TZA Water Engineers
a Lamp Rynearson Company

12596 W. Bayaud Ave., Ste. 330
Lakewood, Colorado 80228
303-971-0030
Tza4water.com

GREATROCK NORTH WATER AND SANITATION DISTRICT
ENGINEER'S REPORT
SEPTEMBER 29, 2014

Concentrate Disposal and Stream Reclassification

Attached is a result from a recent sample of the reverse osmosis concentrate. The fourth quarter sampling required by the EDOP will be used to evaluate the sample result of 2,635 mg/l for total dissolved solids.

2015 Budget Committee

The Budget Committee has met three times. In support of the effort, Brad Simons has developed the following estimates for the District's consideration of future equipment procurement and capital improvement projects:

- Greatrock North Pump Station Replacement - $207,000
- Greatrock North/Rocking Horse Farms Interconnect - $145,000
- Reverse Osmosis Unit Replacement - $200,000
- Redundant Fire Pump - $15,000

In addition, an estimate has been developed for relocating each water meter in Rocking Horse Farms.

Item		Estimated Cost
1" Curb Stop	$	150.00
Curb Stop Box	$	75.00
1" Setter w/ Compression Fittings	$	225.00
Plastic Meter Pit	$	300.00
Cast Iron Pit Dome and Cover	$	125.00
Miscellaneous Pipe/Fittings	$	75.00
Subtotal	$	950.00
Contractor's O&P on Materials (20%)	$	190.00
Materials Subtotal	$	1,140.00
Water Meter	$	250.00
Meter Register Transmitter	$	Incl.
Contractor Labor	$	600.00
Subtotal	$	1,990.00
Contingency (10%)	$	199.00
Total per Installation	**$**	**2,189.00**

TZA Water Engineers
a Lamp Rynearson Company

12596 W. Bayaud Ave., Ste. 330
Lakewood, Colorado 80228
303-971-0030
Tza4water.com

2015 Water Rate Model

The water rate model has been updated based upon water billings from August of 2013 through July of 2014, revenue projections for 2015, and expenditure projects for 2015. The findings of the rate model update will be presented at the October Board meeting.

Water Planning

At the September 2, 2014 Board Meeting, TZA was asked to review the Water Resources Master Plan and identify the quantity of water the District will need at the buildout of the existing and currently planned subdivisions. Attached is the memo that was prepared in response to this request.

Well, Pump, and Motor Replacements

The District has recently initiated efforts to better understand its well infrastructure and the potential need for replacement of pumps and motors, as well as the well structures themselves. As a part of that effort, TZA is compiling the historical aspects of the wells constructed, the pumps installed, and any other improvements (i.e. water level measuring devices) integrated at each site. TZA is evaluating the benefits of a pump, motor, and well maintenance program to detect changes in well performance. Early detection of deterioration in well performance will allow less expensive repairs, rehabilitation, or treatment procedures in order to maximize production capacity. This preventative maintenance program will be discussed with the District's Manager, and a formal proposal will be brought to the Board if deemed appropriate.

Other Activities

Water Service to Greatrock North Lot 45 – As a follow-up to the recent efforts to locate the water service to Lot 45, Brad Simons visited the site on September 22 to review the accuracy of the "Water Service Plan", dated October 16, 1996 (revised April 14, 1998) and prepared by JR Engineering for Hemco, Inc. Although the stationing depicted on the plan is not entirely accurate, the predicated location of the water service on Lot 45 appears to be accurate.

TZA Water Engineers
a Lamp Rynearson Company

12596 W. Bayaud Ave., Ste. 330
Lakewood, Colorado 80228
303-971-0030
Tza4water.com

Warranty Inspections – Ramey Environmental Compliance is tracking the 11-month warranty inspections for the following projects:

- Rocking Horse Farms Pump Station – The warranty inspection was conducted by Jeff Rabas on July 18, 2014.
- Box Elder Creek Ranch Pump Station – The improvements were placed into service on March 13, 2014.
- Rocking Horse Farms Tank Repainting – The improvements were inspected and accepted on June 11, 2014.

Utility Billings and Energy Costs – TZA is now tracking the United Power utility bills and associated water operations. Summary billing data is tabulated below:

Energy Usage (KWH)			
	2012 YTD	2013 YTD	2014 YTD
Alluvial Wells	40,754	32,540	26,243
RO WTP and BECR Pump Station	242,000	203,400	119,400
GN Pump Station	79,160	69,470	61,600
RHF Pump Station	86,560	100,280	34,320
Totals	448,474	405,690	241,563

Billing Amounts			
	2012 YTD	2013 YTD	2014 YTD
Alluvial Wells	$5,441.25	$3,990.64	$3,061.96
RO WTP and BECR Pump Station	$23,639.01	$15,821.84	$9,034.76
GN Pump Station	$9,324.95	$5,655.14	$5,039.48
RHF Pump Station	$9,719.84	$8,236.60	$3,108.57
Totals	$48,125.05	$33,704.22	$20,244.77

Year-to-date totals for energy usage and billing amounts are each 60 percent of the 2013 amounts.

Temperature Gun for Pump Stations – As a result of the recent i-Alert issues at the Box Elder Creek Ranch Pump Station, Brad Simons has recommended the District procure a temperature gun for use at the pump stations to monitor motor and pump temperatures. A technician with Rogers & Sons recommended a "good", a "better" and a "best" model. Ramey Environmental Compliance is procuring the "better" model at a cost of approximately $120.00.

Colorado Analytical LABORATORIES, INC.

Analytical Results

TASK NO: 140826018

Report To: Wayne Ramey
Company: Ramey Environmental Compliance, Inc.
P.O. Box 99
Firestone CO 80520

Bill To: Wayne Ramey
Company: Ramey Environmental Compliance, In
P.O. Box 99
Firestone CO 80520

Task No.: 140826018
Client PO:
Client Project: Greatrock North W&S District CO 0101063

Date Received: 8/26/14
Date Reported: 8/28/14
Matrix: Water - Drinking

Customer Sample ID RO Concentrate
Sample Date/Time: 8/26/14 6:30 PM
Lab Number: 140826018-01

Test	Result	Method	PQL	Date Analyzed	Analyzed By
Total Dissolved Solids	**2635 mg/L**	SM 2540-C	5	8/28/14	ISG

Abbreviations/ References:

PQL = Practical Quantification Limit
mg/L = Milligrams Per Liter or PPM
ug/L = Micrograms Per Liter or PPB
mpn/100 mls = Most Probable Number Index/ 100 mls
Date Analyzed = Date Test Completed
SM = "Standard Methods for the Examination of Water and Wastewater"; APHA; 19th Edition; 1995
EPA = "Methods of Chemical Analysis of Water and Wastes"; USEPA; EPA-600/4-79-020 Rev 3/83

DATA APPROVED FOR RELEASE BY

240 South Main Street / Brighton, CO 80601-0507 / 303-659-2313
Mailing Address: P.O. Box 507 / Brighton, CO 80601-0507 / Fax: 303-659-2315

Drinking Water Chain of Custody

Colorado Analytical
LABORATORIES, INC.

Brighton Lab
240 South Main Street
Brighton, CO 80601

Lakewood Lab
12860 W. Cedar Dr, Suite 100A
Lakewood CO 80228

Phone: 303-659-2313
Fax: 303-659-2315

www.coloradolab.com

Report To Information	Bill To Information (If different from report to)	State Form / Project Information
Company Name: REC INC	Company Name: REC INC	PWSID:
Contact Name:	Contact Name:	System Name: GREAT ROCK NORTH WAS
Address: ON FILE	Address: ON FILE	Address:
City State Zip	City State Zip	City State Zip
Phone: Fax:	Phone: Fax:	County:
Email:	Email:	Compliance Samples: Yes ☐ No ☒
Sampler Name: JEFF NABES	PO No.:	Send Forms to State: Yes ☐ No ☒

Task Number 140826018 RNL

Date	Time	Client Sample ID / EP Code	No. of Containers	Residual Chlorine (mg/L) P/A Samples Only	Total Coliform P/A	504.1 EDB/DBCP	505 Pests/PCBs	515.4 Herbicides	524.2 VOCs	525.2 SOCs-Pest	531.1 Carbamates	547 Glyphosate	548.1 Endothall	549.2 Diquat	524.2 TTHMs	552.2 HAA5s	Lead/Copper	Nitrate	Nitrite	Fluoride	Inorganics	Alk./Lang. Index	TOC, DOC (Circle)	SUVA, UV 254 (Circle)	XTRS	Gross Alpha/Beta	Radium 226	Radium 228	Radon	Uranium
8/25/14	6:30 PM	R.O CONCENTRATE	1	—																					X					

PHASE I, II, V Drinking Water Analyses (check analysis) | Subcontract Analyses

Instructions:

C/S Info: Delivered Via: Hand C/S Charge ☐

Seals Present Yes ☐ No ☒ Headspace Yes ☐ No ☐

Temp. 17 °C /Ice NO Sample Pres. Yes ☐ No ☒

Relinquished By:	Date/Time:	Received By:	Date/Time:	Relinquished By:	Date/Time:	Received By:	Date/Time:
[signature]	8/26/14 0950	[signature]	8/26/14 1053				

TZA Water Engineers
a Lamp Rynearson Company

12596 W. Bayaud Ave., Ste. 330
Lakewood, Colorado 80228
303-971-0030
Tza4water.com

MEMO

TO: Lisa Johnson, District Manager

FROM: Bradley A. Simons, P.E.

DATE: September 5, 2014

RE: Greatrock North Water and Sanitation District Water Planning

PROJECT NO.: 0414018

CC: Chris Sanchez, Bishop-Brogden Associates

At the September 2, 2014 meeting of the Board of Directors, I was asked to review the Water Resources Master Plan, dated November 2012 and prepared by Olsson Associates, and identify the quantity of water the District will need at the buildout of the existing and currently planned subdivisions. Those subdivisions include:

- Box Elder Creek Ranch, Filings No. 1 through 3, inclusive
- Box Elder Creek Ranch, Filing No. 4
- Greatrock North
- Hayesmount Estates
- Homestead Heights
- Ridgeview Estates
- Rocking Horse Farms

Based upon information contained in the 2012 Master Plan, the projected future demand is 209 acre-feet per year. Based upon historical operations, approximately 66 percent of the water supply originates from the alluvial wells, with the remaining water originating from the Upper Arapahoe wells. To meet the projected future demand and account for water wasted (i.e. concentrate) from the reverse osmosis treatment process, a total of 231 acre-feet of source water is required. This would result in approximately 153 acre-feet of alluvial water and approximately 78 acre-feet of Upper Arapahoe water.

TZA Water Engineers
a Lamp Rynearson Company

12596 W. Bayaud Ave., Ste. 330
Lakewood, Colorado 80228
303-971-0030
Tza4water.com

The 2012 water balance is tabulated below:

Component	Amount (gallons)	Amount (acre-feet)
Upper Arapahoe Wells	25,462,806	78
Alluvial Wells	49,829,276	153
RO By-pass from Alluvial Wells	20,549,446	
RO Feed from Alluvial Wells	29,279,830	
RO Concentrate	7,319,958	22
RO Permeate	21,959,873	
Storage/Distribution	67,972,125	209

A review of the August 2013 through July 2013 water usage indicates the 2012 projections are conservative and overstate the potable water demands. The water usage during the most recent review period indicates the project future demand is more likely 181 acre-feet per year. To meet this projected future demand and account for water wasted (i.e. concentrate) from the reverse osmosis treatment process, a total of 200 acre-feet of source water is required. This would result in approximately 132 acre-feet of alluvial water and approximately 68 acre-feet of Upper Arapahoe water.

The 2013/2014 water balance is tabulated below:

Component	Amount (gallons)	Amount (acre-feet)
Upper Arapahoe Wells	22,033,539	68
Alluvial Wells	43,118,393	132
RO By-pass from Alluvial Wells	17,781,898	
RO Feed from Alluvial Wells	25,336,495	
RO Concentrate	6,334,124	19
RO Permeate	19,002,372	
Storage/Distribution	58,817,808	181

Should you have any questions, please contact me at 303-971-0030.