.42 855 125.67 126 150.00 150 500.00 500 1,630.37 1,630.00

### Traffic Control

1 LS

- 10 days of schedule
  - Based on $90 a day, TCP of $225, set up and take down of $245 (2 Total)

---

Andrew Durda
Proprietary and Confidential
## PCL Construction, Inc.
### Water Infrastructure Group
### Item Analysis Sheet

**Bell Butte Tank Rehabilitation - Additional Work**

**Location**: Tempe, AZ, USA

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Quantity</th>
<th>UOM</th>
<th>Units Per Hours</th>
<th>Manhrs Per Unit</th>
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<th>Equipment</th>
<th>Service/Supplies</th>
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<th>SubContract</th>
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<td>Owner Allowance for Paving and Sidewalk</td>
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**Note**: Proprietary and Confidential

Andrew Durda

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**Date**: May 22, 2019

**Time**: 2:31:58 PM

**Details Page 7 of 15**

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**File Path**: C:\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\Civil\C
<p>| No. | Description                                      | Quantity | UOM | Units Per Hours | Manhrs Per Unit | Labor Hours | $ / hr | Total | Equipment Hours | $ / hr | Total | Services/ Tools/ Supplies $/ItemUnit | Total | Perm. Material $/ItemUnit | Total | SubContract $/ItemUnit | Total | Total Cost $/ItemUnit | Total |
|-----|--------------------------------------------------|----------|-----|----------------|-----------------|-------------|--------|-------|-----------------|--------|-------|---------------------------------|-------|--------------------------|-------|--------------------------|-------|------------------------|
| 1   | PCL Construction, Inc. Water Infrastructure Group Item Analysis Sheet |
| 3   | <strong>Upgrade TTHM System to 15HP and Relocate</strong>     | 1.00     | LS  |                |                 |             |        |       |                 |        |       |                                 |       |                         |       |                         |       |                      |
|     | Per Field Order #003A                            |          |     |                |                 |             |        |       |                 |        |       |                                 |       |                         |       |                         |       |                      |
|     | Medora - Grid Bee Upgrade Price                  | 1        | LS  |                |                 |             |        |       |                 |        |       |                                 |       |                         |       |                         |       |                      |
|     | Medora - Control Panel Options                   | 1        | LS  |                |                 |             |        |       |                 |        |       |                                 |       |                         |       |                         |       |                      |
|     | Upsize duct to 8&quot; and add supports              | 1        | LS  |                |                 |             |        |       |                 |        |       |                                 |       |                         |       |                         |       |                      |
|     | Modifications to nozzle penetrations             | 2        | EA  |                |                 |             |        |       |                 |        |       |                                 |       |                         |       |                         |       |                      |
|     | Form, Rebar and Place Concrete Pad               | 1        | EA  |                |                 |             |        |       |                 |        |       |                                 |       |                         |       |                         |       |                      |
|     | Credit for original scope included in GMP        | 1        | LS  |                |                 |             |        |       |                 |        |       |                                 |       |                         |       |                         |       |                      |
|     | <strong>Upgrade TTHM System to 15HP and R</strong>            | 1.00     | LS  |                |                 |             |        |       |                 |        |       |                                 |       |                         |       |                         |       |                      |</p>
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<td><strong>Repair slope and 18” drain pipe</strong></td>
<td>1.00</td>
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<td><strong>Slope repairs and stabilization</strong></td>
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<td>Shotcrete and Color Mock-up</td>
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<td><strong>Replace bottom portion 18” Drain Line</strong></td>
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<td>Assume that last downstream portion from Sta 11+60 to 12+10</td>
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<td>Excavate and remove pipe</td>
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<td>Bckho 324DL 1,5CY –O</td>
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<td></td>
<td>Water Trailer - 500 GAL</td>
<td>50 CY</td>
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<td>3.200</td>
<td>0.313</td>
<td>50.000</td>
<td>53.42</td>
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<td>Pipe Crew</td>
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4 Repair slope and 18” drain pipe 1.00
### Item Analysis Sheet

**PCL Construction, Inc.**  
**Water Infrastructure Group**  
**Bell Butte Tank Rehabilitation - Additional Work**  
**Tempe, AZ, USA**

#### 4 Repair slope and 18" drain pipe  
1.00 LS

<table>
<thead>
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<th>No.</th>
<th>Description</th>
<th>Quantity/UOM</th>
<th>Units Per Hours</th>
<th>ManHrs Per Unit</th>
<th>Labor Hours</th>
<th>Equipment Hours</th>
<th>Equipment UOM</th>
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<th>Total Cost</th>
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<td>Cat, 938G Loader</td>
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<td>1,269</td>
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<td>SDR-6 Pipe</td>
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<td>9</td>
<td>Pipe rack</td>
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<td>11</td>
<td>Trench Box</td>
<td>1 WK</td>
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<td>Road repairs</td>
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<td>Replace Asphalt</td>
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</table>

**Replace bottom portion 18" Drain Lin**  
50.00 LF  
0.423  
2.366  
118  
53.33  
6,310  
89.82  
4,491  
---  
130.50  
6,525  
---  
346.51  
17,326

**Repair 18" Drain Line**  
1.00 LS  
---  
294  
53.38  
15,711  
4,491  
---  
45,925  
269,526  
---  
335,653

**ALLOWANCES**  
1.00 LS  
---  
294  
53.38  
15,711  
4,491  
---  
45,925  
269,526  
---  
335,653
**Item Analysis Sheet**

**Project Management and Support - Additional Duration**

<table>
<thead>
<tr>
<th>No.</th>
<th>Description</th>
<th>Quantity</th>
<th>UOM</th>
<th>Units Per Hours</th>
<th>Manhrs Per Unit</th>
<th>Labor Hours</th>
<th>$ / hr</th>
<th>Total Labor</th>
<th>Equipment</th>
<th>$ / hr</th>
<th>Total Equipment</th>
<th>Permt. Material</th>
<th>SubContract</th>
<th>$ / Item Unit</th>
<th>Total $ / Item Unit</th>
<th>Total</th>
<th>Unit</th>
<th>Total</th>
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<tbody>
<tr>
<td>1</td>
<td>Project completion has been delayed from our current 6/28/19 completion to October 7, 2019 due to additional steel work, 24&quot; valve vault and 18&quot; pipe drain repairs</td>
<td>1.00</td>
<td>LS</td>
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<td>2</td>
<td>Per attached Schedule Impact Analysis and Narrative</td>
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<td>Project delay of 45 working days for Substantial Completion</td>
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<td>4</td>
<td>Project delay of 69 days to final completion</td>
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<td>5</td>
<td>PCL will have full overhead through the 45 day delay = 9 weeks</td>
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<td></td>
<td>PCL will have only supervision and a truck for the difference of 24 days to final completion - 5 weeks</td>
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</table>

**Management**

100 %

- Half time from requested 45 day delay
  - Project Manager - 22 working days
    - 2 WK
    - 1.000
    - 1.000
    - 80
    - ST101.34
    - 8,107
    - 4,053.66
  - Project Engineer - 22 working days
    - 2 WK
    - 1.000
    - 1.000
    - 80
    - EN101.34
    - 7,150
    - 3,574.81
  - Vehicle Allowance (for PM and PE)
    - 4 WK
    - 1.000
    - 1.000
    - -
    - -
    - 600.00
    - 2,400
    - 600.00
    - 2,400

**Supervision**

100 %

- 9 weeks + 5 weeks = 14 weeks
  - Structure Supt.
    - 14 WK
    - 1.000
    - 1.000
    - 91.78
    - 51,397
  - Trc Pickup 4x2
    - 14 WK
    - 1.000
    - 1.000
    - -
    - 11.01
    - 6,168

**Support Equipment**

100 %

- Trailer Office
  - 9 WK
  - -
- Case IH Scout Diesel 2 -Passenger UTV
  - 9 WK
  - 1.000
  - 1.000
  - 6.75
  - 4,860

**Total Cost**

- 176.57
- 17,657
- 575.65
- 57,565
- 71.10
- 7,110
## Item Analysis Sheet

**Project Management and Support - Additional Duration**

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<th>Description</th>
<th>Quantity</th>
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<th>Man-Hrs Per Unit</th>
<th>Hours</th>
<th>Labor $/hr</th>
<th>Total</th>
<th>$/hr</th>
<th>Equipment</th>
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<th>Total</th>
<th>Perm. Material</th>
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<th>Total</th>
<th>SubContract</th>
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<th>Total</th>
<th>Total Cost</th>
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<td><strong>Project Management and Support - Ad</strong></td>
<td>1.00 LS</td>
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<td>720</td>
<td>92.58</td>
<td>66,654</td>
<td>11,028</td>
<td>2,250</td>
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**PCL Construction, Inc.**

**Water Infrastructure Group**

**Item Analysis Sheet**

<table>
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<th>Description</th>
<th>Quantity</th>
<th>UOM</th>
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<th>Man-Hrs Per Unit</th>
<th>Hours</th>
<th>Labor $/hr</th>
<th>Total</th>
<th>$/hr</th>
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<th>SubContract</th>
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<th>Total Cost</th>
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<tbody>
<tr>
<td><strong>Project Management and Support - Ad</strong></td>
<td>1.00 LS</td>
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<td>720</td>
<td>92.58</td>
<td>66,654</td>
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Andrew Durda

Proprietary and Confidential
# Item Analysis Sheet

## Bell Butte Tank Rehabilitation - Additional Work

### Location
Temppe, AZ, USA

### Project Details
- BE Number: BE170006
- Opportunity No: N/A
- Owner File No: N/A
- Location: Bell Butte Tank Rehabilitation - Additional Work
- Project: Bell Butte Tank Rehabilitation - Additional Work
- Location: Tempe, AZ, USA

### Item Analysis Sheet

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<th>No.</th>
<th>Description</th>
<th>Quantity</th>
<th>UOM</th>
<th>Units Per</th>
<th>Man-Hrs Per Unit</th>
<th>Labor</th>
<th>Equipment</th>
<th>Service/Tools/Supplies</th>
<th>Perm. Material</th>
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<td>Hours</td>
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### US CONTRACT BOND Class B
- 100 %
- US CONTRACT BOND Class B: 775,814 TB
- $0.007600 / Hour
- Total: $5,896
- $0.007600 / Hour
- Total: $5,896

### US CONTRACT BOND Class B
- 100.00 %
- US CONTRACT BOND Class B: 775,814 TB
- $58.96 / Hour
- Total: $5,896
- $58.96 / Hour
- Total: $5,896

### SUBCONTRACT BOND
- 100 %
- Sub-Contract: 411,719 SC
- $0.013500 / Hour
- Total: $5,558
- $0.013500 / Hour
- Total: $5,558

### SUBCONTRACT BOND
- 100.00 %
- Sub-Contract: 411,719 SC
- $55.58 / Hour
- Total: $5,558
- $55.58 / Hour
- Total: $5,558

### F6 BOND
- 100.00 %
- F6 BOND: 100,000
- $114.54 / Hour
- Total: $11,454
- $114.54 / Hour
- Total: $11,454
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<th>Equipment Tools/Supplies</th>
<th>$ / ItemUnit</th>
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## Item Analysis Sheet

### Project Information
- **Project:** Bell Butte Tank Rehabilitation - Additional Work
- **Location:** Tempe, AZ, USA
- **BE Number:** BE170006
- **Owner File No.:**
- **Opportunity No.:**
- **Project File No.:**

### Item Analysis

<table>
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<tr>
<th>No.</th>
<th>Description</th>
<th>Quantity</th>
<th>UOM</th>
<th>Units Per Hours</th>
<th>Man-Hrs Per Unit</th>
<th>Labor Hours</th>
<th>Labor $ / hr</th>
<th>Labor Total</th>
<th>Equipment Hours</th>
<th>Equipment $ / hr</th>
<th>Equipment Total</th>
<th>Perm. Material</th>
<th>SubContract</th>
<th>Total Cost</th>
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| TAXES | 100.00 % | --- | --- | --- | --- | --- | 388.04 | 38,804 | --- | --- | 388.04 | --- | --- |

**Total Cost:**

- **TAXES:** 100.00% 388.04 38,804 388.04 38,804

---

1. PCL Network Ado/Clif Southwest/District Office/District Shared/Special Projects/S471188 - CUT Bell Butte/CHANGE ORDERS/COMPLETE CHANG

---

**Andrew Durda**

Proprietary and Confidential
CHANGE ORDER #002 REQUEST

SCHEDULE UPDATE AND TIME IMPACT ANALYSIS NARRATIVE
Bell Butte Tank Rehabilitation Project
Change Order #002 – Schedule Time Impact Analysis
PCL CONSTRUCTION, INC.
May 22, 2019

BACKGROUND
The project received Change Order #1 on March 6, 2019, amending the project contractual date to June 28, 2019, per PCL’s request on a no-cost contractual completion date change request to perform the original scope of work inside the contractual project duration.

PCL received Field Order #1 on January 24, 2019 from Dibble Engineering, which in summary confirmed the original assumptions on steel repairs and new appurtenances to be performed and reduced the floor repair work. Field Order #1 did not touch or noted any additional structural repairs that were carried in PCL’s original GMP as allowances, but did not included any work durations in our schedule.

After mobilization on March 4, 2019, PCL and MMI inspected the current conditions of the structural elements in the tank, and found a lot of defects and issues with corrosion and other important structural problems, this was brought up to the City’s and Dibble’s attention and subsequent RFIs were submitted with repair procedure proposals and price proposal that were accepted by both Dibble and the City on April 29, 2019.

SCHEDULE IMPACTS
The following impacts to the schedule are being noted and are shown in the attached schedule update and schedule update to baseline comparison of the critical path:

1.- With the acceptance of the additional steel work repairs and pricing on April 29, 2019, the structural repair work commenced with the materials procurement on April 22, 2019 (ID:C1140) and steel repairs, which is a critical path activity, commenced on May 2, 2019 (ID:C1030), this resulted on a delay of the structural work of 45 working days (9 weeks)

2.- The structural work delay affected another critical path activities for the coatings ID:C1100 – Interior surface prep ard C1110 – Interior Coatings Install, both with a global delay of 45 working days.

3.- New activities were added for the repair of the existing 18" drain line and the slope stabilization, which is currently part of this new Change Order #002 proposal, this work is delaying the completion of the project for 69 working days (14 weeks), for a new final completion of October 7, 2019. This work can’t be performed parallel to the tank rehabilitation work, since it will close all access to the work and the pipe liner material can’t be installed during the July and August months due to humidity, heat and rain.

CONCLUSION
PCL is requesting to be compensated for additional overhead price as described in our price proposal, for the following durations:

-Complete overhead price, staff and support equipment – 45 working days, for the delays to the project completion created by the additional time to proposed, review, approve and perform structural repairs not noted in Field Order #001.

-Staff and truck only price – 24 working days. Trailer and other support equipment will be demobilized and a superintendent with a truck will be left onsite to supervise the completion of the 18" drain repair work.
<table>
<thead>
<tr>
<th>Activity ID</th>
<th>Activity Name</th>
<th>Original Duration</th>
<th>Start</th>
<th>Finish</th>
<th>BL1 Start</th>
<th>BL1 Finish</th>
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<tbody>
<tr>
<td>C1110</td>
<td>Coating with Sikaflex 2C</td>
<td>15 08-Aug-19 - 08-Aug-19</td>
<td>08-Aug-19</td>
<td>08-Aug-19</td>
<td>08-Aug-19</td>
<td>08-Aug-19</td>
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<tr>
<td>Equipment and Startup</td>
<td></td>
<td>5 09-Aug-19 - 09-Aug-19</td>
<td>09-Aug-19</td>
<td>09-Aug-19</td>
<td>09-Aug-19</td>
<td>09-Aug-19</td>
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<tr>
<td>C1260</td>
<td>Repair slopes at 18&quot; drain blow out</td>
<td>10 20-Sep-19 - 20-Sep-19</td>
<td>20-Sep-19</td>
<td>20-Sep-19</td>
<td>20-Sep-19</td>
<td>20-Sep-19</td>
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<tr>
<td>C1270</td>
<td>Repair 18&quot; drain at bottom portion and N</td>
<td>10 30-Sep-19 - 30-Sep-19</td>
<td>30-Sep-19</td>
<td>30-Sep-19</td>
<td>30-Sep-19</td>
<td>30-Sep-19</td>
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</table>

**Schedule Comparison Layout**

**Critical Path Activities**

- Final C

**Remaining Work**

**Primary Baseline**

**Actual Level of Effort**

**Actual Work**

**Critical Remaining Work**

**Comparision of Latest Schedule Update #4 to Baseline Update #1**
<table>
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<th>Activity Name</th>
<th>Original Start</th>
<th>Original Finish</th>
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<tbody>
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<td>03-Aug-19</td>
<td>04-Sep-19</td>
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<tr>
<td>C1190</td>
<td>Startup and Testing</td>
<td>05-Sep-19</td>
<td>06-Sep-19</td>
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<tr>
<td>24&quot; Valve Vault</td>
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<td>15-Jul-19</td>
<td>06-Jul-19</td>
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<tr>
<td>C1200</td>
<td>Procure Valve Vault Materials</td>
<td>18-Jun-19</td>
<td>21-Jun-19</td>
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<tr>
<td>C1220</td>
<td>Excavate and install line stop</td>
<td>24-Jun-19</td>
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<tr>
<td>C1230</td>
<td>Excavate Valve Vault</td>
<td>26-Jun-19</td>
<td>26-Jun-19</td>
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<tr>
<td>C1240</td>
<td>Install Vault and Piping</td>
<td>27-Jun-19</td>
<td>03-Jul-19</td>
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<tr>
<td>C1250</td>
<td>Backfill and remove line stop</td>
<td>23-Jul-19</td>
<td>08-Jul-19</td>
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<tr>
<td>18&quot; Drain Repair</td>
<td></td>
<td>28-Aug-19</td>
<td>07-Oct-19</td>
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<td>C1260</td>
<td>Repair slope at 18&quot; drain blowout</td>
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<td>16-Sep-19</td>
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<tr>
<td>C1270</td>
<td>Repair 18&quot; drain at bottom portion and replace 18&quot; drain on top</td>
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<td>30-Sep-19</td>
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<td>C1280</td>
<td>18&quot; Drain Pipe Lining</td>
<td>01-Oct-19</td>
<td>07-Oct-19</td>
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</table>
CHANGE ORDER #002 REQUEST

24” VALVE VAULT PRICING QUOTES
# PROPOSAL

**TO:** PCL Construction  
**PHONE:** 480-829-6333  
**DATE:** 4/12/2019  
**JOB NAME:** Bell Butte Tank New Valve  
**LOCATION:** 52nd St & Broadway Rd  
**ATTN:** Greg MacIag

<table>
<thead>
<tr>
<th>1 Ea 24&quot; Line Stop Complete on 24&quot; Steel Water Line.</th>
<th>Price includes a weldon line stop fitting and all welding.</th>
<th>28,775.00</th>
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<tr>
<td>1 Ea 4&quot; Drain Down Port Complete on 24&quot; Steel Water Main.</td>
<td>Above Price Includes All Material - Welding &amp; Wet Tap.</td>
<td>850.00</td>
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**NOTES:** Above pricing does not include any excavation, permits and shoring if required. Thrust blocking of pipe to be done by contractor. Recoating of pipe done done by contractor.

Respectively submitted  
Pipeline Services, Inc  

By Bruce Martell
Project name: PCL/Bell Butte lower pipe/butterfly valve install Project.

Jon Abbey
PCL Construction, Inc
Water Infrastructure Group.
1711 W. Greentree Drive Ste. 201
Tempe, AZ. 8528

PPS is offering a budgetary quote for the above referenced project. Pricing includes carbon materials and labor to fabricate/install concrete lined pipe as listed below based on information provided for $28,943.00.

**Scope**

PPS will fabricate 24" CLP concrete lined flanged pipe and butt straps. These spools will be used to cut in and replace approx. 11' of existing pipe for the isolation valve install. The new pipe will have a 2-6" flanged branch connections for PCL to install a bypass loop. Field labor to cut/prep existing pipe, install/weld new pipe spools, repair concrete lining at weld joints, and touch up paint at weld joints

**Included:**
1. 24" AWWA CLP Pipe, carbon pipe materials, and consumables
2. Exterior coating on new concrete lined pipe and field touchup coatings on weld joints with C210 liquid-epoxy coating systems
3. Shop and field labor
4. QC inspection and fabrication drawings
5. Delivery

**Exclude:**
1. Mics Taxes including sales Tax.
2. Anything not specifically mentioned above.
3. Crane support
4. Line stop (will be provided by Pipeline Services)

Sincerely,

Jim Scallion
Project Manager
Professional piping systems
## Rental Quote

**Order Date:** 3/4/18  
**Quoted By:** Cisco Sacramento  
**Mobile Number:** (602) 250-1569  
**E-mail:** cisco@tsraz.com

**Job Name:** Bures  
**Job Location:** 48th and Broadway

---

### Quantity vs. Equipment Description

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<th>Qty</th>
<th>Equipment Description</th>
<th>Per Day Each</th>
<th>Per Week Each</th>
<th>Per Month Each</th>
<th>Monthly Price Line Item Total</th>
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<td>Pick Up</td>
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<td>$3.00</td>
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<td>Load</td>
<td>Fuel Surcharge</td>
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<td>Each</td>
<td>Site Specific Engineering (if excavation is +20’ Depth or Exceeding Tab Date)</td>
<td>$1,200.00</td>
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**Notes:**  
Customers will be responsible for equipment assembly/disassembly. Customer will be responsible for removing site excavations. Customer will unload/load third party freight transport trucks.

---

Cisco Sacramento  
Quoted By  
**Date:**  
Customer Signature

*We reserve the right to change/cancel terms with our written notice.*  
Quote is good for up to 30 days. Thank you for giving us the opportunity to serve you!
### Site Service Quotation

**Quote No.:** 414-1571916  
**Quote Date:** 04/10/19  
**Quote Expires:** 05/10/19

**Sent To:** PCL CONSTRUCTION INC  
Alex MacKay  
1711 W GREENTREE DR STE 201  
TEMPE, AZ 85284-2717

**Ship To:** PCL CONSTRUCTION INC  
54711 Beil Butte  
1705 W BROADWAY  
TEMPE, AZ 85282

**Order #:** LAX-63062  
**Phone:** 602-663-5832

**Attn:** Alex MacKay  
**Terms:** Due Upon Receipt

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<th>Thru</th>
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<td>0.00</td>
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</table>

**Subtotal:** 480.25  
**Tax:** 5.54  
**Total:** 485.79

---

**Accepted:**  
**Date:**

**Emitted To:** United Site Services, PO Box 53267, Phoenix, AZ 85072-2877

**OTE:** All Units have been calculated for shipping period only. Damage Waiver is optional. Please read terms and conditions on the last page of this document for more information.
From: Alex Mackay <SMackay@pci.com>
Sent: Wednesday, April 3, 2019 2:14 PM
To: Jon Abbey
Subject: Quotes for Change Orders

Crane:
Travel in... $95.00
Travel out... $95.00
Hourly rate begins when crane arrives on site... $185.00
OT after 8 hours, nights, weekends... $40.00 per hour
A 8% surcharge will be applied to invoice total.

12K Fork:
$550 Day $1700 Week $4000 Month

315F (They don't make a 12" bucket for this machine, the smallest they have is an 18"):

<table>
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<tr>
<th>Description</th>
<th>Rate</th>
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<td>315F EXCAVATION PLANTED</td>
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<td>Day</td>
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<td>$1,493.00</td>
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<tr>
<td>4-Week</td>
<td>$4,180.00</td>
</tr>
</tbody>
</table>

Alex Mackay
Senior Buyer
PCL Construction, Inc.
Water Infrastructure Group
M 602-663-5832

Connect with us on:
Sharing your vision. Building success.
QUOTE DONE PER SUPPLIED APPROVED FOR CONSTRUCTION PLANS

STANDARD EXCLUDES UNLESS SPECIFIED IN INCLUDES: Excavation & Excavation Protection, Backfill, Shoring, Final Adjustment, Tax, All Bonds, Traffic Control Access, Dewatering, Pipe Cutting/Breakout/Penetrations/Drops, Permits, Short Loads, Water Stops, Grades, Staking, Concrete Collar, Weekend Work, Night Work between 6 p.m. to 4 a.m., Lighting, Concrete Pumping, Pipe & Valve Work including Stabilization of Pipe, Grount Fill, Coating/Line Painting, Knockouts, Retention, Texture Rolling costs, Stand by charges due to contractor.

STANDARD NOTES: Excavation to not exceed MAG or plan details. Design and Fabrication per industry standard any required modification will be extra. For MAG A concrete will be billed at $150/yd. for over excavation and or lost concrete due to contractor not ready. REQUIRED: Suitable access for boom/miss mix trucks to perform under own power, on level ground no powerlines or overhead obstructions (15' from boom pedestal to center of hole; actual distance determined by depth and weight of product). A one year warranty is included in this price. Prices are good for 45 days from date of estimate. Jobs awarded but not started within 3 months or after concrete price increases may be re-priced. Olson Precast's liability is limited to the total of this quote.

MANHOLE NOTES: Material meets ASTM C-478 specifications. Bases are MAG 420 or 520 unless specified. Waterstop to be provided and installed by Contractor per manufactures specs. Vacuum Testing and Coating Scheduled six months after installation maybe re-priced. Vacuum Testing of Sewer Manholes Only are to top of zone. Olson is not Responsible for Vacuum Testing Grade rings when Adjustment is by Others. If agency requires testing to top of FIC and test passes thru top of cone then change order required to pass through FIC. Customer to Supply and Install Pipe Plug on Pipe larger than 8", 28 day cure time required for Coating of Concrete unless Contractor waives Olson liability in writing. Scheduling of closeout work including, vacuum testing, coating, insect coating requires a two week notice. MAX PIPE DISTANCE: For 8"-12" Pipe from Center of manhole 48" MH = 21' 60" MH = 27" For all other pipe size distance @ Springline from Outside pipe to Outside Pipe cannot exceed 42". Customer responsible for Confirmation of Frame & Cover Lettering. Olson to set manhole openings to outflow pipe. Olson is not responsible for conflicts with manhole openings and curbs.

RV VAULT INCLUDES: 6" BASE w/SUMP HOLE, 6" WALLS AND 8" ROOF, 5,000 P.S.I. CONCRETE, GRADE 60 REINFORCING, 2-BLOCKOUTS, BUTYL SEALANT IN JOINTS, GROUTING OF BLOCKOUTS, 30' TEMPE WATER FIC, DELIVERED AND SET WITH CONTRACTOR ASSISTANCE IN A PREPARED ACCESSIBLE EXCAVATION PROVIDED THERE ARE NO POWERLINES OR OVERHEAD OBSTRUCTIONS, ESTIMATE REFLECTS WATER TABLE BELOW VAULT DEPTH.

EXCLUDES: OTHER HARDWARE, TRAFFIC RATING DESIGN TO BE FILLED w/WATER WITHOUT BACKFILL, SEALING COMPLETE STRUCTURE WATERTIGHT, ENGINEER CALC, COATING, TESTING, WATERSTOPS FOR PIPES, PIPE SLEEVES, CORE DRILLED HOLES, LINK SEALS.

"FIGURED ONE DELIVERY TRIP TO SET BOTTOM AND STOCK TOP FOR CUSTOMER TO SET AFTER PIPE INSTALLED. OLSON TO RETURN TO GROUT AFTER ALL IS SET."

<table>
<thead>
<tr>
<th>Product ID</th>
<th>Structure Type</th>
<th>Qty</th>
<th>Price/Average</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>5'x6'x11.5</td>
<td>ID PRECAST: VAULT w/ 6&quot; WALL</td>
<td>1</td>
<td>$10,288.46</td>
<td>$10,288.46</td>
</tr>
</tbody>
</table>

Total: $10,288.46
<table>
<thead>
<tr>
<th>QUOTE NO</th>
<th>QUOTE BRANCH</th>
<th>QUOTE DATE</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>47/37/9</td>
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<table>
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<tr>
<th>CODE</th>
<th>DESCRIPTION</th>
<th>QUANTITY</th>
<th>UNIT PRICE</th>
<th>TOTAL PRICE</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. **Stock Deliveries are Subject to Shipping Charges**
2. PVC and UPVC materials are subject to a minimum order quantity.
3. All other materials are subject to a minimum order quantity.

---

*Note:* The table contains numerical values and categories related to a quote or order, likely involving quantities and pricing details. Specific values such as 8,800.49 and 8,800.49 are noted in the table. The context suggests a business or industrial setting, possibly involving materials or components.
TRAFFICADE
Work Zone Services

WE PROVIDE:
BARRICADES
TRAFFIC CONTROL
TRAFFIC PLANS
PLATES & SHORING
PAVEMENT MILLING
SAWING & CORING
BARRIER WALL
SAFETY SUPPLIES
CUSTOM SIGNS
SIGN INSTALLATIONS
ASPHALT PAVING

Locations:
Phoenix
2533 W. Holly St.
Phoenix, AZ 85009
(602) 431-0911
Chandler
17046 S. Weber Dr.
Chandler, AZ 85226
(602) 431-0911
Tucson
2802 N. Flowing Wells Rd
Tucson, AZ 85705
(520) 824-0465
Prescott
11580 E. Santa Fe Loop
Dewey, AZ 86327
(928) 759-0094
Flagstaff
5301 E. Commerce Ave.
Flagstaff, AZ 86004
(928) 759-0094
Yuma
3178 33rd Place, Suite A
Yuma, AZ 85365
(928) 344-5046

PCL Construction, Inc.
Attention: Greg Maciag
Phone: 602-799-3596
Re: 52nd Street & Broadway Road, Tempe, AZ. 85282
Date: 04/02/2019

TRAFFIC CONTROL DAILY ESTIMATE

BROADWAY ROAD ONE DIRECTION RIGHT LANE AND SIDE WALK CLOSURE- WORK AREA: 150 FT.
Provide a one direction right lane and side walk closures. redirect pedestrians to the opposite side of the road at the nearest cross walk for the above mentioned street. Allowing two thru lanes of traffic open, for the above mentioned distance.

DAY TIME SET UP.

- Estimated rental cost per day is $90.00*.
- Estimated initial charge for sale items including (1) TCP is $225.00*.
- Estimated labor cost to set up OR take down this closure is $245.00* per occurrence.

OFF-DUTY POLICE OFFICER WITH CAR (IF NEEDED).
$105.00 * per hour. (4 hours minimum / more than 24 hours’ notice required).

EXCLUSIONS:

*TERMS/ CONDITIONS:
- *Rental prices above are estimates from our interpretations of the plans and specifications. Invoices will be based off the actual ticketed equipment and / or labor delivered to the project. Unless specified, this estimate does not include any specialty, non-spec, or project signs which may be requested by the engineer. This estimate is for traffic control; any extra devices used for hazards (flagging, open trench signs, extra barricades, etc.) will have to be added by the contractor.
- Sales tax is not included and will be added to all billings. Tax rate subject to change as the prevailing rate changes.
- This quote is valid for 60 days. If work starts after 60 days, then Trafficade reserve the right to nullify this quote and re-quote at its own discretion.
- Net 30 days on approved credit.
- 0% Retention.

Trafficade Estimator:
Rick Rogers
602-431-0911
Rogers@trafficade.com
CHANGE ORDER #002 REQUEST

TTHM UPGRADES PRICING QUOTES
Quotation for GridBee™ Trihalomethane (THM) Removal Equipment for Bell Butte Reservoir

Date: May 21, 2019

Project #: 9102B

To: Jesus G Angulo
PCL Construction, Inc.
jangulo@pcl.com • 480-493-8706

From: Harvey Hibl, Medora Corporation West U.S. Manager, Offices in: AZ, CO, OR
harvey.hibl@medoraco.com • 303-887-5323

Amy Dinius, Medora Corporation Engineered Sales Dept., Denver, CO
amy.d@medoraco.com • 866-437-8076

1. Equipment Cost - See Section 3 below for Equipment Details.

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Equipment Description</th>
<th>Purchase Cost Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SN15-3P-460 Floating Spray Nozzle machine:</td>
<td>Included</td>
</tr>
<tr>
<td>1</td>
<td>BAF-2hp-3PH Ventilation System:</td>
<td>Included</td>
</tr>
<tr>
<td>1</td>
<td>GS-12 240v 1PH Submersible Mixer:</td>
<td>Included</td>
</tr>
<tr>
<td></td>
<td>Equipment Subtotal:</td>
<td>$80,870</td>
</tr>
<tr>
<td></td>
<td>Applicable Taxes:</td>
<td>-to be determined -</td>
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<tr>
<td></td>
<td>Factory delivery and placement:</td>
<td>$23,100</td>
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<tr>
<td></td>
<td>Equipment, Delivery, and Placement Total:</td>
<td>$103,970</td>
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</tbody>
</table>
OPTIONAL SN15 and Ventilation System Control Panels:
Medora can supply motor control panels for the THM removal system components, or the City can elect to supply the entire electrical system itself. See Section 3 below for Equipment Details.

<table>
<thead>
<tr>
<th>Description</th>
<th>Purchase Cost Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two (2) Three-Phase Motor Control Panels. One (1) panel for each Floating Spray Nozzle Unit and Ventilation System.</td>
<td>$6,640</td>
</tr>
<tr>
<td><strong>Control Panel Cost:</strong></td>
<td>$6,640</td>
</tr>
<tr>
<td><strong>Applicable Taxes:</strong></td>
<td>-to be determined -</td>
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<tr>
<td><strong>Freight:</strong> FOB Destination. Prepay and Add:</td>
<td>-to be determined -</td>
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<tr>
<td><strong>Total Cost for the above Control Panels:</strong></td>
<td>$6,640</td>
</tr>
</tbody>
</table>

OPTIONAL GS-12 Submersible Mixer Control Panel:
Medora can supply motor control panels, or the City can elect to supply the entire electrical system itself. See Section 3 below for Equipment Details.

<table>
<thead>
<tr>
<th>Description</th>
<th>Purchase Cost Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>One (1) GS Series Motor Control Panel for the Mixer.</td>
<td>$1,500</td>
</tr>
<tr>
<td><strong>Control Panel Cost:</strong></td>
<td>$1,500</td>
</tr>
<tr>
<td><strong>Applicable Taxes:</strong></td>
<td>-to be determined -</td>
</tr>
<tr>
<td><strong>Freight:</strong> FOB Destination. Prepay and Add:</td>
<td>-to be determined -</td>
</tr>
<tr>
<td><strong>Total Cost for the above Control Panels:</strong></td>
<td>$1,500</td>
</tr>
</tbody>
</table>

2. Scope of Supply

Medora Scope of Supply for delivery and placement of this equipment:

- Manufacture, deliver and place the above equipment into the tank; including supplying any crane or lifting assistance that may be needed.

- For a Roof Mounted Blower: Medora will bring the electric cord from each piece of equipment to the outside of the tank, via a Medora supplied through-wall fitting and bring the electrical cord through a tank wall, roof, or vertical side of a raised hatch. The top of the through wall fitting contains 3/4" NPT internal threads for conduit connection.

- If the City electrician connects this equipment to the power system while Medora's crew that is placing the equipment is still on site, Medora's crew will assist in startup of this equipment to check for proper motor rotation and to confirm the equipment is operating correctly. If the City electrician cannot make the final electrical connection to this equipment while Medora's crew is on site, then the City will need to start up the equipment without Medora present, which is generally not a problem. However, if the City requests Medora to make a special trip for system startup, then the City must issue a separate purchase order to cover Medora's cost for the special trip.
Customer Scope of Supply for Medora delivery and placement of the above equipment:

- Confirm there are no interior obstructions which would impede the placement of our equipment.
- Verify Cathodic Protection (if present) will work with floating equipment and intake hoses that descend to reservoir floor.
- For a roof mounted blower(s):
  → Confirm in advance that the roof can handle the weight loading of the blower(s)
- Supply source power up to the point of Medora's termination on the tank roof.
- Provide and Install the motor control panels and all associated electrical connections.
- Coordinate SCADA connections and integrations.
- Anything not supplied or listed in Medora Corporation's Scope to be supplied by others.
- Provide and execute all other functions and specifications not included in the Medora Corp. scope.
- Include sales or other taxes; taxes are not included in this quote.
- Execute submittals to Engineer after purchase order.

3. Equipment Description

This system has been designed to be scalable and energy efficient. This energy efficient design allows for the city to only operate what is needed. As an example, many cities would only operate a mixer, or mixer and blower, during low THM months.

**SN15.** 15-hp floating, grid powered, circulation and Trihalomethane (THM) removal equipment for potable water tanks and reservoirs. 316 stainless construction, Certified to NSF / ANSI 61. Designed for continuous operation and placed through a 24-inch square minimum clear roof opening. The spray unit direct flow rate is 1.1 MGD. Operating footprint: 132 inches diameter and a minimum 30 inches headspace required (contact Medora for exceptions that can be made). Shipping crate size: 72 inches length x 48 inches width x 59 inches height. Shipping weight: 1,200 lbs.

**BAF-2hp Ventilation System.** Turbine blower and air filter unit, for 750 CFM at 5 water column inches. Include baseplate, mounting, 2 hp dual voltage TEFC close-coupled motor, and 5 micron x 1,100 CFM intake air filter. Working dimensions are 36 inches long x 30 inches wide x 48 inches tall. Available in single or three phase. Shipping weight is approximately 250 lbs., in a crate approximately 42 inches length x 36 inches width x 54 inches height.

Three-Phase Motor Control Panel Specification (one panel required for each Spray Unit and Ventilation System): Industrial grade construction which includes a door mounted heavy-duty HOA switch, run light, lockable handle for safety, housed in an outdoor rated, gasketed, NEMA 3R enclosure, multi-tap transformer accommodates common voltages and includes integrated secondary protection (no fuses required), surge protection device, 120V control power for field devices, NEMA/IEC rated magnetic contactors feature 2.5 million electrical cycles at full rated current. Service entrance rated UL 489 circuit breaker disconnect provides branch and short circuit protection. All components UL/CUL certified, and the complete panel as shipped is UL508A certified. Operating Temp of -4° to 140°F (-20° to 60°C), 10% to 95% non-condensing relative humidity. Dimensions: 32"H x 15"W x 10"D. NOTE: VFD Source Power is not compatible with this control panel.
GS-12: High-flow submersible mixer, electric, nominal power 0.50-hp, 316 stainless steel and non-corrosion polymer construction. This mixer rests on the tank floor with polymer support pads. It can easily be placed into the tank by the factory, contractor or City through a standard hatch with 12" diameter minimum unobstructed clearance. Comes standard with 75' of submersible cable, tank/roof junction box, through tank fitting for the power cord, pigtail & splice kit and shipping box. Certified to NSF / ANSI 61. Operating footprint: 36 inches length x 10 inches width. Shipping box size: 42 inches length x 15 inches width x 10 inches height. Shipping weight: 105 lbs.

240v GS Series Control Panel with SCADA Monitoring: Completely assembled, Carlon NEMA 4X enclosure, Hand-Off-Auto switch, contactor for mixer or blower control, run indicator light on exterior of door, grounding lug, and locking latch for security. SCADA: 4-20 mAmp current transducer provides analog output for motor current which allows for monitoring proper operation, and a 24 VDC relay for remote on/off control of the mixer or blower. Complete panel as shipped is UL508A certified. Dimensions: 10"H x 8"W x 4"D

The below sales terms apply to this quotation in its entirely:

A. Material Supplier only. This quotation is to supply materials only. No contracting or construction work of any type is being offered or will be performed by Medora Corporation (Medora) at the jobsite or at any Medora location or factory.

1) To order the materials in this quotation, the purchaser should use the same type of purchase order as would be used to order other materials; for example, a desk or a forklift. Please do not attempt to order the equipment quoted here with a "contractor" or "subcontractor" agreement of any sort, because Medora is strictly a material supplier, not a contractor, and would have to reject that type of agreement.

2) The US Department of Labor clearly defines a Material Supplier, such as Medora, and its allowable activities. All activities by Medora factory personnel to transport, place and start up the Medora equipment are incidental to Medora being a Material Supplier, and Medora will not perform contracting or construction work of any type for any project. Also, no local, state, or federal laws regarding contractors or construction projects, or Davis Bacon or similar reporting requirements, are applicable to this quotation because Medora is not a contractor and does not perform any construction activities.

3) It is the responsibility of the purchaser of Medora's equipment to determine in advance whether there are any contracting or construction activities required in order for Medora's equipment to be made operational. Usually there aren't any such activities; but if there are, it is the purchaser's sole responsibility, at its sole cost, to perform all of those activities in advance of Medora's equipment arriving at the jobsite.

B. Assumptions: This quotation may be based on worksheets, calculations or other information that has been provided by the City. The City should bring to Medora's attention any discrepancies, errors in data, or false assumption that Medora may have made while preparing this quotation.

C. Expiration: This quotation expires in 90 days, or on the date of any new quotation for this project, whichever is sooner.

D. Delivery Time: Delivery is scheduled at time of order, and is usually between 8 to 12 weeks.

E. Payment Terms: For a federal, state, or local government purchaser with a good credit rating, full payment is due in US dollars 30 days after invoice date, which is generally the date when the goods leave the Medora factory. For a non-government purchaser, full payment must be made by credit card or cashier's check before the goods leave the Medora factory though, in some cases, based on availability of a payment bonding or a bank Letter of Credit, 30 day credit terms may be extended upon special request by the purchaser. If there are any issues with these payment terms, please do not rely on this quotation until the issues have been resolved with Medora.
F. Add for Taxes and Any Governmental Fees: Except as indicated above, no taxes, tariffs or other governmental fees are included in the quote shown above, nor are there any costs added for special insurance coverage the customer may require. It is the customer's responsibility to pay all local, state, and federal taxes, including, sales and use taxes, business privilege taxes, and fees of all types relating to this sale, whether they are imposed on either Medora or the customer, or whether these taxes and fees are learned about after the customer orders the equipment. The customer's purchase order should indicate any taxes or fees due on equipment and/or services, and whether the customer will pay them directly to the governing body or include the tax payment with the purchase for Medora to submit them to the governing body.

G. Add for Special Insurance Requirements: Medora Corporation maintains adequate liability and workman's compensation insurance to generally comply with its requirements for doing business in all fifty U.S. states, and will provide at no charge certificates of insurance when requested. However, if additional insurance or endorsements beyond the company's standard policy are required by the customer, then the costs of those additional provisions and/or endorsements will be invoiced to the customer after the costs become known.

H. Add for Special Training, Safety, Signage, or Other Requirements: Medora has a very strong safety training program for its employees. If any special training classes for Medora personnel are required by the customer, please notify Medora well in advance. The cost of this training will be added to this quotation or invoiced to the customer separately. The same applies to any other special requirements the customer may have, including providing of project signage or any other requirement.

I. Safe and Accessible Tank Condition Required. This quotation is based on the best information made available to us by the above date. If this equipment is ordered, Medora's engineering team will need detail information and photographs to plan the equipment placement. If the detail information changes the scope significantly, Medora reserves the right to withdraw or alter this quotation, even if the equipment has already been ordered. To avoid surprises, the City should supply detailed tank information and photos as soon as possible. To ensure the safety of Medora's crews, it is the City's responsibility to make sure that all antennas (radio, cell phone, other) located at or near the tank site are inactivated during the placement of this equipment.

J. Customer to Follow Medora's Maintenance and Safety Guidelines: The customer agrees to follow proper maintenance, operating, and safety instructions regarding the equipment as contained in the safety manual that accompanies the equipment or is sent to the customer's address.

K. Regulatory Compliance. The customer must comply with all applicable Federal and State governmental regulations. It is the customer's sole responsibility to inquire about governmental regulations and ensure that GridBee and SolarBee equipment is deployed and maintained so as to remain in compliance with these regulations and guidelines, and to hold Medora harmless from any liability caused by non-compliance with these regulations and guidelines.

L. Medora Corporation's Limited Replacement Warranty: Medora Corporation has the best parts and labor warranties that we are aware of in the industry. The details of the Warranty which applies to this project are either attached to this document or are available at https://www.medoraco.com/resources/warranty-information.
M. To Accept This Quotation

To order the equipment, please issue a purchase order to Medora Corporation, 3225 Hwy. 22, Dickinson, ND 58601. The purchase order can be mailed to the address above, faxed to 866-662-5052, or emailed to the home office at orderprocessing@medoraco.com.

This Medora Corp. quotation should be attached to the purchase order, and the purchase order should refer to the Medora Corp. quotation by date, and should accept the quotation in its entirety. Acceptable language on the purchase order would be "Quantity: 1. Description: "Equipment per the attached quotation from Medora Corp dated __________, including all terms shown on that quotation. " If there is any language missing, or extra language in the purchase order such as a referral to specifications, then Medora Corp. will not be able to accept the purchase order.

If a purchase orders is not utilized, please sign and date below, provide billing information, and fax to 866-662-5052 or email to orderprocessing@medoraco.com.

Signing below acknowledges acceptance of this quotation.

Proposal Date: May 21, 2019

Project #: 9102B

☐ THM Spray Nozzle, Mixing Equipment, and Ventilation System
☐ Optional - THM and Ventilation System Control Panels
☐ Optional - Mixing System Control Panel

_________________________  ______________________
Signature                  Date

_________________________  ______________________
Printed Name               Title
Appendix A. Performance Testing and Evaluation
(link to full information: https://www.medoraco.com/evaluating-thm-removal-performance)

**Important THM Formation Potential Considerations**

**THM Formation Over Time:** The amount of THMs mostly depend on chlorine concentration, bromine concentration, TOC concentration, temperature and pH. Only a small percentage of THMs are formed quickly. Converting THM precursors (often called THM formation potential or THMFP) into actual THMs is one of the slowest set of reactions in the entire water treatment industry and can take 50-80 hours to complete. In fact, it may never actually be completed though it does tend to reach a steady state.

**Temperature Effect:** Temperature has a large effect on the level of THMFP. For instance, a water sample @ 5°C can result in THMFP of 50 ppb while the same water @ 35°C can result in THMFP of over 200 ppb. It should also be noted that water tends to warm up as it moves through the distribution system and water storage tanks. This warming can cause an increase in THMFP.

**Mixing & Increased Detention Time:**
Simple physics indicates the mixing provided by Medora’s SN Series THM Removal Systems helps all chemical reactions in water to occur; however, the conversion of THMFP into actual THMs is probably more about time than it is about mixing because in laboratories where researchers use continuous mixing and shaking of water samples, it still takes many hours to convert THMFP into THMs. So, the most important part of Medora’s mixing might be its effect on detention time.

**Evaluating Performance Of THM Removal Systems**

**THM Removal Equation**
The equation for THM removal is actually quite simple and can be expressed as follows:

\[ R\% = 100\% - \frac{\text{THMout}}{\text{THMinasadjusted}} \]

Where:
- \( R\% \) = THM removal achieved.
- \( \text{THMout} \) = the THM out of the tank.
- \( \text{THMinasadjusted} \) = the THM going into the tank, adjusted upward by the amount of THMFP that was converted in the tank into actual THM = \( \text{THMin} + (\text{THMFPout} - \text{THMFPin}) \)

**Recommended Sampling:** If a lab or AMS Analyzer is not available to determine how much THMFP was converted into actual THM in the tank, then the Sample Aging Method can be used to give an approximation for \( \text{THMinasadjusted} \) in the above formula:
1. Take a sample of both Tank-Out and Tank-In water, at about the same time.
2. For the Tank-Out water, follow standard lab protocol for adding a preservative to stop further chlorine reactions. Test the THM of the Tank-Out water.
3. For the \( \text{THMinasadjusted} \), age the sample first, before adding a preservative to stop further chlorine reactions. The sample should be aged for approximately the same amount of time as the detention time in the tank, plus one day to account for the intense mixing in the tank.

\[ \text{Age Time} = (\text{TankVolume} / \text{Flowrate through the tank}) + 1\ \text{day} \]

The THM test of this water will give an approximation of \( \text{THMinasadjusted} \) in the above formula.
CHANGE ORDER #002 REQUEST

18” DRAIN LINE REPAIR PRICING QUOTES
Confidential Bid Proposal

Buesing Corp
3045 South 7th Street
Phoenix, AZ 85040

Contact: Adam Gudgeon
Phone: 602-819-9622
Fax:

Quote To: PCL Construction, Inc.
1711 W. Greentree Dr.
Tempe, AZ 85284

Job Name: Bell Butte Tank Rehab

Location: Tempe Butte

Arch Plans: Dibble Engineering- 4/30/2019
Civil Plans: Not provided
Soils Report: Not provided

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<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
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<th>UNIT PRICE</th>
<th>AMOUNT</th>
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<td>EA</td>
<td>11,323.76</td>
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<td>25</td>
<td>INSTALL SHOTCRETE LINER</td>
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<td>LS</td>
<td>153,962.03</td>
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<td>165,285.79</td>
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</tbody>
</table>

GRAND TOTAL

NOTES:

******Pricing good through 09-31-2019******

Buesing will not be available for this project until late third quarter/ early fourth quarter 2019

Attached Buesing Standard Conditions Apply(April 2019)

INCLUSIONS
Mobilization - 1 for initial clean pipe liner and backfill. 1 for shotcrete backfill around pipe
Excavate and Clean up around pipe liner (area shown on Dibble preliminary drawing 4/30/19)
Install shotcrete MAG 3000PSI with fiber in lieu of wire mesh per precon meeting with Dibble
Install shotcrete backfill around pipe (pipe will be installed by others)
6" Patina Finish
Embedment of Native Cobble stones at the surface of Patina finish

Exclusions:
Grading, forming, watering of grade
Pipe installation
Construction water/meters
Import/Export material
Structural backfill
Decorative rock
Bonds,Permits, taxes, traffic control
Clear and Grub
Shoring/drilling
Pumping of shotcrete for installation
PAYMENT TERMS 
PAYMENT DUE NET 30 FROM INVOICE DATE 
PRICING ASSUMES ZERO PAYMENT RETENTION WITHHELD 

NOTICE CLAUSE 

"Buesing Corp may require 8 weeks of lead time to start any Shotcrete work, and 14 weeks to start design-build Shoring installation. This requirement is due to the extremely busy work environment and a nationwide shortage of experienced Craft workers and Design Engineers. All work is done on an as-available basis so we strongly encourage our customers to verify start dates with us as soon as possible and realize that schedule creep on your project may mean you will be moved back to our next available date behind other customers who have met their precedent schedule. Your project will not be formally scheduled without a binding letter of intent or a formal contract. We apologize for any inconvenience, but we value our relationship with all customers and we work hard every day to maintain our industry leading level of quality and service."
Project: Bell Butte Water Tower 18" Drain  
Project Address: 1701 W Broadway Rd, Tempe  
Customer: PCL: Jesus Angulo  
Phone: 480-493-8706  
Email: jangulo@pcl.com  

Project Bid Price: $94,241.00  
Warranty: 10 years  
Life Expectancy: 75 - 100 years.  

General Project Description:  
Nu Flow was contacted to offer a no dig solution to rehabilitate the 18" drain line for the Bell Butte water tower. PCL will replace blown out section of pipe with new pipe and Nu Flow will line the entire pipe run. Camera inspection showed complete blockage of pipe 30' in from end of pipe. Once blockage is removed by PCL or other party, Nu Flow will clean and line the pipe system. Access will be from top hill just before pipe drops off hill, mid way down hill where new pipe replaced blown out section, and end of pipe. Liners will be installed in 50' segments. When completed, entire pipe run will be lined with no gaps.  

Scope of Work:  
• Clean and flush pipe from all debris.  
• Install 18" structural liner from top of hill access point to end of run spill way.  
• Perform before and after video and provide them to customer.  
• If anything in the scope of work changes, a change order will be submitted before work continues.  

Time of Completion and Schedule:  
• Because the epoxy is sensitive to ambient temperature, the job will need to be done in early morning hours and not during the months of July and August.  
• 5 days with working hours from Monday-Friday 4am to 2pm.  

Acceptance of Bid:  
• Upon acceptance of this bid we will proceed to the completion of our Contract.  
• Bid is valid for 30 days from date submitted. A revised bid will resubmitted after 30 days.  

Contract Price and Payment Terms  
• The Contract Price is to be paid on the following terms:  
  o Balance due upon completion.
APPPLICABLE STANDARDS

ASTM F 1216 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube

ASTM F1743 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP)


ASTM D2990 Standard Test Methods for Tensile, Compressive, and Flexural Creep-Rupture of Plastics


ASTM D638 Standard Test Method for Tensile Properties of Plastics

ASTM D5813 Standard Specification for Cured-in-Place Thermosetting Resin Sewer Piping Systems

LC1011 Proposed PMG Listing Criteria for the Rehabilitation of Existing Building Drains and Building Sewers by the Inversion or Pulled-in-Place Method and Curing of Resin-Impregnated Tube

NSF/ANSI 14 Plastics Piping System Components and Related Materials

NSF SE 13004 Rehabilitation for small Diameter Pipelines

TECHNICAL SPECIFICATIONS

1. Chemical Resistance in accordance with ASTM D543

2. Liner Thickness in accordance with ASTM D5813

3. Flexural Modulus: Minimum requirement 250,000 psi, Nu Drain 443,000 psi (ASTM D790)
   - Flexural Strength: Minimum requirement 4,500 psi, Nu Drain 6620 psi (ASTM D790)
   - Tensile Strength: Minimum requirement 3000 psi, Nu Drain 3140 psi (ASTM D638)

4. Flow Comparison: Flow (q)-per Manning formula and Williams-Hazen formula.
Coefficients of flow - per PP1 Technical Reports

LISTING/APPROVAL AGENCIES

1. National Sanitary Foundation (NSF) International

2. The International Association of Plumbing and Mechanical Officials (IAPMO) Research and Testing, Inc.


4. Buildings Materials Evaluation Commission (BMEC) - will be approved under the Ontario Building Code (OBC). BMEC will meet on February 27th, approval of Nu Flow CIPP is slated for approval. We should be listed on the BMEC site in early March.

NU DAIN IS CONFORMANCE WITH THE FOLLOWING CODES

1. Uniform Plumbing Code (UPC)

2. International Residential Code (IRC)

3. International Plumbing Code (IPC)

4. National Plumbing Code of Canada (NPC)

MANUFACTURING PLANT AUDITS

IAPMO - one audit/year (every 5 years for sample testing)

ICC-ES - one audit/year (no sample testing is required)

NSF International - two audits/year and two sample tests are done (one by NSF and the other by another accredited laboratory)
CHANGE ORDER #002 REQUEST

FIELD ORDERS 002, 003 AND 004
Notes:
1. Dielectric isolation required at junctions with dissimilar metals.
2. Shop drawings submitted per City Engineers specifications.
3. Shop drawings submitted per City Engineers specifications.
4. Shop drawings submitted per City Engineers specifications.
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Field Order

To: PCL Construction
1711 W. Greentree Dr. Ste 201
Tempe, Arizona 85284

Date: May 8, 2019

ATTENTION: Jesus Angulo, Jon Abbey, Greg Maciag

Field Order No: 003a – TTHM Removal System Blower Assembly Location

This field order supersedes Field Order 003 issued on 4/22/2019. See the attached field order regarding the TTHM removal system blower and other equipment locations. Equipment Locations are based on input provided by Medora and requests made by the City.

This field order provides the updated plan sheet of the TTHM removal system layout. Refer to the attached plan sheet for additional information.

Attachments:
- Construction Plan Sheet 16 of 34

Should you have any questions, please contact me.

Jesse Udall, PE
Dibble Engineering

CC: Jake Nelson, PE; Erich Bonz; Jim Cooper
Field Order

To: PCL Construction
1711 W. Greentree Dr. Ste 201
Tempe, Arizona 85284

Date: May 20, 2019

ATTENTION: Jesus Angulo, Jon Abbey, Greg Maciag

Field Order No: 004 – Drain Line Repair

While dewatering the Bell Butte water storage reservoir in preparation for the construction activities the existing 18-inch corrugated metal pipe (CMP) drain line, which carries water from the overflow drain basin adjacent to the tank to where it daylights under the access road, had failed and caused a portion of the soil covering the drain pipe to become saturated and slough down the butte, creating an open trench or gully. This failure exposed a segment of the existing 18-inch CMP as well as a portion of the existing 24-inch water main adjacent to the drain pipe. The 18-inch drain line requires repair and should be restored to its pre-failure condition.

This Field Order provides design plans for the repair of the failed drain pipe segment, lining of the full length of the existing drain pipe, and repair of the failed slope. Refer to the attached plan sheets for additional information.

Attachments:
- Construction Plan Sheets 11A and 11B of 34
- Memorandum 1, Smith & Annala Engineering Co., May 16, 2019

Should you have any questions, please contact me.

Jess Udall, PE
Dibble Engineering

CC: Jake Nelson, PE; Erich Bonz; Jim Cooper
PIPE §

PLACE PIPE COMPLETLY StaTeD INS TOP LAYER OF SHORTCRETE

PLACE FINISH SHORTCRETE TO 4" 1F GRAY, COLOR AS PRECEDING EXPOSED PIPE

2½"-DIA. HOLLOW ROD BRACE TO HORIZONTAL COUL

EXPOSED WATER MAIN HIPS

L1 = 1½ INCH WATER MAIN

NEW 18" PVC SDR-35 PIPE SECTION TO REPLACE COLLapsed 18" CAP

PLATE PIPE COMPLETELY IN TOP LAYER OF SHORTCRETE

PLACE FINISH SHORTCRETE TO 4" 1F GRAY, COLOR AS PRECEDING EXPOSED PIPE

5' 10' 20'

SCALE 1' = 10'

CITY OF TEMPE

ENGINEERING DEPARTMENT

PO. BOX 1019

TEMPERATURE RESERVOIR REPLACEMENT

BEll BUTTE RESERVOIR

HFC FABRICATED PIPE CAP / TRASH RACK
MEMORANDUM 1

May 16, 2019

Attention: Jesse Udall, P.E.

Dibble Engineering
1630 South Stapely Drive,
Suite No. 123
Mesa, Arizona 85204

Subject: Geotechnical Engineering Study
Tempe Bell Butte Drain Line Repair
SEC of 52nd Street and Broadway Road
Tempe, Arizona
SAECO Project No. 44.19.2141

We are pleased to submit this memorandum of our geotechnical study for the project. The purpose was to examine the geotechnical profile at the site in order to evaluate the subsurface soils and their engineering properties and then develop geotechnical engineering recommendations for project design and construction. This study was performed in general accordance with our proposal PG44.19.009, dated January 31, 2019, and your authorization. From a geotechnical standpoint, we believe the site is suitable for the proposed construction provided the recommendations provided in the memorandum are followed.

1.0 PROJECT UNDERSTANDING
We understand significant erosion occurred on the northwest facing slope of the mountain, below the reservoir, when the corrugated metal pipe (CMP) culvert, acting as the drainpipe, failed while the tank was being emptied. We have been provided with preliminary documents entitled “Steel Reservoir Rehabilitation, Bell Butte Reservoir, Drain Pipe Alternatives”, Project No. 320581, completed by Dibble Engineering, File Dated December 11, 2018. A photographic log included with preliminary documents indicated erosion from the failed portion of the drain pipe exposed an adjacent 24-inch water main that is parallel to it. We understand there are concerns about stability and effects from adjacent mitigation activities that could impact the pipeline given its partially exposed condition.

2.0 SITE VISIT
Daniel Rosenbalm, Ph.D., P.E., and Bryan Reed, P.E. of SAECO performed a site visit on March 4, 2019, to assess the exposed soils and to understand global stability of the slope failure. During our site visit, we documented the existing exposed soil and rock lithology, and current failure configuration.

We noted most of the pipeline alignment is covered with cobble and boulder size (6 to 18 inch) material. The rock generally matches the rock exposed across the Butte. It is highly angular, and we expect it was
generated from blasting operations performed during the tank construction. At the point where the drainpipe failed there is a scarp exposing a nearly vertical face of granular material (similar to aggregate base course) that makes up the upper portions of the hill and likely forms the leveling pad the tank is founded on. At the base of the scour hole, we observed competent bedrock material.

We observed some isolated locations where sloughing and erosion has collected at the base of the slope, against the access road. Conversations with Tempe personnel indicate they have not had issues with rockfalls, or material covering the road.

3.0 SHEAR STRENGTH PARAMETER DEVELOPMENT
After completing our site visit, we modeled the existing failure envelope utilizing the information collected from our site visit as well as topographic information provided by Dibble (Steel Reservoir Rehabilitation, Bell Butte Reservoir, Plan and Profile, dated 4/30/19). We back calculated the shear strength properties of the existing site materials using GeoSlope Slope/W version 2012 assuming the existing slope outside of the failure zone was metastable with a factor of safety of about 1.2. We chose this because it appears slopes are generally stable; we believe if the actual slope's factor of safety were less than 1.2, we would see some slides and rockfall. We believe if we estimate a higher factor of safety, it may lead to a less conservative repair. We iteratively adjusted the strength of the various materials to achieve the arbitrary 1.2 factor of safety. The output of our analysis for the current condition is presented in Figure 1.

We understand the preferred repair will consist of slip-lining the remaining pipe (contained within the rock fill zone below the failure point, and within the tank pad fill between the failure point and the reservoir). The pipe section within the failure zone will be replaced and then the scour hole will be backfilled with shotcrete. The surface of the repair will be blended into the existing slope using on-site rock material embedded into a 6-inch shotcrete mat.

<table>
<thead>
<tr>
<th>Material ID</th>
<th>Unit Weight (pcf)</th>
<th>Phi Angle (Degree)</th>
<th>Apparent Cohesion (psf)</th>
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<tbody>
<tr>
<td>Existing Tank Pad Fill</td>
<td>125</td>
<td>35</td>
<td>150</td>
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<td>Existing Pipeline Rock Fill</td>
<td>140</td>
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<tr>
<td>Repair Shotcrete</td>
<td>135</td>
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<td>Bedrock</td>
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<td>Impenetrable for this analysis</td>
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Geotechnical
Environmental
Construction QA/QC
SAECO
5861 S. Kyrene Road, Suite 5
Tempe, Arizona 85283
4.0 SLOPE REPAIR ANALYSIS
SAECO analyzed the proposed repair recommendations shown on the April 30, 2019 plans and determined that the shotcrete repair would result in a slope with a factor of safety greater than 1.5, (slopes with a factor of safety greater than 1.5 are typically considered stable for long term conditions). The analysis for the repaired condition is shown on Figure 2.

SAECO also performed an analysis for the temporary excavation condition that will be present during the repair (Figure 3). From this analysis the slope condition that will be present during construction appears to be marginally stable. The contractor’s competent person should perform daily inspection of the area; any evidence of instability (tension cracks, bulging, or raveling for example) should be noted, and work should stop until conditions can be further assessed.

We appreciate the opportunity to be of service to you during this phase of the project.

Sincerely,

SMITH & ANNALA ENGINEERING CO.

Daniel C. Rosenbalm, Ph.D., P.E.  
Geotechnical Services Manager

Bryan W. Reed, P.E.  
Senior Geotechnical Engineer

Distribution: (1) Address (via e-mail)

Attachments
   Figure 1 – Current Slope Model  
   Figure 2 – Repair Slope Stability  
   Figure 3 – Construction Phase Stability
1. Name: Bedrock
   Unit Weight: 140 pcf
   Cohesion': 40 psf
   Phi': 38 °

2. Name: Original Pipeline Backfill
   Unit Weight: 125 pcf
   Cohesion': 175 psf
   Phi': 35 °
   Phi-B: 0 °

3. Name: Original Tank Fill
   Unit Weight: 140 pcf
   Cohesion': 40 psf
   Phi': 38 °
STABILITY OF REPAIR

1. Name: Original Tank Fill
   Unit Weight: 125 pcf
   Cohesion: 175 psf
   Phi: 35°

2. Name: Repair Fill
   Unit Weight: 135 pcf
   Cohesion: 1,000 psf
   Phi: 38°

3. Name: Bedrock

4. Name: Shotcrete Rip Rap
   Unit Weight: 135 pcf
   Cohesion: 1,000 psf
   Phi: 38°

5. Name: Original Pipeline Backfill
   Unit Weight: 140 pcf
   Cohesion: 50 psf
   Phi: 38°
1. Name: Original Tank Fill
Unit Weight: 125 pcf
Cohesion': 175 psf
Phi': 35 °
2. Name: Bedrock
3. Name: Original Pipeline Backfill
Unit Weight: 140 pcf
Cohesion': 40 psf
Phi': 38 °