

Nelson, Dan

From: Bryan Reiter [bryanreiter@pmt.org]
Sent: Thursday, March 31, 2016 3:54 PM
To: Nelson, Dan
Subject: RE: Water right 45-13411

Dan,
This message was sent earlier with a 7 MB attachment. We will mail three copies of the attachment also, in case your email server won't let that message size through. Thanks.
Bryan Reiter
City of Burley

From: Bryan Reiter [mailto:bryanreiter@pmt.org]
Sent: Thursday, March 31, 2016 3:39 PM
To: 'Nelson, Dan'
Subject: RE: Water right 45-13411

Dan,
Thanks for the email and for speaking with me on the phone earlier today. Attached is information as requested. I will send three copies of the information to you via the US Postal Service today. We will mail this data to :

Idaho Department of Water Resources
Attn: Daniel A. Nelson, Staff Hydrologist
322 East Front Street
P.O. Box 83720
Boise, Idaho 83720-0098

Please contact me with any questions or if you need any additional information. Thanks.

Bryan Reiter
City of Burley

From: Nelson, Dan [mailto:Dan.Nelson@idwr.idaho.gov]
Sent: Thursday, March 31, 2016 7:43 AM
To: Bryan Reiter
Subject: RE: Water right 45-13411

Hello Bryan,

I apologize for not answering your email yesterday. I have been training staff all week, so I have been in meetings almost all week.

Thank you for the updates on the map. I checked our maps and database information, and I agree with the corrections you made on the map. I will make sure they are corrected in the final documentation.

As for the Peak Hour Demand, of the system, I would say we would like to see both the diversions from the culinary wells to the storage tanks, and the booster pumps from the storage tanks. Then we would need to add that onto the irrigation demand to find a total demand for the system before storage and after storage. The reason I would include both is to show that the storage allows a buffer to allow adequate water supply during the peak time. We are looking for an analysis of the amount of water your systems needs to operate properly. The following is a example of the

conclusion of your date using phony numbers for the ease of showing the total diversion capacity needed for your system:

The system has a maximum culinary well capacity of 5,000 gpm that is diverted into storage tanks. The peak culinary use is actually 7,500 gpm, but is only needed for approximately 4 hours per day. The storage tanks are used to supply the additional water that cannot be supplied by the culinary wells during the peak hours of use. The irrigation wells are generally used in the early hours at approximately the same time the peak use on the culinary system. The irrigation use requires a flow rate of 2,500 gpm to operate all of the systems at the same time. As stated on our Snake River Basin Adjudication decrees, we can incorporate some of the irrigation wells into our culinary system if needed for emergencies. Therefore, our Peak use is 10,000 gpm, and our Peak Well Diversions are 7,500 gpm when the culinary uses and the irrigation uses are combined. The following documentation shows how those numbers were attained.

By showing both the before and after storage numbers, you are providing us with valuable information showing the need for the flow rates you are requesting in the permits. In my limited experience, most system use storage units to ease the pressure on the well pumps during those peak flow periods.

I hope this helps. If you have any further questions, I would be more than happy to work with you to provide any assistance that I can.

Daniel Nelson
Staff Hydrologist
Idaho Department of Water Resources
Telephone (208) 287-4856
Fax (208) 287-6700 (attn: Dan Nelson)

From: Bryan Reiter [<mailto:bryanreiter@pmt.org>]
Sent: Wednesday, March 30, 2016 4:41 PM
To: Nelson, Dan
Subject: RE: Water right 45-13411

Dan,
I need to verify one last item. For our potable/culinary water component, do you want the peak hour that the wells are delivering to the water tanks and water system (Peak Hour for water out of the ground by well pumps)? Or do you want the peak hour that the water system is using (Peak Hour for delivered water by booster pumps)? I have both calculated and want to make sure which number is appropriate for the water right calculations. Thanks for your help.
Bryan Reiter
City of Burley

From: Bryan Reiter [<mailto:bryanreiter@pmt.org>]
Sent: Wednesday, March 30, 2016 2:18 PM
To: 'Nelson, Dan'
Subject: RE: Water right 45-13411

Dan,
I am reviewing the information requested about water right 45-13411. In the letter you asked about verification of the map. I have attached a marked up map with two revisions that I noticed.

One, POD #10, Almo Well, formerly IRR-3, tag #A0002613 is not shown on the map. It is located in the southwest corner of 19th and Almo.

Two, the tag number for the Salmon well is A0002615, rather than A00026145.

I am gathering the peak hour flow information you requested and will be forwarding that to you shortly. Thanks.

Bryan Reiter

City of Burley

From: Nelson, Dan [<mailto:Dan.Nelson@idwr.idaho.gov>]

Sent: Tuesday, February 02, 2016 10:30 AM

To: Bryan Reiter

Subject: FW: Water right 45-13411

Hello Bryan,

I apologize for not getting this email to you yesterday. Per our telephone conversation on January 29, 2016, the Department will allow you until March 31, 2016 to supply the information needed to license water right 45-13411 and 45-7686. I do appreciate you working on these issues. If you have any further questions or need anything from me, please don't hesitate to contact me.

Respectfully,

Daniel Nelson

Staff Hydrologist

Idaho Department of Water Resources

Telephone (208) 287-4856

Fax (208) 287-6700 (attn: Dan Nelson)

From: Nelson, Dan

Sent: Monday, January 25, 2016 1:45 PM

To: 'Bryan Reiter'

Subject: RE: Water right 45-13411

Bryan,

That works fine. I will be in meetings after 2:30 Monday, I will be out of the office all day Tuesday. I will have meetings all day Wednesday and all morning Thursday. I will be available all day Friday. I hope these dates help.

Dan Nelson

From: Bryan Reiter [<mailto:bryanreiter@pmt.org>]

Sent: Friday, January 22, 2016 6:43 PM

To: Nelson, Dan

Subject: RE: Water right 45-13411

Dan,

Sorry I missed calling you this week. I will call you on Monday.

Bryan Reiter

City of Burley

From: Nelson, Dan [<mailto:Dan.Nelson@idwr.idaho.gov>]
Sent: Friday, January 15, 2016 9:10 AM
To: Bryan Reiter
Subject: RE: Water right 45-13411

Bryan

That sounds good. I look forward to your call.

Dan

From: Bryan Reiter [<mailto:bryanreiter@pmt.org>]
Sent: Friday, January 15, 2016 9:07 AM
To: Nelson, Dan
Subject: RE: Water right 45-13411

Daniel,
Thanks for your email. I would like to call you in the beginning of next week, if that works for you.
Bryan Reiter
City of Burley

From: Nelson, Dan [<mailto:Dan.Nelson@idwr.idaho.gov>]
Sent: Thursday, January 14, 2016 7:56 AM
To: Bryan Reiter
Subject: RE: Water right 45-13411

Hello Bryan,

I am sorry about getting taking so long to get back to you, but I have been out of the office for the last couple of weeks. Yes I can give you some additional time. I will need to get a date that you can supply the information, but we can wait until after we speak about what is needed before setting a new deadline to submit the information needed.

Would you like to speak by telephone, or would you like me to drive down and meet with you in person? Except for a couple of meetings, I should be available for a telephone call today and tomorrow. If you want to meet, I will have to schedule sometime next week. I currently have Tuesday, Thursday, and Friday available next week to drive down and meet with you. Please let me know what will work best for you.

Thank you for your response.

Daniel Nelson
Staff Hydrologist
Idaho Department of Water Resources
Telephone (208) 287-4856
Fax (208) 287-6700 (attn: Dan Nelson)

From: Bryan Reiter [<mailto:bryanreiter@pmt.org>]
Sent: Tuesday, January 12, 2016 3:55 PM
To: Nelson, Dan
Cc: David Shirley
Subject: Water right 45-13411

Mr. Nelson,

Thank you for the attached letter concerning water right 45-13411. I would like to request additional time, beyond the 30 days mentioned in the letter, to address your request. I would like to speak with you concerning this information request. We have great information from our potable water wells because they are tracked in our SCADA system. Because of this, we have a Peak Hour Demand established for this portion of our water system. However, our wells currently used to deliver water to the low pressure irrigation system have only monthly readings, without better data for "instantaneous" usage. Can you contact me when you are able to determine the best course of action? Thanks.

Bryan Reiter
City of Burley
1559 Albion Avenue
P.O. Box 1090
Burley, Idaho 83318
Phone (208) 878-2103
Fax (208) 878-5950

Summary of Peak Instantaneous Demand (PDI)

Description	Peak Instantaneous Flow to Water System		Peak Instantaneous Flow from the Ground	
	PDI (gpm)	Notes	PDI (gpm)	Notes
Potable Water (POD's 2 - 7)	9,924	Booster pumps supplying water system from water tanks (Staff has observed ±9,500 gpm previously) (During a non-fire situation)	10,500	All well pumps on simultaneously (Occurs regularly)
Non-Potable Water (POD's 1, 8 - 15, 17 - 19)	5,313	All irrigation pumps on simultaneously (Occurs occasionally)	5,313	All irrigation pumps on simultaneously (Occurs occasionally)
Single, Largest Fire Demand	4,500	Assuming one fire demand at a time	0	Tank Capacity Used to Supply This Demand
Totals	19,737		15,813	

SECTION 1
Potable Water Calculations

6,297 gpm AVERAGES PEAK HOUR FLOW ESTIMATE
FOR 2008 POTABLE WATER
(FROM SECTION 4)

6,945 gpm 2012 ~~PEAK~~ HOUR FLOW

$$\frac{6297}{6945} \Rightarrow 90.67\% \text{ FACTOR}$$

5,473 gpm MAX DAY IN 2012

X 90.67%

4,962 gpm ESTIMATED MAX DAY IN 2008

X 2.0 FACTOR MAX DAY TO INSTANTANEOUS PEAK
FACTOR FROM DRAPER CITY
DRINKING WATER SYSTEM MASTER PLAN

9,924 gpm	ESTIMATED 2008 BURLEY PEAK INSTANTANEOUS DEMAND (POTABLE WATER)
-----------	---

BASED ON 2012 WATER USAGE

Table ES.1: Existing System Demands

	Gallons per Capita per Day (gpcd)	Gallons per Minute (gpm)
Average Winter Day	192	1,407
Average Annual Day	292	2,139
Average Summer Day	450	3,297
Max Day	747	5,473
Peak Hour	948	6,945

ES.4 POPULATION AND WATER DEMAND PROJECTIONS

Burley's historical and projected population is illustrated in Chart ES.1. Table ES.2 shows future populations and assumed rates of growth. Future demands were calculated assuming an annual growth rate of 1.0% as selected by the City for the purpose of this planning study. This is above the 0.64% average over the last four decades, but is reasonable for the growth that Burley may see throughout the next twenty years. This growth rate results in 2022 and 2032 populations of 11,660 and 12,890 people, respectively.

Throughout the study, Keller Associates has attempted to tie growth-related capital improvements to a population benchmark. Future demands are presented in Table ES.5.

Table ES.2: Historical and Future Populations

	Year	Population	Compound Annual Growth Rate
Historical Census Data	1960	7,508	-
	1970	8,279	0.98%
	1980	8,761	0.57%
	1990	8,702	-0.07%
	2000	9,316	0.68%
	2010	10,345	1.05%
Projected Data	2012	10,550	1.00%
	2014	10,770	1.00%
	2024	11,900	1.00%
	2034	13,150	1.00%
	2044	14,520	1.00%
	2054	16,050	1.00%



DRAPER CITY

DRINKING WATER SYSTEM MASTER PLAN

(HAL Project No.: 160.08.100)

October 2008

**HANSEN
ALLEN
& LUCE^{INC}**
ENGINEERS

GLOSSARY OF TECHNICAL TERMS

Average Daily Flow: The average yearly demand volume expressed in a flow rate.

Average Yearly Demand: The volume of water used during an entire year.

Build-out: When the development density reaches maximum allowed by planned development.

Demand: Required water flow rate or volume.

Distribution System: The network of pipes, valves and appurtenances contained within a water system.

Drinking Water: Water of sufficient quality for human consumption. Also referred to as Culinary or Potable water.

Dynamic Pressure: The pressure exerted by water within the pipelines and other water system appurtenances when water is flowing through the system.

Equivalent Residential Connection: A measure used in comparing water demand from non-residential connections to residential connections.

Fire Flow Requirements: The rate of water delivery required to extinguish a particular fire. Usually it is given in rate of flow (gallons per minute) for a specific period of time (hours).

Head: A measure of the pressure in a distribution system that is exerted by the water. Head represents the height of the free water surface (or pressure reduction valve setting) above any point in the hydraulic system.

Headloss: The amount of pressure lost in a distribution system under dynamic conditions due to the wall roughness and other physical characteristics of pipes in the system.

Peak Day: The day(s) of the year in which a maximum amount of water is used in a 24-hour period.

Peak Day Demand: The average daily flow required to meet the needs imposed on a water system during the peak day(s) of the year.

Peak Instantaneous Demand: The flow required to meet the needs imposed on a water system during maximum flow on a peak day.

Pressure Reducing Valve (PRV): A valve used to reduce excessive pressure in a water distribution system.

Pressure Zone: The area within a distribution system in which water pressure is maintained within specified limits.

**TABLE I-2
DESIGN FLOW SUMMARY ¹**

DEMAND	DEMAND PER ERC	TOTAL EXISTING DEMAND	TOTAL BUILD-OUT DEMAND	FLOW RATIO
Average Day	0.56 gpm	2,400 gpm	8,000 gpm	1.0
Peak Day	1.28 gpm	5,400 gpm	18,300 gpm	2.3
Peak Instantaneous	2.56 gpm	10,800 gpm	36,600 gpm	4.6

← 2X
↓ FACTOR

1. Average for all pressure zones

CHAPTER V

DISTRIBUTION SYSTEM

EXISTING DISTRIBUTION SYSTEM

The distribution system consists of all pipelines, valves, fittings, and other appurtenances used to convey water from the water sources and storage tanks to the water users. The existing water system contains over 60 miles of distribution pipe ranging in size from 6 to 30 inch diameter. Four main pressure zones exist currently—Zone 1 is the lowest in elevation and Zone 4 is the highest. Several subzones exist that are separated from the tanks by PRVs. The existing distribution system is shown on Figure I-1.

EXISTING DISTRIBUTION SYSTEM REQUIREMENTS

DDW requires that the distribution system be able to maintain 20 psi at all points in the system under peak instantaneous conditions and under peak day plus fire flow conditions. The City further prefers that the distribution system maintain pressures between **50 and 150 psi** at all points in the system under normal operating conditions, including Peak Instantaneous, Peak Day, and Average Day.

Existing Peak Instantaneous Demand

Peak instantaneous demand is the highest demand on the peak day. The pipes in the distribution system must be large enough to convey the peak instantaneous demand while maintaining a pressure between 50 and 150 psi. The peaking factor from the peak day average flow to peak instantaneous flow was estimated to be 2.0 on the peak day of July 17, 2007 (see Figure III-4). Applying this peaking factor of 2.0 to the peak day demand gives a total existing peak instantaneous demand of **10,800 gpm**.

Existing Peak Day Plus Fire Flow Demand

In accordance with DDW regulations, the distribution system must be capable of delivering fire flow to a specified location within the system while supplying the peak day demand to the entire distribution system and maintaining 20 psi minimum pressure at all delivery points within the distribution system. After discussions with the Unified Fire Authority the City decided that **40 psi** would be used as the minimum pressure instead of 20 psi. A minimum fire flow demand of **2,000 gpm** or more is required for all demand nodes in the system. Larger fire flows are required at larger structures throughout the system based on the International Fire Code and recommendations from the Unified Fire Authority. The highest fire flow required in each zone is presented in Table IV-3. Existing peak day demand, which fire flow is run with, is discussed in Chapter III and existing peak day demand for each pressure zone is presented in Table III-3.

BUILD-OUT DISTRIBUTION SYSTEM REQUIREMENTS

The same requirements for the existing system are required for the projected build-out. DDW requires the distribution system be able to maintain 20 psi at all points in the system under first, peak instantaneous conditions and second, peak day plus fire flow. Again, the City further prefers that the distribution system maintain a pressure between 50 and 150 psi at all points in the system under peak instantaneous conditions and 40 psi during fire flow conditions.

The associated water right is 1,795 gpm (4 cfs). The City recently acquired ownership of this well as a possible new supply to serve development west of the City's system. There is only one well on the Dutchmen site that the City is allowed to run. Further permissions would be needed to run the second private well should the City-owned well go down for some reason. Water quality is reportedly good, with no violations, but nitrates are a concern (max=7.4 ppm, MCL = 10 ppm). Treatment would likely be necessary.

3.2.2 Supply Condition Evaluation

The pumps at Wells 4 and 5 are old and components are approaching their useful life. The City has not reported any significant condition-related problems, but it is recommended that the City begin planning for pump replacements as part of the O&M budget.

3.2.3 Supply Capacity Evaluation

Table 3.1 summarizes the pumping capacity of each of the City's wells and the water rights associated with the potable water system. Municipal water rights have been consolidated for all points of diversion (POD), except Wells 6 and 7, to allow city-wide diversion and use. The total diversion rate for the City's municipal water rights far exceeds the maximum day demand for the system for the 20-year planning period. Water right, POD, and point of use (POU) information was retrieved from the Idaho Department of Water Resources' database, and is reproduced in Appendix B.

Table 3.1: Burley Well Supply Capacity Summary

Well Name	Pumping Capacity (gpm)	Associated Water Right(s)*	Standby Power
Well 2	1,400	27.0 cfs (pooled)	No
Well 3	1,100		No
Well 4 (North Zone)	1,100		Yes
Well 5	1,400		Yes
Well 6	2,000	4.46 cfs	No
Well 7	3,500	7.8 cfs	Yes
TOTAL	10,500 gpm	39.26 cfs*	

* All well water rights are being pooled to allow city-wide diversion and use.

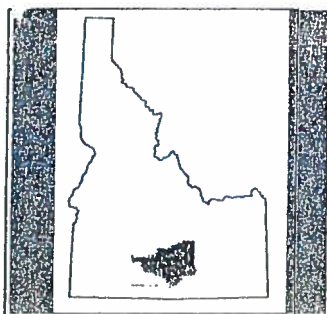
Table 3.2 summarizes the system's total firm capacity (largest well offline) and the estimated supply shortfall, relative to max day demand (Table 2.8).

→ THIS IS THE PEAK DEMAND FOR WATER BEING
 PULLED OUT OF THE GROUND
 (POTABLE WATER)

SECTION 2
Non-Potable Water Calculations

2007 Newly Assigned Point of Diversion Number	IDWR Site Metal Tag Number	Previously Known as Well Number (If Any)	Pumping Rate (gpm)	Reference Name	Address	County	Additional Information
1	E0007518	IRR-12	414	Pumphouse #12 - 100 HP (Old Potable Well #1)	16th and Albion/Normal (Water Dept)	Cassia	East well in water department building
8	A0002618	IRR-1	286	Pumphouse #1 (15 HP)	16th and Albion/Normal (Water Dept)	Cassia	West well in water department building
9	A0002617	IRR-2	693	Hogan (Old Potable Well #2)	16th and Hansen/Normal	Cassia	
10	A0002613	IRR-3	521	Almo	19th and Almo	Cassia	
11	A0002614	IRR-4	570	Carlson	19th and Occidental	Cassia	
12	A0002616	IRR-5	393	Keller	16th/17th and Burton/Conant	Cassia	
13	A0007810	IRR-6	482	Drake	11th and Occidental/Park	Cassia	
14	A0007809	IRR-7	271	Larson	8th and Burton/Schodde	Cassia	
15	A0007808	IRR-8	435	North Park	9th/10th and Oakley/Miller	Cassia	
17	A0007807	IRR-9	626	Snow	9th and Normal	Cassia	
18	A0002619	IRR-10	207	Fairgrounds	10th and Elba (NW corner of fairgrounds)	Cassia	
19	A0002615	IRR-11	415	Salmon Park	18th/19th and Park	Cassia	

5.313 Peak Hour flow for Non-Potable Water Pumped (Water Department Employees Reported Periods (Weeks) Where All Pumps Were Running)



STATE OF IDAHO
WEST ESPA WATER MEASUREMENT DISTRICT
C/O IDAHO DEPARTMENT OF WATER RESOURCES
1341 FILLMORE ST STE 200
TWIN FALLS ID 83301-3380
TELEPHONE NUMBER (208) 736-3033

IDWR DIRECTOR
KARL J. DREHER

September 25, 2006

City of Burley
C/O Bryan Reiter Water Dept. Supervisor
PO Box 1090
Burley ID. 83318

Dear Bryan:

The following report has been put together for your review and records in which calibration work done on your low-pressure irrigation wells were performed. Measurement requirements outlined by the Department of Water Resources in which flow meter methods are used to determine volume pumped from the ground require the calibration work performed by a standard meter. The meters used to perform the measurements on the low-pressure wells were a Tyme Flight Polysonics instrument that has a calibration date of 4/2006 and a Fuji portaflo with a calibration date of 4/2006. Both instruments tested out to be within guidelines outlined by IDWR water measurement standards.

Of the 11 irrigation wells that the City Water Department operates I was able to perform calibration work on all 11 wells.

Along with the calibration work I performed I identified three of the 11 meters that need to either be replaced or repaired. The measurement criteria allow for a $\pm 10\%$ difference between the permanently installed meter and the standard meter used to do the calibration work. The results are as follows:

→ ASSUME FLOW RATES MEASURED DURING PEAK EVENT (PROBABLY TOO CONSERVATIVE)

Well	Date Test was performed	Permanently Installed Meter GPM	Ultrasonic Standard meter GPM	% Error
ALMO WELL	8/04/2006	794 GPM	520.7 GPM	+52.0
PUMPHOUSE #2	8/04/2006	483 GPM	414 GPM	+16.6 %
N. PARK WELL	8/08/2006	450.6 GPM	434.6 GPM	+3.68 %
Pump House #1	8/09/2006	293.6 GPM	285.9 GPM	+2.69%
HOGAN Well	8/09/2006	689.3 GPM	693.3	-0.57%
KELLER Well	8/04/2006	390 GPM	393 GPM	-0.76%
Fairgrounds Well	8/04/2006	200 GPM	207 GPM	-3.38%
Snow Well	8/08/2006	600 GPM	626 GPM	-4.16%

CARLSON Well	8/08/2006	545.4 GPM	569.7 GPM	-4.26%
DRAKE Well	8/03/2006	451.3 GPM	481.6 GPM	-6.29%
LARSON WELL	8/08/2006	223.1 GPM	271.2 GPM	-17.73

The city has four other irrigation wells that are operated by either the Parks Dept. or the Pleasant View Cemetery. Following is the list of wells, the test results and other comments. Three of these diversions need measurement device work.

Well	Inspection or Measurement Date	Permanently Installed Meter GPM	Ultrasonic Standard meter GPM	% Error/ or remedy
Pleasant view Cem. East Well	8/08/2006	173.1 GPM	151.3 GPM	+14.4%
Pleasant View Cem. West Well	8/08/2006	N/A	217.4	TIMECLOCK installed; no further action needed.
Salmon Park Well	415 gpm was measured by Water Well Consultants in 2015 (per Adam McCoy on 03/30/2016)			Need to be able to get Measurement on Well to determine Remedy
Golf Course South of Road Well	8/08/2006			Unable to get Measurement due to well surging

Red Text = meters that need to be worked on

Black Text = meters that are within the measurement guidelines

I was able to contact Brent Winn about the Golf course south well but couldn't get a measurement due to the well surging. This was a problem back in October of 2003 when Corbin Knowles attempted to do a calibration. In order for the permanently installed flow meter to work properly the pipe has to stay full all of the time. A butterfly valve was installed last fall I believe, but there was some misunderstanding on to the placement of the valve. Mr. Winn has been so kind as to say he will move it or install a new one further down the pipe at the end of the season.

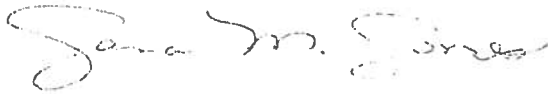
The cities deep culinary wells were all within the 10% compliance. The results are as follow:

WELL	DATE	INSTALLED METER GPM	ULTRASONIC METER GPM	%ERROR OR REMEDY
CULINARY #4	8/30/06	1136.3 GPM	1109.6 GPM	+2.14%
CULINARY #3	8/09/06	1100 GPM	1052.8 GPM	+4.48%
CULINARY #2	8/09/06	1194.4 GPM	1274.6 GPM	-6.29%
CULINARY #6	8/30/06	1970.4 GPM	2150 GPM	-8.35%
CULINARY #5	8/30/06	1773.3 GPM	1950.6 GPM	-9.08%

These changes or repairs on the irrigation wells, needs to be accomplished before irrigation resumes in 2007. At that time IDWR staff will return and confirm the repairs and retest the systems. If you have questions or concerns about what needs to take place please call me or contact me at the above address and or telephone number or contact Corbin Knowles in Boise at 208-287-4800.

Thanks again to you and your staff for their time and availability.

Sincerely,

A handwritten signature in cursive script, appearing to read "Jana M. Jones".

Jana M. Jones
Summer Field Examiner
IDWR

CC Corbin Knowles

SECTION 3

Fire Demands

Needed Fire Flows for P Code 043 | BURLEY

Stories	N.F.F.	PPC & W	OWNER	Address	
1	4,500	05 I-1	BURLEY SCHOOL DIST NO 151	OVERLAND RD	BURLEY
1	4,500	05 I-1	BURLEY SCHOOL DIST NO 151	OVERLAND RD	BURLEY
1	4,500	09	WAYNE JOHNSON	720 MINIDOKA AVE	BURLEY
There are(is) 3 in this group					
1	4,000	03	WILSON BATES	2560 OVERLAND AVE	BURLEY
2	4,000	04 I-1	COLLEGE OF SOUTHERN IDAHO	1600 PARKE AVE	BURLEY
There are(is) 2 in this group					
1	3,500	03	AMALGAMATED SUGAR COMPANY	8th & PARKE AVE	BURLEY
2	3,500	03	RACQUETTERS	1150 E 16TH ST	BURLEY
2	3,500	03	SKAGGS FURNITURE	135 149 E 23RD ST	BURLEY
2	3,500	03	BURLEY SCHOOL DISTRICT	700 W 16TH ST	BURLEY
There are(is) 4 in this group					
2	3,000	03	BURLEY INN INC	800 N OVERLAND AVE	BURLEY
1	3,000	03	CHRISTIANSSEN EQUIPMENT	111 OVERLAND	BURLEY
1	3,000	03	SILVER THORN PROPERTY	513 NORMAL AVE	BURLEY
1	3,000	03	BURLEY SCHOOL DISTRICT	333 W 27TH ST	BURLEY
1	3,000	03 P-1	MH KING COMPANY	811 839 ALBION AVE	BURLEY
There are(is) 5 in this group					
1	2,500	03	SPENCER LEE & JONES BUILDING	1340 1358 OVERLAND AVE	BURLEY
1	2,500	03	BELLISTON BROTHERS APIARIES	915 W 13TH ST SOUTH	BURLEY
1	2,500	03	TS DESIGNS INC	945 W 13TH ST	BURLEY
1	2,500	03	TS DESIGNS INC	945 W 13TH ST	BURLEY
1	2,500	03 W-1	M.H. KING COMPANY	1100 MILLER AVE	BURLEY
1	2,500	09	LITTLE ROCK, INC.	448 HWY 27 SOUTH	BURLEY
1	2,500	03	BURLEY LIVESTOCK COMMISSION	1100 OCCIDENTAL AVE	BURLEY
There are(is) 7 in this group					
2	2,250	03	GOODE MOTORS	1096 E MAIN ST	BURLEY
2	2,250	03	ADVANCE WELDING AND IRON WOR	915 OVERLAND AVE	BURLEY
2	2,250	03	MAYFAIR & CELLAR	1258 OVERLAND AVE	BURLEY
1	2,250	03	SWENSEN'S MARKET	1555 OVERLAND AVE	BURLEY
1	2,250	03	OTIS WILLIAMS BUILDING	2159 2181 OVERLAND AVE	BURLEY
There are(is) 5 in this group					
1	2,000	03	YOUNG AUTOMOTIVE GROUP INC	411 OVERLAND AVE	BURLEY
1	2,000	09	STREAMLINE PRECISION LLC	120 S 100 W	BURLEY
1	2,000	03	K C JONES	119 W 26TH ST	BURLEY
1	2,000	03	EZ MONEY AUTO	150 OVERLAND AVE	BURLEY
1	2,000	03	BURLEY INN INC BUDGET INN	900 N OVERLAND AVE	BURLEY
2	2,000	03	BONANZA MOTORS	333 OVERLAND AVE	BURLEY
1	2,000	03	STOKES FOOD CENTER	539 OVERLAND AVE	BURLEY
2	2,000	03	KIM HANSEN	1221 W MAIN ST	BURLEY
1	2,000	03	ASIAN BUFFET	2444 2450 OVERLAND AVE	BURLEY
1	2,000	03	GUADALAJARA RESTAURANT	262 OVERLAND AVE	BURLEY
There are(is) 10 in this group					
1	1,750	03	BURLEY INN INC BUDGET INN	900 N OVERLAND AVE	BURLEY
1	1,750	03	CRAWFORD'S AUTO BODY	1240 ALBION AVE	BURLEY
1	1,750	03 P-1	FLETCHER LAW	1200 OVERLAND AVE	BURLEY

SECTION 4
Potable Water System Peak Hour Calculations

2008 Peak Hour for Potable Water - Method #1

2007 Newly

Assigned

Point of

Diversion Number

IDWR Site

Metal Tag

Number

Reference Name

Address

14th and Albion

19th and Park (Service Center)

4th North and Oakley

Around 33rd, West of Hiland

Around 31st and Hiland

Around 11th and Hiland

2

E0007520

Potable Well #2

3

E0007519

Potable Well #3

4

A0004031

Potable Well #4

5

E0007521

Potable Well #5

6

D0002353

Potable Well #6

7

D0037120

Potable Well #7

County

Cassia

Cassia

Minidoka

Cassia

Cassia

Cassia

2008 Total

Gallons Pumped

87,316,000

2012 Total

Gallons Pumped

86,368,000

61,070,000

64,084,000

455,589,000

244,528,000

258,562,000

Annual Gallons Pumped

1,036,988,000

1,170,201,000

$$\frac{1,036,988,000}{1,170,201,000} \Rightarrow 88.62\%$$

6,945 Peak Hour Gpm in 2012
(From May 2015 Water Master Plan)

$$X \ 88.62\% = 6,154 \text{ gpm}$$

Estimated 2008
Peak Hour
METHOD #1

Year	Peak Hour (gpm)
2003	5,810 (actual)
2008	6,154 (calculated)
2012	6,945 (actual)

2008 PEAK HOUR FOR POTABLE WATER - METHOD #2

2003 Peak Hour Flow = 5,810 gpm

2012 Peak Hour Flow = 6,945 gpm

$$\frac{6,945 - 5,810}{(2012 - 2003)} \Rightarrow 126.11 \text{ gpm/year (Average)}$$

$$(2008 - 2003) \times 126.11 \text{ gpm} \Rightarrow 630 \text{ gpm (2003 to 2008 increase)}$$
$$+ 5,810 \text{ gpm}$$

METHOD #2

6,440 gpm Estimated in 2008

$$(2012 - 2008) \times 126.11 \text{ gpm} \Rightarrow 504 \text{ gpm (2008 to 2012 increase)}$$

6,945 gpm 2012 Peak Hour Flow

Average of method #1 & #2

$$\frac{6,154 + 6,440 \text{ gpm}}{2} \Rightarrow$$

6,297 gpm Averaged Peak Hour Flow Estimate for 2008 Potable Water

AVERAGE OF METHOD #1 & #2

→ THIS IS PEAK HOUR FOR BOOSTER PUMPS PROVIDING WATER TO THE WATER SYSTEM

Water System Master Plan

BASED ON 2003 WATER USAGE

1.0 - EXECUTIVE SUMMARY

1.1 Introduction

The City of Burley has undertaken this Water System Master Plan in order to evaluate the condition and capacity of their water system facilities. This master plan evaluates the existing system in regards to capacity, established standards and regulations and future conditions. Recommendations for improvements and upgrades necessary to solve existing problems, accommodate future conditions, and meet City objectives in regards to water supply, distribution and storage are presented.

1.2 Water System Requirements

Burley's present and future water needs depend on domestic consumption as well as institutional and commercial growth. The water system must have the capability to deliver potable water and fire protection at adequate pressures during the peak demand periods throughout the projected 20 year design period. This study entails a detailed analysis of the present water usage and projects the demands over the next twenty years.

1.2.1 Population Projections

Burley currently has a population of 9,316 and is expected to increase at a steady rate in the next 20 to 30 years. Data from the January 2003 Transportation Plan prepared by Keller Associates provided the basis for the population projections used in this study. In this plan, a 0.9% growth rate over the next 20 years was assumed, resulting in a population of 11,450 in 2023.

1.2.2 Water Consumption and Production

An analysis of the water production yielded the per capita Average Day Demand (ADD), Peak Day Demand (PDD), and Peak Hour Demand (PHD) for the residents of Burley. This analysis indicated that each person uses 290 gallons per capita per day (gpcd) of potable water on an average day, and 465 gpcd during the average summer day, which accounts for activities such as car washing and lawn irrigation in areas where the low pressure irrigation system is not available. Demand during the peak hour period reaches 5,810 gpm or an equivalent 900 gpcd. Future demands are illustrated in Table 1.1.

Based on 2012 Water Usage

Table ES.1: Existing System Demands

	Gallons per Capita per Day (gpcd)	Gallons per Minute (gpm)
Average Winter Day	192	1,407
Average Annual Day	292	2,139
Average Summer Day	450	3,297
Max Day	747	5,473
Peak Hour	948	6,945

ES.4 POPULATION AND WATER DEMAND PROJECTIONS

Burley's historical and projected population is illustrated in Chart ES.1. Table ES.2 shows future populations and assumed rates of growth. Future demands were calculated assuming an annual growth rate of 1.0% as selected by the City for the purpose of this planning study. This is above the 0.64% average over the last four decades, but is reasonable for the growth that Burley may see throughout the next twenty years. This growth rate results in 2022 and 2032 populations of 11,660 and 12,890 people, respectively.

Throughout the study, Keller Associates has attempted to tie growth-related capital improvements to a population benchmark. Future demands are presented in Table ES.5.

Table ES.2: Historical and Future Populations

	Year	Population	Compound Annual Growth Rate
Historical Census Data	1960	7,508	-
	1970	8,279	0.98%
	1980	8,761	0.57%
	1990	8,702	-0.07%
	2000	9,316	0.68%
	2010	10,345	1.05%
Projected Data	2012	10,550	1.00%
	2014	10,770	1.00%
	2024	11,900	1.00%
	2034	13,150	1.00%
	2044	14,520	1.00%
	2054	16,050	1.00%

SECTION 5
Water Master Plan System Evaluation

ES.5 SYSTEM EVALUATION

The scope of this study included both capacity and condition evaluations of the supply, delivery, and storage components. Keller Associates also evaluated the methods for water treatment.

ES.5.1 Well Supply

The water source for Burley is groundwater. The total pumping capacity of Burley's wells is 10,500 gpm. The Department of Environmental Quality (DEQ) requires that a system meet maximum day demands with the largest source out of service. This is referred to as the firm capacity, and for Burley this equates to 7,000 gpm, which is sufficient for existing maximum day demands. In order to supply future maximum day demands with the largest pump offline, the City would need an additional 2,500 gpm of pumping capacity by 2034 based on the current planning assumptions for growth and future industry.

The City's water rights of 39.26 cfs (17,600 gpm) are sufficient for the projected 20-year maximum day demand. A new point of diversion will be necessary for any future wells.

ES.5.2 Water Quality

The City has not reported any customer complaints for nuisance contaminants, which cause taste and odor problems.

ES.5.3 Storage

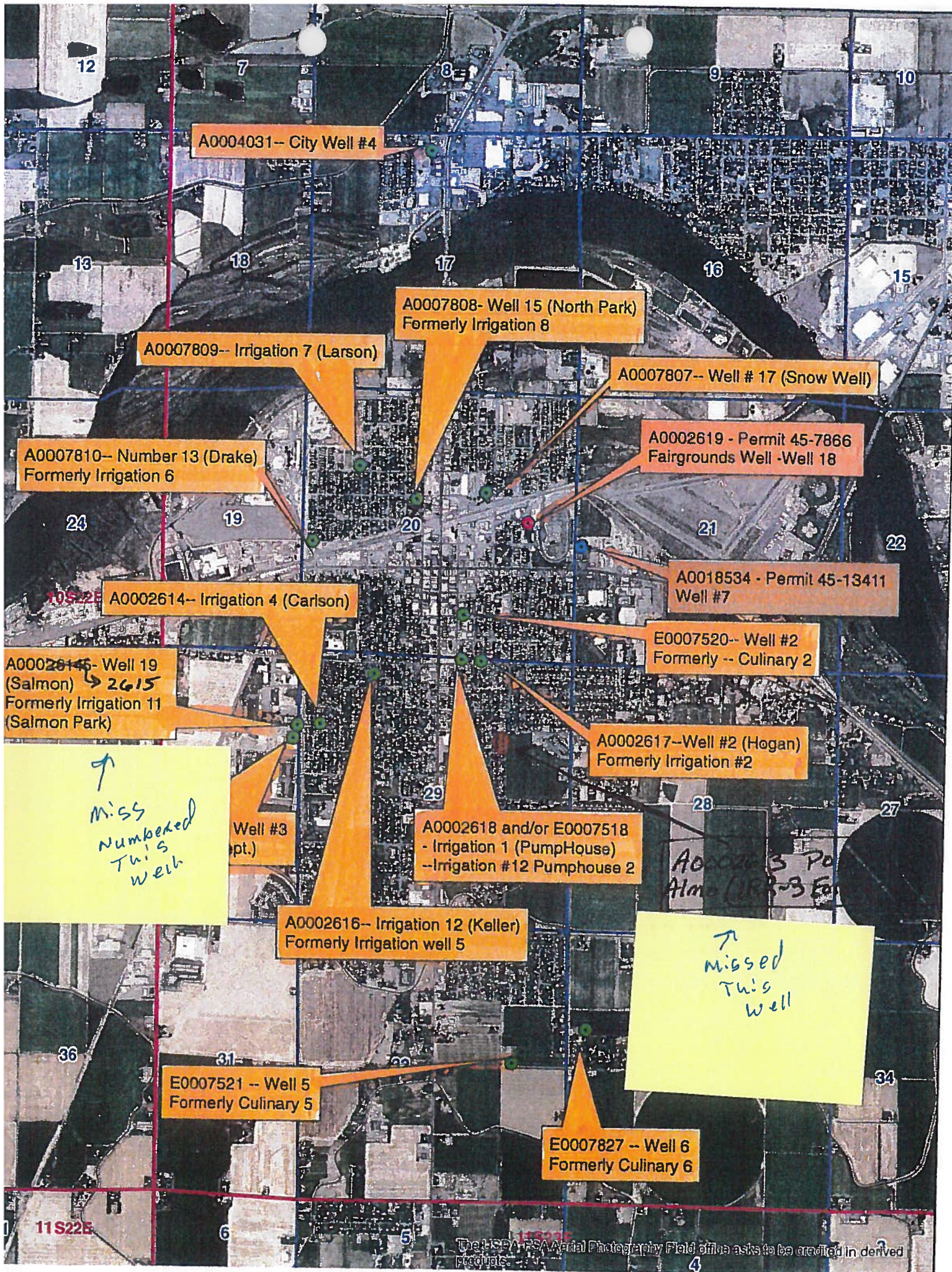
The City has three storage tanks with a capacity of 4.75 million gallons. The existing tanks will provide adequate storage volume for the next 20+ years.

ES.5.4 Booster Pump Stations

Most of the water is delivered from the City's storage reservoirs to their customers via three booster pump stations and two pressure zones separated by one pressure reducing/regulating valve (PRV). There are two wells which pump directly into the water system. The total pumping capacity of the booster pumps is 20,750 gpm. The firm capacity (with the largest pump off-line) is 16,750 gpm. DEQ requires that the system deliver the greater of peak hour demands or maximum day demands plus fire demands with the system's firm delivery capacity. Collectively, the booster pumps have adequate pumping capacity for existing and future max day demand plus fire flow for the total system. However, flow across the PRV is limited due to headlosses which restricts actual available flows in the north zone. Additional pumping capacity is recommended for the north zone booster station at Well 4.

ES.5.5 Distribution System Piping

An evaluation of the City's distribution piping is presented in Chapter 4. Several recommended improvements are presented in the master plan to correct existing deficiencies and accommodate future growth. One of the challenges of the existing distribution system is the large number of small pipelines. Approximately



A0004031-- City Well #4

A0007808- Well 15 (North Park)
Formerly Irrigation 8

A0007809-- Irrigation 7 (Larson)

A0007807-- Well # 17 (Snow Well)

A0007810-- Number 13 (Drake)
Formerly Irrigation 6

A0002619 - Permit 45-7866
Fairgrounds Well -Well 18

A0002614-- Irrigation 4 (Carlson)

A0018534 - Permit 45-13411
Well #7

A0002615- Well 19
(Salmon) **2615**
Formerly Irrigation 11
(Salmon Park)

E0007520-- Well #2
Formerly -- Culinary 2

A0002617--Well #2 (Hogan)
Formerly Irrigation #2

↑
Miss
Numbered
This
Well

Well #3
(pt.)

A0002618 and/or E0007518
- Irrigation 1 (PumpHouse)
--Irrigation #12 PumpHouse 2

A0002613 Po
Alma (RR-3 For

A0002616-- Irrigation 12 (Keller)
Formerly Irrigation well 5

↑
Missed
This
Well

E0007521 -- Well 5
Formerly Culinary 5

E0007827 -- Well 6
Formerly Culinary 6

11 S22E