



November 1, 2022

Mr. Amin Kazemi  
Engineering Division, MUD  
City of Stockton  
425 North El Dorado Street  
Stockton, CA 95202

**SUBJECT: REQUEST FOR BUDGET AMENDMENT FOR COMPREHENSIVE  
WELL EVALUATION WATER OF WELL NO. 33 - PROJECT NO. UH22005**

Dear Mr. Kazemi,

Luhdorff & Scalmanini Consulting Engineers (LSCE) is requesting a budget amendment for the Well No. 33 Evaluation Project (Project No. UH22005) to provide additional project services.

**Background**

LSCE's original project work plan and budget included a video inspection of Well No. 33 to assess its condition, pump development with a temporary pump, test pumping, and water quality sampling. As part of the project, a video survey of the well was performed by LSCE's subcontractor, Roadrunner Drilling and Pump (RDP), on August 9, 2022, to visually evaluate the condition of the well structure.

During the video survey, the upper two screen sections (144' – 170' and 186' – 216') were not visible due to the installation of an inner, 18-inch diameter, steel casing set within the well to a depth of 220 feet that was previously unknown. Subsequent investigation by the City revealed that the inner casing was installed to mitigate cascading water conditions originating from the two uppermost screen intervals after the well was constructed.

Bacterial growth was observed on the screens below the installed liner. Although the uppermost screens, behind the 18-inch casing, are not visible, it is reasonable to expect that they are in the same condition as the lower screen sections. Approximately 21-feet of fill material was also observed in the bottom of the well.

Based on the condition of the screens that were visible during the video survey, the inability to visually inspect the screens behind the installed liner, and the accumulation of fill in the bottom of the well, LSCE recommended that the liner be removed from the well, the fill removed from the well sump, and that a limited well rehabilitation be performed before pump testing and water quality sampling.

LSCE prepared and submitted to the City a work plan (attached) that include recommend work not included in our original work plan. The original and new work plan task elements are listed below.

Original Work Tasks	New Work Tasks
Mobilization	
Video Survey	
	Removal of Inner Liner
	Video Upper Portion of Well
	Airlift Fill
	Brush Well
	Chlorinate Well
	Brush Well
	Airlift Well
Video Well	
Pump Install	
Pump Development	
Pump Testing	
Water Quality Sampling	
	Reinstall Inner Liner
Well Disinfection	
Seal Well	

## Cost Estimate

The original project contractor cost and cost of LSCE oversight and updated project costs are summarized in the table below.

Original cost for contractor services	\$35,000
Increased contractor costs for additional work	\$38,250
New total Contractor Cost	\$73,250
Original cost for LSCE inspection/oversight cost	\$10,400
Increased cost for additional field inspection/oversight (80 hours)	\$14,000
New total LSCE inspection/oversight cost	\$24,400
Original total project cost	\$65,640
Increase over original cost (Budget Amendment Amount)	\$52,250
New total project cost	\$117,890

LSCE is requesting a budget increase amendment to the current project amount in the amount of \$52,250 to perform the additional work included in the updated work plan.

LSCE will bill monthly for labor and materials, only as incurred, in accordance with LSCE's Schedule of Fees.

## Schedule

LSCE's well subcontractor is currently scheduled to mobilize to the Well No. 33 site on or about the week of November 28, 2022 and complete the well and testing work by December 24, 2022.

Mr. Amin Kazemi  
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We will be pleased to answer any questions you may have regarding this budget amendment request or the attached work plan.

Sincerely,

LUHDORFF AND SCALMANINI  
CONSULTING ENGINEERS



Scott Lewis, PG  
Senior Principal Geologist

Attachments: Well No. 33 Evaluation Work Plan, City of Stockton, August 2022



**City of Stockton**  
Municipal Utilities Department  
2500 Navy Drive  
Stockton, CA 95206

**Luhdorff and Scalmanini**  
**Consulting Engineers**  
500 First Street  
Woodland, CA 95695

City of Stockton Contact  
Amin Kazemi  
209-973-8716

LSCE Contact Person  
Scott Lewis  
530-661-0109  
LSCE File No. 21-2-145

## **Well No. 33 Evaluation Work Plan**

### **City of Stockton**

### **August 2022**

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#### **BACKGROUND**

The City of Stockton's (City) Well No. 33 (well) was constructed in 2009. Due to changing water demands at that time, the well was not developed as a water source and has been idle. The City would like to develop Well No. 33 for use as a water supply source. As a first step in that process, Luhdorff & Scalmanini Consulting Engineers (LSCE) has been retained by the City to assess the condition of the well (structural condition, screen intake plugging, bacteriological growth, mineral scale buildup) and its performance (yield, water quality).

A video survey of the well was performed by LSCE's subcontractor, Roadrunner Drilling and Pump (RDP), on August 9, 2022, to visually evaluate the condition of the well structure. The results of the video survey were used to develop the work plan outlined below. After the video survey, the well was sealed shut by welding on a lid.

During the video survey, the upper two screen sections (144' – 170' and 186' – 216') were not visible due to the installation of an inner, 18-inch diameter, steel casing set within the well to a depth of 220 feet (**Figure 1**). The presence of the inner casing was not known about at the start of the video survey. Ken Worster (Brown and Caldwell), who worked on the Well No. 33 project in 2009, communicated to the City that the inner casing was installed after the 2009 well construction and testing to mitigate cascading water conditions originating from the two uppermost screen intervals.

Based on the video survey, bacterial growth observed within the well structure was modest considering the length of time the well has been idle. Bacterial growth is most prevalent at the tops and bottoms of screen sections. The well structure and screens appear to be in structurally good condition. No holes or damage was observed. There is approximately 21-feet of fill material in the bottom of the well. The attached Water Well Video Report by RDP includes images from within the well. Although the

uppermost screens, behind the 18-inch casing, are not visible, it is reasonable to expect that they are in the same condition as the lower screen sections.

Based on the condition of the well, LSCE recommends temporarily removing the installed inner casing, removal of the fill in the bottom of the well, brushing of the entire well structure to dislodge bacterial growth, and shock chlorinating the well before well development and testing using a temporary pump.

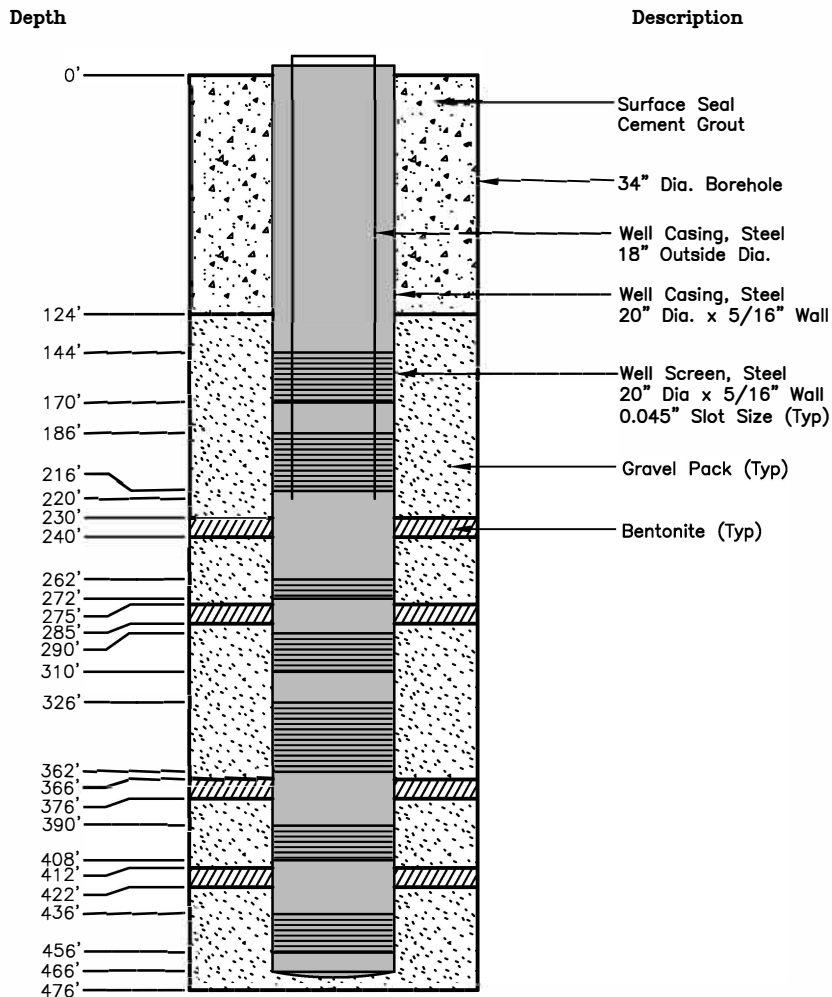
## WORK PLAN

The work plan below includes the elements required to prepare the well for pump testing and performance evaluation. The tasks described below will be completed by RDP. LSCE will oversee and record all operations and collect water samples for analysis.

- The inner, 18-inch casing in the well shall be removed in order to provide access to the upper screened zones for brushing and inspection. The inner casing shall be removed in such a manner that will allow for its reinstallation at the conclusion of pump testing.
- After the inner casing has been removed, the fill material in the well shall be removed via open-ended airlifting. Fluids generated during airlifting shall be discharged to a settling tank. After the fluids have passed through the settling tank, the fluids may be discharged to the on-site sanitary sewer inlet. All fluids discharged to the sanitary sewer inlet will be free of solids. The maximum rate of discharge to the sanitary sewer system will be 300 gpm. A totalizing flow meter and valve to regulate flow shall be installed on the discharge assembly. The daily volume of water discharged to the sanitary sewer system shall be recorded. Airlifting shall continue until the fluids generated from the well are clear and free of solids. At the conclusion of airlifting, the Contractor shall determine the depth of the by direct measurement.
- Once airlifting of the fill has been completed, the well shall be brushed with a tight-fitting polypropylene well brush. The Contractor shall brush the entire well structure from top of pedestal to bottom for a period of two hours. The Contractor shall spend the bulk of brushing time on screen intervals, with minimal time spent in the blank section above the top of the uppermost screen section.
- After brushing the well, it shall be chlorinated to a concentration of 200 parts per million (ppm). The chlorine solution shall be placed in the wells' water column via an installed tremie pipe or hose at regular intervals sufficient to achieve the required 200 ppm concentration throughout the water column. Following well chlorination, the Contractor shall brush the entire well structure for a period of 2-hours. Following the second well brushing, the well shall sit idle for a period of approximately 24-hours, or as determined by the engineer.
- After the well has sat idle, the well shall be open ended airlifted to remove chlorinated water and any solids produced during well brushing. All fluids produced during airlifting shall be discharged to a tank whereupon the residual chlorine shall be measured and recorded. If the chlorine residual concentration exceeds the sanitary sewer limit (to be determined by the City), the water shall be dechlorinated in batches using sodium thiosulfate or approved equal. Once the residual chlorine has been lowered to the approved concentration, all fluids shall be discharged to the on-

site sanitary sewer inlet. Open-ended airlifting shall continue until fluids generated from the well are free of solids and the residual chlorine concentration is below the approved sanitary sewer discharge concentrations.

- At the conclusion of airlifting, a well video survey shall be performed in order to visually inspect the condition of the well structure.
- After the video inspection, the Contractor shall install a temporary turbine test pump in the well. The test pump shall be installed to a depth of 250-feet and be capable of pumping 3,000 gpm. The pump discharge assembly shall be equipped with a totalizing flow meter, Rossum sand tester, sample tap, and a valve to regulate flow. Discharge water shall be directed to the storm drain manhole located in the street adjacent to the project site. The Contractor shall provide the required piping and apparatus to convey the water from the well to the discharge point. Records of flow rate, pumping water level, turbidity, sand content, and daily discharge volume shall be recorded on standardized sheets.
- The well shall be developed using the test pump by pumping and surging techniques. Pump development shall begin at the lowest pumping rate possible with the installed pump and test engine. The well shall be developed via pumping and surging until the fluids produced are less than 5 NTU, have a sand content less than 5 parts per million, and the specific capacity of the well is not increasing. Once these conditions have been met, the flow rate shall be increased at increments of approximately 500 gpm and the process repeated until a flow rate of 3,000 gpm or the limit of the well yield has been achieved. During pump development, water shall be added to the gravel fill and sounding pipe.
- At the conclusion of pump development, an 8-hour constant rate pumping test shall be performed. The rate of the pumping test will be the maximum sustainable flow rate possible based on the performance during pump development.
- Water samples for laboratory analysis will be collected after six hours of pumping. The samples will be submitted to a State Certified Laboratory for the chemical analysis of select water quality analytes.
- At the conclusion of pump testing, the Contractor shall remove the test pump and discharge piping and reinstall the inner casing to the original depth.
- After the inner casing is reinstalled, the well shall be chlorinated to a concentration of 100 ppm. The chlorine solution shall be placed in the water column via an installed tremie pipe or hose at regular intervals sufficient to achieve the required 100 ppm concentration throughout the water column.
- Once the well has been chlorinated, the well shall be sealed with a steel cap welded to the casing. The well site shall be cleaned of debris and all equipment shall be demobilized from the site.



\*Well profile is based on available Well Completion Report. Conductor casing depth is unknown.

Figure 1. City of Stockton Well No. 33 Profile

# WATER WELL VIDEO REPORT

## Roadrunner Drilling & Pump Co inc

Contractor License No.: CA. 803909  
 80 Bee Jay Way Woodland, CA. 95776  
 Phone: 530-406 8559 Fax: 530-666-7854

Client: LSCE Survey Date: August 9, 2022  
 Address: 500 First St. Invoice: 1135-22 Run: 1  
 City: Woodland State: CA Zip: 95695 Well Name: 33  
 Requested By: Scott Lewis P.O.: \_\_\_\_\_ Well Owner: City of Stockton  
 Copy To: \_\_\_\_\_ Camera: CCV Color Flip Camera - Long L.H.  
 Reason For Survey: General Inspection Zero Datum: Top Of Casing  
 Location: 3061 Aerosmith Rd. Stockton, CA  
 Field: Stockton Depth: 456.7 ft. Vehicle: 39  
 County: San Joaquin Country: USA Type Perfs: Stainless Steel Screen  
 Perf Intervals: 264-274 ft. 293-312 ft. 329-364 ft. 392-410 ft. 439-456 ft.  
 1st Csg I.D.: 17.5 in. Csg Weight: \_\_\_\_\_ From: 0.0 ft. To: 219.8 ft. 2nd Csg I.D.: 20 in. Csg Weight: \_\_\_\_\_ From: 219.8 ft. To: 456.7 ft.  
 I.D Reference: Measured- Top only Casing Buildup: Moderate S.W.L.: 74.2 ft. P.W.L.: \_\_\_\_\_ Pump Depth: \_\_\_\_\_  
 Operator: N. Plascencia Latitude: 38.049292° Longitude.: 121.273142° Section: \_\_\_\_\_ Range: \_\_\_\_\_ Township: \_\_\_\_\_  
 Other Information: \_\_\_\_\_

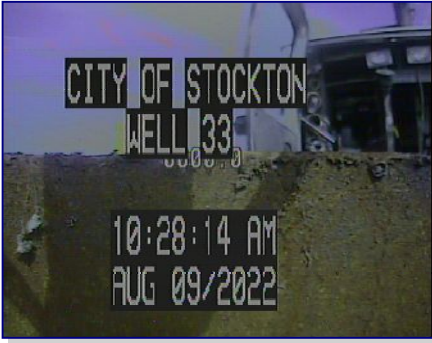
WELLBORE SNAPSHOTS	DEPTHS (SideScan-Feet)	WELLBORE / CASING INFORMATION
	0.0 Ft.	Zeroed At Side Scan Lens
	74.2 Ft.	Static Water Level (SWL)
	139.6 Ft.	Unknown Square Cutout
	219.8 Ft.	18-inch x 20-inch Casing Reduction
	222.3 Ft.	Top of Sounding Box
	229.3 Ft.	Bottom of Sounding Box
	264.8 Ft.	Perforations, Top of Wire Wrapped Stainless Steel Screen
	274.2 Ft.	Perforations, Bottom of Wire Wrapped Stainless Steel Screen
	292.9 Ft.	Perforations, Top of Wire Wrapped Stainless Steel Screen
	312.3 Ft.	Perforations, Bottom of Wire Wrapped Stainless Steel Screen
	328.9 Ft.	Perforations, Top of Wire Wrapped Stainless Steel Screen
	364.3 Ft.	Perforations, Bottom of Wire Wrapped Stainless Steel Screen
	392.0 Ft.	Perforations, Top of Wire Wrapped Stainless Steel Screen
	401.9 Ft.	Wire Wrapped Stainless Steel Screen
	410.2 Ft.	Perforations, Bottom of Wire Wrapped Stainless Steel Screen
	438.8 Ft.	Perforations, Top of Wire Wrapped Stainless Steel Screen
	455.2 Ft.	Down View Top of Fill @ 456.7, Still in Perforations
		
		

Notes: **TOC is 30" AGS**



# WELLBORE SNAPSHOT(S)

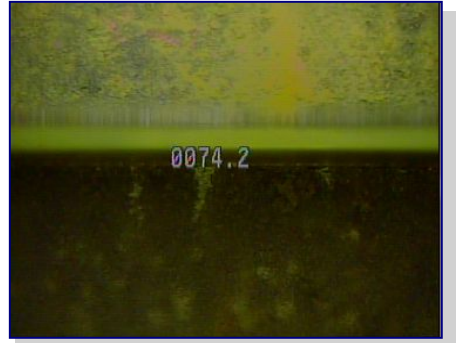
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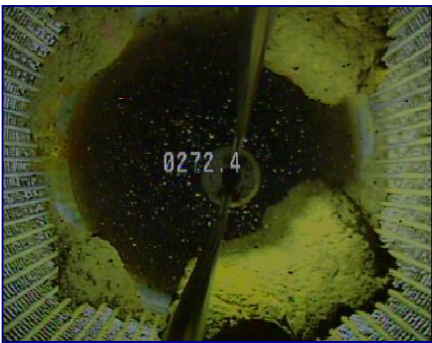
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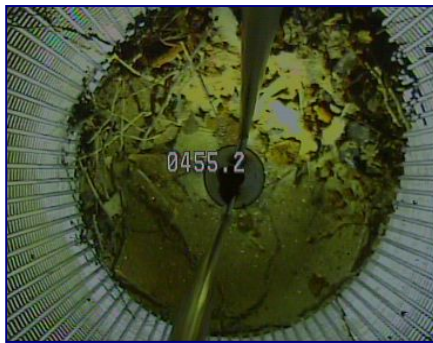
Depth: 74.2 Feet



Depth: 272.4 Feet



Depth: 455.2 Feet



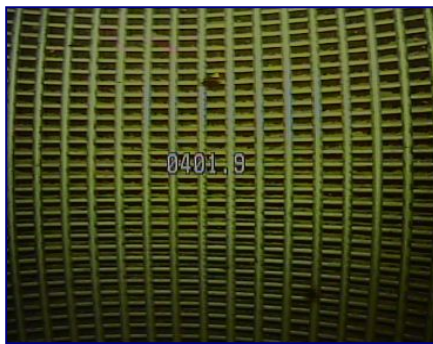
Depth: 438.8 Feet



Depth: 410.2 Feet



Depth: 401.9 Feet



Depth: 392.9 Feet



Depth: 364.3 Feet



Depth: 328.9 Feet






Depth: 312.3 Feet



**WATER WELL  
VIDEO REPORT**

Contractor License No.: CA. 803909  
80 Bee Jay Way Woodland, CA. 95776  
Phone: 530-406 8559 Fax: 530-666-7854

Survey Date: August 9, 2022  
Client: LSCE  
Well Name: 33  
Depth: 456.7 ft.  
1st Csg I.D.: 17.5 in. From: 0.0 ft. To: 219.8 ft.  
2nd Csg I.D.: 20 in. From: 219.8 ftTo: 456.7 ft.  
S.W.L.: 74.2 ft. P.W.L.: \_\_\_\_\_ Pump Depth: \_\_\_\_\_  
Type Perfs: Stainless Steel Screen  
Perf Intervals: 264-274 ft. 293-312 ft.  
329-364 ft. 392-410 ft.  
439-456 ft.

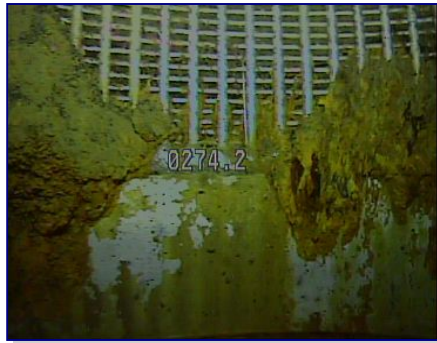
WELLBORE SNAPSHOTS	DEPTHS (SideScan-Feet)	WELLBORE / CASING INFORMATION
 <p>292.9' (See Other Side) 274.2' (See Other Side)</p>		
 <p>229.3' (See Other Side) 222.3' (See Other Side)</p>		
 <p>219.8' (See Other Side) 219.6' (See Other Side)</p>		
 <p>139.6' (See Other Side)</p>		

# WELLBORE SNAPSHOT(S)

Depth: 292.9 Feet



Depth: 274.2 Feet



Depth: 229.3 Feet



Depth: 222.3 Feet



Depth: 219.8 Feet



Depth: 219.6 Feet



Depth: 139.6 Feet

