Executive Summary

Boulder Flats Water Supply Level II Study

November 2013

Submitted to:
Wyoming Water Development Commission
Shoshone Utility Organization

Prepared by:
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In Association with:
Western Groundwater Services, LLC
EXECUTIVE SUMMARY

For

BOULDER FLATS WATER SUPPLY LEVEL II STUDY

Prepared for:

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BUSINESS COUNCIL
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November 2013
PURPOSE AND DISCUSSION

The purpose of this study was to perform a Level II Study for the Boulder Flats area of the Shoshone Utilities Organization (SUO). This included determining all pertinent aspects of required system infrastructure to meet the SUO’s short-term and long-term needs including investigating a water source in the existing North Fork Popo Agie wellfield, also includes evaluations and recommended improvements with respect to storage, transmission, distribution, operations and maintenance, and financing of the public water system for the Boulder Flats area. This study provides a planning tool to help the SUO develop a community water system for Boulder Flats to supplement the supply provided from the SUO’s main system located in the communities of Ft. Washakie/Wind River.

The SUO sponsored this Level II Study funded by the Wyoming Water Development Commission (WWDC). Stetson Engineering, Inc. (acquired by HDR, in 2012 herein after in this report referred to as HDR) was selected to complete the study, and was assisted by Western Groundwater Services, LLC working as a hydrogeology sub-consultant.

The Boulder Flats area is located approximately 8-miles north of Lander adjacent to US HWY 287 (Figure 1-1) and is a subsystem of the SUO’s main system located in the communities of Ft. Washakie/Wind River.

The Boulder Flats area water system is presently supplied from a 6 mile long transmission line that is located along US HWY 287. The Boulder Flats area system users are at risk of losing their domestic water supply in the event that there is a failure in the six mile long transmission line or in the event of a failure in the existing booster pump that feeds the six mile transmission line.

In November 2008, Lidstone and Associates, Inc. of Fort Collins, Colorado, completed the Shoshone Ground Water Development Level II Report for the WWDC sponsored by the SUO. The initial phase of the Lidstone Level II Study recommended developing a source supply well near the north fork of the Popo Agie wellfield. The development of the new source supply is to provide a secondary and or redundant supply to the Boulder Flats area. The primary purpose of this current Level II study was to evaluate this proposed redundant source supply.

The site for this new source was located at the Boulder Flats Wellfield (Figure 1-1) which was developed in 1979 with two or three well installations. At least two of the wells were used until the early 1990s when the wellfield was taken offline due to U.S. EPA concerns over potential surface water contamination. The historic wellfield produced groundwater from a shallow unconfined aquifer and the existing wells were offset about 45 feet from a side channel of the North Fork Popo Agie River.
Figure 1-1
Project Location Map
SUMMARY OF RECOMMENDATIONS

A preferred alternative was selected that includes completion of an alluvial wellfield, improving an access road to the wellfield, and increasing the size of the booster pumps in an existing pump station located south of Plunkett Road.

During this project a wellfield was investigated and a successful test well was drilled. It is recommended that that well (Boulder Flats #4) be completed along with an additional well (Boulder Flats #5) at a combined supply rate of 80 gpm for the majority of the year and a lower summertime supply rate of 50 gpm. Boulder Flats #4 and Boulder Flats #5 are shown in Figure 4-1. An as-built of Boulder Flats #4 is show in Figure 2-2.

Boulder Flats #5 is located approximately 200 feet southeast from Boulder Flats #4. Access to this location requires clearing of brush and trees, grading, emplacement of road base, and emplacement of road surface aggregate. Boulder Flats #5 is planned to have identical construction as Boulder Flats #4. However, the project is planned to include a monitoring well installation at the well site prior to construction of the production well. Alteration to the design can be considered based on the monitoring well data.

Because of location of the proposed wellfield, a Microscopic particulate analysis (MPA) was completed to assess if there will be significant surface water contamination in the proposed wellfield. If significant surface water contamination is present the source is classified as groundwater under the direct influence of surface water (GWUDI) and the Surface Water Treatment Rule (and related rules) applies.

Prior to completing MPA sampling on Boulder Flats #4, a Preliminary Assessment (PA) was completed. It can be possible to classify a well as groundwater based on hydrogeological and well construction conditions by completing a PA. With respect to the Boulder Flats #4 well and based on discussion with U.S. EPA, it was concluded that in all likelihood, U.S. EPA would not classify the well as groundwater based on the PA. It is anticipated that U.S. EPA will at some future time require MPA testing of operating wells in the Boulder Flats Wellfield. So, an extended pumping period was performed in Boulder Flats #4 with the collection of three MPA samples, and field parameters. The results are shown in the following table.

<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Algae (#/100 gal)</td>
<td>ND</td>
<td>53</td>
<td>1</td>
<td>ND</td>
</tr>
<tr>
<td>Diatoms (#/100 gal)</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
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<tr>
<td>Risk Score</td>
<td>0</td>
<td>10</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>Risk Rating</td>
<td>LOW</td>
<td>MODERATE</td>
<td>LOW</td>
<td>LOW</td>
</tr>
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</table>

ND – none detected.
Figure 2-2
Boulder Flats #4 As-Built Log

Pumping test data collected March 2013.
Figure 4-1
Wellfield Alternative
Once the wells are completed, a new control building will be built and a new 6” transmission line will be installed from the control building over to an existing 6” pipe (which was part of the Abandoned Boulder Flats Wellfield). The existing 6” pipe connects to the existing system near the out of service tank near Boulder Flats Spur. The existing 6” pipe will be pressure tested, new valves will be installed along the pipe, and if the pipe is in good condition it will be disinfected and brought back in service. If the existing pipe is in poor condition, new 6” pipe will be installed to transmit water to the existing system. The cost of the completing the wellfield is estimated at $868,000 (see table below).

BOULDER FLATS LEVEL II
PRELIMINARY PROJECT COST ESTIMATE - WELLFIELD COST ESTIMATE

PRE-CONSTRUCTION COSTS

<table>
<thead>
<tr>
<th>NO.</th>
<th>ITEM</th>
<th>UNIT</th>
<th>QUANTITY</th>
<th>PRICE</th>
<th>TOTAL PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Preparation of Final Designs and Specification (Subtotal #2 x 13.5%)</td>
<td>$79,880</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Permitting and Mitigation (Subtotal #2 x 2.5%)</td>
<td>$14,800</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Legal Fees (Subtotal #2 x 1.25%)</td>
<td>$7,400</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Acquisition of Access and Rights of Way</td>
<td>-</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pre-Construction Cost Subtotal =</td>
<td>$102,080</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>TERO Fee (2%) =</td>
<td>$2,042</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Pre-Construction Costs (Subtotal #1) =</td>
<td>$104,122</td>
<td></td>
<td></td>
<td></td>
</tr>
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</table>

CONSTRUCTION COSTS

<table>
<thead>
<tr>
<th>NO.</th>
<th>ITEM</th>
<th>UNIT</th>
<th>QUANTITY</th>
<th>PRICE</th>
<th>TOTAL PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Site Clearing, Site Grading, and Irrigation Ditch Culvert</td>
<td>LS 1</td>
<td>$45,300.00</td>
<td>$45,300</td>
<td></td>
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<tr>
<td>2</td>
<td>Well construction</td>
<td>LS 1</td>
<td>$84,700.00</td>
<td>$84,700</td>
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<tr>
<td>3</td>
<td>Well completion</td>
<td>LS 1</td>
<td>$72,680.00</td>
<td>$72,680</td>
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</tr>
<tr>
<td>4</td>
<td>Control building (includes power service)</td>
<td>LS 1</td>
<td>$135,000.00</td>
<td>$135,000</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Wellfield transmission pipelines</td>
<td>LS 1</td>
<td>$254,025.00</td>
<td>$254,025</td>
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Construction Cost (Subtotal #2) = $591,705
Construction Engineering (Subtotal #2 x 10%) = $59,171
Components and Engineering Costs (Subtotal #3)= $650,876
Contingencies (Subtotal #3 x 15%) = $97,631
Construction Cost (Subtotal #4) = $748,507
TERO Fee (2%) = $14,970
Total Construction Costs = $763,477

TOTAL ESTIMATED PROJECT COST = $867,599
USE $868,000.00

An access road (shown in Figure 4-1 as “Short Route”) will be graded along an existing route to the wellfield. Two routes were investigated to access the wellfield, with the
shorter route being the preferred alternative. The access road will require installation of a culvert crossing across an irrigation ditch, grading the existing route, and improving the access to the wellfield. The estimated cost for completing the shorter route to the wellfield is estimated at $143,000 (see table below).

BOULDER FLATS LEVEL II
PRELIMINARY PROJECT COST ESTIMATE - WELLFIELD ACCESS ROAD (SHORT ROUTE)

PRE-CONSTRUCTION COSTS

<table>
<thead>
<tr>
<th>NO.</th>
<th>ITEM</th>
<th>UNIT</th>
<th>QUANTITY</th>
<th>PRICE</th>
<th>TOTAL PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Preparation of Final Designs and Specification</td>
<td></td>
<td></td>
<td></td>
<td>$20,000</td>
</tr>
<tr>
<td>2</td>
<td>Permitting and Mitigation</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>3</td>
<td>Legal Fees</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Acquisition of Access and Rights of Way</td>
<td></td>
<td></td>
<td></td>
<td>-</td>
</tr>
</tbody>
</table>

Pre-Construction Cost Subtotal= $20,000
TERO Fee (2%)= $400.00
Total Pre-Construction Costs (Subtotal #1)= $20,400

CONSTRUCTION COSTS

<table>
<thead>
<tr>
<th>NO.</th>
<th>ITEM</th>
<th>UNIT</th>
<th>QUANTITY</th>
<th>PRICE</th>
<th>TOTAL PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mobilization</td>
<td>LS</td>
<td>1</td>
<td>$5,000.00</td>
<td>$5,000</td>
</tr>
<tr>
<td>2</td>
<td>Improving Access Road</td>
<td>LF</td>
<td>6,000.00</td>
<td>$15.00</td>
<td>$90,000</td>
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</table>

Construction Cost (Subtotal #2) = $95,000
Construction Engineering (Subtotal #2 x 10%) = $9,500
Components and Engineering Costs (Subtotal #3) = $104,500
Contingencies (Subtotal #3 x 15%) = $15,675
Construction Cost (Subtotal #4) = $120,175
TERO Fee (2%) = $2,404
Total Construction Costs = $122,579

TOTAL ESTIMATED PROJECT COST = $142,979
USE $143,000.00

The existing booster pumps in the pump station south of Plunkett Road will be replaced with larger 15 hp Grundfos Pumps with Baldor Motors and Variable Frequency Drives (VFDs). The larger pumps should provide approximately 192 gpm of supply to the Boulder Flats Service area when in service. The larger pumps are similar to the existing pumps and the retrofit should be relatively easy. New pump controls will be provided with the larger pumps. Also, a new 3-phase electrical service will need to be installed to run the larger sized pumps. The 3-phase service will come from overhead power lines that run along Highway 28 located approximately 200 feet west of the existing pumphouse. The estimated cost of increasing the booster pumps within the current pump station is $98,000 (see table below).
PRE-CONSTRUCTION COSTS

<table>
<thead>
<tr>
<th>NO.</th>
<th>ITEM</th>
<th>UNIT</th>
<th>QUANTITY</th>
<th>PRICE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Preparation of Final Designs and Specification</td>
<td></td>
<td></td>
<td>$20,000</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Permitting and Mitigation (Subtotal #2 x 2.5%)</td>
<td></td>
<td></td>
<td>$1,475</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Legal Fees (Subtotal #2 x 1.25%)</td>
<td></td>
<td></td>
<td>$750</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Acquisition of Access and Rights of Way</td>
<td></td>
<td></td>
<td>$1,475</td>
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</tbody>
</table>

Pre-Construction Cost Subtotal= $22,225
TERO Fee (2%)= $444.50
Total Pre-Construction Costs (Subtotal #1)= $22,670

CONSTRUCTION COSTS

<table>
<thead>
<tr>
<th>NO.</th>
<th>ITEM</th>
<th>UNIT</th>
<th>QUANTITY</th>
<th>PRICE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mobilization</td>
<td>LS</td>
<td>1</td>
<td>$12,000</td>
<td>$12,000</td>
</tr>
<tr>
<td>2</td>
<td>Bonds and Insurance</td>
<td>LS</td>
<td>1</td>
<td>$1,000</td>
<td>$1,000</td>
</tr>
<tr>
<td>3</td>
<td>Pumphouse Modifications - New Pump Controls &amp; Telemetry</td>
<td>LS</td>
<td>1</td>
<td>$15,000</td>
<td>$15,000</td>
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<tr>
<td>4</td>
<td>Replacing Old Pumps with New Larger Pump(s)</td>
<td>LS</td>
<td>1</td>
<td>$24,500</td>
<td>$24,500</td>
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<tr>
<td>5</td>
<td>Installing 3-Phase Electrical Service</td>
<td>FT</td>
<td>200</td>
<td>$30.00</td>
<td>$6,000</td>
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</tbody>
</table>

Construction Cost (Subtotal #2) = $58,500
Construction Engineering (Subtotal #2 x 10%) = $5,850
Components and Engineering Costs (Subtotal #3)= $64,350
Contingencies (Subtotal #3 x 15%) = $9,653
Construction Cost (Subtotal #4) = $74,003
TERO Fee (2%) = $1,480
Total Construction Costs = $75,483

TOTAL ESTIMATED PROJECT COST = $98,152
USE $98,000.00

The total estimated cost for the completion of the preferred alternative is $1,109,000. A 67% grant is being requested/applied for from the WWDC for 2014 funding. The sponsor will pay for the remaining 33% by applying for grants through the Indian Heath Services SDS program, the DWSRF Tribal Set Aside program, and by using General Tribal Funds if necessary. Figure 7-1 shows a system map of the preferred alternative.

The existing system currently struggles to keep up with demand during times of higher usage. During July of 2013, the SUO told HDR the existing booster pumps were running 24 hours a day, and the 330,000 gallon Boulder Flats water tank was dry. This situation appears to occur during the summer months. The preferred alternative was selected to help alleviate the supply situation as well as add a redundant water supply to the Boulder Flats Service area in case of a failure in the long transmission line from Ft. Washakie or a failure in the Booster Pump Station.
The preferred alternative is expected to generate a supply of 242 gpm for the Boulder Flats Service area (assuming the wellfield is producing the lower yield amount of 50 gpm, and that the larger booster pumps will supply 192 gpm).

The average daily demand for the current population of the Boulder Flats area (360 residents) with the current usage of the Shoshoni Rose Casino was estimated at 76 gpm. During this scenario, the preferred alternative is expected to take 8.28 hours to fill the 330,000 gallon tank 8 feet (assuming the booster pumps and wellfield pumps are turned on at 24 feet and shut off 32 feet), and when the pumps are shut off it would take 3/4 of a day drain the tank to the 24 foot level.

The average daily demand for the future population of the Boulder Flats area (420 residents) with the future usage of the Shoshoni Rose Casino was estimated at 135 gpm. During this scenario, the preferred alternative is expected to take 0.54 days to fill the 330,000 gallon tank 8 feet (assuming the pumps are turned on at 24 feet and shut off 32 feet), and when the pumps are shut off it would take approx. 10.19 hours drain the tank to the 24 foot level.

The maximum daily demand for the current population of the Boulder Flats area with the current usage of the Shoshoni Rose Casino was estimated at 170 gpm. During this scenario, the preferred alternative is expected to take 0.8 days to fill the 330,000 gallon tank 8 feet (assuming the pumps are turned on at 24 feet and shut off 32 feet), and when the pumps are shut off it would take approx. 8.35 hours to drain the tank to the 24 foot level.

The maximum daily demand for the future population of the Boulder Flats area with the future usage of the Shoshoni Rose Casino was estimated at 247 gpm. During this scenario, the tank would be emptying slowly at 5 gpm. The pumps would need to run the majority of the time to keep up with the MDD for the future population and casino expansion. If the tank started out full at the beginning of a peaking cycle, it would take 11.46 max days in a row to drain the tank to the 24 foot level; it would take 37.50 max days in a row to drain the tank to the fire storage level; it would take 45.83 max days in a row to empty the tank completely (assuming the tank started with 330,000 gallons).

PERMITS

Production test wells require an SEO permit for construction and beneficial use of water. Form UW5 for the two production wells must be filed during project design (Boulder Flats #4 and #5). A new Form UW5 is required for Boulder Flats #4, as the Level II Study submitted only for a test well. Forms UW 6 and UW 8 must be filed after completion and beneficial use of the water. Well Construction License(s) and a Driller’s License will need to be obtained from the Tribal Water Engineer’s (TWE) Office. Annual Fees must be paid to the TERO office for all businesses that operate on the Wind River Indian Reservation. A 2% project fee shall be paid to the TERO office prior to a Temporary Work Permit being issued for the project. A 2% fee will be applied to all Change Orders.