

**Change Order**  
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**Change Order No. 6**

**Agreement Date: May 29, 2019**

**Name of Project:** Otowi 2 Well Design Drilling and Development

**Contractor:** Wilson & Company, Inc., Engineers & Architects

**Revisions Hereby Made to the Contract Documents:**

The parties, through this Change Order, hereby agree to amend the contract AGR 17-30 ("contract") to increase the contract price by an amount of \$399,587.64 plus applicable NMGR.

**JUSTIFICATION:**

Change Order 6 includes payment for adjustment of final as-constructed quantities, additional work to meet unforeseen regulatory requirements, additional engineering services and payment for difficult drilling conditions associated with fractured basalt. Attached to this change order is detailed description of the costs associated with this change order. A summary of the additional costs included in Change Order No. 6 are as follows:

1. \$117,303.00 payment for adjustment of final quantities.
2. \$138,641.65 payment for difficult drilling through basalt. As the drilling progressed through the fractured basalt, the drill string began to veer out of alignment at 500 feet depth. Corrective actions could not be made immediately to correct the alignment due to the loss of drilling mud circulation at depths between 500 feet to 700 feet depth. Once the bore hole was stabilized the driller spent three weeks performing corrective actions to keep the bore hole within the alignment specifications. Correcting the alignment deviation would have taken minimal effort if the corrective actions could have been made when the deviation was first detected.
3. \$60,478.73 payment for 10 day period where drilling mud circulation was lost in January 2019. The cost incurred included were labor, fuel and LCM to stabilize the bore hole.
4. \$21,020.00 payment for reconciliation of final quantity of dual tube rotary air drilling.
5. \$20,000.00 payment for construction of erosion control measures required by LANL/DOE in preparation of discharging water produced from pump testing of well. The work included installation of rock berms and lining 150 feet of channel.
6. \$24,068.00 payment for demobilizing and remobilizing test pump equipment and rental of two 22,000 gallon storage units. Just days before the pump testing was scheduled to be completed we were notified by the New Mexico Environment Department, Ground Water Quality Bureau that we could not discharge water until we demonstrated the water was free of contaminants. This required rental

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7. of storage tanks to purge the well prior to sampling and the contractor demobilize the crew until approval was granted.
8. \$18,076.26 payment for addition engineering services to administer the project for a year beyond the scheduled completion.

**CHANGE TO CONTRACT PRICE:**

Original Price	<u>\$ 2,583,694.07</u>
Current Contract Price adjusted by previous Change Order	<u>\$ 3,776,829.16</u>
The Contract Price due to this Change Order will be increased by:	<u>\$ 399,587.64</u>
The new Contract Price, including this Change Order will be	<u>\$ 4,176,416.80</u>

**CHANGE TO CONTRACT TIME:****FINAL COMPLETION:**

End of Original Contract Time	<u>December 31, 2019</u>
Current Contract time adjusted by previous Change Order(s)	<u>NA</u>
The Contract Time will remain unchanged:	<u>0 calendar days</u>
The date for work's final completion will be	<u>December 31, 2019</u>

**APPROVALS REQUIRED:**

To be effective, this order must be approved by the County Utilities Manager; or the Los Alamos County Council if the contract modification, change order, or contract price adjustment exceeds the funding budgeted and specifically appropriated for this project, or as may otherwise be required by the General Conditions.

The adjustment in Contract price and/or Contract time stated in this Change Order shall constitute the total price and/or time adjustment due or owed the Contractor for the work or changes ordered by the Change Order. By executing the Change Order, the Contractor acknowledges and agrees that the stipulated price and/or time adjustments represent full compensation for all adjustments in the cost or the time required to perform the Contract as a whole arising directly or indirectly from the Change Order, including costs and delays associated with the interruption of schedules, extended overheads, delay, and cumulative impacts or ripple effect on all other non-affected work under Contract not changed by the

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Change Order. Signing of the Change Order constitutes full and mutual accord and satisfaction for adjustments in contract price and/or time, subject to the current scope of the entire work as set forth in the Contract Documents. Acceptance of this Change Order constitutes an agreement between Owner and Contractor that the Change Order represents an equitable adjustment to the Contract, and that the Contractor will waive all rights to file a claim on this Change Order after it is properly executed.

Requested by Project Manager: \_\_\_\_\_  
James Alarid PE Date

Approved by County/Owner: \_\_\_\_\_  
Timothy A Glasco PE, Utilities Manager Date

Approved by the County Council on the 28th day of May, 2019.

**COUNCIL OF THE INCORPORATED  
COUNTY OF LOS ALAMOS**

\_\_\_\_\_  
Sara Scott, Council Chair

**ACCEPTANCE OF CHANGE ORDER**

(Contractor name)

By: \_\_\_\_\_

Print Name \_\_\_\_\_

Title \_\_\_\_\_

(Corporate Seal)

Attest:

Print Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date: \_\_\_\_\_

May 3, 2019

Mr. James Alarid  
Deputy Director of Utilities  
Los Alamos County  
1000 Central Avenue, Suite 130  
Los Alamos, NM 87544  
Sent Via Email**Re: Otowi Well #2 – Final and Adjusting Change Order (Change Order 6 Proposal)**

James,

This letter serves as the final and adjusting change order to the Otowi Well #2 project. The well has been completed and test pumped. The total depth of the well is 2320' with an estimated production rate above 1,000-gpm. While we still need to complete contract close-out, at this point and time we have identified the final costs of the project. The breakdown of this change order is as follows:

1. Adjustment of Quantities within the Contractors detailed breakdown of the unit costs. Final quantities and prices are based upon the unit prices used to develop the original bid. The included additions and deductions in quantities are as follows:
  - a. Item 7 – 17.5" Pilot Hole, Quantity reduced by 275 feet that was drilled by dual tube rotary air. The cost underrun of Item 7 is \$19,250.00.
  - b. Item 12 – Nominal 26" borehole reaming, Quantity reduced by 200' due to reduction in the final depth of the well. The cost underrun of Item 12 is \$23,600.00
  - c. Item 17 – Furnish and Install 16" LCS casing, Quantity increased by 42' to extend below the final cemented upper zone. The cost overrun of Item 17 is \$2,268.00
  - d. Item 19 – Furnish/install 16" sst screen (wwr), Quantity reduced by 250' due to reduction in the final depth of the well. The cost underrun of Item 19 is \$85,750.00.
  - e. Item 20 – Furnish/install gravel pack, Quantity reduced by 205' due to reduction in the final depth of the well. The cost underrun of Item 20 is \$14,555.00.
  - f. Item 22 – Heavy Fluids Disposal, Quantity increased by 19 loads due to the LCM and cement used during drilling and the associated increased disposal of drilling fluids. The cost overrun of Item 22 is \$38,950.00
  - g. Item 25 – Drill Crew Per Diem, Quantity increase by 189 days due to the unforeseen subsurface and difficult drilling conditions associated with the well. The cost overrun of Item 25 is \$219,240.00.
    - i. Prior Change Orders 4 and 5 used estimates for the projected billings and payments for additional work. The quantities of Per Diem days are now finalized.
    - ii. The projected billings in Change Orders 4 and 5 for Per Diem were not accurate.
    - iii. The Per Diem days included in this change order represent the actual work completed, and the associated costs represent the final cost adjustment based upon the schedule of values provided.

2. Change Order Items – The change order items include added costs associated with items not quantifiable in the contractors detailed breakdown of the unit costs presented under the response to the RFP including added costs associated with:
  - a. Loss of circulation at 972’
  - b. Difficult drilling conditions at 890’ to 1191’
  - c. Pay Application Reconciliation – Final quantity adjustment of Dual Tube Drilling depths previously approved in Change Order 1.
  - d. Installation of BMP’s for development and testing discharge.
  - e. Added Labor and Tank Costs to assist with sampling.
3. Additional Engineering Effort – Design and project management efforts associated with the design of the BMP’s and added time for project coordination and management associated with the contract duration.
4. Additional Hydrogeologist Effort – Additional time for on-site during the project.

#### ADJUSTMENT OF THE QUANTITIES WITHIN UNIT COST BREAKDOWN:

As is normally done with unit cost, not to exceed, contracts, we have prepared a final and adjusting cost spreadsheet (Exhibit A) that quantifies the changes in the construction costs as described under items 1 and 2, above. Exhibit A shows four deductive items for a total of \$143,155.00 savings on the Contract, and three additive cost items totaling \$260,458.00. **The net change of the scheduled items is +\$117,303.00.**

#### CHANGE ORDER ITEMS:

Since restarting drilling of the well on January 7, 2019, Layne has encountered unknown subsurface conditions that have added costs to the project associated with the following:

1. Loss of Circulation at 926’ – The loss of circulation required the use of additional LCM. The loss of circulation is attributed to the vesicular fractured basalt described in the February 22, 2019 letter from John Shomaker & Associates (Exhibit F.)
2. Difficult drilling conditions between 890’ and 1191’ during the widening of the bore hole to correct deviations of the bore hole alignment that precipitated from the fractured basalt around a depth of 500’ bgl (see Exhibit F.)
3. Construction of BMP’s as required by LANL to mitigate erosion into Los Alamos Canyon.
4. Rental of holding tanks and additional time provided by the Contractor to collect water quality samples under heightened sampling requirements mandated by NMED.

**The total added costs for these items are \$264,208.38.** Detailed explanation of costs associated with loss of circulation and difficult drilling are itemized in Exhibit B. Cost items are attached in Exhibit B (Items 1 and 2 above), and Exhibit C (Item 3 above.) Item 3 has previously been approved via email prior to construction of the BMP’s.

#### ADDITIONAL ENGINEERING EFFORT:

During the course of construction Wilson & Company has actively been involved in the coordination, and management of the construction contract. Throughout the course of the project we have managed our time and efforts to achieve a successful project for both Los Alamos County and the Wilson & Company team. As a result of the additional effort to coordinate with Los Alamos County in meeting the needs of LANL to design the BMP’s, and the extended period of construction, Wilson & Company has incurred \$9,751.26 in cost overruns on the project to date. We are estimating that an



additional \$5,325.00 will be required to complete the project. **The total requested amount for engineering services is \$15,076.26**

**ADDITIONAL HYDROGEOLOGIST EFFORT:**

John Shomaker & Associates, Inc. (JSAI) has been careful to manage field oversight services being mindful of the budget. They have been on-site at all critical phases of the project. Due to the extended duration of the project, field oversight services during lost circulation, additional meetings, and assistance during the additional pumping and sample collection required by NMED, **JSAI is requesting and additional \$3,000.00 for Hydrogeologic services.**

**Summary of Cost Changes:**

Item:	Amount:	Total:
Schedule of Value Adjustments:		
- Deductive Total:	-\$ 143,155.00	
- Additive Total:	+\$ 260,458.00	
Net Change:		+\$ 117,303.00
Change Order Adjustments:		
- Change Order 6 Items:		+\$ 264,208.38
Additional Engineering (See Exhibit E):		
- Cost Overrun	+\$ 9,751.26	
- Anticipated Effort to Finish	+\$ 5,325.00	
- Difference		+\$ 15,076.26
Additional Hydrogeology		+\$ 3,000.00
<b>Total Change Order Amount:</b>		<b>\$ 399,587.64</b>

**JUSTIFICATION UNDER TERMS OF THE CONTRACT:**

Per AGR17-30 paragraph 5, on page 1, design and construction of the well was to be based upon the Construction Approach as presented in the Contractor's Response to the RFP, dated February 23, 2017. The Construction Approach was based upon the Hydrogeological Assessment of the Proposed Otowi 2 Well Site Los Alamos County, New Mexico report prepared by John Shomaker & Associates, Inc. (JSAI,) February 6, 2017 and provided to bidders during the RFP process. This report provides geological information collected during the drilling of adjacent wells Otowi 1 and Otowi 4 and was used to infer what types of geological conditions would be encountered at the Otowi 2 well site. Based upon the February 22, 2019 letter from JSAI, the actual geology at the Otowi 2 Well site differs from both Wells Otowi 1 and Otowi 4, specifically pertaining to the fractured nature of the basalt. Per paragraph A.1.f of AGR17-30, the contractor shall not be responsible for unknown geological conditions that cannot be reasonably anticipated. The fractured nature of the Basalt was not reasonably anticipated and resulted in loss of circulation and difficult drilling.



CONCLUSION:

We trust that through the information provided within this letter and its attachments that we have supported our position that the costs incurred and requested under this change order are due to the unknown subsurface geological conditions specific to the Otowi 2 Well site. The well is complete, and constructed within the parameters and specifications of the design. The County's consideration of this change order proposal is greatly appreciated to make this a successful project for all parties.

WILSON & COMPANY

A handwritten signature in blue ink that reads "Brian J. Ambrogi".

Brian J. Ambrogi, P.E.

New Mexico Water and Wastewater Manager

Cc: Steve Costello – Layne  
Andrew Seiden – Layne  
Dan Aguirre – Wilson & Company

Attachments

Exhibit A – Final and Adjusting Schedule of Values

**EXHIBIT A**  
**Los Alamos County Otowi Well 2**  
**Final and Adjusting Schedule of Values**

#	ITEM	UNITS BID	UNIT	\$/UNIT	TOTAL BID	UNITS PREV.	\$ PREV. APPLIC.	UNITS THIS	\$ THIS APPLIC	TOTAL UNITS	TOTAL DOLLARS	% COMPLETE	Final Quantities	Quantity Difference	Underrun	Overrun
1	Mobilization of drill rig	1	LS	\$119,438.00	\$119,438.00	1	\$119,438.00	0	\$0.00	1	\$119,438.00	100.00%	1	0	\$ -	\$ -
2	Site work	1	LS	\$157,325.00	\$157,325.00	1	\$157,325.00	0	\$0.00	1	\$157,325.00	100.00%	1	0	\$ -	\$ -
3	36" surface casing	55	PF	\$538.00	\$29,590.00	44	\$23,672.00	0	\$0.00	55	\$29,590.00	100.00%	55	0	\$ -	\$ -
4	Water storage/hauling	3	Per Month	\$11,760.00	\$35,280.00	3	\$35,280.00	0	\$0.00	3	\$35,280.00	100.00%	3	0	\$ -	\$ -
5	SWPP/NOI	1	LS	\$26,371.00	\$26,371.00	1	\$26,371.00	0	\$0.00	1	\$26,371.00	100.00%	1	0	\$ -	\$ -
6	Rig up	1	EA	\$8,915.00	\$8,915.00	1	\$8,915.00	0	\$0.00	1	\$8,915.00	100.00%	1	0	\$ -	\$ -
7	17.5" pilot hole	2465	PF	\$70.00	\$172,550.00	2190	\$153,300.00	0	\$0.00	2190	\$153,300.00	88.84%	2190	-275	\$ (19,250.00)	\$ -
8	Geophysical logging	1	LS	\$11,957.00	\$11,957.00	1	\$11,957.00	0	\$0.00	1	\$11,957.00	100.00%	1	0	\$ -	\$ -
9	28" intermediate surface casing	700	PF	\$246.00	\$172,200.00	700	\$172,200.00	0	\$0.00	700	\$172,200.00	100.00%	700	0	\$ -	\$ -
10	Caliper log	1	LS	\$5,810.00	\$5,810.00	1	\$5,810.00	0	\$0.00	1	\$5,810.00	100.00%	1	0	\$ -	\$ -
11	Water watch for well design	1	LS	\$43,012.00	\$43,012.00	1	\$43,012.00	0	\$0.00	1	\$43,012.00	100.00%	1	0	\$ -	\$ -
12	Nominal 26" borehole reaming	1820	PF	\$118.00	\$214,760.00	0	\$0.00	1620	\$191,160.00	1620	\$191,160.00	89.01%	1620	-200	\$ (23,600.00)	\$ -
13	Mud cleaning system/centrifuge	1	LS	\$109,715.00	\$109,715.00	1	\$109,715.00	0	\$0.00	1	\$109,715.00	100.00%	1	0	\$ -	\$ -
14	Caliper log	1	LS	\$5,810.00	\$5,810.00	0	\$0.00	1	\$5,810.00	1	\$5,810.00	100.00%	1	0	\$ -	\$ -
15	Furnish/install gage lines	1040	PF	\$12.00	\$12,480.00	0	\$0.00	1040	\$12,480.00	1040	\$12,480.00	100.00%	1040	0	\$ -	\$ -
16	Furnish/install di-electric couplings	1	LS	\$11,175.00	\$11,175.00	0	\$0.00	1	\$11,175.00	1	\$11,175.00	100.00%	1	0	\$ -	\$ -
17	Furnish/install 16" lcs casing	660	PF	\$54.00	\$35,640.00	0	\$0.00	660	\$35,640.00	702	\$37,908.00	106.36%	702	42	\$ -	\$ 2,268.00
18	Furnish/install 16" sst casing	400	PF	\$180.00	\$72,000.00	0	\$0.00	400	\$72,000.00	400	\$72,000.00	100.00%	400	0	\$ -	\$ -
19	Furnish/install 16" sst screen (wwr)	1460	PF	\$343.00	\$500,780.00	0	\$0.00	1460	\$500,780.00	1210	\$415,030.00	82.88%	1210	-250	\$ (85,750.00)	\$ -
20	Furnish/install gravel pack	2520	PF	\$71.00	\$178,920.00	0	\$0.00	2520	\$178,920.00	2315	\$164,365.00	91.87%	2315	-205	\$ (14,555.00)	\$ -
21	Air development with drill rig	180	PH	\$375.00	\$67,500.00	0	\$0.00	0	\$0.00	180	\$67,500.00	100.00%	180	0	\$ -	\$ -
22	Heavy fluid disposal	20	Per Load	\$2,050.00	\$41,000.00	13	\$26,650.00	0	\$0.00	39	\$79,950.00	195.00%	39	19	\$ -	\$ 38,950.00
23	Rig down	1	LS	\$10,030.00	\$10,030.00	0	\$0.00	0	\$0.00	1	\$10,030.00	100.00%	1	0	\$ -	\$ -
24	Demobilization of drill rig	1	LS	\$26,281.00	\$26,281.00	0	\$0.00	0	\$0.00	1	\$26,281.00	100.00%	1	0	\$ -	\$ -
25	Drill crew per diem (per day per crew)	60	Per Day	\$1,160.00	\$69,600.00	188	\$218,080.00	0	\$0.00	249	\$288,840.00	415.00%	249	189	\$ -	\$ 219,240.00
26	Mobilization/demobilization of pump rig	1	LS	\$22,649.00	\$22,649.00	0.5	\$11,324.50	0	\$0.00	1	\$22,649.00	100.00%	1	0	\$ -	\$ -
27	Furnish/install/remove test pump	1	LS	\$50,798.00	\$50,798.00	0	\$0.00	0	\$0.00	1	\$50,798.00	100.00%	1	0	\$ -	\$ -
28	Test pumping (development, step, constant)	92	PH	\$855.00	\$78,660.00	0	\$0.00	0	\$0.00	92	\$78,660.00	100.00%	92	0	\$ -	\$ -
29	TV Survey/Plumbness and alignment testing	1	LS	\$9,995.00	\$9,995.00	0	\$0.00	0	\$0.00	1	\$9,995.00	100.00%	1	0	\$ -	\$ -
30	NMGR	0	LS	\$168,205.12	\$0.00	0	\$0.00	0	\$0.00	0	\$0.00	#DIV/0!	0	0	\$ -	\$ -
31	100% Performance/Payment bond	1	LS	\$19,747.57	\$19,747.57	1	\$19,747.57	0	\$0.00	1	\$19,747.57	100.00%	1	0	\$ -	\$ -
<b>Sub-Total:</b>															<b>\$ (143,155.00)</b>	<b>\$ 260,458.00</b>

<b>ORIGINAL TOTALS</b>	<b>\$2,319,988.57</b>	<b>\$ 1,142,797.07</b>	<b>\$ 1,007,965.00</b>	<b>\$ 2,437,291.57</b>	<b>0</b>	<b>0</b>
<b>Net Change (+ is Increase / - is Deduct)</b>						<b>\$ 117,303.00</b>

CHANGE ORDERS	Bid Qty	Units	\$/Unit	Total Units	\$/Unit	%/Complete	Final Qty	Qty Difference	Change Order Amt
CO1 Rotary Air Drilling	0	LS	\$ 314,237.00						
CO2 Cementing Jobs 1-4	0	LS	\$ 87,000.00						
CO3 Cementing Jobs 5-8	0	LS	\$ 252,632.79						
CO4 Difficult Drilling Adjustment #1	0	LS	\$ 50,401.44						
CO5 Difficult Drilling Adjustment #2	0	LS	\$ 446,490.16						
<b>CO6 CO #6 - Difficult Drilling, Loss of Circulation, &amp; BMP's</b>	<b>0</b>	<b>LS</b>	<b>\$ 264,208.38</b>	<b>1</b>	<b>\$ 264,208.38</b>	<b>100%</b>	<b>1</b>	<b>1</b>	<b>\$ 264,208.38</b>
<i>Difficult Drilling Through Basalt 890' to 1191'</i>			<i>\$ 138,641.65</i>		<i>\$ 138,641.65</i>	<i>100%</i>	<i>1</i>	<i>1</i>	<i>\$ 138,641.65</i>
<i>Loss of Circulation</i>			<i>\$ 60,478.73</i>		<i>\$ 60,478.73</i>	<i>100%</i>	<i>1</i>	<i>1</i>	<i>\$ 60,478.73</i>
<i>Pay Application Reconciliation</i>			<i>\$ 21,020.00</i>		<i>\$ 21,020.00</i>	<i>100%</i>	<i>1</i>	<i>1</i>	<i>\$ 21,020.00</i>
<i>Installation of BMP's (Previously Verbally Approved)</i>			<i>\$ 20,000.00</i>		<i>\$ 20,000.00</i>	<i>100%</i>	<i>1</i>	<i>1</i>	<i>\$ 20,000.00</i>
<i>Added Labor and Tank Costs to assist with sampling</i>			<i>\$ 24,068.00</i>		<i>\$ 24,068.00</i>	<i>100%</i>	<i>1</i>	<i>1</i>	<i>\$ 24,068.00</i>

Sub-Total Change Orders \$ 1,414,969.77

<b>GRAND TOTALS</b>	
Original Contract Amount	\$ 2,319,988.57
Previously Approved Change Orders	\$ 1,150,761.39
Current Approved Contract Amount:	\$ 3,470,749.96
Outstanding Change Orders:	\$ 264,208.38
Underruns/Overruns (Net)	\$ 117,303.00
<b>Subtotal Outstanding Adjustments:</b>	<b>\$ 381,511.38</b>

Final Contract Amount (w/ all additions/deducts): \$ 3,852,261.34